Chromosome counts in subtribe Oncidiinae, the Orchidaceae. Ⅰ. Ten species in nine genera*

Shuichi Hamatani[1], Kiyoshi Hashimoto[2] and Kohji Karasawa[3]

ラン科オンシディウム亜族における染色体数の算定　その１．９属10種*

濱谷修一[1]・橋本清美[1]・唐澤耕司[2]

Introduction

The subtribe Oncidiinae, tribe Vandoideae, the Orchidaceae consists of 1231 species in 77 genera (Dressler 1993) in which most species are distributed in tropical America, and which include many horticulturally meritorious species, especially species of *Oncidium* and *Odontoglossum*. The subtribe is one of the most specialized groups in the Orchidaceae, since it has a large range of variation in external morphology that performs phylogenetic disorders.

The chromosome numbers of 206 species in the subtribe Oncidiinae studied (Tanaka & Kamemoto 1984, Chase 1986, Braem 1988, Chase & Olmstead 1988, Wimber 1989, Nakata & Hashimoto 1990) indicated their basic chromosome numbers were X= 5 or 7. However, chromosome numbers of over half of the genera in the subtribe have not yet been studied.

One hundred and eighty species in 29 genera belonged to the subtribe Oncidiinae have been conserved in the Hiroshima Botanical Garden, Hiroshima, Japan for utilization in cytogenetical researches to clarify and justify species relationships for phylogenetical as well as breeding purposes.

Material and Methods

Ten species in nine genera in the subtribe Oncidiinae conserved in the Hiroshima Botanical Garden were chromosomally studied here. Those species in flower studied are shown in Fig. 1.

Observation of chromosomes was made with the aceto-orcein squash technique developed by Tanaka and Kamemoto (1960) : Active root tips were immersed in 0.002M 8-hydroxyquinoline at 16°C for four hours. They were, then, transferred to a modified Carnoy's solution (1:1:2) at 16°C for 15 minutes, hydrolyzed in 1N HCl at 60°C for two minutes, transferred to 45% acetic acid for three minutes, and squashed and stained in 1% aceto-orcein.

The classification of resting and mitotic prophase chromosomes followed Tanaka (1971).

Results and Discussion

The somatic chromosomes at resting stage observed in the present investigation were shown in Fig. 2. The karyotypes of the chromosomes at resting stage in *Baptistonia echinata*, *Brachtia glumacea*, *Cochlioda noezliana*, *Comparettia macroplectron*, *Helcia sanguinolenta* and *Sigmatostalix adamsii* were classified as the round prochromosome type, those in *Cischweinfia dasyandra*, *Palumbina candida* and *Symphyglossum sanguineum* were classified as the complex chromocenter type and those in *Cochlioda rosea* were classified as the simple chromocenter type.

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1) The Hiroshima Botanical Garden
2) Orchid Museum Takamori, Nagano Prefecture

Table 1. Chromosome numbers of ten species belonged to the subtribe Oncidiinae studied.

Species	Karyotypes of the chromosomes at resting stage *	Chromosome number of present count
		2n
Baptistonia echinata B.-R.	round prochromosome type	56
Brachtia glumacea Rchb.f.	round prochromosome type	60
Cischweinfia dasyandra (Rchb. f.) Dressler & Williams	complex chromocenter type	56
Cochlioda noezliana (Rchb. f.) Rolfe	round prochromosome type	56
Cochlioda rosea (Lindl.) Benth.	simple chromocenter type	56
Comparettia macroplectron Rchb. f. & Triana	round prochromosome type	56
Helcia sanguinolenta Lindl.	round prochromosome type	56
Palumbina candida (Lindl.) Rchb. f.	complex chromocenter type	44
Sigmatostalix adamsii Dodson	round prochromosome type	56
Symphyglossum sanguineum (Rchb. f.) Schltr.	complex chromocenter type	56

* Given names are proposed by Tanaka (1971).

The somatic chromosomes at mitotic metaphase observed in the present investigation were shown in Fig. 3. The results of the chromosome counts of all species investigated were tabulated in Table 1. The chromosome numbers of the ten species observed were recorded here for the first time: *Baptistonia echinata* 2n=56, *Brachtia glumacea* 2n=60, *Cischweinfia dasyandra* 2n=56, *Cochlioda noezliana* 2n=56, *Cochlioda rosea* 2n=56, *Comparettia macroplectron* 2n=56, *Helcia sanguinolenta* 2n=56, *Palumbina candida* 2n=44, *Sigmatostalix adamsii* 2n=56, and *Symphyglossum sanguineum* 2n=56.

The majority of the ten species studied had 2n=56 and only two species (20%) had different chromosome numbers from 2n=56. However, Braem's documentation of chromosome numbers in the subtribe Oncidiinae (1988) reported quite large diversity of chromosome numbers with 2n=10, 14, 24, 26, 28, 29, 30, 36, 37, 38, 40, 42, 44, 48, 50, 56, 59, 60, 84, 86, 105-111, 112, 126, and 133.

Among the ten species studied, *Palumbina candida* was quite different not only in chromosome number but also in external morphology from the other nine species. *Palumbina candida* might be distantly related from the other eight species which have 2n=56.

Summary

Somatic chromosomes at resting stage and metaphase were studied in ten species in the subtribe Oncidiinae. Resting chromosomes in six species showed the round prochromosome type, those in three species showed the complex chromocenter type and those in one species showed the simple chromocenter type. Eight species had the common chromosome number of 2n=56 , one species had 2n=44 and one species had 2n=60. The chromosome numbers of the ten species were recorded here for the first time.

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摘　要

オンシディウム亜族９属10種において体細胞染色体休止期の観察と分裂期中期の染色体数の算定を行った。休止期の観察においては、Tanaka (1971)によるところの球形前染色体型、複雑染色中央粒型と単純染色中央粒型が観察された。分裂期中期染色体数の観察においては、８種が2n=56、１種が2n=44、１種が2n=60であった。今回報告した10種の染色体数はすべて初めての報告である。

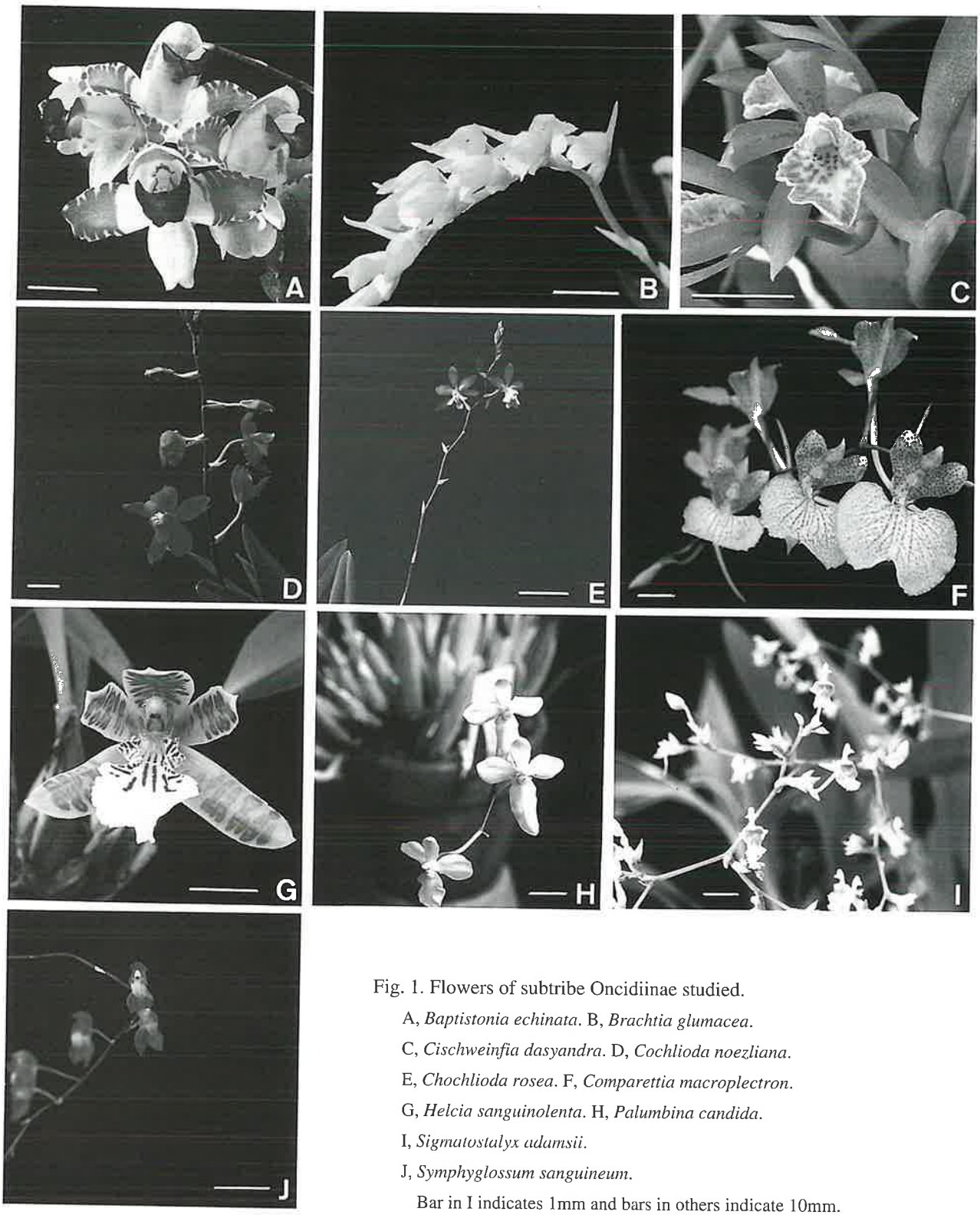

Fig. 1. Flowers of subtribe Oncidiinae studied.
A, *Baptistonia echinata*. B, *Brachtia glumacea*.
C, *Cischweinfia dasyandra*. D, *Cochlioda noezliana*.
E, *Chochlioda rosea*. F, *Comparettia macroplectron*.
G, *Helcia sanguinolenta*. H, *Palumbina candida*.
I, *Sigmatostalyx adamsii*.
J, *Symphyglossum sanguineum*.
Bar in I indicates 1mm and bars in others indicate 10mm.

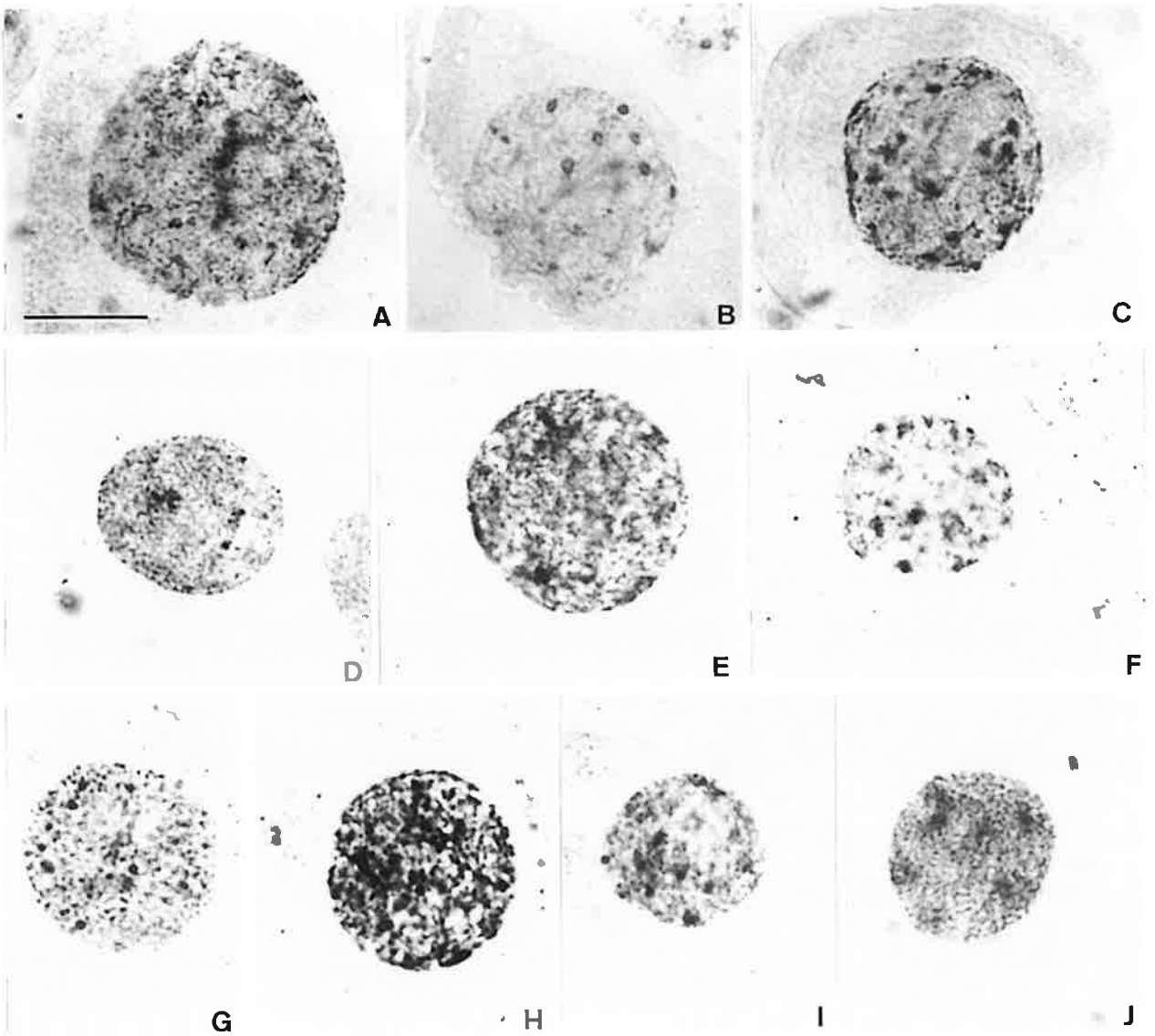

Fig. 2. Somatic chromosomes at resting stage of subtribe Oncidinae studied.
A, *Baptistonia echinata*. B, *Brachtia glumacea*. C, *Cischweinfia dasyandra*.
D, *Cochlioda noezliana*. E, *Chochlioda rosea*. F, *Comparettia macroplectron*.
G, *Helcia sanguinolenta*. H, *Palumbina candida*. I, *Sigmatostalyx adamsii*.
J, *Symphyglossum sanguineum*.
Bar indicates 5 μm.

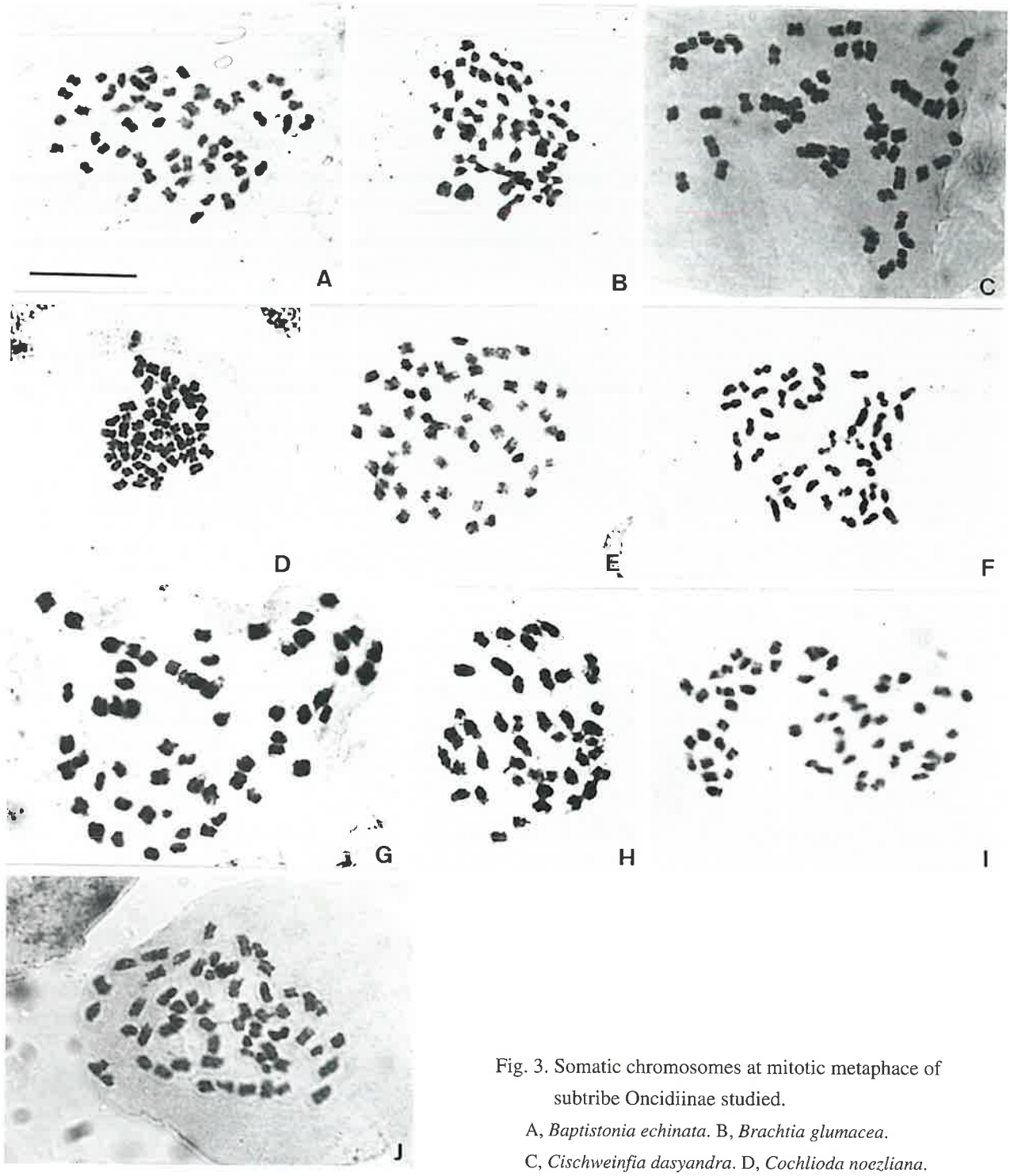

Fig. 3. Somatic chromosomes at mitotic metaphace of subtribe Oncidiinae studied.

A, *Baptistonia echinata*. B, *Brachtia glumacea*.

C, *Cischweinfia dasyandra*. D, *Cochlioda noezliana*.

E, *Chochlioda rosea*. F, *Comparettia macroplectron*.

G, *Helcia sanguinolenta*. H, *Palumbina candida*.

I, *Sigmatostalyx adamsii*.

J, *Symphyglossum sanguineum*.

Bar indicates 5 μm.