

**MOLECULAR EVIDENCE FOR MULTIPLE ORIGINS OF THE
APOMICTIC TRIPLOID FERN *CORNOPTERIS CHRISTENSENIANA*
(WOODSIACEAE)**

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Apomixis (apogamy in a broad sense, agamospermy, agamospory) is a reproductive pathway via chromosomally unreduced spores and gametophytes and the subsequent apogamous reproduction (in a strict sense), i.e. asexual production of a sporophyte from vegetative cells of a gametophyte. Here we use the term apomixis in a broad sense and apogamy in a strict sense to avoid confusion. In pteridophytes, about 10% of the world's species and about 15% of Japanese species are apomictic. Apomixis is often associated with polyploidy, and three quarters of apomictic pteridophytes are triploid. It is often argued that apomixis, like polyploidy, plays a significant role as an escape from sterility caused by hybridization.

Although *Cornopteris christenseniana* had been believed to be a sterile triploid interspecific hybrid, our previous study showed that it produces viable spores at various frequencies and forms apogamous sporophytes at low or moderate frequencies in culture (Park & Kato, 2003). It also suggested that apomictic reproduction (in a broad sense) occurs naturally in an artificial environment in the Fern Garden of the Botanical Gardens, University of Tokyo. We have analyzed molecular variation of the nuclear and cpDNA in *C. christenseniana* and its closely related species. The results strongly support the suggestion that many plants of *C. christenseniana* propagate by apomixis in the artificial environment and not by *in situ* hybridization. We also found that plants of *C. christenseniana* that had been collected from various wild populations, had arisen independently on a markedly recurrent basis. We suggest that *Cornopteris christenseniana* is an incipient apomictic species of multiple and polytopic origin, and its apomixis is not so strongly regulated as in obligate apomicts. The multiple origins of incipient apomicts imply that the evolution of apomixis in *C. christenseniana* began with unreduced sporogenesis with a pleiotropic effect leading to subsequent apogamy.

REFERENCES

- PARK, C.-H. & KATO, M. 2003 Apomixis in the interspecific triploid hybrid fern *Cornopteris christenseniana* (Woodsiaceae). *J. Plant Res.* 116(2): 93-104.