

SHORTER NOTES

***Botrychium pallidum* Newly Discovered in Maine.**—A recent report of *Botrychium pallidum* W. H. Wagner from Maine (Wagner, Jr., W. H. and F. S. Wagner, 1993, Ophioglossaceae. Pp. 85-105 in FNA Editorial Committee, *Flora of North America north of Mexico*, vol. 2. Pteridophytes and Gymnosperms. Oxford University Press, New York) was apparently erroneous (W. H. Wagner, pers. comm.) and was subsequently removed in the second printing of early 1994. It is not known on what basis the report was made, and no specimens have been seen in regional herbaria to support it. Now, however, the species has been discovered at a site in Washington County, Maine, the first in the northeastern United States. The site is located approximately 440 km south of the nearest known station at Bic, Saguenay County, Quebec.

The Maine population was observed first on 3 July 2000 and again on 17 June 2001. On both dates, only two plants were observed. Given the difficulties inherent in identifying moonworts (Williston, P. 2001. *The Botrychiaceae of Alberta*. Alberta Natural Heritage Information Centre, Edmonton), the identification awaited confirmation until another visit was made on 14 June 2003, when 60 well-formed, unequivocally identifiable plants were observed. They occurred singly and in small clumps (2–4 stems per clump), scattered over an area approximately 12 m × 60 m. On a return visit on 24 June 2003, fewer plants were observed, perhaps due to herbivory; plants on that date were observed to be sporulating and most were already senescent. One plant (above ground parts only) was collected for isozyme analysis and two for vouchers. Isozyme analysis also confirmed the identity (Don Farrar, Iowa State University, pers. comm.).

VOUCHER MATERIAL: **USA:** Maine: Washington County: Steuben, Petit Manan National Wildlife Refuge, 60 plants in old field, with *Botrychium simplex* and *Botrychium matricariifolium*, among low grasses, forbs, mosses, and lichens, 14 June 2003, *Gilman 03008*, Norm Famous & Marcia Spencer-Famous (IA); 24 June 2003, *Gilman 03009*, Arthur Haines, Sally Rooney, Linda Welch & Michael Langlois (MAINE, Herb. Petit Manan National Wildlife Refuge).

Botrychium pallidum was originally described from Quebec, where it was collected near Baie St. Catherine (Wagner, Jr., W. H. and F. S. Wagner. 1990. Notes on the fan-leaved group of moonworts in North America with descriptions of two new members. *Amer. Fern J.* 80:73–81). In Quebec, it has also been collected at Bic (Wagner 90010 & Wagner, MICH, image seen; *Coursol et al.*, DAO, image seen), and Forillon Federal Park, Gaspé County (J. Labrecque, Ministère de l'Environnement du Quebec, pers. comm.). It is also known from the Great Lakes region in Michigan (Upper and Lower Peninsulas), Ontario, and Minnesota, and occurs in Saskatchewan, Alberta, Montana, and Colorado (Wagner and Wagner, 1990; Wagner and Wagner, 1993; Williston, 2001). Nevertheless, it is a rare species with widely scattered populations normally

consisting of few individuals. It currently has a Global Heritage Status Rank of G3 (globally vulnerable) taxon (NatureServe, 2003, NatureServe Explorer: an on-line encyclopedia of life [web application]. Version 1.8. NatureServe, Arlington, VA. <http://www.natureserve.org/explorer> accessed 6 April 2004). Williston (2001), however, suggested it may be even rarer, i.e., G2 (globally imperiled).

The Maine population occurs on the Petit Manan National Wildlife Refuge (PMNWR), a federal holding dedicated primarily to preserving migratory bird habitat and enhancing the success of seabird nesting (<http://petitmananfws.gov>). The *Botrychium pallidum* colony is approximately 400 m from the ocean, in a dry field with a sparse to thin stand of grasses, notably *Festuca filiformis* Pourret and *F. rubra* L., and a sparse cover of mostly non-native forbs, especially *Hieracium pilosella* L., *H. praealtum* Gochnat, *Taraxacum laevigatum* (Wild.) DC., *Rhinanthus crista-galli* L., *Rumex acetosella* L., and an undetermined annual species of *Trifolium*. Co-occurring in the habitat are *Botrychium matricariifolium* A. Br. and *B. simplex* E. Hitchc.

Other fields on the Refuge show a significant or dominant cover of ericaceous shrubs, e.g. *Vaccinium angustifolium* Aiton, *V. vitis-idaea* L., *V. myrtilloides* Michx., *Kalmia angustifolia* L., and *Rhododendron canadense* (L.) Torr. However, only a few scattered plants of *Vaccinium angustifolium* and *V. vitis-idaea* occur in the area of the *Botrychium* colony, evidence perhaps of a less acidic soil reaction or different history of disturbance in the immediate area. Areas within the colony not covered with vascular plants support patches of mosses, including *Aulacomnium palustre* (Hedw.) Schaegr. and *Polypodium piliferum* Hedw., and lichens, *Peltigera* sp. and *Cladonia* spp.

The discovery presents challenges. One is to discover other regional populations. *Botrychium matricariifolium*, *B. simplex*, and *B. lunaria* (L.) Sw. all occur along the immediate coast and on islands in eastern Maine and the Maritime Provinces, and additional populations of *B. pallidum* are to be expected. Accurately characterizing the micro-habitat of this population with respect to soil type, soil chemistry, nutrient input (perhaps including ions from storm spray), disturbance regime, and other factors may prove helpful in searching for other regional populations.

Another challenge devolves upon the US Fish and Wildlife Service: to manage the habitat in a manner that will maintain this population. Some type of long-rotation disturbance regime may be necessary to retard habitat succession and provide colonizable sites (Gilman, A. V. 2002. *Botrychium lunaria* (L.) Sw. (Moonwort) Conservation and Research Plan for New England. New England Wild Flower Society, Framingham, MA).

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