

II. PREVIOUS WORK

Regarding cytological work in the genus, most of the earlier works were confined only to the determination of chromosome numbers. They are:

<u>Crotalaria</u>	<u>secytiaca</u> Benth.	2n=10
	Frahn-Lelived (1957)	
"	<u>agatiflora</u> Schweinf	2n=10
	Frahn-Lelived (1957)	
"	<u>alata</u> Lam.	2n=10
	Kawakami (1930)	n=5
"	<u>albida</u>	n=5
	Ghosh and Choudhary (1967)	
"	<u>anagyroides</u> H.B.K.	2n=10
	Kawakami (1930), Rao (1950), Shibata (1962)	
"	<u>amazonae</u>	2n=10
	Shibata (1962)	
"	<u>arenaria</u> Benth.	2n=10
	Hagerup (1932)	
"	<u>aravica</u> Welw	n=5
	Senn (1938)	
"	<u>astragalina</u>	2n=10
	Magoon et al. (1963)	
"	<u>atrorubens</u> Hochst ex Benth.	2n=10
	Miege (1960)	

<u>Orotalaria</u>	<u>barkna</u> Schweinf	2n=16
"	Miege (1960)	
"	<u>bifaria</u>	n=8
	Rao (1950)	
"	<u>Biflora</u>	2n=16
	Rao (1950)	n=8
"	<u>breviflora</u>	n=8
	Raghavan and Venkatasubban (1943)	
"	<u>brownei</u> Bert ex DC.	2n=16
	Srivastava (1958), Kempans (1960)	
"	<u>Burhia</u> Buch-Ham.	n=8
	Malik (1960)	
"	<u>Burhia</u> Hamilt.	2n=16
	Datta and Choudhary (1964)	
"	<u>calycina</u>	2n=16
	Fulzele (1966)	
"	<u>calycina</u> Schrank.	2n=16
	Frahm-Leliveld (1960)	
"	<u>cosoga</u> Bak.	2n=16
	Miege (1962)	
"	<u>cylindrocarya</u> Walp.	2n=16
	Frahm-Leliveld (1960)	
"	<u>Dilloniana</u> Baker	2n=16
	Atchison (1950)	
"	<u>obovoides</u> Walp.	2n=16
	Frahm-Leliveld (1960)	

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<u>Crotalaria</u>	<u>anacalis</u> Baile ex DC.	2n=16
	Frahn-Leliveld (1960), Niese (1960)	
"	<u>erecta</u> Schins.	2n=16
	Turner and Fearing (1959)	
"	<u>falcata</u> Vahl ex DC.	2n=16
	Niese (1960)	
"	<u>falcata</u>	2n=20
	Datta and Mondal (1968)	
"	<u>ferruginea</u> Grab.	2n=16
	Datta and Biswas (1968)	
"	<u>fulva</u>	2n=16
	Sichhorn (1937)	
"	<u>glauca</u> Willd.	2n=14-16, 18
	Frahn-Leliveld (1960)	
"	<u>glaucoidea</u> Bak. f.	2n=16
	Niese (1960)	
"	<u>goorensis</u> G and P.	2n=16
	Atchison (1950), Frahn-Leliveld (1960), Kempans (1960), Niese (1960), Bouharnont (1961)	
"	<u>grantiana</u>	2n=16
	Ehibata (1962)	
"	<u>Grantiana</u> Naras.	2n=16
	Atchison (1950)	
"	<u>hirta</u>	n=8
	Rao (1950)	



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	<u>Crotalaria incana</u>	2n=14 n=7 2n=14
	Rao (1950), Shibata (1962), Gagoon <u>et al.</u> (1963)	
"	<u>incana</u> Linn.	2n=14
	Senn (1938) Atchison (1950), Krapovickas and Pudis de Krapovickas (1957)	n=7
"	<u>intermedia</u> Kotschy	2n=16
	Atchison (1950), Kempama (1960), Sybenga (1960), Shibata (1962)	
"	<u>involutensis</u> Welw.	2n=16
	Atchison (1950)	
"	<u>junces</u>	2n=10 n=8
	Ramanujan <u>et al.</u> (1933), Breslavets <u>et al.</u> (1934), Shibata (1962)	
"	<u>junces</u> Linn.	n=10 n=8
	Datta (1933), Datta and Biswas (1962)	
"	<u>laburnifolia</u> L.	2n=16
	Raghavan <u>et al.</u> (1943), Turner and Fearing (1959)	
"	<u>laburnifolia</u>	2n=16
	Ramanujan <u>et al.</u> (1933)	

		2n=16
	<u>Grotolaria lasiocarpa</u> Hochst.	
	Frahm-Lolived (1960)	
"	<u>lanceolata</u> E. Mey	2n=16
	Raghavan and Venkatasubban (1943), Atchison (1950)	n=8
"	<u>lantana</u>	2n=16
	Kompanna (1960)	
"	<u>linifolia</u>	2n=16
	Pulzele (1966)	
"	<u>maxillaris</u> Klots.	2n=16
	Atchison (1950), Magoon <u>et al.</u> (1963)	n=8
"	<u>medioginea</u> var. <u>neglecta</u>	2n=16
	Rao (1950), Magoon <u>et al.</u> (1963), Ghosh and Choudhary (1967)	5 _{II} , 6 _I n=10
"	<u>medioginea</u> Lam. var. <u>luxurians</u>	2n=16
	Raghavan and Arora (1958)	n=8
"	<u>mesopontica</u> Taub.	2n=16
	Turner and Fearing (1959)	
"	<u>macronata</u> (striata) Desv.	2n=16
	Fenn (1938), Atchison (1950)	n=8
"	<u>macronata</u>	2n=16
	Shibata (1962)	
"	<u>macronata</u> Desv.	2n=16
	Pritchard and Gould (1964)	
"	<u>mysorensis</u>	2n=16
	Shibata (1962), Pulzele (1966)	

		16
	<u>Crotalaria naragatensis</u> Hutch	2n=16
	Frahn-Leliveld (1960)	
"	<u>obovata</u> Don.	n=8
	Hagerup (1932)	
"	<u>ochroleuca</u> G. Don.	2n=16
	Frahn-Leliveld (1960)	
"	<u>orixensis</u>	2n=16
	Fulzele (1966)	
"	<u>paulina</u>	2n=32
	Shibata (1962),	2n=16
	Datta and Mondal (1968)	
"	<u>perrotettii</u> DC.	2n=16
	Frahn-Leliveld (1960),	
	Miege (1962)	
"	<u>pilosa</u>	2n=32
	Atchison (1950),	
	Shibata (1962)	
"	<u>podocarpa</u> DC.	2n=16
	Miege (1960)	
"	<u>polysperma</u> Kotschy	2n=16
	Frahn-Leliveld (1957)	
"	<u>prostrata</u> Roxb.	n=8
	Ghosh and Ghoshary (1967)	
"	<u>pusilla</u>	2n=32
	Atchison (1950)	
"	<u>pusilla</u> Ort.	n=16
	Turner (1958)	

		2n=16
<u>Crotalaria quinquefolia</u> L.		
	Rao (1943), Magoon <u>et al.</u> (1963)	10 _{II+2I}
" <u>retusa</u>		2n=16
	Miege (1960), Magoon <u>et al.</u> (1963), Fulsele (1966)	
" <u>retusa</u> L.		2n=16
	Kawakami (1939), Ramanujan <u>et al.</u> (1933), Frahm-Leliveld (1960)	n=8
" <u>rotundicarnata</u> Baker		2n=16
	Ghosal (1962)	
" <u>scutellata</u> L.		2n=32
	Turner and Pearing (1960)	
" <u>saharae</u> Coseon		n=8
	Reese (1957)	
" <u>saltiana</u> Andra.		2n=16
	Atchison (1959), Srivastava (1958)	
" <u>saltiana</u>		n=8
	Uhuang <u>et al.</u> (1963)	
" <u>sericea</u> Retz.		2n=16
	Miege (1960)	
" <u>spartea</u> Planch		2n=16
	Frahm-Leliveld (1960)	
" <u>spectabilis</u> Roth.		2n=16
	Atchison (1957), Datta and Mondal (1968)	

<u>Crotalaria species</u>	n=9
Turner and Irwin (1961)	
" <u>sphaerocarpa</u> Ferr ex DC.	2n=16
Miege (1960)	
" <u>spinosa</u> Hochst.	2n=16
Siehorn (1937)	
" <u>stipularia</u> Desv.	n=10
Turner and Irwin (1961)	
" <u>striata</u>	2n=16
Shibata (1962), Magoon et al. (1963), Pulsele (1966)	
" <u>striata</u> var. <u>noutifolia</u>	2n=16
Rao (1950)	n=8
" <u>striata</u> DC	n=8
Frahm-Leliveld (1937)	
" <u>striata</u> Schrank	2n=16
Turner and Irwin (1961)	
" <u>usaramensis</u> Bak. fil.	2n=16
Kawakami (1930), Rao (1950), Shibata (1962)	
" <u>usaramensis</u> Baker	n=8
Frahm-Leliveld (1937), Datta and Biswas (1962) Pritchard and Gould (1964)	2n=16
" <u>usorensis</u>	n=8
Engelmann and Venkatasubban (1943)	

<u>Crotalaria</u> <u>valtonii</u> Baker	2n=16
Kawakami (1950)	
" <u>verrucosa</u>	2n=16
Fulzele (1966)	
" <u>verrucosa</u> L.	2n=10 n=5
Ramanujan <u>et al.</u> (1933), Atchison (1950), Datta and Biswas (1962, 1963)	
" <u>virgulata</u> Klotsch	2n=16
Turner and Fearing (1959)	
" <u>vogelii</u> Benth.	2n=16
Frabu-Leliveld (1960)	

Apart from chromosome number, some have studied meiosis. Mostly it is found to be normal as reported by Ramanujan et al. (1933) in some species. Benerji and Samal (1939) studied microsporogenesis of C. juncea and stated that metaphase-I is normal. In anaphase-I two chromosomes were seen to move faster than the rest. Frivestava (1959) has discussed the cytotaxonomic position of C. Brownei and its relation to C. saltiana. He is of the opinion that they are independent species and C. Brownei is primitive to C. saltiana in evolutionary history. In 1960 Sybenca has studied non-random distribution of chiasmata in C. intermedia. Bouharmont (1961) got the tetraploid C. gossensii Guill et Perr. (2n=16, 32) by

treating the seedling with colchicine. He found that in the tetraploid plant there is lot of sterility. He attributes that the sterility is due to (i) meiotic irregularities in the pollen mother cells, (ii) incomplete development of embryo sac and (iii) slow growth in the development of the pollen tube.

Datta and Biswas (1962) studied meiosis and chiasma frequencies in C. ussuriensis, C. lutea and C. ferruginea. They reported hypo- and hyperploidy in these species, and a comparative study of chiasma frequency reveals that recombination of characters is maximum, moderate and minimum in these species respectively.

In the year 1963, Magoon et al. studied Cytomorphological characters of 15 species of Crotalaria and discussed their genetical and cytological aspects in detail. The importance of conducting combined study of morphological, genetical and cytological aspects in finding out a more natural classification of the species of Crotalaria is stressed. Interspecific hybridisation in various combinations was also attempted among the species of Crotalaria. The results and the significance of such studies are considered. Datta and Ghoshal (1963) studied the karyotypes in the three species of Crotalaria (C. ganensis Jacq, C. ferruginea Crab and C. mysorensis Roth.). They are of the opinion that all these species stand between primitive and advanced stages in evolution.

While making karyotypic study in two species of Crotalaria Datta and Biswas (1963) have come to the conclusion that C. saltiana and C. ferruginea stand intermediate between primitive and advance stages in evolution.

Datta and Choudhury (1964)¹⁹⁶⁶ while studying meiosis and chiasma frequencies in C. ferruginea Grah. have observed multivalents which give the clue for doubting the apparent basic number which is 8. Karyotypic analysis in C. burhia Reault suggests that this species is more towards primitive stage in the course of evolution. In the year¹⁹⁶⁶ Datta and Neogy have studied the inter-specific hybridisation in C. ferruginea × C. mysorensis and C. brownei × C. labrunifolia reciprocally and got viable seeds except in the case of C. ferruginea ♂ × C. mysorensis ♀ and in reciprocal crosses between C. ferruginea and C. usaramoensis.

The meiotic studies of C. rotundicarinata H.G. Baker and C. retusa Linn. by Datta and Neogy (1964) revealed the presence of quadrivalents in both and univalents in the former species. Irregular segregation and lagging have been observed in anaphase-I and IV. Chiasma frequency study shows that recombination of characters is more in C. retusa than C. rotundicarinata. Ghoshal and Datta (1964) during their further study on the meiosis of C. saltiana Andr. found that at late diakinesis the number of bivalents varied from 5 to 8. Lagging

chromosomes and unequal division were observed. Chosh and Choudhary (1966), studied meiosis of G. Prostrata, G. medicaginea and G. albida and noted the univalents in G. Prostrata and G. medicaginea, quadrivalents in G. medicaginea. Chiasma frequency is maximum in G. Prostrata and lowest in G. medicaginea and moderate in G. albida. In the case of G. medicaginea, $n=16$ is a new record from them. Pulselo (1966) has observed normal meiosis in G. calycina, G. linifolia, G. mysorensis, G. orizensis, G. retusa, G. stricta, and G. verrucosa.

Karyotypic study in G. juncea Linn. G. sericea Retz. and G. anagyroides H.B.K. by Datta and Ganguly (1967) shows a good deal of similarities amongst the chromosome complements of the three species. Two pairs of comparatively long chromosomes, each with primary and secondary constrictions are common in all the three species. A few dissimilarities among the chromosome complements of the three species have also been observed.

It shows that only a few species in the genus Crotalaria are studied cytologically, but this cytological work is incomplete because only a few aspects are investigated. Literature on the cytological work on the Leguminosae till today is only 13.2% (Bir and Sidhu 1967).