CHAPTER II

RUBUS IN KASHMIR

Hooker recorded 9 species in Kashmir. The present study adds five more to this list. Still only 5 of our species extend beyond India (Fig. b). Distribution and short notes adapted from Hooker on some of the species are given below:

1. *R. panulatus* Sm., Rajouri, Baramulla.
2. *R. saxatilis* L., Tibet.
3. *R. niveus* Wall., the species has the following varieties:
   - var. *niveus* proper (Wall, Cat. 734), Nepal.
   - pedunculatus (Wall, Cat. 729), Nepal, Sikkim.
   - racemosus it resembles what a hybrid with *R. corylifolius* might be, Kashmir, Muree.

   *hyparsvrus* approaches *R. lasiocarpus*. Hab. nill.

   *sitchisorni* Kashmir.

   *microcarpa* Sikkim.

   *concolor* Kashmir, Kumaon, this variety passes into the
   *hyparsvrus* and may be same as *R. concolor* (Wall, Cat. 733).

   *falconeri* it is similar to var. *concolor* but carpels are quite glabrous. Northwest India, along river Kishenganga west of Kashmir. This variety is said to connect *R. niveus*, Wall., with *R. casius*.

8. *R. purpureus* Bunge., var. *subinermis*, Kishtwar, in water channels. According to Hooker, it is clearly a lax state of the Tibetan drier climate Prickly Plant.

9. *R. lasiocarpus* Sm., It is difficult to separate the three following species from it by constant definable characters;

- var. *furfuraceus* = *R. furfuraceus* Wall. Cat. 739.
- *pauciflorus* = *R. pauciflorus* Wall. Cat. 727.
  Himalayas.

- *micranthus* = Nepal.
- *sericeus* = Kishtwar.
- *membranaceus* = Kumaon, Sikkim.
- *rosaeolius* = Sikkim.
- *subglaber* = Thw. Ceylon


11. *R. corvifolius* Sm., Harwan (Srinagar).


KEY TO THE HIMALAYAN RUBI

1. Leaves simple, undivided or lobed.

2. Herbs (to undershrubs), stem creeping or prostrate, rooting at the nodes, leaves reniform, obscurely lobed
   ... ... R. calyceus.

2. Shrubs, erect sarmentose or climbing

3. Leaves oblong, usually entire, carpels few

4. Stipules slender, (mature leaves pubescent beneath)

5. Leaves ovate or lanceolate, calyx hooked ... ... R. acuminatus

5. Leaves oblong lanceolate, calyx tomentose ... ... R. griffithii

4. Stipules pectinate

6. Branches, petioles and panicles villous, prickles prominent.

7. Leaves more acuminate, inflorescence black when dry ... ... R. hamiltonii

7. Leaves cordate at base, oblong obtuse acute or various ... ... R. hexagynus

6. Plant organs not villous, prickles few, short, leaves obscurely lobed ... ... R. assamensis

3. Leaves lobed at the sides towards the base, carpels many

8. Leaves longer than broad

9. Leaves white beneath


11. Leaves above densely tomentose, membranous, lateral lobes obscure ... ... R. paniculatus.

11. Leaves not tomentose, 3-5 lobed. R. glameratus

10. Prickles very prominent extending along the
petiole and midrib of leaf beneath, leaves lobulate near base, toothed

9. Leaves green beneath, petioles densely tomentose, prickles hooked

8. Leaves normally broader than long, palmately lobed.

12. Leaves (3)-5-7 lobed.

13. Glandular

14. Deeply cordate, longly petioled, calyx, silky, petioles, obovate

14. Cordate, orbicular, calyx lobes tomentose

13. Glandular, as a rule membranous, green

12. Leaves 5 or less lobed

15. Obscurely lobed, serrate, petals small, linear oblong

15. 5-lobed (acutely), petals rather large

1. Leaves 3-5 foliolate

16. Leaves digitate or pedate

17. Prickles present, few small or scattered

18. Straggling shrub, leaflets 3-5, acutely crenate-serrate, stipules linear-lanceolate

18. Slender trailing, leaflets broad ovate, acuminate, membranous, 3; stipules filiform

17. Prickles few or absent

19. Leaves glabrous beneath, very small plants, stem normally sub-terrestrial; leaflets obovate or orbicular

19. Leaves silky beneath; leaflets elliptic oblong or lanceolate
20. Glandular strong suberect herb, prickles when present few scattered.

20. Glandular, always unarmed, leaflets rather broader

16. Leaves pinnately foliace

21. Stem creeping or prostrate

22. Prickles absent, leaflets orbicular

22. Prickles present, leaflets rhombic-ovatifsh

23. Stem thin, rootstock 30-60 cm long, leaflets obscurely lobed, acutely doubly toothed ... \textit{R. nutans}

23. Stem long, creeping, leaflets finely toothed ... \textit{R. tookeanus}

24. Low shrub, leaflets lobulate or toothed ... \textit{R. hookeri}

24. Annual, rhizome short erect, leaflets doubly toothed, membranous ... \textit{R. saxatilis}

21. Stem erect, climbing or trailing

25. Leaflets 3(-5)

26. Stem purplish

27. Leaflets toothed, prickles scattered

28. Stem or branches angled, prickles short, slender.

29. Climber, prickles very short, leaflets brown when dry, serrate, racemes long slender, stipules setaceous ... \textit{R. lucena}

29. Rambling bush, prickles scattered, recurved, leaflets membranous, entire to toothed, racemes few flowered, stipules filiform ... \textit{R. niveus}

28. Stem not angled, prickles numerous, prominent, leaflets green, double crenate.
30. Plants stouter, leaflets more coriaceous, flowers erect ... *R.* _antennifer_

30. Plants slender, leaflets dark green, flowers drooping ... *R.* _clarkei_

27. Leaflets entire

31. Stem angled, prickles hooked, stout, stipules subulate ... *R.* _fruticosus discolor_

31. Stem not angled, prickles straight, flattened, stipules setaceous (stem pale or dark yellowish) ... *R.* _purpureus_

26. Stem brownish, leaflets toothed

32. Stem angled, leaflets coriaceous

33. Obtusely angled, trailing, prickles much flattened, stipules setaceous ... *R.* _macilentus_

33. Obscurely angled, suberect bush, prickles hardly flattened, stipules subulate ... *R.* _ellipticus_

32. Stem not angled, leaflets coarsely glandular above, glabrous beneath, prickles shining, stipules linear ... *R.* _sikkimensis_

25. Leaflets 5-7(-9), always shrubs.

34. Plants rambling

35. Leaflets 5(or 3) doubly toothed, chiefly on lateral branches, prickles stout, hooked ... *R.* _biflorus_

35. Leaflets 5 or more, acute toothed or serrate, prickles various.

36. Leaflets 5-9 very variable ... *R.* _lastiocarnus_

36. Leaflets 7 (-3) ... *R.* _folicoolosus_

34. Prostrate, smaller, branches slender

37. Glandular

38. Leaflets 5-7, stipules lanceolate
39. Undersurface of leaf white, woolly, acutely toothed
     prickles straight or hooked, petals red...
     *R.racemosus*

39. Undersurface of leaf green, doubly inciso-serrate,
     prickles hooked, petals white *R.rosaefolius*

38. Leaflets 5 or less, crenate toothed, stipules setaceous,
    (straight prickles flattened) *R.onulifolius*

37. glandular, prickles hooked, flowers solitary, leaflets
    incisoserrate.

40. Leaflets densely hairy, petals purple, flowers always
    one...
    *R.horridulus*

40. Leaflets membranous, bright green on both surfaces,
    petals white, flower 1 or 2-3 *R.nungens*
E. paniculatus, Smith, in Rees Cylop. 30, Rubus 41; F.B.I. 2: 329

Fig A, 1 - 7

A large climber, eglandular, all parts except leaves, densely tomentose, the panicles clothed with cottony white tomentum. Prickles small, base flattened, often hooked on petioles, large and straight on stem, 1 - 2 cm long. Leaves variously lobed to pinnate compound, lower down the branch with 3 leaflets, terminal leaflet ovate - lanceolate to oblong - ovate, 6.2 cm long and 4.5 cm broad, the two laterals ovate - lanceolate, 4.5 cm long, 3.2 cm broad. Intermediate nodes bearing pinnatipartitely lobed leaves, the leaves above small and simple. Petiole slender 9 - 26 mm long, hairy, rarely with a prickle. Stipules entire, hairy, laciniate, 4 - 6 mm long. Panicles axillary and terminal, very lax, much branched, large ovate, acute silky; petals much smaller, oblong, white; carpels glabrous; receptacle villous, stone rugose, Fruit globose, drupes many, large, black.

Specimens examined: No. 19678 (Baramulla) in Herb. NBG. Lucknow.


Fig B, 1 - 35

An annual, short and erect species, arising from a stout woody rhizome; eglandular, glabrous, usually covered with numerous minute prickles, the latter absent from the midrib. All parts covered with thick cottony growth of tomentum and


**Fig. A.** Distribution of Rubus species in Jammu & Kashmir State (localities where actually observed).

Fig. A.1-7, *R. maniculatus*: 1, portion of stem; 2, part of petiole; 3, portion of leaf margin; 4, terminal leaflet; 5, mature leaf; 6, simple leaf; 7, leaf with 3 leaflets. NBG 19678.

8-27, *R. purpureus*: 8-17, terminal leaflets; 18, leaf with 3 leaflets; 19,20, mature leaf; 21-24, 26 portion of stem and petiole; 25, 27, part of leaf margin. All from Kew 30849.

28-39 *R. lasiocarpus*: 28-30 terminal leaflet; 31, mature leaf; 32, portion of leaf margin; 33, portion of stem; 34, petiole a part; 35, mature leaf; 36, 39 a portion of leaf margin; 37,38 portion of stem.

28-30 from NBG 48442.

31-35 from NBG 48376.

36-39 from HKU VD1.

Pl. l. 1-14 *R. lasiocarpus*: 1-10 variation in size and number of leaflets/leaf. 11-12 portion of branch with flowers. 13-14 same with fruits.

Fig. B.1-15 *R. saxatilis*: 1) part of leaf margin; 2, portion of stem; 3,9 portion of leaf margin; 4, part of petiole; 5,6 portion of stem; 7, portion of leaf margin; 8,10 part of petiole; 11, portion of stem; 12 portion of leaf margin; 13, portion of stem; 14, portion of petiole; 15, portion of leaf margin.

Fig. BB 1-35 *R. saxatilis*: leaves from the same population.

1-6 from Kew 1033.

7,8 from Kew 404.

9-15 from Kew 14281.

Pl. 2,3,4 Showing portion of branch with fruits.
hairs, which on the leaves arise from the veins. Prickles straight and acicular, sometimes very few or altogether absent, 1 - 3 mm long. Stem slender, rough, solid, sometimes grooved. Leaves palmate - compound and trifoliate, sometimes both on different branches of the same plant. Usually terminal leaflet larger than the two laterals, 3.79 - 9.12 cm long and 2.54 - 5.58 cm broad, petiolulate, petiolule 1 - 2 cm long. Lateral leaflets subsessile to sessile. Rarely leaves simple, or palmati-partite to incompletely 3-lobed, of this the terminal lobe is again lobulated. Simple leaf 4.79 - 7.62 cm long and 6.33 - 9.32 cm broad, leaf lobes 2.54 - 4.04 cm broad and 4.73 - 7.08 cm long; petiole solid, 5.08 - 5.33 cm long. In compound leaves, leaflets rhombic-ovate or ovate-lanceolate or lobulate, biserrate, triserrate or lobed, lobes serrate, serrations either projecting outwards or towards apex. Apex acute or acuminate, base cuneate. Petiole solid or hollow, 3.04 - 3.87 cm long. Stipules linear, entire and adnate to petiole, sometimes leaf base sheathing. Inflorescence corymbose axillary, 1.25 - 1.50 cm long, 1.50 - 1.75 cm wide; consisting of 3 - 4 flowers in one cluster. Flowers shortly pedicelled, pedicels 5.08 - 5.58 cm long. Flowers 1.0 - 1.25 cm in diameter borne on the tip of long peduncle; bracts linear or filiform and hairy, sometimes bracteoles also present; calyx tube persistent, lobes linear, ovate, entire and glabrous; petals white slender. Fruit with few large scarlet drupes. Seeds bigger in size, stone reticulated.

Specimens examined: Nos. 1033 (Daul, Kashmir), 22881 (Kulu Lahaul), 404 (West Tibet), 14281 (Astan Marg, Kashmir), Pang1 (Rubus near saxatilia) in Herb. Kew.
R. niveus Wall., Cat. p.734, F.B.I.2:335

Fig C, 12 - 23

A large rambling bush, eglandular, each branch 60-219 cm long. Bristles absent, branches, petioles, inflorescences glabrous to glaucous. Prickles short, scattered, straight to projected downwards, the base short or long, the tip pointed or nearly so; 1-8 per internode. Leaves with three leaflets, thick white cottony growth of trichomes on the ventral surface, dorsal surface glabrous 5-12.5 cm long, 4.2-12.7 cm broad. Terminal leaflets elliptic - ovate symmetrically or asymmetrically lobulate, acute, doubly crenate, 3-6.7 cm long, 3.3-6.7 cm broad, petiolulate; petiolule longer than in lateral leaflets. Lateral leaflets ovate to lanceolate to obovate, 2.3-6.2 cm long, 2-4.5 cm broad, subsessile. Petiole slender with 3-11 prickles; stipules filiform, hairy. Flowers in lateral and terminal few - many flowered corymbs. Flowers small; calyx tube glabrous, unarmed, lobes acute to acuminate, 4-5.2 mm long, 2-2.4 mm broad; petals small, obovate, white; stamens small uniseriate, carpels glabrous. Fruits, glabular, 1.5-2.2 cm in size with 57-99 succulent drupes per fruit.

R. niveus var. falconeri is similar to var. concolor but carpels quite glabrous. This connects R. niveus with R. casius, L". (Hooker, 1879).

In R. niveus var. falconeri the leaflets are variable in size, shape and in dentations on the margin which ranges from incisoserrate to toothed to crenate. Hooker remarked that the species ( R. niveus ) itself was closely allied to R. lasiocarpus.
**Fig. C.** 1-11 near *E. rosaefolius*; 1, portion of stem; 2, petiole a part; 3, portion of leaf margin; 4, leaf with (3) leaflets; 5, same with lobed leaflets; 6, leaflets with distinct lobes; 7, leaf with 5 leaflets; 8, same with 7 leaflets; 9, leaf with 3 leaflets; 10,11, mature leaves with 7 leaflets.

**Pl. 5.** 1-14 near *E. rosaefolius*; 1-8 variation in size and number of leaflets/leaf; 9, vegetative branch; 10-11, same with flowers; 12-14, branch with fruits.

**Fig. C.** 12-23 *B. niveus*; 12, portion of petiole; 13, portion of leaf margin; portion of stem; 15-18, leaves showing variation in form; 19, mature leaf; 20,21, leaves with 3 leaflets; 22, prickle on stem; 23 prickle on petiole.

1-11 from HKU VD
12-23 from HKU VD 3

**Pl. 6.** 1-15 *B. niveus*; 1-11 variation in size and number of leaflets per leaf; 12-15 branch with fruits and flowers.

**Fig. D.** 1-6 *B. ellipticus*; 1, portion of branch with flowers; 2, *V. sem* flower; 3, single petal; 4, a carpel; 5, fruit; and 6 seed. All from HKU VD 4

**Fig. E.** 1-31 *B. fruticosus*; 1, portion of stem; 2, prickle on stem; 3, petiole a part; 4-8, leaves with 3 leaflets; variation in form; 9, same with more lobing; 10, same with 5 leaflets; 11, mature leaf with 3 leaflets; 12 same with 4 leaflets; 13, part of leaf margin; 14, part of petiole; 15 portion of stem; 16 portion of leaf margin; 17-20, variation in form and size of leaves; 21,22, leaf with 3 leaflets; 23, same with 4 leaflets; 24, mature leaf with 3 leaflets; 25, mature leaf; 26 portion of branch; 27, 28, 29, 30,31 mature leaf.

**Pl. 7.** 1-16 *B. fruticosus*; 1-11 variation in size and number of leaflets/leaf; 12 vegetative branch; 13, branch with flowers; 14-16, same with fruits.

**Fig. F.** 1-24 from HKU VD 5; 25-29 from NBG 22846.
30-31 from HKU VD 5.
Specimens examined: No. 72/126 R. niveus var. falconeri HK.f., Kashmir (Kangan), Lahaul, in Herb. Kew.


Fig. D

A tall suberect bush, branches stout, recurved and obscurely angled. Branches, petioles covered by dense growth of brown hairs. Prickles many, scattered, base slightly compressed, hooked or straight, 25 mm long. Leaves pubescent beneath; leaflets 3, obvate - elliptic, obtuse, with acutely toothed margins. Leaf 1.5-5.8 cm long, 16 mm - 6 cm wide. Petioles 6 mm-5 cm long.

Flowers in small many-flowered axillary panicles. Flowers 1.2 cm diameter, calyx pubescent, ovate with acute tips; petals obvate; stamens many in one whorl. Fruit globose, exposed, drupes yellowish to golden yellow, succulent, stone rugose.

Specimens examined: No. 50642 (Assam), in Herb. NBG, Luck. No. 250 (Jammu), in Herb FL Jammu.


Fig. E, 1-31

A stout robust erect to creeping shrub; stem, branches arched, obtusely angled, prickly. Branches 50-279 cm long, 1.3-3.8 cm thick, with 20-90 nodes per branch; each internode 2.3-5.1 cm long with 3-12 (usually 4 or 5) prickles. Prickles stout, short rarely long scattered and hooked. Leaf compound with 3 leaflets sometimes 5 or 4 at the base of stem branch, 2.4-8.6 cm long, 3.6 to 13.1 cm broad, hoary beneath with white stellate tomentum, glabrous above. Leaflets coriaceous, orbicular-
obvate to ovate - lanceolate, acute, serrate; terminal one larger, 2.2 - 6.8 cm long, 1.7-6.9 cm broad, lateral ones smaller, 1.8-6.3 cm long, 1.2-6.5 cm broad, usually longer than broad, incompletely or completely bilobed or forming two leaflets, much variation shown in lobing. Petiole slender, 4mm-5.9 cm long, 3 mm - 1 cm thick with 2-5 prickles. Stipules simple, velvety, entire, 4-6.6 mm long, 0.4-0.7 mm broad. Flowers in dense thyrsiform lateral and terminal panicles; the panicles 8-14.5 cm long, 3-5 cm in lateral spread, stout, densely tomentose, bearing 19-53 flowers; pedicels stout, short 7 mm-1 cm long. Flowers 2.4-3.1 cm in size; calyx tube short, lobes ovate, acute, woolly on both surfaces, sharply reflexed in fruit, 5.6-6.3 cm long, 2.5-3.2 mm broad; petals obovate, larger than sepals, pink, hairy, 7.2-8.2 mm long, 2.5-3.2 mm broad, sometimes very numerous, in many series; carpels glabrous, receptacle deciduous, fruit small, globose, black, 1.6-2.5 cm in size, with 13-26 big fleshy drupes; each drupe 6-8 mm in size; stone pitted.

Specimens examined: Nos.22846 (Doda to Prem Nagar), 51,482 (Harwan) in Herb NBG Luck. No. VD5 (Naseembagh), in Herb KU.

R. clarkei Hook.f. F.B.I. 213 337

Fig. F; 12-22

A very slender, dwarf, herbaceous species, covered with hairs (less so). Branches petioles, peduncles armed with numerous small slender acicular straight to occasionally deflexed prickles, 1-2 mm long. Leaves either pinnatipartately divided into three lobes or distinctly compound with three leaflets, intermediate forms common; the former petiolate, petioles slender,
Fig. F. 1-11  *R. antennifer*: 1. portion of stem; 2. part of petiole; 3. portion of leaf margin; 4. prickle on stem; 5. same on petiole; 6. part of petiole; 7. portion of stem; 8. 11. portion of leaf margin; 9. portion of leaf tip; 11. 10. Mature leaf.
1-5 from HKU V061. 6-11 from NBG 228344.

12-22 from Kew 30848.


Pl. 9. 1 *R. pachyphyllus*: portion of vegetative branch.

Fig. G. 1-10 *R. biflorus*: 1. portion of stem; 2. part of petiole; 3. leaf with 3 leaflets; 4. same with 4 leaflets; 5. same with 5 leaflets; 6. leaf with 4 leaflets; 7. portion of leaf tip; 8. portion of leaf margin; 9. prickle on petiole; 10. prickle on stem. All from HKU V07.

Fig. H. 1-5, *R. racemosus*: 1. portion of stem; 2. part of petiole; 3. petiole a part; 4. mature leaf; 5. portion of leaf margin.

1-5 from NBG 48871; 6-14 from NBG 4249.

15-24 *R. nungens*: 15. 16. 23. portion of stem; 17. leaf with 3 leaflet; 18. 19 and 20 same with 5 and 6 leaflets; 21. 22. part of petiole; 24. portion of leaf margin. From NBG.

Pl. 10. 1-12 *R. biflorus*: 1-7 variation in size and number of leaflets/leaf; 8. portion of vegetative branch; 9,10, same with flowers; 11-12 branch with fruits.
5.83-9.12 cm long. In compound leaves, leaflets orbicular, pubescent, tip obtuse to acute margins coarsely serrate to serrulate 3.79-6.58 cm long, 2.25-6.58 cm broad, longer than broad, sometimes as long as broad with cuneate base, petiolulate. Stipules persistent, linear, 1.5 mm long, hairy, acute, serrate. Inflorescence a corymb, 2.2 cm long, 2 cm broad. Flowers drooping, solitary in lower axils, 5-6 mm in size; calyx persistent, hairy, lobes linear to acute, serrate. Berry of 1-5, glabrous drupes, red, stone pitted.

Specimens examined: No. 30848 (Sonamarg, berry of 1-5 drupes, a red dewberry, very dwarf) in Herb. Kew.

R. antennifer HK.f., Fl.B. I. 2:337

Fig 1-11

A small stouter species, arising from an underground woody stem, not much thick, 6-8.5 cm long, 4-4.5 mm thick and 14-16.3 in lateral spread, branches with 4-5 nodes, internode 1-2 cm long with 50 to numerous prickles; all parts clothed with small straight, slender, acicular prickles and soft hairs, extending up to midrib of leaflets on ventral surface; prickles on main stem brown, that of petiole yellow, 2-4 mm long, with 3 mm broad base. Leaves green, small, broader than long, 1.3-6 cm long, 2.2 to 7.4 cm broad. Leaflets 3, ovate or obovate, acutely toothed, terminal occasionally definitely cordate, usually simply lanceolate, doubly toothed, acutely so, green above, greyish tomentose below, 1.5-4.5 cm long, 7 mm-4 cm broad, petiolulate; petiolule 5-14 mm long. Lateral leaflets sessile, ovate to lanceolate, less lobulate, acute, 3.8 cm long, 5 mm
to 2.6 cm broad. Stipules green, entire, lanceolate, acute 3-4 mm long, 1-1.2 mm broad. Corymbs axillary and terminal. Flowers small, calyx hardly bristly, pubescent on both surfaces; petals white, obovate, equalling the calyx; carpels many, glabrous on a pubescent columnar receptacle. Fruit globose, black, stone pitted.

Specimens examined: Nos. 22844 (Baramulla) in Herb HBG. Luck. No. VDc (Sonamarg) in Herb KU. June, 1970.


Fig C, 8-27

A stout, dark yellow, hairy, glandular shrub, with branches petioles, inflorescence and calyx densely covered with small deflexed prickles. Each branch cylindrical, 81-185 cm long, with 20 to 37 nodes per branch. Prickles, short, straight, 2.5-3 mm long, extending up to ventral surface of leaflets along the midrib. Leaves compound with 3-5 (3 being normal) leaflets; later broad-ovate, 2-3 crenate, glabrous above, grey beneath, covered with cottony growth of tomentum. Terminal leaflet much variable in size, general shape, and dentation of margin, acute in each dentation, normally broader, ovate to orbicular, sometimes cordate, 1.5-10.5 cm long, 5 mm-9.2 cm broad apex acute to acuminate; petiolulate. Lateral leaflets sessile to subsessile, smaller ovate to lanceolate, 2.2-8.6 cm long, 9 mm-5.2 cm broad, leaflet apex acute-acuminate, base cuneate. Petiole stout, pale, 1.5-7.8 cm long. Stipules setaceous, glandular, small, 8 mm-1.3 cm long, 0.5-1.2 mm broad. Inflorescence on axillary peduncled cyme, 2.5-12.3 cm long, 1.7-4.0 cm in lateral spread with 3-14 flowers per inflorescence. Lower flowers solitary 1-1.7 cm in
size, small, calyx pubescent, bristly, lobes ovate to lanceolate, tips acute to acuminate, 6 mm-1 cm long, 1-3 mm broad; petals small, white, orbicular, 4-6 mm long, 1.5-2.2 mm wide; stamens small, uniseriate, 2.5-3 mm long; carpels hairy, 2-2.3 mm long on a columnar pubescent receptacle. Fruit globular, red, 2.8-3.2 cm in size with 21-29 succulent drupes. Drupes small, 6-8 mm in size, seeds small pitted.

Var. subinermis Hook. (op. cit. p 338) cannot be recognized on the character "more slender and lax with the prickles reduced almost to bristles". The same plant has been found to show such nature in one of the branches. However No. 30849 (Fig C.19,20) shows distinct obovate - lanceolate lateral leaflets, a character not discernible in typical R. nurpureus.

Specimens examined: No. 30849 (Sonamarg, var. subinermis; berry of few drupes, flowers like the English raspberry, light red bush), Kishtwar, Kanewar (Herb Ind. or Hook FL. and Thomson), Gulmarg and above it was subinermis HK, a raspberry common in water channels, fruits in August), all in Herb. Kew. No. VD11 (Gulmarg, Baramulla) in Herb. KU.

R. biflorus Ham. in Smith, in Rees Cyclop 30 Rubus 9 F.B.I. 2: 338.

Figs G, 1-10; H, 6-14

A large stout rambling bush, glabrous, eglandular, and prickly, young parts pubescent, angular in cross section, branches 98-150 cm long, each with 21-36 nodes, latter 2.3-7.3 cm long, each internode with 3-12 prickles, those of main stem stout, straight, light yellow in colour, 5-6 mm long, 4-5 mm
broad; those of petioles and inflorescence short, slightly hooked with brown base, light yellow tips, 2-4 mm long and 1-3 mm broad at base. Leaves of main stem and branches with five leaflets; those of branchlets with 3 leaflets, then usually the laterals lobed once or on one side divided into two leaflets and on the other simply lobed; coriaceous, dark green above hairy beneath, 4.6 to 11.2 cm long, 5.7 - 16 cm broad, about 2.8 times broader than long; leaflets elliptic or ovate-lanceolate, narrowed at both ends or on tip alone, acutely doubly serrate and acuminate. Terminal leaflet largest, 4.5-8.3 cm long, 1.8-4 cm broad, subsessile to petiolulate, sometimes lobulate, the incisions fid, partite or sect. Lateral leaflets smaller than the terminal one, 4-4.6 cm long, 1.7-2.3 cm broad, sometimes lobulate. Petiole slender, less pubescent, 6 mm-8.2 cm long, with 4-9 minute prickles. Stipules linear to ovate, glabrous, acute to acuminate, entire, 5.7 cm long, 1-3 mm broad, hairy. Flowers in axillary and terminal corymbose racemes; corymbs 5.2-12.2 cm long, 4.8-6.3 cm in lateral spread with 4-7 flowers. Flowers large, drooping, 1.2 to 2.5 cm in size; sepals densely pubescent on inner surface, ovate, unarmed, acute, 6-7 mm long, 3-3.4 mm broad, reflexible in fruit; petals larger than sepals or equalling the calyx lobes, orbicular or oblong with rounded apex, 8-12 mm long, 6-8 mm broad, white; stamens long, multiseriate, 3.2-6 mm long; carpels many, 2.5-3.1 mm long on villous columnar receptacle. Fruit globose to oblong, large, 1.8-3 cm long, 0.7-1.3 mm in diameter, bearing 16-40 big fleshy black (golden yellow in Hooker) drupes, which 4.6-5.3 mm in size; stone reticulated with pits.

Specimens examined: Nos. 4249 (Tehri Garwal), 42270 (Dalhousie), 48871 (Verinag) in Herb. NBG. Luck. No. VD7 (Zethyar) in Herb. KU.
R. lasiocarpus Smith, in Rees Cyclop 30, Rubus s. F.R.I. 2:339

Fig 4 ,28-40

A large rambling eglandular shrub, branches cylindrical, with coloured prunose bark, very young only tomentose, branches 63-170 cm long, 1.5-2.7 cm thick with 10-18 nodes, internode 4.2-13.5 cm long with 3-7 prickles. Prickles scattered, stout flattened, straight on stem and branches, hooked on petioles. Leaves compound, longer than broad, 6.2-22.5 cm long, 4.5-18.6 cm broad, with 5-13 leaflets, latter ovate-lanceolate, acutely doubly toothed and mucronate, coriaceous, opaque, glabrous above, ventral surface hoary with white tomentum. Terminal leaflet, broad ovate, lobulate, cordate at base, petiolulate, 2-7 cm long, 38 mm broad; lateral ones sessile, ovate-lanceolate, 1.7-10 cm long, 7 mm-5.3 cm broad, Petiole stout, glabrous, shining, 1.8-5.5 cm long, 5.9-6.4 mm thick. Stipules linear, 7-9 mm long, l-1.2 mm broad. Corymbs axillary and terminal, sometimes subpanicled, villous, on short or long peduncles, 2.4-15.5 cm long, 2.2-6.4 cm in lateral spread with 8-18 flowers. Flower pedicels short, bracts setaceous. Flowers small, 6-7.5 mm in size; calyx densely tomentose, tube small, lobes ovate, acute-acuminate, spreading in fruit, laciniate; petals deep pink or red, small, not exceeding the calyx tube, obovate; stamens few, small, uniseriate; carpels many, tomentose, receptacle columnar. Fruit small, globose, hoary, black, 5-14 mm in size, with 42-86 small fleshy drupes, latter 2-2.5 mm in size; seed, very small, light pitted.

Specimens examined: Nos. 48442, 48376 (Imphal) in Herb. NBG. Luck; No. V04 (Harwan) in Herb KU.
**Fig. I. 1-18**
R. lasiocarpus var. rosaeolulus: 1, portion of stem; 2, portion of leaf margin; 3, part of petiole; 4, prickle on petiole; 5, simple leaf; 6, simple lobed leaf; 7, same with 3 distinct lobes; 8 leaf with 3 leaflets; 9, mature leaf with 3 lobed leaflets; 10, portion of leaf margin; 11,12 leaf with 3 leaflets; 13, same with 4 leaflets; 14, 3 lobed leaflets; 15, mature leaf with 5 lobes; 16, 17, same with 5 leaflets; 18, same with 6 leaflets. All from HKU V8.

**Fig. J. 1-39**
R. pungens: 1, portion of stem; 2, portion of leaf margin; 3, part of petiole; 4, mature leaf; 5, 6,7 terminal leaflets; 8, portion of stem; 9, portion of petiole; 10, part of leaf margin; 11,12 mature leaf; 13-18 terminal leaflets; 19-21 mature leaves; 22, portion of stem; 23, portion of leaf margin; 24, mature leaf; 25, portion of leaf margin; 26, leaf with 3 leaflets; 27-29, terminal leaflets; 30-32, terminal leaflets; 33-36, 38 mature leaves; 37 portion of stem; 39 part of petiole.
1-7 from Kew 19379.
8-21 from Kew 11469
22-27 from Kew 20080.
30-39 HKU V8.

**Fig. K. 1-9**
R. casius: 1-8 part of petiole; 2, terminal leaflet; 3, portion of leaf margin; 4 mature leaf; 5, portion of stem; 6, portion of petiole; 7, spine on petiole; 8, leaf with 3 leaflets.
9-14 R. coryllifolius: 9, mature leaf; 10, portion of leaf margin; 11, portion of stem; 12,13,14, leaf with 3 leaflets.
1-8 from Kew; 9-14 from HKU VD10.

**Pl. 11. 1-11**
R. lasiocarpus var. rosaeolulus: 1-6, variation in size and number of leaflets/leaf; 7, portion of vegetative branch; 8-9 same with fruits; 10-11 branch with flowers.

**Pl. 12. 1-14**
R. pungens: 1-11 variation in leaf form; 12, portion of vegetative branch; 13-14 same with flowers.

**Pl. 13. 1**
R. casius: Portion of branch with flowers and leaf.

**Pl. 14. 1-9**
R. coryllifolius: 1-8 variation in leaf form; 9, portion of branch.
R. lasiocarpus Smith var. rossifolia HKf.F.B.12.339

Fig.1, 1-18

An erect to creeping or sarmentose species, branches slender, glabrous, 37-83 cm long, 1.4-1.8 cm thick with 3-5 cm long internodes, pubescent with gland tipped hairs, 27-92 minute prickles per internode. Prickles scattered, hooked on petiole and inflorescence, straight on stem and branches. Leaves compound, 6.3-10 cm long, 8.8-11.4 cm broad, 3-7 leaflets, bright green upper surface, never glaucous, membranous, coriaceous white tomentose ventral surface. Leaflets very rarely 4,3 in Tungmarg specimen, 3-7 in Baramulla specimen. Terminal ovate to lanceolate, doubly incisoserrate, larger 5.2 to 9 cm long, 5.3 to 9.6 cm broad, petiolulate; laterals smaller, lanceolate, 4.3-8.0 cm long, 3.5-6.1 cm broad, sessile; rachis 3 mm-2.8 cm long. Rarely simple leaves, 2-3 lobed, present on branches bearing compound leaves with 5-7 leaflets. A number of other variants have been figured. Stipules linear-lanceolate, 6 mm-11 mm long, 2-1.5 mm broad, acute. Flowers solitary and in very loose panicles, each panicle 5.2-10.7 cm long, 5.5-8.1 cm in lateral spread, with 4-7 flowers. Flowers bigger, 1.5-2.2 cm in size, long pedicelled, pedicels 2-4.3 cm long; calyx glabrous, not prickly, tube small, lobes acute, drawn out to a serrated limb, nearly (4-6 mm) or 6-9 mm long, 3-6 mm broad, spreading in fruit; petals white, exceeding the calyx obovate, 1-1.4 cm long, 6-8 mm broad; carpels numerous on an oblong villous receptacle. Fruit oblong, very rarely globose, 2-3 cm long and 1.4-2.2 cm wide with 46-59 drupes, latter being glabrous, orange red, minute, 2.5-4 mm in size. Stone deeply pitted.

Herb. Specimens examined: Nos. VDG (Tungmarg, Baramulla), in

Fig. H, 1-8

A large rambling shrub with branchlets, petioles, inflorescence clothed with copious glandular bristles and hairs, tomentose. Prickles mostly hooked on petiole, normally straight on stem. Leaflets 3-4 (rarely 5) ovate to orbicular, acutely toothed, densely tomentose beneath; terminal broader, lobulate, glabrous above, coriaceous, petiolulate; lateral smaller, ovate-obovate, subsessile, leaflets 2.8-7.7 cm long. Stipules lanceolate, entire 6 mm long. Corymbs axillary and terminal. Flowers large, calyx prickly, ovate, entire; petals large, red obovate; stamens numerous; carpels many, villous. Fruit globular, bright red, stone pitted.

Hooker had this to say about validity of this species.

I cannot

Specimens examined: No. 48812 (Verinag) in Herb NBG. Luck.


Fig. H, 15-24; I, 1-39

A very long, slender, sarmentose or climbing, eglandular shrub. Branches long, lax, weak, cylindrical, 80-246 cm long, all parts covered with numerous, minute, straight to slightly hooked prickles, 17-64 per internode of a branch, 2.5-5.0 mm long, extending upto the midrib on under surface of leaflet. Leaves pinnately compound, leaflets 3-7, mostly 5.4-15.5 cm long,
3.3 - 16.7 cm broad, membranous, glabrous, bright green on both surfaces, lower surface faintly hairy without tomentum, ovate, deeply incisoserrate. Terminal leaflet broader, ovate-lanceolate, or obcordate, 1.25-10.5 cm long, 1.0 to 6.0 cm broad, or almost twice longer than broad, sometimes asymmetrically or symmetrically 3-5 lobed, petiolulate. Lateral leaflets smaller, lanceolate, subsessile to sessile, 1.8-6 cm long, 1.2 to 3.4 cm broad, acute, rounded base. Petiole long, slender, 1.6-6.2 cm long with 11-25 small, minute, slightly curved prickles. Stipules lanceolate to setaceous, hairy, 1 - 1.4 mm long, 1-1.5 mm broad. Inflorescence axillary, long peduncled raceme 5.6-10.1 cm long, 2.4-3 cm lateral spread. Flowers solitary (in lower axils) or 6-20 per inflorescence, 1.2-2 cm in diameter; pedicels long, stout, prickly, pubescent, 1.2-2.5 cm long; bracts setaceous 7.2-8 mm long; calyx tube hemispherical, lobes 6-7.6 mm long, 2-3 mm broad, acuminate, pubescent on both surfaces, densely prickly and bristly, lanceolate, spreading in fruit; petals obovate, spatulate, longer than calyx, 5-5.8 mm long, 2.2-3.2 mm broad, white; stamens uniseriate, 2.4-3 mm long; carpels 6-22 mm per flower, 2.3 mm long, hairy on a conical glabrous receptacle. Fruit globose, red, 1 to 2.5 cm in size with 6-24 drupes per fruit, each 7.3 to 8.2 mm in size, Stone pitted.

Specimens examined: Nos. 20080 (Panjab), 11469 (Sindh Valley), 11412 (Near Gulmarg), 19379 (Kangan Valley) in Herb. Kew, Nos. VDq (Tangmarg), VDq (Dachigam) in HabbKU.
Hubus sps A near *R. rosaefolius*, Smith., Ic. Ind. 3 to 60, F. B. I. 2: 341.

**Fig C, 1-11**

A slender prostrate species, branches glabrous, 30-83 cm long, 1.4-1.09 cm thick with 8-20 nodes; internodes 2.1-9.2 cm long, each bearing 14-51 prickles. Prickles scattered, straight to hooked. Leaves 4.5-9.8 cm long, 6.0-12.5 cm broad, with 3-7 (5-7 usually) leaflets, terminal leaflet broad, orbicular, ovate or ovate - lanceolate, biserrate, acute, 3-7.3 cm long, 2.2-5.2 cm broad, petiolulate; lateral ones sessile, 2.6-7.5 cm long, 2.0-4.5 cm broad, ovate- lanceolate; lobing in both terminal and lateral leaflets common; the 3 leaflet-leaves normally lobed. Stipules lanceolate, 0.5-1.2 mm long, 0.5-1 mm broad. Flowers solitary, in very loose panicles, latter 5.2-8.5 cm long, 5.5-8.1 cm broad, bearing 3-7 flowers. Flowers large, 1.5-2.3 cm in size; calyx lobes caudate, acute, glabrous, drawn out into a serrated limb, 7 mm-1 cm long, 3-4 mm broad; petals smaller, not exceeding the calyx, white, obovate, 1-1.4 cm long, 6-8 mm broad; stamens numerous; carpels very numerous, glabrous, on a columnar villus receptacle. Fruit oblong, 2.2-3.1 cm long, with 40-50 black fleshy drupes; seeds big, stone pitted.

The description given above comes very close to *R. rosaefolius*. But one of the main important features given by Hooker for this species is "drupes smaller than in any other species". In our taxon the seed size is slightly bigger than in *R. lasiocarpus*, with which it shares some morphological features. The structure of seed is again wholly different in not being 5-faced and in having the embryo cream vs lemon coloured. Seed colour in *lasiocarpus* is pinkish red so is it in our "*rosaefolius"."
Specimens examined: Nos. VD\textsubscript{12} (Jethyore, Baramulla) in Herb. KU.


Fig K, 9-14

A large rambling bush, bristles absent, Branches, patioles, inflorescence thinly tomentose; leaves with gland tipped hairs. Branches stout, young often thickly tomentose or glabrous, 78-215 cm long, 0.7-3 cm thick, with 10-24 nodes, each internode bearing 6-12 prickles, the latter short, scattered, recurved. Leaves mostly very large, with 3 leaflets, rarely 4 or 5; in 3 leaflet-leaves, the laterals usually bilobed; coarsely doubly toothed, acute, densely hoary ventral surface, glabrous above. Each leaf 7.5-10.5 cm long, 10-15.2 cm broad, broader than long; terminal leaflet elliptic-ovate or cordate, 4-9.2 cm long, 3-7 cm broad, longer than broad; lateral ones ovate, acuminate and lobulate, 2.7-7 cm long, 1.5-8.00 mm broad longer than broad, rarely broader than long. Petiole slender, 3-9.5 cm long, 2-2.6 mm thick with 5-13 minute prickles.

Stipules filiform, hairy, 1-1.5 cm long, 1 mm-2 mm broad.

Flowers in lateral and terminal 14-29 flowered corymbose racemes, latter 5.6-11 cm long, 1.5-5.2 cm broad. Flowers large, 1-2.5 cm in size, calyx tube short, flat, lobes ovate to lanceolate, quite entire, 5-6 mm long, 2.5-3.1 mm broad, tomentose on both surfaces, reflected in fruit; petals large, light pink to white, obovate to spathulate, 5.4-6.4 mm long, 4-4.4 mm broad; stamens numerous; carpels few. Fruit globose, small, 1-2 cm in size with 1-3 big black fleshy drupes, drupe 5-15 mm in size; seeds big, pitted.
Fig. L. 1-28 *E. procerus* : 1, portion of stem; 2, portion of leaf margin; 3, part of petiole; 4, small portion of branch; 5-8 variation in form of leaf; 9, 10 simple leaves; 11-13, leaves with 3 leaflets; 14, 15 leaflets showing lobing; 16-26, different stages in formation of leaflets; 27, prickle on stem; 28, leaf with 5 leaflets.

29-36 *E. purpureus* : 29, portion of leaf margin; 30, part of petiole; 31-35, variation in size of leaves; 36, portion of stem.

1-28 from HKU VD 11; 29-36 from HKU VD 12.

Pl. 15. 1.12 *E. procerus* : 1-9 variation in form of leaf; 10, portion of vegetative branch; 11-12 same with flowers;

Pl. 16. 1-17 *E. purpureus* : 1-7 variation in leaf form; 8, portion of vegetative branch; 9-10 same with floral buds; 11, 12 portion of branch with flowers; 13-17 same with fruits.

Fig. M. 1-23 Venation in Rosaceae. 1-8, *Rubus*; 1, 2 *E. pungens*; 3, 4 *E. purpureus*; 5, 6 *E. laevigatus*; 7, *E. hirta*; 8 near *E. roseaeolius*; 9, Prunus amygdalus; 10, *spirea*; 11, *osa incana*; 12, Pyrus malus; 13, Fragaria vesca;

Fig. N. 1-8, *Rubus*; 1, 2 *E. pungens*; 3, 4 *E. purpureus*; 5, 6 *E. laevigatus*; 7, *E. hirta*; 8 near *E. roseaeolius*; 9, *E. coriophloens*; 10, *E. procerus*.

Pl. 17 1-15 Venation in Rosaceae. 1, *Fragaria* (middle portion of leaf, a); 2, *Pyrus malus* (middle, a); 3, Prunus persica (a, middle); 4, *Sprucea* (a, middle, b, tip); 5, Prunus amygdalus (a, middle); 6, *Potentilla* (b, tip); 7, *Cotoneaster* (a, middle). 8, *E. fruticosus* (a, middle, b, tip); 9, *E. laevigatus* (a, middle, b, tip); 10, *E. roseaeolius* (a, middle, b, tip); 11, *E. purpureus* (a, middle); 12, *E. pungens* (a, middle, b, tip); 13, near *E. roseaeolius* (a, middle); 14, *E. laevigatus var. roseaeolius* (a, middle, b, tip); 15, *E. procerus* (a, middle, b, tip).

All X33.5
Specimens examined : No. 107/VW of I.L.S. (Hardwan B. from Kashmir) in Herb. Kew. Nos \textit{V}D_{10} (Harwan) in Herb. KU.


Fig. L, 1-8

A large rambling shrub, without bristles or glandular hairs. Stem and branches stout, cylindrical, prickly, hairy, dull, thickly tomentose. Prickles short scattered. Leaves 3 foliate, about 9.8 cm long and 12 cm broad; leaflets glabrous beneath, acutely inciso-serrate, membranous; terminal one cordate, above green; petiolulate, usually 7.5 cm long, 6.8 cm broad, lateral ones subsessile, ovate-lanceolate, 1.25-6.8 cm long, 1-4.0 cm broad usually longer than broad. Flowers in terminal and axillary corymbose recemes, latter tomentose. Flowers long pedicelled, pedicel tomentose, flowers small; calyx tube short, lobes ovate-lanceolate, entire; petals much smaller, white. Fruit globose, black, small, of few drupes, stone pitted.

Specimens examined : Kishenganga, in Herb. Kew.

\textit{R. procerus} Muell

Fig. L, 1-28

A tall suberect sarmentose bush, stem arched, 5-angled, branches robust, tomentose, 80-170 cm long, 1.0-2.8 cm thick, bearing 12-35 nodes, the internode 6.5-11.0 cm long bearing 6-15 prickles per internode. Prickles, short, scattered, hooked, 4-9 mm long, 3-7 mm broad at base. Leaves large, hoary beneath with white cottony tomentum, 4.4-13.5 cm long, 5-19.7 cm
broad, bearing (3) 5 leaflets; a large number of variants are illustrated. Leaflets coriaceous, orbicular, obovate, or ovate-lanceolate, to acuminate-serrate; terminal the largest, 3.4-10.3 cm long, 2.3-7.6 cm broad, petiolulate, lateral ones 2.7-8.2 cm long, 1.1-5.7 cm broad, petiolulate to subsessile. Stipules subulate, glabrous, 6-8 mm long, 0.7-0.9 mm broad. Petioles long, slender, tomentose or glabrous, 2.2-7.0 cm long. Flowers in terminal small, panicles, latter 4-6.5 cm long, 2.8-4.5 cm in lateral spread, 3-7 flowers per panicle. Flowers small, 2.1-2.5 cm in size, pedicels stout, armed, hairy, 8 mm-2 cm long; calyx tube short, lobes woolly on both surfaces, ovate, acute, unarmed, entire, 4-7 mm long, 2-3 mm broad, reflexed in fruit; petals large, obovate, 9 mm-1.4 cm long, 7.7-8.3 mm broad, pink; stamens numerous, multiseriate; carpels many, glabrous. Bracts toothed, hairy, 7.2-9 mm long, 1.7-2.4 mm broad. Fruit globose, 1.8-2.8 cm in size, bearing 15-28, fleshy black drupes, latter 3-6 mm in size; seeds small, stone pitted.

Specimens examined: No. VD41 (Jethyore) in Herb.KU.