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CYTOLOGY OF THE NATIVE AUSTRALIAN AND SEVERAL EXOTIC PASSIFLORA SPECIES

2. CHROMOSOME MORPHOLOGY

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SUMMARY

Chromosome morphology was examined in the three native Australian species of *Passiflora* (*P. aurantia* Forst., *P. herbertiana* Lindl. and *P. cinnabarina* Lindl. (all 2n = 12)) and four exotic species (*P. maliformis* L., *P. seemanni* Griseb., *P. quadrangularis* L. (all 2n = 18) and *P. suberosa* L. (2n = 24)).

The chromosome morphology of the three native Australian and four exotic *Passiflora* species in Australia was examined as an adjunct to previous studies (Beal 1969*a*, 1969*b*), when chromosome numbers were determined.

The root-tip preparations for examining mitotic chromosomes were made using acid aceto-orcein for maceration and staining according to Darlington and La Cour (1962, p. 157). Examination of mitosis was facilitated by pretreating freshly collected root-tips for 2 hr in a saturated solution of aqueous para-dichlorobenzene at 45°F. Pretreated root-tips were stored in 70% ethyl alcohol at 45°F before maceration. Chromosome length and arm length were measured. Details of materials and results are found in Table 1.

TABLE 1

CHROMOSOME LENGTH AND ARM RATIO IN SPECIES OF PASSIFLORA

Species	Queensland Herbarium No.	No. of Cells Examined	Total Chromosome Length in the Complement (μ)	Mean Chromosome Length (μ)	Ratio of Length of Long Arms to Length of Short Arms	Ratio of Longest to Shortest Chromosome
(2n = 12)						
P. aurantia Forst. ..	BRI 057816	11	37·2 ± 1·67*	3·1	1·2	2·2
P. herbertiana Lindl. ..	BRI 057166	12	37·3 ± 1·14	3·1	1·4	2·2
P. cinnabarina Lindl. ..	BRI 063791	12	32·9 ± 1·57	2·7	1·3	2·7
(2n = 18)						
P. maliformis L. ..	BRI 063594	7	55·9 ± 2·33	3·1	1·2	2·1
P. seemanni Griseb. ..	BRI 064525	12	66·9 ± 1·54	3·7	1·3	1·8
P. quadrangularis L. ..	BRI 065810	12	62·8 ± 3·29	3·5	1·5	1·9
(2n = 24)						
P. suberosa L.	BRI 063596	10	55·1 ± 2·29	2·3	1·3	3·4

* Standard error of the mean.

Species of *Passiflora* have relatively small chromosomes and generally possess symmetrical karyotypes (medium or submedium centromere position), but changes in chromosome size and symmetry have occurred (Table 1). In the seven Passiflora species studied there is substantial range in chromosome size. The somatic chromosomes of the 2n = 18 species were as large as or larger than those of the three 2n = 12 species and *P. suberosa* had the smallest chromosomes. Since these three 2n = 12 species are a disjunct group indigenous to Australia, they may constitute a biased sample of the natural variation in the genus. An evolutionary trend between the 2n = 12 and 2n = 18 species towards increase in chromosome size may exist, although the increased chromosome size could also be a ploidy effect. There was no definite association of perenniality with particular chromosome size, as all species in this study possess the perennial character.

P. cinnabarina differed from both other Australian species in having the smallest chromosomes and a large gradient in size between chromosomes of the complement. *P. suberosa* also had a large gradient in size between chromosomes in the complement. This assymmetry is normally indicative of specialization of karyotype (Stebbins 1950).

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