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First Florida records for *Anovia circumclusa* (Gorham) (Coleoptera: Coccinellidae: Noviini): A natural enemy of *Icerya genistae* Hempel (Hemiptera: Margarodidae)

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First Florida records for *Anovia circumclusa* (Gorham) (Coleoptera: Coccinellidae: Noviini): A natural enemy of *Icerya genistae* Hempel (Hemiptera: Margarodidae)

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Lady beetles in the tribe Noviini (Coleoptera: Coccinellidae) are well-known control agents for scale insects. The tribe consists of ~ 80 species divided among three genera, and is represented on every continent except Antarctica. *Anovia* Casey is native to North and South America, *Novius* Mulsant is restricted to Australia, and *Rodolia* Mulsant, while native to Australia, has been widely introduced to other regions of the world.

Only three noviines have been known to occur in the United States. *Rodolia cardinalis* (Mulsant) and *Rodolia koebelei* (Olliff) were both introduced from Australia and contributed to the biological control of the cottony cushion scale, *Icerya purchasi* Maskell (Koebele 1892, Olliff 1895). Unfortunately, *Rodolia koebelei* has not been collected for some time, and is thought to be nonexistent in the United States now (Gordon 1985). *Anovia virginalis* (Wickham), known from Arizona, New Mexico, Texas, and Utah, is apparently a native U.S. species (Wickham 1905). The remaining five species of *Anovia*, until now, were known only from south of the Mexican-American border. New collection records indicate the presence of a second *Anovia*, *A. circumclusa* (Gorham), in the United States. This species was previously known only from Honduras, Mexico, and Panama (Gordon 1972). It has now been collected from three sites in Florida: one in Port Everglades, Fort Lauderdale (Broward County) and two in Miami (Dade County).

The adults of *Anovia* species are diagnosed by the following suite of characters: dorsum convex, subhemispherical, widest medially, with arcuate lateral margins; dorsum (including eye facets) with pale, suberect pubescence; head with no ocular canthus; clypeal apex horizontal; antenna 8-segmented, weakly clubbed; tarsal formula 3-3-3. Gordon (1972) used elytral color patterns to distinguish species of *Anovia*; however, further examination of *Anovia* specimens indicates that dorsal coloration is not always a reliable character for differentiating species in this genus. *Anovia circumclusa* is distinguishable from all congeners by the form of the tegmen. The basal lobe of *A. circumclusa* is slender and does not extend laterally beyond the internal margin of the parameres (Fig. 1a), while in *A. virginalis* the basal lobe is quite broad, extending well beyond the internal margin of the parameres (Fig. 2a). Also, in *A. circumclusa* the basal piece is widest anteriorly, not posteriorly as in *A. virginalis* (Figs. 1a, 2a).

The data for the three new collection sites are as follows: **Site 1:** "Port Everglades, Fort Lauderdale, on leguminous weeds infested with *Icerya genistae*" (voucher deposited in the United States National Museum of Natural History (USNM)); **Site 2: "**FLORIDA: Miami-Dade Co.; Miami S30 T53 R42; 13-IX-2007; coll. O. Garcia; on *Quercus virginiana* [Fagaceae]. A *Diomus roseicollis* was in the same collection" (voucher deposited in the Florida State Collection of Arthropods (FSCA)); and **Site 3**: "FLORIDA: Dade Co.; Aventura 10-X-2007; coll. O. Garcia; on *Sphagneticola trilobata* [Asteraceae]" (voucher deposited in the FSCA).

The range expansion for *A. circumclusa* is noteworthy, particularly given the host association. *Anovia circumclusa* is a predator of the scale insect *Icerya genistae* Hempel (Hemiptera: Margarodidae). This pest species was first reported from Florida in November, 2006, and like *A. circumclusa*, is apparently native to the Neotropics (Hodges 2006). The range expansion of *I. genistae* to Broward and Dade counties predates that of *A. circumclusa* by almost a year (Hodges 2006), and it is unknown whether or not the two occurrences are correlated. *Icerya genistae* feeds on legumes and ornamentals, but very little is known about its potential economic impact. Likewise, it is unknown whether or not *A. circumclusa* may be a potential control agent for this pest.

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Cultures of *Anovia circumclusa* are currently being reared at the USDA, APHIS Center for Plant Health Science and Technology Research Station. Specimens from these rearings will be used as the basis for the first published descriptions of the egg, pupal, and larval stages of *A. circumclusa* along with a redescription of the adult.

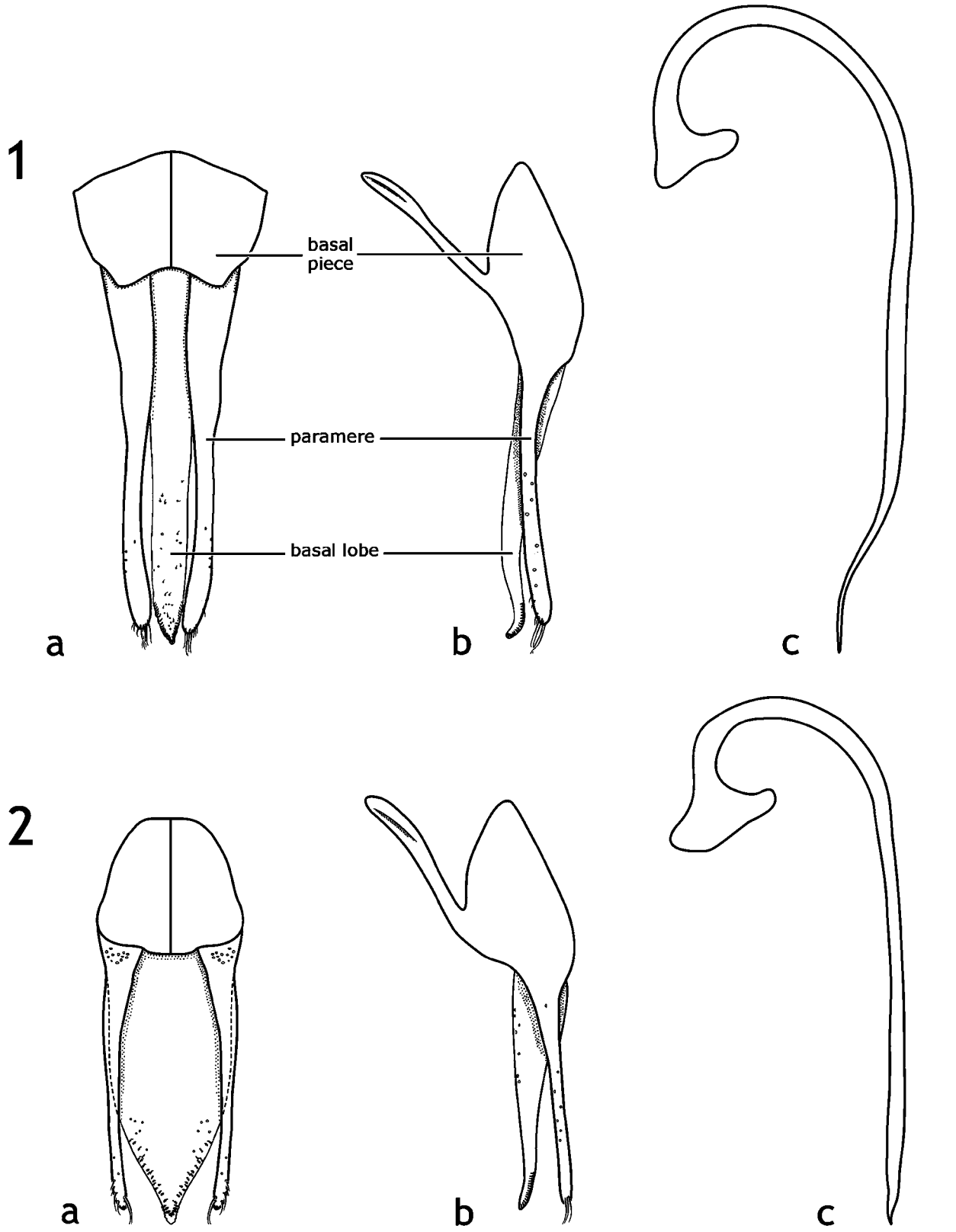

FIGURE 1–2. 1, *Anovia circumclusa* (Gorham). Male genitalia. **a.** Tegmen, dorsal view. **b.** Tegmen, lateral view. **c.** Sipho, lateral view. **2,** *Anovia virginalis* (Wickham). Male genitalia. **a.** Tegmen, dorsal view. **b.** Tegmen, lateral view. **c.** Sipho, lateral view.

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