

A REVISION OF THE CICHORIACEOUS GENERA KRIGIA, CYNTHIA, AND CYMBIA.

By PAUL C. STANDLEY.

INTRODUCTION.

The revision embodied in this paper was undertaken as the result of an attempt by the writer to determine a cichoriaceous plant from the mountains of northern New Mexico, which came to hand at the New Mexico Agricultural College. The specimen strongly suggested the *Adopogon virginicum* of the Central States, but did not seem to agree in all particulars with the published characterizations of *Adopogon*. It was finally decided that it must be a *Hieracium*, although very much unlike most members of that genus in general appearance. This view was strengthened by finding the same plant determined, but never published, by Dr. E. L. Greene as a new species of *Hieracium*. Accordingly, a description was drawn up and a manuscript name given the plant under this genus. Upon submitting the two specimens to Dr. P. A. Rydberg, however, we were informed that the plant really belonged to the genus *Adopogon*, although it was admitted that certain of its characteristics were deceptive. Both Doctor Greene and myself had thought that the plant had the pappus of *Hieracium*, overlooking the row of minute outer scales which are scarcely visible under an ordinary hand lens.

That others have had similar difficulties is shown by the following letter attached to a sheet in the herbarium of the Missouri Botanical Garden. Although written by one evidently inexperienced in botany it shows the difficulties encountered in the usual characterizations of this group of plants.

To Dr. WM. TRELEASE:

By this same mail I send you specimens of a member of the Compositae, on which I desire your opinion. I have studied it very carefully, as best I could, and can place it nowhere unless it be *Crepis glauca* T. & G. But this in even the latest monograph is placed only in localities of 3,000 to 6,000 feet elevation in Utah and Oregon.

Upon examination of the National Herbarium material in the *Adopogon* covers and after consulting the literature of that genus it has been found that the arrangement of this group of the Cichoriaceae

given in most works dealing with it is very unsatisfactory. Generic relationships appear never to have been definitely settled, and the synonymy has never been completely established.

In addition to the material in the National Herbarium the writer has had the privilege, through the kindness of Dr. William Trelease, of examining all that in the herbarium of the Missouri Botanical Garden. He also wishes to express his obligations to Dr. J. M. Greenman and to Prof. L. M. Umbach who have forwarded material for study. In the two larger lots of material examined several sheets of various species of *Serinea* were found. This genus can readily be distinguished from those treated here by the fact that its achenes are altogether without pappus.

The plants included by most of the later American authors in the genus *Adopogon* have been described by the botanists who have studied the plants of the eastern United States under several generic and many specific names. Linnæus described two of them in his *Species Plantarum* under different generic names, one in the genus *Tragopogon* and the other in the genus *Hyoseris*, the latter name being now applied exclusively to a European group. Schreber in 1791 made the Linnæan *Hyoseris virginica* the type of the new genus *Krigia*. In 1829 Don founded the genus *Cynthia* upon *Tragopogon virginicus*. Since that time some authors have accepted these genera as distinct, while others have merged them in *Krigia* or in *Adopogon*.

Torrey and Gray in 1843 considered the genera *Cynthia* and *Krigia* distinct. Besides this, they founded under *Krigia* a new section, *Cymbia*, for the Nuttallian *Krigia occidentalis*. De Candolle kept the two genera separate, while Bentham and Hooker united them under *Krigia*. Doctor Gray in the *Synoptical Flora* followed Bentham and Hooker, but very properly recognized three sections of the genus, *Cynthia*, *Eukrigia*, and *Cymbia*. He also gave a good account of the synonymy of the group, although he omitted numerous published names. When Otto Kuntze published his *Revisio Generum Plantarum* in 1891 he united all the species of the group under the Neckerian genus name *Adopogon*. In this he has been followed by Britton and Brown and by Small.

All three of Doctor Gray's sections, the writer thinks, are worthy of generic recognition. The groups are very natural ones, sharply defined, at least as much so as most of the genera of the *Compositae*. The genus *Cymbia* here proposed is farther removed from the genera *Cynthia* and *Krigia* than those two are from each other, although the latter have been separated by most authors, while *Cymbia* has never been segregated from the genus *Krigia*.

Adopogon of Necker is very fully described by that author in the first volume of his *Elementa*. He names no species, but says that the genus is founded upon certain of the Linnæan *Tragopogons*.

De Candolle, and later Bentham, suggests that the name was probably based upon *T. virginicus* and *T. dandelion*. Bentham says: "Adopogon * * * est verisimiliter *K. virginica*." Kuntze evidently concluded that what had been suggested as a possibility was actually the truth and proceeded to transfer to Adopogon all the species of *Krigia* and *Cynthia*, Adopogon antedating *Krigia* by one year. Necker's description of his new genus, however, precludes this use of his name. In the first line upon page 56 of the first volume of the *Elementa* we read: "Pappus * * * stipitatus;" and again in the ninth line "pappo stipitato." It is true that the description seems to apply to only three of the Linnæan species of *Tragopogon*, *T. virginicus*, *T. dandelion*, and *T. lanatus*. It evidently does not apply to either of our American species, neither of which has the pappus stipitate in any sense of the word. After examination of specimens of *Tragopogon lanatus* (*Scorzonera lanata*) the writer is inclined to believe that Necker must have had that plant in mind. The pappus of this plant is hardly stipitate, but the achene is prolonged into a long beak and it may have been this character to which Necker referred. It is sufficient for our purpose that our American plants have not such a pappus. Some writers, notably De Candolle, have suggested that Necker was mistaken in giving this character to his genus, but we may take it for granted that he knew what he was writing about. At any rate the statement is not due to a typographical error or slip of the pen, for it is repeated. Since Necker did not actually name a species as the type of the genus it seems wisest to proceed upon the supposition that in the characterization of the new genus Necker was more accurate than his successors have credited him with being.

Aside from this one name there is little doubt as to the meaning of generic and specific names in this group. Linnæus was very careful in his descriptions of the two species upon which the genera *Krigia* and *Cynthia* were founded. There are few species to be maintained—so it seems after careful examination of all available material—and there is, accordingly, little uncertainty regarding the application of the many specific names that have been published in the group at various times. The following treatment of these plants will at least help to make clear the synonymy and true generic and specific relationships of the group.

SYSTEMATIC TREATMENT.

KEY TO THE GENERA.

Bracts 5 to 8, erect in fruit, ovate or lance-ovate, distinctly keeled; pappus of 5 broad, conspicuous, obovate scales, with as many alternating bristles; these about twice as long as the scales and scarcely, if at all, longer than the achene; annuals..... 1. CYMBIA.

Bracts 9 to 18, reflexed in fruit, not keeled or conspicuously nerved, lanceolate or linear-lanceolate; bristles several to many times as long as the scales and twice as long as the achene or more.

Annuals; pappus of 5 round or obovate, rather conspicuous scales and 5 or 10 bristles. 2. KRIGIA.

Perennials; pappus of 10 to 15 minute, oblong or linear scales and as many or more bristles. 3. CYNTHIA.

1. CYMBIA gen. nov.

Krigia section *Cymbia* Torr. & Gr. Fl. N. Amer. 2: 467. 1843.

Annual acaulescent herbs, glabrous or glandular-hispid, with rosettes of thin, glabrous or pubescent leaves, from the midst of which rise numerous scapes bearing heads of ligulate flowers; bracts of the involucre 5 to 8, strongly keeled and nerved, ovate or lance-ovate, acute, erect in age; disk naked; achenes striate, turbinate, glabrous; pappus in two series, the outer row of broad, thin, obovate scales, the inner of usually the same number of bristles, these mostly about twice as long as the scales, seldom or never longer than the achene, the bristles alternate with the scales.

A single species, the type of the genus being *Krigia occidentalis* Nutt.

The characters given in the key to the genera show the principal differences between this proposed genus and *Krigia* and *Cynthia*, differences which are believed to be great enough to make it desirable to separate this genus from those older ones.

1. *Cymbia occidentalis* (Nutt.) Standley.

Krigia occidentalis Nutt. Journ. Acad. Phila. 7: 104. 1834.

Krigia nervosa Hook. Icon. Pl. 237. 1840.

Krigia occidentalis mutica Torr. & Gr. Fl. N. Amer. 2: 468. 1843.

Krigia bellidioides Scheele, Linnaea 25: 257. 1853.

Adopogon occidentale Kuntze, Rev. Gen. Pl. 304. 1891.

TYPE LOCALITY: "In Arkansas, near Fort Smith."

DISTRIBUTION: Arkansas to Missouri, southeastern Kansas, Oklahoma, and central and eastern Texas.

The subspecies *mutica* was simply a form with "bristles of inner pappus altogether wanting." It is scarcely separable even as a subspecies, for the bristles very often fall when the achenes are mature.

The type of Scheele's species was collected on "Galveston Island, auf feuchtem Muschelsand; Römer legit. Aprili 1846." It was said to have white heads, and pappus two or three times as long as the achene; the achenes were said to be five-angled. This might be a distinct species with these characteristics, but the specimens I have seen from Galveston Island differ in no way from the typical form. Upon this species Scheele founded the section Bellidion of the genus *Krigia*.

2. KRIGIA Schreb.

Krigia Schreb. Gen. Pl. 532. 1791.

1. *Krigia virginica* (L.) Willd. Sp. Pl. 3: 1618. 1804.

Hyoseris virginica L. Sp. Pl. 809. 1753.

Hyoseris caroliniana Walt. Fl. Carol. 194. 1788.

Hyoseris? ramosissima Bart. Fl. Phila. Prodr. 75. 1815.

Krigia caroliniana Nutt. Gen. N. Amer. Pl. 2: 126. 1818.

Krigia dichotoma Nutt. Gen. N. Amer. Pl. 2: 127. 1818.

Krigia tenella Reichenb. Icon. Bot. pl. 87. 1830.

Krigia petiolaris Raf. New Fl. N. Amer. 4: 86. 1836.

Krigia leptophylla DC. Prodr. 7: 88. 1838.

Krigia virginica dichotoma A. Gray. Man. 246. 1848.

Adopogon carolinianum Britton, Mem. Torrey Club 5: 346. 1894.

TYPE LOCALITY: "In Virginia." The species was founded upon a plant described by Gronovius.

DISTRIBUTION: Massachusetts, southward through Pennsylvania, Maryland, Virginia, North and South Carolina, Georgia, westward to Illinois, Missouri, Arkansas, Oklahoma, and eastern Texas, and in Washington.

Torrey and Gray recognized two species here, depending upon the shape of the primary leaves for distinguishing characteristics. Among all the material that I have examined I have been able to distinguish but a single species. The plants change their appearance very materially as they grow older, and with the spring and late summer forms before one it seems they must be distinct until one sees the intermediate forms. The Washington plant, one collected between Olympia and Gate City in 1898 by A. A. and E. Gertrude Heller, no. 4052, was deceptive on this account. Coming from a locality so far distant from the common range of the species and showing several apparent peculiarities, it seemed certainly distinct. After examining the Missouri Botanical Garden material, however, it was seen that the same form is found in the Central and Southern States. It seems probable that the Washington plant was introduced into the locality where it was collected, for we have only the single collection of it from west of Kansas.

Krigia dichotoma Nutt. is the form with much branched stem; it develops in late summer. *Krigia leptophylla* DC. seems to have been of similar origin. It was characterized as having very narrow leaves, such as the plant develops late in the season. *Krigia petiolaris* Raf., I think, belongs here. As far as the description informs us, it might have been *Cynthia montana*, except for Rafinesque's statement that his plant had small heads. The heads of *Krigia* are scarcely more than half as large as those of *Cynthia*, and Rafinesque had seen both genera.

3. CYNTHIA Don.

Cynthia Don, Edinburgh Phil. Journ. 12: 305. 1829.

Luthera Schultz Bip. Linnæa 10: 257. 1835.

TYPE SPECIES: *Tragopogon virginicum* L.

KEY TO THE SPECIES.

- Plants acaulescent..... 1. *C. dandelion*.
 Plants caulescent.
 Stems reclining, weak, and slender; leaves of the stem numerous. 2. *C. montana*.
 Stems erect, much stouter; stem leaves only one or two pairs of
 much reduced, often bract-like leaves.
 Upper leaves prominently aquiline-serrate..... 3. *C. falcata*.
 Upper leaves entire.
 Leaves glaucous. Of the eastern and central United
 States..... 4. *C. virginica*.
 Leaves bright green, not glaucous. Of the mountains
 of New Mexico and Arizona..... 5. *C. viridis*.

1. *Cynthia dandelion* (L.) DC. Prodr. 7: 89. 1838.

Tragopogon dandelion L. Sp. Pl. ed. 2. 1111. 1763.

?*Hyoseris major* Walt. Fl. Carol. 194. 1788.

Hyoseris angustifolia Michx. Fl. Bor. Amer. 2: 87. 1803.

Troximon dandelion Pers. Syn. Pl. 560. 1807.

Krigia dandelion Nutt. Gen. N. Amer. Pl. 2: 127. 1818.

Cynthia lyrata Nutt. Journ. Acad. Phila. 7: 68. 1834.

Cynthia boscii DC. Prodr. 7: 89. 1838.

Cacalia tuberosa Bosc.; DC. loc. cit.

Adopogon dandelion Kuntze, Rev. Gen. Pl. 304. 1891.

TYPE LOCALITY: "In Virginia." The species was founded upon a plant described by Gronovius.

DISTRIBUTION: Maryland and Virginia, southward to North Carolina, westward to eastern Texas, Oklahoma, and southeastern Kansas.

2. *Cynthia montana* (Michx.) Standley.

Hyoseris montana Michx. Fl. Bor. Amer. **2**: 87. 1803.

Krigia montana Nutt. Gen. N. Amer. Pl. **2**: 127. 1818.

Cynthia dandelion montana Chapm. Fl. South. U. S. 250. 1860.

Adopogon montanum Kuntze, Rev. Gen. Pl. 304. 1891.

TYPE LOCALITY: "In altissimis montibus Carolinae septentrionalis."

DISTRIBUTION: Mountains of North and South Carolina and Georgia.

3. *Cynthia falcata* sp. nov.

A perennial plant 40 to 50 cm. high; basal leaves erect, oblong in outline, acutish, glaucous, pinnatifid toward the base, the segments linear, ascending or divergent; leaves on slender, narrowly winged, purplish petioles; stem stout, strongly striate, purplish, bearing an oblong, acute, purplish leaf about the middle, this obtuse or clasping at the base, aquiline-serrate (that is, with falcate teeth directed forward); peduncles several, naked or bracted at the base, the bracts when present entire; peduncles short, strongly hispid just below the heads; involucre bracts 15 to 18, about 1 cm. long; fruit as in *C. virginica*, with tawny pappus several times as long as the achene.

Type in the U. S. National Herbarium, no. 415971, collected at Turin, Michigan, June 21, 1901, by Bronson Barlow. A very different plant from *C. virginica*, readily distinguished by the peculiar tothing of its leaves.

4. *Cynthia virginica* (L.) Don, Edinburgh Phil. Journ. **12: 309. 1829.**

Tragopogon virginicus L. Sp. Pl. 789. 1753.

Hyoseris biflora Walt. Fl. Carol. 194. 1788.

Hyoseris amplexicaulis Michx. Fl. Bor. Amer. **3**: 87. 1803.

Hyoseris prenanthoides Willd. Sp. Pl. **3**: 1615. 1804.

Troximon virginicum Pers. Syn. Pl. **2**: 560. 1807.

Krigia amplexicaulis Nutt. Gen. N. Amer. Pl. **2**: 127. 1818.

Cynthia griffithsii Nutt. Journ. Acad. Phila. **7**: 69. 1834.

Luthera virginica Schultz Bip. Linnaea **10**: 257. 1835.

Krigia integrifolia Raf. New Fl. N. Amer. **4**: 86. 1836.

Adopogon virginicum Kuntze, Rev. Gen. Pl. 304. 1891.

TYPE LOCALITY: "In Virginia, Canada."

Krigia integrifolia Raf. I take to be this species, although one can not be certain from the description. It came from "Mts. Alleghanies." *Cynthia griffithsii* Nutt. seems to belong here, but Nuttall thought it very different from his *Hyoseris amplexicaulis*.

DISTRIBUTION: Pennsylvania and New Jersey south to North Carolina, westward to Minnesota, Missouri, eastern Kansas, and eastern Texas.

Cynthia virginica seems to be a polymorphic species, and it is very possible that some of these supposed synonyms must at some time be restored or new names given to various segregates. The plant of North Carolina, Georgia, and Tennessee is notable because of its large size, vigorous habit, and large leaves and heads. Its peduncles are always hispid just below the heads. The form found in Pennsylvania and New Jersey is marked by its numerous leaves and glabrous peduncles. The most common form is a plant with inconspicuous cauline leaves, of rather low stature, and with glabrous peduncles. It is the form common through the central part of the range from Virginia westward. Two specimens, one from northern Ohio and one from the Mammoth Cave, Kentucky, attract one's attention because of their long, narrow, entire basal leaves. The Minnesota form is characterized by its much-branched

stem and small heads. A form common in Missouri and found also elsewhere has all its radical leaves pinnatifid with very obtuse segments. Certain Indiana specimens have filiform bracts scattered along the peduncles. Several other forms have been noted, but with our present herbarium material it seems inadvisable to attempt to segregate any of these forms either specifically or subspecifically. The two species separated here have constant and well-marked characters.

5. *Cynthia viridis* sp. nov.

A perennial plant 30 cm. high or less, with rather coarse, almost fleshy roots; leaves ascending or spreading, thin, bright green, oblong to elliptical or oblanceolate, acutish, attenuate into a slender winged petiole, entire or remotely and shallowly dentate, about 10 cm. long; stems with one or two ovate-lanceolate clasping, bract-like leaves at about their middle; rising from their axils two or several long, slender peduncles, these glandular-hispid just below the heads; involucre bracts 8 or 9 mm. long, the heads about 18 mm. high; achenes light or dark brown, cylindrical, striate, the tawny bristles of the inner pappus twice as long; outer row of pappus of minute, linear scales visible only under a strong lens.

Type in the National Herbarium, no. 498744, collected near Cowles, in the Pecos River National Forest, San Miguel County, New Mexico, altitude about 2,400 meters, July 11, 1908, by Paul C. Standley (no. 4418). The plant was rare in the region, and only a few individuals were found at this station. They grew on a steep hillside under pine trees. On August 1 it was re-collected at Harvey's Upper Ranch, about 20 miles to the southeast, at an altitude of about 2,900 meters (*Standley* 4644). This southwestern plant seems amply distinct from *C. virginica* in its green leaves and more slender habit. Between the mountains of New Mexico and the eastern part of Kansas there intervenes a large area in which no representative of the genus seems to occur.

Other specimens examined:

NEW MEXICO: Upper Pecos River, July, 1904, *Mrs. W. H. Bartlett*; West Fork of the Gila, in the Mogollon Mountains, Socorro County, 1903, *O. B. Metcalfe* 578; Las Vegas Hot Springs, August, *F. H. Snow*; Fresno, July 21, 1899, *E. O. Wootton*; Gallinas Planting Station, August, 1908, *Mrs. W. H. Bartlett*.
ARIZONA: Willow Spring, 1890, *Dr. Edward Palmer* 539.