GEOGRAPHICAL DISTRIBUTION OF THE GENUS SOLANUM

The genus Solanum includes more than 2000 species distributed widely from Tropical to Temperate region of the world, and from Sea level to 12000 ft. (Fig. 1).

According to Index Kewensis (1955) 1175 species the largest number are reported from South and Central America, while 154 species have been reported from Asia, 649 species from Africa and Australia, and only 17 species are found growing in Europe which is the lowest number for any continent (Fig. 1).

Of the 154 Asian species, only 27 are recorded in Hooker's Flora of British India (1885), Santapau (1948) has added one more to this list by describing a new species S. maconii from Bombay. Out of these total 28 species, only 22 species are considered as genuine Solanum species and are indigenous to India (Santapau, 1948). These species form two natural groups:

1. Armed &
2. Unarmed.

The armed species include:

1. S.giganteum
2. S.ferox.
Fig. 1: Histogram showing distribution of the genus *Solanum* in world.

Fig. 2: Map showing distribution of the genus *Solanum* in India.
DISTRIBUTION OF THE GENUS SOLANUM IN INDIA

1. Solanum melongena
2. Solanum nigrum
3. Solanum atroviride
4. Solanum dulcamara
5. Solanum acaule
6. Solanum veyanum
7. Solanum verospernum
8. Solanum pubescens
9. Solanum hermannii
10. Solanum irav
11. Solanum guineense
12. Solanum fenox
13. Solanum barbatum
14. Solanum cajennense
15. Solanum mulaleum
16. Solanum torvum
17. Solanum indicum
18. Solanum gulosum
19. Solanum variegatum
20. Solanum suecoalbum
21. Solanum belladonna
22. Solanum quidites
23. Solanum aculeatissimum
24. Solanum macrocarpon
25. Solanum marmoratum
26. Solanum amethystinum
27. Solanum eximium
28. Solanum scarlatinum

DISTRIBUTION OF GENUS SOLANUM IN THE WORLD

Fig. 1

Fig. 2
3. *S.barbisetum*
4. *S.khasianum*
5. *S.wightii*
6. *S.torvum*
7. *S.indicum*
8. *S.melongena*
9. *S.coagulans* (described by C.B.Clarke in Hooker's Flora syn.to *S.incomum*.
10. *S.sarmentosum*
11. *S.surrateuse*
12. *S.maconii*
13. *S.trilobatum*
14. *S.gracilipes*.
15. *S.aculeatissimum*

The unarmed species includes:-

1. *S.nigrum*
2. *S.dulcamara*
3. *S.spirale*
4. *S.vagum*
5. *S.verbascifolium*
6. *S.pubescens*
7. *S.laeve*.

Of the Indian species, there are about 15 with spines while the rest are unarmed. Majority of the Indian species are found growing in tropical and sub-tropical zones of the sub-continent.

Among the unarmed species *S.nigrum* a cosmopolitan species is found growing in India from the Deccan Peninsula to the height of 12,000 ft. in Nubra valley of Ladakh. (B.K.Abrol No.4565).
S. verbascifolium and S. pubescense are the two sub-arboreal species standing apart from the other spineless species by their habitat and having densely woolly stem and leaves are distributed throughout tropical Asia. In Jammu & Kashmir State, S. verbascifolium is very common in Udhampur and its vicinity, it has been collected from lower Chamba range (L. D. Kapoor No. 1410) and from Reasi and Batal glen also (P. S. Jamwal No. 8365). These species are quite common in Western and Eastern India, and has been collected from Maredumali, Gudem, North Kanara from Bombay to Poona, and Harshnath Aravelli hills, etc. Both these species are very common in Deccan, oarnatic to the east slopes of the Western Ghats.

S. vagum, S. wightii and S. leuc is restricted in their distribution to Southern part of the India. These species are reported from Tinnevelley and other hills of Western Ghats, in N. Cirear and Madgol hills of Vizagapatam, etc. (A. W. Lashinton). Solanum wightii is very common in W. ghats and Eastern side of Nilgiris and hills of Coimbatore (Fischer).

Solanum dulcamera a species widely distributed in Europe, Western and Central Asia, China & Japan, is found in India only in Temperate Himalayas.

Of the remaining species, there are species which are only found in Eastern part of the sub-continent
and are only reported from Bengal and Assam. These are *S. spirale*, *S. sub-trucatum*, *S. barbigatum* and *S. sarmene-
losum*.

*S. khasianum* which is more widely distributed in Northern and Eastern parts of the country has also been reported from Nilgiris (Fyson). *S. noleatissimum* (a Malayan species) which was previously reported from Assam and Bengal only has recently been collected from Travancore also. *S. ferox* is distributed throughout India but is not very common. It has been collected from Konkan (Nimmo ex Graham) and from Belgaum by S.M. Country. It is quite common in the Western Ghat. *S. torvum* is distributed throughout India being very common in Bengal and Assam extending into Nepal and all along the Terai.

*S. inscum* a species quite closely resembling in morphology with *S. melongena* probably the ancestor of the cultivated brinjal is found growing in Northern as well as Southern part of the country. S. inscum Linn had not been described in Hooker's Flora of British India as such but is considered as a wild variety of *S. melongena* Linn (Hoxburg, 1832) described the two varieties of *S. melongena* Linn as two distinct species *S. longum* and *S. insanum*. Prain (1903) mentions the two varieties as var. esculenta (*S. longum*); var. insana (*S. insanum*).
Solanum coagulans an allied species to S. melongena Linn described in Hooker's Flora is taken by Cooke and Gamble as synonymous to S. incanum. Gamble describes two wild varieties of S. melongena as var. esculenta and var. insana. Willd has raised the variety insana to a specific rank. S. incanum (Linn) is very common in North Africa, Egypt and Turkey and in Balkan countries. In India, it has been collected from almost all parts of the country, being very common in Punjab. In Jammu & Kashmir State, it has been reported from Anantnag (K. S. Ahluwalia No. 5810) and is common in Jammu. It is reported in Flora of U.P., Baroda (19840) Pavagadh hills, Sind and in W. ghats.

A related species to Solanum incanum with much smaller fruits is Solanum indicum Linn which is distributed in Southern and Central India. It is very common in the Deccan and Konkan hills, Khandala (Graham, Cooke, Woodrow) and Mahableshwar (Cooke). It is reported to be a very common weed in Mahendragiri hills of Orissa. It is widely distributed in Southern part of the Sub-continent growing in all districts in the plains and the lower hills, chiefly by roadside on rubbish heaps and in similar places. S. indicum var. multiflorum is found only in W. ghats, Nilgiri and pulney hills.

Solanum melongena a popular vegetable
which is being widely cultivated throughout India, has wild varieties growing only in India (Filov 1940).

*Solanum melongena* var. *icanum* Prain is found growing wild throughout India. This variety has been raised to specific rank by wild. In South India, it is found in all districts, in waste places and by road-side. There are few other wild varieties of this species the majority being reported from Indo-Burma region (Filov 1940)

*Solanum surrattense* Burm. syn. *Solanum xanthocarpum* Schrad and Wendl is another species with a very wide distribution, is found as common road-side weed throughout India and is also common in Ceylon, S.E. Asia, Malaya, Tropical Australia and Polynesia. It has been collected from Konkan (Laep) Elephanta (Graham) Poona (Cooke) Pavagarh hill, Harshnath Aravelli hills (Santapau) Parlakimadi (Burkill, Grant and Candler 20579) from Jhunjhunu, Mandrill, Muzaffarnagar (Gupta 529) Lucknow, Manori and Madh, Hare islands in Bombay, Cuttack, Pondicherry, Rajasthan, Gorakhpur, Gujarat and also in Capecomerin.

*Solanum maconii* Santapau is another species very much allied in morphology to the *Solanum surrattense* and is reported only from Bombay province (Santapau 1946).

*Solanum giganteum* is quite common in higher hills of Bombay presidency and has been collected
from hills near Par (Graham) Harish Chamdragad (Gibson) Mahableshwar very common (Cooke) Belgaum (Ritchie) N.Circa hills of Vizagapatam (A.W.Lashington) Deccan in hilly country of Mysore and Coimbatore, W.ghat all districts. 

*Solanum trilobatum* Linn. is strictly restricted to warmer parts of the country. It is reported from Bijapur (Cooke) Ahmedgar (Cooke) Bharwar (Woodrow) Gujrat (Gibson and Graham) N.Circa, Deccan and Carnatic, especially near the coast.

There are quite a number of species, which have been introduced in India from different continents of the world and few others from other parts of Asia itself. *Solanum aculeatissimum* and *Solanum sarmentosum* included in Hooker's *Flora of British India* are the two Malayan species which now run wild in Assam, Bengal and Quilon travancore (*S.aculeatissimum*). Other species like *Solanum macranthum* & *Solanum sisyembrifolium* which are of South American origin ran wild in many parts of India specially South India. These species along with two Australian species *Solanum laciniatum* and *Solanum simile* are included in the present investigations.

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The species of non-tuberous Solanum under investigation fall in the following two main groups:

1. **Plants without Spines, Anthers Short & Thick.**
   
   A. **Plants climbers.**
   
   3. **Solanum seaforthianum Andr.**

This species is a herbaceous climber sometimes becoming woody. The stem is 3-4 ft. long and is glabrous throughout. Leaves on the lower parts of the plant are compound with three leaflets while the leaves on the upper part of the plant are simple, being lanceolate to ovate-lanceolate with entire or sometimes undulate margin. Peduncle is long and axillary in position bearing numerous flowers. The pedicel is swollen at the apex. The corolla is light purple in colour. Fruit is usually ovoid or nearly glabose.

B. **Plants not climbers, leaves simple and glabrous.**

**Solanum nigrum Linn:** This species is represented by plants which are mostly herbs. Calyx is saucer shaped, Corolla is nearly glabrous and white in colour. The ovary is usually glabrous while the base of the style is hairy. Naturally occurring population of this species had been classified into three type of the
covered by soft stellate, pale fulvous hairs. Stout, very sharp prickles with a broad hairy base and recurved shining tip is the characteristic of this species. The peduncle is lateral in position and usually paired, one bearing a single fertile flower and the other bear a racemose cyme of male flowers. Calyx is cup shaped and is prickly only in the fertile flowers. Ovary is glabrous at the base and hairy at the apex, the style is hairy below and shining above. Berry is sub-glabose and is yellow in colour when ripe.

5. Solanum indicum Linn:— A much branched under shrub covered with soft stellate hairs. Prickles very abundant, compressed stout and recurved. Peduncle is extra-axillary in position and is branched bearing 5-7 flowers. Calyx tube is small and the lobes are triangular and acute. Sometimes calyx is bilipped, the posterior lip being made up of 2 and anterior of (2) + 1 sepals. Ovary is glabrous. The style is covered by stellate hairs. Berries are yellow, very small and glabose.

6. Solanum khasianum Clarke:— A branched under shrub covered by yellow stiff shining hairs which are more pronounced on the stem and younger parts of plant. The plant is very prickly, prickle being white in colour, straight and very sharp. On the leave, the
the basis of fruit colour and size I(i) the fruits are 03-05 cm. in diameter and are shiny bluish black in colour. This type is the diploid form of the species, 

2n=24

ii. This form shows pseudo dichotomous branching and has much indented leaves. The fruits in this type are 06-08 cm. in diameter and are orange red in colour. This type is the tetraploid form. 2n=48

The third type is the hexaploid form of the species. The berries are purplish black in colour and are 09-11 cm. in diameter being bigger than both the above described types. 2n=72

Calyx is often obscure in the fruit.

C. Plants not olimber, Foliage and young branches stellately woolly.

3. Solanum pubescence Willd;— It is shrub 2-3 ft. high sometimes reaching the height of a small tree. Young branches and leaves are covered by a thick coat of soft stellate hairs, older portions of the plant are almost glabrous. Pedunole is axillary and manyfid bearing short pedicelld flowers. Calyx lobes are triangular in outline and are tomentose from outside. Ovary is usually glabrous, but the style is covered by stellate soft hairs. Corolla is purple in colour. Fruit is round and is yellow when ripe.

Plants with spines, Anther elongated and thin

4. Solanum incanum Linn;— A branched shrub
the prickles are found along the veins on both sides. They are altogether wanting from the floral parts. Peduncle is very obscure or all together wanting 4-5 flowers arise at one point. Calyx tube is small, the lobes are lanceolate covered by stiff hairs. Ovary is glabose and shining. Fruit is yellow and glabose.

7. *Solanum surratense* Burm: A diffuse herb 1-4 ft. in diameter. Stem and leaves are bright green in colour. Leaves being much indentated, the prickles are big, straight, very abundant and are yellow in colour. Peduncle is short, and is mostly extra-axillary in position. 2-3 flowers are borne at one point, all flowers are fertile, Pedicels and the calyx may be stellately woolly or may be glabrous. Berry is round and yellow in colour.

8. *Solanum aculeat-issimum* Jacq: An undershrub 1-2 ft. in height and is branched. Stem, leaves and calyx is beset with many small straight spines. On the younger parts of plants the spines are interspersed with stiff bristle. Leaves are solitary or in pairs, broadly ovate or ovate-cordate. Peduncle is extra-axillary in position, few fist bearing flowers in a cymose order. Calyx lobes are triangular bearing a number of spines, Corolla is snow white. Fruit is almost glabose with flattened corrugated ends. The berry is bright orange in colour and shining.
9. *Solanum sisymbriifolium* Lam:— The species is shrubby in habit. The main peculiarity of the species is the presence of yellow thin spines covering the stem and both surfaces of leaves, petioles and sepals. The upper younger parts of the plant are villose due to the presence of glandular hairs. Inflorescence is terminal which soon becomes lateral. Flowers are numerous, white in colour. Berries are round and are red in colour almost surrounded by ovate lanceolate calyx lobes. This species has been introduced in India from South America.

10. *Solanum ferox* Linn: A sub-erect shrub up to 4 ft. in height. Stem is herbaceous, prickly, prickles are short stout with a very broad base and recurved tip. Peduncle is short enclosed by the leaves. Inflorescence is a raceme. It is woolly due to the presence of thick coat of stellate as well as needle like hairs. Ovary is also covered by stiff shining yellow hairs. Berry is round, yellow in colour and hissute.

11. *Solanum macranthum* Dun:— A shrub or a small tree with yellowish brown straight prickles. Leaves are large 30–40 cm. in length and are sinuously and slenderly lobed. On the under surface of the leaves there is present a thin coat of stellate hairs imparting a pale colour to the leaf. The pubescence is more
denser on the younger parts of the plant. Peduncle is long 7-12 fid bearing flowers in a simple racemose order. Young floral buds are glandular imparting a sticky touch. This plant is a native of South America and has been introduced in India for its ornamental value which is due to its guardy violet flowers.

12. *Solanum torvum* Swartz: - A shrub sparingly spiny, spines straight. When in seedling stage resemble *Solanum melongena* due to absence of spines and shape of leaves. Peduncle is short, extra-axillary in position. Flowers are arranged in many fid racemose fashion or sometimes in a dichotomous manner. A thin layer of hairs is present on all parts of plants. Calyx lobes are sparingly hairy. Ovary as well as style is glabrous. Berry is round and yellow in colour.

13. *Solanum melongena* Linn: - This is a herbaceous species which is sometimes armed. Peduncle is mostly extra-axillary and like *Solanum incanum* it is paired one bearing a fertile flower and the other raceme of male flowers or in other words the whole inflorescence could be considered as a sessile raceme with only the lower most flower fertile. Calyx lobes in flower is oblong to linear. The lobes of corolla are hairy from outside. Style is mostly stellately pubescent or it may be glabrous. Ovary is oval in shape and glabrous. Berry shows great variation in shape from round and small to
oval big and very long. On the shape of the berries various varieties are distinguished.