Additions to the Iowa Pteridophyte Flora - III

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To prior reports on the studies of the Iowa pteridophyte flora, five taxa (Botrychium campestre Wagner & Farrar, Botrychium mattriariifolium A. Braun, Cystopteris fragilis (L.) Bernh., Cystopteris laurentiana (Weath.) Blasdoll, and Lycopodium inundatum L.) are added, along with 215 new county occurrence records for 39 taxa. Currently, the Iowa pteridophyte flora consists of 70 taxa, supported with 1656 county occurrence records; only 72 (4%) of these records are based solely on collections made before 1950.

INDEX DESCRIPTORS: Botrychium campestre, Botrychium mattriariifolium, Cystopteris fragilis, Cystopteris laurentiana. Ferns, Fern allies, Iowa vascular flora, Lycopodium inundatum, Pteridophytes.

The last comprehensive manual of the Iowa pteridophytes (ferns and fern allies) by Cooper (1959) reported a flora of 54 taxa supported by 846 county occurrence records. Since 1970, the Iowa pteridophyte flora has been studied by D. R. Farrar, C. J. Peck, D. M. Roosa, and J. H. Peck, with the support of many other workers. A series of reports summarized literature that dealt with Iowa pteridophytes (Peck, 1976a, 1984), herbarium collections (Peck, 1976b), and ongoing field searches that added taxa to the flora or increased the extent of county occurrence records (Peck, 1980, 1983). Since the last floristic summary (Peck, 1983), additional taxa and county occurrence records of Iowa pteridophytes have been brought to my attention (Peck, Nekola, and Farrar, 1989). Field work conducted in autumn 1987 also contributed additional county occurrence records, allowed verification of identifications of new collections, and allowed me to re-examine problematic specimens in Iowa herbaria.

Many problematic specimens are of the genus Cystopteris, which Peck (1976b) noted was a significant problem for future study of Iowa pteridophytes. Almost simultaneously, Lovis (1977) described Cystopteris as being "perhaps the most formidable biosystematic problem in the ferns". Subsequent collecting in the Driftless Area of northeastern Iowa (Peck, 1982) led to a realization that the Cystopteris fragilis complex in that region was not adequately treated by the generic monograph of Blasdoll (1963). Specimens were sent to a variety of experts, including Robin Moran and Chris Haufler, who were in the process of documenting the presence of 17 taxa (many of which are cryptic and remain unnamed) hidden within plants originally called "Cystopteris fragilis", including three diploids, five triploids, seven tetraploids, one pentaploid, and one hexaploid taxon (Lellinger, 1985). Of these 17, five are now known from Iowa: C. fragilis, C. prostrata, C. tenuis, C. tennesseensis, and C. laurentiana. Based on the taxa known to occur in Iowa, and the possible backcrossing among them, another seven Cystopteris taxa may yet be discovered in Iowa. Additional collection and study of Cystopteris in Iowa probably will be rewarding.

This report adds five taxa new to the pteridophyte flora of Iowa, clarifies nomenclatural status of several Iowa taxa, adds 215 new county occurrence records, and lists 72 county occurrence records which remain voucheder only by specimens collected before 1950. With these additions and clarifying remarks, the Iowa pteridophyte flora now consists of 70 taxa, supported by 1656 county occurrence records. This is a surprisingly large flora and county occurrence record total for a state once dominated by tall grass prairie that was subsequently replaced by equally inimical, intensive row-crop agriculture.

STATE RECORDS

Botrychium campestre W. Wagner and Farrar, Prairie Moonwort, is a North American endemic occurring in the northern Great Plains and Great Lakes region of Canada and the United States. It was recently described (Wagner and Wagner, 1986) from populations that occur in the Loess Hills from four counties in western Iowa. The Iowa plants were discovered in Monona Co. by Ted Van Bruggen in 1982, recognized as plants new to Iowa by Lawrence Ellers, and after study by Farrar (1985), Farrar and Johnson, Groh (1986), and Wagner and Wagner (1986), described as a new species. The Prairie Moonwort is encountered in xeric prairies, but only from late-April to mid-June, when soil conditions are moderated. It is now known from six counties in Iowa: Dickenson, Fremont, Monona, Plymouth, Portawattamie, and Woodbury.

Botrychium mattriariifolium A. Braun ex Koch., Daisy-leaved Moonwort, is an amphi-atlantic species that occurs in northeastern North America, westward into the Great Lakes Region, and then southward into the Driftless Area of Wisconsin (Peck, 1982). It was collected in 1986 from Yellow River State Forest in Allamakee Co., Iowa. The site was a relatively pure stand of sugar maple (Acer saccharum) on a north-facing slope with a sparse understory, thick leaf litter, and deep humus. This locality is only 15 km across the Mississippi River from its nearest known population at Wyalusing State Park, Grant Co., Wisconsin. Additional effort is needed to locate more localities of this fern in Iowa. It should be searched for in May and June.

Cystopteris fragilis (L.) Bernh., Fragile Fern, co-occurs in Iowa with other species and hybrids in the Fragile Fern complex that were previously reported from Iowa. These taxa are particularly abundant on north-facing, moist, algalic and sandstone outcrops in the Driftless Area in northeastern Iowa (Peck, 1982). Extensive collection of Cystopteris was undertaken during a survey of the pteridophytes of the Driftless Area (Peck, 1982). These specimens and those of major Iowa herbaria were re-examined in autumn 1987, and compared with recent works on the biosystematics of the genus (Moran, 1982a, 1982b, 1983a, 1983b; Haufler, 1985; Haufler et al., 1985; Lellinger, 1985). Collections of this taxa were located in nine counties: Allamakee, Clayton, Delaware, Fayette, Harding, Howard, Jackson, Lyon, and Winneshiek.

Cystopteris laurentiana (Weath.) Blasdoll, the Northern Hybrid Fragile Fern, is a North American endemic that occurs in northeastern North America, westward to the Great Lakes Region and southward in the Driftless Area (Peck, 1982). It is the putative hybrid of C. fragilis (L.) Bernh. and C. bulbifera (L.) Bernh. that has undergone polyploidy to become a fertile hexaploid (Blasdales, 1963; Lellinger, 1985). In Iowa, it co-occurs with C. bulbifera, C. fragilis, C. prostrata, and C. tenuis one north-facing, moist, algalic or sandstone outcrops. The small, dark, scaly, and abortive bulblets on C. laurentiana do not readily fall off, making this taxon easy to distinguish from its parents. It is distinguished from C. tennesseensis Shaver by foliar morphology and its larger spore size. Based on reexamination of herbarium specimens and some additional field work in autumn 1987, this hybrid is now known from six counties, all located in extreme
northeastern Iowa; Allamakee, Clayton, Dubuque, Howard, Jackson, and Winneshiek. *Lycopodiun inundatum* L., Bog Clubmoss, was discovered in Iowa by Jeff Nekola in 1987. He found this circumboreal, bog-loving species in an over-grazed, native, sand prairie in Buchanan Co. The plants were growing in wet swales. In 1987, the plants released spores in late September. The population is disjunct by 500 km from the nearest populations in Illinois and Wisconsin (Peck, 1982).

**NOMENCLATURAL NOTES**

The correct binomial for Mackay's Fragile Fern is *Cystopteris tennensis* (Michx.) Desv., recently interpreted as the correct binomial for *C. protesta* and an unknown diploid species (Haufler, et al., 1985; Lelling, 1985). It was formerly known as *C. fragilis* (L.) Bernh. var. *mackayi* Laws. It hybridizes with *C. bulbosa* to form *C. x illeminsis* Moran, a hybrid not yet known from Iowa. It also hybridizes with the fertile hybrid *C. tennensis*, forming the the backcross hybrid *C. x tugnieri*, which also is not yet known from Iowa.

The correct name for the Spinule Wood Fern is now *Dryopteris carthusiana* (Villars) H. P. Fuchs (Lelling, 1985). It was formerly known as *D. spinulosa* (O. F. Muell.) Watt.

The correct name for the Crowdwood Clubmoss is now *Lycopodiun digitatum* A. Br. (Hickey and Beitel, 1979). It was formerly known as *L. complanatum var. flabelligerum* Fern. and *L. flabelligerum* (Fern.) Blanch.

The correct name for the Northern Adder's-tongue Fern is now *Ophioglossum pusillum* Raf. (Lelling, 1985). It was formerly known as *O. vulgare* L. var. *pseudopodum* (Blake) Farwell.

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**COUNTY OCCURRENCE RECORDS**

Black Hawk Co.: Lamners 3196 (ISTC), Boone Co.: Farrar sn. (ISTC), Bremer Co.: Peck 87187 (ISTC), Buchanan Co.: Peck 87179 (ISTC), Cedar Co.: Peck 87167 (ISTC), Chickasaw Co.: Peck 87188 (ISTC), Clinton Co.: Peck 87190 (ISTC), Davis Co.: Peck 87096 (ISTC), Hancock Co.: Farrar sn. (ISTC), Howard Co.: Peck 87197 (ISTC), Jefferson Co.: Peck 87110 (ISTC), Keokuk Co.: Peck 87114 (ISTC), Louisa Co.: Peck 87129 (ISTC), Muscatine Co.: Peck 87121 (ISTC), Scott Co.: Peck 87170 (ISTC), Washington Co.: Peck 87060 (ISTC), Wayne Co.: Peck 87109 (ISTC).

*Cystopteris laevigata* (Weath.) Blasdell: Allamakee Co.: Peck 80624 (ISTC), Benedict sn. (VPI), Clayton Co.: Roosa 1814 (ISTC), Dubuque Co.: Peck 80617 (ISTC), Howard Co.: Farrar sn. (ISTC), Pammel and Zimmerman 325 (MO), Jackson Co.: Peck 80607 (ISTC), Winneshiek Co.: Peck 87242 (ISTC), Rosendahl 3668 (MIN).

*Cystopteris tennensis* Shaver: Boone Co.: Farrar 855204 (ISTC), Fayette Co.: Peusteri 404 (ISTC), Pammel sn. (MO), Jones Co.: Farrar 6187 (ISTC).

Deletions: Allamakee, Clayton, Dubuque, Jackson, Winneshiek co.

*Dryopteris carthusiana* (Vill.) H. P. Fuchs: Buchanan Co.: Peck 87247 (ISTC), Chickasaw Co.: Peck 87192 (ISTC), Fayette Co.: Klug 524861 (IA), Guthrie Co.: Farrar 874123 (ISTC), Keokuk Co.: Klug 726875 (IA), Louisa Co.: Peck 87131 (ISTC), Mitchell Co.: Roosa 6539 (ISTC), Monroe Co.: Roosa 6535 (ISTC), Scott Co.: Peck 87174 (ISTC).

*Dryopteris cristata* (L.) Gray: Benton Co.: Peck 87161 (ISTC), Buchanan Co.: Peck 87247 (ISTC), Fayette Co.: Klug 524861 (IA), Hardin Co.: Farrar 855202 (ISCT), Howard Co.: Roosa 6590 (ISTC), Iowa Co.: Klug 913861 (IA), Jones Co.: Peck 87161 (ISTC), Marshall Co.: Pustari 286 (ISTC), Mitchell Co.: Roosa 6269 (ISTC), Worth Co.: Roosa 6486 (ISTC).

*Dryopteris goldiana* (Hook.) Gray: Delaware Co.: Pustari 356 (ISTC), Iowa Co.: Klug 83861 (IA), Mitchell Co.: Roosa 6216 (ISTC).

*Equisetum fluviatile* L.: Bremer Co.: Nekola 6891 (ISTC), Buchanan Co.: Nekola 6594 (ISTC).

*Equisetum pratense* Ehrh.: Butler Co.: Klug sn. (IA), Mitchell Co.: Leoschke 181 (ISTC).

*Equisetum scirpoides* Michx.: Jackson Co.: Pustari sn. (ISTC), Delaware Co.: Roosa 6187 (ISTC).

*Equisetum sylvaticum* L.: Buchanan Co.: Roosa 6309 (ISTC), Butler Co.: Klug sn. (IA), Howard Co.: Nekola 6920 (ISTC).

*Equisetum X litorale* Kuhlb.: Clinton Co.: Leoshcke 225 (ISTC), Mitchell Co.: Farrar (ISTC).

*Lycopodiun digitatum* A. Braun: Clinton Co.: Bryant & Selby sn. (ISTC), Dubuque Co.: Lehmann 820611126 (ISTC), Jones Co.: Nekola 6565 (ISTC).

*Lycopodiun inundatum* L.: Buchanan Co.: Nekola sn. (COE), Roosa 6576 (ISTC), Peck 87003 (ISTC).

*Lycopodiun lucidulum* Michx.: Benton Co.: Nekola sn. (COE), Guthrie Co.: Roosa 6542
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REFERENCES


