Summary

Karyomorphological and Cytotaxonomic studies have been made in 36 species of Crotalaria involving 200 collections from South-western India, a few other parts of India and from other countries from which seeds could be obtained. Historical accounts and taxonomic developments in the genus have been traced to the present day.

Morphological descriptions are given in detail for each species and varieties. Polygraphs are drawn for each collection based on morphological characters of the individual to know the variation pattern. Habit, nature of pubascence, nature, shape and size of leaf or leaflets, nature of stipules, nature of bract and bracteoles, nature of pod and number of seeds etc. are taken into considerations for delimiting species.

The present study reveals presence of diploids and tetraploids in the genus. However, the chromosome number 2n=16 is predominant. Exceptions like 2n=14 (C. incana) and 2n=32 (C. nitens, C. paulina and C. stipularia) are noticed in a few species. The basic number for this genus is x = 8. The reduction in chromosome number in case of C. incana (2n=14) is due to aneuploidy loss.

The karyomorphological study of the different species reveals the presence of five types of chromosomes viz., median, sub-median, sub-terminal, terminal satellited and interstitial satellited chromosomes. The chromosome size

varies from 1.85 to 7.03 μ. Chromosome with submedian centromeres are in high frequency. At least one pair of interstitial satellited chromosome is observed both in diploids and tetraploids. This is very characteristic of the genus.

In a few species morphological specialisation is associated with the increase in chromosome length the peak of which is seen in showing end point of a trend of G. orixensis, G. inoana, G. barkae, and G. ianreese. In some species, different collections show heteromorphism in their karyomorphology and phenotype pointing towards the existence of cytotypes and ecotypes as in G. alata, G. brownei, G. inoana, G. juncea, G. lanfumifolia, G. retusa, G. serissa and G. verrucosa.

Meiosis in most of the species is normal. However, abnormalities like non-congression, non-disjunction, stickyness, laggards, bridges univalents and multivalents, unequal distribution, micronuclei, hypo- or hyper number of nuclei and chromosomes are noticed in a low percentage. The occurrence of laggards and bridges at anaphase-I may point to the existence of structural differences and inversion heterozygotes amongst the "genomes" involved.

The occurrence of cytomixis is encountered for the first time in species like G. alata, G. ianreese, G. inoana, G. juncea, G. retusa, G. sheveroroensis, G. zanzibarica, G. mucronata, G. nitens, and G. stipularis, but is far

very low frequency. Therefore, it does not effect the fertility of the species in general. In a few species as in *G. juncea* and *G. inconna* extra chromosomes are noticed i.e. P.S.Cs. The occurrence of extra chromosome may be due to cytomixis. Cytomixis might have also played the role in the origin of tetraploids like *G. nitens*, *G. pauliae* and *G. stipularia*.

Breeding experiments show that there are well developed reproductive barriers between the species.

On the grounds of cytotaxonomical considerations, it is concluded that all the species are well differentiated. The merging of *G. speectabilis* Rota. into *G. seriesa* etc. by Hooker (1879) has been supported to the extent of giving the varietal rank to *G. speectabilis* Both of *G. seriesa* etc. do exist karyomorphological variations within them.

On the basis of present study it is felt necessary to elevate *G. brunei* Bert ex DC., *G. aucrnata* Benv., *G. striata* DC., and *G. striata* var. *aquifolia* Cria. to varietal ranks of *G. pallida* Ait. instead of keeping them as synonyms of *G. pallida* Ait. as done by Polhill (1964).

The present study does not support Hooker and Jackson (1894) in merging *G. saltiana* Andr. with *G. brownei* as these differ both in karyomorphology and phenology.

The reduction in chromosome number (2n=14) in *G. linifolia* is due to reciprocal translocation resulting in loss of

centromere without the loss of genetic material.

It is suggested to elevate the sub-section of Incana of Bentham (1048) to sectional rank on the grounds of chromosome number which is n=7 only in this sub-section and not 8. The chromosomes are longer than the rest, and all species belonging to this sub-section are pubescent with a few flowered racems.

From the present study, it is clear that evolution in this genus is from members with simple leaves to trifoliate and to multifoliate leaves. Speciation is also through chromosomal repattering and gene mutation. The interrelationships among different species is reticulate but it looks that evolution is parallel among the three groups with simple Trifoliate and Multifoliate leaves.