



## Variation in chromosome number and the basic number of subfamily Epidendroideae (Orchidaceae)

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The chromosome numbers of 21 genera and 44 species of subfamily Epidendroideae belonging to tribes Sobralieae, Epidendreae, Malaxideae and Vandaeae, and subtribe Dendrobiinae, were determined. Chromosome numbers varied from  $2n = 24$  in *Malaxis pubescens* to  $2n = c. 240$  in *Epidendrum cinnabarinum*. A revision of the chromosome numbers known for the subfamily was also performed, aimed at determining the basic numbers of the genera, subtribes and tribes. The first counts for 31 species and six genera of tribe Sobralieae and subtribe Ponerinae are presented. The basic number for each genus was evaluated. A predominance of  $x = 20$  in genera of Epidendreae and Arethuseae,  $x = 19$  in Vandaeae and subtribe Dendrobiinae and  $x = 15$  and 21 in Malaxideae was observed. Other tribes were more variable. A wide occurrence of  $x = 19$  and 20 in Epidendroideae and of  $x = 21$  in at least one genus of all tribes suggests that dispolyploidy of one or a few chromosomes has played a decisive role in the establishment of the basic karyotypes. The karyotype variability observed in the subfamily is discussed in light of current phylogenetic proposals for the family. © 2010 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2010, **163**, 234–278.

**ADDITIONAL KEYWORDS:** basic chromosome number – cytogenetics – dispolyploidy – polyploidy.

### INTRODUCTION

The analysis of chromosome numbers has been used to evaluate evolutionary and taxonomic relationships in diverse groups of plants. Studies of chromosomal variations in Orchidaceae have contributed to the better understanding of the taxonomy of this family at many hierarchical levels. Arditti (1992) reviewed some of the important aspects of the cytology of the orchid family, with emphasis on chromosomal variation. Brandham (1999) reviewed chromosomal variation in each genus of Apostasioideae Garay and Cyripedioideae Garay, but did not consider the probable basic numbers of higher taxonomic categories. Felix & Guerra (2000, 2005) examined the chromosomal variability in the cymbidioid clade (*sensu* Dressler, 1993) and in Cyripedioideae, Orchidoideae (including Spiranthoideae Dressler) and Vanilloideae Szlach. and

concluded that  $x = 7$  is the most probable basic number for the family Orchidaceae. The basic number corresponds to the haploid number encountered in a given taxon that explains in the most parsimonious manner the variation in chromosome numbers seen in that and related taxa (Guerra, 2000).

According to Chase, Freudenstein & Cameron (2003), orchids are subdivided into five subfamilies: Apostasioideae, Cyripedioideae, Vanilloideae, Orchidoideae and Epidendroideae Lindl. Epidendroideae comprise an estimated 18 000 species and 650 genera (Cribb & Chase, 2005), mainly epiphytic plants, distributed in tropical and subtropical regions throughout the world. Epidendroideae are highly diversified and no morphological synapomorphy is shared by all members of the group. They are subdivided into 16 tribes, of which Epidendreae Kunth, Cymbidieae Pfitzer, Dendrobieae Lindl. and Vandaeae Lindl. account for approximately 15 000 species (Chase *et al.*, 2003).

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Cymbidieae have corms or pseudobulbs and two to four pollinia bodies (Chase *et al.*, 2003). The chromosome numbers in this tribe are quite variable, ranging from  $n = 6$  in *Erycina pusilla* (L.) N.H. Williams & M.W. Chase (as *Psycmorchis pusilla* (L.) Dodson & Dressler) to  $n = 84$  in two species of *Oncidium* Sw. (revised by Felix & Guerra, 2000). Epidendreae are subdivided into two main subtribes: Pleurothallidinae Lindl. and Laeliinae Benth. The former has 28 genera and approximately 4000 species, but chromosome numbers are available only for four genera and 36 species, with a predominance of  $n = 20$  in *Pleurothallis* R.Br. *s.l.* and  $n = 16$  in *Stelis*. Chromosome numbers are known for 14 out of 45 genera and 94 of 1788 species of Laeliinae, with a predominance of  $n = 20$  in the majority of the genera (Tanaka & Kamemoto, 1984). Vandeeae are comprised of two monophyletic subtribes having monopodial growth (Aeridinae Pfitzer with  $x = 19$  and Angraecinae Summerh. with  $x = 19, 20, 21, 23, 24$  and 25) (Carlswald *et al.*, 2006) and subtribe Polystachiinae Schltr. which has sympodial growth and  $x = 20$  (Jones, 1966). Subtribes Agrostophyllinae Szlach., Dendrobiiinae Lindl. and Collabiinae Pfitzer do not have well-defined positions in Epidendroideae (Chase *et al.*, 2003).

Although the molecular phylogenetics of Epidendroideae has been relatively well studied, it has never been cytotaxonomically evaluated. In the present study, we analysed 44 Brazilian species of Epidendroideae (*sensu* Chase *et al.*, 2003) and critically reviewed the chromosome numbers for each genus and subtribe in order to establish the probable basic numbers of the subfamily. These data were compared with the classification system developed by Dressler (1993) and Chase *et al.* (2003), and with recent phylogenetic proposals by Pridgeon, Solano & Chase (2001), Freudenstein *et al.* (2004), Carlswald *et al.* (2006), Cameron (2005), van den Berg & Chase (2004a), van den Berg *et al.* (2005, 2009), among others.

## MATERIAL AND METHODS

The large majority of the plants analysed here were collected in north-eastern Brazil. All of the material studied was cultivated at the Federal Rural University of Pernambuco, the Federal University of Paraíba or the Federal University of Pernambuco, except for some plants donated by private collectors. The species analysed, chromosome numbers counted here and previous counts are listed in Table 1. Samples of all materials were deposited in the PEUFR, HST and EAN herbaria. Identifications were based on Pabst & Dungs (1975, 1977), but the binomials were updated according to Govaerts *et al.* (2009; <http://www.kew.org/wcsp/monocots/>).

Chromosome analyses were undertaken using root tips pretreated with 0.002 M 8-hydroxyquinoline at 4 °C for 24 h. The material was then fixed in absolute ethanol/glacial acetic acid (3 : 1 v/v) for 3–24 h at room temperature 25 °C and stored at –20 °C. To prepare slides, root tips were hydrolysed in 5 M HCl at room temperature, frozen in liquid nitrogen to remove the coverslip and stained with 1% acetic haematoxylin (Guerra, 1999) or 2% Giemsa (Guerra, 1983).

The diversity in chromosome numbers in the epidendroid clade was examined by undertaking a revision based on the chromosome numbers compiled by Tanaka & Kamemoto (1984) and the indexes prepared by Fedorov (1969), Moore (1973, 1974, 1977), Goldblatt (1981, 1984, 1985, 1988), Goldblatt & Johnson (1990, 1991, 1994, 1996, 2000, 2003, 2006) and more recent papers. A separate list of chromosome numbers was then prepared, including the data from the present analysis (see also Appendix 1). In this table, the names of the genera, species and authors are cited as in the World Checklist of Monocotyledons (Govaerts *et al.*, 2009) and previous names indicated in parentheses.

The data from Appendix 1 were synthesized in Table 2, showing the chromosome number variation in each genus. The numbers were ordered from the most to the least frequent, and the probable basic number for each genus was underlined, based on the frequency of each number in the genus and in the closest related genera. The chromosome numbers that were considered questionable (as they differed significantly from information available in the literature), and the occasional case of monosomy and trisomy were excluded from Appendix 1 and Table 2, and from the discussion, and are presented separately in Appendix 2.

## RESULTS

The interphase nucleus structure and the chromosome number of a total of 44 species belonging to 21 genera, seven subtribes and four tribes of Epidendroideae (*sensu* Chase *et al.*, 2003) were analysed. The structure of the interphase nuclei was quite variable among the species analysed. According to the classification of interphase nuclei suggested by Tanaka (1971) for Orchidaceae, the structural types varied from diffuse nuclei in *Campylocentrum pernambucense* Hoehne (Fig. 1B) and *Cattleya walkeriana* Gardner to complex chromocentric nuclei in *Prosthechea caetensis* (Bicalho) W.E. Higgins and *Malaxis excavata* Kuntze (Fig. 1C).

The species analysed here generally had small chromosomes, varying slightly in length, all species displaying meta- to submetacentric chromosomes and

**Table 1.** List of species analysed with respective provenances, voucher numbers, chromosome numbers ( $n$  and/or  $2n$ ), figures in the text, herbarium where each material was deposited, previous counts and sources

Taxa	Provenance*	Voucher no.	$2n/n$	Herbarium	Figs	Previous counts ( $2n$ )	Sources†
Subfamily Epidendroideae							
Tribe Sobralieae							
<i>Elleanthus brasiliensis</i> (Lindl.) Rchb.f.	Maranguape, CE	L.P.Felix, 8284	50	PEUFR	1A, 2A		
<i>Sobralia liliastrum</i> Lindl.	Camocim do São Felix, PE	L.P.Felix, 8213	48	PEUFR	2B		
	Palmeiras, BA	L.P.Felix, 9124	48	PEUFR			
<i>S. sessilis</i> Lindl.	Morro do Chapéu, BA	L.P.Felix, 7394	48	EAN	2C		
Tribe Epidendreae							
Subtribe Ponerinae							
<i>Isochilus linearis</i> (Jacq.) R.Br.	Taquaritinga do Norte, PE	L.P.Felix, 12715	40	EAN	2D		
Subtribe Bletinae							
<i>Bletia catenulata</i> Ruiz & Pav.	Gilbués, PI	L.P.Felix, S/N	40	HST	2E		
Subtribe Laeliinae							
<i>Brassavola tuberculata</i> Hook.	Camocim do São Felix, PE	L.P.Felix, 9650	40	PEUFR		40	DA09
	Puxinanã, PB	L.P.Felix, 12728	40	EAN	2F		
	Cultivated	L.P.Felix, 12725	40	EAN	2G	40	TK84
<i>B. nodosa</i> (L.) Lindl.							
<i>Cattleya amethystoglossa</i> Linden & Rchb.f. ex R.Warner	Morro do Chapéu, BA	L.P.Felix, 9651	40	PEUFR	2H		
<i>C. elongata</i> Barb. Rodr.	Morro do Chapéu, BA	L.P.Felix, 12976	80	EAN	2I		
<i>C. granulosa</i> Lindl.	Natal, RN	L.P.Felix, 12977	40	EAN	2J		
	Alcaçuz, RN	L.P.Felix, 12978	40	EAN			
	Cultivated	Unvouchered	42	–	2K		
<i>C. nobilior</i> Rchb.f. var. <i>amaliae</i> Pabst	Cultivated, Ostetto Orquídeas	Unvouchered	42	–			
<i>C. nobilior</i> var. <i>nobilior</i>	Cultivated, St Cruz 3263	Unvouchered	40	–		40	TK84
<i>C. walkeriana</i> Gardner	Cultivated, St Cruz 3149	Unvouchered	c. 80	–	2L		
<i>C. walkeriana</i> var. <i>princeps</i> L.C.Menezes							
<i>Cattleyella araguaiensis</i> (Pabst) Van den Berg & M.W.Chase	Rio Araguaia, TO	L.P.Felix, 9360	40	EAN	1E, 2M		
<i>Dimerandra emarginata</i> (G.Mey.) Hoehne	Carmópolis, SE	L.P.Felix, 9652	40	PEUFR	2N	40	GJ90
<i>Encyclia advena</i> (Rchb.f.) Porto & Brade	Bonito, PE	L.P.Felix, 9638	40	HST	3A	40	TK84
	Brejo da Madre de Deus, PE	L.P.Felix, 12725	40	EAN			
	Araguaia, TO	L.P.Felix, 12723	40	EAN	3B		
<i>E. flava</i> (Lindl.) Porto & Brade	Brejo da Madre de Deus, PE	L.P.Felix, 12727	40	EAN	3C		
<i>E. oncidoides</i> (Lindl.) Schltr.	Esperança, PB	L.P.Felix, 12731	40	EAN			
Subtribe Laeliinae (cont.)							
<i>Epidendrum avicule</i> Lindl.	Brejo da Madre de Deus, PE	L.P.Felix, 8355	40	EAN	3G	40	TK84
<i>E. cinnabarinum</i> Salzm. ex Lindl.	Camocim do São Felix, PE	L.P.Felix, 9653	c. 240	PEUFR	3D	c. 240	G00, OL06
	Mamanguape, PB	L.P.Felix, 2165	c. 240	EAN			
	Serraria, PE	L.P.Felix, 11489	$n = 108-124$	EAN			
	Esperança, PB	L.P.Felix, 12989	c. 240	EAN			
<i>E. difforme</i> Jacq.	Cabo, PE	L.P.Felix, 8324	40	PEUFR	3F	39–40	TK84
<i>E. ellipticum</i> Graham	Camocim do São Felix, PE	L.P.Felix, 9435	68	PEUFR	3E	–	
<i>E. latilabrum</i> Lindl.	Taquaritinga do Norte, PE	L.P.Felix, 12736	40	EAN	3H	–	
<i>E. nocturnum</i> Jacq.	Belém, PA	L.P.Felix, 12667	80	EAN		40, 80	TK84
<i>E. rigidum</i> Jacq.	Brejo da Madre de Deus, PE					–	
<i>Jacquinella globosa</i> (Jacq.) Schltr.	Bonito, PE	L.P.Felix, 12735	40	EAN	3I		
	Bonito, PE	L.P.Felix, 8385	38	PEUFR	3J	–	
	Taquaritinga do Norte, PE	L.P.Felix, 12721	38	EAN			
<i>Laelia marginata</i> (Rchb.f.) L.O.Williams	Bezerras, PE	L.P.Felix, 1038	40	EAN	3K	40	TK84
<i>Prosthechea caetensis</i> (Bicalho) Pabst	Morro do Chapéu, BA	L.P.Felix, 8644	80	PEUFR	4A	–	
<i>P. fragrans</i> (Sw.) W.E.Higgins	Brejo da Madre de Deus, PE	L.P.Felix, 12733	40	EAN	4B	40	TK84
	Alcaçuz, RN	L.P.Felix, 12732	40	EAN			
<i>P. vespa</i> (Vell.) W.E.Higgins	São Felix do Xingu, PA	L.P.Felix, 12979	40	EAN	4C	–	
<i>Scaphyglottis fusiformis</i> (Griseb.) R.E.Schult.	Bezerras, PE	L.P.Felix, 9640	40	PEUFR	4D	–	
<i>Sophranitis lobata</i> (Lindl.) Van den Berg	Cultivated	Unvouchered	40	–	–	–	
<i>S. purpurata</i> (Lindl. & Paxton) Van den Berg & M.W.Chase	Cultivated	Unvouchered	40	–	–	40	M77
Subtribe Pleurothallidinae							
<i>Acianthera ochreate</i> (Lindl.) Pridgeon & M.W.Chase	Bezerras, PE	L.P.Felix, 9641	40	PEUFR	4E	–	
<i>Stelis</i> sp.	Ibateguara, AL	L.P.Felix, 8271	32	EAN	4F	–	
Tribe Malaxideae							
<i>Malaxis excavata</i> (Lindl.) Kuntze	Bonito, PE	L.P.Felix, 8464	30	PEUFR	4G	–	
<i>M. pubescens</i> (Lindl.) Kuntze	Rio Grande, RS	L.P.Felix, 9022	24	PEUFR	4H	–	
Tribe Vandaeae							
Subtribe Polystachiinae							
<i>Polystachya estrellensis</i> Rchb.f.	Itapororoca, PB	L.P.Felix, 798	80	EAN	–	80	TK84
Subtribe Angraecinae							
<i>Campylocentrum amazonicum</i> Cogn.	Acará, PA	L.P.Felix, 8490	80	EAN	4I	–	
<i>C. crassirhizum</i> Hoehne	Bezerras, PE	L.P.Felix, 8919	38	PEUFR	4J	–	
<i>C. pernambucense</i> Hoehne	São Vicente Ferrer, PE	L.P.Felix, S/N	38	EAN	4K	–	
	Areia, PB	L.P.Felix, 12982		EAN			
Unplaced subtribes within Epidendroideae							
Subtribe Dendrobiinae							
<i>Bulbophyllum cribbianum</i> Toscano	Rio de Contas, BA	L.P.Felix, 8831	38	PEUFR	4L	–	
<i>B. sanderianum</i> Rolfe	Brejo da Madre de Deus, PE	L.P.Felix, 12981	38	EAN	4M	–	
<i>Bulbophyllum</i> sp. 1	Campo Formoso, BA	L.P.Felix, 11802	38	EAN	4N	–	
<i>Bulbophyllum</i> sp. 2	Morro do Chapéu, BA	L.P.Felix, 11701	80	EAN	4O	–	

\*Brazilian state abbreviations: AL, Alagoas; BA, Bahia; CE, Ceará; PA, Pará; PB, Paraíba; PE, Pernambuco; PI, Piauí; RN, Rio Grande do Norte; RS, Rio Grande do Sul; SE, Sergipe; TO, Tocantins.

†Sources: TK84, Tanaka & Kamemoto (1984); GJ90, Goldblatt & Johnson (1990); G00, Guerra (2000); M77, Moore (1977); OL06, Conceição *et al.* (2006); DA09, Daviña *et al.* (2009).

**Table 2.** Chromosome numbers and probable base numbers (underlined) of tribes, subtribes and genera of subfamily Epidendroideae (*sensu* Chase *et al.*, 2003), except those of the cymbidioid phylad previously published by Felix & Guerra (2000), including the number of genera and species in brackets

Subfamilies, tribes and subtribes, number of genera/species cytologically known and probable base number	Genera with the number of species known/analysed	Chromosome numbers*† and most probable base numbers (underlined)
TRIBE NEOTIEAE (6/191)	<i>Aphyllorchis</i> Blume (15/1) <i>Cephalanthera</i> L.C.Rich. (14/10) <i>Epipactis</i> Sw. (21/19) <i>Limodorum</i> L. (1/1) <i>Neottia</i> L. ( <i>Listera</i> included) (63/30)	c. 18 16–18, 17, 22 <u>20</u> , 18–30, 16–19 28–32 <u>18</u> , 19–20–21, 17, 14–28–23
TRIBE SOBRALIEAE (4/237) Subtribe Sobraliinae (4/237)	<i>Elleanthus</i> Presl. (106/1) <i>Sobralia</i> Ruiz & Pavon (120/2)	25 <u>24</u>
TRIBE GASTRODIEAE (6/70)	<i>Gastrodia</i> R.Br.(41/4)	<u>20</u> , 19
TRIBE CALYPSOE (13/70)	<i>Calypso</i> Salisb. (1/1)	28
TRIBE EPIDENDREAE (86/5870) Subtribe Ponerinae (22/3)	<i>Isochilus</i> R.Br. (12/1)	20
Subtribe Bletinae (3/48)	<i>Bletia</i> Ruiz & Pavon (30/2)	<u>20</u> , 30
Subtribe Pleurothallidinae (28/3021) <i>x</i> = 20	<i>Acianthera</i> Scheidw. (131/7) <i>Anathallis</i> Barb. Rodr. (89/1) <i>Masdevallia</i> Ruiz & Pavon (380/2) <i>Pabstiella</i> Brieger & Senghas (8/1) <i>Pleurothallis</i> R.Br. (1120/10) <i>Scaphosepalum</i> Pfitzer (41/1) <i>Specklinia</i> Lindl. (90/1) <i>Stelis</i> Sw. (370/7)	20 21 18–22 <u>16</u> 19–20, 18, 34–36–42 32 <u>10</u> <u>16</u> –19, 17–21–32–38–39
Subtribe Laeliinae (van den Berg <i>et al.</i> , 2000) (45/1788) <i>x</i> = 20	<i>Brassavola</i> R.Br. (20/4) <i>Broughtonia</i> R.Br.(6/1) <i>Cattleya</i> Lindl. (54/26) <i>Catleyella</i> Van den Berg & Chase (1/1) <i>Caularthron</i> Rafin. (4/1) <i>Dimerandra</i> Schltr. (6/2) <i>Encyclia</i> Hook. (154/7) <i>Epidendrum</i> L. (1125/38)  <i>Guarianthe</i> Dressler & W.E.Higgins (5/1) <i>Jacquiella</i> Schltr. (6/1) <i>Laelia</i> Lindl. ( <i>s.l.</i> ) (11/9) <i>Leptotes</i> Lindl. (6/1) <i>Prosthechea</i> (93/14) <i>Psychilis</i> Raf. (17/1) <i>Rhyncholaelia</i> Schltr. (2/1) <i>Scaphyglottis</i> Lindl. (63/4) <i>Sophranitis</i> Lindl. (57/19)	20 20 20, 40, 21–27–30 20 20 <u>20</u> <u>20</u> <u>20</u> , 14–40, 30–34, 12–15–19–26–35–60, 21–24–45–80–(108–124)–120 20 19 20, 21, 22–30 20 <u>20</u> , 28–40 20 20 20 <u>20</u> , 19 <u>20</u> , 40, 60
TRIBE PODOCHILEAE (21/1232) Subtribe Eriinae (11/725)	<i>Ceratostylis</i> Blume (145/1) <i>Cryptochilus</i> Wallich (4/2) <i>Eria</i> Lindl. (404/48) <i>Mediocalcar</i> J.J.Sm. (24/4) <i>Porpax</i> Lindl. (13/3) <i>Pseuderia</i> Schltr. (19/1) <i>Trichotisia</i> Blume (73/2)	20 <u>19</u> <u>19</u> , 20, 18–22, 33–38 <u>19</u> <u>12</u> , 21 20 19–22
Subtribe Podochilinae (4/208)	<i>Podochilus</i> Blume (60/1)	19
Subtribe Thelasiinae (6/299) <i>x</i> = 16	<i>Phreatia</i> Lindl. (201/1) <i>Thelasis</i> Blume (23/1)	16 16
TRIBE ARETHUSEAE (24/701) Subtribe Arethusinae (2/3) <i>x</i> = 20	<i>Anthogonium</i> Lindl. (1/2) <i>Arethusa</i> L. (1/1) <i>Arundina</i> Blume (1/1) <i>Calopogon</i> R.Br. (5/5) <i>Eleorchis</i> Maek. (2/1)	<u>20</u> –19–21 <u>20</u> <u>20</u> , 16–19 <u>21</u> , 13 20

Table 2. Continued

Subfamilies, tribes and subtribes, number of genera/species cytologically known and probable base number	Genera with the number of species known/analysed	Chromosome numbers*† and most probable base numbers (underlined)
Subtribe Coelogyninae (20/274) x = 20	<i>Bletilla</i> Rchb.f. (9/3) <i>Coelogyne</i> Lindl. (100/19) <i>Dendrochilum</i> Blume (100/2) <i>Neogyne</i> Rchb. f. (1/1) <i>Otochilus</i> Lindl. (4/3) <i>Panisea</i> Steudel (7/3) <i>Pholidota</i> Hook. (30/11) <i>Pleione</i> D.Don (15/11) <i>Thunia</i> Rchb.f. (5/1)	<u>16</u> , 32–38 <u>20</u> , 19, 21–40 <u>15</u> –19 21 20 <u>20</u> <u>20</u> , 19, 21–22 <u>20</u> , 19–40 <u>20</u> , 19
TRIBE MALAXIDEAE (7/1158) x = 15, 21	<i>Liparis</i> Rich. (418/52) <i>Malaxis</i> Sw. (395/13) <i>Oberonia</i> Lindl. (308/30)	<u>21</u> , 15, 19, 10–20, <u>14</u> –18–40, 11–13–28–34–38 <u>21</u> , 15–30, <u>14</u> , 18–c. 20–22 <u>15</u> , 30
TRIBE VANDEAE (157/1960)		
Subtribe Polystachyinae (4/228) x = 20	<i>Polystachya</i> Hook. (150/42)	<u>20</u> , 40, c. 60
Subtribe Aeridinae (98/1352) x = 19	<i>Acampe</i> Lindl. (7/4) <i>Aerides</i> Lour. (25/10) <i>Arachnis</i> Blume (11/1) <i>Ascocentrum</i> Schltr. (13/5) <i>Biermannia</i> King & Pantl. (10/1) <i>Calymmanthera</i> Schltr. (5/2) <i>Chilochista</i> Lindl. (20/3) <i>Cleisostoma</i> D.Don (87/17) <i>Cleisostomopsis</i> Seidenf. (2/1) <i>Cottonia</i> Wight (1/1) <i>Diplocentrum</i> Lindl. (2/2) <i>Diplopore</i> Hook. (2/1) <i>Drymoanthus</i> Nicholls (4/3) <i>Esmeralda</i> Rchb.f. (2/1) <i>Euanthe</i> Schltr. (1/1) <i>Gastrochilus</i> D.Don (55/9) <i>Gunnarella</i> Senghas (9/1) <i>Holcoglossum</i> Schltr. (10/2) <i>Hygrochilus</i> Pfitzer (1/1) <i>Luisia</i> Gaudich. (39/9) <i>Micropera</i> Lindl. (18/2) <i>Neofinetia</i> Hu (2/1) <i>Ornithochilus</i> Lindl. (3/1) <i>Papilionanthe</i> Schltr. (10/6) <i>Paraphalaenopsis</i> Hawkes (4/2) <i>Pelatantheria</i> Ridl. (7/2) <i>Phalaenopsis</i> Blume (62/23) <i>Pomatocalpa</i> Breda (35/3) <i>Pteroceras</i> Hasselt ex Hassk. (24/2) <i>Renanthera</i> Lour. (33/7) <i>Rhynchostylis</i> Blume (3/3) <i>Robiquetia</i> Gaudich. (38/5) <i>Sarcochilus</i> R.Br. (25/2) <i>Sedirea</i> Garay & H.R.Sweet (2/1) <i>Schoenorchis</i> Blume (26/2) <i>Seidenfadenia</i> Garay (1/1) <i>Smitinandia</i> Holttum (3/2) <i>Smithsonia</i> C.J.Saldanha (3/2) <i>Staurochilus</i> Ridl. (14/1) <i>Stereochilus</i> Lindl. (7/1) <i>Taeniophyllum</i> Blume (185/5) <i>Thrixspermum</i> Lour. (144/6) <i>Trichoglottis</i> Blume (64/4) <i>Tuberolabium</i> Yamam. (12/2) <i>Uncifera</i> Lindl. (6/3) <i>Vanda</i> Jones (57/21) <i>Vandopsis</i> Pfitz. (5/3)	<u>19</u> , 18 <u>19</u> , 38 19 <u>19</u> 19 <u>19</u> <u>19</u> <u>19</u> , 20 19–20 19–20 <u>19</u> 8 <u>19</u> , 38 21 19 <u>19</u> , 17–20 19 19 19 <u>19</u> , 20, 18 19 19 19 19 19 19–20–38 19 19 <u>19</u> , 38 19 19 <u>19</u> 19 19 19–20, 28 <u>19</u> 19 19 15–19 19 <u>19</u> , 38, 57 <u>19</u>

Table 2. Continued

Subfamilies, tribes and subtribes, number of genera/species cytologically known and probable base number	Genera with the number of species known/analysed	Chromosome numbers*† and most probable base numbers (underlined)
Subtribe Angraecinae (18/445) <i>x</i> = 19	<i>Angraecum</i> Bory (219/28) <i>Calyptrochilum</i> Kraenzl. (2/2) <i>Campylocentrum</i> Benth. (73/4) <i>Cryptopus</i> Lindl. (4/1) <i>Dendrophylax</i> Rehb.f. (9/1) <i>Jumellea</i> Schltr. (58/1) <i>Listrostachys</i> Rehb.f. (2/1) <i>Oeonilla</i> Schltr. (2/1)	<u>19</u> , 25, 21, 20–23–24, c. 38–46 <u>19</u> <u>19</u> –22–40 38 44 19–22 23 <u>19</u>
Subtribe Aerangidinae (32/315) <i>x</i> = 25	<i>Aerangis</i> Rehb.f. (490/15) <i>Ancistrorhynchus</i> Finet (16/9) <i>Angraecopsis</i> Kraenzl. (21/5) <i>Bolusiella</i> Schltr. (6/1) <i>Chamaeangis</i> Schltr. (10/2) <i>Cribbia</i> Senghas (4/1) <i>Cyrtochis</i> Schltr. (15/9) <i>Diaphananthe</i> Schltr. (24/5) <i>Eggelingia</i> Summ. (3/1) <i>Eurychone</i> Schltr. (2/1) <i>Microcoelia</i> Lindl. (29/14) <i>Microterangis</i> Senghas (7/1) <i>Mystacidium</i> Lindl. (9/1) <i>Podangis</i> Schltr. (1/1) <i>Rangearis</i> Summ. (7/3) <i>Rhipidoglossum</i> Schltr. (37/6) <i>Solenangis</i> Schltr. (6/2) <i>Sphyrarhynchus</i> Mansf. (1/1) <i>Tridactyle</i> Schltr. (43/3)	25, 21, 23–26–27–100 <u>24</u> , c. 25–36–48 <u>25</u> , 24 25 25–50 <u>25</u> 23, 25–46–69–75 25 23 25 <u>24</u> 25 24 23 23–46–50–54 25, 50 <u>25</u> 25 50, <u>25</u>
UNPLACED SUBTRIBES		
Subtribe Agrostophyllinae (8/196) <i>x</i> = 20	<i>Agrostophyllum</i> Blume (91/5) <i>Earina</i> Lindl. (6/3) <i>Glossorhyncha</i> Ridl. (80/2)	<u>20</u> , 19 <u>20</u> <u>20</u>
Subtribe Dendrobiinae (17/3332) <i>x</i> = 19	<i>Bulbophyllum</i> Thouars (1784/166) <i>Dendrobium</i> Sw. (1184/251) <i>Diplocaulobium</i> Kraenzl. (99/5) <i>Epigeneium</i> Gagnep. (38/5) <i>Flickingeria</i> A.D.Hawkes (69/3) <i>Geniorchis</i> Schltr. (7/1) <i>Saccoglossum</i> Schltr. (5/1) <i>Trias</i> Lindl. (12/1)	<u>19</u> , 20, 18, 21, 10–40 <u>19</u> , 20–18, 38, 10–21–22 <u>19</u> <u>20</u> <u>19</u> <u>19</u> <u>19</u> c. 20 <u>19</u>
Subtribe Collabiinae (19/435) <i>x</i> = 20	<i>Acanthephippium</i> Blume (12/6) <i>Calanthe</i> R.Br. (187/48) <i>Cephalantheropsis</i> Guillaumin (5/2) <i>Chrysoglossum</i> Blume (6/1) <i>Gastrorchis</i> Thouars (8/4) <i>Nephelaphyllum</i> Blume (12/1) <i>Pachystoma</i> Blume (1/1) <i>Phaius</i> Lour. (48/11) <i>Plocoglottis</i> Blume (39/2) <i>Spathoglottis</i> Blume (45/8) <i>Tainia</i> Blume (29/9)	<u>24</u> , 21–23 <u>20</u> , 21, 19–22, 23, 10–30 <u>20</u> , 21 18 <u>20</u> <u>18</u> 20 <u>21</u> , 22, 14–19–23–24 <u>19</u> <u>20</u> , 18–19 <u>20</u> , 15–16–18–36–38

\*Chromosome numbers are ordered from the more to the less frequent.

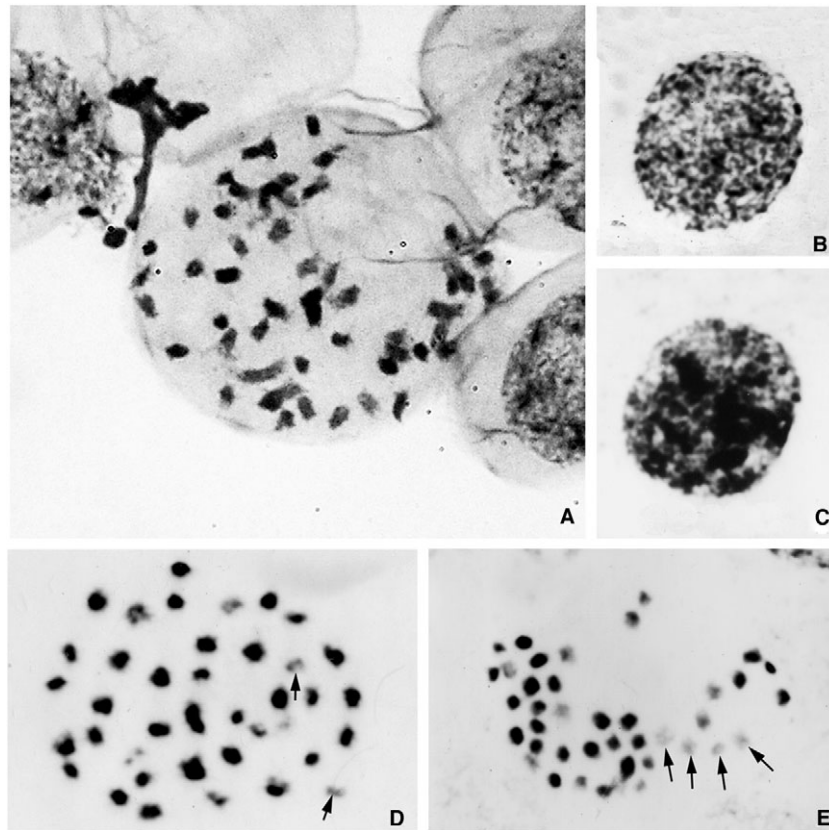
†Numbers connected with a rule (–) have equal frequencies.

symmetrical karyotypes. Chromosome numbers varied from  $2n = 24$  in *Malaxis pubescens* Kuntze to  $2n = c. 240$  in *Epidendrum cinnabarinum* Salzm. ex Lindl.

In tribe Sobralieae Pfitzer, subtribe Sobraliinae Pfitzer, *Elleanthus brasiliensis* Rehb.f. had  $2n = 50$  (Fig. 2A), whereas *Sobralia liliastrum* Lindl. and *S. sessilis* Lindl. had  $2n = 48$  (Fig. 2A–C). The proportion

of condensed chromatin per chromosome was more variable in the most asymmetric karyotypes, generally being greater in the largest chromosome pairs, as for example in *E. brasiliensis* (Fig. 1A).

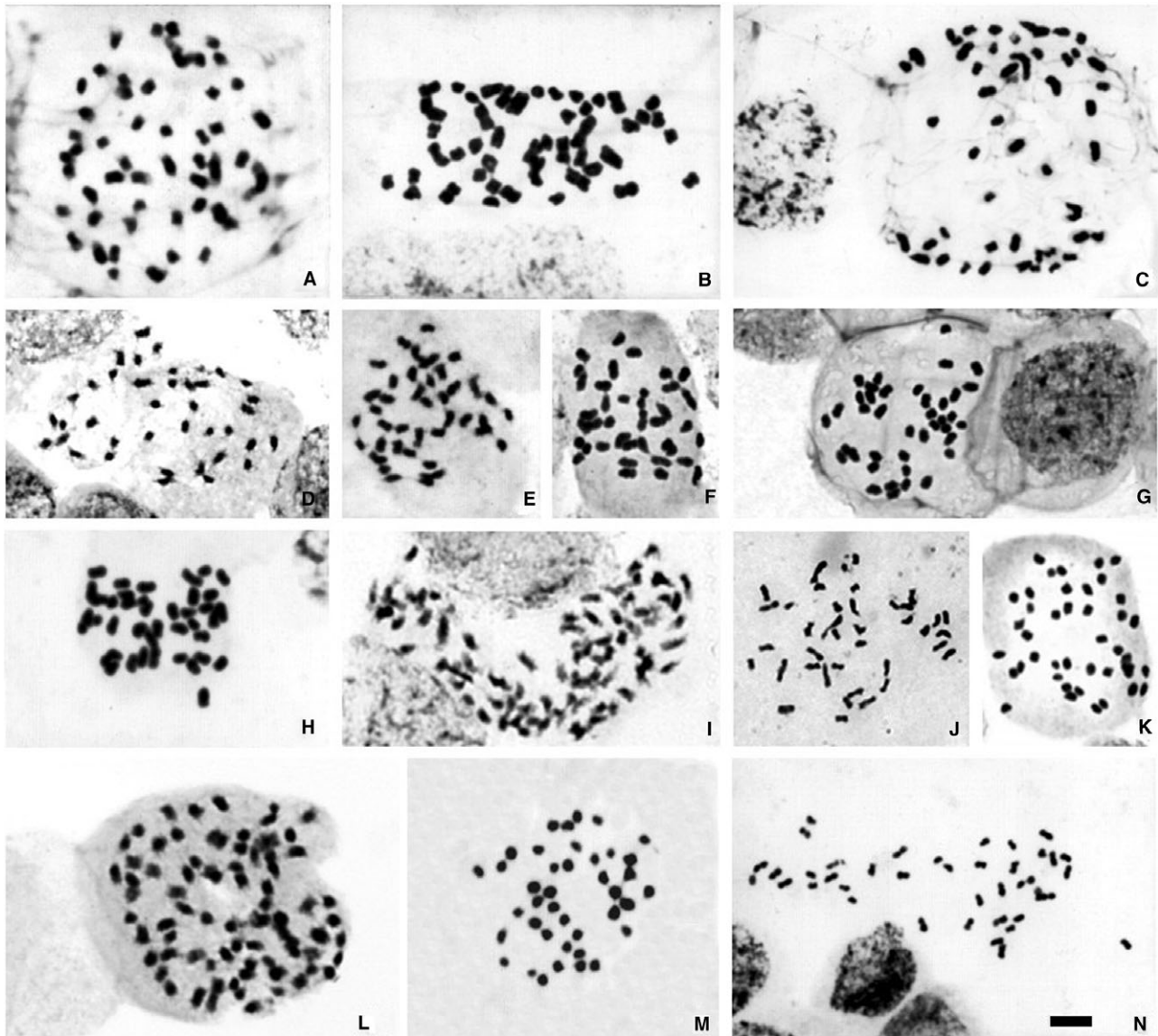
In tribe Epidendreae, *Isochilus linearis* (Jacq.) R.Br. (Fig. 2D) and *Bletia catenulata* Ruiz & Pav. (Fig. 2E), from subtribes Ponerinae and Bletiinae had  $2n = 40$ , whereas subtribe Laeliinae, the most extensively



**Figure 1.** Prometaphase chromosomes and interphase nuclei of representatives of Sobraliinae, Laeliinae and Angraeciinae. A, *Eleanthus brasiliensis* showing more condensed chromatin in two larger and 10 smaller chromosomes. B–C, interphase nuclei of the diffuse type in *Campylocentrum pernambucense* (B) and the complex chromocentric type in *Malaxis excavata* (C). D–E, *Jacquinella globosa* (D) and *Cattleyella araguaiensis* (E) showing late-condensed chromosomes (arrows).

studied subtribe, exhibited the greatest numerical chromosomal diversity, varying from  $2n = 38$  to  $2n = c. 240$ . These species had generally symmetrical karyotypes, with metacentric and submetacentric chromosomes, and prophase chromosomes with a similar condensation pattern. All species investigated of *Brassavola* R.Br. (Fig. 2F, G), *Encyclia* Hook. (Fig. 3A–C), *Sophronitis* Lindl., *Laelia marginata* (Lindl.) L.O. Williams (Fig. 3K) and *Scaphyglottis fusiformis* (Griseb.) R.E.Schult. (Fig. 4D) had  $2n = 40$ . In the genus *Cattleya* Lindl., *C. amethystoglossa* Linden & Rehb.f. ex R.Warner (Fig. 2H), *C. granulosa* Lindl. (Fig. 2J) and the accession Santa Cruz 3263 of *C. walkeriana* had  $2n = 40$ , whereas *C. nobilior* var. *nobilior* Rehb.f. and *C. nobilior* var. *amaliae* Pabst (Fig. 2K) had  $2n = 42$ . *Cattleya walkeriana* accession Santa Cruz 3149 (Fig. 2L) and *C. elongata* Barb.Rodr. were polyploids with  $2n = c. 80$  (Fig. 2I). *Prosthechea fragrans* (Sw.) W.E.Higgins (Fig. 4B) and *P. vespa* (Vell.) W.E.Higgins (Fig. 4C) had  $2n = 40$ , whereas *P. caetensis* (Fig. 4A) had  $2n = 80$ . In *Epidendrum* L.,  $2n = 40$  was observed

in most species [*E. difforme* Jacq. (Fig. 3F), *E. avicula* Lindl. (Fig. 3G), *E. latilabre* Lindl. (Fig. 3H) and *E. rigidum* Jacq. (Fig. 3I)], whereas *E. ellipticum* Sessé & Moc. (Fig. 3E) and *E. cinnabarinum* Salzm. ex Lindl. (Fig. 3D) displayed  $2n = 68$  and  $2n = c. 240$ , respectively. Meiotic analysis of a sample of *E. cinnabarinum* collected in Serraria, Paraíba, revealed the formation of up to five tetravalents during diakinesis, and the occurrence of bridges and lagging chromosomes during anaphases I and II. Haploid numbers ranged from  $n = 105$  to  $n = 122$ , in prometaphase II cells, to  $n = 108$  to  $n = 124$  in pollen mitosis (in a total of 66 cells analysed). *Jacquinella globosa* (Jacq.) Schltr. with  $2n = 38$  had large and small chromosomes. In several species of subtribe Laeliinae, including *Jacquinella globosa* (Figs 1D, 3J), *Cattleyella araguaiensis* (Pabst) Van den Berg & M.W.Chase (Figs 1E, 2M) and *Epidendrum cinnabarinum* (Fig. 3D), some entire chromosomes were late condensing. These chromosomes were generally small (approximately  $0.5 \mu\text{m}$ ), difficult to visualize during prophase and apparently did not have



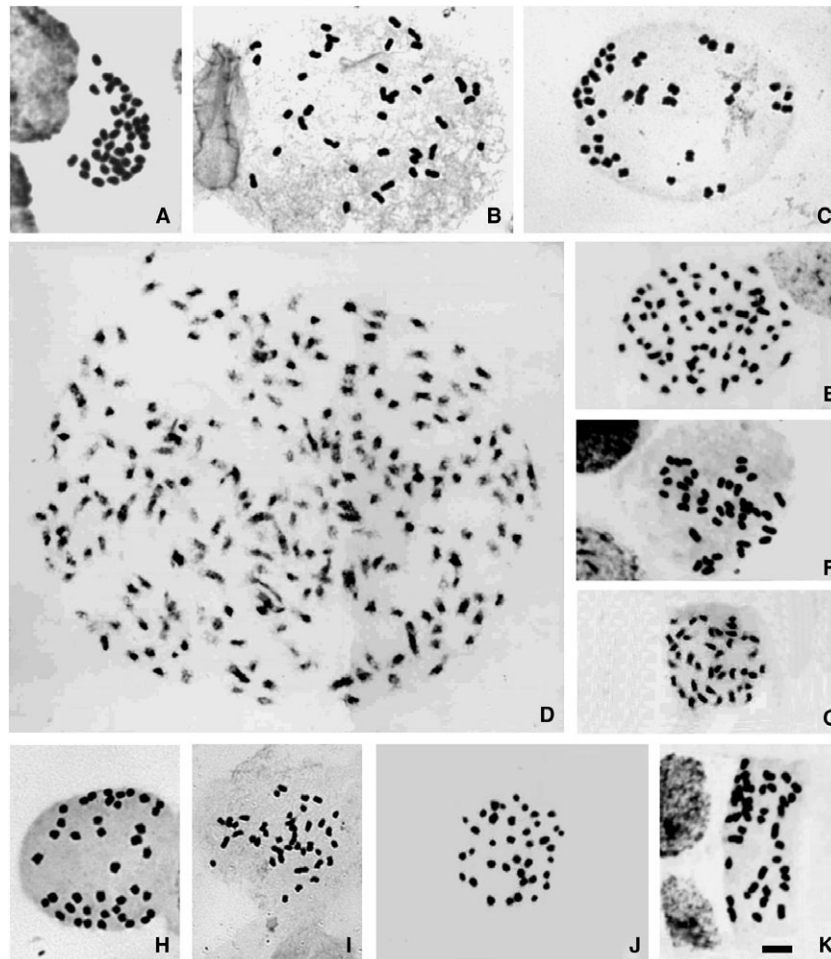
**Figure 2.** Chromosome complements of subtribes Sobraliinae, Ponerinae, Blettiinae and Laeliinae. A, *Eleanthus brasiliensis* ( $2n = 50$ ). B, *Sobralia liliastrum* ( $2n = 48$ ). C, *S. sessilis* ( $2n = 48$ ). D, *Isochilus linearis* ( $2n = 40$ ). E, *Bletia catenulata* ( $2n = 40$ ). F, *Brassavola tuberculata* ( $2n = 40$ ). G, *B. nodosa* ( $2n = 40$ ). H, *Cattleya amethystoglossa* ( $2n = 40$ ). I, *C. elongata* ( $2n = 80$ ). J, *C. granulosa* ( $2n = 40$ ). K, *C. nobilior* var. *amaliaeae* ( $2n = 42$ ). L, *C. walkeriana* var. *princeps* ( $2n = c. 80$ ). M, *Cattleyella araguaiensis* ( $2n = 40$ ). N, *Dimerandra emarginata* ( $2n = 40$ ). Scale bar in (O), 5  $\mu\text{m}$ .

the condensed proximal chromatin observed in all other chromosomes.

In subtribe Pleurothallidinae, *Acianthera ochreatea* (Lindl.) Pridgeon & M.W.Chase had  $2n = 40$  (Fig. 4E) and *Stelis* sp. had  $2n = 32$  (Fig. 4F), both with small chromosomes. The latter had a slightly asymmetric karyotype. *Malaxis excavata*, tribe Malaxideae, had  $n = 15$  in the first microspore mitosis (Fig. 4G) and  $2n = 30$  in somatic mitosis. *Malaxis pubescens* Kuntze showed  $2n = 24$  and chromosomes larger than those of *M. excavata* (Fig. 4H). In the tribe Vandaeae, *Polys-*

*tachya estrelensis* Reichb.f. had  $2n = 80$ , and, in subtribe Angraecinae, *Campylocentrum crassirhizum* Hoehne (Fig. 4J) and *C. pernambucense* (Fig. 4K) had  $2n = 38$ , and *C. amazonicum* Cogn. had  $2n = c. 80$  (Fig. 4I). In tribe Dendrobieae, *Bulbophyllum cribbianum* Toscano, *B. sanderianum* Rolfe and *Bulbophyllum* sp. 1 had  $2n = 38$  (Fig. 4L–N), whereas *Bulbophyllum* sp. 2 (Fig. 4O) had  $2n = 80$ . In *B. sanderianum* and *Bulbophyllum* sp. 1, two of the four small chromosomes were only partially condensed during metaphase (Fig. 4M–N, arrows).



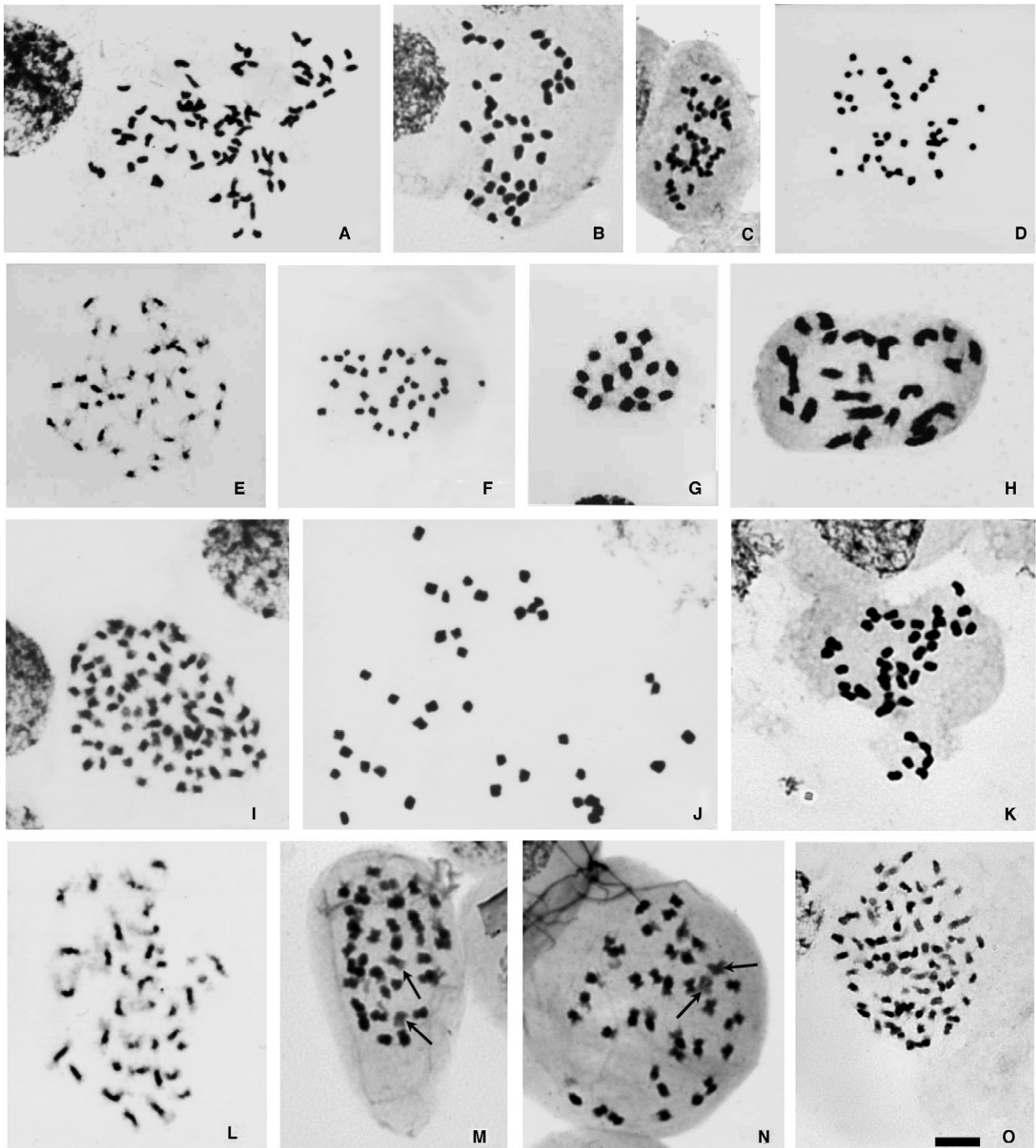


**Figure 3.** Chromosome complements of subtribe Laeliinae. A, *Encyclia advena* ( $2n = 40$ ). B, *E. flava* ( $2n = 40$ ). C, *E. oncidioides* ( $2n = 40$ ). D, prometaphase of *Epidendrum cinnabarinum* ( $2n = c. 240$ ). E, *E. ellipticum* ( $2n = 68$ ). F, *E. diffforme* ( $2n = 40$ ). G, *E. avicula* ( $2n = 40$ ). H, *E. latilabre* ( $2n = 40$ ). I, *E. rigidum* ( $2n = 40$ ). J, *Jacquiniella globosa* ( $2n = 38$ ). K, *Laelia marginata* ( $2n = 40$ ). Scale bar in (I), 5  $\mu\text{m}$ .

Appendix 1 lists the chromosome numbers of 115 genera and 844 species of subfamily Epidendroideae, compiled from the chromosome number indexes and our own data. Counts for the cymbidioid clade (*sensu* Dressler, 1993) published previously (Felix & Guerra, 2000) were not included here. Subfamily Epidendroideae (Table 2) shows a predominance of genera with the basic numbers  $x = 19$  (tribes Podochyleae Pfitzer and Vandaeae) and  $x = 20$  (tribes Epidendreae, Arethuseae and Colabieae Pfitzer). Some disparate basic numbers are also observed, including  $x = 16$  in *Stelis* (subtribe Pleurothallidinae), *Bletilla* Rchb.f. (Coelogyninae), *Phreatia* Lindl. and *Thelasis* Blume (Thelasiinae), and principally  $x = 23$ , 24 and 25 in various genera of Aerangidinae Summerh. Other tribes, such as Sobralieae and Neottieae, are currently insufficiently sampled or have variable basic numbers among genera.

## DISCUSSION

The present work provides the first chromosome counts for 31 species, including the first counts for six genera (*Elleanthus* C.Presl, *Sobralia* Ruiz & Pav., *Isochilus* R.Br., *Cattleyella* Van den Berg & M.W.Chase, *Jacquiniella* Schltr. and *Acianthera* Scheidw.) and for subtribe Ponerinae and tribe Sobralieae. Previous chromosome counts were confirmed for *Dimerandra emarginata* (G.Mey.) Hoehne (Guerra, 1986), *Sophronitis purpurata* (Lindl. & Paxton) Van den Berg & M.W.Chase [as *Laelia purpurata* Lindl. & Paxton (Moore, 1977)], *Brassavola tuberculata* Hook. (Daviña *et al.*, 2009), *Encyclia advena* (Rchb.f.) Porto & Brade (as *E. megalantha* (Barb.Rodr.) Porto & Brade), *Epidendrum avicula* (as *Lanium avicula* Lindl. ex Benth.), *Laelia marginata* (Lindl.) L.O.Williams (as *Schomburgkia crispa* Lindl.)



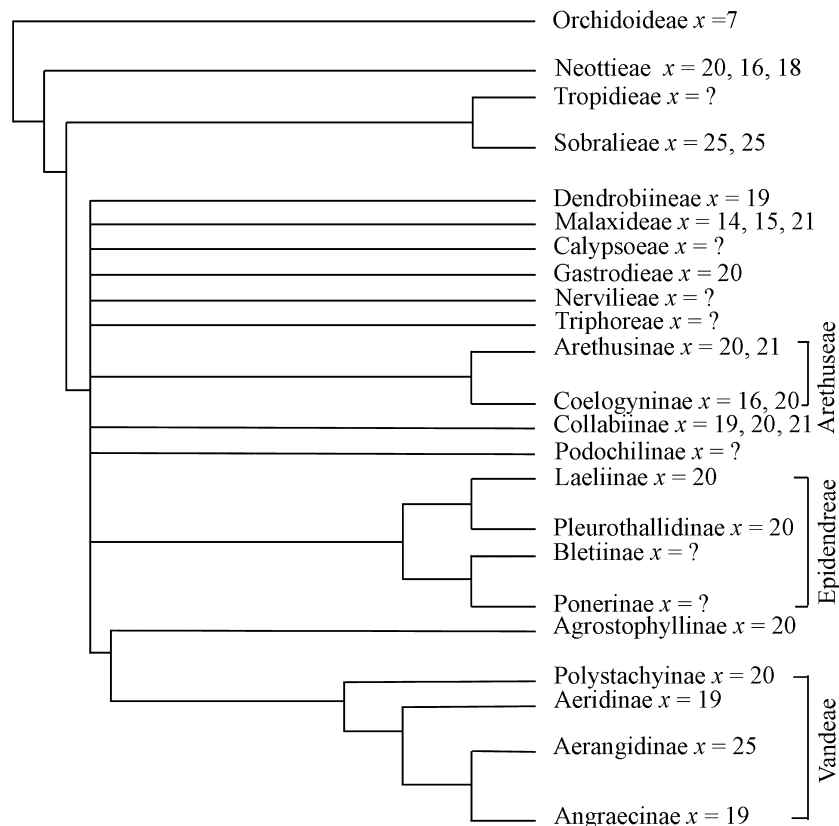
**Figure 4.** Chromosome complements of tribe Malaxideae, subtribes Laeliinae, Pleurothallidinae, Polystachyinae, Angraecinae and Dendrobiinae. A, *Prosthechea caetensis* ( $2n = 80$ ). B, *P. fragrans* ( $2n = 40$ ). C, *P. vespa* ( $2n = 40$ ). D, *Scaphyglottis fusiformis* ( $2n = 40$ ). E, *Acianthera ochreatea* ( $2n = 40$ ). F, *Stelis* sp. ( $2n = 32$ ). G, metaphase of first mitotic division of microspore of *Malaxis excavata* ( $n = 15$ ). H, *M. pubescens* ( $2n = 24$ ). I, *Campylocentrum amazonicum* ( $2n = c. 80$ ). J, *C. crassirhizum* ( $2n = 38$ ). K, *C. pernambucense* ( $2n = 38$ ). L, *Bulbophyllum cribbianum* ( $2n = 38$ ). M, *B. sanderianum* ( $2n = 38$ ). N, *Bulbophyllum* sp. 1 ( $2n = 38$ ). O, *Bulbophyllum* sp. 2 ( $2n = c. 80$ ). Scale bar in (P), 5  $\mu$ m.

and *Prosthechea fragrans* (Sw.) W.E.Higgins (as '*Hormidium fragrans*'), all having  $2n = 40$  (Tanaka & Kamemoto, 1984), *Polystachya estrellensis* Rchb.f and *Epidendrum nocturnum* Jacq. with  $2n = 80$  (Blumenschein, 1960a), and *E. cinnabarinum*, with  $2n = c. 240$  (Guerra, 2000; Conceição, Oliveira & Barbosa, 2006). We found  $2n = 40$  for *Epidendrum difforme*, previously reported as  $2n = 39-40$  (Tanaka & Kamemoto, 1984). The count of  $2n = 40$  for *Cattleya walk-eriana* (accession Santa Cruz 3149) confirmed the only previous count for the species (Blumenschein, 1960a). Additionally,  $2n = 80$  was found for another accession of *C. walk-eriana*, indicating that this species has at least two ploidy levels.

There are records of chromosome numbers for five of the six recognized genera of tribe Neottieae, but its basic number is still unclear. According to Chase *et al.* (2003), this tribe comprises an early branching group of Epidendroideae. In Neottieae,  $x = 20$  is the basic number in *Epipactis* Sw. and the orthoploid series  $x = 14, 21 \pm 1$  occurs in *Neottia* L., *Limodorum* L. and *Cephalanthera* Rich., supporting the hypothesis of an ancestral basic number related to this series in the tribe and to the entire subfamily Epidendroideae (Fig. 5). Tribes Sobralieae and Calypsoeae are also

insufficiently investigated. The numbers of  $n = 24$  and 25 for tribe Sobralieae diverge from the lower chromosome numbers observed in the majority of species of Epidendroideae. The count of  $2n = 54$  for *Sobralia*  $\times$  *amesiana* Hort.Sander (Vij & Shekhar, 1985) from West Bengal, India, was transferred to the table of excluded numbers (see also Appendix 2) as it appears to be a misidentification. This genus is exclusively American (Bechtel, Cribb & Launert, 1992) and this binomial was included by Govaerts *et al.* (2009) in the World Checklist of Orchidaceae as an 'unplaced name'.

Tribe Epidendreae, the largest group of subfamily Epidendroideae (Chase *et al.*, 2003), has karyological reports for 27 genera and 163 species, corresponding to 31% of the genera but less than 3% of the species. These data indicate  $n = 20$  as the most widely occurring number among the three subtribes. *Pleurothallis* and *Stelis* display an exceptionally high variation in chromosome numbers, with 13 different numbers among the 17 species investigated here for these genera. The number  $2n = 20$  reported for *Specklinia grobyi* (Bateman ex Lindl.) Pridgeon & M.W.Chase (Nakata & Hashimoto, 1983) and for *Liparis cordifolia* Hook.f and *L. glossula* Rchb.f. (Goldblatt &



**Figure 5.** Partial cladogram of subfamily Epidendroideae, based on Chase *et al.* (2003), with the probable basic number indicated for each tribe and subtribe.

Johnson, 1994) is probably the lowest diploid number for the subfamily. It seems to represent two independent examples of intense dysploid reduction rather than the ancestral chromosome number of these genera (Guerra, 2008). Similarly low haploid numbers, not representatives of the basic number, have also been found in a few genera of subtribe Oncidiinae (Felix & Guerra, 1999, 2000) and in other families, for example  $n = 6$  in Aristolochiaceae (Ohi-Toma *et al.*, 2006) and  $n = 2$  in Cyperaceae (Vanzela, Guerra & Luceño, 1996). Likewise,  $n = 10$  in *Specklinia* Lindl. and *Liparis* Rich. can be a dysploid remnant of the ancestral number  $x = 7$  or of a tetraploid lineage with  $n = 14$ .

In subtribe Laeliinae,  $n = 20$  is observed in all of the genera, except *Jacquiiniella*, a small genus previously included in subtribe Ponerinae (Dressler, 1993), which also has  $n = 20$ . Small variations around this number have been observed in some species of *Cattleya*, *Epidendrum*, *Laelia*, *Scaphyglottis*, and *Sophronitis*. *Cattleya nobilior* Rchb.f., for example, which is morphologically close to *C. walkeriana* (Pabst & Dungs, 1975), differs from the other species of *Cattleya* by having  $2n = 42$ , a rare number in this genus. *Jacquiiniella globosa* (Jacq.) Schltr. and *Scaphyglottis reflexa* Lindl. (Sau & Sharma, 1983), both with  $2n = 38$ , were included recently in the *Scaphyglottis* alliance by van den Berg *et al.* (2009). Tetraploid species with  $2n = 80$  occur in *Cattleya*, *Epidendrum*, *Prosthechea*, and *Sophronitis*. Intraspecific polyploidy occurred in *C. bicolor* Lindl. (Blumenschein, 1960a), in *Sophronitis* (Blumenschein, 1960b; Yamagishi-Costa & Forni-Martins, 2009) and in some species of *Epidendrum* (Blumenschein, 1960a; Pinheiro *et al.*, 2009). This ploidy change seems to be related to morphological variants placed in distinct subspecies, as in *C. bicolor* ssp. *bicolor* with  $2n = 40$  and *C. bicolor* ssp. *minasgeraensis* Fowlie with  $2n = 80$  (Blumenschein, 1961). In *C. walkeriana* var. *princeps* (accession Santa Cruz 3149), the number  $2n = 80$  reported here was observed only in a cultivated specimen.

In some lithophytic species of *Sophronitis*, the intraspecific polyploidy observed seems to be related to the acquisition of this habit, as has been reported for *Sophronitis longipes* (Rchb.f.) Van den Berg & M.W.Chase (Blumenschein, 1960b), *S. rupestris* Cogn. (Yamagishi-Costa & Forni-Martins, 2009), *Oncidium* aff. *flexuosum*, and *O. varicosum* Lindl. (Felix & Guerra, 2000). This tendency was also observed in the polyploids *Epidendrum cinnabarinum*, *C. walkeriana* var. *princeps*, and *C. elongata*, which have the lithophytic or terrestrial habit. Terrestrial species of subfamilies Vanilloideae and Cyripedioideae also have genome sizes notably higher than most epiphytic orchids. Leitch *et al.* (2009) suggested that orchids with large genomes are restricted to a terrestrial

habit because of the water stress associated with the epiphytic habit. As species with large genome size usually have large guard cells and a slower response to water stress, they are better adapted to the terrestrial lifestyle, whereas species with small genome size are free to occupy both habits.

The only population analysed here of *E. elipticum*, from the *Epidendrum secundum* complex showed  $2n = 68$ . However, an analysis of six populations of this complex displayed  $2n = 28, 40, 48, 52, 56, 68$  and  $80$  (Pinheiro *et al.*, 2009). These data indicate that *E. secundum* is a highly polymorphic complex. It also showed intra- and inter-populational morphological variants (Pinheiro & Barros, 2007). It belongs to the Amphylottidae group of *Epidendrum* (Pabst & Dungs, 1975), which comprises species with different chromosome numbers ( $n = 12, 14, 18, 19$  and  $28$ ) (Hágsater & Arenas, 2005). In *E. cinnabarinum*, the count of  $2n = c. 240$  in four populations from Pernambuco and Paraíba and at least in one population from Bahia (Conceição *et al.*, 2006) indicates that its ploidy is stable, in spite of some meiotic instability, as the occurrence of ring tetravalents and aneuploid spores, observed here, and anaphase bridges and lagging chromosomes, reported by Conceição *et al.* (2006).

In tribe Podochileae,  $n = 19$  occurred in the majority of the genera of subtribe Eriinae and in the sole species of Podochilinae analysed, whereas, in subtribe Thelasiinae,  $n = 16$  was found in the only two species studied. In subtribe Eriinae Benth., *Eria* Lindl. had  $n = 19$  in 27 of the 54 species investigated. The other four genera, with few species investigated, had  $n = 19$  (*Cryptochilus* Wall. and *Mediocalcar* J.J.Sm),  $n = 20$  (*Ceratostylis* Blume), and  $n = 12$  and  $21$  (*Porpax* Lindl.).

The tribe Arethuseae is monophyletic (Goldman *et al.*, 2001), but do not have well-defined relationships with other Epidendroideae (Chase *et al.*, 2003). In this tribe,  $n = 20$  was the best represented haploid number in the genera of both subtribes that are cytologically known, with the exception of *Bletilla* with  $n = 16$ , and *Dendrochilum* Blume with  $n = 15$  and  $n = 19$ .

Tribe Malaxideae has a great diversity in chromosome numbers, with  $n = 21$  predominating in *Liparis* and *Malaxis* and  $n = 15$  in *Oberonia*. The other genera are quite small and insufficiently studied. The most probable basic numbers for the tribe are  $x = 15$  and  $x = 21$ ,  $n = 21$  being the most frequent haploid number and  $n = 15$  the second most frequent and the only one that occurs in all three genera. The occurrence of  $n = 14$  in some species of *Liparis* and *Malaxis*, and the high frequency of  $n = 21$  in these two genera, suggest that these numbers may be related to the polyploid series  $x = 7, 14, 21$  that is quite common in orchids (Felix & Guerra, 2000). *Liparis* and *Malaxis* are arti-

ficial cosmopolitan genera (Cameron, 2005), which may explain their large numerical chromosomal variations. Similarly, the large and chromosomally variable genus *Habenaria* (Orchidoideae) (Felix & Guerra, 1998, 2005) was also recognized as polyphyletic (Bateman *et al.*, 2003). *Oberonia*, which is exclusively epiphytic (a type of habitat that is considered primitive in this subtribe), has  $n = 15$  or  $30$  and is related to a group of 'primitive' epiphytic *Liparis* (Cameron, 2005). At least one of these *Liparis* species (*L. viridiflora*) has  $n = 15$  (Mehra & Sehgal, 1980), indicating the karyological affinity between these two genera. The occurrence of  $n = 15$  in Malaxideae further supports the hypothesis that the karyological evolution of the family was principally through dysploidy of approximately one chromosome in the three principal ploidy levels,  $n = 7, 14, 21 \pm 1$  (Felix & Guerra, 2000, 2005).

In tribe Vandaeae, a group of orchids principally known from the Old World,  $n = 19$  predominates in subtribes Aeridinae and Angraecinae, whereas  $n = 25$  predominates in Aerangidinae and  $n = 20$  in Polystachyinae (*sensu* Chase *et al.*, 2003). The latter is considered the sister group of the other subtribes of Vandaeae (Chase *et al.*, 2003; van den Berg *et al.*, 2005; Carlswald *et al.*, 2006). *Polystachya*, the largest genus of Polystachyinae and the only one with known chromosomal counts, had  $n = 20$  in 35 of the 41 species analysed. This haploid number also occurred in various genera of Aeridinae and in some Angraecinae, suggesting that  $x = 20$  is the basic number for the tribe Vandaeae and that  $x = 19$  represents a secondary basic number. Subtribes Aerangidinae and Angraecinae are considered individually to be polyphyletic, but together they form the more widely circumscribed monophyletic clade Angraecinae *s.l.* (Carlswald *et al.*, 2006). Cytologically, the two tribes have shown a distinct base number ( $x = 19$  and  $x = 25$ ) and at least Aerangidinae, with  $x = 25$ , seems to represent a well-defined branch of Epidendroideae.

Among the subtribes with undefined taxonomic positions (Chase *et al.*, 2003), Agrostophyllinae and Collabinae predominantly have  $n = 20$ , whereas in Dendrobiinae  $n = 19$  predominates in all genera except *Epigeneium* and *Saccoglossum* (both with  $n = 20$  in the single species analysed). Therefore, Dendrobiinae may be cytologically related to tribe Vandaeae, which includes some subtribes with  $x = 19$ . Among Dendrobiinae, the two genera largely investigated, *Bulbophyllum* and *Dendrobium*, showed relatively little variation. In contrast, in Collabiinae, the two genera with many species investigated, *Calanthe* and *Phaius*, exhibited a large variation in chromosome numbers.

A karyotypic aspect observed in four genera and seven species of subfamily Epidendroideae is the

presence of one or more pairs of late-condensing chromosomes. Among orchids, this type of chromosome was recorded for the genus *Habenaria* (Felix & Guerra, 1998), in some species of subtribe Oncidiinae (Felix & Guerra, 2000) and in the genus *Spiranthes* of New Zealand (Dawson, Maloy & Beuzember, 2007). Late-condensing chromosomes have also been observed in other angiosperms, e.g. in some Velloziaceae (Melo *et al.*, 1997) or in species of *Arachis* L. (Fabaceae) with the A genome, where they are used as a cytogenetic marker (Fernandez & Krapovickas, 1994). *Cattleyella araguaiensis*, a species recently separated from *Cattleya* (van den Berg & Chase, 2004b) stood out from the other species of *Cattleya* that were analysed by having at least one pair of late-condensing chromosomes.

The data presented here reaffirm the extensive variation in chromosome numbers encountered in subfamily Epidendroideae. Only five of the 128 genera with chromosome records for more than five species have stable chromosome numbers. As the large majority of these genera have haploid numbers between 15 and 25 (principally 19 and 20), each of these numbers may have arisen independently several times during the evolution of the family.

The principal karyological difference between tribes Epidendreae, Cymbidieae, Podochileae and Vandaeae, together comprising the large majority of the Epidendroideae orchids, is the predominance of  $n = 20$  in Epidendreae,  $n = 21$  in Cymbidieae (Felix & Guerra, 2000) and  $n = 19$  in the last two tribes. Multiples of  $n = 7$ , especially  $n = 21$  or nearly 21, also predominate in the majority of the genera of subfamily Orchidoideae (Martínez, 1985; Yokota, 1990; Pridgeon *et al.*, 1997; Felix & Guerra, 2005). Among orchids in general,  $n = 21$  is a recurring chromosome number that appears to be related to the probable basic number of the family  $x_1 = 7$  (Felix & Guerra, 1999, 2000, 2005). The principal polyploid series has been hypothesized to be  $n = 7, 14, 21$ , with a variation of  $\pm 1$  at each ploidy level (Felix & Guerra, 2005). According to this assumption, dysploid reduction occurred in the large majority of the tribes of Epidendroideae ( $x = 21, 20, 19$ ), whereas ascending dysploidy occurred only in the subtribe Angraecinae *sl.* ( $x = 25$ ).

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**Appendix 1.** Chromosome numbers in epidendroid orchids, organized according to Chase *et al.* (2003), except the cymbidioid phylad *sensu* Dressler (1993).

TAXON	<i>n</i>	<i>2n</i>	Source
<b>TRIBE NEOTTIEAE</b>			
<i>Aphyllorchis caudata</i> Rolfe ex Downie		ca. 36	TK84
<i>Cephalanthera damasonium</i> (Mill.) Druce (as <i>C. alba</i> )		36	F69
<i>C. damasonium</i> (Mill.) Druce	18	36	TK84, G84, 88, GJ91, GJ96
<i>C. longifolia</i> (L.) Fritsch (as <i>C. ensifolia</i> )	16, 17	32, 34	TK84, G84, GJ90
<i>C. epipactoides</i> Fisch. & Meyer		32	G85, G88
<i>C. erecta</i> (Thunb.) Blume		34	TK84, G88, GJ91
<i>C. erecta</i> (Thunb.) Blume (as <i>C. shizuoi</i> )		32	F69, TK84
<i>C. erecta</i> f. <i>subaphylla</i> (Miyabe & Kudô) M.Hiroe (as <i>C. subaphylla</i> )		34	G85
<i>C. falcata</i> (Thunb.) Blume		34	TK84, G88, GJ91
<i>C. longibracteata</i> Blume		32	TK84, G88, GJ91
		34, 36	GJ94
<i>C. longifolia</i> (L.) Fritsch (as <i>C. grandiflora</i> )	18	36	TK84, G88
<i>C. longifolia</i> (L.) Fritsch (= <i>C. ensifolia</i> )	16	32	TK84, G84, G85, G88, GJ91
<i>C. rubra</i> (L.) Rich.		36	TK84, G84, G88, GJ91
		44	G85
		32, 36	F69
<i>Epipactis atrorubens</i> (Hoff.) Schult. (as <i>E. atropurpurea</i> )	20	30, 38, 40, 60	TK84, G84, 85, 88, GJ03
<i>E. atrorubens</i> (Hoff.) Schult. (as <i>E. rubiginosa</i> )		40	F69
<i>E. exilis</i> P.Delforge (as <i>E. gracilis</i> B.Baumann & H.Baumann)		40	GJ03
<i>E. fageticola</i> (C.E.Hermos.) Devillers-Tersch.			
<i>E. falcata</i> Sw.		24	TK84
<i>E. gigantea</i> Dougl. ex Hook.	20	40	TK84
<i>E. helleborine</i> (L.) Crantz	20	40	G81, G84, G84, GJ91, GJ96, GJ03
	18, 18 + 2B	32, 38, 40	GJ06
<i>E. helleborine</i> subsp. <i>latina</i> Rossi & Klein	19		GJ91
<i>E. helleborinae</i> subsp. <i>tremolsii</i> Klein		40	G88, GJ91
<i>E. helleborine</i> subsp. <i>orbicularis</i> (K.Richt.) E.Klein (as <i>E. distans</i> )		40	GJ03
<i>E. latifolia</i> Sw.	20	40	G81, TK84, G84, GJ90, GJ94
<i>E. leptochilla</i> (Godf.) Godf.		36	TK84
<i>E. leptochila</i> subsp. <i>futakii</i> (Mered'a & Potucek) Kreutz (as <i>E. futakii</i> )		40	GJ03
<i>E. microphylla</i> (Ehrh.) Sw.		40	TK84, GJ03
<i>E. muelleri</i> Godfrey		38	GJ03
<i>E. palustris</i> (L.) Crantz	20	40	G81, TK84, G84, GJ91, GJ00, GJ03
<i>E. papillosa</i> Franch. & Savat.	20	40	TK84, GJ94
<i>E. papillosa</i> Franch. & Savat. (as <i>E. sayekiana</i> )		40	TK84
<i>E. persica</i> (Soó) Hausskn. ex Nannf.	20	40	TK84
<i>E. phyllanthes</i> G.E.Sm.		36	TK84
<i>E. phyllanthes</i> var. <i>phyllanthes</i> (as <i>E. confusa</i> )	20	40	TK84
<i>E. placentina</i> L.Bongiorni & P.Grunanger		38	GJ03
<i>E. purpurata</i> Sm. (as <i>E. pseudopurpurata</i> )		40, ca. 40	G88, GJ96, GJ03
<i>E. royleana</i> Lindl.	20	40	TK84, G84, GJ90
<i>E. veratrifolia</i> Boiss. & Hohen. (as <i>E. consimilis</i> )	20	40	TK84, G85, GJ90, GJ91, GJ94
<i>Limodorum abortivum</i> (L.) Sw.		56, 64	GJ03
<i>Neottia asiatica</i> Ohwi		36	TK84
		50	A08
<i>N. camtschatea</i> (L.) Rchb.		40	G88
<i>N. cordata</i> (L.) Rich. (as <i>Epipactis cordata</i> )		40 (34 + 6B)	G85
<i>N. inayatii</i> (Duthie) Beavard	21	42	TK84, G84, GJ90
<i>N. listeroides</i> Lindl.	20	40	TK84, GJ90, GJ94
<i>N. nidus-avis</i> (L.) Rich.	18	36	TK84, G88, GJ91,
<b>TRIBE SOBRALIEAE</b>			
<i>Elleanthus brasiliensis</i> Rchb.f.		50	PW
<i>Sobralia sessilis</i> Lindl.		48	PW



Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<b>TRIBE GASTRODIEAE</b>			
<i>Gastrodia cunninghamii</i> Hook.f.		40	D07
<i>G. minor</i> Petrie		40	D07
<i>G. aff. sesamoides</i>		38–40	D07
<i>Gastrodia</i> sp.		38–40	D07
<b>TRIBE CALYPSOEAE</b>			
<i>Calypso bulbosa</i> (L.) Oakes		28	G84
<b>TRIBE EPIDENDREAE</b>			
<b>Subtribe Ponerineae</b>			
<i>Isochilus linearis</i> (Jacq.) R.Br.		40	PW
<b>Subtribe Blettiinae</b>			
<i>Bletia catenulata</i> Ruiz & Pavon		40	PW
<i>B. catenulata</i> (as <i>B. rodriguesii</i> Cogn.)		40	TK84
<i>B. purpurea</i> (Lam.) DC. (as <i>B. verecunda</i> )		60	TK84
<b>Subtribe Pleurothallidinae</b>			
<i>Acianthera ochreatea</i> (Lindl.) Pridgeon & M.W.Chase		40	PW
<i>A. aurantiolateritia</i> (Speg.) Pridgeon & M.W.Chase (as <i>Pleurothallis aurantiolateritia</i> )		40	G85
<i>A. brevipes</i> (H. Focke) Pridgeon & M.W.Chase (as <i>P. brevipes</i> )		43	G85
<i>A. aff. casapensis</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis aff. cofeicola</i> )		40	G85
<i>A. luteola</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis luteola</i> )		40	G85
<i>A. teres</i> (Lindl.) Borba (as <i>Pleurothallis teres</i> )		40	G85
<i>A. pubescens</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis vittata</i> )	21		TK84
<i>Anathallis obovata</i> (Lindl.) Pridgeon & M.W.Chase (as <i>P. obovata</i> )		43, 42, 45	G85
<i>Masdevallia civilis</i> Rchb.f. & Warsc.		36	G85
<i>M. coccinea</i> Linden ex. Lindl.		44	TK84
<i>Pabstiella tripterantha</i> (Rchb.f.) F. Barros (as <i>P.procumbens</i> )	16		TK84
<i>Pleurothallis alopec Luer</i>		36	G85
<i>P. bivalvis</i> Lindl.		77	G85
<i>P. bivalvis</i> Lindl. (as <i>P. chanchamayoensis</i> )		84	G85
<i>P. carinata</i> Schweinf.		40	G85
<i>P. matudana</i> C.Schweinf.		68, 72	G85
<i>P. revoluta</i> (Ruiz. & Pav.) Garay		40, 80, ca. 80	G85, GJ94
<i>P. ruscifolia</i> (Jacq.) R.Br.		38	G85
<i>P. saccatilabia</i> Schweinf.		38	G85
<i>P. tridentata</i> Klotz		36	G85
<i>P. xanthochlora</i> Rchb.f.		40	G85
<i>Pleurothallis</i> sp.		38	G85
<i>Scaphosepalum verrucosum</i> (Rchb.f.) Pfitzer (as <i>Masdevallia ochthodes</i> )		64	TK84
<i>Specklinia grobyi</i> (Bateman ex Lindl.) F.Barros (as <i>Pleurothallis grobyi</i> )		20	G85
<i>Stelis argentata</i> Lindl.		38	G85
<i>S. ciliaris</i> Lindl.	16		TK84
<i>S. gelida</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis gelida</i> )		32, 64	G85
<i>S. pachyglossa</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis pachyglossa</i> )		38	G85
<i>S. restrepioides</i> (Lindl.) Pridgeon & M.W.Chase (as <i>Pleurothallis restrepioides</i> )		76, 78	G85
<i>S. segoviensis</i> (Rchb.f.) Pridgeon & M.W.Chase (as <i>Pleurothallis segoviensis</i> )		42	G85
<i>S. velaticaulis</i> (Rchb.f.) Pridgeon & M.W.Chase (as <i>Pleurothallis velaticaulis</i> )		34	G85
<b>Subtribe Laeliinae</b>			
<i>Brassavola cucullata</i> R.Br.		40	TK84
<i>B. grandiflora</i> Lindl.	20		TK84
<i>B. nodosa</i> Hook.		40	TK84, PW
<i>B. tuberculata</i> Hook.		40	DA09, PW
<i>B. tuberculata</i> Hook. (as <i>Brassavola perrinii</i> )	20		TK84
<i>Broughtonia sanguinea</i> (Sw.) R.Br.	20		TK84
<i>Cattleya amethystoglossa</i> Linden & Rchb.f. ex R.Warner		40	PW
<i>C. bicolor</i> Lindl.		40, 80	TK84
<i>C. bicolor</i> var. <i>bicolor</i> (as <i>C. bicolor</i> var. <i>measuresiana</i> )		80	TK84
<i>C. dorminiana</i> Rchb.f.		40	TK84
<i>C. dowiana</i> Bateman	20		TK84
<i>C. dowiana</i> var. <i>aurea</i> (Linden) B.S.Williams & Moore		40	TK84
<i>C. elongata</i> Barb. Rodr.		80	PW
<i>C. forbesii</i> Lindl.		54–60	TK84
<i>C. gaskelliana</i> (N.E.Br.) B.S.Williams	20		TK84

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>Cattleya granulosa</i> Lindl.		40	PW
<i>C. guttata</i> Lindl.		40	TK84
<i>C. harrisoniana</i> Bateman ex Lindl.	20	40	TK84
<i>C. intermedia</i> Graham ex Hook.		40	TK84
<i>C. intermedia</i> var. <i>alba</i>		41 + 1f	TK84
<i>C. labiata</i> Lindl.	20	40	M73, TK84
		46	TK06
<i>C. labiata</i> var. <i>amesiana</i>	20, 21	40, 41	TK84
<i>C. lueddemanniana</i> Rchb.f.		40	TK84
<i>C. mossiae</i> C.Parker ex Hook.	20	40	TK84
<i>C. nobilior</i> Rchb.f.		42	PW
<i>Cattleya nobilior</i> var. <i>amaliae</i> Pabst		42	PW
<i>C. percivaliana</i> (Rchb.f.) O'Brien	20	40	TK84
<i>C. tigrina</i> Rich. (as <i>C. leopoldii</i> )		40	TK84
<i>C. trianae</i> Linden & Rchb.f.	20	40	TK84
<i>C. velutina</i> Rchb.f.		40	TK84
<i>C. walkeriana</i> Gardn.		40	TK84, PW
<i>C. walkeriana</i> var. <i>princeps</i> L.C.Menezes		80	PW
<i>C. warnerii</i> T.Moore ex Warner		40	TK84
<i>Cattleya warscewiczii</i> Rchb.f. (as <i>C. gigas</i> )	20	40	TK84
<i>Cattleya</i> sp.		46, 56, 76	GJ91
<i>Cattleyella araguiensis</i> (Pabst) van den Berg		40	PW
<i>Caularthron bicornutum</i> (Hook.) Raf.	20	40	M73
<i>Dimerandra emarginata</i> (Meyer) Hoehne		40	G88, PW
<i>D. stenopetala</i> Schltr.		40	TK84
<i>Encyclia advena</i> (Rchb.f.) Porto & Brade		40	PW
<i>Encyclia advena</i> (as <i>E. megalantha</i> )		40	TK84
<i>E. flava</i> (Lindl.) Porto & Brade		40	PW
<i>E. patens</i> Hook. (as <i>E. odoratissima</i> )		40	TK84
<i>E. oncioides</i> (Lindl.) Schltr.		40	PW
<i>E. serroniana</i> (Barb. Rodr.) Hoehne (as <i>E. odoratissima</i> var. <i>serroniana</i> )		40	TK84
<i>E. tampensis</i> (Lindl.) Small (as <i>Epidendrum tampense</i> )	20	40	TK84
<i>Epidendrum angustatum</i> (T.Hashim.) Dodson (as <i>Neolehmannia angustata</i> )		36	GJ94
<i>Epidendrum appendiculatum</i> T.Hashimoto		38	GJ94
<i>E. avicula</i> Lindl.		38, 40	TK84, G, J94, DA09, PW
<i>E. avicule</i> Lindl. (as <i>Lanium avicula</i> )		40	
<i>E. blepharistes</i> Barker ex Lindl. (as <i>E. funckii</i> )		40	GJ94
<i>E. calanthum</i> Rchb.f. & Warsc.		30	PI09
<i>E. ciliare</i> L.	20	40	TK84, G85
	20	40, 80, 160	TK84
<i>E. cinnabarinum</i> Salzm.	108–124	ca. 240	PW
<i>E. cochlidium</i> Lindl.		28	PI09
<i>E. cooperianum</i> Bateman (as <i>E. longispathum</i> Barb. Rodr.)		40	TK84
<i>E. cristatum</i> Ruiz & Pavon (as <i>E. raniferum</i> Lindl.)	20	40	TK84
<i>E. denticulatum</i> Barb. Rodr.		40	TK84, PI09
<i>E. difforme</i> Jacq.		39–40	TK84
		40	PW
<i>E. diffusum</i> Sw.	20	40	TK84
<i>E. ellipticum</i> Grah.		56	TK84
		68	PW
<i>E. elongatum</i> Jacq.			
<i>E. flexuosum</i> G.Mey		24	PI09
<i>E. fulgens</i> Brongn.		28	PI09
<i>E. fulgens</i> Brongn. (as <i>E. mosenii</i> )		24	TK84
<i>E. ibaguense</i> Kunth		70	PI09
<i>E. lanipes</i> Lindl.		40	G85
<i>E. latilabrum</i> Lindl.		40	PW
<i>E. loefgrenii</i> Cogn.		40	TK84
<i>E. magnoliae</i> Muhl. (as <i>E. conopseum</i> )	20	40	TK84
<i>E. myrmecophorum</i> Barb. Rodr.		120	PI09
<i>E. munroeanum</i>		40	TK84

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>E. nocturnum</i> Jacq.	20	ca. 80 40, 80 80	TK84 TK84 TK84 PW
<i>Epidendrum nocturnum</i> var. <i>guadeloupense</i>		42–48	TK84
<i>E. obrienianum</i> Rolfe		40	G81
<i>E. paniculatum</i> Barb. Rodr. (as <i>E. floribundum</i> Kunth)		40	TK84
<i>E. patens</i> Sw.		40	TK84
<i>E. propinquum</i> Rich. & Gall.		40	TK84
<i>E. puniceoluteum</i> F.Pinheiro and F.Barros		52	PI09
<i>E. purpureum</i> Barb. Rodr.		56 120	TK84 PI09
<i>E. radicans</i> Pav.	19	40, 70 60	M73 TK84 PI09
<i>E. rigidum</i> Jacq.		40	TK84, PW
<i>E. secundum</i> Jacq.		28, 40, 48, 52, 68,	PI09
<i>E. secundum</i> Jacq. (as <i>E. brachyphyllum</i> )	30		TK84
<i>E. secundum</i> Jacq.		56	TK84
<i>Epidendrum aff secundum</i> (as <i>Epidendrum aff. brachyphyllum</i> )	14		TK84
<i>E. xanthinum</i> Lindl.		ca. 80 40 28, 30, 60	TK84 G88 PI09
<i>Guarlanthe aurantiaca</i> (Bateman ex Lindl.) Dressler & W.E.Higgins (as <i>Cattleya aurantiaca</i> )		40	TK84
<i>G. bowringiana</i> (O'Brien) Dressler & W.E.Higgins (as <i>Cattleya bowringiana</i> )	20	40	TK84
<i>Jacquiiniella globosa</i> (Jacq.) Schltr.		38	PW
<i>Laelia albida</i> Bateman ex Lindl.		42, ca. 63	TK84
<i>L. anceps</i> Lindl.		40	TK84
<i>Laelia anceps</i> subsp. <i>dawsonii</i> (J.Anderson) Rolfe (as <i>L. anceps</i> var. <i>sanderiana</i> )		40	TK84
<i>L. autumnalis</i> (Lex.) Lindl.		41, 42	TK84
<i>L. gouldiana</i> Rchb.f.		40, 60	TK84
<i>L. peciosa</i> (Kunth) Schltr. (as <i>L. grandiflora</i> )	20		TK84
<i>L. marginata</i> (Lindl.) L.O.Williams		40	PW
<i>L. marginata</i> (Lindl.) L.O.Williams (as <i>Schomburgkia crispa</i> Lindl.)		40	TK84
<i>L. rubescens</i> Lindl.	20	40	TK84
<i>L. rubescens</i> Lindl. (as <i>L. peduncularis</i> )		40–44	TK84
<i>Leptotes unicolor</i> Barb. Rodr.		40	TK84, DA09
<i>Prosthechea brassavolae</i> (Rchb. f.) W. E. Higgins (as <i>Epidendrum brassavolae</i> )	20	40	TK84
<i>P. caetensis</i> (Bicalho) W.E.Higgins		80	PW
<i>P. calamaria</i> (Lindl.) W.E.Higgins (as <i>Hormidium calamarium</i> )		40	TK84
<i>P. campylostalix</i> (Rchb. f.) W.E.Higgins (as <i>Epidendrum campylostalix</i> )	20	40	TK84
<i>P. citrina</i> (Lex.) W.E.Higgins (as <i>Cattleya citrina</i> )			
<i>P. cochleata</i> (L.) W.E.Higgins (as <i>E. cochleatum</i> )	20	40	TK84
<i>P. fragrans</i> (Sw.) W.E.Higgins		40	PW
<i>P. fragrans</i> (Sw.) W.E.Higgins (as <i>Hormidium fragrans</i> )		40	TK84
<i>P. glumacea</i> (Lindl.) W.E.Higgins (as <i>Hormidium glumaceum</i> )		40	TK84
<i>P. lindenii</i> (Lindl.) W.E.Higgins (as <i>E. lindenii</i> )		56	TK84
<i>P. linkiana</i> (Klotzsch) W.E.Higgins (as <i>Epidendrum linkianum</i> )	ca. 20 20		TK84 TK84
<i>P. mariae</i> (Ames) W.E.Higgins (as <i>E. mariae</i> )		40	TK84
<i>P. ochracea</i> (Lindl.) W.E.Higgins (as <i>Epidendrum ochraceum</i> )	20	40	TK84
<i>P. prismatocarpa</i> (Rchb.f.) W.E.Higgins (as <i>Epidendrum prismatocarpum</i> )		40	TK84
<i>P. vespa</i> (Vell.) W E Higgins		40	PW
<i>Prosthechea vespa</i> (Vell.) W E Higgins (as <i>Hormidium variegatum</i> )		40	TK84
<i>Psychilis atropurpurea</i> (Willd.) Saulea (as <i>Epidendrum atropurpureum</i> )	20	40	TK84
<i>Rhyncholaelia digbyana</i> (Lindl.) Schltr. (as <i>Brassavola digbyana</i> )		40	TK85
<i>Scaphyglottis reflexa</i> Lindl. (as <i>Hexisea reflexa</i> )	19	38	G85
<i>S. prolifera</i> (R.Br.) ex Lindl.) Cogn.		40	GJ94
<i>S. fusiformis</i> (Griseb.) R.E.Schult.		40	PW
<i>Sophronitis briegeri</i> (Blumensch. ex Pabst) Van den Berg & M.W.Chase (as <i>Laelia briegeri</i> )		80	TK84
<i>S. caulescens</i> (Lindl.) Van den Berg & M.W.Chase (as <i>Laelia calulescens</i> )		80	TK84

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>S. cernua</i> Lindl.		40	TK84, DA090
<i>S. cinnabarina</i> (Bateman ex Lindl.) Van den Berg & M.W.Chase (as <i>Laelia cinnabarina</i> )		40	TK84
<i>S. crispata</i> (Thunb.) Van den Berg & M.W.Chase (as <i>Laelia crispilabia</i> )		80	TK84
<i>S. crispata</i> (Thunb.) Van den Berg & M.W.Chase (as <i>Laelia flava</i> )		40	TK84
<i>S. crispata</i> (Thunb.) Van den Berg & M.W.Chase (as <i>Laelia rupestris</i> )		80	TK84
<i>S. esalqueana</i> (Blumensch. ex Pabst) Van den Berg & M.W.Chase (as <i>Laelia esalqueana</i> )		40	TK84
<i>S. fournieri</i> (Cogn.) Van den Berg & M.W.Chase (as <i>Laelia oestemayeri</i> )		40	TK84
<i>S. harpophylla</i> (Rchb. f.) Van den Berg & M.W.Chase (as <i>Laelia harpophylla</i> )		40	TK84
<i>S. lobata</i> (Lindl.) van den Berg & M.W.Chase		40	PW
<i>S. longipes</i> (Rchb. f.) Van den Berg & M.W.Chase (as <i>Laelia longipes</i> )		40, 60, 80	TK84
<i>S. milleri</i> (Blumensch. ex Pabst) Van den Berg & M.W.Chase (as <i>Laelia milleri</i> )		40	TK84
<i>S. mixta</i> (Hoehne) Van den Berg & M.W.Chase (as <i>Laelia mixta</i> )		40	TK84
<i>S. perrinii</i> (Lindl.) Van den Berg & M.W.Chase (as <i>Laelia perrinii</i> )	20		TK84
<i>S. pumila</i> (Hook.) Van den Berg & M.W.Chase (as <i>Laelia pumila</i> )		40	TK84
<i>S. purpurata</i> (Lindl. & Paxton) van den Berg & M.W.Chase		40	PW
<i>S. purpurata</i> (Lindl. & Paxton) van den Berg & M.W.Chase (as <i>Laelia purpurata</i> )		40	M77
<i>S. tereticaulis</i> (Hoehne) Van den Berg & M.W.Chase (as <i>Laelia tereticaulis</i> )		80	TK84
<b>TRIBE PODOCHILEAE</b>			
<b>Subtribe Eriinae</b>			
<i>Ceratostylis subulata</i> Blume		40	G88
<i>Cryptochilus lutea</i> Lindl.	19		M73
<i>C. sanguineus</i> Wall.	19		M73
<i>Eria acervata</i> Lindl.		38	G85, G88, GJ91, GJ96
<i>E. alba</i> L.		40	G81
<i>E. amica</i> Rchb.f. (as <i>E. confusa</i> )	20		M77
	18		G88, GJ94
<i>E. bambusifolia</i> Lindl.	19	38	G81, GJ91
<i>E. biflora</i> Griff.	21	42	G81, G84
<i>E. brachystachya</i> Rchb.f.		44	TK84
<i>E. bractescens</i> Lindl.		40	TK84
		38	G88
<i>E. bulbophylloidea</i> Tang & Wang		42	GJ91, GJ96
<i>E. clemensiae</i> Leavitt		44	TK84
<i>E. corneri</i> Rchb.f.		36	TK84, G88
<i>E. corneri</i> Rchb. f. (as <i>E. yakuschimensis</i> )		36	TK84
<i>E. coronaria</i> (Lindl.) Rchb.f.	18	36	M73, G88
<i>E. crassicaulis</i> Hook.f.	19		G81
<i>E. crassipes</i> Ridl. (as <i>E. reptans</i> )		40	TK84
		76	G88
<i>E. cymbidifolia</i> Ridl.		42 ± 2	TK84
<i>E. dalzellii</i> Lindl.		24 + 5–7B	TK84
		24 + 10B	G84
		24 + 5B	G84
		42	G84
<i>E. excavata</i> Lindl.	20		M73
		38	G84
<i>E. exilis</i> Hook.f.		38	TK84
<i>E. feddeana</i> Schltr.		38	G88
<i>E. ferruginea</i> Lindl.		38	G84
<i>E. fitzalanii</i> F.Muell. (as <i>E. solomonensis</i> )		38	G88
<i>Eria floribunda</i> Lindl.		44	TK84
		38	G88
<i>E. floribunda</i> Lindl. (as <i>E. giungii</i> )	20		TK84
<i>E. gigantea</i> Ames		66	TK84
<i>E. graminifolia</i> Lindl.	19	38	M73, G84
<i>E. hyacinthoides</i> (Blume) Lindl.		38	G88
<i>E. japonica</i> Maxim. (as <i>E. arisanensis</i> )		40	TK84
<i>E. javanica</i> (Sw.) Blume		36	G88
<i>Eria lasiopetala</i> (Willd.) Ormerod (as <i>E. flava</i> )		40	G81
		38	G84
<i>E. microchilos</i> Lindl.		24 + 5–11B	TK84, G84
<i>E. muscicola</i> Lindl.	18		G81

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>E. mysorensis</i> Lindl.		38	TK84
<i>E. ovata</i> Lindl.		38	G88
<i>E. ovata</i> Lindl. ( <i>E. luehensis</i> )	18	36	M77, TK84
<i>E. ovata</i> var. <i>retroflexa</i> (Lindl.) Garay & H.R.Sweet (as <i>E. nudicaulis</i> )		40	G85
<i>E. pachystachya</i> Lindl.		38	G88
<i>E. paniculata</i> Lindl.	19 + 0–2B		G81, GJ91
<i>E. pannea</i> Lindl.		38	G88, GJ91
<i>E. philippinensis</i> Ames		40	TK84
		38	TK84
<i>E. queenslandica</i> T.E.Hunt		38	G88
<i>E. reticosa</i> Wight		42	TK84
<i>E. retusa</i> (Blume) Rchb.f.		38	G88
<i>E. ringens</i> Rchb.f.		44	TK84
<i>E. spicata</i> (D.Don) Hand-Mazz.		38	G81, GJ94
<i>E. spicata</i> (D.Don) Hand-Mazz. (as <i>E. convallarioides</i> )	20		M73
	19	38	TK84, G88
<i>E. stricta</i> Lindl.		40	G88
<i>E. tomentosa</i> Hayata		38	G88
<i>E. woodiana</i> Ames		44	TK84
<i>E. yakushimensis</i> Nakai			
<i>Eria</i> sp.		38	G84
<i>Eria</i> sp.		38	GJ91
<i>Eria</i> sp.		38	GJ96
<i>Mediocalcar agathodaemonis</i> J.J.Sm.		38	G88
<i>M. latifolium</i> Schltr.			
<i>M. paradoxum</i> subsp. <i>latifolium</i> (Schltr.) Schuit. (as <i>M. latifolium</i> )		38	G88
<i>M. aff. pygmaeum</i>		85	G88
<i>M. uniflorum</i> Schltr. (as <i>M. sepikanum</i> )		38	G88
<i>Porpax fibuliformis</i> King & Pantl.		24	G85
<i>P. jerdoniana</i> (Wight) Rolfe		42	G84
<i>P. meriux</i> King & Pantl.	12		TK84
<i>Pseuderia smithiana</i> C.Schweinf.		40	GJ03
<i>Trichotosia lagunensis</i> (Ames) Schuit. & de Vogel (as <i>Eria lagunensis</i> )		44	TK84
<i>T. pulvinata</i> (Lindl.) Kraenzl. (as <i>Eria rufinula</i> )		38	G88
<b>Subtribe Podochilinae</b>			
<i>Podochilus cultratus</i> Lindl.	19		M73
<b>Subtribe Thelasiinae</b>			
<i>Phreatia elegans</i> Lindl.		32	G81
<i>Thelasis capitata</i> Blume		32	G88
<b>TRIBE ARETHUSEAE</b>			
<b>Subtribe Arethusinae</b>			
<i>Anthogonium gracile</i> Lindl.		42	M73
	20		M73
	19	38	M73, G84
<i>Anthogonium</i> sp.		42	G84
<i>Arethusa bulbosa</i> L.		40	G84
<i>Arundina graminifolia</i> (D.Don) Hochr.	20	40	M73, G81, G84, G85, GJ90
<i>A. graminifolia</i> (D.Don) Hochr. (as <i>A. bambusifolia</i> )	20	40	G84, G85
<i>A. graminifolia</i> (D.Don) Hochr. (as <i>A. chinensis</i> )		38	GJ91, GJ96
<i>Arundina</i> sp.	16	32	TK84
<i>Arundina</i> spp.		40	G84
<i>Calopogon barbatus</i> (Walter) Ames		42	M77
<i>C. multiflorus</i> Lindl.		42	M77
<i>C. pallidus</i> Chapm.		42	M77
<i>C. pulchellus</i> (Salisb.) R.Br.			
<i>Calopogon tuberosus</i> (L.) Britton, Sterns & Poggenberg		42	M77
<i>C. tuberosus</i> (L.) Britton (as <i>C. pulchellus</i> )	ca. 13	ca. 26	TK84
<i>Eleorchis japonica</i> (A.Gray) Maek.		40	M73
<b>Subtribe Coelogykinae</b>			
<i>Bletilla formosana</i> (Hayata.) Schltr.		36	M73
	18		TK84
<i>B. hyacinthia</i>	16		TK84

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>B. striata</i> (Thunb.) Rehb.f.	16	32	M73, TK84 G88, GJ90
		32, 64	GJ90
		32, 76	GJ91, GJ96
<i>B. striata</i> (Thunb.) Rehb.f. (as <i>B. striata</i> var. <i>albomarginata</i> )		32	TK84
<i>Coelogyne barbata</i> Griff.	20		M73, G84
<i>C. beccarii</i> Rehb.f.		40	G88
<i>C. corymbosa</i> Lindl.	20		M73
<i>C. cristata</i> Lindl.	20	40	M73, M77, G88, GJ94
<i>C. fimbriata</i> Lindl.	20 + 1f	40	G81, GJ90, GJ91, GJ96
<i>C. flaccida</i> Lindl.	20	40	M73, G84, G85
<i>C. fragrans</i> Schltr.		40	G88
<i>C. fuscescens</i> Lindl.	20	40	M73, G85, GJ06
<i>C. longipes</i> Lindl.	20	40	M73, G84, GJ91
<i>C. macdonaldii</i> F.Muell. & Kraenzl.		40	GJ03
<i>C. macdonaldii</i> (as <i>C. lamellata</i> )		40	G88
<i>C. micranta</i> Lindl.	21		M77
<i>C. nitida</i> Lindl.	20		G85
<i>C. nitida</i> (Wall. ex D.Don) Lindl. (as <i>C. ochracea</i> )	20		M73, G85
<i>C. oculata</i> Hook.f.	20		M73
		38	G81
<i>C. ovalis</i> Lindl.	20	40	M73, G84 G88, GJ90, GJ94
		80	GJ96
<i>C. prolifera</i> Lindl.	20		M77
<i>C. prolifera</i> Lindl. (as <i>C. flavida</i> )	20		M73
<i>C. punctulata</i> Lindl.	19 + (0–2B)	38	M77, GJ91, GJ96
<i>C. speciosa</i> (Blume) Lindl. (as <i>Pleione speciosa</i> )		80	GJ91
<i>C. stricta</i> (D.Don) Schltr. (as <i>C. elata</i> )	20		M73
<i>C. viscosa</i> Rehb.f.		40	G88
<i>Dendrochilum longifolium</i> Rehb.f. (as <i>D. bartonii</i> (Ridl.) Schltr.)		38	G88
<i>D. uncatum</i> Rehb.f. (as <i>D. formosanum</i> )		30	M74
<i>Neogyne gardneriana</i> (Lindl.) Rehb.f. (as <i>Coelogyne gardneriana</i> )	21		M77
<i>Otochilus albus</i> Lindl.	20		M73
<i>O. fuscus</i> Lindl.	20	40	M73, G85
<i>O. porrectus</i> Lindl.	20	40	M73, G85, G88
<i>Panisea demissa</i> (D.Don) Pfitzer (as <i>P. parviflora</i> Rehb.)		40	G85
<i>P. tricallosa</i> Rolfe		40	GJ91
<i>P. uniflora</i> (Lindl.) Lindl. (as <i>Coelogyne uniflora</i> )	20		M73
<i>Pholidota articulata</i> Lindl.	20 + O-3B	40	M73, TK84, GJ96
		38	GJ96
<i>P. articulata</i> Lindl. (as <i>P. articulata</i> var. <i>griffithii</i> Lindl.)	20		G81, GJ91
<i>P. articulata</i> Lindl. (as <i>P. griffithii</i> Hook.)		40	G85
<i>P. chinensis</i> Lindl.		40	M73
<i>P. imbricata</i> Lindl. (as <i>P. conchoidea</i> )	20		TK84
<i>P. imbricata</i> (Roxb.) Lindl.	20	40	M73, G84, GJ94
<i>P. imbricata</i> Lindl. (as <i>P. calceata</i> )		40	G85
<i>P. pallida</i> Lindl.		40	G84
<i>P. protracta</i> Hook.f.	20	40	M73, G85
<i>P. recurva</i> Lindl.	20		M73, TK84
<i>P. rubra</i> Lindl.		40	G85
<i>Pleione bulbocodioides</i> (Franch.) Rolfe		40	G88, GJ91, GJ96
<i>P. bulbocodioides</i> (Franch.) Rolfe (as <i>P. pogonioides</i> )		80	M73
<i>P. coronaria</i> P.J.Cribb & C.Z.Tang		40	GJ96
<i>P. formosana</i> Hayata		40 + 0–2B	M73, GJ90, GJ91
		40	GJ06
<i>P. formosana</i> Hayata (as <i>P. priscei</i> )		38, 40, 42	GJ91, GJ96
<i>P. forrestii</i> Schltr.		40	M73, GJ91
<i>P. hookeriana</i> (Lindl.) B. S. Williams	20	40	M73, G84, GJ91
<i>Pleione humilis</i> Lindl.	20	40 + 0–1B	M73, G84, GJ91
<i>P. limprichtii</i> Schltr.		40, 80	M73, GJ91
<i>P. maculata</i> Lindl.		40	M73, G84, GJ91
<i>P. praecox</i> Lindl.	20	40	M73, G84, GJ91, GJ94
	20 + 0–3B		G81
<i>P. scopulorum</i> W.W.Sm.		40	GJ91

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>P. yunnanensis</i> (Rolfe) Rolfe		40	GJ91, GJ96
<i>Thunia alba</i> Rchb.f.	20	40	M73, GJ90, GJ94
	ca. 40		G81
		ca. 40	G85
<i>T. alba</i> Rchb.f. (as <i>T. marshalliana</i> Rchb.f.)	20		M73
		38	G81
<i>T. alba</i> (Lindl.) Rchb.f. (as <i>Phaius albus</i> )		42	G84
		40	G85
<i>T. alba</i> var. <i>bracteata</i> (Roxb.) N.Pearce & P.J.Cribb (as <i>T. venosa</i> Rolfe)	20		G81
<b>TRIBE VANDEAE</b>			
<b>Subtribe Polystachyinae</b>			
<i>Polystachya adansoniae</i> Rchb.f.		40	M73, G84
<i>P. affinis</i> Lindl.		40	M73, G84
<i>P. albescens</i> Summerh.		40	M73
<i>P. albescens</i> subsp. <i>imbricata</i> (Rolfe) Summerh.		ca. 40	TK84
<i>P. bancoensis</i> Van der Burg		40	G84
<i>P. bennettiana</i> Rchb.f. (as <i>P. stricta</i> )		40	TK84
<i>P. caespitifica</i> subsp. <i>hollandii</i> (L. Bolus) P.J.Cribb & Podz. (as <i>P. hollandii</i> )		40	TK84
<i>P. caloglossa</i> Rchb.f.		40	M73
<i>P. campyloglossa</i> Rolfe		ca. 80	TK84
<i>P. concreta</i> (Jacq.) Garay & H.R.Sweet (as <i>P. extinctoria</i> )	40	80	TK84
<i>P. cooperi</i> Summerh.		40	TK84
<i>P. coriscensis</i> Rchb.f.		40	M73
<i>P. cultriformis</i> Lindl.		38, 39	TK84
<i>P. dendrobiiiflora</i> Rchb.f. (as <i>P. tayloriana</i> )		40	TK84
<i>P. doggettii</i> Rendle & Rolfe		81	TK84
<i>P. dolichophylla</i> Schltr.		40	M73
<i>P. estrellensis</i> Rchb.f.		80	TK84, PW
<i>P. eurygnatha</i> Summerh.		40	TK84
<i>P. falax</i> Kraenzl.		40	TK84
<i>P. foliosa</i> (Hook.) Rchb.f. (as <i>P. clavata</i> )		ca. 80	TK84
<i>P. fulvilabia</i> Schltr.		40	TK84
<i>P. fusiformis</i> Lindl.		ca. 40	TK84
<i>P. galeata</i> (Sw.) Rchb.f.		40	M73, G84, TK84
<i>P. isochiloides</i> Summerh.		40	TK84
<i>P. laxiflora</i> Lindl.		40	M73, TK84
<i>P. mauritiana</i> Spreng. (as <i>P. tessellata</i> )		40	TK84
<i>P. modesta</i> Rchb.f.		ca. 40	TK84
<i>P. mukandaensis</i> De Wild.		40	M73
<i>P. nyanzoensis</i> Rendle		40	M73
<i>P. odorata</i> Lindl.		40, 80	M73
		40	TK84
<i>P. polychaete</i> Kraenzl.		40	M73, G84
	ca. 20		TK84
<i>P. pubescens</i> Rchb.f.		ca. 120	TK84
<i>P. ramulosa</i> Lindl.		40	M73, TK84
<i>P. rhodoptera</i> Rchb.f.		40, 41	M73
	19		TK84
<i>P. ruwenzoriensis</i> Rendle		40	TK84
<i>P. stauroglossa</i> Kraenzl.		40	TK84
<i>P. stuhlmanii</i> Kraenzl.		40	TK84
<i>P. subulata</i> Finet		40	TK84
<i>P. supfiana</i> Schltr.		40	M73
<i>P. transvaalensis</i> Schltr.		40	TK84
<i>P. zambesiaca</i> Rolfe (as <i>P. hislopii</i> )		80	TK84
<i>Polystachya</i> sp.		40	M73
Subtribe Aeridinae			
<i>Acampe ochracea</i> (Lindl.) Hochr.		38	TK84, G88
<i>A. pachyglossa</i> Rchb.f.		38	G85
<i>A. praemorsa</i> (Roxb.) Blatter & McCann		38	TK84
<i>A. praemorsa</i> (Roxb.) Blatt. & McCann (as <i>A. papillosa</i> )		38	M73
	18	36	G81, GJ94
	18, 19		TK84
<i>Acampe praemorsa</i> (Roxb.) Blatter & McCann (as <i>A. wightiana</i> )		38	TK84

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>A. praemorsa</i> (Roxb.) Blatter & McCann (as <i>Saccolabium papulosum</i> )		38	M73
<i>A. rigida</i> Buch.-Ham. ex Sm.) P.F.Hunt	19		G85
<i>A. rigida</i> (Buch.-Ham. ex Sm.) P.F.Hunt (as <i>A. longifolia</i> )	19	38	G81, TK84
<i>A. rigida</i> (Buch.-Ham. ex Sm.) P.F.Hunt (as <i>Aerides rigida</i> )	19		G84
<i>A. rigida</i> (Buch.-Ham. ex Sm.) P.F.Hunt (as <i>Saccolabium longifolium</i> )	19		M73
<i>Aerides crassifolia</i> Par & Rchb.f.		38	TK84
<i>A. crispa</i> Lindl.	19	38	TK84, G85
<i>A. falcata</i> Lindl. & Paxt.	19	38	TK84
<i>A. houlettiana</i> Rchb.f.			
<i>A. lawrenceae</i> Rchb.f.		40	TK84
	19	38	TK84
<i>A. maculosa</i> Lindl.		38	M73, TK84, G84
<i>A. multiflora</i> Roxb.	19	38	M73, TK84
<i>A. multiflora</i> Roxb. (as <i>A. affine</i> )		38	G85
<i>A. odorata</i> Lour.	19	38	M73, TK84, G85, GJ94
<i>A. odorata</i> Lour. (as <i>A. suavissima</i> )		ca. 38	M73
		38	TK84
<i>A. odorata</i> Lour. (as <i>A. odorata</i> var. <i>immaculata</i> )		76	TK84
<i>A. ringens</i> Fischer		38	TK84
<i>A. rosea</i> Lodd. ex Lindl. & Paxton (as <i>A. fieldingii</i> )		38	G85
<i>A. rosea</i> Lodd. ex Lindl. & Paxton (as <i>A. williamsii</i> )		38	M73, G88
<i>Arachnis labrosa</i> (Lindl. & Paxton) Rchb.f. (as <i>Armadorum labrosum</i> )		38	G88
<i>Ascocentrum ampulaceum</i> (Roxb.) Schltr.		38	M73
<i>A. curvifolium</i> (Lindl.) Seltr.		38	M73
<i>A. himalaicum</i> (Deb, Sengupta & Malick) Christenson (as <i>Holcoglossum junceum</i> )		38	GJ96
<i>A. miniatum</i> (Lindl.) Schltr.		38, ca. 38	M73
<i>A. rubescens</i> (Rolfe) P.F.Hunt (as <i>Saccolabium rubescens</i> )	19–20		TK84
<i>Biermannia bimaculata</i> (King & Pantl.) King & Pantl.	18		G81
<i>Calymmanthera major</i> Schltr.		38	G88
<i>C. paniculata</i> J.J.Sm.		38	G88
<i>Chilochista lunifera</i> J.J.Sm.		38	TK84
<i>C. usneoidese</i> (Don) Lindl.		38	M73
<i>C. lunifera</i> (Rchb.f.) J.J.Sm. (as <i>Sarcophilus luniferum</i> )	19		M73
<i>Cleisostoma appendiculata</i> (Hook.f.) (as <i>Sarcanthus appendiculatus</i> )		38	M73, TK84
<i>C. discolor</i> Lindl. (as <i>Sarcanthus termissus</i> )		38	M77
<i>C. duplicilobum</i> (J.J.Sm.) Garay (as <i>Sarcanthus carinatum</i> )		38	M73
<i>C. filiforme</i> (Lindl.) Garay (as <i>S. filiformis</i> )	19		M73
<i>C. fuerstenbergianum</i> Kraenzl. (as <i>Sarcanthus flagelliformis</i> )		38	M73
<i>C. paniculatum</i> (Ker Gawler) Garay		38	GJ91
<i>C. peninsularis</i> (Dalz.) (as <i>S. peninsularis</i> )		38	G81, G85
<i>C. recemiferum</i> (Lindl.) Garay		38	G88
<i>C. recemiferum</i> (Lindl.) Garay (as <i>S. recemiferum</i> )	19		G81
<i>Cleisostoma racemiferum</i> (Lindl.) Garay (as <i>Sarcanthus palidus</i> )		38	M73
<i>C. recurvum</i> (Hook.) ined. (as <i>C. rostratum</i> )		38	GJ91
<i>C. striatum</i> (Rchb.f.) Garay	19, 20		TK84
<i>C. striatum</i> (Rchb.f.) N. E. Br. (as <i>Cleisostoma brevipes</i> )	36		M77
<i>C. stronglyloides</i> (Ridl.) Garay (as <i>S. stroyloides</i> )		38	M73
<i>C. subulatum</i> (Blume) as ( <i>S. subulatus</i> )	19	38	M73, G88
<i>C. williamsonii</i> (Rchb.f.) Garay (as <i>S. williamsonii</i> )	19		M77
<i>Cleisostoma</i> sp. as ( <i>Sarcanthus</i> sp.)		38	TK84
<i>Cleisostomopsis eberhardtii</i> (Finet) Seidenf. (as <i>Saccolabium eberhardtii</i> )	19–20		TK84
<i>Cottonia peduncularis</i> (Lindl.) Rchb.f.	19	38	G88, GJ90
<i>C. peduncularis</i> (Lindl.) Rchb.f. (as <i>C. macrostachya</i> )		40	G84
<i>Diplocentrum congestum</i> Wight	19	38	TK84, G88, GJ90
<i>D. recurvum</i> Lindl.		38	TK84
<i>Diploprora championii</i> (Lindl.) Hook.f. (as <i>D. uraiense</i> )		16	M74
<i>Drymoanthus adversus</i> (Hook.f.) Dockrill		76	D07
<i>D. flavus</i> St.George & Molloy		38	D07
<i>D. minimus</i> (Schltr.) Garay		38	D07
<i>Esmeralda clarkei</i> Rchb.f. (as <i>Arachnis clarkei</i> )		42	GJ91, GJ96
<i>Euanthe sanderiana</i> (Rchb.f.) Schltr. (as <i>Vanda sanderiana</i> )	19	38	TK84
<i>Gastrochilus calceolaris</i> (Sm.) D.Don	19	38	M73, GJ94
<i>G. dasypogon</i> (Lindl.) Ktze.		38	M73
<i>G. dasypogon</i> (as <i>Saccolabium dasypogon</i> )		38	TK84



Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>G. distichus</i> (Lindl.) Kuntze (as <i>Saccolabium distichum</i> )	19		M73
<i>G. inconspicuus</i> (Hook.f.) Kuntze (as <i>L. inconspicua</i> Hook.f.)	19		M73, G85, G88
<i>G. intermedius</i> (Griff. ex Lindl.) Kuntze (as <i>Saccolabium calceolare</i> )	38		M73
<i>G. japonicus</i> Schltr.		40	TK84
		38	TK84
<i>G. japonicus</i> (Makino) Schltr. (as <i>G. somai</i> )		30	M74
<i>G. maculatus</i> Kuntze			
<i>G. matsuran</i> (Makino) Schltr.		34	TK84
<i>G. pseudodistichus</i> (King & Pantl.) Schltr. (as <i>Saccolabium pseudodistichus</i> )	19		M73
<i>Gunnarella robertsii</i> (Schltr.) Senghas (as <i>Chamaeanthus robertsii</i> )		38	G88
<i>Holcoglossum amesianum</i> (Rchb.f.) Christenson (as <i>Vanda amesiana</i> )		38	TK84
<i>H. kimballianum</i> (Rchb.f.) Garay (as <i>V. kimballiana</i> )		38	TK84
<i>Hygrochilus parishii</i> (Veitch & Rchb.f.) Pfitzer (as <i>Vanda parishii</i> )	19	38	M73, TK84
<i>Luisia boninensis</i> Schltr.		40	TK84
<i>L. brachystachys</i> (Lindl.) Blume	20		M73
<i>L. liukuensis</i> Schltr.		38	M73
<i>L. macrantha</i> Blatt. & McC.		38	TK84, G88
<i>L. tenuifolia</i> Blume	19	38	TK84, G88
<i>L. tenuifolia</i> (as <i>L. tenuifolia</i> var. <i>evangelinae</i> )		38	G88
<i>L. teres</i> Blume (= <i>L. teretifolia</i> )	18		TK84
<i>L. trichorhiza</i> Blume	19	38	M73, G81, G88
<i>L. tristis</i> (G. Forst.) Hook.f. (as <i>L. teretifolia</i> )	19	38, ca. 38	M73, G88
<i>L. volucris</i> Lindl.	19		G85
<i>Micropera manni</i> (Hook.f.) Tang & F.T.Wang (as <i>Sarcochilus manni</i> )		38	G85
<i>M. rostrata</i> (Roxb.) N.P.Balakr. (as <i>Sarcochilus purpureus</i> )		38	M73, TK84
<i>Neofinetia falcata</i> (Thunb.) Hu		38	TK84
<i>Ornithochilus difformis</i> (Wall. ex Lindl.) Schltr. (as <i>Ornithochilus fuscus</i> Wall.)	19	38	G81, TK84, G88
<i>Papilionanthe biswasiana</i> (Ghose & Mukerjee) Garay (as <i>Aerides biswasianum</i> )	19		M73
<i>P. hookeriana</i> (Rchb.f.) Schltr. (as <i>Vanda hookeriana</i> )	19	38	TK84
<i>P. teres</i> (Roxb.) Schltr.		38	G88
<i>P. teres</i> (Roxb.) Schltr. (as <i>Vanda teres</i> )	19	38	TK84, G85
		40	GJ91, GJ96
<i>Papilionanthe tricuspidata</i> (J.J.Sm.) Garay (as <i>Vanda tricuspidata</i> )		76	TK84
<i>P. uniflora</i> (Lindl.) Garay (as <i>A. longicornu</i> )	19	38	M73, G85
<i>Papilionanthe vandarum</i> (Rchb.f.) Garay (as <i>Aerides vandarum</i> )		38	G85
<i>Paraphalaenopsis denevei</i> (J.J.Sm.) A.D.Hawkes		38	G84
<i>P. serpentina</i> (J.J.Sm.) A.D.Hawkes		38	G84
<i>Pelatantheria ctenoglossa</i> Ridl.		38	M73
<i>P. scolopendrifolia</i> (Makino) Aver. (as <i>Sarcanthus scolopendrifolium</i> )		38	TK84
<i>Phalaenopsis amabilis</i> Blume	19	38	M73, G81, TK84
<i>P. amabilis</i> var. <i>grandiflora</i>		38	TK84
<i>P. amboinensis</i> T.J.Sm.	19	38	M73, G81
<i>P. aphrodite</i> Rchb.f.	19	38	M73, G81
<i>P. buyssoniana</i> Rchb.f. (as <i>Doritis buyssoniana</i> )		76	TK84
<i>P. cornu-cervi</i> Blume & Rchb.f.		38	G81
<i>P. deliciosa</i> Rchb.f. (as <i>Doritis wightii</i> )	19		M73
<i>P. equestris</i> Rchb.f. (= <i>P. rosea</i> )	19	38	M73, G81
<i>P. equestris</i> (Schauer) Rchb.f. (as <i>P. rosea</i> )	19		G81
<i>P. esmeralda</i> Rchb.f. (= <i>Doritis pulcherrima</i> )	19	38	TK84
<i>P. fuscata</i> Rchb.f.		38	G81
<i>P. gigantea</i> J.J.Sm.		38	G81
<i>P. lindenii</i> Loker		38	TK84
<i>P. luedemanniana</i> Rchb.f.	19	38	M73, G81
<i>P. luedemanniana</i> var. <i>boxallii</i>		38	G81
<i>P. luedemanniana</i> var. <i>ochracea</i>		38	G81
<i>P. manni</i> Rchb.f.	19	38	M73, G81
<i>P. manni</i> Rchb.f. (as <i>P. boxallii</i> )		38	TK84
<i>P. mariae</i> Burbidge		38	G81
<i>P. parishii</i> Rchb.f.		38	G81
<i>P. parishii</i> Rchb.f. (as <i>P. decumbens</i> )		38	TK84
<i>P. pulcherrima</i> (Lindl.) J.J.Sm. (as <i>Doritis pulcherrima</i> )	19	38	TK84
<i>P. pulcherrima</i> var. <i>buyssoniana</i>		76	TK84
<i>P. sandieriana</i> Rchb.f.	19	38	M73, G81
<i>P. schilleriana</i> Rchb.f.		38	G81, TK84

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>P. speciosa</i> Rchb.f.		38	G81
<i>P. stuartniana</i> Rchb.f.	19	38	M73, G81
<i>P. taenialis</i> (Lindl.) Christenson & Pradhan (as <i>Doritis taenialis</i> )		40	M73, G81, GJ94
<i>P. tetraspis</i> Rchb.f.		38	G81
<i>P. violacea</i> Teijsm. & Binn.		38	G81
<i>Pomatocalpa marsupiale</i> (Kraenzl.) J.J.Sm.		38	G88
<i>P. kunstleri</i> (Hook.f.) J.J.Sm. (as <i>Sarcanthus kunstleri</i> )		38	TK84
<i>P. spicatum</i> Breda (as <i>Cleisostoma mannii</i> )		38	G85
<i>Pteroceras longicalcareum</i> (Ames & Rolfe) Garay (as <i>Sarcochilus longicalcareum</i> )		38	TK84
<i>Pteris</i> (Blume) Holttum (as <i>Sarcochilus palawanensis</i> )		38	TK84
<i>Renanthera coccinea</i> Lour.		38	TK84, GJ96
<i>R. elongata</i> Lindl.	19	38	TK84
<i>R. histrionica</i> Rchb.f.	19	38	TK84
<i>R. imschootiana</i> Rolfe	19		TK84
<i>R. matutina</i> Lindl.	19	38	TK84
<i>R. monachica</i> Ames	19	38	TK84
<i>R. storiei</i> Rchb.f.	19	38	M73, TK84
<i>Rhynchosstylis coelestis</i> Rchb.f.		38	M73
<i>R. gigantea</i> Ridl.		38	TK84
<i>R. gigantea</i> (as <i>Saccolabium albo-lineatum</i> )	19–20		TK84
<i>R. gigantea</i> (as <i>V. densiflora</i> )		38	TK84
<i>R. retusa</i> (L.) Blume	19	38	G81, TK84, G88,
<i>Robiquetia bertoldii</i> (Rchb.f.) Scltr.		38	GJ03
<i>R. bertoldii</i> (as <i>R. mimus</i> (Rchb.f.) Garay)		38	G88
<i>R. mooreana</i> (Rolfe) J.J.Sm.		38	G88
<i>R. spathulata</i> (Blume) J.J.Sm.		38	TK84
<i>R. succisa</i> (Lindl.) Seidenf. & Garay (as <i>R. paniculata</i> )		38	M73
<i>R. wassellii</i> Dockr.		38	G88
<i>Sarcochilus fitzgeraldii</i> F.Muell.		76	GJ96
<i>S. hartmannii</i> F.Muell.		38	D07
<i>Schoenorchis gemmata</i> (Lindl.) J.J.Sm. (as <i>Cleisostoma gemmatum</i> )	20		TK84
<i>Sedirea japonica</i> (Rchb.f.) Garay & H.R.Sweet (as <i>Aerides japonica</i> )		38	M73
<i>Schoenorchis gemmata</i> (Lindl.) Sm.		38	G88
<i>S. micrantha</i> Reinw. ex Blume (as <i>Ascocentrum micranthum</i> )	19	38	G81, M73
<i>Seidenfadenia mitrata</i> (Rchb.f.) Garay (as <i>Aerides mitrata</i> )		38	M73
<i>Smitinandia micrantha</i> (Lindl.) Holttum		38	G88
<i>S. micrantha</i> (Lindl.) Holttum (as <i>Cleisostoma micranthum</i> )	19	38	TK84, G88, GJ94
<i>Smithsonia maculata</i> (Dalzell) C.J.Saldanha (as <i>Gastrochilus maculatus</i> )		38	GJ90
<i>S. viridiflora</i> (Dalzell) C.J.Saldanha (as <i>Gastrochilus dalzielianus</i> )		38	GJ90
<i>Staurochilus fasciatus</i> (Rchb.f.) Ridl. (as <i>Trichoglottis fasciata</i> )		38	M73
<i>Stereochilus erinaceus</i> (Rchb.f.) Garay (as <i>Sarcanthus erinaceus</i> )		38	TK84
<i>Taeniophyllum crepidiforme</i> King. & Pantl.	19		TK84
<i>T. elmeri</i> Ames		40	TK84
<i>T. fasciola</i> (G.Forst.) Rchb.f.		56	G88
<i>T. glandulosum</i> Blume (as <i>T. aphyllum</i> )		38	TK84
<i>T. philippinensis</i> Rchb.f.		40	TK84
<i>Thrixspermum acuminatissimum</i> (Blume) Rchb.f.		38	M73
<i>T. carinatifolium</i> Ridl.		38	G88
<i>T. centipeda</i> Lour.		38	GJ96
<i>T. graeffei</i> Rchb.f.		38	G88
<i>T. japonicum</i> Rchb.f. (as <i>Sarcochilus japonicum</i> )		38	TK84
<i>T. pygmaeum</i> (King & Pantl.) Holttum (as <i>Sarcochilus pigmaeum</i> )	19		G81
<i>Trichoglottis cirrhifera</i> Teijsm. & Binn.		38	M73
<i>T. rosea</i> (Lindl.) Ames		38	M73
<i>T. tenera</i> (Lindl.) Rchb.f. (as <i>Saccolabium tenerum</i> )		ca. 38	M73
<i>T. triflora</i> (Guillaumin) Garay & Seidenf. (as <i>Saccolabium triflorum</i> )	19–20		TK84
<i>. kotoense</i> Yamam. (as <i>Saccolabium kotoense</i> )		30	M74
<i>T. rhopalorrhachis</i> (Rchb.f.) J.J.Wood (as <i>Saccolabium rhopalorrhachis</i> )		38	G88
<i>Uncifera obtusifolia</i> Lindl.	19		G84
<i>U. obtusifolia</i> (as <i>Saccolabium obtusifolia</i> )	19		M73
<i>Uncifera</i> sp.		38	TK84
<i>Vanda alpina</i> Lindl.	19	38	TK84, G85
<i>V. coerulea</i> Griffith	19	38	TK84, G85, GJ91, GJ96

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>V. coeruleascens</i> Griff.	19	38	M73, TK84, GJ91, GJ96
<i>V. concolor</i> Blume		76	TK84
		38, 76	GJ91, GJ96
<i>V. cristata</i> Lindl.	19	ca. 38, 38	M73, G81, TK84, G85, GJ00
			GJ00
<i>V. dearei</i> Rchb.f.		38	TK84
<i>V. denisoniana</i> Benson & Rchb.f.		38, 76	TK84
<i>V. denisoniana</i> (as <i>V. denisoniana</i> var. <i>hebraica</i> Rchb. f.		76	GJ91, GJ96
<i>V. flabellata</i> (Rolfe ex Downie) Christenson (as <i>Aerides flabellata</i> )		38	TK84, GJ91, GJ96
<i>V. lamellata</i> Lindl.		38	TK84
<i>V. lamellata</i> var. <i>boxallii</i> Rchb.f.	19	38	TK84
<i>V. lilacina</i> Teijsm. & Binn. (as <i>V. laotica</i> )		38	TK84
<i>V. luzonica</i> Loher ex Rolfe	19	38	TK84
<i>V. pumila</i> Hook.f.		38	GJ91, GJ96
<i>V. spatulata</i> Spreng.	38	76	TK84, G88
		114, 115	TK84
<i>V. stangeana</i> Rchb.f.	19	38	M73, G85, G88
<i>V. subconcolor</i> Tang & Wang		38	GJ91, GJ96
<i>V. tessellata</i> (Roxb.) Hook.		38	TK84
<i>V. tessellata</i> (Roxb.) Hook. ex G.Don (as <i>V. roxburghii</i> )	19	38	G81, TK84, G85
<i>V. testacea</i> (Lindl.) Rchb.f.	19	38	M73, GJ90
<i>V. testacea</i> (Lindl.) Rchb.f. (as <i>A. wrightiana</i> )		38	M77
<i>V. testacea</i> (Lindl.) Rchb.f. (as <i>V. parviflora</i> )	19	38	G81, G88, G85, GJ94
<i>V. tricolor</i> Lindl.	19	38	TK84
<i>V. tricolor</i> Lindl. (as <i>V. suavis</i> )		38	TK84
<i>V. tricolor</i> var. <i>suavis</i>	19	38	TK84
<i>Vanda</i> sp.		38	GJ96
<i>Vanda</i> sp.		57	GJ96
<i>Vandopsis gigantea</i> (Lindl.) Pfitzer		38	M73
<i>V. lisochiloides</i> Pfitzer		38	TK84
<i>V. undulata</i> (Lindl.) J.E.Sm.	19	38	G84, GJ06
<i>V. undulata</i> (Lindl.) J.J.Sm. as <i>Stauropsis undulatum</i> )		38	GJ96
<b>Subtribe Angraeacinae</b>			
<i>Angraecum aichlerianum</i> Kraenzl.		38	M73
<i>A. aporoides</i> Summerh.		48	G85
<i>A. arachnites</i> Schltr.		38	M73
<i>A. bancoense</i> Burg		50	G50
<i>A. birrimense</i> Rolfe		38	G84
<i>A. calceolus</i> Thouars		38	M73, G85
<i>A. calceolus</i> Thouars (as <i>A. onocentrum</i> )		38	M73
<i>A. caricifolium</i> Perrier		38	G85
<i>A. compressicaule</i> H.Perrier		42–48	TK84
<i>A. cultriforme</i> Summerh.		38	G85
<i>A. distichum</i> Lindl.		50	G84
<i>A. doratophyllum</i> Summerh.		92	G85
<i>A. eburneum</i> Bory		40	TK84
<i>Angraecum eburneum</i> subsp. <i>giryamae</i> (Rendle) Senghas & P.J.Cribb (as <i>A. giryamae</i> )		38	M73
<i>A. eichlerianum</i> Kraenzl.		38	TK84, GJ91
<i>A. erectum</i> Summerh.		63	M73
		42	G85
<i>A. gabonens</i> Summerh.		46	G85
<i>A. guillauminii</i> H.Perrier		50	TK84
<i>A. infundibulare</i> Lindl.		38	M73
<i>A. leonis</i> (Rchb.f.) Vietch		38	G85
		40	TK84
<i>A. moandense</i> De Wild. (as <i>A. chevaleri</i> )		ca. 38	M73
<i>A. multinominatum</i> Rendle		42	M73
<i>A. podoichiloides</i> Schltr.		50	G85
<i>A. pungens</i> Schltr.		46	G85
<i>A. sacciferum</i> Lindl.		ca. 76	M73
<i>A. scottianum</i> Rchb.f.		38	M73

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>A. sesquipedale</i> Thouars		38	G85
<i>A. subulatum</i> Lindl.		50	G84
<i>Calyptrochilum christianum</i> (Rchb.f.) Summerh.		38	G84
<i>C. emarginatum</i> (Sw.) Schltr.		38	G84
<i>Campylocentrum amazonicum</i> Cogn.		80	PW
<i>C. crassirhizum</i> Hoehne		38	PW
<i>C. neglectum</i> (Rchb.f. & Warm.) Cogn.		38	DA09
<i>C. pernambucense</i> Hoehne		38	PW
<i>Cryptopus elatus</i> (Thouars) Lindl.		95	M73
		76	G85
<i>Dendrophylax monteверdi</i> (Rchb.f.) Ackerman & Nir (as <i>Campylocentrum monteверdi</i> )		44	G88
<i>Jumellea walleri</i> (Rolfe) la Croix (as <i>Jumellea filicornoides</i> )		38–40	M73
<i>Listrostachys pertusa</i> (Lindl.) Rchb.f.		46	G84
<i>Oeoniella stachys</i> Schltr.		38	TK84
<b>Subtribe Aerangidinae</b>			
<i>Aerangis biloba</i> (Lindl.) Schltr.		50	M73
<i>A. biloba</i> (Lindl.) Schltr. (as <i>Angraecum bilobum</i> )	25	50	TK84
<i>A. brachycarpa</i> (A.Rich.) Durand & Schinz		50	G85
<i>A. calantha</i> (Schltr.) Schltr.		46	G85
<i>A. citrata</i> (Thouars) Schltr.		ca. 50, ca. 50	M73, G85
<i>A. collum-cygni</i> Summerh. (as <i>A. compta</i> )		51	M73
<i>A. cryptodon</i> Rchb.f.		50	G85
<i>A. kirkii</i> (Rchb.f.) Schltr.		52	G85
<i>A. kotschyana</i> (Rchb.f.) Schltr.		50, ca. 50	M73
<i>A. luteoalba</i> var. <i>rhodosticta</i> (Kraenzl.)			
J. Stewart		42	G85
<i>Aerangis luteoalba</i> var. <i>rhodosticta</i> (Kraenzl.) J.Stewart (as <i>A. rhodosticta</i> )		42	M73, G85
<i>A. modesta</i> (Hook.f.) Schltr. (as <i>Angraecum sanderianum</i> )	25		TK84
<i>A. somalensis</i> (Schltr.) Schltr.		54	G85
<i>A. ugandensis</i> Summerh.		ca. 50, 50	M73, G85
<i>Aerangis</i> sp.		50, ca. 50, 200	M73
<i>Ancistrorhynchus capitatus</i> (Lindl.) Summerh.		72	G85
<i>A. clandestinus</i> (Lindl.) Schltr.		48	M73, G85
<i>A. crystalensis</i> Crib & Van der Lan		48	GJ91
<i>A. metteniae</i> (Kraenzl.) Summerh.		48	G85
<i>A. ovatus</i> Summerh.		48	G85
<i>Ancistrorhynchus recurvus</i> Finet		ca. 50	M73
<i>A. straussii</i> (Schltr.) Schltr.		48	GK91
<i>A. tenuicaulis</i> Summerh.		48	GJ91
<i>Ancistrorhynchus</i> sp.		96	G85
<i>Angraecopsis amaniensis</i> Summerh.		48	G88
<i>A. breviloba</i> Summerh.		50	M73
<i>A. gracillima</i> (Rolfe) Summerh.		50	G85
<i>A. pusilla</i> Summerh.		50	G85
<i>A. trifurcata</i> Schltr.		50	GJ91
<i>Bolusiella batesii</i> (Rolfe) Schltr.		50	G84
<i>Chamaeangis odoratissima</i> (Rchb.f.) Schltr.		50	M73, G85
<i>C. vesicata</i> (Lindl.) Schltr.		95–100	M73
<i>Cribbia brachyceras</i> (Summerh.) Senghas (as <i>Rangaeris brachyceras</i> )		50	M73, G85
<i>Cyrtorchis arcuata</i> (Lindl.) Schltr.		ca. 150	M73
<i>C. arcuata</i> subsp. <i>arcuata</i> (as <i>C. arcuata</i> subsp. <i>variabilis</i> )		46	G85, GJ91
<i>C. arcuata</i> subsp. <i>whytei</i> (Rolfe) Schltr.		138	G85
<i>C. aschersonii</i> (Kraenzl.) Schltr.		46	G84
<i>C. brownii</i> (Rolfe) Schltr.		46	G85
<i>C. chailluana</i> (Hook.f.) Schltr.	22–23		TK84
<i>C. hamata</i> (Rolfe) Schltr.		46	G84
<i>C. monteiroae</i> (Rchb.f.) Schltr.		46	G85
<i>C. praetermissa</i> Summerh.		46, 92	G85
<i>C. ringeus</i> (Rchb.f.) Summerh.		46	G85
<i>Cyrtorchis</i> spp.		46, 50	M73
<i>Diaphanthe fragrantissima</i> (Lindl.) Schltr.		50	G85

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. pellucida</i> (Lindl.) Schltr.		50	G85, GJ91
<i>D. plehniana</i> (Schltr.) Schltr.		50	M73
<i>Diaphananthe</i> sp.		ca. 50	M73
<i>Diaphananthe</i> sp.		50	GJ91
<i>Eggelingia gabonensis</i> Cribb & Van der Lan		46	GJ91
<i>Eurychone rothschildiana</i> (O' Br.) Schltr.		50	M73, GJ91
<i>Microcoelia bispiculata</i> L.Jonsson		48	G84
<i>M. bulbocalcarata</i> L.Jonsson		48	G84
<i>M. caespitosa</i> (Rolfe) Summerh.		48	G84
<i>M. exilis</i> Lindl.		48	G84, G85, G88, GJ91
<i>M. gilpiniae</i> (Rchb.f. & S.Moore) Summerh.		48	G84
<i>M. globulosa</i> (Hochst.) L.Jonsson		48	G84
<i>M. hirschbergii</i> Summerh.		48	G84
<i>M. koeleri</i> (Schltr.) Summerh.		48	G84
<i>M. macrantha</i> (H.Perr.) Summerh.		48	G84
<i>M. macrorhynchia</i> (Schltr.) Summerh.		48	G85
<i>M. megalorrhiza</i> (Rchb.f.) Summerh.		48	G88
<i>M. obovata</i> Summerh.		48	G84
<i>M. physophora</i> (Rchb.f.) Summerh.		48	G84
<i>M. stolzii</i> (Schltr.) Summerh.		48	G84, G88
<i>Microterangis hildebrandtii</i> (Rchb.f.) Senghas (as <i>Chameangis hildebrandtii</i> )		50	G85
<i>Mystacidium capense</i> (L.f.) Schltr.		48	G85
<i>Podangis dactyloceras</i> (Rchb.f.) Schltr.		46	GJ91
<i>Rangaeris amaniensis</i> (Kraenzl.) Summerh.		92	GJ91
<i>R. musicola</i> (Rchb.f.) Summerh.		ca. 100	M73
<i>R. rhipsalisocia</i> (Rchb.f.) Summerh.	54II	ca. 108	M73
		46	G84
<i>Rhipidoglossum brevifolium</i> Summerh. (as <i>Diaphananthe brevifolia</i> )		50	G85
<i>R. cuneatum</i> (Summerh.) Garay (as <i>Diaphananthe cuneata</i> )		ca. 50	M73
<i>R. densiflorum</i> Summerh. (as <i>Diaphananthe densiflora</i> )		50	M73
<i>R. pulchellum</i> (Summerh.) Garay (as <i>Diaphananthe pulchella</i> )		50	G85
<i>R. rutilum</i> (Rchb.f.) Schltr. (as <i>Diaphananthe rutila</i> )		100	M73, G85
<i>R. xanthopollinium</i> (Rchb.f.) Schltr. (as <i>Diaphananthe xanthopollinia</i> )		50	G85
<i>Solenangis clavata</i> (Rolfe) Schltr.		50	G84
<i>S. scandens</i> (Schltr.) Schltr.		50	G84
<i>Sphyrarhynchus achiliebenii</i> Mansf.		50	GJ91
<i>Tridactyle anthomaniaca</i> (Rchb.f.) Summerh.		ca. 100	M73
<i>T. tridactylites</i> (Rolfe) Schltr.		ca. 100	M73
<i>Tridactyle</i> sp.		ca. 50	M73
<b>UMPLACED SUBTRIBES</b>			
<b>Subtribe Agrostophyllinae</b>			
<i>Agrostophyllum brevipes</i> King & Pantl.	20		M73
<i>A. callosum</i> Rchb.f.	20	40	M73, G85
		38	TK84
<i>A. myrianthum</i> King & Pantl	20		M73
<i>A. planicaule</i> (Wall. ex Lindl.) Rchb.f. (as <i>A. khasianum</i> )	20	40	M73, G85
<i>A. uniflorum</i> Schltr.		38	G88
<i>Earina aestivalis</i> Cheeseman		40	D07
<i>E. autumnalis</i> (G.Forst.) Hook.f.		40	D07
<i>E. mucronata</i> Lindl.		40	D07
<i>Glossorhyncha chlorantha</i> van Royen		40	G88
<i>G. macdonaldii</i> Schltr.		40	GJ06
<b>Subtribe Dendrobiinae</b>			
<i>Bulbophyllum acuminatum</i> (Ridl.) Ridl. (as <i>Cirrhopetalum acuminatum</i> )		38	TK84
<i>B. aff. acuminatum</i>		38	G88
<i>B. acutibracteatum</i> var. <i>rubrobrunneopapillosum</i> (De Wild.) J.J.Verm. (as <i>B. fuscoides</i> )		ca. 38	M73
<i>B. acutissepalum</i> De Willd.		38	G88
<i>B. adenopetalum</i> Lindl.		38	M73
<i>B. aeolium</i> Ames		40	TK84
<i>B. andersonii</i> J.J.Sm. (as <i>C. andersonii</i> )		38	TK84
<i>B. affini</i> Lindl.		36	TK84
	20		M73

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>B. alagense</i> Ames		40	TK84
<i>B. ambrosia</i> (Hance) Schltr.		38	G88, GJ91, GJ96
<i>B. andersonii</i> Kurz.		38	G85
<i>B. anteniferum</i> Rchb.f.		40	TK84
<i>B. apodum</i> Hook.f.		38	M73
<i>B. apodum</i> Hook.f. (as <i>B. ebulbum</i> )		38	G85
<i>B. argyropus</i> (Endl.) Rchb.f. (as <i>Adelopetalum argyropus</i> )		36	D07
<i>B. aurantiacum</i> F.Muell.		38	G85
<i>B. auratum</i> Rchb.f.	20		TK84
<i>B. aureolabellum</i> T.P.Lin (as <i>C. gracillimum</i> )		ca. 38	TK84
<i>B. baileyi</i> F.Muell.		38	G85
<i>B. barbigerum</i> Lindl.		38	M73, G85
<i>B. biantennatum</i> Schltr.		38	G85
<i>B. biflorum</i> Teijsm. & Binn.,		38	G88
<i>B. bisetum</i> Lindl.		40	G84
<i>B. boninense</i> J.J.Sm. (as <i>C. boninense</i> )		20	TK84
<i>B. braccatum</i> Rchb.f.	20		TK84
<i>B. caespitosum</i> Thou (as <i>B. Caespitosum</i> )	20		TK84
<i>B. canlanoense</i> Ames		40	TK84
<i>B. cauliflorum</i> Hook.f.	21		TK84
<i>B. careyanum</i> Spreng.	19 + 0–1B	38	M73, TK84
<i>B. cauliflorum</i> Hook.f.	21		G81
<i>B. cerinum</i> Schltr.		38	G88
<i>B. clandestinum</i> Lindl. (as <i>B. sparsifolium</i> )		38	G85
<i>B. clavatum</i> Thouars		38	G88
<i>B. cochleatum</i> var. <i>tenuicaule</i> (Lindl.) J.J.Verm. (as <i>B. tenuicaule</i> )	19	38	TK84
<i>B. cocoinum</i> Bateman ex Lindl.		38	M73, G85
<i>B. congolanum</i> Schltr.		38	M73, G85
<i>B. cornutum</i> Ridl.		38	TK84
<i>B. cornutum</i> (as <i>C. cornutum</i> )	19		TK84
<i>B. crassifolium</i> Thouars		38	G88
<i>B. crassipes</i> Hook.f.		38	G88
<i>B. cribbianum</i> Toscano		38	PW
<i>B. cumingii</i> (Lindl.) Rchb.f.		40	TK84
<i>B. cumingii</i> (Lindl.) Rchb.f. (as <i>C. cumingii</i> )		38	TK84
<i>B. cumingii</i> (Lindl.) Rchb.f. (as <i>C. stramineum</i> )		38–40	TK84
<i>B. cylindraceum</i> Lindl.	19		G84
	20		M73
<i>B. daloaense</i> Cribb & Perez-Vera		38	G85
<i>B. denisii</i> J.J.Wood.		38	G88
<i>B. densiflorum</i> Rolfe	19		M73
<i>B. drymoglossum</i> Maxim.		40	TK84
<i>B. elassonotum</i> Summerh.		38	G85
<i>B. elliottii</i> Rolfe (as <i>B. malawiense</i> )		38	G85
<i>Bulbophyllum elisae</i> F.Muell.		38	G88
<i>B. emiliorum</i> Ames & Quisumb.		40	TK84
<i>B. encephalodes</i> Summerh.		38	G85
<i>B. eublepharum</i> Rchb.f.	19		M73
<i>B. evrardii</i> Gagnep.		38–42	TK84
<i>B. exiguum</i> F.Muell.		ca. 38	G88
<i>B. falcatum</i> (Lindl.) Rchb.f.		38	M73
<i>B. falcatum</i> var. <i>velutinum</i> (Lindl.) J.J.Verm. (as <i>B. melanorhachis</i> )		38	G88
<i>B. falcatum</i> var. <i>velutinum</i> (Lindl.) J.J.Verm. (as <i>B. rhizophorae</i> )		38	G88
<i>B. fascinator</i> (Rolfe) Rolfe		38	G88
<i>B. flavidum</i> Lindl.		40	M73
		38	G84
<i>B. fletcherianum</i> Rolfe		38	G88
<i>B. formosum</i> Schltr.		38	G88
<i>B. fritillariflorum</i> J.J.Sm.		38	G88
<i>B. frostii</i> Summerh.		38	M73
<i>B. gamblei</i> Hook.f.	20		M73
	19		G88
<i>B. gibbosum</i> (Blume) Lindl.		38	G85
<i>B. grandiflorum</i> Blume		38	M73, G85

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>B. grandiflorum</i> Blume		38	M73
<i>B. griffithii</i> Rehb.f.	19		G81
<i>B. gymnopus</i> Hook.f.	19		M77
<i>B. imbricatum</i> Lindl.		38	M73, G84
<i>B. imbricatum</i> Lindl. (as <i>B. linderi</i> )		38	G88
<i>B. inconspicuum</i> Maxim.		38	M73
<i>B. intertextum</i> Lindl.		38	M73, G85
<i>B. intricatum</i> Seidenf.		38	G88
<i>B. ipanemense</i> Hoehne		38	G85
<i>B. japonicum</i> Makino		40	M73
<i>B. khasyanum</i> Griff.	20		G84
<i>B. lasiochilum</i> Par. & Rehb.f.(as <i>Cirrhopetalum lasiochilum</i> )		38	TK84
<i>B. leopardinum</i> Lindl.	19		M73
<i>B. leptanthum</i> Hook.f.	19		G81
<i>B. lepidum</i> (Blume) J.J.Sm.		38	G85
<i>B. lepidum</i> (as <i>C. lepidum</i> )		38	TK84
<i>B. levanae</i> var. <i>giganteum</i> Quisumb. & C. Schweinf.		60	TK84
<i>B. aff. levatii</i>			
<i>B. lobbi</i> Lindl.		39	M73
<i>B. logiflorum</i> Thouars		38	G85
<i>B. logiflorum</i> Thouars (as <i>C. longiflorum</i> )		38–40	TK84
<i>B. longiscapum</i> Rolfe		38	G88
<i>B. lupulinum</i> Lindl.		38	M73
		40	M73
<i>B. macraei</i> (Lindl.) Rehb.f.		38	G88
<i>B. macranthum</i> Lindl.		38	G85
<i>B. maculosum</i> Ames (as <i>C. maculosum</i> )		38	TK84
<i>B. mahonii</i> Rolfe		38	G85
<i>B. makoyanum</i> Rehb.f.		38–40	TK84
<i>B. mandibulare</i> Rehb.f.		38	G88
<i>B. mastersianum</i> J.J.Sm. (as <i>C. mastersianum</i> )		38	TK84
<i>B. maximum</i> (Lindl.) Rehb.f.		38	G85
<i>B. maximum</i> (Lindl.) Rehb.f. (as <i>B. oxypterum</i> )		38	G85
<i>B. medusae</i> (Lindl.) Rehb.f.		38	G85
<i>B. miniatum</i> Hort. ex F. Moore		38	G85
<i>B. minutipetalum</i> Schltr.		38	M73
		36	GJ96
<i>B. morphologorum</i> Kraenzl.		38	G88
<i>B. mundulum</i> (W. Bull) J.J.Sm. (as <i>C. mundulum</i> )		38	TK84
<i>B. mysorensis</i> (Rolfe) J.J.Sm. (as <i>C. mysorensis</i> )		ca. 38	TK84
<i>B. neilgherense</i> Wight		40	TK84
<i>B. nutans</i> Thou.		38	M73
<i>B. odoratissimum</i> (Sm.) Lindl.	19	38	TK84, G88
<i>B. odoratum</i> var. <i>odoratum</i> (as <i>B. elatius</i> )		38	M73
<i>B. oreonastes</i> Rehb.f.		38	G85
<i>B. oreonastes</i> Rehb.f. (as <i>B. zenkerianum</i> )		38	G85
<i>Bulbophyllum ornatissimum</i> J.J.Sm. (as <i>C. ornatissimum</i> )		38–40	TK84
		ca. 38	TK84
<i>B. orthoglossum</i> Kraenzl.		38	G85
<i>B. oxychilum</i> Schltr. (as <i>B. buntingii</i> )		38	G88
<i>B. pallidiflorum</i> Schltr.		38	G88
<i>B. parvulum</i> Lindl. (as <i>C. parvulum</i> )	19		TK84
<i>B. patens</i> King		57	G85
<i>B. pahudii</i> (de Vriese) Rehb.f. (as <i>B. virescens</i> )		38	M73
<i>B. penicillium</i> Par. & Rehb.f.	19		G81
<i>B. peninsulare</i> Seidenf.		38	G88
<i>B. phalaenopsis</i> J.J.Sm.		38	G85
<i>B. picturatum</i> Rehb.f.		38	G85
<i>B. picturatum</i> (as <i>C. picturatum</i> )		48	TK84
<i>B. pipio</i> Rehb.f.		38	G84
<i>B. polyrhizum</i> Lindl.	19		M73
<i>B. protractum</i> Hook.f.	19	38	G84, G85
<i>B. pulchrum</i> (N.E.Br.) J.J.Sm.		38	G85

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>B. pulchrum</i> (as <i>C. pulchrum</i> )		38	TK84
<i>B. purpureorhachis</i> (De Willd) Schltr.		38	G85
<i>B. raii</i> Arora		40	TK84, G88, GJ94
<i>B. reflexiflorum</i> H.Perrier		38	TK84
<i>B. refractum</i> Rchb.f.		38	G88
<i>B. refractum</i> Rchb.f. (as <i>C. refractum</i> )	19		G88, GJ94
<i>B. reptans</i> Lindl.	19 + 0–1B	38	G81, G88, GJ94
<i>B. retusiusculum</i> Rchb.f.	19		G84
<i>B. retusiusculum</i> Rchb.f. as <i>B. micholitzii</i>		38	M73, G85
<i>B. rigidum</i> King & Pantl.		38	G85
<i>B. robustum</i> Rolfe (as <i>C. robustum</i> )		38	TK84
<i>B. rothchildianum</i> (O'Brien) J.J.Sm.		38	G88
<i>B. roxburghii</i> (Lindl.) Rchb.f.		38	G88
<i>B. rufinum</i> Rchb.f.		38	G88
<i>B. rugosibulbon</i> Summerh.		38	G88
<i>B. saltatorium</i> Lindl.		38	G85
<i>B. saltatorium</i> var. <i>calamarium</i> (Lindl.) J.J.Verm. (as <i>B. calamarium</i> )	19	38	M73, G85
<i>B. saltatorium</i> var. <i>albociliatum</i> (Finet) J.J.Verm. (as <i>B. distans</i> )		38	G85
<i>B. saltatorium</i> var. <i>albociliatum</i> (Finet) J.J.Verm. (as <i>B. nudiscapum</i> )		38	G85
<i>B. sanderianum</i> Rolfe		38	PW
<i>B. sandersonii</i> (Oliv.) Rchb.f.		38	G85
<i>B. saurocephalum</i> Rchb.f.	20		TK84
<i>B. schinzianum</i> Kraenzl.		38	G85
<i>B. schiazianum</i> Kraenzl. (as <i>B. phaepogon</i> )		38	M73, G85
<i>B. secundum</i> Hook.f.	19		M73
	20		TK84
<i>B. sociale</i> Rolfe		38	M73
<i>B. stenobulbon</i> E.C.Parish & Rchb.f.		38	G88
<i>B. stenobulbon</i> E.C.Parish & Rchb.f. (as <i>B. clarkeanum</i> )	19		M73
<i>B. sterile</i> (Lam.) Suresh (as <i>C. caudatum</i> )	19		TK84
<i>B. striatum</i> Rchb.f.	19		M73
<i>B. tentaculgerum</i> Rchb.f.		38	G84
<i>B. tetragonum</i> Lindl. (as <i>B. wrightii</i> )		38	G84
<i>B. trachyantum</i> Kraenzl.		38	G85
<i>B. tricanaliferum</i> J.J.Sm.		38	G88
<i>B. tridentatum</i> Kraenzl.		38	G88
<i>B. trimeni</i> (Hook.f.) J.J.Sm.		38	G88
<i>B. triste</i> Rchb.f.	19		M73, G81
<i>B. tseanum</i> Hu & Barr.		39	G88
<i>B. tuberculatum</i> Colenso (as <i>Adenopetalum tuberculatum</i> )		38	D07
<i>B. umbellatum</i> Lindl.		38	TK84, GJ94
<i>B. umbellatum</i> Lindl. (as <i>C. umbellatum</i> )		38	TK84, G88
<i>B. unicaudatum</i> Schltr.		38	G88
<i>B. unifoliatum</i> De Wild.		38	G85
<i>B. vagans</i> Ames & Rolfe		95	G85
<i>B. vaginatum</i> (Lindl.) Rchb.f. (as <i>C. vaginatum</i> )		38	TK84, G88
<i>B. velutinum</i> (Lindl.) Rchb.f.	19		M73
		40	G84
<i>Bulbophyllum viridiflorum</i> Lindl.	19 + 1B		G88
<i>B. viridiflorum</i> (as <i>C. viridiflorum</i> )	19 + 0–3B		TK84, GJ94
<i>B. wallichii</i> Rchb.f. (as <i>C. wallichii</i> )	18		TK84
<i>B. wallichii</i> Rchb.f. (as <i>B. refractoides</i> )	19		M73
<i>B. wendlandianum</i> (Kraenzl.) J.J.Sm.		57	G88
<i>B. winkleri</i> Schltr.		38	G84
<i>B. zenkerianum</i> Kraenzl.		38	G85
<i>Bulbophyllum</i> sp.		40	TK84
<i>Bulbophyllum</i> sp.		38	PW
<i>Bulbophyllum</i> sp.		80	PW
<i>Bulbophyllum</i> sp. nv.		38 + Bs	G88
<i>Bulbophyllum</i> sp. nv.		38	G88
<i>Dendrobium acinaciforme</i> Roxb.	19	38	G81, G84, G88 GJ90
<i>D. acerosum</i> Lindl.		38	G84, G88
<i>D. acuminatissimum</i> Lindl.		40	TK84



Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. acuminatum</i> (Rolfe) Kraenzl. (= <i>D. lyonii</i> )		38	TK84
		40	GJ90
<i>D. adae</i> F.M.Bayley		38	G88
<i>D. aduncum</i> Wall. ex Lindl.		38	G85, GJ90
		40	G88, GJ90
<i>D. aemulum</i> R.Br.		38	G84, GJ90
<i>D. agrostophyllum</i> F.Muell.		38	GJ90
	20	40	G84
<i>D. alaticaulinum</i> Royen		38	G85, G88
<i>D. albayense</i> Ames		40	TK84
<i>D. albosanguineum</i> Lindl. & Paxton		40	G88, GJ90
<i>D. anosmum</i> Lindl. (as <i>D. leucorhodum</i> )		38	TK84
<i>D. anosmum</i> Lindl. (as <i>D. superbum</i> )		38	G84, GJ90
<i>D. antennatum</i> Lindl. (as <i>D. dalbertisii</i> )		38	M73
<i>D. aphyllum</i> (Roxb.) C.E.C.Fisch. (as <i>D. macrostachyum</i> )		38	M73, M77
<i>D. aphyllum</i> (Roxb.) C.E.C.Fisch. (as <i>D. pierardii</i> )	19	38	M73, G84, G85, GJ90
<i>D. atroviolaceum</i> Rolfe		38	M73, G88
<i>D. aurantiroseum</i> P.Royen ex T.M.Reeve		76	G88
<i>D. baileyi</i> F.Muell.		38	G85
<i>D. barbatum</i> Lindl.		38	G84, GJ90
<i>D. bellatullum</i> Rolfe		38	G85
<i>D. bensoniae</i> Rchb.f.		38	G88, GJ90
<i>D. bicallosum</i> Ridl.		40	TK84
<i>D. bicameratum</i> Lindl.	19 + 0–4B	38	G81, G85, G88, GJ90, GJ94
<i>D. bifalce</i> Lindl.		38	G85
<i>D. biflorum</i> (Forst.) Sw.		38	G85
<i>D. bigibum</i> Lindl.	19	38	TK84, G84, GJ90
<i>D. bigibbum</i> Lindl. (as <i>D. phalaenopsis</i> )	19	38	TK84, G84, GJ90
<i>D. bilobum</i> Lindl.		38	G85
<i>D. brymerianum</i> Rchb.f.		38	TK84, GJ90
<i>D. bulbophylloides</i> Schltr.		38	G88
<i>D. bullenianum</i> Rchb.f.		38	M73, GJ90
<i>D. bullenianum</i> Rchb.f. (as <i>D. topaziacum</i> )		38	TK84
<i>D. calcaratum</i> A.Rich.		38	G85
<i>D. camaridiorum</i> Rchb.f.		38	G85
<i>D. canaliculatum</i> R.Br.		38	M73, GJ90
	19	38	G84
<i>D. candidum</i> Wall.	19	38	G81, TK84, G84, G88, GJ90
<i>D. capilipes</i> Rchb.f.		38	TK84
<i>D. capituliflorum</i> Rolfe		38	G85, GJ90
<i>D. capra</i> J.J.Sm.	19		G84
<i>D. cariniferum</i> Rchb.f.		38	M73
<i>D. catenatum</i> Lindl. (as <i>D. tosaense</i> )	19	38	M73, G84
		40	TK84
<i>D. cathcartii</i> Hook.f.	19		M73
<i>D. chameleon</i> Ames		38	G85
<i>D. chrysanthum</i> Wall.	20	40	G81, TK84, G88, GJ94
	19	38	G81, TK84, G85, GJ90
		76	GJ06
<i>D. chryseum</i> Rolfe		38	GJ06
<i>D. chryseum</i> Rolfe (as <i>D. clavatum</i> )	19	38	M73, G81, G85, G88
<i>D. chryseum</i> Rolfe (as <i>D. denneanum</i> )	19	38	G88, GJ90
<i>D. chrysotoxum</i> Lindl.	19	38	M73, TK84, G84 G88, GJ90
<i>Dendrobium chrysocrepis</i> E.C.Parish & Rchb.f. ex Hook.f.		ca. 76	TK84
<i>D. clavator</i> Ridl.		38	GJ90
<i>D. coelogyne</i> Rchb.f.		40	G85, GJ90
<i>D. compactum</i> Rolfe	20	40	G84, GJ90
<i>D. compressum</i> Lindl. (as <i>D. platycaulon</i> )		38	TK84
<i>D. connatum</i> Schltr.		38	G85, G88
<i>D. crassifolium</i> Schltr.		38	G88
<i>D. crassinodes</i> Benson & Rchb.f.		38	TK84, G84, GJ90

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. crepidatum</i> Lindl.		38	M73, TK84, M77, G88
<i>D. crispilinguum</i> Cribb.		38	G85
<i>D. cruentum</i> Rchb.f.		40	M73, TK84
		38 + 1B	G81
<i>D. crumenatum</i> Sw.		38, 38 + 0–2B	M73, TK84, G84, G85
<i>D. crumenatum</i> Sw. (as <i>D. kwashotense</i> )		38	M74
<i>D. crystallinum</i> Rchb.f.		38	M73, G88
<i>D. chryseum</i> Rolfe (as <i>D. flaviflorum</i> )		38	M74
<i>D. cruttwellii</i> T.M.Reeve		38	G85
<i>D. cucumerinum</i> Maclay ex Lindl.		38	G84, GJ90
<i>D. cumulatum</i> Lindl.		40	G85
<i>D. cunninghamii</i> Lindl.		38	G85
<i>D. cunninghamii</i> Lindl. (as <i>Winika cunninghamii</i> )		40	D07
<i>D. cuthbertsonii</i> F.Muell.		76	G88
<i>D. cuthbertsonii</i> F.Muell. (as <i>D. sophronites</i> )		38	G84, GJ90
<i>D. cyanocentrum</i> Shltr.		38	G88
<i>D. cymbidioides</i> (Blume) Lindl.		40	G84, GJ90
<i>D. delacourii</i> Guill. (= <i>D. ciliatum</i> )		38	M73
	20	40	G84, G88
<i>D. × delicatum</i> (F.M.Bailey) F.M.Bailey		38	G85, G88
<i>D. denneanum</i> × <i>D. moschatum</i> (Buch.-Ham.) Sw.		44	GJ06
<i>D. densiflorum</i> Wall.		38	G81, G85, G88
	20 + (0–2B)	40, 40 + 1–3f	M73, G81, TK84, G84, G85, GJ90
<i>D. denudans</i> D.Don	20	40	G81, G84, GJ90
<i>D. devonianum</i> Paxton	19	38	M77, TK84, G88
<i>D. dicuphum</i> F.Muell.		38	TK84
		39	G84, GJ90
		38	G88
<i>D. dichaeoides</i> Schltr.		38	G88
<i>D. dilonianum</i> Hawkes & Helter		38	G88
<i>D. distichum</i> Rchb.f.	19	38	M73, G84, GJ90
<i>D. dixanthum</i> Rchb.f.		40 + 2–4f	M73, G84, G85, GJ90
<i>D. draconis</i> Rchb.f.		38	M73, G85
<i>D. engae</i> Reeve		36	G85, G88, GJ90
<i>D. epiphedum</i> Lindl.	20		G81
<i>D. equitans</i> Kraenzl.		38	G84, GJ90
<i>D. equitans</i> Kraenzl. (as <i>D. batanense</i> )	19	38	G85
<i>D. falconeri</i> Hook.f.		38	G84, G88, GJ90
<i>D. farmerii</i> Paxt.		40	M73, M77, G84
<i>D. farmerii</i> var. <i>aureoflava</i> Hook.f.		40	M73, G85
<i>D. fellowsii</i> F.Muell. (as <i>D. bairdianum</i> )		36	G88
<i>D. fimbriatum</i> Hook.	20	40	M73, G85, G88
	19	38, 38 + 0–2B	G81, TK84, G88, GJ90, GJ94
<i>D. fimbriatum</i> Hook. (as <i>D. normale</i> )		38	G81, GJ90
<i>D. findlayanum</i> Par. & Rchb.f.		38	M73, G84, JG90
<i>D. finetianum</i> Schltr.		40	GJ96
<i>D. finisterrae</i> Schltr.		38 + 2B	G85
		40	G84, GJ90
<i>D. flamula</i> Schltr.		38	TK84
<i>D. fleckeri</i> Rupp. & C.T.White		38	G88
<i>D. forbesii</i> Ridl.		38 + 2B	G85
		40	G84
<i>D. formosanum</i> Roxb. ex Lindl.	19	38	M73, M77, G84, GJ90
<i>D. friedericksianum</i> Rchb.f.		38	M73, G84, G85, GJ90
<i>D. gibsoni</i> Paxton	19	38	G81, G88, GJ90
<i>D. goldfinchii</i> F.Muell.		38	G85
<i>D. goldschmidtianum</i> Kraenzl. (as <i>D. miyakei</i> )		38	M74, GJ90
<i>D. goldschmidtianum</i> Kraenzl. (as <i>D. victoriae-reginae</i> var. <i>miyakei</i> )		38	
<i>D. gordonii</i> S.Moore		38	TK84
<i>Dendrobium gouldii</i> Rchb.f.		38	M73, G85, GJ90
<i>D. gracilicaule</i> F.Muell.		38	G85
<i>D. gracilicaule</i> var. <i>houneanum</i> Miden		38	TK84

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. gratioissimum</i> Rchb.f.		38	G85
<i>D. griffithianum</i> Lindl.		40	G85
<i>D. guerreroi</i> Ames & Quisumb.		40	G84
<i>D. haemoglossum</i> Thwaites (as <i>bambusiaefolium</i> )		38	G85, GJ90
<i>D. hancokii</i> Rolfe		40	G88
<i>D. heishanaense</i> Hayata		38	M74
<i>D. helix</i> Cribb		38	G85
<i>D. hellwigianum</i> Kraenzl.		38	G85
<i>D. hendersonii</i> A.D.Hawkes & A.H.Heller		38	TK84
<i>D. herbaceum</i> Lindl.		38	G84, GJ90
<i>D. hercoglossum</i> Rchb.f.		38	G85
<i>D. hercoglossum</i> Rchb.f. (as <i>D. wangi</i> )		38	G88
<i>D. heterocarpum</i> Wall.		38	M73, M77, TK84
			G84, G85, GJ90
<i>D. hookerianum</i> Lindl.	20	40	G81, G85, GJ90
<i>D. indivisum</i> var. <i>indivisum</i> (as <i>D. porphyrophyllum</i> )	19		TK84
<i>D. infudibulum</i> Lindl.	19	38	M73, TK84, G88, GJ90
<i>D. infudibulum</i> Lindl. (as <i>D. jamesianum</i> )		38	TK84
<i>D. insigne</i> (Blume) Rchb.f.		36 + 2f	G88, GJ90
<i>D. jenkinsii</i> Wall. ex Lindl.		38	TK84
<i>D. jenkinsii</i> Wall. ex Lindl. (as <i>D. aggregatum</i> var. <i>jenkinsii</i> )		38	G85
<i>D. johanis</i> Rchb.f.	19		TK84
<i>D. johnsoniae</i> F.Muell.		38	G88
<i>D. jonesii</i> var. <i>jonesii</i> (as <i>D. fusiforme</i> )		38	TK84
<i>D. jonesii</i> var. <i>jonesii</i> . (as <i>D. ruppianum</i> )		38	G85, GJ90
<i>D. kauldorunii</i> T.M.Reeve		36	G85, G88
<i>D. kingianum</i> Bidw.		76	TK84
		ca. 76	TK84
<i>D. leucocyanum</i> T.M.Reeve		38	G88
<i>D. aff. leucohybos</i>		38	G88
<i>D. lichenastrum</i> (F.Muell.) Kraenzl.		38	G85
<i>D. linawianum</i> Rchb.f.		38, 40, 76	G88
<i>D. lindleyi</i> Steud.		38	G85, G88, GJ90
<i>D. lindleyi</i> Steud. (as <i>D. aggregatum</i> )	19	38	M73, TK84, GJ90
<i>D. lineale</i> Rolfe		38	G85
<i>D. lineale</i> Rolfe (as <i>D. grantii</i> )		38	M73
<i>D. lineale</i> Rolfe (as <i>D. veratrifolium</i> )		38	TK84
<i>D. linguella</i> Rchb.f.		38	M73, G85
<i>D. linguiforme</i> Sw.		38	G85, GJ90
		40	G84
<i>D. lituiflorum</i> Lindl.		38	M73, GJ90
<i>D. lodgesii</i> Rolfe		38	G85, G88
<i>D. longicalcaratum</i> Hayata		38	M74
<i>D. longicornu</i> Lindl.	19	38	G81, G85, GJ90
		43	G84
<i>D. lohohense</i> Tang & Wang		38	G88
<i>D. lyoni</i> Ames	20	40	G84
<i>D. macranthum</i> A.Rich.		38	G85
<i>D. macrophyllum</i> A.Rich.		38	G85, GJ90
		38 + 2f	G88
<i>D. macrophyllum</i> A.Rich. (as <i>D. musciferum</i> )		38, 38 + 3f	TK84
<i>D. macrophyllum</i> A.Rich. (as <i>D. polysema</i> )		38, 38 + B	G85, GJ03
<i>D. mannii</i> Ridl.		38	GJ90
<i>D. mayandyi</i> T.M.Reeve & Renz		36	G85
<i>D. microbulbon</i> Blatter & McCann	19	38	G84, GJ90
<i>D. microchilos</i> Dalzell		38	TK84
<i>D. mirbelianum</i> Gaudich.		38	M73, TK84
<i>D. mohlianum</i> Kraenzl.		38	G85, GJ03
<i>D. moniliforme</i> (L.) Sw.		ca.38	M73
		38	M73, G84, G85, G88
		38, 38 + 1-3f	TK84
<i>D. moniliforme</i> (L.) Sw. (as <i>D. monile</i> )		38	M73, GJ90
<i>D. monophyllum</i> F.Muell.		38	G85, GJ90

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. mooreanum</i> Lindl.		36	G88
<i>D. morrisonii</i> Schltr.		38	GJ03
<i>Dendrobium mortii</i> F.Muell.		38	G88
<i>D. moschatum</i> Sw.	19	38	M73, G81, G84, GJ90
<i>D. mutabile</i> (Blume) Lindl.		40	G85
<i>D. nanum</i> Hook.f. (as <i>D. mabelae</i> )		38	G84
<i>D. nebularum</i> Schltr.		38	G88
<i>D. nindii</i> W.Hill (as <i>D. toffii</i> )		38	TK84
<i>D. nobile</i> Lindl.	19	38	M77, TK84, G85, G88, GJ90, GJ06
		ca. 57	TK84
		38–40	TK84
		57	TK84
<i>D. nobile</i> Lindl. misc. cultivars		38, 57, 76	GJ03
<i>D. ochreatum</i> Lindl.		38	G85, G88, GJ90
<i>D. oreodoxa</i> Lindl.		38	G85
		40	G85
<i>D. ovatum</i> (Willd.) Kraenzl.		40	TK84
		38	GJ90
<i>D. palpebrae</i> Lindl.		40	TK84, GJ90
<i>D. parcum</i> Rchb.f. (as <i>D. parcooides</i> )	20		TK84
<i>D. papilio</i> Lohner		38	G85
<i>D. parishii</i> Rchb.f.		38	M73, G84, G88, GJ90
<i>D. parishii</i> Rchb.f. (as <i>D. rhodopterigium</i> )		38	G84
<i>D. patentilobum</i> Ames & Schweif.		38	G88
<i>D. pendulum</i> Roxb.		38	G85
<i>D. petiolatum</i> Schltr.		38	G88
<i>D. philippinensis</i> Ames		38	TK84
<i>D. pinifolium</i> Ridl.		40	G88
<i>D. platygastrium</i> Rchb.f.		40	G85, GJ90
<i>D. plicatile</i> Lindl.		38	G84
<i>D. polyanthum</i> Wall. ex Lindl. (as <i>D. cretaceum</i> )		38 ± 1f	TK84
<i>D. polyanthum</i> Wall. ex Lindl. (as <i>D. primulinum</i> )	19	38	M73, G88, GJ90, GJ94
<i>D. polyschistum</i> Schltr.		38	G88
<i>D. porphyrochilum</i> Lindl.	19		G81
<i>D. praecinctum</i> Rchb.f. (as <i>D. pauciflorum</i> )		38	G88, GJ90
<i>D. pseudoglomeratum</i> T.M.Reeve & J.J.Wood		38	G88
<i>D. pugioniforme</i> A.Cunn.		38	G85, GJ90, GJ96
<i>D. pulchellum</i> Roxb. ex Lindl.		40	M73
		38	TK84
<i>D. punamense</i> Schltr.		38	G85
<i>D. pygmaeum</i> Sm. (as <i>Ichthyostomum pygmaeum</i> )		38	D07
<i>D. ramosii</i> Ames		40	G84, GJ90
<i>D. regium</i> Prain		38	TK84
<i>D. revolutum</i> Lindl.		40	M73, G84
<i>D. rhytidotece</i> Schltr.		38	G88
<i>D. rhodostictum</i> F.Muell. & Kraenzl.		36	G85
<i>D. rigidum</i> Lindl.		38	G85, G88, GJ90
<i>D. ruckeri</i> Lindl. (as <i>D. ramosum</i> )		40	TK84
<i>D. ruginosum</i> Ames		36	G85
<i>D. salascense</i> (Blume) Lindl.		38	G85
<i>D. sanderæ</i> Rolfe	20	40	TK84, GJ90
<i>D. scabrilingue</i> Lindl.		38	M73, G84, GJ90
<i>D. schneideræ</i> F.M.Bailey		38	G88, GJ90
<i>D. schoeninum</i> Lindl. (as <i>D. beckeri</i> )		38	G85, GJ90
	19	38	G84
<i>D. schuetzei</i> Rolfe	20	40	TK84
<i>D. schulteri</i> J.J.Sm.		38	TK84
<i>D. secundum</i> (Blume) Lindl.	20	40	M73, TK84, G84, GJ90
<i>D. senile</i> Par. & Rchb.f.		38	M73, G88
<i>D. signatum</i> Rchb.f. (as <i>D. hildebrandtii</i> )		38, 38 + 1f	M73, TK84, G88
<i>D. smillie</i> F.Muell.		38	TK84, G88, GJ90
<i>D. smillie</i> F.Muell. (as <i>D. ophioglossum</i> )		38	G84

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. speciosum</i> Sm.		38	G85
<i>D. speciosum</i> Sm. (as <i>D. speciosum</i> var. <i>fusiforme</i> )		38	TK84
<i>D. speciosum</i> var. <i>hillii</i> Mast.		38	TK84
<i>D. spectabile</i> (Blume) Miq.		38	M73, G85
<i>D. sphenochilum</i> F.Muell. & Kraenzl. (as <i>D. confusum</i> )		38	G88
<i>D. spurium</i> (Blume) J.J.Sm.		40	TK84
<i>D. stuposum</i> Lindl.		40	G85, G88, GJ90
<i>Dendrobium stratiotes</i> Rchb.f.		38	M73, TK84
<i>D. strebloceras</i> Rchb.f.		38	M73
<i>D. striaenopsis</i> M.A.Clem. & D.L.Jones (as <i>D. phalaenopsis</i> var. <i>schroederianum</i> )	19	38	TK84
<i>D. striolatum</i> Rchb.f.		38	G85
<i>D. stuposum</i> Lindl.		40	GJ90
<i>D. subclausum</i> var. <i>phlox</i> (Schltr.) J.J.Wood (as <i>D. phlox</i> )		38	G85, G88, GJ90
<i>D. × suffusum</i> Cady		57	G85
<i>D. sulphureum</i> Schltr.		76	G85
<i>D. subulatum</i> (Blume) Lindl.		38	GJ90
<i>D. sulcatum</i> Lindl.		40	GJ90
<i>D. × superbiens</i> Rchb.f.	19	38	G81, TK84, GJ90
<i>D. sutepense</i> Rolfe ex Downie		38	M73, GJ90
<i>D. tangerinum</i> P.J.Cribb		38	G85
<i>D. taurinum</i> Lindl.		38	TK84
<i>D. tenuissimum</i> Rupp		38	G88
<i>D. teretifolium</i> R.Br.		76	G85
<i>D. teretifolium</i> var. <i>fasciculatum</i> Rupp		40	G84
<i>D. terminale</i> E.C.Parish & Rchb.f.		40	G88
		38	G84
<i>D. terrestre</i> J.J.Sm.		36	G85
<i>D. tetragonum</i> var. <i>giganteum</i> P.A.Gilbert		38	G88
<i>D. thyrsiflorum</i> Rchb.f. ex André	20	40	M73, TK84, G85, G88, GJ90
<i>D. tokai</i> Rchb.f.	19	38	TK84
<i>D. toressae</i> (F.M.Bailey) Dockrill		38	G85
<i>D. tortile</i> Lindl.		38	M73, G85, GJ90
<i>D. transparens</i> Wall. ex Lindl.	20	40	M73, TK84, GJ90
	19	38	G84, G85
<i>D. trigonopus</i> Rchb.f.		38	M73, TK84, G88
<i>D. undulatum</i> R.Br.	19	38	M73, TK84
<i>D. undulatum</i> var. <i>broonfieldii</i>	19		TK84
<i>D. unicum</i> Scidenf.		38	G85, G88
<i>D. uniflorum</i> Griff.		40	GJ90
<i>D. vagans</i> Schltr. (as <i>D. semanii</i> )		38	G85
<i>D. vannouhuysii</i> J.J.Sm.		38	G85
<i>D. ventricosum</i> Kraenzl.		38	TK84
		20	TK84
<i>D. venustum</i> Teijsm. & Binn. (as <i>D. ciliatum</i> )		40	GJ90
<i>D. verruciferum</i> Rchb.f.		41	GJ96
<i>D. vexillarius</i> J.J.Sm.		38	G85
<i>D. victoria-reginae</i> Loher		38	M73, G85
<i>D. violaceum</i> Kraenzl.		38	G85
<i>D. violaceum</i> Kraenzl. (as <i>D. quinquecostatum</i> )		38	G84, GJ90
<i>D. wardianum</i> R.Warner	19	38	G81, TK84, GJ90
		ca. 57	TK84
		40	TK84
<i>D. wassellii</i> S.T.Blake		38	G85, GJ90
<i>D. wightii</i> A.D.Hawkes & A.H.Heller (as <i>D. graminifolium</i> )		38	TK84
<i>D. williamsianum</i> Rchb.f.		38	G88, GJ90
<i>D. williamsonii</i> Day & Rchb.f.		57	G81, GJ90
		38	G85
<i>D. woodsii</i> P.J.Cribb		36	G85
<i>Dendrobium</i> sp.		40	G81
<i>Dendrobium</i> sp.		38	G81
<i>Dendrobium</i> sp.		40	G85
<i>Dendrobium</i> spp.		40, 42	GJ90
<i>Diplocaulobium aratriferum</i> (J.J.Sm.) P.F.Hunt & Summerh.		38	G88

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. chrysotropis</i> (Schltr.) A.D.Hawkes		38	G88
<i>D. chrysotropis</i> (Schltr.) A.D.Hawkes (as <i>Dendrobium chrysotropis</i> )		38	TK84
<i>D. aff. fariniferum</i> (Schltr.) Carr		38	G88
<i>D. hydrophilum</i> (J.J.Sm.) Kraenzl.		38	G88
<i>D. mekynosepalum</i> (Schltr.) Kraenzl.		38	G88
<i>Epigeneium amplum</i> (Lindl.) Summerh.	20		G81
<i>E. fuscescens</i> (Griff.) Summerh. (as <i>Dendrobium fuscescens</i> )		40	G88, GJ90
<i>E. nakaharai</i> (Schltr.) Summerh. (as <i>D. nakaharai</i> )		40	G85, GJ90
<i>Epigeneium nakaharai</i> (Schltr.) Summerh. (as <i>D. sanseiense</i> )		40	G84
<i>E. rotundatum</i> (Lindl.) Summerh. (as <i>D. rotundatum</i> )	20	40	M73, G88, GJ90
<i>Flickingeria comata</i> (Blume) A.D.Hawkes (as <i>Dendrobium fimbriatolabellum</i> )		18	TK84
<i>F. macraei</i> (Lindl.) Seidenf. (as <i>Dendrobium macraei</i> )	19	38	M73, G81, GJ90
<i>F. scopae</i> (Lindl.) Brieger (as <i>D. scopae</i> )		38	GJ90
<i>Genyorchis pumila</i> (Sw.) Schltr.		38	G85
<i>Saccoglossum verrucosum</i> L.O.Williams		ca. 40	G88
<i>Trias stocksii</i> Benth. ex Hook.		38	TK84
<b>Subtribe Collabiinae</b>			
<i>Acanthephippium bicolor</i> Lindl.	24 II	48	G84
<i>A. pictum</i> Fukuy		48	G85
<i>A. striatum</i> Lindl.		48	G84, G85
<i>A. striatum</i> Lindl. (as <i>A. sinense</i> )		42	GJ96
<i>A. splendidum</i> J.J.Sm.		46	GJ06
<i>A. sylhetense</i> Lindl.		48	G85
<i>Acanthephippium</i> sp.		48	G84
<i>Calanthe actinomorpha</i> Fukuy.		40, 38	G85
<i>C. alismifolia</i> Lindl.	22	44	M73, G81
	20		G81
<i>C. alismifolia</i> Lindl. (as <i>C. fauriei</i> )		40	TK84
<i>C. alismifolia</i> Lindl. (as <i>C. japonica</i> )		40	G84, TK84, G85
<i>C. alismifolia</i> Lindl. (as <i>C. okinawaensis</i> )		40	G84
<i>C. alpina</i> Hook.f. ex Lindl.	20		M73
<i>C. alpina</i> Hook.f. ex Lindl. (as <i>C. schlechteri</i> )		42	G84
<i>C. arcuata</i> Rolfe (as <i>C. caudatilabella</i> )		40	G85
		38	GJ94
<i>C. argenteostriata</i> C.Z.Tang & S.J.Cheng		45	GJ94
<i>C. arisanensis</i> Hayata		40	G85, GJ94
<i>C. aristulifera</i> Rchb.f.		40	TK84, G84, GJ94
<i>C. aristulifera</i> Rchb.f. (as <i>C. elliptica</i> )		40	G85
<i>C. aurantiaca</i> Ridl.		40	G84, G88
<i>C. biloba</i> Lindl.	40		M73, TK84
		38	M73, G81
<i>C. brevicornu</i> Lindl.	20		M73
<i>C. cardioglossa</i> Schltr.		ca. 44	TK84
		46	GJ94
<i>C. chevallieri</i> Gagnep.	20		TK84
<i>C. chloroleuca</i> Lindl.	20	40	G81, G88
<i>C. clavata</i> Lindl.	20	40	M77, G85, GJ94
<i>C. coreana</i> Nakai		40	GJ91
<i>C. conspicua</i> Lindl.		40	GJ94
<i>C. cremeoviridis</i> J.J.Wood		46	GJ94
<i>C. davidii</i> Franch. (as <i>C. bungoana</i> )		42	G84
<i>C. davidii</i> Franch. (as <i>C. matsudae</i> )		40	G85, GJ94
<i>C. densiflora</i> Lindl.	20	40	G84, G85, GJ94
<i>C. discolor</i> Lindl.		40	M73, G84, G88, GJ91,
			GJ96
<i>C. discolor</i> Lindl. (as <i>C. discolor</i> var. <i>kanashiroi</i> ).		40	G84, TK84
<i>C. graciliflora</i> Hayata		40	G85, GJ94
<i>C. graciliflora</i> Hayata (as <i>C. hamata</i> )		40	G88, GJ94
<i>C. hancockii</i> Rolfe		40	GJ94
<i>C. hattorii</i> Schltr.		40	G81, G84
<i>C. hennisii</i> Loher		42	GJ94
<i>C. herbacea</i> Lindl.		40 + 0–2B	M73G81, GJ94
	21	42	G81, GJ94
<i>C. hirsuta</i> Seidenf.		46	GJ94

Appendix 1. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>C. izu-insularis</i> (Satomi) Ohwi & Satomi		40	G84
<i>C. lyroglossa</i> Rehb.f.		40	G84, G85, GJ94
<i>C. lyroglossa</i> Rehb.f. (as <i>C. foertermannii</i> )		40	TK84
<i>C. lyroglossa</i> Rehb.f. (as <i>C. liukuensis</i> )		40	M73
<i>C. mannii</i> Hook.f.	20	40	M77, G81, G84, G88
<i>C. musca</i> (D.Don) Lindl.		40	G84
<i>C. nipponica</i> Makino		38	G84
<i>C. oblanceolata</i> Owi & T.Koyama		40	G84
<i>C. plantaginea</i> Lindl.		40	M73, GJ94
<i>C. puberula</i> Lindl.	20	40 + 0–1B	G81, G88, GJ94
<i>C. puberula</i> Lindl. (as <i>C. reflexa</i> )		40	M73, G84, G85, GJ90, GJ94,
<i>C. pulchra</i> (Blume) Lindl.		40	G84, G88
<i>Calanthe rosea</i> (Lindl.) Benth.		44	GJ94
<i>C. rubens</i> Ridl.		40 + 0–2B	G84, G88, GJ94
<i>C. rubens</i> Ridl., (as <i>C. elmeri</i> )		44	GJ94
<i>C. speciosa</i> (Blume) Lindl. (as <i>C. formosana</i> )		40	G85, GJ94
<i>C. speciosa</i> (Blume) Lindl. (as <i>C. yushuni</i> )		20	M74
<i>C. striata</i> R.Br.	20	40	M77
<i>C. striata</i> R.Br. (as <i>C. striata</i> var. <i>sieboldii</i> )		40	G85
<i>C. striata</i> R.Br. ex Lindl. (as <i>C. bicolor</i> )		40	G84
<i>C. striata</i> R.Br. ex Lindl. (as <i>C. sieboldii</i> )		40	G84, GJ90, GJ94
<i>C. succedanea</i> Gagnep.		44	GJ94
<i>C. sylvatica</i> (Thouars) Lindl.		40	GJ94
<i>C. sylvatica</i> (Thouars) Lindl. (as <i>C. longicalcarata</i> )		40	G85
<i>C. sylvatica</i> (Thouars) Lindl. (as <i>C. masuca</i> )	20	40	M73, GJ94
<i>C. tricarinata</i> Lindl.	20	40	M73, G85 GJ94
		40, 60	TK84
<i>C. triplicata</i> (Willemet) Ames		40	G84, G85, G88, GJ94
<i>C. triplicata</i> (Willemet) Ames (as <i>C. triplicata</i> var. <i>anraecifolia</i> )		40	GJ96
<i>C. triplicata</i> (Willemet) Ames (as <i>C. furcata</i> )		40	M73
<i>C. triplicata</i> (Willemet) Ames (as <i>C. veratrifolia</i> )		40 + 0–2B	TK84, G84, G88
<i>C. trulliformis</i> King & Pantl.,	20		M73
<i>C. ventilabrum</i> Rehb.f. (as <i>C. langei</i> )		40	GJ96
<i>C. vestita</i> Wall. ex Lindl.	20		TK84
	21	42	GJ94
<i>Calanthe</i> sp.	20		M73
<i>Calanthe</i> sp.		40	TK84
<i>Cephalantheropsis calanthoides</i> (Ames) T.S.Liu & H.J.Su (as <i>C. koshunensis</i> )		40	GJ94
<i>C. obcordata</i> (Lindl.) Ormerod (as <i>C. gracilis</i> )	20	40	M73, G88, GJ94
<i>C. obcordata</i> (Lindl.) Ormerod (as <i>Calanthe venusta</i> )		40	TK84
<i>C. obcordata</i> (Lindl.) Ormerod (as <i>Phaius gracilis</i> )		42	G85
<i>Chrysoglossum ornatum</i> Blume		36	GJ91
<i>Gastrorchis francoisii</i> Schltr.		40	GJ06
<i>G. humblotii</i> (Rehb.f.) Schltr.		40	GJ06
<i>G. humblotii humblotii</i> var. <i>schlechteri</i> (H.Perrier) Senghas ex Bosser & P.J.Cribb		40	GJ06
<i>G. lutea</i> (Ursch & Toill.-Gen. ex Bosser) Senghas		40	GJ06
<i>G. tuberculosa</i> (Thouars) Schltr.		40	GJ06
<i>Nephelaphyllum cordifolium</i> (Lindl.) Blume		36 + 3–7B	G81
<i>Pachystoma pubescens</i> Blume (as <i>Pachystoma senile</i> )	20	40	G81, G88, GJ94
<i>Phaius elatus</i>		42	TK84
<i>P. flavus</i> (Blume) Lindl.		42	G85, GJ90, GJ96
<i>P. flavus</i> (Blume) Lindl. (as <i>P. maculatus</i> )	21		G81
<i>P. flavus</i> (Blume) Lindl. (as <i>P. minor</i> )			
<i>P. flavus</i> (Blume) Lindl. (as <i>P. minor</i> f. <i>punctatum</i> )		44	TK84
<i>P. luridus</i> Thwaites		44	GJ90
<i>P. mannii</i> Rehb.f.		28	G84
<i>P. mindorensis</i> Ames		42	TK84
<i>P. mishmensis</i> (Lindl. & Paxton) Rehb.f.		42	G81
	22 + 2f		G88
<i>P. mishmensis</i> (Lindl. & Paxton) Rehb.f. (as <i>P. gracilis</i> )		42	G85
<i>P. pulchellus</i> Kraenzl.		40	GJ06
<i>P. pulchellus</i> var. <i>sandrangatensis</i> Bosser		40	GJ06

## Appendix 1. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>P. tankervilleae</i> (Aiton) Blume	23	42	G81
		48	G85
			G84, G88
	22 + 2B		GJ90
		38	GJ90, GJ96
<i>P. tankervilleae</i> (Aiton) Blume (as <i>P. grandifolius</i> )		38	M73
<i>P. wallichii</i> Lindl.		48	M73
	21		M73
<i>Phaius</i> sp.		38	GJ90
<i>Phaius</i> sp.		38	GJ96
<i>Plocoglottis javanica</i> Blume		38	G84, G88
<i>P. lowii</i> Rchb.f.		38	G84
<i>Spathoglottis affinis</i> de Vries		40	G84
<i>S. aurea</i> Lindl. (as <i>S. microchilina</i> )		40	G84, G88, GJ96
<i>S. pacifica</i> Rchb.f.		40	GJ06
<i>S. paulinae</i> F.Muell. (as <i>S. rivularis</i> )		40	G88
<i>S. petri</i> Rchb.f.		40	GJ06
<i>S. plicata</i> Blume	20	40	TK84, G84 G88
<i>S. plicata</i> Blume (as <i>S. spicata</i> )		40	G85
<i>S. pubescences</i> Lindl.		36	M77
	19		TK84
<i>S. unguiculata</i> (Labill.) Rchb.f.		40	GJ06
<i>Tainia bicornis</i> Benth.	15 + 1–3B		G88
<i>T. latifolia</i> Benth.		40	G81
		32	G84
<i>T. latifolia</i> (Lindl.) Rchb.f. (as <i>T. khasiana</i> )		32	G84
<i>T. laxiflora</i> Makino		36 + 0–9B	TK84
<i>T. minor</i> Hook.f.	20	40	G85
<i>T. penangiana</i> Hook.f.		ca. 72	TK84
<i>T. penangiana</i> Hook.f. (as <i>T. hookeriana</i> )		40	G84, GJ91, G96
<i>T. viridifusca</i> (Hook.) Benth. ex Hook.f.	20		G81
<i>Tainia</i> spp.		32, 40	G84
<i>Tainia</i> sp. (as <i>Ania</i> sp.)		76	GJ96

F69 = Fedorov, 1969; M73 = Moore, 1973; M74 = Moore, 1974; M77 = Moore, 1977; G81 = Goldblatt, 1981; TK84 = Tanaka and Kamemoto, 1984; G84 = Goldblatt, 1984; G85 = Goldblatt, 1985; G88 = Goldblatt, 1988; GJ90 = Goldblatt and Johnson, 1990; GJ91 = Goldblatt and Johnson, 1991; GJ94 = Goldblatt and Johnson, 1994; GJ96 = Goldblatt and Johnson, 1996; Goldblatt and Johnson, 2000; Goldblatt and Johnson, 2003; Goldblatt and Johnson, 2006; FG98 = Felix and Guerra, 1998; DA09 = Davinha *et al.* (2009); PI09 = Pinheiro *et al.* (2009); D07 = Dawson *et al.* (2007); PW = Present work.



**Appendix 2.** Species with chromosome numbers uncertain or unimportant to evolutionary interpretation of the group. Abbreviation according to Table 1.

TAXON	<i>n</i>	<i>2n</i>	Source
<i>Acampe papillosa</i> (L.) Lindl. <sup>1</sup>	36		G88
<i>A. papillosa</i> (L.) Lindl. <sup>1</sup>	18	36	G81, GJ94
	18, 19		TK84
<i>Aerangis compta</i> Summ. <sup>2</sup>		51	M73
<i>A. hitchongii</i> <sup>9</sup>		40	TK84
<i>Aerides multiflorus</i> Roxb. <sup>3</sup>		40 (22)	TK84
<i>A. odoratum</i> Lour. <sup>1</sup>	18	36	G84, GJ94
	20	40	TK84
<i>A. suavissima</i> Lindl. <sup>1,4</sup>		ca. 38	M73
<i>Anthogonium gracile</i> Lindl. <sup>1</sup>	27		M73
<i>Arundina bambusifolia</i> Lindl. <sup>1</sup>	21		G81
<i>A. graminifolia</i> (Don) Hochr. <sup>1</sup>		32	TK84
		42	TK84
<i>Bletilla formosana</i> (Hay.) Schltr. <sup>6</sup>		16	M74
<i>B. striata</i> (Thumb.) Rehb.f. <sup>4</sup>		ca. 38	M73
<i>Bulbophyllum cylindraceum</i> Lindl.		42	G84
<i>B. distans</i> Lindl. <sup>2</sup>		57	M73
<i>B. leopardinum</i> Lindl. <sup>1</sup>	18		G81
<i>B. lobbi</i> Lindl. <sup>1,2</sup>		38–42	TK84
<i>B. mastersianum</i> J.J.Smith (as <i>C. mastersianum</i> ) <sup>3</sup>		38–40	TK84
<i>B. odoratissimum</i> (Sm.) Lindl. <sup>1</sup>	29		G81
<i>B. oreonastes</i> Rehb.f. <sup>1</sup>		80	M73
<i>B. patens</i> King <sup>2</sup>		57	G85
<i>B. reptans</i> Lindl. <sup>1</sup>		42	G81, GJ90
<i>B. vagans</i> Ames & Rolfe <sup>2</sup>		95	G85
<i>B. wendlandianum</i> (Kraenzl.) U.Dammer <sup>2</sup>		57	G88
<i>Calanthe argenteo-striata</i> C.Z.Tang & S.J.Cheng <sup>2</sup>		45	GJ94
<i>C. brevicornu</i> Lindl. <sup>1,3</sup>	24		M73, GJ94
		38(57)	TK84
<i>C. brevicorum</i> <sup>9</sup>	24		G81
<i>C. chloroleuca</i> Lindl. <sup>1</sup>		28	M73, G81
<i>C. discolor</i> var. <i>amaniana</i> (Fukuyama)			
Nasamune <sup>5</sup>		60	G84
<i>C. longicalcarata</i> Hay. <sup>6</sup>		20	M74
<i>C. masuca</i> Lindl. <sup>1</sup>		52	M73
	21		G81
<i>C. matsudai</i> Hayata <sup>1</sup>		44	G85
<i>C. puberula</i> Lindl. <sup>1</sup>		42	G81
<i>C. reflexa</i> Maxim. <sup>1</sup>		42	G85
<i>C. tricarinata</i> Lindl. <sup>1,5</sup>		42	M73
		60	TK84
<i>C. triplicata</i> (Willemet) Ames <sup>6</sup>		20	G85
<i>Calanthe</i> sp.		20	M74
<i>Calanthe</i> sp. (Thailand) <sup>9</sup>		58	TK84
<i>Cattleya bicolor</i> Lindl. var. <i>measuresiana</i> <sup>5</sup>		80	TK84
<i>C. forbesii</i> Lindl. <sup>3</sup>		54–60	TK84
<i>C. intermedia</i> Grah. <sup>1,3</sup>		46, 55, 76	GJ96
<i>C. intermedia</i> var. <i>alba</i> <sup>7</sup>		41 + 1f	TK84
<i>C. labiata</i> Lindl. <sup>1</sup>		42	TK84
<i>C. labiata</i> var. <i>amesiana</i> <sup>3</sup>	20, 21	40, 41	TK84
<i>Cattleya</i> sp. <sup>1,3</sup>		46, 56, 76	GJ91
<i>Cephalanthera damasonium</i> (Mill.) Druce <sup>1</sup>		54	G85
		32	TK84

## Appendix 2. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>C. longibracteata</i> Blume <sup>3</sup>		30, 42	TG84, G88
<i>C. longifolia</i> (L.) Fritsch <sup>3</sup>		16–34 + 2B, 33	G84, G88
<i>C. rubra</i> (L.) Rich. <sup>1</sup>	24	48	TK84, G91
<i>Cleisostoma micranthum</i> (como <i>Sarcanthus micranthus</i> ) <sup>1</sup>		36	M74
<i>C. pallida</i> (como <i>S. palidus</i> Lindl.) <sup>1</sup>	16		TK84
<i>Coelogyne corymbosa</i> Lindl. <sup>1</sup>		38	G84
<i>C. elata</i> Lindl. <sup>1</sup>		43	M73
	22	44	G81
		44	G81
<i>C. micranthum</i> Lindl. <sup>1</sup>		76	M77
<i>Cyrtochis arcuata</i> subsp. <i>variabilis</i> Summ. <sup>5</sup>		138	G85
<i>Cryptopus elatus</i> (Thouars) Lindl.		95	M73
<i>Dendrobium agregatum</i> Roxb. <sup>3</sup>		32–35	TK84
<i>D. amoenum</i> Wall. <sup>5</sup>		80	GJ90
<i>D. anceps</i> Sw. <sup>1</sup>	18 + 0–6B		GJ90
<i>D. aphyllum</i> (Roxb.) Fischer <sup>1</sup>		40	G88
<i>D. bicameratum</i> Lindl. <sup>1</sup>		40	M73, GJ90
<i>D. brymerianum</i> Rehb. f. <sup>1</sup>		40	TK84, G88
<i>D. candidum</i> Wall. <sup>5</sup>		57	G88
<i>D. chrysanthum</i> Wall. <sup>5</sup>		76	G88
<i>D. chrysotoxum</i> Lindl.	20	40	TK84
<i>D. crumenatum</i> Sw. <sup>1</sup>		40	TK84
<i>D. densiflorum</i> Lindl. <sup>1</sup>		42	GJ90
<i>D. delicatum</i> Bailey <sup>5</sup>		ca. 57	TK84
<i>D. dicuphum</i> F. Muell. <sup>2</sup>		39	G84, GJ90
<i>D. digibum</i> var. <i>compactum</i> C.T. White <sup>3,5</sup>		ca. 57	TK84
<i>D. distichum</i> Rehb. f. <sup>5</sup>		57	TK84, G84
<i>D. dixanthum</i> Rehb. f. <sup>2</sup>		41	TK84
<i>D. fimbriatum</i> Hook. <sup>1</sup>	18		GJ90
<i>D. fimbriatum</i> var. <i>oculatum</i> <sup>1,2</sup>		43	G88
<i>D. gibsoni</i> Lindl. <sup>1</sup>		40	G85
<i>D. hercoglossum</i> Rehb.f. <sup>5,1</sup>		57	G88
		36	G81
<i>D. kingianum</i> Bidw. <sup>4</sup>	20	ca.57, 74, 112–114	TK84
<i>C. bowringiana</i> Weitch ex Gardn. <sup>1,5</sup>	21	41	TK84
		42	TK84
		60	TK84
<i>D. kingianum</i> var. <i>album</i> <sup>4</sup>		ca.57, ca. 76	TK84
<i>D. leonis</i> Rehb.f. <sup>1</sup>		40	M73
<i>D. lodgesii</i> Rolfe <sup>1</sup>		40	TK84
<i>D. longicornu</i> Lindl. <sup>2</sup>		43	G84
<i>D. longispicatum</i> <sup>9</sup>		38	TK84
<i>D. macrostachyum</i> Lindl. <sup>1</sup>	20		M73
<i>D. moschatum</i> Sw. <sup>1,2</sup>		39	M73
<i>D. nagasaki</i> <sup>9</sup>		38	G84
<i>D. nakaharaei</i> Schltr. <sup>1</sup>		30	M74
<i>D. nobile</i> Lindl. <sup>1</sup>		40	G85
<i>D. nobile</i> var. <i>nobilius</i> <sup>4,5</sup>		ca. 57	TK84
<i>D. nobile</i> var. <i>virginale</i> <sup>5</sup>		57	TK84

Appendix 2. *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>D. parishii</i> Rchb.f. <sup>1,5</sup>		40	G81
		76	GJ90
<i>D. phlox</i> var. <i>flava</i> <sup>9</sup>		38	G84
<i>D. pierardii</i> Roxb. <sup>1,3</sup>		40	G81
	19–20	38, 57	TK84
<i>D. primulinum</i> Lindl. <sup>1,5</sup>		40	G81
		57	G81, GJ90
<i>D. pitcherianum</i> Rchb.f. <sup>9</sup>		38	G85
<i>D. sawianum</i> Lindl. <sup>9</sup>		38	M77
<i>D. senile</i> Par. & Rchb.f. <sup>1</sup>		40	G84
<i>D. sophronites</i> Schltr. <sup>4,5</sup>		ca. 80	TK84
<i>D. suffusum</i> Cady <sup>5</sup>		57	G85
<i>D. toressae</i> (Bailey) Dockr. <sup>4</sup>		ca. 36	G88
<i>D. transparens</i> Wall. <sup>1</sup>		(30)	TK84
<i>D. ventricosum</i> Kraenzl. <sup>1</sup>		20	TK84
<i>D. verruciferum</i> Rchb.f. <sup>2</sup>		41	GJ96
<i>D. wardianum</i> Warm. <sup>1</sup>	20	40	G85
<i>D. wardianum</i> var. <i>album</i> <sup>4,5</sup>		ca. 57	TK84
<i>D. williamsonii</i> Day & Reich. <sup>5</sup>		57	GJ90
<i>Doritis taenialis</i> Benth. <sup>1,5</sup>	19	57	G88, GJ94
<i>Epidendrum atropurpureum</i> Willd. <sup>3,5</sup>		80–90	TK84
<i>E. difforme</i> Jacq. (= <i>Neolehmannia difforme</i> ) <sup>3</sup>		39–40	TK84
<i>E. nocturnum</i> Jacq. <sup>3,4</sup>		45–85, ca. 80	TK84
<i>E. nocturnum</i> var. <i>guadetouense</i> <sup>3</sup>		42–48	TK84
<i>E. radicans</i> Pav. <sup>3</sup>		48–57	TK85
		57, 62	GJ91, GJ96
	19		M73
		40, 70	TK84
<i>Eria acervata</i> Lindl. <sup>1</sup>	20		G81
<i>E. alba</i> L. <sup>1</sup>		34	M77
<i>E. biflora</i> Griff. <sup>1</sup>		46	G88
<i>E. coronaria</i> Rchb.f. <sup>3</sup>	17, 19, 22, 26		G84
<i>E. dalzellii</i> Lindl. <sup>1</sup>		24 + 5–7B	TK84
		24 + 10B	G84
		24 + 5B	G84
<i>E. microchilos</i> Lindl. <sup>1</sup>		24 + 5–11B	TK84, G84
<i>E. graminifolia</i> Lindl. <sup>1</sup>		42	G88
<i>E. noodiana</i> <sup>9</sup>		44	TK84
<i>E. ovata</i> Lindl. <sup>1</sup>		44	TK84
<i>E. pannea</i> Lindl. <sup>1</sup>	18		M73
<i>E. spicata</i> (D. Don) Hand-Mazz. <sup>1</sup>		20 + 2B	G88
<i>Holcoglossum junceum</i> Tsi <sup>5</sup>		57	GJ96
<i>Laelia peduncularis</i> Lindl. <sup>1</sup>		40–44	TK84
<i>Listera cordata</i> (L.) R.Br. <sup>3</sup>		39–42, 44	G85
<i>Listera ovata</i> (L.) R.Br. <sup>3,4</sup>		34–36	G85, GJ91
		ca. 38	GJ00
	16	17, 20, 32, 35,	TK84, G85, G88
		37, 39, 40,	
		42, 44	
<i>Luisia teres</i> Blume (= <i>L. teretifolia</i> ) <sup>1</sup>	21		TK84
<i>L. trichorhiza</i> Blume <sup>1</sup>	20		M73
<i>Mediocalcar</i> aff. <i>pygmaeum</i> Schltr. <sup>5</sup>		85	G88

## Appendix 2. Continued

TAXON	<i>n</i>	<i>2n</i>	Source
<i>Microcoelia caespitosa</i> (Rolfe) Summ. <sup>2</sup>		47	G84
<i>Neotia listeroides</i> Lindl. <sup>1,3</sup>		36, 46	TK84
<i>N. nidus-avis</i> (L.) Rich. <sup>1</sup>	16		TK84
		60	gj90
<i>N. nigra</i> (L.) Rchb.f. <sup>5</sup>		60	GJ94
<i>Nephelaphyllum cordifolium</i> Lindl. <sup>1</sup>		36 + 4–10B	G81
		18 + 4–10B	G84
	18 + 3–8B		GJ90
<i>Ornithochilus fuscus</i> Wall. <sup>1</sup>		(36)	TK84
<i>Phaius albus</i> Lindl.		44	M73
<i>P. mishmensis</i> Rchb.f. <sup>1,4</sup>	31		M73
		ca. 50	G81
<i>Phalaenopsis amabilis</i> Blume <sup>5,2</sup>		114	TK84
		69 + 3f	TK84
<i>P. schilleriana</i> Rchb.f. <sup>5</sup>		76	TK84
<i>Pholidota bicolor</i> Lindl. <sup>9</sup>		44	G85
<i>P. calcarata</i> Rchb.f. <sup>9</sup>	21		M77
<i>P. yunnanensis</i> (Rolfe) Rolfe		120	M73
<i>Pleione bulbocodioides</i> (Franch.) Rolfe <sup>5</sup>		120	GJ91
<i>P. forrestii</i> Schltr. <sup>1,2</sup>		38, 39, 42, 44	GJ91, GJ96
<i>P. humilis</i> Lindl. <sup>5</sup>		60	GJ91
<i>P. praecox</i> var. <i>wallichiana</i> <sup>9</sup>		40	M73
<i>P. versailles</i> <sup>9</sup>		80	M73
<i>Polystachya cultriformis</i> Lindl. <sup>1,2</sup>		38, 39	TK84
<i>P. galeata</i> (Sw.) Rchb.f. <sup>4</sup>		ca. 40	TK84
<i>P. rhodoptera</i> Rchb.f. <sup>1</sup>	19		TK84
<i>Renanthera coccinea</i> Lour. <sup>5,2</sup>	54 + 1	ca. 114, 115	M73, TK84, GJ96
<i>Saccolabium calceolare</i> Lindl. <sup>3,1,2,6</sup>		19–20	TK84
<i>S. papilosum</i> Lindl. <sup>1,2,6</sup>		19	G85
<i>S. japonicus</i> Miq.		36	TK84
<i>Sarcanthus crinaceus</i> <sup>9</sup>		38	M73
<i>Spatoglottis plicata</i> Blume <sup>1,6,5</sup>		18	M74
		60	G84
<i>Taeniophyllum aphyllum</i> Makino <sup>1</sup>		24	TK84
<i>Tainia</i> spp. <sup>8</sup>		32, 40	G84
<i>Thunia alba</i> Rchb.f. <sup>1,4</sup>		42	M73
		44	G81
		36	G81
<i>Tunia alba</i> Rchb.f. <sup>1,4</sup>		ca. 40	G81
		ca. 40	G85
		38	G88
<i>T. marshaliana</i> Rchb.f. <sup>4</sup>		ca. 40	G81
<i>Vanda alpina</i> Lindl. <sup>1</sup>	10		M73
<i>V. coerulea</i> Griffith <sup>1</sup>		(36)	TK84
<i>V. coerulescens</i> Griff. <sup>1</sup>		40	G85
<i>V. cristata</i> Lindl. <sup>1</sup>		(36)	TK84
<i>V. densiflora</i> Lindl. <sup>1</sup>		36(42)	TK84
<i>V. luzonica</i> Loher ex Rolfe <sup>1</sup>		42	TK84
<i>V. parviflora</i> Lindl. <sup>1,4</sup>		ca. 40	M73
<i>V. pumila</i> Hook.f. <sup>1,5</sup>		40	G85
		72, 76	GJ91, GJ96
<i>V. polyantha</i> (W.W.Sm.) Tang & Wang <sup>9</sup>		38	GJ91, GJ96
<i>V. roxburghii</i> R.Br. <sup>1</sup>		(42)	TK84

**Appendix 2.** *Continued*

TAXON	<i>n</i>	<i>2n</i>	Source
<i>V. spatulata</i> Spreng. <sup>5</sup>		114 114, 115	TK84, G88 TK84
<i>V. suavis</i> Lindl. <sup>9</sup>		38	TK84
<i>V. teres</i> Lindl. <sup>1</sup>		(36)	TK84
<i>V. tricolor</i> Lindl. <sup>1,4</sup>		ca. 16 ca. 18, ca. 20 28	TK84 TK84 TK84
<i>V. tricolor</i> var. <i>suavis</i> <sup>1,4</sup>	ca. 16 ca. 18		TK84 TK84
<i>Vanda</i> sp. <sup>5</sup>		57	GJ96

- 1 Chromosome number clearly conflicting with previous counts to the species or the genus;
- 2 Odd diploid numbers;
- 3 Poorly defined count;
- 4 Imprecise counts (ca.) substituted by another more precise record;
- 5 Occasional polyploids in this species;
- 6 Apparently haploid number;
- 7 Occasional aneuploids;
- 8 Different chromosome numbers reported for several undetermined species.
- 9 Misidentification.