Final Project Report:
A search for three rare, endemic Minnesota mushroom species
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ABSTRACT

A search was made in August through October for three mushroom species, endemic to Minnesota, that have not been reported since about 1970. The search was focused on Nerstrand Woods State Park in the vicinity of which *Psathyrella rhodospora* was originally collected; Wolsfeld Woods Scientific and Natural Area, a potential site for *Psathyrella cystidiosa* which has not been reported since its original description from Minneapolis in 1912; and Crow Wing State Park near the original locality for *Suillus weaverae*. *Psathyrella rhodospora* was found twice and *P cystidiosa*, once. Both species were found at Nerstrand Woods State Park. *Psathyrella rhodospora* was also collected in Hennepin Co.; it appears to be uncommon. These are the first precise localities for these *Psathyrella* species and new county records for both species. Neither species was readily recognized from published accounts; field characters are discussed. More specific habitat data for both species has been obtained, and that for P. *rhodospora* should permit management decisions. *Suillus weaverae* was not found, probably because of the unusually dry weather in the type locality. A search for this species in a more favorable year for mushroom fruiting is needed.

INTRODUCTION

Three endemic mushroom species were the subject of a search this summer. They are listed as endangered on the Minnesota List of Endangered, Threatened and Special Concern Species, 1996. These fungi have not been reported since about 1970. They are: 1) *Psathyrella cystidiosa* (GH), not reported since its original description from Minneapolis in August, 1912; 2) *Psathyrella rhodospora* (G1), reported only from Rice County, MN, near Nerstrand Woods State Park, August, 1971, and 3) *Suillus* (*Fuscoboletinus*) *weaverae* (G1), reported only from Crow Wing County, Sept. and Oct., 1964 and 1969, between Pelican and Markee Lakes. The original collector of *Suillus weaverae* has searched for this species but has not observed it in recent years, but the search has not been expanded to similar habitat in the area. Previous searches have not been made for the other species. The two *Psathyrella* species have been collected only once. Better specimen documentation, including photographs, and habitat details would aid in field identification. These species have not been considered in any ecoregional planning effort, but establishment of a known locality would make such planning possible.

MATERIALS AND METHODS

Searches focused on three localities: Nerstrand Woods State Park, Wolsfeld Woods Scientific and Natural Area, and Crow Wing State Park. Each locality appeared to contain appropriate habitat for one of the three species. The area of Nerstrand Woods State Park has doubled in recent years and it was possible that it contained the original

locality for *Psathyrella rhodospora*. Wolsfeld Woods contains a variety of habitats appropriate for *Psathyrella* species and was searched for *Psathyrella* species in general, including *Psathyrella cystidiosa*. This genus has about 200 species. Because it is poorly known in Minnesota and *P. cystidiosa* can be confused with other species, we collected a number of *Psathyrella* species in all three localities. Crow Wing State Park is near the original habitat for *Suillus weaverae*.

David J. McLaughlin was responsible for organization of the effort and the identifications. He was assisted by a graduate student, Majahabeen Padamsee, in planning and processing materials. Day trips were made to Nerstrand Woods State Park, and Wolsfeld Woods SNA. The Minnesota Mycological Society and its President Anna Gerenday participated in several forays organized around searches for each of the species. A volunteer, Judy Kenny, participated in several of the trips.

Specimens were documented with descriptions, color photographs, and spore prints, and preserved by drying. Specimens and their documentation will be deposited in the University Herbarium. Identified specimens have been added to the Herbarium computerized fungal database.

RESULTS

The following trips have been made: Nerstrand Woods State Park, Aug. 12, 14, 18, and 29, the latter a foray of the Minnesota Mycological Society; Wolsfeld Woods SNA, Sept. 4 and 27; Crow Wing State Park, Sept. 11 and Oct. 11; Crow Wing State Forest and the original habitat of *Suillus weaverae*, Sept. 11 and Oct. 11, 12; Fort Snelling State Park, Sept. 10. Additional searches have been carried out in northern Minnesota by members of the Minnesota Mycological Society.

Two of the three species have been found at Nerstrand Woods State Park: *Psathyrella rhodospora* and *P. cystidiosa*. This is only the second time either of these species has been collected, and this is the first precise locality for each species. Each was obtained here only once despite extensive searches, especially for the large *P. rhodospora*, suggesting that at least *P. rhodospora* is uncommon since one other large *Psathyrella* species, *P. echiniceps*, was found repeatedly.

A chance find of *P. rhodospora* on and beside a cottonwood stump in Minneapolis on a bank above the Mississippi River suggested the desirability of searching for appropriate sites in Fort Snelling State Park. This is the first report of this species from Hennepin Co.

The search for the third species, *Suillus weaverae*, in Crow Wing Co. has been hampered by dry weather this summer. A detailed study was made of the vegetation at the original site to aid in finding appropriate habitat for this species in a good fruiting year (see attachment).

In addition to the two species reported, 13 collections of additional *Psathyrella* species, representing approximately 12 species, have been obtained and await detailed analysis. Three of the collections, one from Wolsfeld Woods SNA and two from Crow Wing State Park macroscopically resembled *P. cystidiosa*, but microscopic examination revealed that they lack the characteristic thick-walled cystidia of that species.

DISCUSSION

Psathyrella cystidiosa is difficult to recognize in the field. It appears to have a distinctive grayish brown spore print, while other similar species that were collected had blacker spore prints. Microscopically it can not be confused with other small species with yellowish brown pilei and white stipes because of the distinctive thick-walled cystidia on the face of the gills. A possible field character is the medium brown gills, but it remains to be determined whether similar species are consistently different. The collection grew scattered along a fallen branch and one specimen was on soil. The original report mentions a soil ball at the base of the fruitbodies (Peck, 1913), but the exact substrate has been uncertain. This is a new county record for this species and the first precise location. Some additional work on the specimen is needed as there is some disagreement with the published details for the type. Our specimen agrees microscopically with the specimen in the University Herbarium which appears to be a cotype, but the macroscopic appearance in the dried condition is not identical between the collections perhaps because of differences in preparation methods. Nevertheless, we are confident that this is the long lost *P. cystidiosa*.

Psathyrella rhodospora was not recognized when we first encountered it because the coloring and pileus surface details in very fresh specimens were not included in the original report (Smith, 1972, pp. 435-436). Pilei of fresh specimens are concentrically zoned with brownish pink and light reddish brown bands, but the colors and concentric zones fade to pale brown with age and fit the original description. However, the reddish brown spores on the gills, observable with a handlens, and spore deposits on some pilei, and the cespitose habit (i.e., fruitbodies with stipes joined at the base), are good field characters. The second collection from Hennepin Co. is a range extension, and suggests that the species may be more widespread. *Psathyrella rhodospora* was found only once at Nerstrand Woods State Park despite a very careful search over several days of several miles of woodland in the vicinity of the original collection; this suggests that it is uncommon. This species has been collected on three host trees: basswood (Smith, 1972), ironwood and aspen. In the new collections it was consistently associated with a dead tree or stump with the bark still attached, and the original report states that it was on a stump (Smith, 1972). The fruitbodies in the new collections were on the ground near or at the base of the host tree, and on the tree a short distance above the ground. This species appears to require recently dead deciduous trees with the bark in place. It was not observed with oaks which were consistently associated with *Psathyrella echiniceps*. Its conservation may require forests where recently dead trees are allowed to decay undisturbed.

Suillus weaverae was not observed in the several locations searched, including the original habitat. However, this was a dry year, and we know from monitoring of field plots elsewhere in Minnesota that species do not fruit every year. From past experience in Crow Wing Co. we know that many species were absent or fruiting in low numbers this year. Boletes, the common name for the group that includes *S. weaverae* , were very uncommon, and only three species, and few fruitbodies of each, were found in three days of searching. In October at the original locality for *S. weaverae* 15 mushroom species were present but no boletes. On the other hand, *Laccaria trullisata*, a special concern species on the State List, was very abundant nearby. Crow Wing State Park on the east side of the Mississippi River was not a promising habitat because it was not very similar

to the original locality of the species, especially in the low number of pines, the probable host for this mycorrhizal species, and the high number of oaks. The west side of the Mississippi River within the park looks promising for a future search as does Crow Wing State Forest near Lougee Lake, just west of the original site for this species. The original locality of the species on private land is not secure and an adjacent lot was cleared this year of most trees and shrubs.

In conclusion, *Psathyrella rhodospora* could be more widely distributed in deciduous woodlands and a search for it throughout the maple-basswood forest region appears desirable. It is also possible that *P. cystidiosa* will have a similar distribution. For *Suillus weaverae* a search in a good fruiting year is needed to determine the status of this species.

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References

Peck, C. H. 1913. Report of the state botanist for 1912. Bull. Univ. State N. Y., pp. 46, 47.

Smith, A.H. The North American species of *Psathyrella*. Mem. N.Y. Bot. Gard. 24: 1-623.

Appendix

Vegetation analysis of the original locality for *Suillus weaverae*.
Vegetation analysis of the original locality for *Suillus weaverae* . between Markee and Pelican Lakes, Crow Wing Co., 10 Oct. 1998

Many of the smaller trees would have been absent when *Suillus weaverae*. was originally collected in 1964 and 1969.

Trees

3, 18-inch-diam *Pinus strobus*
1, 12-inch-diam *Pinus banksiana*
1, dead 12-inch-diam *Pinus resinosa*
1, 8-inch-diam birch, plus several dead ones
3, 8- to 12-inch-diam *Quercus* (*ellipsoidalis*?)
1, 6-inch-diam *Quercus macrocarpa*
2-3, 12-inch-diam basswoods
Many, up to 5-inch-diam *Ostrya virginiana*, mostly small and fairly common
Several, young *Acer saccharum*

1, 14-inch-diam aspen, some distance away

Shrubs
Many hazel
Dogwood
Ribes
Young ash = prickly ash?

Herbaceous plants
Blackberry?
Blueberry
Bracken fern
Chimaphila umbellata
Cornus canadensis
Small grasses
Hepatica
Lady fern?
Maianthimum canadense
Monotropa
Poison ivy
Thalictrum
Ranunculus (*abortivus*?)
Strawberry