

## Chromosomal Characters of Two *Cycas* Species (Cycadaceae, Cycadales)

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國府方吾郎<sup>1</sup>・Ken D. Hill<sup>2</sup>・近藤勝彦<sup>3</sup>：ソテツ属 2 種における染色体形質

The genus *Cycas* (Cycadaceae, Cycadales; Stevenson 1992) distributes in the Malaysian region, Japan and Southeast Asia, extending to Micronesia, Polynesia, Madagascar and East Africa, and is the largest in the Cycadales (Stevenson *et al.* 1995). Although taxonomical studies of *Cycas* have been advancing (*e.g.*, Hill 1992, 1994a, 1994b, 1996), its chromosomal studies have been poorly performed. The reason for the few accumulations of cytotaxonomic information in *Cycas* is that all species of the genus are regarded as endangered species in the world, and that it is difficult to observe too large chromosomes of *Cycas*. The aim of the present study is to investigate chromosome numbers and karyotypes of *C. ophiolitica* and *C. wadei*, which have been unreported cytotaxonomically, by the standard aceto-orcein staining method.

### Materials and Methods

*Cycas ophiolitica* K. D. Hill and *C. wadei* Merrill cultivated in the experiment nursery of Tsukuba Botanical Garden were investigated in the present study (Table 1). Young leaflets were pretreated in 2 mM 8-hydroxyquinoline at 4°C for 20 hr, fixed in acetic ethanol (1:3) at 4°C for 20 hr, and stored in 70% ethanol at -20°C. The stored leaflets were macerated in 45% acetic acid at 60°C for 5 min and then stained in 2% aceto-orcein at 20°C for 12 hr. After being squashed with 45% acetic acid, the stained chromosomes at mitotic metaphase were classified with their arm ratio following Levan *et al.* (1964).

### Results and Discussion

*Cycas ophiolitica* and *C. wadei* showed a chromosome number of  $2n = 22$  (Fig. 1). The chromosome number of the two species is for the first time. The chromosome number of the two species corresponded with those of other *Cycas* species in the earlier reports (*e.g.*, Sax and Beal 1934, Kokubugata and Kondo 1994, Kondo *et al.* 1995). Chromosome lengths of *C. ophiolitica* ranged from 14.1 to 28.8  $\mu\text{m}$ , and that of *C. wadei* from 16.6 to 32.9  $\mu\text{m}$ .

Two species showed four subterminal-centromeric chromosomes from the 1st to the 4th chromo-

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Table. 1. Plant materials of two *Cycas* species observed in the present study

Species	Accession no.*	Origin	Chrom. no. (2n)
<i>C. ophiolitica</i>	TBG 136405	Australia: Rockhampton: Mt. Archer. 120 m alt., Queensland.	22
<i>C. wadei</i>	TBG 136391	The Philippines: Culion Island.	22

\*TBG: Accession number of Tsukuba Botanical Garden.

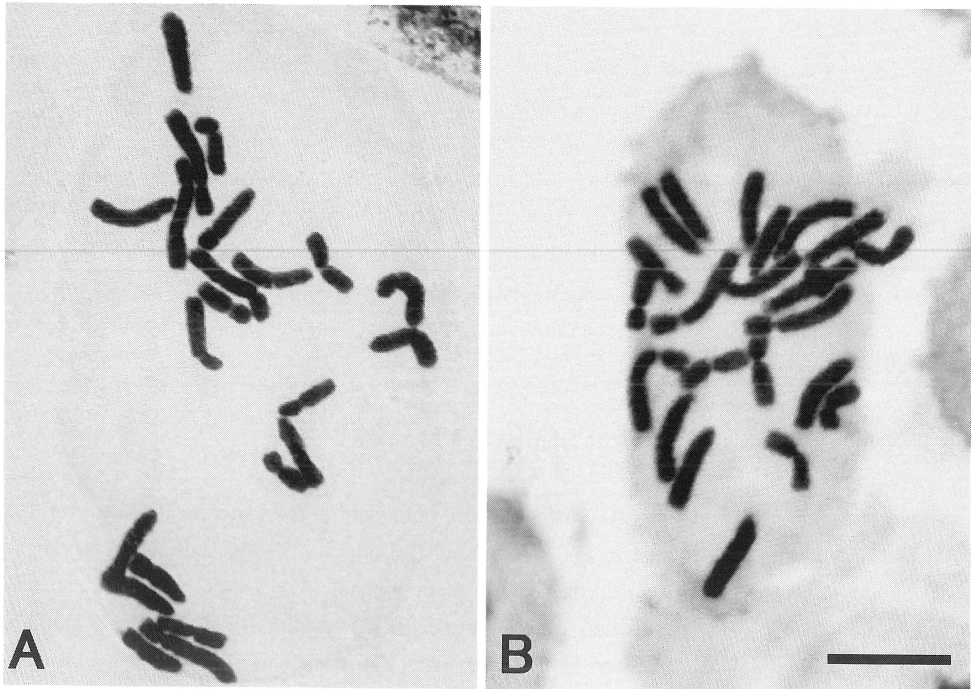


Fig. 1. Chromosome at mitotic metaphase of two *Cycas* species studied. A. *C. ophiolitica*. B. *C. wadei*. Bar shows 10  $\mu\text{m}$ .

somes, twelve terminal-chromosomes from the 5th to the 16th, and four submedian- and two median-centromeric chromosomes from the 17th to the 22nd (Fig. 2). In conclusion, the present karyotypic data of two species were similar to each other and those of other *Cycas* species in the previous reports (e.g., Sax and Beal 1934, Kokubugata and Kondo 1994, Kondo *et al.* 1995).

### Summary

Somatic chromosomes of *Cycas ophiolitica* and *C. wadei* were observed by the standard aceto-orcein staining method. Two species showed chromosome number of  $2n = 22$ , and karyotype consist of two median-, four submedian-, four subterminal- and twelve terminal-centromeric chromosomes. The karyotypes of the two species were similar to those of other *Cycas* species reported previously.

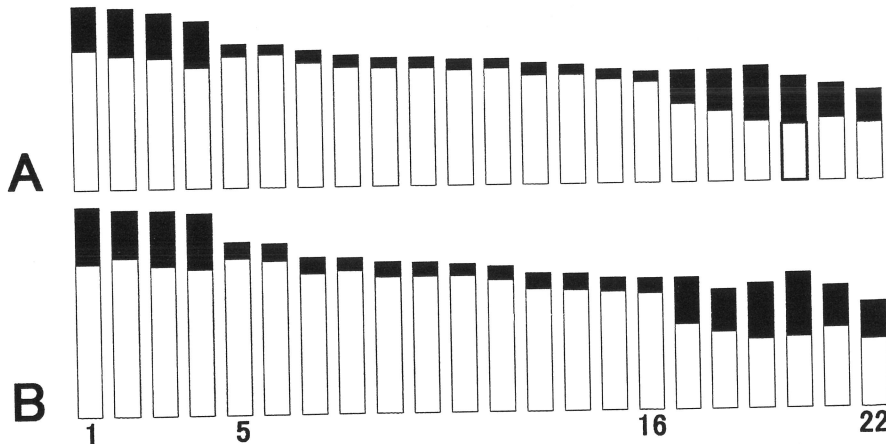


Fig. 2. Ideogram of two *Cycas* species studied. A. *C. ophiolitica*. B. *C. wadei*. Opened areas show long arm. Solid areas show short arm.

### 摘 要

ソテツ属 (ソテツ科, ソテツ目) のこれまで染色体学的研究のなされていない2種, *Cycas ophiolitica* と *C. wadei* の2種の染色体と核型をアセトオルセイン染色法により観察した。2種ともに染色体数  $2n = 22$  を示し, 核型は, 2個の中部動原体型染色体, 4個の長い次端部動原体型染色体, 4個の次中部動原体型染色体, 12個の端部動原体型染色体から構成されていた。これら2種の染色体数は過去の報告と一致し, 核型は過去の報告におけるソテツ属他種の核型と類似していた。

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