

INSECTA MUNDI

A Journal of World Insect Systematics

0304

Description of a new *Crossidius* LeConte (Coleoptera: Cerambycidae: Cerambycinae: Trachyderini) from southern Georgia with comments on its biology and unusual distribution

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Date of Issue: June 10, 2013

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Insecta Mundi 0304: 1-7

ZooBank Registered: urn:lsid:zoobank.org:pub:3CAD53B1-347F-4B6F-B83B-5974C7739057

Published in 2013 by

Center for Systematic Entomology, Inc.
P. O. Box 141874
Gainesville, FL 32614-1874 USA
<http://www.centerforsystematicentomology.org/>

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Description of a new *Crossidius* LeConte (Coleoptera: Cerambycidae: Cerambycinae: Trachyderini) from southern Georgia with comments on its biology and unusual distribution

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Abstract. *Crossidius grahami* Morris and Wappes **new species** (Coleoptera: Cerambycidae) is described from the Ochoopee Dunes of southern Georgia. Comments are included on the new species' biology and disjunct distribution compared to other species of *Crossidius* LeConte. Illustrations include: dorsal and lateral views of the primary types of *C. grahami*, its natural habitat, the known host plant (*Chrysoma pauciflosculosa* (Michx.) Greene (Asteraceae)), pupal chamber, and dorsal views of both sexes of *Crossidius humeralis quadrivittata* Penrose, 1974, considered its closest anatomical counterpart and nearest geographical relative.

Key words. Coleoptera, Cerambycidae, new species, Georgia, Ochoopee dunes, *Chrysoma pauciflosculosa*.

Resumen. Se describe *Crossidius grahami* Morris and Wappes, **especie nueva** (Coleoptera: Cerambycidae) de la Dunas Ochoopee del sur de Georgia. Se incluyen comentarios sobre la biología de la nueva especie y sobre su distribución dispersa en comparación con las otras especies de *Crossidius* LeConte.

Palabras Clave. Coleóptera, Cerambycidae, especie nueva, Georgia, dunas de Ochoopee, *Chrysoma pauciflosculosa*.

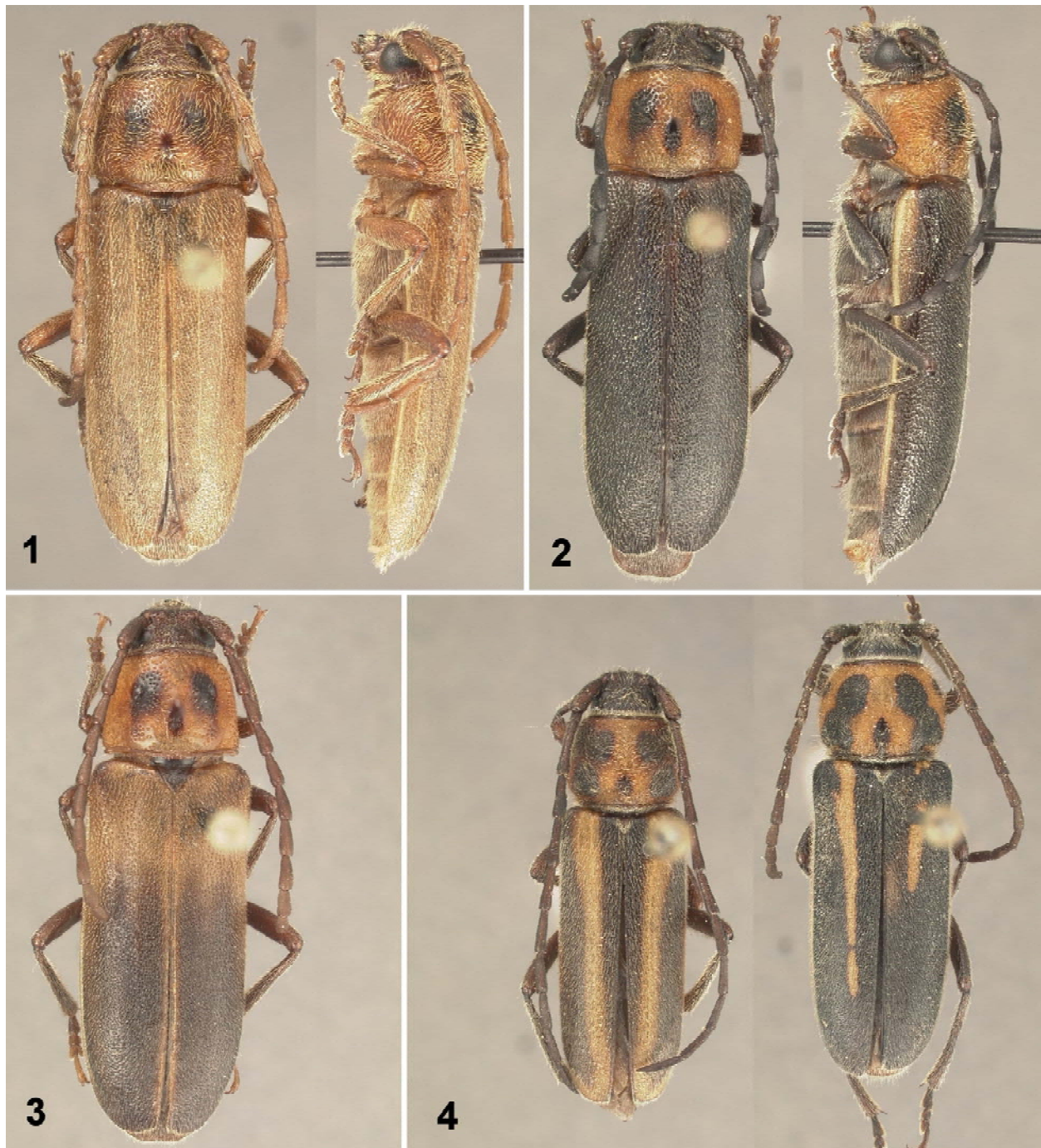
Introduction

Collecting by the senior author in southern Georgia, in the inland sand dune system known as the Ochoopee Dunes, has led to the discovery of a new species of *Crossidius* LeConte (Cerambycidae). The occurrence of this species in the southeastern United States is surprising since this large trachyderine genus, containing 13 species and 37 subspecies, was previously only recorded from the western States (California to Texas) and Mexico (Monné and Bezark 2012). Adult *Crossidius* are moderate sized (8-22 mm), lightly to brightly colored and typically found on the blossoms of their host plant, yellow flowering composites (Linsley and Chemsak 1961). They are a favorite of collectors because of this, for typically being found in large numbers, and for their habit of sitting fully exposed in the sun easily available for handpicking. The fact that *Crossidius grahami* was undiscovered until recently is a mystery. The differences in its habits and biology may help to explain why and are discussed later in this paper (see: "Biology").

Crossidius grahami has a disjunct distribution, hundreds of mile east of other *Crossidius* species with *C. humeralis quadrivittata* Penrose, found along the southern gulf coast of Texas, the nearest species geographically. The nominate form of this relative is where the new species will key in the most recent key to *Crossidius* species (Linsley 1962).

Materials. Specimens studied are deposited in the following collections:

- ACMT** – American Coleoptera Museum (James E. Wappes), San Antonio, TX, USA
- EMEC** – Essig Museum of Entomology (University of California), Berkley, CA, USA
- FSCA** – Florida State Collection of Arthropods, Gainesville, FL, USA



Figures 1-4. *Crossidius* spp. **1)** *Crossidius grahami*, holotype male, a) dorsal, b) lateral. **2)** *Crossidius grahami*, allotype female Emanuel Co., a) dorsal, b) lateral. **3)** *Crossidius grahami*, paratype female, Tattnall Co. **4)** *Crossidius humeralis quadrivittata*, Texas, Kleberg Co., a) male, b) female.

JBMC – Jeff Burne, Macon, GA, USA

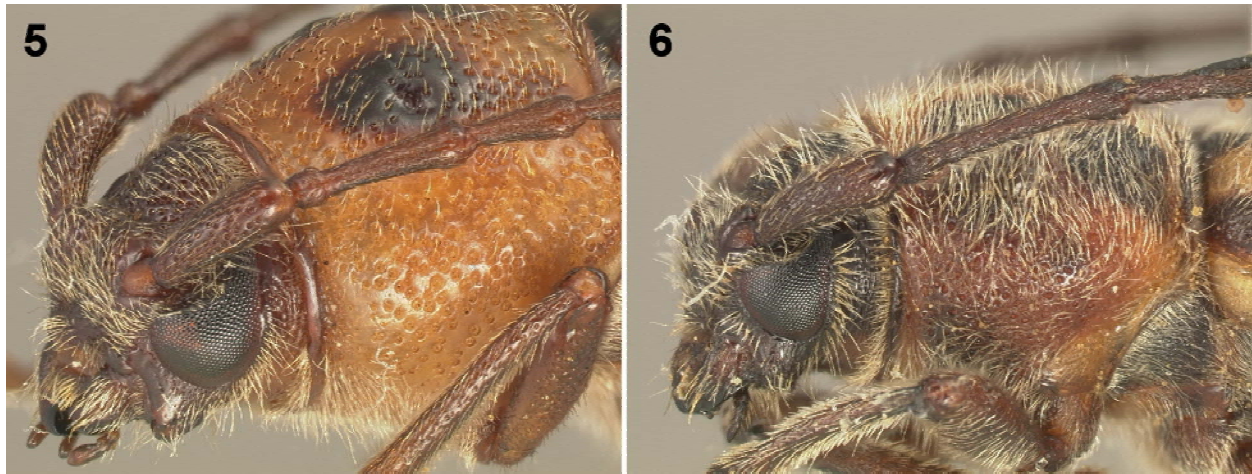
JHGC – Jeffrey Huether, Geneva, NY, USA

JPBC – Joshua P. Basham, Tennessee State University, McMinnville, TN, USA

MEMC – Mississippi Entomological Museum, Mississippi State, MS, USA

MNRJ – Museu Nacional, Universidade Federal do Rio de Janeiro, RJ, BRASIL

MZSP – Museu de Zoologia da Universidade de São Paulo, SP, BRASIL



Figures 5-6. Head, pronotum and basal antennomeres. **5)** *Crossidius grahami*, holotype male. **6)** *Crossidius humeralis quadrivittata*, Texas, Kleberg Co., male.

RAAC – Robert A. Androw, Pittsburg, PA, USA

RFMC – Roy F. Morris, Lakeland, FL, USA

RHTC – Robert H. Turnbow Jr., Enterprise, AL, USA

RMBC – R. Michael Brattain, Lafayette, IN, USA

UGAC – University of Georgia Arthropod Collection, Athens, GA, USA

USNM – National Museum of Natural History, Smithsonian Institution, Washington, DC, USA

Crossidius LeConte

Crossidius LeConte 1851: 102. Type species: *Crossidius testaceus* LeConte 1851: 102, by monotypy. Linsley and Chemsak 1961: 26-64 (distributional and taxonomic study of the genus); Linsley 1962: 142-175 (revision); Penrose 1974: 248-254 (new subspecies of *Crossidius humeralis* LeConte).

Crossidius grahami Morris and Wappes, new species

(Figures 1-3, 5, 9-10)

Description. Male (Fig. 1): Moderate sized, elongate, parallel-sided, robust; integument entirely brownish-testaceous, pronotum with three dark-brown to black discal spots, elytra entirely testaceous. **Head** with pale pubescence, sparse, not obscuring surface, denser on front of head and along basal margin; underlying punctures dense, almost contiguous, smaller than those on elytra. **Antennae** 11 segmented, short, reaching apical quarter of elytra but not surpassing apices; scape twice as long as broad; third segment short, stout, as long as the scape and second segment combined, slightly expanded at apex (Fig. 5); antennomeres 4-10 flattened with length subequal to scape; antennal punctures and pale pubescence sparse. **Pronotum** cylindrical, swollen, almost parallel sided, basally and apically margined; sides rounded, lacking tubercles; surface punctures dense, larger than those at base of elytra; pale pubescence moderate, not obscuring surface; discal area with two punctate, glabrous submedial dark areas and a less punctate similar area basally. **Prosternum** swollen at sides, densely pubescent across middle. **Metasternum** finely punctate, densely pubescent. **Scutellum** dark, flat, triangular, not indented medially, apex slightly rounded; pubescence fine. **Elytra** length 2.4 times width of both elytra at the humeri; surface moderately coarsely, densely punctate, becoming denser apically; pubescence short, pale, sparse, not obscuring surface; apices slightly rounded, angles usually distinct but not acute. **Legs** with fine punctures, pubescence sparse, not obscuring surface; mesotibial spurs short, nearly subequal in length. **Abdomen** with dense, pale pubescence, almost obscuring the fine surface punctures. Length 10-15 mm.

Female (Fig 2): Form similar to male except as noted. Body testaceous with head, antennomeres, elytra and legs black, uniformly covered with short pale pubescence. **Head** punctate, sparsely pubescent.

Antenna 11 segmented, reaching middle of elytra, sparsely pubescent, punctuate with punctures small and shallow. **Pronotum** not inflated (as in male); pubescence pale, sparse; punctures larger than those of elytral base. **Elytra** with apical third slightly expanded, pubescence short, sparse and erect. **Legs** short, with sparse pubescence. **Abdomen** and metasternum with fine, pale, suberect pubescence not obscuring surface. Length 12-15 mm.

Variation. Females from Tattnall County, GA tend to have the basal third of the elytra tan (Fig. 3) while those from Emanuel County have solid black elytra (Fig. 2).

Diagnosis. *Crossidius grahami* is the only *Crossidius* species known from east of the Mississippi River and to date has only been found in the relict sand formations of southern Georgia. As such its distribution is diagnostic. It is also morphologically unique for *Crossidius* species in having the antenna distinctly shorter than the elytra in both sexes. From its nearest geographical relative, *C. humeralis quadrivittata* Penrose (Fig. 4), *C. grahami* can be separated by the following characters: shorter, more robust and apically expanded antennomeres (Fig. 5); shorter, nearly subequal metatibial spurs; greatly reduced pubescence on the sides of the pronotum, and on the vertex of the head and between the eyes; and by the lack of elytral vitta. In *C. h. quadrivittata*, antennomeres are longer and nearly parallel-sided (Fig. 6); inner metatibial spur distinctly longer than outer; long, dense pubescence on the sides of the pronotum, and on the vertex and between the eyes, and distinct, dark elytral vitta in most specimens.

Type Material. Male holotype of *Crossidius grahami* labeled: “/ GA: Emanuel co., 1.5 mi. S. Covena, 10/VI/00, R. Morris / Sweeping *Chrysoma pauciflosculosa* ”. The female allotype is labeled: “/ GA: Emanuel co., 1.5 mi. s. Covena, 6/VI/99, R. Morris”. They are deposited in the FSCA.

Paratypes: 257 males and 84 females (Unless otherwise noted the following paratypes are deposited in the collection of the collector). **Georgia:** Same data as holotype (13m, 6f – RFMC, 4m, 2f -UGAC; 1m – RMBC); **Emanuel Co.:** 1.5 mi. S. Covena, 6/VI/99, R. Morris (9m, 1f – RFMC; 1f – RMBC); 1 mi. SW Covena, 11 June 2000, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (6m, 2f-USNM); 1 mi. SW Covena, 10 June 2000, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (17m, 9f - RHTC); 1 mi. SW Covena, 11 June 2006, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (17m, 5f - RHTC); 1 mi. SW Covena, 11 June 2011, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (20m, 9f – RHTC, 4m, 2f EMEC); Oohoopee Dunes WMA, Co. Rd. 160, 12/VI/1999, R. Morris, sweeping *Chrysoma pauciflosculosa* (6m – RFMC); Oohoopee Dunes Natural Area, Hall’s Bridge Rd., 10/VI/00, R. Morris, sweeping *Chrysoma pauciflosculosa* (7m, 1f – RFMC); Oohoopee Dunes Natural Area, 10 June 2000, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (5m, 2f – MNRJ, 5m 2f - MZSP); Oohoopee Dunes Natural Area, 11 June 2011, R. Turnbow (2m - RHTC); Oohoopee Dunes Natural Area, 12 June 2011, R. Turnbow (2m, 1f - RHTC); Oohoopee Dunes Natural Area, 4.5 km NE Norristown, Halls Bridge Tract, 32.53581, -82.46023, 8 June 2011, beaten from foliage of woody goldenrod, *Chrysoma pauciflosculosa*, R. A. Androw, coll. (3m - RAAC); Oohoopee Dunes Natural Area, 32°32’15”N 82°27’40”W, 19 June 2002, T. L. Schiefer, R. L. Brown, or J.G. Hill, sweeping *Chrysoma pauciflosculosa* in xeric dune scrub. W. H. Cross Expedition (9m, 1f – MEMC); Hwy. 56 at Oohoopee River, 10 June 2000, R. Turnbow (1m – RHTC); I-16 & US 1, Gar Rd., 6-7/VI/99, R. Morris (18m, 4f – RFMC); I-16 & US 1, Gar Rd., 12/VI/99, R. Morris, sweeping *Chrysoma pauciflosculosa* (5m – RFMC); I-16 & US 1, Gar Rd., 9/VI/00, R. Morris, sweeping *Chrysoma pauciflosculosa* (1m – RFMC); I-16 & US 1, Gar Rd., 15/VI/01, R. Morris (1m – RFMC); I-16 & US 1, Gar Rd., 30/V/10, J. Basham, cut fm *Chrysoma pauciflosculosa* root crown 14/I/10 (1f –JPBC); Jct. Rts. 1 & 16, VI/15-16/03, J. &M. Huether (8m, 2f – JHGC); Jct. I-16 & hwy. 1, 9 June 2000, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (9m, 1f – RHTC); **Tattnall Co.:** 3 mi. E of 147 along Oohoopee River, Col. 1-IV-98, Em. 1-VI-98, R. Morris, ex *Chrysoma pauciflosculosa* (1m – RFMC); 3 mi. E of 147 along Oohoopee River, 12-13-VI-1998, R. & G. Morris, sweeping *Chrysoma pauciflosculosa* (18m, 5f – RFMC); 3 mi. E of 147 along Oohoopee River, 12-VI-1998, Roy & Graham Morris (1m – RFMC); 3 mi. E of 147 along Oohoopee River, 20-VI-1998, Morris/Wappes, sweeping *Chrysoma pauciflosculosa* (5m, 1f – RFMC); 3 mi. E of 147 along Oohoopee River, 19-20 June 1998, Wappes & Morris, sweeping woody goldenrod, *Chrysoma pauciflosculosa* Grn. (5m, 3f -ACMT); 2 mi. E of 147 along Oohoopee River, 11/VI/99, R. Morris, sweeping *Chrysoma pauciflosculosa* (1f – RFMC); 2 mi. E of 147 along Oohoopee River, 30-V-04, Morris/Nearns/Skelley (6m – RFMC); 2 mi. E of 147 along Oohoopee River, 5-VI-99, R. Morris



Figures 7-10. Habitat and host pictures. **7)** Typical habitat of *C. grahami* with its host plant, woody goldenrod, front center. **8)** *Chrysoma pauciflosculosa* (Michx.) in bloom during October. **9)** Root crown of woody goldenrod, showing pupal chamber and the teneral male reared from it with label data (Photos by J. P. Basham). **10)** *Crossidius grahami* sitting on the main stem of the host plant (Photo by M. C. Thomas).

(5m, 4f – RFMC); 2 mi. E of 147 along Ohoopsee River, 5-VI-99, J. Burne (6m, 2f – JBMC); 2 mi. E of 147 along Ohoopsee River, 9-VI-99, J. Burne (15m, 4f – JBMC); 2 mi. E of 147 along Ohoopsee River, 12-VI-99, J. Burne (9m, 1f – JBMC); 2 mi. E of 147 along Ohoopsee River, 24-VI-99, J. Burne (3m, 3f – FSCA); 3 mi. S. of Reidsville, 22-VI-02, R. Morris (4m, 2 f – RFMC); 4 mi. S. Reidsville, 28 June, 1998, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (3m - RHTC); 4 mi. S. Reidsville, 13 June, 2011, R. Turnbow, on *Chrysoma pauciflosculosa* (Michx.) Greene (8m, 2f - FSCA); 4 mi. S. Reidsville, 12-VI-2011, M. C. Thomas, sweeping *Chrysoma pauciflosculosa* (2m, 2f-FSCA); 1 mi. S. Covina, 11-VI-2011, M. C. Thomas, sweeping *Chrysoma pauciflosculosa* (3m, 2f-FSCA).

Etymology. It is our pleasure to name this new species for Graham Morris, who as an eight year old accompanied his father to southern Georgia and helped collect the first specimens of this new species.

Biology. The known distribution of *Crossidius grahami* is restricted to the relict island sand dune systems along the Ohoopsee and Little Ohoopsee rivers in Emanuel and Tattnall counties of Georgia. These dunes were formed during the late Pleistocene glacial or the intermediate post glacial period (Markewich and Markewich 1994), with the natural vegetation (Fig. 7) upland scrub with smaller areas of dwarf oak forests (Wharton 1978). The only known host plant of *C. grahami* is woody goldenrod,

Chrysoma pauciflosculosa (Michx.) Greene (Asteraceae) (Fig. 8). During April, 1998 the senior author found a dying woody goldenrod, 3 miles east of GA Highway 147, along the Ohooppee River. Curious about the cause of the plant's demise he excavated and examined the root crown. After finding some larval working he cut it open and found the larvae of a cerambycid. Securing the pieces together it was placed in a rearing container on his desk at home. On June 1, a male of an unknown cerambycid emerged. Not knowing the identity of this specimen, a trip with his son Graham was made to the area the next week to look for more specimens. There, they successfully collected additional specimens by sweeping *Chrysoma*. Recently (January, 2012), Joshua Basham, McMinnville, TN, also confirmed woody goldenrod as a host plant by extracting a teneral male from its root crown pupal chamber (Fig. 9). Most of the paratypical specimens have been collected by sweeping woody goldenrod or by handpicking, as they sit facing upward on the main stem (Fig. 10). Only rarely have they been observed and taken in flight. Woody goldenrod occurs primarily in coastal dunes, and among scrub oak ridges across the southern US, from Mississippi to the inner coastal plain of southern Georgia and all the way into North Carolina wherever suitable habitat is found (Godfrey 1988). Extensive collecting by the senior author in other areas of Georgia and north Florida, where the host plant occurs, has not yielded any specimens of *C. grahami*. We can only hypothesize that some biological factor, other than just having available host plant, is key to the species development and hence restricting its distribution.

Most *Crossidius* host plants bloom in the late summer and early fall, with adults of *Crossidius* species typically emerging at the start of the host blooming season. During the day both sexes can be found feeding on blossoms. Males also commonly perch with antenna extended, on the tallest flowers of the host, hoping to locate freshly emerged females. During cool or overcast days adults of both sexes can be found sitting quietly among the foliage and stems of the host plant waiting for warmer temperatures to then become active. It is assumed that most adults spend the night at the base of the host as we have observed adults crawling down the stems in the evenings and, as morning sun warms the air, crawling back up the plant and becoming active by mid-morning. Rarely, but especially on warm nights, adults of some smaller species can be found still flower sitting or in the upper foliage of the host. In one case we observed males of *C. pulchellus* LeConte, in West Texas, sitting on *Gutierrezia* flowers early in the morning covered by snow from a previous night's snowfall. *Chrysoma pauciflosculosa* blooms in late October, somewhat later than western *Crossidius* hosts. Unlike the western species, adults of *Crossidius grahami* are normally late spring active with almost all collected specimens taken in late May or June. Obviously, this is not when the host, woody goldenrod, blooms. Hence, adults are not flower feeders and are not feeding at the top of the plant, exposed, to be easily found by the collector or observer. Rather, they sit on the main stem of the host (Fig. 10), or hide in the dead leaves that are still attached to the terminal stem. This makes them much more difficult to find and experience indicates they are best collected by sweeping the plant. Collecting, during the fall bloom season, at localities known to have populations of *C. grahami*, has not produced any specimens. This aberrant behavior may help explain why the species has escaped discovery until recent years.

Acknowledgments

Special thanks are due Paul Skelley, Florida State Collection of Arthropods, for his technical assistance, help with many of the photographs, reviewing an early draft of this paper, sharing his expertise as an Editor and, most importantly, for providing guidance on numerous issues related to writing this paper. The final product is much improved because of his kind assistance. We thank Joshua P. Basham, McMinnville, TN, for allowing us to use host plant material from which he extracted a specimen of the new species. We also thank our colleagues Steven Lingafelter, USNM, Miguel Monné, MNRJ and Donald Thomas, Weslaco, TX, for reviewing the manuscript. Thanks to Julieta Brambila, FSCA, for doing the Spanish version of the Abstract and Keywords. We also appreciate Steven Christman, Editor, www.floridata.com, for providing the photograph that appears as Figure 8. Finally, we appreciate and thank all the collectors and collection managers that provided their specimens so they could be included in this paper.

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Received April 29, 2013; Accepted May 2, 2013.

