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CHROMOSOME NUMBERS IN *LOMANDRA* (DASYPOGONACEAE)

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ABSTRACT

Briggs, Barbara G. (National Herbarium of New South Wales, Royal Botanic Gardens, Sydney, Australia 2000) 1986. Chromosome numbers in Lomandra *(Dasypogonaceae). Telopea 2(6): 741–744* — Chromosome numbers for Sections *Lomandra* (13 species studied) and *Typhopsis* (one species) are based on $x = 8$, but three species of Sect. *Cephalogyne* have $x = 7$. Eight species are reported as diploid and five as tetraploid, while four show infraspecific polyploidy.

The chromosome numbers of 17 species have been determined (Table 1). Several of these counts were previously reported (in Lee 1966) but without citation of voucher specimens. Preparations were of root-tips or pre-meiotic floral buds, pre-treated with saturated aqueous *p*-dichlorobenzene for about 2¼ hours, fixed in 1:3 acetic-alcohol and stained with aceto-orcein or alcoholic-carmine. The sex of many vouchers could not be determined, since they were collected out of the flowering season.

One of the counts of *L. preissii (Waterhouse NSW 75454),* a diploid, was cultivated for nine months in Sydney and there produced female and hermaphrodite flowers and set fruit in isolation from other flowering plants of *Lomandra.* This genus is normally dioecious but hermaphrodite flowers occur sporadically in other species (A. T. Lee pers. comm.).

Two base numbers are represented: $x = 8$ in the 13 counted species of Sect. *Lomandra* and $x = 7$ in three species of Sect. *Cephalogyne,* following the classification of Stevens (1978). A count of $2n = 16$ has been obtained on *L. leucocephala* (Sect. *Typhopsis*), but another collection of this species (West Spirey Creek, Warrumbungle Mountains, *Rodd NSW 72291*) gave an approximate count of $2n =$ c. 24–28, which suggests triploidy.

Despite the extremely restricted sampling, infraspecific polyploidy was found in *L. gracilis, L. glauca, L. longifolia* and probably *L. leucocephala,* i.e. in over a third of the species sampled from more than a single site. Chromosome numbers were previously reported for *L. gracilis, L. glauca* and *L. longifolia* (Briggs in Lee 1966), but only one level was known in each species at the time. Some collections were made from sites designated by Lee for sampling variant forms, so such karyological diversity may be associated with minor morphological differences.

The results for *L. obliqua, L. elongata, L. leucocephala, L. laxa, L. preissii, L. sericea* and *L. multiflora* agree with previous counts (Keighery 1984). The finding of tetraploidy in *L. confertifolia* ssp. *rubiginosa* contrasts with diploidy in counts by Doley on ssp. *confertifolia* and ssp. *pallida* A. Lee, published by Keighery (op. cit.).

The positions of centromeres were usually discernible (Figs. 1–5) and some preparations showed heterochromatic bands or constrictions in several chromosomes. A distinctive small submedian pair is seen in *L. leucocephala* (Fig. 3) but

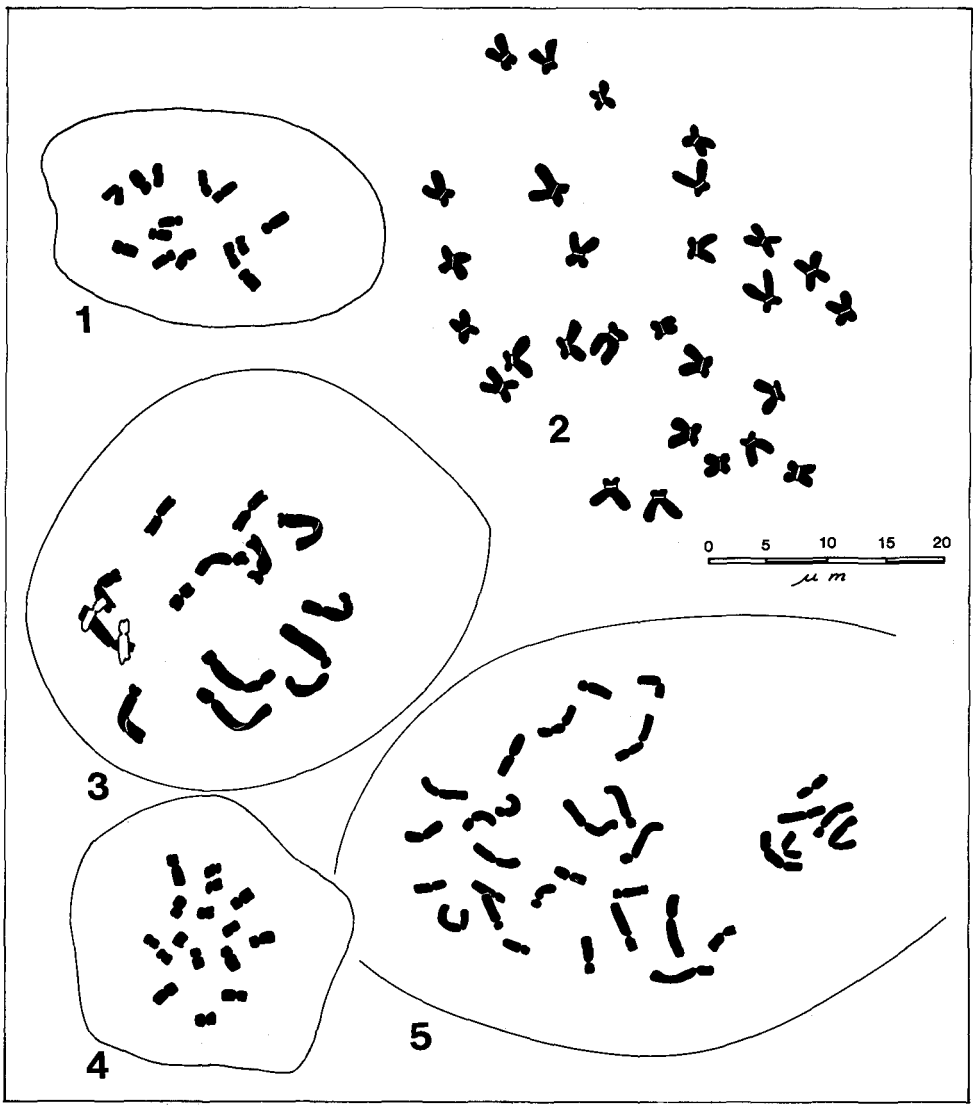
TABLE 1. *LOMANDRA* CHROMOSOME NUMBER RECORDS

Taxon	2*n*	Locality*	Voucher	Sex	Fig.
Sect. *Cephalogyne*					
L. obliqua (Thunb.) Macbride	14	Q Blackdown Tableland	Gittins 1186	♀	
	14	N Kulnura	Briggs NSW 69615	—	
	14	N Wentworth Falls	Briggs NSW 69621	—	
	14	N Lugarno	Briggs NSW 69002	—	1
L. glauca (R. Br.) Ewart	14	N NE. of Wisemans Ferry	Briggs NSW 96401	♀	
	28	N Berowra	Briggs NSW 69620	—	
	28	N Berowra	Briggs NSW 77890	♂	2
	28	N Wentworth Falls	Briggs NSW 69620	—	
L. elongata (Benth.) Ewart	c.28	Q Noosa Heads	Harrold NSW 85309	♀	
Sect. *Typhopsis*					
L. leucocephala (R. Br.) Ewart ssp. *leucocephala*	16	Q 'Mt Playfair', W. of Salvator Rosa National Park	Gittins 1137	—	3
Sect. *Lomandra*					
L. bracteata A. Lee	16	N Warrumbungle Mts	Rodd NSW 72292	♂	4
L. cylindrica A. Lee	32	N Hornsby	Lee NSW 49112	♂	
L. filiformis (Thunb.) Britten ssp. *filiformis*	36	N Berowra Waters	Briggs NSW 69617	—	
ssp. *coriacea* A. Lee	32	N NE. of Mittagong	Lee NSW 65649	—	
	32	V Mt Cole, Pyrenees	Johnson NSW 77891	♂	
	58	N Lugarno	Briggs NSW 68998	—	
L. filiformis x? *L. gracilis* (R. Br.) A. Lee	16	N Blackheath	Briggs NSW 69619	♂	
L. gracilis (R. Br.) A. Lee	16	N Lugarno	Briggs NSW 68997	—	
	32	N Waterfall	Briggs NSW 69610	—	
L. laxa (R. Br.) A. Lee	16	Q Blackdown Tableland	Gittins 1204	♂	
L. micrantha (Endl.) Ewart ssp. nov.	32	N Cheltenham	Coveny 1008	—	5
	32	N NE. of Wisemans Ferry	Briggs NSW 96400	♂	
L. preissii (Endl.) Ewart	16	W. Porongorup	Waterhouse NSW 75454	♂	
	16	W S. of Busselton	Briggs 776	♂	
L. sericea Endl.	16	W Albany	Waterhouse NSW 75455	—	
L. confertifolia (F. M. Bail.) Fahn ssp. *rubiginosa* A. Lee	32	N Kulnura	Briggs NSW 75444	—	
L. fluviatilis (R. Br.) A. Lee	32	N Bents Basin	Briggs NSW 73930	♀	
L. longifolia Labill.	16	N Mt Yengo	Briggs NSW 90677	—	
	32	N Menai	Briggs NSW 69001	♀	
	32	N Menai	Briggs NSW 68999	♂	
	32	N Jacobs R.	Briggs NSW 75446	—	
	32	V W. of Omeo	Briggs NSW 75447	♂	
L. montana (R. Br.) L. Fraser & Vick.	16	N Mt Tomah	Rodd NSW 77834	♀	
	16	N Mt Hay	Constable NSW 77823	♀	
L. multiflora (R. Br.) Britten ssp. *multiflora*	16	Q Blackdown Tableland	Gittins 1203	♀	
	16	N nr. Glenbrook	Constable NSW 68992	♀	
	16	N Lugarno	Briggs NSW 68996	—	
	16	N Lugarno	Briggs NSW 69616	—	

*The locality is prefixed by an abbreviation for the State: Q = Queensland, N = New South Wales, V = Victoria, W = Western Australia.

not in other species. No attempt has been made to compare karyotypes in detail or to identify chromosome pairs, although such a study would be of interest.

The procedures, and in particular the duration and temperature of the pre-fixation treatment, were not standarized sufficiently for meaningful size comparisons between the complements illustrated. Thus Fig. 2, of *L. glauca,* shows chromosomes relatively over-contracted compared with others and at a later arrested stage in mitosis.



Figs. 1–5. Mitotic chromosomes of *Lomandra*. Fig. 1. *L. obliqua* ($2n = 14$); Fig. 2. *L. glauca* ($2n = 28$); Fig. 3. *L. leucocephala* ($2n = 16$); Fig. 4. *L. bracteata* ($2n = 16$); Fig. 5. *L. micrantha* ($2n = 32$).

Lomandra and eight other genera have customarily been included in the Xanthorrhoeaceae, but Huber (1969), Chanda & Ghosh (1976), Stevens (1978), Staff & Waterhouse (1981) and others have drawn attention to discordant features in this assemblage. *Xanthorrhoea,* so far as known, has a karyotype of $n = 11$, uniform except for some differences in total length of the complement, with a single large metacentric (Briggs 1966, D. Bedford pers. comm.). The chromosomal differences between *Xanthorrhoea* and *Lomandra* add weight to the already strong case for dividing the Xanthorrhoeaceae. Dahlgren et al. (1985) placed all genera except *Xanthorrhoea* and *Calectasia* in Dasypogonaceae but noted 'great variation in Dasypogonaceae that may possibly justify division into three families'. Whatever the fate of the other genera, *Lomandra* and *Xanthorrhoea* appear to be members of independent, but somewhat convergent, lineages within the Liliiflorae.

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REFERENCES

Briggs, B. G. (1966). Chromosome numbers of some Australian monocotyledons. *Contr. New South Wales Natl. Herb.* 4: 24–34.

Chandra, S. & Ghosh, K. (1976). Pollen morphology in Xanthorrhoeaceae. *In* Ferguson, I. K. & Muller, J. (Eds), 'The Evolutionary Significance of the Exine'. *Linn. Soc. Symp. Ser.* 1. (Academic Press: London) pp. 527–551.

Dahlgren, R. M. T., Clifford, H. T. & Yeo, P. F. (1985). 'The Families of the Monocotyledons' (Springer-Verlag: Berlin).

Huber, H. (1969). Die Samenmerkmale und Verwandtschaftsverhaltnisse der Liliiflorae. *Mitteil. Bot. Staatssamml. München* 8: 219–538.

Keighery, G. J. (1984). Chromosome numbers in Australian Liliaceae. *Feddes Repert.* 95: 523-532.

Lee, A. (1966). Xanthorrhoeaceae. *Contr. New South Wales Natl. Herb. Fl. Ser.* 34: 1–42.

Staff, I. A. & Waterhouse, J. T. (1981). The biology of arborescent monocotyledons, with special reference to Australian species. *In* Pate, J. S. & McComb, A. J. (Eds), 'The Biology of Australian Plants'. (Univ. Western Austral. Press: Nedlands) pp. 216–257.

Stevens P. F. (1978). Generic limits in the Xeroteae (Liliaceae sensu lato). *J. Arnold Arbor.* 59: 129–155.

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