

THE GENUS *HEMICARPHA* (CYPERACEAE) IN OKLAHOMA

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A study of specimens and the literature on *Hemicarpha* has resulted in the recognition of three species for Oklahoma: *H. micrantha* (Vahl) Pax, *H. drummondii* Nees, and *H. aristulata* (Coville) Smyth. A key to the species and their distribution within the state are presented.

The investigation reported here represents an attempt to delimit the Oklahoma species of *Hemicarpha*. Herbarium specimens were used primarily for plant material in the present study. The entire Oklahoma material at the Bebb Herbarium of the University of Oklahoma, at the Herbarium of Oklahoma State University, and at the Missouri Botanical Garden totals 34 sheets and represents only 28 collections. The scarcity of collections may be due in part to the low habit of the plants. In the field they are inconspicuous and, therefore, easily overlooked. Their inconspicuous nature is emphasized by the author's attempts to collect fresh material from previously recorded sites in many Oklahoma counties. After travels to these sites during the summer and fall of 1972, only one plant was found. Even this one specimen might have been overlooked had the area not been traversed more than once.

The literature on *Hemicarpha* is as confusing as finding fresh material is difficult. There is little agreement as to how the taxa should be treated. Friedland (1), in his study of the American species of *Hemicarpha*, treated the taxa he found in Oklahoma as varieties of *H. micrantha*. He indicated only two varieties, *drummondii* and *aristulata*, as occurring in the state. Waterfall (2) followed this same treatment of the taxa in his catalogue; however, in the most current treatment for the state, Waterfall (3) recognized two taxa, and these as species (*H. micrantha* and *H. drummondii*). No reference was made to *H. aristulata*. A specimen of *H. aristulata* would key in Waterfall (3) to *H. micrantha*. However, in Svenson's (4) treatment *H. aristulata* was listed in synonymy under *H. drummondii*. Pertinent manuals and floras whose ranges do not cover Oklahoma treat the taxa in different ways. For example, Fernald (5) recognized three distinct species, *micrantha*, *drummondii*, and *aristulata*, while Correll and

Johnston (6) listed these three as varieties of *H. micrantha* in Texas.

In addition to the varied disposition of the taxa, it is interesting to note that characters used in describing a taxon may be different and even contradictory among these taxonomic works. In this study some of the current taxonomic characters were evaluated and compared with original descriptions of each taxon in an attempt to clarify the situation.

The characters of the spikelet appear to be the most reliable ones for taxonomic purposes. Each spikelet is made up of several florets. Each floret consists of an outer glume or bract, an akene or fruit, and usually an inner hyaline perianth scale. In the early stages of development there are two stigma lobes and usually one stamen present. The structure of the bract and the perianth scale varies greatly in the Oklahoma material.

Hemicarpha micrantha has bracts with short, recurved tips (Fig. 1, A). Bracts with short, straight tips are found in the spikelets of *H. drummondii* (Fig. 1, B), while *H. aristulata* has bracts with long, spreading or recurved tips (Fig. 1, C).

The variation in the perianth scale is not so clear-cut. The only definitive statement that can be made is that the scales are either present or absent. Further utilization of the perianth scale was made by Friedland (1). If the perianth scales were present, then, depending on the taxon, they might or might not have vascular strands. Friedland correlated the presence or absence of vascular strands with two types of tips of the bracts. Supposedly, the taxon *aristulata* with its long, spreading or recurved tips or the bracts would have perianth scales devoid of vascular strands. Likewise, the taxon *drummondii* with its short, straight tips or the bracts would have perianth scales with

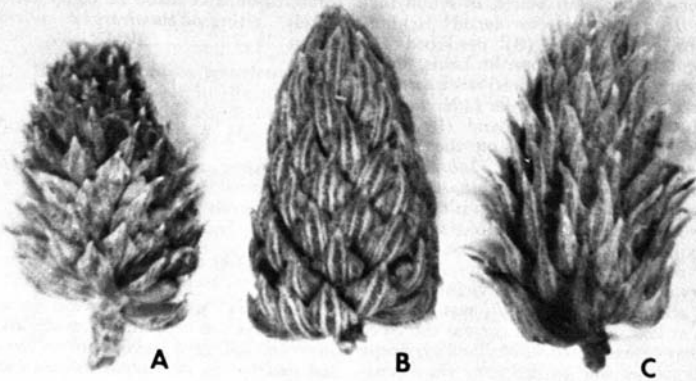


FIGURE 1. Spikelets of (A) *Hemicarpha micrantha*, Charles S. Wallis 1886, Cherokee County; (B) *H. drummondii*, Robert Pearce 1426, Grady County; (C) *H. aristulata*, U. T. Waterfall 9145, Comanche County.

from 3 to 5 vascular strands. The plant collected during the present study had the long, recurved tips on the bracts. If Friedland's correlation were valid, then no vascular strands should have been present in the perianth scales; instead complete and incomplete strands were present. These vascular strands could not be detected when the specimen dried, and they became visible again only after the dried perianth scales were placed in a softening agent (7).

When dried perianth scales from other specimens which had the same type of bract were placed in the softening agent (7), complete and incomplete strands became visible in most cases. There were a few perianth scales which showed no vascular strands in either the dried or moistened condition.

Reexamination of the perianth scales in material which had short, straight tips on the bracts revealed that the strands, though detectable in the dried material, were more conspicuous when dampened. This material also had more complete vascular strands than the material which had long, recurved tips on the bracts.

In our material the presence or absence of vascular strands in the perianth scale was a consistent species character in dried

material, but it was not a reliable character when the material was fresh or dampened.

In order to resolve the difficulty of contradictory descriptions of the taxa, a summary is presented of what is known of the types of each. In the case of *H. micrantha* there is general agreement that the tips on the bracts are short, or according to Svenson (4), "not strongly mucronate." Few comments have been made concerning the perianth scales. Svenson (4) examined the type (originally described as *Scirpus micranthus* Vahl) and stated that the perianth scales in the species were "minute, subulate to bifid, more frequently absent." His examination provides verification that the type has bracts with short tips and vestigial or missing perianth scales. In addition to showing bracts with short tips, descriptions and drawings of several synonyms of *H. micrantha* also show the tips to be recurved. The original description of *H. micrantha* stated that the bristles (characteristic of species of *Scirpus*) were missing. The perianth scale character became important when *S. micranthus* was transferred to *Hemicarpha*.

Hemicarpha drummondii has been described as having short, long, appressed, or straight tips on the bracts. When information on the perianth scale is given, there

is general agreement that the scales are present. However, in some instances, *H. drummondii* has been placed in synonymy under *H. micrantha*, a taxon lacking perianth scales. Nees (8) described *H. drummondii* (collected near St. Louis, Mo.) along with another species, *H. subsquarrosa*. He described *H. subsquarrosa* as having recurved tips on the bracts and *H. drummondii* with straight tips on the bracts. Later studies have shown *H. subsquarrosa* to be a synonym of *H. micrantha*. It seems certain that Nees could distinguish between the two species he described. As Friedland (1) explained, "Since a distinct entity has been recognized by various American authors and is found in the vicinity of St. Louis, the name *drummondii* was retained for it, at least until such a time as the Nees type may be examined." Friedland's concept of this species was learned from the examination of material which he had annotated. Since much of our material fits his concept, Friedland's reasoning and assumption that *H. drummondii* is the correct name are being followed in this study.

Hemicarpha aristulata was originally described as having long, spreading tips on the bracts. That the tips are long and spreading and the perianth scales are present is further substantiated by comments and drawings made by Friedland (1) after he examined the type specimen, G. C. Nealley, Texas, 1888. It seems undesirable to unite *H. aristulata* and *H. drummondii* as a single species. Although both have perianth scales, the bracts are very different, as shown in the original descriptions and from the herbarium material examined. Union with *H. micrantha* is likewise difficult to defend. Again, the types of bracts are unlike, and in this instance perianth scales are present only in *H. aristulata*.

Because the taxa differ so much in the morphology of the bract in addition to the presence or absence of a perianth, they are treated as three distinct species. These character differences which are summarized below in the key to the Oklahoma species also are in line with the original descriptions and studies of the types as were presented here. The distribution of the Oklahoma species is shown in Figure 2.

An additional discrepancy can be found in the literature on *Hemicarpha*. In the case of *H. micrantha*, two different authors, Pax

(9) and Britton (10), are credited in various texts as having published the new combination. Pax made his combination by merely citing "*Hemicarpha micrantha*

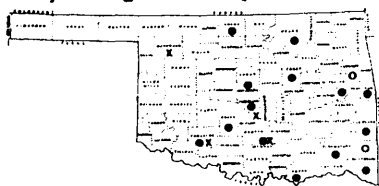


FIGURE 2. Distribution of *Hemicarpha* in Oklahoma. ○ = *H. micrantha*, ● = *H. drummondii* × = *H. aristulata*.

(Vahl) Pax" under a drawing in a text. Britton, on the other hand, made his combination and gave a reference to the original description of *Scirpus micranthus*. His publication appeared three months later than that of Pax.

Inasmuch as Article 32 of the *International Code of Botanical Nomenclature* (11) states that a new name must be accompanied by a description of the taxon or by a direct or indirect reference to a previously and effectively published description or diagnosis of a taxon, Pax's publication would appear to be valid. He made an indirect reference (as defined in Note 2 of Article 32) by citing "Vahl" in parentheses after his new combination. In this way he clearly indicated that a previously and effectively published description applied to the taxon to which his new name was given.

It is intriguing that the citation *H. aristulata* (Coville) Smyth has gone practically unquestioned although Smyth's original publication (12) of his new combination included nothing more than "*Hemicarpha aristulata* (Cov.) Southeastern Kansas; occasional" in a list of plants. Nelson (13), like Britton, gave a full reference to a description, but few texts have credited him with the new combination. Smyth also made an indirect reference to a description. By accepting (Vahl) Pax for *H. micrantha* and (Coville) Smyth for *H. aristulata* there is complete consistency.

KEY TO THE HEMICARPHA IN OKLAHOMA

- A. Perianth present, equaling and enveloping the achene.

B. Bracts of the spikelets with spreading or recurved tips equaling or nearly equaling the length of the bract body ----- 1. *H. aristulata*

BB. Bracts of the spikelets with appressed, straight tips much shorter than the length of the bract body ----- 2. *H. drummondii*

AA. Perianth absent or vestigial; bracts of the spikelets with recurved tips much shorter than the length of the bract body ----- 3. *H. micrantha*

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H. micrantha var. *aristulata* Coville, Bull. Torr. Bot. Cl. 21: 36. 1894.
H. aristulata (Coville) Nelson, Bull. Torr. Bot. Cl. 29: 400. 1902.

2. *Hemicarpha drummondii* Nees in Mart. Fl. Bras. 2¹: 62. 1842.

H. subsquarrosa var. *drummondii* (Nees) Gray, Man. (ed. 2). 495. 1856.

H. micrantha var. *drummondii* (Nees) Friedland, Amer. J. Bot. 28: 860. 1941/42.

Scirpus micranthus var. *drummondii* (Nees) Mohlenb., Amer. Midl. Nat. 70: 22. 1963.

3. *Hemicarpha micrantha* (Vahl) Pax in Engler & Prantl Nat. Pflanzenf. 2²: 105. 1888.

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Isolepis micrantha (Vahl) Roem. & Schult., Syst. Veg. 2: 110. 1817.

Scirpus subsquarrosus Muhl., Desc. Gram. 39. 1817.

Isolepis subsquarrosa (Muhl.) Schrad. in Schult. Mant. 2: 64. 1824.

Isolepis subsquarrosa var. *minor*

Schrad. in Schult. Mant. 2: 64. 1824.
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