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The Orchidaceae of Iowa

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EXPLANATION TO PLATE,

- I. *Polyporus brumalis* (Per.) Fr.
 II. *Hydnum coralloides* Scop.
 III. *Morchella esculenta* Pers. *a* spore sack containing eight spores.
 IV. *Guepinia bififormis* Peck. *b* Mycelium, *c* spores.
 V. *Lycoperdon giganteum* Batsch. *d* Capillitium, *e* spores.
 VI. *Panus torulosus* Fr.

THE ORCHIDACEÆ OF IOWA.

BY T. J. AND M. F. L. FITZPATRICK.

The Orchidaceæ comprises 5,000 species distributed among 410 genera. The species are mostly tropical but are found in temperate climates, one as far north as the 68th degree of latitude. The orchids are of especial interest to lovers of flowers because of their great beauty, peculiar forms, sweet fragrance and strange habits, and are great favorites with floriculturists in the old world as well as in the new.

Several of our Iowa species are of brilliant color, sweet odor, and attractive form; the remaining ones being quite inconspicuous. They all merit protection and cultivation if only to perpetuate them in their native haunts. No doubt it would be more or less difficult but nevertheless a very worthy effort for Iowa floriculturists to collect and perpetuate our native forms.

At no distant date with the increasing cultivation of the soil our members of this singularly beautiful family are apparently destined to disappear from our state. Several of them are already rare and the others fast becoming so. The changing conditions incident to the settling of the state have upset the pre-existing balance of nature and in the new order of things many species of plants turn tramp and set out for more congenial surroundings, but our species of the orchids seem to be too respectable to be tramps and like most members of a worn-out nobility they face extinction.

Of the twenty-two species belonging to the state and representing eleven genera our collection contains twenty.

From the data at hand we find sixteen species in Johnson county; Muscatine and Fayette counties, each with thirteen; ten in Winneshiek; seven in Story; Scott, Emmet, and Jasper counties, each with four; Woodbury county, three; Hamilton, Delaware, Cherokee and Poweshiek counties, each with two; and one in each of the following counties, viz: Jones, Howard,

Winnebago, Webster, Pottawattamie, Hancock, Wayne, Benton, Page, Crawford, Appanoose, Allamakee, Ringgold, and Jefferson. This would indicate that the majority of the species are confined to the eastern portion of the state.

Cypripedium hirsutum Mill. (1768.) This is our most frequent lady's slipper, once common in rich woods and thickets, usually near water courses throughout our area, now gradually disappearing because of the destruction of the timber and too close pasturing. In favored nooks this species may still be found in considerable numbers but such localities are few and remote. Specimens vary from twelve to twenty inches in height and are pubescent or hairy. The sepals are yellowish or greenish, often more or less purplish. Petals more or less twisted. The lip varies from one to two inches in length, pale yellow, with purple lines. Most writers state that this species is inodorous, but this is not true. Many specimens have a penetrating, sweet, honey-like odor which is very noticeable when a number are placed in a vasculum for a short time. It has been discovered by Prof. D. T. MacDougal that the glandular hairs contain a poisonous oil which affects the skin in a similar manner to that of toxicodendrol. We have had no poisonous results but it is claimed that one-half the people are immune and we may belong to that class.

The specimens in our herbarium have been collected from Winneshiek, Fayette, Muscatine, Johnson, and Decatur counties. We have observed the species in Allamakee and Ringgold counties and have seen specimens from Delaware county in the S. U. I. herbarium. It is reported from Scott (Nagel and Haupt), Story (Hitchcock), and Cherokee and Woodbury (Pammel) counties. Fruiting specimens were collected in Winneshiek and Appanoose counties.

A handsome species.—Much of the effort wasted upon foreign house plants could well be given to this native plant and meet with happy returns. *C. pubescens* Willd., (1805).

Arthur's Flora of Iowa, 1876, p. 31; Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 212; Proc. Iowa Acad. of Sciences, Vol. 3, p. 133; Vol. 4, p. 103; Vol. 5, pp. 128 and 165; Vol. 6, p. 197; St. Louis Acad. of Science, Vol. 5, p. 519; Nagel and Haupt in Proc. Dav. Acad. of Sciences, Vol. 2; Bul. Torr. Bot. club, Vol. 6, p. 206.

Cypripedium parviflorum Salisbury (1791). Forms in our collection from Winneshiek, Johnson, Decatur, and Crawford

counties have been referred to this species. It is also reported from Scott county by Nagel and Haupt in Proceedings of Davenport Academy of Sciences.

We have long doubted that this is a valid species. At best it very closely simulates the preceding. It is usually distinguished by its smaller size, brighter color and smaller size of the lip, and the presence of a sweet odor. Our material affords specimens varying in height from seven to twenty inches. The color of the flowers of the specimens determined by Professor Norton of the Missouri Botanical gardens, and of specimens collected in Muscatine county by Mr. Reppert, agree with the small stature and small flowered forms which may with safety be referred to this species if such is possible. As to the character of possessing an odor we have no faith in it whatever as a distinguishing factor. The length of the lip varies in our material from one to one and a half inches, while the lip of the preceding species varies in length from one to two inches. Professors Beal and Wheeler in their "Flora of Michigan," page 138, say that the preceding species is, "Much coarser in every way, with strongly plaited hairy leaves, and large light yellow flowers, more or less brown spotted. Small forms of this are often mistaken for *C. parviflorum*, but the two species are apparently distinct in Michigan." From this plain statement it will be readily perceived that the two forms at best are *not* readily distinguished and further that the size of the lip is no constant character. Britton and Brown in their "Illustrated Flora," Vol. 1, page 459, admit that this form appears to intergrade with the preceding, or of which it may be but a form. Professor Gray in his Manual, sixth edition, says it seems to pass into the preceding. Professor Wood, in his Botanist and Florist, says that *C. pubescens* Sw., a synonym for the preceding, has the "Stems usually clustered," which is contrary to our experience, though in more favored localities this could readily be the case, and further, "Lip compressed laterally, *moccasin-shaped*, leaves broadly lanceolate," whereas for *C. parviflorum* Salisb. he gives, "Leaves lanceolate, lip depressed." The depression of the lip seems not to be considered of any importance by botanists generally, while any distinction founded upon difference in the form of the leaves will so far as these two forms are concerned end in disappointment. Professor MacMillan in his "Metaspermae of the Minnesota Valley," page 163, gives the two species but makes

no comment as to their relationship or identity. Bigelow in his "Florula Bostoniensis," second edition, 1824, p. 327, gives only *C. parviflorum* Willd. and, as a synonym, *C. calceolus* Mx. The description there given will apply as well to one form as the other; that is, as well to *C. hirsutum* Mill. as to *C. parviflorum* Salisb.

Dr. Torrey, in his "Flora of the State of New York," Vol. 2, page 287, says: "This *C. parviflorum* Salisb. and the preceding species, *C. pubescens* Swartz, are very nearly allied, and many of our botanists do not consider them distinct. Since my attention has been particularly directed to these plants, I have had no opportunities of comparing them in the living state. The diagnostic characters given above are those of Hooker, who has no doubt (having examined cultivated specimens) that they are perfectly distinct." On comparing the characters of the two forms the only difference discernible is the size and depression of the lip, the form of the sepals, and some imaginary distinctions in the coloring of the sepals and petals.

Amos Eaton, in his "Manual of Botany of North America," seventh edition, 1836, page 271, gives, after eliminating the common phrases, the following for *C. parviflorum*, "Lobes of the style triangular, acute," and for *C. pubescens*, "Lobes of the style triangular, oblong, obtuse." The other apparent differences are merely a play on words.

Professor Rafinesque, in his "Medical Flora," edition, 1828, page 142, says, "Many botanists have made two species, *C. pubescens* and *C. parviflorum* of this, to which the previous and better name of *C. luteum* ought to be restored. I have ascertained that they form only one species, affording many varieties, some of which are: var. *pubescens*, entirely pubescent, even the flowers; var. *glabrum*, nearly smooth; var. *grandiflorum*, slightly pubescent, labellum very large; var. *parviflorum*, slightly pubescent, labellum very small; var. *maculatum*, labellum more or less spotted, with red dots, lobule often red; var. *biflorum*, with two flowers and bracteoles; var. *concolor*, the whole flower yellow or yellowish, unspotted; var. *angustifolium*, leaves and bracteoles lanceolate. A multitude of intermediate varieties or deviations may be seen, with undulate or spiral sepals, obtuse or acute lobule, broader or narrower leaves, etc."

While all this may not be to the reader's taste yet the description together with the figure given leaves no doubt in our minds as to what Rafinesque referred and further it well

illustrates the difficulty of trying to make distinctions upon supposed differences.

Professor Hitchcock, in Trans. St. Louis Acad. of Science, Vol. 5, p. 519, says, "*C. parviflorum* Salisb. has been reported, but I doubt if it occurs." The locality he refers to is Ames, Story county.

We have now clearly shown the confusion into which botanists have fallen in trying to make two species out of forms having no well defined limit between them. The only way out of the difficulty is to recognize but one species. As *C. hirsutum* Mill. is the older it should stand, *C. parviflorum* Salisb. must fall.

Bul. Lab. Nat. Hist., Vol. 3, p. 212; Proc. Iowa Acad. of Sciences, Vol. 5, p. 165; Vol. 6, p. 197; Nagel and Haupt in Proc. Dav. Acad. of Sciences, Vol. 2; Trans. St. Louis Acad. of Science, Vol. 5, p. 519.

Cypripedium candidum Willd. (1805.) A pretty little species, six to twelve inches high, with elliptic or lanceolate leaves, and solitary flowers. The lip is white, purple inside. This species is found in bogs and low prairies, from May to July, and seems formerly to have been quite frequent but is now rarely found. Our rapid development has no doubt changed conditions so radically that the species is unable to adapt itself to its new environment and must soon perish.

The specimens examined were collected in Emmet, Fayette, Muscatine, and Page counties. It has been reported from Scott (Nagel and Haupt), Benton and Johnson (Shimek), Story (Hitchcock), and Hamilton (Pammel) counties. Dr. E. M. Reynolds informs us that it was formerly frequent in Appanoose county, but none were collected and the species is probably extinct.

Bul. Nat. Hist. S. U. I., Vol. 3, p. 212; Proc. Iowa Acad. of Sciences, Vol. 4, p. 103; Vol. 5, p. 165; Vol. 6, p. 197; Nagel and Haupt in Proc. Daven. Acad. of Sciences, Vol. 2; Plant World, Vol. 2, p. 45; St. Louis Acad. of Science, Vol. 5, p. 519.

Cypripedium reginae Walt. (1788). This species is the crowning glory of the *Cypripediums* and like most beautiful objects it is rare and approaching extinction. When the state was in its primeval condition this species is said to have been common, but now it is rarely observed. Our specimens are from Winneshieck, Johnson, and Jasper counties; the S. U. I. herbarium has specimens collected from Winnebago (Shimek) and Muscatine (Reppert) counties. It has been reported from Fayette (Fink)

and Story (Hitchcock) counties. Dr. E. M. Reynolds informs us that it was formerly frequent on the brakes of Soap creek in Appanoose county.

This species is one to two feet high, and may be found in bogs and wet woods in June and July. Two flowered forms are comparatively not uncommon. *C. spectabile* Salisb. (1791); *C. album* Ait. (1789); *C. canadense* Mx. (1803).

MacMillan, *Metaspermae* of the Minnesota Valley, page 163; Gray's Manual, sixth edition, p. 511; Bigelow *Florula Bostoniensis*, p. 328; Wood's *Botanist and Florist*, edition 1889, p. 326, Eaton's Manual, p. 271; Torrey's *Flora of New York*, p. 287; Arthur's *Flora of Iowa*, p. 31; *Bul. Lab. Nat. Hist., S. U. I.*, Vol. 3, p. 212; *Proc. Iowa Acad. of Sciences*, Vol. 4, p. 102; Vol. 5, p. 165; Vol. 6, p. 197; *Trans. St. Louis Acad. of Science*, Vol. 5, p. 519.

Orchis spectabilis L. (1753). This species is to be found in rich woods during the months of May and June. It is at best only locally frequent though quite widely distributed throughout the state. Our specimens are from Fayette (Fink), Johnson, and Poweshiek (Norton) counties. We have seen specimens in the S. U. I. herbarium which were collected in Muscatine, Webster, and Pottawattamie counties. This species is reported from Story (Hitchcock) and Woodbury (Pammel) counties. A handsome species and is worthy of the attention of floriculturists.

Trans. St. Louis Acad. of Sciences, Vol. 5, p. 519; *Trans. Iowa Acad. of Sciences*; Vol. 3, p. 133; Vol. 4, p. 102; Vol. 5, p. 165; *Bul. Lab. Nat. Hist.*, Vol. 3, p. 212.

Habenaria hookeriana A. Gray. (1836). During the last season we received three handsome specimens collected in June, 1899, in Winneshiek county by Herbert Goddard of Decorah. It is reported from Winneshiek county by Arthur and from Fayette county by Fink. Its native haunts are woods; in Iowa is rarely found. The variety *oblongifolia* Paine is reported from Fayette county by Fink, but this variety is no longer recognized. The locality in Winneshiek county given by Arthur is Hesper. *H. orbiculata* Goldie (1822), *H. hookeri* var. *oblongifolia* Paine (1865).

Proc. Daven. Acad. of Sciences, Vol. 3, p. 170; Gray's Manual, sixth edition, p. 508; Britton and Brown's *Flora*, Vol. 1, p. 461.

Habenaria bracteata (Willd.) R. Br. This species occurs in rich woods, usually solitary, once we found two together, fairly

well distributed, and is infrequently found. Our material is from Winneshiek, Fayette, Johnson, Poweshiek, Jasper, and Decatur counties; specimens were examined from Muscatine county; and it is reported from Delaware county by Shimek and from Story county by Hitchcock. *Orchis bracteata* Willd. (1805); *Habenaria bracteata* R. Br. (1813); *H. viridis* R. Br. var. *bracteata* Reichenb. (1851). This species presents considerable variation in the form of its leaves and in the arrangement of its flowers.

Gray's Manual, sixth edition, p. 507; Arthur's Flora of Iowa, p. 31, edition 1876; Bul. Nat. Hist., S. U. I., Vol. 3, p. 212; Proc. Iowa Acad. of Sciences, Vol. 4, p. 102; Vol. 5, pp. 128 and 165.

Habenaria clavellata (Mx.) Spreng. Our specimens are from Fayette county and were collected by Professor Fink who reports, "Border of woods, rare." There are specimens in the S. U. I. herbarium from Muscatine county, contributed by Mr. Reppert who, in a note with the specimens, says, "Infrequent, first collected by Kenneth MacKensie, 1893; these July and September, 1894." No other localities are at present known. *Orchis clavellata* Mx. (1803); *O. tridentata* Willd. (1805); *H. tridentata* Hook. (1825); *H. clavellata* Spreng. (1826).

Proc. Iowa Acad. of Sciences, Vol. 1, part 4, p. 103.

Habenaria flava (L.) A. Gray. Our only Iowa specimen is from Muscatine county, collected by Mr. Reppert. *Orchis flava* L. (1753); *O. virescens* Willd. (1805); *Habenaria virescens* Spreng. (1826); *H. flava* A. Gray. (1840).

Habenaria leucophaea (Nutt.) A. Gray. This species is of frequent occurrence in the southern portion of the state. It may be collected during the month of June in moist low places in prairie soil. In one corner of Rose Hill cemetery, Lamoni, Decatur county, this species is frequent, as well as in many other localities in the county where the prairie soil is undisturbed. About two miles east of Humeston, Wayne county, along the Keokuk & Western track many specimens were collected on June 29, 1899. Many were three feet high. Within the railway right of way seems to be this species' only refuge. Jasper and Emmet counties are represented by specimens in our collection. The S. U. I. herbarium has a specimen from Hancock county. The species is reported from Fayette (Fink), Johnson (Shimek), Story (Hitchcock), and Cherokee (Pammel) counties. *Orchis leucophaea* Nutt. (1833-'37); *Habenaria leucophaea* A. Gray (1867).

Arthur's *Flora of Iowa*, p. 31, edition 1876; *Bul. Nat. Hist., S. U. I.*, Vol. 3, p. 212; *Proc. Iowa Acad. of Sciences*, Vol. 3, p. 133; Vol. 4, p. 103; Vol. 5, p. 165.

Habenaria psychodes (L.) Gray. This is reported from Fayette county by Professor Fink, who records it as rare and the habitat, wet river banks. *Orchis psychodes* L. (1753); *O. fimbriata* Ait. (1789); *Habenaria psychodes* A. Gray. (1840).

Proc. Iowa Acad. of Sciences, Vol. 1, part 4, p. 103.

Habenaria hyperborea (L.) R. Br. Reported from Winneshiok county by Arthur, who gives the locality as Hesper. *Proc. of Daven. Acad. of Sciences*, Vol. 3, p. 170. There are three specimens in the S. U. I. herbarium that are supposed to be Iowa specimens, but the locality for them is unknown.

Gray's *Manual*, sixth edition, p. 507.

Pogonia trianthophora (Sw.) B. S. P. This is a rare and local plant in Iowa. It blooms during the month of August. Our specimens are from Fayette county, collected by Professor Fink, and from Johnson county. It occurs in rich woods. *Arethusa trianthophora* Sw. (1800); *Pogonia pendula* Lindl. (1825); *P. trianthophora* B. S. P. (1888).

Arthur's *Flora of Iowa*, edition 1876, p. 31; *Bul. Lab. Nat. Hist., S. U. I.*, Vol. 3, p. 212; *Proc. Iowa Acad. of Sciences*, Vol. 4, p. 102; Vol. 5, p. 165.

Gyrostachys cernua (L.) Kuntze. This species may be found in bogs, low prairies, and wet banks, and may be collected in August or early September. It is widely distributed over the state but is infrequently collected. Our specimens are from Muscatine (Reppert), Emmet (Cratty), Johnson, and Decatur counties. It has been reported from Fayette (Fink), Story (Hitchcock), Hamilton and Woodbury (Pammel) counties. Formerly frequent but now disappearing. *Ophrys cernua* L. (1753); *Spiranthes cernua* L. C. Rich. (1817); *Gyrostachys cernua* Kuntze (1891).

Arthur's *Flora of Iowa*, edition 1876, p. 31; *Proc. Iowa Acad. of Sciences*, Vol. 3, p. 133; Vol. 4, p. 102; Vol. 6, p. 197; *Plant World*, Vol. 2, pp. 44 and 183; *Trans. St. Louis Acad. of Science*, Vol. 5, p. 519.

Gyrostachys gracilis (Bigelow) Kuntze. Usually collected in August in open upland woods and prairies. Rather rare but occasionally frequent locally. Our specimens are from Johnson and Decatur counties. It has been reported from Winneshiok county by Arthur, who gave the locality as Decorah.

Contr. to Flora of Iowa, No 6, Proc. Daven. Acad. of Sciences. *Neottia gracilis* Bigelow (1824); *Spiranthes gracilis* Beck (1833); *Gyrostachys gracilis* Kuntze (1891).

Bigelow Florula Bostoniensis, p. 322; Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 211; Proc. Iowa Acad. of Sciences, Vol. 5, p. 164; and Vol. 6, p. 197.

Peramium pubescens (Willd.) MacM. This species seems to be found only in the eastern portion of the state. It may be found in dry upland woods, flowering usually in August. Because of the evergreen character of the leaves this species may be collected during the winter season, but of course, only the root and leaves will be secured. As a whole the species is infrequent. Our specimens are from Muscatine (Reppert) and Johnson counties. We have seen specimens from Winneshiek and Jones counties. *Neottia pubescens* Willd. (1805); *Goodyera pubescens* R. Br. (1813); *Peramium pubescens* MacM. (1892).

Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 198; Proc. Iowa Acad. of Sciences, Vol. 5, pp. 128 and 164; Plant World, Vol. 2, p. 186.

Achroanthes unifolia (Mx.) Raf. This species seems to be the rarest of the Orchid family as represented in Iowa. Our single Iowa specimen was collected in low woods in Johnson county. The S. U. I. herbarium has one specimen from Johnson county and two specimens from Muscatine county. The Muscatine specimens were contributed by Mr. Reppert who, in a note with the specimens, says, "Found a few, once by Kenneth MacKensie, July, 1893." It is reported from Winneshiek county by Arthur, who gives the localities, Decorah and Hesper. Proc. Daven. Acad. of Sciences; Vol. 3, p. 170. *Malaxis unifolia* Mx. (1803); *Achroanthes unifolia* Raf. (1808); *Microstylis ophioglossoides* Nutt. (1818).

Bul. Lab. Nat. Hist., Vol. 3, p. 211; Proc. Iowa Acad. of Sciences, Vol. 5, p. 164.

Leptorchis liliifolia (L.) Kuntze. This species is to be found in open upland woods during May and June. It is often locally frequent but generally very infrequent. Our specimens are from Winneshiek (Goddard), Muscatine (Reppert), Johnson, and Jasper (Norton) counties. It is reported from Scott county by Nagel and Haupt in Proc. of Daven. Acad. of Sciences, Vol. 2. The data limits the species to the eastern portion of the state. *Ophrys liliifolia* L. (1753); *Liparis liliifolia* L. C. Rich. (1825); *Leptorchis liliifolia* Kuntze (1891).

Arthur's Flora of Iowa, edition 1876, p. 31; Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 210; Proc. Iowa Acad. of Sciences, Vol. 5, p. 164.

Leptorchis loestii (L.) MacM. This species is rare within our limits. It occurs in hillside bogs and wet thickets and may be found during May and June. Specimens before us are from Muscatine (Reppert) and Emmet (Cratty) counties. *Ophrys loestii* L. (1753); *Liparis loestii* L. C. Rich. (1825); *Leptorchis loestii* MacM. (1892).

Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 198; MacMillan's Metaspermae of the Minn. Valley, p. 173.

Corallorhiza odontorhiza (Willd.) Nutt. We have collected this species only on two occasions in Johnson county. It is usually considered rare. In August, 1896, it was common but has not been observed since. So far as we are aware this is the only locality known in the state, but it probably occurs near the Mississippi river. It may be found in rich upland woods where there is a considerable depth of decaying leaves. *Cymbidium odontorhiza* Willd. (1805); *Corallorhiza odontorhiza* Nutt. (1818).

Bul. Lab. Nat. Hist., S. U. I., Vol. 3, p. 215; Proc. Iowa Acad. of Sciences, Vol. 4, p. 108; and Vol. 5, p. 164.

Limodorum tuberosum L. (1753). This species is infrequent in the eastern portion of the state, occurring in bogs and low places during June and July. Our specimens are from Fayette (Fink), Muscatine (Reppert), and Johnson counties; and there is a specimen in the S. U. I. herbarium from Howard county. *Cymbidium pulchellum* Willd. (1805); *Calopogon pulchellus* R. Br. (1813).

Arthur's Flora of Iowa, edition 1876, p. 31; Bul. Lab. Nat. Hist., Vol. 3, p. 212; Proc. Iowa Acad. of Sciences, Vol. 4, p. 102; and Vol. 5, p. 165.

Aplectrum spicatum (Walt.) B. S. P. This species is to be found only in rich woods. Its occurrence is rather infrequent. Our specimens are from Fayette (Fink), and Johnson counties. Our last collection was obtained on May 26, 1898. *Arethusa spicata* Walt. (1788); *Cymbidium hyemale* Willd. (1805); *Aplectrum hyemale* Nutt. (1818); *A. spicatum* B. S. P. (1888).

Arthur's Flora of Iowa, edition 1876, p. 31; Proc. Iowa Acad. of Sciences, Vol. 4, p. 102; and Vol. 5, p. 164; Bul. Lab. Nat. Hist., Vol. 3, p. 211.