CHAPTER - 5

FLORA OF HASTINAPUR WILDLIFE SANCTUARY

1. RANUNCULACEAE

Key to species:
1. Flowers white .......................................................... 3. *R. trichophyllus*
1. Flowers yellow .......................................................... 2
2. Plant body glabrous ...................................................... 2. *R. sceleratus*
2. Plant body hairy .......................................................... 1. *R. cantoniensis*

Annual, erect, hairy herbs. Radical leaves 3-foliate. Flowers light yellow, solitary. Achenes in globose or oblong heads, compressed, shortly beaked, receptacle pilose. **Flowering and fruiting**: March - December. Occurs on moist sandy soil on the banks of Ganga and other moist localities. Unlike *R. sceleratus* this species is not found in aquatic habitats. Sweta 787.


A white-flowered, aquatic herb. Included on authority of Murty & Singh (1961b). **Note**: According to Rau (1993) this species is a denizen of high altitudes occurring between 3500-4500 m, therefore, its occurrence at Hastinapur Wildlife sanctuary is doubtful.

2. ANNONACEAE

Key to Genera:
1. Large straight trees; leaves with undulated margins; flowers in large drooping panicles; fruiting carpels stalked .......... 2. *Polyalthia*
2. Small trees or shrubs; leaves with entire margins; flowers on short branchlets; fruiting carpels not stalked. 1. **Annona**

### 1. **ANNONA** L.


Evergreen shrubs or small trees. Leaves up to 10.0 cm long, oblong-lanceolate or elliptic. Flowers solitary, yellowish-green. Fruits globosely, pulp white. Seeds black, polished.

**Flowering and fruiting:** Commonly planted in orchards and kitchen gardens for the sake of delicious fruits. Sweta 957.

### 2. **POLYALTHIA** Blume


A tall straight, evergreen tree with long pendulous branches. Leaves lanceolate, margins undulate. Flowers in pendulous panicles. Fruiting carpels stalked, purple on ripening.

**Flowering and fruiting:** April-June. Commonly planted as an avenue tree. Sweta 958.

### 3. MENISPERMACEAE

#### KEY TO GENERA:

1. Large climbers with aerial roots; stems with numerous lenticels; leaves cordate; flowers appearing before the leaves. 1. **Tinospora**

2. Slender climbers, aerial roots absent; stems without or with few lenticels; flowers appearing with the leaves. 2

3. Leaves peltate; filaments united; carpel solitary. 2. **Cissampelos**

4. Leaves not peltate; filaments free; carpels. 3. **Cocculus**

#### 1. **CISSAMPELOS** L.

*Cissampelos pareira* L. Sp. Pl. 1031. 1753.


Slender, twining, dioecious herbs. Leaves peltate, alternate, orbicular or reniform, cordate or truncate at base, apiculate, hairy. Flowers greenish-yellow; male flowers in axillary cymes; female flowers in pendulous racemes. Male bracts linear. Female bracts ovate-cordate to
reniform. Drupe subglobose, red when ripe. **Flowering and fruiting:** June-November. Common among the hedges. Sweta 300.

2. **COCCULUS DC. nom. cons.**


Scandent, dioecious shrubby-herbs. Leaves alternate upto 5.0 cm long, ovate-oblong, cordate-lanceolate or subdeltoid. Flowers small, yellowish-green. Male flowers in axillary, cymose panicles; female flowers in axillary clusters. Drupes smooth, reddish-purple. Seeds transeversely rugose, black. **Flowering and fruiting:** August- June. Common throughout the Sanctuary, growing among the hedges or trailing on the ground in *Kholas*. Plants growing in relatively dry environment of the *Kholas* are stunted, more woody at the base and bear smaller leaves. Sweta 786.

3. **TINOSPORA** Miers


Large, deciduous, glabrous climbers, aerial roots long, hanging. Leaves petiolate upto 15.0 cm long, broadly ovate, cordate, acute or apiculate, nerves prominent. Flowers in axillary racemes appear before the emergence of new leaves, yellow; male ones fascicled; female ones solitary. Stamens 6. Female flowers with 6 staminodes. Drupe globose, red. **Flowering and fruiting:** March- June. Common in the area, climbing on large trees and among the hedges. Sweta 959.

4. **NYMPHAEACEAE**

**NYMPHAEA** L. *nom. cons.*

**Key to species:**

1. Stamens with apical, sterile appendages................................................................. 1. *N. nouchali*
2. Stamens without apical, sterile appendages......................................................... 2. *N. pubescens*


Aquatic herbs. Leaves deeply cordate, sharply toothed, suborbicular, floating on water surface. Flowers white with cream or yellow center, solitary. Sepals ribbed, petals oblong,
white. Anther appendages white. Stigmatic appendages none. Fruit globose; seeds broadly ellipsoidal. **Flowering & fruiting:** August-October. Common in ponds, ditches and near banks of Ganga during the rainy season. Sweta 535.


Aquatic herbs with ovate-elliptic or orbicular leaves, dentate, glabrous above and pubescent beneath. Flowers white with yellowish tinge, up to 12.0 cm across. Sepals ovate lanceolate, subacute or obtuse, 5-9 veined outside, white inside. Petals 10-25. Stamens yellow, numerous. Stigmatic appendages up to 1.0 cm long, yellow. **Flowering and fruiting:** August-December. Found in ponds and ditches. Sweta 338.

5. **NELUMBONACEAE**

**NELUMBO** Adans.


Large handsome, aquatic herbs with milky juice and horizontal creeping root stock. Leaves 20-80 cm, usually raised above the water surface, shallowly notched, glabrous, glaucous, dark green above, pale beneath. Flowers rose-pink, fragrant. Anthers orange. Receptacle spongy, yellow during anthesis, turns green later and finally become dark green. Seeds ovoid, glabrous, black. **Flowering & Fruiting:** June-October. **Local Name:** Kamal. Found in ponds and swampy areas. Sweta 961.

6. **PAPAVERACEAE**

**ARGEMONE L.**

**Key to species:**

1. Flowers light yellow; style 1-3 mm long.................................2. *A. ochroleuca*

1. Flowers sulphur yellow, style minute or none.......................1. *A. mexicana*


**forma mexicana**

Prickly, erect, robust herbs with yellow sap. Leaves 7-15 cm long, sessile, amplexicaul, spiny on margins and veins, bluish green especially on veins, sinuate -pinnatifid. Flowers yellow, solitary terminal, subtended by leafy bracts at the base. Stigmas red. Capsule erect, spinous.
Seeds numerous, black. **Flowering and fruiting**: February-October. Common in shady areas. Local Name: *Kateli*, *Satyanasi*. Sweta 670.

2. **Argemone ochroleuca**  
   According APG-2 this genus belongs to tribe Papavereae of subfamily Papaveroideae.

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7. **FUMARIACEAE**

**FUMARIA L.**

   **Note**: According APG-2 this genus belongs to tribe Fumarieae, subfamily Fumarioideae and family Papaveraceae.

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8. **BRASSICACEAE**

**KEY TO GENERA:**

1. Pods wider than long................................................. 2
1. Pods longer than wide............................................. 3
2. Prostrate herbs; leaves pinnately dissected;
   pods didymous, indehiscent........................................... 4. *Coronopus*
2. Erect herbs; leaves not dissected;
   pods triangular or orbicular........................................ 2. *Capsella*
3. Leaves 2-3 pinnatisect........................................... 5. *Descurainia*
3. Leaves not as above.................................................. 4
4. Flowers white..................................................... 5
4. Flowers yellow................................................... 7
5. Plants aquatic; rooting at the lower nodes......................... 6. *Nasturtium*
5. Plants terrestrial............................................... 6
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6. Leaves simple; cotyledons incumbent
   .................................................. 1. *Arabidopsis*

6. Leaves pinnate; cotyledons accumbent
   .................................................. 3. *Cardamine*

7. Seeds biseriate or sub-biseriate in fruit
   .................................................. 7. *Rorippa*

7. Seeds 1-seriate in fruit
   .................................................. 8. *Sisymbrium*

1. **ARABIDOPSIS** Heynh.


Erect, slender, annual herbs. Basal leaves in a rosette, obovate or oblanceolate-spathulate, entire or finely dentate. Flowers white, pedicels 1.0-1.5 cm long. Petals longer than the sepals. Stamens 4. Pods linear upto 2.0 cm long; glabrous, shortly beaked. Seeds reddish-brown.

**Flowering and fruiting:** January- June. Common in agricultural fields and in moist and shady places in *Kholas*. Sweta 746.

**Note:** According APG-2 this genus is synonymous with *Arabis* L.

2. **CAPSELLA** Medik. nom. cons.


Erect, annual herbs; hairs simple or branched. Radical leaves upto 8.0 cm long, oblong or oblanceolate-spathulate, toothed; cauline leaves hastate. Racemes upto 20.0 cm long. Flowers white. Pods glabrous, deltoid, notched at the apex. **Flowering and fruiting:** December-May. Occasionally found in grassy localities and agricultural fields. Sweta 962.

3. **CARDAMINE** L.


Annual herbs. Leaves crowded at base, pinnate, auricled, sparsely hairy or fringed with bristles. Inflorescence erect, racemose or somewhat sub-corymbose. Flowers white. Style very short, stigma globose. Fruit erect, linear, flat, valves with distinct midrib. Seeds many oval or ellipsoid, reddish-brown. **Flowering and fruiting:** January- April. Often found in nurseries. Sweta 960.

4. **CORONOPUS** L. nom. cons.

Small, prostrate, slightly hispidly hairy herbs. Leaves pinnately dissected, lobes spreading. Flowers pale-green, minute, in racemes. Stamens 2. Pods 1 x 2 mm, separating into 2, indehiscent transversely reticulate lobes. Seeds 2, reniform, brownish. **Flowering and fruiting:** December-April. Commonly found in moist and shady places and also as weed in crop fields. Sweta 584.

5. **DESCURAINIA** Webb. & Benth. nom. cons.


Erect, sparsely pubescent herbs. Leaves 2-3 pinnatisect, lobes narrowly linear. Flowers light yellow, in racemes. Fruits spreading or erect, subtorulose, valves 1-veined. Seeds reddish brown. **Flowering and fruiting:** Rainy season. Occurs in moist sandy soil. This taxon was reported by Khan et al. (1985) from Bijnor, therefore, its occurrence in the study area can not be ruled out.

6. **NASTURTIUM** R. Br. nom. cons


Aquatic or semi-aquatic, annual herbs. Stems creeping, rooting profusely at the lower nodes. Leaves imparipinnate, leaflets 5-9, ovate-orbicular. Flowers white. Petals nearly twice the length of sepals. Pods patent, slightly curved upward, upto 2.0 cm long including beak. Seeds 2-seriate, ovoid rounded, rugose. **Flowering and fruiting:** December-June. Commonly found on margins of ponds and ditches and banks of the river Ganga. Sweta 644.

**Note:** According to APG-2 the accepted for this genus is *Rorippa* Scopoli.

7. **RORIPPA** Scop.


8. **SISYMBRIUM** L.

Erect, annual herbs, usually glabrous. Radical leaves petiolate, pinnatipartite, cauline ones runcinate or pinnatifid. Flowers yellow in corymbose racemes. Pods upto 6.0 cm long, slender ascending, glabrous. Seeds oblong, light-brown. **Flowering and fruiting:** December- April. Occasionally found on roadsides near villages. Sweta 963.

9. CLEOMACEAE

**CLEOME L.**

**Key to species:**
1. Flowers white or pinkish, androgynophore well developed........1. *C. gynandra*
1. Flowers yellow, androgynophore not well developed..........2. *C. viscosa*


var. **gynandra**


Erect glandular-hairy annual herbs with foetid smell. Leaves 3-5 foliolate; elliptic- oblong or obovate. Flowers in lax, leafy racemes. Petals yellow, unequal. Capsule upto 10 cm long, glandular hairy, glands black. Seeds many, reniform, with faint concentric ribs and strong cross-ribs, dark-brown to black. **Flowering and fruiting:** August- December. Common in sandy soil, often forms dense patches. Sweta 969.

10. CAPPARACEAE

**KEY TO GENERA:**
1. Plants with hooked spines........................................1. *Capparis*
1. Plants without hooked spines........................................2
2. Leaves simple; sepals fused........................................3. *Maerua*
2. Leaves palmate; sepals free........................................2. *Crataeva*
1. **CAPPARIS L.**

**Key to species:**

1. Leafless shrubs or small trees; flowers red, zygomorphic………………..1. *C. decidua*
2. Leafy shrubs or climbers; flowers actinomorphic or subzygomorphic………………2

2. Younger parts ferruginous; flowers pink; climbers……………………3. *C. zeylanica*

2. Younger parts, not ferruginous; flowers pure cream in colour; erect or subscandant shrubs ………………………………2. *C. sepiaria*


Extensively branched shrubs or small trees; branches glabrous. Leaves early deciduous. Flowers deep red, zygomorphic in corymbose racemes or in fascicles. Berries ovoid, many seeded, red when ripe. **Flowering and fruiting:** April-June. Occasionally occurs in dry sandy habitats. Sweta 975.


Sub-scandent or erect shrubs with zigzag branches. Leaves ovate, elliptic, oblong or oblong-lanceolate, sub-acute to retuse. Flowers white or cream in umbellate, terminal inflorescence. Petals unequal. Berries 1-seeded, black when ripe. **Flowering and fruiting:** May-July. Common in *Kholas*. Sweta 904.


This taxon can be readily distinguished from other species of *Capparis* by its climbing habit, ferruginous younger parts and flower buds and flowers suffused with pink. **Flowering and fruiting:** March-June. Commonly found climbing on trees in *Kholas* and on roadsides. Sweta 731.

2. **CRATEVA L.**

Shrubs or medium sized trees. Leaves palmately trifoliate. Flowers creamy, polygamous, in terminal corymbs. Gynophore 4.0 –6.0 cm long. Stamens many, filaments long. **Flowering and fruiting:** April- October. Included on authority of Murty and Singh (1961b).

3. **MAERUA** Forssk.


Scandent shrubs. Leaves simple, ovate, elliptic-oblong or lanceolate. Corymbs axillary, dense. Flowers greenish-yellow or white. Stamens up to 25. Gynophore up to 2.5 cm long. Berries moniliform or cylindric. **Flowering and fruiting:** Nearly round the year. Included on authority of Murty and Singh (1961b).

11. **VIOLACEAE**

**HYBANTHUS** Jacq.


Erect or diffuse, suffruticose herbs. Leaves linear or lanceolate, subsessile, serrate. Stipules gland tipped. Flowers solitary, red or pink, zygomorphic, one petal clawed. Capsule ovoid or subglobose. Seeds numerous, striated, pale-yellow. **Flowering and fruiting:** July-November. Occasionally found in moist grassy localities. Sweta 994.

12. **FLACOURTIACEAE**

**KEY TO GENERA:**

1. Armed shrubs or small trees; flowers unisexual

2. *Flacouritia* 

1. Unarmed trees; flowers bisexual

1. *Casearia* Jacq.

**Key to species:**

1. Mature leaves hairy, at least along midrib and veins beneath

2. *C. tomentosa* 

1. Mature leaves glabrous

2. *C. graveolens*

Medium sized, deciduous trees. Leaves up to 20 x 12 cm, elliptic to elliptic-oblong, shallowly crenate, coriaceous, glabrous. Flowers greenish, foetid smelling, in dense axillary clusters. Filaments glabrous, staminodes shorter than the stamens, hairy. Stigma capitate. Capsule ellipsoid, up to 2.0 cm long, orange-yellow when ripe. **Flowering and fruiting:** March-August. Occasionally found in Kholas. Sweta 975.


Small trees up to 6.0 m tall; branches tomentose or pubescent. Leaves ovate-lanceolate, coarsely serrate or subentire, up to 15.0 cm long, mature ones sub-coriaceous, softly tomentose. Flowers small, greenish in axillary condensed fascicles. Stigma discoid. Capsules up to 2.5 cm long, ellipsoid. **Flowering and fruiting:** March-September. Found in Kholas. Sweta 970.

2. **FLACOURTIA** L’ Herit.


Shrubs or small dioecious trees, branches thorny. Leaves obovate, ovate, oblong or suborbicular, cuneate, obtuse or emarginate, coarsely dentate. Flowers yellowish-green, in short, few flowered, axillary or terminal racemes. Stamens numerous, anthers versatile. Ovary globular, with 3-6 radiating, thick styles. Berries sub-globose, 5-10 mm across, purple or red, seeds trigonous, pale-yellow to brown. **Flowering and fruiting:** March-August. **Local name:** Kango. Common in Kholas. Sweta726.

**Note:** In APG-2 both *Casearia* and *Flacourtia* have been transferred to the Family Salicaceae.

13. **POLYGALACEAE**

**POLYGALA** L.

**Key to species:**

1. Flowers yellow ........................................2. *P. erioptera*

2. Flowers pink ........................................1. *P. arvensis*
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Erect or decumbent-ascending annual herbs. Leaves subsessile, oblanceolate to lanceolate. Racemes 1-10 flowered. Outer sepals ovate, sharply acuminate; wings falcate. Petals obovate 4.0 mm long; keel with a bearded crest. Capsule broadly oblong-orbicular, notched at the apex, narrowly winged, ciliate. Seeds black, patently hairy, 4.0 mm long. **Flowering and fruiting:** July-November. Found in grassy localities in Kholas. Sweta 978.


Erect or decumbent, annual herbs. Leaves obovate, obcordate or narrowly linear. Flowers in racemes, shortly pedicelled. Petals 3-lobed, middle lobe keeled. Fruit ovate, notched at the apex, pubescent; seeds densely hairy, strophiole with 3 membranous appendage. **Flowering and fruiting:** August-December. Common in Kholas. Sweta 1126.

14. **CARYOPHYLLACEAE**

**KEY TO GENERA:**

1. Leaves linear. ................................................................. 2
2. Inflorescence silvery-white; sepals scarious. ....................... 2. *Polycarpaea*
3. Stipules present, scarious. ........................................... 3. *Polycarpon*
4. Calyx polysepalous; flowers white........................................ 5
5. Petals deeply bi-lobed .................................................. 6. *Stellaria*
6. Calyx 5-nerved; petals without basal scales...................... 1. *Arenaria*
7. Calyx usually 10-nerved and petals with 2 basal scales .......... 4. *Silene*

1. **ARENARIA** L.


2. POLYCARPAEA Lamk. nom.cons.


var. corymbosa

Erect much branched herbs with purplish white branches. Leaves linear, whorled, stipulate. Flowers white or pinkish, silvery-white when mature. Sepals chaffy, silvery. Stamens 5, style 1. Capsule 3-valved, seeds minute, pale-brown. **Flowering and fruiting:** August-November. Mostly found on sandy soil, especially in Kholas. Sweta 347.

3. POLYCARPON L.


4. SILENE L.


Erect, dichotomously branched herbs. Leaves opposite, sessile; radical ones spatulate or linear-lanceolate, acute. Flowers few, rosy pink, in corymbose or paniculate cymes. Calyx tubular, teeth linear-lanceolate. Capsule narrowed at the apex, 6-toothed, shining, ovoid, enclosed in inflated calyx. Seeds reniform, 5-ribbed, greyish-brown, shining. **Flowering and fruiting:** February-April. **Local Name:** Chota-takla. Common in cultivated fields. Sweta 681.

5. SPERGULA L.


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Found in moist habitats, sometimes forming pure populations. Specimens growing in drier habitats are glaucous, smaller and bear few flowers. Sweta 980.

6. STELLARIA L.


Annual, glabrous, decumbent herb, rooting at the lower nodes. Lower leaves long petiolated, ovate-cordate, entire, acute or acuminate; upper ones sessile, ovate-elliptic. Flowers white in axillary and terminal cymes. Petals 5, white, bilobed nearly to the base. Capsule ovoid, 3-valved. Seeds reddish brown with acute conical tubercles. **Flowering and fruiting:** December-April. Common in cultivated fields, waste lands and near marshy places. Sweta 568.

7. VACCARIA Wolf.


15. PORTULACACEAE

PORTULACA L.

**Key to species:**

1. Flowers 4-merous................................................................. 3. P. quadrifida
1. Flowers 5-merous............................................................... 2
2. Flowers pink; nodes with hairy appendages............................. 2. P. pilosa
2. Flowers yellow; nodes without hairy appendages................ 1. P. oleracea


Prostrate or ascending herbs. Leaves alternate, sessile, obovate. Flowers yellow. Capsule obovoid to ovoid. Seeds many, black, reniform. **Flowering and fruiting:** March-December. Common along water channels and other moist places. This taxon shows great morphological variations, probably in response to soil moisture. Plants growing in drier situation have smaller leaves crowded towards the ends of branches, and smaller flowers. Sweta 972.

subsp. *pilosa*
Herbs with fusiform deep roots. Leaves about elliptic-linear, acute. Flowers terminal, pink or red, surrounded by tufted hairs. Style branches upto six. Capsule ovoid or conical. Seeds blackish, minutely tubercled. **Flowering and fruiting:** June-January. Common on sandy soil on river beds or among the grasses in *Kholas*. In some specimens lower part of the stem is completely devoid of leaves while the hairs persist. Sweta 318, 414.


16. TAMARICACEAE

**TAMARIX** L.

**Key to species:**

1. Flowers unisexual................................................................. 1. *T. dioica*
2. Flowers bisexual........................................................................ 2. *T. indica*


This species can be readily distinguished from *T. dioica* by bisexual flowers and relatively short coma of seeds. Included on authority of Murty and Singh (1961b).

17. ELATINACEAE

**BERGIA L.**


Erect or ascending, annual herbs with reddish stem. Leaves opposite, oblanceolate or elliptic, serrate or subentire. Flowers small in dense axillary cymes, pink. Sepals and petals 5 each. Stamens 5. Capsule 5-loculed. **Flowering and fruiting:** October- May. Common in or near swampy areas. Sweta 984.

18. HYPERICACEAE

**HYPERICUM L.**


19. MALVACEAE

**KEY TO GENERA:**

1. Fruit a capsule................................................................. 2
2. Trees; epicalyx segments obovate-spathulate................................. 5. *Kydia*
3. Herbs or low shrubs; epicalyx segments not as above............... 3
4. Calyx 2 to 3 - lobed, spathaceous, caducous................................ 1. *Abelmoschus*
5. Calyx 5- toothed or lobed, not spathaceous, persistent.............. 4
6. Calyx winged........................................................................... 3. *Fioria*
7. Calyx not winged...................................................................... 4. *Hibiscus*
8. Epicalyx present........................................................................ 6
9. Epicalyx absent......................................................................... 9
10. Epicalyx segments 3............................................................... 7
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6. Epicalyx segments 5................................................................. 8
7. Leaves orbicular, palminerved, long petioled; flowers pinkish or white................................................................. 6. Malva
7. Leaves ovate-lanceolate, penninerved; flowers yellow........... 7. Malvastrum
8. Each sepal with a stout protuberance at the base;
   calyx exceeding the fruit; mericarps smooth......................... 8. Pavonia
8. Sepals without a protuberance at the base;
   calyx shorter than the fruit; mericarps glochidiate.................. 10. Urena
9. Mericarps 2 or more seeded................................................. 2. Abutilon

1. ABELMOSCHUS Medic.

Key to species:
1. Tall herbs, bracteoles ovate, base of each petal
   completely brown forming a seemingly continuous ring
   at the base of corolla, hairs on fruit not tubercle based.......... 1. A. manihot
1. Dwarf herbs, bracteoles linear, scarlet spot at the base
   of each petal flanked by yellow bands forming a
   discontinuous ring at the base of corolla,
   hairs on the fruits tubercle based................................. 2. A. tuberculatus

Herbs or undershrubs with hispid stem. Leaves usually 3-9 lobed or parted. Flowers solitary axillary or in terminal racemes. Epicalyx segments 4-6 ovate-oblong, acute. Corolla yellow or light-yellow with a purple centre. Capsule ovoid-oblong, 5-angled, Seeds dark-brown, stellate hairy. Flowering and fruiting: Rainy season. Often found in agricultural fields, may be an escape from cultivation. Sweta 979.

This species was described by Pal et al. (1952) on the basis of material collected from Ajmer (Rajasthan), Indore (Madhya Pradesh) and Saharanpur (Uttar Pradesh). Curiously, this species was not reported either in Flora of Rajasthan or any latest work on flora of Uttar Pradesh. This
is, therefore, first collection of this species in plains after 1952. The digital photographs of this species on the disk accompanying this thesis may well be first color photographs.

2. **ABUTILON** Mill.

**Key to species:**

1. Mericarps 8-10, beaked; leaves glabrescent;
   - fruits cylindric, less than 1.0 cm long........................................... 3. *A. ramosum*
1. Mericarps more than 10, with a small mucro.........................2
2. Flowers orange-yellow with a dark centre................................. 1. *A. hirtum*
2. Flowers yellow or pale-yellow, without a dark centre................ 2. *A. indicum*


Annual under shrubs up to 2.0 m tall. Leaves broadly ovate-orbicular, crenate, dentate. Flowers orange-yellow with a dark center. Schizocarp truncate, mericarps 20-30, shortly acuminate, 2-3 seeded. Seeds brownish-black, reniform, hairs longer at the hilum. **Flowering and fruiting:** January- May. Included on authority of Murty and Singh (1961b).


Perennial under shrubs up to 2.0 m tall. Leaves ovate cordate, densely stellate pubescent abaxially. Flowers solitary-axillary, yellow. Schizocarp cylindric, up to 1.0 cm long, mericarps 8-10, viscid-pubescent, each with 2 long villous awns, 2-3 seeded. Seeds reniform, brownish black, minutely stellate pubescent. **Flowering and fruiting:** August-December. Included on authority of Murty and Singh (1961b).

3. **Fioria** Mattei


Herbs or under-shrubs, 60 cm-150 cm high. Leaves broadly ovate to orbicular, subcordate to rounded at base, crenate-serrate or dentate, acute. Flowers axillary, solitary, strongly nodding, epicalyx linear. Calyx campanulate, 5-lobed. Corolla yellow with dark purple centre. Capsule shortly beaked, 5-winged, wings bristly. Seeds reniform, glabrous, brownish-black. **Flowering and fruiting.** April-December. Often found in waste lands especially near *Kholas.* Sweta 974.

4. **Hibiscus** L. nom. cons.

**Key to species:**

1. Calyx becoming fleshy and deep red after anthesis....................... 4. *H. sabdariffa*
2. Calyx not as above................................................................. 2

2. Seeds cottony; corolla reflexed............................................. 3. *H. micranthus*
2. Seeds not cottony; corolla spreading...................................... 3

3. Glandular hairy herbs; epicalyx minute or absent..................... 2. *H. lobatus*
3. Prickly herbs; epicalyx well developed................................. 1. *H. cannabinus*


Prickly herbs. Leaves palmately 3-5 lobed, lobes linear-lanceolate, serrate. Flowers solitary, yellow with a crimson center. Bracteoles 8-10, basally adnate to calyx. Calyx white tomentose externally and with a large nectary at the base. **Flowering and fruiting:** September-December. Often cultivated in the area for the sake of fibres obtained from the stem. Sweta 985.


   Undershubs up to 1.5 m tall; branches slender, terete. Leaves up to 1.0 cm long, ovate to oblong, obtuse, serrate, stellate hairy. Flowers solitary, axillary, pedicels short. Calyx lobes about 5.0 mm long. Corolla small, pinkish-white, petals oblong-obtuse, often reflexed. Capsule globose, 5-valved. Seeds reniform, black, hirsute with long white silky hairs. **Flowering and fruiting:** June-December. Frequently found in sandy habitats near Kholas. Sweta 354.
   **Note:** According to Paul (Fl. Ind. l. c.) the distribution of this taxon is in southern peninsula. Therefore this is first record of its occurrence in north India.

   This species can be readily distinguished from other species of *Hibiscus* by fleshy, red and acid sepal s. Often cultivated for the sake of stem fiber and edible sepal s. Sweta 269.

5. **KYDIA** Roxb.
   Trees up to 10.0 m tall. Leaves sub-orbicular or ovate-rounded, 5-9 nerved at the base. Flowers polygamous, in axillary or terminal panicles, white or pink. Epicalyx segments 4-6, connate, oblong-spathulate or obovate. Ovary globose, woolly. **Flowering and fruiting:** October- January. This species occurs in forests of Najibabad, however, no specimen was observed in the study area. Included on authority of Murty and Singh (1961b).

6. **MALVA** L.
Key to species:
1. Sepals very sparsely stellate pubescent; mericarps
   obscurely reticulate; columella conical........................................... 2. *M. verticillata*
2. Sepals densely stellate hairy; mericarps
   conspicuously reticulate; columella flat or concave........................ 1. *M. parviflora*

Prostrate or ascending, annual herbs. Leaves orbicular, 2.0-6.0 cm across, cordate, 3-5 lobed,
crenate-serrate, repand. Stipules ovate-lanceolate, ciliate. Flowers in axillary clusters, white or
pinkish-white. Schizocarps discoid 5.0 7.0 mm across, mericarps 8-10. Seeds black or brown,
glabrous. **Flowering and fruiting:** January-June. Common in moist places, often forms
dense patches on garbage heaps near villages. Sweta 991.

Annual, stellate hairy or glabrescent annual herbs. Leaves orbicular, 5-lobed, cordate or sub
truncate, coarsely crenate-dentate. Flowers axillary, pinkish. Calyx accrescent. Petals lobed
apically. Mericarps 10-12, rugose, reniform. **Flowering and fruiting:** January-June. Included
on authority of Murty and Singh (1961b).

7. **MALVASTRUM** Gray nom. cons.
   *Malvastrum coromandelianum* (L.) Garcke in Bonplandia 5: 295.1857; Fl. India 3:
Erect, appressedly hairy herbs. Leaves ovate, serrate. Flowers yellow, solitary, axillary,
bracteoles 3, hairy. Corolla yellow, notched apically. Carpels reniform with 3 projecting
points. **Flowering and fruiting:** Almost throughout the year. Commonly found in dry sandy
and grassy places and on margins of cultivated fields. Sweta 181.

8. **PAVONIA** Cav./nom. cons.
   1832.
Perennial, erect or ascending, under-shrubs. Leaves ovate to ovate-rounded, upper ones
lanceolate, cordate, repand, serrate, midrib with a nectary beneath. Flowers axillary, solitary
or in terminal clusters; epicalyx cup-shaped, firmer than the calyx, segments 5, strongly nerved. Petals pink with dark base, oblong-ovoid. Mericarps oblong-ovoid, unarmed, glabrous. Seeds oblong-ovoid, glabrous, brownish-black. **Flowering and fruiting:** June-November. Found on sandy soil near the banks of river Ganga. Sweta 107.

9. **SIDA L.**

**Key to species:**

1. Stems with 1-2 short spines at the base of petiole;  
   mericarps with two divergent apical awns.......................... 6. *S. spinosa*

1. Stems without spines; mericarps with or without  
   apical awns.......................................................... 2

2. Mericarps 5; prostrate or trailing herbs covered with  
   glandular hairs..................................................... 2. *S. cordata*

2. Mericarps 6-12........................................................... 3

3. Mericarps 8-12, dehiscent.......................................... 4

3. Mericarps 6-8, indehiscent......................................... 5

4. Awns 2, retrorsely hairy; exceeding the calyx.................. 3. *S. cordifolia*

4. Awn single or none, if present then not retrorsely hairy  
   and shorter than the calyx........................................ 5. *S. rhombifolia*

5. Leaves oblong-ovate, downy on both surfaces; flowers  
   creamy white.......................................................... 4. *S. ovata*

5. Leaves lanceolate, glabrous; flowers yellow.................... 1. *S. acuta*


Straggling, gland hairy herbs. Leaves ovate- cordate, crenate, acute to acuminate. Flowers solitary, axillary, orange-yellow. Carpels 5, mericarps awned, thin walled. Seeds triangular,
with blackish dots, dark-brown. **Flowering and fruiting:** Almost throughout the year. Commonly found in wastelands, among hedges and bushes. Sweta 313.

### 3. Sida cordifolia

Erect hairy herbs, branched from the base. Leaves ovate, crenate-dentate, cordate, tomentose. Flowers solitary, axillary, yellowish. Fruit pyriform, hairy, mericarps reticulately veined, 2 awned. Seeds triangular, brown. **Flowering and fruiting:** August-December. Commonly found throughout the area during the monsoon and post monsoon period, along the field borders, roadsides and also in wastelands and Kholas. Sweta 123, 304.

### 4. Sida ovata


### 5. Sida rhombifolia


### 6. Sida spinosa

This species can be readily recognized by shortly spinous stem nodes and divergent awns of mericarps. Sweta 976.

### 10. URENA L.


Large shrubs with stout, slightly scabrid stem. Leaves broadly ovate, margins serrate, red. Flowers rose-pink, in axillary clusters; sepal 5, connate. Mericarps 5, covered with brown,
hooked spines. Seeds dark brown, reniform with a conspicuous scar. **Flowering & fruiting:** June-January. Abundantly found in sandy soil near the Ganga. Sweta 190.

**Note:** According to APG-2 the taxa treated here as belonging to the family Malvaceae, belong to the group Malvoideae Burnett of Malvaceae.

### 20. BOMBACACEAE

**BOMBAX L.**


Tall, deciduous trees with buttressed trunk; bark corky, spiny. Leaves crowded at the end of branches, digitately 5-7 foliate, leaflets ovate-lanceolate or elliptic-lanceolate, glabrous. Flowers crowded at the end of leafless branches, crimson or orange-yellow, shining. Sepals united, succulent, shining within. Petals recurved apically. Stamens many. Capsule woody, apiculate, 5-valved. Seeds many, cottony. **Flowering and fruiting:** April-June. Flowers appear when the tree is completely leafless. Common in grasslands. Sweta 986.

*Ceiba pentandra* (L.) Gaertn. is occasionally planted as ornamental.

**Note:** According to APG-2 the genus *Bombax* belongs to the group Bombacoideae Burnett of the family Malvaceae.

### 21. STERCULIACEAE

**KEY TO GENERA:**

1. Shrubs with zygomorphic flowers and spirally twisted ripe carpels.................................................................1. *Helicteres*

1. Under shrubs or herbs; flowers actinomorphic;
   carpels not twisted.................................................................................................................................2

2. Herbs with deep red flowers; stamens 15 with 5 petaloid staminodes.........................................................3. *Pentapetes*

2. Flowers not deep red; staminodes absent.................................3

3. Flowers yellow; petals clawed; style single;
   capsule 2- valved..............................................................................................................................4. *Waltheria*

3. Flowers whitish- pink; petals not clawed; styles 5;
   capsule 5- valved..............................................................................................................................2. *Melochia*

1. **HELICTERES L.**

**Note:** According to APG-2 the genus *Helicteres* belongs to the group Helicteroideae Meisner of Malvaceae.

2. MELOCHIA L.
Much branched, erect, annual herbs. Leaves ovate-oblong, serrate-incised, glabrous. Flowers white or pinkish, in terminal capitate heads, mixed with lanceolate-subulate involucral bracts. Corolla nearly twice the length of calyx, ciliated. Petals white. Stamens 5. Capsule globular brown, hairy; seeds angular, smoothed, brown. **Flowering and fruiting:** July -October. Abundantly found near river banks and in swampy areas. Sweta 114

**Note:** According to APG-2 the genus *Malochia* belongs to group Byttnerioideae Burnett of Malvaceae.

3. PENTAPETES L.
Erect annual, hairy herbs or under shrubs. Leaves 2.0-7.0 cm long, petiolate, linear-lanceolate, serrate. Flowers axillary, solitary, scarle-red. Stamens 15 in 5 groups, alternating with 5 petaloid staminodes. Capsule, globose, hairy. **Flowering and fruiting:** Rainy season. Occasionally found in moist areas, especially sugar cane fields; probably an escape from cultivation. Sweta 359.

**Note:** According to APG-2 the genus *Pentapetes* belongs to group Malvoideae Burnett of Malvaceae.

4. WALThERIA L.
Erect, white, tomentose, woody herbs or under shrubs. Leaves broad oblong, lanceolate, crenate-serrate. Flowers yellow in axillary clusters. Capsule 5-lobed, campanulate. **Flowering and fruiting:** August- November. Common in wastelands and open areas especially near the Kholas. Sweta 292.
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22. TILIACEAE

KEY TO GENERA:
1. Fruits spiny or bristly ................................................................. 3. *Triuntfetta*
1. Fruit neither spiny nor bristly .................................................. 2
2. Petals glandular at the base; fruit indehiscent ............................. 2. *Grewia*
2. Petals eglandular; fruit dehiscent .............................................. 1. *Corchorus*

1. **CORCHORUS** L.

Key to species:
1. Capsule elongated; beaked ...................................................... 2
1. Capsule globose; beak none ...................................................... 2. *C. capsularis*
2. Beak divided into 3 bifid arms ................................................ 3
2. Beak entire, straight ............................................................... 4
3. Capsule 6-angled; three angles winged; stamens .......................... 1. *C. aestuans*
3. Capsule cylindric, without angles or wings; stamens 10 ............. 4. *C. tridens*
4. Capsule 5-valved, 10-ribbed .................................................... 3. *C. olitorius*
4. Capsule 3-4 valved, cylindric, 3-4 angled, not ribbed .................. 5. *C. trilocularis*

Ascending, erect or suberect herbs. Leaves ovate-lanceolate hairy, serrate. Flowers yellowish, peduncles 2-3 flowered; sepals 5, free; margin reddish brown; petals, longer than sepals. Capsule 3-valved, cylindric, beaked. **Flowering & Fruiting:** August-October. It is most common species of *Corchorus* found in this area. Common in cultivated fields and in waste places on moist soil. Sweta 120.

Erect or suberect annual herbs. Leaves 6-10 cm long, ovate-lanceolate, the two lowest teeth produced into awns. Flowers yellow, solitary; sepals 5, mucronate; petals 5. Stamens 8-10. Fruit globular with ridges and groves, ridges irregularly cut. Seed dark brown-black. **Flowering & Fruiting:** August-October. Common in marshy or wet habitats, mainly in paddy fields. Sweta 117.

Erect herbs with woody base. Leaves ovate-lanceolate, serrate. Flowers in axillary cymes, yellow. Petals 5, free, oblong, yellow. Stamens many. Fruit capsular 3-7 cm long, 5 angled, cylindric, beak blunt. **Flowering and fruiting:** September-October. Commonly found in sandy soil. Sweta 256.


Erect or ascending annual herbs. Leaves ovate-lanceolate, serrate; basal serratures produced into filiform awns. Flowers yellow, in 2-4 flowered leaf opposed cymes. Capsule up to 4.0 cm long, cylindric, curved; beak trifiircated; valves without partitions. **Flowering and fruiting:** August-December. Included on authority of Murty and Singh (1961b).


Annual, erect or suberect, pubescent herbs. Leaves broadly oblong-elliptic, serrate, lowest serratures prolonged into awns. Flowers yellow, in 1-3 flowered leaf-opposed cymes. Stamens 15-20. Capsule up to 8.0 cm long, 3-4 angled, scabrous-tuberculate, valves with transverse partitions. Seeds 3-gonous, black. **Flowering and fruiting:** July-December. Included on authority of Murty and Singh (1961b).

2. **Grewia L.**

**Key to species:**

1. Trees; peduncles shorter than the petiole;
   leaves tomentose, regularly crenate; main
   nerves arching ................................................................. 1. *G. asiatica*

1. Shrubs or undershrubs; peduncles much exceeding petioles.................................................. 2

2. Leaves broad, not cordate; a dwarfed
   undershrub producing annual,
   herbaceous, flowering stems................................. 3. *G. sapida*

2. Leaves ovate-lanceolate, 3-nerved at the base,
   tomentose beneath and
   scabrous above; flowers all bisexual................................. 2. *G. hirsuta*

Small trees or large shrubs. Leaves up to 18 x 5 cm; broadly ovate or suborbicular, obliquely cordate or rounded at the base, crenate, scabrous above, tomentose beneath. Flowers in axillary umbellate cymes; peduncles up to 3.0 cm long; buds ribbed, tomentose. Petals yellow, oblong-obovate or linear-oblong, obtuse; glands obovoid. Ovary ovoid, villous; stigma 4-lobed. Drupe 6-12 mm across, subglobose, obscurely lobed, red or purple, pilose, sweet or acid. **Flowering and fruiting:** January-August. **Local name:** Falsa. **Occurrence:** Usually cultivated for its fruits. Sweta 998.


Small shrubs. Leaves up to 12.0 cm long, ovate-lanceolate or ovate-elliptic, acute, serrate, pubescent above, tomentose beneath, 3-4 nerved. Flowers polygamous in axillary, umbellate cymes, peduncles 1-3 together; buds globose. Petals white, about 3.0 mm long, oblong, rounded, glands half the length of petals. Ovary globose, densely villous; stigma 5-lobed, lobes fringed. Drupe about 1.0 cm across, subglobose, obscurely 4-lobed, fleshy, densely hirsute, wrinkled, sweet. **Flowering and fruiting:** April-November. **Local name:** Gursakri. **Occurrence:** Found in Kholas. Sweta 987.


Small shrubs. Leaves up to 10.0 cm long, ovate or broadly elliptic, subacute or rounded at the base and apex, coarsely double serrate, scabrid above, tomentose beneath, 5-7 nerved. Flower in axillary cymes, yellow; buds obovoid or oblong-obovoid, tomentose. Sepals 7-12 mm long, oblong or oblanceolate. Stamens many, filaments 5-6 mm long, glabrous. Ovary elliptic-oblong, hirsute. Drupe about 6-7 mm across, subglobose or broadly obovoid, obscurely 2-lobed, hirsute. **Flowering and fruiting:** March-September. **Occurrence:** Occasionally found in Kholas among grasses. Sweta 784.

3. **TRIUMFETTA L.**


Erect, hirsute, large herbs Leaves broad, ovate. Flowers yellow, clustered at the nodes. Fruit globular, with hooked spines. **Flowering and fruiting:** August-October. Commonly found on the road sides, in cultivated field and waste lands. Sweta121.

**Note:** According to APG-2 these three genera belong to group Grewioideae Hochreutiner of Malvaceae.
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23. LINACEAE

LINUM L.

Erect, glabrous annul herbs. Leaves alternate, sessile, linear-lanceolate, acute, entire. Flowers long pedicelled, light blue with dark blue dichotomous veins. Capsule globose, with a stylar beak and supported by persistent calyx. Seeds compressed, brown. **Flowering and fruiting:** January-April. Commonly cultivated as winter season oil crop; sometimes found as an escape. Sweta 701.

Linum grandiflorum Desf. is sometimes cultivated as an ornamental

24. ZYGOPHYLLACEAE

KEY TO GENERA:

1. Leaves pinnate; stipules not spinous, flowers yellow, fruit a schizocarp ........................................................................................................ 2. Tribulus

1. Leaves 1-3 foliate; stipules spinous, flowers pinkish-purple, fruit a capsule .............................................................................................. 1. Fagonia

1. FAGONIA Tourn. ex L.

Annual or perennial, profusely branched herbs. Leaves unifoliate or lower sometimes trifoliate, leaflets narrowly ovate-lanceolate. Stipular spines suberect. Flowers 10-12 mm across. Capsules softly hairy. **Flowering and fruiting:** October-March. Included on authority of Murty and Singh (1961b).

2. TRIBULUS Tourn. ex L.


This plant shows considerable variations as regards the leaf size, flower size, fruit size and hairiness of fruits. Specimens no.524 is very close to *T. rajasthanensis*. A specimen was sent
to Dr. V. Singh, Arid Zone Circle, Botanical Survey of India, Jodhpur for identification. He commented that the specimen appeared to be an ecological variant of *T. terrestris*. Recently in a study of Taxonomic Status of Some of the *Tribulus* Species in the Indian Subcontinent Verghese et al. (1996) have reduced *T. rajasthanensis* as a variety of *T. terrestris*. In fact it seems to be intermediate between these two species.

**Note:** According to APG-2 this genus belongs to group Tribuloideae (Reichenbach) D. H. Porter of Zygophyllaceae.

### 25. AVERRHOACEAE

**AVERRHOA L.**


Small trees with drooping branches. Leaves alternate, imparipinnate, estipulate. Flowers pink-red in axillary cymes. Fruit oblong, acutely 5-winged, acid. **Flowering and fruiting:** Rainy and cold season. Often cultivated in orchards for the sake of acid, edible fruits. The fruits, locally known as 'Kamrakh', are sold in market and eaten either raw or pickled. **Sweta ????

**Note:** According to APG-2 this genus belongs to family Oxalidaceae.

### 26. OXALIDACEAE

**OXALIS L.**

**Key to species:**

1. Underground, bulbous root-stock present; flowers purplish………………………………………………………….2. *O. dehradunensis*

1. Underground, bulbous root-stock absent;

   flowers yellow………………………………………………………….1. *O. corniculata*


Pubescent, hairy, perennial herbs. Leaves digitately trifoliate, leaflets obcordate. Flowers yellow, subumbellate. Capsule oblong, angular, hairy, erect. Seeds transversely ribbed, brown. **Flowering and fruiting:** Almost throughout the year. Commonly found in moist to dry sandy places, cultivated fields, wastelands and in *Kholas*. Some populations growing in *Kholas* have somewhat woody stems and larger flowers suffused with red. **Sweta 640.**


Perennial, acaulescent herbs. Root-stock. bulbous, light pink Leaves digitally 3-foliate, petiole long, hairy; leaflets cuneate, apex deeply notched. Flowers 2- many in subumbellate
corymbs, pedicels upto 4.0 cm long. Upper two-third part of petals purplish with purplish streaks, lower one-third part greenish-yellow with green streaks. Stamens 10, longer filaments densely hairy. **Fruiting and Fruiting:** Nearly round the year. Occasionally found in moist, humus rich soil in shady places. Sweta 740.

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### 27. TROPAEOLACEAE

**Tropaeolum L.**


Trailing or climbing, annual, glabrous herbs. Leaves orbicular, peltate, long petioled. Flower solitary-axillary, long pedicelled, orange or yellow, variously blotched, zygomorphic. Sepals 5, posterior one produced into a spur. Petals 5, distinctly clawed, 2 posterior smaller, 3 anterior larger. Ovary 3-lobed, 3- celled, style shortly 3-branched. Fruit 3-lobed capsule, 3-seeded. **Flowering and fruiting:** January-April. Cultivated in gardens and parks, sometimes found as an escape. Sweta 987.

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### 28. BALSAMINACEAE

**Impatiens L.**


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### 29. RUTACEAE

**KEY TO GENERA:**

1. Plants without spines. ................................. 3. *Murraya*
1. Plants with axillary spines. ........................... 2
2. Leaves imparipinnate; stamens 10-12 ................  2. *Feronia*
2. Leaves 3-foliate; stamens many .......................... 1. *Aegle*

1. *Aegle* Correa *nom. cons.*

Thorny, deciduous trees with greyish-white bark. Leaflets 3, ovate-lanceolate, lateral leaflets sessile, terminal one stalked. Flowers greenish-white, sweet-scented, in axillary panicles. Fruits globose, rind rough, ripe pulp orange. Seeds glabrous, pale-brown. **Flowering and fruiting:** March- July. Mostly cultivated in the area, a few apparently self-planted specimens growing wild could be observed. However, in nearby forests of Najibabad the species is found growing wild. Sweta 990.

2. **FERONIA** Correa


Medium sized trees, bark dark grey, spines straight. Leaves alternate, 5-7 foliate; leaflets cuneate or obovate. Flowers small, numerous, in lateral and terminal pubescent panicles, pale-green with reddish tinge. Anthers dark-red. Fruit globose, hard, woody, grey. **Flowering and fruiting:** March- September. Occasionally found near villages, probably planted. Sweta 993.

3. **MURRAYA** J. G. Koenig ex L. *nom. cons.*

**Key to species:**

1. Leaflets 5-7; flowers in few flowered inflorescence, petals reflexed......................................................2. *M. paniculata*

2. Leaflets 9-25; flowers in large terminal inflorescence, petals spreading..................................................1. *M. koenigii*


Large, deciduous shrubs or small trees with dark-brown bark. Leaves alternate, imparipinnate, leaflets 9-25, obliquely-ovate or oblanceolate, slightly pubescent. Flowers in large, terminal, corymbose cymes, creamy-white, fragrant. Petals narrowly oblong, spreading. Fruits purplish. **Flowering and fruiting:** April - June. Occasionally occurs near villages. Sweta 930.


Differs from preceding species in having 5-7 leaflets which are shining on upper surface, pure white flowers in few flowered cymes, petals broader and distinctly reflexed and the red berries. **Flowering and fruiting:** Summer to cold season. This plant bears several flushes of
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flowers in summer and rainy season. Often planted in houses and orchards for the sake of fragrant flowers. Sweta 1000.

30. SIMAROUBACEAE

AILANTHUS Desf. nom. cons.


Tall, deciduous, foetid smelling trees. Trunk with prominent leaf scars, bark whitish-grey. Leaves crowded at the end of branches, upto 90.0 cm long, glandular hairy; leaflets 7-29, upto 15.0 cm long, ovate lanceolate, coarsely toothed. Flowers yellowish in large hairy panicles. Samaras upto 5.0 cm long, spindle shaped, glabrous, 1-seeded. **Flowering and fruiting:** March-June. Often found in Kholas. Sweta 1301.

31. MELIACEAE

**KEY TO GENERA:**

1. Leaflets entire; stamens free; fruit dehiscent.............................. 3. *Toona*
2. Leaflets toothed; stamens united; fruit indehiscent...................... 2


Tall, deciduous trees; bark fissured. Leaves 1-pinnate, leaflets 7-15, falcate, coarsely dentate. Flowers in pendulous panicles, creamy-white, slightly sweet-scented. Staminal tube creamy-white. Drupes ovoid-oblong, yellow, juicy, single seeded, immature drupes possess white latex. **Flowering and fruiting:** February-June. Commonly planted in the area. Sweta 995.

2. *MELIA* L.


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3. TOONA Roem.

32. CELASTRACEAE

CELASTRUS L.
Medium sized, deciduous climbers with laticellate bark. Leaves upto 10. 0 cm long, ovate or elliptic, crenulate. Racemes axillary and terminal, upto 20.0 cm long. Flowers greenish-yellow, 4-5 merous. Stamens inserted on the margin of the disk. Fruit orange-yellow, 3-celled, each cell 1-2 seeded. Seeds ribbed, brown, enclosed within red aril. **Flowering and fruiting:** April- November. Occasionally found in Kholas climbing on shrubs and trees. Sweta 820.

33. RHAMNACEAE

ZIZIPHUS Mill.
Key to species:
1. Straggling or climbing shrubs..................................................3. Z. oenoplia
1. Erect shrubs or trees.................................................................2
2. Erect trees; branches drooping; leaves densely
tomentose beneath, fruits more than 1.5 cm in diametere.............1. Z. mauritiana
2. Diffuse, much branched shrubs; fruits less than
1.25 cm in diameter.....................................................................2. Z. nummularia

Large shrubs or trees; bark dark-grey or black. Spines solitary or in pairs, straight or recurved. Leaves alternate, basally 3-nerved, ovate-oblong or suborbicular, entire or serrulate. Flowers in axillary fascicles, greenish-white, 4-5 mm across; calyx campanulate; petals spathulate, clawed, lamina hooded. Disc distinctly 10-grooved, fleshy. Drupe oblong or ovoid. Seeds 2-celled, with hard, thick, bony shell. **Flowering and fruiting:** April – February. **Local name:** Ber. Extensively cultivated for the sweet, edible fruits. Sweta 212.


34. **VITACEAE**

**KEY TO GENERA:**

1. Leaves trifoliate; petals 4................................................................. 2. *Cayratia*
1. Leaves simple; petals 5................................................................. 1. *Ampelocissus*

1. **AMPELOCISSUS** Planch. *nom. cons.*


Extensive climbers with, hollow branches. Leaves long-petioled, orbicular, cordate, 3-5 angled, lobes dentate, basal nerves 5. Flowers small reddish-brown, in small, thyrsoid, compact cymes. Berries globose, black, 2-seeded. Seeds ellipsoid, margins crenate. **Flowering and fruiting:** April-October. Often found climbing on shrubs near swampy areas. Sweta 79.
2. CAYRATIA A.L. Juss. nom. cons.


Slender, herbaceous, climbers. Leaflets 3, ovate-elliptic or obovate, up to 7.0 cm long, somewhat fleshy, crenate. Flowers in axillary cymes, greenish white. Fruit obovoid-globose, 3-4 seeded. Seeds trigonous, rugose. **Flowering and fruiting:** July-December. Frequently found in the sanctuary climbing on trees or shrubs. Sweta 999.

*Cissus quadarangularis* L. (*Harjore*) is often cultivated in the area as an ornamental and is used in traditional medicine for treatment of fractured bones.

*Vitis vinifera* L. (*Angoor*) is cultivated for the sake of edible fruits.

**Note:** According to APG-2 all these genera belong to group Viticoidae Eaton of Vitaceae.

35. SAPINDACEAE

**KEY TO GENERA:**

1. Trees; petals none; fruit not balloon like................................. 2. *Schleichera*

1. Climbers; petals white; fruit balloon like................................. 1. *Cardiospermum*

1. CARDIOSPERMUM L.


Slender, thinly hairy climbers. Tendrils axillary, 3-fid, stiff. Leaves up to 7.0 cm long deltoid or ovate. Leaflets deeply cut, acuminate, glabrous and thin. Flowers minute, white, zygomorphic. Fruits balloon like, winged. Seeds 3, globose, smooth, black with a heart shaped white aril. **Flowering and fruiting:** July-December. Often found among hedges. Sweta 1305.

2. SCHLEICHERA Willd. nom. cons.

Medium sized to tall trees; bark grey, smooth. Leaves imparipinnate, upto 15.0 cm long; leaflets 2-4 pairs, oblong or elliptic-oblong, entire. Flowers yellowish-green in axillary racemes, often several together. Petals none. Fruit pointed, ovoid, dark-brown, glabrous. Seeds smooth, glabrous. **Flowering and fruiting:** March-June. Often found on roadsides as avenue tree. Young crimson foliage makes this species conspicuous in early summer season. Sweta 1306.

### 36. ANACARDIACEAE

**MANGIFERA L.**


Small to tall trees depending on the variety. Bark blackish-grey, fissured. Leaves oblong-lanceolate, entire or margin undulate, acute, glabrous, shining on upper surface. Flowers in large terminal panicles, yellowish-green, male and bisexual on the same panicle. Fertile stamen 1. Drupe subovoid or obliquely pyriform. Pulp fragrant, orange to whitish. **Flowering and fruiting:** February-July. Extensively planted in the area for the sake of delicious fruits. Sweta 1312.

### 37. MORINGACEAE

**MORINGA** Adans.


Medium sized, soft wooded trees. Leaves 3-pinnate, upto 60.0 cm long, leaflets 5-9 pairs, obovate or elliptic-ovate, entire. Flowers in large panicles; sepals reddish externally near the base; petals creamy white. Antheriferous filaments hairy at the base. Capsule upto 45.0 cm long, trigonous, ribbed, beaked, dark-brown when ripe, seeds winged. **Flowering and fruiting:** February-June. Often planted near villages or in kitchen gardens for edible fruits. Sweta 1314.

### 38. FABACEAE

**KEY TO GENERA:**

1. Stamens 1-adelphous................................. 2
2. Pods jointed, echinate; leaflets 2................... 31. *Zornia*
3. Trees...................................................... 4
4. Flowers cream-yellow; calyx not brown hairy;
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pods oblong or linear, thin.........................................................9 Dalbergia

4. Flowers pinkish; calyx brown hairy; pods
   obliquely oblong, stout.......................................................21. Pongamia

5. Erect, or prostrate herbs; flowers yellow, in racemes;
   pods turgid.................................................................8. Crotalaria

5. Herbaceous or woody twiners; flowers not yellow..................6

6. Stamens 9; seeds pink-red with a black spot........................1. Abrus
   Stamens 10; seeds not as above...........................................7

7. Anthers uniform; leaflets 5-7; style bearded below
   the stigma.................................................................7. Clitoria

6. Stamens 10; seeds not as above 7

7. Anthers dimorphic..........................................................8

7. Style bearded; pods continuous within...............................8. Crotalaria
   Style not bearded; pods septate between the seeds...............25. Teramnus

9. Stamens in two bundles of 5 each; leaves odd-pinnate;
   ripe pods much longer than the calyx.................................10
   Stamens in two bundles of 9+1...........................................11

10. Herbs or shrubs; leaflets numerous pods jointed;
    standard with a central red spot......................................2. Aeschynomene

10. Trees; leaflets 3-5; pods not jointed; standard
    without a red spot.....................................................9. Dalbergia

11. Leaf rachis or leaflets modified into tendrils...................12

11. Leaf rachis or leaflets not modified into tendrils,
    i.e. tendrils absent..................................................13

12. Staminal tube truncate at the mouth.................................15. Lathyrus
   Staminal tube oblique at the mouth..................................29. Vicia

13. Pods jointed; herbs or shrubs.........................................14

13. Pods not jointed; habit various.....................................17

14. Plants spiny; leaves exstipellate....................................3. Alhagi
   Plants not spiny; leaves stipellate..................................15

15. Joints of pods folded on one another...............................28. Uraria

15. Joints of pods not folded .............................................16

16. Joints of pods turgid, if compressed then corolla not
    or hardly exerted.....................................................4. Alysicarpus


17. Trees; leaflets 3, stipellate.........................................18

17. Herbs, shrubs or twiners...............................................19

18. Armed trees; sepals green; petals very unequal in size.........12. Erythrina

18. Unarmed trees; sepals with black tomentum; petals
    nearly equal in size................................................6. Butea

19. Climbing or twining herbs or shrubs................................20
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19. Erect or prostrate herbs, under shrubs or shrubs ........................................... 26
20. Leaves gland dotted beneath ................................................................. 21
20. Leaves not gland dotted beneath ......................................................... 22
21. Pods 3 to many seeded; densely hairy ................................................ 5. *Atylosia*
21. Pods 1-2 seeded; thinly hairy or glabrous .............................................. 22. *Rhynchosia*
22. Style bearded below the stigma .......................................................... 23
22. Style not bearded below the stigma; keel much
   exceeding the standard; anthers dimorphic; pods
   clothed with brittle, irritant bristles .................................................. 20. *Mucuna*
23. Petals almost equal in size ................................................................. 24
23. Petals very unequal in size, blue; standard with
   a white spot in the centre ................................................................... 7. *Clitoria*
24. Stigma terminal; pods compressed ...................................................... 25
24. Stigma oblique; pods turgid ................................................................. 30. *Vigna*
25. Style long and slender, or slightly widened above .................................. 17. *Macrotyloma*
25. Style thick, conspicuously laterally flattened, and
   blade like throughout its length ......................................................... 14. *Lablab*
26. Anthers apiculate ................................................................................... 13. *Indigofera*
26. Anthers muticus or obtuse .................................................................... 27
27. Leaves or leaflets entire ........................................................................ 28
27. Leaves or leaflets toothed ..................................................................... 32
28. Leaflets 5; lower leaflets stipule like, arising
   from the base of petiole; flowers subtended by a reduced
   3-foliate leaf at the end of long peduncle; filaments
   dilated at the apex .............................................................................. 16. *Lotus*
28. Leaflets 1- many; lower leaflets and filaments not as above;
   flowers not subtended by trifoliate reduced leaf .................................. 29
29. Leaflet 1, nearly orbicular, sometimes with
   2 very small lateral leaflets ............................................................... 11. *Eleiotis*
29. Leaflets 3- many; pods 3- many seeded .............................................. 30
30. Flowers in racemes or in peduncled to sessile heads;
   inflorescence axillary ......................................................................... 31
30. Flowers axillary or in leaf opposed and / or
   terminal racemes ............................................................................... 24. *Tephrosia*
31. Pods transversely septate between the seeds; erect
   large herbs or trees ........................................................................... 23. *Sesbania*
31. Pods aseptate or not transversely separate between
   the seeds; flowers in pedunculate, axillary racemes;
   pods 4-7 seeded; climbing or prostrate herbs .................................... 5. *Atylosia*
32. Stipules adnate to the petioles ............................................................. 33
32. Stipules free lateral

33. Leaves digitately 3-foliolate; flowers in axillary, condensed, head-like racemes

33. Leaves pinnately 3-foliolate; flowers in long, axillary racemes

34. Pods spirally twisted, echinate or globose and smooth and 1-seeded

34. Pods linear, straight or slightly upcurved, more than 2-seeded

1. ABRUS Adans.

Deciduous, medium sized woody climbers. Leaves paripinnate; leaflets 12-20 pairs, elliptic-oblong. Flowers in short, axillary or terminal racemes, pinkish. Pods oblong, beaked, usually many seeded, truncate. Seeds subglobose, bright red with a black spot around the hilum. **Flowering and fruiting**: August-January. **Local Name.** Ratti, Ghumchi. Commonly found along roadsides and in the sandy soil. Sweta 309, 576.

2. AESCHYNOMENE L.

Erect, aquatic or amphibious, annual herbs. Stem fistular, warty. Leaves 2-10 cm long, leaflets numerous, small, lanceolate or oblong, glabrous, obtuse. Flowers 1-4, short peduncled. Calyx about 0.5 cm long, lower lip shortly 3-toothed, upper lip 2-dentate, punctate. Corolla cream, often streaked with purple, wings shorter than keels, seeds black. Pods 2.5-5 X 0.4-0.5 cm, slightly curved, 6-10 jointed. **Flowering and fruiting.** August-November. **Local name.** Chhuimui. Common along canal banks, in rice fields and or margins of ditches. Sweta 996.

3. ALHAGI Gagnebin

Erect, deep-rooted, spinous bushy undershrubs. Leaves simple, obovate-oblong, entire. Flowers 1-6 on axillary spines, shortly stalked, reddish or pinkish. Corolla reddish. Pods 2-4.5
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x 0.1-0.2 cm, linear-cylindric, irregularly constricted between the seeds, smooth. **Flowering and fruiting.** March-July. Included on authority of Murty and Singh (1961b).

4. **ALYSICARPUS** Desv. *nom. cons.*

**Key to species:**

1. Pods moniliform..............................................................2
1. Pods not moniliform...........................................................3
2. Calyx shorter than, or as long as the first joint of the pod.............2. *A. monilifer*
2. Calyx much longer than, or equaling the pod..............................3. *A. rugosus*
3. Leaflet broadly elliptic-oblong or linear-lanceolate; pods
turgid, not indented..........................................................4. *A. vaginalis*
3. Leaflets suborbicular; pods compressed; shallowly
indented on both sutures......................................................1. *A. hamosus*


Prostrate, ascending, hirsute, annual herbs. Leaves 1-3 X 1.5-2.5 cm, obtuse, mucronate, base rounded. Flowers purplish, in lax 4-8 flowered racemes. Three lower calyx teeth linear-lanceolate, acute, ciliate. Pods falcate-oblong, 4-7 jointed, hooked along the sutures. Seeds oval, smooth, brown. **Flowering and fruiting.** August-November. Found in moist habitats near ditches. Sweta 324.


Prostrate, perennial herbs. Leaves simple, oblong, obtuse, cordate, glabrous. Flowers shortly stalked, 4-10 in axillary or terminal peduncled racemes, pink. Calyx persistent, teeth lanceolate acute, striate. Pods 2-6 jointed, joints globose, hairs hooked. **Flowering and fruiting.** August-November. **Local name.** Chatta ki ghas. Common along the roadside and in waste places forming dense patches. Sweta 1307.


**Flowering and fruiting.** September-November. Common in grassy places, agricultural fields and on road sides. Sweta 1318.


5. **ATYLOSIA** Wight & Arn.

**Key to species:**

1. Leaflets subdigitate, much longer than the broad .......................... 2. *A. scarabaeoides*

1. Leaflets not subdigitate; the terminal leaflet with an elongated stalk ........................................ 1. *A. platycarpa*


Trailing or twining, hairy herbs. Leaflets 1-2.5 x 0.5-2.0 cm, elliptic-oblong, mucronate, grey-tomentose, membranous, acuminate. Flowers 1-2, in axillary racemes shorter than the leaves, yellow. Bracts ovate, acuminate. Calyx hirsute, lobes ovate-lanceolate, densely pilose, acuminate. Corolla slightly exserted. Pods 2 x 0.5 cm, clothed with deciduous grey hairs, straight, flat; seeds oblong, black. **Flowering and fruiting.** August-November. Found in grassy fields and dried bed of Ganga. Included on authority of Murty and Singh (1961b).

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Slender, trailing annual or perennial herbs with densely grey-downy stems. Leaves subdigitately 3 foliate; leaflets 1-3 x 0.5-2.0 cm, elliptic-obovate, rounded, mucronate, grey tomentose. Stipules minute, caducous. Flowers in axillary, 2-6 flowered corymbose racemes. Calyx densely grey-silky, teeth linear. Corolla yellow, slightly exserted, keel abruptly incurved at the tip. Pods 2 x 6 cm, oblong, straight, 4-6 seeded. **Flowering and fruiting.** August-November. Common in waste lands, Kholas and on roadsides. Sweta 370.


Small or moderate size trees. Leaflets 3, coriaceous, rhomboid or broadly obovate, glabrous above, silky-tomentose beneath, cuneate. Flowers bright orange-red, 5-8 cm long in terminal and lateral racemes. Calyx brown-velvety outside, grey silky within. Corolla silvery tomentose, bright orange-red, keel much curved, acute. Pods 12-15 x 2-6 cm, flat, silky tomentose, pendulous, 1-seeded. **Flowering and fruiting.** March-June. **Local name.** Dhak, Palas, Tesu. Commonly found in Kholas. Also cultivated in gardens for its beautiful flowers. Sweta 1311.

7. **CLITORIA** L.


Climbers with terete, downy, stems. Leaflets 5-9, ovate-oblong, obtuse, 2-4 x 1.0-2.5 cm. Flowers axillary, solitary or paired, blue or rarely white. Bracteoles large, obtuse, suborbicular. Calyx teeth lanceolate. Corolla bright blue with a white centre. Pods 6-12 cm long, linear, flat. Seeds 6-10, oblong, glabrous. black **Flowering and fruiting.** August-March. Found in hedges as an escape. Also cultivated as an ornamental climber. Sweta 1317.

8. **CROTALARIA** L.

**Key to specie:**

1. Leaves 3-foliate ................................................................. 2
2. Leaves simple ................................................................. 3
2. Pods 2-seeded, sessile ......................................................... 4. *C. medicaginea*
2. Pods many seeded, stalked ............................................ 6. *C. orixensis*
3. Stem alate by the decurrent stipules ................................... 1. *C. bialata*
3. Stem exalate; stipules not decurrent .................................. 4
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4. Pods glabrous ................................................................. 5
4. Pods densely hairy ........................................................... 3. C. juncea
5. Pod as long as or hardly exceeding the calyx ....................... 2. C. calycina
5. Pod much exceeding the calyx ........................................... 5. C. mysorensis

Erect, annual, shrubby herbs. Leaves short-petioled, elliptic to obovate, obtuse or retuse, mucronate, appressed hairy, up to 10.0 x 5.0 cm. Racemes few flowered, bracteoles inserted on the calyx. Calyx appressed hairy, up to 1.5 cm. Corolla hardly exserted, pale-yellow. Pod up to 5.0 cm long, 30-40 seeded. **Flowering and fruiting:** September- June. Included on authority of Murty and Singh (1961b).


Tall, erect stiff annual herbs. Leaves 4-15 x 0.5-4 cm, shortly petioled, lanceolate-oblong, mucronate, shining, reddish-brown silky hairy. Stipules minute, subulate. Flowers 3-10, in lateral and terminal lax racemes. Bracts minute, linear. Calyx reddish-velvety, deeply toothed, acuminate. Corolla bright-yellow, exserted, glabrous. Pods 2-3.5 cm long, clothed with short spreading persistent greyish hairs, 6-15 seeded. **Flowering and fruiting:** September-February. Found on road sides and in waste places. Also cultivated. Sweta 362.


Erect annual herbs. Leaves subsessile 2-10 x 0.5-2 cm, linear-oblong, obtuse, mucronate. Stipules foliaceous, linear or lanceolate. Flowers 3-8 in lax racemes. Bracts lanceolate, leafy. Bracteoles inserted just below the calyx, lanceolate. Calyx segments lanceolate, densely ferruginous hairy. Corolla as long as the calyx. Pods subsessile, 3-3.5 cm long, oblong, 50-60 seeded. **Flowering and fruiting.** August-December. Found in grassy areas of river beds and neglected corners of fields. Sweta 1336.


Diffuse, annual or perennial herbs. Leaflets 1.5-4 x 0.2-1.5 cm, elliptic or obovate-oblong, obtuse, gland-dotted beneath. Stipules foliaceous, lanceolate, persistent. Racemes terminal or lateral, 3-10 flowered. Bracts leafy, cordate, acuminate, reflexed. Calyx teeth linear. Pods 1.2-2 cm long, long stalked, oblong, glabrous. Seeds 8-10, reniform, brown, smooth. **Flowering and fruiting.** August-November. Rare in wet habitats. Sweta 21.

9. **DALBERGIA** L. f. nom. cons.

**Key to species:**

1. Leaflets rounded or emarginate at the apex................................. 1. *D. latifolia*

1. Leaflets abruptly acuminate.................................................. 2. *D. sissoo*


Large deciduous trees. Leaves imparipinnate, leaflets 5-9, broadly elliptic, 2-5 x 1.5-4.0 cm, elliptic obovate, obtuse, cuneate. Flowers in lax, axillary panicles, white. Corolla twice the calyx. Pods oblong-lanceolate, 4-8 x 1.2-2.0 cm, flat, 1-4 seeded. Seeds reniform, black. **Flowering and fruiting.** Safed sisum. Included on authority of Murty and Singh (1961b).

Large deciduous trees with grey bark. Leaflets 3-5, alternate, 3-6 x 2-5.5 cm, obliquely ovate, acuminate, suborbicular, glabrous. Flowers subsessile, in axillary panicles, yellowish. Corolla yellowish-white, twice the calyx, standard with long claw. Pods 4-6 x 1 cm, strap shaped, flat, obtuse, mucronate, glabrous, 2-3 seeded. **Flowering and fruiting.** March-August. **Local name.** *Sisum or Shisham.* Commonly found along the roadsides and on boundaries of fields and gardens. Also occurs in *Kholas.* Sweta 1324.

10. **Desmodium** Desv. nom. cons.

**Key to species:**

1. Leaves trifoliate; flowers 1-3 in axillary clusters;
   - small prostrate herbs.............................................. **2. D. triflorum**

1. Leaves simple; flowers in long, axillary and terminal racemes; erect herbs or undershrubs.............................................. **1. D. gangeticum**


Slender erect herbs or undershrubs. Leaflets ovate, oblong, acute, rounded, 3-18 x 2-10 cm, ovate or elliptic, repand, hairy beneath. Flowers in axillary and terminal racemes, white or pink. Bracts triangular, minute, setaceous. Pods linear, flat, 4-8 jointed, clothed with hooked hairs. Seeds smooth, brown. **Flowering and fruiting.** March-December. **Local name.** *Salpalni.* Common in grassy localities, fallow land and on roadsides. Sweta 725.


Small, creeping or prostrate, perennial herbs. Leaflets 0.5-1 x 0.35-0.8 cm, obovate, truncate or emarginate, membranous. Stipules ovate-lanceolate, persistent, acuminate. Flowers 1-3, axillary. Calyx with long white hairs, teeth long, setaceous. Corolla pink. Bracts ovate, acute. Pods 2-5 jointed, linear, flat, often falcate, indented on both the sutures, joints 1-seeded, pubescent. **Flowering and fruiting.** September-November. Common in grassy localities, wastelands and on roadsides. Sweta 192, 295.

11. **Eleiottis** DC.

**Glycine monophylla** Burm. f. Fl. Ind. 161. t. 50. f. 2. 1768.

**Hedysarum sororium** L. Mant. 2: 270. 1771.


Prostrate or straggling, glabrous, annual herbs with wiry stems. Leaves up to 4.0 x 4.5 cm, ovate-orbicular or subreniform. Stipules and stipels scarious. Flowers in axillary 5-10 flowered racemes, pale to creamy-yellow. Calyx-tube truncate. Standard emarginate. Fruits up to 0.5 cm long, boat-shaped, compressed, brown. Seeds subreniform, dark-brown, polished.

**Flowering and fruiting:** August-December. Occasionally found in Kholas. Sweta. 1322.

**Note:** According to Hooker (1876) and Duthie (1960) this species occurs in Bundelkhand in southern part of Uttar Pradesh state, close to Madhya Pradesh. Earlier works on floristics of western Uttar Pradesh, Delhi or Punjab have not documented its occurrence. Therefore, its occurrence in the study area is interesting.

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**12. ERYTHRINA L.**


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**13. INDIGOFERA L.**

**Key to species:**

1. Leaves simple ................................................................. 2
2. Leaves compound ............................................................ 3
3. Leaves linear lanceolate; pods globose, 1-seeded .................. 5. *I. linifolia*
4. Leaves ovate-cordate; pods oblong, 1-2 seeded ..................... 1. *I. cordifolia*
5. Flowers in axillary short peduncled heads; leaves 5-9 foliolate ................................................................. 6. *I. linnaei*
6. Pods densely tomentose ................................................... 3. *I. hirustana*
6. Pods nearly glabrous .................................................. 7. *I. tinctoria*

Prostrate or diffuse, annual herbs. Leaves 0.5-1.5 x 0.5-1.0 cm, subsessile, simple, ovate, cordate, mucronate, hairy at back. Stipules minute, setaceous. Flowers 4-8, in dense nearly sessile heads. Calyx with a short tube. Corolla bright red. Pods oblong, terete, beaked, acute, 2-seeded, seeds ovate, truncated, white. **Flowering and fruiting.** August-December. Included on authority of Murty and Singh (1961).

Densely caespitose, annual herbs. Leaves shortly petioled; leaflets 5, opposite, 4-2 x 0.2-1.0 cm, obovate, oblanceolate, membranous, hairy. Stipules lanceolate, acute, hairy persistent. Flowers in axillary, 2-4 flowered racemed, red. Pods 1-2 cm, straight, turgid, glabrous, 8-12 seeded. Seeds cylindrical, truncate. **Flowering and fruiting.** August-October. Found in dry sandy soil. Sweta 351.

Erect, annual or biennial herbs. Leaflets 5-7, 2-6 x 1.5-4.0 cm, short petioled, ovate-elliptic, hairy, ovate, membranous, greyish-green above, smooth below. Flowers in dense spikes. Calyx teeth long, setaceous, densely pubescent. Corolla exserted, reddish. Pods straight, 4-angled, 6-8 seeded, densely hairy. **Flowering and fruiting.** August-November. Common along roadsides. Sweta 160.


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Suberect or prostrate, suffruticose, perennial herbs. Leaves 0.5-3 x 0.2-0.5 cm, subsessile, linear-lanceolate, appressed hairy, mucronate. Flowers bright red, sessile, in axillary racemes. Bracts ovate-lanceolate. Corolla red, 2-3 times the calyx. Pods ovoid-globose, apiculate, silky hairy, single seeded. Seeds shining, globose. **Flowering and fruiting:** July-December. Common on sandy river beds and in agricultural fields. Sweta 271.


Prostrate, hairy annual-perennial herbs. Leaflets 5-9, obovate, nearly sessile, alternate, oblanceolate-oblong, obtuse, mucronate, hairy. Flowers in axillary, short, capitulate, globose racemes, red. Pods oblong, cylindrical, hairy, 2-seeded. **Flowering and fruiting:** August-December. Commonly grows in wastelands and on roadsides. Sweta 47.


Grey pubescent herbs. Leaflets 7-13, obovate or oblanceolate, apiculate, silvery pubescent beneath. Stipels minute, setaceous. Flowers small, in 15 or more flowered racemes. Calyx silvery pubescent. Corolla exserted, standard greenish yellow, wings pink. Pods 3.5 cm long, slightly curved, deflexed, glabrous when mature, 8-12 seeded, sepal between the seeds. Seeds oblong, truncate. **Flowering and fruiting:** August-November. **Local name.** Neel.
Common in wastelands and on roadsides. Sweta 1326.

14. LABLAB Adans.


Extensive, twining, annual or perennial herbs. Leaflets 3, broadly ovate, acute, entire, cuneate, pale-green. Stipels small, subulate, smooth. Bracts caducous. Bracteoles oblong, spathulate. Calyx teeth short, deltoid. Corolla white or pink. Pods very variable in shape and size, tipped with the hooked persistent base of the style, glabrous, 3-5 seeded. **Flowering and fruiting:** November-June. **Local name.** Sem. It is usually grown along the borders of tall crops, and the castor (*Ricinus communis* *Sem.*) plants often form its support. Sweta 1333.

15. LATHYRUS L.

**Key to species:**

1. Leaflets none; flowers yellow..............................................1. *L. aphaca*
2. Leaflets present; flowers red or bluish.............................2
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2. Pods winged on the back .................................................. 2. *L. sativus*
2. Pods not winged .............................................................. 3. *L. sphaericus*

   Trailing annual herbs. Stipules paired, appressed to stem, leaf-like, hastate or truncate, entire, acute. Flowers yellow, axillary, solitary. Calyx divided halfway down, lobes equal, lanceolate. Corolla yellow, twice the calyx. Pods oblong-linear, glabrous, 4-6 seeded. Seed smooth, black. **Flowering and fruiting:** November-April. **Local Name.** Jangli mattar. Commonly found in cultivated fields, on roadsides and on wet clayey soil. Sweta 715.

   Climbing, annual herbs. Leaves ending in 3 fid tendrils; leaflets 2, linear-lanceolate, oblong, entire. Stipules broad, semi-sagittate. Flowers solitary-axillary. Corolla reddish-purple, rarely white, emarginate. Pods 3-4 cm long, flat, conspicuously winged on either side of the dorsal suture. Seeds 4-5, compressed, brown or yellowish-red. **Flowering and fruiting.** January-March. **Local name.** Hiran Khuri) Often grows on margins of agricultural fields and on roadsides. Sweta 1309.

   Decumbent, ascending, annual herbs. Leaflets 2, 3-15 x 0.2-0.5 cm, linear, oblong, acute; stipules linear, semi-sagittate. Flowers axillary, solitary. Calyx teeth linear. Corolla reddish, twice the calyx. Pods linear, glabrous, wingless, many seeded. Seeds globular smooth. **Flowering and fruiting.** February-May. Found in agricultural fields, grassy and sandy places. This species is commonly found at Bijnor and used as vegetable and added to *Chane ka saag* (leaves of *Cicer arietinum* L.) to improve flavour and taste. Its occurrence in the study area can not be ruled out.

16. LOTUS L.
Erect or prostrate, perennial herbs. Leaves 5-foliate, the lowest pair of leaflets, arising from the base of the petiole and looks like stipules. Flowers reddish-yellow, subtended by a reduced trifoliate leaf. Standard obovate clawed, exceeding the wings, incurved shortly beaked keel, 2-3 times longer than the calyx. Pods brownish, cylindrical, straight, 1-3 cm
Flowering and fruiting: January-April. Occasionally found in moist to wet localities. Note: According to available literature, this taxon was never reported from Upper Gangetic Plain except for a single report from Delhi (Rangaswamy and Chakrabarty, 1966). Sweta 763.

17. MACROTYLOMA (Wight & Am.) Verdc.


18. MEDICAGO L.

Key to species:
1. Flowers blue or violet, not yellow................................. 3. M. sativa
1. Flowers yellow............................................................. 2
2. Pods, yellowish, spiral with armed edges.......................... 2. M. polymorpha
2. Pods blackish, globose, unarmed.................................... 1. M. lupulina


Trailing, hairy, biennial herbs. Leaves trifoliate, leaflets obovate, cuneate, apex notched, entire or dentate. Flowers very minute, yellow, in dense capitate, peduncled racemes. Pods many in clusters, minute, linear, sickle shaped, indehiscent, 1-seeded, glabrous, black at maturity. Flowering and fruiting: Winter season. Occurs in grasslands as weed and on the bed of canals when they dry up in the winter. Sweta 714, 766.


Prostrate, or decumbent-ascending, annual herbs. Leaves trifoliate, leaflets 0.5-3 x 0.5-2.0 cm, obovate, cuneate, emarginate, apex mucronate, dentate. Flowers yellow, in 2-6 flowered racemes. Pods coiled 2-3 times, with 2 marginal rows of spines on outer suture, 2 or 3 seeded.
**Flowering and fruiting**: January-April. Very common weed in cultivated field in winter season. Sweta 771.


Murty and Singh (1961b) reported this species from Hastinapur. This is a cultivated species grown for forage.

19. **MELILOTUS** Mill.

**Key to species:**

1. Flowers yellow; plants slender..........................2. *M. indica*
2. Flowers white; plants robust..........................1. *M. alba*


Erect or ascending annual or biennial herbs. Leaflets 1.5-3.0 x 0.5-1.5 cm, obovate oblanceolate, dentate, glabrous. Stipules linear, acuminate. Flowers many in lax axillary racemes. Corolla yellow, minute, standard exceeding the wings and keel. Pods 0.3-0.4 cm long, ovoid or oblong, 1-2 seeded, glabrous, reticulately veined, supported by red, persistent calyx. **Flowering and fruiting**: January-April. **Local name**: Morila. Common weed of cultivated fields. Sweta 1323.

20. **MUCUNA** Adans. *nom. cons.*


**Flowering and fruiting**: September-March. **Local Name**: Kaunch. Found on banks of Ganga or on roadsides and **Kholas** climbing on trees or spreading on stony embankments. Sweta 148.

21. **PONGAMIA** Vent. nom. cons.


Moderate sized, glabrous, almost evergreen trees. Leaves imparipinnate, pale-green; leaflets usually 5-7, 4-10 x 3-5 cm, oblong or ovate, acuminate, entire, sub-coriaceous. Flowers in axillary racemes, pinkish-white. Calyx densely covered with ferruginous hair. Corolla white, tinged with pink. Pods 3-6 x 1.5-03.0 cm, obliquely oblong, woody, glabrous, brownish green, 2-seeded. Seeds white with brownish lines. **Flowering and fruiting**: Marchy-June. **Local name**: Karanj. Often planted along roadsides. Sweta 1349.

22. **RHYNCHOSIA** Lour. nom. cons.

**Key to species:**

1. Plants trailing; flowers in capitate racemes; pods
   orbicular; seeds strophiolate................................................................. 1. *R. capitata*

1. Plants twining; flowers in lax racemes; pods
   elliptic-lanceolate............................................................................... 2

2. Leaflets small, nearly glabrous............................................................ 2. *R. minima*

2. Leaflets large, softly pubescent; stipules lanceolate,
   subpersistent...................................................................................... 3. *R. rothii*


Trailing or climbing, annual, hairy herbs. Leaves petiolate, 3 foliate, terminal leaflets rhomboidal, ovate-elliptic, gland-dotted beneath, cuneate. Flowers in axillary capitate racemes, yellow. Pods nearly orbicular, shortly beaked, reddish-brown with green spots and
white, long hairs, often burried in the sand, 2-seeded. **Flowering and fruiting:** April-November. Occasionally found on damp, sandy soil. Sweta 145.


Twinning annual herbs, nearly or quite glabrescent. Leaves 3-foliate, leaflets 2.0-5.0 x 1.5-3.0 cm, rhomboid-ovate, obtuse or acute, yellow-dotted. Flowers in 6-10 flowered, axillary racemes. Corolla yellow, standard hairy on back, purplish-streaked. Pods oblong-falcate, turgid, beaked, usually 2-seeded. Seeds compressed, black. **Flowering and fruiting.** August-November. Common among hedges in wastelands and on road sides. Sweta 1332.


**Key to species:**

1. Herbs or undershrubs; branches and leaf-rachis prickly………………1. **S. bispinosa**

1. Trees or shrubs; branches and leaf-rachis not prickly………………2. **S. sesban**


Erect, large, annual herbs. Leaves pinnate; leaflets 10-45 pairs, shortly petioled, oblong-lanceolate, unequal, apex obtuse, thinly hairy, distinctly mucronate. Stipules caducous. Leaves retain their green colour in herbarium specimens. Flowers yellowish, small, 1-6, in short racemes. Pods 20-30 cm long, many seeded, tomentose, beaked, glabrous. **Flowering and fruiting:** August-October. Common in rice fields and swampy areas. Sweta 112.

Glabrous, soft wooded shrubs or small trees. Leaflets many, 0.5-2.5 x 0.2-0.5 cm, linear-oblong, obtuse or acute, membranous, pale-green, apiculate, glabrous. Flowers in dropping, axillary racemes, yellow. Calyx with short deltoid teeth. Corolla pale-yellow, often dotted with purple. Pods 15-30 cm long, linear, straight, beaked, glabrous, flexible, twisted, 20-40 seeded. **Flowering and fruiting.** Almost throughout the year. **Local name.** Rawasan, Jainti. Usually planted near villages. Sweta 1342.

24. **TEPHROSIA** Pers. nom. cons.

**Key to species:**

1. Leaves simple.................................................................3. *T. strigosa*

1. Leaves imparipinnate.........................................................2

2. Racemes 1-3 flowered......................................................1. *T. pumila*

2. Racemes more than 3 flowered; pods straight or slightly curved at the end; leaflets 11-21; calyx teeth as long as tube.......... 2. *T. purpurea*


Small, perennial, deep-rooted herbs. Leaflets 6-12, oblanceolate, glabrous or hairy, cuneate, apex retuse. Flowers reddish-purple. Pods straight, brown, 4-6 seeded. Seed yellowish green with black spots. **Flowering and fruiting:** August-October. Commonly found in sandy habitats. Sweta 168.


Erect, perennial herbs, woody at base. Leaves imparipinnate leaflets, 6-7 pairs, oblong-obovate, hairy beneath, glabrous above. Flowers in axillary or terminal racemes, dark-purple. Calyx densely silky, teeth linear. Corolla red, thinly silky. Pods linear, brown, slightly curved near apex, hairy, 4-6 seeded. Seeds yellowish-green with dark or blackish strips. **Flowering and fruiting:** May-December. Commonly found in wastelands and on sandy soils. Sweta 15,171.

Appressed hairy, annual herbs. Leaves up to 10 x 0.8 cm, simple, linear-lanceolate, thinly silky beneath. Flowers 1-2 in the axils of leaves, bluish-yellow. Pedicel filiform. Calyx teeth shorter than the tube. Standard pubescent on the back. Style short, glabrous, filiform. Pods up to 4.0 cm long, linear, flat, appressed hairy, 6-10 seeded. **Flowering and fruiting:** August-November. Included on authority of Murty and Singh (1961b).

25. **TERAMNUS** R. Br.


Prostrate or twining herbs, thinly hairy. Leaves 3-foliate, leaflets up to 5.0 x 2.0 cm, rhomboid-oblong or ovate-lanceolate, appressed hairy beaneath. Flowers solitary or in few-flowered, axillary racemes, reddish. Pods up to 5.0 cm long, linear, slightly curved at the apex, 8-12 seeded. Seeds oblong, glabrous, brown-black. **Flowering and fruiting:** August-November. Common in grassy habitats, especially in plantations. Sweta 1356.

26. **TRIFOLIUM** L.

**Key to species:**

1. Inflated part of the calyx pyriform, with distinctly exserted, divergent upper teeth.................................1. *T. resupinatum*

1. Inflated part of the calyx globose with inwardly or slightly exserted, recurved upper teeth.................................2. *T. tomentosum*


Decumbent-ascending, annual, glabrous herbs. Leaves trifoliate, leaflets 1.5-2.5 x 1.2-1.5 cm, obovate-lanceolate, serrate-dentate, apex rounded, emarginate,. Flowers pinkish, in axillary capitate heads. Calyx appressed hairy on back, teeth subulate, fruiting calyx pyriform, densely hairy, reticulate. Pods 2-seeded. **Flowering and fruiting:** January-April. **Local Name:** Barseen. Found as weed in cultivated fields. Sweta 709.


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Fruiting calyx globose densely hairy. **Flowering and fruiting:** October-March. Common in waste places and fallow fields etc. Sweta 1360.

27. **TRIGONELLA** L.

**Key to species:**

1. Racemes exceeding the leaves; pods upcurved...1. *T. corniculata*
2. Racemes shorter than or equaling the leaves; pods slightly curved.......................2. *T. monantha* subsp. *incisa*


Erect or suberect, glabrous annual herbs. Leaflets 1-1.2 x 0.5-1.0 cm, obovate, rounded emarginate, serrate-dentate; stipules lanceolate. Flowers, yellow, closely racemed on axillary, solitary peduncles. Calyx teeth shorter than the tube, glabrous or thinly hairy. Pods 3-4 cm long, glabrous, transversely veined, 4-8 seeded. **Flowering and fruiting.** January-March. Found in cultivated fields during winter season. Sweta 1368.


Prostrate or decumbent ascending, annual herbs. Leaflets obovate, 0.4-0.5 x 0.3-0.5 cm, cuneate, emarginate, sharply incise-dentate. Stipules semi-sagittate. Flowers 1-6, sessile, clustered on axillary peduncles. Calyx teeth setaceous, shorter than the sub-cylindrical tube. Corolla slightly exserted, yellow. Pods 0.3-0.4 cm long, 10-20 seeded, transversely wrinkled, falcate, appressedly hairy. **Flowering and fruiting.** March-May. Murty and Singh (1961b) reported it from the study area.

28. **URARIA** Desv.


Erect, perennial undershrubs. Leaves imparipinnate, leaflets, linear-lanceolate, 3-9 pairs, rigidly coriaceous, acute, pubescent beneath; stipules lanceolate, acuminate. Racemes in dense cylindrical heads. Corolla exserted purple. Pods glabrous, whitish, 3-6 jointed. **Flowering and fruiting.** September-November. Murty and Singh (1961b) reported it from the study area.
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29. VICIA L.

Key to species:

1. Erect herbs; wings with black or dark-brown spots...................... 1. *V. faba*
2. Prostrate or climbing herbs; corolla without black spots.................. 2
3. Flowers lilac or white; 1-5 together........................................ 2. *V. hirsuta*
4. Flowers reddish-pink; solitary or paired................................. 3. *V. sativa*


Twinning, glabrous or hairy, slender, annual herbs. Leaves paripinnate, leaflets 4-8 pairs, 0.1-3.0 x 0.1-0.35 cm, linear-oblong, mucronate, glabrous; stipules semi-sagittate, toothed. Flowers very small, white or bluish in 1-4 flowered racemes. Calyx appressedly hairy. Corolla slightly exserted. Pods elliptic-oblong, 2-seeded, constricted between the seeds when mature. Flowering and fruiting: Winter season. Local Name: Baklia, Kala Matar. Abundant in cultivated fields and among hedges. Sweta 702.


30. VIGNA Savi.

Erect or decumbent, ascending, annual herbs. Leaves 3-foliate, leaflets palmatifid; stipules small, narrowly lanceolate. Flowers minute, yellow in dense racemes, peduncles hairy.
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Bracteoles linear. Pods 3-5 cm long, 3-8 seeded. Seeds oblong, smooth, brown. **Flowering and fruiting.** October-December. Found on roadsides and in cultivated fields. Sweta 1339.

31. ZORNIA J. F. Gmel.


Annual, prostrate herbs. Leaves bifoliate, stalked, leaflets 2, 1-3 x 0.5-1.0 cm, lanceolate, acute, black dotted at lower surface; stipules semi-sagittate. Flowers yellow, in between 2 large, acute, acuminate, ovate-lanceolate, ciliate bracts. Calyx segments lanceolate, ciliate. Standard yellow, purplered veined. Pods 1-6 jointed, exserted, covered with tough hairs. **Flowering and fruiting:** August-October. Found frequently in damp, shady localities. Sweta 315.

According to APG-2 all genera listed above belong to group Faboideae Rudd of Fabaceae.

39. **CAESALPINIACEAE**

**KEY TO GENERA:**

1. Leaves simple; calyx spathaceous or splitting into
two halves..............................................................................1. Bauhinia

1. Leaves pinnate...........................................................................2

2. Leaves 1-pinnate........................................................................3

2. Leaves 2-pinnate........................................................................5

3. Leaf rachis ending in spine, rachilla flat, leaflets small;
pods moniliform..........................................................................5. Parkinsonia

3. Leaf rachis and rachilla not as above........................................4

4. Petals 3; fertile stamens 3, monadelphous;
large trees with acid leaves.......................................................6. Tamarindus

4. Petals 5; fertile stamens 5-10, free; herbs, shrubs or trees;
leaves not acid..........................................................................3. Cassia

5. Straggling shrubs; pods armed..................................................2. Caesalpinia

5. Erect shrubs or trees; pods not armed......................................6

6. Sepals valvate; stamens shorter than petals............................4. Delonix

6. Sepals imbricate; stamens longer
than petals..................................................................................2. Caesalpinia

**1. BAUHINIA L.**

**Key to species:**

1. Fertile stamens 10 ....................................................................2. _B. racemosa_
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1. Fertile stamens 3-5 ................................................................. 2
2. Calyx spathaceous ................................................................. 3. B. variegata
2. Calyx divided into 2 halves .................................................... 1. B. purpurea

Small or medium sized trees. Leaves longer than broad, 9-11 nerved; lobed nearly halfway down. Flowers rose-coloured. Calyx usually splitting into two halves. **Flowering and fruiting:** September – December. Often planted on roadsides by Forest Department. Sweta 1392.

Small trees with drooping branches and dark bark. Leaves broader than long, divided nearly halfway down, lobes rounded, tomentose beneath. Flowers in terminal or leaf opposed racemes, white. Pods 15-25 x 1.0-2.5 cm, blunt apically, somewhat falcate, glabrous. **Flowering and fruiting:** May-November. Murty and Singh (1961b) reported it from the study area.

Differs from preceding species in lip often marked with purple or red; spathaceous calyx and narrower pods. **Flowering and fruiting:** February – October. Often cultivated on roadsides and in gardens etc. Sweta 1385.

2. **CAESALPINIA** L.

**Key to species:**
1. Scandent shrubs; flowers yellow; pods broader than long, covered with spines .................................................. 1. C. bonduc
1. Erect shrubs; flowers red-yellow; pods longer than broad, glabrous .................................................. 2. C. pulcherrima

Scandent, armed shrubs. Prickles straight. Leaves upto 20.0 cm long; pinnae 6-8 pairs; leaflets
6-10 pairs, elliptic-oblong, pubescent beneath. Flowers in terminal and axillary racemes,
yellow. Pods ovoid oblong, somewhat flattened, covered with long spines, 1-2 seeded. Seeds
oblong, smooth, lead coloured. **Flowering and fruiting:** July–December. Often found near
villages and in *Kholas*. Sweta 563.

A medium sized shrub. Branches prickly and lenticellate. Pinnae 8-16. Leaflets numerous,
oblique-oblong. Flowers long pedicelled, in erect terminal racemes. Pods thin, broad, brown
when ripe. **Flowering and fruiting:** April–December. Often planted in gardens and parks etc.
Sweta 1348.

3. **CASSIA** L.

**Key to species:**
1. Trees or shrubs.................................................................2
1. Herbs..............................................................................6
2. Inflorescence erect; pods winged........................................2. *C. alata*
2. Inflorescence and pods not as above.................................3
3. Bracts conspicuous, persistent; leaflets 8-20 pairs;
   racemes from scars of fallen leaves.................................6. *C. renigera*
3. Bracts small, caducous.....................................................4
4. Fertile stamens 6-7............................................................7. *C. siamea*
4. Fertile stamens 10............................................................5
5. Stamens nearly all equal in length; pods
   flat, dehiscent.................................................................9. *C. surattensis*
5. Stamens unequal; pods cylindric, very long, indehiscent..........3. *C. fistula*
6. Foliar glands on the petiole always present, may
   or may not be present between the leaflets.....................7
6. Foliar glands always present between the leaflets;
   usually no gland on the petiole........................................9
7. Glands stalked, peltate; prostrate small herbs; stamens 5........5. *C. pumilla*
7. Glands sessile; stamens usually more than 5......................8
8. Leaflets 3-5 pairs...........................................................4. *C. occidentalis*
8. Leaflets 8-12 pairs.........................................................8. *C. sophera*
9. Leaflets 2 pairs; plants with viscous hairs.........................1. *C. absus*
9. Leaflets more than 2 pairs; plants with simple hairs...........10. *C. tora*


Erect undershrubs or shrubs. Leaflets 5-15 pairs; lowest pair close to the base of petiole, higher leaflets oblong or oblong-ovate. Racemes upto 80.0 cm long (inclusive stalk). Petals connivent, bright yellow. Fertile stamens 10. Pods patent, black when mature, broadly winged. Seeds numerous. **Flowering and Fruiting:** Often planted in the area. Sweta 1330.


Medium to large sized deciduous trees, bark whitish grey. Leaflets 4-8 pairs, ovate or elliptic-ovate, glabrous above thinly hairy beneath. Flowers in long, pendulous racemes, sulphur-yellow or lemon yellow. Calyx much shorter than the petals. Pods long, cylindric, indehiscent, blackish-brown when mature. Seeds embedded in brown pulp, ovate or ellipsoidal. **Flowering and Fruiting:** February – July. Extensively planted as an avenue tree. Sweta 1321.


Subglabrous undershrubs. Leaflets 3-6 pairs, upto 10.0 cm long, lanceolate or ovate-lanceolate. Flowers in axillary corymbs, arranged in terminal panicles, yellow. Pods slightly curved, linear oblong, transversely septate. Seeds smooth, greenish-brown. **Flowering and Fruiting:** June-December. Common on roadsides and wastelands. Sweta


Erect or ascending, thinly hairy, annual, herbs. Leaflets 20-30 pairs, close-set. Flowers shortly pedicelled, solitary-axillary. Stamens 5. Pods upto 4.0 cm long, straight, linear, pale to dark-brown. Seeds 5-10, brown. **Flowering and Fruiting:** August-December. Common in grassy localities. Sweta 169. Among the species of *Cassia*, this species possesses smallest leaflets. This plant remains concealed among the grasses.


Medium sized to large trees, bark blakish-brown. Leaflets upto 14 pairs, ovate-oblong or ellipsoid-oblong. Flowers yellow, in large terminal, corymbose racemes. Fertile stamens 6-7, usually 3 posterior ones small. Pods, nearly straight, beaked, flat, sutures thickened. Seeds flat, glabrous, dark-brown. **Flowering and fruiting:** Nearly round the year. Commonly planted on roadsides. Sweta 1319.


Erect, glabrous or subglabrous under shrubs. Leaflets 8-10 pairs, upto 6.0 cm long, lanceolate, acute. Flowers in axillary and terminal, umbellate racemes, yellow. Pods turgid, linear, septate. Seeds ovoid, dark-brown. **Flowering and fruiting:** April-December. Often found in waste places and near villages. This taxon is less frequent than *C. occidentalis*. Sweta 1350.


Small trees. Leaflets 4-6 pairs, light-green, oval-oblong, obtuse or rounded, thinly hairy. Racemes short, stalk hairy. Flowers bright yellow. Pods often curved, flat, 15-30 seeded. **Flowering and fruiting:** April-June, followed by a second, generally less profuse, flush in September. Sweta 1357.


Low, thinly hairy herbs. Leaflets sessile, upto 5.0 cm long, obovate. Flowers axillary, paired, yellow. Pods narrowly-linear, reticulate, beaked, sepals persistent. **Flowering and fruiting:** July-October. Frequently found on roadsides and in waste places. Sweta 203.

4. **DELONIX** Rafin.

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A large, handsome, deciduous tree with hemispheric crown and dense foliage. Leaves 2-pinnate. Leaflets numerous. Flowers red or orange-red; odd petal often blotched with dark-red and white. Filaments red. Pods woody, upto 50.0 cm long, septate between seeds. Seeds oblong. **Flowering and fruiting:** Nearly round the year. Sweta 1361.

5. PARKINSONIA L.
Large, glabrous, armed shrubs. Leaves 2-pinnate, rachis flat about 0.5 cm wide; leaflets very small 20-30 pairs, ovate-oblong. Flowers in axillary racemes, yellow. Petals crumpled, posterior petal blotched with red. Pods linear, constricted between seeds, light brown when ripe. Seeds oblong, smooth, mottled. **Flowering and fruiting:** May- July. Often planted in wastelands and on roadsides. Sweta 1401.

6. TAMARINDUS L.
Large trees with rough bark and dense crown. Leaflets 10-20 pairs, acid, oblong. Flowers yellow, blotched with red. Young pods green, falcate; mature pods reddish-brown, fibrous, pulpy inside, pulp usually acid. Seeds dark-brown, polished. **Flowering and fruiting:** July-December. **Local name:** Imli, Katari (fruits). Commonly planted as avenue tree. Sweta 1422.

**Note:** According to APG-2 all genera listed above belong to group Caesalpinioideae Candolle of Fabaceae.

*Saraca asoca* (Roxb.) de Wilde is cultivated as an ornamental and medicinal plant.

40. MIMOSACEAE

**KEY TO GENERA:**

1. Stamens definite, as many as or twice as many as petals.............. 2
2. Flowers in heads.................................................... 3
3. Plants and fruits prickly; fruits curved, with segmented valves and indehiscent sutures........................................ 4. *Mimosa*
4. Plants armed with spines or prickles................................ 5

3. Unarmed; fruits straight, dehiscing at the sutures; shrubs or trees; heads creamy-white; anthers not gland tipped................................................................. 3. *Leucaena*
4. Plants unarmed ................................................................. 2. Albizia
5. Pinnae 1-pair; stamens monadelphous; pods coiled ................ 5. Pithecellobium
5. Pinnae more than one pair; stamens free; pods flat,
straight ........................................................................ 1. Acacia

1. ACACIA Mill.

Key to species:
1. Flowers in globose heads ................................................. 2
1. Flowers in cylindrical spikes ........................................... 6
2. Trees or shrubs ............................................................... 3
2. Climbers ....................................................................... 5
3. Pods moniliform ............................................................. 6. A. nilotica
3. Pods not moniliform ........................................................ 4
4. Heads axillary, fascicled ................................................. 3. A. farnesiana
4. Heads in terminal panicles ............................................. 5. A. leucophloea
5. Stipules cordate-ovate; pinnae 3-6 pairs;
flowers pinkish in bud ................................................... 7. A. sinuata
5. Stipules linear, caducous; pinnae 7-14 pairs;
flowers creamy-white .................................................... 4. A. gageana
6. Unarmed; leaves absent; phyllodea falcate;
flowers yellow; pods coiled ............................................ 2. A. auriculiformis
6. Armed; leaves present; phyllodea absent;
flowers pale-yellow; pods straight .................................. 1. A. catechu

A medium sized tree, spines hooked, paired; bark dark-brown. Petiole up to 10.0 cm long often prickly; pinnae 15-20 pairs; leaflets numerous, linear. Flowers in 5-7 cm long cylindrical spikes, white, fragrant. Fruit 5.0-6.0 cm long, flat, dark-brown, shining. **Flowering and fruiting:** August-November. **Local name:** Khair. Found in Kholas. Sweta 1435.

A medium sized to tall tree, branches drooping. Petiole flattened into a falcate, parallel veined, coriaceous, glabrous phyllode. Flowers bright yellow, in axillary spikes, 5-merous.
Pod spirally twisted, brown, 5-10 seeded. **Flowering and fruiting:** August-December. Often planted on roadsides and in Kholas. Sweta 1334.


A small tree with straight stipular spines. Leaves 2-pinnate, pinnae 2-8 pairs, leaflets 10-20 pairs, small. Flowers yellow in globular heads arranged in axillary fascicles, fragrant. Pods 4-6 x 1.5 cm, thick, dark-brown, cylindric, tip hooked. Seeds in 2 rows. **Flowering and fruiting:** November-June. Frequently occurs around Kholas. Sweta 1337.


A large, prickly, scrambling shrub, stems fluted, angled. Leaf-rachis 15.0 cm long; gland near rachis base, similar glands often present between upper 1-3 pairs of pinnae; pinnae 6-14 pairs, 5-10 cm long; leaflets 15-30 pairs. Flowers pale or cream white in pedunculate heads, 0.3-1.3 cm across, arranged in large terminal panicles. Pod 12-15 cm long, strap-shaped, brown. **Flowering and fruiting:** August- April. Included on authority of Murty & Singh (1961b).


A medium sized, grey-tomentose, thorny tree, spines straight, white. Leaf rachis downy, pinnae 6-12 pairs, 2.5- 4.0 cm long, gland cup-shaped; leaflets 15-30 pairs, crowded, linear, rigidly coriaceous. Heads about 1.0 cm in diam., in large terminal panicles, bracts 2. Corolla very small, pale-yellow or white. Pod up to 15.0 cm long, narrowly ligulate, curved, 8-12 seeded. **Flowering and fruiting:** September- October. Included on authority of Murty & Singh (1961b).


Small to large trees, bark dark-grey, spines stipular. Pinnae 4-6 pairs; leaflets 10-20 pairs about 0.5 cm long, membranous, thinly hairy. Flowers yellow, fragrant, 1.0-1.5 cm across, often arranged in panicle. Calyx minute, campanulate. Corolla twice the calyx. Pod up to 15.0 cm long, sutures indented. Seeds elliptic-ovate, compressed, 8-12 in a row. **Flowering and**
fruiting: August-February. Frequently found near the villages. Local name: Babul, Keekar.
Sweta 1445.

Large, prickly climbing shrubs, prickles curved. Leaf rachis up to 15.0 cm long, with a large gland near the base; pinnae 3-6 pairs; leaflets 6-20 pairs, linear, obtuse, very unequal at the base. Heads globose, 1.0-1.5 cm across, arranged in large panicles. Calyx tubular, crimson. Corolla little exserted, white, veined with red. Pods up to 10.0 cm long, straight thick and succulent, sutures broad, 6-10 seeded. Flowering and fruiting: April-December. Included on authority of Murty and Singh (1961b).

2. ALBIZIA Durazz.

Key to species:
1. Flowers in umbels, stalked; pods straw colored
   1. A. lebbeck
2. Flowers in panicles, sessile; pods reddish or brown
   2. A. odoratissima


This species can be readily distinguished from the preceding one by sessile flowers and narrower and reddish-brown pod. Flowering: April-May. Included on authority of Murty and Singh (1961b).

3. LEUCAENA Benth.

Soft wooded, small trees or shrubs. Leaves large, 2-pinnate; pinnae 6-7 pairs, a prominent gland present between lowest pair of pinnae; leaflets 14-17 pairs, linear, acute. Main rachis as well as secondary rachii end in a bristle. Peduncles solitary or paired, axillary, flowers arranged in globose heads. Petals 5, greenish-white. Stamens twice the length of corolla, anthers versatile. Pod strap-shaped, flat, shining dark-brown, in umbellate clusters, shortly beaked, many seeded. Flowering and fruiting: September-March. Often planted in the study area. Sweta 1458.

4. Mimosa L.

Key to species:

1. Prostrate or diffuse herbs; pinnae 1-2 pairs; stamens 4................. 2. M. pudica

1. Erect or straggling shrubs; pinnae 6-10 pairs; stamens 8............. 1. M. himalayana


An erect, prickly shrub. Leaves 2-pinnate, rachis ending in a bristle; pinnae 5-12 pairs; leaflets up to 20 pairs, oblong, unequal sided, obtuse, mucronate. Flowers 4-merous, pink, turning to white. Stamens 8-10. Fruits up to 12.0 x 1.25 cm; slightly curved, smooth, joints 4-10, each 1-joint seeded. Flowering and fruiting: August-January. Often found on banks of Ganga. Sweta 183.


5. Pithecellobium Mart. nom. cons.

Thorny trees, up to 10.0 m high, bark greyish-white. Leaves 2-pinnate; leaflets 2, oblique-rhomboide or elliptic-oblong, coriaceous, glaberescent. Heads in terminal and axillary panicles, 0.5-1.0 cm across, white. Pods spirally twisted, torulose, red-brown, pulp sweet. Seeds broadly ovate, polished, black, covered with red or dirty green aril. **Flowering and fruiting:** March-October. **Local name:** Jangal-falebi. Found on roadsides. Ripe pods are eaten. Sweta 1495.

6. PROSOPIS L.


Small trees or large shrubs, up to 5.0 m high, with solitary axillary spines. Leaves 2-pinnate, pinnae 1-2 pairs, leaflets 15-25 pairs, up to 15 x 4.0 mm, obliquely oblong, obtuse or mucronate. Flowers greenish-yellow, in cylindrical pendulous spikes. Stamens 10. Fruit up to 20.0 cm long, pendulous, sub-falcate, yellow, pulp sweet. Seeds ovoid to ellipsoid, glossy, brown. **Flowering and fruiting:** Almost round the year. Common in Kholas. Sweta 1476.

Note: According to APG-2 all genera listed above belong to group Mimosoideae Candolle of Fabaceae.

41. ROSACEAE

**POTENTILLA L.**

**Key to species:**

1. Leaves pinnately compound; flowers solitary axillary .................. 2. *P. supina*

1. Leaves digitately compound; flowers in cymes, combined into a leafy panicle ........................................ 1. *P. sundaica*


Small, decumbent, appressed hairy, annual herbs. Lower leaves 5-foliolate, petiolate; upper ones 3-foliolate, sessile; leaflets oblong-obovae, dentate, obtuse. Flowers small, yellow, in axillary cymes. Bracteoles lanceolate, hairy, notched or 2-fid up to 0.5 cm long. Petals yellow, obcordate, up to 0.5 cm long. Style sub-terminal. Achene subreniform, rugose, reddish-brown. **Flowering and fruiting:** February-June. Occasionally found on moist ground near the bank of river Ganga. Sweta 887.
Annual herbs with dichotomous branches. Radical leaves hairy, petiole up to 9.0 cm long, upper ones short-petioled; leaflets 5-9 in lower leaves and 3-5 in upper leaves, obovate, opposite or alternate. Flowers solitary axillary, yellow. Bracteoles ovate-oblong, entire, hairy. Styles ventral. Achenes numerous, ovoid, smooth. **Flowering and fruiting:** February-June. Common in moist and grassy localities and on semi-dried beds of ponds and ditches. Sweta 616, 654.

### 42. COMBRETACEAE

**KEY TO GENERA:**

1. Climbers with white, pink flowers................................. 2. *Quisqualis*
1. Trees or herbs with yellowish flowers.............................. 2
2. Herbs with xylotubers.................................................. 1. *Combretum*
2. Trees........................................................................ 3. *Terminalia*

1. **COMBRETUM** Loefling *nom. cons.*

Low undershrubs, nearly glabrous. Branches 15.0 – 50.0 cm long. Leaves upto 8.0 cm long, ovat-lanceolate, glabrous, shining, punctate on both surfaces. Racemes 1 to few, subterminal about 5.0 cm long. Flowers 4- merous, cream-white in colour. Calyx tube hairy at the base within, funnel-shaped. Petals narrowly obovate, longer than the calyx. Fruit about 4.0 cm long, wings 4, papery. **Flowering and fruiting:** July-September. Occasionally found in *Kholas* among grasses. Sweta 1325.

2. **QUISQUALIS** L.

A large, deciduous, climbing shrub. Bark thin, light brown. Leaves elliptic or ovate-oblong, upto 10.0 cm long, entire, acute. Flowers white and pink, in drooping terminal spikes fragrant, especially at night. Calyx tube long, teeth reflexed. Ovary angled. Fruits not seen. **Flowering:** April-October. Widely cultivated in the area as an ornamental, occasionally found as an escape. Sweta 1331.

3. **TERMINALIA** L. *nom. cons.*

Key to species:
1. Leaves long petioled; obovate-cuneate, crowded at the end of branches; fruits without wings, velvety. ................................................................. 2. T. bellerica

1. Leaves shortly petioled; elliptic-oblong, distributed through the length of branches; fruits winged, fibrous. ................................................................. 1. T. arjuna


Tall trees. Bark greenish-white, exfoliating in flat, thin pieces. Leaves upto 20.0 cm long, elliptic-oblong, margins subentire, base 1-2 glandular. Flowers in terminal panicles, whitish-yellow. Fruits obovoid-oblong, glabrous, dark-brown, with four fibrous wings. **Flowering and fruiting:** March-November. Often planted on roadsides and in wasteland. Sweta s. n.


Deciduous, tall trees. Bark dark-grey to nearly black, longitudinally fissured. Leaves long petioled, upto 20.0 cm long, crowded at the ends of branches, broadly obovate, cuneate. Spikes upto 15.0 cm long, axillary or from the axils of fallen leaves. Flowers foetid smelling, male flowers usually towards the upper part of the spike. Calyx teeth woolly inside. Petals none. Stamens much exerted. Fruit globose or ovoid, grey-tomentose. **Flowering and fruiting:** March-August. Planted on road sides. Sweta 1524.

### 43. MYRTACEAE

**KEY TO GENERA:**

1. Flowers red, in pendulous spikes; leaves stiff, narrowly lanceolate ................................................................. 1. Callistemon

1. Flowers neither red nor in pendulous spikes ................................................................. 2

2. Fruit a cup shaped capsule ................................................................. 2. Eucalyptus

2. Fruit succulent, not cup shaped ................................................................. 3

3. Flowers on 1 or few flowered axillary peduncles; fruit with numerous seeds ................................................................. 3. Psidium

3. Flowers in large paniculate cymes; fruit 1-seeded ................................................................. 4. Syzygium

1. CALLISTEMON R. Br.
**Callistemon lanceolatus** DC. Prodr. 3: 223. 1828; Fl. Delhi 158. 1963.


**Note:** According to WCSPF the authority and citation of this combination is as follows:

*Callistemon lanceolatus* (Sm.) Sweet, Hort. Brit.: 155. 1826.

**2. EUCALYTUS** L’Herit

Following species of *Eucalyptus* are planted in the area.

3. *E. camaldulensis* Dehnh.

**3. PSIDIUM** L.


Large shrubs or small trees. Stem knotty, bark smooth, light-brown. Leaves shortly petioled, entire. Flowers white, one or few in leaf axils. Berries yellowish when ripe, crowned with persistent calyx, pulp white or pink. **Flowering and fruiting:** There are two flushes of flowering and fruiting one in rainy season and the second in winter season. Rainy season fruits are often infested with larvae of fruit fly. Extensively planted in orchards. Sweta 1338.

**4. SYZYGIUM** Gaertn. *nom. cons.*


Large trees with light-brown and shallowly fissured bark. Leaves ovate-lanceolate, chartaceous, obtuse-acuminate, upper surface shining. Flowers in panicked cymes, nearly sessile; pale or greenish-white. Corolla calyptrate. Stamens numerous. Berries globose or oblong, purple. **Flowering and fruiting:** March-August. Commonly planted on road sides and in orchards for the sake of edible fruits. Sweta 1320.

**WCSPF citation for the family:**

44. LYTHRACEAE

KEY TO GENERA:

1. Herbs................................................................. 2
2. Shrubs or trees........................................................ 3

2. Flowers with petals, in terminal paniculate inflorescence........................................ 4. Rotala

2. Flowers without petals, in axillary cymes..................... 1. Ammannia
3. Stamens 8........................................................................ 3. Lawsonia
3. Stamens numerous........................................................... 2. Lagerstroemia

1. AMMANNIA L.

Key to species:

1. Petals present ............................................................. 1. A. auriculata
1. Petals absent............................................................... 2. A. baccifera


Erect, much branched, annual herbs. Stems 4-angled and narrowly winged in upper part. Leaves upto 8.0 cm long, linear-lanceolate, auriculate. Flowers in few flowered, axillary cymes, purplish or dark-pink. Capsules globose, exceeding the calyx tube, red when ripe. **Flowering and fruiting:** September-November. Rare, occasionally found in moist localities. Sweta 1327.


Erect or ascending, glabrous herbs. Leaves oblong or narrowly elliptic, base narrowed, rounded or subcordate, acute or obtuse, entire. Flowers in condensed axillary cymes, reddish. Stamens 4. Capsule depressed-globose, reddish, exceeding the calyx. **Flowering and fruiting:** Nearly round the year. Abundant in the area in moist or marshy places. Sweta 157, 329.

2. LAGERSTROEMIA L.

Key to species:

1. Trees; calyx strongly ribbed; claw of petals much shorter than the limb........................................2. *L. speciosa*
1. Shrubs; calyx not ribbed; claw of petals equaling or longer than the limb ........................................ 1. *L. indica*

Erect, glabrous, deciduous shrubs. Leaves shortly petioled, elliptic or oblong, acute or rounded. Flowers white, pink or purplish, in large panicles. Calyx smooth, 5-angled, glabrous. Petals with long claw, margin crisp. Stamens numerous, outer stamens longer and curved inward. Capsule woody. **Flowering and fruiting:** March-July. Often planted as an ornamental. Sweta 1344.


3. *LAWSONIA* L.
Large shrubs or small trees. Bark thin, greyish-brown. Leaves upto 2.0 cm long, nearly sessile, lanceolate, glabrous. Flowers in large terminal panicles, white, yellowish at length. Stamens exceeding the sepals and petals. **Flowering and fruiting:** May-August. Cultivated as hedge plant. Leaves are extensively used to dye skin and hair. Sweta s. n.

4. *ROTHALAL* L.
**Key to species:**
1. Bracteoles with a distinct midrib and longer than the calyx ................................................................. 1. *R. densiflora*
1. Bracteoles without distinct midrib and shorter than the calyx .......................................................... 2
2. Capsule opening by 2 valves ............................................ 2. *R. indica*
2. Capsule opening by 4 valves .......................................... 3. *R. rotundifolia*


Small, glabrous, ascending herbs rooting at lower nodes. Leaves upto 2.0 cm long, ovate or oblong, sessile, entire, acute or rounded. Flowers solitary axillary, forming terminal panicles, bright-pink. Capsule two valved, ellipsoid, glabrous. Seeds pale-brown or reddish-brown. Flowering and fruiting: June- December. Frequently found on the margins of swamps among the grasses. Sweta 669.


**45. ONAGRACEAE**

**KEY TO GENERA:**

1. Seeds comose.................................................................1. *Epilobium*

1. Seeds not comose..........................................................2

2. Calyx tube distinctly produced beyond the ovary;
   capsule sterile towards the base........................................3. *Oenothera*

2. Calyx tube not produced beyond the ovary;
   capsule fertile throughout............................................2. *Ludwigia*

1. **EPILOBIIUM** L.

Branched, hairy herbs up to 1.5 m high. Cauline leaves opposite, sessile, semi-apexcical, lanceolate, coarsely dentate, pubescent on both surfaces. Flowers solitary axillary. Petals 4, rose-purple, retuse. Ovary inferior, 4-celled. Stigmas 4, distinct, white. Capsule 5-10 cm long, hairy, 4-angled. Seeds elipsoid or obovoid, 2.5 -3 times as long as broad, coma fulvous. **Flowering and fruiting:** September-December. Occasionally found in semidried swamps and on moist bed of the river Ganga. Sweta 1478.

2. **Ludwigia** L.

**Key to species:**

1. Plants floating with spongy floats .............................................. 1. *L. adscendens*
2. Stamens as many as petals .............................................. 2
3. Stamens twice as many as sepals .............................................. 2. *L. octovalvis*
4. Seeds in many rows in each locule of the capsule .............................................. 3. *L. perennis*
5. Seeds in a single row in each locule of the capsule .............................................. 4. *L. prostrata*


Free-floating, dark-green or brownish-green herbs. Leaves glabrous, subsessile, rounded, cuneate at the base; stipules minute. Flowers light-yellow or cream. Capsule woody, cylindric, glabrous. **Flowering and fruiting:** June- December. Common in ponds and ditches. This species can be readily recognized by white spongy floats. Sweta 341.


A glabrous, annual herb. Leaves linear-lanceolate or elliptic-lanceolate, entire. Flowers solitary, axillary, small, yellow. Sepals 4, connate; calyx-lobes ovate. Petals 4, equaling the sepals. Fruit obtusely 4-angled, linear-oblong, crowned by persistent calyx-lobes. **Flowering and fruiting:** August- November. Found in moist and shady places. Sweta 638.


3. **OENOTHERA** L.

**Key to species:**

1. Leaves obovate lyrate; flowers yellow.................................1. *O. laciniata*

1. Leaves distantly dentate; flowers pink..............................2. *O. rosea*


Erect or ascending herbs, stem somewhat woody at base, red tinged. Basal and cauline both obovate-lyrate, sinuate, apex and margins slightly ciliate, veins puberulous, younger parts dense hairy. Flowers, yellow, solitary axillary, sessile. Calyx tube nearly 2.0 cm produced beyond the ovary, densely hairy, lobes strongly reflexed. Stigma 4-lobed, yellow. Capsule clavate, with 4 apical teeth, pubescent, 4-angled. **Flowering and fruiting:** March-June. Frequently occurs in fallow lands and on dry sandy bed of Ganga. Sweta 1482.

**Note:** This species was first reported from India by Khan (1987) on the basis of a single specimen collected from Bijnor. In HWLS the species is frequent in areas close to Ganga.


Prostrate, erect or ascending annual herbs. Stem red-tinged, hairy. Leaves alternate, ovate-lanceolate, serrate-dentate, acute. Flowers solitary, axillary. Calyx tube 1.0 cm long above the ovary, pubescent, 4-partite, lobes lanceolate. Corolla rosy-pink with a greenish yellow base,
petals obovate-rounded. Capsule clavate, 4-angled, appressed hairy. **Flowering and fruiting:** Major part of the year. Occasionally found on moist banks of Ganga. Sweta 706.

### 46. TRAPACEAE

**Trapa L.**


Floating, annual, herbs. Floating leaves in rosette, rhomboid, crenate-toothed on upper margins; glabrous above, tomentose beneath; petiole inflated. Submerged leaves divided into fine linear segments. Flowers white, solitary, axillary, pedunculate. Drupes obscurely 4-angled, red or green when immature, black when ripe, glabrous, spines 2, lateral, single seeded. **Flowering and fruiting:** August- January. Extensively cultivated in ponds for edible fruits. Sweta 789.

**Note:** In Indian floras the citation of *T. natans* var. *bispinos* is given as follows:

*Trapa natans* var. *bispinosa* (Roxb.) Makino in Linuma, Somoku-Dzusetsu ed. 3. 1: 137. 1907.

I am thankful to Ms. Katherine Challis, IPNI Editor, Herbarium, Library, Art and Archives, Royal Botanic Gardens, Kew for pointing out a much earlier publication for this combination.

According to APG-2 the genus *Trapa* belongs to family Lythraceae.

### 47. CUCURBITACEAE

**KEY TO GENERA:**

1. Fruits operculate.................................................................2
2. Fruits not operculate.........................................................3

2. Fruit not fibrous; splitting in to nearly two equal halves.........................1. *Actinostemma*

3. Fruits fibrous; operculum small, apical................................6. *Luffa*

3. Petals with fimbriate margins............................................9. *Trichosanthes*

4. Petals not fimbriate on margins........................................4

5. Male flowers with large, sessile, orbicular-reniform, cucullate or suborbicular-cordate bracts; petals with 2-3 scales at the base...............................................8. *Momordica*

5. Male flowers without bracts; petals without scales.................6

6. Corolla rotate or if campanulate then 5-partite up to the base.........................................................7
6. Corolla campanulate, divided less than halfway down; tendrils simple; flowers white; anthers coherent at the base only or completely free. 4. *Coccinia*

7. Tendrils simple; connective produced above the anther cells into an appendage; seeds ovate. 5. *Cucumis*

7. Tendrils 2-3 fid; connective not produced above the anther cells; seeds oblong. 3. *Citrulus*

8. Tendrils 2-fid; fruits with six, white, longitudinal strips. 2. *Bryonopsis*

8. Tendrils simple; style short, surrounded by an annular disc; fruit uniformly bright red. 7. *Melothria*

1. **ACTINOSTEMMA** Griff.


2. **BRYONOPSIS** Amott.


Subglabrous, annual herbs. Leaves deeply palmately 5-lobed, margins distantly denticulate. Male flowers greenish-yellow. Calyx lobes spreading, about 4.0 mm long. Fruit 10.0-15.0 mm in diameter, spherical, 6-8 striped, mature fruit red with white stripes. **Flowering and fruiting:** July-October. Common in the area, found climbing on hedges and trees. All earlier authors have mentioned the fruit as six striped. However, some populations of this taxon in this area bear eight striped fruits. It may be a distinct taxon. Sweta 127.

According to APG-2 the accepted name for this genus is *Kedrostis* Medik.

3. **CITRULUS** Schrad. *nom. cons.*

Prostrate herbs with long, trailing, angular, slightly scabrid stems. Leaves deeply 3-5 lobed, each lobe sinuate, thinly villous, nerves densely hairy abaxially. Tendrils simple or bifid. Male flowers greensih-yellow, on 4.0 -5.0 mm long hairy peduncle; calyx tube broadly campanulate, hairy; corolla lobes ovate, acute, mucronate. Fruits globose, slightly depressed, ripe fruit red, with 6-8 longitudinal, white stripes, pulp spongy and bitter. Seeds ovate-oblong, not margined about 6.0 mm long. **Flowering and fruiting:** May-October. Occasionally found in sandy localities. Sweta 1523.

4. **COCCINIA** Wight & Arn.


5. **CUCUMIS L.**


6. **LUFFA** Mill.

**Key to species:**

1. Flowers yellow; stamens 5; fruit tuberculate........................................2. **L. graveolens**

1. Flowers white; stamens 3; fruit densely covered
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7. **MELOTHRIA L.**

Key to species:

1. Male flowers subumbellate; fruits finely reticulate........................................................................... 2. *M. perpusilla*

1. Male flowers fascicled; fruits not reticulate,

finely hairy........................................................................................................ 1. *M. maderaspatana*


Scabrous climbers. Leaves ovate or subdeltoid, 3-5 lobed, acute, denticulate, scabrid. Flowers yellow. Fruits bright-red, finely hairy, usually in clusters of three. Seeds grey, ovoid-oblong. **Flowering and fruiting:** July-December. Commonly found climbing on shrubs. Sweta 573.

8. **MOMORDICA L.**


Perennial climbers, root tuberous. Leaves up to 10.0 cm long, membranous, ovate, mucronate, 3-5 lobed; lobes denticulate, dotted on lower surface. Flowers yellow. Bracts about 2.0 cm long, sessile, cucullate, orbicular-reniform. Fruit ellipsoid or ovoid, beaked, densely echinate with soft spines. Seeds pyriform, attenuated at the base, rounded at the apex. **Flowering and fruiting:** August-November. Occasionally found climbing on shrubs. Sweta 39.

9. **TRICHOSANTHES L.**


Scabrid, annual, climbing herbs. Leaves broadly ovate or orbicular-reniform, denticulate, deeply 5-7 lobed, up to 10.0 cm long. Tendrils 2-3 fid. Flowers white. Fruits about 5.0 cm long, beaked, base attenuate, orange when ripe. Seeds ovate-oblong, compressed, truncate. **Flowering and fruiting:** August-November. Common among the hedges. Sweta 113, 936.

48. **PASSIFLORACEAE**

**PASSIFLORA L.**


49. **CACTACEAE**

**OPUNTIA** Mill.

A medium-sized shrub, upper part of stem modified into flat, obovate, fleshy, olive-green phylloclades. Areoles scattered, minutely tufted hairy, spines 1-8 per areole, terete, acicular, yellowish-brown. Flowers yellow, sessile, tepals many seriate, outer ones with red middle region. Stamens numerous. Ovary glochidiate. Styles lobes 6. Fruit a pyriform berry, red when ripe. **Flowering and fruiting:** April-July. **Local name:** Nag-phani. Often found in dry, sandy habitats and waste places. Also used to fence the orchards. Sweta 1340.

Cereus sp. is grown on fencing of orchards etc.

50. Aizoaceae

**KEY TO GENERA:**

1. Style 1.............................................................. 1. Trianthema

1. Styles 2................................................................... 2. Zaleya

1. TRIANTHEMA L.

Key to species:

1. Stamens 10 or more....................................................... 1. T. portulacastrum

1. Stamens 5.................................................................... 2. T. triquetra


Prostrate or procumbent, succulent herbs, often forming dense patches. Leaves obovate to rounded, obtuse or retuse at the apex, margin often pink. Flowers solitary-axillary, pink or white. Stamens ten or more. Fruit half sunken in the leaf axil, slightly mitriform-oblique, circumcissile. Seeds 5-10, lenticular, reniform, black. **Flowering and fruiting:** October-February. Often found on humus rich soil near villages. Sweta 76.


Prostrate, succulent, annual herbs. Leaves linear or lanceolate, dilated at the base. Capsule enclosed by perianth tube. Seeds orbicular, brownish-black. **Flowering and fruiting:** October- March. Included on authority of Murty and Singh (1961b).

2. ZALEYA Burm. f.

Trianthema decandra L. Mant. 1: 70. 1767; FBI. 2: 661. 1879.

Prostrate, spreading herbs. Leaves elliptic-oblong or slightly obovate. Flowers in axillary clusters, pink. **Flowering and fruiting:** July-December. Included on authority of Murty and Singh (1961b).

51. MOLLUGINACEAE

**KEY TO GENERA:**

1. Carpels united ................................................................. 2
2. Carpels free ...................................................................... 1. Gisekia

1. Carpels free ...................................................................... 1. Gisekia

2. Flowers in axillary clusters; seeds appendaged ................. 2. Glinus

2. Flowers in terminal, paniculate cymes; seeds not appendaged ........................................................................... 3. Mollugo

1. GISEKIA L.


Prostrate, deep-rooted, glabrous herbs. Leaves linear-oblong, sub-opposite, subsessile, slightly fleshy. Flowers in axillary or terminal, umbellate-cymes, pinkish-green. Sepals 5, free or slightly connate at base, margins scarious. Stamens 5, filaments dilated at the base. Carpels 5, free, style short. Fruit consisting of 5, free, densely papillose, indehiscent, cocci surrounded by persistent sepals. Seeds sub-reniform, compressed, black. **Flowering and fruiting:** June-November. Often found in moist sandy soil. Sweta 1341.

**Note:** According to Vascular Plant Families and Genera Database at Kew website this genus belongs to family Gisekiaceae.

2. GLINUS L.


Profusely branched, densely stellate-hairy, prostrate herbs. Leaves ovate-obovte, up to 2.0 x 0.5 cm, densely stellate-hairy. Flowers 3-5 in axillary clusters, subsessile. Sepals 5, densely stellate-hairy. Petals 0. Stamens 5, filaments short initially, elongating later. Ovary glabrous, thin-walled, 5-celled. Styles 5. Capsule 5-valved, included in persistent calyx. Seeds many, reniform, tubercled, shining, dark-brown, with a long filiform appendage. **Flowering and fruiting:** March-September. Often found on bottom of dried ditches. Sweta 1345.

3. MOLLUGO L.

Much branched, suberect, glabrous herbs, stem reddish. Leaves linear to linear-lanceolate, acute, glabrous, up to 2.5 x 0.5 cm. Flowers greenish-white, in terminal paniculate cymes, small. Perianth lobes ovate-oblong, scarious margined. Stamens 3-5. Styles 3. Capsule obtusely 3-gonous, many seeded. Seeds granulate, reniform, dark-brown. **Flowering and fruiting:** March-December. Found in sugar cane fields and wastelands. Sweta 1351.

52. APIACEAE

**KEY TO GENERA:**

1. Root conical, orange to purple.................................................. 4. Daucus
2. Leaves compound; ........................................................................... 4
3. Mericarps 7-9 ribbed; leaves not lobed............................................ 2. Centella
4. Mericarps 3-ribbed; leaves deeply lobed.......................................... 5. Hydrocotyle
5. Mericarps with winged margins; leaves tripinnate................................ 1. Anethum
6. Mericarps not with winged margins................................................. 5
7. Peripheral flowers of the umbel zygomorphic, light purple in colour.................................................. 3. Coriandrum
8. All flowers of the umbel actinomorphic, white or pinkish in colour................................................................. 6
9. Stem creeping below; leaves 1-2 pinnate, glabrous.......................... 6. Oenanthe
10. Stem not creeping below; leaves 2-3 pinnate, pubescent or hairy.......................................................... 7. Seseli

1. ANETHUM L.


Tall, erect, annual, glabrous herbs. Leaves 2-3 pinnate, linear, upper sessile, lower petiolate. Flower in decompound, terminal umbels, yellow. Fruits up to 0.5 cm long, dorsally compressed. **Flowering and fruiting:** December-March. Cultivated, often found as an escape. Sweta s.n.

2. CENTELLA L.
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Perennial, stoloniferous, creeping herbs. Leaves long petioled, up to 5.0 cm in diam., in a rosette, reniform, deeply cordate, crenate-dentate, glabrous. Flowers in axillary umbels consisting of 2-5 flowers, bracts small, pink to red in colour. Calyx teeth absent. Petals ovate-rounded 0.1-0.15 cm long. Fruits shallowly 2-lobed, 0.4-0.5 cm long, reticulately wrinkled. **Flowering and fruiting:** April-December. Found in moist and shady places, especially in plantations of *Terminalia arjuna*. Sweta 925.

**3. CORIANDRUM L.**


Erect, glabrous, annual herbs. Juvenile leaves palmatilobed-partite; leaves in floral region decompound with fine linear segments. Flowers in axillary or terminal umbels, light-purple or white. Outer flowers of the umbel zygomorphic. Calyx teeth radiate, triangular-lanceolate, up to 0.1 cm long. Fruit subglobose, greenish-yellow or light-yellow, up to 0.2 cm long, primary ribs undulate. **Flowering and fruiting:** February-April. Widely cultivated in the area. Leaves are used to garnish curries and seeds are used as condiment. Also found as an escape near villages. Sweta 1346.

**4. DAUCUS L.**


**5. HYDROCOTYLE L.**


Slightly fleshy, creeping or ascending, glabrous or hairy, perennial herbs. Leaves rounded, 3-5 palmatilobed, segments crenate-serrate. Stipules ovate-rounded, entire or dentate. Umbels solitary, peduncles up to 0.5 cm long. Involucres ovate-acute. Calyx teeth none. Petals red, lanceolate, acute. Fruit glabrous or hairy, often red-punctate, compressed, 5-gonal. **Flowering and fruiting:** March-November. Occasionally found in moist localities. Sweta 1426.

According to APG-2 this genus belongs to group Hydrocotyloideae Link of the family Araliaceae.
6. OENANTHE L.


Stoloniferous, glabrous herbs with fistular stem. Leaves 1-pinnate; leaflets 3-5, serrate, acute, petiole long. Flowers in terminal or leaf-opposed compound umbels, white. Fruits up to 0.3 cm long, ribs swollen. **Flowering and fruiting:** January-June. Abundant in swampy areas. Sweta 45, 906.

7. SESELIL.


Densely hairy, ascending or diffuse annual herbs. Leaves 2-pinnate, segments ovate-oblong or linear-lanceolate. Flowers in compound umbels, whitish-pink. Petals 5, deeply notched. Fruits prominently ridged, subglobose, vittae distinct. **Flowering and fruiting:** April-June. Frequently found on margins of ditches and other moist localities. Sweta 1440.

53. RUBIACEAE

KEY TO GENERA

1. Herbs........................................................................................................ 2

1. Shrubs or trees; flowers in dense globose heads.......................... 5

2. Each cell of the ovary 1-ovuled.......................................................... 3

2. Each cell of the ovary 2-many ovuled.................................................... 4

3. Leaves opposite; flowers sessile............................................................ 1. *Borreria*

3. Leaves whorled; flowers pedicellate...................................................... 4. *Galium*

4. Flowers 5-merous; throat hairy; fruits densely hairy.................... 3. *Dentella*

4. Flowers 4-merous; throat glabrous; fruit glabrous.......................... 6. *Oldenlandia*

5. Ovules many in each cell, a shrub......................................................... 2. *Cephalanthus*

5. Ovules solitary in each cell................................................................. 5. *Morinda*

1. **Borreria** G. F. W. Mey., *nom. cons.*

Key to species:

1. Corolla tube with a ring of hairs within at the base..................... 1. *B. articularris*

1. Corolla tube without a ring of hairs within at the base................. 2. *B. pusilla*


Prostrate or procumbent herbs, stem hispidly hairy, 4 angled. Leaves subsessile, obovate, oblong or elliptical, acute, margins thickened, ciliated. Flowers whitish-pink or pale-blue, in whorls of 4-6. Calyx hispid, linear-lanceolate. Corolla salver shaped, petals oblong, acute. Mericarps hispid. Seeds brown cylindrical, grandulate. **Flowering & Fruiting:** August-October. Found frequently in sandy areas, roadsides and Kholas. Sweta 159.

**Note:** According to WCSPF the accepted name for this taxon is *Spermacoce articuliris* L.f., Suppl. Pl.: 119 (1782).


**Note:** According to WCSPF the accepted name for this taxon is *Spermacoce pusilla* Wall. in W.Roxburgh, Fl. Ind. 1: 379 (1820).

2. **CEPHALANTHUS L.**


Large to medium sized, evergreen shrubs. Leaves opposite, petioled, 11-20 x 4-7 cm, ovate-lanceolate, acuminate, entire, nerves prominent; stipules short, young leaves bright-red in colour. Flowers white, fragrant, sessile, in globose heads arranged in terminal branched inflorescence or axillary-solitary. Calyx limb cup-shaped, lobes short, ovate with interposed black glands. Corolla glabrous, lobes 4-5. Style long exserted, stigma yellowish, capitate. Fruits forming a globose fleshy mass which consists of numerous indehiscent, 1-seeded cocci. **Flowering & Fruiting:** March-July. **Local Name:** Jal Kaim. Occurs in marshy habitats in the patches of *Phragmites karka*. Sweta 434.
3. **Dentella** J. & G. Forst.


4. **Galium** L.


5. **Morinda** L.


Small trees with 4-angled, tomentose branches. Leaves opposite, elliptic, tomentose, acute; stipules bifid, 8-15 cm long. Flowers white, 5-merous, in globose heads. Calyx truncate. Corolla tube 2.0-3.0 cm long, lobes obtuse or subacute. Fruits globose, fleshy, about 3.0 cm in diam. **Flowering and fruiting:** April-August. Included on the authority of Murty and Singh (1961b).

6. **Oldenlandia** L. *emend.* Brem.


Erect or decumbent annual herbs. Leaves sessile, linear-lanceolate, acute, glabrous, margins revolute, bristly, up to 2.5 cm long. Flowers 2-5, in axillary, long peduncled cymes, white or pinkish. Calyx-lobes 4, ovate-triangular, acute. Corolla lobes 4, acute. Stamens included. Capsule, crowned by calyx lobes. Seeds angular. **Flowering and fruiting:** Major part of the year. Common in grassy habitats. Sweta 884.
This taxon shows great deal of variation as regards the leaf size, number of flowers per inflorescence (sometimes up to 8) and length of the peduncle and pedicels.

**WCSPF citation:**

**Govaerts R, Andersson L, Robbrecht E, Bridson D, Davis A, Schanzer I & Sonke B**


**Anthocephalus chinensis** (Lam.) A. Rich. ex Walp. is planted as an ornamental.

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**54. ASTERACEAE**

**KEY TO GENERA:**

1. Involucral bracts spinescent or aristate;
   - heads many flowered.......................................................... 2

1. Involucral bracts neither spinescent nor aristate.................. 5

2. Heads heterogamous; glabrous or scabrous herbs;
   - florets purple; spines of involucral bracts long, thinly
     feathery and spreading.......................................................... 3. *Amberboa*

2. Heads homogamous; involucral bracts not as above............. 3

3. Heads dioecious or polygamo-dioecious............................... 4

3. Heads bisexual; achenes glabrous; leaves spinescent;
   - florets orange-yellow; pappus absent................................. 10. *Carthamus*

4. Involucral-bracts of female heads united into an ovoid,
   - 2-beaked utricle clothed with hooked spines; florets
     without petals........................................................................ 41. *Xanthium*

4. Involucral bracts of female heads free, spine tipped;
   - florets with petals................................................................. 8. *Breea*

5. Heads homogamous, either male or female or bisexual......... 6

5. Heads heterogamous; outer florets usually female, inner
   - ones bisexual or male.......................................................... 20

6. All florets ligulate; plants usually laticiferous................. 7

6. Heads with tubular florets only (except *Pulicaria angustifolia*,
   - where outer florets are ligulate)........................................ 12

7. Pappus of extremely short, 2-3 seriate scales;
   - florets purplish.................................................................... 12. *Cichorium*

7. Pappus of equal or unequal, multiseriate hairs.................. 8

8. Achenes beaked; pappus hairs free................................. 9
8. Achenes not beaked, with an attenuated top; pappus hairs united at the base.

9. Achenes angular or subterete.

10. Leaves rosetulate; corolla yellow.

11. Leaves mostly cauline; involucre campanulate; achenes narrow at the base and truncate at the apex.

12. Heads compound; each head 1-flowered, sessile, in the axils of dilated leaf-sheaths; pappus of 2 scales; anthers exserted, dark purple.

13. Leaves opposite, at least in the lower region.

14. Anthers without an apical appendage; pappus of 3-4 thick, clavate, sticky scales.

15. Plants with aromatic smell; pappus of 5 serrate, awn-tipped scales.

16. Involucral bracts 1-seriate.

17. All heads on a plant bisexual and fertile; involucre bracts united before fruit maturation; receptacle flat, naked; florets pink, rarely white; receptacle naked, flat; filaments free; style 2-fid; plants glabrous or thinly hairy.

18. Anther bases sagittate, tailed.

19. Usually procumbent herbs with smaller cauline leaves; heads yellow; outer florets ligulate; outer pappus a laciniate cup.

20. Achenes not beaked, with an attenuated top; pappus hairs united at the base.

21. Plants without any smell; pappus of 6 to many rigid, 1-seriate hairs.

22. Involucral bracts 2-many seriate.

23. All heads on a plant bisexual and fertile; involucre bracts united before fruit maturation; receptacle flat, naked; florets pink, rarely white; receptacle naked, flat; filaments free; style 2-fid; plants glabrous or thinly hairy.

24. Female and bisexual (functionally male) heads on the same plant; bisexual heads with cylindric, paleaceous receptacle and paleas enclosing the florets; filaments united and style undivided; plants usually scabrid.
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19. Usually erect herbs with large basal leaves; heads pale-red; all florets tubular; outer pappus none

24. *Himalaella*

20. Heads collected into globular compound heads;

stem winged; florets purple

36. *Sphaeranthus*

20. Heads simple distinct

21. Leaves opposite at least in the lower region

22. Leaves alternate and/or radical

29

22. Leaves simple, entire or serrate-dentate; pappus neither stiff nor retrorsely barbed

23. Palea concave, embracing the florets or achenes

24. Ray florets 2- many seriate

17. *Eclipta*

24. Ray florets 1- seriate

25

25. Flowers white; receptacle flat; ligule of ray florets exserted

6. *Blainvillea*

25. Flowers yellow, ray florets fertile

26. Involucral bracts definite

27

26. Involucral bracts several; receptacle raised, conical; ligule of ray florets included; achenes with a pungent taste

37. *Spilanthes*

27. Involucral bracts 4, eglandular, oblong; leaves sessile; aquatic herbs

19. *Enydra*

27. Involucral bracts 5, glandular, spathulate; lower leaves petiolate; terrestrial herbs

33. *Siegesbeckia*

28. Pappus of many, aristate, feathery bristle; small, procumbent herbs with bulbous based hairs

38. *Tridax*

28. Pappus of 2 subulate awns; erect large herbs; hairs not bulbous based

39. *Verbesina*

29. Ray florets apetalous, fertile; disc florets male or neuter; leaves all radical, 2-pinnatifid; heads borne close to ground

34. *Soliva*

29. Ray florets petaliferous; disc florets 2-sexual;

leaves not all radical; heads not borne close to ground

30

30. Ray florets ligulate

31

30. Ray florets narrow, tubular, not ligulate

35

31. Pappus of 2 stiff awns

32

31. Pappus of more than 2 hairs, bristles or scales

33
32. Flowers yellow; leaves simple serrate-dentate; radical leaves absent; heads 1.5-3.0 cm in diameter ................. 39. *Verbesina*

32. Flowers white; leaves pinnately or bi-pinnately lobed; radical leaves present at least in young stage; heads 4.0-5.0mm in diameter .................................................. 29. *Parthenium*

33. Anther bases tailed ................................................................. 34

33. Anther bases obtuse, not tailed; ligules purplish-pink or white, never yellow; heads in corymbose or branched panicles, rarely terminal solitary ........................................... 20. *Erigeron*

34. Pappus 1-seriate, hairy; achenes not ribbed .................................. 30. *Pentanema*

34. Pappus 2-seriate, outer of short jagged teeth, inner of smooth hairs; achenes ribbed ......................................................... 32. *Pulicaria*

35. Anther bases tailed ...................................................................... 36

35. Anther bases obtuse or truncate, not tailed ..................................... 38

36. Involucral bracts herbaceous; plants with strong aromatic smell ........................................................................ 7. *Blumea*

36. Involucral bracts dry, scarious .................................................... 37

37. Herbs; heads in leafless clusters or leafy spikes; style arms of bisexual flowers truncate ................................................. 22. *Gnaphalium*

37. Undershubs; heads in leafless corymbs; style arms of bisexual flowers filiform .................................................. 31. *Pluchea*

38. Pappus wanting .......................................................................... 39

38. Pappus present ........................................................................... 42

39. Heads axillary, solitary ................................................................. 11. *Centipeda*

39. Heads in spiciform racemes or panicles ......................................... 40

40. Achenes with a thickened border ................................................. 16. *Dicrocephala*

40. Achenes without a thickened border ........................................... 41

41. Flowers rose-purple; herbs with faint sweet smell .......................... 15. *Cyathocline*

41. Flowers white or yellow; strongly scented herbs ............................ 4. *Artemisia*

42. Pappus 1, wedge shaped, scaly .................................................... 14. *Cotula*

42. Pappus more than 1, 1-seriate; styles 2-fid .................................... 43

43. Heads solitary, terminal or leaf opposed ....................................... 23. *Grangea*

43. Heads in clusters or various inflorescence .................................... 44

44. Stem winged due to decurrent leaf bases ....................................... 27. *Laggera*

44. Stem not winged; achenes compressed, not ribbed ....................... 13. *Conyza*

1. **ADENOSTEMMA** J. & G. Forster


2. AGERATUM L.

**Key to species:**

1. Heads up to 80 flowered; phyllaries acute, subglabrous; corolla up to 2.0 mm long.................................................................................. 1. *A. conyzoides*

1. Heads 80 to 100 flowered; phyllaries setaceous, hirsute; corolla up to 8.0 mm long.................................................................................. 2. *A. houstonianum*


Erect, annual, hairy herbs. Heads in terminal corymbs, blue or white, 50-80 flowered. Pappus-scales 5, serrate, awned, often barbed. **Flowering and fruiting:** Almost throughout the year. Abundant on roadside, in waste places and agricultural fields, especially in sugar cane and wheat fields etc. Sweta 1325.


Erect annual herbs. Head 80-100 flowered, in terminal or axillary dense corymbs. Corolla violet, funnel shaped. Pappus scales 5, serrate, awn-tipped. **Flowering and fruiting:** Throughout the year. Common in waste land, agricultural fields and on banks of Ganga. Sweta 615.

3. AMBERBOA (Pers.) Less.


4. ARTEMISIA L.
Key to species:
1. Stem whitish appressed hairy, leaves densely white lanate beneath........................................... 3. *A. nilagirica*
1. Stem and leaves glabrous.......................................................... 2
2. Lower leaves entire to serrate-lobed............................................... 2. *A. japonica*
2. Lower leaves pinnatifid to 2-pinnate............................................. 1. *A. capillaris*

Erect, annual, slightly woody herbs. Cauline leaves pinnatisect, hairy at lower side. Heads minute, short peduncled, greenish-yellow. Ray florets fertile, corolla filiform. Disc florets sterile, tubular. Achenes very minute, brown, glabrous. **Flowering and fruiting time:** June-February. Frequently occurs in the damp areas and along the river banks and road sides. Sweta 118.


Tall, stoloniferous, aromatic, perennial herbs. Leaves sessile, pinnatifid, lobed or laciniate, lanceolate-oblong. Heads sessile in spiciform racemes combined into panicles, white, ovoid or subglobose. **Flowering and fruiting.** October-February. Found on banks of Ganga among vegetation. Sweta 1358.

5. *BIDENS* L.
Erect, annual herbs, with 4-angled stem. Leaves imparipinnately compound, opposite; upper leaves simple. Heads radiate, in corymbs, yellow. Ray florets few, sterile. Disc florets many,
dark-yellow. Achenes black, 5.0-10.0 mm long, narrowed at top. Pappus 2-4, retrorsely barbed. **Flowering and fruiting:** March-November. **Local Name:** Chirchitta; Sui ka ped. Abundant in the area. Sweta 260, 617.

6. **BLAINEILLA** Cass.


Erect, annual, hispidly hairy herbs. Leaves simple, opposite, ovate-lanceolate, serrate or dentate. Heads white, terminal or axillary. Outer bracts broadly ovate, leaf like, hairy; inner bracts folded gradually becoming scale like. Ray florets ligulate. Disc florets white or yellow, tubular. Achenes 3-quetrous, hairy, greenish-black, transversely rugose. Pappus connate. **Flowering and fruiting:** Rainy season. Frequently occurs in Kholas. Sweta 352.

7. **BLUMEA** DC. nom. cons.

**Key to species:**

1. Heads purple or lilac.................................................. 3. *B. mollis*

1. Heads yellow........................................................... 2

2. Receptacle hairy around the pits................................. 2. *B. laciniata*

2. Receptacle glabrous.................................................. 1. *B. lacera*


Erect, aromatic, viscid, annual or biennial herbs. Heads peduncled, in short axillary cymes or collected into terminal spiciform panicles, yellow. Involucral bracts villous, glandular hairy. Achenes hairy, slightly 4-gonous, not ribbed. Pappus white. **Flowering and fruiting.** January-May. Found commonly in moist and shady habitats. Sweta 1364.


Erect, annual, hairy herbs. Lower leaves lyrate-pinnatifid, toothed, hairy. Heads yellow, combined into a large leafy panicle. Achenes brown, ribbed, sparsely hairy. Pappus hairs white. **Flowering and fruiting:** Almost through out the year; especially in February-June. Common in wastelands, open fields; particularly in wet and shady places. Sweta 844.
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8. BREEA Less.


9. CAESULIA Roxb.

Caesulia axillaris Roxb. PI. Cor. 1: 64. t. 93. 1798; FBI. 3: 291.1881; FUGP.1: 462. 1905; Fl. India 13: 2.1995.

Prostrate, or suberect, annual, slightly fleshy herbs. Leaves sessile, lanceolate, serrate, acute, glabrous. Heads globose, axillary, sessile, pale-blue. Involucral bracts 2, membranous. Anther tube dark-purple, Pappus scales 2. **Flowering and fruiting:** Rainy and winter season. Frequently found in paddy fields, shallow ditches and also near river banks. Sweta 238.

10. CARTHAMUS L.


11. CENTIPEDA Lour.
12. Cichorium L.
Annual or perennial herbs, roots fleshy. Lower leaves oblong or oblong-lanceolate, pinnatifid.
Upper leaves cordate-amplexicaul at base. Heads, bright blue, solitary or clustered, terminal
or axillary. Florets all ligulate. Achenes pale, subcompressed, angled, smooth, many ribbed;
pappus pale very short. **Flowering and fruiting:** February-September. **Local name:** Kasni.
Often found as weed in fields of *Trifolium alexandrinum* L. (Barseem). Sweta 1369.


**Key to species:**

1. Pappus hairs white, dirty white or yellow.................................2
1. Pappus hairs usually red..........................................................3
2. Pappus hairs yellow.....................................................................2. *C. bonariensis*
2. Pappus hairs pale rosy or purplish..........................................3. *C. canadensis*
3. Plants not viscid, heads 0.2-0.3 cm across..............................5. *C. stricta*
3. Plants viscid, heads 0.4-1.5 cm across........................................4
4. Leaves pinnatifoliated...............................................................1. *C. aegyptiaca*
4. Leaves serrate-dentate, coarsely toothed or entire,
oblong-spathulate.......................................................................4. *C. japonica*

112.1767.
Erect, annual or biennial, hirsute herbs. Basal leaves shortly petioled, obovate; upper ones
sessile. Heads in terminal, compact corymbs, yellow or white. Ray florets filiform, female.
Disc florets tubular. Achenes oblong, compressed, with a thickened margin, thinly hairy.
Pappus hairy. **Flowering and fruiting.** June-October. Rare, found in wastelands and in dry
sandy soils. Sweta 1374.

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**Centipeda minima** (L.) A. Br. & Aschers. Ind. Sem. Hort. Berol. App. 6:1867; Fl. India 12:
Prostrate or decumbent-ascending, densely leafy annual herbs. Leaves subsessile, spathulate-
obleng, entire to pinnatifid, glabrous. Heads sessile, yellowish, axillary, solitary. Ray florets
2-toothed. Disc florets yellow. Achenes oblong, 4-angular, minute. Pappus none. **Flowering
and fruiting.** January-March. Common in grassy, sandy localities, ricefields and on
semidried river beds. Sweta 889.


14. **COTULA L.**


15. CYATHOCLINE Cass.


16. DICROCEPHALA L’ Herit ex DC.

Erect annual herbs. Leaves alternate, ovate-lanceolate to lyrate. Heads small, globose, in terminal panicles. Ray florets pink or purplish, disc florets yellow. Achene minutely puberulous. Flowering and fruiting: May-December. Occurs frequently in moist shady places; especially on moist banks of the river Ganga. Specimens from the study area are referable to subsp. integrifolia. Sweta 868.

17. ECLIPTA L. nom. cons.

Erect or prostrate herbs. Leaves, simple, opposite. Heads solitary or 2-3 together, axillary, white. Ray florets 2-3 seriate, ligulate, sterile; disc florets tubular. Achenes dark brown, sharply angled or winged on margins. Pappus a ring of thick, ciliate, partially or completely united scales. Flowering and fruiting: Almost throughout the year. Local Name. Kala Bhangara. Commonly occurs in grasslands, agricultural fields and wet and swampy places. Specimens collected from swampy habitats are much larger, extensively branched and prostrate. Leaves are thicker, shorter and with undulate margins. Sweta 431.

18. EMILIA Cass.

var. sonchifolia
Slender, weak, glaucous herbs. Leaves variable in shape, lower ones petiolate, lyrate-pinnatifid with triangular-ovate terminal lobe; upper leaves sessile, coarsely toothed. Heads solitary on long peduncles, corymbose, pink or white. Involucral bracts glabrous or puberulous connate when young but separating at maturity. Achenes brown, 5-ribbed, cylindrical. Pappus hairs soft, white. **Flowering and fruiting:** Throughout the year. **Local Name:** Hirankhur. Occurs frequently in moist and shady places, especially or north facing slopes of Kholas. Sweta 319.

19. ENYDRA Lour.


**Note:** As regards the orthography of this genus name, Raizada (1977) pointed out, "The correct spelling is *Enydra* Lour. (Fl. Cochinch. 511. 1790) and not *Enhydra* as spelled by Hook. f. in FBI. 3: 304.1881 or in Flora of Tropical Africa, Flora of Tropical Africa ed. 1 and other works". IPNI has also spelled this genus as *Enydra*.

20. ERIGERON L.


Erect, villous, annual herbs. Basal leaves obovate, shortly petioled; cauline leaves obovate-oblong, hairy. Ray florets ligulate, pinkish or purplish, many. Disc florets yellow. Achenes minute, glabrous or puberulous, compressed. Pappus hairy, dirty-white. **Flowering and fruiting:** September-March. Frequently found in moist or swampy habitats. Sweta 788.

21. EUPATORIUM L.

Erect, tall, annual herbs, often woody at the base. Leaves broadly ovate-triangular. Heads white, in terminal corymbose inflorescence. Involucral bracts 3-seriate, linear-lanceolate. Achene brown, 5-angled, glabrous. Pappus hairs white. **Flowering and fruiting time.** February- June. Rare, collected only once from the bank of Madhya Ganga Canal near Simbhawli Sugar Mills. Sweta 1379.

22. **GNAPHAliUM L.**

**Key to species:**

1. Pappus hairs connate into a ring at the base. .................. 2. *G. pensylvanicum*

2. Heads in leafy spikes. .................................... 3. *G. polycaulon*

3. Heads in leafless corymbs.................................................. 1. *G. luteo-album*


   Erect, cottony or woolly herbs. Leaves spatulate-lanceolate, white woolly on lower surface. Heads in axillary and terminal clusters, densely white woolly. Ray florets female, corolla narrow, filiform; disc florets few, bisexual. Achene brown, oblong, pappus hair white, coherent at base to form a ring. **Flowering and fruiting:** January-June. Found in agricultural fields, wastelands and on roadsides. Sweta 1468.


23. **GRANGEA** Adans.


24. **HIMALAIELLA** Raab-Straube


Erect, cottony, annual herbs. Basal leaves in rosette, petiolate, lyrate-pinnatifid, covered with white soft hairs; upper leaves lanceolate, dentate. Heads on 3.0-15.0 cm long peduncles, pinkish-white, in corymbiform panicles. Achenes 4.0 mm long, 4-5 angled. Pappus hairs white, ca 1.3 cm. **Flowering and Fruiting:** March-August. Occurs near Kholas. Sweta 774.

**Note:** Molecular taxonomic studies of the genus *Saussurea* (DNA sequences from the nuclear ribosomal ITS and from the chloroplast trnL-trnF regions of 47 species of all six subgenera and 13 sections of *Saussurea*) showed that *Saussurea* in its present circumscription was paraphyletic. The results also corresponded to differences in morphological characters of achenes and pappus, which also suggested that *Saussurea* sect. *Elatae*, *Saussurea* subg. *Jurinocera* and *Saussurea* subg. *Frolovia* were not closely related to the remainder of the genus. Consequently, *Saussurea* sect. *Elatae* was separated as the new genus *Himalaiella* (Raab-Straube, 2003).

25. **IXERIS** Cass.

Erect annual, flaccid, glabrous herbs. Leaves variable, auricled; basal leaves in rosette, linear-lanceolate; cauline ones sessile, with a sagittate, amplexicaul base. Heads sub-umbellate or corymbose. Ligules 3-toothed, yellow. Achenes yellowish, elliptic-lanceolate, 10-ribbed, beaked. Pappus hairs white. **Flowering and fruiting**: February-May. Frequently found in cultivated fields as weed, plantations of *Terminalia arjuna* and on roadides. Sweta 769.

### 26. LACTUCA L.

**Key to species:**

1. Flowers blue, small herbs................................................. 1. *L. dissecta*
2. Flowers yellow, tall herbs................................................. 2. *L. serriola*


Tall, annual herbs, upper part corymbosely branched, densely bristly or glabrous. Leaves runcinate-pinnatifid, finely spinoulose-toothed. Heads, yellow, in panicles with ascending, corymbose branches. Achenes pale-brown, oblanceolate, 6-8 ribbed, smooth. Pappus silvery white, soft, simple and spreading. **Flowering and fruiting**: Summer season. Occasionally found on margins of agricultural fields and on roadsides. Sweta 1480.

### 27. LAGGERA Sch.-Bip. ex Koch.


### 28. LAUNAEA Cass.

**Key to species:**
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1. Heads terminal on paniculately branched flowering stem;
   leaves not spinous margined..............................................1. *L. aspleniifolia*

1. Heads in clusters on the nodes of racemose inflorescence;
   leaves spinous margined..............................................2. *L. procumbens*

   Biennial or perennial herbs with white latex. Leaves mostly radical. Heads erect, peduncles slender. Involucral bracts few seriate, outer shorter. Florets all ligulate, yellow. Achenes pale-brown, narrow, angled, smooth, much smaller than pappus. Pappus white or pale-white, deciduous. **Flowering and fruiting:** February-June. Sweta 877.

   Prostrate, glabrous herbs with yellow latex. Leaves sessile, in a basal rosette, oblong-lanceolate, spatulate, dentate, teeth cartilaginous. Heads yellow, cylindric, in terminal and subracemose clusters. Achenes pale yellow, ribbed. Pappus hairs soft, white, deciduous. **Flowering and fruiting.** March-September. **Local Name:** Pathari. Found commonly in wastelands, agricultural fields and on roadsides. Sweta 38.

29. PARTHENIUM L.
   Erect herbs. Leaves alternate, pinnately or bipinnately lobed; uppermost leaves entire to 3-lobed. Heads numerous in lax panicles, heterogamous, white. Involucral bracts 10 in 2 series of 5 each, ovate. Achenes flattened, crowned by persistent remnant of corolla, appendage and style. Pappus of 2 broad, strongly reflexed awns. **Flowering and fruiting:** Almost round the year. Abundant in wastelands, agricultural fields, plantations and on roadsides etc. Sweta 1359.

30. PENTANEMA Cass.

**Key to species:**
1. Hispidly hairy herbs; involucral bracts linear-lanceolate,
   acute; ligule of ray florets lanceolate..............................................1. *P. indicum*

1. Softly villous herbs; involucral- bracts squarrose, with
   filiform, recurved tips; ligule of ray florets linear........................2. *P. vestitum*
*Vicoa indica* (L.) DC. in Wight, Contrib. Bot. Ind. 10. 1834.  

*Vicoa vestita* (Wall. ex DC.) Benth. ex Hook. f. FBI 3: 297. 1881.  
This species can be readily distinguished from *P. indica* by the indumentum and involucral bracts. Indumnetum is rough in *P. indica* and soft in *P. vestita*. The tips of involucral bracts are erect in the former and recurved in the latter. **Flowering and fruiting**: March-June. Frequently found in wasteland and on sandy soil, especially in *Kholas*. Sweta 739.

31. **PLUCHEA** Cass.  

32. **PULICARIA** Gaertn.  
**Key to species:**  
1. Peduncle thickened below the heads................................. 2. *P. wightiana*  
1. Peduncle not thickened below the head.................................. 1. *P. angustifolia*

Erect annual herbs. Leaves sessile, linear-oblong or obovate, pubescent. Heads yellow. Ray florets ligulate. Achenes terete or 4-angled, with a few minute scattered hairs. Outer row of pappus forming a setulose-laciniate cup; inner row of white, barbellate hairs. **Flowering and fruiting**: October-February. Included on the authority of Murty & Singh (1961b).
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Erect annual herbs. Leaves oblong, serrate. Heads solitary, peduncles thickened below the heads. Ray florets ligulate, yellow. Achenes brown, oblong, 4-angled, hairy, shining. Pappus 2-seriate. **Flowering and fruiting time.** June to August. **Local Name.** Sonela. Occasionally found in sandy soil. Sweta 807.

33. SIEGESBECKIA L.


Erect much branched herbs. Leaves opposite, ovate-triangular or rhomboid, glandular pubescent beneath. Heads combined into leafy panicles, yellow. Outer involucral bracts 5, spathulate, gland hairy outside, viscid inside. Achenes obpyramidal, 4-gonous, viscid. Pappus none. **Flowering and fruiting:** March-October. Included on authority of Murty & Singh (1961b). This species is frequently found in nearby forests of Najibabad. Habitat degradation at Hastinapur might be the reason of disappearance of this taxon.

34. SOLIVA Ruiz. & Pav.


Creeping, annual or biennial, stoloniferous herbs. Leaves 2-pinnatifid. Heads sessile, axillary, greenish yellow, close to ground. Ray florets in several rows, female, apetalous. Disc florets tubular, corolla greenish - yellow. Achenes truncate, winged, tipped with a persistent and hardened style. Pappus none. **Flowering and fruiting:** November-May. This species forms a dense mat on semidried bed of Madhya Ganga Canal near Ganga barrage. Sweta 669.

35. SONCHUS L.

**Key to species:**

1. Outer involucral bracts densely white tomentose;
   - perennials ................................................................. 3. *S. wightianus*
2. Outer involucral bracts without coarse gland- bristles;
   - annuals ................................................................. 2

2. Achenes transversely rugose, thick, with a thickened margin; basal auricles of leaves acute; leaf margins not spinulose ................................................................. 2. *S. oleraceus*
2. Achenes smooth, papery, with a winged margin;
   - basal auricles of leaves rounded; margins spinulose


Erect annual herbs. Leaves quite variable, dentate, glabrous; basal auricles acute; lower leaves pinnatifid. Inflorescence corymbose-umbellate; heads glandular hispid. Florets all ligulate, yellow. Achenes ovoid, longitudinally 3-5 ribbed on lateral faces, transversely muricate between ribs. Pappus white. **Flowering and fruiting**: December-June. Common in grasslands, on margins of agricultural fields and moist patches in wastelands. Sweta 1498.


36. **SPHAERANTHUS L.**


37. **SPILANTHES** Jacq.


Diffuse, thinly hairy herbs. Leaves ovate acute, base rounded or truncate. Heads yellow, rays 8 or more; receptacle conical. Involucral bracts 2-seriate, 3-nerved with narrowly winged margins. Ray florets female; disc florets numerous, bisexual. Achenes of disc florets compressed, black, ciliate on margins. Pappus of two unequal bristles. **Flowering and fruiting:** June-October. Frequently found in wet habitats at the banks of Ganga. Sweta 882, 863.

Identification of this species is based on the key provided by Chowdhery (1995). My specimens come close to *S. ciliata* in having more than 8 ray florets and the size of head (less then 1.0 cm) brings it close to *S. uliginosa*. But the latter species is characterized by 5-6 ray florets against 8-12 in the former. Therefore, the specimens collected from the study area seem to be intermediate between these two species.

38. **TRIDAX** L.


Annual, hispid-hairy, procumbent herbs. Leaves ovate-lanceolate, confined to lower ⅓ part of the stem, dentate, hair bulbous based. Heads solitary on long, upcurved peduncles, hirsute. Ray florets pale to yellow-white, ligulate. Disc florets tubular, purple tinged. Achenes oblong or obconical, black, silky hairy. Pappus bristles plumose, unequal. **Flowering and fruiting:** Almost throughout the year. Abundantly found on roadsides in wastelands and agricultural fields. Sweta 30.

39. **VERBESINA** L.


40. **VERNONIA** Schreb. nom. cons.

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Short to tall, annual or perennial, thinly pubescent herbs. Leaves obovate, entire to slightly dentate. Heads in terminal corymbose, panicles, purplish or pink. Achenes cylindric, appressedly silky, faintly ribbed. Pappus hairy white, biseriate, hairs of outer row short. Flowering and fruiting: Almost throughout the year. Local Name. Sahadevi. Abundant in a variety of habitats. Sweta 58, 245.

41. XANTHIUM L.

Erect, annual scabrid herbs. Leaves long petioled, alternate, 3-5 palmately lobed, dentate. Heads in terminal and axillary racemes. Male head globose; anthers free. Female heads in axillary cymes, 2-flowered, fertile, ovoid. Fruit hard, oblong or ovoid, covered with hooked spines and with 2 apical, hooked spines. Flowering and fruiting: Rainy and winter season. Local Name. Gokhru. Commonly found in waste lands and on roadside. Sweta 111.

42. YOUNGIA Cass.


55. CAMPANULACEAE

KEY TO GENERA
1. Flowers in lax corymbose panicles; capsule dehiscing
   loculicidally................................................................. 2. Wahlenbergia
1. Flowers in panicked clusters; capsule dehiscing by
   lateral pores or by three basal valves.................................. 1. Campanula
1. CAMPANULA L.
Erect, hispid, annual herbs. Basal leaves in a rosette, 1.0-2.0 x 1.0-1.5 cm, spatulate; upper leaves alternate, sessile, linear-lanceolate, dentate, hairy. Flowers in paniced clusters, purplish-white. Corolla divided less than half way down. Capsule hemispheric, 3-celled, hairy. Seeds much compressed, margined. **Flowering and fruiting:** December-April. Found frequently in moist and shady places, especially near ponds and ditches. Sweta 639, 734.

2. WAHLENBERGIA Schard. ex Roth nom. cons.

56. SPHENOCLEACEAE
SPHENOCLEA Gaertn. nom. cons.
Erect amphibious, annual herbs, 30-90 cm high. Leaves 3-10 x 0.5-3 cm, oblong-lanceolate, alternate, entire, acute. Flowers sessile, greenish-yellow in compact, erect, cylindric, terminal spikes. Corolla white, caducous, lobes ovate-triangular. Capsule globose, depressed, enclosed within persistent calyx. Seeds minute, oblong, brown. **Flowering and fruiting:** June-November. Occasionally found in rice fields, on margins of ponds and semi-dried bed of Ganga where it forms pure populations. Sweta 850
**Note:** According to APG-2 this genus belongs to the family Campanulaceae.

57. PLUMBAGINACEAE
PLUMBAGO L.


Erect or straggling, perennial undershrubs. Leaves 2-8 x 1.5-5 cm, ovate-lanceolate, entire, acute, undulate-crispy. Flowers white in long axillary and terminal racemes. Calyx densely covered with stalked, sticky glands, persistent. Corolla salver shaped, lobes oblong, apiculate. Capsule oblong, enclosed within the persistent calyx, seeds oblong. **Flowering and fruiting:** September-March. **Local Name:** *Makkhi.* Frequently occurs straggling among bushes. Sweta 722.

58. PRIMULACEAE

**KEY TO GENERA**

1. Leaves mostly basal, petioled, dentate; flowers white, in terminal umbels
   
   2. Primula

1. Leaves all cauline, sessile, entire; flowers purple, axillary
   
   1. Anagallis

1. ANAGALLIS L.


Erect, prostrate or ascending, glabrous, annual herbs. Leaves 1-2 x 0.5-2 cm, opposite, sessile, ovate-lanceolate, glabrous, acute. Flowers axillary, solitary, blue. Calyx lobes lanceolate. Corolla blue, petal margins ciliate. Filaments bearded with pink-red moniliform hairs. Capsule many seeded, globular, dehiscence transverse. Seeds trigonous. **Flowering and fruiting:** December-March. Commonly found as weed in grasslands and cultivated fields. Sweta 380.

**Note:** According to APG-2 this genus belongs to family Myrsinaceae.

2. PRIMULA L.


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59. SAPOTACEAE

KEY TO GENERA

1. Leaves clustered at the end of branches, long petioled;
   calyx lobes 4-5; staminodes none........................................ 1. Madhuca

1. Leaves not clustered at the end of branches, petiole short;
   calyx lobes 6-8; staminodes present..................................... 2

2. Flowers usually 4-merous; leaves acute or acuminate.............. 3. Mimusops

2. Flowers usually 3-merous; leaves rounded or emarginate
   at the apex................................................................. 2. Manilkara

1. MADHUCA Ham. ex J. F. Gmelin


Medium sized to large, deciduous trees with milky latex. Leaves crowded at the end of branches, up to 18.0 x 10.0 cm, elliptic-obovate, obtuse or subacute, nerves prominent abaxially, young leaves crimson. Flowers white or cream, tomentose, long pedicelled. Calyx 4-lobed, tomentose. Corolla succulent, sweet, lobes 8-9, acute, erect. Stamens up to 30 in 2-3 series. Style exserted. Berries ovoid, fleshy, on long pedicels, beaked, hairy, 1-4 seeded. Flowering and fruiting: March- July. Local name: Mahua. Often planted on roadsides. Sweta 1552.

2. MANILKARA Adans. nom. cons.


Evergreen trees, up to 15.0 m high. Bark blackish grey, deeply furrowed. Leaves up to 10.0 x 5.0 cm, elliptic-ovate or oblong, obtuse or emarginate, entire. Flowers in axillary, few flowered fascicles, white. Calyx lobes 6, ciliate, ovate, subacute, reflexed. Corolla lobes usually 18, in two series. Fertile stamens 6, staminodes 6 or occasionally 8, denticulate. Berries ovoid, reddish-yellow, 1-seeded, sweet. Flowering and fruiting: October-April. Local name: Khirni. Often planted near villages for edible fruits. Sweta 1428.

3. MIMUSOPS L.

Handsome trees with dark-green foliage. Leaves elliptic-oblong, acute or acuminate, shining above, margins slightly wavy, up to 12.0 x 6.0 cm. Flowers white, tinged with pink, sweet scented, star shaped, solitary, or in axillary fascicles. Calyx deeply 8-lobed, 2-seriate. Corolla 8-lobed. Stamens 8, staminodes ovate-lanceolate, acute. Berries elliptic-oblong, fleshy, yellow, edible. Seed usually single, oblong, black. **Flowering and fruiting:** March-June. **Local name:** Maulsari. Often planted for beautiful foliage and scented flowers in parks, mosques and on roadsides. Sweta 1431.

60. EBENACEAE

Diospyros L.


Small trees, with crooked stem and black or dark-brown bark. Leaves alternate, up to 9.0 x 4.0 cm, thinly hairy, ovate-oblong or ovate-lanceolate, entire. Flowers creamy-white; males in 3-flowered cymes, female ones solitary. Corolla white or dirty-white, hairy outside. Stamens 16 in opposite pairs, united at the base, anthers awnless, pubescent. Calyx strongly reflexed in fruit. Fruit globose, up to 2.0 cm in diam., yellow and glabrous when ripe. **Flowering and fruiting:** April-October. **Local name:** Bis-tendu. Common in Kholas. Sweta 1436.

61. OLEACEAE

**KEY TO GENERA**

1. Fruit a berry; flowers uniformly white or yellow.......................... 1. *Jasminum*

1. Fruit a capsule; flowers white with an orange tube........................ 2. *Nyctanthes*

1. JASMINUM L.


Large scandent shrubs. Leaves 6.0-8.0 x 2.0-6.0 cm, simple, opposite, ovate-lanceolate, acute, entire. Flowers white in terminal cymes, pedicellate, fragrant. Calyx teeth linear, hairy. Corolla lobes linear-lanceolate, acute. Fruit globular, blackish at maturity, solitary. **Flowering:** April-May; **Fruiting:** June-August. **Local Name:** Bela-Chameli. Found in Kholas. Sweta 437.

2. NYCTANTHES L.

Larger shrub or small trees. Leaves 3.5-10.0 x 2.0-5.0 cm, opposite, ovate-lanceolate, acuminate or acute, upper surface scabrous. Flowers fragrant, white, in 3-6 flowered axillary cymes. Corolla 4-8 lobed, lobes obcordate, white, salver-shaped, tube orange. Capsule 1.0-2.0 x 1.3-2.0 cm, dorsally compressed, 2-seeded, seeds orbicular, flattened. Flowering and fruiting: August-November. Local name. Harsingar. Cultivated in the gardens for ornamental purpose. Sweta 1456.

### 62. APOCYNACEAE

#### KEY TO GENERA

1. Erect herbs
2. Catharanthus
1. Trees, shrubs or climbers
2. Armed shrubs; fruit fleshy
1. Carissa
2. Unarmed; fruit follicular
3. Anthers free not adhering to the stigma
3. Holarrhena
3. Anthers conniving in a cone and adhering to the stigma
4. Trees; throat scaly; corolla lobes overlapping to the left
6. Wrightia
4. Climbers

Erect or scandent, evergreen shrubs. Leaves 2-5 x 1-2 cm, opposite, obovate, shortly mucronate, acute. Flowers white, in terminal corymbose cymes, faintly scented. Calyx acute,
ciliated. Corolla tube cylindric, dilated upwards, lobes lanceolate, acute, pubescent. Berries 1-2.5 x 1.5 cm, ellipsoid, smooth, 4-seeded, fleshy, purplish when ripe. **Flowering and fruiting.** January-June. **Local name.** Karunda. Often cultivated for edible fruits. Sweta 1488.

Large, thorny, evergreen shrubs. Leaves 1.5-2.5 cm long, broadly-ovate, acute, entire. Flowers white, scented, tinged with pink, in corymbose cymes. Calyx lobes acuminate. Corolla salver shaped, tube cylindric. Berries globose or subglobose, reddish-brown when young, dark purple at maturity, 4-seeded. **Flowering:** July-December. **Fruiting:** February-April. **Local Name:** Jangli-Karaunda. Occasionally found in sandy soil near Kholas and nearby areas. Sweta 761.

2. **CATHARANTHUS** G. Don

**Key to species:**
1. Leaves lanceolate; flowers always white................................. 1. *C. pusillus*
1. Leaves oblong-obovate; flowers white or pink.......................... 2. *C. roseus*

Erect, glabrous annual herbs. Leaves 1.2-3 x 1-2.5 cm, membranous, lanceolate, acuminate. Flowers small, white, solitary or paired. Corolla tube hairy, lobes oblong-obovate, apiculate. Carpels 2. free, glabrous. Follicles 2.5-5 cm long, slender, straight, pointed, many ribbed. Seeds cylindric, black. **Flowering and fruiting,** June-August. Common weed on margins of agricultural fields. Sweta 1490.

*Vinca rosea* L. Syst. Nat. ed. 10. 944. 1759.
Erect perennial herbs. Leaves, oblong-ovate, obtuse, rounded, apiculate, glabrous. Flowers pink or white, in axillary cymes. Corolla 5-lobed, white with yellow centre or pink with dark red centre. Follicles 2.5-3 cm long, having longitudinal ridges, turns black at maturity. **Flowering and fruiting:** Almost throughout the year. **Local name.** Sadabahar. Cultivated as an ornamental plant. Sweta 1505.
3. **HOLARRHENA** R.Br.


4. **ICHNOCARPUS** R.Br. nom. cons.


Large, evergreen climbing shrubs, younger parts rusty tomentose. Leaves 3-6 cm long, elliptic-oblong or ovate-lanceolate, acute to acuminate, entire. Flowers greenish-white, fragrant, in trichotomous cymes. Corolla twice as long as the calyx, lobes acuminate. Follicles slightly curved or straight, cylindric, rusty. Seeds linear, black. **Flowering and fruiting**: September-February. **Local Name**: Kalidudhi. Found climbing on small trees in Kholas and open areas. Sweta 581.

5. **VALLARIS** N.C. Burman


Large straggling shrubs with milky latex. Leaves 4-10 x 1.5-3 cm, opposite, ovate oblong, acute, gland dotted, glabrous, shining. Flowers white, in lax pubescent cymes, fragrant. Calyx lobes ovate lanceolate, acute at the apex. Corolla tube about 1.5 cm long, with spreading limb; lobes obovate. Anthers exerted, connective with a dorsal spherical gland. **Flowering and fruiting**: November-April. **Local name**: Dudhi bel. Occasionally occurs in Kholas. Sweta 1439.

**Note**: In IPNI the specific epithet has been spelled as 'heynii'

6. **WRIGHTIA** R. Br.

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WCSPF citation:

63. ASCLEPIADACEAE

KEY TO GENERA:
1. Habit erect................................................................. 2
1. Habit climbing.......................................................... 3
2. Anthers with a membraneous appendage; pollen
   masses pendulous; follicles paired.............................. 1. Calotropis
2. Anthers without a membraneous appendage; pollen
   masses erect; follicles solitary (L. reticulate is a climber)...... 2. Leptadaenia
3. Leaves narrowly lanceolate; flowers whitish
   with dark red or purple blotches.............................. 3. Oxystelma
3. Leaves broad; flowers not blotched.............................. 4
4. Fruits softly echinate all over................................. 4. Pergularia
4. Fruits smooth......................................................... 5. Telosma

1. CALOTROPIS R. Br.

Key to species:
1. Buds hemispheric; corolla lobes purple apically
   within, erect.......................................................... 2. C. procera
1. Buds ovoid; corolla pure white, spreading.................... 1. C. gigantea

Large shrubs or small trees with yellowish bark. Leaves sessile or shortly petioled, thick, up to 15.0 cm long, elliptic-oblong, acute or shortly-acuminate, cordate or sometimes amplexicaul. Flower in terminal and lateral umbellate cymes. Corolla white, lobes deltoid, spreading. Corona lobes shorter than the staminal column, thinly hairy, apex rounded with two obtuse auricles. Follicles up to 10.0 cm long, glabrous, green, recurved. Seeds broadly ovate, flat, comose. **Flowering and fruiting**: Nearly round the year. Often found in waste places. Perhaps an escape from cultivation. Sweta 917.


Erect, large, shrub. Leaves sessile, 4-13 x 2-7.5 cm, ovate oblong, acuminate, cordate. Flowers purplish, in axillary or terminal corymbose cymes. Corolla purplish, lobes erect, acute. Corona 5, fleshy glabrous, straight. Follicles 6.5-10 cm long, ellipsoid, recurved, turgid, smooth. Seeds broadly ovate, flat, minutely tomentose; coma silky white. **Flowering and fruiting**: March-July. **Local name**: Madar, Akhra. Occurs commonly in open waste places and on roadsides. Sweta 1423.

2. **LEPTADENIA** R. Br.

**Key to species:**

1. Erect almost leafless shrubs ................................................................. 1. *L. pyrotechnica*
2. Climbing shrubs with well developed leaves ................................... 2. *L. reticulata*


Much branched, twining shrubs with watery sap. Leaves 5-12 x 2.5-5 cm, ovate-lanceolate, acuminate, rounded at base, coriaceous. Flowers pale-yellow, in axillary umbellate cymes. Corolla tube very short, lobes thick, ovate-oblong, margins revolute, tips often reflexed. Follicles oblong-lanceolate, with a thick curved beak, smooth, whitish. Seeds ovate, flat; coma 2-4 cm long. **Flowering and fruiting**: July-December. Found in open waste places. Sweta 1353.


Erect much branched, glabrous, often leafless shrubs, with watery sap. Leaves sessile, linear, acuminate, linear lanceolate, caducous, thick. Flowers yellow in umbellate cymes. Corolla lobes deeply divided, valvate, tube funnel shaped, glabrous, thickened towards the apex. Follicles 5-15 × 0.5-1 cm, terete, lanceolate, tapering into the long straight beak, glabrous. Seeds ovate-lanceolate, glabrous; coma silky white. **Flowering and fruiting**: August-January. Included on authority of Murty and Singh (1961b).

3. OXYSTELMA R.Br.


4. PERGULARIA L.


Twining, hispid, perennial herbs. Leaves 2.5-10 × 2-7 cm, long petioled, ovate, acuminate, pubescent on upper surface, hispid on lower surface, cordate. Flowers pale - green, drooping in lateral corymbose cymes. Corolla lobes ovate, acute with ciliated margins. Follicles paired, 4-8 × 0.75-1.5 cm, lanceolate, covered with long soft spines, beaked. Seeds ovate, dentate at the margins, rounded. **Flowering and fruiting**: April-December. Included on authority of Murty and Singh (1961b).

5. TELOSMA Coville

Large, twining shrubs. Leaves 2-7 x 2-5 cm, ovate, acuminate, membranous, cordate or rounded. Flowers yellow, many, in umbellate cymes. Corolla lobes linear, glabrous. Corona scales linear, beaked. Follicles 10-12 x 1.5-2.0 cm, margined, longitudinally ribbed, glabrous. Seeds ovate, flat, brown, smooth, comose. **Flowering and fruiting**: August-December. Found along the roadsides among hedges. Sweta 71.

**Note:** According to APG-2 the members of Asclepiadaceae are included in group Asclepiadoideae Burnett of family Apocynaceae.

### 64. PERIPLOCACEAE

**CRYPTOSTEGIA** R.Br.


Large, twining or straggling, glabrous shrubs with milky sap. Leaves 4-10 x 2.5-5 cm, opposite, elliptic-oblong, acute, shining on upper surface. Flowers light-purple in dichotomous cymes. Corolla funnel shaped. Corona lobes free, filiform. Follicles 7-15 x 2-4 cm, 3-angled, slightly woody, ovoid, tapering. Seeds many, minute, oblong, compressed; coma silky white. **Flowering and fruiting**: April-September. **Local name.** Rubber ke bel. Cultivated in gardens as an ornamental plant. Sweta 1354.

**Note:** According to APG-2 family Periplocaceae is group Periplocoideae Endlicher of Apocynaceae.

### 65. GENTIANACEAE

**KEY TO GENERA**

1. Flowers pink, in dichotomous cymes .......................... 1. _Centaurium_

1. Flowers not pink .......................................................... 2

2. Flowers in terminal dichotomous cymes; corolla irregular; fertile stamen one ............................................. 3. _Hoppea_

2. Flowers in sessile axillary clusters; corolla regular; all stamens fertile .................................................. 2. _Enicostema_

1. _CENTAURIUM_ Hill


Small, erect, annual herbs, branching from the base. Basal leaves in rosette, 0.5-2 x 0.1-0.5 cm, lanceolate-oblong, acute, obtuse; cauline leaves smaller, linear-oblong. Flowers in

2. **ENICOSTEMA** Blume nom.cons.


Erect, glabrous, perennial herbs. Leaves sessile, 1-6 x 0.5-1.5 cm, linear-lanceolate, 3-nerved, obtuse, amplexicaule. Flowers white in axillary whorled clusters. Corolla tubular, lobes acute, elliptic. Capsule 2-5 mm long, oblong, 2-valved, narrowed at the base. Seeds many, minute, brown. **Flowering and fruiting:** July-December. Included on authority of Murty and Singh (1961b).

3. **HOPPEA** Willd.


Small, annual, glabrous herb. Leaves 0.1-0.5 cm long, sessile, opposite, ovate, acute, glabrous. Flowers pale-yellow in terminal, dense, dichotomous cymes. Calyx 4-lobed, ribbed, ovate, with prominent green nerve along the margin. Corolla greenish, ovate-triangular, acute, recurved. Capsule ellipsoidal. Seeds numerous, dark - green. **Flowering and fruiting:** September-January. Common in marshy places and other moist or wet habitats. Sweta 571.

66. **MENYANTHACEAE**

**NYMPHOIDES** Seguir


Flowering and fruiting: October-May. Commonly found in stagnant water bodies. Sweta 266, 655.

67. HYDROPHYLLACEAE

HYDROLEA L. nom.cons.


Erect or decumbent, annual herbs. Leaves 2-8 x 1-1.5 cm, oblong-lanceolate, narrowed at both ends, shortly petioled. Flowers blue in short lateral racemes. Calyx lobes acute, lanceolate, pubescent, glandular, 3-nerved. Corolla blue with darker veins, lobes ovate. Stamens exserted. Anther sagittate or twisted. Capsule 3-6 mm long, ovoid-oblong enclosed in enlarged persistant calyx. Seeds many, minute, oblong. **Flowering and fruiting:** September-December. Found mainly in wet ground, rice fields etc. Included on authority of Murty and Singh (1961b).

**Note:** According to APG-2, the genus *Hydrolea* is included in group Hydrophylloideae Burnett of Boraginaceae.

68. BORAGINACEAE

**KEY TO GENERA**

1. Flowers yellow; root red in colour........................................ 1. *Arnebia*
2. Flowers not yellow; root colourless........................................ 2
3. Calyx lobes cordate or hastate at the base in fruit; corolla with deep reddish-brown spots at the base; fruits not glochidiate........................................ 4. *Trichodesma*
4. Calyx lobes not as above; corolla with blue spots
   at the base; fruits glochidiate........................................ 2. *Cynoglossum*

1. ARNEBIA Forsk.


Erect or decumbent, hispidly hairy herbs with a red root. Leaves 2.0-5.0 x 0.5-1.0 cm, alternate, sessile, linear-lanceolate, densely hispid. Flowers sessile, in secund spikes, yellow. Calyx lobe lanceolate, acute, hairy. Corolla hairy outside, lobes oblong, obtuse. Nutlets small, ovoid, tuberculate, acute, brownish. **Flowering and fruiting:** February-October. Commonly found in the dry sandy soil in *Kholas* and cultivated fields. Sweta 408, 673.
2. CYNOGLOSSUM L.


Erect, hispid annual herbs. Leaves 2.0-5.0 x 1.0-1.5 cm ovate, lanceolate, acute, upper surface with short stiff-hairs, lower surface strigose, denticulate. Flowers in axillary terminal forked cymes, shortly pedicelled. Calyx lobes ovate oblong, softly hairy. Corolla lobes oblong, white with blue tinge. Nutlets ovate, convex, minutely tuberculate, brown, margined with decurved hooks. **Flowering and fruiting**: August-January. Often found in wastelands and on banks of Ganga. Sweta 1365.

3. HELIOTROPIUM L.

**Key to species:**

1. Erect herbs with broad leaves.................. 1. _H. europaeum_
2. Prostrate or ascending hers with narrow leaves.................. 2
3. Flowers sessile; closely set on the inflorescence.................. 2. _H. marifolium_


Perennial, procumbent herbs. Leaves 1.5-2.0 x 0.1-0.75 cm, broadly lanceolate, appressed hairy with sharp tricomes. Flowers white in axillary and terminal spikes. Bracts leafy,


4. **TRICHODESMA** R. Br. nom. cons.


var. *indicula*

Erect or decumbent, annual, hispid herbs. Leaves 2.0-5.0 x 1.0-2.0 cm, opposite, shortly sessile, ovate-oblong, margins revolute, semi-amplexicaul, upper surface with stiff hairs seated on flattened circular discs, old dry leaves blackish. Flowers in leafy racemes, white turning to blue or pink. Calyx keeled, acute, hastate. Corolla limb funnel shaped, center with a brown spot at the base of each petal. Anther tips excurrent, hairy and twisted. Fruits pyramidal, smooth, polished. Nutlets oblong. **Flowering and fruiting**: August-December. Commonly grows in open waste lands and on dry sandy soil. Sweta 17, 413.

The orthography of the specific epithet, according to IPNI, is ‘indicum’. According to IPNI the combination *Trichodesma indicum* R. Br. is an invalid name. The earliest available combination is *Trichodesma indicum* (L.) Sm. -- Cycl. (Rees) 36: Trichodesma no. 1. 1817.

**Note:** According to APG-2 the members of family Boraginaceae as treated here are included in groups Boraginoideae Arnott and Heliotropeoideae Arnott of Boraginaceae.

### KEY TO GENERA

1. Calyx accrescent in fruit; mesocarp viscous;
   - style 4-fid
     - 1. *Cordia*

1. Calyx not accrescent in fruit; mesocarp not viscous;
   - style 2-fid
     - 2. *Ehretia*

69. **EHRETIACEAE**
1. CORDIA L.


**Note**: Genus *Cordia* is included in group Cordioideae Link of Boraginaceae, according to APG-2.

2. EHRETIA P. Brown


1. var. aspera

Small trees or large shrub. Leaves variable, 2.5-6.0 x 2.0-4.0 cm, oblong, elliptical, obovate, acuminate, slightly hairy. Flowers white in terminal corymbose cymes. Calyx lobes ovate-oblong, ciliated. Corolla oblong, obtuse. Drupe globose, depressed, smooth, black. **Flowering and fruiting**: June-August. Occurs in *Kholas* and on roadsides. Sweta 758, 931.


Differs from var. *aspera* by its obovate-spathulate leaves with rounded apices, more lax corymbs and relatively larger flowers. **Flowering and fruiting**: March-May. **Local Name**: *Tambolan*. Frequently found in *Kholas*. Sweta 821.

**Note**: Genus *Ehretia* is included in group Ehretioideae Arnott of Boraginaceae, according to APG-2.

### 70. CONVOLVULACEAE

**KEY TO GENERA**

1. Capsule indehiscent with thin fragile walls.................................3. *Ipomoea*
2. Capsule dehiscent........................................................................2

2. Stems shortly winged; capsule operculate,
   almost translucent........................................................................5. *Operculina*

2. Stems not winged; capsule neither operculate
nor translucent; valvate or dehiscing irregularly .......................... 3

3. Styles 2, free or slightly united at the base;
each style 2-fid; stigmas lateral; capsule 2-4 valved ...................... 2. Evolvulus

3. Style 1, entire or slightly 2-lobed apically;
capsules 4 or more seeded; stigmas elliptic oblong
or globose .................................................. 4

4. Stigmas elliptic oblong; capsule 4-valved or
   irregularly dehiscent ........................................ 1. Convolvulus

4. Stigmas globose ............................................. 5

5. Pollen spinulose .......................................... 3. Ipomoea

5. Pollen smooth .............................................. 4. Merremia

1. CONVOLVULUS L.

Key to species:
1. Leaves hastate at the base; corolla 3-4 times
   as long as calyx; nearly glabrous climbing herbs ...................... 1. C. arvensis

1. Leaves not hastate; corolla at the most twice as
   long as calyx; hairy or pilose prostrate herbs ...................... 2. C. prostratus


Glabrous, climbing, herbs with milky latex. Leaves 2-7 x 1.0-5 cm, ovate or oblong lanceolate, obtuse, hastate. Flowers in axillary cymes, peduncles 2-10 cm long. Calyx unequal, elliptic-oblong, mucronate, glabrous. Corolla funnel shaped, pink or white. Capsule 4-6 mm in diameter, globose, smooth, shining. Seeds slightly trigonous, tuberculate, reddish-brown. **Flowering and fruiting**: November-March. Common weed of cultivated fields and on roadsides. Sweta 1536.


Prostrate, hairy perennial herb. Leaves 2-4 cm long, linear-oblanceolate, hairy. Flowers hairy sessile, solitary or in pairs, white or pink. Corolla funnel shaped. Capsule 4-valved, globose, oblong, brown. Seeds many, minute, brown. **Flowering and fruiting**: May-December. **Local name.** Shankhpushpi. Occurs on sandy soil or among grasses. Sweta 1554.

2. EVOLVULUS L.
Key to species:

1. Glabrous, prostrate herbs, rooting at the nodes;
   leaves oblong-orbicular; flowers white; fruiting pedicel
   curved downward.................................................. 2. *E. nummularius*

1. Hairy, ascending herbs; not rooting at the nodes;
   leaves lanceolate; flowers blue; fruiting pedicels straight............. 1. *E. alsinoides*

   Prostrate or ascending, multicauline, hairy, perennial herbs. Leaves 1-4 x 0.25-1.5 cm,
   lanceolate-oblong, acute, densely hairy. Flowers blue, in axillary cymes. Calyx densely silky,
   lanceolate, acute. Corolla blue, rotate, shallowly lobed. Capsule globular, glabrous, 4-valved,
   4-seeded. Seeds smooth, black. **Flowering and fruiting:** Rainy and winter season.
   Commonly found in sandy localities. Sweta 92. Habit, hairiness and length of pedicel varies a
   great deal in this taxon.

   nummularius* L. Sp. Pl. 157. 1753. *Volvulopsis nummularius* (L.) Roberty in Candollea 14:
   28. 1952.
   Prostrate, creeping, perennial, glabrous herbs. Leaves 0.25-2.5 x 0.5-2.0 cm, ovate-elliptic,
   cordate. Flowers 1-2, sessile, pedicels erect first but curved after fruit setting. Corolla white,
   **Flowering and fruiting:** March-November. Common in waste, landsand grasslands and
   margins of agricultural fields. Sweta 191.

3. **IPOMOEA** L.

**Key to species:**

1. Creeping aquatic or marshy herbs................................. 1. *I. aquatica*

1. Terrestrial herbs.................................................. 2

2. Leaves pinnately divided into fine comb like segments .......... 9. *I. quamoclit*

2. Leaves entire or palmately lobed................................ 3


3. Ovary 2-celled................................................... 4

4. Flowers sessile or sub-sessile, in heads or clusters............. 5

4. Flowers pedicellate, arranged variously but not in heads........ 7

5. Leaves rotundate in outline, deeply palmately
   5-9 lobed.................................................................... 8. *I. pes-tigridis*

5. Leaves ovate-cordate or oblong-hastate
or elliptic- rhomboid, entire or repand or obscurely
3- lobed…………………………………………………………………………………………………6
6. Capsule glabrous; seeds villous……………………………………………………………………11. I. sindica
6. Capsule pubescent; seeds glabrous………………………………………………………………5. I. eriocarpa
7. Leaves stipulate, deeply digitately or pedately 5-9
partite or foliolate; seeds pubescent………………………………………………………………2. I. cairica
7. Leaves exstipulate entire, angular or somewhat lobed
but never digitately……………………………………………………………………………………8
8. Flowers in pedunculate umbels……………………………………………………………………9
8. Flowers in pedunculate cymes or panicles………………………………………………………10
9. Corolla up to 1.5 cm long……………………………………………………………………………12. I. triloba
9. Corolla more than 2.5 cm long……………………………………………………………………10. I. sepiaria
10. Corolla upto 3.0 cm long; capsule crowned by
    calyx base…………………………………………………………………………………………………11
10. Corolla more than 5.0 cm long; capsule obtuse…………………………………………………3. I. carneae
11. Sepals glabrous………………………………………………………………………………………7. I. obscura
11. Sepals with long non bulbous-based hairs………………………………………………………4. I. dichroa

Creeping, annual or perennial, aquatic or marshy herbs. Leaves 3-8 x 1-4 cm, elliptic-oblong, glabrous, cordate or hastate, acute. Flowers axillary in 1-5 flowered, pedunculate cymes. Corolla funnel shaped, pinkish to purple with a dark centre. Filaments unequal hairy at the base. Capsule glabrous, ovoid. Seeds brown, minutely hairy. **Flowering and fruiting:** Rainy season. Commonly found in the ponds and on their edges. Sweta 344.

var. cairica
Glabrous, perennial climbing shrubs. Leaves palmately 5-6 partite, lobes elliptic lanceolate, glabrous. Flowers campanulate, purplish, arranged in 1-3 flowered cymes. Calyx segments unequal, ovate, tuberculate. Corolla purplish, funnel shaped. Capsule 2-celled, 4-valved. Seeds small, slightly pubescent. **Flowering and fruiting:** Almost throughout the year. **Local name:** Railway creeper. Commonly found among hedges on roadsides. Sweta 1453.

**Key to subspecies:**

1. Twining shrubs; leaves acute or apiculate......................... 1. *I. carnea* subsp. *carnea*
2. Erect, stout shrubs; leaves acuminate............................. 2. *I. carnea* subsp. *fistulosa*

1. subsp. *carnea*

Large twining shrubs with milky latex. Leaves 8-30 x 6-8 cm, broadly ovate, acute, entire. Flower in axillary cymes, large, purple, funnel shape, with a dark centre. Stamens included. Capsules globular, brown. Seeds densely villous, light yellow. **Flowering and fruiting:** Throughout the year. Frequently found on roadsides, around the gardens. Sweta 218.


**Note:** This species was introduced in India as an ornamental (Raizada, 1976). Its presence as a successful escape was first documented by Santapau and Patel (1945). In Hastinapur Wildlife Sanctuary, this species outcompetes native flora in swamps and on banks of Ganga where even *Phragmites karkas* population dwindles to a great deal in patches occupied by this species. Rapid spread of this species is, probably, due to its alternative mode of reproduction. Cut stems root easily and develop into a new plant.


var. nil  
Medium sized, annual climbers with watery sap. Leaves 3-12 x 2-12 cm, ovate-cordate, 3-lobed lobe acute. Flower in axillary, peduncled cymes. Calyx segments ovate-lanceolate, tapering towards the apex. Corolla funnel shaped, limb purple with white external longitudinal bands, tube white. Capsule 1-1.5 cm in diameter, 3-celled, globose. Seeds 4-6, glabrous. **Flowering and fruiting**: August-November. Common in wasteland, and on roadsides. Sweta 184, 285.


Twining, hairy herbs. Leaves 4-10 cm, in diameter, deeply 5-7 palmately lobed, lobes elliptic oblong, hirsute. Flowers sessile in few flowered heads, peduncle equal to or exceeding the petiole. Bracts ovate-lanceolate forming an involucre. Two outer sepals larger. Corolla funnel shaped, pink. Capsule ovoid, glabrous, hidden in the calyx. Seeds minutely hairy, dark-brown, triangular. **Flowering and fruiting**: September-December. Commonly found as weed in fields, and among the hedges. Sweta 110, 126.


Beautiful, dark-green, slender, glabrous, twining annual herbs. Leaves pinnately divided, segments linear, filiform. Flowers in 1 to few flowered cymes. Corolla bright-red, tubular, narrowly funnel shaped, lobes triangular. Seeds black, compressed, ellipsoid. **Flowering and fruiting**: Rainy and winter season. Included on the authority of Murty and Singh (1961b) who reported it from the area. This species is common in forest tracts of Bijnor district, therefore its occurrence in Hastinapur can not be ruled out. Also cultivated as an ornamental.


Twining annual or perennial herbs. Leaves 2-7.5 x 2.5- 6 cm, long, ovate, acute, cordate to sagittate, entire. Flowers in long peduncled, subumbellate cymes. Calyx lobes elliptic, glabrous with membranous margin, 2 outer shorter than 3 inner ones. Corolla funnel shaped, pinkish - white. Capsule globose, glabrous, 2-celled, ovoid, 2-4 seeded. Seeds light brown, glabrous or thinly hairy, ovoid. **Flowering and fruiting**: August-December. Occasionally found along the roadside or among the hedges in open areas. Sweta 229.


Creeping, hirsute, annual herbs. Leaves 2-7 x 2-5 cm, ovate-cordate, sagittate, entire. Flowers axillary, solitary or in few flowered cymes, peduncle very short. Bracts linear, hispidly hairy. Calyx lanceolate, hispid, enlarged in fruit. Corolla pink, campunulate, with small tufts of hairs at the tip of each lobe. Capsule 4-8 mm long, globose, glabrous. Seeds black, thinly grey-velvety. **Flowering and fruiting**: August-November. Common in waste lands among grasses and hedges. Sweta 1565.

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4. **MERREMLIA** Dennst. ex Endl. *non. cons.*

**Key to species:**

1. Flowers yellow ................................................................................................. 3. *M. hederacea*
2. Flowers white .................................................................................................. 2
3. Flowers pure white .......................................................................................... 1. *M. aegyptiaca*


Twining herbs with dense brown hairy stems. Leaves palmately, 7–9 lobes, lobes sinuate to sinuate-dentate, glabrous. Flowers solitary, axillary or in cymes. Sepals up to 3.0 cm long, mucronate, glabrous. Corolla 2.5–5.0 cm long, white with purple centre. Capsule 1.0–2.0 cm in diam. depressed globose. Seeds black, glabrous. **Flowering and fruiting**: April–December. Often found climbing on shrubs. Sweta 498, 559.


Annual, twining, herbs. Leaves 2–8 x 1.5–8 cm, ovate, cordate, acute, basal lobes rounded, entire or 3-lobed. Flowers in axillary cymes, short pedicellate. Calyx oblong, truncate, toothed, reflexed in fruit. Corolla funnel shaped, yellow with green longitudinal nerves at

5. **OPERCULINA** Silva Manso


Note: Members of family Convolvulaceae, as treated here, now constitute group Convolvuloideae Burnett of family Convolvulaceae.

71. **CUSCUTACEAE**

**Cuscuta L.**

Key to species:

1. Stems greenish yellow, thick; style 1; stigma ovoid
   2. *C. reflexa*

1. Stems orange-yellow, slender; styles 2; stigma capitate or globose


Leafless, total stem parasites; stem much branched, twining, greenish-yellow or brown, thicker than that of preceding species. Flowers in clusters arranged in racemes. Bracts ovate-suborbicular, fleshy. Calyx lobes ovate-oblong, obtuse, verrucose. Corolla white, lobes deltoid, obtuse, reflexed. Scales at the base of corolla-tube fimbriate. Ovary ovoid, fleshy. Style single, thick and short. Capsule depressed globose, glabrous, circumcissile. Seeds 2-4, glabrous, black. **Flowering and fruiting:** September-March. **Local name:** Akash-bel, Amar-bel. Commonly occurs climbing on *Bougainvillea* sp., *Cassia* spp., *Withania somnifera* and *Casuarina equisetifolia* etc. This taxon can be readily distinguished from *C. chinensis* by greenish-yellow, relatively thicker stem and its preference for woody host species. Sweta 1449.

**Note:** Members of family Cuscutaceae as treated here now constitute group Convolvuloideae Burnett of family Convolvulaceae.

### 72. SOLANACEAE

**KEY TO GENERA:**

1. Calyx completely covering the fruit ........................................ 2
1. Calyx not completely covering the fruit .................................... 3
2. Densely hairy herbs or under shrubs with nearly tuberous roots; flowers fascicled in leaf axils; ripe fruit red or orange in colour .......................................................... 5. *Withania*
2. Thinly hairy or glabrous herbs; flowers solitary-axillary; ripe fruits yellow................................................................................. 3. *Physalis*
3. Fruit a capsule; anthers not connivent ....................................... 4
3. Fruit a berry; anthers connivent into a cone around the style ........ 4. *Solanum*
4. Flowers solitary, axillary; fruit spinous ..................................... 1. *Datura*
4. Flowers in cymose panicles or corymb; capule unarmed ............. 2. *Nicotiana*

#### 1. DATURA L.

**Key to species:**

1. Branches tinged with purple; capsule covered with blunt tubercles ........................................................................ 1. *D. fastuosa*
1. Branches green; capsule covered with spines .................................... 2
2. Plants clothed with erect, glandular hairs ........................................ 2. *D. innoxia*
2. Plants pubescent with eglandular hairs ............................................ 3. *D. stramonium*

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Erect branched herbs with a foetid smell. Branches zigzag with scattered white spots. Leaves 5-20 x 4-10 cm, long petioled, ovate, triangular, hairy, slightly dentate. Flowers axillary, solitary, white or purple. Calyx lobes triangular, acuminate, reflexed in fruit. Corolla purple-white, 5-angled, folds cuspidate. Capsule globular with blunt spines, nodding. Seeds red, flat, trigonous. **Flowering and fruiting**: Almost throughout the year. Occasionally found near the canals. Sweta 62.


Stout short shrubs with grey tomentum. Leaves 8-15 x 5-10 cm, petioled, ovate-lanceolate, acute or acuminate, entire or repand-dentate. Flowers axillary, solitary, funnel shaped. Calyx accrescent, reflexed in the fruit, forms tube in flowers. Corolla white, tubular, limb 10 toothed. Capsule globose, covered with long spines. **Flowering and fruiting**: July-December. **Local Name.** Dhatura. Commonly in waste lands and along roadsides. Sweta 356.


Erect, annual-perennial herbs. Leaves 5-20 x 2-15 cm, ovate oblong or triangular, acuminate, cordate. Flowers solitary, axillary. Calyx 3-4 cm long, 5-angled. Corolla 5-10 cm long, white or purple, teeth 5, linear. Capsule erect, ovoid-oblong, spiny, greenish. Seed black. **Flowering and fruiting**: December-May. Rarely found in wastelands on roadsides and river beds. Sweta 1438.

2. *NICOTIANA* L.


3. *PHYSALIS* L.

Key to species:
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1. Anthers blur or violet................................................................. 1. *P. angulata*

1. Anthers yellow........................................................................ 2

2. Leaves sinuate dentate; corolla upto 7.0 - 10.0 mm long;
   fruiting calyx 5-angled............................................................ 3. *P. minima*

2. Leaves entire or subentire; corolla upto 5.0 mm long;
   fruiting calyx not 5-angled...................................................... 2. *P. micrantha*

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Erect or prostrate, glabrous, annual herbs. Leaves 1.5-6 x 1.5-5 cm, ovate, entire to dentate, acute, dentate, cuneate. Flowers solitary, terminal and axillary, pale-yellow. Calyx hairy, lobes triangular, acute. Filaments hairy at base, anthers yellow. Berries globose, enclosed in inflated calyx. **Flowering and fruiting**: July-December. Common in waste places and on roadsides. Sweta 611.


Erect or decumbent, annual herbs. Leaves 2-6 x 2-3.5 cm, ovate, acute, slightly toothed or entire, cuneate. Flowers solitary, axillary on long slender deflexed pedicles, yellow. Corolla yellow. Berries globose, yellow when ripe, completely enclosed within the enlarged, 5-10 ribbed reticulately veined calyx. Seeds discoid, muricate, orange-yellow. **Flowering and fruiting**: May-January. Commonly found in waste places and in shady habitats. Sweta 1437.

4. **Solanum** L.

**Key to species:**

1. Berries less than 1.0 cm in diameter........................................ 2

1. Berries more than 1.0 cm in diameter; prickly herbs
   with purple flowers.................................................................. 3. *S. virginianum*
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2. Unarmed herbs with red or purple berries................................. 2. S. nigrum
2. Armed undershrubs; berries yellow or orange-yellow............... 1. S. anquivi


Erect, glabrous, unarmed, annual herbs. Leaves 2-8 x 1-2.5 cm, ovate-oblong, sinuate or toothed, with cuneate base. Flowers white with light purple tinge, arranged in umbellate extra-axillary cymes. Corolla divided nearly halfway into 5 oblong, subacute lobes. Berries globose, yellowish-red, purple or black. Seeds minute, yellow, slightly pitted. **Flowering and fruiting**: Throughout the year. **Local Name.** Makoi. Common in waste places, agricultural fields and on road sides. Sweta 618.


5. WITHANIA Pauq. nom. cons.


Erect, much-branched under-shrubs, with stellate, tomentose, greenish-white hairs. Leaves 5-15 x 2-6 cm, ovate-oblong, minutely stellate hairy, acute, decurrent. Flowers greenish-yellow, subsessile, in umbelliform, axillary cymes. Calyx 5-angled, teeth linear, acute.
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Corolla greenish-yellow, lobes lanceolate, acute, stellate hairy outside. Fruit globular berries, reddish, enclosed in enlarged calyx. **Flowering and fruiting:** Throughout the year. **Local Name.** Asgandh. Common in waste places and on road sides. Sweta 933.

**Note:** APG-2 has divided family Solanaceae into eight clades. Members of Solanaceae listed here are included in clades Nicotianoideae Miers and Solanoideae Kosteletzky.

### 73. SCROPHULARIACEAE

**KEY TO GENERA:**

1. All leaves alternate; corolla rotate; stamens 4 or 5 .......................... 11. *Verbascum*
2. Corolla gibbous or saccate at the base or throat .......................... 3
3. Capsule dehiscing by apical pores; leaves linear; corolla white or pinkish ........................................ 1. *Antirrhinum*
4. Leaves ovate, cauline as well as basal; flowers yellow in the axils of leafy bracts; anther cells stipitate; calyx not much enlarged in fruit ........................................ 5. *Lindenbergia*
5. Fertile stamens 2, with or without 2 staminodes .......................... 6
6. Anthers 2-celled; cells parallel ........................................ 7
7. Corolla with upper lobes outside in the bud; capsule valves placentiferous, 2-partite ........................................ 3. *Dopatrium*
8. Corolla subequal; lateral or lower lobes outside in the bud; capsule valves not placentiferous, entire ........................................ 12. *Veronica*
9. Anthers 1-celled; calyx tubular, ribbed; corolla tube incurved at or above the middle; two upper lobes smaller than others ........................................ 10. *Striga*
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9. Anthers 2-celled................................................................. 10
10. Corolla with lower lobes outside in the bud......................... 11
10. Corolla with upper lobes outside in the bud....................... 12
11. Corolla yellow, sometimes red tinged;
    2-lipped 5-lobed........................................................ 5. Lindenbergia
11. Corolla white; rotate, 4-lobed......................................... 8. Scoparia
12. Corolla 4-lobed........................................................... 8. Scoparia
12. Corolla 5-lobed........................................................... 13
13. Lower pair of stamens inserted in the corolla throat;
    upper pair inserted in the corolla tube; calyx not winged..... 6. Lindernia
13. All the 4 stamens inserted within the corolla tube................ 14
14. Corolla campanulate; lobes rounded subequal..................... 2. Bacopa
14. Corolla distinctly 2-lipped........................................... 15
15. Anther cells stipitate.................................................... 16
15. Anther cells not stipitate............................................. 7. Mazus
16. Placentae either separating in fruit or if conjoined
    in a column, the column not winged; seeds terete............. 9. Stemodia
16. Placentae always conjoined in a column which
    is winged by the remains of the septa; seeds
    angular........................................................................ 4. Limnophila

1. ANTIRRHINUM L.
Erect or ascending annual herbs. Leaves 1.5-5 x 0.1-0.6 cm, sessile, linear or oblong-lanceolate, acute, entire. Flowers nearly sessile solitary axillary, palle - pink. Calyx lobes spreading, hairy, equal to or exceeding the corolla. Corolla bilabiate, personate. Capsule obliquely ovoid, pubescent, about 1 cm long. Seeds compressed, concave, keeled. Flowering and fruiting. December-March. Common in grassy localities, Kholas and on roadsides. Sweta 1400.

2. BACOPA Aublet nom. cons.
Key to species:
1. Leaves entire, rounded or emarginate at the apex;
    flowers purplish............................................................ 1. B. monnieri
1. Leaves crenate, acute; flowers yellow................................ 2. B. procumbens

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Creeping-ascending, succulent herbs. Leaves 1-3 x 0.3-0.75 cm, opposite, sessile or shortly petioled, ovate-oblong, entire, fleshy, gland-dotted abaxially. Flowers solitary, axillary on 0.25-1 cm long pedicles. Outer calyx segments ovate, inner ones linear. Corolla light purple with darker veins, lobes rounded. Capsule about 0.5 cm long, ovoid, glabrous, acute. Seeds transversely rugose. **Flowering and fruiting:** Throughout the year. **Local Name:** Jalbuti, Brahmi. Abundantly found in swamp and marshy places. Sweta 1594.


Prostrate or ascending annual herbs. Leaves opposite, sessile, 6-14 x 5-10 mm, ovate, crenate-serrate. Flowers axillary, solitary, yellow, long pedicellate. Calyx as long as the corolla. Corolla 2-lipped, throat hairy. Stigma lamellate. Capsule small about 5 mm long, cylindric, 2-valved. Seeds reticulate. **Flowering and fruiting:** July-August. Common in agricultural fields and in other moist and shady places. Sweta 858.

3. **Dopatrium** Buch.-Ham. ex Benth.


Erect, rather fleshy, glabrous annual herbs. Leaves 0.4-0.15 x 0.25-0.5 cm, sessile, elliptic-oblong or ovate-lanceolate. Flowers in opposite distant pairs; lower ones sessile, cleistogamous, upper ones perfect, pedicellate. Calyx divided half way down, lobes oblong-lanceolate, obtuse. Corolla bilabiate, pinkish. Capsule globose, apiculate with persistent style base. Seeds minute, ellipsoid, tuberculate. **Flowering and fruiting:** September-November. Included on authority of Murty and Singh (1961b).

4. **Limnophila** R. Br. nom. cons.


Amphibious, perennial herbs with terpentine smell. Leaves slightly fleshy, punctate, ovate, dentate, sessile; lower leaves dissected. Flowers pedicelled, axillary, solitary. Bracteoles 2, linear. Calyx ovate lanceolate, shortly acuminate. Corolla white with red longitudinal streaks
on the lower lip. Fruit subglobose, compressed. **Flowering and fruiting:** August-December. Khan (1987) reported this taxon from Bijnor, therefore the possibility of its occurrence in Hastinapur can not be ruled out.

5. **LINDENBERGIA** Lehm


Erect or decumbent-ascending, annual, glandular hairy herbs. Leaves 2-10 x 1-6 cm, ovate-elliptic, crenate-serrate. Flowers axillary, shortly pedicelled, 1-3 together, passing into terminal leafy racemes. Calyx densely villous, lobes 5, campanulate. Corolla yellow with red spots, glandular hairy, 2-lipped, throat hairy. Capsule hairy, ovoid, laterally compressed, beaked. Seeds ellipsoid. **Flowering and fruiting:** July-March. Occasionally found in damp shady places, especially on walls and road sides. Sweta 1577.

6. **LINDERNIA** All.

**Key to species:**

1. Staminodes 2
2. Leaf serrations acute, aristate; flowers white
   - with red streaks; seeds truncate, not tailed ................. 3. *L. ciliata*
3. Capsule not exceeding the calyx; flowers pedicelled;
   - calyx divided nearly to the base.......................... 1. *L. anagallis*
4. Capsule not exceeding the calyx.................................. 4
5. Calyx divided half way down .................................. 4. *L. crustacea*
6. Calyx divided nearly to the base ................................ 5. *L. multiflora*


Erect or decumbent, annual herbs. Leaves 1.0-2.5 x 0.5-3.0 cm, nearly sessile, ovate-oblong, serrate, glabrous. Flowers axillary, solitary, purplish, long pedicellate. Calyx segments
narrowly lanceolate, acuminate. Corolla pink or purple; upper lip entire; lower lip with a yellow spot, 3-lobed. Capsule linear, beaked with persistent style, acute. Seeds ellipsoidal.

**Flowering and fruiting:** August-March. Common within the area in the swampy habitats and in rice fields. Sweta 441.


Erect or decumbent annual herbs. Leaves 1-3 x 0.5-1.5 cm, sessile, lanceolate-oblong, penni-nerved, densely serrate with bristle-tipped teeth. Flowers in terminal racemes. Calyx deeply divided, segments linear-lanceolate, ciliated, acuminate. Corolla white with red streaks and dots. Fertile stamens 2. Capsule cylindric. Seeds minute, truncate. **Flowering and fruiting:** July-December. Found frequently in moist and shady places. Sweta 1391.

Erect or decumbent, annual herbs. Leaves 0.5-2.0 x 0.4-1.5 cm, petiolate, ovate, cordate, acute, serrate. Flowers axillary, solitary or subracemose. Bracts linear. Calyx linear-lanceolate, 5-ribbed, 5-angled, acute. Corolla purple with a yellow spot at base. Stamens 4, anterior filaments appendiculate. Capsule ellipsoid-oblong, apiculate with persistent style. **Flowering and fruiting:** August-February. Common in grassy localities, agricultural fields and wet habitats. Sweta 1557.

Small, erect, glabrous, annual, somewhat succulent herbs. Leaves 1.0-3.0 x 1.0-1.5 cm, lower petiolate, upper sessile, ovate-oblong, cordate, acute, serrate. Flowers in terminal racemes, glandular hairy. Calyx divided nearly to the base, segments narrowly lanceolate, acute. Corolla white or pale-purple. Stamens 4, filaments of anterior pair appendaged at the base. Capsule ellipsoid-oblong, acute. Seeds rugose. **Flowering and fruiting:** August-February. Common in grassy localities and wet habitats. Sweta 1532.


Small, erect, glabrous, annual herbs. Leaves 0.25-1.0 x 0.5-1.5 cm, sessile, broadly-ovate, cordate, acute, serrate, 3-5 nerved. Flowers solitary, axillary. Calyx lobes lanceolate, acute. Corolla white, lower one purplish in centre. Stamens 4, fertile. Capsule ovoid-orbicular, acute. **Flowering and fruiting:** October-March. Occasionally found in wet and shady places, rice fields and on river-beds. Sweta 823.

7. MAZUS Lour.


8. SCOPARIA L.

Erect, suffruticose, annual herbs. Branches 4-6 angled. Leaves 1-6 x 0.5-4.5 cm, opposite or in whorls of 3, elliptic-lanceolate, crenate-serrate, subacute. Flowers many in terminal panicles. Calyx 4-lobed, lanceolate, ciliated, acute. Corolla whitish, 4-lobed, hairy on the throat, lobes oblong, obtuse. Capsule globose, glabrous, 4-valved. **Flowering and fruiting:** Almost throughout the year. Found commonly along waste places, road sides, ponds, ditches. Two distinct forms occur in the study area, one with broader and dark-green leaves and the other with smaller, narrower and whitish green leaves. Sweta 1528.

9. **STEMODIA** L. nom. cons.


Erect, viscidly hairy, aromatic herbs. Leaves 1-3 x 0.25-1.0 cm, sessile, ovate-oblong, serrate or dentate, amplexicaul, glandular-pubescent. Flowers axillary, solitary or in few flowered racemes. Calyx segments lanceolate, acute, glandular-hairy. Corolla violet, glabrous, lower lip hairy. Filament glabrous. Anther cells shortly stalked, suborbicular. Capsule ovoid oblong, acuminate glabrous, 4-valved, enclosed in the calyx. Seeds ellipsoidal. **Flowering and fruiting:** August-October. Included on authority of Murty and Singh (1961b).

10. **STRIGA** Lour


Erect, scabrid annual herbs. Leaves 1-6 x 0.2-0.5 cm, sessile, linear-lanceolate, hispid upper ones smaller, passing into bracts. Flowers white, subsessile, solitary, axillary, passing into terminal spikes. Calyx 5 lobed, each segment 3-ribbed. Corolla white, tube exceeding calyx. Capsule oblong, shorter than calyx. Seeds oblong, truncate, verrucose. **Flowering and fruiting:** August-November. Found in paddy fields and mixed with grasses in moist habitats. Sweta 368.

11. **VERBASCUM** L.

**Key to species:**

1. Densely pubescent herbs; leaves undivided; inflorescence compact; stamens 5 .............................. 2. **V. thaspus**

1. Thinly gland hairy herbs; leaves lyrate-pinnatifid; inflorescence lax; stamens 4 ................................ 1. **V. chinense**


12. **VERONICA** L.

**Key to species:**

1. Prostrate herbs; leaves ovate, crenate; flowers
   
   solitary-axillary............................................................. 1. *V. agrestis*

1. Erect herbs; leaves oblong-lanceolate;

   flowers in racemes.......................................................... 2. *V. anagallis-aquatica*


Prostrate-decumbent, annual herbs. Leaves 0.5-1.5 x 0.5-1.75 cm, petiolate, broadly ovate, crenate-dentate, acuminate, hairy. Flowers axillary, solitary. Pedicels decurved in fruit. Calyx deeply divided, ovate-lanceolate, obtuse, ciliated. Corolla white or tinged with blue, lobes subequal. Stamens 2. Filament glabrous. Capsule didymous, lobes globose, 4-10 seeded. **Flowering and fruiting.** December-May. Common in moist and shady habitats. Sweta 737.
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Key to varieties:

1. Robust herbs, up to 70.0 cm high; rooting at the lower nodes.................................................. 1. var. anagallis-aquatica

1. Small herbs, up to 6.0 cm high; not rooting at the lower nodes; raceme as long as or longer than the leaves.............. 2. var. montioides

1. var. anagallis-aquatica


Differs from typical variety in dwarf habit, absence of roots on the lower nodes and the racemes being equal to or longer than the leaves. Flowering and fruiting: January-May. Found in moist and wet places. Sweta 1384.

Note: According to Vascular Plant Families and Genera Database available at Kew website, all taxa listed above are included in family Scrophulariaceae. But according to APG-2 website, only Verbascum is included in Scrophulariaeeae. Remaining genera are placed in other families i.e. Antirrhinum, Bacopa, Dopatrium, Limnophila, Scoparia, Stemodia and Veronica (Plantaginaceae); Striga (Orobanchaceae); Lindernia (Lindeniaceae). The position(s) of Lindenbergia and Mazus could not be ascertained.

74. LENTIBULARIACEAE

UTRICULARIA L.

Key to species:

1. Peduncle with a whorl of floats...................................................... 2. U. stellaris

1. Peduncle without floats................................................................. 1. U. aureus


Aquatic, submerged, rootless herbs. Leaves dichotomously branched, in whorls of 4, submerged. Flowers yellow, in 5-7 flowered racemes. Calyx lobes 2, ovate, subequal. Corolla
yellow; upper lip suborbicular, folded in the middle; lower lip larger than the upper lip, orbicular. Capsule subglobose. Seeds prismatic, narrowly winged along the angles. **Flowering and fruiting:** December-March. Common in ponds, lakes etc in stagnant water. Sweta 911.


Free-floating aquatic herbs. Leaves in whorls of 4, pinnately divided. Bladders obliquely ovoid. Racemes 4-6 flowered, rising above the water surface. Floats ellipsoidal, white, spongy, inserted above the middle on scape. Calyx lobes subequal, suborbicular, enlarged in fruit. Corolla yellow, 2-lipped, upper lip rounded and lower lip sub-quadrate, curved, spur a little shorter than the lower lip. Capsule globose, with reflexed calyx at the base. Seeds minute, discoid, 4-5 angled, slightly winged. **Flowering and fruiting:** August-December. Common in ponds, ditches and in shallow water near the bank of Ganga. Sweta 1383.

75. OROBANCHACEAE

**OROBANCHE L.**


76. BIGNONIACEAE

**KEY TO GENERA:**

1. Climbers ...........................................................................................................2
2. Leaves serrate; aerial roots present; corolla
   funnel shaped ........................................................................................................ 1. *Campsis*
3. Leaves 1-pinnate ................................................................................................. 4
4. Shrubs; leaflets toothed; flowers bright yellow,
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6. Tecoma

4. Trees; leaflets entire; flowers yellowish-brown, woolly-tomentose; capsule large, ribbed, corolla nearly glabrous; capsule linear.

2. Fernandoa

5. Leaflets crenate; flowers white; staminodes absent.

4. Millingtonia

5. Leaflets entire; flowers blue; staminodes present.

1. CAMPSIS Lour.


2. FERNANDOA Welw. ex Seem.


3. JACARANDA Juss.

fruiting: March-September. Planted in parks and on roadsides. IPNI has spelled the specific epithet as 'mimosifolia'. Sweta 1520.

4. MILLINGTONIA L. f.
Tall trees up to 15.0 m high, bark corky, wood soft, yellowish. Leaves 2-pinnate, leaflets elliptic-ovate, coarsely toothed, acuminate. Flowers in corymbose panicles, white. Corolla tubular, up to 7.0 cm long, 2-lipped. Stamens 4; anthers with 1 fertile cell, barren cell reduced to an appendage. Capsule up to 25.0 cm long. Flowering and fruiting: October-April. Local name: Akash-Neem. Planted on roadsides, also found near villages. Sweta 1444.

5. PYROSTEGIA Presl.
This taxon can be readily recognized by its 2-3 entire leaflets, 3-fid minutely clawed tendrils and narrowly tubular, orange corolla. Flowering and fruiting: December-May. A favorite climber for walls and arches etc. Sweta 1459.

6. TECOMA Juss.

77. PEDALIACEAE

KEY TO GENERA:
1. Flowers yellow; fruit with 4 spines...........................................1. Pedalium
1. Flowers rosy-pink; fruits without spines........................................2. Sesamum

1. PEDALIUM L.
Erect, or ascending, mucilaginous, foetid smelling herbs. Leaves obovate-oblong or obliquely-ovate, repand-dentate, 2 dark-violet glands at the base of petiole. Flowers yellow, solitary-
axillary, with two glands at the base of pedicel. Corolla densely glandular pubescent externally as well as in the throat, lobes suborbicular. Stamens 4, incuded, staminode 1, orange coloured. Ovary papillose, stigma 2-lamellate. Fruit a pyramido-conical, 4-spined capsule. Seeds 3-angled towards apex. **Flowering and fruiting:** August-December. **Local name:** Gokharu. Found in sandy soil, not very common. Sweta 158.

2. **SESAMUM L.**


Erect, annual, glandular-pubescent herbs, up to 100.0 cm tall; stem bluntly 4-angled, sulcate. Leaves up to 15.0 cm long, elliptic-lanceolate, upper ones entire, lower 3-partite or palmately 3-foliolate, serrate. Flowers solitary-axillary, pink. Corolla 2-lipped, pubescent outside, rosy-pink, spotted with yellow. Capsule oblong-quadrangular, deeply 4-grooved, beaked. Seeds black, numerous, compressed, smooth or rugose. **Flowering and fruiting:** August-November. **Local name:** Til. Widely cultivated as rainy season crop. Seeds yield an edible oil and used in a variety of other ways. Frequently found as an escape. Sweta 296.

78. **MARTYNIACEAE**

*MARTYNYA L.*


79. **ACANTHACEAE**

**KEY TO GENERA:**

1. Corolla without an upper lip; bracts in 4 pairs.................. 3. *Blepharis*

1. Upper lip well developed or corolla lobes with

5 unequal lobes........................................................................2

2. Seeds not supported on hard retinaculae; pedunules of
spikes covered with alternate scales.......................... 6. *Elytraria*
2. Seeds supported on hard, upcurved retinaculae........ 3
3. Corolla lobes twisted to the left in bud.................. 4
3. Corolla lobes imbricate in bud............................ 7
4. Corolla 2-lipped; axillary spines present.............. 9. *Hygrophila*
4. Corolla sub equally 5-lobed............................... 5
5. Stamens 2.................................................. 7. *Hemiadelphis*
5. Stamens 4.................................................. 6
6. Capsule fusiform, not clavate, seed bearing throughout,
     flowers in capitate spikes............................. 8. *Hemigraphis*
6. Capsule clavate, with a sterile, solid, stalk-like base;
     flowers 1-3 in the axils of leaves.................... 5. *Dipteracanthus*
7. Corolla lobes 5, sub equal............................... 2. *Barleria*
7. Corolla 2-lipped........................................... 8
8. Ovules 3 to many in each cell i.e. capsule 6 or more-seeded;
     flowers in unilateral racemes........................ 10. *Indoneesiella*
8. Ovules 1 to 2 in each cell i.e. capsule 2 to 4-seeded........ 9
9. Placenta separating elastically from the valves,
     from the base upward.................................... 10
9. Placenta not separating elastically from the valves......... 11
10. Bracts clustered in leaf axial or laxly cymose........ 4. *Dicliptera*
11. Anther cells, at least the lower one, spurred at the base. 11. *Justicia*
11. Anther cells not spurred at the base....................... 12
12. Anther cells apiculate.................................... 1. *Adhatoda*
1. **ADHATODA** Nees.


Erect, glabrous, evergreen shrubs, upto 2 m high. Leaves 3-8 x 1-2.5 cm, linear-obovate, glabrous, acuminate or acute. Flowers white or creamy, in dense axillary 4.5-12.5 cm long spikes. Bracts leafy, ciliate. Corolla 2-lipped; upper lip curved, ovate, notched; lower lip 3-lobed with light-pink or purple streaks inside; throat villous. Fruit 4-seeded, dark brown, hard. Seeds glabrous, rugose, brown. **Flowering and fruiting:** October-April. **Local Name.** Adusa. Common on roadside, wastelands and near villages. Sweta 674.

2. **BARLERIA** L.

Key to species:
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1. Axillary spines present; flowers yellow ................................................. 3. B. prionitis
1. Axillary spines absent; flowers purplish or white .................................. 2
2. Flowers purple-blue .............................................................................. 1. B. cristata var. cristata
2. Flowers white ....................................................................................... 2. B. cristata var. dichotoma


1. var. cristata
Erect, perennial, hairy herbs, 0.5-1.0 m high. Leaves 1.5-5.0 x 0.5-1.5 cm, 0.5-3.0 cm long petioled, entire, hairy. Flowers in axillary and terminal spikes, purplish blue. Bacteoles membranous, acute, margins ciliate. Calyx 4-partite; 2 outer lobes lanceolate, whitish, acuminate, margins ciliate; inner ones linear-lanceolate, ciliate. Corolla bluish-purple or white, tube funnel-shaped, pubescent. Stamens often 2, fertile. Capsule about 1.25 cm long, smooth, ovoid, 4-seeded. Seeds compressed, brown, silky hairy. Flowering and fruiting: September-February. Occasionally found among the hedges in wastelands. Sweta 349.

Perennial, erect under-shrubs, up to 70.0 cm high. Leaves elliptic-oblong, acuminate, puberulous, up to 10.0 x 4.0 cm. Flowers axillary, solitary or few, white. Calyx 4-partite, bristle tipped, thinly hairy. Corolla tube glandular. Capsule up to 1.5 cm long, ellipsoid, 4-seeded. Seeds compressed, orbicular. Flowering and fruiting: October-February. Often found in wastelands and in Kholas. Sweta 759.

Erect, prickly undershrubs. Leaves 3.0-10.0 x 2.0-5.0 cm, petiolate, ovate, acute, entire, sparsely hairy, tipped with a spine. Axillary spines white, 3-4. Flowers dark yellow, in terminal spikes. Bracts 2, lanceolate, spiny. Calyx outer 2 calyx segments oblong-lanceolate, spine-tipped; 2 inner ones, linear-lanceolate, mucronate. Corolla 2-lipped. Fruit 2-seeded, 1.0-1.5 cm long, with a solid beak. Seeds sub-orbicular, appressed hairy. Flowering and fruiting: October-April. Local Name. Kala Bansa. Found often in waste places near the villages. Specimens collected from the study area are referable to the subsp. prionitis var. prionitis. Sweta 688.

3. BLEPHARIS Juss.
Key to species:
1. Leaves hairy beneath .................................................. 2. *B. repens*

2. Leaves glabrous beneath .................................................. 1. *B. maderaspatensis*


Prostrate, perennial, pubescent herbs. Leaves in whorls of 4, unequal in size, sessile, ovate-lanceolate, acute, entire with few distant teeth, ciliate. Flowers sessile, axillary, white with purple streaks, often combined into a leafy spike. Bracts 8, in 4-opposite pairs, spathulate, upper margins with retrorsely hairy bristles. Calyx 4-lobed, sepals unequal, ciliate. Capsule about 6.0 mm long, 2-seeded, ellipsoidal, brown, polished. Seeds ovoid, compressed, echinate with white spines, smooth, brownish. **Flowering and fruiting.** September-April.

Found frequently in dry sandy soil and on slopes of Kholas. Sweta 711

Note: According to IPNI database correct spelling of the specific epithet in Persoon’s name is ‘*boerhaviifolia*.’


Diffuse, pubescent herb. Leaves oblong or obovate, whorls of 4, sessile, entire, hispid, up to 4.0 cm long. Flowers sessile, axillary, solitary, blue or white; bracteoles 8-10 spinous, in opposite pairs. Calyx segments linear-lanceolate, acute, membranous-marginated. Fruits ellipsoid, compressed, glabrous, completely enclosed within calyx, 2-seeded. Seeds hairy. **Flowering and fruiting:** November-April. Included on authority of Murty and Singh (1961b).

4. **DICLIPTERA** Juss. **nom. cons.**


5. **DIPTERACANTHUS** Nees *emend* Bremek.


Prostrate, branched herbs with woody base; nodes swollen, younger parts hairy. Leaves ovate-lanceolate, rounded or subcordate at the base, obtuse or acute at the apex. Flowers solitary, sessile, pale-purple. Bracteoles spathulate, subacute, longer than the calyx. Ovary densely hairy near the top. Capsule densely pubescent. **Flowering and fruiting:** February – May. Occasionally found among the hedges. Sweta 1566.


Erect herbs with leaves crowded at the base. Leaves obovate to oblong, obtuse or rounded, crenate, cuneate at the base. Spikes one to many, equal to or longer than the leaves. Flowers white. Bracts ovate, acuminate. Corolla 2-lipped, 5-lobed. Capsule ovoid, acute, brownish. **Flowering and Fruiting:** August – November. Occasionally found in sandy habitats. Sweta s. n.

7. **HEMIADELPHIS** Nees


Erect or procumbent, annual herbs. Leaves 0.5-1.2 x 0.2-0.5 cm, sessile, short, opposite, oblong-ovate, entire, acute or subacute. Flowers 2-lipped, purplish or white in terminal spikes. Bracts elliptic-oblung, hairy. Calyx 5-lobed, linear. Corolla 2-lipped. Stamens 2, fertile. Capsule about 0.8 cm long, linear, brown. Seeds numerous, light-brown. **Flowering and fruiting.** September-March. Sweta 283, 705.

8. **HEMIGRAPHIS** Nees *emend* T. Anders.

Prostrate, softly pubescent herbs. Leaves 0.5-3.0 x 0.5-2.0 cm, ovate or oblong, crenate, acute. Flowers in terminal heads, pale-blue. Bracts elliptic, pubescent. Filaments hairy below. Capsule linear, 0.5-1.0 cm long, glabrous. Seeds 12, compressed, brownish, discoid. **Flowering and fruiting time.** April-July. Occasionally found on margins of agricultural fields and other moist habitats. Sweta 897.

9. HYGROPHILA R.Br, emend. Heine


Erect, hispid, perennial herbs, with straight, yellow, axillary spines. Leaves 3.0-15.0 x 0.5-2.5 cm, oblong-lanceolate, sessile, hispid. Flowers many, axillary, blue, Bracts 2-seriate, lanceolate, hispidly hairy. Calyx 4 partite, lobes unequal, lanceolate, hyaline, ciliate, upper one broader. Capsule oblong, pointed, 4-6 seeded. **Flowering and fruiting:** September-January. Common in marshy places and on margins of water bodies. Sweta 1567.

10. INDONEESIELLA Sreemadh.


Erect, annual herbs. Leaves sessile, elliptic-oblong or oblanceolate, glabrous above, lineolate beneath. Flowers pink, in subsecund racemes. Lower lip of corolla mottled with red or dark purple spots. Anthers and filaments bearded, red. Capsules elliptic-oblong. **Flowering and Fruiting:** August-December. Included on authority of Murty and Singh (1961b).

11. JUSTICIA L.


Erect glabrous herbs. Leaves 5.5 x 1.5 cm long, shortly pectioled, lanceolate, glabrous, entire. Flowers pinkish in terminal spikes. Calyx 4-partite, sepals all similar, linear, margins
scarious, obtuse, glabrous. Corolla bilabiate; upper lip notched, white or colourless; lower lip

**Flowering and fruiting.** August-December. Common weed throughout the area. Sweta 116.

**Note:** IPNI has spelled the specific epithet as ‘quinquangularis’

12. PERISTROPHE Nees


*Peristrophe bicalyculata* (Retz.) Nees. in Wall. Pl. Asiat. Rar. 3: 113.1832; FBI. 4: 554. 1885;

Erect, annual shrubby herbs. Leaves ovate-lanceolate, acute, margin entire, ciliate. Flowers in
axillary, dichotomous cymes, pink or light purple. Bracts 2 unequal, linear, acute. Calyx lobe
linear-lanceolate, ciliate, acute. Collora bilabiate. Stamens 2. Capsule about 5.0 mm long,
ellipsoidal, stalked, pubescent. Seeds brown, slightly rugose. **Flowering and fruiting.**
October-February. Commonly found in waste lands, on margins of cultivated fields and
roadsides. Sweta 116.

13. RUNGIA Nees.

**Key to species:**

1. Bracts dimorphic.......................................................................................... 1. *R. pectinata*
1. Bracts uniform............................................................................................... 2. *R. repens*


*Justicia pectinata* L. Cent. Pl. 2: 3. 1756 and Amoen. Acad. 4: 299. 1759. *Rungia parviflora*

Erect, procumbent, annual herbs. Leaves 1.5-4.0 x 0.6-1.5cm, elliptic-oblong, acute, entire.
Flowers in axillary or terminal one sided spikes, blue, bilabiate. Bracts scarious margined.
Capsule 4 seeded. **Flowering and fruiting:** Rainy season. Found commonly in moist and
shady places. Sweta 144.


Spreading, decumbent herbs. Leaves elliptic-lanceolate, acute or obtuse, glabrous, sub-entire.
Flowers purplish, in erect terminal 3-10 cm long spikes. Bracts broad, elliptic, cuspidate.
Bracteoles lanceolate, ciliate, acuminate. Calyx 5 lobed, lobes lanceolate, ciliate, acute.

80. VERBENACEAE

KEY TO GENERA:

1. Trees ................................................................. 2
1. Shrubs or herbs .................................................. 4

2. Corolla regular; stamens all equal; calyx accrescent,
   bladder like in fruit ............................................... 6. Tectona
2. Corolla 2-lipped; stamens didymous ................................ 3
3. Flowers upto 3.0 cm long, brownish-yellow .......................... 2. Gmelina
3. Flowers 1.0 -1.5 cm long, greenish-yellow .......................... 5. Premna
4. Leaves digitate .................................................................................. 8. Vitex
4. Leaves simple ................................................................................... 5

5. Flowers in cone-like head; creeping herbs .............................. 4. Phyla
5. Inflorescence otherwise ......................................................... 6

6. Bracts conspicuous in fruits ...................................................... 7
6. Bracts inconspicuous in fruits; Corolla irregular,
   2-lipped; inflorescence cymose; stamens exserted ..................... 1. Clerodendrum
7. Spikes elongate; calyx tubular, ribbed; fruit dry; herbs ............... 7. Verbena
7. Spikes condensed; calyx truncate, not ribbed; fruit
   fleshy; shrubs .............................................................................. 3. Lantana

1. CLERODENDRUM L.

Key to species:

1. Leaves verticillate, entire; stem fistular; calyx
   fleshy and brick-red in fruit .................................................. 1. C. indicum
1. Leaves opposite, dentate; stem solid; calyx
   not fleshy in fruit .................................................................. 2

2. Leaves broadly ovate-cordate; calyx enlarged
   and red in fruit; corolla with crimson throat .......................... 2. C. infortunatum
2. Leaves oblong-ovate; calyx not much enlarged
   in fruit; corolla pure white ............................................. 3. C. phlomidis

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Large shrubs. Leaves 1-6 x 1-5 cm, petiolate, ovate-rhomboid, crenate, acute to acuminate, margin entire or undulate. Flowers white or creamish, fragrant in dichotomous axillary, terminal panicles. Bracts leaf like, lanceolate, acute. Calyx glabrous, slightly enlarged in fruit. Corolla much exserted, 5 lobed, elliptic, obtuse. Drupe obovoid, glabrous, blakish brown. Seeds oblong, dirty white. **Flowering and fruiting**: August-March. Planted in the hedges of gardens. Sweta 750.

Note: According to WCSPF the genus *Clerodendrum* belong to the family Lamiaceae.

2. **GMELINA** L.


Unarmed deciduous trees. Leaves 5-18 x 2.5-1.5 cm, broadly ovate, acuminate, entire, cordate, glabrous. Flowers in large terminal or axillary panicles, fulvous-tomentose. Calyx campanulate, densely hairy, teeth triangular, acute. Corolla 5-lobed, deeply divided, pinkish-red, densely hairy outside, 2 lipped. Drupes 3 x 2 cm, ovoid, smooth, yellowish-orange with persistent calyx, oblong. **Flowering and fruiting**: April-August. Included on authority of Murty and Singh (1961b).

Note: According to WCSPF the genus *Gmelina* belong to the family Lamiaceae.
3. **LANTANA L.**

**Key to species:**

1. Inflorescence corymbose; flowers pink and yellow in the same inflorescence; armed shrubs
   1. *L. camara*

1. Inflorescence elongated; flowers white; unarmed shrubs
   2. *L. veronicifolia*


Erect spiny shrubs with an unpleasant smell. Leaves 2-10 x 1-6 cm, opposite, ovate-oblong, crenate-serrate, hairy on the lower surface, acuminate. Flowers orange or yellow, in axillary long peduncles. Bracts lanceolate, appressed hairy. Calyx white hairy. Corolla 4-lobed, lobe unequal. Drupe globose, deep purple, shining, 2-seeded. **Flowering and fruiting**: Almost throughout the year. Abundantly found in the study area. Sweta 53.


Erect, unarmed shrubs. Leaves 3-12 x 1-5 cm, opposite or in whorls of 3, ovate-lanceolate, serrate. Flowers white, slightly aromatic, in axillary peduncled spikes. Calyx truncate, densely hairy, membranous. Corolla with yellow tube, hairy outside. Drupes 0.2-0.5 cm across, globose, shining, purple when ripe. **Flowering and fruiting**: throughout the year. Found occasionally on roadsides. Sweta 1571.

4. **PHYLA** Lour.


Widely creeping herbs. Leaves 0.5-4 x 0.3-2 cm, subsessile, spathulate, cuneate, dentate. Flowers pinkish or white, sessile, in dense globose, peduncled, axillary heads. Calyx membranous, compressed, 2-lipped, hairy outside, closely covering the fruit. Corolla 2-lipped. Fruits about 0.1 cm across, enclosed within the persistent calyx, separating at maturity into two, 1-seeded, plano-convex, pale-brown pyrenes. **Flowering and fruiting**: May-October. Commonly found in moist places forming a mat on the ground. Some forms of this taxon bear quite long spikes and appear to be perennial in habit. Sweta 40.
5. PREMNA L.


Small or medium sized trees with hairy stem. Leaves broadly ovate, margin entire, deep green, membranous, acuminate, cuneate. Flowers white in terminal corymbs, rusty pubescent. Calyx 5-teethed, accrescent. Corolla 2 - lipped, greenish-white. Anthers black. Fruit globose, dark purple, supported by enlarged calyx. **Flowering and fruiting**: April-September. Not common, planted on the roadside. Sweta 104.

**Note:** According to WCSPF the genus *Premna* belong to the family Lamiaceae.

6. TECTONA L.f. nom.cons


Tall, straight, deciduous trees. Leaves 10-50 x 12-32 cm, broadly elliptic, acute, cuneate, entire, grey or yellowish tomentose. Flowers white in large pyramidal panicles. Calyx broadly campanulate, 5-7 lobed, unequal lobed, bladder like. Corolla white, glabrous, lobes equal, spreading. Fruits globose, 1.0-2.0 cm across, 4 - celled, enclosed in enlarged calyx. Seed oblong, brown. **Flowering and fruiting**: September-December. **Local name.** Teak, Sagon. Commonly planted as a timber crop. Sweta 1573.

**Note:** According to WCSPF the genus *Tectona* belong to the family Lamiaceae.

7. VERBENA L.


Erect, pubescent, perennial herbs. Leaves 4-10 x 2-4 cm, oblong, scabrous, lyrately pinnatifid; lower petiolate, coarsely toothed; upper ones sessile, usually 3-partite. Flowers bluish in dense, slender, terminal spikes. Calyx 5-toothed, pubescent, ribbed. Corolla 5-lobed, throat hairy. Fruits dry, oblong, 1-seeded. **Flowering and fruiting**: March-November. Found on waste ground and roadsides. Sweta 1581.

8. VITEX L.

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Large spreading shrubs with thin, grey bark. Leaves digitately trifoliate, leaflets stalked, lanceolate, acute, glabrous, crenate serrate, white-tomentose abaxially. Flowers light purple in large, pyramidal, terminal panicles. Calyx white tomentose, teeth small, triangular. Drupe 4-celled, black on ripening, enclosed within calyx. **Flowering and fruiting**: Throughout the year. Confined to sandy habitats near *Kholas* where it grows in clumps. Sweta 80.

**Note**: According to WCSPF the genus *Tectona* belong to the family Lamiaceae.

**WCSPF citation**:  

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81. **LAMIACEAE** (Labiatae nom. alt.)

**KEY TO GENERA:**

1. Stamens erect or ascending .............................................................. 2

1. Stamens declinate ............................................................................. 7

2. Corolla 4-lobed, aubequal; stamens 4, equal or subequal;
   calyx 5-toothed; stamens exserted; flowers purplish ....................... 8. *Pogostemon*

2. Corolla 2-lipped; stamens 2, if 4, then didynamous ......................... 3

3. Perfect stamens 2 ............................................................................ 9. *Salvia*

3. Perfect stamens 4 ............................................................................. 4

4. Calyx 15 nerved; upper pair of stamens longer;
   small herbs with purplish flowers ................................................... 5. *Nepeta*

4. Calyx 5-10 nerved; lower pair of stamens longer .............................. 5

5. Flowers reddish, in elongated inflorescence .................................... 1. *Anisomeles*

5. Flowers orange or white, in globular heads ..................................... 6

6. flowers orange ................................................................................ 3. *Leonotis*

6. Flowers white .................................................................................. 4. *Leucas*

7. Lower lip of corolla deflexed; corolla 5-lobed;
   lowest lobe shorter or equaling the other lobes;
   saccate, contracted at the base ....................................................... 2. *Hyptis*

7. Lower lip of the corolla declinate, flat or nearly so ............................ 8

8. Corolla tube exceeding the calyx; stamens included;
   stigma entire .................................................................................. 7. *Orthosiphon*

8. Corolla tube not exceeding the calyx; stamens exserted;
   stigma 2-fid .................................................................................. 6. *Ocimum*
1. ANISOMELES R. Br.

**Nepeta indica** L. Sp. Pl. 571.1753.  

Erect, densely hairy herbs. Leaves 3-15 x 2.5-10 cm, broadly ovate, crenate-dentate, acute, cuneate to rounded at base. Verticillasters many flowered, axillary, arranged in interrupted spikes. Corolla bilabiate, bluish-purple, lower lip 3-lobed. Nutlets ovoid, black when ripe, polished, with rounded ends. **Flowering and fruiting:** Throughout the year. Commonly found in wastelands and open sandy habitats. Sweta 124.

2. HYPTIS Jacq. nom. cons.


Tall, strongly aromatic, annual-perennial herbs. Leaves 2-8 x 2.5-9.5 cm, petioled, opposite, dentate, ovate, cordate. Flowers in axillary cymes, arranged racemously. Calyx 10-ribbed, patently hairy. Corolla blue. Stamens 4, didynamous. Nutlets oblong, emarginated, glabrous. **Flowering and fruiting:** Rainy and winter season. Commonly found in the open waste lands and on roadsides. Sweta 125.

3. LEONOTIS R. Br.


Tall, erect, hairy, annual herbs. Leaves 1-15 x 0.75-6 cm, ovate-lanceolate, petioled, crenate-serrate, acute, cuneate. Flowers in glomerate, axillary whorls, orange. Bracts linear, deflexed, hairy, spine-tipped. Calyx ribbed, tube incurved, throat glabrous, teeth unequal, spine tipped. Corolla 2-lipped, densely woolly, orange. **Flowering and fruiting:** September-February. This is a characteristic species of areas close to Ganga. Sweta 270.

**Note:** Hooker (1885) and Duthie have spelled the specific epithet of this taxon as ‘nepetaefolia’ while Shetty and Singh (1991) spelled the same as ‘nepetiifoHa’. International Plant Name Index (IPNI) spells the specific epithet as ‘nepetifolia’. I have followed IPNI in this regard.

4. LEUCAS R. Br.

Key to species:
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1. Flowers in terminal heads only.............................................. 2. L. cephalotes

1. Flowers in terminal heads and/or axillary whorls..................... 2

2. Lower half of calyx mouth exceeding the upper........................ 3. L. urticaefolia

2. Upper half of calyx mouth exceeding the lower,
   calyx mouth glabrous or minutely pubescent within................... 1. L. aspera


5. **Nepeta L.**

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6. **OCIMUM L.**

**Key to species**

1. Calyx tube with a hairy annulus within......................................................... 2
2. Calyx tube glabrous within; pedicel equaling the calyx; lower lip of calyx not upcurved after anthesis; corolla reddish-pink.............................................................. 3. **O. tenuiflorum**

1. Fruiting calyx 3-5 mm long; corolla 4.0 -6.0 mm long........................................ 1. **O. americanum**

2. Fruiting calyx 5.0- 7.0 m long; corolla 7.0- 10.0 mm long........................................ 2. **O. basilicum**


Erect, gland-hairy, annual herbs. Leaves 0.5-4 x 0.25-2 cm, elliptic-lanceolate, cuneate, acute, gland-dotted. Venticillasters 6-flowered, combined into an interrupted, spicate inflorescence. Bracts shortly stalked, ovate, ciliate. Corolla white, upper lip broadly oblong, 4 - toothed, lower lip obtuse, oblong. Nutlets ovoid, ellipsoidal, smooth, black. **Flowering and fruiting:** Throughout the year. **Local name.** Ram Tulsi. Cultivated in gardens, also found in open waste places. Sweta 1593.


Erect, strongly aromatic, annual herbs. Leaves 1-6 x 0.75-2.5 cm, ovate-lanceolate, acute, entire or toothed, thinly hairy. Flowers in verticillasters, arranged in simple or branched racemes, white. Bracts stalked, ovate, acute. Corolla white or pale-purple, pubescent. Stamens exserted. Nutlets 0.1-0.15 cm long, oblong-ellipsoid, glabrous, black or dark-brown. **Flowering and fruiting:** Almost throughout the year. **Local name.** Kali Tulsi. Cultivated in gardens, also found as an escape. Sweta 1591.
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Erect annual herbs, often woody at base and clothed with reddish-purple hairs. Leaves 1-3 x 0.50-2.5 cm, elliptic-oblong, acute, serrate, hairy, minutely gland dotted. Flowers in axillary whorls arranged in racemes, purplish. Bracts broadly ovate, acuminate, ciliate. Nutlets ellipsoidal, smooth, warty, yellow, dotted with black. **Flowering and fruiting**: throughout the year. **Local name.** *Krishna Tulsi*. Mostly cultivated in garden, sometimes also found in waste places as an escape. Sweta 1568.

7. ORTHOSIPHON Benth.


Diffuse herbs or under shrubs. Leaves 1-4 x 1-2.5 cm, petioled, ovate, acute, coarsely serrate, hairy. Verticellaster 6-flowered, combined into long racemes, white. Calyx ovoid, campanulate, deflexed in fruit. Corolla 2-lipped. Nutlets subglobose, smooth, pale brown. **Flowering and fruiting**: June-December. **Local name.** *Ban tulsi*. Included on authority of Murty and Singh (1961b).

8. POGOSTEMON Desf.


**Note:** In Indian floras the specific epithet is spelled as 'benghalense'.

9. SALVIA L.


minute, ovoid, brown when ripe, smooth or rugose. **Flowering and fruiting**: January-May. Abundantly found in agricultural fields and other moist places. Sweta 566.

**WCSPF citation:**

### 82. PLANTAGINACEAE

***Plantago L.***


Annual or perennial, hairy, acaulescent herbs. Leaves 5-15 x 0.5-1.5 cm, lanceolate, finely acuminate, base sheathing, distantly toothed. Scapes axillary, many, terete. Flowers in 1-4 cm long ovoid spikes. Bracts cup-like, membranous, glabrous. Corolla lobes ovate, acute. Capsule ellipsoidal, 2-celled, subobtuse. Seeds 2, oblong, boat-shaped, brownish or black. **Flowering and fruiting**: January-March. **Local Name**: *Isabgol*. Found in sandy soil and in waste places. Sweta 708.

### 83. NYCTAGINACEAE

**KEY TO GENERA:**

1. Erect herbs; flowers more than 2.0 cm long, with
   - an involucre of prominent sepaloid bracts.......................... 3. *Mirabilis*

1. Prostrate, suberect or scandent herbs; flowers
   - less than 1.0 cm long; bracts not as above..................................2

2. Flowers shortly pedicelled or sessile; stamens
   - shorter than or equal to perianth tube; prostrate or
   - suberect herbs.......................................................... 1. **Boerhavia**

2. Flowers long pedicelled; stamens much longer than
   - the perianth tube; scandent herbs........................................ 2. **Commicarpus**

#### 1. BOERHAVIA L.


Prostrate, spreading herbs. Leaves 1-5 x 0.5-5 cm, ovate-lanceolate, margins undulate, apex rounded. Flowers minute, in axillary and terminal, bracteolate panicles or subcapitate umbels. Perianth pink-red. Stamens scarcely exserted. Anthocarp 0.3-0.4 cm long, clavate, fusiform,
green. **Flowering and fruiting:** Major part of the year. Occurs commonly in wastelands, open areas and on roadsides. Sweta 37.

2. **COMMICARPUS** Standley


Diffuse or scandent, glabrous herb. Leaves 1-4 x 1-3.5 cm, opposite, equal, paired, cordate, broadly ovate, sinuate-repand. Inflorescence terminal or axillary, superposed umbels. Perianth funnel-shaped, pink with greenish tube. Stamens 4 or 5, much exserted. Fruit clavate, longitudinally grooved, uniformly covered with warty glands. **Flowering and fruiting:** August -December. Found among the hedges, especially in moist places. Sweta 185.

3. **MIRABILIS** L.


Erect, glabrous, annual herbs. Leaves 2-10 x 1-6 cm, ovate-lanceolate, acuminate, subentire, glabrous. Flowers subsessile, crowded in fascicles. Perianth red, white, yellow or variegated, glandular hairy. Stamens 5, exserted. Anther yellow. Anthocarps globose, 5-ribbed, black at maturity. **Flowering and fruiting:** Almost through out the year. Cultivated in gardens as an ornamental, also found as an escape in waste places. Sweta 1545.

84. **AMARANTHACEAE**

**KEY TO GENERA:**

1. Inflorescence spinous
   1. Inflorescence not spinous
2. Flowers clustered at the nodes of spikes; fertile
   - flowers surrounded by sterile flowers modified into hooked spines
   - 8. *Pupalia*
5. 2. Flowers single at the nodes of spikes; bracts and bracteoles spinous, not hooked
   - 1. *Achyranthes*
3. Leaves never all opposite
   4. Leaves all opposite
3. Leaves all opposite
   4. Pseudostaminodes present
   5. Pseudostaminodes absent
   - 5. *Celosia*
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5. Inflorescence elongated; ovary uniovulate. ........................................ 6

6. Flowers unisexual, green. ................................................................. A. Amaranthus

6. Flowers bisexual, red-pink. .......................................................... 6. Digera

7. Flowers in sessile, axillary head-like spikes;
   stigma capitate. ................................................................. 3. Alternanthera

7. Flowers in peduncled, terminal head-like spikes;
   stigma bifid. ................................................................. 7. Gomphrena

1. ACHYRANTHES L.

Key to varieties:

1. Plants sub-glabrous; leaves membranous; flowers
   bright reddish-purple.......................................................... 2. A. aspera var. porphyristachya

1. Plants hairy to densely tomentose; flowers greenish........... 1. A. aspera var. aspera


1. var. aspera

Erect herbs with 4-angled and tomentose stem. Leaves 1.5-9.0 x 0.8-6.0 cm, broadly, obovate and rounded at apex, softly hairy. Flowers in terminal and axillary long spikes, sharply deflexed against the rachis. Bracts and bracteoles spinous. Uricles 1-3 mm long. Seeds cylindric, smooth. Flowering and fruiting: All most throughout the year. Commonly found along the road sides, also as weed in wastelands and agricultural fields. Sweta 143.


Distinguishable from var. aspera by its leaves which are membranous, up to 15.0 x 8.0 cm, elliptic-lanceolate or ovate-lanceolate, glabrous. Flowers bright reddish-purple. Flowering and fruiting: August -February. Occasionally found in moist and shady places. Sweta 142.

2. AERVA Forsk. nom. cons.

Key to species:

1. Flowers unisexual, dioecious; outer tepals with the
   midrib creasing well below the apex........................................ 1. A. javanica

1. Flowers bisexual or female and hermaphrodite; outer
   tepals with the midrib excurrent into a distinct mucro.................. 2

2. Leaves alternate; spikes axillary, forming a long leafy
   inflorescence; flowers bisexual.............................................. 2. A. lanata

2. Leaves alternate and opposite; spikes in axillary and
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terminal racemes, not subtended by leaves; flowers
bisexual or bisexul and female both............................... 3. A. sanguinolenta


var. javanica


Erect or prostrate, perennial herbs. Leaves 1.0-6.0 x 0.25-3.0 cm, alternate, elliptic-ovobate, acute, cuneate, pubescent above, white woolly beneath. Flowers minute, sessile, white or creamy, in dense axillary spikes. Bracteoles ovate, apiculate. Perianth ovate-oblong, apiculate. Utricles ovoid, acute and compressed. Seeds reniform, black and shining. **Flowering and fruiting.** Throughout the year. Common in open waste places. Sweta 1417.


Erect perennial herbs. Leaves alternate, opposite, 1.5-5.0 x 0.8-3 cm, elliptic-ovate, acute, hairy. Flowers silvery-white, bisexual, in ovoid or cylindric axillary or terminal spikes. Bracteoles ovate, hairy. Stamens 4, connate, forming a cup around the ovary. Seeds black, reniform. **Flowering and fruiting:** July-December. Commonly found among hedges. Sweta 27, 89, 174.

3. ALTERNANTHERA Forsk.

Key to species:
Prostrate, branched, annual herbs. Leaves opposite, ovate-oblong, spathulate, acute, entire. Flowers white, sessile, in 2 or 3 axillary, globose heads. Bracts and bracteoles small, white, scarious. Tepals lanceolate, acute. Urticles winged, brown, shining. **Flowering and fruiting:** Almost throughout the year. Occurs chiefly on drying bottom of ditches and ponds. Sweta 422.

Aquatic or marshy herbs, up to 100. cm long. Leaves up to 10.0 x 1.5 cm, oblong-lanceolate to spathulate-ovovate, apex submucronate, entire or remotely denticulate. Inflorescence ovoid-globular, peduncled, white head. Flowers up to 7.0 mm long, whitish. Bract ovate, acute, 1-nerved; bracteoles ovate-lanceolate, acuminate, glabrous, 1-nerved. Tepals 5, subequal, 5-7 mm, lanceolate-oblong. Stamens 5, up to 4.0 mm long, anthers yellowish; pseudostaminodes strap-shaped, 2-3 fid. Fruit not seen. **Flowering and fruiting:** April-November. Collected only once from a swamp at Bihargarh. Sweta 1530.

Note: According to IPNI database the combination Bucholzia philoxeroides Mart. was published in *Beitraege zur kenntnis der Naturlichen Families der Amaranthaceen* in the year 1825.

Prostrate, spiny, perennial herbs. Leaves 1.0-4.0 x 0.25-0.75 cm, rhomboid or broadly ovate, opposite, entire. Flowers in sessile, whitish, axillary, cylindrical, prickly heads. Bracts lanceolate-ovate, denticulate. Tepals unequal. Urticles rounded above, about 0.2 cm long enclosed within persistent perianth. Seeds rounded, brownish. **Flowering and fruiting.** July-
December. **Local name.** *Kante-wali-Santi.* Occasionally found in waste lands and on roadsides. Sweta 1538.


**Flowering and fruiting.** Major part of the year. Common in moist, marshy places near ponds, ditches, paddy fields and river banks. Sweta 202.

4. **AMARANTHUS** L.

**Key to species:**

1. Axillary spines present..................................................2. *A. spinosus*

1. Axillary spines absent..................................................2

2. Capsule circumcissile; flowers in axillary cymose clusters.............................................3

2. Capsule indehiscent or irregularly rupturing;
   flowers in axillary or terminal spikes and sometimes in axillary clusters also.................................4

3. Perianth segments 2; capsule hyaline, with prominent green, longitudinal ribs........................................3. *A. tenuifolius*

3. Perianth segments 3; capsule neither hyaline nor ribbed........................................4. *A. tricolor*

4. Capsule smooth or rugose; distinctly exceeding the female perianth...............................................1. *A. lividus*

4. Capsule very strongly corrugated; scarcely exceedig the female perianth........................................2. *A. viridis*


Erect, spinous, annual herbs. Leaves 2.0-8.0 x 0.75-2.0 cm, ovate-lanceolate, alternate blunt at the apex, cuneate, entire. Flowers green in axillary clusters and long dense terminal spikes. Bracts linear, tipped with a bristle. Perianth of male flowers, ovate, acute; that of female flowers; oblong, obtuse, apiculate. Stamen. 5. Urticles ovoid, rugose, thickened above. Seeds black, shining. Flowering and fruiting. Major part of the year. Local name: Kataili chaulai. Common weed in agricultural fields, waste places and on roadsides. Sweta 1555.


Erect ascending glabrous, annual herbs. Leaves 2.0-8.0 x 1.5-4.0 cm, ovate-rhomboid, petioled, obtuse, subentire, glabrous. Flowers shortly stalked, in axillary or terminal panicled spikes, green. Bracts ovate, acute, membranous, keeled. Bracteoles lanceolate ovate. Tepals 3, lanceolate-oblong, mucronate, acute. Stamens 3. Urticles ovoid, compressed, strongly rugose,
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acute, shortly beaked. Seeds minute, rounded, black, shining. **Flowering and fruiting.**
October-March. Common weed in cultivated fields. Also found in open waste places and grasslands. Sweta s.n.

5. **CELOSIA** L.
Erect, glabrous, annual herbs. Leaves 2.0-15.0 x 0.5-4.0 cm, linear-lanceolate, ovate, lower ones short-petioled, upper ones sessile, often tinged with red, entire. Flowers in dense axillary or terminal cylindrical spikes, pink or white, glistening later. Bracts and bracteoles subequal, linear-lanceolate, mucronate. Tepals 5, ovate-lanceolate, acute, mucronate, white or pink. Stamens 5. anthers purplish. Utricles 0.35 cm, ellipsoidal. Seeds 4-6, lenticular, black, shining. **Flowering and fruiting.** September-November. **Local name.** Sufaid Murgha.
Commonly found in cultivated fields, waste places and on roadsides. Sweta 1570.

6. **DIGERA** Forsk.
Erect-ascending, annual or perennial herbs. Leaves 1.5-10.0 x 0.5-3.0 cm, ovate or elliptic, acute, apiculate or rounded. Flowers sessile in lax, axillary, peduncled spikes, deep pink. Bracts ovate, acute, persistent. Tepals ovate-oblong, acute. Utricle globose, somewhat compressed. Seeds yellowish-brown. **Flowering and fruiting:** September-December. Common in waste places on roadsides and margins of agricultural fields. Sweta 1543.

7. **GOMPHRENA** L.

8. **PUPALIA** Juss. *nom. cons.*
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Straggling or semiscandent, annual or perennial herbs. Leaves up to 10.0 x 5.0 cm, ovate or elliptic-lanceolate, acuminate, mucronate. Flowers in sessile clusters, arranged in lax, pedunculate, terminal, erect or drooping spikes. Bracteoles of 2-sexual flowers cordate-ovate, mucronate; spines of modified flowers galbrous, hooked. Utricle ovoid, membranous. Seeds oblong-ellipsoid, with subtruncate ends. **Flowering and fruiting:** Through out the year. Commonly found among the hedges. Sweta 24.

85. CHENOPODIACEAE

**KEY TO GENERA:**

1. Fruiting perianth with transverse wing ................. 2. *Kochia*
1. Fruiting perianth not winged ................................ 1. *Chenopodium*

1. *CHENOPODIUM* L.

**Key to species:**

1. Plants with strong terpine smell; stigmas 5 .................. 2. *C. ambrosioides*
1. Plant without terpine smell; stigmas 2 ........................ 2
2. Seeds dull black .................................................. 3. *C. murale*
2. Seeds shining black ............................................... 1. *C. album*


Erect, annual herbs, clothed with white powdery vesicles. Leaves 0.5-10 x 0.2-5 cm; lower ones long-petioled, ovate-rhomboid to oblong, irregularly dentate; upper ones short petioled, elliptic-ovate, acute, entire. Flowers in paniculate clusters, combined in large terminal, leafy, lax, panicles. Tepals ovate, rounded. Fruits depressed globose. Seeds orbicular, compressed, polished. **Flowering and fruiting:** October-April. Local name: *Bathua*. Common weed in cultivated fields and waste places. Sweta 93.


Erect, annual or perennial herbs with sweetish terpine smell. Leaves 3-15 x 1-3 cm, oblong-ovate, obtuse or acute, serrate-dentate, thinly pilose. Flowers greenish, sessile in axillary clusters combined into a large leafy panicles. Tepals 5, green, cordate, ovate-rounded, keeled. Urticles enclosed in perianth. Seeds smooth, shining with an obtuse margin.
Flowering and fruiting: Winter season. Commonly found as weed in cultivated field, moist places and along river banks. Sweta 73.

Erect, subglabrous herbs. Leaves 1-6 x 0.5-3.5 cm, alternate, oblong-ovate, dentate or irregularly lobulate or toothed, cuneate. Flowers greenish, axillary, in racemes or panicles. Tepals oblong, slightly keeled, subacute. Seeds horizontal, orbicular, compressed, keeled, rugose, dull-black. Flowering and fruiting: November-March. Frequently found on moist soil and in agricultural fields. Sweta 225.

2. KOCHIA Roth
Note: According to APG-2 both Chenopodium and Kochia are now included in Amaranthaceae.

86. BASELLACEAE

BASELLA L.
Glabrous, twining, succulent herbs. Leaves ovate-cordate, up to 10.0 x 4.5 cm, entire, acuminate. Flowers sessile, in lax, pedunculate spikes, red or greenish-white. Perianth 5-fid. Stamens 5, anthers versatile, globose. Fruits globose, utricle enclosed within the fleshy perianth. Flowering and fruiting: October- May. Local name: Poi. Common on road sides, climbing on trees and shrubs. Also cultivated for the sake of leaves which are used as vegetable. Sweta 200, 602.

87. Polygonaceae

KEY TO GENERA:
1. Perianth petaloid, pink or white ................................................. 2
1. Perianth sepaloid ........................................................................... 3. Rumex
2. Climbers; apical portion of inflorescence modified
   into tendril ...................................................................................... 1. Antigonon
2. Erect or prostrate herbs; tendrils absent.

2. Polygonum

1. ANTIGONON Endl.


Large, extensive, herbaceous climbers. Leaves ovate-triangular, cordate, petiolate, entire, acute, subglabrous or thinly hairy. Flowers in axillary racemes, terminating in a branched tendril, pink or white; 3 outer perianth lobes larger. Fruits enclosed within perianth lobes, 3-angled. **Flowering and fruiting:** Winter season. Frequently cultivated as an ornamental, also found as an escape. Sweta 1529.

2. POLYGONUM L.

**Key to species:**

1. Prostrate or ascending herbs; flowers all axillary

- 6. P. plebeium

1. Erect or ascending herbs; flowers in terminal pseudo-spikes

- 2

2. Stipules echinate at the margins

- 3. P. glabrum

2. Stipules ciliate at the margins

- 3

3. Styles 2; nut biconvex; bracts densely white woolly

- 5. P. lapathifolium var. lanatum

3. Styles 3; nut trigonous

- 4

4. Pseudo-spikes dense; bracts closely imbricate

- 5

4. Pseudo-spikes lax; bracts remote

- 6

5. Leaf base acute, narrowed

- 1. P. barbatum subsp. barbatum

5. Leaf base usually rounded or subcordate

- 2. P. barbatum subsp. gracile

6. Perianth glandular; stem eglandular;

- ochrea long ciliate

- 4. P. hydropiper subsp. microcarpum

6. Perianth eglandular; ochrea long ciliate;

- appressed hairy; aceme filiform; bracts remote;

- short ciliate; perianth white

- 2. P. caespitosum


1. subsp barbatum

Erect or creeping-ascending, annual-perennial herbs. Leaves 5.0-15.0 x 1.5-2.0 cm, sessile, lanceolate-oblong, acuminate, leaf base narrowed. Ochrea appressed-pubescent, strigose, cilia
longer than the tube. Flowers in pseudo-lateral spikes, white or pinkish, peduncles quite glabrous. Bracts crowded, glabrous, shortly ciliated. Perianth eglandular, white, segments ovate-rounded. Nutlets trigonous, blackish-brown, shining, enclosed within persistent perianth. **Flowering and fruiting:** Winter season. Common in marshy habitats and at the margins of ponds and ditches. Sweta 327.


Readily distinguishable from the former subspecies by rounded or subcordate leaf base. **Flowering and fruiting:** Winter season. Commonly found in marshy and moist places. Sweta 619, 635.


Erect, creeping, flaccid, perennial herbs. Leaves 2.0-10.0 x 1.0-3.0 cm, elliptic-lanceolate, cuneate, acuminate, appressedly hairy on nerves. Ochreae thin, appressed. Raceme erect, filiform. Bracts minute, imbricate, very shortly ciliate. Perianth white, very small, eglandular. Nutlets brownish, smooth, polished. **Flowering and fruiting:** Winter season. Commonly found in marshy & swampy localities. Sweta 196.


Erect, glabrous, stout, annual herb. Leaves 15.0-18.0 x 1.0-3.0 cm, lanceolate, acute, entire, gland-dotted on both surfaces. Ochreae eciliate, upto 3.0 cm long. Flowers in paniculate, slender racemes. Bracts glabrous. Perianth pink or white, segments ovate-oblong, obtuse. Stamens 6, reddish. Nutlets biconvex, black or brown, polished. **Flowering and fruiting:** September-March. Commonly found on margins of ditches and ponds and wet places near banks of Ganga. Sweta 234.
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Erect, robust, annual herbs. Leaves 5.0-18.0 x 1.0-5.0 cm, lanceolate, acuminate, densely white-woolly beneath. Ochreae membranous, striate. Flowers in terminal or axillary spikes. Bracts small, crowded, white-woolly. Perianth white or pink, eglandular. Nutlets brown, ovoid, biconvex, black, polished. Flowering and fruiting: August-November. Found mostly in marshy places. Sweta 196, 325.


Key to varieties:
1. Stipules longer than the leaves; leaves elliptic oblong;
   margins strongly recurved; flowers sunken among the
   stipules............................................................................................................. 3. P. plebeium var. scindica
2. Stipules shorter than the leaves................................................................. 2


Highly branched, prostrate herbs. Leaves 0.5-1.25 cm long, short, linear, flat, oblong. Ochreae very short or minute, membranous. Flowers crowded in the leaf axils, reddish. Tepals broad, 2 outer ones acute. Nutlets trigonous, brown. Flowering and fruiting: August - December. Occasionally found in waste land. Sweta 561.
2. var. plebeium
Prostrate or decumbent-ascending, much branched herbs. Leaves 1.0-3.0 x 0.25-0.5 cm, oblong-lanceolate, glabrous, obtuse or rounded. Ochreae white, papery. Flowers pink, 1-5 in axils, pedicel short. Perianth segment rounded. Nutlets trigonous, brown, polished. **Flowering and fruiting:** October-April. Commonly found in sandy areas, sometimes also on the old walls. Sweta 78.

Highly branched, prostrate herb. Leaves 0.1-0.3 cm long, short, linear, flat, oblong. Ochreae very short or minute, ciliated. Flowers subsessile, sunken among stipules. Nutlets trigonous, brown. **Flowering and fruiting:** October-November. Occasionally found among stones on the bed of Madhya Ganga canal. Sweta 1589.

3. RUMEX L.
**Key to species:**
1. Leaves strongly wavy; tapering at base into a petiole; inner perianth lobes entire or nearly so at the margins in fruit. ......................................................... 1. *R. crispus*

1. Leaves rounded or cordate at the base; inner perianth segments dentate; teeth erect. .............................................................. 2. *R. dentatus*

Erect, perennial, glabrous herbs. Leaves 3.0-8.0 x 0.5-1.5 cm, alternate, crumpled, crenulate, acute, glabrous. Flowers in compound raceme, green. Nutlet smooth, triangular, brown. **Flowering and fruiting:** April-August. Rare, in moist habitats. Sweta 100.

88. ARISTOLOCHIACEAE

ARISTOLOCHIA L.


Erect to prostrate perennial herbs. Leaves petioled, up to 2.0 x 8.0 cm, broadly ovate or reniform, obtuse, cordate, glaucous beneath. Flowers dark-purple, solitary, pedicel about 2.0 cm long, bracts large, sessile, orbicular or subreniform, inserted near the base of pedicel. Perianth base subglobose. Capsule up to 2.0 cm long, oblong-ellipsoid, glabrous, 12-ribbed. Seeds triangular, flattened, cordate. **Flowering and fruiting:** July-December. Included on authority of Murty & Singh (1961b) who collected a single specimen of this taxon from the study area. According to Duthie (l.c.) this plant is found in Bundelkhand and Gwalior. The specimen collected by Murty & Singh might be a casual.

89. PROTEACEAE

GREVILLEA R. Br. nom. cons.


90. LORANTHACEAE

DENDROPHTHOE Mart.


Large, bushy, perennial, partial stem parasites. Leaves 6-20 x 3-12 cm, opposite, ovate-lanceolate, elliptic-oblong, glabrous, thickly coriaceous. Flowers orange in secund racemes, orange-red or yellowish-red. Perianth curved, glabrous, 5 lobed, linear, reflexed. Stamens 5, epipetalous. Fruits ovoid-oblong, glabrous, red when ripe. **Flowering and fruiting:** September-November. Found as a partial parasite on *Mangifera indica* and *Ficus religiosa* etc. Sweta 1600.

91. EUPHORBIACEAE
KEY TO GENERA:

1. Dioecious trees ................................................................. 6. *Mallotus*

1. Monoecious herbs, shrubs or trees ........................................ 2

2. Inflorescence a cyathium ..................................................... 4. *Euphorbia*

2. Inflorescence otherwise ...................................................... 3

3. Small herbs ................................................................. 4

3. Trees or shrubs .............................................................. 6

4. Leaves distichous, flowers axillary ........................................ 7. *Phyllanthus*

4. Leaves otherwise, flowers in racemes .................................... 5

5. Each female flower subtended by a cupular bract ................. 1. *Acalypha*

5. Female flowers not subtended by cupular bracts ................. 3. *Croton*

6. Leaves peltate, palmately lobed; fruits echinate .................. 8. *Ricinus*

6. Leaves not as above, fruits not echinate .............................. 7

7. Leaves 2-glandular at base; trees ....................................... 9. *Triadica*

7. Leaves eglandular at base ................................................ 8

8. Leaves distichous ............................................................ 9

8. Leaves not distichous ........................................................ 10

9. Fruit small, red, seated on enlarged calyx; shrubs ............... 2. *Breynia*

9. Fruits large, yellowish-green, not seated on enlarged calyx; trees ......................................................... 7. *Pyllanthus*

10. All stamens free; pistillodes large; fruit white; shrubs .... 5. *Flueggea*

10. Three stamens united, 2 free; pistillodes absent; fruit deep-purple to black; straggling shrubs ......................... 7. *Phyllanthus*

1. ACALYPHA L.

Key to species:

1. Bracts fimbriate; capsule glabrous ...................................... 1. *A. ciliata*

1. Bracts shortly dentate; capsule hispid ................................ 2. *A. indica*


Erect, often much-branched, annual herbs. Leaves 2.0-6.0 x 1.5-4.0 cm, ovate-lanceolate, acuminate, mucronate, finely serrate, hairy on the nerves beneath. Flowers in axillary androgy nous spikes; male ones sessile, near the top of spikes; female ones towards the base. Bracts large, green, exceeding capsules. Capsule glabrous, white, twisted after dehiscence, seeds globosely ovoid, smooth. **Flowering and fruiting.** August-February. Included on authority of Murty & Singh (1961b).

Erect, annual herbs. Leaves 1.5-7.0 x 1.0-5.0 cm, long petioled, ovate or ovate-rhomboid, obtuse, crenate-serrate, cuneate. Flowers in long, axillary, lax, androgynous spikes, greenish yellow; male ones minute, ebracteate; female ones 3-5, subtended by a shortly stalked leaf-like, cup-shaped dentate, many nerved bract. Capsule hispid, small, grey-white. Seeds ovoid, smooth, pale-brown. **Flowering and fruiting.** June-December. Common weed in moist places and on roadsides. Sweta 579.

2. **BREYNIA** J. Forster & G. Forster nom.cons.


Small or large, glabrous shrubs with horizontal, bifarious branches. Leaves 2.0-3.0 cm long, membranous, elliptic-ovate, shortly stalked, dark-brown or black when dry. Flowers axillary, monoecious, very small; male flowers: calyx sub-campanulate, mouth entire or obscurely lobed; female flowers: calyx cup shaped, 6-lobed, acute. Fruits small, globose, smooth, succulent, dull-red or purple. **Flowering and fruiting.** October-December. Included on authority of Murty and Singh (1961b).

Note: According to WCSPF the genus *Breynia* belongs to family Phyllanthaceae.

3. **CROTON L.**


Erect, hairy, monoecious annual to perennial herbs. Leaves 2.0-5.0 x 0.25-2.0 cm, ovate-lanceolate, serrate, with 2 glands at the base. Flowers in terminal racemes; male flowers pale-white, borne at the top of inflorescence. Stamens about 15. Females ones at base. Capsule trigonous, stellately hairy. Seeds rugose, oblong, grey. **Flowering and fruiting.** May-September. **Local name.** *Kala-Bhangra.* Common weed in fallow fields, on roadsides, dry sandy banks and bed of the river Ganga. Sweta 10.

Note: According to WCSPF the specific epithet is 'bonplandianus'.

4. **EUPHORBIA L.**

**Key to species:**

1. Cactus like, succulent shrubs; stem with three faces;
   
   each node with a pair of spines; leaves small deciduous.............. 1. *E. antiquorum*

1. Normal plants, neither succulent nor spiny; leaves well
developed and not deciduous ................................................. 2
2. Upper leaves opposite, lower alternate .................................. 3
2. All leaves opposite .......................................................... 4
3. Rootstock with proliferous shoots; seeds
   smooth, with a strophiole .................................................. 5. *E. prolifera*
3. Rootstock not proliferous; seeds rugose or tuberculate,
   strophiolate ........................................................................ 2. *E. dracunculoides*
4. Involucral gland with a conspicuous, petaloid limb ................ 4. *E. indica*
4. Involucral glands without a conspicuous petaloid limb .......... 5
5. Ascending or erect herbs; leaves up to 4.0 cm long .............. 3. *E. hirta*
5. Prostrate, hairy herbs; leaves less than 1.0 cm long,
   crenulate; capsule hairy throughout; seeds furrowed .......... 6. *E. thymifolia*

Large, dark-green, erect, succulent shrubs with milky latex. Branches 3-angled with longitudinal rows of paired stipular spines. Leaves small, nearly orbicular, caducous. Cyathia in short peduncled cymes, yellow or greenish-yellow; glands 5, large. Fruits not seen. **Flowering and fruiting:** March-April. Often planted on the margins of orchards for fencing. Also planted as ornamental in rockeries. Sweta 1432.

Erect, glabrous, annual herbs. Leaves 0.5-6.0 x 0.2-1.0 cm, linear-lanceolate, subacute to acute, entire. Involucres subsessile, solitary, campanulate, glabrous, subtended by lanceolate floral leaves, lobes ovate, ciliolate. Filaments pubescent. Capsule smooth, 3-lobed, 3-seeded. Seeds oblong, obovoid or ellipsoid, grooved on one side; testa whitish, rugose. **Flowering and fruiting.** August-May. **Local name.** Ban beri. Occasionally found in fallow land. Sweta 1598.

Erect, ascending, annual, hairy herbs. Leaves 1.0-4.0 x 0.5-2.0 cm, opposite, shortly stalked, elliptic-oblong or oblong-lanceolate, acute, serrate, base obliquely cordate. Involucres many, crowded in axillary and terminal, shortly pedunculate cymes, glands minute, globose, with an obsolete appendage. Ovary on a long stalk, hairy. Capsule appressedly hairy, trigonous. Seeds ovoid, trigonous, transversely rugose, reddish-brown. **Flowering and fruiting.** Almost
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throughout the year. **Local name.** *Dudhi.* Common in grassy localities, waste places, cultivated fields and on roadsides. Sweta 175.


Erect or decumbent, annual herbs. Leaves 0.2-1.5 x 0.2-1.0 m, opposite, linear-oblong to elliptic ovate, rounded or subacute, serrate, glabrous, base oblique. Cymes axillary, densely many flowered. Involucres minute, cup shaped, entire, 5-lobed, ovate, glands green with pink or white margin. Capsule depressed-globose, style short, deeply bifid. Seeds ellipsoid, 4 angled, rugose, reddish-brown. **Flowering and fruiting.** Almost throughout the year. Common weed in cultivated fields and on wet clayey soil. Very close to *E. hirta* L. but can be readily distinguished by petaloid limb of the involucral glands which are not so in *E. hirta.* Sweta 1366.


Erect, glaucescent, multicauline, perennial herbs. Leaves 2.0-4.5 x 0.3-0.8 m, alternate, sessile, coriaceous, linear-oblong or spathulate, acute, mucronate, somewhat fleshy. Involucres shortly campanulate; lobes 5, triangular, glands yellow, reniform, stalked, 2-horned. Capsule glabrous seeds 4-angled, grooved, glabrous, reddish-brown. **Flowering and fruiting.** March-June. Found on dry margins of canals. Sweta 56.


Small, hispid, annual herbs, pale with coppery tinge. Leaves 0.2-1 x 0.2-0.8 cm, obovate-oblong, opposite, obliquely-oblong, crenulate. Involucres minute, axillary, solitary or 2-3 together, campanulate. Capsules erect, shortly stalked, obtusely keeled, pubescent. Seeds 4-angled, bluntly pointed, with 5-6 shallow transverse furrows. **Flowering and fruiting.** August-December. **Local name.** *Duddhi.* Found on roadsides wasteland and margins of agricultural fields. Sweta 1355.

5. **FLUEGGEA** Willd.

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Erect, glabrous, annual or perennial shrubs. Leaves shortly petioled, 3.0-8.0 x 1.0-6.0 cm, obovate, ovate-elliptic or nearly orbicular, cuneate, entire. Stipules ovate-lanceolate, acute, scarious. Flowers very small in axillary clusters, greenish-yellow. Male flowers many on filiform pedicels. Sepals 5, ovate, subobtuse, ciliate, concave. Stamens usually 5, exserted. Female flowers 1-5. Berry globose, white when mature, fleshy. Seeds 3-6, minutely punctate.

**Flowering and fruiting.** August-April. Frequently in soil especially near *Khola*s. Sweta 94, 75.

**Note:** According to WCSPF the genus *Flueggea* belongs to family Phyllanthaceae.

6. **MALLOTUS** Lour.

**Key to species:**
1. Ripe fruits covered with red powder; male inflorescence not pendulous
   
   \[ M. phippensis \]
2. M. nudiflorus


Medium sized deciduous tree. Leaves ovate, acuminate, bright-green above, glabrous, rounded or cordate, 3-5 nerved. Male flowers pale-green, in pendulous racemes. Sepals valvate, concave. Female flowers solitary or 2-3 together, on long peduncles. Sepals 5, caducous, styles yellow. Fruits almost woody, globose, seeds smooth, dark-brown, polished.

**Flowering and fruiting.** December-April. Found near villages and on roadsides, probably planted. Sweta 814.


**Note:** In Indian floras *Mallotus* and *Trewia* are treated as separate genera. I have followed WCSPF in this regard.
7. **PHYLANTHUS** L.

**Key to species:**

1. Fruits fleshy indehiscent; shrubs or trees ........................................... 2
2. Ripe fruit purplish-red, 3-4 mm across; straggling shrubs .............................. 5. *P. reticulatus*
3. Capsule echinate ......................................................................................... 4. *P. urinaria*
4. Stipules peltate ............................................................................................ 5
5. Stipules red-brown, sagittate at base; leaves linear-oblong, rounded at base .............................................................................. 5. *P. virgatus*
5. Stipules scarious, whitish; leaves obovate, cuneate at base ......... 3. *P. maderaspatensis*
6. Leaves closely distichous, obtuse to rounded at apex; style minute 2-lobed; disk of female flowers irregularly cup-shaped, with deep 6-9 crenulate-lacerate segments ................................. 2. *P. fraternus*
7. Leaves not imbricating, acute; styles 2, distinct, with reflexed and recurved arms ............................................................................................. 1. *P. debilis*


Erect, glabrous, annual herbs with a woody base. Leaves 0.5-1.0 x 0.2-0.5 cm, ovate elliptic, acute, subacute, dark-green above. Stipules lanceolate, acuminate. Flowers axillary. Male flowers in fascicles. Perianth segments 5-6, subequal, 2-seriate. Stamens 3. Female flowers solitary, yellowish; perianth segments 6, obovate-spathulate, styles free. Capsule oblate, 0.2-0.3 cm across, smooth; seeds brown, longitudinally ribbed, transversely striate between the ribs on the back side. **Flowering and fruiting.** September- November. Found in cultivated fields, waste places and on roadsides. Sweta 216.


Moderate sized, deciduous trees. Leaves pinnate; leaflets small, subsessile, 1.2-2.0 x 0.3-0.5 cm, linear, obtuse. Flowers yellow, in axillary fascicles; male flowers many, shortly
pedicelled, sepals 6, oblong, obtuse, anthers 3; female flowers few, subsessile. Ovary 3-celled. Fruits fleshy, globose, pale-yellow obscurely 6-lobed, breaking into three, 2 seeded, crustaceous cocci when dry. Seeds 6, trigonous. **Flowering.** March-May; **Fruiting.** Winter season. **Local name.** Amla, Anwla. Cultivated in the fruit orchards. Sweta 1424.


Erect or decumbent, annual herbs. Leaves 1.0-2.0 x 0.3-0.7 cm, oblong-obovate, cuneate, mucronate, dark-green above, pale beneath, oblique at the base. Stipules ovate, triangular, acuminate. Flowers axillary; male pedicellate, fascicled, sepals ovate-suborbicular to elliptic-oblong, obtuse. Stamens 3. Female flowers sessile, solitary sepals 5-6, ovate-oblong, obtuse. Style arms recurved. Capsule globose, densely warty, bright red in colour. Seeds transversely ribbed, greenish brown. **Flowering and fruiting.** After the rainy season. Common weed in cultivated fields, gardens, wastelands etc. Sweta 214, 280.


Erect or decumbent, ascending, perennial herbs. Leaves 1.0-3.0 x 0.3-0.6 mm, elliptic lanceolate to oblong, obtuse, entire, glabrous. Stipules ovate triangular, acute. Flowers pedicellate, solitary, axillary. Male flowers solitary; perianth segments 5-7, oblong. Stamens 3. Filaments free. Female flowers solitary; perianth segments 5-6, ovate oblong, obtuse. Style 2-fid. Disc cup-shaped, glandular. Capsule globose, warty, obscurely 3-lobed. Seeds minute, 3-gonous, brown. **Flowering and fruiting.** August-December. Common in grassy localities and cultivated fields. Sweta 1470.

**Note:** According to WCSPF the genus *Phyllanthus* belongs to family Phyllanthaceae.

8. *RICINUS L.*


Large, erect glabrous, monoecious, annual or perennial shrubby herbs. Leaves 10-30 cm in diam., palmately 5-7 lobed, alternate, long-petioled. Flowers in pyramidal, terminal or leaf opposed panicles. Male flowers pedicellate, perianth segments 5, unequal, ovate-lanceolate, acute, glandular. Female flowers sessile, solitary, perianth spathaceous or 2-3 lobed, caducous. Capsules subglobose, covered with soft spines. Seeds oblong-ovoid, smooth, mottled, caruncled. **Flowering and fruiting.** Almost throughout the year. **Local name.** *Arandi.* Common in waste places and roadsides. Also cultivated for ornamental purpose. Two forms of this taxon are met with in the study area, one with red fruits the other with green. Sweta 1479.

9. **TRIADICA**

A small, deciduous tree with a dense crown of foliage. Leaves broad rhomboid, acuminate, base deltoid. Included on authority of Murty and Singh (1961b).

WCSPF citation:

92. ULMACEAE

**HOLOPTLEA** Planch.


Large spreading, deciduous, almost glabrous trees. Leaves broadly elliptic-ovate, acuminate, entire, subcordate, entire or distantly toothed. Flowers purplish-green. Perianth pubescent, segments 4-5 partite, connate basally. Stamens 5-7, anthers hairy. Ovary shortly-stalked, glabrous, elliptic, compressed, margined, styles 2. Samara broadly elliptic, notched at apex, flat, winged. Seeds ovate-oblong. **Flowering and fruiting:** February-May. **Local Name:** *Chilbil, Papri*. Planted along the road side. Sweta 727.

93. MORACEAE

**KEY TO GENERA:**

1. Flowers arranged in globose heads or inside fleshy receptacles.............................................................. 2  
2. Flowers arranged in spikes or heads.......................................................... 3

2. Flowers arranged on the outside of the receptacle........................................... 1. *Artocarpus*

3. Male flowers spicate; perianth fleshy in fruits................................................ 4

4. Male flowers in heads or spikes; female flowers solitary or 2-3 together; perianth not fleshy in fruits....................... 5. *Streblus*

5. Style undivided............................................................................. 2. *Broussonetia*

6. Style 2-fid.............................................................................. 4. *Morus*


**Key to species:**

1. Fruit subglobose, smooth, velvety.................................................. 2. *A. lakoocha*

2. Flowers cylindric, tubercled.................................................. 1. *A. heterophylla*
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Large, evergreen trees. Leaves elliptic or obovate, up to 20.0 cm long, coriaceous, glabrous; stipules large caducous. Flowers on main trunk or older woody branches. Fruits cylindric, oblong, up to 45.0 cm long, covered with thick conical tubercles and with sticky latex.

**Flowering and fruiting:** February-November. **Local name:** Kathal. Often planted for the sake of fruits which are used as vegetable and sold in market. Sweta 1799.


Large deciduous trees, up to 15.0 m tall. Leaves subcoriaceous, up to 20.0 cm long, oblong or elliptic, entire or serrate; dark-green, glabrous, shining. Stipules lanceolate, caducous. Flowers in axillary, globose, shortly stalked heads, sepals 2-3, truncate, stamen 1. Fruit clusters up to 6.0 cm in diam., lobulate, smooth, velvety, orange-yellow when ripe, mature fruits sweet-acid.

**Flowering and fruiting:** March-October. **Local name:** Barhal. Often planted in gardens for the sake of edible fruits. Sweta 1486.

2. **BROUSSONETIA** L’ Herit ex Vent.


Small or medium sized trees with smooth, grey bark. Leaves ovate, acuminate, base oblique, crenate, scabrous, up to 20.0 x 10.0 cm. **Flowers and fruits:** Not seen. Included on authority of Murty and Singh (1961b).

3. **FICUS** L.

**Key to species:**

1. Receptacles sessile

1. Receptacles stalked

2. Leaves pubescent beneath; apex rounded

2. Leaves glabrous; apex caudate-cuspidate

3. Stamen 1

3. Stamens 2-3

4. Receptacles in clusters on leafless branches; leaves scabrous, base unequal

4. Receptacles paired, axillary; leaves glabrous, base

5. **F. semicordata**
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5. Leaves scabrous, crenate-serrate; receptacles on normal branches................................................. 6. F. virens var. virens

5. Leaves glabrous, entire; receptacles on short leafless branches..................................................... 2. F. palmata


Large, evergreen trees. Branches horizontally spreading, producing a succession of stout aerial roots. Leaves 5.0-20.0 x 5.0-15.0 cm, ovate-oblong, obtuse, entire, thinly coriaceous, rounded at base; stipules coriaceous, red. Receptacles sessile, axillary, globose, silky pubescent, red. Male flowers many, sepals 4, lanceolate. Stamens 1. Gall flowers perianth as in male flowers. Fertile flowers perianth shorter than male, elongated styles. Flowering and fruiting. Almost throughout the year. Local name. Bargad. Appears spontaneously on tombs or old buildings and also as an epiphyte on the stem of various trees. Also planted by Hindus near villages and in the vicinity of their temples. Sweta 1398.


Tall evergreen trees with few, short, aerial roots and ash-grey bark. Leaves membranous, 5.0-15.0 x 2.0-8.0 cm, ovate, oblong or elliptic-lanceolate, subacute, entire. Receptacles ovoid, subglobose, smooth or downy, reddish when ripe, on short, thick, scaly, tubercled, leafless branchlets. Male flowers sessile; sepals 3-4, membranous, inflated. Stamens 2. Gall flowers stalked; sepals irregularly toothed, gamophyllous; style lateral, elongated, stigma clavate. Fertile flowers nearly sessile; sepals gamophyllous, lanceolate teeth. Style subterminal; stigma clavate. Flowering and fruiting. Throughout the year. Local name. Gular. Planted in villages. Sweta 1386.

Large, deciduous, glabrous trees. Leaves 7.0-20.0 x 6.0-12.0 cm ovate, long petioled, shining, apex, long caudate-acuminate, cordate, 5-7 nerved. Receptacles paired, axillary, sessile, smooth, spherical, reddish purple when ripe. Male flowers few sessile; sepals 3, broadly ovate. Stamen 1, filament short. Gall flowers: sepals 3. Fertile flowers: sepals 5, lanceolate. **Flowering and fruiting.** Throughout the year. **Local name.** Pipal. Commonly planted in villages and in the vicinity of Hindu temples. Also on the walls of old buildings and as epiphyte on *Phoenix sylvestris* (L.) Roxb. Sweta 1469.


Medium sized trees. Leaves alternate, petioled, entire, acute, base semi-cordate, surface very scabrous. Receptacles shortly peduncled, paniculate on special, drooping branches, pyriform, hispid, reddish-brown and ribbed when ripe; basal bracts 3. **Flowering and fruiting:** February-September. Khan (1987) reported this taxon from a nearby place, Balawali, situated on the bank of Ganga. Therefore, the occurrence of this taxon in Hastinapur Wildlife sanctuary can not be ruled out.


var. **virens.**


4. **MORUS** L.


Medium sized, deciduous trees. Leaves 5.0-15.0 cm long, ovate, acute, serrate or dentate, cordate, often lobed. Flowers in short ovoid spikes. Female flower sepals 4, two inner ones
flat, outer ones keeled. Style free. Fruiting spikes white or red, sweet. **Flowering and fruiting.** Summer season. **Local name.** Shetut. Commonly found on roadsides and near villages. Sweta 778.

5. **STREBLUS** Lour.


Murty and Singh (1961b) reported *Morus australis* Poir. and *M. macroura* Miq. from this area.

94. **CANNABINACEAE**

*Cannabis* L.


Erect, dioecious, aromatic, annual herbs. Leaves 3-6 foliate, petiolate; leaflets lanceolate, serrate. Stipules filiform. Flowers greenish-white. Male ones in short, terminal panicles, perianth lobes 5. Stamens 5, antipetalous, filaments filiform. Female ones enclosed by prominent, gland-pubescent bracts; ovary 1-celled, style 1. Fruits about 4.0 mm long, compressed, brownish yellow. Seeds light brown. **Flowering and fruiting:** January-October. Commonly found in wastelands and along roadsides. **Local name:** Bhang. Sweta 1393.

95. **URTICACEAE**

*POUZOLZIA* Gaud.

**Key to species:**

1. Flowers in terminal bracteate spikes; stamens 5................................. 1. *P. pentandra*

1. Flowers in axillary clusters; stamens 4........................................ 2. *P. zeylanica*

Medium sized, erect-decumbent, glabrous perennial herbs with 4-angled stem. Leaves 2.0-8.0 x 0.5-2.5 cm, sessile or shortly stalked, lower ones opposite, oblong-linear-lanceolate, acute to acuminate, strongly 3-nerved ciliate. Upper ones smaller, alternate, linear-oblong, acuminate, cordate. Flowers in axillary clusters, greenish-white; male flowers stalked. Perianth 5-partite, lanceolate-oblong, stamens 5; female flowers sessile. Fruiting perianth with 2 broad, semiobicular wings and 1 shorter wing. Achenes ovoid, acute, enclosed in persistent calyx, polished, black. **Flowering and fruiting:** October-January. Occasionally found on the riverbank and wet and shady habitats. Sweta 41, 197.


A perennial, strigose, erect or ascending herbs. Leaves opposite, ovate, acute or acuminate, entire, base acute or rounded, lateral nerves one pair above the three basal ones. Sepals of male flowers dorsally rounded, acute; those of female flowers tubular persistent, ribbed, bifid at apex. Achene broadly ovoid, shining. **Flowering and fruiting:** September-December. Occasionally found among tall grasses on the margins of ponds and streams. Sweta 1472.

96. **CASUARINACEAE**

**CASUARINA L.**


Evergreen, handsome, leafless trees with drooping branches. Leaves highly reduced, minute, scaly, 6-9, whorled, basally connate. Male flowers in spikes on lateral branches. Stamen1, purplish. Female flowers in ovoid heads. Ovary 2-celled, ovules 2, style red, bifid. Fruit an apically winged samara. **Flowering and fruiting:** April-September. Often planted on roadsides and in wastelands. Sweta 1394.

97. **SALICACEAE**

**SALIX L.**

Medium sized to large, branched, deciduous trees, up to 5.0 m tall. Leaves 3.0-9.0 x 1.5-2.5 cm, ovate-lanceolate or elliptic-lanceolate, serrate, membranous, acuminate. Flowers unisexual; male ones sessile, yellowish, scented, stamens 5-10. Female inflorescence up to 10.0 cm long, flowers pedicellate. Capsule glabrous, long stalked, puberulous, dark-brown when mature. Seeds 4-6, cottony. **Flowering and fruiting:** October-March. Found frequently in swampy areas an on banks of Ganga. Sweta 729, 732.

98. CERATOPHYLLACEAE

**Ceratophyllum L.**


Submerged, rootless, rough, aquatic herbs. Leaves dichotomously forked, usually 5-10 in a whorl, minutely toothed. Flowers minute, sessile, axillary, solitary, unisexual. Male flowers: perianth segments 10-12, 2-fid, stamens 10-20. Female flowers: ovary sessile, 1-celled, style 1, stigma 1 with a lateral pouch. Achene ellipsoid, with persistent, subulate style and subtended by 2 basal spines. **Flowering & Fruiting:** September-November. Common in ponds, ditches and in stagnant water near banks of the river Ganga. Sweta 1420.

99. HYDROCHARITACEAE

**KEY TO GENERA:**

1. Leaves all radical, ribbon-like; female flowers long pedicelled which coil after fertilization

   3. *Vallisneria*

1. Leaves radical or cauline; pedicel of female flowers not as above

   2

2. Leaves radical, long petioled, ovate-cordate with prominent nerves; spathe winged

   2. *Ottelia*

2. Leaves cauline, whorled; spathe not winged

   1. *Hydrilla*

1. *Hydrilla* L.C.Rich


Slender, leafy, submerged, fresh water herbs forming large masses. Leaves in whorls of 3-8, oblong or linear, serrate-dentate. Flowers unisexual, white or reddish, minute, solitary. Male flowers pedicellate; female flowers sessile. Perianth of 3 sepals and 3 petals. Stamens 3.
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2. **OTTELIA** Pers.


3. **VALLISNERIA** L.


Submerged, tufted, dioecious, rooted, perennial herbs. Leaves radical, linear, ribbon like, base sheathing, serrate, erect. Female flowers solitary on long flexuous or spiral, leafless scape coiled after pollination. Male flowers minute, short stalked, enclosed in a 3-lobed spathe. Petals 3, minute. Stamens 3, bifid. Fruits up to 1.5 cm long, linear. Seeds oblong-fusiform, embedded in a gelatinous mass. **Flowering and fruiting**: August-October. Found frequently at the bottom of ponds and ditches. Plants growing in slow running water are longer and prostrate. Sweta 664.

100. **ORCHIDACEAE**

**KEY TO GENERA:**

1. Flowers distinctly pedicelled, lip spurred and

   with pink margins ................................................................. 1. *Eulophia*

1. Flowers subsessile; lip not spurred, saccate, white ....................... 2. *Zeuxine*

1. **EULOPHIA** R. Br. *nom. cons.*

Erect, terrestrial orchids. Leaves 2 arising from the pseudostem after flowering, up to 30.0 cm long, linear, acuminate. Racemes lax, subsecund, up to 15.0 cm long; scape sheathed with loose, membranous bracts. Flowers pale-pink with purple tinge. Bracts linear or lanceolate, acuminate, usually longer than the ovary. Sepals linear-lanceolate, acute or acuminate, 5-nerved, with a prominent midrib. Lip as long as sepals, oblong. Spur short, conical, subacute. Capsule oblong-obovate. **Flowering and fruiting.** May-August. Occasionally occurs among grasses in moist, humus rich soil. Sweta 772.

2. **ZEUXINE** Lindl. *nom. cons.*


**Rhynchostylis retusa** (L.) Bl. was seen growing in some nurseries.

**WCSPF citation:**


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**101. MUSACEAE**

**MUSA** L.

102. ZINGIBERACEAE

KEY TO GENERA:

1. Inflorescence compact; low herbs ............................................................... 1

2. Inflorescence lax; filaments long; anther cells divergent at apex; stigma subglobose; large shrubs .......................................................... 1. Alpinia

2. Lateral staminodes well developed and broad; rhizome orange inside .......................................................... 2. Curcuma

2. Lateral staminodes none or minute; rhizome not orange inside .......................................................... 3. Zingiber

1. ALPINIA Roxb.


Erect, perennial, aromatic, herbs, root stock rhizomatous. Leaves 60.0 x 10.0 cm, oblong-lanceolate, cuneate, acute, glabrous, shining. Flowers white, drooping, rosy or purplish, fragrant. Bracts large, white, pinkish at tip. Calyx cylindric, 3-toothed. Corolla lip deeply 3-lobed. Stamen 1, white. Staminodes 2. **Flowering and fruiting.** March-June. **Local name.** Elaichi. Planted as an ornamental. Sweta 1407.

2. CURCUMA L.


Erect herbs. Rootstock rhizomatous, ovoid, sessile cylindric, orange inside. Leaves very large, oblong-lanceolate, tapering base. **Flowering and fruiting:** Not seen. **Local name.** Haldi. Cultivated for the sake of rhizomes which are extensively used in cooking and in medicines. Sweta 1491.

3. ZINGIBER Boehm., nom.cons.


Erect, perennial herbs with horizontal, jointed, tuberous rhizomes. Leaves 10.0-35.0 cm long, subsessile, lanceolate, glabrous beneath, attenuate base, acuminate. Ligule glabrous. Sheath
glabrous. **Flowering and fruiting:** Not seen. **Local name.** *Adrak.* Locally cultivated in gardens for rhizomes. Sweta 1466.

**Govaerts R & Lock J M (2009)** World Checklist of Zingiberaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; http://www.kew.org/wcsp/ accessed 22 May 2009; 08.45 pm IST.

### 103. CANNACEAE

**Canna L.**


Erect, perennial herbs. Pseudo-stems leafy. Leaves 35.0-40.0 x 10.0-15.0 cm, subsessile, oblong, acuminate, elliptic-lanceolate, entire. Flowers scarlet or yellow, zygomorphic, distant in terminal panicles, erect, sessile. Bracts rounded suborbicular. Bracteoles ovate-oblong, red, lanceolate-oblong. Corolla oblong-oblanceolate, acute. Staminodes 5. Capsule 3-gonous, red, muricate, 1.5-2.0 x 2.0 cm. **Flowering and fruiting.** August-December. Widely cultivated as an ornamental herb; often occurs as escape on margins of water bodies and water channels. Sweta 1485.

### 104. AMARYLLIDACEAE

**KEY TO GENERA:**

1. Peduncle fistular in the upper part; leaves about 0.5 cm broad................................................................. 2. Zephyranthes

1. Peduncle solid; leaves 5.0 cm or more in breadth.......................... 1. Crinum

#### 1. CRINUM L.


#### 2. ZEPHYRANTHES Herb.


105. AGAVACEAE

**AGAVE L.**


106. DIOSCOREACEAE

**DIOSCOREA L.**


107. LILIACEAE

**KEY TO GENERA:**

1. Climbers................................................. 2
1. Erect herbs with radical, fistular leaves........................................ 2. *Asphodelus*

2. Leaves minute without tendril apex; flowers
   white, in racemes........................................ 1. *Asparagus*
2. Leaves well developed, apices modified into tendrils;
   flowers solitary axillary, orange-yellow or scarlet................. 3. *Gloriosa*
1. **ASPARAGUS L.**


**Note:** According to WCSPF this taxon belongs to family Asparagaceae.

2. **ASPHODELUS L.**


Erect, annual herbs with a short root stock and scapose, leafless stem. Leaves in a rosette, 10.0-35.0 x 0.2-0.3 cm, acute, sheathing at base, erect, ribbed. Flowers white or pinkish, laxly racemose, scapes solid. Bracts broadly ovate, boat-shaped, brownish keeled. Perianth whitish-brown, lanceolate oblong, segments oblong, obtuse and with median dark brown keel. Capsule globose, 3-gonous, 3-valved. Seeds 2 in each locule, obovoid, rugose, black. **Flowering and fruiting.** May. **Local name.** Piazi. Common weed during winter season in agricultural fields. Sweta 1556.

**Note:** According to WCSPF this taxon belongs to family Xanthorrhoeaceae.

3. **GLORIOSA L.**


**Note:** According to WCSPF this taxon belongs to family Colchicaceae.

*Aloe vera* (L.) Burm. f. (*Gheekavar*) is often cultivated as a medicinal plant. The genus Aloe belongs to Xanthorrhoeaceae.
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WCPF citation:


108. PONTEDERIACEAE

KEY TO GENERA:
1. Floating herbs; petioles swollen into floats; flowers
   zygomorphic; posterior tepal with a yellow blotch;
   filaments hairy................................................................. 1. Eichhornia
1. Rooted herbs; petioles not swollen; flowers actinomorphic;
   all tepals of same color; filaments glabrous......................... 2. Monochoria

1. EICHHORNIA Kunth nom.cons.


2. MONOCHORIA Persl.

Key to species:
1. Leaf base hastate or sagittate, lobes acuminate or acute.................. 1. M. hastata
1. Leaf base rounded-truncate to cordate, lobes rounded.................... 2. M. vaginalis


Annual or perennial herbs. Leaves 5.0-12.0 x 0.5-10.0 cm, ovate-oblong to triangular or linear-lanceolate, cordate, acuminate, glabrous. Flowers blue, spotted with red. Perianth campanulate, outer tepals lanceolate-oblong; inner ones broader. Capsule glandular outside, ellipsoid, 3-gonous, seeds brown, 10 ribbed. **Flowering and fruiting.** September-November. Included on authority of Murty and Singh (1961b). Khan (1987) reported this taxon from Bijnor, therefore, its occurrence in the study area can not be ruled out.

109. **COMMELINACEAE**

**KEY TO GENERA:**

1. Filaments bearded........................................................................................................2
2. Filaments glabrous; perfect stamens 2........................................................................1. **Commelina**
3. Perfect stamens 2, with 3 staminodes........................................................................4. **Murdania**
4. Perfect stamens 6; staminodes none........................................................................3. **Cyanotis**

1. **COMMELINA** L.

**Key to species:**

1. Capsule usually 2-celled, sometimes 1-celled; each cell 2-seeded........................................1. **C. attenuata**
2. Capsule 3-celled............................................................................................................2
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2. Capsule 3-seeded and 3-valved; seeds free in the cells ................. 4. C. paludosa
2. Capsules usually 5-seeded, i.e., two anterior cells

2-seeded and the posterior cell 1-seeded or obsolete ....................... 3

3. Leaves elliptic-ovate; spathes sessile or subsessile, turbinate; seeds closely pitted ...................... 2. C. benghalensis
3. Leaves lanceolate; spathes distinctly pedunculate, cordate; seeds smooth, truncate at one end and sub-acute or rounded at the other ........................................ 3. C. caroliniana


Slender, much-branched herbs, up to 60.0 cm long tall. Leaves linear or linear-lanceolate, up to 10.0 x 0.5 cm, acute or subobtuse; sheaths ciliate. Spathes ovate-lanceolate, acute or caudate-acuminate, cordate, glabrous, up to 2.0 x 3.0 cm. Flowers small, blue. Capsule 1-2 celled, each locule 2-seeded. Seeds oblong-ellipsoid, truncate. **Flowering and fruiting:** October-December. Included on authority of Murty & Singh (1961b).


Prostrate herb, roots bearing white, cleistogamous flowers. Leaves ovate-oblong, sheath inflated. Aerial flowers blue, 2 posterior petals larger, clawed, anterior one smaller, concave. Stamens 6, 3 posterior ones with divergent, cruciform, yellow anthers. Capsule trigonous, shortly stalked. Seeds wrinkled, pitted. **Flowering and fruiting:** August-November. Commonly found as weeds in crop fields, wastelands. Sweta 284.


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Tall, scandent or scrambling, perennial herbs. Leaves subsessile, lanceolate-oblong to oblong or elliptic-lanceolate, acuminate or acute. Sheaths glabrous, mouth oblique, ciliate. Spathes 3-8 clustered, funnel-shaped, cordate, acuminate, up to 2.0 x 1.5 cm. Cymes simple or branched. Sepals unequal. Petals blue, large petals orbicular. Capsule 3-celled, 3-seeded. Seeds ovoid-oblong, smooth. **Flowering and fruiting:** August-December. Found in moist and shady localities. Sweta 1580.

2. **CYANOTIS** D. Don. *nom. cons.*

**Key to species:**

1. Leaf sheaths inflated; flowers sessile, in axillary fascicles, enclosed in inflated leaf sheaths; bracteoles small, not imbricated .............................................. 1. *C. axillaris*

1. Leaf sheaths not inflated; flowers pedicellate, in terminal scorpoid cymes; bracteoles 2-seriate, imbricated .................. 2. *C. cristata*


3. **MURDANNIA** Royle *nom. cons.*


**WCSPF citation:**

### 110. JUNCACEAE

**JUNCUS L.**

**Key to species:**

1. Leaves septate; cymes terminal, compact...................... 2. *J. wallichianus*
1. Leaves not septate; cymes lax, scattered...................... 1. *J. bufonius*


Erect, slender, tufted, annual grass like herbs, up to 20.0 cm high. Leaves linear, acute, sheath not auricled. Flowers sessile, solitary or 2-5 in lax cymes. Bracts and bracteoles membranous, ovate-acute. Outer tepals lanceolate, acute, green, membranous margins; inner ones smaller. Stamens 6. Styles pinkish. **Flowering and fruiting:** January- June. Abundant in the area, found in moist to wet habitats. Sweta 647.


Tufted herbs, root-stock very short. Leaves few, soft, terete or flat, septate. Flowers 5 to many in sessile, terminal heads, arranged in panicles. Tepals up to 0.4 cm long. Stamens 3. Capsule trigonous, acute. Seeds reticulate, minute. **Flowering and fruiting:** March-June. Occasionally found on moist sandy bed of Ganga. Sweta 1539.

**Note:** In Indian floras this species is referred to as *J. monticola* Steud., I have followed International Organization for Plant Information: Provisional Global Plant Checklist (http://bgbm3.bgbm.fuberlin.de/IOPI/GPC/PTaxonDetail.asp?NameId=318&PTRefFk=1).
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111. ARECACEAE

PHOENIX L.


Tall, unbranched, monoecious, handsome palms. Leaflets up to 25.0 x 2.0 cm, linear-lanceolate, cunduplicate, coriaceous, apices spinous. Spathe woody, dark-brown, scurfy, consisting of 2 boat-shaped, keeled, valves. Male flowers numerous, creamish-yellow, fragrant. Female flowers distant, roundish. Fruits oblong-ellipsoid, scattered, orange-yellow. Seeds rounded, deeply grooved. **Flowering and fruiting.** February-August. Commonly found in wastelands and on roadsides. Sweta 1502.

WCSPF citation:


112. TYPHACEAE

TYPHA L.


Erect perennial, marshy herbs, upto 3.0 m tall. Leaves exceeding the flowering stem, trigonous, vertical, linear, acute. Sipkes cylindrical, 40.0-50.0 cm long, dark-brown. Female spikes reddish-brown. Male flowers mixed with clavate-tipped pistillodes. Ovary on gynophore, white hairs at base. Stigma spathulate. Fruits not seen. **Flowering & Fruiting:** October-June. **Local name:** Patera. Commonly found in aquatic and marshy places. This species is extensively harvested for making mats. Sweta 912.

113. SPARGANIACEAE

SPARGANIUM L.

Erect herbs, rootstock creeping, up to 75.0 cm high. Leaves up to 90.0 cm long, broad, 2-ranked, linear, margins entire, triquetrous. Flowers in round heads, sessile or shortly stalked, male heads smaller, olive-brown, soon falling off, male flowers with 2-3 stamens surrounded by 3-6 linear scales; female heads larger. Drupe angled, sessile, shortly beaked. **Flowering and fruiting.** February-June. Common in shallow water on banks of the river Ganga and in marshy habitats. Sweta 1474.

**Note:** First reported from western Uttar Pradesh by Khan & Khan (2000). This taxon seems to have entered this area very recently and has spread all over the sanctuary. Studies to assess its impact on local flora are needed.

**Note:** According to APG-2 the genus *Sparganium* belongs to family Typhaceae.

### 114. ARACEAE

**COLOCASIA** Schott


Prennial herbs, with short, tuberous root-stock. Leaves purple blotched, up to 35.0 x 15.0 cm, cordate or sagittate, apiculate. Spathe up to 30.0 cm long, lanceolate-oblong, convolute, cylindric, tube pale-yellow. Spadix shorter than the spathes. Berries several, angular, reddish-orange or orange. **Flowering and fruiting:** August-November. **Local name:** Arvi, Ghuiyan. Found in marshy habitats. Also cultivated for edible subterranean parts which are sold in market. Sweta 1545.

### 115. LEMNACEAE

**KEY TO GENERA:**

1. Fronds subglobose, not flat, rootless; reproductive
   
   - pouch solitary, basal; inflorescence espathaceous, male
   
   and female flowers one each................................. 3. *Wolffia*

2. Fronds 3-18 nerved, with a dorsal and ventral scale
   
   and two to many roots; stipe ventrally attached; anthers
   
   longitudinally dehiscent; utricle winged.......................... 2. *Spirodella*

3. Fronds 1-3 nerved, without scales and with a
   
   solitary root; marginally attached; anthers transeversely
   
   dehiscent; utricles smooth, not winged.............................. 1. *Lemna*
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1. **Lemna L.**

**Key to species:**

1. Fronds tailed; root cap acute ................................................. 2
2. Fronds sessile, not tailed; root cap obtuse .................................. 1. *L. minor*


Minute, floating, annual herbs. Fronds up to 3.0 mm long, sessile, symmetrical obovoid or oblong. Flowers in marginal clefts of fronds, spathe 2-lipped. Stamens 2. Style long; ovule solitary. **Flowering and fruiting:** July-October. Found in ponds, pools and ditches. Sweta 1579.


Floating, minute, annual, aquatic herbs. Fronds obovate, flat, glabrous, entire. Spathe membranous with two male and one female flower. Male flower with one stamens. Female flowers- ovary one, one-ovuled. **Flowering and fruiting:** July-September. Common in ponds, canals and lakes etc. Sweta 643.


Small, submerged, annual, aquatic herbs. Fronds 4.0-8.0 mm long, flat, oblanceolate, tip serrate. Flowers 1-3, naked or in spathe, perianth none. Stamens 1-2, anthers 1 or 2 celled. Ovary 1-celled, style very short, ovule solitary. Seeds horizontal, testa rough, grooved. **Flowering:** March-April. Included on authority of Murty and Singh (1961b).

According to WCSPF specific epithet is ‘trisulca’.

2. **Spirodela** Schleid.


Minute, floating herbs. Fronds up to 8.0 x 7.0 mm, flat, orbicular or broadly ovate-oblong, opaque, dark-green above, purplish beneath. Spathes with 2 male and 1 female flower.

**Note:** According to WCSPF the orthography of the specific epithet is ‘polyrrhiza’

3. **WOLFFIA** Horkel ex Schleid. *nom. cons.*

**Key to species:**

1. Fronds subglobose on lower side ........................................ 1. *W. arrhiza*
2. Fronds conical or subcylindric on lower side ................................ 2. *W. microscopica*


Smallest, simplest plants resembling small dots or grains floating on still water. Fronds up to 1.0 x 1.5 mm, orbicular or ellipsoid, upper surface slightly convex. **Flowering and fruiting:** Not seen. Common in ponds and ditches. Sweta 1562.


Floating, aquatic herbs. Fronds flat, ovate or obovate, glabrous, entire. Male and female flowers solitary, inserted in groove on upper surface of frond. **Flowering and fruiting:** July-October. Included on authority of Murty and Singh (1961b).

**Note:** In WCSPF all duckweeds are placed in family Araceae.

**WCSPF citation:**


116. **ALISMATACEAE**

**SAGITTARIA L.**

**Key to species:**

1. Leaves erect, raised above the water surface;
   - sagittate, acute ............................................................. 2. *S. sagittifolia*
2. Leaves floating on water surface, ovate-cordate
with rounded basal lobes, obtuse........................................... 1. \textit{S. guayanensis}


Laticiferous, aquatic, floating herbs, often thinly hairy. Leaves floating, up to 6.0 x 3.5 cm, ovate, deeply cordate, obtuse. Flowers white, in irregular whorls, lower whorl bisexual, upper staminate; pedicel very short, stout. Achenes numerous, flat, wing toothed. \textbf{Flowering and fruiting.} August-December. Found in paddy fields and stagnant water bodies. Less common than \textit{S. sagittifolia}. Sweta 1576.


\textbf{WCSPF citation:}


117. \textbf{APONOGETONACEAE}

\textbf{APONOGETON f.}


Submerged, aquatic herbs. Leaves lanceolate to linear-oblong, cuneate, opaque, nerves 2-3. Floating leaves larger, 7-nerved. Flowers in solitary, dense spike, blue. Spathes up to 15.0 mm long, caducous. Stamens 6, anthers bluish-purple. Follicles up to 3.5 x 2.0 mm, beaked. Seeds 4-8 longitudinally ribbed. \textbf{Flowering and fruiting:} August- November. Included on authority of Murty & Singh (1961b).

\textbf{WCSPF citation:}
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118. POTAMOGETONACEAE

KEY TO GENERA:
1. Leaves linear, filiform; sheaths up to 2 cm long..........................2. *Stuckenia*
2. Leaves not as above; sheaths free, forming stipules.......................1. *Potamogeton*

Key to species:
1. Upper leaves floating, coriaceous; lower leaves submerged
   and membranous.........................................................2. *P. nodosus*
2. All leaves similar and submerged; margins crisped
   and serrulate ..................................................................1. *P. crispus*

1. POTAMOGETON L.


Submerged aquatic herbs. Leaves 5.0 -10.0 x 2.5-4.0 cm, linear to elliptic-lanceolate, glabrous, margins undulate. Spikes dense 4.0-5.0 cm long, reddish-brown. Tepals 4, clawed, suborbicular, concave. Druplets obliquely-ovoid, shortly beaked. **Flowering and fruiting**: December- May. Common throughout the study area in pond and marshy places. Sweta 6.


Floating or marshy, pale-purple herbs. Submerged leaves lanceolate, very thin, often with undulate margins; floating ones elliptic lanceolate, thicker. Flowers white, in reddish brown spikes. Fruits 3-ribbed, with a recurved beak. **Flowering and fruiting**: November-June. Common in ponds, ditches and in slow running water. Sweta 403.

2. STUCKENIA Börner


Submerged grass-like, aquatic herbs. Leaves linear to filiform. Stipules adnate to the leaf sheath. Spikelets 1.5-2.0 cm long, white, short, projecting above the water surface. Tepals 4,
broadly obovate. Fruits oblique, shortly beaked, hardly keeled. **Flowering and fruiting:** October-April. Found frequently in ponds, ditches and slow running water of Madhya Ganga Canal. Sweta 406.

**Note:** According to Kaplan (2008) the genus *Stuckenia* is characterized by the presence of long leaf sheaths, characteristic leaf and peduncle anatomy and a higher ploidy level (hexaploid) than in *Potamogeton* s. str. (generally diploid or tetraploid). The genus is represented, in Asia, by seven species and three confirmed hybrids. *S. pectinata* is cosmopolitan in distribution.

**WCSPF citation:**
Govaerts R (2009) World Checklist of Potamogetonaceae. The Board of Trustees of the Royal Botanic Gardens, Kew. Published on the Internet; http://www.kew.org/wcsp/ accessed 19 May 2009; 0.41 pm IST. (Names of reviewers were not available).

**119. ZANNICHELLIACEAE**

**ZANNICHELLIA** L.


Fragile, submerged herbs. Leaves opposite or whorled, linear or filiform. Male flower 1, naked, stamen solitary. Female flowers 2-5, perianth cupular, hyaline. Carpels 1-9, stigma peltate. Achenes stipitate, rostrate, tuberculate. Seeds oblong, pendulous. **Flowering and fruiting:** February-July. Often found in ponds and ditches. Sweta 1561.

**120. NAJADACEAE**

**NAJAS** L.


Submerged, fragile, dichotomously branched herbs. Leaves up to 2.5 cm long, with 6-12, broad-based, upcurved spinules on margins. **Flowering and fruiting:** Not seen. Occasionally found in large water bodies and in shallow water near margins of Ganga. Sweta 1446.

**121. ERIOCaulaceae**

**ERIOCAULON** L.

Stemless, monoeccious, glabrous, small, annual herbs. Leaves in a rosette, subulate to linear, opaque. Heads 2.5-3.0 mm across, ovoid-globose, grey or blackish-white. Involucre bracts many, scarious, biseriate. Male flowers stipitate, outer perianth segments 3, basally connate, cupular. Female flowers with 2, free, linear, acute sepals, petals none; style long, stigmas 3, filiform. Capsule membranous. Seeds ellipsoid-ovoid, smooth, pale-brown. **Flowering and fruiting:** August- November. Often found in sugarcane fields. Sweta 1496.

**122. CYPERACEAE**

**KEY TO GENERA:**

1. Flowers unisexual; female flowers enclosed in a utricle .................. 3. *Carex*

1. Flowers bisexual; female flowers not enclosed within a utricle

2. Style jointed with the ovary, style-base dilated or spongy-thickened, clearly demarcated .................. 3

2. Style continuous with the ovary, without any demarcation between ovary and style, or any protuberance at the top of achene .............................................................. 5

3. Hypogynous bristles present; spikelets solitary terminal ................ 5. *Eleocharis*

3. Hypogynous bristles none; spikelets not solitary terminal (except in *F. ovata*) ........................................ 4

4. Entire style falling off from achene; achene not crowned by a bulbous style base ........................................ 6. *Fimbristylis*

4. Style persistent on the mature achene, hence achene crowned by a bulbous style base ................................ 2. *Bulbostylis*

5. Hypogynous bristles present; glumes spirally imbricated ........ 6

5. Hypogynous bristles absent; glumes spirally imbricated or 2-ranked ........................................ 7

6. Leaves absent or reduced to sheaths, or at the most mucro; hypogynous bristles needle-like .................. 10. *Schoenoplectus*

6. Leaves with distinct lamina; hypogynous bristles 3-6, not needle-like, retrorsely scabrid, up to as long as the nut; styles 2, rarely three; nut obovate ........................................ 1. *Bolboschoenus*

7. Glumes spiral ........................................ 10. *Schoenoplectus*

7. Glumes 2-ranked ........................................ 8

8. Rachilla articulated; spikelets falling entirely .................. 9

8. Rachilla not articulated, persistent; glumes falling apart from the rachilla ........................................ 10


9. Nut bilaterally flattened with one side facing the rachilla .......... 7. *Kyllinga*
10. Nut triangular or dorsiventrally flattened with one side facing rachilla. .......................... 4. *Cyperus*


1. **BOLBOSCHOENUS** (Ascherson) Palla


var. *maritimus*


2. **BULBOSTYLIS** Kunth nom. cons.


3. **CAREX** L.

**Key to species:**

1. Spikes green, drooping; stigmas 2; utricle compressed. .................. 1. *C. dimorpholepis*

1. Spikes yellowish-brown, erecto-patent, stigmas 3;

   utricle not compressed. .............................................. 2. *C. fedia*

Erect perennial herbs. Leaves equalling the stem, flat, linear, scabrous. Spikes 4-6, cylindric, 4-6 cm long; female spikelets at top; male at base. Bracts leaf like. Urnicles stalked, obovate, conically beaked, densely glandular. **Flowering and fruiting**: February-April. Occasionally found near water streams. Sweta 762.


Erect, rhizomatous, marshy herb up to 75.0 cm high. Basal leaves equaling the stem, up to 0.3 cm broad; margins smooth; sheath broken into fibers. Spikelets racemose. Female spikelets 2-5 at base, male ones 3-6 at apex. Achene elliptic-elongate, trigonous, enclosed in perigynium. **Flowering and fruiting**: January-April. Found in moist places, especially on clayey soil. Sweta 753.

4. **CYPERUS** L.

**Key to species:**

1. Stigmas 2; nuts dorsally compressed................................................. 2

2. Spikelets in a decompound umbel.................................................. 1. *C. alopecuroides*

3. Perennials, rhizomatous herbs; spikelets in pseudolateral heads...................................................... 8. *C. laevigatus*

4. Spikelets distinctly spicate or rarely sub-racemosely arranged...................... 8

5. Annuals with fibrous roots; stamen 1, rarely 2;
   glumes obtuse or mucronate.......................................................... 6

6. Spikelets in dense, globsoe heads.................................................. 4. *C. difformis*

7. Glumes mucronate; nut pale-brown or dirty white;
   spikelets upto 1.0 cm long.......................................................... 3. *C. amabilis*
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7. Glumes obtuse, emucronate; nut white;
   spikelets upto 0.5 cm long........................................ 14. *C. tenuispica*

8. Rachilla of spikelets distinctly alate with
   decurrent base of glumes........................................... 9

8. Rachilla of spikelets exalate...................................... 10

9. Rhizomes stoloniferous; stolons persistent, bearing hard,
   black, fragrant tubers; bracts 3; glumes frequently
   slightly recurved at the apex; slenderly 5-nerved;
   nuts oblong.......................................................... 13. *C. rotundus*

9. Rhizomes not stoloniferous; wings of rachilla persistent;
   spikelets conspicuously flattened, laxly arranged,
   exposing rachis; ripe spikelets ascending....................... 6. *C. exaltatus* var. *dives*

10. Annuals with tufted stems; roots fibrous only................ 11

10. Perennials with woody rhizomes and
    often with long stolons........................................... 12

11. Glumes dorsally 3 to 5 nerved, back smooth.................. 7. *C. iria*

11. Glumes dorsally 5 to 7 nerved, back spinulose-ciliate........ 2. *C. alulatus*

12. Rachilla pilose; spikelets over 1.0 cm long................... 12. *C. procerus*

12. Rachilla glabrous.................................................. 12

13. Plants without true stolons; spikelets in
    cylindric spikes................................................ 11. *C. nutans*

13. Plants stoloniferous; spikelets in spicate racemes;
    mature spikelets acicular, patent; glumes obtuse;
    nuts as long as the glumes...................................... 5. *C. distans*

   Erect, stout, perennial, marshy herbs. Leaves 4.0-6.0 x 0.5-1.5 cm, linear, acuminate. Spikes
digitate, patent, cylindrical, in compound umbels. Bracts 3. Spikelets ovate-lanceolate, brown,
**Flowering and fruiting**: August-November. Frequently found in the marshy places. Sweta
219, 834.

   Erect, tufted, annual sedges. Leaves longer than the stem. Involural bracts 3 -5, unequal.
   Inflorescence a terminal, lax, compound umbel. Spikelets patent, compressed, ovate to oblong
   – linear, 5-15 flowered, golden- or yellowish-brown. Nuts obovate-ellipsoid, triquetrous with

### 3. Cyperus amabilis


Erect annual herbs. Leaves 0.2-0.5 cm broad, subbasal. Spikelets linear, reddish-brown. Bracts 2. Glumes ovate-oblong, mucronate. Stamens-1. Nut obovoid, pale-brown, rugose. **Flowering and fruiting**: August-December. Found in marshy places. Sweta 1418.

### 4. Cyperus difformis


Erect, tufted, annual herbs with purple, fibrous roots. Leaves 0.2-0.5 cm broad, smooth, linear. Inflorescence a terminal, compound umbel with a sessile head at the base of umbel, rays 3-9, very unequal. Bracts 2-3. Spikelets linear to linear-oblong, 10-25 flowered. Rachilla wingless. Glumes membranous, obtuse, emarginate, white-hyaline on margins, brown. Nuts obovoid, triquetrous, yellowish or pale-brown. **Flowering and fruiting**: June-December. Found on margins of ponds and ditches. Sweta 826.

### 5. Cyperus distans


Tall, perennial sedges with knotty rhizomes. Leaves shorter than or equaling the stem, about 5.0 mm wide, linear. Inflorescence an open, compound or decompound umbel. Bracts 4-6, leafy. Spikes loose, broadly ovate, bearing 10-20 spikelets. Spikelets linear, divergent, subterete, 10-30 flowered. Rachilla winged. Glumes distant on zig-zag rachilla, elliptic to ovate-oblong, obtuse, membranous, 3-5 nerved on either sides of keel. Nut narrowly ellipsoid, trigonous, dark-brown. **Flowering and fruiting**: July-December. Found on road sides and in agricultural fields. Sweta 1464.

### 6. Cyperus exaltatus


Tall, erect, glabrous, perennial herbs. Leaves many, leaf blades linear, acuminate. Inflorescence a terminal, compound umbel. Bracts 5-6, leafy, unequal. Spikes 0.5-1.5 cm broad, cylindrical. Spikelets linear, spreading, much compressed, 5-20 flowered. Glumes imbricate, ovate-oblong, membranous, keeled, golden-yellow, scarious at margins. Nut
elliptic to elliptic-ovate, trigonous, brown. **Flowering and fruiting**: June-December. Found frequently in marshy habitats and on margins of water bodies. Sweta 43.


   **var. iria**
   Erect, glabrous, tall herbs with fibrous roots. Leaves 0.2-0.5 cm broad, linear, acuminate, margins scabrous. Inflorescence a terminal, compound umbel. Bracts 3-5, leafy. Spikes ovate-oblong, 1.0-4.0 cm long. Spikelets erect, linear-oblong, golden-yellow, 5-28 flowered. Rachilla straight, narrowly winged. Glumes boat-shaped, acute, sharply keeled, mucronate. Nut triquetrous, dark-brown, smooth, obovate. **Flowering and fruiting**: July-November. Found in paddy fields and on margins of water bodies. Sweta 205.


   Erect, perennial, glabrous herbs, rhizomes horizontal, creeping. Leaves usually absent, if present, then equaling or shorter than the stem. Spikelets 1-30 in pseudolateral heads, straw-coloured, 0.2-0.5 cm broad, ovate, acute, dotted with brown spots. Glumes oblong, acute, mucronate, margins hyaline. Nuts ellipsoid, minute. **Flowering and fruiting**: August-November. Common in marshy places. Sweta 1535.


   Annual, densely tufted sedges with fibrous roots. Leaves 8.0-10.0 cm long, linear, acuminate, slightly longer than stem, scabrid on margins. Sheaths reddish-brown. Inflorescence solitary, terminal head, 3- or more lobed, spikelets numerous. Bracts 4-6, dilated at base. Spikelets 0.1-0.25 cm broad, ovate-lanceolate, compressed, 8-20 flowered, greenish-white. Glumes boat shaped, acuminate, keel rounded. Stamens 2. Nuts oblong, plano-convex, trigonous, pale-brown. **Flowering and fruiting**: Almost throughout the year. Common on damp and sandy soil, on the river banks and margins of ponds etc. Sweta 828.

Perennial, slender herbs. Rhizomes woody and arranged in a single file. Leaves 0.2-0.35 cm broad, linear, acuminate. Inflorescence a sessile head of digitae spikes. Spikelets 3-10, white or dirty white, elliptic, compressed. Bracts 2, unequal. Glumes ovate, acute, 0.4 x 0.1 cm, keeled. Stamens 3. Nut triqueterous, obovoid-elliptic, black or dark-brown. **Flowering and fruiting**: July-November. Commonly found in dry, sandy habitats, especially in *Kholas*. This is a highly variable species as regards the size of plant, number of spikes per head and colour of the inflorescence varying from pure white to brownish white. Sweta 51, 410.


Erect, glabrous, perennial herbs; rhizome woody, stoloniferous. Leaves 0.15-0.45 cm broad, shorter than the stem, linear. Bracts 3, leaf like, unequal, exceeding umbel. Spikelets pale-yellow or brownish, with reddish tinge, linear, acute, 10-30 flowered. Glumes ovate, subacute, keeled, margins hyaline. Stamens 3. Nuts dark-brown, obovoid, triangular. **Flowering and fruiting**: Throughout the year. **Local Name.** Nagar motha. Commonly found as weeds in lawns, wastelands and cultivated fields. Sweta 2, 675.

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Erect or diffuse, tufted, annual herbs, roots fibrous, red-purplish. Leaves few, basal, 0.25-0.45 cm broad, equal to stem, linear. Inflorescence a terminal, compound umbel. Bracts 1-2 unequal, slightly longer than umbels. Spikelets 0.05-0.07 cm, linear-oblong, compressed, 8-25 flowered. Glumes ovate-oblong, reddish brown. Stamens 2. Nuts oval, slightly trigonous, white or yellow. **Flowering and fruiting**: July-December. Found mainly in marshy habitats and paddy fields. Sweta 1367.

5. **ELEOCHARIS** R. Br.

**Key to species:**

1. Annual herbs; spikelets less than 10.0 mm long;
   - stigmas 2; nuts black about 0.5 mm long..........................2. *E. atropurpurea*
2. Perennials; spikelets more than 10.0 mm long.........................2

2. Glumes membranous, keel green;
   - nuts smooth.................................................................4. *E. palustris*
3. Glumes sub-rigid, not keeled; nuts vertically striate....................3
4. Culms terete, hollow, transversely septate when dry....................3. *E. dulcis*
5. Culms triquetrous, solid, not transversely septate........................1. *E. acutangula*


Perennial, tufted, stoloniferous herbs. Leaves represented by sheaths. Spikelets cylindric, up to 3.0 cm long, subacute, obtusely angular, pale-green. Glumes ovate to ovate-elliptic, rounded, unicostate, hyaline. Nuts compressed, up to 2.0 mm long, triangular, apex constricted to annular neck. Hypogynous bristles 6, rigid, retrorsely barbulate. **Flowering and fruiting**: December-June. Occasionally found in marshy habitats. Sweta 1370.


Annual, tufted sedges, up to 30.0 cm high. Leaves absent. Sheath membranous, reddish tinged, glabrous. Spikelets 0.2-0.50 cm broad, terminal, long, ovoid, acute, purplish-brown.
Glumes 0.3-0.75 cm, ovate-oblong, dark-brown, keel greenish. Hypogynous bristles 4-5, longer than the achene, whitish. Nuts biconvex, minute, smooth, black or dark-brown, rounded-truncate at apex. **Flowering and fruiting**: September-April. Occurs in marshy habitats or in paddy fields. Sweta 410.

**Note:** Author citation, according to WCSF was as follows:

**Eleocharis atropurpurea** (Retz.) Kunth, Enum. Pl. 2: 151 (1837). Since the combination of Presl was published earlier, therefore, I have retained it. This error in the WCSF was communicated to Dr. R. Govaerts. In his e-mail dated May 19, 2009, he agreed that this was valid and made necessary change in the database.


6. **FIMBRISTYLIS** Vahl *nom. cons.*

**Key to species:**

1. Stigmas 2; nut biconvex ................................. 2
1. Stigmas 3; nut trigonous ................................. 5
2. Ligule of a ciliate auricle or a fringe of pubescens .... 3
2. Ligule absent; style base glabrous ........................ 1. *F. aestivalis*
3. Spikelets 2.0 -4.0 mm wide; glumes usually with 2-4
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3. Spikelets 1.2 – 1.8 mm wide; glumes usually without
distinct lateral nerves ........................................... 2. F. bisumbellata

4. Style-base conical; stamens usually 2 .............................. 3. F. dichotoma ssp. dichotoma
4. Style-base inconspicuous; stamens usually 1 .............................. 4. F. dichotoma ssp. podocarpa

5. Glumes 2-ranked, at the lower part of a spikelet ....... 5. F. ovata
5. Glumes spirally imbricated ............................... 6

6. All leaves at the culm base with blade; ligule none;
rhizome very short or inconspicuous; glumes glabrous,
puberulous on upper half with short glandular hairs;
keel acute ................................................................. 7. F. tenera

6. Some leaves at culm-base reduced to bladeless sheath ....... 7
7. Culms compressed; tetragonal; leaves laterally flattened;
rachilla deeply pitted after the fall of glumes ................. 4. F. miliacea
7. Culms acutely pentagonous; leaves dorsiventrally flattened;
rachilla ragged with scale like wings after the
fall of glumes ................................................................. 6. F. quinquangularis

Inflorescence a terminal, dense, compound umbel. Bracts 3, unequal. Spikelets 0.1-0.15 cm
broad, lanceolate-ovate, solitary, 8-30 flowered. Glumes boat-shaped, mucronate, lower ones
hairy, 3-nerved, keeled, brownish. Nuts slightly biconvex, cuneate at base, yellow.
Flowering and fruiting: August-December. Rarely, found in marshy places. Sweta 1372.

Densely tufted, annual herbs. Leaf blades 5.0-15.0 cm long, linear, blunt at apex, margins
scabrous, incurved. Sheath 1-3 cm long, pale-green, membranous, hairy. Bracts leafy 1-3,
unequal. Inflorescence a compound umbel. Spikelets ovate-oblong, yellow-brown, acute, 10-
25 flowered. Glumes broadly ovate, boat shaped, apiculate, keel ridged, excurrent into a
recurved mucro. Nuts broadly ovate, light-brown or yellow, smooth, minute, rounded.
Flowering and fruiting: June-March. Common in marshy places and along river banks.
Sweta 424, 704.

**subsp. dichotoma**


Erect annual or perennial herbs. Leaves 0.1-0.25 cm broad, linear, smooth. Inflorescence simple or compound corymbs. Spikelets many flowered, ovate, acute. Glumes ovoid to ovoid-ellipsoid or orbicular, pale brown, lateral nerves 2-3. Stamen 1. Nuts flattened, thickly biconvex. **Flowering and fruiting**: Almost throughout the year. Occasionally found in the marshy places. Sweta 87.


Erect, annual herbs with short woody rhizomes. Leaves 0.1-0.25 cm broad, basal, margins thick. Inflorescence a compound umbel. Bracts short, unequal, leafy. Spikelet solitary, brown, obtuse, 0.2-0.4 x 0.1-0.2 cm, many flowered. Glumes oblong, obtuse, boat-shaped, mucronate, pale-brown, keeled, glabrous. Stamens 2. Nuts trigonous, dirty white. **Flowering and fruiting**: July-November. Common in moist and swampy places.


Erect perennial herbs, rhizomes short, knotty. Leaves linear, acute, shorter than stem. Sheath scarious on margins. Inflorescence a single terminal spikelet, 0.5-1.5 x 0.25-0.75 cm, narrowly ovate, acute, 10-20 flowered. Glumes triangular, ovate, acute keel, mucronate, pale-
yellow. Nuts trigonous, light-brown, rounded, yellowish. **Flowering and fruiting:** August-November. Frequently found in damp, sandy soil. Sweta 198.


Erect, annual herbs with short woody rhizomes. Leaves 0.1-0.25 cm broad, basal, margins thick. Inflorescence a decompound umbel. Bracts short, unequal, leafy. Spikelet solitary, brown, obtuse, 0.2-0.4 x 0.1-0.2 cm, many flowered. Glumes oblong, obtuse, boat-shaped, mucronate, pale-brown, keeled, glabrous. Stamens 2. Nuts trigonous, dirty white. **Flowering and fruiting:** July-November. Common in moist and swampy places. Sweta 153, 231.

**Note:** In Flora of Rajasthan (Shetty and Singh, 1993) *Fimbristylis miliacea* (L.) Vahl and *Fimbristylis quinquangularis* (Vahl) Kunth are treated as different species. But according to WCSPF they are conspecific.


Tufted, tall, erect, annual herbs with very short rhizomes. Leaves 1.0-12.0 x 0.025-0.1 cm, linear, falcate. Sheath red-punctate. Corymbs simple or compound with 3-14 spikelets. Bracts 2-4, leafy. Spikelets 0.1-0.2 cm broad, ovoid, lanceolate, acute, brownish-red. Glumes broadly ovate, boat-shaped, with an acute keel, margins hyaline. Nut trigonous, dirty-white, minutely verrucose. **Flowering and fruiting:** July-November. Frequently found in paddy fields. Sweta 57.


**Key to species:**

1. Glumes winged on keels; plants stoloniferous; wings of glumes serrulate-scabrous.......................... 4. *K. nemoralis*
2. Glumes not winged on keel.............................................. 2

2. Rhizomes long, stoloniferous; culms armaged in a single file along the rhizome; keel of glumes spinulose
   at least towards the apex.............................................. 1. *K. brevifolius*
3. Rhizomes short, not stoloniferous.............................................. 3

3. Lower 2 glumes 1 or 3 nerved; nuts brownish.............................................. 2. *K. bulbosus*
4. First and second glumes 9-11 nerved; nuts black........................... 3. *K. odorata* subsp. *cylindrica*


Erect, densely tufted, small perennial herbs. Leaves flat, linear, 0.1-0.25 cm, acuminate. Inflorescence a terminal head of 3-5 spikes. Bracts leafy 24, linear, unequal. Spikelets 0.15 x 0.06 cm, lanceolate, greenish, 1- flowered. Glume ovate-oblong, acute, keeled. Stamens 2. Nut brownish, oblong apiculate, laterally compressed. **Flowering and fruiting**: July-November. Frequently found in sandy localities and on roadides. Sweta 1549.


Tufted, erect, perennial herbs. Leaves basal, 0.1-0.45 cm broad, slightly shorter than the stem, linear. Inflorescence a terminal head bearing globose central spike and 2-3 small lateral spikes. Bracts 3, leafy. Spikelets compressed, ovate-elliptic, whitish, 1-2 flowered. Glumes usually five, the lowest two smaller and narrow, ovate, acuminate, brownish, 3-4 nerved on either sides of keel. Nut reddish-brown, apiculate, oblong or biconvex. **Flowering and fruiting**: July-December. Found rarely in marshy places. Sweta 1553.

**Note**: According to IPNI the citation of the basionym is as follows: *Thryocephalon nemorale* J.R. Forst. & G.Forst. Char. Gen. Pl. 65. 1775.

According to Haines (1921-24) this species is more slender than *K. bulbosa* Beauv. Stem up to 30 cm, not much thickened into short rootstock. Heads cylindric up to 4.0 mm long. Keel green, scarcely excurrent, sides strongly nerved. Included on authority of Murty & Singh (1961b). This is the only report of the occurrence of this species in Upper Gangetic Plain and adjoining areas.

### 8. MARISCUS Vahl nom. cons.

**Key to species:**

1. Anthela compound or decompound; spikes globose.................1. *M. compactus*

1. Anthela simple; cylindrical, subglobose or ellipsoidal........2

2. Spikelets more or less flattened, with an acute edge, bearing 3-many nuts; glumes folded, with conspicuous keel and recurved awn..........................3. *M. squarrosus*

2. Spikelets terete, without conspicuous edge,

   bearing 1-2 nuts; glumes involute, without distinct keel and awn; base of culm hardly enlarged; basal leaf sheaths purplish-brown..........................3

3. Spikelets 4.0-5.0 mm long, patent to ascending at maturity; nuts 2, 2.0 mm long..................................4. *M. sumatrensis*

3. Spikelets 2.0-3.0 mm long, spreading at maturity; nut single,

   less than 2.0 mm long.........................................2. *M. paniceus*


Perennial sedges with, short, often corm like rhizomes. Culms obtusely trigonous to subterete, solitary or few together. Leaves few, slightly longer than the stem. Sheaths purple-brown. Bracts 3-5 or up to 8, patent to divergent, unequal. Spikes with many, stellately arranged spikelets. Rachis very short. Spikelets jointed at the base, narrowly lanceolate to linear-subulate, pale-green and tinged with rusty-brown. Rachilla wings pale-white, hyaline. Glumes 5-7 nerved, obtuse or subacute at apex. Nuts linear-oblong, trigonous, yellow-brown.

**Flowering and fruiting:** July-September. Found in moist habitats. Sweta 1120.

**Note:** According to WCSPF the accepted name of this species is *Cyperus compactus*. Citation is as follows:

*Cyperus compactus* Retz., Observ. Bot. 5: 10 (1788).


**Note**: According to WCSPF the accepted name of this species is *Cyperus paniceus*. Citation is as follows:

*Cyperus paniceus* (Rottb.) Boeckeler, *Linnaea* 36: 381 (1870).


Erect, annual herbs with reddish fibrous roots. Leaves linear, 0.1-0.25 cm broad, filiform, shorter than the stem. Sheaths membranous, greenish. Inflorescence a compound umbel. Bracts 2-4, unequal, longer than inflorescence. Spikes 0.5-1.25 cm broad, yellowish-green. Spikelets membranous, ovate-oblong, greenish. Glume ovate, recurved awns, keeled. Stamens 1. Nuts obovoid, triangular, pale brown, apiculate. **Flowering and fruiting**: July-November. Commonly found in sandy localities and on roadsides. Sweta 1596.

**Note**: According to WCSPF the accepted of this species is *Cyperus squarrosus* L., Cent. Pl. II: 6 (1756).


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Note: According to WCSPF the accepted name for this species is *Cyperus cyperoides* (L.) Kuntze, Revis. Gen. Pl. 3(2): 333 (1898) subsp. *cyperoides*.

9. PYCREUS P. Beauv.

Key to species:

1. Glumes with 3-nerved keel and nerveless sides; stamen usually 1
   2. *P. pumillus*

1. Glumes with 3-nerved keel and distinctly nerved sides; stamens usually 2
   2. Stem erect, not rooting at the lower nodes; glumes with straight keel, without depression; nuts oblong or oblong-ovate
   1. *P. flavidus*

2. Stem decumbent and rooting at the lower nodes; keel of glumes arcuate and usually with a depression on either side; nuts oblong to almost orbicular
   3. *P. sanguinolentus*

   var. *flavidus*


Small, glabrous, tufted, annual herbs. Leaves 0.1-0.25 cm broad, linear, shorter or longer than the culm. Inflorescence a compound umbel of short spikes or contracted to a head. Bracts 3-5, leafy. Spikelets linear, compressed, 10-30 flowered, light greenish, digitate. Glumes ovate, boat-shaped, acute, keeled, greenish. Nuts obovoid, compressed, blackish, minute, apiculate.
Flowering and fruiting: August-October. Commonly found in agricultural fields, and in open moist places. Sweta 330.


10. Schoenoplectus (Reichb.) Palla nom. cons.
Key to species:
1. Inflorescence congested in a head, rarely corymbose with short rays.................................2
1. Inflorescence anthellate, open, with elongated rays.........................4
2. Hypogynous bristles retrorsely scabrid; culms triquetrous; styles 3........................................3. S. mucronatus
2. Hypogynous bristles absent; culms usually flowering in the upper half; not or scarcely septate when dry; glumes mucronate, distinctly keeled.................................3
3. Culms often septate when dry; glumes multistriate, lax, inflated in fruit........................................................................... 4. S. roylei
3. Glumes aseptate when dry; glumes smooth, imbricating, not inflated in fruit................................................... 5. S. supinus
4. Hypogynous bristles soft, plumose........................................ 2. S. littoralis
4. Hypogynous harsh, retrorsely scabrid........................................ 1. S. lacustris


**Note:** In Flora of Rajasthan (Shetty and Singh, 1993) the specific epithet is spelled as 'littoralis'.


Erect, annual sedges with fibrous roots. Leaves absent. Inflorescence pseudolateral heads. Spikelets 0.5-1.5 cm long, ovoid-oblong, acute, slightly compressed, shining, straw-brown. Glumes 5-ranked, many-ribbed, elliptic-lanceolate, membranous, keeled. Nuts about 1.5 cm long, trigonous, apiculate, black. **Flowering and fruiting:** October – March. Common in marshy places. Sweta 1460.

**Note:** Lye (2003) described a new genus Schoenoplectiella based mainly on rbcL data to segregate all annual taxa, previously part of Schoenoplectus (Simpson et al., 2007). If this segregation is followed, this species is transferred to Schoenoplectiella as follows:


**Note:** If transferred to *Schoenoplectiella* and elevated to rank of species, the name of this species is as follows:


**WCSPF citation:**


123. **POACEAE**

**KEY TO GENERA:**

1. Upper glume with rows of stout, hooked spines.........................57. *Tragus*
2. Upper glume without spines.......................................................2

2. Spikelets 2-flowered, falling entire at maturity, usually
   with female upper floret and male or barren lower one,
   frequently dorsally compressed..............................................3

3. Spikelets all hermaphrodite, with male or barren
   or hermaphrodite spikelets mixed in the same
   inflorescence; if unisexual then lemmas of the fertile
   floret indurated.................................................................4

3. Male and female spikelets in separate inflorescences or
   different parts of the same inflorescence.............................32

4. Spikelets paired, with one sessile and one pedicelled
   ones, similar or dissimilar; glumes as long as the spikelet
   and enclose the florets, rigid; lemmas hyaline or
   membranous; upper one usually awned.................................5

4. Spikelets solitary or paired, usually similar;
glumes shorter or as long as the spikelets,
membranous; lemmas especially upper one papery
or very tough, rigid, awnless……………………………………………………… 20
5. Spikelets in similar pairs; female joints thin, linear
or slightly dilated at the top………………………………………………… 6
5. Spikelets in dissimilar pairs, sessile one hermaphrodite,
pedicelled male or sterile or absent, if similar then joints
and pedicel thick and swollen……………………………………………… 10
6. Spikelets in panicles or in compound racemes………………… 7
6. Spikelets in 2-few digitate racemes; lower glume more or
less flat, shallowly depressed, neither furrowed nor rounded
on the back; lower glume not markedly truncate; pedicelled
spikelets developed; florets 2; upper lemma 2-toothed……………… 28. *Eulaliopsis*
7. Rachis of racemes tough or tardily breaking up………………… 8
7. Rachis of racemes fragile, breaking up…………………………… 9
8. Lemmas awned; panicles narrow, contracted; glumes very
delicate; callus hairs twice as long as the glume or more………… 33. *Imperata*
8. Lemmas unawned…………………………………………………………… 39. *Narenga*
9. Spikelets awned…………………………………………………………… 36. *Erianthus*
9. Spikelets unawned…………………………………………………………… 52. *Saccharum*
10. Joints of rachis and pedicels swollen, 3-angled,
rounded or flattened…………………………………………………………… 11
10. Joints of rachis and pedicels narrow, neither thickened
nor flattened, often with a longitudinal, translucent groove…… 14
11. Upper lemma awned; sessile spikelets with male and
hermaphrodite florets…………………………………………………………… 12
11. Upper lemma unawned; sessile spikelets with hermaphrodite
florets only, or rarely with male floret below……………………………… 13
12. Racemes 1-noded, reduced to 3 heteromorphous spikelets,
enclosed in a boat shaped spathe……………………………………………… 3. *Apluda*
12. Racemes many-noded, espathate……………………………………… 35. *Ischaemum*
13. Sessile spikelets rounded; lower glume pitted………………… 29. *Hackelochloa*
13. Sessile spikelet not rounded; lower glume not pitted;
rachis of the spike tough, not breaking up…………………………… 30. *Hemarthria*
14. Spikelets in racemes which are neither interrupted by
spathes nor solitary at the end of branches, usually in
whorled panicles…………………………………………………………………… 15
14 Spikelets in panicles of racemes interrupted by spathes,
if not, then the racemes solitary or digitate; upper lemma from
the tip or sinus, often reduced to hyaline base of an awn……………… 17
15. Spikelets dorsally compressed (lower glume flat).................. 54. *Sorghum*
15. Spikelets laterally compressed (lower glume usually convex)..... 16
16. Lower glume tuberculate; spikelets in pairs.............................. 60. *Vetiveria*
16. Lower glume smooth; spikelet 3-nate at the end of branches.................. 14. *Chrysopogon*
17. Lower glume of the sessile spikelets with in-folded margins, 2-keeled; awn glabrous.......................... 18
17. Lower glume of sessile spikelets without inflexed sides, intumed and rounded, not keeled as above, if keeled then keeled mostly at the top; racemes without and involucre of homogamous spikelets; awns long, brown, twisted......................... 31. *Heteropogon*
18. Upper lemma of sessile spikelets awned from the entire tip, often stipitate and passing into an awn; racemes digitate or in short, spiciform panicles.............................................. 19
18. Upper lemma of sessile spikelets 2-cleft or lobed, awned from the sinus; racemes 2-nate, combined into large spathate panicles; plants aromatic.......................................................... 16. *Cymbopogon*
19. Joints and pedicels with a translucent furrow; pairs of spikelets heterogamous .................................................. 10. *Bothriochloa*
19. Joints and pedicels without a translucent furrow; lowest 1-3 pairs of spikelets homogamous; upper lemma of sessile spikelets reduced to the translucent base of an awn............ 21. *Dichanthium*
20. Spikelets with an involucre of bristles or subtended by a solitary bristle, falling with or without bristles at maturity............. 21
20. Spikelets not subtended by an involucre of bristles or a solitary bristle, falling singly.................................. 23
21. Upper lemma transversely rugose; bristles persistent............. 53. *Setaria*
21. Upper lemma smooth; bristles caducous................................. 22
22. Involucre of free, naked or plumose bristles........................ 46. *Pennisetum*
22. Involucre of spines or rigid bristles united at the base in to a hard cup................................................... 12. *Cenchrus*
23. Spikelets in open panicles, not gibbous................................. 43. *Panicum*
23. Spikelets in secund (1-sided) spikes or spicate racemes, which are either digitate or scattered, rarely solitary.................. 24
24. Lemma of the upper floret more or less crustaceous or coriaceous, usually with inrolled margins exposing much of the palea.......................................................... 25
24. Lemma of the upper floret thinly cartilagenous, usually with flat, hyaline margins; spikelets awnless.......................... 22. *Digitaria*
25. Lower glume and lowest internode of the rachis not forming
a swollen callus at the base of the spikelet.................................26

25. Lower glume and lowest internode of the rachilla forming
da swollen callus at the base of the spikelet; upper lemma
mucronate or shortly awned......................................................27. *Eriochloa*

26. Lower glume turned away from the rachis, with back to
    upper lemma facing it, i.e. spikelets abaxial...........................27

26. Lower glume turned towards the rachis, with back of
    upper lemma turned away from it, i.e. spikelets adaxial............31

27. Lower glume usually present, often very much reduced.............28

27. Lower glume usually absent..................................................45. *Paspalum*

28. Glumes acuminate or awned ; upper lemma not mucronate..........29

28. Glumes not awned, if acuminate then upper lemma mucronate......30

29. Leaves linear; culms erect; leaf base not oblique....................23. *Echinochloa*

29. Leaves ovate-lanceolate; culms creeping below;
    leaf base oblique..........................................................41. *Opismenus*

30. Upper lemma acute, not mucronate.......................................44. *Paspalidium*

30. Upper lemma obtuse, mucronate or very short-awned ...............59. *Urochloa*

31. Lower glume present........................................................11. *Brachiaria*

31. Lower glume absent..........................................................8. *Axonopus*

32. Male and female flowers in the same inflorescence;
    male above and single female flower below; female spikelets
    enclosed in a metamorphosed leaf sheath which forms a spherical
    or cylindrical, ivory-bead like structure...............................15. *Coix*

32. Male inflorescence terminal, female axillary; female spikelets
    in crowded longitudinal rows on a very thick axis.................61. *Zea*

33. Arborescent; leaves articulated with sheaths; stamens 6;
    lodicules usually 3 .........................................................34

33. Otherwise; leaves not articulated with sheaths; stamens 1-3;
    lodicules usually 2 or absent...........................................35

34. Spikelets in dense globose heads; pericarp fleshy,
    free from the seeds.......................................................19. *Dendrocalamus*

34. Spikelets not in globose heads; pericarp thin;
    closely adhering to seeds.................................................9. *Bambusa*

35. Spikelets in open or contracted, spicate panicles, less often
    in racemes or spikes........................................................36

35. Spikelets on opposite sides of the rachis of a solitary spike
    or spicate raceme............................................................58. *Triticum*

36. Spikelets with one fertile floret, with or without 1 or 2 male or
    barren florets below it.....................................................37

36. Spikelets with 2 or more fertile florets, if one, then with
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sterile floret above................................................. 48

37. Glumes minute or suppressed; fertile lemma and palea
    similar in shape and texture........................................... 38

37. Glumes well developed; fertile lemma and palea not similar........... 40

38. Leaf blades ovate-oblong or ovate lanceolate, with
    inflated sheath; a floating grass; glumes
    absent; floret one; lemma awned........................................... 32. *Hygroryza*

38. Leaf blade linear, acute or acuminate; without inflated sheath;
    aquatic or marshy grasses................................................. 39

39. Fertile lemma supported by 2 empty scales; tip of
    pedicel with 2 lips................................................. 42. *Oryza*

39. Fertile lemma solitary; tip of fertile lemma without lips;
    spikelets imbricate................................................. 36. *Leersia*

40. Spikelets with 3 florets, lower 2 florets reduced to lemmas
    which are often minute or absent......................................... 48. *Phalaris*

40. Spikelets with 1-2 florets........................................... 41

41. Spikelets with 2 florets........................................... 42

41. Spikelets with 1 floret........................................... 44

42. Lower floret empty, epaleate; glumes about half the
    length of the spikelet............................................. 56. *Thysanolaena*

42. Lower floret male or empty, usually paleate; upper
    glume as long as the spikelet........................................... 43

43. Glumes unequal, lower one acute, upper one
    acuminate; upper lemma awned........................................... 5. *Arundinella*

43. Glumes equal, obtuse or mucronate; upper lemma awnless........ 34. *Isachne*

44. Spikelets very rarely falling entire, and then with firmly
    membranous to coriaceous, awned or 5-nerved lemmas.......... 45

44. Spikelets falling entire at maturity, either singly or in clusters... 47. *Perotis*

45. Lemmas hyaline or membranous at maturity,
    rarely indurated and then laterally compressed...................... 46

45. Lemmas indurated or rigid at maturity, terete or
    dorsally compressed................................................. 4. *Aristida*

46. Lemmas 1-3 nerved, awnless; glumes and lemmas similar in
    texture, hyaline or thinly membranous.................................. 55. *Sporobolus*

46. Lemmas usually 3-5-nerved, very often awned; glumes longer
    and firmer than hyaline lemmas........................................... 47

47. Panicle cylindric, spiciform, compact.................................. 2. *Alopecurus*

47. Panicle spreading, lobulate.......................................... 51. *Polypogon*

48. Lemmas or rachilla joints long hairy which envelope lemmas........ 49

48. Lemmas and rachilla joints glabrous, if hairy, then hairs not
enveloping lemmas, or if so, then lemmas with a geniculate awn

49. Lemmas glabrous; rachilla long hairy. 49. Phragmites

49. Lemmas hairy on the back; rachilla glabrous. 6. Arundo

50. Glumes as long as or longer than the lowest floret, often

as long as the spikelet. 7. Avena

50. Glumes usually shorter than the lowest floret, with the

upper floret distinctly exserted. 51

51. Lemmas 5-13 nerved. 51. Avena

51. Lemmas 1-3 nerved. 53

52. Spikelets in a simple, solitary raceme, awned. 38. Lolium

52. Spikelets in panicle, awnless. 50. Poa

53. Inflorescence of digitate secund spikes. 54

53. Inflorescence of paniciles. 55

54. Spikelets without imperfect flowers, awnless. 17. Cynodon

54. Spikelets with 1 or more imperfect flowers, awned. 13. Chloris

55. Lemmas 2-4 lobed or -toothed or - notched at the apex, if entire,

then hairy on the nerves. 56

55. Lemmas usually entire at the apex, obtuse, acute or acuminate;

lemmas 1-3 nerved; inflorescence a panicle or a raceme. 57

56. Spikelets in panicles; perennials. 40. Neyraudia

56. Spikelets in spike - like racemes. 37. Leptochloa

57. Spikelets in open or contracted spicate panicle. 25. Eragrostis

57. Spikelets in digitate or racemosely arranged spikes

or spicate racemes. 58

58. Axis and branches or inflorescence ending in a spikelet. 59

58. Axis of the spike ending in a sharp point. 18. Dactyloctenium

59. Spikelets falling entire, in numerous spikes which are crowded

into a long, narrow, dense or lax panicle. 20. Desmostachya

59. Spikelets breaking up at maturity; spikes few to several. 60

60. Spikes usually in pseudo-whorls or scattered; lemmas with

the lateral nerves running out into minute teeth and the

middle nerve into a mucro or short awn. 1. Acrachne

60. Spikes digitate or subdigitate; lemma entire; spikes persistent. 24. Eleusine

1. ACRACHNE Wt. & Arn. ex Chiov.


1820; FBI 7: 295.1897.
Erect or decumbent-ascending herbs. Leaves 4.0-12.0 x 0.25-1.0 cm, linear, acuminate. Ligule short, fimbriate. Spikelets scattered, pedicellate, ellipsoidal. Spikelets many flowered, brownish and shining. Glumes unequal, acuminate. Lemma 3-nerved, two lateral ones running out into minute teeth, the middle one in form of awn. Caryopsis rugose. **Flowering and fruiting:** August-November. Common in sandy loam soil. Sweta 1493.

2. **ALOPECURUS** L.


Prostrate or decumbent-ascending herbs. Leaves 12.0 x 0.1-0.2 cm, linear, long, acuminate. Ligule fimbriate. Spikelets pedicellate, ellipsoidal. Glumes acute, 0.2 cm long. Lemma truncate, 0.25-0.3 cm long, unawned. Stamens 2-3, anthers yellow. **Flowering and fruiting:** December-April. common on moist, clayey soil on bed of Ganga River in winter and summer season. Sweta 317.

3. **APLUDA** L.


Ascending or erect perennial herbs, upto 1.2 m high. Leaves 8.0-40.0 x 0.5-1.5 cm, linear-lanceolate, long, acuminate. Ligule membranous. Sheath glabrous. Inflorescence a leafy panicle of 2- many simple racemes, each enclosed in a peduncled spathe. Spikelets 3, 1 sessile, 2 pedicellate. Sessile spikelet hermaphrodite. Glumes equal, chartaceous. Upper lemma awned. Caryopsis oblong. **Flowering and fruiting.** August-February. Commonly grows among hedges, in fallow lands and in Kholas. Two distinct forms grow in the area, one tall and the other dwarf in relatively shady places in Kholas. Sweta 167, 178.

4. **ARISTIDA** L.

**Key to species:**

1. Articulation between the lemma and awn near
   the base of column; lower glume always longer than
   the upper one; base of callus pointed; column of the
   awns more than 2.5 cm long........................................... 2. *A. funiculata*

1. Articulation between the lemma and awn absent.................. 2

2. Glumes awned; panicles effuse........................................ 3. *A. hystrix*

2. Glumes not awned.............................................1. *A. adscensionis*

Erect or ascending, annual or perennial grasses. Leaves 5.0-20.0 x 0.1-0.5 cm, convolute. Ligule hairy. Spikelets erect, green, turn to purple at maturity. Glumes unequal, linear-lanceolate, emarginate, acute. Lemma laterally compressed, tripartite awn. Caryopsis linear-oblong. **Flowering and fruiting.** July-October. Common in dry sandy habitats. Sweta 281.


Ascending annual herbs. Leaves 14.0 x 0.1 cm, flat, hairy. Ligule membranous, hairy. Spikelets about 2.0 cm long, green with purple tinge. Lower glume linear-lanceolate, acute, awned; upper one slightly shorter than lower one. Lemma articulated at the top; column twisted, awn branched, twisted. **Flowering and fruiting.** August-November. Included on authority of Murty and Singh (1961b).


Diffusely branched perennial herbs. Leaves 3.0-7.0 x 0.25-0.50 cm, glabrous, acute. Ligule hairy. Rachis angular. Spikelets greenish-brown. Lower glume awned, lanceolate, acuminate; upper one glabrous, toothed. Lemmas subequal. **Flowering and fruiting.** August-November. Included on authority of Murty and Singh (1961b).

5. **ARUNDINELLA** Raddi

**Key to species:**

1. Spikelets small, not more than 2.0 mm long;
   - upper lemma 1.0 mm long; leaf blade
   - elliptic-acuminate, membranous to chartaceous,
   - 3.0 - 25.0 cm long, 5.0 25.0 mm wide;
   - inflorescence a very effuse panicle 10.0 30.0 cm
   - long with many spikelets; annual grasses

2. **A. pumila**

1. Spikelets well above 2.0 m long; leaves not as above;
   - spikelets glabrous or shortly and thinly hairy on the keels
   - of the glumes; panicle 10.0 45.0 cm long; pedicels shorter
   - than or not much longer than the spikelets; perennial grasses

1. **A. nepalensis**
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   Erect, perennial herbs. Leaves 0.75-1.25 cm, hirsute. Ligule membranous. Sheath glabrous. Lower glume acuminate, 3-nerved; upper one 5-nerved. Lower lemma 5-nerved, acute; upper lemma 3-nerved, awned. **Flowering and fruiting.** August-November. Included on authority of Murty and Singh (1961b).


   Tufted, erect, annual hairy grasses. Leaves 6.0 x 2.5 cm, linear-lanceolate, membranous, acuminate. Sheaths ciliate on margins. Panicle 5.0-25.0 cm long, branched effuse. Rachis slender, erect. Spikelets upto 2.0 mm long. Lower glume ovate-lanceolate, acute, 3 nerved; upper glume acuminate, 5-nerved. Lower lemma ovate, obtuse; upper one awned. **Flowering and fruiting.** August-December. Included on authority of Murty and Singh (1961b).

6. *ARUNDO L.*


   Erect, perennial herbs. Leaves 15.0-40.0 x 2.0-4.0 cm, linear-lanceolate, glabrous, acuminate, rounded at base. Ligule a scarious rim. Panicle plumose, about 60.0 cm long. Spikelets brown or purplish, 2-flowered. Glumes subequal, 5-nerved, acuminate, scabrid at keel. Lemma 5-nerved, long hairy. Stamens 2-3. Caryopsis with linear hilum. **Flowering and fruiting.** August-January. Commonly found in moist places especially on dried up beds of Ganga. Sweta 355.

7. *AVENA L.*


   Tufted, erect annual grasses. Leaves 15.0-35.0 x 1.0-2.0 cm, linear-lanceolate, acute. Ligule hairy. Panicles lax, terminal, upto 15.0-20.0 cm long. Spikelets 2.0-3.0 cm long, 2-3 flowered. Rachilla articulated. Glumes lanceolate, acute, white. Lemma bearded, awned. Caryopsis
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8. AXONOPUS P. Beauv.

9. BAMBUSA Schreb. nom. cons.
Tufted, stout, woody, thorny reed-bamboos, up to 15.0 m tall. Stem sheath coriaceous, golden hairy. Leaves 5.0 -15.0 cm long, triangular-lanceolate, acuminate, glandular, densely hirsute, margins ciliate; ligule narrow. Flowers not seen. Flowering and fruiting: Flowers after a long periods. Often found near villages. Sweta 954.

10. BOTHRIIOCHLOA O.Kuntze

11. BRACHIARIA (Trin.) Griseb.
Key to species:
1. Spikelets solitary................................................................. 2
1. Spikelets paired or fascicled, distant or clustered.................. 3
2. Spikelets upto 2.5 mm long, elliptic, turgid.............................. 5. B. villosa
2. Spikelets 3.0 – 4.0 mm long, ovate to lanceolate,
   not turgid........................................................................ 4. B. setigera
3. Spikelets upto 2.0 mm long; lower glume truncate .......................... 3. *B. reptans*
3. Spikelets more than 2.5 mm long; lower glume acute
   to subacute......................................................... 4
4. Distance between the spikelets upto 1.5 mm; sheath
   and blades glabrous; leaf blade entire, with cordate base............. 2. *B. ramosa*
4. Distance between the spikelets 1.0 -2.0 mm; leaves
   less than 10.0 cm long; spikelets acute; pedicels shorter
   than the spikelets...................................................... 1. *B. kurzii*

Erect or decumbent, annual herbs. Leaves 3.0- 8.0 x 0.5-1.5 cm, lanceolate, acuminate, amplexicaul, margins crisped. Ligule beared. Spikelets ovate, glabrous. Lower glume 5-nerved. Upper lemma elliptic-oblong, apiculate. **Flowering and fruiting.** August-November. Often found in sandy habitats in rainy and early winter season. According to Bor (1960) this taxon occurs in Bengal, Bihar and Madras. Sweta 1373, 66.

**Note:** Moulik (1997) stated this species to be distributed in Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, Andhra Pradesh and Tamilnadu between 450-900m. Therefore, its occurrence in Hastinapur Wildlife Sanctuary at a much lower altitude is noteworthy.

Erect or prostrate, branched herbs. Leaves 3.0-12.0 x 0.5- 1.0 cm, ovate-lanceolate, acuminate, rounded at the base. Ligule a ring of hairs. Sheath thinly ciliate. Rachis scabrid, hairy. Spikelets paired, globose, alternate. Lower glume ovate, glabrous; upper pubescent. Lower lemma 5-nerved, glabrous, empty. Upper lemma transversely rugose, apiculate. Caryopsis elliptical, flattened. **Flowering and fruiting.** June-November. Common in cultivated fields and on road sides. Sweta 182, 288.

Tufted, erect, annual or perennial herbs. Leaves 5.0 x 2.0 cm, ovate-lanceolate, acuminate, amplexicaul, glabrous. Ligule a ciliate rim. Sheath ciliate. Panicle shortly peduncled. Spikes secund. Rachis scabrid, trigonous, hairy. Spikelets broadly elliptic, acute, glabrous. Lower glume a small, ovate, triangular scale; upper faintly 5-nerved. Upper lemma mucronate,
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glabrous, shining, rugose, whitish. Lower lemma 5-nerved. Caryopsis about 1.0 mm long, oblong-elliptic, flattened. **Flowering and fruiting.** June-October. Common throughout the sanctuary in mixed habitats. Sweta 1508.


**Note:** According to GrassBase-The Online World Grass Flora (Calyton & Hrman, 2002 onwards), the accepted name for this species is as follows:


Tufted, erect, annual herbs, 20.0-40.0 cm high. Leaves 2.0-4.0 x 0.5-1.2 cm, lanceolate, acuminate, glabrous. Ligule a ciliate rim. Inflorescence consisting of 3-9, secund racemes. Spikelets acute, glabrous. Upper lemma transversely rugose. Caryopsis ellipsoidal, smooth. **Flowering and fruiting.** June-October. Common on sandy exposed soil. Sweta 632.

12. CENCHRUS L.

**Key to species:**

1. Bristles of the involucre retrogressedly scabrid, tenaciously prickly
   1. **C. biflorus**

1. Bristles of the involucre antorsely scabrid,
   not prickly
   2

2. Bristles united only at the base to form a shallow disc;
   base of involucre small, elliptic; inner bristles not very stout at the base; outer ones not more than 1.50 cm long; perennials
   2. **C. ciliaris**

2. Bristles connate above the base a 1.0-4.0 mm long cup
   3

3. Outer bristles numerous, slender, one of the inner bristles longer and stouter than the rest, otherwise very slender, widened into a cup at the base and tapering to a setiform tip more than 1.5 cm long
   3. **C. pennisetiformis**
3. Outer bristles few or absent; none of the inner bristles longer and stouter than the rest, all similar, rigid, flattened and subulate, acute at the tip, upto 5.0 mm long; rachilla scabrid; perennials............................................. 4. C. setigerus

Erect or ascending herbs, about 10.0-60.0 cm high. Leaves 1.0-18.0 x 0.25-1.0 cm, scabrid, acuminate. Ligule a ciliate rim. Spikelets 2, sessile. Lower glume hyaline, lanceolate; upper one ovate. Flowering and fruiting. August-December. Common on sandy exposed soil. Sweta 1531.

Tufted, prostrate, perennial grasses, 25.0-110.0 cm high. Leaves 4.0-23.0 x 0.25-0.5 cm, linear, flat, tapering. Panicle purplish, cylindric. Spikelets oblong-lanceolate. Upper and lower glumes lanceolate, acute, 1-nerved. Flowering and fruiting. August-March. Commonly found in sandy habitats. Sweta 85, 282.

Erect or ascending, perennial herbs, 50.0-60.0 cm high. Leaves 2.0-12.0 x 0.25-0.5 cm, linear, flat, acute, hairy. Ligule a ciliate rim. Panicle cylindric, greenish with purple tinge. Involucre subsessile with numerous ciliate bristles. Rachis wavy. Spikelets 2-4, sessile. Glume membranous. Caryopsis brownish, obovate, truncate. Flowering and fruiting. August-October. Found occasionally in moist, sandy soil. Sweta 68.

Erect or geniculately ascending, perennial herbs, 10.0-60.0 cm high. Leaves 4.0-20.0 x 0.25-0.5 cm, lanceolate, acuminate. Ligule a ciliate rim. Panicle cylindric, greenish with purple tinge. Spikelets 2-3, sessile. Lower glume 1-nerved, hyaline; upper one 5-nerved. Caryopsis dorsally compressed, oblong, smooth. Flowering and fruiting. August-November. Found occasionally in sandy moist soil. Sweta 1585.
13. **CHLORIS** Sw.

**Key to species:**
1. Empty lemmas above the floret 2-4………………………………………1. *C. barbata*
1. Empty lemma above the fertile floret solitary…………………………2. *C. dolichostachya*

Tufted, erect or geniculately ascending, perennial herbs. Leaves 8.0-35.0 x 0.25-0.5 cm, flat, linear, acuminate. Ligule membranous. Spikes 5-12, digitate, slightly purple tinged. Spikelets 3-flowered and 3-awned. Lower glume upto 1.25 mm long; upper glume about 2.0 mm long. Lower lemma ovate-elliptic, pallid, ciliate, awned; upper one much smaller, obovate, awned, glabrous. **Flowering and fruiting.** July-September. Often found in sandy soil near villages. Common on earthen walls and roofs. Sweta 965.

Tufted, erect or geniculately ascending herbs. Leaves 10.0-20.0 x 0.25-1.5 cm, flat, linear. Ligule a ring of hairs. Sheath compressed, keeled. Spikes 6-10, digitate. Rachis trigonous, scabrid. Spikelets 2-flowered, 2-awned, imbricate, lanceolate. Lower glume acuminate, keeled, glabrous; upper one 1-nerved. Lemmas 3-nerved, scabrid, with a 0.75-1.25 cm long awn. Stamens 3. Caryopsis 2-2.5 mm long, enclosed in persistent lemma and palea. **Flowering and fruiting.** August-December. Found in *Kholas*. Sweta 966.

**Note:** According to GrassBase-The Online World Grass Flora (Calyton & Hrman, 2002 onwards), the accepted name for this species is as follows:


Erect or ascending, perennial herbs. Leaves 35.0 x 1.0 cm, linear-lanceolate, acuminate. Ligule a membranous rim. Panicle yellowish-purple. Sessile spikelets longer than pedicellate
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15. **COIX L.**

**Key to species:**
1. Lower glume of the male spikelets hardly or narrowly winged........................................ 2. C. lacryma-jobi
1. Lower glume of the male spikelets distinctly and broadly winged at the apex........................................ 1. C. gigantea


**Note:** According to GrassBase-The Online World Grass Flora (Calyton & Hrman, 2002 onwards), the accepted name for this species is as follows:

**Chionachne gigantea** (Koenig) Veldkamp in Blumea 47:559 (2002).


Annual, marshy herbs. Leaves 6.0-35.0 x 1.5-4.0 cm, ovate-lanceolate, acuminate, glabrous, margins scabrid; ligule membranous; sheath glabrous. Raceme androgynous, solitary. Female spikelet at base, solitary, whitish. Male spikelets 3-nate, imbricate. Lower glume lanceolate-elliptic, keeled; upper glume lanceolate, acuminate. **Flowering and fruiting.** August-November. Grows in marshy habitats. Sweta 967.

16. **CYMBOPOGON** Spreng.


Erect, perennial, aromatic grasses. Leaves 8.0-25.0 x 0.25-0.5 cm, flat, linear, narrowed at base; ligule oblong membranous; sheath glabrous. Inflorescence a panicle, spatheate; internodes and pedicels densely ciliate. Sessile spikelets linear-lanceolate, hermaphrodite,
awned. Pedicellate spikelets, oblong, acuminate. Fruits not seen. **Flowering and fruiting.**
August-December. Found frequently in the sandy habitats and in crevices between concrete slabs near barrage. Sweta 274.


Creeping, perennial grasses. Leaves 2.0-12.0 x 0.25-0.75 cm, linear-lanceolate, acute, glabrous, margins scabrid. Ligule a minute, ciliate rim. Sheath compressed, keeled, hairy at throat. Spikes 2.0-4.0, 2.0-6.0 cm long, spikelets 0.2-0.25 x 0.75-0.1 m crowded, secund. Lower glume linear-lanceolate, acute, 1-nerved; upper one short. Lemmas bidentate, obliquely oblong, keeled. Paleas 2-keeled. Stamens 3. Caryopsis 1.0 mm long, turgid, laterally compressed. **Flowering and fruiting.** January-December. **Local name.** Doob. A dominant species of grasslands, on road sides and in wet habitats. Sweta 756.

18. **DACTYLOCTENIUM** Willd.

**Key to species:**

1. Stoloniferous perennials; anthers more than 1.0 mm long

> 1. *D. scindica*

1. Non-stoloniferous annuals; anthers less than 0.75 mm long; spikes 2.5-6.0 cm long; tip of the rachis shortly produced, up to 2.0 mm long; lemmas acute, cuspidate or mucronate; caryopsis finely rugose

> 2. *D. aegyptium*


Erect or decumbent, annual grasses. Leaves 5.0-18.0 x 0.25-0.5 cm, linear, acute, flat; ligule a ring of white hairs; sheath compressed, glabrous. Spikes digitate. Rachis trigonous, rigid. Glumes subequal, keeled. Anthers yellow. Caryopsis subglobose, light brown or reddish, compressed, rugose. **Flowering and fruiting.** May-November. Common on moist sandy soil; along paddy fields, road sides and on margins of water bodies. Sweta 235.

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Profusely branched, creeping, annual herbs. Leaves 1.0-10.0 x 0.1-0.5 cm, linear, margins hairy. Ligule membranous, hairy. Spikes 3-4, 1.0-2.0 cm long, digitately radiating, falcate, rachis produced into a short mucro. Spikelets 3-9 flowered. Glumes unequal. Upper glume, keeled awned; lower one narrowly winged at keel. Caryopsis ovoid, transversely rugose, brownish. **Flowering and fruiting.** Throughout the year. Commonly found in sandy places, forms a mat on the ground. Sweta 161.

19. **DENDROCALAMUS** Nees


Densely tufted, arborescent bamboos up to 5.0 m tall. Leaves 15.0 x 2.5 cm, linear-lanceolate, rounded at the base, hairy, acuminate; ligule serrate; sheath hairy. Inflorescence a panicle of dense, globular heads. Spikelets spiny, terete, hairy. Glumes hairy, mucronate. Lemma ovate, hairy, sharply spine tipped. Paleas 2-keeled, truncate, hairy. Caryopsis globular, brownish. **Flowering and fruiting.** At the intervals of many years. **Local Name.** Bans, Basahl. Found in dry places near villages. Sweta 955.

20. **DESMOSTACHYA** Stapf


21. **DICHANTHUS** Willemet

**Key to species:**

1. Nodes of the culm glabrous; lower glume of
   - the sessile spikelet ovate, with simple, scattered hairs
   - on the dorsal surface; pedicel of pedicellate spikelet less than half the length of the sessile spikelets
     1. Nodes of the culms densely bearded; lower glume
     - of the sessile spikelet oblong, with bulbous based hairs
     2. *D. caricosum*
on the keels and near the apex; pedicel of the pedicellate
spikelet equal to or more than half the length of the sessile
spikelets................................................................. 1. *D. annulatum*

Erect, perennial, densely tufted grasses. Leaves 4.0-22.0 x 0.25-1.0 cm, linear-lanceolate,
subcordate, acuminate. Ligule about 0.1-0.2 cm long. Raceme 2-6 digitate, greenish or
purplish, joints silky hairy. Glumes equal; lower glume hairy, truncate, 5-nerved, oblong,
keeled; upper 3-nerved, lanceolate, one keeled, awned. Pedicellate spikelets, oblanceolate-spathulate, reduced to empty glume, awned. **Flowering and fruiting.** August- November.
Occurs on roadsides, banks of rivers Ganga and in wasteland. Sweta 180.

Erect, perennial, densely tufted herbs. Leaves 3.0-22.0 x 0.25-1.0 cm, linear-lanceolate,
glabrescent, acuminate. Ligule about 0.1-0.2 cm long, membranous. Raceme 2-6 digitate,
hairy. Sessile spikelets elliptical. Glumes equal; lower ones hairy, 5-nerved, keeled, awned;
upper ones 3-nerved, lanceolate, keeled, awned. **Flowering and fruiting.** August- January.
Occurs in rocky and sandy places. Sweta 1389.

22. **DIGITARIA** Haller nom. cons.

**Key to species:**

1. Hairs on the spikelets always verrucose; culms erect;
leaves all linear; inflorescence 2-6 racemes 4.0-10.0 cm
long; mature fruit purplish; annuals................................. 5. *D. violascens*

1. Hairs on the spikelets, if any, never verrucose......................2

2. Hairs on the spikelets clavate; tips of the pedicels with a
corona of hairs exceeding the summit.................................4. *D. stricta*

2. Hairs on the spikelets not clavate......................................3

3. Lower glume sometimes missing in the upper spikelets,
usually present as minute triangular scale........................... 2. *D. griffithii*

3. Lower glume always present and well developed......................4

4. Racemes mostly 2, divaricate, stiff; spikelets of
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Perennial grasses. Leaf-blades 10-12 cm long; 4.0-8.0 mm wide; flaccid, scabrous, rough on both sides; glabrous, or pilose; with tubercle-based hairs. Ligule an eciliate membrane; lacerate; truncate. Racemes 4; digitate; unilateral; 2.0 -10.0 cm long. Rhachis narrowly winged; angular; scabrous on margins. Spikelets paired, distant. Fertile spikelets pedicelled; pikelets comprising 1 basal sterile florets; 1 fertile florets; without rhachilla extension, lanceolate, dorsally compressed, acute; 2.5-3 mm long; falling entire. Lower glume absent or obscure; shorter than spikelet. Upper glume ovate; 0.75 times length of spikelet; membranous; 3 -veined, surface pubescent; hairy between veins, apex acute. Basal florets barren; without significant palea. Lemma of lower sterile floret elliptic; membranous; 5 -veined; pubescent; hairy between veins; acute. Fertile lemma elliptic, or oblong; 2.5–3 mm long; cartilaginous; 3 -veined. Lemma margins flat; covering most of palea. Lemma apex acute, or apiculate. Palea cartilaginous. Anthers 3; 1.2 mm long. Rarely found in sandy soil. Sweta 452, 463.

Note: According to Moulik (1997) this species is found in Sri Lanka and Southern India. This is, therefore, first record of its occurrence in Northern India. This species can be easily distinguished from other related species of Digitaria by triangular scale like lower glume.
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Erect annual herbs. Leaves 4.0-18.0 x 0.25-0.75 cm, linear-lanceolate, acute, hairy. Ligule membranous. Racemes 10-12, digitate. Rachis winged. Spikelets pedicellate, elliptic-lanceolate, acute. Lower glume ovate; upper one 3-nerved, glabrescent. Lower lemma membranous, minute, triangular, pubescent. Caryopsis lanceolate, brownish. **Flowering and fruiting.** August-November. Found as a weed in cultivated fields. Sweta 1541.


23. **ECHINOCHLOA** P. Beauv. nom. cons.

**Key to species:**

1. Spikelets acuminate to awned, hispid; racemes
   2- several roved, the longest more than 5.0 cm long
   and usually with secondary branches at the base......................2. *E. crus-galli*

1. Spikelets acute to cuspidate, pubescent; racemes less
   than 3.0 cm long, simple.................................................2

2. Spikelets up to 3.0 mm long; racemes distinctly
4-rowed, openly placed, commonly half of their length
apart and half appressed to the axis, sometimes
subverticillate and spreading........................................1. *E. colona*

2. Spikelets up to 3.5 mm long; racemes crowded
with plump, pallid spikelets closely placed to form
a dense, lanceolate head.............................................3. *E. frumentacea*

1. *Echinochloa colona* (L.) Link, Hort. Berol. 2: 209. 1833; GBCIP. 308. f. 34. 1960
(‘colonum’); Fl. Rajasthan 3: 1033.1993; Moulik 1: 98. 1997 (‘colonum’). *Panicum colonum*
L. Syst. Nat. ed.10. 2: 870.1759; FBI. 7: 32. 1897.
Annual, prostrate or decumbent, ascending grasses. Leaves 3.0-22.0 x 0.5-0.75 cm, linear-
lanceolate, flat, acute, flaccid, glabrous. Sheath glabrous, compressed. Racemes distinctly 4
rowed. Spikes sessile, simple. Spikelets crowded, ovoid. Lower glume ovate, 5-nerved; upper
ones acute, 7-nerved. Caryopsis plano-convex, broadly elliptic. **Flowering and fruiting.**
June-November. Commonly found along river banks and in paddy fields. Sweta 278.

Erect annual herbs. Leaves 5.0-25.0 x 0.5-1.0 cm, linear, acute, hairy. Ligule absent. Sheath
glabrous, compressed. Racemes 2-3 together, erect. Rachis 2-nate, hairy with white bulbous
based hairs. Spikelets 2-3-nate, elliptic, acuminate, awned, hispid. Lower glume ovate,
rounded, 5-nerved; upper glume cuspidate, hairy, 7-nerved. Lower lemma awned. Caryopsis
1.25- 1.50 mm long, elliptic. **Flowering and fruiting.** July-November. Found commonly in
paddy fields or in moist shady places. Sweta 1433.
**Note:** In GrassBase the specific epithet is spelled as ‘crusgalli’.

*frumentacea* (Link) Ridl. Fl. Malay Penin. 5: 223. 1925.
Tall erect, robust annual herbs. Leaves 24.0 x 2.0-3.0 cm, linear, acute, scabrid, dentate.
Sheath glabrous, compressed. Ligule absent. Spikelets 3-4-nate, acute, yellowish, hairy.
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Lower glume ovate, acuminate, hairy; upper ones with sacbrid nerves. Lower lemma empty; upper ones acuminate. Caryopsis plano-convex polished, light-brown or yellowish.

**Flowering and fruiting.** July-November. Found commonly in paddy fields and in swampy areas. Sweta 233, 267, 426, 589.

24. **ELEUSINE** Gaertn.

**Key to species:**

1. Spikes less than 0.75 cm wide, slender, straight, nearly glabrous at the base; spikelets elliptic, disarticulating between the florets; caryopsis elliptic to oblong, obtusely trigonous, not exposed when ripe ............................................................. 2. *E. indica*

2. Spikes more than 1.0 cm wide, stout, incurved, hairy at the base; spikelets ovate, non shattering, very closely over-lapping; caryopsis globose, exposed when ripe ............................................................. 1. *E. coracana*


Erect, tall, annual herbs. Leaves 2.5-18.0 x 0.25-0.75 cm, acute, hairy. Ligule ring of hairs. Sheath compressed, membranous. Spikes 4-10 subdigitate, erect. Spikelets ovate-elliptic, 4-5 flowered, awnless. Glumes unequal, membranous. Lower glume lanceolate, 1-nerved; upper glume 2-5 nerved. Lemmas broadly ovate, obtuse, winged keel. Stamens 3. Caryopsis smooth, globose, brown or blackish. **Flowering and fruiting.** August-November. Included on authority of Murty and Singh (1960a).


25. **ERAGROSTIS** N. M. Wolf
Key to species:

1. Spikelets breaking up from apex downwards at maturity;
   rachis fragile ........................................... 2

1. Spikelets breaking up from below upwards at maturity;
   rachis tough ........................................... 3

2. Lemma ciliate on margins .................................. 3. E. coarctata

2. Lemma eciliate on the margins .................................. 3

3. Keels of the palea more or less ciliate ....................... 4

3. Keels of the palea scabrid or smooth, eciliate; panicles
   oblong or linear; branches not capillary; lemmas less
   than 1.0 mm long ........................................... 5. E. japonica

4. Panicle compact and dense; lemmas ciliate on keels;
   stamens 2; annuals .......................................... 2. E. ciliaris

4. Panicle effuse; lemmas eciliate on the keel;
   culms and leaves not viscous; panicles loose, with
   spreading branches; axis more or less bearded
   at the nodes ........................................... 10. E. tenella

5. Plants glandular ........................................... 6

5. Plants eglandular ........................................... 7

6. Lowest branches of panicle fascicled or subwhorled,
   with pitted glands just above and below the lowest
   node and also with glandular band below culm-nodes;
   palea deciduous .......................................... 9. E. pilosa

6. Lowest branches of panicle not whorled; glandular bands
   below the culm-nodes absent; palea persistent; fresh plants
   without any specific odour; pedicels of spikelets
   with crateriform glands .................................. 6. E. minor

7. Spikelets broadly ovate to ovate-oblong .......................... 12. E. unioloides

7. Spikelets narrowly oblong or linear .......................... 8

8. Lemmas up to 1.5 mm long .................................. 9

8. Lemma more than 1.5 mm long ................................ 11

9. Stamens 2; spikelets more than 10 flowered; lemmas
   acute to subacute, with overlapping margins .................. 4. E. gangetica

9. Stamens 3 .................................................. 10

10. Spikelets slatey - grey to black; caryopsis about
    0.75 mm long, truncate at both ends, slightly grooved
dorsally .................................................. 7. E. nigra

10. Spikelets grey or purple; caryopsis about 0.5 mm
    long, cylindrical, smooth .................................. 1. E. atrovirens

11. Annuals; pedicels over 5.0 mm long; lemmas
broadly ovate; stamens 2 ...................................................... 11. *E. tremula*

11. Perennials; stamens 3; lemmas less than 1.75 mm

   long; panicle contracted; spikelets less than 1.0 mm wide,

crowded, packed, straight; lemmas oblong, acute, lateral

nerves straight ...................................................... 8. *E. nutans*


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Tall erect, annual or perennial grasses. Leaves 5.0-12.0 x 0.25-0.5 cm, linear, flat or inrolled. Ligule a short hairy rim. Sheath glabrous. Inflorescence a panicle. Spikelets 10 flowered, linear. Glumes subequal, ovate-lanceolate, acute. Lemma boat shaped, acute. Palea-scabrid. Stamens 2. Caryopsis subglobose, reddish brown. **Flowering and fruiting.** August – December. Commonly found in moist habitats along the river banks and on sandy river bed. Sweta 588.


Erect, tufted, annual or perennial grasses. Leaves 5.0-20.0 x 0.25-1.0 cm, linear, acute, glabrous. Ligule a scarious rim. Sheath glabrous. Panicles linear, greenish-purple. Spikelets 4-8 flowered, linear. Glumes subequal, ovate, oblong, 1-nerved. Lemma ovate, obtuse, 3-nerved, about 1.0 mm long. Palea with smooth keels. Stamens 3. Caryopsis obovoid, polished, brown. **Flowering and fruiting.** August-March. Commonly found in moist places along the river banks, sandy river beds and in paddy fields. Sweta 134.


Erect tufted slender annual grasses. Leaves 2.5-8.0 x 0.25-0.5 cm, linear-lanceolate, acute; ligule hairy; sheath glandular. Panicles 8.0-12.0 cm long, stiff with short pedicels. Pedicels with crateriform glands. Spikelets 4-10 flowered, green with purple tinge. Glumes subequal, ovate. Lemmas obtuse, keel glandular. Palea-keeled. Stamens 3. Caryopsis dorsally flattened, brown. **Flowering and fruiting.** September-March. Commonly found in the moist places in cultivated fields. Sweta 1455.


Erect tufted perennial grasses. Leaves 10.0-22.0 x 0.25-0.5 cm, linear, flat, acute; sheath glandular; ligule a ciliated rim. Spikelets slaty-greyish to black. Glumes subequal, ovate.
Lemmas ovate, acute. Palea keeled, scabrid. Stamens 3, yellow. Caryopsis slightly grooved dorsally. **Flowering and fruiting.** July-November. Commonly found in the moist places and on margins of swamps. Sweta 1584.


Erect or decumbent-ascending, weak annual grasses. Leaves 4.0-12.0 x 0.25-1.0 cm, linear-lanceolate, acuminate; sheath glabrous; ligule a scarious rim. Spikelets 4-10 flowered, greenish. Rachilla scabrous, fragile. Glumes subequal, ovate-lanceolate, 1-nerved. Lemmas ovate, oblong, 3-nerved. Palea keeled, hairy. Stamens 3. Caryopsis oblanceolate, polished, brown. **Flowering and fruiting.** June-December. Commonly found in the moist places along the river banks. **Sweta** 155, 308.

**Note:** J. F. Veldkamp (2002) in a revision of genus *Eragrostis* in Malesia pointed out that *Eragrostis amabilis* (L.) Nees was the correct name for *E. tenella* (L.) Roem. & Schult. Since, full paper was not available to me, therefore, I have retained *E. tenella*, the name currently in vogue. Moreover, in GrassBase *E. tenella* is still the accepted name for this species.

Tufted erect annual grasses. Leaves 5.0-18.0 x 0.25-0.75 cm, linear-lanceolate, flat, acute, hairy; ligule a minute line of hairs; sheath beared at mouth. Spikelets 8 to many flowered, linear. Glumes subequal, obtuse, 1-nerved. Lemmas about 3.0 mm long, broadly-ovate. Palea with scabrid keel. Stamens 2. Caryopsis brownish yellow, globose. **Flowering and fruiting.** August-October. Common in wet habitats. Sweta 348.


Slender, erect or ascending, tufted, annual grasses. Leaves 5.0-15.0 x 0.25-0.5 cm, linear-lanceolate, base rounded, glabrous; ligule a scarious rim; sheath smooth. Spikelets many flowered, straw-coloured, purple tinged, broadly-ovate or ovoid-oblong. Glumes ovate-lanceolate, subequal or unequal, acute, 1-nerved. Lemmas acute, elliptic, paniculate, glabrous. Palea bidentate, keeled. Stamens 3. Caryopsis obovoid, laterally compressed, pale-brown. **Flowering and fruiting.** July-November. Common in sandy soil; found in agricultural fields. Sweta 361.

26. **ERIANTHUS** Michx.


Tall tufted, glabrous, perennial herbs. Leaves linear, margins scabrid; sheath glabrous; ligule a rim of hairs. Spikelets paired, ovate-lanceolate, awned, one sessile, other pedicellate. Callus bearded with creamish-white hairs. Lower glume ovate-lanceolate, 2-dentate, hairy; upper glume lanceolate, acuminate. Lower lemma empty, 1-nerved; upper lemma long, glabrous, awned. **Flowering and fruiting.** September-January. Commonly found on roadsides and dry sandy habitats. Sweta 355.

**Note:** According to GrassBase the accepted for this species is follows:

**Saccharum ravennae** (L.) Murr. Syst. ed. XIII. 88 (1774).

27. **ERIOCHLOA** H. B. K.

Tufted, erect annual grasses. Leaves 4.0-22.0 x 0.25-1.0 cm, flat, ovate-lanceolate, acute; sheath glabrous, membranous; ligule a scarious rim. Spikelets acute, slightly hairy. Lower glume absent; upper glume acute, awnless. Lemma mucronate. Caryopsis compressed, smooth, lenticular. **Flowering and fruiting.** September-November. Found frequently in moist and marshy places; especially in water logged areas. Sweta 136, 360, 630.

**28. EULALIOPSIS** Honda


Tufted, erect, perennial grasses, rootstock thick, woody, rhizomatous. Leaves 10.0-50.0 x 0.25-0.50 cm, folded; sheath glabrous, ciliated at mouth; ligule a scarious rim. Racemes 2-4, whitish-brown, unequal, hairy. Sessile spikelets lanceolate. Lower glume lanceolate, 2-3 toothed, hairy; upper glume obtuse, hairy, keeled. Lower lemma lanceolate, oblong, 1-nerved; upper lemma hermaphrodite, bidentate, awned. Caryopsis linear-oblong, free. **Flowering and fruiting.** September-January. Included on authority of Murty and Singh (1961b).

**29. HACKELOCHLOA** O. Ktze.


Tufted, erect, hirsute, annual grasses. Leaves 4.0-15.0 x 0.5-1.0 cm, linear-lanceolate, acute, hirsute; ligule a scarious rim. Racemes spatheate, spiciform. Sessile spikelets globular. Pedicelled spikelets ovate-lanceolate, acute. Glumes subequal; lower glume rounded, pitted, tubercled; upper glume obtuse, oblong, 3-nerved. Lower lemma empty; upper lemma hermaphrodite, obtuse. Caryopsis about 1.5mm long. **Flowering and fruiting.** July-October. Included on authority of Murty & Singh (1961b). This taxon is common in forests of Najibabad.

**30. HEMARTHRIA** R. Br.

Prostrate or ascending, slender, perennial herbs. Leaves 2.0-15.0 x 0.1-0.5 cm, linear, acute, rounded or subcordate at base, glabrous; sheath ciliated at base, hairy at mouth; ligule a scarious rim. Racemes solitary, compressed. Sessile spikelets elliptic-oblong. Pedicelled spikelets acute. Glumes subequal; lower glume bidentate, lanceolate, ciliolate, winged; upper glume acute, membranous. Lower lemma empty; upper lemma hermaphrodite. Flowering and fruiting. July-November. Common in moist and marshy localities. Sweta 98.

31. HETEROPOGON Pers.

Erect or decumbent-ascending perennial herbs. Leaves 5.0-22.0 x 0.25-0.5 cm, linear, acuminate, hairy; sheath compressed, keeled, ciliated at mouth; ligule a scarious rim. Lower sessile spikelets male or neutral, awnless; upper spikelets hermaphrodite, awn brown. Glumes subequal. Lower glume lanceolate, eglandular, hirsute, glandular, awned; upper glume linear, truncate, acuminate, glabrous. Lower lemma empty; upper lemma hermaphrodite, awn brownish, twisted, hirsute. Caryopsis oblong, terete. Flowering and fruiting. August-November. Common in wastelands, along road sides and in Kholas. Sweta 323.

32. HYGRORYZA Nees

Hydrophytic herbs. Leaves 4.0 x 2.0 cm, oblong, base rounded, wavy; sheath inflated; ligule membranous. Spikelets sessile or shortly pedicellate. Lemma tapering into long scaberulous awn. Flowering and fruiting. October-February. Often found floating in ponds, ditches and near banks of the river Ganga etc. Sweta 131.

33. IMPERATA Cyr.

Tall, erect, perennial herbs. Leaves 4.5-12.0 x 0.25-0.5 cm, linear, flat, hairy; ligule a scarious rim; sheath glabrous. Inflorescence silvery-white, dense. Spikelets linear lanceolate, acute.
Lemmas hyaline, oblong, empty, denticulate. Callus bearded with white, soft hairs exceeding spikelets. Stamens 2. **Flowering and fruiting.** Almost throughout the year. Commonly found in moist and marshy places. Sweta 93, 905.

34. **ISACHNE** R. Br.

**Key to species:**
1. Spikelets 2.0 - 2.5 mm long; leaves not particularly rigid; pedicels glandular.......................... 2. *I. himalaica*
1. Spikelets about 1.5 mm long; leaves stiff; pedicels eglandular........................................... 1. *I. albens*

Perennial grasses, up to 60.0 cm high, erect, tufted, glabrous. Leaves linear-lanceolate, scabrid along margins, up to 15.0 x 0.5 cm; sheath loose, glabrous; ligule a rim of hairs. Panicles up to 20.0 cm long, solitary-terminal, spreading. Spikelets globose, 2.0 - 4.0 mm long, 2-flowered. Glumes sub-equal, many nerved. Lemmas cartilagenous, obtuse, pubescent. Stamens 3. Stigma plumose. Caryopsis orbicular, glabrous. **Flowering and fruiting:** Major part of the year. Occasionally found in swampy habitats. Sweta 519.

Perennial herbs up to 30.0 - 60.0 cm long. Leaves linear; 3.0 - 13.0 cm long; 4.0 - 9.0 mm wide, surface scabrous; glabrous, margins cartilaginous; sheaths glabrous; ligule a fringe of hairs. Spikelets orbicular, dorsally compressed, 1.8 - 2.5 mm long. Glumes deciduous; lower glume ovate, 1.8 - 2.5 mm long, membranous, smooth, or scabrous, obtuse; upper glume ovate, 1.8 - 2.5 mm long, membranous, smooth, obtuse. Lemma of lower sterile floret ovate, 1.5 mm long. Anthers 3. Caryopsis with adherent pericarp. **Flowering and fruiting:** September-October. Included on authority of Murty & Singh (1961b). According to Moulik (1997) this taxon occurs between 1000-1500 m.

35. **ISCHAEMUM** L.

Erect, annual herbs. Leaves 5.0 - 25.0 x 0.25-1.0 cm, linear-lanceolate, acuminate, hairy. Ligule truncate. Sheaths inflated. Racemes in pairs, erect, yellowish. Sessile spikelets, rugose, whitish-purplish. Lower glumes coriaceous, ridged, 2 keeled, margins inflexed; upper glume oblong-lanceolate, keeled. Lower lemma lanceolate, acute, hyaline, ciliate; upper lemma
hermaphrodite, oblong, awned. Lower glume winged; upper glume without winged keel. **Flowering and fruiting.** September- December. Found near the moist places and on the margins of water bodies. Sweta 1467.

36. **LEERSIA** Soland. ex Sw. nom. cons.


**Note:** According to distribution range, in India, of this taxon as given by Moulik (1997) this is first record of its occurrence in Uttar Pradesh.

37. **LEPTOCHLOA** P. Beauv.

**Key to species:**

1. Lemmas acuminate; anthers 0.25-0.5 mm long...................2. *L. panicea*

1. Lemmas acute to obtuse; anthers

0.5-0.75 mm long................................................. 1. *L. chinensis*


Annual grasses, upto 100.0 cm tall; culms erect from the geniculate base. Leaves 20-40 cm long. Ligule lacerate. Panicle about 30.0 cm long, branches erect or patent. Spikelets 4-6 flowered. Lower glume lanceolate, subulate. Upper glume lanceolate. Lemmas lanceolate. Caryopsis trigonous, rugose. **Flowering and fruiting.** September- December. Found near the moist places. Sweta 103.


Erect or geniculately ascending, annual herbs. Leaves 20.0 x 0.5 cm, linear-lanceolate, acuminate, hairy; sheath compressed, hairy; ligule a scariosum rim. Racemes filiform. Spikelets 2-3 flowered, green, overlapping. Lower glumes linear, acute mucronate, 1-nerved; upper glume lanceolate, acute or acuminate, oblong. Lemmas obovate, obtuse, hairy, 2-lobed. **Flowering and fruiting.** July- December. Rare, in paddy fields. Sweta 1534.
38. LOLIUM L.
Tufted, erect, annual grasses, 20-50 cm tall. Leaves 5.0-22.0 x 0.25-1.0 cm, linear-lanceolate, acuminate, auricled; sheath glabrous; ligule a scarious rim. Spikelets upto 10 flowered, elliptic-oblong. Lower glumes absent; upper glume lanceolate, obtuse, 5-9 nerved, equaling or exceeding the spikelet. Lemmas elliptic-oblong, turgid, awn 1.5-2.0 cm long. **Flowering and fruiting.** January-July. Found as a weed in cultivated fields especially in wheat fields. Sweta 1382.

39. NARENGA Bor
Tufted, erect, perennial grasses. Leaves 0.25-0.75 cm broad, linear-lanceolate; sheath hairy; ligule a scarious rim. Sessile spikelets golden-brown, lanceolate, rounded base. Lower glumes hairy; upper glume ciliated. Lower lemma empty, flat, ciliated. **Flowering and fruiting.** August-November. Found in open wastelands. Sweta 1542.
Note: According to GrassBase the accepted name for this species is as follows:
_Saccharum narenga_ (Nees ex Steud.) Hack. in DC., Monogr. Phan. 6:19 (1889).

40. NEYRAUDIA Hook. f.
Tall, erect, glabrous, perennial herbs. Leaves linear, filiform, up to 0.5 cm broad, rolled; ligule a ring of hairs; sheath glabrous, throat hairy. Spikelets compressed, florets 5-6. Lower glume lanceolate, mucronate. 1-nerved; upper glume slightly longer. Lemmas 3-nerved, awned. Palea shortly bi-dentate, keeled. **Flowering and fruiting:** January- June. Common in _Kholas_. Sweta 299, 671, 743.

41. OPLIS M E N U S P. Beauv. _nom. cons._
Key to species:
1. Rachis and pedicels with long hairs; awns pale,
Prostrate or decumbent-ascending, annual herbs. Leaves 3.0 x 2.0 cm, ovate-lanceolate, acute, hairy; ligule a scarious rim. Spikelets lanceolate, secund, acute, 2-3 nate, pubescent. Lower glumes ovate-lanceolate, silky hairy, 3-nerved, brown, awn barbellate; upper glume ciliate, 5-nerved. Lower lemma ovate, acute, hairs, 8-nerved; upper lemma acute. **Flowering and fruiting.** July-November. Common in shady, grassy localities. Sweta 42, 140.

Annual, decumbent-ascending herbs. Leaves 10.0 x 2.0 cm, linear-lanceolate, acute, hairy; sheath hairy; ligule ciliate. Spikelets lanceolate, secund, acute, 2-3 nate, purple tinged. Lower glumes ciliate, scabrid, 5-nerved, reddish, viscid, awn smooth; upper glume ciliate or hairy, 9-nerved, awned. Lower lemma ovate, acute, empty, 8-nerved, membranous; upper lemma acute. Caryopsis dorsally compessed. **Flowering and fruiting.** August-November. Rare, in wet and shady localities. Sweta 1533.

42. ORYZA L.
Marshy or aquatic perennial herbs. Leaves 25.0 x 1.0 cm, linear-lanceolate, acute, hairy; sheath glabrous, compressed; ligule membranous. Spikelets deciduous. Sterile lemma 1-nerved, keeled. Fertile lemma hispid, having a conical callus, awn scabrid. Caryopsis compessed. **Flowering and fruiting:** September-December. Occasionally, found near marshy habitats. Sweta 217.

43. PANICUM L.
**Key to species:**
1. Upper lemma finely transversely rugose........................................ 2. *P. maximum*
1. Upper lemma quite smooth and shining.......................... 2
2. Aquatic grasses; culms soft, spongy, green floating;
   spikelets narrowly lanceolate............................................ 4. *P. paludosum*
2. Terrestrial grasses of sandy or moist habitats; culms
   not spongy; spikelets oblong, ovate-oblong to elliptic,
   mostly obtuse.................................................................... 3
3. Lower glume quarter to half the length of spikelet;
   root stock villous-hairy, stout, creeping; lower florets
   neuter.............................................................................. 1. *P. antidotale*
3. Lower glume one-half to three-quarter the length
   of spikelet or more; root-stock woody; leaves deeply
   cordate at the base; ligule obscure, with long soft hairs;
   spikelets obtuse.................................................................. 3. *P. notatum*

Stout, creeping, perennial herbs. Leaves 10.0-50.0 x 0.75-1.0 cm, linear-lanceolate, acute,
hair; sheath glabrous; ligule membranous. Spikelets ovoid, acute, glabrous. Lower glume
broadly ovate, 5-nerved. Lower lemma hairy, 5-7 nerved; upper lemma pallid or dull.
**Flowering and fruiting:** October-February. Found commonly in sandy localities. Sweta 305.

   1997.
Stout, erect, perennial herbs, more than 2.0 m in height. Leaves 50.0 x 2.5 cm, linear-
lanceolate, acuminate, softly hirsute; sheath glabrous, compressed, keeled, hairy; ligule
membranous, hairy. Spikelets oblong, obtuse, acute, glabrous. Glumes unequal. Lower glume
transparent; upper glume 4-7 nerved. Lower lemma hairy; upper lemma transversely rugose.
Caryopsis about 1.0 mm long, pallid. **Flowering and fruiting:** March-November. Found
along the water streams. Sweta 1396.

Tall, erect, tufted, perennial herbs with woody rootstock. Leaves 12.0 x 2.0 cm, lanceolate,
acuminate, deeply cordate, softly hairy; sheath compressed, hairy; ligule obscure. Spikelets
elliptic-oblong, obtuse, 1-2-nate, acute, glabrous. Glumes unequal. Lower glume ovate-
lanceolate, acute, 5-nerved, sparsely hairy; upper glume acute. Lower lemma obtuse, ovoid, empty; upper lemma brown, coriaceous. **Flowering and fruiting:** August-November. Found in moist places. Sweta 224, 373.

Hydrophytic herbs. Leaves linear, flat, glabrous; sheath prominently veined; ligule membranous, finely dissected. Spikelets ovate-lanceolate, acuminate. Lower glume cup like; upper glume ovate-lanceolate, acute. **Flowering and fruiting:** August-November. Commonly found in marshy places, along river banks and in stagnant water. Sweta 132.

44. PASPALIDIUM Stapf

**Key to species:**
1. Upper lemma rugulose; lower floret sterile
   - without palea................................................................. 3. *P. punctatum*
2. Leaves acuminate; sheaths compressed, keeled, ciliate;
   - racemes usually less than their own length apart; spikelets
   - planoconvex................................................................. 2. *P. geminatum*

Tufted, erect or decumbent-ascending, perennial herbs. Leaves 20.0 x 1.0 cm, flat, obtuse, glabrous; sheath terete, hairy at throat; ligule a ring of hairs. Spikelets ovoid-ellipsoidal, obtuse, sessile. Lower glume suborbicular, 5-nerved; upper glume ovate, 7-nerved. Lower lemma ovate, acute, 5-nerved; upper lemma granular, acute. Caryopsis ovoid, 1.5-2.5 mm long. **Flowering and fruiting:** August-November. Commonly found in marshy places. Sweta 1550.

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Creeping perennials. Leaves linear, acuminate, up to 18.0 x 1.0 cm. Spikelets about 2.0 mm long, ovate-acute. Glumes unequal. Lower lemma equal to spikelet, coriaceous, shining.

**Flowering and fruiting:** September- April. Found in wet habitats. Sweta 133.


Tufted, erect, glaucous, perennial herbs. Leaves 20.0 x 1.0 cm, convolute, obtuse, scabrid margins; sheath hairy at throat; ligule a short hairy rim. Spikelets ovate-oblong, obtuse, glabrous. Lower glume membranous, 5-nerved; upper glume ovate. Lower lemma ovate, acute, sterile, without palea; upper lemma rugulose, acute. Caryopsis ovoid, compressed.

**Flowering and fruiting:** August-November. Rare, in marshy places. Sweta 1399.

45. **PASPALUM** L.

**Key to species:**

1. Spikelets rotundate-elliptic, broadly obovate-elliptic to
   almost orbicular, obtuse; upper glume papery, glabrous.................. 2. *P. scrobiculatum*

1. Spikelets broadly elliptic to ovate –elliptic, acute; upper
glume herbaceous, mostly pubescent.................................2

2. Erect or geniculate grasses; racemes up to 10.0 cm long;
   spikelets elliptic, twice as long as broad; upper glume
   pubescent; lower lemma with a prominent middle nerve ...........1. *P. paspaloides*

2. Prostrate grasses, with stem rooting at the nodes;
   racemes less than 4.0 cm long; spikelets broadly lanceolate,
   three times as long as broad; upper glume glabrous; lower
   lemma with faint middle nerve....................................... 3. *P. vaginatum*


Marshy, creeping, annual herbs. Leaves 2.0-12.0 x 0.25-1.0 cm, linear-lanceolate, sparsely hairy; ligule short, membranous; sheath ciliate, hairy margins. Spikelets 2-3 seriate, elliptic, acute, green, seced. Upper glume pubescent, acute, 5-nerved. Lower lemma 3-nerved, glabrous; upper lemma smooth, greenish white. Caryopsis ovoid. **Flowering and fruiting:** September-March. Commonly found in marshy habitats and near water bodies. 133, 333.

**Note:** According to GrassBase the accepted name for this species is as follows:

*Paspalum distichum* L. Syst. Nat. ed. 10, ii. 855 (1759).

Erect, perennial herbs. Leaves 15.0-20.0 x 0.75-1.0 cm, linear, white margined, pubescent; sheath glabrous, keeled, compressed. Spikelets whitish, biseriate, secund, elliptic-rounded or obovate. Lower glume absent; upper glume papery, glabrous, 3-6 nerved. Lower lemma 3-5 nerved, epaleate; upper lemma brown. Stamens 3. Caryopsis light brown, smooth, subglobose. **Flowering and fruiting:** July-November. Commonly found near the ponds and ditches. Sweta 230.


Prostrate, rhizomatous, perennial herbs. Leaves 12.0 x 0.50-0.75 cm, linear, acuminate; sheath bearded at mouth; ligule short, membranous. Spikelets broadly lanceolate, subsessile, flattened, glabrous. Lower glume absent; upper glume membranous, glabrous. Lower lemma epaleate; upper lemma acute. Caryopsis light-brown, smooth, elliptic. **Flowering and fruiting:** July-November. Found commonly near the ponds, ditches and water bodies. Sweta 910.


Erect, annual herbs. Leaves 12.0 x 1.0-3.0 cm, linear-lanceolate, acuminate, hairy; sheath hairy at mouth; ligule a ring of short white hairs. Spikelets ovate-elliptic. Lower glume minute, ciliate, orbicular; upper glume absent. Lower lemma 3-nerved, ciliate, obtuse; upper lemma hermaphrodite, 5-nerved. Palea 2-3 toothed, ciliated. Caryopsis brown, smooth. **Flowering and fruiting:** August-November. **Local Name.** Bajra. Widely cultivated in the area, also found as an escape. Sweta 375.

47. **Perotis** W. Ait.

Erect-ascending herbs. Leaves 12.0 x 1.0-3.0 cm, linear-lanceolate, acuminate, hairy; sheath hairy at mouth; ligule a short scarious rim. Spikelets linear-lanceolate, 1-flowered, 2-awned, awns usually purplish. Glume equal, hairy on dorsal surface. Stamens 3. Caryopsis smooth, cylindrical. **Flowering and fruiting:** August-October. Found commonly in sandy soil, open dry waste places and *Eucalyptus* plantations. Sweta 150, 197.

48. **PHALARIS L.**


Erect or decumbent-ascending, annual herbs, upto 100.0 cm tall. Leaves 20.0-25.0 x 1.0-1.50 cm, linear-lanceolate, acuminate, glabrous; sheath compressed; ligule a scarious rim. Spikelets oblong, compressed. Glumes equal in size, broadly winged, keeled, apiculate. Lower lemma absent; upper lemma fertile, broadly ovate-lanceolate, 5-nerved, acute, shining. Palea lanceolate, 2-keeled, hairy. Caryopsis smooth, brown. **Flowering and fruiting:** August-October. Commonly found in agricultural fields, especially wheat fields, sandy soil and semi-dried bed of the river Ganga. The specimens collected from agricultural fields are as rule erect and taller, while those collected from the bed of Ganga are smaller and prostrate or ascending. Sweta 59, 684.

49. **PHRAGMITES Trin.**


Erect, perennial herbs, culms hollow. Leaves 40.0-50.0 x 2.0-3.0 cm, linear-lanceolate, acuminate, coriaceous; sheath with a hairy throat; ligule a ciliate ridge. Spikelets hermaphrodite. Lower glume lanceolate, acute, glabrous; upper glume apiculate. Lemmas hermaphrodite, narrower upwards. Stamens 3. Caryopsis oblong, free. **Flowering and fruiting:** Winter season. Most dominant species in swamps. Sweta 367.

50. **POA L.**


Erect or decumbent-ascending, flaccid, light green, annual herbs. Leaves 1.0-8.0 x 0.25-0.5 cm, linear-lanceolate, margins scabrid; sheath compressed; ligule ovate, rounded. Spikelets lanceolate oblong, obtuse, 3-5 flowered. Lower glume lanceolate, glabrous, 1-nerved; upper glume ovate-lanceolate, 3-nerved. Lemma oblong, obtuse. Palea truncate, ciliate keels.
Stamens 3. Caryopsis ellipsoidal. **Flowering and fruiting:** Almost throughout the year. Common weed in irrigated fields, along water streams. Sweta 70, 956.

**51. POLYPOGON** Desf.

**Key to species:**

1. Callus short or obsolete; awn 0.4 – 1.0 cm long.......................... 1. *P. monspeliensis*
2. Callus prominent; awn 0.15 – 0.3 cm long.......................... 2. *P. fugax*


Erect or decumbent-ascending, annual herbs. Leaves 0.75-1.0 cm broad, linear-lanceolate; sheath glabrous; ligule a scarious rim. Spikelets lanceolate, greenish, hispid. Glumes equal, lanceolate, glabrous, bidentate, ciliate. Lemma oblong, obtuse, hairy, 5-toothed. Palea truncate, 2-toothed. Stamens 3. Caryopsis ellipsoidal. **Flowering and fruiting:** Almost throughout the year. Occasionally found in swampy localities. Sweta 885.


Prostrate or decumbent-ascending, annual herbs. Leaves 3.0-12.0 x 0.25-0.75 cm, linear-lanceolate, flat, acute; sheath glabrous; ligule 2-3 mm long. Spikelets linear-lanceolate, greenish-yellow. Glumes equal, lanceolate, notched at apex, hairy margins, awn antorsely barbellate. Lemma oblong, hairy, 5-toothed, 5-nerved, awned. Palea truncate, 2-toothed. Stamens 3. **Flowering and fruiting:** Almost throughout the year. Commonly found in moist and shady localities. This plant shows a great deal of variation as regards the size of plant, inflorescence and number of spikelets. Sweta 98, 685.

**52. SACCHARUM** L.

**Key to species:**

1. Leaves petiolate, base with a narrow wing on either side of the mid nerve; peduncles hairy below the panicles; rachis very fragile; lower glume of the sessile spikelets glabrous on the back.................................................. 2. *S. spontaneum*
2. Leaves neither petiolate nor winged at the base; peduncles glabrous below the panicles; rachis not so fragile; lower glume of sessile spikelets hairy on the back.................................. 1. *S. bengalense*

Erect, tall, perennial herbs, stem solid. Leaves 50.0-70.0 x 1.0-2.0 cm, linear-lanceolate, glaucous, acuminate, scabrid margins; sheath silky; ligule a ciliate rim. Panicle silvery-white, woolly. Sessile spikelets linear-lanceolate. Glumes equal; upper glume acuminate, glabrous; lower glume acute, empty. Lower lemma hairy, acute, membranous, empty; upper lemma hermaphrodite, ciliated margins, acuminate. Stamens 3. Caryopsis oblong, brown.

**Flowering and fruiting:** November-March. Local name: *Moonj*. Commonly found along the river banks and in moist places. 1463.


Erect, tall, rhizomatous, glabrous, perennial herbs. Leaves 70.0-90.0 x 1.0-1.25 cm, linear, folded, acute, glaucous, margin scabrid; sheath hairy; ligule membranous, somewhat triangular. Panicle slivery white, ciliated. Sessile spikelets linear-lanceolate. Lower glume lanceolate, glabrous, sharply acute, brown; upper glume acuminata. Lower lemma empty, hyaline, ovate-lanceolate, ciliated; upper lemma awned, hermaphrodite. Stamens 3. Caryopsis oblong. **Flowering and fruiting:** Almost throughout the year. **Local Name.** Sweta 162.

53. **SETARIA** P. Beauv. *nom. cons.*

**Key to species:**

1. Panicle cylindrical, dense or often lobulate; leaves
   - not plicate................................................................. 2

2. Panicle lax, effuse, with branched primary branches;
   - involucre bristles not more than twice as long as spikelets;
     - leaves plicate...................................................... 3. *S. palmifolia*

3. Involucre-bristles retrorsely barbed........................................ 5. *S. verticillata*

4. Involucre-bristles antorsely barbed; upper lemma rugose
   and shorter than the upper glume......................................... 4

5. Panicle spiciform, lobulate.................................................. 4. *S. tomentosa*

6. Panicle cylindric, dense; spikelets about 0.3 cm long;
   - upper lemma slightly keeled at the top.................................. 2. *S. glauca*
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Perennial, rhizomatous herbs. Leaves 2.5-7.0 x 0.25-0.5 cm, linear, acute, flat, hairy; sheath glabrous, keeled; ligule a stiff rim of short hairs. Lower glume hyaline, acute, 3-nerved; upper glume hyaline, 5-nerved. Lower lemma 7-nerved; upper lemma transversely rugose. **Flowering and fruiting:** August-October. Commonly found in agricultural fields. 243, 540.

**Note:** According to GrassBase the accepted name for this species is as follows: Pennisetum polystachion (L.) Schult. Mant. ii. 146 (1824).

Basionym: Panicum polystachion L. Syst. ed. X. 870 (1759).


Erect or decumbent-ascending, annual herbs. Leaves 5.0-20.0 x 0.75-1.0 cm, linear, acuminate, margins scabrid; sheath compressed, smooth, keeled; ligule a ring of hairs. Spikelets ellipsoidal, solitary, smooth. Bristles reddish brown or yellow. Lower glume ovate, hyaline, rounded at base, 3-nerved; upper glume ovate, subacute, 5-nerved. Lower lemma hyaline, 5-nerved, 2-toothed; upper lemma rugose, acute, boat-shaped, keeled, 3-nerved. **Flowering and fruiting:** Almost throughout the year. Commonly found in sandy habitats. Sweta 195, 243.

**Note:** In GrassBase this species has been transferred to Pennisetum as follows: Pennisetum glaucum (L.) R. Br. Prod. 195 (1810).


Prostrate, perennial herbs. Leaves 5.0-10.0 cm broad, linear-lanceolate, acuminate, glabrous; sheath ciliate; ligule a hairy ring. Spikelets lanceolate, acute. Lower glume ovate, rounded base, 3-5 nerved. Upper glume 7-nerved. Upper lemma rugose, apiculate; lower lemma empty, membranous, 5-nerved. Stamens 3. Caryopsis plano-convex. **Flowering and fruiting:** August-November. Included on authority of Murty & Singh (1961b).

Prostrate-ascending, annual grasses. Leaves 15.0-20.0 x 0.75-1.0 cm, linear-lanceolate, acuminate, hairy; sheath ciliate, keeled; ligule ciliate. Spikelets solitary. Bristles scabrid, slender. Lower glume ovate, membranous, apiculate, glabrous; upper glume ovate, shortly apiculate. Lower lemma empty, membranous, 5-nerved; upper lemma transversely rugose. Stamens 3. Caryopsis plano-convex, with punctiform hilum. **Flowering and fruiting:** August-November. Commonly found in open wase lands, roadsides. Sweta 1558.


Tufted, erect or geniculately ascending, annual herbs. Leaves 25.0 x 2.0 cm, linear-lanceolate, acuminate, margins scabrid; sheath compressed, keeled, hairy; ligule ciliate. Spikelets ovate, usually 2. Bristles retrorsely barbed. Lower glume ovate, hyaline, 3-nerved, apiculate; upper glume obtuse, 5-nerved. Lower lemma empty, dorsally compressed, 5-nerved; upper lemma transversely rugose, coriaceous, apiculate. Stamens 3. **Flowering and fruiting:** July-November. Commonly found on margins of agricultural fields, roadsides and in waste places. Sweta 968.

54. **SORGHUM** Moench. *nom. cons.*


Erect, perennial herbs. Leaves 40.0-4.0 cm, linear-lanceolate, acuminate; ligule hairy, membranous; sheath glabrous. Spikelets acute, red. Sessile spikelets acute, elliptic. Lower glume keeled, ciliated, 2-toothed, glabrescent, 7-9 nerved; upper glume narrower, acute, hairy. Lower lemma empty, acute, 2-nerved, ciliate; upper lemma hermaphrodite, ovate, ciliated, awned. Stamens 3, anthers yellow. Style yellow. **Flowering and fruiting:** September-December. Abundantly found in agricultural fields and on road sides. Sweta 186, 606.

55. **SPOROBOLUS** R.Br.

**Key to species:**
1. Lowest branches of the inflorescence not whorled;
   upper glume distinctly shorter than the lemma;
   stamens 2................................................................. 1. *S. diander*
1. Lowest branches of the inflorescence whorled; upper glume equal or longer than the lemma; stamens 3.  

Tufted, erect, perennial herbs. Leaves 20-0.25 cm, linear, acute, often rolled; ligule a ring of hairs; sheath glabrous. Sipkelets 1-flowered, lanceolate, acute. Lower glume ovate, nerveless 0.4 mm long; upper glume elliptic, truncate, 1-nerved. Lemmas lanceolate, ovate. Stamens 2, anthers purple. Caryopsis 0.5-0.75 mm long, compressed, truncate, reddish-brown. **Flowering and fruiting:** August-December. **Local Name.** *Chiriya-ka-duna.* Abundantly found in moist places. Sweta 59, 369.  
In GrassBase the specific epithet is spelled as *'diandrus'.*

Tufted, erect or prostrate perennial herbs. Leaves 2.0-3.0 x 0.1-0.25 cm, flat, acute, filiform; ligule hairy; sheath glabrous. Sipkelets crowded, shortly pedicellate. Lower glume ovate, lanceolate, acute, 1-nerved; upper glume elliptic, ovate, 1-nerved. Stamens 3. Caryopsis broadly oblong. **Flowering and fruiting:** August-December. Rarely found in moist places. Sweta 428, 827.

56. **THYSANOLAENA** Nees  

Erect, perennial herbs. Leaves 50.0-60.0 x 5.0-10.0 cm, lanceolate, semi-amplexicaul, acuminate, glabrous; ligule a scariuos rim; sheath hairy. Sipkelets greenish or purplish, elliptic-lanceolate, 2-flowered, acuminate, hairy. Lower glume ovate, acute, nerveless; upper glume ovate. Lower lemma truncate, 2-nerved; upper lemma hermaphrodite, ovate, acute, 3-

57. **TRAGUS** A. Haller *nom. cons.*


Ascending or prostrate, annual grasses. Leaves linear-lanceolate, bristles tubercle-based. Ligule a ciliate rim. Inflorescence a loose spike-like panicle or a single terminal, spike-like raceme. Spikelets paired. Lower glume minute, upper 5-nerved and with rows of stout hooked spines. **Flowering and Fruiting:** Rainy and winter season. Included on authority of Murty and Singh (1961b).

**Note:** According to GrassBase the accepted name for this species is as follows:

*Tragus mongolorum* Ohwi in Acta Phytotax. & Geobot., Kyoto, x. 268 (1941).

58. **TRITICUM** L.


Annual, erect herbs. Leaves up to 1.0 cm broad; ligule 2.0 mm long; sheaths glabrous. Spikes up to 12.0 x 1.0 cm. Spikelets laterally compressed, 3-5 flowered, hairy. Glumes ovate, hairy, rounded at base, keeled, awn up to 1.0 cm long. Lemmas 5-nerved, an scabrid awn up to 10.0 cm long. Paleas 2-keeled, entire, obtuse or truncate, keeled. Stamens 3. Ovary hairy. **Flowering and Fruiting:** February-May. Extensively cultivate in the area. Occasionally found as an escape near villages. Sweta 1559.

59. **UROCHLOA** P. Beauv.


Tufted, prostrate or geniculately ascending grasses. Leaves linear-lanceolate, up to 10.0 x 2.0 cm, acute, semi-amplexicaul, crisped-undulate, ciliate; sheath striated, densely ciliate-pubescent; ligule a ciliate rim. Spikelets 4.0-5.0 mm long, ovate or elliptic-oblong, acute, glabrous or hairy. Lower glume 5-nerved; upper glume more than 7-nerved. Upper lemmas hermaphrodite, mucronate, transversely rugose or granulate. Caryopsis up to 2.5 mm long, rotundate, compressed, yellowish-brown. **Flowering and Fruiting:** August-January. Common in cultivate fields and on margins of orchards. Sweta 1564.
60. VETIVERIA Lem. -Lisanc.


Erect, perennial herbs, with aromatic roots. Leaves 50.0-60.0 x 1.5-1.0 cm, linear, glaucous; ligule a minute, scariuos rim; sheath glabrous. Sessile sipkelets lanceolate, acute, yellowish, dark-yellow at maturity. Lower glume lanceolate, spinulose, 5-nerved; upper glume concave, spinulose. Lower lemma empty, acute, lanceolate, ciliate; upper lemma hermaphrodite, mucronate, notched at apex. **Flowering and fruiting**: August-March. **Local Name.** Khas.

Common in moist to wet habitats, on banks of Ganga or margins of water bodies. Sweta 242, 342.

**Note:** In GrassBase this species has been transferred to **Chrysopogon** as follows:


61. ZEA L.


Erect, annual, tall herbs. Leaves upto 10 cm broad, sheath glabrous, throat hairy. Male spikes in terminal panicle. Female spikelets seated on the spongy axis of the cylindrical axillary spike, surrounded by the bracts. **Flowering and fruiting**: Rainy season. Widely cultivated in the study area. Sweta 1419.