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Resemblance to Co-Occurring Pseudomyrmecine Ants**

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***WOLCOTTIA* (=ISOHYDNOCERA) *AEGRA* (COLEOPTERA: CLERIDAE):
ASSOCIATION WITH GRASSES (POACEAE), NATIVE *SPARTINA* SPP. AND
THE INTRODUCED *ERAGROSTIS CURVULA*, AND RESEMBLANCE TO
CO-OCCURRING PSEUDOMYRMECINE ANTS**

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Wolcottia aegra (Newman) a narrow, elongate, brown clerid beetle about 4.3 mm long (Fig. 1) was described in the genus *Hydnocera* and later placed in *Isohydnocera* (Chapin 1917; Kolibáč 1998). Kolibáč (1998) synonymized *Isohydnocera* with *Wolcottia*, but Opitz (2002) did not follow that synonymy. We follow Kolibáč (1998) in recognizing *Wolcottia* (=Isohydnocera).

Known only from the southeastern United States, Florida, Georgia (Peck & Thomas 1998), Mississippi (Lago et al. 2002), North Carolina (Davis & Gray 1966), and South Carolina (Kirk 1969, 1970), *W. aegra* generally is not well represented in collections, and its habitat and plant associations are little known. In Florida, Shelford (1963) collected it in Dec in semidry prairies of tall sawgrass (*Cladium mariscus* ssp. *jamaicense* (Crantz) Kükenth.; Cyperaceae) marsh near Miami, and Cuda et al. (2007) rarely encountered it during a survey of insects associated with the adventive torpedo grass (*Panicum repens* L.) near Lake Okeechobee. In Mississippi, an adult was swept from a saltgrass (*Distichlis*) meadow and another from *Schrankia* (Fabaceae; probably an incidental occurrence) on Point Clear Island (Lago et al. 2002). The beetle was found in North Carolina from May to Oct on *Spartina patens* (Ait.) Muhl. in salt marshes in Carteret County (Davis & Gray 1966). In South Carolina, Kirk (1970) swept *W. aegra* from "salt marsh grass" on Hunting Island, and 5 adults were collected at the

Belle Baruch Marine Field Laboratory of the Hobcaw Barony, east of Georgetown, from late Apr to early May 2004, and another adult was taken at the same locality in mid-Sep 2007 (S. M. Paiero, Dept. Environmental Biology, University of Guelph, personal communication).

Here, we report adults from 2 native grasses, sand cordgrass (*Spartina bakeri* Merr.) and salt-meadow cordgrass (*S. patens*), and an introduced African species, weeping lovegrass (*Eragrostis curvula* (Schrad.) Nees), and note the beetle's resemblance to syntopic pseudomyrmecine ants. From 2002 to 2009, an ax handle was used to beat the crowns of the 3 bunchgrass species into a shallow, short-handled net. Voucher specimens of the beetle are deposited in the Clemson University Arthropod Collection (CUAC) and National Museum of Natural History, Smithsonian Institution, Washington, DC; ants are deposited in the CUAC.

We collected adults of *W. aegra* in Florida, Georgia, and South Carolina from grasses at 14 sites (28 collections) during Jan, Feb, Mar, Apr, Jun, Aug, Oct, and Dec (Table 1). Of the 182 adults we collected, 7 were on *S. patens* and 71 were beaten from crowns of the more architecturally complex *S. bakeri*, which grows in dense clumps. The remaining 104 adults of *W. aegra* were collected in Florida from weeping lovegrass (*E. curvula*), an African bunchgrass used in the Southeast mainly for erosion control and slope stabilization. *Wolcottia aegra* can be included among the little-known or seldom-collected native insects that have become associated with weeping lovegrass (Wheeler 1999, 2003; Wilson & Wheeler 2005). We did not observe adults during the sampling of other coastal spartinas, smooth cordgrass (*S. alterniflora* Loisel.), and big cordgrass (*S. cynosuroides* (L.) Roth).

At one site, a highway embankment northwest of Loughman in Lake County, Florida, *E. curvula* and *S. bakeri* co-occurred. During about 20 min of sampling in mid-Mar 2007, split about evenly between the 2 grass species, 22 adults of the clerid were taken on *E. curvula* and 1 on *S. bakeri*.

In salt marshes, Davis (1978) considered *W. aegra* not abundant on, but "fairly characteristic" of, *S. patens*, a grass on which we found relatively few adults. One could infer from the scattered literature on this clerid that it is restricted to coastal marshes. We did find adults on *S. patens* in brackish flats and salt marshes and on *S. bak-*



Fig. 1. Alate of the pseudomyrmecine ant *Pseudomyrmex seminole* (top) and adult of the co-occurring myrmecomorphic clerid *Wolcottia aegra* (bottom). Scale line = 1 mm.

TABLE 1. *WOLCOTTIA AEGRA* IN FLORIDA, GEORGIA, AND SOUTH CAROLINA, 2002-2009.

State	County	Locality	Date	No. of adults	Plant species ¹
Florida	Duval	E of Eastport 30°25.03'N 81°35.54'W	27-IV-2008	5	<i>Spartina bakeri</i>
Florida	Hamilton	NW of Jennings 30°36.769'N 83°08.038'W	20-III-2007	1	* <i>Spartina bakeri</i>
Florida	Hamilton	NW of Jennings 30°36.769'N 83°08.038'W	25-IV-2008	9	* <i>Spartina bakeri</i>
Florida	Highlands	NW of Avon Park 27°38.375'N 81°33.453'W	23-III-2007	5	<i>Spartina bakeri</i>
Florida	Highlands	NW of Avon Park 27°38.375'N 81°33.453'W	14-XII-2007	1	<i>Spartina bakeri</i>
Florida	Highlands	NW of Avon Park 27°38.375'N 81°33.453'W	12-III-2008	15	<i>Spartina bakeri</i>
Florida	Highlands	NW of Avon Park 27°38.375'N 81°33.453'W	4-I-2009	3	<i>Spartina bakeri</i>
Florida	Highlands	NW of Avon Park 27°38.375'N 81°33.453'W	28-II-2009	5	<i>Spartina bakeri</i>
Florida	Lake	NW of Loughman 28°20.829'N 81°40.275'W	24-II-2002	3	* <i>Eragrostis curvula</i>
Florida	Lake	NW of Loughman 28°20.829'N 81°40.275'W	21-III-2002	6	* <i>Eragrostis curvula</i>
Florida	Lake	NW of Loughman 28°20.821'N 81°40.217'W	10-VIII-2002	1	* <i>Eragrostis curvula</i>
Florida	Lake	NW of Loughman 28°20.821'N 81°40.217'W	22-III- 2007	5	* <i>Eragrostis curvula</i>
Florida	Lake	NW of Loughman 28°20.821'N 81°40.217'W	11, 12-III-2008	23	* <i>Eragrostis curvula</i> * <i>Spartina bakeri</i>
Florida	Lake	NW of Loughman 28°20.821'N 81°40.217'W	28-II-2009	12	* <i>Eragrostis curvula</i>
Florida	Lake	Altoona 28°57.688'N 81°39.064'W	11-III-2008	15	* <i>Eragrostis curvula</i>
Florida	Lake	S of Clermont 28°28.855'N	11-III-2008	17	* <i>Eragrostis curvula</i>

¹Asterisks indicate landscape or ornamental plantings.

TABLE 1. (CONTINUED) *WOLCOTTIA AEGRA* IN FLORIDA, GEORGIA, AND SOUTH CAROLINA, 2002-2009.

State	County	Locality	Date	No. of adults	Plant species ¹
Florida	Lake	81°42.853'W S of Clermont 28°28.619'N 81°42.918'W	22-III-2007	13	* <i>Eragrostis curvula</i>
Florida	Lake	S of Clermont 28°28.619'N 81°42.918'W	3-I-2009	1	* <i>Eragrostis curvula</i>
Florida	Lake	S of Clermont 28°28.619'N 81°42.918'W	28-II-2009	8	* <i>Eragrostis curvula</i>
Florida	Nassau	NW of Yulee 30°42.76'N 81°40.20'W	27-IV-2008	2	* <i>Spartina bakeri</i>
Florida	Polk	NW of Loughman 28°16.61'N 81°39.65'W	2-VI-2002	1	* <i>Eragrostis curvula</i>
Georgia	Glynn	WSW of Brunswick 31°07.55'N 81°33.07'W	27-IV-2008	3	<i>Spartina bakeri</i>
Georgia	McIntosh	N of South Newport 31°40.56'N 81°24.14'W	27-IV-2008	6	<i>Spartina bakeri</i>
South Carolina	Charleston	NW of Edisto Island 32°38.069'N 80°20.479'W	19-IV-2008	3	<i>Spartina patens</i>
South Carolina	Colleton	N of Bennetts Pt. 32°39.961'N 80°31.960'W	19-IV-2008	5	<i>Spartina bakeri</i>
South Carolina	Colleton	N of Bennetts Pt. 32°35.516'N 80°28.122'W	19-IV-2008	1	<i>Spartina bakeri</i>
South Carolina	Colleton	Bear Island WMA 32°35.571-577'N 80°27.146-750'W	19-IV-2008	12	<i>Spartina bakeri</i> <i>S. patens</i>
South Carolina	Colleton	Bear Island WMA 32°35.577'N 80°27.733'W	4-X-2008	1	<i>Spartina patens</i>

¹Asterisks indicate landscape or ornamental plantings.

eri in brackish and freshwater marshes along the coast. In Florida, however, we also found *W. aegra* in native populations and landscape plantings of *S. bakeri* in the Lake Wales Ridge in the center of the peninsula, as well as inland plantings of weeping lovegrass. We did not find clerid larvae on any of the 3 grass species. Trophic habits of other hydnocerine clerids are little known, but *W. aegra* has been assumed to be predacious (Davis & Gray 1966). Larvae of 2 other species of *Wolcottia* (= *Isohydnocera*)

prey on endophages such as gall-inducing and stem-boring insects (Sabrosky 1934; Clausen 1940; Knull 1951). Potential prey of *W. aegra* on *S. bakeri* are stem borers known from other spartinas (Stiling & Strong 1984; White et al. 2005), including languriid beetles (Ward et al. 2007). We observed adults of *Languria mozardi* Latreille in several stands of weeping lovegrass inhabited by *W. aegra*. Numerous species of Cleridae mimic aculeate Hymenoptera such as ants. Most hydnocerine

clerids are generalized ant mimics, including species currently placed in *Wolcottia* (Mawdsley 1994).

We collected adults of *W. aegra* with the similarly colored pseudomyrmecine ants *Pseudomyrmex pallidus* (F. Smith) and *P. seminole* Ward (Fig. 1) on *E. curvula* and *S. bakeri*. After the presence of pseudomyrmecines began to be recorded in field notes (21 Mar 2007), 16 of 23 collections of the clerid also included one or both species of *Pseudomyrmex*. The clerid's resemblance to pseudomyrmecines was enhanced by an erratic antlike movement. Clerid males were about the same size as worker ants, whereas the larger females were about the same size as dealated queens. We found *P. pallidus* in Florida and South Carolina and *P. seminole* in Florida, Georgia, and South Carolina. *Pseudomyrmex pallidus* nests preferentially in stems of tall grasses (Van Pelt 1958), including salt marsh grasses (Carter 1962). Sympatric assemblages characterize the *P. pallidus* group. *Pseudomyrmex seminole* co-occurs with *P. pallidus* and might be a facultative social parasite of that species; it nests in dead stems of grasses, such as *Andropogon* spp. (Ward 1985).

Although the adult of *W. aegra* exhibits an antlike habitus, use of the more neutral term myrmecomorphy might be preferable to ant mimicry in the absence of data demonstrating that a resemblance to ants enhances survivorship of the clerid. Experimental studies documenting ant mimicry by *W. aegra*, and examining the possibility that adults are chemically protected, as are certain other myrmecomorphic Cleridae (Mawdsley 2002), are needed. Studies on bionomics of the clerid also are needed, especially information on larval feeding habits. Also desirable would be to determine whether ant densities on native *Spartina* species differ from those on the adventive weeping lovegrass and whether stems of these grasses differ in their suitability as nesting sites for pseudomyrmecines.

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SUMMARY

Wolcottia (= *Isohydnocera*) *aegra*, an antlike or myrmecomorphic clerid beetle typically not well represented in collections, was associated with grasses at 14 sites (28 collections) in Florida, Georgia, and South Carolina. Adults ($n = 182$) were beaten from crowns of bunchgrasses; the introduced South African weeping lovegrass, *Eragrostis curvula* ($n = 104$), along highways; sand cordgrass, *Spartina bakeri* ($n = 71$), in coastal brackish and freshwater marshes and

inland swales, as well as in landscape plantings; and saltmeadow cordgrass, *S. patens* ($n = 7$), in brackish flats and salt marshes. The ants *Pseudomyrmex pallidus* and *P. seminole* (Formicidae: Pseudomyrmecinae) co-occurred with the clerid.

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