NOTES

CHROMOSOME NUMBERS OF NEW CALEDONIAN PLANTS

Chromosome numbers of 26 collections that represent first reports for 23 species embracing 17 families of New Caledonian flowering plants are presented and discussed. Chromosome numbers are documented for the first time in the genera *Adenodaphne* (n = 12), *Agatea* (n = 8), *Dubouzetia* (n = ca. 90), *Kibariopsis* (n = 19), *Montrouziera* (n = ca. 29), *Oncotheca* (n = 25), *Phelline* (n = 17), and *Sphenostemon* (n = ca. 26). Two of these represent the first reports for Oncothecaceae and Sphenostemonaceae. Numbers not previously reported are established in *Belliolum* (n = ca. 43), *Garcinia* (n = 33), *Grevillea* (n = ca. 22), and *Zygogynum* (n = ca. 43).

Although the flora of New Caledonia is one of great potential value in the interpretation of phytogeographic and phylogenetic relationships, few species are cytologically known. In an effort to contribute to a better understanding of these relationships, the Missouri Botanical Garden included as part of its 5-year-long field program on the island the collection of flower buds for cytological study. The purpose of this paper is to present and discuss the 26 chromosome counts that these collections have yielded so far.

Materials and Methods

Floral buds for study were preserved and stored in modified Carnoy's fixative (6 chloroform : 3 absolute ethanol : 1 glacial acetic acid; v:v:v). Meiotic, and in two cases, mitotic chromosome determinations were made from anther material macerated in acetocarmine. Hoyer's solution (Beeks, 1955) was added to the preparations in order to increase quality and durability. The indexes of chromosome numbers that were consulted for interpretive and comparative data include Fedorov (1974), Goldblatt (1981, 1984), and Moore (1973, 1974, 1977). The sequence of families in the list follows Cronquist (1981). All collection numbers (Table 1) are G. McPherson's. Voucher specimens are deposited at MO.

Results

The results are presented in Table 1. Where there was some question about the cytological determination due to small size of chromosomes, high numbers, inadequate fixation, or stickiness, the number reported is listed as approximate (prefaced with ca.). These are the reports in greatest need of additional confirmation. There were no clear indications of meiotic abnormalities in any of the material studied.

Discussion

Winteraceae. The report here of n = ca. 43 (Table 1) for *Belliolum crassifolium* is the second for this species and differs from the earlier record of n = ca. 86 (Ehrendorfer et al., 1968). Our determination of n = ca. 43 for *Zygogynum pomiferum* subsp. *balansae* is also a lower ploidy level than previously known in this New Caledonian endemic genus. The only other report available is n = 86 for *Z. baillonii* V. Tiegh. (Ehrendorfer et al., 1968).

Monimiaceae. *Hedycarya parvifolia* has n = 19 (Table 1), a number that has also been reported in two other species of the genus (Ehrendorfer et al., 1968). Hair and Beuzenberg (1959) have recorded n = 57 in a third species of *Hedycarya*. The report here of n = 19 for *Kibariopsis caledonica* is the first for this endemic New Caledonian genus. This number has now been established in at least five genera of Monimiaceae.

Lauraceae. The count here of n = 12 for *Adenodaphne uniflora* apparently represents the first report for this genus. The same number characterizes many genera of the family.

Chloranthaceae. The report here of n = ca. 14 for *Ascarina rubricaulis* agrees with an earlier one of $2n$ = 28 (Ehrendorfer et al., 1968). This number is also known in *Chloranthus* (Sugiura, 1931).

Fagaceae. The count of n = 13 for *Nothofagus discoidea* (Table 1) is the same as that found in all seven species of the genus already investigated (Armstrong & Wylie, 1965; Ono, 1977). Other genera in Fagaceae reportedly have n = 11, 12, and 24.

Oncothecaceae. The report of n = 25 for *Oncotheca balansae* (Table 1) is the first for this endemic New Caledonian family. At diakinesis ring pairs of chromosomes ranged from about 1.5–2 μm in diameter while rod pairs ranged from about 2–3.3 μm in length. The inclusion of On-

TABLE 1. Chromosome numbers of New Caledonian plants.

Taxon	*N*	2*n*	Collection data
Winteraceae			
Belliolum crassifolium (Baillon) van Tieghem	ca. 43		Thy Valley, *1852*
Zygogynum pomiferum Baillon subsp. *balansae* (van Tieghem) Vink[a]	ca. 43		Mt. Dzumac, *3880*
Monimiaceae			
Hedycarya parvifolia Perk. & Schltr.[a]	19		Mt. Do, *2000*
Kibariopsis caledonica (Guillaumin) Jérémie[b]	19		Mandjélia, *2546*
Lauraceae			
Adenodaphne uniflora (Guillaumin) Kostermans[b]	12		Yaté Dam, *3886*
Chloranthaceae			
Ascarina rubricaulis Solms	ca. 14		Plaine des Lacs, *4612*
Fagaceae			
Nothofagus discoidea (Baum.-Bodenh.) van Steenis[a]	13		Thy Valley, *2487*
Oncothecaceae[c]			
Oncotheca balansae Baillon[b]	25		Thy Valley, *3130, 3301*
Clusiaceae			
Garcinia puat (Montrouzier) Guillaumin[a]	33		Mt. Mé Ori, *2013*
Montrouziera sphaeroidea Pancher ex Planch. & Triana[b]	ca. 29		Plaine des Lacs, *3014*
Elaeocarpaceae			
Elaeocarpus speciosus Brongn. & Gris[a]		30	Mt. Mé Maoya, *2950*
Dubouzetia elegans Brongn. & Gris[b]	ca. 90		Mt. Mé Ori, *3029*
Violaceae			
Agatea sp.[b]	8		Rivière Bleue Valley, *3670*
Symplocaceae			
Symplocos baptica Brongn. & Gris[a]	11		Mt. Do, *3810*
Pittosporaceae			
Pittosporum cf. *dzumacense* Guillaumin[a]	12		Mt. Do, *3813*
Proteaceae			
Beauprea neglecta R. Virot[a]	11		Houailou, *3261*
Grevillea meisneri Montrouzier[a]	ca. 22		Népoui Valley, *1896*
Olacaceae			
Olax hypoleuca Baillon[a]	12	24	Goro, *3631*
Aquifoliaceae			
Phelline sp.[b]	17		Mt. Mé Ori, *3041*
Phelline sp.[b]	17		Col de Mouirange, *3599*
Sphenostemonaceae[c]			
Sphenostemon comptonii Baker f.[b]	ca. 26		Mt. Mé Ori, *3047*
Malpighiaceae			
Acridocarpus austrocaledonicus Baillon[a]	9		Tiébaghi, *3306*
Apocynaceae			
Alstonia plumosa Labill.[a]	11		Thy Valley, *1877*
A. vieillardii van Heurck & Muell. Arg.[a]	11		Montagne des Sources, *1640*
Rauvolfia semperflorens (Muell. Arg.) Schlechter[a]	11		Mt. Mou, *1871*

[a] Denotes species not recorded in chromosome indexes.
[b] Denotes genera not recorded in chromosome indexes.
[c] Denotes families not recorded in chromosome indexes.

cothecaceae in Theales by Cronquist (1981) is compatible with cytological data because $n = 25$ is also known in *Ternstroemia* (Theaceae) (Morinaga & Fukushima, 1931).

Clusiaceae. The count of $n = 33$ for *Garcinia puat* (Table 1) is unique in the genus. However, $n = 22$, 24, ca. 27, ca. 28, ca. 29, 36, 38, 40, and 48 have been reported for *Garcinia* (cf. Fedorov, 1974; Goldblatt, 1984). The count of $n =$ ca. 29 for *Montrouziera sphaeroidea* (Table 1) apparently represents the first for this endemic New Caledonian genus. In addition to the numbers listed above for *Garcinia*, $n = 28$ and ca. 28 have been reported for *Allanblackia* (Mangenot & Mangenot, 1957) and *Pentadesma* (Mangenot & Mangenot, 1962), respectively.

Elaeocarpaceae. The count of $2n = 30$ for *Elaeocarpus speciosus* (Table 1) agrees with reports for at least three other species of the genus (Mehra, 1976; Rattenbury, 1957). Other numbers reported for *Elaeocarpus* are $n = 12$ and $n = 14$ (Arora, 1961; Ono, 1975). Our report of $n =$ ca. 90 for *Dubouzetia elegans* is apparently the first for this genus. This number may represent dodecaploidy based on $n = 15$.

Violaceae. The report here for *Agatea* of $n = 8$ is the first for the genus. It agrees with reports for *Hybanthus, Ionidium,* and a couple of species of *Viola* (Moore, 1973, 1974; Goldblatt, 1981, 1984). Two species of the Hawaiian endemic genus *Isodendrion* also have $n = 8$ (Carr, 1985).

Symplocaceae. The count of $n = 11$ for *Symplocos baptica* (Table 1) agrees with the number established in several other species in the genus. Counts of $n = 12$ (Nevling, 1969) and $2n =$ ca. 90 (Nooteboom, 1975) have also been reported for *Symplocos.*

Pittosporaceae. The first report here of $n = 12$ for *Pittosporum* cf. *dzumacense* agrees with nearly every report for the family. Only *Citriobatus* differs by having $n = 18$ (Fedorov, 1974).

Proteaceae. The count of $n = 11$ for *Beauprea neglecta* (Table 1) accords with the report for *B. paniculata* Brongn. & Gris. (Johnson & Briggs, 1963), the only other count for the genus. Counts of $n = 11$ are common in Proteaceae, but $n = 22$ has not been reported previously. Thus, the count of $n =$ ca. 22 given here for *Grevillea meisneri* is noteworthy, but needs verification. In any case, it contrasts markedly with $n = 10$, the only other number known in the approximately 27 species of *Grevillea* that have been investigated (cf. Fedorov, 1974).

Olacaceae. The count of $n = 12$ for *Olax hypoleuca* (Table 1) agrees with the only other report available for the genus. *Olax nana* Wall. and *Schoepfia fragrans* Wall. appear to be the only other species in the family reported to have $n = 12$ (Mehra, 1976).

Aquifoliaceae. The report here of $n = 17$ for two collections of *Phelline* represent the first for this genus. The same number has also been reported in a few species of *Ilex,* including *I. matanoana* and *I. mertensii* (Ono & Masuda, 1981).

Sphenostemonaceae. Our count of $n =$ ca. 26 for *Sphenostemon comptonii* is apparently the first for this family. At diakinesis ring pairs of chromosomes ranged from about 2.3–3.4 μm in diameter while rod pairs were about 3 μm long. Historically, the family has been included in Trimeniaceae, Clusiaceae, Aquifoliaceae, or Theaceae. Cronquist (1981) included *Sphenostemon* in the Aquifoliaceae. However, strictly in terms of chromosome numbers, the greatest accord appears to be with Theaceae (cf. *Ternstroemia japonica, n* = 25; Morinaga & Fukushima, 1931) or Clusiaceae, but obviously the data are equivocal.

Malpighiaceae. Acridocarpus austrocaledonicus is here reported to have $n = 9$. This number has also been reported for the two other species in the genus that are known cytologically (Mangenot & Mangenot, 1962). *Tristellateia* and *Stigmaphyllon* appear to be the only other genera of Malpighiaceae reported to have species with this number (Fedorov, 1974).

Apocynaceae. First reports of $n = 11$ are given here for *Alstonia plumosa* and *A. vieillardii.* This number and $n = 22$ and 44 have also been found in other species of the genus (Fedorov, 1974). A first report here of $n = 11$ for *Rauvolfia semperflorens* agrees with the number in several other species in *Rauvolfia,* in which $n = 22$, 33, 44, and 88 are also known (Fedorov, 1974; Goldblatt, 1981).

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