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The Flora of Iowa—A Progress Report Based on Past Contributions

CHARLES L. GILLY

As one of the basic preliminaries in a plan for the ultimate preparation of a flora of Iowa, a survey of Iowa botanical literature has been undertaken in an attempt to assay the status of our knowledge of the state flora. Three aspects of this knowledge were kept in mind during the literature search: (a) general, regional and county floras, (b) the comparison of areas, and (c) taxonomic treatments of specific families and genera of plants. Only the ferns and the flowering plants were included in this literature survey, the mosses and liverworts having been recently summarized by Conard (1945a, 1945b) and the algae and fungi being considered as beyond the scope of this particular study. To obtain the data presented in the present paper, individual volumes of certain periodicals were examined for papers dealing with Iowa plants, a few unpublished theses in the Iowa State College library were consulted, and complete sets of the following publications were examined:

1. The Proceedings of the Davenport Academy of Natural History, Vol. 1 (1876) to vol. 13 (1914).
2. The Proceedings of the Iowa Academy of Science, vol. 1 (1887) to vol. 52 (1946); the recently published Botany Index (Drexler, 1945) to the first fifty volumes was of considerable value in simplifying the search through this important series.
3. The Bulletins from the Laboratories of Natural History of the State University of Iowa, vol. 1 (1888) to vol. 5 (1904), and the subsequent University of Iowa Studies in Natural History, vol. 6 (1911) to vol. 18 (1944).
4. The Iowa Geological Survey Annual Report, vol. 1 (1893) to vol. 38 (1943), and supplementary bulletins 1 (1905) and 4 (1913, 1926).
5. The Iowa State College Journal of Science, vol. 1 (1926) to vol. 21 (1947).

The data assembled in the literature survey cover many pages and it has seemed advisable, both for economy of space and for clarity, to present these data concisely in the form of maps and tabulations, with only such explanatory text as seems necessary to supplement the figures.

General, Regional, and County Floras

A total of 114 papers, which should be included in this category, were discovered during the course of the literature survey. These may be subdivided as follows:

- 1) General Floristic Studies—these include papers describing the prairies, sand regions, forests, bogs, aquatic plants, poisonous plants, woody plants, weeds, etc. Cratty's checklist of the Iowa flora (1933) and his papers on the immigrant flora of the state (1929,

1934) belong in this category as do a number of contributions by various authors to the state flora. Papers and volumes included in this category number 48.

2) Regional Floras—there are seven such papers, which may be summarized as follows: northern Iowa, 2; western Iowa, 2; north-eastern Iowa, 2; southeastern Iowa, 1.

3) County Floras—these include 59 papers, some of which are only fragmentary in content and a few of which include more than one county. Only 36 counties, out of the 99 counties in Iowa, are represented by floras or partial floras; these counties are indicated on a map (Figure 1) which shows the approximate date of publication for such floras. Counties represented by more than one paper, with the number indicated in parentheses, are: Henry (8), Lyon (5), Story (4), Emmet, Muscatine and Winneshiek (3 each), Adair, Clayton, Decatur, Dickinson, Hamilton, Johnson, Linn, Madison, Mahaska and Scott (2 each).

Our knowledge of the flora of the other 63 counties, scanty though it is in some cases, is based on material from two sources: (a) the general floristic papers mentioned above, and (b) distributional reports of individual species as mentioned in the taxonomic treatments referred to below.

Comparative Knowledge of Areas

While engaged in the completion of a recent paper on the Cyperaceae, the author (1946) chanced to tabulate the number of species of that family known from each county of the state. Certain obvious conclusions were drawn from this tabulation, but it seemed desirable to check these conclusions by means of similar tabulations for other families represented in the Iowa flora. For this purpose the recent papers by Murley on the Euphorbiaceae (1945) and the Umbelliferae (1946) were taken as representative of the polypetalous dicotyledons; the paper on the Labiatae by Bass (1944) together with his unpublished maps kindly placed at my disposal, was taken as representative of the gamopetalous dicotyledons. Analyses of these four families have been made and are here presented on maps (Figures 2 to 5, inclusive).

The number of species and well-marked varieties represented in Iowa for these four families, as tabulated by the author, totals 243; this total may be apportioned as follows: Cyperaceae, 127; Euphorbiaceae, 27; Umbelliferae, 30; Labiatae, 59. The number of species of these four families known from each of the eleven better-collected counties is as follows: Emmet, 125; Johnson, 114; Jefferson, 106; Webster, 100; Story, 92; Lee, 82; Clay, 78; Palo Alto, 77; Muscatine, 61; Poweshiek, 48; Winneshiek, 44. It should be noted that only the author of the paper on Cyperaceae examined the specimens in the herbaria of Grinnell College and Iowa Wesleyan College; the total for Poweshiek County, as given above, is almost certainly an

underestimate, and Henry County perhaps should be included among the counties in which the flora is comparatively well known.

In addition to determining the counties in which the flora was most thoroughly known, it was possible—by means of the tabulations of species for the same four families—to determine the counties in which the flora was least known. No species of any of the four families was recorded for Adams County¹; no specimen of three out of the four families was recorded for either Audubon or Montgomery Counties, and nine other counties were unrepresented by specimens of two out of the four families under consideration. These data are summarized on the map (Figure 6) which may be used as an indication of areas within the state where study of the flora seems most necessary.

Taxonomic Studies of Iowa Plants

A total of 98 papers, dealing with the identification and classification of Iowa plant families and genera, or representative species thereof, were discovered in the course of the literature survey; some of these contained discussions of more than one family or genus. Incidental mention of Iowa plants is, of course, made in many other taxonomic papers published in periodicals or series not included in the present survey. The families and genera of plants which have been studied and reported upon are tabulated below, with the families arranged approximately in the order of the Engler and Prantl system of plant classification. Numerals in parentheses indicate the number of papers or volumes which deal with each family or genus; where individual genera are listed following the family name, the numeral in parentheses after the family name does not include the individual generic papers. And in cases where there is no parenthetical numeral immediately following the name of the family, only the subsequently listed generic paper (or papers) has been published for the Iowa representatives of that family.

The number of families included in the following tabulation is 54, of which only 37 have been more or less fully discussed in Iowa literature. The number of genera, or portions of genera, separately treated and not included in a family paper is 47, of which approximately 25 have been more or less fully studied.

PTERIDOPHYTA (7): Polypodiaceae: *Pellaea* (1).

GYMNOSPERMAE (2): Pinaceae: *Juniperus* (1).

ANGIOSPERMAE: Monocotyledoneae: Typhaceae (1); Sparganiaceae (1); Potamogetonaceae (1); Hydrocharitaceae (1); Naiadaceae (1); Alismaceae (1); Gramineae (4): *Agropyron* (1), *Andropogon* (1), *Aristida* (1), *Bromus* (3), *Elymus* (1), *Eragrostis* (1), *Festuca* (1), *Hordeum* (1), *Lolium* (1), *Panicum* (1), *Paspalum* (1), *Sporo-*

¹In the summer of 1947, at the suggestion of the author, Dr. Duane Isely and Mr. Robert G. Brown, both of the Iowa State College Department of Botany, made two collecting trips into Adams County. A total of 500 numbers, representing approximately 400 species of plants were collected; a report on these specimens is planned for presentation at the Academy meeting in 1948.

bolus (1); Cyperaceae (3); Araceae (1); Lemnaceae (1); Commelinaceae (1): *Tradescantia* (1); Pontederiaceae (1); Juncaceae (2); Liliaceae (2): *Lilium* (1), *Trillium* (1); Melanthaceae (2); Amaryllidaceae (1); Iridaceae (1); Dioscoreaceae (1); Orchidaceae (1).

Dicotyledoneae: Apetalae and Polypetalae: Salicaceae: *Salix* (2); Juglandaceae (1): *Carya* (2); Betulaceae (1); Fagaceae (1); *Quercus* (3); Polygonaceae: *Polygonum* (1), *Rumex* (1); Ceratophyllaceae (1); Nymphaeaceae: *Castalia* (3), *Nelumbo* (1), *Nymphoides* (1); Ranunculaceae (1); Berberidaceae (1): *Berberis* (1); Cruciferae (3): *Arabis* (1); Rosaceae: *Malus* (1), *Rosa* (1); Leguminosae: *Amphicarpa* (1), *Astragalus* (1), *Cercis* (1); Geraniaceae (1); Oxalidaceae: *Oxalis* (1); Euphorbiaceae (1); Anacardiaceae: *Rhus* (2); Rhamnaceae: *Ceanothus* (1), *Rhamnus* (1); Violaceae (1); Haloragaceae (1); Umbelliferae (1).

Gamopetalae: Primulaceae: *Lysimachia* (1); Gentianaceae (1); Apocynaceae: *Apocynum* (1); Convolvulaceae: *Cuscuta* (3); Labiatae (1): *Salvia* (1); Solanaceae: *Solanum* (1); Scrophulariaceae (1): *Linaria* (1), *Verbascum* (2); Lentibulariaceae (1); Rubiaceae: *Galium* (1); Caprifoliaceae: *Symphoricarpos* (1), *Viburnum* (1); Compositae (3): *Ambrosia* (1), *Antennaria* (1), *Cirsium* (2), *Iva* (1), *Solidago* (1), *Sonchus* (1).

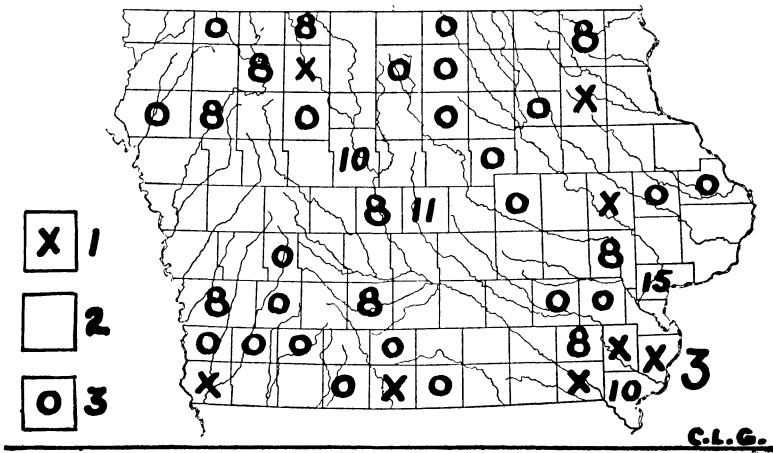
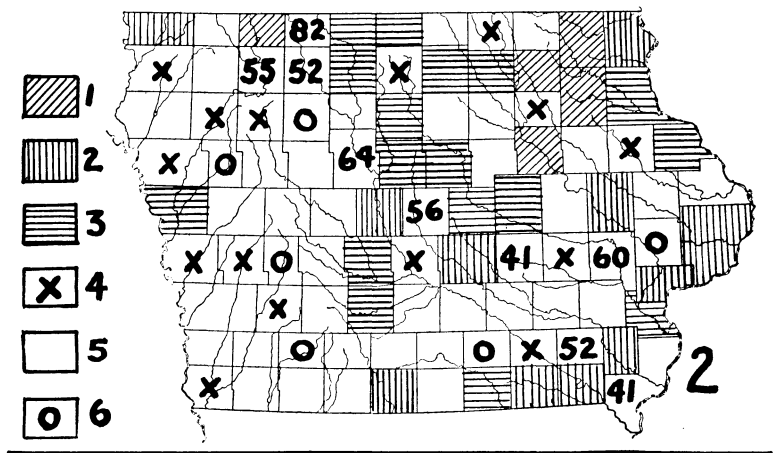
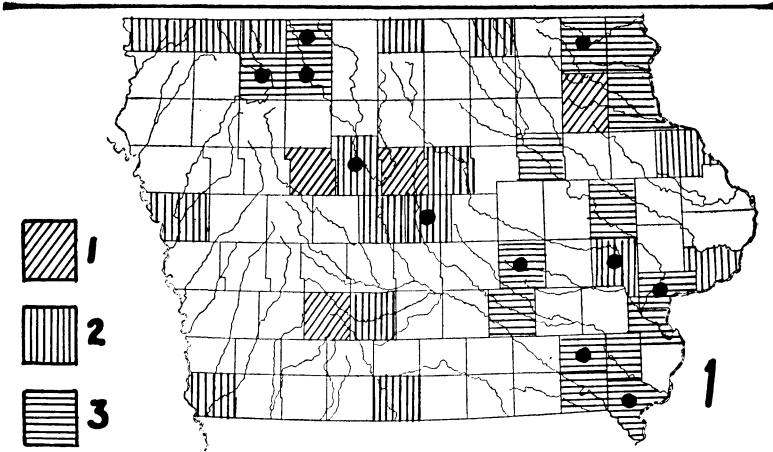
Summary and Conclusions

An analysis of the literature of Iowa botany dealing with the subjects of taxonomy, floristics and plant geography has been made from the five most important series of volumes containing such papers, as well as other readily available papers from miscellaneous sources. Floras or partial floristic lists are known from only 36 out

Figure 1. County Floras, or partial Floras, for Iowa. *Key to legend:* 1—most recent flora published prior to 1900; 2—most recent flora published between 1901 and 1925; 3—most recent flora published between 1926 and 1947. Black dots indicate the eleven counties in which the flora is most thoroughly known (see, also, figure 6).

Figure 2. Known distribution of the family Cyperaceae in Iowa (Gilly, 1946); based on all Iowa herbaria, except the private Savage collection, and additional specimens in out-of-state herbaria. Total number of species and varieties in Iowa, 127. *Key to legend:* 1—31 to 40 species; 2—21 to 30 species; 3—11 to 20 species; 4—6 to 10 species; 5—1 to 5 species; 6—no species known from actual specimens, although 1 or more species have been reported in the literature.

Figure 3. Known distribution of the family Euphorbiaceae in Iowa (Murley, 1945); based on specimens in the herbaria of Iowa State College, State University of Iowa and Parsons College (data from the last named were added by the author of the present paper). Total number of species and varieties in Iowa, 27. *Key to legend:* 1—6 or 7 species; 2—1 to 5 species; 3—no species known.



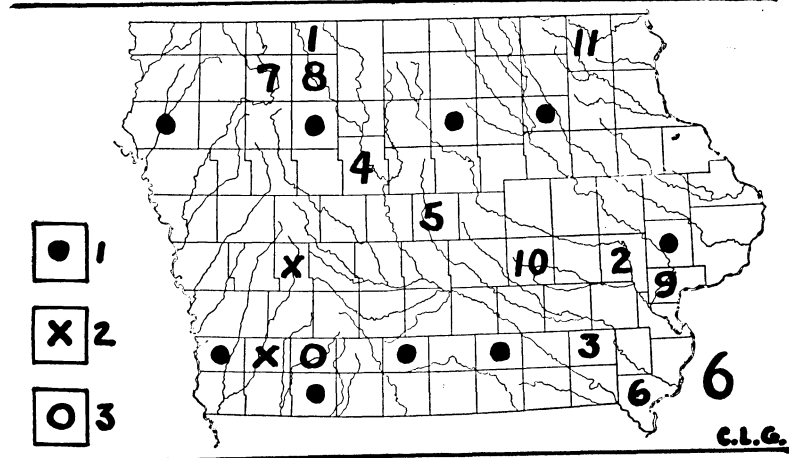
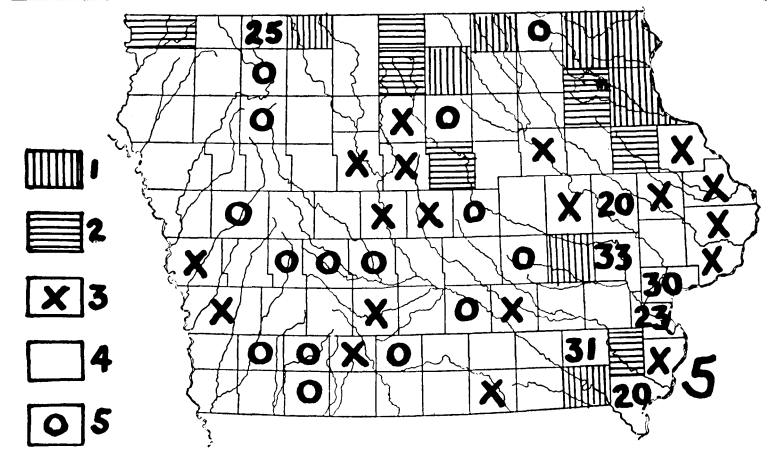
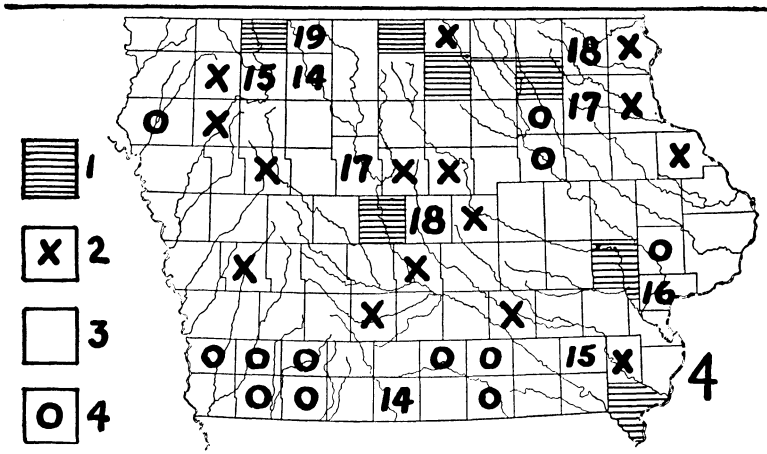
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of the 99 counties in Iowa, although data are available on most of the other counties in the form of general, regional or taxonomic papers. Using recently published treatments of the families Cyperaceae, Euphorbiaceae, Umbelliferae and Labiatae as a basis of comparison, the following statements may be made: (1) the flora is reasonably well known in only 11 of the 99 counties in the state; (2) the flora is quite well known in only 5—Emmet, Johnson, Jefferson, Webster and Story—of these 11 counties, and a sixth county (Poweshiek) probably should be added to this list; (3) the flora of Adams County is almost completely unknown (see footnote number 1 on a preceding page); and (4) the flora of Audubon and Montgomery Counties is very poorly known, while the flora of nine other counties in the state may be classed as poorly known. Only 37 families, out of the approximately 125 plant families known in the state, and only 25 genera (in additional families) have been more or less thoroughly studied and reported upon.

The obvious conclusion, on the basis of the above summary of the facts presented in the present paper, is that no adequate flora of the state of Iowa can be prepared in the near future. Much additional field study and collecting, collation of data from specimens already accumulated in the herbaria of the state, and detailed taxonomic study of a considerable number of plant families and genera is still necessary before actual preparation of a state flora can begin.

The author of this brief progress report hopes that the information included will serve as a stimulus to botanists and botanical students in the state of Iowa, and as an indication to them of the areas within the state and the groups of plants which are in greatest need of study.

- Figure 4.** Known distribution of the family Umbelliferae in Iowa (Murley, 1946); based on specimens in the herbaria of Iowa State College, State University of Iowa and Parsons College (data from the last named were added by the author of the present paper). Total number of species and varieties in Iowa, 30. *Key to legend:* 1—11 to 13 species; 2—6 to 10 species; 3—1 to 5 species; 4—no species known.
- Figure 5.** Known distribution of the family Labiatae in Iowa (Bass, 1944); based on specimens in the herbaria of State University of Iowa and Parsons College (data from the latter were added by the author of the present paper). Total number of species and varieties in Iowa, 59. *Key to legend:* 1—16 to 19 species; 2—11 to 15 species; 3—6 to 10 species; 4—1 to 5 species; 5—no species known.
- Figure 6.** Comparative knowledge of the flora of Iowa; based on preceding figures 2—5, inclusive. Numerals indicate rank of the eleven counties in which the flora is better known; the number of species of the four families from each of the eleven counties is given in the text. *Key to legend:* 1—no species of two out of the four families is known; 2—no species of three out of the four families is known; 3—no species of any of the four families is known.



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