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Rare Iowa Plant Notes from the R. V. Drexler Herbarium

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Notes on the distribution, habitats, associated species, and taxonomic considerations for 134 rare Iowa plants are presented. These taxa, including 15 Pteridophytes, 74 Dicots, and 45 Monocots were located during a decade of field research (1979-1989) concentrated in eastern, northeastern, and northwestern Iowa. Included among these are 10 taxa previously unrecorded from the Iowa flora (*Carex sterilis*, *Circaea X intermedia*, *Cypripedium calceolus* var. *parviflorum*, *Lycopodium inundatum*, *Opuntia macrorhiza*, *Salix candida X Salix rigida*, *Salix X clarkei*, *Solidago uliginosa*, *Spiranthes ovalis*, *Viola adunca*), and 15 taxa (*Angelica atropurpurea*, *Aristolochia serpentaria*, *Artemisia frigida*, *Aster linarifolius*, *Berula pusilla*, *Carex conoidea*, *Eleocharis pauciflora* var. *fernaldii*, *Erythronium americanum*, *Galium labradoricum*, *Hypericum gentainoides*, *Juncus marginatus*, *Potentilla pensylvanica*, *Salix candida*, *Viola renifolia*, and *Xyris torta*) which were once feared extirpated from the state (based on Roosa and Eilers 1978, Howe *et al.* 1984). The remainder of the species discussed are rare in Iowa or are restricted to special habitats within the state, including algific talus slopes, fens, and vernal pools.

INDEX DESCRIPTORS: Iowa flora, Rare taxa, Algific talus slopes, Fens, Vernal pools.

During his tenure at the University of Iowa, Robert F. Thorne became deeply interested in the flora of the state. Twice he published papers describing distributions, habitats, associated species, and new sites for the rarest of Iowa's plants (Thorne 1953, 1956). These two landmark papers were the first accounts of rare plant species published in the state, and were the only work of their kind available until the issuing of the first publication on Iowa "threatened and endangered species" almost two decades later (Roosa and Eilers 1978). The acquisition of this reference in 1979 (with a handwritten good-luck wish from Dean Roosa) spurred the author's interest in Iowa's rare flora. An effort was initiated that year to locate as many populations for rare Iowa plants as possible, with the hope that the habitats and species identified could be afforded protection. The following decade of field work (principally in eastern, northeastern, and northwestern Iowa) has produced a large number of historical site re-verifications and new stations for many of the state's rarest plants. A number of unique habitat types across the state, including the first documentation of fen communities from eastern and central Iowa (Nekola 1988) were also discovered during this time. This new information has altered not only the number of extant stations for these rare species, but their habitat associations and distributions as well.

A written record of the distribution, habitats, and natural history for these species would be useful for interested botanists in the state, a goal identical to that of Thorne (1956) in the publication of his "Notes." An effort has been made in this paper to remain consistent with the spirit and format used by R. F. Thorne in his two original "Notes," so that this contribution can function as a continuation of his work.

Taxa have been arranged alphabetically by family, genus and

Pteridophytes

Adiantaceae

Pellaea atropurpurea (L.) Link has been reported from only 4 sites in the state - 3 of which are located in Allamakee County (Peck 1978). A fourth Allamakee County site has been vouchered: Fish Farm Mounds Wildlife Area, Sec. 23 and 26, Iowa Twp., June 25, 1986, JCN and Dennis Schlicht (6993). Two colonies were observed in glades adjacent to the preserve, where individuals grew on vertical sandstone ledges in full sun or partial shade of over-hanging *Betula papyrifera* and *Juniperus virginiana* trees.

Equisetaceae

Equisetum fluviatile L. is considered rare and

species within the major subheadings of "Pteridophytes," "Dicotyledons," and "Monocotyledons." Nomenclature, except for minor exceptions in the Pteridophytes and Orchidaceae, follows that of Swink and Wilhem (1979). The nomenclature of Peck (1982) and Luer (1975) have been used, respectively, for these two other groups. For each taxon, information regarding Iowa distributional information at time of discovery, observed extant populations, and preferred habitat has been enumerated. In addition, some associated species lists and taxonomic information have been included. Distributional information at time of discovery is discussed so to provide a historical context for these findings. Thus, some older publications (such as Roosa and Eilers 1978) have been utilized, and some recent unpublished data from other researchers have not been included. As only published references at time of writing were utilized, unpublished data from other researchers may alter some of my county record information.

Each record for an observed extant population of a species includes: 1) site name (if applicable), 2) legal location, 3) date of collection or observation, 4) collectors/observers (no listing is included if the author (JCN) was the only collector/observer), and 5) accession number of collection. All collections are deposited in the R.V. Drexler Herbarium of Coe College in Cedar Rapids, Iowa.

The bulk of these observations are based upon sites first discovered by the author. The remainder represent old historical records or sites originally located by other parties. As the identification of rare species on these latter sites was possible only through the generosity of other individuals, these locations, along with those who provided the location information, are listed in Table 1. While other researchers may have independently visited some of these sites, all data were gathered solely through personal investigation by the author.

restricted to the northern half of the state (Peck 1976). It is represented by 16 post-1980 collections in the R.V. Drexler Herbarium: **Allamakee:** Clear Creek Fen, S½ NW¼ Sec. 27, Union City Twp., June 25, 1986, JCN and Dennis Schlicht (6973); **Bremer:** Buschine Fen, N½ NW¼ Sec. 36, Polk Twp., June 6, 1986. JCN and John Brayton (6891), July 19, 1989 (8154); **Buchanan:** Cutschall Access Park, Sec. 6, Perry Twp., May 28, 1985, JCN and Dave Wendling (6594); **Cerro Gordo:** Buffalo Slough, W½ NE¼ SE¼ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Terrence Frest, Dennis Schlicht, and Dean Roosa (7419); **Chickasaw:** Split Rock Park, SW¼ SW¼ SW¼ Sec. 35, Dresden Twp., June 24, 1986, JCN and Dennis

Schlicht (6985); **Clayton:** SW¼ SE¼ SE¼ Sec. 29, Sperry Twp., June 14, 1986 (6888); **Clinton:** Selby Sand Ridge 2 Fen, NE¼ SE¼ NE¼ Sec. 23, Liberty Twp., June 29, 1989 (8055); **Fayette:** SW¼ Sec. 5, Illyria Twp., June 18, 1986 (6965); **Alpha SW 1 Fen,** SE¼ SW¼ SE¼ SE¼ Sec. 9, Bethel Twp., July 19, 1988 (7726); **Alpha SW 2 Fen,** NE¼ SE¼ SW¼ Sec. 9, Bethel Twp., July 19, 1988 (7727); **Linn:** Central City Fen, NE¼ NW¼ NE¼ Sec. 9, Maine Twp., May 28, 1984 (6225); **Matus Fen,** NE¼ Sec. 36, Maine Twp., May 25, 1985 (6742); **Muscatine:** Conesville Fen, NE¼ Sec. 20, Orono Twp., June 18, 1989, JCN and Dean Roosa (7999); **Worth:** Belin Sough, W½ SE¼ NE¼ Sec. 13, Brookfield Twp., June 3, 1986, JCN

and Dennis Schlicht (6940); Christianson-Taylor Wildlife Area, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 15, Hartland Twp., June 3, 1986, JCN and Dennis Schlicht (6942); Hanlontown Marsh, N $\frac{1}{2}$, NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 12, Fertile Twp., June 3, 1986, JCN and Dennis Schlicht (6951).

These populations were located in cool, wet soil of fens, seepage areas, and marshes, usually in full sun. While certainly more common than once believed, *E. fluviatile* still represents an uncommon to rare component of Iowa's flora.

Equisetum pratense Ehrh. was recently considered infrequent to rare in the state, being essentially restricted to east-central and north-eastern counties (Peck 1976, Roosa and Eilers 1978). Eighteen collections from unreported populations have been made since 1980: Allamakee: SW $\frac{1}{2}$ SW $\frac{1}{2}$ Sec. 29, Waterloo Twp., May 16, 1984, JCN and Shawn Dvorak (6189); Sec. 18, Franklin Twp., August 12, 1986 (7048); NE $\frac{1}{4}$ Sec. 24, Franklin Twp., June 30, 1987, JCN and Terrence Frest (7408); Clayton: Bixby State Preserve, Sec. 23, Lodomillo Twp., July 12, 1982 (7617); Pike's Peak State Park, Sec. 35, Mendon Twp., October 3, 1982 (7619); Sec. 16, Garnaville Twp., May 17, 1984, JCN and Shawn Dvorak (6190); Sec. 31, Sperry Twp., June 14, 1986 (6882); Sec. 7, Jefferson Twp., June 19, 1986 (6960); Sec. 29, Garnaville Twp., May 14, 1987 (7273); Delaware: Sec. 11, Elk Twp., August 18, 1984, JCN, Robert Thomson, and William Thomas (6297); Sec. 10, Elk Twp., August 31, 1984 (6406); Fayette: Sec. 5, Fairfield Twp., June 18, 1986 (6972); Linn: Indian Creek Nature Center, W $\frac{1}{2}$ Sec. 30, Bertram Twp., September 18, 1982 (7621); Greenvalley Woods, SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 24, Bertram Twp., October 17, 1982, JCN and William Desmaris (7620); Wickiup Access, N $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 10, Monroe Twp., September 7, 1983 (6113); N $\frac{1}{2}$ Sec. 32, Buffalo Twp., May 20, 1989, JCN and Fred R. Nekola (7864); Winneshiek: Sec. 2, Madison Twp., July 1, 1985 (6638); Sec. 13, Bluffton Twp., June 28, 1987 (7378).

While this species seems to be most regularly encountered on algific talus slopes, it also frequently occurs on wooded, sandy banks. In these situations, *E. pratense* can become established in woodland openings dominated by old-field species such as *Achillea millefolium*, *Helianthemum canadense*, *Heuchera richardsonii*, *Rhus radicans*, *Rudbeckia hirta*, *Rumex acetosella*, and *Taraxacum officinale*. Population sizes may become very large on such sites, with it becoming the dominant herbaceous species.

Equisetum scirpoides Michx. was first reported in the state by Hartley (1962) from Allamakee, Clayton, and Winneshiek counties. As recently as 11 years ago, only 6 extant populations were known, all restricted to cold, mossy areas on algific talus slopes (Peck 1978). A number additional populations have been uncovered by Terrence Frest in field investigations of these communities (Frest 1982, 1983, 1984, 1986a, 1986b). Six sites are represented in collections at the R. V. Drexler Herbarium: Allamakee: Sec. 18, Franklin Twp., August 12, 1986 (7049); Clayton: Sec. 25, Boardman Twp., May 16, 1984, JCN and Shawn Dvorak (6200); Sec. 27, Elk Twp., May 12, 1985 (6623); Delaware: Sec. 10, Elk Twp., August 31, 1984 (6385); Winneshiek: Sec. 20, Decorah Twp., May 16, 1984,

JCN and Shawn Dvorak (6163); Sec. 2, Madison Twp., July 1, 1985 (6641). The Delaware County collection represented, at time of discovery, a southern extension of the species' Iowa range, as well as a county record. Subsequently, a more southerly population was discovered in Jackson County (Frest 1986b).

Equisetum sylvaticum L., was recently thought limited to one extant population in Iowa County (Peck 1976; Roosa and Eilers 1978; Howe *et al.* 1984). Five additional populations have been observed in 3 counties since 1984: Buchanan: Bearbauer Prairie, W $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, Homer Twp., May 28, 1985, JCN and Dave Wendling (6596); Fayette: Hawkeye Prairie, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, Windsor Twp., July 20, 1988, JCN and John Brayton (7742); Howard: Lime Springs Fen, S $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 27, Forest City Twp., June 1, 1986, JCN and Dennis Schlicht (6920); Howard Center Prairie, S $\frac{1}{2}$ S $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 14, Howard Center Twp., August 2, 1988 (7777); Linn: E $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 9, Maine Twp., May 28, 1984, JCN and Robert Thomson (6224).

The Linn County site grows along the same railroad from which Bohumil Shimek collected this species in 1928 (Peck 1978). In Iowa, this species seems to prefer mesic to wet-mesic prairies, and is usually found in full sun. It also seems capable of withstanding fairly severe disturbances; at the Linn County site stems were observed growing at least 3 meters into an adjacent cultivated field.

Lycopodiaceae

Lycopodium dendroideum Michx. had been considered extant at only a single Clayton County site (Howe *et al.* 1984). When observed in June 1987, this population was found to have dwindled to one single rhizome with three erect stems. This species had also been collected from White Pine Hollow State Preserve in northwestern Dubuque County (Thorne 1964), but had not been observed there in recent years (Roosa and Eilers 1978). The population was relocated in 1984 (Sec. 8, Liberty Twp., September 16, 1984 [6399]) and found to be quite healthy, covering a 4 meter-square patch on a *Taxus canadensis*-covered limestone block on an algific talus slope.

Lycopodium digitatum Dillen *ex* A.Br. had been considered extant at only 3 Iowa sites (Howe *et al.* 1984). Four additional populations have been vouchered since 1985 in eastern Iowa: Clinton: Sherman Park, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 36, Spring Rock Twp., July 20, 1987, JCN and Bob Bryant (7446); Fayette: Volga Recreation Area, SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 22, Westfield Twp., June 13, 1987, JCN and Terrence Frest (7307); Jones: Camp Courageous, NE $\frac{1}{4}$ Sec. 5, Scotch Grove Twp., May 10, 1985 (6565); Linn: Izaak Walton League Grounds, NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 12, Monroe Twp., June 21, 1989, JCN and Leslie Blin (8030). All 4 of these collections represent county records. The Linn County site is most unusual, as the population occurs with *Polytrichum* moss in almost full sun on the border of a xeric sand prairie remnant. The other three populations were more typical, being found in wooded, usually sandy, situations.

Lycopodium inundatum L. was first observed in the state July 17, 1987 by the author and Shawn Dvorak in extreme southern Buchanan County:

SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., (7465). This population is 150 miles disjunct from the nearest sites in Wisconsin and Illinois (Hartley 1962, Sheviak 1981, Peck 1982). It occurred in bare sand at the edges of vernal pools on a heavily pastured paha ridge. This site was found to harbor a remarkable assemblage of rare or uncommon eastern Iowa taxa, including *Botrychium multifidum*, *Carex tonsa*, *Dryopteris cristata*, *Eriophorum angustifolium*, *Grindelia squarrosa*, *Hypericum gentianoides*, *Hypericum majus*, *Linaria canadensis*, *Ludwigia polycarpa*, *Muhlenbergia glomerata*, *Ophioglossum pusillum*, *Polygala cruciata*, *Polygala polygama* var. *obtusata*, *Salix pedicellaris*, *Triadenum fraseri*, *Viola lanceolata*, *Viola pallens*, *Vulpia octoflora*, and *Xyris torta*. This site is certainly one of the richest localities for rare plants in the state.

Lycopodium lucidulum Michx. is known from scattered localities in northeastern and central Iowa (Peck 1976, 1978). It can be added to the floras of two additional counties: Fayette: Foot's Woods, S $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 36, Eden Twp., May 1, 1985, JCN, Gretchen and John Brayton (6614); Linn: Indian Creek Nature Center, W $\frac{1}{2}$ Sec. 30, Bertram Twp., May 26, 1982, JCN and Shawn Dvorak (7606); Palisades-Dows State Preserve, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 24, Bertram Twp., April 15, 1986 (6800). A population has also been discovered by Jacquie Broz near Urbana in Benton County. While a single specimen from this population has been observed by the author, the site needs to be reverified as this collection has been lost.

Ophioglossaceae

Botrychium multifidum (Gmel.) Rupr. was recently known only from pre-1960 Allamakee, Fayette, and Winneshiek County collections (Roosa and Eilers 1978, Peck 1978). Two new populations for this taxon can be reported: Linn: Xyris Pond, E $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 1, Grant Twp., July 3, 1989, JCN and Robert Thomson (8074); Winneshiek: Hesper Woods, S $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 9, Hesper Twp., June 16, 1989, JCN and Dean Roosa (7954).

While the latter population was found in the usual mesic woodland habitat for this species, the Linn County population occurred in a radically different situation, with stunted plants growing in full sun on bare sand at the margin of a vernal pool, associating with typical species of this habitat such as *Carex conoidea*, *Gerardia purpurea*, *Hypericum majus*, *Triadenum fraseri*, *Viola lanceolata*, and *Xyris torta*. Another vernal pool population of *B. multifidum* was discovered in nearby Buchanan County, at the site harboring *Lycopodium inundatum* (James Peck, personal communication).

Ophioglossum pusillum Raf. was thought to be one of the rarest Iowa pteridophytes, being restricted to three small populations (Peck 1978, Roosa and Eilers 1978). It appears that this fern has actually been overlooked due to its inconspicuous nature and poorly understood habitat requirements, for 16 populations are represented in post-1982 collections: Benton: Gilchrist Fen, S $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 12, Polk Twp., July 21, 1988 (7669); Bremer: Horsley Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 28, 1984 (6368); Middle Slough - Brayton Prairie, NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 2, Dayton Twp., August 25,

1984 (6377); **Black Hawk:** Mark Sand Prairie, Sec. 19, Union Twp., May 29, 1989, JCN and Dennis Schlicht (7865); **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., June 21, 1985 (6737); Winthrop Prairie, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 33, Byron Twp., June 8, 1989 (7927); Walker Sand Ridge, SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., June 10, 1989 (7939); **Cedar:** NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 36, Rochester Twp., June 27, 1986 (7388); **Chickasaw:** Kleiss Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 26, Stapleton Twp., September 23, 1984, JCN and John Brayton (6401); **Fayette:** Donnan Prairie, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 2, Center Twp., July 6, 1986, JCN and John Brayton (6900); Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., July 18, 1988 (7714); Sumner SW Fen, SE $\frac{1}{4}$ Sec. 6, Fremont Twp., August 3, 1988 (7760); **Johnson:** William's Prairie, Sec. 5, Oxford Twp., June 9, 1983, JCN and Shawn Dvorak (5989); **Linn:** Rock Island Preserve, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 1, Monroe Twp., June 13, 1983 (5995); Coggon Pond, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 27, Jackson Twp., July 3, 1989, JCN and Robert Thomson (8069); **Marshall:** Marietta Sand Prairie, Sec. 11, Marietta Twp., July 15, 1989 (8107). The 1989 Coggon Pond collection greatly increased its known population size at this station, with a large number of individuals being observed on the site's extreme northwestern end.

Three habitats seem to be preferred by this species: 1) sedge dominated wet-mesic prairie, 2) wet sand areas (ranging from full sun to heavy shade), and 3) open (typically *Sphagnum* or other bryophyte dominated) hummocks in fens. Diligent hands-and-knees searching is usually required for location of specimens, even in areas with large populations. *Ophioglossum pusillum*, while always of restricted occurrence, may be located eventually in most east-central and north-eastern Iowa counties.

Polypodiaceae

Dryopteris cristata (L.) Gray has been considered rare in the state by most pteridophyte authorities (Melhus 1936, Cooperrider 1959, Peck 1976). While certainly uncommon, *D. cristata* has been found to occur in fens, sandy marshes, and sandy woodlands in a number of eastern Iowa counties: **Benton:** Gilchrest Fen, S $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 12, Polk Twp., June 6, 1987 (7227); **Bremner:** Brayton-Horsely Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., August 25, 1984 (6376); **Buchanan:** Sheldon Fen, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 12, Madison Twp., May 3, 1986, JCN and Dennis Schlicht (7391); **Cedar:** SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 25, Rochester Twp., June 19, 1989 (8016); **Chickasaw:** Kleiss Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 26, Stapleton Twp., September 23, 1984, JCN and John Brayton (6405); **Clayton:** Postville Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., August 23, 1986, JCN and Dennis Schlicht (7127); **Clinton:** Gray's Marsh, NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 36, Liberty Twp., June 23, 1986 (6978); SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 24, Liberty Twp., June 29, 1989 (8059); **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., July 3, 1985 (6664); **Fayette:** Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., April 26, 1986 (8221); Volga Recreation Area, SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 23, Westfield Twp., June 8, 1989 (7936); **Linn:** 30th Street Woods, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 12, Marion Twp., June 30, 1980, JCN and Shawn Dvorak (7627); Loupee Fen, NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec.

14, Bertram Twp., April 28, 1982, JCN and Shawn Dvorak (7628); Indian Creek Nature Center, W $\frac{1}{2}$ Sec. 30, Bertram Twp., May 10, 1983 (6569); Rock Island Preserve, NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 1, Monroe Twp., June 13, 1983 (5998); Windy Oaks Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 29, Buffalo Twp., February 21, 1987, JCN and Robert Thomson (7276); **Mitchell:** Jenkins Township Mound Spring, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 2, 1986 (6933); McIntire Alder Swamp, E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 28, Wayne Twp., June 4, 1986 (6849); **Staceyville Fen,** N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Liberty Twp., June 5, 1986 (6840) **Riceville Fen Complex,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Jenkins Twp., June 5, 1986 (6845); **Muscatine:** Nichols Fen, Sec. 23, Pike Twp., June 30, 1989 (8060).

Gymnocarpium dryopteris (L.) Newm. is known to be extant in only 5 counties (Roosa *et al.* 1986). Six populations have been observed on algific talus slopes and north-facing sandstone outcrops: **Allamakee:** Old Stone House, Sec. 12, Post Twp., August 9, 1986 (7063); **Clayton:** Bixby State Preserve, Sec. 23, Lodomillo Twp., June 29, 1982 (7629); Giard School House, N $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 24, Giard Twp., June 20, 1987, JCN and Terrence Frest (7345); **Dubuque:** White Pine Hollow State Preserve, Sec. 8, Liberty Twp., September 16, 1984 (6398); **Winneshiek:** Sec. 7, Bluffton Twp., June 28, 1987, JCN and Terrence Frest (7374); Sec. 23, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7354).

This species is much less common on algific talus slopes than *G. robertianum*. Some individuals observed on algific talus slopes tend to appear intermediate between true *G. dryopteris* and *G. robertianum*, with some *G. dryopteris*-type fronds being quite glandular, and some *G. robertianum*-type fronds being eglandular. Such intermediate specimens may represent *G. X heterosporum* Wagner, if sterile, abortive spores are present.

Gymnocarpium robertianum (Hoff.) Newm. is restricted to 4 counties, where it is limited to cold, mossy places on algific talus slope communities (Roosa *et al.* 1986). Eleven extant stations for this taxon have been observed at: **Allamakee:** Sec. 18, Franklin Twp., August 12, 1986 (7034); Sec. 18, Franklin Twp., August 12, 1986 (7040); **Clayton:** Sec. 25, Boardman Twp., May 16, 1984, JCN and Shawn Dvorak (6196); Sec. 21, Garnavillo Twp., June 18, 1984 (6312); Sec. 22, Garnavillo Twp., August 7, 1986 (7070); **Winneshiek:** Sec. 20, Decorah Twp., May 15, 1984, JCN and Shawn Dvorak (6164); Sec. 16, Decorah Twp., May 15, 1984, JCN and Shawn Dvorak (6177); Sec. 2, Madison Twp., July 1, 1985 (6640); Sec. 13, Bluffton Twp., June 8, 1987, JCN and Terrence Frest (7233); Sec. 13, Bluffton Twp., June 8, 1987, JCN and Terrence Frest (7238); Sec. 8, Bluffton Twp., June 15, 1987, JCN and Terrence Frest (7318).

Selaginellaceae

Selaginella rupestris (L.) Spring had been considered extant at only 13 stations in Iowa (Peck 1978). Twelve populations, representing both relocations of historical sites (based on Peck 1978) and discoveries of new populations, have been identified since 1982: **Allamakee:** Fish Farm Mounds Wildlife Area, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 26,

Iowa Twp., June 1, 1987, JCN and Dennis Schlicht (7217); **Benton:** North Vinton Sand Ridge, W $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 15, Harrison Twp., July 17, 1987, JCN and Shawn Dvorak (7452); **Buchanan:** Sand Creek Area, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 23, Cono Twp., May 28, 1985, Dave Wendling (6597); **Clayton:** Pike's Peak State Park, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 35, Mendon Twp., October 3, 1982; Turkey River Mounds State Preserve, N $\frac{1}{2}$ Sec. 11, Millville Twp., November 10, 1984, JCN and William Desmarias (6409); **Delaware:** Backbone State Park, W $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Richland Twp., May 14, 1984 (5992); **Linn:** Chain Lakes Sand Prairie, SE $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 22, Monroe Twp., June 26, 1981 (7591); **Wakpica Sand Prairie,** S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 10, Main Twp., July 16, 1982 (7590); **Lewis Bottoms Park,** NW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 20, Fayette Twp., July 17, 1987, JCN and Shawn Dvorak (7449); **Lyon:** Gitchie Manitou State Preserve, Sec. 11, Sioux Twp., June 4, 1989, JCN and Tim Orwig (7879); **Winneshiek:** NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 7, Highlands Twp., June 16, 1989, JCN and Dean Roosa (7948); NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 18, Highlands Twp., June 16, 1989, JCN and Dean Roosa (7949). The Pike's Peak State Park population, while not vouchered, was photographically documented. All of these populations were found in xeric sites, on substrata of sandstone, limestone, quartzite and eolian or fluvial sand and gravel deposits.

Dicotyledons

Adoxaceae

Adoxa moschatellina L., typically northern and cordilleran in distribution (Hartley 1962), is known from a few disjunct populations in north-eastern and eastern counties. It most frequently occurs on the cold, mossy talus of algific slopes, but may also be found on moist, wooded, non-algific talus slopes, limestone or sandstone outcrops, and woodland fens. The following 10 locations may be added to this species' Iowa distribution: **Benton:** Hoefle-Dulin Recreation Area, E $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 23, Taylor Twp., May 18, 1986 (6806); **Clayton:** Bixby State Preserve, Sec. 23, Lodomillo Twp., April 8, 1984 (6221); Sec. 27, Garnavillo Twp., May 14, 1987 (7269); **Delaware:** Fountain Springs Park, Sec. 10, Elk Twp., June 10, 1986 (6902); **Fayette:** Sec. 5, Fairfield Twp., June 18, 1986 (6966); **Jackson:** Sec. 17, Otter Creek Twp., June 16, 1989, JCN and Dean Roosa (7962); **Winneshiek:** Sec. 33, Burr Oak Twp., June 9, 1987, JCN and Terrence Frest (7300); Sec. 2, Bluffton Twp., June 16, 1987, JCN and Terrence Frest (7329); Sec. 7, Bluffton Twp., June 28, 1987, JCN and Terrence Frest (7373); Sec. 23, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7237).

Apiaceae

Angelica atropurpurea L. was considered extirpated from the state by Roosa and Eilers (1978). Twelve sites for this species have been discovered since 1986: **Cerro Gordo:** Fertile Woodland Fen, N $\frac{1}{2}$ Sec. 6, Lincoln Twp., June 4, 1986 (6870); NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 23, Lincoln Twp., August 21, 1986 (7106); Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7415); **Mitchell:** Osage Spring Park, SE $\frac{1}{4}$ Sec. 28, Cedar Twp., June 2, 1986,

JCN and Dennis Schlicht (6930); Otranto Marsh, S½ NW¼ NW¼ Sec. 22, Otranto Twp., June 5, 1986 (6859); NE¼ NE¼ Sec. 8, Otranto Twp., June 5, 1986 (6861); NW¼ NW¼ NW¼ NW¼ Sec. 10, Otranto Twp., June 5, 1986 (6831); SE¼ NE¼ SE¼ Sec. 16, Otranto Twp., June 5, 1986 (6830); Hamlin Garlin Wildlife Area, SW¼ NE¼ SW¼ Sec. 11, Newburg Twp., June 5, 1986 (6864); Worth: W½ SW¼ NW¼ Sec. 23, Brookfield Twp., June 3, 1986, JCN and Dennis Schlicht (6947); NE¼ NE¼ NE¼ NE¼ Sec. 9, Bristol Twp., June 3, 1986, JCN and Dennis Schlicht (6948); Hanlontown Marsh, NE¼ Sec. 12, Fertile Twp., June 3, 1986 (6949). The largest single stand, in a peaty marsh near Hanlontown, extended for almost 1 km and conservatively contained over 10,000 individuals.

Berula pusilla (Nutt.) Fern. was considered extirpated from Iowa by Roosa and Eilers (1978). Four extant populations have recently been verified in Dickinson County: Spooky Hollow Woodland Fen, NW¼ Sec. 4, Okobojo Twp., August 28, 1985 (6666); Milford Fen, SE¼ SE¼ Sec. 11, Okobojo Twp., July 9, 1986 (7000); Lower Gar Lake Fen, NE¼ SE¼ Sec. 32, Center Grove Twp., July 28, 1989 (8218); Silver Lake Fen, NW¼ Sec. 32, Silver Lake Twp., July 28, 1989 (8214). Individuals were observed rooting in the cold water runoff and soil at the discharge zone of fens. All of these sites were relocated from historical stations by Bob Moats, except the Milford Fen site which was first discovered by the author and Bob Moats on August 30, 1985. The largest of these populations occurs at the Spooky Hollow Woodland Fen, where well over 2000 individuals were observed in bloom.

Lomatium orientale C. & R. known historically from only 6 northwestern and south central counties, had not been collected from Emmet County since 1917 (Roosa *et al.* 1986). An extant population was located there in 1985 by Bob Moats. This station was relocated in 1989. Over 300 individuals were observed on a xeric, gravel prairie: Anderson Prairie, SW¼ Sec. 28, Emmet Twp., June 5, 1989 (7920). By this date the plants had almost completely senesced and would have been undetectable by late June. Also occurring on these xeric gravel outcrops were *Agoseris cuspidata*, *Astragalus crassicaeris*, *Bouteloua hirsuta*, *Carex eleocharis*, *Psoralea esculenta*, and *Wulfenia bullii*.

Aristolochiaceae

Aristolochia serpentaria L., last collected in 1894 in Muscatine County (Guldner 1960), and long feared extirpated from the Iowa flora (Roosa and Eiler 1978, Roosa *et al.* 1986), is now known from a single extant population in southern Lee County: Croton Unit, Shimek State Forest, SE¼ NW¼ Sec. 1, Des Moines Twp., June 17, 1989, JCN and Dennis Schlicht (7979), where 26 individuals were found in undisturbed, mesic forest on the lower slopes and bottoms of a small creek valley. The forest canopy at this sites was quite diverse, containing *Acer saccharum*, *Carya ovata*, *C. tomentosa*, *Platanus occidentalis*, *Quercus alba*, *Q. rubra*, and *Tilia americana*. The herb layer was also quite rich, containing the uncommon Iowa species *Asclepias quadrifolia*, *Carex jamesii*, *Elymus wiegandii*, and *Veratrum woodii*. This *A. serpentaria*

colony was also found to host the only known breeding population of Pipevine Swallowtail (*Battus philenor*) in the state, a butterfly whose larvae are obligate *Aristolochia* consumers (Opler and Krizek 1984).

Asclepiadaceae

Asclepias lanuginosa Nutt. has been considered one of the state's rarest milkweeds, with only 13 historical sites having been documented (Nicholson and Russell 1955, Howe *et al.* 1984). Two additional populations can be reported: Lyon: Inwood NW 2 Prairie, NW¼ Sec. 11, Lyon Twp., June 5, 1989, JCN and Tim Orwig (7900); Palo Alto: SE¼ NE¼ Sec. 23, Highland Twp., August 20, 1986 (7114). The latter population, located in an 80-acre lightly-grazed prairie, consisted of over 50 individuals. In addition, a single blooming individual was observed (but not collected) on the southeastern lip of the big kettle at Freda Haffner Kettlehole Preserve (Dickinson: SW¼ Sec. 33, Lakeville Twp., June 21, 1986). In the northwestern counties, this species appears to favor xeric gravel prairies.

Asteraceae

Artemisia frigida Willd., reported as being limited to Sioux Quartzite exposures and gravel prairies in Lyon County (Shimek 1896), was last collected from the state in 1912 (Eilers and Roosa, manuscript). An extant population still exists on west-facing, gravelly slopes at a station first located by Shimek in 1897: Granite Prairie, W½ SW¼ Sec. 19, Sioux Twp., June 5, 1989, JCN and Tim Orwig (7887). A brief reconnaissance revealed approximately 20 clumps of this species in a prairie community characteristic of the northern Great Plains, dominated by early season grasses and forbs such as *Astragalus crassicaeris*, *Echinacea angustifolia*, *Herchbergia richardsonii*, *Koeleria cristata*, *Onosmodium occidentale*, *Oxytropis lambertii*, and *Stipa spartea*. This site was also noteworthy for harboring the very rare Iowa plant *Penstemon albidus*, and the state's only extant population of the butterfly *Coenonympha inornata*.

Aster junciformis Rydb. is one of the rarest asters in the state, being documented from only six northwestern and northcentral counties (Roosa *et al.* 1986). Many of these historical locations, including the Lake Mills peat bog in Winnebago County (Thorne 1952) and the Estherville Fen in Emmet County (Thorne 1956, Wolden 1956) have long since been destroyed by human activities. This species has been collected at four new sites since 1985: Dickinson: Milford Fen, SW¼ SE¼ SE¼ Sec. 11, Okobojo Twp., August 30, 1985, JCN and Bob Moats (6671); Lower Gar Lake Fen, SW¼ NW¼ SW¼ Sec. 33, Center Grove Twp., August 21, 1986 (7111); Howard: Staff Creek Fen, N½ SE¼ SW¼ Sec. 28, Oakdale Twp., July 29, 1989 (8132); Mitchell: St. Ansgar Fen, NW¼ NW¼ SW¼ SW¼ Sec. 13, St. Ansgar Twp., August 17, 1986 (7117).

Aster junciformis has also been observed extant at a single site in Cerro Gordo County: Buffalo Slough, W½ NE¼ SE¼ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Richard Baker, Terrence Frest, and Dean Roosa; but was not vouchered as only a single specimen was observed. This species had been collected here by Bohumil Shimek over 90 years before (Eilers 1971).

Aster linariifolius L., was recently considered extirpated from the state, having been last collected from Clinton County in 1932 (Howe *et al.* 1984, Roosa *et al.* 1986). Two extant populations were discovered during the summer of 1986 in Clinton County: Selby Sand Ridge, S½ SW¼ NW¼ Sec. 24, Liberty Twp., July 18, 1986 (7007), June 29, 1989 (8058); Sherman Park, NW¼ SE¼ Sec. 25, Spring Rock Twp., July 18, 1986 (7011). The first of these was originally located by JCN, Dennis Schlicht and Jerry Selby on June 23, 1986 in a xeric sand prairie remnant north of Calamus, where it constituted the dominant ground-cover over a sizeable portion of the site. This population was noted to be in good condition on June 29, 1989. The second population was observed along a hiking trail in a sandy *Quercus velutina* woodland near the Wapsipinicon River where only a few plants were noted. William Pusateri (personal communication) has reported the presence of at least one additional population from the county.

Cacalia suaveolens L. has been reported from a few scattered prairie remnants and river banks throughout eastern Iowa (Davidson 1953). This species has been recently collected at two additional locations: Bremer: Northwoods Park, SE¼ Sec. 13, Sumner Twp., August 6, 1984 (6363); Muscatine: Conesville Fen, NE¼ Sec. 20, Orono Twp., June 18, 1989, JCN and Dean Roosa (7995). At both sites, it was found in shady areas under woody vegetation on the borders of fens. The rare taxa *Amelanchier laevis*, *Dryopteris cristata*, *Eriophorum angustifolium*, *Platanthera psychodes*, *Lysimachia terrestris*, and *Pilea fontana* were also seen at Northwoods Park.

Cirsium muticum L. was documented from only a limited number of sites in extreme eastern and northcentral Iowa (Davidson 1953, Cooperrider 1962). Pammel (1908, 1919), however, reported it as a frequent component of the fen floras in Cerro Gordo, Winnebago, and Worth counties. Seven new populations of this species can be reported from fens and woodland seeps in 5 eastern Iowa counties: Benton: Mt. Auburn Fen, E½ Sec. 23, Cedar Twp., July 21, 1988 (7676); Cerro Gordo: Neuhring Fen, S½ NE¼ NE¼ SW¼ Sec. 15, Lincoln Twp., August 21, 1986, (7100); NW¼ NE¼ Sec. 23, Lincoln Twp., August 21, 1986 (7105); Pope Fen, NE¼ NE¼ SW¼ NW¼ Sec. 9, Lincoln Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7421); Chickasaw: Chickasaw Fen, SW¼ NE¼ SW¼ Sec. 28, Chickasaw Twp., August 12, 1986, JCN and Herb Wilson (7021); Fayette: Turner Creek Fen, N½ NW¼ SE¼ Sec. 11, Windsor Twp., July 19, 1988 (7715); Mitchell: St. Ansgar Fen, W½ Sec. 36, St. Ansgar Twp., August 17, 1986 (7118).

At these sites, *Cirsium muticum* was found with many other rare Iowa taxa including *Angelica atropurpurea*, *Carex sterilis*, *Cornus stolonifera*, *Eriophorum angustifolium*, *Gentiana procera*, *Lobelia kalmii*, *Mimulus glabratus* var. *fremontii*, *Muhlenbergia glomerata*, *Parnassia glauca*, *Pilea fontana*, *Salix candida*, *Salix pedicularis*, and *Valeriana edulis* ssp. *ciliata*.

Solidago patula Muhl. had been collected only once in the state during the last 30 years (Thorne

1953, Roosa and Eilers 1978). A second extant population, totaling over 300 individuals, can be reported: **Muscatine**: Conesville Fen, NE $\frac{1}{4}$ Sec. 20, Orono Twp., June 18, 1989, JCN and Dean Roosa (8000). The species was found on wet, peaty soil in both full sun and partial shade, where it occurred with a large population of *Equisetum fluviatile* in a *Carex*-dominated turf. This site may constitute the most diverse extant fen in Muscatine County.

Solidago uliginosa Nutt., previously unreported from the Iowa flora, is restricted to a single site in Allamakee County where it is disjunct from central Wisconsin: Clear Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 27, Union City Twp., August 5, 1989, JCN and Fred R. Nekola (8177). It was located on a quaking sedge mat in cold, wet, peaty soil at the center of a fen where it grew with the rare species *Carex prairea*, *Epilobium leptophyllum*, *Eriophorum angustifolium*, and *Muhlenbergia glomerata*. This site also harbors populations of *Equisetum fluviatile*, *Gemiana crenata*, *Parnassia glauca*, and the only Iowa population of *Spiranthes lucida* (Dean Roosa, personal communication).

Much variation was observed in plant size and level of inflorescence branching in this *S. uliginosa* population, with plants in the wettest areas tending to be smaller and less branched than those in drier soils. A similar pattern was noted by Deam (1940) from an Indiana population. Unusual *Solidago* plants seen at a Howard County fen (Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp.) on July 22, 1989 by JCN, John Brayton, Gretchen Brayton, and Robert K. Peet, may also be found to be of this species once flowering material is secured.

Berberidaceae

Jeffersonia diphylla (L.) Pers. has been reported from only 3 sites in the state (Roosa and Eilers 1978). Two of these populations have been recently reverified: **Dubuque**: White Pine Hollow, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 8, Liberty Twp., May 8, 1984 (6220); **Fayette**: Franklin Park, W $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Auburn Twp., July 19, 1988 (7729). A new population can also be reported: **Dubuque**: Bankston Park, N $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 3, Iowa Twp., April 29, 1984 (6216). All of these sites represent mesic *Acer saccharum* - *Tilia americana* forests; two are in close proximity to large algific talus slopes. Other rare Iowa plants, including *Allium cernuum*, *Erythronium americanum* and *Hybanthus concolor* have been observed to utilize these and similar habitats.

Betulaceae

Alnus rugosa (DuRoi) Spreng. was considered restricted to moist wooded slopes in northeastern Iowa by Thorne (1953). Eilers (1971), however, documented additional populations in Black Hawk, Buchanan, Chickasaw, and Howard counties. Five populations have been recently observed extant: **Mitchell**: E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 28, Wayne Twp., June 4, 1986 (6856); **Stacyville** Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Liberty Twp., June 5, 1986 (6838); NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 8, Otranto Twp., June 5, 1986 (6862); **Hamlin** Garlin Wildlife Area, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 11, Newburg Twp., June 5, 1986 (6863); **Winneshiek**: Freeport Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 14, Decorah Twp., April 26, 1986 (6795). All of

these sites were found in fens or swampy river backwaters.

Betula pumila L. var. *glandulifera* Regel was recently considered extant at only a single site in the state (Roosa and Eilers 1978). Six additional populations have been vouchered since 1984: **Bremer**: Northwoods Park, SE $\frac{1}{4}$ Sec. 13, Dayton Twp., August 6, 1984 (6367); **Chickasaw**: Split Rock Park, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Dresden Twp., June 4, 1984 (6266); **Boyd** Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 34, Hampton Twp., August 12, 1986 (7029); **Howard**: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8124); **Mitchell**: Riceville Fen Complex, SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Jenkins Twp., June 5, 1986 (6841); **Jenkins** Twp. Mound Spring, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 2, 1986 (6929). Other extant populations have been observed, but not vouchered, at: **Bremer**: Brayton-Horsley Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 5, 1989; **Howard**: Crossman Prairie, Sec. W $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 11, Jamestown Twp., June 26, 1986. While this species grows both in wet prairie and fen habitats, the latter habitat appears to be the favored one in northeastern Iowa, accounting for 75% of the above sites.

Boraginaceae

Mertensia paniculata (Ait.) G. Don had been known extant in the state from only 2 sites in Winneshiek County (Roosa and Eilers 1978). Since that time, a number of additional populations have been uncovered in Allamakee, Clayton, Fayette, and Howard counties (Frest 1981, 1983, 1984, 1986a, 1987). Six recent collections are represented in the R. V. Drexler Herbarium: **Fayette**: Brush Creek Canyon State Preserve, Sec. 17, Fairfield Twp., August 17, 1985, JCN and Shawn Dvorak (6688); **Winneshiek**: Sec. 2, Madison Twp., July 1, 1985 (6649); Sec. 13, Bluffton Twp., June 8, 1987, JCN and Terrence Frest (7231); Sec. 4, Bluffton Twp., June 8, 1987, JCN and Terrence Frest (7235); Sec. 7, Bluffton Twp., June 28, 1987, JCN and Terrence Frest (7379); Sec. 14, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7372). All of these populations were found on cold, mossy limestone talus of algific slopes.

Cactaceae

Opuntia fragilis (Nutt.) Haw., for well over 100 years, was believed limited to Sioux Quartzite outcrops in Lyon County (Roosa and Eilers 1978; Gitchie Manitou State Preserve, Sec. 11, Sioux Twp., June 5, 1989, JCN and Tim Orwig [7882]). The range of this species was reported, however, to extend as far east as Wisconsin and Illinois (Gleason 1952), suggesting that populations might also occur in central and eastern Iowa. Such a population was located in extreme southern Buchanan County on a xeric, eolian sand prairie remnant at the crest of a paha ridge on April 28, 1985, although it was not vouchered until two years later: Bearbauer Prairie, SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, Homer Twp., July 20, 1987 (7468). In four seasons of observation, no individuals from this population have flowered - a feature characteristic of this species (Weniger 1984).

Opuntia macrorhiza Eng., though not listed in any treatments of the Iowa flora, is known from a

few isolated sites across the state (Dean Roosa, personal communication). Individuals from an *Opuntia* population first located June 10, 1981 (Linn: Hitaga Sand Ridge, NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 23, Spring Grove Twp., August 15, 1987 [7469]) were referred to this taxon by D.L. Ferguson of Colorado State University and Jim Doyle of the University of North Carolina. A second eastern Iowa population, called to the author's attention by John Brayton, has also been documented: **Buchanan**: Cemetery Prairie, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 5, Perry Twp., July 12, 1989 (8100). Both of these populations are found on xeric eolian sand prairies. The Linn County site is notable for its active blowouts and dominance by the short-grass *Bouteloua hirsuta*. *Opuntia macrorhiza* differs from *O. humifusa* by having more than one spine per areole, by having longest spines averaging more than 2.5 cm long, and by having ascending rather than prostrate stems (Weniger 1984).

Callitricaceae

Callitriche heterophylla Pursh. is known from a very few shallow water habitats across the state (Roosa and Eilers 1978; Howe *et al.* 1984). Two unreported populations have been observed: **Buchanan**: NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Hazelton Twp., August 26, 1984, JCN and Shawn Dvorak (6373); **Fayette**: Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., June 24, 1986 (6981). Both of these occurred in the cold water runoff of springs or fens. Another population which was not vouchered, has been observed in a large vernal pond on a sand ridge in northern Linn County: Xyris Pond, Sec. 1, Grant Twp., July 24, 1983. This pond has remained completely dry over the years 1988 and 1989, and the continued existence of this population must be considered questionable.

Campanulaceae

Lobelia kalmii L. was known east of Emmet County from only pre-1920's collections in Worth County and Clayton counties. In the course of inventorying eastern Iowa fen sites (Nekola 1988), two populations for this species on the Iowan Erosional Surface have been documented: **Cerro Gordo**: Neuhring Fen, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., August 21, 1986 (7090); **Howard**: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8128). On these sites, other plants considered "typical" of northwestern Des Moines Lobe fens, such as *Gentiana procera*, *Platanthera hyperborea*, *Rhynchospora capillacea*, and *Triglochin maritima* have been found co-existing with "typical" eastern Iowa fen taxa such as *Betula pumila* var. *glandulifera*, *Cirsium muticum*, *Salix candida*, and *Valeriana edulis* ssp. *ciliata*.

Lobelia kalmii has also been collected at 5 northwestern Iowa fens: **Clay**: Hungry Hollow Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Logan Twp., August 21, 1986 (7090); **Gillett** Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8197); **Dickinson**: Silver Lake Fen, Sec. 32, Silver Lake Twp., July 28, 1989 (8213); **Emmet**: Wallingford Fen, Sec. 24, Twelve Mile Lake Twp., August 30, 1985, JCN and Bob Moats (6767); **O'Brien** Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989 (8193).

Caprifoliaceae

Linnaea borealis L. was first collected in Iowa by Herbert Goddard near the Upper Iowa River at Decorah in 1896. The species was not seen in the state again until Hartley's 1959 collection from an algific talus slope in eastern Clayton County (Roosa and Eilers 1978). While additional populations have been located in the same general region of Clayton County (Terrence Frest 1981, 1982, 1986b), no extant Winneshiek County sites were discovered until 1987, when a population was discovered in acidic humus under *Abies balsamea* on an algific slope (Sec. 8, Bluffton Twp., June 15, 1987, JCN and Terrence Frest [7317]). Other rare species observed on this site included *Allium cernuum*, *Cerastium arvense*, *Circaea alpina*, *Cystopteris laurentiana*, *Gymnocarpium robertianum*, *Lathyrus obovatus*, *Maianthemum canadense*, *Poa paludigena*, *Pyrola secunda*, *Rhamnus alnifolia*, *Rubus pubescens*, *Saxifraga forbesii*, and *Viburnum opulus* var. *americana*. The *L. borealis* and *P. secunda* populations at this station may be the largest in the state.

Cistaceae

Lechea intermedia Leggett has been reported from only single sites in Allamakee and Guthrie counties (Howe et al. 1984, Roosa et al. 1986). Two additional sites may be added: Benton: Vinton Airport, SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 33, Harrison Twp., July 21, 1988 (7684); Winneshiek: NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 7, Highland Twp., June 16, 1989, JCN and Dean Roosa (7947). The Benton County population was found in bare sand on the border of a vernal pool, while the Winneshiek County population was observed on dry sandy talus below a sandstone outcrop where it occurred with the rare species *Carex tonsa*, *Panicum depauperatum*, *Potentilla tridentata*, and *Selaginella rupestris*.

Cornaceae

Cornus canadensis L. was first authentically reported in Iowa from a Clayton County algific talus slope community in 1959 (Hartley 1962, Roosa and Eilers 1978). During the early 1980's, a second population was discovered by Alan Branham in Winneshiek County (Dean Roosa, personal communication). The range of this species can be expanded to include Delaware County: Sec. 11, Elk Twp., August 18, 1984, JCN, Robert Thomson, and William Thomas (6293). This population consisted of over 750 individuals scattered throughout cold, moss-covered talus of an algific talus slope with other species of restricted Iowa distribution including *Aconitum noveboracense*, *Betula papyrifera*, *Carex media*, *C. peckii*, *C. pedunculata*, *Corylus cornuta*, *Cypripedium calceolus* var. *pubescens*, *Equisetum pratense*, *Liparis loeselii*, *Maianthemum canadense*, *Oryzopsis asperifolia*, *O. racemosa*, *Polypodium vulgare*, *Pyrola secunda*, *Rhamnus alnifolia*, *Ribes hudsonianum*, *Rosa acicularis*, *Rubus pubescens*, *Salix bebbiana*, *Saxifraga forbesii*, *Schizachne purpurascens*, *Sullivantia renifolia*, and *Taxus canadensis*. For many of these taxa, populations at this site represent county records and significant range extensions within Iowa. The number of rare vascular plant taxa found at this site makes it one of the more significant algific talus slope communities known.

Ericaceae

Chimaphila umbellata (L.) Bart. collected from six counties, had been observed extant at only one site since 1900 (Roosa and Eilers 1978, Roosa et al. 1986). A second population can also be reported from Allamakee County: Little Paint Creek, Yellow River State Forest, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 30, Taylor Twp., May 28, 1989 (7875). A single, diffuse colony approximately 5 meters by 3 meters in size was observed on a steep, northwest-facing slope under a native *Pinus strobus* grove. This site was originally located in the late 1960's by the late R.V. Drexler, who did not vouch for the population, but did relate its location to the author prior to his death.

Gaylussacia bacata (Wang.) K. Koch was known from 3 historical collections in the state (Howe et al. 1984). These populations, plus a new one in Clinton County, have been recently visited, and found to still be extant: Allamakee: Fish Farm Mounds Wildlife Area, Sec. 23, Iowa Twp., May 14, 1987 (7259); Clinton: Sherman Park, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 36, Spring Rock Twp., July 20, 1987, JCN and Bob Bryant (7447); Linn: Coggon Pond, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 27, Jackson Twp., July 3, 1989, JCN and Robert Thomson (8072); Muscatine: Wildcat Den State Park, Sec. 17, Montpelier Twp., June 27, 1987 (7384). All of these populations occur in sandy woodlands, in both upland and lowland situations.

Pyrola asarifolia Michx. was first reported from Iowa by Frest (1983), and is disjunct in the northeastern counties from sites in central Wisconsin (Hartley 1966). Two populations have recently been vouchered: Allamakee: Old Stone House, Sec. 12, Post Twp., August 9, 1986 (7054); Winneshiek: Sec. 2, Madison Twp., July 1, 1985, (6644). Frest (1983) also reports this taxon from Howard County. The Old Stone House population consisted of less than 20 individuals growing in acidic humus under a dense canopy of *Abies balsamea* on an algific slope. The Winneshiek County population, easily exceeding 1000 individuals, was observed on cold, mossy limestone talus under a very open *Pinus strobus* canopy. In both of these populations, blooming very rarely occurs and may not take place during most seasons.

Pyrola secunda L. was known historically from only four populations, only one of which had been observed in this century (Thorne 1956, Howe et al. 1984). This latter population is still extant, with hundreds of individuals occurring in acidic litter under *Abies balsamea* on an algific talus slope (Allamakee: Old Stone House, Sec. 12, Post Twp., August 9, 1986 [7055]). In addition to this station, 4 unreported populations from 3 northeastern counties have also been documented: Allamakee: Sec. 18, Franklin Twp., June 30, 1987, JCN and Terrence Frest (7209); Delaware: Sec. 11, Elk Twp., June 3, 1985 (6635); Winneshiek: Sec. 2, Madison Twp., June 1, 1985, JCN and John Prestidge (6643); Sec. 8, Bluffton Twp., June 15, 1987, JCN and Terrence Frest (7319). A small, sterile, unvouchered population of a *Pyrola* spp. from a degraded site in Delaware County (Sec. 15, Elk Twp., June 1984), are likely individuals of this species. All of these populations occurred in acidic humus under conifers (*Abies balsamea*, *Pinus*

strobus, or *Taxus canadensis*) on algific slopes.

Fabaceae

Lupinus perennis L. had been reported from only a single 1893 Winneshiek County collection. This species was rediscovered in Iowa by Alan Branham in 1983 (Dean Roosa, personal communication) at Fish Farm Mounds Wildlife Area in Allamakee County. It was recollected at this same site in 1987: NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 26, Iowa Twp., June 1, 1987, JCN and Dennis Schlicht (7223). This population occurs within dry, sandy soils of a *Quercus velutina* forest on a stranded river terrace, and has remained in good condition through July 1989.

Gentianaceae

Gentiana crinita Froel. was recently known from only 4 extant colonies, although historical records existed from 11 northern and northeastern Iowa counties (Roosa and Eilers 1978). Since 1984, new populations have been located on fens and wet prairies in: Allamakee: Clear Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 27, Union City Twp., July 22, 1989, JCN and Robert K. Peet (8171); Benton: Gilchrist Fen, S $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 12, Polk Twp., Dennis Schlicht, October 17, 1987 (7195); Buchanan: Rowley Fen, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., September 25, 1988, Dennis Schlicht (7850); Corkray Prairie, S $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 17, Cono Twp., September 25, 1988, Dennis Schlicht (7849); Delaware: Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., September 14, 1985, JCN and Dennis Schlicht (6695); Robinson Fen, W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 19, Adams Twp., JCN and Dennis Schlicht (6711); Linn: Central City Fen, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 9, Maine Twp., October 1, 1984 (6408); Matus Fen, NE $\frac{1}{4}$ Sec. 36, Maine Twp., September 13, 1985 (6719); Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp. September 7, 1985 (6723).

New populations which have been field verified, but not vouchered due to advanced senescence or immaturity of individuals, or to small population size include: Bremer: Brayton-Horsley Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., September 23, 1984; Buchanan: Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., September 27, 1985; Butler: Feldman Fen, S $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 8, Ripley Twp., July 6, 1988, JCN and Dennis Schlicht; Chickasaw: Boyd Prairie, E $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 34, New Hampton Twp., August 12, 1986, JCN and Herb Wilson; Fayette: Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., April 26, 1986; U.S. 18 Prairie, SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 11, Bethel Twp., April 26, 1986; Linn: Patton Fen, E $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 6, Jackson Twp., February 21, 1987, JCN and Robert Thomson; Windy Oaks Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 29, Buffalo Twp., February 21, 1987, JCN and Robert Thomson.

Almost 80% of the new sites exist on fen habitats. On such sites, *G. crinita* populations are often large, and exceed 500 individuals. Populations on wet prairie sites are typically much smaller, with rarely more than 50 blooming individuals being observed on a site per year.

Gentiana procera Holm. was recently known from only five historical records in northern counties, with extant populations believed limited to northwestern Iowa fens (Howe et al.

1984). Since 1985, additional populations of this species have been on fens throughout the northern half of the state: **Cerro Gordo:** Neuhring Fen, S½ NE¼ NE¼ SW¼ Sec. 15, Lincoln Twp., August 21, 1986 (7094); **Chickasaw:** Kleiss Fen, SW¼ SW¼ SE¼ NE¼ Sec. 26, Stapleton Twp., September 23, 1984, JCN and John Brayton (6402); **Clay:** Hungry Hollow Fen, SE¼ NW¼ Sec. 16, Logan Twp., August 21, 1986 (7083); **Emmet:** Wallingford Fen, E½ SW¼ Sec. 24, Twelve Mile Lake Twp., August 30, 1985, JCN and Bob Moats (6766); **Fayette:** Sumner SW Fen, SE¼ SE¼ Sec. 6, Fremont Twp., August 11, 1986, JCN and John Brayton (7083); **Winneshiek:** Jackson Junction Fen, SE¼ NE¼ SW¼ NE¼ Sec. 20, Jackson Twp., August 2, 1988 (7772). A further new population, which was not vouchered, was observed in Dickinson County: Milford Fen, SW¼ SE¼ SE¼ Sec. 11, Okoboji Twp., August 30, 1985, JCN and Bob Moats. In over a decade of field observations, the author has never seen *G. procera* and *G. crinita* co-occurring in Iowa, although no differences can be readily observed between sites.

Guttiferae

Hypericum gentianoides (L.) BSP., known only from Clinton, Madison, Muscatine, and Scott counties, was last collected in 1932 (Barnes *et al.* 1900, Roosa *et al.* 1986). An extant population was discovered in 1987 in sterile sand on the border of vernal pools on a eolian sand capped paha ridge in Buchanan County: Walker Sand Ridge, SW¼ SW¼ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7467). Approximately 500 individuals were observed at this location. Many did not exceed 4 cm in height, and would be virtually impossible to find if not in flower. The limited number of vernal pool sites in the state suggests that *H. gentianoides* may be, even though easily overlooked, one of the rarest species in the state.

Lentibulariaceae

Utricularia minor L., has been reported from only three counties in northern Iowa (Cratty 1903, Grant 1950, Grant and Thorne 1955). It has been found to be extant at two of its known historical sites: **Dickinson:** Excelsior Fen Complex, SE¼ Sec. 10, Excelsior Twp., August 29, 1985 (6684); **Silver Lake Fen,** NW¼ Sec. 32, Silver Lake Twp., June 5, 1989 (7913), July 28, 1989 (8212). Flowering material was collected both in early June and late August, suggesting a prolonged flowering period for this species. It was found most frequently in damp depressions on the sedge mat, not in the larger pools.

Menyanthaceae

Menyanthes trifoliata L. was considered extant at only 3 sites in the state (Roosa and Eilers 1978). Since 1985, 3 additional populations have been discovered on the Iowan Erosional Surface: **Bremer:** Buschline Fen, N½ NW¼ Sec. 36, Polk Twp., July 19, 1989 (8155); **Buchanan:** Cutshall Access, SE¼ Sec. 6, Perry Twp., May 28, 1985 (6600), July 12, 1989 (8096); **Cerro Gordo:** Buffalo Slough, W½ NE¼ SE¼ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7414). This latter site was collected extensively by Bohumil Shimek in the late 1800's and early 1900's, but had not been visited in recent times

until relocation by Dean Roosa, Lawrence Eilers, and Bob Moats in June of 1986.

Malvaceae

Callirhoe triangulata (Leavenw.) Gray had been reported extant from only one station (Roosa *et al.* 1986). This population, in disturbed sandy soil under a powerline cut, has been recently revisited and found to be extant: **Allamakee:** Sec. 36, Union City Twp., August 5, 1989, JCN and Fred R. Nekola (7854). A second population, previously unreported, was located on a nearby native, xeric sand prairie: Sec. 1, French Creek Twp., August 5, 1989, JCN and Fred R. Nekola (8222). This latter population consisted of 50-100 plants scattered throughout open prairie, and under groves of *Quercus velutina* saplings. William Pusateri (personal communication) also reports location of a small population of this species on a sand prairie in Clinton County.

Napaea dioica L. is an alluvial woodland species known from only five northeastern Iowa counties (Roosa *et al.* 1986), had not been collected in Fayette County since the late 1800's (Fink 1896). This species has been relocated in the county from alluvial woods along the Volga River, possibly at its original collection site: **Fayette:** Big Rock Access, NW¼ NW¼ NW¼ Sec. 27, Westfield Twp., July 20, 1988 (7703). It occurred with large populations of *Impatiens capensis*, *Laportea canadensis*, *Pilea pumila*, and *Urtica dioica* at this station.

Melastomataceae

Rhexia virginica L. had been documented from only two counties in eastern Iowa, the most recent collected being in 1960 (Roosa and Eilers 1978). Extant populations have been vouchered at 3 stations: **Cedar:** SW¼ NW¼ NW¼ Sec. 31, Sugar Creek Twp., June 19, 1989 (8010), July 13, 1989 (8124); **Clinton:** Sherman Park, SE¼ NE¼ NE¼ Sec. 36, Spring Rock Twp., July 18, 1986 (7006); **Selby Sand Ridge,** SW¼ NW¼ Sec. 24, Liberty Twp., July 18, 1986 (7012). At these sites, individuals were observed in sandy soil on the margins of drainage ditches, vernal pools and fens. The Clinton County populations were quite large, with over 100 individuals being observed at both locations.

Nymphaeaceae

Brasenia schreberi Gmel. had not been collected for almost 2 decades prior to the late 1970's (Roosa and Eilers 1978). Two extant populations have recently been observed: **Buchanan:** Hamm's Marsh, W½ SW¼ NE¼ Sec. 8, Washington Twp., August 16, 1985, JCN and Shawn Dvorak (6751); **Linn:** Toddville Pond, W½ NW¼ SE¼ Sec. 18, Monroe Twp., September 7, 1983 (6142). This latter site was first located by R. V. Drexler in 1957. As of this writing, a subdivision is in the process of being built around this pond; it is hoped that this species will be able to persist in its new, urban environment.

Onagraceae

Circaea X intermedia Ehrh., the sterile hybrid between *C. lutetiana* var. *quadrisulcata* and *C. alpina*, was first located in Iowa by Terrence Frest during his 1984 survey of algific slope sites (Terrence Frest, personal communication). Populations in three northeastern counties have now

been observed: **Allamakee:** Sec. 19, Taylor Twp., June 20, 1987, JCN and Terrence Frest; **Clayton:** Bixby State Preserve, Sec. 23, Lodomillo Twp., July 21, 1989, JCN and Robert K. Peet (8163); **Winneshiek:** Sec. 33, Burr Oak Twp., June 9, 1987, JCN and Terrence Frest (7301). The Allamakee County collection was inadvertently not collected. This hybrid differs from its parents through its intermediate size, intermediate pedicel orientation, pink blossoms, abortive fruit, and by flowering as the raceme elongates (Boufford 1978).

Circaea X intermedia seems restricted in Iowa to moist, but not excessively cool, limestone talus areas bordering algific slopes, often in areas with dense bryophyte cover. Species observed with *C. X intermedia* at these sites include *Aconitum noveboracense*, *Adoxa moschatellina*, *Beula lutea*, *Carex deweyana*, *Cerastium arvense*, *Chrysosplenium iowense*, *Cypripedium reginae*, *Diervilla lonicera*, *Maianthemum canadense*, *Rhamnus alnifolia*, *Ribes hudsonianum*, *Rubus pubescens*, *Sambucus pubens*, *Saxifraga forbesii*, and *Schizachne purpurascens*.

Polygalaceae

Polygala incarnata L., known from only 8 historical collections in the northern half of the state, was recently believed limited to 2 extant sites (Howe *et al.* 1984, Roosa *et al.* 1986). Two additional stations can be reported: **Black Hawk:** Mark Sand Prairie, SW¼ NW¼ Sec. 19, Union Twp., July 6, 1988, JCN and Dennis Schlicht (7650); **Linn:** Matsell Bridge Park, SW¼ NE¼ SE¼ SE¼ Sec. 26, Buffalo Twp., September 5, 1981, JCN and Shawn Dvorak (7507). Both populations consisted of less than 30 individuals, and occurred in dry, sandy prairie remnants in areas with low groundcover of other plants.

Polygala polygama Walt. var. *obtusata* Chodat. is even more restricted than *P. incarnata* in the state, being known from only 3 historical sites in Allamakee, Clinton, and Wapello counties (Roosa *et al.* 1986). Only the single Allamakee County station was considered extant (Roosa *et al.* 1986). Three additional populations from xeric sand prairie have been uncovered since 1986: **Buchanan:** Walker Sand Ridge, SW¼ SW¼ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7464), June 10, 1989 (7940); **Clinton:** Gray's Marsh Prairie, Sec. 36, Liberty Twp., JCN, Dennis Schlicht, Jerry Selby, and Bob Bryant, June 23, 1986 (7014); **Linn:** Walker SW Sand Prairie, E½ SW¼ Sec. 8, Grant Twp., July 4, 1988, JCN and Robert Thomson (7637). The Buchanan County population was by far the largest of the three, with over 1000 individuals observed in 1987.

Polemoniaceae

Phlox bifida Beck appears to be restricted to dry, sandy sites in Black Hawk, Benton, Clinton, Linn, and Muscatine counties (Guldner 1960, Cooperrider 1962, Eilers 1971, Roosa *et al.* 1986). Three extant populations have been observed in Linn County since 1981: **Chain Lakes Prairie,** E½ SE¼ Sec. 22, Monroe Twp., May 11, 1981, JCN and Shawn Dvorak (7504); **Lisbon Sand Prairie,** E½ SW¼ SW¼ Sec. 36, Franklin Twp., May 12, 1982, JCN and Shawn Dvorak (7505); **Lewis Bottoms Park,** NW¼ SE¼ NW¼ SW¼ Sec. 20, Washington Twp.,

July 17, 1987, JCN and Shawn Dvorak (7450). The Chain Lakes population was first located by R.V. Drexler during the early 1950's.

Primulaceae

Dodecatheon amethystinum Fassett is restricted to sites near the Mississippi River in 4 northeastern counties (Thorne 1956, Roosa *et al.* 1986). Extant populations have been observed on sandstone and limestone bluffs at 4 sites: **Allamakee:** Paint Creek Unit, Yellow River State Forest, Sec. 31, Taylor Twp., October 23, 1983; **Clayton:** Pike's Peak State Park, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 35, Mendon Twp., May 17, 1984, JCN and Shawn Dvorak (6180); **Turkey River Mounds**, N $\frac{1}{2}$ Sec. 11, Millville Twp., June 19, 1986 (6961); **North Buena Vista Woods**, N $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 21, Buena Vista Twp., June 19, 1986 (6957). The Paint Creek population, when discovered, consisted only of old seed pods and was not vouchered. The largest of these populations was the North Buena Vista station, where well over 500 individuals were observed on a cool, north-facing limestone cliff with *Sullivantia renifolia*.

Ranunculaceae

Aconitum noveboracense A. Gray was recently considered restricted to 7 stations in 4 northeastern counties (Roosa and Eilers 1978). This number of sites has increased by an order of magnitude with initiation of the Iowa Pleistocene Snail project (Terrence Frest 1986b). Six of these new populations were located by the author: **Clayton:** Sec. 13, Boardman Twp., July 16, 1983 (6062); **Sec. 27, Garnavillo Twp., May 14, 1987, JCN and Fred R. Nekola (7272); Delaware:** Sec. 11, Elk Twp., August 18, 1984, JCN, Robert Thomson, and William Thomas (6295); **Sec. 10, Elk Twp., August 21, 1984 (6303); Jackson:** Sec. 17, Otter Creek Twp., June 3, 1987, JCN and Terrence Frest (7211). In addition to these, a large population, inadvertently left unvouchered, was discovered in 1985: **Clayton:** Sec. 27 & 28, Elk Twp., May 12, 1985. All attempts at discovery of an extant Fayette County population have failed.

Hydrastis canadensis L. is known only from the easternmost counties of the state, with most populations being found in mesic woodlands of the Paleozoic Plateau (Roosa *et al.* 1986). Since 1984, four stations have been located in rich *Quercus - Acer saccharum - Tilia americana - Ulmus rubra* forests: **Allamakee:** Yellow River State Forest, NW $\frac{1}{4}$ Sec. 16, Fairview Twp., May 18, 1984 (6203); **Clayton:** NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 4, Volga Twp., May 18, 1984 (6204); **Sec. 16, Garnavillo Twp., August 8, 1986 (7074) W $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 14, Volga Twp., May 4, 1986 (7389).**

Rhamnaceae

Rhamnus alnifolia L'Her has been reported as rare in the state, being limited to wooded slopes and bluffs in the northeasternmost counties (Thorne 1953). It has subsequently been found to be a frequent component of algific talus slope floras, typically occurring as clumps of individuals in damp, cool areas. It has been collected from 22 sites in 7 northeastern counties: **Allamakee:** Sec. 18, Franklin Twp., August 12, 1986 (7033); **Sec. 18, Franklin Twp., August 12, 1986 (7050); Sec. 28, Franklin Twp., April 26, 1987 (7287); Sec. 16, Taylor Twp., July 21, 1989, JCN and Robert K. Peet (8166); Clayton:**

Sec. 25, Boardman Twp., May 16, 1984, JCN and Shawn Dvorak (6199); Sec. 21, Garravillo Twp., June 18, 1984 (6315); Sec. 27, Elk Twp., May 12, 1985 (6621); Sec. 31, Sperry Twp., June 14, 1986 (6877); Sec. 16, Garnavillo Twp., August 8, 1986 (7075); Sec. 27, Garnavillo Twp., May 14, 1987 (7263); Delaware: Sec. 11, Elk Twp., August 18, 1984, JCN, Robert Thomas, and William Thomson (6294); **Sec. 10, Elk Twp., August 21, 1984 (6301); Dubuque:** Sec. 29, Washington Twp., JCN and Dean Roosa, June 16, 1989 (7966); **Fayette:** Sec. 8, Fairfield Twp., June 18, 1986 (6968); **Jackson:** Sec. 17, Otter Creek Twp., JCN and Dean Roosa, June 16, 1989 (7956); **Winneshiek:** Sec. 16, Decorah Twp., May 16, 1984, JCN and Shawn Dvorak (6176); **Sec. 2, Madison Twp., July 1, 1986, JCN and John Prestidge (6646); Sec. 21, Fremont Twp., June 15, 1987, JCN and Terrence Frest (7310); Sec. 8, Bluffton Twp., June 15, 1987, JCN and Terrence Frest (7321); Sec. 3, Bluffton Twp., June 16, 1987, JCN and Terrence Frest (7373); Sec. 23, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7353); Sec. 14, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7371).**

Throughout the rest of the southern terminus of its range, this species appears to be restricted to fens (Swink and Wilhelm 1979; Barbara Andreas, personal communication). Although rather frequent on algific slopes, it has never been located in Iowa fen habitats. However, fens as far west as Peoria, Illinois, do harbor this species (Sheviak 1981).

Rosaceae

Amelanchier laevis Weig. was reported by Eilers (1971) from only a single site on the Iowan Erosional Surface. Three additional Iowan Surface sites have been documented since 1983: **Linn:** Troy Pond, NE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 13, Bertram Twp., September 24, 1983 (6103); **Indian Creek Nature Center**, W $\frac{1}{2}$ Sec. 30, Bertram Twp., May 5, 1983 (6521); **Mitchell:** E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 12, Jenkins Twp., June 4, 1986 (6847). A population seen in Bremer County (Northwoods Park, SE $\frac{1}{4}$ Sec. 13, Sumner Twp., August 6, 1984), was inadvertently not vouchered. A population of this species has also been documented in Clayton County (Pike's Peak State Park, Sec. SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 35, Mendon Twp., May 17, 1984 [6181]). All of these populations were observed in moist, sandy woodlands. The extremely rare Iowa species *Ilex verticillata* was found co-occurring with *A. laevis* at the Mitchell County site.

Potentilla fruticosa L. must be considered one of the state's rarest plants, being documented from only single sites in Allamakee, Jackson, Jones, and Winneshiek counties (Grant 1953a, Hartley 1962, Cooperrider 1962). A second Allamakee County population has been located: **Sec. 18, Franklin Twp., August 12, 1986 (7036).** Plants were observed on dry limestone outcrops on an algific talus slope, growing with *Cerastium arvense*, *Cryptogramma stelleri*, *Epilobium angustifolium*, *Equisetum scirpoides*, *Gymnocarpium robertianum*, *Pyrola secunda*, *Rosa acicularis*, *Rubus pubescens*, *Salix bebbiana*, and *Solidago sciaphila*.

Potentilla palustris (L.) Scop. is also quite rare in the state, having been known from only 8 northern counties (Grant 1953a, Lammers and van der

Valk 1977). Many of these collections are quite old. It has been recently observed extant at 5 sites: **Bremer:** Brayton-Horsley Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 28, 1984; **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., June 3, 1985 (6632), July 12, 1989 (8099); **Cerro Gordo:** Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7418); **Hancock:** Pilot Knob State Park, Sec. 4, Ellington Twp., July 26, 1989 (8184); **Worth:** Christianson-Taylor Wildlife Area, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 15, Hartland Twp., June 3, 1986, JCN and Dennis Schlicht (6945). This species is certainly one of the most uncommon components of the fen flora in eastern Iowa.

Potentilla pensylvanica L. was first reported from the Iowa flora by Shimek (1897) who indicated it was restricted to a single Sioux Quartzite exposure in Lyon County. This species was apparently last collected at this location, within Gitche Manitou State Preserve, in 1954 (Thorne 1956). Recently this species has been considered extirpated from the state (Roosa *et al.* 1986). The population of this species at Gitche Manitou has been found to still be extant: **Sec. 11, Sioux Twp., June 5, 1989, JCN and Tim Orwig (7877).** Approximately a dozen plants were observed on a small Sioux Quartzite exposure flush with the ground. Dean Roosa (personal communication) indicates that a large population of this species has also been located in O'Brien County on a xeric gravel prairie during the 1989 Natural History Foray.

Potentilla tridentata Ait. is known from only a few exposed sandstone outcrops in Allamakee and Winneshiek counties (Roosa *et al.* 1986). Two extant populations have recently been verified: **Winneshiek:** SE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Highland Twp., June 9, 1987, JCN and Terrence Frest (7299); **NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 7, Highland Twp., June 16, 1989, JCN and Dean Roosa (7943).**

Prunus pumila L. a low growing shrub of xeric sandy sites, has been reported from extreme northeastern (Allamakee and Winneshiek counties) and northwestern (Dickinson and Lyon counties) Iowa (Grant 1953, Thorne 1953, Hartley 1962). Two additional populations of this rare shrub can be reported: **Allamakee:** Fish Farm Mounds Wildlife Area, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 26, Iowa Twp., June 1, 1987, JCN and Dennis Schlicht (7218); **Louisa:** Big Sand Mound, Sec. 4, Port Louisa Twp., August 20, 1984 (6371), May 27, 1987 (7280).

Rosa acicularis Lindl. was originally reported from the Iowa flora by Hartley (1962), who located it in Allamakee and Clayton counties. Seven stations for this northern plant, all on algific talus slopes, have been located: **Allamakee:** Sec. 18, Franklin Twp., August 12, 1986 (7039); **Old Stone House**, Sec. 12, Post Twp., August 9, 1986 (7058); **Sec. 16, Taylor Twp., July 21, 1989, JCN and Robert K. Peet (8165); Delaware:** Sec. 11, Elk Twp., June 3, 1985 (6634); **Winneshiek:** Sec. 20, Decorah Twp., June 7, 1987, JCN and Terrence Frest; **Sec. 13, Bluffton Twp., June 8, 1987, JCN and Terrence Frest (7241); Sec. 3, Bluffton Twp., June 16, 1987, JCN and Terrence Frest (7328).** The Decorah Twp. site was not collected, but was

photographically documented. The specimens collected in Sec. 3, Bluffton Twp. appeared intermediate between *R. acicularis* and *R. blanda*, suggesting a possible hybrid origin.

Rubus pubescens Raf. is one of the characteristic species of alfic talus slopes in northeastern Iowa. It has been found on many such sites in Allamakee, Clayton, Delaware, Dubuque, Fayette, Howard, Jackson, and Winneshiek counties (Frest 1981, 1984, 1986a, 1987). However, 6 additional populations have been recently uncovered on fen sites in eastern Iowa: **Bremer:** Brayton-Horsley Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., June 22, 1985 (6732); **Cedar:** Rochester South Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 25, Rochester Twp., June 19, 1989 (8011); **Fayette:** Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., June 24, 1986 (6982); **Linn:** Matus Fen, NE $\frac{1}{4}$ Sec. 36, Maine Twp., May 25, 1985 (7640); **Mitchell:** Staceyville Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Liberty Twp., June 5, 1986 (6839); **Riceville Fen Complex,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Jenkins Twp., June 5, 1986 (6842).

Tolstead (1938) was apparently the first to report *R. pubescens* from an Iowa fen, on a now destroyed site north of Cresco in Howard County. The largest populations of this species occur in Iowa on fen sites, often being locally dominant in the vegetation. The Cedar County population is one of the most southerly known between the mountains of West Virginia and Colorado.

Rubiaceae

Galium labradoricum Wieg. was considered extirpated from the state (Roosa *et al.* 1986), having been known only from a 1896 Cerro Gordo County and a 1952 Winnebago County collection. The latter site was being drained as the species was collected there (Thorne 1952). Extant populations have, however, recently been documented from two sites: **Cerro Gordo:** Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7416), July 6, 1989 (8080); **Clayton:** Postville Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., July 18, 1989 (8140). Both populations were observed growing near or under clumps of *Salix pedicellaris*. The Buffalo Slough population, first located by Dean Roosa, Lawrence Eilers, and Bob Moats in June 1986, is very large, the species being a dominant ground cover over much of the site.

Salicaceae

Salix candida Fluegge was considered extirpated from Iowa by Spence (1959) and Roosa and Eilers (1978). Since discovery of eastern Iowa fen communities in 1984 (Nekola 1988) it has been observed extant at 26 sites on the Iowan Erosional Surface and Paleozoic Plateau: **Benton:** Mt. Auburn Fen, E $\frac{1}{2}$ Sec. 23, Cedar Twp., July 21, 1988 (7670, 7672); **Black Hawk:** Hammond Road Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 15, 1988 (7690); **St. Francis 1 Fen,** NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Barclay Twp., July 15, 1988 (7699); **St. John's Fen,** NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 27, Bennington Twp., July 15, 1988 (7705); **Bremer:** Buschine Fen, NW $\frac{1}{4}$ Sec. 36, Polk Twp., June 6, 1986, JCN and John Brayton (6892), July 19, 1989 (8156); **Brayton-Horsley Fen,** NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 5, 1989; **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., May 28, 1985

(6599); **Rowley Fen,** E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., June 27, 1986, JCN and Dennis Schlicht (6980); **Cerro Gordo:** Neuhing Fen, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., August 21, 1986 (7095); **Buffalo Slough,** W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7413), July 6, 1989 (8078); **Pope Fen,** NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Lincoln Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7420); **Chickasaw:** Kleiss Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 26, Stapleton Twp., September 23, 1984, JCN and John Brayton (6400); **Clayton:** Postville Fen, NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., August 23, 1986 (7123); **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., July 3, 1985 (6656); **Robinson Fen,** W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 19, Adams Twp., June 24, 1986, JCN and Dennis Schlicht (6990); **Fayette:** Sumner SW 2 Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Fremont Twp., May 16, 1987, JCN and John Brayton (7291); **Turner Creek 1 Fen,** N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7725); **Smithfield Township Hall Fen,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7747); **Hunter Creek Fen,** SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 30, Jefferson Twp., July 31, 1988 (7807); **Oelwein West Fen,** E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Oran Twp., July 31, 1988 (7800); **Otter Creek Fen,** NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Harlan Twp., July 31, 1988 (7810); **Howard:** Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8123); **Linn:** Matus Fen, NE $\frac{1}{4}$ Sec. 36, Maine Twp., May 25, 1985 (6725); **Anderson Fen,** SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., June 24, 1985 (6745); **Whittier Fen,** NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Brown Twp., July 12, 1988 (7658); **Mitchell:** St. Ansgar Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., June 5, 1986 (6868). As it had been previously vouchered by T.G. Lammers (personal communication), the Brayton Fen population was not collected. The Benton, Black Hawk, Buchanan, Fayette, Howard, Linn, and Mitchell county collections represent county records. This is one of the most characteristic species of eastern Iowa fen communities, and seems restricted, throughout its range, to these habitats.

Salix candida Fluegge X *Salix rigida* Muhl., previously unreported from the state, has been documented from a few locations in eastern Iowa fens where the two parents co-exist: **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., June 26, 1989 (8043); **Fayette:** Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7842); **Linn:** Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., June 30, 1985 (6782). It has been observed, but not vouchered at: **Black Hawk:** Hammond Road Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 15, 1988; **Linn:** Matus Fen, NE $\frac{1}{4}$ Sec. 36, Maine Twp., June 28, 1989. The Anderson Fen specimen was identified by Dr. George Argus of the Canadian National Museum in Ottawa. This taxon is usually quite rare, being restricted to single individuals when present at all. It is much rarer in the state than the other *S. candida* hybrid, *S. X clarkei*.

Salix X clarkei Bebb., the hybrid between *S.*

candida and *S. petiolaris*, is also unreported from the state. It is occasionally observed co-occurring with *S. candida* in fens of eastern and northern Iowa. It has been documented from the following stations: **Black Hawk:** Hammond Road Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 15, 1988 (7691); **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., June 26, 1989 (8045); **Fayette:** Turner Creek 1 Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7717); **Smithfield Township Hall Fen,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7749); **Hunter Creek Fen,** SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 30, Jefferson Twp., July 31, 1988 (7809); **Linn:** Whittier Fen, NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Brown Twp., July 12, 1988 (7659); **Marus Fen,** NE $\frac{1}{4}$ Sec. 36, Maine Twp., June 28, 1989 (8047). It has also been observed, but not vouchered at: **Benton:** Mt. Auburn Fen, E $\frac{1}{2}$ Sec. 23, Cedar Twp., July 21, 1988; **Buchanan:** Rowley Fen, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., July 23, 1989; **Fayette:** Sumner SW 2 Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Harlan Twp., August 3, 1988; **Linn:** Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jefferson Twp., July 14, 1988. Individuals exhibiting all intergradations between both parents are usually seen within a population.

Salix lucida Muhl. is apparently the rarest willow in the state, having been reported extant from only 2 sites in the last 3 decades (Roosa *et al.* 1986). An additional population, constituting a county record, can be reported: **Clay:** Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8200). Two trees were observed at this site, which also contains a rich assemblage of fen plant species, including *Carex prairea*, *Cyperipedium candidum*, *Epilobium leptophyllum*, *Eriophorum angustifolium*, *Gentiana procerca*, *Juncus balticus*, *Lobelia kalmii*, *Muhlenbergia glomerata*, *Parnassia glauca*, *Rhynchospora capillacea*, *Scirpus americanus*, *Scleria verticillata*, *Solidago riddellii*, and *Triglochin palustre*. The combination of high quality (most of the 5 individual fens in this complex are pristine), and large number of rare species observed, makes this one of the most important fen occurrences in the state.

Salix pedicellaris Pursh. was recently thought to be restricted to the *Sphagnum* mat of the nutrient-poor fen on the western side of Dead Man's Lake in Pilot Knob State Park (Howe *et al.* 1984). This population was found to still be healthy (Sec. 4, Ellington Twp., July 26, 1989 [8182]). Since 1985 it has also been found at an additional 7 sites in eastern Iowa: **Benton:** Mt. Auburn Fen, E $\frac{1}{2}$ Sec. 23, Cedar Twp., June 22, 1989 (8032); **Bremer:** Brayton-Horsley Fen, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., June 22, 1985 (6750); **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., June 21, 1985 (6749); **Walker Sand Ridge Fen,** SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7453); **Cerro Gordo:** Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7412); **Clayton:** Postville Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., August 23, 1986, JCN and Dennis Schlicht (7122), July 18, 1989 (8139); **Mitchell:** Jenkins Township Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 2, 1986, JCN and Dennis Schlicht (6926). Like *S. candida*, this species seems to be wholly restricted to fen

habitats. However, *S. pedicellaris* is certainly much less frequently encountered within the state.

Saxifragaceae

Chrysoplenium iowense Rydb., once known from only 8 sites in the state (Rosendahl 1947), is now known from 41 algalic talus slope locations in 8 counties of northeastern Iowa (Frest 1987). Of these, 7 were first located by the author. The populations which have been vouchered include: Delaware: Sec. 10, Elk Twp., August 31, 1984 (6386); Fayette: Sec. 4, 5, 8, Fairfield Twp., June 18, 1986 (6969); Winneshiek: Sec. 23, Bluffton Twp., June 23, 1987, JCN and Terrence Frest (7350). The Fairfield Twp. site included, in total, 5 separate populations. As the only other known Fayette County site has been reduced to fewer than 25 plants by intense and prolonged grazing (Terrence Frest, personal communication), the discovery of these populations, containing over 10,000 individuals in total, increases its long-term likelihood for survival in the county.

Parnassia glauca Raf. had not been documented in eastern Iowa since a 1912 Linn County collection (Eilers 1971), although it was known to be frequent in northwestern Iowa fens (Roosa and Eilers 1978). After initiation of a systematic inventory of eastern Iowa fen sites (Nekola 1988), 18 sites for this species in 11 eastern Iowa counties have been documented: Allamakee: Clear Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 27, Union City Twp., June 25, 1986, JCN and Dennis Schlicht (6974), July 22, 1989, JCN and Robert K. Peet (8176); Bremer: Buschline Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 36, Polk Twp., August 4, 1986 (7080); Buchanan: Rowley Fen, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., August 15, 1985 (6760); Cerro Gordo: Neuhring Fen, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., August 21, 1986 (7093); Hoffman Prairie, S $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Clear Lake Twp., August 21, 1986 (7102); Pope Fen, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Lincoln Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7422); Fayette: Sumner SW 1 Fen, SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Fremont Twp., August 11, 1986, JCN and John Brayton (7082); Turner Creek 1 Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7720); Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7744); Otter Creek Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Harlan Twp., July 31, 1988 (7811); Franklin: Maynes Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 12, Geneva Twp., June 23, 1987, JCN and Terrence Frest (7348); Grundy: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., August 29, 1988 (7831); Howard: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8134); Linn: Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., September 7, 1985 (6722); Western College Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 35, College Twp., September 10, 1985 (6755); Patton Fen, E $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 6, Jackson Twp., July 13, 1988 (7666); Mitchell: St. Ansgar Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., August 17, 1986 (7115); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7763). The population discovered at Hoffman Prairie in Cerro Gordo

County is most interesting, as it occurs in wet-mesic tallgrass prairie, and not in a fen habitat. Such occurrences were mentioned by Cratty (1903), who noted that this species was "common on low prairies, but rapidly disappearing."

This species has also been collected from 8 historical or new sites in 3 northwestern counties: Clay: Hungry Hollow Fen; SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Logan Twp., August 21, 1986 (7087); Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., August 27, 1989 (8187); Dickinson: Excelsior Fen Complex, SE $\frac{1}{4}$ Sec. 10, Excelsior Twp., August 29, 1985 (6681); Lower Gar Lake Fen, NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Center Grove Twp., August 21, 1986 (7110); Silver Lake Fen, NW $\frac{1}{4}$ Sec. 32, Silver Lake Twp., June 6, 1989 (7914); Emmet: Wallingford Fen, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 24, Twelve Mile Lake Twp., August 30, 1985, JCN and Bob Moats (6770); Gravel Pit Fen, NE $\frac{1}{4}$ Sec. 3, Estherville Twp., August 30, 1985, JCN and Bob Moats (6774); O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., August 27, 1989, JCN and Bob Moats (8187). All of these populations are restricted to fens.

Ribes hudsonianum Richards is restricted to a few algalic talus slope sites northeastern Iowa, where it is disjunct from northern Wisconsin (Roosa and Eilers 1978). Since 1984, the historical record from Bixby State Preserve has been reverified, and two new populations have been located: Clayton: Bixby State Preserve, Sec. 23, Lodomillo Twp., May 16, 1984, JCN and Shawn Dvorak (6171); Sec. 27, Elk Twp., May 15, 1985 (6620); Delaware: Sec. 11, Elk Twp., August 18, 1984, JCN, Robert Thomson, William Thomas (6296). The Delaware County site, besides representing a county record, is also the southernmost population of this species in the state (Terrence Frest, personal communication). At the time of discovery, this population also represented the largest stand of this species in the state (Terrence Frest, personal communication), with well over 1000 individuals present.

Sullivantia renifolia Rosend. has been reported from 9 eastern and northeastern counties (Fay 1951, Hartley 1962, Rickey 1964, Eilers 1974, Roosa and Eilers 1978). Fifteen extant populations have been observed since 1982 on shaded, moist limestone and sandstone cliffs, or algalic talus slopes: Allamakee: Bear Creek Bluff, N $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 29, Waterloo Twp., May 16, 1984, JCN and Shawn Dvorak (6184); Clayton: Bixby State Preserve, Sec. 23, Lodomillo Twp., June 29, 1982 (7491); North Buena Vista Woods, N $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 21, Buena Vista Twp., June 19, 1986 (6955); Sec. 30, Read Twp., August 10, 1986 (7078); Delaware: Sec. 10, Elk Twp., August 21, 1984 (6309); Backbone State Park, NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 9, Richland Twp., September 14, 1985, JCN and Dennis Schlicht (6700); Fountain Springs Park, Sec. NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 15, Elk Twp., June 26, 1985 (6764); Dubuque: Bankston Park, Sec. 3, Iowa Twp., April 29, 1984 (6217); Fayette: Sec. 5, Fairview Twp., June 18, 1986 (6967); Jackson: Maquoketa Caves State Park, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 6, South Fork Twp., September 25, 1982 (7490); Linn: SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Bertram Twp., August 22, 1983 (6100). In addition to these sites, others which were observed, but not vouchered, include: Clayton: Sec. 27, Elk Twp., May 12, 1985; Delaware:

Sec. 11, Elk Twp., August 18, 1984; Jackson: Sec. 28, Brandon Twp., May 30, 1985, JCN and Terrence Frest; Jones: Pictured Rocks Park, Sec. 5, Scotch Grove Twp., May 5, 1981. The latter site was photographically documented at time of discovery.

Soltis (1980) maintains that this species is conspecific with the eastern *S. sullivantii*, based primarily upon isozyme analysis. Comparison of specimens of the two taxa at U.S. National Herbarium revealed that they were easily differentiated based on leaf margin and overall shape. It does not seem clear why these geographically and morphologically distinct populations should be lumped, based solely upon chemical analysis. I have thus maintained these taxa as distinct.

Scrophulariaceae

Gerardia pauperula (Gray) Britt. is documented from recent collections primarily in the fens of northwestern Iowa (eg. Emmet: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats [8192]). Only recently has it also been established to be a component of the eastern Iowa fen flora: Fayette: Oelwein West Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Oran Twp., August 31, 1988 (7795); Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7836); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7771). All three of these sites bear in common the occurrence of low-statured vegetation patches. Such sites may also support populations of rare fen species such as *Carex sterilis*, *Lobelia kalmii*, *Parnassia glauca*, *Platanthera hyperborea*, *Rhynchospora capillacea*, *Scleria verticillata*, and *Triglochin maritima*.

Mimulus glabratus HBK var. *fremontii* (Benth.) Grant is known from a very few collections in northern and eastern Iowa (Roose *et al.* 1986). Two of its historical sites have been recently redocumented: Dickinson: Lower Gar Lake Fen, NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 32, Center Grove Twp., July 28, 1989 (8219); Linn: Marion Springs, E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 35, Marion Twp., August 7, 1982, JCN and Shawn Dvorak (7488). Additional new populations have also been discovered at: Mitchell: St. Ansgar Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., June 5, 1986 (6865); Osage Spring Park, SE $\frac{1}{4}$ Sec. 28, Cedar Twp., June 2, 1986, JCN and Dennis Schlicht (6931), July 7, 1989 (8087); Muscatine: Conesville Fen, SE $\frac{1}{4}$ Sec. 17, Orono Twp., June 18, 1989, JCN and Dean Roosa (7991). An unvouchered, exceedingly small new population was also observed in Dickinson County: Milford Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Okoboji Twp., August 30, 1985, JCN and Bob Moats.

All the populations were observed in cold water discharge of springs or fens. The largest of these was noted at Osage Spring Park in July 1989, where literally tens of thousands of plants formed a thick carpet over the 2 meter wide outlet stream from Osage Spring.

Penstemon albidus Nutt. is restricted to a very few sites in Lyon, Plymouth, and Sioux counties (Thorne 1956). Three populations of this quite rare Iowa species were recently documented in Lyon County, all occurring in xeric gravel prairie: Granite Prairie, W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 19, Sioux Twp., June 4, 1989, JCN and Tim Orwig

(7884); Inwood NW 1 Prairie, SW $\frac{1}{4}$ Sec. 3, Lyon Twp., June 4, 1989, JCN and Tim Orwig (7904); Inwood NW 2 Prairie, NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 11, Lyon Twp., June 4, 1989, JCN and Tim Orwig (7899). The site at Granite was first botanically observed by Bohumil Shimek in 1897. Additional populations for this species may also occur in similar xeric prairie sites in the extreme northwestern tier of counties.

Wulfenia bullii Barnh., is known from only a few sandy or gravelly areas in eastern and northwestern Iowa (Roosa *et al.* 1986). By the late 1970's only one extant population was known (Roosa and Eilers 1978). Four populations, including both historical and new sites, have recently been verified: **Benton:** North Vinton Sand Ridge, W $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 15, Harrison Twp., July 17, 1987, JCN and Shawn Dvorak (7451); **Emmet:** Anderson Prairie, SW $\frac{1}{4}$ Sec. 28, Emmet Twp., June 5, 1989 (7921); **Linn:** Chain Lakes Woods, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 22, Monroe Twp., May 11, 1981, JCN and Shawn Dvorak; **Muscatine:** NW $\frac{1}{4}$ Sec. 22, Lake Twp., June 19, 1989, JCN and Dean Roosa (8003). The Linn County population, which was first located in the late 1940's by Partee, has been photographically documented. The Benton County collection represents not only a county record, but also one of the state's largest *W. bullii* populations. Many thousands of individuals were observed on this site, both in roadside sand prairie, and in a badly grazed, sandy horse pasture.

Valerianaceae

Valeriana edulis Nutt. ex. Torr. & A. Gray ssp. *ciliata* (Torr. & A. Gray) F. G. Mey, recently known from historical collections in only 7 northeastern counties (Roosa and Eilers 1978), has been observed at 19 locations, since 1984: **Black Hawk:** St. Francis 1 Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Barclay Twp., July 15, 1988 (7700); St. John's Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 27, Bennington Twp., July 15, 1988, (7703); **Bremer:** Brayton Prairie, SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 28, 1984; Laggeschulte Prairie, N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Warren Twp., April 30, 1985, JCN and John Brayton; **Chickasaw:** Chickasaw Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Chickasaw Twp., August 12, 1986, JCN and Herb Wilson (7022), July 19, 1989 (8145); **Boyd Prairie,** E $\frac{1}{2}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 34, Dresden Twp., August 12, 1986, JCN and Herb Wilson (7030); **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., September 14, 1985, JCN and Dennis Schlicht (6696); **Robinson Fen,** W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 19, Adams Twp., June 24, 1986, JCN and Dennis Schlicht (6986); **Fayette:** *Valeriana* Swale, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, Banks Twp., June 22, 1985, JCN and John Brayton (6736); **Randalia Prairie,** NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 14, Center Twp., June 6, 1986, JCN and John Brayton (6897); **Hawkeye Prairie,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, Windsor Twp., July 20, 1988, JCN and John Brayton (7738); **Smithfield Township Hall Fen,** SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7743); **Howard:** Florenceville Glade, W $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 27, Albion Twp., April 26, 1986, JCN and John Brayton (6801); **Crossman Prairie,** W $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 11, Jamestown Twp., June

26, 1986, JCN and Dennis Schlicht; **Hayden Prairie,** Sec. 33, Chester Twp., May 30, 1989, JCN and Dennis Schlicht (7874); **Staff Creek Fen,** N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8125); **Mitchell:** Jenkins Township Prairie, S $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 29, Jenkins Twp., June 2, 1986, JCN and Dennis Schlicht (6925); **Jenkins Township Fen,** SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 2, 1986, JCN and Dennis Schlicht (6932); **Winneshiek:** Jackson Junction Prairie, SW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 22, Jackson Twp., July 20, 1989 (8161).

All of these sites except Laggeschulte Prairie, Brayton Prairie, Hayden Prairie, and Crossman Prairie represent previously undocumented populations. Of these, only the Hayden Prairie population has been vouchered by the author. Populations have been noted growing in three distinct habitats: 1) xeric limestone glades (1 site), 2) wet-mesic prairies (10 sites), and 3) fens (8 sites). On some wet-mesic prairie sites, such as the Hawkeye and Randalia prairies, this species was the dominant groundcover.

Violaceae

Hybanthus concolor (T. F. Forst) Spreng. was known from only a few localities in Allamakee and Dubuque counties (Roosa *et al.* 1986). It can also be reported from Winneshiek County: Sec. 23, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7363). This population may be the largest in the state, with over 500 stems being noted in a patch covering approximately 20 square meters. It was located in cool, rocky woods within a large algific talus slope. Also found on this site were the rare species *Abies balsamea*, *Adoxa moschatellina*, *Cerastium arvense*, *Chrysosplenium iowense*, *Circaea alpina*, *Corylus cornuta*, *Cryptogramma stelleri*, *Cypripedium reginae*, *Cystopteris laurentiana*, *Diervilla lonicera*, *Gymnocarpium dryopteris*, *Rhamnus alnifolia*, *Rubus pubescens*, *Salix bebbiana*, *Saxifraga forbesii*, *Schizachne purpurascens*, *Taxus canadensis*, and *Viola rugulosa*.

Viola adunca Sm., previously unreported from Iowa, is apparently restricted to a single colony in southwestern Allamakee County, where it is disjunct 100 miles from its nearest population in central Wisconsin (Hartley 1962): Sec. 18, Franklin Twp., August 12, 1986 (7053). At this site, *V. adunca* is abundant on bare limestone talus with cold air drainage at the boundary between a xeric hill prairie and an algific talus slope. It was also found to occur in small, scattered clumps throughout the hill prairie. The seemingly impossible coexistence of taxa such as *Bouteloua curtipendula*, *Gymnocarpium robertianum*, *Liatrix cylindracea*, *Potentilla arguta*, *Rhamnus alnifolia*, and *V. adunca* at this site makes it one of the most unusual algific talus slope areas so far discovered. Reconnaissance of additional hill prairie — algific slope habitats in northeastern Iowa by JCN and Terrence Frest during June and July of 1987 did not uncover any additional *V. adunca* populations. It is undoubtedly one of the state's most restricted native taxa.

Viola incognita Brainerd is one of the rarest violets in the state, being restricted to sites in 3 counties (Roosa *et al.* 1986). This species was collected in northern Winneshiek County in 1987 by JCN and Terrence Frest (W $\frac{1}{2}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 10, Highlandville Twp., June 21

[7336]) in a rich, moist woodland with *Aralia nudicaulis*, *Atthyrium filix-femina*, *Goodyera pubescens*, *Maianthemum canadense*, *Osmunda claytoniana*, *Pyrola elliptica* and other typical forest herbs. This same site was reported by Hartley (1962) to harbor *Mitchella repens*, although it could not be relocated.

These plants have been referred to *V. incognita* on the basis of Russell (1953), who stated that all collections within the *V. incognita* — *V. blanda* group from Iowa are referable to this taxon. However, if reddish suffusion of the petiole and peduncle and the sparse pubescence on the upper leaf surface are important diagnostic features as suggested by House (1935), Gleason (1952), and Gleason and Cronquist (1963), these plants would clearly represent specimens of *V. blanda*, and would constitute an addition to the state's flora.

Viola renifolia Gray was collected by Hartley from 3 sites in northeastern Iowa (Hartley 1962), yet was recently considered extirpated from the state (Howe *et al.* 1984). Two extant stations for this taxon have been documented: **Allamakee:** Old Stone House, Sec. 12, Post Twp., May 17, 1984, JCN and Shawn Dvorak (6159); **Clayton:** Sec. 25, Boardman Twp., May 16, 1984, JCN and Shawn Dvorak (6196). In addition, 2 other populations have been observed, but not vouchered: **Clayton:** Sec. 23, Garnaville Twp., August 8, 1986; **Dubuque:** White Pine Hollow State Preserve, Sec. 8, Liberty Twp., September 16, 1984. Frest (1983) also reports this taxon from Howard County. All specimens collected are sparsely pubescent on the upper leaf surface, characteristic of *V. renifolia* var. *brainerdii* (Greene) Fern. This taxon can be most easily separated from the similar *V. pallens* by the absence of stolons.

Viola striata Ait., reported from a single Van Buren County site by Davidson (1959), has also been located in Jefferson County: County Park, SW $\frac{1}{4}$ Sec. 35, Fairfield Twp., August 15, 1987, JCN and Dennis Schlicht (7474). It was found to be abundant along a footpath in moist woodland. While Davidson (1959) considered this species to be naturalized in southeastern Iowa, no support is given for this contention. As its range includes Iowa (Gleason 1952), and as it is not commonly used for garden plantings in the state, it seems reasonable to assume that these plants represent a native population. The Fairfield population was quite large, and has evidently been present for quite some time.

Urticaceae

Pilea fontana (Lunnell) Rydb., listed as rare and probably overlooked in Iowa by Thorne (1953), has been found in many fens throughout the state: **Bremer:** Northwoods Park, SE $\frac{1}{4}$ Sec. 13, Sumner Twp., August 6, 1984 (6864); **Buchanan:** NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Hazleton Twp., August 26, 1984, JCN and Shawn Dvorak (6374); **Delaware:** Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., July 3, 1985 (6669); **Dickinson:** Milford Fen, SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Okoboji Twp., August 30, 1985, JCN and Bob Moats (6669); **Spooky Hollow Woodland Fen,** NW $\frac{1}{4}$ Sec. 4, Okoboji Twp., August 28, 1985 (6672); **Emmet:** Wallingford Fen, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 24, Twelve Mile Lake Twp., August 30, 1985, JCN and Bob Moats (6769); **Linn:**

Central City West Fen, NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 9, Maine Twp., August 31, 1984 (6387); Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., September 7, 1987, JCN and John Brayton (6724). A number of additional populations from eastern Iowa fens have not been vouchered. It is typically found in the shade of tall vegetation (such as *Typha*) in cold, mossy, and wet areas on fens.

Monocotyledons

Cyperaceae

Carex abdita Bickn. has been reported in Iowa only from two dry glades near the Upper Iowa River in Allamakee County (Hartley 1962). An additional location may also be reported along another drainage system in the same county: Allamakee: Hickory Creek Glade, W $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 28, Franklin Twp., April 26, 1987 (7286). At this site, *C. abdita* were found with *Ranunculus rhomboideus* on the driest places of a xeric, southwest facing limestone glade. Other dry prairie species noted at this site included *Amorpha canescens*, *Andropogon scoparius*, *Aster sericeus*, *Bouteloua curtipendula*, *Lithospermum incisum*, *Juniperus communis*, *J. virginiana*, *Oxalis violaceae*, and *Viola pedatifida*. *Carex abdita* differs from the related *C. tonsa* by its lax, unscabrous leaves and manifestly short-pubescent perigynia (Swink and Wilhelm 1979).

Carex conoidea Schkuhr was considered extirpated from the state, being known only from old collections in Fayette, Howard, Johnson, Linn and Scott counties (Thorne 1956, Guldner 1960, Roosa and Eilers 1978). It has been observed extant at 3 stations: Fayette: Donnan Prairie, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 2, Center Twp., June 6, 1986, JCN and John Brayton (7838); Linn: Walker West Sand Prairie, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 8, Grant Twp. July 4, 1988, JCN and Robert Thomson (7646); *Xyris* Pond, E $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 1, Grant Twp., July 3, 1989, JCN and Robert Thomson (8075). The Fayette County population was found in a wet-mesic prairie, while the two Linn County sites were located in mesic to annually-wet sand prairie.

Carex crinita Lam. may be one of the state's rarest sedges, having been reported from two 1934 Jefferson County collections (Gilly and McDonald 1936, Davidson 1959). A third site for this species may be reported: Linn: Indian Creek Nature Center, W $\frac{1}{2}$ Sec. 30, Bertram Twp., May 26, 1982, JCN and Shawn Dvorak (7584). It was found in partial shade on the wet, sandy soil of a small woodland stream floodplain where it grew with *Amphicarpa bracteata*, *Cardamine bulbosa*, *Carex haydenii*, *Equisetum arvense*, *Equisetum hyemale*, *Impatiens biflora*, *Parthenocissus quinquefolia*, *Ranunculus abortivus*, *Ranunculus septentrionalis*, *Senecio aureus*, and *Symplocarpus foetidus*. This woodland tract, which harbors over 200 plant species (including 14 state rare taxa), is one of the most important natural areas in Linn County (Nekola 1983).

Carex deveyana Schwein. is known only from a very few moist woodlands in northwestern counties (Thorne 1956, Wolden 1956) and the Paleozoic Plateau (Hartley 1962). An additional northeastern Iowa site has been recently observed: Winneshiek: Sec. 33, Burr Oak Twp., June 9, 1987, JCN and Terrence Frest (7305). Approxi-

mately 25 plants were found growing in cold, moist places on a large, but weak algific talus slope with *Adoxa moschatellina*, *Cerastium arvense*, *Circaea X intermedia*, *Sambucus pubens*, and *Saxifraga forbesii*. Terrence Frest (personal communication) reports that *C. deveyana* has been located on less than 10 Iowa algific sites.

Carex media R.Br. had been reported from a single Clayton County algific slope (Hartley 1962), where it is disjunct over 550 km from its nearest population in northern Minnesota. A second location can also be reported from a Delaware County algific talus slope: Sec. 11, Elk Twp., May 12, 1985 (6618). This site was first located by JCN, Robert Thomson, and William Thomas on August 18, 1984. *Carex media* was observed growing with *Aconitum noveboracense*, *Cornus canadensis*, *Equisetum pratense*, and *Ribes hudsonianum* at this station. Though a thorough inventory for this species was not attempted due to the general fragility of the site, over 30 individuals were noted. Like *Cornus canadensis*, *Pyrola secunda*, and *Ribes hudsonianum*, this species reaches the known southern terminus of its Iowa range at this site.

Carex peckii Rydb. has been collected only a few times in Allamakee, Clayton, Dubuque, and Winneshiek counties (Thorne 1956, Hartley 1962). Recent collections have been made from two algific talus slope sites: Clayton: Sec. 27, Elk Twp., May 30, 1985 (6630); Delaware: Sec. 11, Elk Twp., May 12, 1985 (6757). It seems particularly fond of those sites which are developed into the Blanding Formation where large limestone blocks are common. This sedge and the rare Iowa grasses *Oryzopsis asperifolia* and *Schizachne purpurascens* frequently co-occur in dry areas on top of these blocks.

Carex plantaginea Lam. must also be considered one of the state's rarest sedges, having been recorded only from single stations in Clayton, Jackson, and Jones counties (Cooperrider 1962, Hartley 1962). Two additional populations for this sedge have been recently observed in Jackson County: Sec. 28, Brandon Twp., May 30, 1985, JCN and Terrence Frest; Sec. 17, Otter Creek Twp., June 16, 1989, JCN and Dean Roosa (7955). The first of these sites was inadvertently not vouchered. This species seems to favor cool, moist woods on the periphery of algific talus slopes. This species is proposed as "threatened" within Minnesota (Smith 1988).

Carex prairiea Dew. has been considered rare in the state, being restricted to the northern counties (Lammers and van der Valk 1979). It has been last collected within the Iowan Erosional Surface in 1917 (Eilers 1971). Since systematic survey of eastern Iowa fens began in 1984 (Nekola 1988), this species has been found to be one of the most characteristic components of the floras of these sites, being present in well over 95% of them (Nekola, unpublished data). Stations for this species which have been vouchered include: Allamakee: Clear Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 27, Union City Twp., July 16, 1988 (7709); Benton: Elberon Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17, Kane Twp., July 30, 1988, JCN and Fred R. Nekola (7839); Black Hawk: Hammond Road Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 15, 1988 (7694); St. Francis 1 Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Barclay

Twp., July 15, 1988 (7706); Bremer: Buschline Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 36, Polk Twp., June 6, 1986, JCN and John Brayton (6896); Buchanan: Rowley Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., May 17, 1985, JCN and Dennis Schlicht (7206); Chickasaw: Kleiss Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 26, Stapleton, Twp., June 3, 1985, JCN and John Brayton (6791); Clayton: Postville Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., July 18, 1989 (8138); Clinton: Selby Sand Ridge 2 Fen, NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 23, Liberty Twp., June 29, 1989 (8053); Delaware: Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., July 13, 1988 (7667); Emmet: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats (8189); Fayette: Alpha NW Fen, E $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 29, Eden Twp., April 26, 1986 (6812); Valeriana Swale, NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 32, Banks Twp., May 16, 1987, JCN and John Brayton (7290); Sumner SW 1 Fen, SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Fremont Twp., May 16, 1987, JCN and John Brayton (7295); St. Lucas Fen, S $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 9, Auburn Twp., July 18, 1988 (7710); Turner Creek Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7723); Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7753); Wadena NW 1 Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 18, Illyria Twp., August 1, 1988 (7787); Hunter Creek Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 30, Jefferson Twp., August 31, 1988 (7806); Otter Creek Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Harlan Twp., July 31, 1988 (7816); Grundy: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., July 29, 1988 (7829); Howard: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8126); Jones: Temple Hill Fen, NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 17, Clay Twp., June 1, 1987, JCN and Dennis Schlicht (7213); Linn: Whittier Fen, NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 8, Brown Twp., July 12, 1988 (7656); Matus Fen, NE $\frac{1}{4}$ Sec. 36, Maine Twp., July 12, 1988 (7663); June 28, 1989 (8046); Lyon: Klondike Fen, SE $\frac{1}{4}$ Sec. 16, Centennial Twp., June 4, 1989, JCN and Tim Orwig (7894); Mitchell: Jenkins Township Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 2, 1986, JCN and Dennis Schlicht (6927); St. Ansgar Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., June 5, 1986 (6866); Muscatine: Nichols Fen, Sec. 23, Pike Twp., June 19, 1989 (8063); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7768).

Carex sartwellii Dew. is rare and apparently restricted to the northern half of the state (Lammers and van der Valk 1979). It has been observed within 3 fen sites: Cerro Gordo: Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 6, 1989 (8079); Fayette: Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 8, 1989 (8090); Lyon: Klondike Fen, SE $\frac{1}{4}$ Sec. 16, Centennial Twp., June 4, 1989, JCN and Tim Orwig (8266). This species can easily be confused with *C. prairiea*, but is distinguished by its absence of copper-colored sheaths (Swink and Wilhelm 1979), and possession of leaf blades at least $\frac{1}{3}$ of the way up the culm.

Carex sterilis Willd. has not previously been

reported from the Iowa flora. Three stations have been documented in northeastern Iowa, all from fens: **Chickasaw**: Chickasaw Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Chickasaw Twp., July 19, 1989 (8153); **Fayette**: Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7859), July 8, 1989 (8088); **Winneshiek**: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7786), June 16, 1989, JCN and Dean Roosa (7953), July 20, 1989 (8157).

This species can be most readily differentiated from the similar *C. interior* by its: 1) chestnut brown perigynia; 2) manifest perigynial beak, obviously bidentate at the tip; 3) scales which are equal to or exceed the perigynia body; and 4) presence of completely-staminate individuals in the population (Braun 1967, Swink and Wilhelm 1979, Smith 1988). In the field, this species also appears somewhat taller and more robust than *C. interior*, but this aspect is not as apparent in herbarium specimens.

The species seems to favor species-rich fens in eastern Iowa, often occurring with other apparent calcicoles such as *Carex tetanica*, *Gentiana procera*, *Gerardia paupercula*, *Parnassia glauca*, *Rhynchospora capillacea*, *Scleria verticillata*, and *Valeriana edulis* ssp. *ciliata*. It does not seem to be present on all favorable sites, suggesting that this species will continue to be exceedingly rare within the state. It is currently listed as "threatened" in Minnesota, and appears to be local and rare throughout the western portion of its range (Smith 1988).

Carex tetanica Schkuhr is reported as being rare throughout the northern half of the state (Lammers and van der Valk 1979). It has been found to be an infrequent component of fen floras throughout Iowa. Populations have been documented at: **Benton**: Mt. Auburn Fen, E $\frac{1}{2}$ Sec. 23, Cedar Twp., June 22, 1989 (8035); **Buchanan**: Rowley Fen, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., June 23, 1989 (8038); **Fayette**: Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 8, 1989 (8092); **Mitchell**: St. Ansgar Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., July 7, 1989 (8086); **Winneshiek**: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 20, Jackson Twp., June 16, 1989, JCN and Dean Roosa (7952). It was also observed, but not collected at: **Grundy**: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., July 11, 1989. This species typically prefers zones of low vegetation growth, where many other rare taxa occur.

Carex tonsa (Fern.) Bickn. has been reported only from a very few sand prairies in extreme eastern Allamakee, Louisa and Muscatine counties (Roosa *et al.* 1986). The Louisa County population has been relocated, and found to be quite large: Big Sand Mound, Sec. 4, Port Louisa Twp., April 27, 1987 (7281). The species range has been expanded west in the state with discovery of the following populations: **Buchanan**: Walker Sand Ridge, SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., June 10, 1989 (7941); **Clinton**: Mockridge Wildlife Area, E $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 36, Liberty Twp., April 24, 1986, JCN, Dennis Schlicht, Bob Bryant, and Jerry Selby (7204); **Syslow Sand Prairie**, SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Spring Rock Twp., April 24, 1986, JCN, Dennis Schlicht, Bob

Bryant, and Jerry Selby (7208); **Linn**: Walker West Sand Prairie, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 8, Grant Twp., July 4, 1988, JCN and Robert Thomson (7636); **Winneshiek**: NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 7, Highlands Twp., June 16, 1989, JCN and Dean Roosa (7942); NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 18, Highlands Twp., June 16, 1989, JCN and Dean Roosa (7950). *Carex tonsa* can be most easily differentiated from *C. abdita* by its stiff, very scabrous leaues and scarcely pubescent to glabrous perigynia (Swink and Wilhelm 1979). The Winneshiek County populations seem transitional, having more perigynial pubescence than the other populations. However, they are not pubescent enough to warrant classification as *C. abdita*.

Eleocharis elliptica Kunth has only twice been listed from Iowa (Wolden 1956, Thorne 1956). In the latest enumeration of the Iowa flora (Eilers and Roosa, manuscript), it is considered synonymous with *E. compressa*. However, the most recent treatments of the North American flora (Kartesz and Kartesz 1980; Kartesz, in press) have considered these two taxa distinct. This species is actually more closely allied to *E. tenuis* (Braun 1967), which also occurs in the state (Thorne 1956). It is unknown how many of the historical records of *E. tenuis* (or *E. compressa*) in Iowa actually represent specimens of *E. elliptica*. It seems probable, based on the distribution of *E. elliptica* in northeastern Illinois (Swink and Wilhelm 1979) that it is restricted to fen communities and is rare in the state. The author's collections and observations seem to bear this prediction out, as all 7 documented sites came from fens, where it usually occurred in zones of low vegetation growth: **Buchanan**: Rowley Fen, E $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 2, Homer Twp., July 23, 1989 (8041); **Cerro Gordo**: Neuhring Fen, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., August 21, 1986 (7099); **Clay**: Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8201); **Fayette**: Oelwein West Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Oran Twp., July 31, 1988 (7799); **St. Lucas** Fen, S $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 9, Auburn Twp., July 18, 1988 (7835); **Smithfield Township Hall Fen**, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7853); **Winneshiek**: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7764).

Eleocharis pauciflora (Lightf.) Link var. *fernaldii* Sv. was last collected in the state from the Silver Lake and Estherville fens in 1953, and had been feared extirpated as no subsequent collections were made (Roosa *et al.* 1986). However, it was relocated in 1989 at Silver Lake Fen: **Dickinson**: NW $\frac{1}{4}$ Sec. 32, Silver Lake Twp., June 5, 1989 (7919). Individuals were most abundant on the downslope side of pools at the base of the large northwestern fen mat, but were also observed less commonly on the other fen mats in the preserve. In places this species became abundant enough to form small sods. It was observed growing with the fens obligates *Lobelia kalmii*, *Rhynchospora capillacea*, and *Triglochin palustre*. No other *Eleocharis* was observed on the fen mat, much simplifying the search for this species.

Eriophorum angustifolium Honckeny had only been documented twice from Iowa between 1958 and 1978 (Roosa and Eilers 1978). Through

systematic inventory of fen sites throughout Iowa (Nekola 1988), 37 extant populations have been observed in 17 counties during the last 5 years: **Allamakee**: Clear Creek Fen, NW $\frac{1}{4}$ Sec. 27, Union City Twp., July 22, 1989, JCN and Robert K. Peet (8175); **Benton**: Gilchrest Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 12, Polk Twp., June 6, 1987 (7226); **Boar Power Fen**, S $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 12, Polk Twp., July 2, 1987, JCN and Dennis Schlicht (7424); **Mt. Auburn Fen**, E $\frac{1}{2}$ Sec. 23, Cedar Twp., July 21, 1988 (7673); **Black Hawk**: Mark Sand Prairie 1 Fen, SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 19, Union Twp., July 6, 1988, JCN and Dennis Schlicht (7649); **Hammond Road Fen**, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 15, 1988 (7696); **St. John's Fen**, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 27, Bennington Twp., July 15, 1988 (7698); **Bremer**: Northwoods Park, N $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 13, Sumner Twp., June 23, 1985 (6733); **Brayton-Horsely Fen**, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., July 5, 1989 (8076); **Buchanan**: Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., June 21, 1985 (6738); **Walket Sand Ridge Fen**, N $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7455); **Butler**: Feldman Fen, S $\frac{1}{2}$ S $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 8, Ripley Twp., July 6, 1988, JCN and Dennis Schlicht (7647); **Cerro Gordo**: Buffalo Slough, W $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Lime Creek Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa; **Neuhring Fen**, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa (7423); **Pope Fen**, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 9, Lincoln Twp., July 3, 1987, JCN, Dennis Schlicht, Terrence Frest, and Dean Roosa; **Chickasaw**: Kleiss Fen, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 26 Stapleton Twp., June 3, 1985 (6783); **Chickasaw Fen**, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Chickasaw Twp., July 19, 1989 (8157); **Clay**: Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8205); **Delaware**: Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., July 3, 1985 (6655); **Robinson Fen**, W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 19, June 24, 1986, JCN and Dennis Schlicht (6988); **Emmet**: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats (8194); **Fayette**: Alpha NW Fen, NW $\frac{1}{4}$ Sec. 29, Eden Twp., April 26, 1986 (6813); **Randalia Prairie**, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 14, Center Twp., June 6, 1986, JCN and John Brayton; **Sumner SW 2 Fen**, NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Fremont Twp., May 16, 1987 (7293); **Turner Creek 1 Fen**, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7724); **Smithfield Township Hall Fen**, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., August 7, 1988, JCN, John Brayton, and Dean Roosa (7759); **Oelwein West Fen**, E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Oran Twp., July 28, 1988 (7798); **Hunter Creek Fen**, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 30, Jefferson Twp., July 31, 1988 (7802); **Grundy**: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., July 29, 1988 (7830); **Stout Fen**, NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 18, Fairfield Twp., July 29, 1988 (7823); **Howard**: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8133); **Linn**: Western College Fen, NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 35, College Twp., June 2, 1985 (6631); **Matus Fen**, NE $\frac{1}{4}$ Sec. 36, Maine Twp., June 25, 1985 (6741); **Anderson Fen**, SE $\frac{1}{4}$

NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., June 24, 1985 (6744); Moses Road Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Grant Twp., July 4, 1988, JCN and Robert Thomson; Mitchell: Riceville Fen Complex, SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 20, Jenkins Twp., June 5, 1986 (6846); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7770). The populations at Buffalo Slough, Pope Fen, Randalia Prairie, and Moses Road Fen were not vouchered due to their small sizes. All of these stations, save for the Randalia Prairie, were located in fens.

Rhynchospora capillacea Torr. has long been considered restricted to fens in the northwestern counties (Roosa and Eilers 1978, Roosa *et al.* 1986). Its range can be extended east to also include fens on the Iowan Erosional Surface with the discovery of three extant stations on this landform. In all, 7 populations for this species have been observed statewide since initiation of the author's fen research (Nekola 1988): Clay: Hungry Hollow Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Logan Twp., August 21, 1986 (7091); Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., August 27, 1989 (8197); Dickinson: Excelsior Fen Complex, SE $\frac{1}{4}$ Sec. 10, Excelsior Twp., August 29, 1985 (6777); Emmet: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., August 27, 1989, JCN and Bob Moats (8193); Fayette: Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7756), August 7, 1988, JCN, John Brayton, and Dean Roosa (7757); Howard: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8127); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7761). The largest of the Iowan Surface populations was observed at Jackson Junction, where sods covering over 5 square meters were observed. *Rhynchospora capillacea* seems limited to those sites which have extensive patches of short vegetation growth, usually not exceeding 35 cm in height (Nekola, unpublished data).

Scleria verticillata Muhl. ex Willd. had been presumed extirpated from the state's flora (Thorne 1956, Roosa and Eilers 1978), although a population was later discovered in Emmet County (Roosa *et al.* 1986; Bob Moats, personal communication). In 1988 and 1989, 4 additional extant populations were observed: Clay: Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8198); Emmet: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats (8188); Fayette: Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7755), August 7, 1988, JCN, John Brayton, and Dean Roosa (7758); Grundy: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., July 29, 1988 (7825).

The documentation of this species from eastern Iowa significantly expands its distribution in the state. Both the Grundy and Fayette County populations are very large. The New Hartford site represents the only pristine fen remaining in Grundy County. The Smithfield Township Hall site, while impacted from attempted draining, is still essentially intact. At this site, large clumps of this species were observed growing amongst alfalfa in the site's cultivated margin. Other rare fen species observed at this location included

Carex prairea, *C. sterilis*, *Eriophorum angustifolium*, *Gerardia pauperula*, *Muhlenbergia glomerata*, *Parnassia glauca*, *Rhynchospora capillacea*, *Salix candida*, *S. X. clarkii*, *S. candida X S. rigida*, *Solidago riddellii*, and *Valeriana edulis* ssp. *ciliata*.

Poaceae

Muhlenbergia glomerata (Willd.) Trin. was considered primarily restricted to sites in the northwestern counties (Pohl 1966, Lammers and van der Valk 1979). Since 1984, a number of new stations have been observed in northwestern and eastern Iowa, all on fens: Allamakee: Clear Creek Fen, S $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 27, Union City Twp., July 16, 1988 (7708); Benton: Mt. Auburn Fen, E $\frac{1}{2}$ Sec. 23, Cedar Twp., July 21, 1988 (7671); Buchanan: Walker Sand Ridge Fen, N $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7456); Butler: Clarksville East Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 11, Butler Twp., August 2, 1988 (7775); Cerro Gordo: Neuhring Fen, S $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 15, Lincoln Twp., August 21, 1986 (7097); Chickasaw: Chickasaw Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Chickasaw Twp., August 12, 1986, JCN and Herb Wilson (7018); Clay: Hungry Hollow Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 16, Logan Twp., August 21, 1986 (7089); Clayton: Postville Fen, W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 21, Grand Meadow Twp., August 23, 1986, JCN and Dennis Schlicht (7124); Clinton: Selby Sand Ridge 2 Fen, NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 23, Liberty Twp., June 29, 1989 (8049); Dickinson: Lower Gar Lake Fen, NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Center Grove Twp., August 21, 1986 (7119); Emmet: O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats (8191); Fayette: Sumner SW 1 Fen, SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 6, Fremont Twp., August 11, 1986, JCN and John Brayton (7086); Turner Creek 1 Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, Windsor Twp., July 19, 1988 (7721); Smithfield Township Hall Fen, SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, Smithfield Twp., July 20, 1988, JCN and John Brayton (7752); Wadena NW 1 Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 18, Illyria Twp., August 1, 1988 (7785); Oelwein West Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 13, Oran Twp., July 31, 1988 (7796); Hunter Creek Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 30, Jefferson Twp., July 31, 1988 (7803); Otter Creek Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Harlan Twp., August 31, 1988 (7814); Grundy: New Hartford Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Fairfield Twp., July 29, 1988 (7826); Stout Fen, NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 18, Fairfield Twp., July 29, 1988 (7822); Howard: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8270); Linn: Anderson Fen, SE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 30, Jackson Twp., September 7, 1985, JCN and John Brayton (6720); Matus Fen, NE $\frac{1}{4}$ Sec. 36, Main Twp., September 13, 1985 (6715); Mitchell: St. Ansgar Fen, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 13, St. Ansgar Twp., August 17, 1986 (7119); Winneshiek: Jackson Junction Fen, SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 20, Jackson Twp., August 2, 1988 (7765).

Oryzopsis asperifolia Michx. was not included in the most recent treatment of Iowa grasses (Pohl 1966), although it had been collected from Allamakee, Clayton, and Dubuque counties (Hartley 1962, Thorne 1964). This very rare species may also be reported from Delaware County: Sec.

11, Elk Twp., May 12, 1985 (6627). This population was observed in cool, moist woodland associated with an algific talus slope.

Panicum boreale Nash was first reported from Iowa by Thorne (1956), through reidentification of a 1923 Shimek collection from Clayton County. This grass has been more recently collected from Black Hawk county in a dry, sandy prairie (Eilers and Roosa, manuscript). A second extant population has also been located from a Delaware County fen: Hawker Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Coffins Grove Twp., June 26, 1989 (8044). It was located in dry peat soils on the top of large hummocks, where it associated with *Achillea millefolium*, *Aster umbellatus*, *Fragaria virginiana*, *Geum aleppicum*, *Heuchera richardsonii*, *Impatiens biflora*, *Lysimachia quadriflora*, *Onoclea sensibilis*, *Pycnanthemum virginianum*, *Rudbeckia hirta*, *Spiraea alba*, *Thelypteris palustris*, *Triadenum fraseri*, *Valeriana edulis* ssp. *ciliata*, and *Viola nephrophylla*.

Poa paludigena Fern. & Wieg. is one of the rarest grasses in the state. Only two populations had been reported from algific talus slope sites in Allamakee and Dubuque County (Pohl 1966, Howe *et al.* 1984). Since 1984, a number of additional stations for this taxon have been observed on algific talus slopes (Frest 1981) and moderate cliffs (Frest 1986a) throughout the Paleozoic Plateau. Because many of these populations are small, and only single specimens were collected, vouchers for most of these sites were destroyed in the identification process. However, a voucher for a Winneshiek County population has survived: Sec. 8, Bluffton Twp., June 15, 1987, JCN and Terrence Frest (7311). Stations for this species which have been verified, but in which adequate collections no longer exist, are as follows: Allamakee: Old Stone House, Sec. 12, Post Twp., August 9, 1986; Clayton, Sec. 16, Garnavillo Twp., August 7, 1986; Delaware: Sec. 10, Elk Twp., August 31, 1984; Fayette: Sec. 4, Fairfield Twp., June 18, 1986; and Howard: Sec. 12, Albion Twp., June 15, 1987, JCN and Terrence Frest.

The Delaware County collection was examined by R. W. Pohl, who considered it to be *Poa wolfii* (personal communication to Paul Christiansen). However, after comparison of this specimen with specimens of true *P. wolfii* and *P. paludigena* at the U. S. National Herbarium, I have concluded that this collection clearly represented *P. paludigena*. The level of "distinctness" in the intermediate nerves was within the range of variation of *P. paludigena*, but much less than that of *P. wolfii*. Also in agreement with the National Herbarium *P. paludigena* specimens, the Iowa material has 1.7-2.2 mm long first glumes, 2.0-2.8 mm long second glumes, 2.5-3.3 mm long lemmas, and truncate ligules, features lacked by *P. wolfii* (Gleason 1952). The lemmas and glumes of the National Herbarium *P. wolfii* specimens were also somewhat rugose in appearance. Like typical *P. paludigena*, the Iowa material does not exhibit this characteristic, and are smooth. This species has apparently been often confused with *P. wolfii* in Iowa and Minnesota. The only putative Minnesota specimen of *P. wolfii* in the Herbarium of the University of North Carolina, from a moderate cliff in southeastern Minnesota (SE $\frac{1}{4}$ Sec. 20, Pleasant Grove Twp., June 11, 1977, Gerald Ownbey [490141]), is actually *P. paludigena*. *Poa paludigena* may actually be a frequent component

of both algific talus slope and moderate cliff floras. On algific talus slopes, it is often found in moss-covered talus near cold air vents. On moderate cliffs, it occurs in cool soil on small ledges of the cliff.

Schizachne purpurascens (Torr.) Swallen was known only from a few historical collections in northeastern Iowa (Howe *et al.* 1984) where it was believed restricted to sandy slopes (Roosa *et al.* 1986). An even more important habitat in the state appears to be the tops of large talus blocks and other dry areas on algific talus slopes, where the following 4 stations have been documented: Allamakee: Sec. 19, Taylor Twp., June 16, 1987, JCN and Terrence Frest (7331); Clayton: Sec. 28, Elk Twp., May 12, 1985 (6622); Delaware: Sec. 11, Elk Twp., May 12, 1985 (6625); Winneshiek: Sec. 23, Bluffton Twp., June 29, 1987, JCN and Terrence Frest (7368). In addition, this species has been observed, but not collected, at the following sites: Allamakee: Sec. 18, Franklin Twp., August 12, 1986; Fayette: Secs. 4, 5, 8, Fairfield Twp., June 18, 1986; Jackson: Sec. 17, Otter Creek Twp., June 3, 1987, JCN and Terrence Frest; Sec. 30, Read Twp., August 10, 1986. At these sites, populations are typically quite small (almost always less than 20 individuals), and often associated with the rare taxa *Carex peckii*, *C. pedunculata*, *Equisetum pratense*, *Luzula acuminata*, *L. campestris*, and *Oryzopsis asperifolia*.

Zizania aquatica L. was believed to be native extant only at a single Emmet County site (Roosa and Eilers 1978). A very large native population, first located by Dave Wendling, was observed covering over 5 acres of the margin of an upland pond in Buchanan County: Hamm's Marsh, W $\frac{1}{2}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 8, Washington Twp., JCN and Shawn Dvorak, August 15, 1985 (6726). A very large population of *Brasenia schreberi* was also located at this station. This site, according to the owner, has been cultivated a few times in the past during exceedingly dry years. These two species must be able to maintain sizable seedbanks to have withstood this disturbance.

Juncaceae

Juncus alpinus Vahl has been reported only from the Excelsior Fen Complex and Silver Lake Fen in Dickinson County (Holte and Thorne 1962, Roosa *et al.* 1986). Both of these sites have been found to still support healthy populations of this species: Excelsior Fen Complex, SE $\frac{1}{4}$ Sec. 10, Excelsior Twp., August 19, 1986 (7120); Silver Lake Fen, NW $\frac{1}{4}$ Sec. 32, Silver Lake Twp., August 19, 1986 (7121), July 28, 1989 (8209). At both stations it seems limited to the *Rhynchospora capillacea* - *Triglochin maritima* dominated vegetation mat, where plant growth rarely exceeds 30 cm in height.

Juncus effusus L. has been reported extant from only three counties in the state (Roosa *et al.* 1986). It has been recently collected at two additional sites: Clinton: Selby Sand Ridge Marsh, NW $\frac{1}{4}$ Sec. 24, Liberty Twp., June 23, 1986, JCN, Dennis Schlicht, and Jerry Selby (7844), June 29, 1989 (8057); Lee: Croton Unit, Shimek State Forest, SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 1, Van Buren Twp., June 17, 1989, JCN and Dennis Schlicht (7968). This species was last collected in Lee County in 1931; the Clinton County station represents a county record. While

this latter site is typical for this species in Iowa, existing on the margin of a sandy marsh, the Lee County population is most unusual, occurring in mesic soil of a creek bottom along a trail in disturbed woodland.

Juncus greenei Oakes & Tuckerm. was first documented from Iowa through a 1903 Winneshiek County collection (Thorne 1956). It has subsequently been located at only 3 additional stations in Black Hawk, Howard, and Scott counties (Guldner 1960, Eilers 1971, Roose *et al.* 1986). A fourth population for this essentially coastal plain species has been located in Benton County: Vinton Airport, SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 33, Harrison Twp., July 21, 1988 (7856). At this site it was found on a dry, sterile sand flat at the margin of a vernal pool, where it occurred with *Gerardia purpurea*, *Hypericum majus*, *Krigia biflora*, *Lechea intermedia*, *Polygala sanguinea*, *Salix humilis*, *Scleria triglomerata*, *Viola lanceolata*, and *Xyris torta*. The habitat conditions at this location seem similar to those described for the Scott County site (Guldner 1960).

Juncus marginatus Rostk. was presumed extirpated from Iowa, having been collected only from Muscatine County in 1892, Cedar County in 1950, and Scott County prior to 1960 (Guldner 1960, Roosa *et al.* 1986). The Cedar County station was badly altered, with the original sandy marsh community (Fay and Thorne 1953) having been drained and turned into a cultivated field. However, in a recent visit, this species was found to still persist in the wet, sandy soil of the ditch draining the site: SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 31, Sugar Creek Twp., June 19, 1989 (8022), July 13, 1989 (8028). Over 200 individuals were observed on the latter date in the course of a quick inventory. *Rhexia virginica*, also reported from this location (Fay and Thorne 1953), persists as well along the drainage ditch.

Juncus tenuis Willd. var. *anthelatus* Wieg. had been reported previously in Iowa (as *J. tenuis* var. *discretiformis*) from only two Scott County sites (Guldner 1960). A third population has been found on the sandy margins of a marsh in Clinton County: Selby Sand Ridge Marsh, NW $\frac{1}{4}$ Sec. 24, Liberty Twp., June 29, 1989 (8048). At this station it was found associated with the rare *Juncus effusus*, *Platanthera flava* var. *herbiola*, and *Rhexia virginica*. This distinctive variety is differentiated from typical *J. tenuis* by its taller growth habit, longer inflorescence branches, and more scattered flowers (Braun 1967).

Luzula acuminata Raf. must be considered one of the state's most restricted species. It was reported by Thorne (1953) only from single sites in Delaware, Dubuque, and Muscatine counties. Hartley (1962) documented it from only single sites in Allamakee, Clayton, Dubuque, and Winneshiek counties. Two additional Clayton County populations may be reported: Bixby State Preserve, Sec. 23, Lodomillo Twp., May 16, 1984, JCN and Shawn Dvorak; Sec. 28, Elk Twp., May 12, 1985 (6628). The Bixby population was not vouchered due to its small size. It, like the preceding *Carex peckii*, *Oryzopsis asperifolia*, and *Schizachne purpurascens*, prefers the cool, dry areas on the top of large talus blocks on algific talus slopes.

Juncaginaceae

Triglochin maritima L. was known to be extant

only from Dickinson, Emmet, and Boone counties, although it had historical stations in Clay, Hancock, Palo Alto, and Winnebago counties (Hayden 1943, Grant 1953a, Grant and Thorne 1955, Roosa *et al.* 1986). This species can also be reported from the Iowan Erosional Surface: Howard: Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8130). Fewer than 50 plants were observed in short vegetation of this species-rich fen. As this site resembles many other sites in eastern Iowa, *T. maritima* should be expected throughout this region, particularly in those sites maintaining low vegetation growth.

Triglochin palustre L. was also known only from fen sites in northwestern Iowa. It has been observed extant at 5 sites in this region: Clay: Gillett Grove Fen Complex, SE $\frac{1}{4}$ Sec. 30, Logan Twp., July 27, 1989 (8199); Dickinson: Excelsior Fen Complex, SE $\frac{1}{4}$ Sec. 10, Excelsior Twp., August 29, 1985 (6680); Silver Lake Fen, NW $\frac{1}{4}$ Sec. 32, Silver Lake Twp., June 5, 1989; Emmet: Wallingford Fen, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 24, Twelve Mile Lake Twp., August 30, 1985, JCN and Bob Moats; O'Brien Fen, SE $\frac{1}{4}$ Sec. 34, Emmet Twp., July 27, 1989, JCN and Bob Moats (8195). The Wallingford and Silver Lake Fen populations were not vouchered. The Clay County collection represents a county record.

At these locations, it consistently occurred in the very short vegetation surrounding discharge zones or mat pools. Unlike the preceding species, *T. palustre* has eluded discovery within eastern Iowa. Only it, *Berula pusilla*, *Eleocharis pauciflora* var. *feraldii*, *Juncus alpinus*, *Potentilla anserina*, *Spiranthes romanoffiana*, and *Utricularia minor* are still limited to fens on the Des Moines Lobe or Northwest Iowa Plains.

Liliaceae

Allium cernuum Ait. was recently known from less than 10 collections, all limited to the northeastern counties. Since 1982 this species has been located at an additional 7 sites: Clayton: Bixby State Preserve, Sec. 23, Lodomillo Twp., July 21, 1989, JCN and Robert K. Peet (8164); Delaware: Backbone State Park, NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 9, Richland Twp., September 14, 1985, JCN and Dennis Schlicht (6698); Fayette: N $\frac{1}{2}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 34, Auburn Twp., August 26, 1984, JCN and John Brayton (6380); Echo Valley Park, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 22, Union Twp., July 12, 1986 (7015); Franklin Park, NW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 34, Auburn Twp., July 19, 1988 (7651); Volga Recreation Area, W $\frac{1}{2}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 27, Westfield Twp., June 8, 1989; Winneshiek: Sec. 8, Bluffton Twp., July 22, 1989, JCN, Robert K. Peet, and John Brayton (8178). Due to its small size, the Volga Recreation Area population was not vouchered. This species is most frequently found in the rocky woodlands surrounding algific talus slopes, however it also occurs in rocky woodlands not associated with algific sites.

Erythronium americanum Ker. was recently feared extirpated from Iowa (Roosa and Eilers 1978). It has been seen extant at two stations, both cool, rocky woodlands bordering algific talus slopes: Allamakee: Old Stone House, SW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 11, Post Twp., May 17, 1984, JCN and Shawn Dvorak, (6154); Dubuque: Bankston Park, Sec. 3, Iowa Twp., March 29, 1984, JCN and John Prestidge

(6219). The paucity of Iowa records for this species may be due to a lack of recognition of the preferred habitat, and to the short blooming period during which this taxon can be readily differentiated from the more common *E. albidum*.

Melanthium virginianum L. was believed restricted to a single extant site in Johnson County (Roosa and Eilers 1978). Since 1980, 4 populations have been verified at the following stations: **Black Hawk:** SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 5, Eagle Twp., July 15, 1988 (7689); **Iowa:** SE $\frac{1}{4}$ Sec. 15, Lenox Twp., July 10, 1982 (7561); **Linn:** Meadowbrook Prairie, NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 30, Monroe Twp., July 6, 1983 (6007); **Fairfax-Walford Railroad Prairie,** Sec. 30, Fairfax Twp., July 12, 1980, JCN and Shawn Dvorak (7562). This species typically grows in wet-mesic prairie remnants, often persisting along highways and railroad right-of-ways. The populations at these sites appear to flower heavily only in alternating years.

Streptopus roseus Michx. was first authenticated for the state by Thorne (1956) from Clayton and Dubuque counties. Hartley (1962) also documented populations from Allamakee and Winneshiek counties. This species is restricted in Iowa to algific talus slope communities, where it is typically found in shaded areas on cool, moist, limestone talus. Four collections, representing both historical record confirmations and new populations, may be reported: **Clayton:** Bixby State Preserve, Sec. 23, Lodomillo Twp., June 6, 1983 (5993); **Sec. 27, Garnaville Twp.,** May 14, 1987 (7270); **Delaware:** Sec. 10, Elk Twp., August 21, 1984 (6304); **Jackson:** Sec. 17, Otter Creek Twp., June 3, 1987, JCN and Terrence Frest (7210). The Delaware and Jackson County collections are both county records, and represent significant southerly range extensions for the state.

Orchidaceae

Aplectrum byemale (Muhl. ex Willd.) Torr., reported between 1950 and 1975 from only 7 counties (Niemann 1975), was considered very uncommon (Roosa and Eilers 1978). Since 1980, 10 stations for this species have been observed: **Allamakee:** Yellow River State Forest, Sec. 17, Fairview Twp., May 18, 1984 (6205); **Clayton:** NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 14, Volga Twp., May 9, 1981 (7548); **Fayette:** W $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Illryia Twp., May 4, 1986 (7390); **Linn:** Buffalo Creek Woods, SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 5, Buffalo Twp., June 14, 1983 (6000); **Wickiup Access,** N $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 10, Monroe Twp., April 15, 1984 (6212); **Pinicon Ridge Park,** SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 33, Jackson Twp., June 2, 1981, JCN and Shawn Dvorak (7550); **Marsell Bridge Park,** SE $\frac{1}{4}$ Sec. 36, Buffalo Twp., March 30, 1981 (7547); **30th Street Woods,** SW $\frac{1}{4}$ Sec. 12, Marion Twp., November 11, 1980 (7549); **Camp Waubeek,** N $\frac{1}{2}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17, Buffalo Twp., January 9, 1983 (7552); **Sec. 32, Buffalo Twp.,** May 20, 1989, JCN and Fred R. Nekola (7862). All of these stations were found in rich, mesic woodlands.

Corallorhiza maculata Raf. is restricted to a few upland woods in northeastern Iowa. As predicted by Niemann (1975), this species has been located in Delaware County: **Backbone State Park,** SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 9, Richland Twp., July 30, 1982, JCN and Shawn Dvorak. Only a single

individual was observed, on a dry, southeast-facing wooded slope, and was thus photographically documented. Approximately 10 senesced individuals were observed at this station on August 18, 1984. No individuals have been observed from this site since.

Cypripedium calceolus L. var. *parviflorum* (Salisb.) Fern., is found in wet, open ground of the Lake States, northeastern U.S., and southeastern Canada (Luer 1975, Case 1987). Niemann (1975) reported that all references of this taxon from Iowa were based on misidentifications of *C. calceolus* var. *pubescens*, and excluded var. *parviflorum* from the flora. A population of this taxon was located in May 1986 by Dave Wendling in a fen along the Wapsipinicon River north of Jesup (Buchanan: Sec. 6, Perry Twp., May 20, 1986 [6816]). This population is disjunct 150 miles from the nearest Illinois and Wisconsin populations (Hartley 1962, Sheviak 1981, Case 1987).

Approximately 150 individuals were found in scattered clumps of up to 20 stems on cold, peaty soil associating with a characteristic fen flora of *Equisetum fluviale*, *Eriophorum angustifolium*, *Menyanthes trifoliata*, *Opbioglossum pusillum*, *Salix candida*, *Salix pedicularis*, *Gentiana crinita*, *Liparis loeselii*, *Lysimachia thyrsoiflora*, *Muhlenbergia glomerata*, *Pilea fontana*, *Platanthera psychodes*, *Potentilla palustris*, and *Triadenum fraseri*. This habitat and its associated species, while radically different from that of *C. calceolus* var. *pubescens* in Iowa, is typical of var. *parviflorum* throughout its range (Luer 1975, Swink and Wilhelm 1979, Case 1987).

Cypripedium calceolus var. *parviflorum* may be easily differentiated from var. *pubescens* by its small leaf, lip, and plant size, leaf shape, degree of twisting in lateral sepals, sepal color, and habitat preferences. Individuals not possessing the full compliment of characters are considered only variant examples of *C. calceolus* var. *pubescens* (Luer 1975). Northeastern Iowa populations with the size of "normal" *C. calceolus* var. *pubescens* and dark sepals characteristic of var. *parviflorum*, such as those at the Split Rock Park "aspen bog" fen, should be referred to the former taxon until further research is conducted on this complex group.

Cypripedium reginae Walt. although once present in at least 20 counties (Roosa *et al.* 1986), is now limited to a very few extant stations. This species has been observed extant at 6 sites in the following northeastern Iowa counties: **Allamakee:** Sec. 18, Franklin Twp., June 30, 1987, JCN and Terrence Frest; **Chickasaw:** Split Rock Park, SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Dresden Twp., June 3, 1985 (6739); **Clayton:** Sec. 30, Read Twp., August 10, 1986; **Delaware:** Fountain Springs Park, Sec. 10, Elk Twp., June 10, 1986; **Sec. 10, Elk Twp.,** August 21, 1984; **Howard:** Crossman Prairie, W $\frac{1}{2}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 11, Jamestown Twp., May 31, 1986. Due to the small population sizes at all other stations, only the Split Rock population was vouchered. The Crossman Prairie population originated from plants rescued from a now-drained fen southeast of Riceville in Howard County (Glenn Crossman, personal communication).

Liparis loeselii (L.) L. C. Rich. had been reported from only 7 counties since the turn of the

century (Niemann 1975). Since 1980, 7 additional locations in 6 counties have been observed: **Black Hawk:** Hammond Road Fen, E $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 15, Eagle Twp., July 11, 1989 (8095); **Cedar:** Rochester South Fen, SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 25, Rochester Twp., June 19, 1989 (8009); **Dickinson:** Lower Gar Lake Fen, NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Center Grove Twp., July 28, 1989 (8215); **Delaware:** Sec. 11, Elk Twp., June 3, 1985, JCN and Terrence Frest; **Linn:** Rock Island Preserve, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 1, Monroe Twp., June 13, 1983 (5996); **Indian Creek Nature Center,** W $\frac{1}{2}$ Sec. 30, Bertram Twp., June 27, 1980 (7546), August 15, 1980 (6013); **Muscatine:** Conesville Fen, NE $\frac{1}{4}$ Sec. 20, Orono Twp., June 18, 1989, JCN and Dean Roosa (7993). The Delaware County site was not vouchered due its small population size.

Although Niemann (1975) reports no extant woodland populations for this species, both the Delaware county and Indian Creek Nature Center sites occurred in woodland situations. The former population was observed in cool limestone talus of an algific slope, while the latter population was observed in sandy uplands under a planted pine grove. It was also observed at this same station on a moist, sandy bank along a stream, and on the side of an *Andropogon scoparius* clump in xeric sand prairie.

Platanthera flava (L.) R. Br. var. *herbiola* (R. Br.) Luer could not be located in the state by Niemann (1975). However, his assertion that it was still extant has been verified, with three colonies being located since 1986: **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., July 23, 1986, JCN and Dave Wendling; **Clinton:** Selby Sand Ridge Marsh, NW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 24, Liberty Twp., June 23, 1986, JCN, Dennis Schlicht, and Jerry Selby; **Linn:** Windy Oaks Sand Ridge, SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 29, Buffalo Twp., June 27, 1987 (7382). The former two populations consisted of 3 and 1 individuals, respectively, and were thus not vouchered. The Linn County station consisted of over 100 individuals, however. These three sites are found in moist sand surrounding marshes or fens.

Platanthera hyperborea (L.) Lindl. var. *hyperborea* had been collected from only four counties: **Dickinson,** Emmet, Story, and Winneshiek (Niemann 1975). It has been seen in this century only in the fens of northwestern Iowa (Roosa *et al.* 1986). Four extant stations for this species have been located, including the first eastern Iowa population since the late 1800's: **Dickinson:** Iowa Lakeside Laboratory Fen, NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 29, Lakeville Twp., July 5, 1986 (6994); **Silver Lake Fen,** NW $\frac{1}{4}$ Sec. 32, Silver Lake Twp., July 28, 1989 (8211); **Lower Gar Lake Fen,** NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 35, Center Grove Twp., July 28, 1989 (8216); **Howard:** Staff Creek Fen, N $\frac{1}{2}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, Oakdale Twp., July 17, 1989 (8131). The latter small population was found in deep moss on low vegetation mats of a species-rich fen, where it associated with the rare species *Betula pumila* var. *glandulifera*, *Carex prairiea*, *Eriophorum angustifolium*, *Lobelia kalmii*, *Muhlenbergia glomerata*, *Parnassia glauca*, *Rhynchospora capillacea*, *Salix candida*, *Triglochin maritima*, and *Valeriana edulis* ssp. *ciliata*. On this site, many of the *Betula pumila* var. *glandulifera* individuals never exceeded 30 cm in height, giving the site the overall aspect of the far-north. Given

the unique flora of this site, and its pristine condition, the Staff Creek Fen certainly ranks among the most important remaining fens in the state.

Platanthera psychodes (L.) Lindl. was also not relocated by Niemann (1975) during his field work on Iowa orchids. Since 1984 it has been seen extant at 5 sites: **Bremer:** Brayton-Horsley Fen, N $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 2, Dayton Twp., August 6, 1984, JCN, Shawn Dvorak, and John Brayton; Northwoods Park, N $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 13, Sumner Twp., August 6, 1984, JCN, Shawn Dvorak, and John Brayton (6366); **Buchanan:** Cutshall Access, SE $\frac{1}{4}$ Sec. 6, Perry Twp., July 24, 1987 (7430); **Mitchell:** McIntire Alder Swamp, E $\frac{1}{2}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 28, Wayne Twp., June 4, 1986; Hamlin-Garlin Park, E $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 11, June 19, 1987, JCN and Terrence Frest. Because of their small sizes, the Brayton-Horsley, McIntire Alder Swamp, and Hamlin-Garlin populations were not vouchered. All of these populations have been located in wet soils of fens, sandy low prairie, or riparian woodland.

Spiranthes lacera (Raf.) Raf. was known from 6 historical records, only 2 of which were collected in the past 60 years (Niemann 1975). It has been observed extant at 2 sites: **Cedar:** Rochester Cemetery, NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 12, Rochester Twp., August 29, 1982, JCN and Shawn Dvorak (7544); **Johnson:** F. W. Kent Park, SW $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 24, Oxford Twp., September 10, 1985 (6754). This species had last been documented from Johnson County in 1889.

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The Kent Park population was discovered August 1982 by William Thomas of Marion, Iowa. At both of these sites, *S. lacera* occurs dry prairie, either on eolian sand or cemented till substrata. Similar dry prairie habitats have been observed in Jefferson County on hillsides and ridgetops, and probably occur throughout the Southern Iowa Drift Plain. *Spiranthes lacera* should be sought on any of these sites. However, discovery of this taxon is complicated by its very short flowering period (Niemann 1975).

Spiranthes ovalis Lindl. was unreported from Iowa when it was located from two eastern counties in the early 1980's: **Jackson:** Maquoketa Caves State Park, SE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 6, South Fork Twp., September 17, 1983, JCN and William Desmarais; **Linn:** Indian Creek Nature Center, Sec. 30, Bertram Twp., August 20, 1980, JCN and Shawn Dvorak. As both of these populations were exceedingly small (less than 6 blooming individuals per site), verification was limited to photographs of blooming plants. These populations were located in a windthrow gap and a successional forest. The species apparently has wide soil preferences, for the Jackson County population was observed in loess over carbonate bedrock, while the Linn County population was observed in deep, eolian sand.

During the last century, *S. ovalis* has significantly extended its range north in Illinois through invasion into recently disturbed land of forests and old fields (Sheviak 1974). With the great increase in available habitat created through

European settlement, it should not be surprising that *S. ovalis* has become established in the Iowa flora. Additional sites will certainly be uncovered.

Xyridaceae

Xyris torta Sm. had been considered extirpated from Iowa (Roosa and Eilers 1978), being last collected in 1952 and 1960 from Muscatine and Cedar counties (Thorne 1953, Guldner 1960). Three extant populations can be reported: **Benton:** Vinton Airport, SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 33, Harrison Twp., July 21, 1988 (7682); **Buchanan:** Walker Sand Ridge, SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 31, Cono Twp., July 17, 1987, JCN and Shawn Dvorak (7466); **Linn:** Xyris Pond, E $\frac{1}{2}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 1, Grant Twp., July 24, 1983 (6005). The largest of these populations is the Walker Sand Ridge site, where over 2000 individuals have been observed. However, the Vinton Airport station is also impressive, with an almost equal number of plants growing in less than 100 square meters of habitat. In places at this station, *Xyris* was the dominant groundcover. All of these sites are similar by being seasonally moist, sandy areas. Typically, dense mats of *Polytrichum* moss grow in these places, and may be used as an indicator of appropriate habitat. Many other rare Iowa species, including *Botrychium multifidum*, *Carex conoidea*, *Carex tonsa*, *Hypericum gentianoides*, *Juncus greenei*, *Lechea intermedia*, *Lycopodium inundatum*, *Polygala cruciata*, and *Polygala polygama* var. *obtusata* have been found co-occurring with *X. torta* in these habitats.

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Table 1. Individuals who provided location information for those areas not originally located by the author.

Individual(s) who provided site location information	Site Name
Richard Baker:	Postville Fen
Leslie Blin:	Izaak Walton Grounds
John and Gretchen Brayton:	Brayton Prairie Brayton-Horsley Fen Cutshall Cemetery Donnan Prairie Foot's Woods Franklin Park Kleiss Fen Laggeschulte Prairie Northwoods Park U.S. 18 Prairie Valeriana Swale Winthrop Railroad Prairie
Bob Bryant:	Sherman Park
Bob Bryant and Jerry Selby:	Gray's Marsh Syslow Sand Prairie
Paul Christiansen:	Lisbon South Sand Prairie Matsell Bridge Prairie
Glenn Crossman:	Crossman Prairie
Terrence Frest:	many algific slope sites
Willard Hawker:	Hawker Fen
Stephanie Loupee:	Loupee Fen
Bob Moats:	Estherville Gravel Pit Fen Milford Fen O'Brien Fen Spooky Hollow Woodland Fen Wallingford Fen
John Nehnevaj:	Clear Creek Fen
Tim Orwig:	Granite Prairie
William Pusateri:	Fish Farm Mounds Wildlife Area
Richard Reitz:	Robinson Fen
Dean Roosa:	Buffalo Slough Christianson-Taylor Area <i>Ilex</i> Site McIntire Alder Swamp Nichols Fen
Dennis Schlicht:	Boar Power Fen Corkray Prairie Matus Fen
Jerry Selby:	Selby Sand Ridge
Cecil Sheldon:	Sheldon Glade and Fen
William Thomas:	F. W. Kent Park
Robert Thomson:	Patton Fen
Robert Thomson and William Thomas:	Central City Fen
Dave Wendling:	Bearbauer Prairie Cutshall Access Hamm's Marsh Rowley Fen Sand Creek Winthrop Prairie
Herb Wilson:	Boyd Fen and Prairie Chickasaw Fen

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