CHROMOSOME NUMBERS IN THE GESNERIACEAE: IV

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ABSTRACT. Chromosome numbers are recorded for thirty seven species and two hybrids belonging to the Old World Gesneriaceae. The genera represented, with number of species studied in brackets, are as follows: *Hexatheca* (1), *Aeschynanthus* (7 + 1 hybrid), *Boea* (2), *Chirita* (1), *Didymocarpus* (9), *Paraboea* (1) and *Streptocarpus* (16 + 1 hybrid). In *Didymocarpus* there is a wide range of chromosome numbers and evolution has obviously involved much change by the processes of dysploidy and polyploidy. The *Streptocarpus* counts conform to the normal pattern: 2n = 32 in subgenus *Streptocarpus* and 2n = 30 in *Streptocarpella*.

The following paper reports chromosome counts made in Old World species of the family Gesneriaceae.

The plants studied are from the collection at the Royal Botanic Garden, Edinburgh; the great majority are of known wild origin and the few exceptions are marked by an asterisk in Table I. Specimens of all collections investigated are in the herbarium of the Royal Botanic Garden, Edinburgh, under the numbers quoted in Table I. *Aeschynanthus* species have been identified by Mr. P. J. B. Woods whilst all other identifications have been made by Mr. B. L. Burtt.

The cytological preparations were either acetocarmine or propionocarmine squashes of material which had been fixed in 3:1 ethanol: acetic acid. In the case of root tips, pretreatment was carried out in a saturated solution of paradichloro-benzene for three to four hours before fixation.

Chromosome numbers are listed in Table 1 and illustrated in fig. 1 and plate 10.

DISCUSSION

The chromosome number of 2n = 34 for *Hexatheca fulva* is interesting since it is the same as has been recorded in eighteen species of *Cyrtandra*, which cover much of the geographical and taxonomic range of that huge genus. Clearly 2n = 34 is not only widespread in *Cyrtandra* but extends into the related *Hexatheca*. Before, however, one is tempted to postulate n = 17 as the basic number of the tribe Cyrtandreae it should be pointed out that the only chromosome number known for other genera of the tribe is 2n = 20 in *Rhyncotechum discolor* (Maxim) B. L. Burtt (Ratter, 1963).

The *Aeschynanthus* chromosome counts belong to the x = 16 series, already well known in the genus, except in *A. radicans* C 6438 from Singapore Island which has 2n = 30; two other stocks of *A. radicans*, C 4860 from Sarawak and C 6442 from Malaya, both have 2n = 32. Previous studies in the genus have shown the existence of x = 15 and x = 16 series which cannot be related to any corresponding morphological division; the situation in *A. radicans* shows that the two different basic numbers can even be found in the same species.

Fifteen chromosome counts are now available for the large genus *Didymocarpus* and although they represent only a small fraction of the total

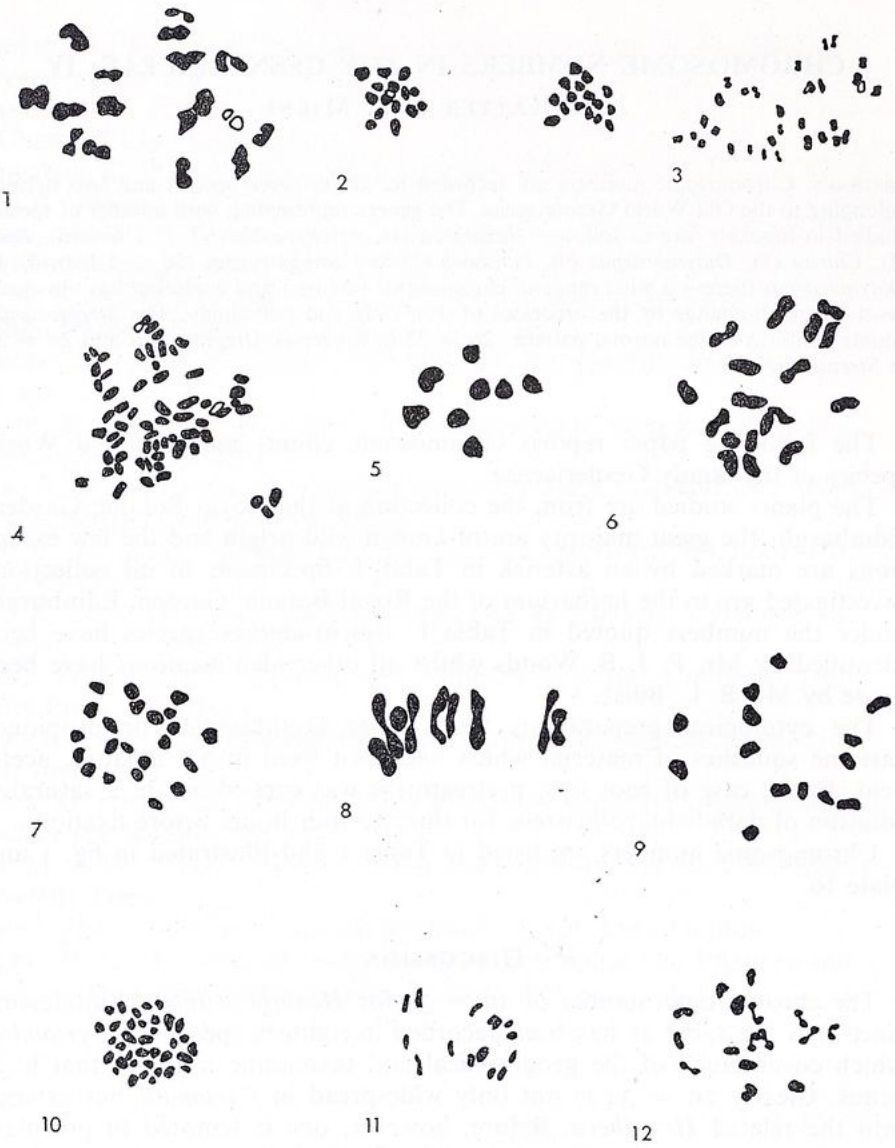

FIG. 1. Camera lucida drawings of squash preparations, x1200. (Unless otherwise stated figures are of 1st mei. met. in P.M.C.). 1, *Hexatheca fulva*, 17_{II}, one bivalent (shown in outline) has already disjoined; 2, *Aeschynanthus praelongus*, n = 16, 1st mei. telo.; 3, *Aeschynanthus tricolor*, 2n = 32, root tip mitosis; 4, *Aeschynanthus parvifolius*, C6440, 2n = 64, root tip mitosis; 5, *Boea magellanica*, C6028, 8_{II}; 6, *Didymocarpus alternans*, 18_{II}; 7, *Didymocarpus corchorifolius*, 22_{II}; 8, *Didymocarpus flavescens*, 9_{II}; 9, *Didymocarpus rodgeri* var. *siamensis*, 14_{II}; 10, *Paraboea vulpina*, 2n = 36, mitosis in anther tissue; 11, *Streptocarpus nobilis*, 15_{II}; 12, *Streptocarpus johannis*, 16_{II}.

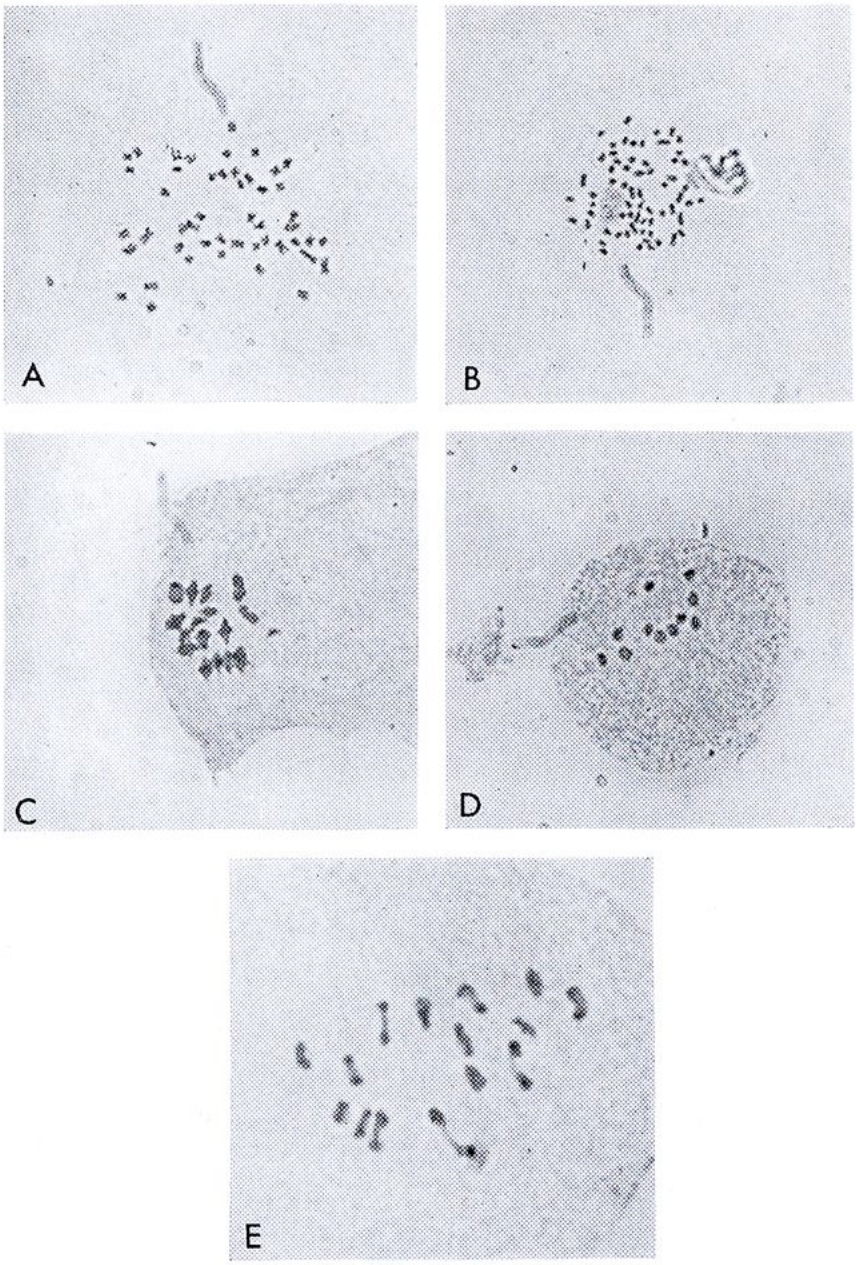

PLATE 10. A & B, root tip mitosis; C, D & E, 1st meiotic metaphase in P.M.C. A, B, C & D × 1,000; E, × 1,600.
A, *Aeschynanthus tricolor* × *parvifolius*, 2n = 48; B, *Aeschynanthus parvifolius*, C4870, 2n = 64; C, *Boea sp.*, C5937, 16_{II}; D, *Didymocarpus citrinus*, 11_{II}; E, *Streptocarpus caulescens*, 15_{II}.

species they nevertheless provide some interesting information. The basic number x = 9 characterises *D. bombycinus*, *D. flavescens*, *D. malayanus*, *D. reticulosus* and *D. alternans*, all of which are Malayan members of the section *Heteroboea* or are closely related to it; *D. alternans* is tetraploid (2n = 36), whilst the other four species are diploids (2n = 18). In another Malayan member of sect. *Heteroboea*, *D. pumilus*, the haploid number is n = 19, which is perhaps a dysploid basic number derived from n = 2x = 18 as found in *D. alternans*. There is a considerable range of basic numbers in the section *Didymocarpus:* the closely related Malayan species *D. citrinus* and *D. corchorifolius* have x = 11, diploid (2n = 22) in the former and tetraploid (2n = 44) in the latter; the Burmese *D. praeteritus* Burtt & Davidson has 2n = 24 (Ratter & Prentice, 1964); 2n = 32 occurs in the North Malayan *D. purpureus* Ridl. (R. & P., 1967); in the Thai species 2n = 28 occurs in both *D. rodgeri* var. *siamensis* and *D.* sp. C 4304, whilst 2n = 54, possibly derived by dysploidy from 2n = 56, is found in *D. siamensis* Barnett (R. & P., 1964); 2n = 32 occurs in *D. innominatus* B. L. Burtt and n = ± 90 in *D. tomentosus* Wight, two South Indian species of the Section *Orthoboea* which have been studied previously (R. & P., 1967). Obviously evolution by dysploidy and polyploidy has been very active in *Didymocarpus* and in this respect it resembles the related genus *Chirita* (see R. & P., 1967).

The new chromosome counts in *Streptocarpus* conform to the well known pattern of 2n = 32 in the acaulescent and rosulate subgenus *Streptocarpus* and 2n = 30 in the caulescent species of *Streptocarpella*. The hybrid *S. michelmorei* × *candidus* shows a regular meiosis, giving no indication of any structural heterozygosity in the chromosomes.

TABLE I

	Herbarium Specimen Number	*Meiotic Count PMC*	*Mitotic Count Root Tip 2n*
SUBFAMILY CYRTANDROIDEAE ENDL.			
TRIBE CYRTANDREAE			
Hexatheca fulva C.B.Cl.	C5835	17_{11}	
TRIBE TRICHOSPOREAE K. FRITSCH			
Aeschynanthus nummularius (Burk. & S. Moore) K. Sch.	C4598		64[a]
A. parvifolius R. Br.	C4858*		64[e]
	C4870		64
	C6371*		64
	C6439		64
	C6440		64
A. praelongus Kraenzl.	C4593	16_{11}	
A. radicans Jack	C4860		32
	C6438*	15_{11}	
	C6442		32
A. sikkimensis (C.B.Cl.) Stapf	C6441		32[a]
A. tricolor Hk. f.	C6443*		32[e]
A. sp. nov. (Sect. Polytrichum)	C5838*	16_{11}	
A. tricolor × parvifolius	C5839*†		48

TABLE I (*continued*)

	Herbarium Specimen Number	*Meiotic Count PMC*	*Mitotic Count Root Tip 2n*
TRIBE DIDYMOCARPEAE ENDL.			
Boea herbacea C.B.Cl.	C5834		36 (mitosis in anther tissue)
B. magellanica Lam.	C6028	8_{11}[b]	
B. sp. (from Solomon Islands).	C5937	16_{11}	
Chirita micromusa B. L. Burtt	C5927	17_{11}	
Didymocarpus alternans Ridl.	C5488	18_{11}	
D. aff. bombycinus Ridl.	C4375		18
D. citrinus Ridl.	C5320	11_{11}	
D. corchorifolius R. Br.	C5168	22_{11}	
D. flavescens Ridl.	C5430	9_{11}	
D. malayanus Hk. f.	C6870	9_{11}	
D. pumilus Ridl.	C5975	n = 19 (2 mei. met).	
D. reticulosus C.B.Cl.	C5833	9_{11}	
D. rodgeri var. siamensis W. W. Sm.	C5940	n = 14 (2 mei. met.)	
Paraboea vulpina Ridl.	C3980		36[h] (mitosis in anther tissue)
Streptocarpus baudertii L. L. Britten	C5087	16_{11}	
S. "caeruleus"††	C4895	n = 16 (2 mei. telo.)	
S. caulescens Vatke	C5942	15_{11}[a]	
S. erubescens Hilliard & Burtt	C5376	16_{11}	
S. eylesii var. brevistylus Hilliard & Burtt	C5361	16_{11}[c]	
S. glandulosissimus Engl.	C4955	16_{11}	
S. goetzei Engl.		16_{11}	
S. hirtinervis C.B.Cl.	C5365	16_{11}	
S. johannis L. L. Britten	C5293	16_{11}	
S. kentaniensis Britten & Story	C4024		32 (mitosis in anther tissue)
S. montanus Oliver	C5031	16_{11}	
S. nobilis C.B.Cl.	C5234	15_{11}[f]	
	C5294*	15_{11}	
S. saundersiae Hook.	C5822*	16_{11}[d]	
S. solenanthus Mansf.	C5295	n = 16 (1 mei. telo.)	
S. wendlandii Spreng. ex Damman	C5156	n = 16 (1 mei. telo.)[g]	
S. "decipiens"††	C6870	16_{11}	
S. michelmorei B. L. Burtt × candidus O. M. Hilliard	C5162*†	16_{11}	

Footnote

* Collections not of known wild origin.

† Synthetic hybrid.

†† Name awaiting publication (Hilliard & Burtt, in press).

Previous counts are noted by the small letters.

a, Ratter, (1963); identical count from different stock.

b, Ratter & Prentice, (1964); from different stock.

c, Ratter & Prentice, (1967) n = 16 in *S. eylesii*, C4903.

d, Ratter & Prentice, (1967), Suguira (1940): identical counts from different stocks.

e, Eberle (1956), 2n = 32.

f, Mangenot & Mangenot (1957), 2n = 28, P.M.C.

g, Lawrence et al (1939), 2n = 32, P.M.C.

h, Ratter & Prentice (1967), 2n = ± 36, root tip.

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