

Chromosome counts on the fern genus *Gymnocarpium* (Dryopteridaceae) from Finland

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Chromosome counts are published for *Gymnocarpium continentale* (Petrov) Pojark. ($n = 80$), *G. dryopteris* (L.) Newman ($n = 80$), *G. continentale* \times *dryopteris* ($n = 80$) and *G. robertianum* (Hoffm.) Newman ($n = 80$).

Key words: chromosome number, fern, Finland, *Gymnocarpium*

The plan by Jaakko Sarvela to prepare a paper including chromosome counts of, and taxonomic comments on, the fern genus *Gymnocarpium* Newman (Dryopteridaceae) did not materialize before his death on 30 Dec. 1996, at the age of 83. However, his ideas on *Gymnocarpium* in North Europe will be published in his account of the genus in *Flora Nordica* (see also Jäkäläniemi 1994). The chromosome counts made by Kerttu Pellinen on the *Gymnocarpium* material selected and determined by Jaakko Sarvela are published here. Pertti Uotila is responsible of sorting out Sarvela's voucher material, and of the comments in the text.

MATERIAL AND METHODS

Fern tussocks were collected from the wild and transplanted to the Helsinki Botanical Garden at Kaisaniemi, Helsinki, or to the Oulu Botanical Garden at Linnanmaa, Oulu. Mostly very pale capsules (not yet at all turned brown) were fixed

by Carnoy liquid (methanol–chloroform–acetic acid, 6:3:1). According to the previous experience, the first meiotic divisions take place at this phase. The material was stored in the fixative at -25°C . Later the samples were stained by the feulgen method, and squashed. Squashed material was stained by aceto-hematoxylin. The chromosome counts were made from the spore mother cells at metaphase I by using a Wild M20 microscope.

RESULTS

Gymnocarpium continentale (Petrov) Pojark.

$n = 80$ (80, 76, 80, 74, 75, 76, 79, 76, 80). Origin: Koillismaa, Kuusamo, Oulanka National Park, I.VIII.1986 *T. Ulyinen* (OULU 128115). Transplanted to Oulu Botanical Garden; cultivated in the garden, voucher 1990 *R. Hiltunen* (H 1687543), also 1990 *P. Tähtinen* (OULU).

Sarvela (1978) included *Gymnocarpium continentale* in *G. jessoënsis* (Koidz.) Koidz. as a widespread subsp. *parvulum* Sarvela, but later changed

his mind, especially when it became evident that the East Asiatic *G. jessoënsis* is diploid with $n = 40$, and *G. continentale* is tetraploid with $n = 80$ (Sarvela *et al.* 1981).

Gymnocarpium dryopteris (L.) Newman

$n = ca. 80$ (69, 70, 76, 87). Origin: Uusimaa, Helsinki, Vuosaari, rich forest, 19.VI.1978 *P. Alanko*. Transplanted to Helsinki Botanical Garden; cultivated in the garden, voucher 17.IX.1991 *J. Sarvela* (H 1687554).

$n = ca. 80$ (74, 71, 71, 71). Origin: Varsinais-Suomi, Lohja, Jantoniemi, 22.VIII.1979 *P. Havas*. Transplanted to Helsinki Botanical Garden; cultivated in the garden, voucher 17.IX.1991 *J. Sarvela* (H 1687552).

The number matches well with the earlier Finnish counts from Uusimaa, Helsinki, and Inari Lapland, Utsjoki (Uotila & Pellinen 1985), as well as the other counts from Europe.

Gymnocarpium continentale \times *dryopteris* (*G. x intermedium* Sarvela)

$n = ca. 80$ (76, 76, 90, 90, 77, 81, 83, 91, 73, 79). Origin: Kuusamo, Kuusamo, Juuma, vuomat, *M. Aalto*. Trans-

planted to Helsinki Botanical Garden; cultivated in the garden, voucher 17.IX.1991 *J. Sarvela* (H 1687550).

Gymnocarpium robertianum (Hoffm.) Newman

$n = ca. 80$ (74, 76, 81, 79, 77). Origin: Kuusamo, Juuma, Hautaniitynvaoma, 29.VIII.1979 *P. Alanko* 37164 (H 560029). Transplanted to Helsinki Botanical Garden; cultivated in the garden, voucher 17.IX.1991 *J. Sarvela* (H 1687547-9).

$n = 80$ (81, 80, 83, 80, 86, 82, 81, 80, 83, 82, 62, 93, 79, 79, 84, 89, 81, 79, 84). Origin: Kuusamo, Juuma, Hautaniitynvaoma, 29.VIII.1979 *P. Alanko* 37169 (H 721469). Transplanted to Helsinki Botanical Garden; cultivated in the garden, voucher 17. IX.1991 *J. Sarvela* (H 1687545-6).

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