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Present Status of Our Knowledge of the Vascular Plant Flora of Iowa

By ROBERT F. THORNE

The flora of Iowa is relatively well known compared to that of some of the southern and western states. Many of the earlier botanists in the state, like Macbride, Shimek, Fitzpatrick, Arthur, Pammel, Cratty, and Conard, collected extensively throughout the state. Much floristic work has been done by other botanists, often in limited areas, during and since their time.

There is, however, no modern complete flora of Iowa. There is not even a complete check list of the known vascular plants of the state. Conard's very useful "Plants of Iowa" (1951) with keys to the more common native and cultivated vascular plants of the state contains the most nearly complete published list of indigenous or naturalized vascular plants in Iowa. Cratty's "The Iowa Flora" (1933) is an excellent annotated list of the Iowa vascular plants represented in 1932 in the Herbarium of Iowa State College. That herbarium, like all the other Iowa herbaria, lacks, however, many species known to occur in the state. Cratty listed 1608 species and varieties as growing without cultivation in Iowa. An analysis made of his list produced a total of 1450 taxa considered by this writer as distinct species actually native or naturalized in the state. In supplements to Cratty's list, Goodman (1940, 1943) and Hayden (1940, 1945) added 75 additional acceptable species, giving a total of 1525 species represented by Iowa specimens at Ames up to 1945.

No list of Iowa species in the Herbarium of the State University of Iowa has been published. A considered estimate of the number represented in the permanent collections would be about 1600 species. In 1950 approximately 25,000 sheets of Iowa vascular plants were included in the herbarium. Since then 4000 Iowa sheets have been added, chiefly from Cedar, Jones, Iowa, Poweshiek, Johnson, and Dickinson counties. Counting more than 11,000 additional Iowa sheets now in various stages of processing, the permanent collections at Iowa City should contain more than 40,000 sheets of Iowa vascular plants in another year or two. It would be very interesting to know how many Iowa specimens are preserved in other Iowa herbaria.

In order to learn what vascular plants are already known to occur without cultivation in the state, the writer has been preparing a check list. Although this list still is neither complete nor ready for publication, it has been possible to add to the Ames total 260 species, most of them now represented by Iowa sheets in the Herbarium of the State University. We have thus a current list of 1785 species indigenous or naturalized in Iowa. It is probable that some of these plants have not become established in the state flora or have become extinct since they were last collected.

In as much as additional species are constantly being added to our list, and others surely will be discovered in the state, the known vascular plant flora will soon exceed 1800 species. Several of the 260 additions mentioned above have apparently not been reported, at least authentically, from Iowa. Some of these are *Potamogeton vaseyi* Robbins, *Carex peckii* Howe, *Carex woodii* Dew., *Juncus greenii* Oakes & Tuckerm., *Chenopodium bushianum* Aellen, *Lysimachia clethroides* Duby, *Ajuga reptans* L., *Dipsacus laciniatus* L., and *Gnaphalium uliginosum* L. (the last five being introduced weeds or escapes from cultivation).

In order to learn what had already been published or prepared in thesis form about the vascular plants of Iowa, a survey of Iowa botanical literature was made at the University. The results of this survey were presented by Hippler (1951) in a Master of Science Thesis entitled "An annotated bibliography of the taxonomic and ecological literature of the vascular plants of Iowa." This thesis is available in the Library of the State University of Iowa. The 485 papers examined during the literature survey are organized in the thesis under floristic (state-wide, sectional, and local), ecological and distributional, revisionary, and phenological studies. A similar survey had apparently been made by Gilly (1948), but the data assembled in that study were made available only in map and tabular form. It would seem highly desirable to have a bibliography, incorporating the results of both these surveys, published and thus made readily available to all the botanists of the state.

A study of both Hippler's and Gilly's results has been made to ascertain what areas of the state and what groups of vascular plants are most in need of critical investigation. Gilly pointed out that many counties of Iowa, especially those in the southwestern section of the state, had not been botanized very intensively, if at all. The writer and students under his direction since 1949 have undertaken to fill in some of the worst gaps in our botanical

knowledge of the state. Recently, for example, a thorough survey of the southwesternmost 16 counties of Iowa, comprising the botanically least well-known area in the state, has been made by Fay (1953, 1954). Adams, Audubon, and Montgomery counties, listed by Gilly as the most poorly collected in Iowa, were included in this study. Similar surveys of southeastern Iowa and northeastern Iowa are being made currently by Robert A. Davidson and Carl Eiben.

Gilly listed the following counties as being relatively well-collected: Emmet, Johnson, Jefferson, Webster, Story, Lee, Clay, Palo Alto, Muscatine, Poweshiek, and Winneshiek. Recent county surveys resulting in published papers or theses have made it possible to add several more counties to the list of those in which the flora is relatively well known: Cedar (Fay, 1952, Fay and Thorne, 1954), Dickinson (Grant, 1951, 1954), Iowa (Easterly, 1952), Jones (Brown, 1949), and Washington (Wagenknecht, 1954). The 16 southwesternmost counties might well be added to this list for Fay collected approximately 10,000 sheets of more than 4000 numbers in these counties. His catalogue (1953) includes 1072 species of vascular plants. Several other counties are now receiving intensive study, such as Linn by R. V. Drexler of Cedar Rapids, Poweshiek by N. H. Russell of Grinnell, Story and Muscatine by L. F. Guldner of Davenport, and Johnson by this writer.

Recently in bringing the catalogue of vascular plants of Johnson County up to date, the writer listed 1103 species, of which 754 have been collected or observed by him since 1950. An additional 209 species are represented by specimens in the Iowa City and Ames herbaria, some collected many years ago, and 140 species are reported by presumably reliable authorities. A similar count for Muscatine County of species collected or observed by the writer, represented in the Iowa City and Ames herbaria, or reported in the literature, produced about 1000 species. These two counties have the largest known floras in the state.

Data were also obtained from various county floras and other published papers concerning the number of species reported from the better collected counties. The numbers are not strictly comparable, because some of the authors had a more liberal concept of species than others, some authors counted varieties as well as species in their lists, and some of the numbers are approximations. The results of this comparison are presented in tabular form here with the counties listed in order of decreasing number of reported

species. (See Fig. 1 for the location of these and the other counties in Iowa.)

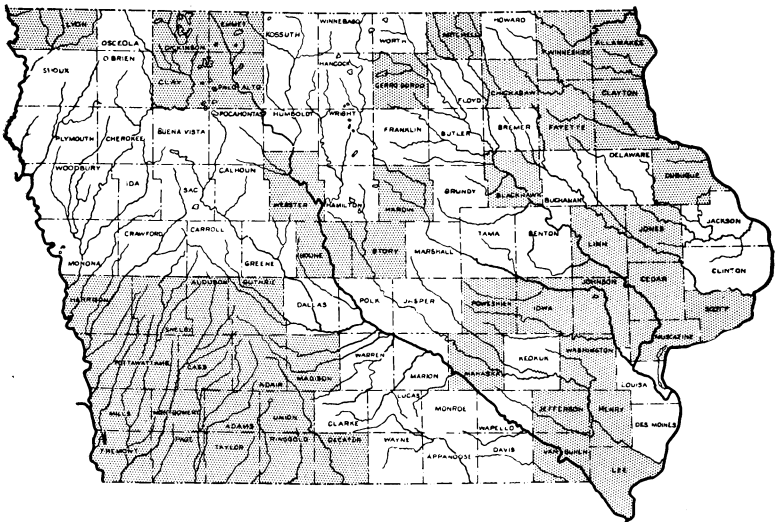


Figure 1. Map of Iowa Indicating Botanically Best-Known Counties (shaded).

Table 1

<i>Counties</i>	<i>Number of Species</i>	<i>Counties</i>	<i>Number of Species</i>
Johnson	1103	Fayette	700
Muscatine	1000	Winneshiek	700
Jefferson	938	Washington	687
Emmet	930	Black Hawk	674
Henry	929	Mahaska	643
Webster	852	Decatur	628
Cedar	804	Fremont	576
Dickinson	800	Jones	509
Lee	792	Mitchell	497
Van Buren	755	Muscatine & Scott	1068
Iowa	704	Clay & Palo Alto	827
Hardin	704	Winneshiek &	
Story	700	Allamakee	813

Certain counties and sections of Iowa still are much in need of botanical exploration and thorough collecting. Since 1940 only 25 counties have been treated fully or in considerable part by theses or published papers. Particularly requiring attention are north central, south central, and northwestern Iowa (exclusive of the four lake counties). Some of the counties most badly in need of intensive collecting are Benton, Bremer, Buchanan, Buena Vista,

Butler, Calhoun, Carroll, Clarke, Crawford, Franklin, Greene, Grundy, Howard, Humboldt, Jackson, Lucas, Marion, O'Brien, Osceola, Plymouth, Pocahontas, Sac, Warren, Wayne, and Worth. Any amateur or professional botanists undertaking a thorough investigation of one or more of these counties, or for that matter of any county in the state, would be making a real contribution to our knowledge of the flora of Iowa.

Another approach to the problem of augmenting and organizing our knowledge of the vascular plants of Iowa has been made through critical studies of selected taxonomic groups. In the last ten years careful statewide studies have been made of such groups as *Viola* (Russell, 1954), Senecioneae, Cynareae, and Cichorieae (Davidson, 1954), aquatic monocots (Beal, 1952), aquatic dicots (Monson, 1952), *Solidago* (Pick, 1952), Boraginaceae, Convolvulaceae, Hydrophyllaceae, Polemoniaceae, Verbenaceae (Kwang, 1951), Liliaceae (Coleman, 1950), Boraginaceae (Gilly & O'Brian, 1949), *Polygonum* (Blickenstaff & Gilly, 1949), *Apocynum* (Murley, 1947) *Aster* (Kellogg, 1947), Umbelliferae (Murley, 1946), Cyperaceae (Gilly, 1946, Bennett, 1949), Euphorbiaceae (Murley, 1945), Leguminosae (Fox, 1945), and Labiatae (Bass, 1944). After adjustment for overlapping treatments, these revisions include approximately 800 species, a large proportion of the known vascular flora of Iowa.

Similar critical treatments of other groups of vascular plants are badly needed before a definitive flora of the state can be completed. Perhaps most badly needed is a taxonomic study of the Rosaceae of Iowa employing the methods of the biosystematists. Other groups especially needing revision are such grass genera as *Aristida*, *Bromus*, *Muhlenbergia*, *Panicum*, and *Poa*, the Caryophyllales, Ranunculaceae, Cruciferae, *Hypericum*, Onagraceae, *Cornus*, Gentianales, Solanaceae, Scrophulariaceae, Caprifoliaceae, Heliantheae, Astereae, and Eupatoriae.

In summary, our knowledge of the flora of Iowa, though still incomplete, is fast reaching the point where a manual of the vascular plants of Iowa should be prepared. Since the production of a definitive flora requires much time, much critical study, and enormous labor, it might best be undertaken as a cooperative enterprise by the botanists of the state. The time to begin work on the *Flora of Iowa* has arrived.

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