

CENTENNIAL RESEARCH REVIEW

Changes in Knowledge of the Vascular Plant Flora of Ohio, 1860–1991^{1,2}

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ABSTRACT. Newberry's 1860 *Catalogue* of 1,377 species was the first annotated checklist of Ohio's vascular plants. Five similar works were published during the next 72 years. The last, Schaffner's 1932 *Catalog*, listed 2,309 species. Since 1950, studies for the Ohio Flora Project and related projects have produced further additions to the known flora. In 1961, I estimated that Ohio's vascular plant flora would prove to consist of approximately 2,700 species. Over the course of the past century, from 1893 to the present, periodic exclusions have removed many species incorrectly attributed to the state's flora. Recent field studies for 1) the Ohio Flora Project, 2) the individual projects of botanists at several Ohio institutions, and 3) the investigations of Ohio's rare plants conducted by the Ohio Department of Natural Resources' (ODNR's) Division of Natural Areas and Preserves have greatly increased knowledge of plant species distribution within Ohio.

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EPIGRAPH

"The following catalogue, although presenting but an imperfect view of the vegetation of Ohio, as the first effort toward the formation of a complete flora of the State, will perhaps not be thought by botanists to be entirely without value or interest. It includes many facts not yet in possession of the public, and such as perhaps would never be put on record in any other form" (Newberry 1860).

THE SIX OHIO FLORA CATALOGS, 1860-1932

With the sentences quoted above, John S. Newberry (1860) began the introduction to an annotated checklist of the vascular plants of Ohio, written for the *Fourteenth Annual Report of the Ohio State Board of Agriculture . . . for the year 1859*. Although entitled "Catalogue of the flowering plants and ferns of Ohio," it included in fact all the vascular plants. The catalog, published when Newberry was 37 years old (Armstrong 1901), was based in part on a manuscript he had prepared earlier from his own field work in Summit and Cuyahoga counties, in part on local floras written prior to that time by several early Ohio botanists, and in part on records given him in personal communication by other plant collectors of the period. It was, therefore, a composite of data assembled from several sources. Newberry went on to become one of the nation's leading naturalists and geologists of the second half of the 19th century (Waller 1943).

In all, Newberry's list includes 1,377 species and 17 additional infraspecific taxa, the latter all at the rank of variety, for a total of 1,394 taxa. The name of each taxon is followed by an indication of its known Ohio range. Of the 1,377 species, 101 are termed "naturalized," "introduced," or "escaped," indicating that they were regarded as aliens in the flora. Although not explicitly stated, the remaining 1,276 species were presumably

thought to be indigenous to the state; many of them are today, however, regarded as alien members of the Ohio flora, e.g., *Ranunculus acris* L., *Ranunculus bulbosus* L., *Ranunculus repens* L., *Cardamine hirsuta* L., *Barbarea vulgaris* R. Br., *Erysimum cheiranthoides* L., *Sisymbrium officinale* Scop., *Sinapis nigra* L. [*Brassica nigra* (L.) K. Koch], *Sinapis arvensis* L. [*Brassica kaber* (DC.) L. C. Wheeler], *Draba verna* L. [*Erophila verna* (L.) Besser], *Capsella bursa-pastoris* Moench., *Lepidium campestre* L., etc. Those named are taken from the first three pages of the 32-page catalog. Accordingly, the actual number of aliens in the flora at that time was considerably higher than the 101 designated by one of the three terms listed above.

Although many of the species' scientific names have changed over the past 130 years, the common names of 1860 have proved remarkably stable; most are current today. Only a few have passed from general usage and sound unfamiliar to our ears, for example, orange-root instead of the currently used name of golden-seal for *Hydrastis canadensis* L., papoose-root instead of blue cohosh for *Caulophyllum thalictroides* (L.) Michx., side-saddle flower instead of American pitcher-plant for *Sarracenia purpurea* L., turkey-pea as well as harbinger-of-spring for *Erigenia bulbosa* (Michx.) Nutt., pepperidge instead of sweet-gum or tupelo for *Nyssa sylvatica* Marsh., dwarf pink instead of bluets or Quaker ladies for *Houstonia caerulea* L., simpler's joy instead of blue vervain for *Verbena hastata* L., snake-head salt rheum weed instead of turtlehead for *Chelone glabra* L., moose wood instead of leatherwood for *Dirca palustris* L., hemlock spruce instead of American hemlock or simply hemlock for *Tsuga canadensis* (L.) Carr., and cat-tail flag, instead of broadleaved cat-tail for *Typha latifolia* L.

Newberry's was the first of six catalogs published for the Ohio flora. Some of the subsequent five covered also one or more groups of non-vascular plants, but the present report considers only their vascular plant listings. The totals (Table 1) show that over the following decades the number of species in the known vascular plant flora increased steadily. These increases resulted from the field

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TABLE 1

Vascular plants reported in six catalogs of the Ohio flora.

	Species Total	(Native	Alien)*	Additional Intraspecific Taxa	Interspecific Hybrids	Total Taxa
Newberry, 1860	1377	(1276	+ 101)	17	–	1394
Beardslee, 1874	1500	(1405	+ 95)	118	–	1618
Kellerman and Werner, 1893	1865	(1822	+ 43)	111	2	1978
Kellerman, 1899	1945			78	3	2026
Schaffner, 1914	2068	(1590	+ 478)	14	12	2094
Schaffner, 1932	2309	(1730	+ 579)	29	12	2350

*Totals in the "alien" column are of species annotated with some term indicating non-native status; totals in the "native" column are of those species lacking such an annotation and, therefore, presumably thought by the respective authors to be indigenous to the Ohio flora.

work of several generations of Ohio botanists as well as from the collections of the catalog authors themselves.

In the second catalog, Henry C. Beardslee (1874) added more than 100 species and slightly more than 100 infraspecific taxa to the flora. As with the 1860 catalog, the list was to a considerable extent derived from the publications and communications of others, although the number of botanists consulted in its preparation suggests critical evaluation of the entries. While the species total increased by 123, the number designated as aliens actually declined slightly. The totals given for this catalog (Table 1) include one unnamed variety of *Carex squarrosa* L., which I assume to have been var. *typhinooides* (Schw.) Dewey, a taxon now generally treated as a species and called *C. typhina* Michx.

In the 1890s, two catalogs appeared, the first by William A. Kellerman and William C. Werner, the second by Kellerman alone. The two lists are closely interrelated. The first (Kellerman and Werner 1893) is preceded and followed by separate lists of changes; data from both the lists are incorporated into the totals (Table 1). In all, the number of species increased by 365 over Beardslee's 1874 catalog but, surprisingly, the number designated by some term denoting alien status declined to only 43.

The Kellerman and Werner catalog was the first to include interspecific hybrids. Two were listed: one the familiar oak hybrid *Quercus imbricaria* Michx. x *Q. velutina* Lam. (the latter here called *Q. coccinea* Wang.), the hybrid's binomial *Q. x leana* Nutt., and the other a sedge hybrid, *Carex gracillima* Schwein. x *C. hirtifolia* Mackenz. (here called *C. pubescens* Muhl.), the hybrid's binomial *C. x sullivanii* Boott.

Two major problems troubled the authors as they assembled the 1893 list: 1) unsubstantiated literature reports, and 2) misidentified specimens or, in a few cases, ones collected from introduced plants. These difficulties persisted through the remaining catalogs and indeed through much of the 20th century.

The inclusion of species unsubstantiated by any known herbarium specimens received critical attention, Kellerman and Werner writing: "It has been [our] . . . aim to admit no plant of doubtful occurrence . . ." Although this aim was

generally realized, several species were retained with reservations expressed, e.g., *Solidago virgaurea* L.: "J. S. Newberry (Cat.); probably a wrong determination," *Aster pauciflorus* Nutt.: "No authentic specimen," *Aster longifolius* Lam.: "Given in previous catalogues, probably *A. novi-belgii* [L.] is the species referred to," and *Clematis ochroleuca* Ait.: "identification is possibly erroneous." For two other species the authors went farther. *Lobelia nuttallii* Roem. and Schult. has the distinction of being the first species formally excluded from the Ohio flora in any of the six catalogs; Kellerman and Werner wrote: "On examination of the specimen it was found to be *Lobelia spicata* [Lam.]." They excluded also *Clethra alnifolia* L. because "the specimens were transplanted from another state."

Kellerman's second (1899) catalog, in many ways a supplement to his first, is primarily a terse list of taxa. No distinction is made between native and alien elements in the flora. The most important feature of the 1899 work is the Ohio flora's first major housecleaning. In a section entitled, "Reported species omitted from the catalogue," Kellerman appended a list of 123 species and two varieties prefaced with these comments: "The species named below are not authenticated by any known Herbarium specimens. Their hitherto known distribution throws doubt on the probability of their occurrence in Ohio. They are therefore discarded, yet possibly several may have to be restored to the list of the Ohio flora." With this stand, he affirmed the necessity of tangible proof for catalog entries.

The two remaining catalogs were written by John H. Schaffner, the first in 1914, the second in 1932. Despite Kellerman's major list of exclusions, Schaffner (1914), looking back only 15 years later, wrote that Kellerman's 1899 catalog had included "a large number of species . . . for which there was no direct evidence," and went on to note that in his new list: "Most of these, together with some species wrongly identified, have been omitted." As the phrase "most of these" suggests, Schaffner did not delete all, the 1914 list including, for example, *Equisetum pratense* Ehrh. with the comment: "Supposed to occur in the state but no definite specimens." There were other similar entries.

In this first catalog Schaffner (1914) went on record

regarding the validity of the identifications, writing: "The species in the State Herbarium have been carefully determined, in the more difficult groups by the best experts in the country, and it is believed that there are few mistakes in the list as now published. Any errors, however, can be definitely corrected in the future." He also noted that of the 2,068 species listed, "about one-fourth . . . are non-indigenous." The actual count was 478 (Table 1).

In the introduction to his second catalog, Schaffner (1932) wrote: "The present catalog numbers 2,309 species. . . . The distribution records are based on actual specimens in the State Herbarium together with some obtained from other herbaria. The origin of these latter records is mostly indicated . . ." Although *Equisetum pratense* was gone, other unsubstantiated species remained. The following, for example, were listed among the 2,309 species with commentary indicating they had been reported for Ohio, but that no specimens were known: *Rhynchospora corniculata* (Lam.) Gr., *Streptopus amplexifolius* (L.) DC., *Dentaria furcata* Small, *Sida hermaphrodita* (L.) Rusby, *Tilia michauxii* Nutt., *Iresine paniculata* (L.) Ktze. [*I. rbizomatosa* Standley], *Prunus nigra* Ait., *Quercus ilicifolia* Wang., *Circaea intermedia* Ehrh., *Gaylussacia frondosa* (L.) T. & G., *Eulophus americanus* Nutt. [*Perideridia americana* (DC.) Reichenb.], *Houstonia tenuifolia* Nutt., and *Helianthus laetiflorus* Pers. In some instances Schaffner's reluctance to exclude proved warranted, bona fide records of the species in question having since been found in Ohio; in other instances it seems unwarranted, the species not having been found in the state—at least not yet.

Along this same line of thought, two intriguing case histories can be traced through the six catalogs. One concerns the circumboreal species *Moneses uniflora* (L.) A. Gray, one-flowered wintergreen. Newberry (1860) listed it in the first state catalog, noting that Dr. Kellogg reported it from Lorain County. It was not mentioned in the second catalog, but was reinstated in the third with the comment: "No herbarium specimen can be found." It survived Kellerman's major 1899 housecleaning and was listed in the fourth catalog without comment. Schaffner, however, did not include it in either the fifth or sixth catalogs; presumably it was one of the group, noted above, deleted for lack of supporting evidence. That might have been the end of the story, but for its 1988 discovery in Lucas County, which gives considerable credibility to the 1860 report of its occurrence in nearby Lorain County.

The second case concerns another boreal species, *Mitella nuda* L., naked miterwort. The species was listed in the 1860 catalog with the single notation, "Cleveland." It was included in the second, third, and fourth catalogs, but in 1914 Schaffner did not list it, presumably because he had found no specimen. In 1932 Schaffner reinstated the species on the basis of a specimen collected from Cedar Swamp in Champaign County. Later, I determined that specimen to be a misidentified juvenile form of the common *Mitella diphylla* L. and excluded *Mitella nuda* from the Ohio flora again (Cooperrider 1980). But the Cleveland report remains a haunting one, and one wonders if this species, like *Moneses uniflora*, awaits discovery in some northern Ohio county.

FROM 1932 TO 1991

Since 1932, work on determining the known Ohio flora has continued, especially under the impetus of the Ohio Flora Project (Cooperrider 1984), which began in 1950. In 1961, using preliminary lists of pteridophytes, monocots, legumes, and composites distributed by the Ohio Flora Committee, I projected that the total vascular plant flora of Ohio would prove to consist of about 2,700 species (Cooperrider 1961).

In the 1960s, E. Lucy Braun (1961, 1967) published two books on the Ohio flora. In them she took an increasingly hard, but not absolute, stance on the requirement of vouchers to support individual entries, and included in each book only a very few species (e.g., *Rubus argutus* Link, *Scirpus olneyi* A. Gray, *Carex cumulata* (Bailey) Mackenz., *Carex ormostachya* Wieg.) for which she had seen no specimens. Her work for these books also produced additions to the known flora as well as several exclusions from it. The second major housecleaning of the state's flora occurred in the 1980s in the book *Endangered and Threatened Plants of Ohio* (Cooperrider 1982); numerous taxa were excluded from the flora by the authors of the several sections. Also in the 1980s, species were added to and subtracted from the known flora by the ODNR's Division of Natural Areas and Preserves staff, as they prepared biennial lists of rare taxa (e.g., Ohio Division of Natural Areas and Preserves 1990).

Ohio's dicotyledons are presently the subject of three Ohio Flora Project books. The first was T. Richard Fisher's (1988) work on Ohio Asteraceae, in which was initiated the commendable practice of noting unsubstantiated records in the introductory statement of the genus in question but denying them formal listing in the text. The other two parts, now in preparation, are my own *Limaceae through Campanulaceae* (Cooperrider 1985), and John J. Furlow's *Saururaceae through Fabaceae* (Furlow 1991). Preliminary work for these three books on the dicots has produced still more deletions from and additions to Ohio's known vascular plant flora.

CONCLUDING REMARKS

This centennial meeting of the Academy being devoted in part to historical matters, and this year (1991) marking one third century of my own involvement in studies on the Ohio flora, I close on a personal note.

In his 1860 catalog, Newberry gave for each species an indication of its distribution *within* Ohio, warning that these statements described the Ohio distribution only "so far as known." Some seventy years later, Schaffner (1932) observed that "present knowledge of the geographic distribution of the species . . . of the state is still very incomplete." When I joined the Kent State University faculty in 1958—a century after Newberry's work—I soon determined that while overall knowledge of the components of the Ohio flora was good, knowledge of species distribution within the state was still in many sections only poor to fair, and that little was being done to improve it. I resolved to correct that situation. I began by publishing a map (a revised version of which is shown in Fig. 1) designed to indicate the approximate number of species in the known flora of each Ohio county: the darker the

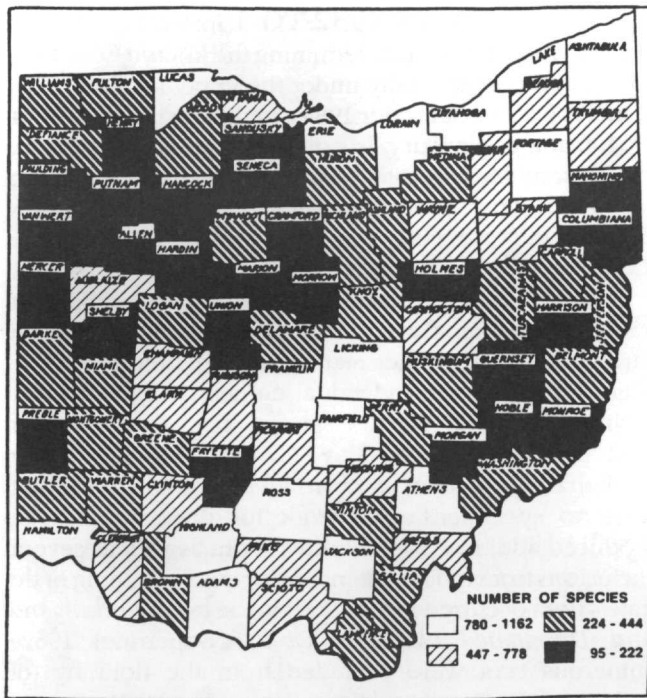


FIGURE 1. Map of Ohio, with 1961 estimate of number of vascular plant species known from each county; revised from Cooperrider (1961).

shading, the fewer were the species known. Since that time, improving knowledge of plant distribution within Ohio has been a major goal of my career. I have worked toward this goal by making new Ohio collections, especially from northeastern Ohio, in 1960 and 1961, by training a number of students in Ohio floristics and directing their efforts toward comprehensive studies of areas in the state most in need of floristic work, and by encouraging a number of other individuals, not my students, in their collecting of Ohio specimens. For these field botanists, and for still others with whom I had little or no direct contact, it has been my goal, through sustenance of the Ohio Flora Project (Cooperrider 1984), to stimulate interest and pride in botanical exploration by providing a larger framework in which all new Ohio distribution records

would have value and importance. The richness of the recently completed distribution maps of Ohio dicotyledons (Cooperrider 1985, Fisher 1988, Furlow 1991) bears testimony to the success of the enterprise and to the efforts of the many plant collectors involved.

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