

CHROMOSOME STUDIES ON SOME ORCHIDS FROM SOUTH AMERICA

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ABSTRACT. Chromosome counts and some karyomorphological observations of 14 different orchid species of nine genera are reported. The results include first counts for *Encyclia argentinensis* (Speg.) Hoehne ($2n = 38$), *Laelia lundii* Rchb. f. & Warm. ($2n = 40$), *Campylocentrum neglectum* Cogn. ($2n = 38$), *Huntleya meleagris* Lindl. ($2n = 46$), *Oeceoclades maculata* (Lindl.) Lindl. ($2n = 56$), *Oncidium longicornu* Mutel ($2n = 56$), and *O. bifolium* Sims ($2n = 108$). The chromosome numbers of seven additional species is also confirmed: *Eltropectris triloba* (Lindl.) Pabst. ($2n = 46$), *Pelexia bonariensis* (Lindl.) Schltr. ($2n = 46$), *Catasetum fimbriatum* Rchb. f. ($2n = 108$), *Oncidium jonesianum* Rchb. f. ($2n = 30$), *O. morenoi* Dodson & Luer ($2n = 30$), *O. pumilum* Lindl. ($2n = 30$), and *O. longipes* Lindl. ($2n = 56$). The results are discussed in relation to previous chromosome studies for each taxon.

Key words: Orchidaceae, chromosome numbers, karyotype

INTRODUCTION

The Orchidaceae is one of the largest and most diverse families of plants, and includes 10–14% of all flowering plant species. However, the cytological knowledge of the family is far from complete, with many genera in which chromosome information is scarce or totally absent. Most chromosome studies available for orchids have been made on species from temperate areas, while chromosome counts from tropical and subtropical taxa are relatively limited (Blumenschein 1960).

Here, 14 South American orchid species from nine genera are analyzed for chromosome numbers. Seven of the 14 species are reported here for the first time, and the other seven are confirmations of previous counts.

MATERIAL AND METHODS

Collections used in the study were made in Argentina, Brazil, and Paraguay. Voucher specimens of the collections are listed in TABLE 1 and deposited in the herbaria of the Instituto de Botánica del Nordeste (CTES) and Universidad Nacional de Misiones (MNES). The subtribal classification utilized here is that suggested by Dressler (1981).

Chromosome analysis was made on root-tips cells. The rootlets were pretreated in 8-oxyquinoline 0.002 M solution during a 4–5 hour period, fixed in acetic acid/absolute ethanol (1:5) and

then stained according to the Feulgen's technique. The terminology used for chromosome morphology description is that suggested by Levan et al. (1964).

OBSERVATIONS AND DISCUSSION

Following are the mitotic chromosome observations of the 14 orchid species analyzed. TABLE 1 summarizes the species studied and includes their respective chromosome numbers.

Tribe Cranichideae

***Eltropectris triloba*.** Chromosome number of this species was determined to be $2n = 46$ (FIGURE 1). The karyotype was notably bimodal with 44 small (S) and 2 large (L) chromosomes. The two L chromosomes had sub-terminal centromeres, while all the S chromosomes presented centromeres at median or submedian position.

***Pelexia bonariensis*.** This entity presented a diploid chromosome number of $2n = 46$ (FIGURE 2). In agreement with the previous entity, the karyotype was bimodal with 44 S and 2 L chromosomes, however, it differed from *Eltropectris triloba* as the L pair has a submedian centromere. The results obtained here for *E. triloba* and *Pelexia bonariensis* are in concordance with those published by Martínez (1985) on material from a different source. Both taxa are diploids with $x = 23$, a basic chromosome number probably derived by polyploidy. The presence of a large chromosome pair in the two species seems

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TABLE 1. Species studied, chromosome numbers, and voucher specimens. First-ever counts are indicated by an asterisk (*).

Species	2n	Voucher
Cranichideae		
<i>Eltropectris triloba</i> (Lindl.) Pabst.	46	Argentina. Prov. Corrientes: Dept. Ituzaingó, Santa Tecla Cué, Pérez <i>et al.</i> 104 (MNES).
<i>Pelexia bonariensis</i> (Lindl.) Schltr.	46	Argentina. Prov. Corrientes: Dept. Ituzaingó, Puerto Valle, Dematteis & Daviña 485 (MNES).
Epidendreae		
<i>Encyclia argentinensis</i> (Speg.) Hoehne*	38	Argentina. Prov. Corrientes: Dept. Capital, Corrientes, Dematteis & Schinini 586 (CTES).
<i>Laelia lundii</i> Rchb. f. & Warm.*	40	Argentina. Prov. Misiones: Arroyo Uruguaf, Krauczuk & Camarero s.n. (MNES, CTES).
Vandae		
<i>Campylocentrum neglectum</i> Cogn.*	38	Paraguay. Dept. Alto Paraná: Reserva Biológica Limoy, Dematteis & Schinini 587 (CTES).
Maxillarieae		
<i>Huntleya meleagris</i> Lindl.*	46	Brazil. Santa Catarina: Mun. Barra Velha, Itajuba, Kravickas <i>et al.</i> 46556 (CTES).
Cymbidieae		
<i>Catasetum fimbriatum</i> Rchb. f.	108	Argentina. Prov. Corrientes: Dept. Capital, Corrientes, Schinini 11003 (CTES).
<i>Catasetum fimbriatum</i> Rchb. f.	108	Argentina. Prov. Corrientes: Dept. Capital, Cristóbal 2481 (CTES).
<i>Oeceoclades maculata</i> (Lindl.) Lindl.*	56	Argentina. Prov. Corrientes: Dept. Ituzaingó, Santa Tecla Cué, Pérez <i>et al.</i> 106 (MNES).
<i>Oncidium bifolium</i> Sims*	108	Argentina. Prov. Corrientes: Dept. San Luis del Palmar, Lomas de González, Schinini <i>et al.</i> 1772 (CTES).
<i>Oncidium jonesianum</i> Rchb. f.	30	Paraguay. Dept. Guairá: Colonia Independencia, Ayo, Guazú on the way to San Gervasio, Schinini <i>et al.</i> 27922 (CTES).
<i>Oncidium longicornu</i> Mutel*	56	Argentina. Prov. Misiones: Dept. San Pedro, Parque Provincial Moconá, Seijo <i>et al.</i> 181 (MNES).
<i>Oncidium longipes</i> Lindl.	56	Argentina. Prov. Misiones: Dept. San Ignacio, San Ignacio, Dematteis & Daviña 486 (MNES).
<i>Oncidium morenoi</i> Dodson & Luer	30	Paraguay. Dept. Alto Paraná: Reserva Biológica Limoy, Dematteis & Schinini 585 (CTES).
<i>Oncidium pumilum</i> Lindl.	30	Argentina. Prov. Misiones: Dept. San Ignacio, Teyú Cuaré, Guillén 316 (MNES).

to suggest an allopolyploid origin of the chromosome complement.

Tribe Epidendreae

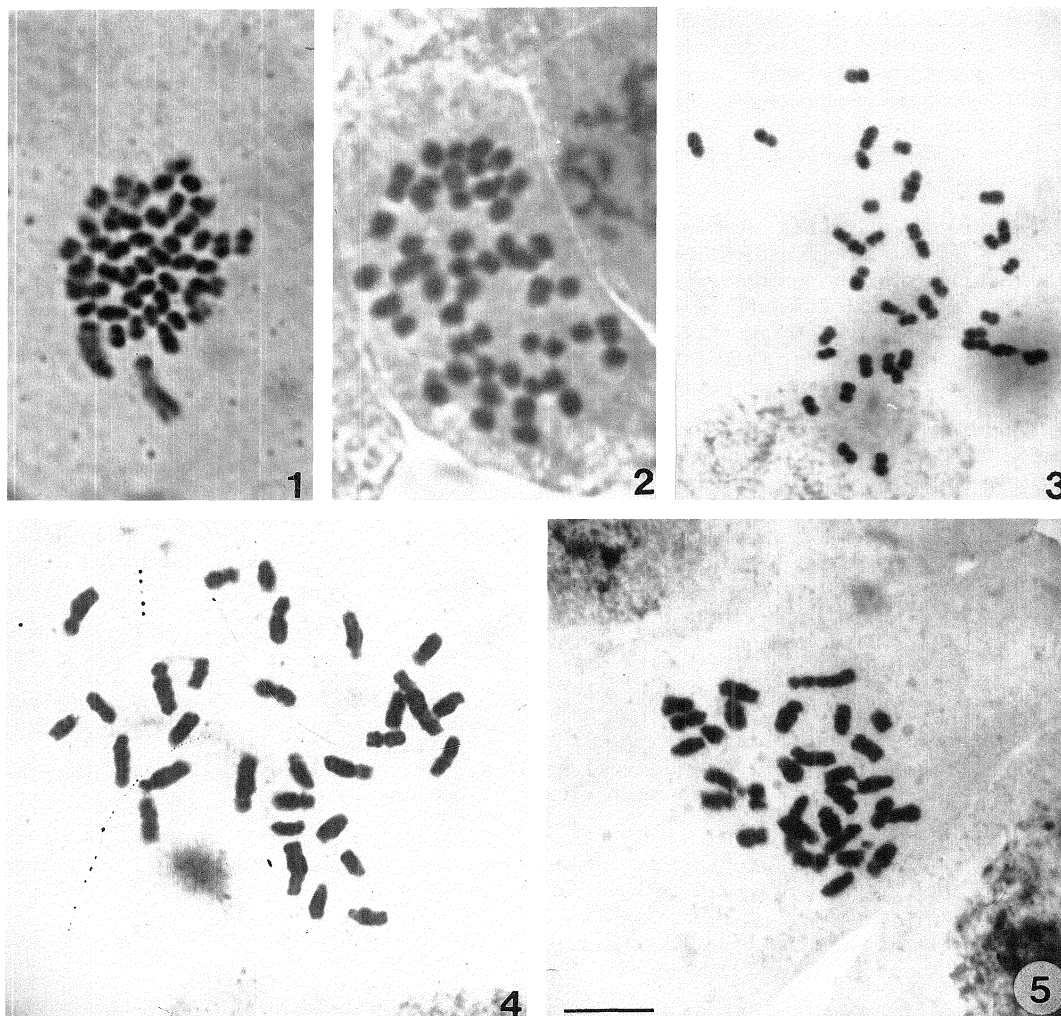
Laelia lundii. 2n = 40 chromosomes were counted at mitotic metaphase. The karyotype possessed mainly metacentric pairs accompanied by a smaller proportion of sub-metacentric chromosomes. The chromosome size was relatively homogeneous varying between 1.9 and 2.8 μ m. The chromosome number found in this entity (2n = 40) agrees with the more frequent in sub-tribe Laeliinae, especially in the genus *Laelia* Lindl. (Blumenschein 1960, Dressler 1981).

Encyclia argentinensis. At mitotic prometa-

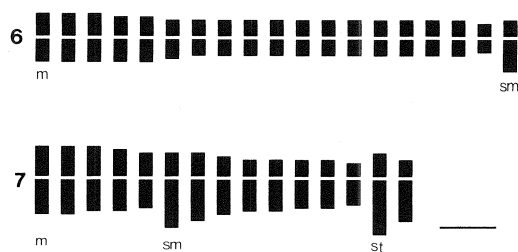
phase and metaphase 2n = 38 chromosomes were observed, which is a new number for *Encyclia*. All other species of the genus analyzed to date have been reported to have 2n = 40 chromosomes (Blumenschein 1960, Tanaka and Maekawa 1983).

Tribe Maxillarieae

Huntleya meleagris. The specimens analyzed presented all 2n = 46 chromosomes at mitotic metaphase. This constitutes the first chromosome number report for the genus *Huntleya*, which has about 10 species distributed in tropical America.



FIGURES 1-5. Mitotic chromosomes of Orchids. 1. *Eltropectris triloba* ($2n = 46$). 2. *Pelexia bonariensis* ($2n = 46$). 3. *Campylocentrum neglectum* ($2n = 38$). 4. *Oncidium jonesianum* ($2n = 30$). 5. *Oncidium morenoi* ($3n = 30$). Scale = $5\mu\text{m}$.



FIGURES 6-7. Idiograms of two orchids species. 6. *Campylocentrum neglectum* ($36m + 2sm$). 7. *Oncidium jonesianum* ($10m + 16sm + 2st$). Scale = $2\mu\text{m}$.

Tribe Vandeae

Campylocentrum neglectum. The somatic chromosome number found in this taxon was $2n = 38$ (FIGURE 3). The karyotype was highly symmetric, integrated by 36 metacentric and 2 submetacentric chromosomes (FIGURE 6), that varied in size between 0.97 and $1.98\mu\text{m}$. Our count agrees with most of the chromosome numbers observed for the subtribe Angraecinae which ranges from $2n = 38$ to $2n = 42$ (Jones 1967).

Tribe Cymbidieae

Catasetum fimbriatum. Both plants analyzed from two populations presented $2n = 108$

chromosomes, a number that coincides with the single earlier study made in this species on material of Brazil and Paraguay (Jones and Daker 1968). The basic chromosome number of the genus *Catasetum* is apparently $x = 27$, owing to which *C. fimbriatum* could be considered a tetraploid species.

***Oeceoclades maculata*.** A somatic number of $2n = 56$ was determined, which constitutes the first published chromosome count. Aoyama (1989) has reported a chromosome number of $2n = 58$ for *O. saundersiana* (Rchb. f.) Garay & Tayler, the only other species of the genus for which cytological information is available.

***Oncidium jonesianum*.** The studied population presented a somatic chromosome number of $2n = 30$ (FIGURE 4). The karyotype was composed of 10 m + 16 sm + 4st (FIGURE 7). Chromosomes had a mean length of $2.77 \mu\text{m}$, ranging in size between 1.90 and $3.64 \mu\text{m}$. The present study confirms the counts made by Sinoto (1969) and Charanasri and Kamemoto (1975). The karyotype of *O. jonesianum* is presented here for the first time.

***Oncidium morenoi*.** $2n = 30$ chromosomes were observed at mitotic metaphase (FIGURE 5). The chromosome size varied from $1.5\text{--}4.5 \mu\text{m}$. Our count agrees with the single preceding report for the species (Dematteis 1997).

***Oncidium pumilum*.** At mitotic metaphase $2n = 30$ chromosomes $\pm 2.5 \mu\text{m}$ long were observed. The number found in this species confirms those determined previously by Ames and Withner (in Sinoto 1969) and Dematteis (1997).

***Oncidium longicornu*.** Chromosome number was determined as $2n = 56$, the most common number within the genus *Oncidium*.

***Oncidium longipes*.** $2n = 56$ chromosomes were counted at mitotic metaphase. The chromosomes were considerably similar in size and had a mean length of $1\text{--}1.5 \mu\text{m}$. This count con-

firms an earlier study based upon Brazilian material (Blumenschein 1960).

***Oncidium bifolium*.** The number observed at mitotic metaphase was $2n = 108$. Chromosomes size was comparatively homogeneous, varying between 1 and $1.3 \mu\text{m}$.

A possible base chromosome number $x = 5\text{--}7$ has been suggested for the genus *Oncidium* (Dressler 1981). If this is the case, the species analyzed here with $2n = 30$ are probably hexaploids based on $x = 5$, while the taxa with $2n = 56$ may be octoploids with $x = 7$. *Oncidium bifolium* with $2n = 108$ chromosomes may be considered $18x$ with basic number $x = 6$.

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