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Cytotaxonomical Studies of Orchidaceae from Vanuatu and its Adjacent Regions: II

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Comprehensive observations of chromosomal characters of orchid taxa in Melanesia are needed because there are few cytotaxonomical reports on Melanesian orchids such as Jones *et al.* (1982), Lim (1985a, b, c), Ishida *et al.* (1992), and Kokubugata and Yukawa (1998). In this study, we investigate the chromosomal characters of 7 taxa from Vanuatu and adjacent Pacific islands.

Materials and Methods

Table 1 shows the materials used in this study. Further data for each collection are provided in Hashimoto *et al.* (1998), Konishi *et al.* (1998), and Yukawa (1998). Voucher specimens and permanent slides are deposited in TNS.

Root tips were harvested from plants in cultivation and pretreated in 2mM 8-hydroxyquinoline at 20 °C for 2 hr. Subsequently, they were fixed in 45% acetic acid at 4°C for 10 sec and then macerated in a mixture of 1N hydrochloric acid and 45% acetic acid (2:1) at 60°C for 10 sec. Following these treatments, they were put on slides and stained in 1% aceto-orcein for 2 hr. The squash method was applied to investigate chromosomes at mitotic metaphase.

Results and Discussion

1. ***Acanthephippium splendidum*** J. J. Sm., 2n = 46 (Figs. 1A and 2).

This is a new count for the genus *Acanthephippium*. The prevailing chromosome number of this genus is 2n = 48 (e.g., Tanaka 1965, Hsu 1976), but 2n = 40 (e.g., Vij and Shekhar 1983) and 2n = 42 (e.g., Li and Chen 1989) were also observed. It is likely that aneuploid series play an important role on the evolution of this genus.

2. ***Spathoglottis unguiculata*** (Labill.) Rchb. f., 2n = 40 (Figs. 1B and 3).

This is the first cytological record for the species. Previously, 2n = 40 and 60 were counted for this genus.

3. ***Spathoglottis pacifica*** Rchb. f., 2n = 40 (Figs. 1C and 4).

This species also has not been cytologically studied and the present count represents the first record.

4. ***Spathoglottis petri*** Rchb. f., 2n = 40 (Figs. 1D and 5).

This is also the first cytological record for the species. Based on our results and previous studies, 2n = 40 is a sole somatic chromosome number of *Spathoglottis* except for a single triploid record (2n =

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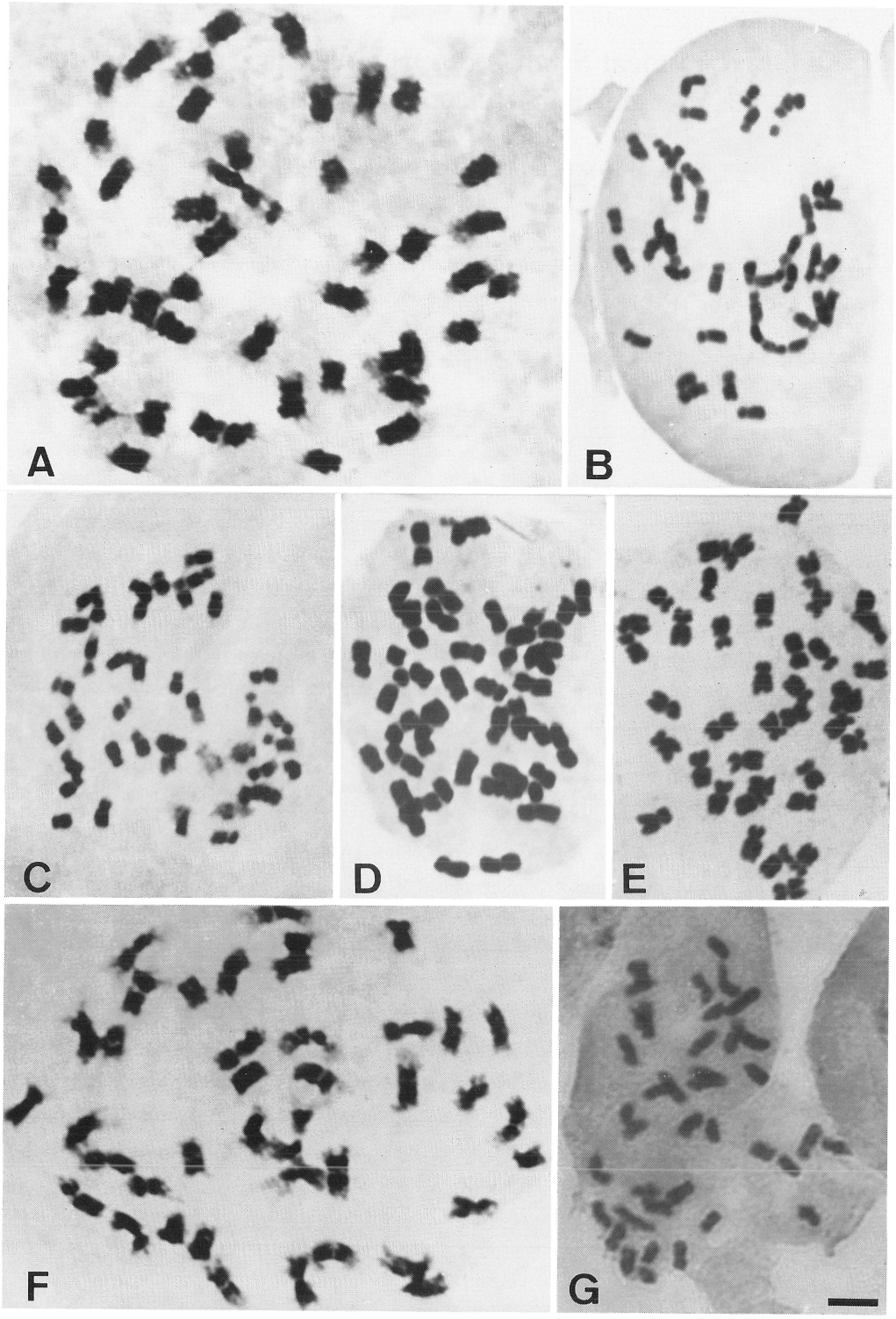

Fig. 1. Orcein-stained chromosomes at mitotic metaphase of seven species of Orchidaceae. **A**. *Acanthephippium splendidum*. **B**. *Spathoglottis unguiculata*. **C**. *Spathoglottis pacifica*. **D**. *Spathoglottis petri*. **E**. *Calanthe triplicata*. **F**. *Calanthe ventilabrum*. **G**. *Glossorhyncha macdonaldii*. Bar = 10 μm.

Fig. 2. *Acanthephippium splendidum* in cultivation, × ca. 0.5. Sugimura 97-4307.

Fig. 3. *Spathoglottis unguiculata* in cultivation, × ca. 0.6. Hashimoto 9710720.

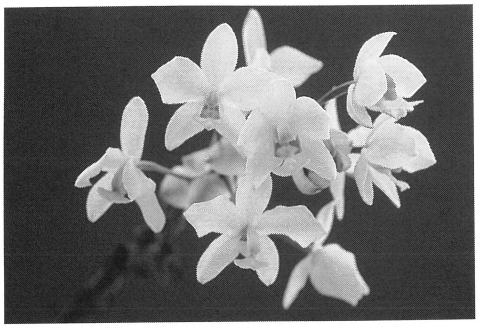

Fig. 4. *Spathoglottis pacifica* in cultivation, × ca. 0.4. Yukawa 97-2161.

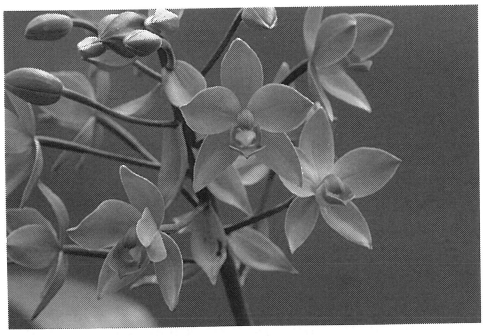

Fig. 5. *Spathoglottis petri* in cultivation, × ca. 0.5. Yukawa 97-2232.

Fig. 6. *Calanthe triplicata* in cultivation, × ca. 0.7. Yukawa 97-2303.

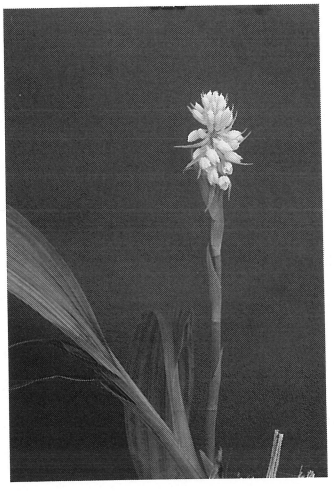

Fig. 7. *Calanthe ventilabrum* in cultivation, × ca. 0.2. Yukawa 97-2095.

Fig. 8. *Glossorhyncha macdonaldii* in cultivation, × ca. 1.2. Yukawa 97-2067.

Table. 1. Chromosome numbers of seven species of Orchidaceae observed

Species	Locality	Voucher	Chrom. no. (2n)
Acanthephippium splendidum	Fiji: Viti Levu	Sugimura 97-4307	46
Spathoglottis unguiculata	Vanuatu: Espiritu Santo	Hashimoto 9710720	40
Spathoglottis pacifica	Vanuatu: Espiritu Santo	Yukawa 97-2161	40
Spathoglottis petri	Vanuatu: Efate	Yukawa 97-2232	40
Calanthe triplicata	New Caledonia: Grande Terre	Yukawa 97-2303	40
Calanthe ventilabrum	Vanuatu: Espiritu Santo	Yukawa 97-2095	40
Glossorhyncha macdonaldii	Vanuatu: Espiritu Santo	Yukawa 97-2067	40

60) for *S. plicata* (Teoh 1980).

5. *Calanthe triplicata* (Willemet) Ames, 2n = 40 (Figs. 1E and 6).

Both vegetative and reproductive parts of Melanesian material are much larger than plants from other regions. Several authors recognized it as a distinct variety, *C. triplicata* var. *angraeciflora* (Schltr.) N. Hallé. We thus suspected poliploidy of these plants, but the number is identical to previous records of *C. triplicata* from various regions.

6. *Calanthe ventilabrum* Rchb. f., 2n = 40 (Figs. 1F and 7)

We confirmed the count of Ishida *et al.* (1992) where they treated this species as *C. langei* F. Muell., a later synonym. This species belongs to section *Styloglossum* and all the counts hitherto for this section show 2n = 40.

7. *Glossorhyncha macdonaldii* Schltr., 2n = 40 (Figs. 1G and 8).

This is the second cytological record for the genus *Glossorhyncha*. The chromosome number of this species was consistent with that of *G. chlorantha* van Royen from Papua New Guinea (Lim 1985c). Dressler (1993) disposed this genus into tribe Epidendreae subtribe Glomerinae in which 2n = 38 and 46 have been recorded for *Agrostophyllum*.

Summary

Mitotic chromosomes of seven taxa from Vanuatu and its adjacent regions were examined by the standard aceto-orcein staining method. *Acanthephippium splendidum* showed the chromosome number of 2n = 46; and three species of *Spathoglottis*, two species of *Calanthe*, and a single species of *Glossorhyncha* showed that of 2n = 40.

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