

Two *Gymnocarpium* hybrids new to the Iowa Pteridophyte flora

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ABSTRACT.—A survey of over 100 algific talus slope sites in northeastern Iowa for individuals of the genus *Gymnocarpium* revealed the presence of two additional taxa in the Iowa Pteridophyte flora. *Gymnocarpium* \times *brittonianum* (Sarvela) Pryer & Haufler was located at two adjacent sites in Clayton County, where it is disjunct approximately 300 km from the nearest reported stations in northernmost Wisconsin. *Gymnocarpium* \times *intermedium* Sarvela was located at individual sites in Clayton and Dubuque Counties. The “Driftless Area” populations for this taxon are disjunct from the northern shore of Lake Superior.

Until recently, only two taxa from the genus *Gymnocarpium* were reported from Iowa: *G. dryopteris* (L.) Newman and *G. robertianum* (Hoffm.) Newman (Peck, 1976, 1983, 1989). Recent taxonomic work by Pryer (1993) and Pryer and Haufler (1993) has demonstrated that at least five species and five hybrids occur in North America. During survey work from 1985–1991 on northeastern Iowa algific (cold producing) talus slopes (Frest, 1981), a number of specimens from *Gymnocarpium* populations were observed and collected. Examination of these materials, housed in the R.V. Drexler Herbarium (COE) at Coe College, Cedar Rapids, Iowa, revealed two additional *Gymnocarpium* taxa from the state.

Gymnocarpium \times *brittonianum* (Sarvela) Pryer & Haufler is composed of sterile, robust *Gymnocarpium* individuals that appear to be hybrids between the boreal *G. dryopteris* and the Pacific Northwest *G. disjunctum* (Rupr.) Ching (Pryer, 1993; Pryer and Haufler, 1993). The closest published records for this taxon to Iowa exist along the southern shore of Lake Superior. Large *Gymnocarpium* individuals with aborted spores were located on 7 July 1990 on an algific talus slope at Bixby State Preserve in Clayton County (Sec. 23, Lodomillo Township, *Nekola & Thomson* s.n. [COE 8499]). These specimens were examined by Kathleen Pryer in the spring of 1991 and identified as the first collection of *G.* \times *brittonianum* from Iowa. An extensive search for additional populations was made in the summer of 1991 on over 100 algific talus slope sites throughout northeastern Iowa. Only one additional clone, found on an algific slope 0.5 km east of the original colony, was located in Clayton County (Sec. 23, Lodomillo Township, *Nekola* s.n. [COE 9415]). Additionally, a third clone likely exists in the same valley, 1 km east of the original colony, but could not be definitively verified due to the early date of collection, which precluded the presence of mature spores. This taxon must be considered one

of the rarest of Iowa ferns, as it is restricted to two or three small colonies along a one km section of a single stream valley.

Gymnocarpium ×*intermedium* Sarvela is the sterile hybrid between *G. dryopteris* and *G. jessoense* (Koidz.) Koidz. ssp. *parvulum* Sarvela (Pryer, 1993; Pryer and Hafler, 1993). Whereas *G. ×intermedium* has been reported from Alaska to Northern Quebec, it is most abundant along the northern and western shores of Lake Superior. Although this taxon has been reported from Fillmore County, in southeastern Minnesota (K. Pryer, personal communication), no previously published reports of this taxon existed from Iowa. Two unusual *Gymnocarpium* populations with aborted spores were collected in the summer of 1990 from algific talus slope habitats in Clayton County (Sec. 26, Boardman Township, *Nekola & Thomas* s.n. [COE 9051]) and Dubuque County (Secs. 4 & 5, Taylor Township, *Nekola* s.n. [COE 8385]). These were identified by K. Pryer in the spring of 1991 as *G. ×intermedium*. Of these, the Dubuque County population was by far the largest, with this taxon being dominant on an open, mossy, cold northwest-facing, algific talus slope. Extensive searches in the summer of 1991 on other algific slope sites uncovered no additional populations. Subsequent examination of *Gymnocarpium* specimens from other major Iowa herbaria in 1995 by K. Pryer (pers. comm.) uncovered an additional historical (1896) collection of this taxon from Winneshiek County (*Goddard* s.n. [IA, ISC]).

Although this taxon typically occurs with both parent species in its western Great Lakes populations, neither *G. dryopteris* nor *G. jessoense* ssp. *parvulum* was located at either of the extant *G. ×intermedium* sites. Discovery of *G. jessoense* var. *parvulum* would be important, as it currently is not known as an extant member of the Iowa flora. Kathleen Pryer (pers. comm.) noted the existence of two herbarium specimens of *G. jessoense* var. *parvulum* collected in Iowa, portions of a July 1882 collection from Winneshiek County (*Holway* s.n. [GH]) and a September 1958 collection from Allamakee County (*Hartley* 6254 [IA]). Unfortunately, the Allamakee County specimen could not be located during this study and recent searches for this taxon at the site have been unsuccessful.

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