

Cytology

KARYOMORPHOLOGICAL STUDIES IN SPINACEOUS SPECIES OF *SOLANUM*

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Somatic chromosomes ($2n = 24$) of 12 spinaceous species of *Solanum* have been analysed. The karyotypes of most of these taxa have not been previously described. Relatively long chromosomes are noticed in *S. robustum*, *S. wendlandii*, *S. sisymbriifolium* and *S. ferox*. All have a majority of submedian chromosomes, but a single pair of subterminal chromosomes is seen only in five species. Majority of the species reveal two pairs of satellites. *S. torvum* has one to two pairs of tandem satellites. One pair in *S. wendlandii*, *S. aculeatissimum* and two pairs in *S. sisymbriifolium* are seen with secondary constrictions.

INTRODUCTION

The genus *Solanum* includes approximately 2000 species, of which about 25 species are represented in South India. Distribution, breeding behaviour and certain cytological aspects of South Indian Solanums have been dealt earlier (Chennaveeraiah and Krishnappa 1965, 1966, 1968; Krishnappa and Chennaveeraiah 1965; Krishnappa 1968). As far as the chromosome number is concerned, most of them give an evidence of a natural assemblage having $2n = 24$. Among the spinaceous members, Sharma and Bal (1961) have reported the morphology of somatic chromosomes in *S. indicum*, *S. torvum* and Rai (1959) in both the cultivated and wild varieties of *S. melongena*. The present paper deals with *S. robustum*, *S. wendlandii*, *S. sisymbriifolium*, *S. ferox*, *S. marginatum*, *S. aculeatissimum*, *S. eleagnifolium*, *S. giganteum*, *S. xanthocarpum*, *S. trilobatum*, *S. torvum* and *S. khasianum*. The karyotype in most of them are discussed for the first time.

The chromosomes, in general, are small, their length ranging from 1 to 6 μ . On the basis of their length, position of primary and secondary constrictions and satellites the following chromosomal types have been represented while describing the karyotypes:

The types A, B, C and D include long chromosomes (4–6 μ), of which A is with satellite, B with secondary constriction, C with median primary constriction and D with submedian primary constriction.

Among the medium chromosome types E, F, G and H (2.5–4 μ), E has satellite, E' tandem satellites, F secondary constriction near the middle of the chromosome

arm, F' secondary constriction near the centromere, G median primary constriction and H submedian primary constriction.

Short chromosome types (2–2.5 μ), I reveals satellite, I' tandem satellites, J median primary constriction and K submedian primary constriction.

Very short chromosomes (less than 2 μ) possess only 3 types namely, L bearing satellite, M bearing median primary constriction and N bearing submedian primary constriction.

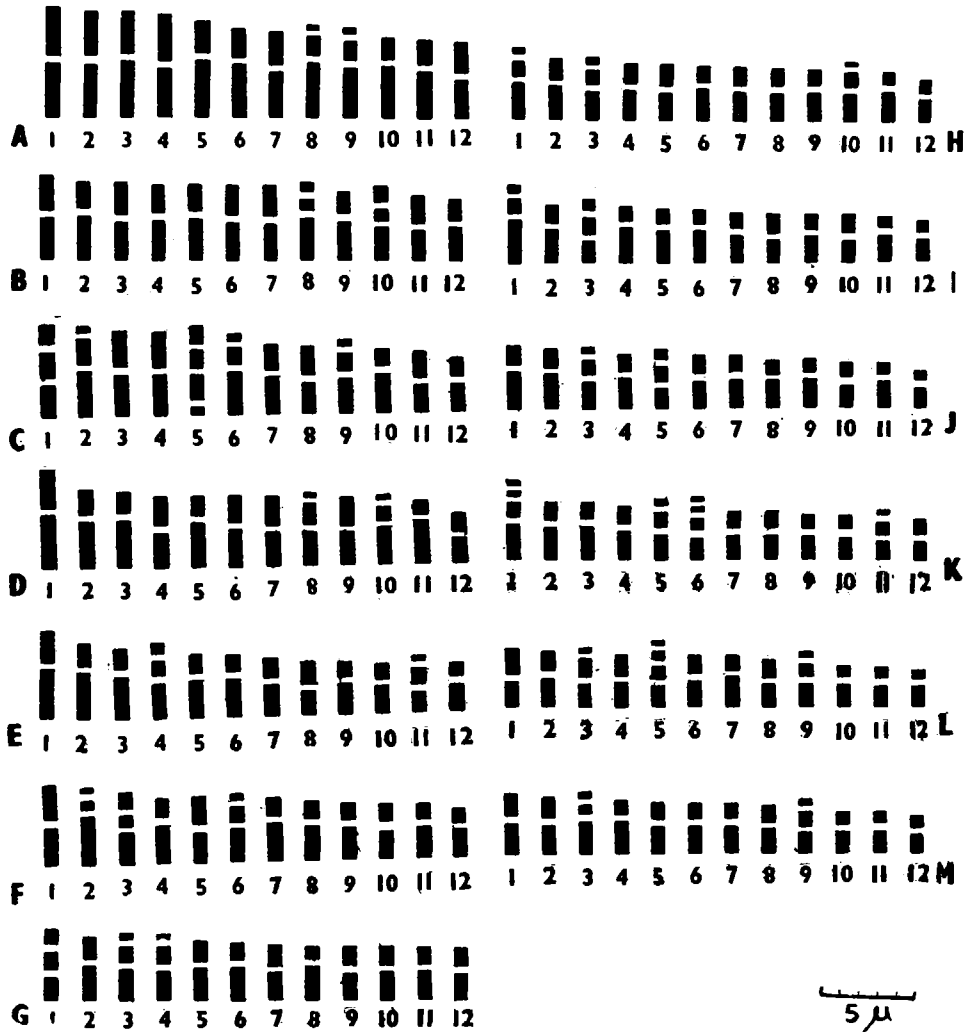
Total haploid chromatin length and karyotype formula of respective species of *Solanum* are given in Table I. Idiograms of the somatic metaphase chromosomes in different species are represented in Figs. A–M.

TABLE I
Chromatin length and chromosomal types in respective taxa

Species	Total haploid chromatin length (μ)	No. of types from karyotype formula
1. <i>S. robustum</i> Wendl.	53.2	2A + 4C + 10D + 2E + 6H
2. <i>S. wendlandii</i> Hook.	41.1	2D + 2E + 2F' + 4G + 14H
3. <i>S. sisymbriifolium</i> Lam.	40.8	4A + 2B + 2C + 4E + 2F + 4G + 4H + 2K
4. <i>S. ferox</i> L. var. <i>majus</i>	39.9	2D + 4E + 4G + 12H + 2K
5. <i>S. marginatum</i> L.	33.9	2D + 2E + 10H + 2I + 2J + 6K
6. <i>S. aculeatissimum</i> Jacq.	33.9	4E + 2F' + 4G + 8H + 6K
7. <i>S. eleagnifolium</i> Cav.	30.9	6E + 6H + 12K
8. <i>S. giganteum</i> Jacq.	30.0	4E + 2G + 8H + 2I + 6K + 2N
9. <i>S. xanthocarpum</i> Schrad & Wendl.	28.1	4E + 4H + 4J + 10K + 2N
10. <i>S. trilobatum</i> L.	27.8	2E + 6H + 2I + 12K + 2N
11. <i>S. torvum</i> Swartz		
Collection 435	27.6	2E + 2E' + 6H + 2I' + 8K + 2L + 2M
—do— 44	26.2	2G + 2H + 4I + 2I' + 2J + 6K + 2L + 4N
12. <i>S. khasianum</i> Clarke	26.9	2E + 4H + 2I + 10K + 6N

DISCUSSION

Though the chromosomes are small, a marked difference among them is seen with respect to their absolute length, primary and secondary constrictions. The chromosomes of *S. robustum* are longer than those of any other species. However, relatively long chromosomes are seen in *S. wendlandii*, *S. sisymbriifolium* and *S. ferox*. In *S. eleagnifolium*, *S. xanthocarpum*, *S. trilobatum*, *S. torvum* and *S. khasianum* majority of the chromosomes are short. Very short chromosomes are seen in five species. Although the chromosomes with submedian centromeres are in majority, every species has at least one to two pairs with nearly median centromeres. One pair with nearly subterminal primary constrictions is noted in *S. wendlandii*, *S. aculeatissimum*, *S. eleagnifolium*, *S. khasianum* and two pairs in *S. ferox*.



Figs. A–M. Idiograms of the somatic metaphase chromosomes in the following species of *Solanum*: A, *S. robustum*; B, *S. wendlandii*; C, *S. sisymbriifolium*; D, *S. ferox*; E, *S. marginatum*; F, *S. aculeatissimum*; G, *S. eleagnifolium*; H, *S. giganteum*; I, *S. xanthocarpum*; J, *S. trilobatum*; K, *S. torvum* (collection 435); L, *S. torvum* (collection 44); M, *S. khasianum*.

The karyotype of *S. sisymbriifolium* is distinct from others in having two pairs of chromosomes with secondary constrictions. Further, in *S. wendlandii* and *aculeatissimum* the secondary constrictions in one pair are found near the centromere as knob like structures. Though majority of the species have two to three pairs of satellites their size is variable in different taxa. Thus large satellites are absent in *S. torvum*, *S. ferox*, and *S. khasianum*. In addition, *S. torvum* has one to two pairs of tandem satellites. The species studied in the present work, therefore, could be identified on the basis of morphologically separable karyotypes.

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