SUMMARY

Chromosome numbers in 88 accessions belonging to 70 species in 22 genera were determined during this study. Of these the cytology of 56 accessions belonging to 47 species in 20 genera has been reported for the first time from South India. This includes first chromosome number determinations* in 29 species and new chromosome counts** in 11 species. The chromosome numbers observed varied from 2n=10 to 2n=68 as shown below:

Taxon	Chromosome number	
	n	2n
Ocimum basilicum	24	48
**O. basilicum* var. *pilosum*	34	68
O. basilicum var. *purpurascens*	-	48
O. canum Accession No.1	13	26
**Accession No.2	26	-
O. gratissimum	20	40
O. tenuiflorum 'green'	17	-
O. tenuiflorum 'purple'	16	32
O. tenuiflorum 'purple-green'	18	-
***Becium filamentosum* 'green'	11	22
***B. filamentosum* 'purple'	11	22
**Orthosiphon aristatus*	25	50

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Taxon	Chromosome number	
	n	2n
O. thymiflorus Accession No.1	13	26
*Accession No.2	14	28
**Accession No.3	12	-
*Acrocephalus hispidus	9	18
*Geniosporum elongatum	9	-
G. tenuiflorum	9	-
Basilicum polystachyon	15	30
Plectranthus barbatus		
*Accession No.1 (wild)	15	30
*Accession No.2 (cultivated)	15	30
Plectranthus caninus	15	30
P. coesta	12	24
P. fruticosus	28	56
*P. nilgherricus	12	24
P. wightii Accession No.1	12	-
Accession No.2	12	-
Accession No.3	12	-
Coleus amboinicus	17	34
C. malabaricus	14	28
*C. thyrsoideus	14	-
*C. zeylanicus	14	-

contd...

Taxon	Chromosome number	
	n	2n
*Anisochilus argenteus	26	-
A. carnosus	17	34
*A. scaber	17	34
**Hyptis rhomboidea	14	28
H. suaveolens	14	28
Lavandula vera	24	-
Pogostemon auricularius	17	34
P. benghalense	32	64
*P. gardneri	16	-
*P. heyneanus	32	64
*P. mollis	16	32
*P. paniculatus	16	32
**P. purpurascens	17	34
P. wightii *Accession No.1	16	-
**Accession No.2	32	64
*Eusteralis stellata var. roxburghiana	14	-
*E. tomentosa var. gracilis	16	32
Colebrookea oppositifolia	16	32
**Calamintha umbrosa	5	-
**Salvia azurea	22	-

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Taxon	Chromosome number	
	n	2n
S. coccinea var. red Indian	11	22
S. coccinea var. pink pearl	11	-
S. coccinea var. white dove	11	-
S. grahamii	11	-
**S. hians	9	-
**S. involucrata	11	22
S. leucantha	11	22
S. rutilans	10	-
S. splendens	22	-
*S. splendens var. alba	22	-
*S. splendens var. atropurpurea		44
Rosemarinus officinalis	12	-
Anisomeles indica	17	34
*A. indica var. typica	17	-
A. malabarica	16	32
Scutellaria violacea	13	-
S. violacea var. colebrookiana	13	-
*S. wightiana	12	-
*Leucas biflora	14	28
*L. biflora var. procumbens	14	28

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Taxon	Chromosome number	
	n	2n
**L. chinensis	14	28
L. diffusa	11	-
L. eriostoma	-	22
L. helianthemifolia	11	-
L. indica	11	-
L. lancefolia	11	-
*L. marrubioides	14	28
L. martinicensis	14	-
L. plukenetii	11	-
*L. prostrata	11	22
L. vestita	-	22
L. zeylanica	11	-
*Gomphostemma eriocarpon	-	34
*G. heyneanum	17	34
*Teucrium tomentosum	16	32

All the taxa studied showed regular meiosis. The mitotic chromosomes of the various species examined were found to be relatively small ranging in length from 0.4-1.3 µm in Plectranthus fruticosus to 0.9-4 µm in Ocimum basilicum var. purpurascens.

On the basis of the chromosome numbers determined in the present study and those reported previously it is suggested that the presently investigated 22 genera have basic chromosome numbers as shown below.

Name of the genus	Basic chromosome number
Ocimum	10, 12, 13, 16
Becium	11, 12
Orthosiphon	14
Acrocephalus	9
Geniosporum	9
Basilicum	15
Plectranthus	12, 14
Coleus	12, 14, 15, 16, 17
Anisochilus	13, 16, 17
Hyptis	8
Lavandula	6
Pogostemon	16, 17
Eusteralis	14, 16
Colebrookea	16
Salvia	6, 7, 8, 9, 10, 11, 13, 15, 17
Rosemarinus	12

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Name of the genus	Basic chromosome number
Anisomeles	17
Scutellaria	8,9,10,11,12,13
Leucas	11,14
Gomphostemma	17
Teucrium	8,9,13

It is suggested that the Labiatae has two ancestral numbers: plants with small-sized chromosomes probably have evolved from x=7 and those with comparatively large-sized chromosomes from x=5. The basic chromosome numbers in the family such as 9 and 18; 10, 20 and 19; 11, 22 and 21 might have derived from x=5 while the basic chromosome numbers such as 14 and 13; 16, 15 and 17 might have derived from x=7, by dysploidy and/or polyploidy followed by aneuploidy.

Nearly 19.3 per cent of the members of South Indian Labiatae examined during the present study are polyploids. The incidence of polyploidy among the South Indian Labiatae is found to be very low compared to that from other phytogeographic regions such as the Himalayas, Central India, Canada, Britain and West Africa.

Majority of the polyploid species in the South Indian Labiatae (88.2%) are tetraploids. The highest level of polyploidy observed is 8x - in Lavandula vera. Intraspecific polyploidy is also found in Ocimum canum (n=13 and 26) and Pogostemon wightii (n=16 and 32).

The basic chromosome numbers such as x=6, 8, 9,11, 13,15,17,19,21,25 and 29 seen in different genera are shown to be the result of dysploid changes at different levels of ploidy and the subsequent polyploidization of these dysploid numbers. Intraspecific dysploidy is observed in Ocimum tenuiflorum (n=16,17 and 18) and Orthosiphon thymiflorus (n=12,13 and 14). In addition to these, new chromosome numbers other than already known are observed in Plectranthus barbatus, Hyptis rhomboidea, Lavandula vera, Calamintha umbrosa, Anisomeles malabarica, Scutellaria wightiana and Leucas chinensis indicating dysploid or aneuploid changes within them. Based on these facts it is suggested that dysploidy is an active mechanism of cytological evolution among the South Indian members of the Labiatae.

The classification of the family is discussed in the light of cytological data obtained. A composite chart showing the classification of the genera reported in the study according to the major systems of classification of the family and the probable line of evolution of chromosome numbers in them is given.

There is no clear correlation between the basic chromosome numbers and the subdivisions of the family according to any one of the major systems of classification. The present study, however, revealed that members of the subfamily Lamioideae of Erdtman are predominantly 7-based and have small chromosomes while a large majority of the members of the subfamily Nepetoideae are 5-based and have large chromosomes.

On the basis of available cytological data the separation of Pogostemon by Erdtman and also of Dysophylla (now Eusteralis) and Colebrookea by Wunderlich from the rest of the genera belonging to tribe Mentheae of Bentham (1876) or Pogostemoneae of Briquet (1895-'97) and their inclusion in the subfamily Lamioideae is supported.

The presence of n=12 large bivalents in the genus Rosemarinus is shown as evidence in support of its alliance to Salvia of Salvieae, as suggested by Bentham (1876) rather than to Teucrium of Ajugoideae as Briquet thought.