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Notes of Some Introduced Plants of Iowa

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into a groove in the lower lip of the corolla. This mechanism may thus assist the anthers to return to their normal position, or may prevent the proboscis of the insect from being thrust down the side of the corolla, and thus evading the pollen. Many small bees were seen to visit these flowers on bright days. The plant blossoms during July and August and a few flowers were found in the latter part of September.

NOTES OF SOME INTRODUCED PLANTS OF IOWA.

L. H. PAMMEL.

Since the settlement of Iowa many changes have taken place in our flora, especially with reference to introduced plants, and the disappearance of many indigenous species owing to breaking up of prairies, and the destruction of some timber areas, and the draining of ponds and lakes.

It is with difficulty that species of *Potamogeton* have been enabled to retain their hold in water, or that *Oxyrhaptes spectabile* should maintain itself in the wooded and much pastured timbers of Iowa. With the early settlement of Iowa there came a host of European weeds. They are so well naturalized that it is no longer possible to state whether they are introduced or indigenous, nor are we able to state when they were introduced. In fact there are no early collections, and in many cases early collectors failed to note whether the plant was introduced or indigenous. We have no early records for such common weeds as *Portulaca oleracea*, *Verbascum thapsus*, *Anthemis cotula*, *Malva rotundifolia*, *Chenopodium album*. Indeed, we are unable to say how rapidly these weeds have spread. In fact when we look over our introduced plants we find that there are but few cases in which there are statistical records such as we now have for *Lactuca scariola*, *Salsola kali*, var. *tragus* or *Solanum rostratum*, *Hieracium aurantiacum* and a few others. Those who are connected with our experiment station have frequent requests to identify weeds, and it would

seem to me proper to make a record of all such plants in a card catalogue where the specimens cannot be preserved.

It is an interesting fact to note that it frequently takes years for a weed to become so well established as to attract attention. Some years ago Dr. Halsted, while connected with the Iowa Agricultural college, noted that *Solanum rostratum* had been reported to him. This plant has long occurred in western Iowa but it is only recently that it has been reported from many parts of the state, showing increased tendency to spread. It is no longer considered worth while by the average farmer to report *Lactuca scariola*, it is so thoroughly naturalized, and yet some few years ago it was seldom seen. It has undoubtedly become thoroughly acclimated over a large extent of our territory, occurring not only in streets and timbers of our own state but in the heart of the Rocky mountains far away from any habitation.

In the appended list the species are arranged according to Gray's Manual, sixth edition, also adopting the nomenclature of that work.

RANUNCULACEÆ.

Ranunculus acris L. College campus in Ames. It is scarcely persistent.

Delphinium consolida L. Corning, 1895 (Ellen Bettonier.)

PAPAVERACEÆ.

Argemone alba L. Southern Iowa near Ottumwa.

CRUCIFERÆ.

Camelina sativa Crantz. Ames, 1891 (Hitchcock). Hazleton (Knight.)

Brassica alba Boiss. Ames. Corbett in Hitchcock. (Anthophyta and Pteridophyta of Ames, 1891, p. 486) 1896. Dooryards north of agricultural building, I. A. C. campus, Geo. Carver, 1896.

Erysimum asperum D. C. Ames, 1896, along railroads undoubtedly from the west (G. W. Carver.)

Sisymbrium altissimum L. Ames, 1895, G. W. Carver.

To this should be added the localities given by L. H. Dewey, Davenport, Blue Grass, Dickens. (Circular No. 7, Division of Bot. U. S. Dept. of Agr.

CAPPARIDACEÆ.

Cleome integrifolia Torr. & Gray. Only indigenous to western Iowa, has become a common weed in Council Bluffs, Missouri Valley, Sioux City and Onawa.

CARYOPHYLLACEÆ.

Saponaria vaccaria L. Little Rock (C. R. Ball). A weed of wheat fields.

Silene cucubalus Wibel. Ames.

Silene noctiflora L. Ames, 1896.

Lychnis vespertina Sibeth. Ames, 1896, R. Combs, C. R. Ball, Geo. Carver. Red Oak, 1896, C. G. Patten.

L. githago Lam. Rock Valley, 1896 (J. F. Jensen and W. Newell). Little Rock (C. R. Ball). Ames (Hitchcock). This weed has shifted with wheat culture. I have never seen a specimen growing in central Iowa.

MALVACEÆ.

Malva rotundifolia L. Abundant in some parts of Iowa. It is frequent in central Iowa. Common in western Iowa in cities and along the Missouri river and in eastern Iowa along the Mississippi river. Little Rock, 1893 (C. R. Ball).

Hibiscus trionum L. Ames, 1890-1896. Has scarcely escaped to fields, usually about flower gardens. Muscatine (F. Reppert). LeClaire in fields (P. H. Rolfs).

Trifolium arvense L. Collected by Professor Bessey in 1871, has not been found since.

T. agrarium L. Reported by Hitchcock from Ames in 1886, has not been found since.

T. procumbens L. Ames, 1882 (Hitchcock). Occurred in Ames in 1886. Iowa city 1884 (Hitchcock). It is now frequently collected every spring.

Melilotus officinalis Willd. As yet is not common in central Iowa though abundant in Sioux City, 1895, and Council Bluffs, 1895. Also occurs in Muscatine, 1891 (F. Reppert). Iowa City, 1889 (A. S. Hitchcock). Dakota City, 1896 (L. H. Pammel).

M. alba Lam. Iowa City, 1889 (A. S. Hitchcock). Ames, frequent, 1890 (J. F. Rolfs). (F. C. Stewart) 1891. Abundant at Moingona, 1895. Boone, 1895. Council Bluffs, 1895. Sioux City, 1895, (L. H. Pammel). Iowa City, 1887 (A. S. Hitchcock). Muscatine, 1891 (F. Reppert).

Medicago sativa L. Ames occasionally, now frequent in Council Bluffs, Muscatine, 1891 (F. Reppert). Sioux City, 1896 (L. H. Pammel).

M. lupulina L. Ames, 1871 (C. E. Bessey). Has not been found since Hitchcock (Cat. Anthenphyta and Pteridophyta of Ames, p. 491) says occasionally found in waste places.

Hosackia purshiana Benth. Indigenous loess of Iowa along the Missouri river. Sioux City. Naturalized. Boone, 1895 (G. W. Carver.)

Glycyrrhiza lepieota Nutt. Ontario, 1856 (Hitchcock). Ames (A. S. Hitchcock) 1889. Greenfield, 1891 (F. C. Stewart). Spreading at near Greenfield, undoubtedly introduced indigenous to western and northwestern Iowa. It is spreading at Hull, 1895 (W. Newell). Little Rock, 1893 (C. R. Ball). Logan, 1895. Council Bluffs, 1895. Spreading at Le Mars, 1896 (W. J. Newell). Lenox, 1896 (J. L. H.). Grand Junction, 1872 (C. E. Bessey). Harrison county, 1875, Rev. Burgess.

Cassia tora L. Ames, along C. & N.-W. R. R., 1894 (C. R. Ball, Robert Combs). Not found since.

COMPOSITÆ.

Grindelia squarrosa Dunal. Indigenous to western Iowa and is rapidly spreading in contiguous territory, and has been reported from Keokuk, 1891 (P. H. Rolfs). Boone and Moin-gona, abundant in borders of woods along C. & N.-W. R. R., 1890. Battle Creek, 1895 (E. G. Preston). Osgood, 1895, C. A. Wells. Carbonado, 1895 (John H. Smith). Smithland, 1895 (J. M. Wrapp).

Iva xanthiifolia Nutt. I have given its distribution as far as Iowa is concerned quite fully in another connection. It is, however, spreading. Reported from Keokuk 1891. Lawler, 1891 (P. H. Rolfs). Missouri Valley, 1894. Ontario, 1890. Sioux City, 1872. Ames, 1895 (G. W. Carver). Boone, 1870. Charles City, 1876 (J. C. Arthur). Woodbine, 1894. Vale, 1894. Boone, 1890 and 1894. Turin, 1894. Onawa, 1894. Carroll, 1894. Humboldt (F. L. Harvey). It will not be many years until this weed is as common in western part of Iowa as *Ambrosia trifida*; originally a plant of northern and western Iowa, from whence it has spread east and south.

Eclipta alba Hassk. Keokuk, 1877 (George E. Ehinger). 1891 (P. H. Rolfs).

Lepachys columnaris Torr. & Gray. Boone, 1889. In 1896 it was found by George W. Carver.

Helianthus annuus L. Ames and other parts in central Iowa occasional, but in western Iowa indigenous and very abundant, becoming frequent as far as Carroll, Denison and Boone. Ames, 1882. It is scarcely abundant except in a few localities in central Iowa. I am inclined to think it is an introduced plant with us. Boone, 1871 (C. E. Bessey). Grinnell, 1891 (M. E. Jones). Keokuk, 1891 (P. H. Rolfs). Muscatine, 1891 (Reppert). Marshalltown, 1891 (F. C. Stewart).

Helianthus maximiliani Schrad. Indigenous to northern and western Iowa, confined originally in western part of the state to the loess hills and adjoining bottoms, but now occurs along some of the great trunk lines extending across the state. A small patch has persisted at Ames for several years. 1894 (G. W. Carver).

Gaillardia aristata Pursh. This western plant has been found at Ames, 1896 (G. W. Carver). Too soon to say whether it will become naturalized.

Dysodia chrysanthemoides Lag. Boone, 1890. Ackley, 1878 (B. E. Canavan). Keokuk, 1891 (P. H. Rolfs). Muscatine, 1891 (F. Reppert). This striking weed has been known for some time at Ames, though said to be frequent by Hitchcock (Anth. *Pteridophyta* of Ames, p. 503). It is more or less periodic in its appearance, some years frequent, others it is not so common. It is, however, always abundant in western and southwestern Iowa, which leads me to believe that the plant is not indigenous to central Iowa, but introduced, although now occurring in timber and along river banks.

Anthemis cotula D. C. This European weed is by no means as common in dooryards, along roadsides and in streets as in Wisconsin, Illinois and Minnesota. It shows evidence, however, of being widely distributed in the state, and early introduced.

Chrysanthemum leucanthemum L. For a long period of years occasional specimens of this weed have been found in the vicinity of the college, and it is an occasional introduction in meadows, but except in one place some four miles from Ames it shows no evidence of being naturalized. It has also been reported from Muscatine (Reppert). Atlantic (S. O. Hamill). Ames, 1871 (C. E. Bessey). Ames, 1891 (P. H. Rolfs). Sheldahl, 1885 (L. V. Harpel). Ackley, 1878, (B. E. Canavan).

Tanacetum vulgare L. Although escaped here and there from gardens there are but few places where it is naturalized.

Cnicus lanceolatus Hoffm. This is a frequent weed, especially eastern, southern, northern, western and central portions of the

state, and found as an occasional plant in every part of the state, especially in pastures where timber has been cut. It shows evidence of having been introduced a long time. Boone, 1890. Lawler, 1890. Keokuk, 1891 (P. H. Rolfs). Muscatine, 1891 (F. Reppert). Iowa City (A. S. Hitchcock).

C. altissimus Willd., var. *filipendulus* Gray. Indigenous in Western Iowa, loess hills, is spreading to cultivated fields eastward. Reported from Ruthven (Daniel Chaffie). Atlantic, 1895. Marcus, 1895 (N. E. Willey).

C. arvensis Hoffm. Widely distributed in the state, but generally confined to small areas. It is reported more frequently than any other *Cnicus*, though the least common of our species, it is interesting to record the fact that occasionally seed is produced. Lawler, 1890 (P. H. Rolfs). Greenfield, 1891 (F. C. Stewart). Marcus, 1896 (Willey). Winterset, 1896. Corning, 1895 (A. B. Shaw). 1896 (Chas. B. Collman). Chase, Johnson county, 1874 (O. G. Babcock). Taylor, 1895 (J. B. Matthews). Maple River Junction, 1895 (L. Bernholtz). Faragut, 1895 (C. Collman). Randall (C. and G. P. Christianson). Redding (Dr. W. A. McClanahan). Griswold (R. E. Pierce). Conrad Grove, Cresco, 1892, with "seed" (C. V. Johnson). Oelwein (J. Thompson). Chickasaw county (P. H. Rolfs). Muscatine (F. Reppert). Barnes City, 1896 (J. W. Jones).

Cichorium intybus L. Corning, 1895 (Ellen Bettonier). Midway, well established, 1896. Des Moines, 1895.

Tragopogon porrifolius L. Ames, 1896 (C. R. Ball).

T. pratensis L. Ames, in meadow, 1894. Iowa City, 1889, Newton, 1889 (A. S. Hitchcock).

Hieracium aurantiacum L. Ames, 1894, meadows, not established.

Lygodesmia juncea Don. Indigenous only to western and northwestern part of the state, becoming a bad weed in northwestern Iowa. (C. R. Ball.) Armstrong (R. I. Cratty). Most abundant on loess hills; has appeared at Carroll, 1895, Logan, and other points along the C. & N.-W. R. R.

Lactuca scariola L. Abundant everywhere in Iowa except northwestern and possibly northeastern. Marshalltown, 1891 (F. C. Stewart). Ames, 1889 (A. S. Hitchcock). Muscatine, 1891 (F. Reppert).

L. pulchella DC. Indigenous to loess hills of western Iowa. Has become abundant along roadsides and streets in Sioux City. Showing tendency to spread. Ames, 1887, 1889 (A. S.

Hitchcock). Fremont county (A. S. Hitchcock). Sioux City, Council Bluffs, Keokuk, 1891 (P. H. Rolfs).

BORRAGINACEÆ.

Echium vulgare L. Ames, 1894 (G. W. Carver). Not since observed.

CONVOLVULACEÆ.

Convolvulus arvensis. Ames. Since 1887 well established. Ladora, 1895 (John Hiltbrummer). Des Moines, 1896 (C. N. Page). Very likely occurs in other places. First introduced as a cultivated plant. This may become one of our most pestiferous of perennial weeds.

SOLANACEÆ.

Solanum carolinense L. This weed has been well established on the college farm since 1887. As it started in an experimental plot, I am inclined to think it was introduced accidentally with some cultivated plants. It has been reported to me from many other places in the state. Certainly showing an extension northward and that acclimation has occurred.

The following are the localities for this state:

Zearing, 1896 (J. S. Bartley). Indianola, 1895 (A. D. Field). Mapleton, 1895 (Abjh. Lamb). Story City (C. C. Johnson). Central City, 1894 (Herman Finson). Fayette, 1894 (Mrs. M. E. Williams). Logan, 1895, Council Bluffs, 1895. (L. H. P.) Professor Bessey informs me that he observed it here many years ago. It is well established at this point. Ogden, 1894 (John Williams). Plattsville, 1894 (J. B. Studley). Des Moines, 1894. Woodbine (Erastus Childs, Geo. Phillips). Muscatine (F. Reppert). Keokuk, 1891 (P. H. Rolfs). Taylor county, 1894 (C. O. Pool). Grand Junction, 1890.

Solanum rostratum Dunal. This weed has been reported from many widely scattered localities. It was not common in 1887 or up to 1890, since Professor Hitchcock, a diligent collector, does not report it in catalogue of the Anthophyta and Pteridophyta of Ames, Iowa, 1891. It has been long known in western Iowa, as Professor Todd informs me. Ames, 1895 (John Arrasmith, Turner McClain). Montezuma, 1895 (J. M. Bryan). Aspinwall, 1895 (C. H. Laughlin). Woodbine, 1895 (R. B. Boustead). New Hartford, 1895 (J. W. P). Maple Grove, 1895 (Mitchell). Gilmore City, 1895 (Van Alstine). Rowley, 1895 (J. G. E. McDonald). Creston, 1895 (Mrs. Mary A. McClure). I observed it common in the streets at this place in

1894. Newell 1894, Corning, 1894, Ainsworth, 1894, Perlee, 1894 (D. M. Carty). Ladora, 1896 (Whitlock and Fields). Emmetsburg, 1896 (McCarty and Lindermann). New London, 1895. Guthrie Center (W. M. Ashton). Whitmore, 1894 (J. E. Albin). Morrison, 1894 (A. E. Allen). Elliott, 1895 (Adam Lentz). Renwick, 1895 (Bell and Thiel). Dysart (Emma Sistine). Des Moines, Carson (J. A. Bass). Perry, 1895 (Geo. O. Roberts). Gilmore City, 1895 (D. Van Alstine). Hamburg, 1888 (A. S. Hitchcock). Agency, 1887 (Mrs. Richman). Council Bluffs, 1883. Mt. Ayr, 1894 (J. W. Sale). Carroll county, Des Moines fair grounds (A. G. Lucas).

Solanum Torreyi Gray. Southern Iowa, 1895.

SCROPHULARIACEÆ.

Verbascum Thapsus L. This weed is common in eastern, central and southern Iowa. Probably early introduced. It is not, however, spreading rapidly.

V. Blattaria L. Ames, 1889 (Hitchcock). And several times since (F. A. Sistine). Not, however, a permanent weed. Muscatine, 1890 (F. Reppert).

Linaria, vulgaris Mill. Ames. I am unable to learn when first introduced. Well established.

LABIATÆ.

Salvia lanceolata Willd. Indigenous to western Iowa. Council Bluffs, Fremont county, Missouri Valley, Ames, 1890 (F. A. Sistine). Des Moines, 1895. Well established. Muscatine, 1890 (F. Reppert).

PLANTAGINACEÆ.

Plantago lanceolata L. Ames, 1874 (C. E. Peterson). Well established in fields. Milton (J. C. Holland).

CHENOPODIACEÆ

Cycloloma platyphyllum Moquin. Not indigenous in Iowa. Cedar Rapids, Des Moines, 1894 (G. W. Carver). Muscatine, 1890. Des Moines, 1887 (A. S. Hitchcock). Hamburg (A. S. Hitchcock).

Chenopodium urticum L. Nevada, 1880 (A. S. Hitchcock). Iowa City 1887 (A. S. Hitchcock). Keokuk, 1887 (A. S. Hitchcock). Ames, 1891 (A. S. Hitchcock). Muscatine, 1889, Davenport, 1889 (A. S. Hitchcock). Muscatine, 1890 (F. Reppert). Keokuk, 1891 (P. H. Rolfs).

C. glaucum L. Iowa City, 1839 (Hitchcock). Muscatine (F. Reppert).

C. Botrys L. Ames, 1883; Iowa City, 1887 (A. S. Hitchcock).

C. ambrosioides L. Keokuk (J. C. Arthur). Muscatine, 1876 (Burgess.) Muscatine 1890 (F. Reppert).

C. Rubrum. Keokuk, P. H. Rolfs, 1891.

Atriplex patulum L., var. *hastatum* Gray. Keokuk, 1891 (P. H. Rolfs). Ames, 1896-6. It has become well established. Iowa City, 1887 (A. S. Hitchcock). Var. *littorale*. Iowa City, 1887 (A. S. Hitchcock).

A. argenteum Nutt. Ames, 1895 G. W. Carver).

PHYTOLACCACEÆ.

Phytolacca decandra L. Grinnell, 1889 (A. S. Hitchcock). Muscatine, 1891 (F. Reppert).

POLYGONACEÆ.

Rumex Patientia L. Boone (G. W. Carver). Established. Escaped from cultivation.

Polygonum orientale L. Muscatine, 1890 (F. Reppert). Onawa, 1894.

EUPHORBIACEÆ.

Euphorbia marginata Push. Indigenous to western Iowa. Little Rock, Sioux City, Onawa, Council Bluffs and Hawarden. Naturalized east. At Denison abundant, 1894. Woodbine, 1894. Vale, abundant, 1894. Missouri Valley, Carroll, 1895, abundant (W. Newell). Hamburg, 1888 (A. S. Hitchcock). Iowa City, 1887 (A. S. Hitchcock).