

Chromosome Numbers in the Genus 'Pimelea'

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WITH 4 TEXT FIGURES

SUMMARY

Chromosome numbers in 14 species of *Pimelea* were determined. A polyploid series with basic number $x = 9$ exists in the genus. Cytological examination has shown that *P. lindleyana* is specifically distinct from *P. spathulata*.

INTRODUCTION

In Tasmania the genus *Pimelea* is represented by about 18 species of which 6 are endemic. In most cases separation of the species is easy on classical morphological lines. However, the group of forms allied to *P. linifolia* have been variously treated by the earlier taxonomists. This cytological investigation was started in order to see if the confusion which existed between *P. spathulata*, *P. lindleyana*, *P. linifolia*, &c., could be resolved.

EXPERIMENTAL METHODS

For somatic chromosome counts, divisions in apical meristems and very young leaves were stained in Feulgen (Darlington and La Cour 1947). In all the pubescent species, very careful dissection of the macerated and stained buds under the microscope was necessary to obtain preparations free from hairs which interfere with squashing. Some counts were checked on microtomed roots stained in crystal violet.

Pollen diameter was measured internal to the exine. Measurements were made of 15 grains from each of 10 plants in a population.

RESULTS AND DISCUSSION

The chromosomes of the *Pimelea* species investigated were found to be small, averaging 2.5 microns in length. A comparative study of chromosome morphology was not possible since the treatments used rarely revealed the centromere constrictions.

Table 1 is a summary of the numbers determined. It shows that a polyploid series with a basic number of $x = 9$ exists within the genus, the mitotic counts being 36, 72, 90 and 108. The diploid remains to be detected. All species examined have fertile pollen and there is no evidence of any apomixis, &c., in the genus. In two dioecious species (both tetraploid) the numbers of males and females are approximately equal. A sample of *P. flava* from Glenorchy gave 49 males to 51 females, and a sample of *P. pauciflora* from Dunorlan gave 22 males to 17 females. No difference in the chromosome complement between male and female could be detected in either species.

Pollen diameter varies from 20.2 to 49.5 microns for those species measured. It is not directly related to chromosome number, the 12x species *P. drupacea* having smaller pollen than most of the 4x species. The close relationship of *P. spathulata* and *P. lindleyana* is, perhaps, reflected in their pollen diameters. By calculation from the pollen diameter of the 4x species *P. spathulata*, the expected diameter of the 10x *P. lindleyana* pollen is 49.2 microns which agrees closely with the measured diameter of 49.5.

As regards taxonomic treatment of the genus, the cytology shows that *P. lindleyana*, which was grouped by Rodway with *P. linifolia*, by Bentham partly with *P. spathulata* and partly with *P. linifolia* (Sm.) should be regarded as a separate species. *P. linifolia* is probably not a Tasmanian species.

As regards general classification of the THYMELAEACEAE, the family is a homogeneous one cytologically. The three genera, **Daphne**, **Edgeworthia** and **Wikstroemia** are reported by Darlington and Janaki Ammal (1945) all to have a basic chromosome number of 9. The family has been differently placed in the schemes of classification of the Dicotyledons drawn up by the various taxonomists. Engler and Gilg (1924) group the THYMELAEACEAE, and the ELAEAGNACEAE together as a suborder of the MYRTIFLOAE. Since the basic numbers of the ELAEAGNACEAE are 7, 10, 11, 12, 13 and 14, there is no cytological justification for this grouping. For other classifications (e.g., Hutchinson, 1946) the cytological data appear to be neutral at present.

REFERENCES

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TABLE I

Chromosome Numbers of Tasmanian Pimeleas

Species	Collecting Locality	Chromosome number (2n)	Pollen diameter (micron.)
<i>P. cinerea</i> R.Br.	Nicka Mt. Wellington	36	28.6
<i>P. curviflora</i> R.Br.	Dunorlan Launceston	36 36	
<i>P. flava</i> R.Br.	Glenorchy Murdunna	36 36	27.8
<i>P. glauca</i> R.Br.	Triabunna	36	32.5
<i>P. spathulata</i> Labill.	Campania Collinsvale Dry Creek Dunorlan Guildford Junction Kingston Port Sorell	36 36 36 36 36 36 (fig. 1) 36	36.5 36.6
<i>P. ligustriana</i> Labill.	Mt. Lloyd	36	32.5
<i>P. nivea</i> Labill.	Collinsvale Glenorchy Sandy Bay	36 36 36	34.1 32.5
<i>P. pauciflora</i> R.Br.	Dunorlan Launceston	36 36	
<i>P. pygmaea</i> F.v.M.	James River, Lake Augusta	36	
<i>P. sericea</i> (R.Br.)	Mt. Arthur	36	27.7
<i>P. serpillifolia</i> R.Br.	King Island	36	20.2
<i>P. humilis</i> R.Br.	Campania Glenorchy Sandy Bay	72 72 72 (fig. 2)	39.2 39.8
<i>P. lindleyana</i> Meissn.	Hastings	90 (fig. 3)	49.5
<i>P. drupacea</i> Labill	Hobart Taranna	108 (fig. 4) 108	28.2
<i>P. axiflora</i> F.v.M.	Not collected		
<i>P. filiformis</i> Hook.	Not collected		
<i>P. milligani</i> Meissn.	Not collected		
<i>P. stricta</i> Meissn.	Not collected		

FIGURES 1-4

Magnification x 1,500



FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4

- FIG. 1.—*Pimelea spathulata*. Kingston. $2n = 36$ (Acetic alcohol — Feulgen)
 FIG. 2.—*Pimelea humilis*. Sandy Bay. $2n = 72$ (Acetic alcohol — Feulgen)
 FIG. 3.—*Pimelea lindleyana*. Hastings. $2n = 90$ (Acetic alcohol — Feulgen)
 FIG. 4.—*Pimelea drupacea*. Proctor's Rd., Hobart. $2n = 108$ (Root tip,
 2BD — C.V.)