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CHROMOSOME NUMBERS IN CHILEAN SPECIES OF *LUZURIAGA* RUIZ ET PAV. (LUZURIAGACEAE)

NUMEROS CROMOSOMICOS EN ESPECIES CHILENAS DE LUZURIAGA *RUIZ ET PAV. (LUZURIAGACEAE)*

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ABSTRACT

Mitotic chromosome counts for *Luzuriaga radicans* Ruiz et Pav. and *L. polyphylla* (Hook) J.F. Macbr. from Chile, reported here for the first time, are the same as those reported for *L. parviflora* (Hook) Kunth in New Zealand and *L. marginata* (Gaertner) Benth. on Falkland Islands (2n = 2x = 20). These results indicate a constancy of chromosome number in the genus *Luzuriaga*.

Luzuriaga Ruiz et Pav. (Luzuriagaceae) is a small genus, with three species in the southern cone of South America (36º-50ºS) [*L. radicans* Ruiz et Pav. *L. polyphylla* (Hook.) J.F. Macbr. and *L. marginata* (Banks et Sol. ex Gaertn.) Benth.], and a single species in New Zealand, *L. parviflora* (Hook.) Kunth (Fineran 1964; Moore & Edgar 1970; Arroyo & Leuenberger 1988a, 1988b). This genus is a clear example of the floristic links between distant land masses of the southern hemisphere (Arroyo & Leuenberger 1988b). Historically, the taxonomic status of the genus *Luzuriaga* has been controversial, with four different classifications having been proposed at family level (Arroyo & Leuenberger 1988a). However, its adscription to the family Luzuriagaceae has now found general acceptance (Arroyo-Leuenberger 2001, APG II 2003).

Chromosome numbers of *Luzuriaga* spp. have been reported previously from New Zealand, and from the Falkland Islands, but not for Chilean species of the genus (Rodríguez & Marticorena 1987). The New Zealand species *L. parviflora* (Beuzenberg & Hair 1963) and *L. marginata* from the Falkland Islands (Moore 1968) were both found to have a diploid complement 2n = 2x = 20.

To complement the existing cytogenetic data on the genus *Luzuriaga*, chromosome counts were carried out in *L. radicans* and *L. polyphylla* from southern Chile. Specimens of one accession of each species were obtained from naturally growing populations (Table I). The voucher specimens were deposited in the herbarium (UCT) of the School of Biological and Chemical Sciences of the Universidad Católica de Temuco. In the laboratory, plants were kept with their rhizomes submerged in water subject to constant aeration, to favor active growth of adventitious roots. After seven days, 5 mm-long root tips were excised from the rhizomes. Chromosomes were obtained and stained according to the protocol described by Jara-Seguel & Zúñiga (2004).

Luzuriaga radicans y *L. polyphylla* both show a basic chromosome number x = 10. Pairs of homologous chromosomes were identified during metaphase, enabling to deduce that both species have a diploid chromosome complement of 2n = 2x = 20. In both species, a pair of acrocentric chromosomes were observed with secondary constriction and a satellite on the short arm (Fig. 1a-b).

Our results on chromosome counts in *L. radicans* y *L. polyphylla* match the basic number x =10 and the diploid level 2n = 2x = 20 previously described for *L. parviflora* (Beuzenberg & Hair 1963) and *L. marginata* (Moore 1968). Additionally, the secondary constriction and the satellite located on the short arm in acrocentric chromosomes, are a common character in *L. radicans*, *L. polyphylla*

y *L. parviflora*. On the basis of this cytogenetic evidence and despite the geographic insulation between South American and New Zealand taxa, the genus *Luzuriaga* may be considered chromosomally stable with a constancy of the chromosome number and in the chromosome location of the satellites. Similarly, in the closely-related genus *Alstroemeria* L. (Alstroemeriaceae) (see Rudall *et al*. 2000), with nearly 50 species recognized, a constancy of the chromosome number 2n = 2x = 16 has also been described in all 27 species which have been cytogenetically examined to date (Buitendijk & Ramanna 1996; Sanso & Hunziker 1998; Sanso 2002; Jara-Seguel *et al*. 2004). In this genus, due to its interspecific uniformity in karyotype asymmetry, mechanisms of karyotype orthoselection were proposed as probable evolutionary trends (Sanso 2002).

TABLE I. Collection sites of *Luzuriaga* spp.

Species	Plants analyzed	Collection sites
Luzuriaga radicans	6	CHILE, Araucanian Region, Province of Malleco, Fundo Niágara, 300 m north of highway between Curacautín and Manzanar, km 15, altitude 380 m, (38° 27' S; 71° 44' W), 13-12-2004, P. Jara-Seguel 0204.
Luzuriaga polyphylla	4	CHILE, Lakes Region, Province of Osorno, Aguas Calientes, altitude 450 m, (40° 44' S; 72° 18' W), 11-02-2005, M. Romero 0205.

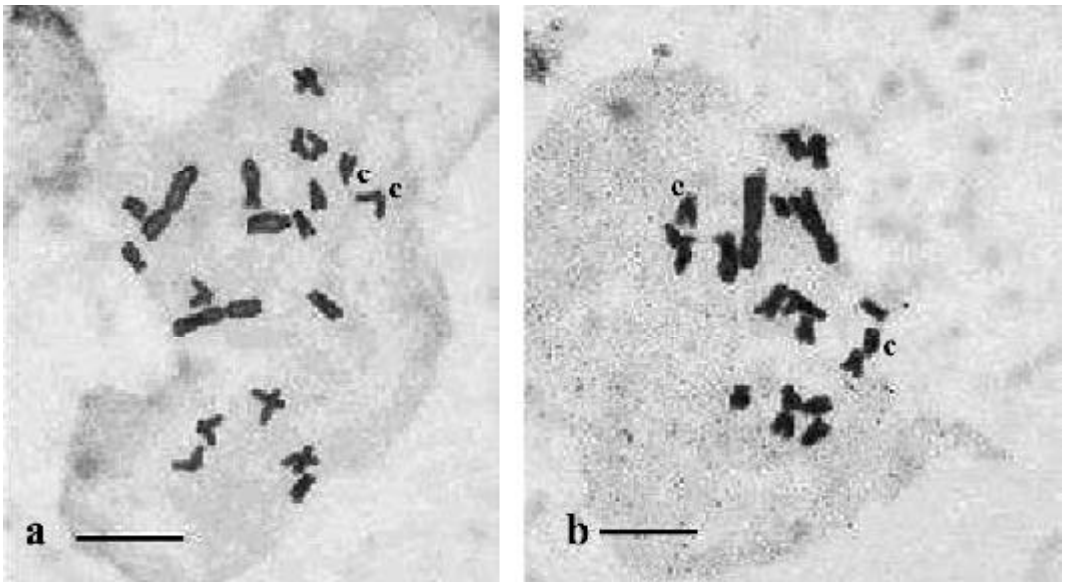

FIGURE 1. Mitotic metaphases 2n = 2x = 20 of (a) *Luzuriaga radicans* and (b) *L. polyphylla*. "c" identifies chromosomes with secondary constriction and satellite on the short arm. Scale bar represents 10 µm.

Studies on comparative karyology of *Luzuriaga* (e.g. chromosome morphology, C-banding pattern, genomic *in situ* hybridization, meiotic chromosome pairing) may help elucidate trends in karyotype evolution, degrees of genomic differentiation, genetic flow between species, and the cases of genetic self-incompatibility described previously in *L. radicans* (Riveros *et al.* 1996) and *L. polyphylla* (Arroyo & Humaña 1999). Furthermore, the cytogenetic data may complement the framework of biosystematics research in the family Luzuriagaceae, whose phylogenetic relationships with other families within the order Liliales have been outlined only on the basis of morphological characters and nucleotide sequences of nuclear, plastid and mitochondrial DNA (Rudall *et al*. 2000; Soltis *et al.* 2000; Vinnersten & Bremer 2001; APG II 2003; Davis *et al*. 2004; Janssen & Bremer 2004).

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