

**PAPPUS VARIATION IN NORTH AMERICAN ASTERS. II.
IONACTIS AND OCLEMENA
(ASTERACEAE: ASTEREAE).**

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ABSTRACT

The pappus of all species in *Ionactis* and *Oclemena* is similar and consists of four distinct whorls of bristles. The innermost whorl (1° inner) is the longest and consists of bristles with flattened clavate tips (more obvious in *Ionactis*). The middle two whorls consist of bristles that taper to the apex and are not at all clavate. The 2° inner bristles are mostly 50-80% the length of the 1° inner clavate bristles. The 2° outer bristles are much shorter and range from 30-60% in length of the longest inner bristles. The outermost whorl (1° outer) is shorter but similar to the 2° outer whorl and are not broader and flattened as in species of *Doellingeria*.

Allen et al. (2019) proposed the merger of the eastern North American genus *Doellingeria* with the western North American genus *Eucephalus* based on the results of molecular analyses. The genera were treated as separate in Flora North America (Semple and Chmielewski 2006; Allen 2006) and separated again recently (Nesom 2022). The *Doellingeria-Eucephalus* complex came out as basal in the North American clade in the DNA based phylogeny of the tribe Astereae presented by Brouillet et al. (2009). *Ionactis* and *Oclemena* came out in the next polytomy of that phylogeny and are thus likely near basal in the North American clade.

In the Flora of North America (FNA) treatment, 5 species were recognized in *Ionactis* (Nesom 2006): the eastern North American *I. linariifolia* (L.) Greene (Fig. 1), and the western North American *I. alpina* (Nutt.) Greene, *I. caelestis* Leary & Nesom, *I. elegans* (Soreng & Spellenberg) Nesom, and *I. stenomeris* (A. Gray) Greene. *Ionactis repens* Nesom (2020) has recently been described from the Gulf Coastal Plain.

Three eastern North American species and one interspecific hybrid of *Oclemena* were recognized in FNA (Brouillet 2006): *Oclemena acuminata* (Michx.) Greene, *O. nemoralis* (Ait.) Greene (Fig. 2), *O. reticulata* (Pursh) Nesom, and *O. ×blakei* (Porter) Nesom.

This paper presents illustrations that show the close similarities of the pappus traits of *Ionactis* and *Oclemena* species to each other and to *Doellingeria*. The choice of examples illustrated is the result of the availability of samples ideal for imaging whole fruits and individual pappus bristles. The pappus traits of the other species were similar. Fruits of *I. linariifolia* (Semple & Chmielewski 6385 WAT; Fig. 3) and *O. nemoralis* (Oldham et al. 21346 WAT; Fig. 4) provided ideal material for imaging with a dissecting scope and a compound microscope using a Nikon CoolPix 990 digital camera for whole fruit (front lighting) and pappus bristle detail images (back lit). Individual pappus bristles were mounted in water under a coverslip for imaging of distal portions of bristles on the compound microscope.

The pappus of *Ionactis linariifolia* and *Oclemena nemoralis* are similar in each having 4 whorls of bristles with the outer three grading from one to the other. The innermost whorl (1° inner) of both species has enlarged apices somewhat flattened (clavate), but the marginal cells of *I. linariifolia* have slightly longer spreading free tips than those of *O. nemoralis*. This difference makes the clavate condition slightly more obvious in *I. linariifolia*. There is little difference in the 1° outer, 2° inner, and 2° outer bristles other than in length and thickness, and all three whorls are non-clavate in both species. Inner pappus bristles of *I. elegans* are not obviously clavate (Nesom 2006). The line drawing illustration of *O. reticulata* in Semple et al. (2001) clearly shows that the inner longest bristles are slightly clavate; the species was incorrectly treated as a species closely related to *Aster umbellatus* Mill. [i.e., *Doellingeria umbellata* (Mill.) Nees following Semple and Chmielewski (2006)] following Greene's (1896) treatment of the species as *Doellingeria reticulata* (Pursh) Greene.

The mature cypsela bodies (ovary post-anthesis) of disc florets are densely strigose in *Ionactis linariifolia*, while disc floret cypsela faces are sessile- to stipitate-glandular in *I. alpina*, *I. elegans*, and *I. stenomeris*. The disc florets of *I. caelestis* are functionally staminate (with sterile ovaries). *Ionactis repens* was not included in the early stages of this study, but a chromosome count of $2n=18$ is listed on the label of the USF specimen that was cited for *Semple 10930* (WAT, USF) — the chromosome count is formally reported here¹. The pappus is very similar to that of *I. linariifolia*, as is that of *Semple & Godfrey 3159* (MT-271151), *Godfrey 82237* (MT-271105) and *Semple, Canne, & Brouillet 3893* (MT-271134; $2n=18$, Semple et al. 1992). The mature cypsela body of *O. nemoralis* is stipitate-glandular (Fig. 4), while that of *O. reticulata* is finely strigose and stipitate-glandular (Fig. 17E in Semple et al. 2001).

¹ *Ionactis repens* Nesom. $2n=18$. Florida. Franklin Co.: S of Sumatra. Apalachicola Natl Forest. FR-129A, 3.2 km N of FR-129, N of Ft. Gadsden Historic Site, 0.2 km S on side road, 24 Oct 1999, *Semple 10930* (USF, WAT). Specimens distributed as *Ionactis linariifolia*.

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Figure 1. *Ionactis liniarifolia*. **A.** Habit of robust individual, Pender Co., North Carolina. **B.** Habit of small individual, Virginia, *Semple 10731*. **C.** Capitulescence, Virginia, *Semple 10731*. **D.** Heads, Tennessee, *Semple 11570*.



Figure 2. *Oclemena nemoralis*. **A.** Ontario, Semple 11087. **B.** Nova Scotia, Semple & Keir 4832. **C-D.** Ontario, Semple 11087.

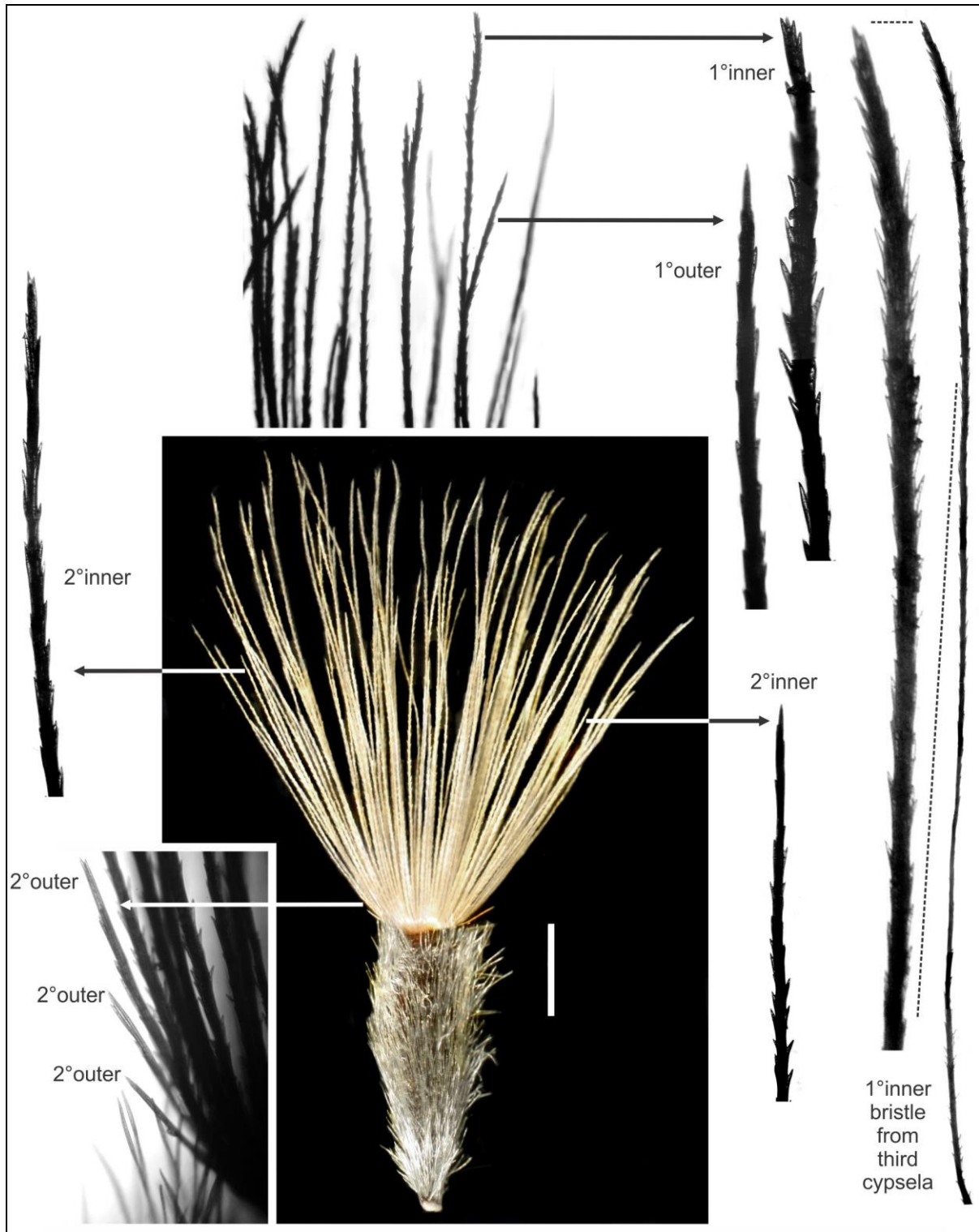


Fig. 3. Disc floret fruit of *Ionactis linariifolia* (Semple & Chmielewski 6385, WAT); scale bar = 1 mm. Figure created from three cypselae from one head; 1) entire fruit, 2) bristle tips with arrows indicating approximate location of bristles on second fruit, and 3) near-entire, excised, somewhat clavate primary inner bristle (on right) from a third fruit and enlargement of the tip.

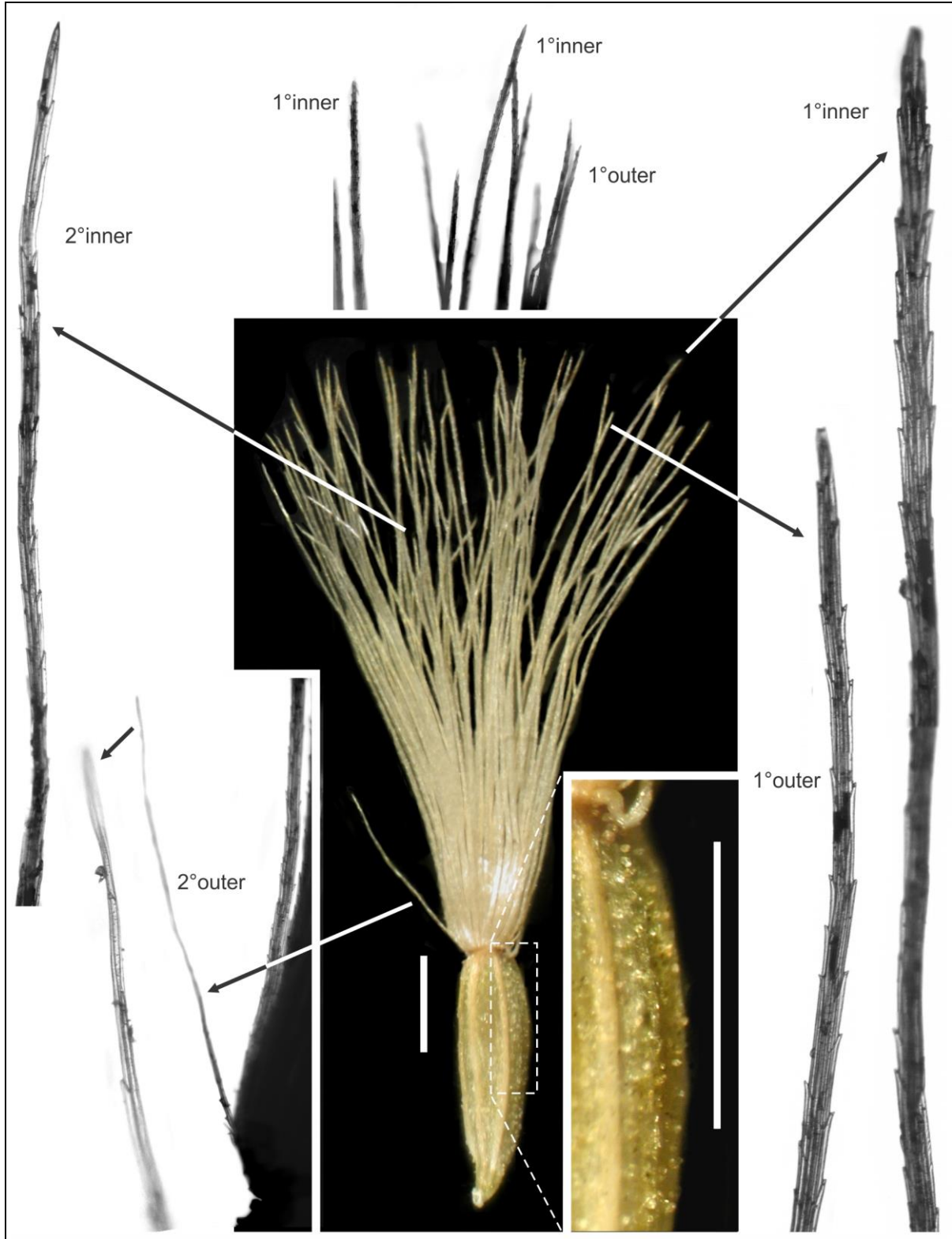


Fig. 4. Disc floret fruit of *Oclemena nemoralis* (Oldham *et al.* 21346, WAT); scale bars = 1 mm. Figure created from one cypsela; arrows indicate approximate source locations of enlarged bristle tips.