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A. G. Wheeler Jr.  
Clemson University

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**Pentatomoidea (Hemiptera: Pentatomidae, Scutelleridae)  
Associated with the Dioecious Shrub Florida Rosemary,  
*Ceratiola ericoides* (Ericaceae)**

A. G. Wheeler, Jr.<sup>1</sup>

**Abstract**

Florida rosemary (*Ceratiola ericoides*), an ericaceous shrub with needlelike leaves, is characteristic of Florida scrubs and certain other xeric plant communities of well-drained sands. The plant is dioecious, its inconspicuous male and female flowers borne on separate individuals. From 2003 to 2012 (mainly 2007–2012), rosemary was sampled periodically (with all months included at least once during the period) in sand ridges of peninsular Florida and two riverine dunes in southeastern Georgia. Branches of male and female plants were tapped separately into a beating net. Sampling during the final three years was female-plant-biased to facilitate work on fruit- and seed-feeding heteropterans. Nymphs and adults of three pentatomoid species were found on *C. ericoides*: the pentatomid *Thyanta custator custator* (F.) and scutellerids *Diolcus chrysorrhoeus* (F.) and *Homaemus proteus* Stål. Only *T. c. custator* was taken in both states, occurring at 19 sites (19 nymphs, 53 adults); *D. chrysorrhoeus* was found in Florida at 16 sites (9 nymphs, 165 adults). The collection of *T. c. custator* and *D. chrysorrhoeus* from female rosemary plants essentially throughout the sampling period, including nymphs, exuviae, and mating pairs, coupled with their near absence from male plants, suggests that the bugs are not incidental on rosemary but feed on its fruits. Whether either species completes its life cycle on rosemary is unknown. Three nymphs and eight adults of the little-known *H. proteus* were collected from female rosemary plants at four sites, but the scutellerid's relationship to *C. ericoides* remains to be determined. Briefly noted is the collection of the pentatomid *Euschistus obscurus* (Palisot de Beauvois) and scutellerid *Stethaulax marmoratus* (Say), whose adults were collected infrequently on female rosemary plants in Florida.

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Florida rosemary (or sand heath; hereafter rosemary), *Ceratiola ericoides* L. (Ericaceae; formerly Empetraceae), is a characteristic plant of Florida scrubs (Mulvania 1931, Austin et al. 1987, Menges and Kohfeldt 1995). These plant communities are xeric, pyrogenic, shrub-dominated, and occur on excessively well-drained deep sands of ancient shorelines and ridges (Laessle 1958, Myers 1990, Menges 1999). Although biodiversity of scrubs is lower than for certain other plant communities, these ecological islands harbor numerous endemic (precinctive) and near-endemic animals and plants, many of them threatened or endangered (Deyrup 1989, Christman and Judd 1990, Menges 1999, Lamb et al. 2006, FNAI 2010). Scrubs were widespread in Florida during the late Pliocene and early to mid-Pleistocene before fragmentation into patches with a shift from xeric to mesic conditions (Webb 1990, Branch et al. 2003). Especially since 1900, suburban and urban development and the clearing of land for citrus and other crops have reduced the extent of scrub communities (Huck et al. 1989,

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<sup>1</sup>School of Agricultural, Forest, and Environmental Sciences, Clemson University, Clemson, SC 29634-0310. (e-mail: awhlr@clemson.edu).

Christman and Judd 1990, Myers 1990). In addition, fire suppression can be detrimental to scrub biodiversity (Menges 1999).

Rosemary in Florida is locally abundant in scrubs of the Mt. Dora Ridge (Ocala National Forest), Lake Wales Ridge, and certain other sand ridges of the central peninsula. It also is common in scrubs of the Atlantic Coastal ridge and Panhandle coast, and persists elsewhere in smaller patches. Rosemary scrubs (balds), dominated by *C. ericoides*, are a community variant found on the driest ridge crests, such as in the southern Lake Wales Ridge (e.g., Archbold Biological Station), and on barrier islands of the Panhandle (FNAI 2010). *Ceratiola ericoides* ranges north, with disjunct populations in Georgia and South Carolina, and southwest to the Florida Panhandle, southwestern Alabama, and southeastern Mississippi (Abrahamson et al. 1984, Wally and Menges 2002, FNAI 2010, USDA NRCS 2012).

*Ceratiola ericoides* belongs to a monotypic genus traditionally placed in the small family Empetraceae but is now considered a member of a redefined, more inclusive Ericaceae (Kron et al. 2002). The shrub has evergreen needlelike leaves, is wind pollinated, and bears inconspicuous male and female flowers on separate individuals (dioecy). Plants bloom mainly from September to November (Trapnell et al. 2007, 2008; Wheeler 2009), but under certain conditions can flower at other times (Patrick et al. 1995). Fruits are two-seeded drupes (Small 1933, Godfrey 1988), with clusters containing greenish-yellow, fleshy (ca. 2–3 mm) fruits, as well as dry, hard fruits (Schmidt 2008, Trapnell et al. 2008). Fleshy fruits, generally less numerous than dry fruits, are assumed to result from pollinated flowers (Schmidt 2008).

Rosemary is aromatic (Hubbell and Walker 1928, Tanrisever et al. 1987, Jordan et al. 1992), presumably well defended against herbivory by insects (Deyrup 1989; Deyrup and Eisner 1993, 2001), and is fed on by relatively few insects (Sandoval-Mojica and Capinera 2011). *Ceratiola* specialists include a grasshopper, *Schistocerca ceratiola* Hubbell and Walker (Franz and Franz 1989, Smith and Capinera 2005); geometrid moth, *Nemoria outina* Ferguson (Deyrup and Eisner 1993, Eisner et al. 2005, Canfield et al. 2008); leafhopper, *Alconeura bisagittata* (Beamer) (Wheeler and Hicks 2012); and plant bugs *Keltonia balli* (Knight) (Wheeler 2009) and *Parthenicus weemsi* Henry (Henry 1982). The relatively few generalist herbivores of rosemary include the walkingstick *Anisomorpha buprestoides* (Stoll) (Conle et al. 2009), scale insects such as the coccid *Neopulvinaria innumerabilis* (Rathvon) (Hamon and Williams 1984) and diaspidid *Rhizaspidiotus dearnessi* (Cockerell) (Beshear et al. 1973), and two rhyparochromid seed bugs (A.G.W., unpubl. data).

Here I document the association of three pentatomid heteropterans with *C. ericoides*: the scutellerids *Diolcus chrysorrhoeus* (F.) and *Homaemus proteus* Stål, and the pentatomid *Thyanta custator custator* (F.). I take pleasure in dedicating this paper to J. E. McPherson, an esteemed friend and colleague who has contributed substantially to our knowledge of the bionomics and systematics of North American Pentatomoidea.

### Methods and Study Sites

Pentatomid heteropterans were collected periodically, beginning in 2003 but mainly from 2007 to 2012, during studies of other rosemary insects (Wheeler 2009, Wheeler and Hicks 2012). *Ceratiola ericoides* was sampled at irregular intervals, primarily in peninsular Florida scrubs such as the Crescent City, Lake Wales, and Northern Brooksville ridges, and in two riverine dunes of the Ochoopee Dunes system in the coastal plain of southeastern Georgia. Male and female plants were sampled separately by using an ax handle to tap branches over a short-handled beating net with a shallow bag. From 2010 to 2012, sampling was biased toward female plants to increase the probability

of encountering fruit-feeding pentatomoids. Sampling time depended on the size of a rosemary population and ranged from about 10 min (< 5 plants) to 45 min (> 50 plants). A woody vine, earleaf greenbrier (*Smilax auriculata* Walt.; Smilacaceae), which sometimes grew over rosemary plants, was avoided during sampling except when greenbrier fruits were sampled for possible individuals of Pentatomoidea. Nymphs and adults of pentatomids and scutellerids from rosemary were collected into snap-cap plastic vials, and nymphs later were sorted to instar using a stereoscopic microscope. Several fifth instars of *D. chrysorrhoeus* and *T. c. custator* were held with sprigs of rosemary to obtain adults for species identifications. Late instars assumed to be those of *H. proteus* were not reared to adulthood; they tentatively were identified based on their collection from female plants that yielded adults of *H. proteus*, smaller size compared to late instars of *D. chrysorrhoeus*, and head structure more similar to that of *Homaemus* than *Diolcus*. Nymphs thought to represent *H. proteus* also resembled those of *H. variegatus* Van Duzee taken on the rosaceous shrub chamise, *Adenostoma fasciculatum* Hook. and Arn., in California (A.G.W., pers. obs.).

In listing specimens examined, Roman numerals are used to indicate nymphal instars and are preceded by Arabic numerals referring to the numbers collected for each instar. The number of males and females is given, or number of adults when gender is unknown. Voucher material has been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM).

## Results

### *Diolcus chrysorrhoeus* (F.)

This pachycorine scutellerid was described from "Carolina" by Fabricius (1803); *Scutelleria viridipunctata*, described from Florida by Say (1832), was synonymized with *D. chrysorrhoeus* by Uhler (1859). Common in Florida, where it has been recorded from Jacksonville and St. Augustine in the north (Barber 1914) to the Everglades and Keys in the south (Blatchley 1926, Torre-Bueno 1933), *D. chrysorrhoeus* ranges west to Arkansas and eastern Texas. An Illinois record is of questionable validity (McPherson 1982); a provisional record from Virginia was published by Hoffman (1994).

Ecological data on this scutellerid are scant. In swamps near Mansura in central Louisiana, ten adults were collected from Spanish moss, *Tillandsia usneoides* (L.) L. (Bromeliaceae), in June 1909, but none were found during more extensive sampling of the moss during the winter of 1908–1909 (Rosenfeld 1911). Blatchley (1926), however, noted that adults overwinter in clumps of Spanish moss in Florida, and Rainwater (1941) collected *D. chrysorrhoeus* from Spanish moss near Tallulah in northeastern Louisiana. Adults in Florida are found on trees and shrubs (Blatchley 1926) and have been recorded from holly, *Ilex* sp. (Aquifoliaceae), and observed feeding on developing fruits of guava (Lattin 1964), presumably the introduced *Psidium guajava* L. This scutellerid has been collected in South Carolina (Sullivan's Island) from common wax-myrtle or southern bayberry, *Morella cerifera* (L.) Small (Myricaceae) (Krauss 1964). I have taken nymphs and adults of *D. chrysorrhoeus* on fruits of *M. cerifera* at Charleston, South Carolina, in late October 2008 (USNM collection). Overgaard (1968) reported *D. chrysorrhoeus* as a possible predator of the southern pine beetle, *Dendroctonus frontalis* Zimmermann, in Texas, but scutellerids are regarded as strict plant feeders (Schuh and Slater 1995, Javahery et al. 2000).

**Association with *Ceratiola ericoides*.** *Diolcus chrysorrhoeus* (Figs. 1, 2) was found on fruit-bearing rosemary plants at 16 sites in peninsular Florida, from the Crescent City Ridge of Putnam County south to the southern Lake Wales Ridge in Highlands County. One first instar, one third instar, two fourth instars, five fifth instars, and 165 adults were observed. The largest



Figure 1. *Diolcus chrysorrhoeus*, third-instar nymph (collected as instar I), Levy County, Florida, Rt. 27A, 3.7 km SE of Bronson, 18 August 2012.



Figure 2. *Diolcus chrysorrhoeus*, adult, collected with the first-instar nymph in Levy County, Florida.

numbers of adults in any sample were 56 in Levy County in early June and 30 in Gilchrist County in late March. Nymphs were found on rosemary in early June, mid-August, and from late October to late December; adults, from late January to mid-August and late October to late December. A mating pair was observed in mid-June.

**Specimens examined.** FLORIDA: *Alachua Co.*, Rt. 24, 1.8 km SW of Archer, 29°31.585'N 82°32.079'W, 9 June 2012, 1♂; Rt. 24, 3.5 km SW of Archer, 29°30.928'N 82°33.046'W, 31 Oct. 2009, 2♂, 1♀ & 29 July 2010, 1♂ & 12 Nov. 2010, 1♂. *Gilchrist Co.*, Rt. 129, 2.6 km N of Bell, 29°46.680'N 82°51.996'W, 30 Mar. 2012, 15♂, 15♀ & 9 June 2012, 1–III, 1–V, 2♂, 1♀; Rt. 26, 10.5 km E of Trenton, 29°37.816'N 82°42.643'W, 9 June 2012, 1♀. *Highlands Co.*, S of Rt. 621 W of Daffodil St., 7.2 km NW of Lake Placid, 27°19.229'N, 81°25.525'W, 15 Nov. 2003, 1 adult & 27 Nov. 2004, 3 adults; Rt. 70, 8.5 km S of Lake Placid, 27°12.555'N, 81°21.426'W, 7 Nov. 2007, 1♂, 1♀. *Lake Co.*, Rt. 19, 1.5 km S of Rt. 40 & W of Astor Park, Ocala National Forest, 29°08.008'N 81°37.039'W, 7 Nov. 2007, 1–V, 2 adults. *Levy Co.*, Rt. 24, 1.5–1.6 km S of Alachua Co. line SW of Archer, 29°30.252–254'N 82°34.181–186'W, 31 Oct. 2009, 1–V, 2♂, 3♀ & 14 Mar. 2012, 1♂; Rt. 27A, 3.7 km SE of Bronson, 29°25.920'N 82°36.363'W, 31 Oct. 2009, 1–IV & 31 Mar. 2012, 4♂, 4♀ & 9 June 2012, 1–IV, 37♂, 19♀ (including mating pair) & 18 Aug. 2012, 1–I, 18♂, 8♀; Rt. 27A, 4.2 km SE of Bronson, 29°25.906'N 82°36.327'W, 14 Mar. 2012, 3♂, 1♀; NE 62nd St., 0.4 km N of Rt. 27A, 6.5 km SE of Bronson, 29°25.603'N 82°34.892'W, 31 Mar. 2012, 2♂, 1♀; Rt. 27A, 10 km SSE of Bronson, 29°24.729'N 82°32.686'W, 9 Nov. 2008, 4♂ & 22 Dec. 2011, 1♂ (dead when collected) & 14 Mar. 2012, 1♀ & 18 Aug. 2012, 1♂. *Marion Co.*, Rt. 40, Ocala National Forest, 16 km E of Lynne, 29°10.632'N 81°46.573'W, 23 Dec. 2011, 1–V (molted to adult ♂), 1♂, 2♀; For. Rd. 13, Ocala National Forest, 0.6 km E of Rt. 40, 11 km W of Juniper Springs, 29°10.352'N 81°45.379'W, 21 Jan. 2012, 2♂. *Putnam Co.*, jct. Rt. 20 & Royal Way, 5.7 km W of Interlachen, 29°37.533'N 81°56.752'W, 18 Aug. 2012, 1♂, 1♀; Johnson, nr jct. Co. Rd. 20A & Rt. 21, 29°35.526'N 81°58.532'W, 22 Nov. 2009, 1–V.

### *Homaemus proteus* Stål

The pachycorine scutellerid *H. proteus* was described by Stål (1862) from Mexico and now is known to occur south to Colombia. U.S. records mostly are western: California, New Mexico, and Texas (Froeschner 1988), as well as Arizona (Van Duzee 1917) and Nevada (Christensen 1970). *Homaemus proteus* was listed from Iowa by Osborn (1890), but Van Duzee (1904) questioned the record, as did Stoner (1920), who noted that all other U.S. records are southwestern. Neither Barber (1914) nor Blatchley (1926) recorded this scutellerid from Florida. Walley (1929) was the first to report it from the state: “eastern Florida (Ashmead)”; the record apparently is based on a specimen (♀) in the USNM collection, labeled “So. Fla./Ashmead USNM Acc. 18050.” W. H. Ashmead, a hymenopterist, donated his collection to the USNM in 1898 (USNM 1976); insects of orders other than Hymenoptera, including the specimen of *H. proteus*, probably were part of the donation. Froeschner (1988) included Florida in the U.S. distribution, but *H. proteus* was not included in Eger and Baranowski’s (2002) key to Florida Scutelleridae despite recent collections from Florida. The first Florida record published since Walley’s (1929) paper was from Alachua County (Dixon and Anderson 2005). Additional Florida county records are Charlotte, Lee, Orange, Palm Beach, and Pinellas (Dixon and Anderson 2006–2010), as well as Hernando, Hillsborough, Martin, and Miami-Dade (I. C. Stocks, pers. comm.).

Host relationships for *H. proteus* are uncertain because collection records do not mention the presence of nymphs. Torre-Bueno (1939) mentioned its occurrence on, or near, the roots of grasses. Such habits might characterize the more frequently encountered and widespread *H. parvulus* (Germar) (Slater and Baranowski 1978, McPherson 1982, Jones 1993, A.G.W., pers. obs.), but probably do not apply to *H. proteus*. Recent records of *H. proteus* mainly are from

composites (Asteraceae): *Parthenium argentatum* Gray in Texas (Stone and Fries 1986), *P. hysterophorus* L. in Mexico (McClay et al. 1995), and *Ambrosia artemisiifolia* L. (Dixon and Anderson 2007, 2010) and *Helianthus* sp. (Dixon and Anderson 2005) in Florida. Additional collection records include *Lantana camara* L. (Verbenaceae) in Mexico (Palmer and Pullen 1995) and *Gaura angustifolia* Michx. (Onagraceae) in Florida (Dixon and Anderson 2006).

**Association with *Ceratiola ericoides*.** *Homaemus proteus* was collected from female rosemary plants at four sites in peninsular Florida. Five of the eight adults and the only nymphs (1 fourth and 2 fifth instars) were found at a site in Putnam County (Crescent City Ridge). Single adults were collected in scrubs of Alachua and Levy counties (Northern Brooksville Ridge) and Highlands County (southern Lake Wales Ridge).

**Specimens examined.** FLORIDA: *Alachua Co.*, Rt. 24, 3.5 km SW of Archer, 29°30.928'N 82°33.046'W, 29 July 2009, 1 adult. *Highlands Co.*, 8.5 km S of Lake Placid, 27°12.555'N, 81°21.426'W, 23 Mar. 2007, 1♂. *Levy Co.*, Rt. 27A, 3.7 km SE of Bronson, 29°25.920'N 82°36.363'W, 9 June 2012, 1♂. *Putnam Co.*, jct. Rt. 20 & Royal Way, 5.7 km W of Interlachen, 29°37.533'N 81°56.752'W, 23 Jan. 2010, 1♀ & 15 Apr. 2010, 1♀ & 19 June 2010, 1-V, 1♂ & 20 Jan. 2012, 1♀ & 18 Mar. 2012, 1-IV & 8 June 2012, 1-V, 1♂.

#### *Thyanta custator custator* (F.)

Fabricius (1803) described *Cimex custator* from “Carolina”; Stål (1862) included the species in his new genus *Thyanta*. The original description was sufficient to fix the species, but subsequent workers often identified other large (at least 8 mm) species of the genus as *T. custator*, even though specimens did not conform to the Fabrician description and were from other regions of North America. The confused taxonomic history of *T. custator* and similar taxa largely was resolved by Ruckes (1957), who regarded the nominate form as stable morphologically and restricted to the Atlantic and Gulf coasts (inland to ca. 120 km) from Massachusetts (since deleted from the range; Rider and Chapin 1992) and New York (Long Island) south to Florida and west to central Louisiana. The record from extreme southern Ohio (Ruckes 1957: p. 7, footnote 1) is based on a misidentification of *T. calceata* (Say) (D. A. Rider, pers. comm.). Ruckes (1957) placed the morphologically similar form *accerra* McAtee as a subspecies of *T. pallidovirens* (Stål). Rider and Chapin (1992), however, gave *accerra* subspecific status within *T. custator*; the range of *T. c. accerra*, found in the eastern two-thirds of the United States, overlaps only narrowly with that of the nominate subspecies (Rider and Chapin 1992).

Most plant associations and biological data attributed to *T. c. custator* are based on studies outside the range of the nominate subspecies and refer to *T. c. accerra* (Ruckes 1957, Rider and Chapin 1992, map 2, p. 52). Thus, a biological study of “*T. custator*” in Missouri (Oetting and Yonke 1971) pertains to *T. c. accerra* (McPherson 1982), as do host associations in Arizona (Jones 1993) and those of Furth (1974), which were based mainly on records by Hart (1919) and Esselbaugh (1948) for Illinois (McPherson 1979, 1982). Furth (1974) also included under “*T. custator*” the hosts given by Torre-Bueno (1939), but Torre-Bueno’s concept of *T. custator* included both the nominate subspecies and *accerra* (Rider and Chapin 1992). Few host records for *T. custator*, therefore, can be attributed reliably to the nominate subspecies. An exception, as noted by McPherson (1982), is Dozier’s (1920) Florida record from “haw bush” [*Crataegus* sp.; Rosaceae]; *T. c. accerra* is not known from Florida (Rider and Chapin 1992). Because even valid plant records for *T. c. custator* probably are based only on the collection of adults, host relationships of this subspecies should be considered undocumented.

**Association with *Ceratiola ericoides*.** *Thyanta c. custator* was collected from rosemary in Georgia (2 sites: 6 nymphs, 7 adults) and peninsular Florida (17 sites: 13 nymphs, 46 adults). At an Emanuel County site in Georgia, two

mating pairs were observed in mid-March, a third instar and two fifth instars in late April, a third instar in mid-May, and second instars in mid-May and mid-September. Single adults were found in late April, mid-July, and late November. I encountered nymphs in Florida in late March, early June, late October, mid-November, and late December. Adults were collected in late January, late March, early and mid-June, late October, late November, and late December. Mating pairs were found in mid- and late March.

**Specimens examined.** FLORIDA: *Alachua Co.*, Rt. 24, 3.5 km SW of Archer, 29°30.928'N 82°33.046'W, 31 Oct. 2009, 2-V, 2♂, 3♀. *Clay Co.*, Rt. 21, 3.2 km NE of Keystone Heights, 29°48.536'N 82°00.575'W, 22 Nov. 2009, 6 adults & 23 Jan. 2010, 1♂ & 20 Mar. 2010, 2♂ & 21 Jan. 2011, 1♂, 1♀. *Gilchrist Co.*, Rt. 129, 2.6 km N of Bell, 29°46.680'N 82°51.996'W, 31 Oct. 2009, 1 adult & 9 June 2012, 1♂; Rt. 26, 10.5 km E of Trenton, 29°37.816'N 82°42.643'W, 9 June 2012, 1-V (molted to adult ♂). *Highlands Co.*, nr jct Lancaster & Livingston Ave, 7 km NW of Avon Park, 27°38.375'N 81°33.453'W, 22 Nov. 2009, 1 adult & 13 Nov. 2010, 1-V (reared to adult ♂). *Levy Co.*, Rt. 24, 1.5–1.6 km S of Alachua Co. line SW of Archer, 29°30.252–254'N 82°34.181–186'W, 31 Oct. 2009, 1 adult & 14 Mar. 2012, 1♂, 1♀; Rt. 27A, 3.7 km SE of Bronson, 29°25.920'N 82°36.363'W, 31 Oct. 2009, 1 adult & 23 Jan. 2010, 1♂ & 31 Mar. 2012, 2-II; Rt. 27A, 4.2 km SE of Bronson, 29°25.906'N 82°36.327'W, 14 Mar. 2012, 2♂, 1♀ (including mating pair); NE 62nd St., 0.1 km N of Rt. 27A, 6.5 km SE of Bronson, 29°25.484'N 82°34.869'W, 31 Mar. 2012, 1♂, 2♀ (including mating pair); NE 62nd St., 0.4 km N of Rt. 27A, 6.5 km SE of Bronson, 29°25.603'N 82°34.892'W, 31 Mar. 2012, 1-III; Rt. 27A, 10 km SSE of Bronson, 29°24.729'N 82°32.686'W, 14 Mar. 2012, 1♂; Co. Rd. 32, 1.8 km N of Bronson, 29°27.825'N 82°37.770'W, 31 Oct. 2009, 3♀. *Marion Co.*, Rt. 40, Ocala National Forest, 16 km E of Lynne, 29°10.632'N 81°46.573'W, 23 Dec. 2011, 3-V (all molted to adult ♀); Ocala National Forest, 0.6 km E of Rt. 40, 3.4 km W of Juniper Springs, 29°10.663'N 81°44.568'W, 21 Jan. 2012, 1♂, 1♀. *Putnam Co.*, jct. Rt. 20 & Royal Way, 5.7 km W of Interlachen, 29°37.533'N 81°56.752'W, 23 Jan. 2010, 2♀ & 19 June 2010, 1-III, 2-V, 1 adult & 20 Jan. 2012, 1♀ & 18 Mar. 2012, 1♂, 1♀ (mating pair); Illinois St., 0.1 km E of Co. Rd. 315, 5 km N of Interlachen, 29°40.106'N 81°53.698'W, 18 Mar. 2012, 1♂, 2♀; Co. Rd. 315, 2.2 km S of Interlachen, 29°36.531'N 81°53.186'W, 23 Dec. 2011, 1♂. GEORGIA: *Emanuel Co.*, Old Hwy. 46, 0.1 km E of Rt. 1, 4.8 km N of Oak Park, 32°23.704'N 82°18.474'W, 19 Mar. 2011, 2♂, 2♀ (mating pairs) & 30 Apr. 2011, 1-III, 2-V, 1♀ & 15 May 2011, 1-III & 16 July 2011, 1 adult & 17 Sept. 2011, 1-II & 23 Nov. 2011, 1♀ & 19 May 2012, 1-II; *Tattnall Co.*, Handy Kennedy Rd. (=Co. Rd. 90), 1.3 km N of Rt. 152, 7.7 km W of Cobbtown, 32°17.713'N 82°11.928'W, 23 Nov. 2011, 1-V.

#### Other Pentatomoidea

Adults of two other pentatomoid species, whose relationship to *Ceratiola ericoides* might be incidental, also were collected on female rosemary plants.

**Pentatomidae.** In Florida, I collected a female of *Euschistus obscurus* (Palisot de Beauvois) in Alachua County (SW of Archer) on 31 October 2009, a male in Levy County (3.7 km SE of Bronson) on 18 August 2012, and a female in Putnam County (5.7 km W of Interlachen) on 18 August 2012. Cotton and soybean are among the hosts of *E. obscurus* in southeastern states (Bundy and McPherson 2000).

**Scutelleridae.** Four males of *Stethaulax marmoratus* (Say) were collected in Levy County, Florida (3.7 km SE of Bronson), on 9 June 2012, and a female was taken on the same date at a nearby site in Levy County (6.5 km SE of Bronson). Adults are known from plants of several families, including species of *Juniperus* and *Thuja* (Cupressaceae) and *Rhus* (Anacardiaceae). Nymphs have been collected from *R. copallina* L. and *R. glabra* L. (Walt and McPherson 1972, 1973; McPherson 1982; Tecic and McPherson 2004).



### Discussion

Information on host plants of the three pentatomoid species found on *Ceratiola ericoides* has remained scant, even for the nominate subspecies of the common pentatomid *T. custator*. In harboring nymphs (mostly late instars) of the scutellerids *D. chrysorrhoeus* and *H. proteus* and pentatomid *T. c. custator*, the shrub, thus, meets an important criterion of host status. Only one or two individuals of *H. proteus* were collected in any sample, but adults of *D. chrysorrhoeus* sometimes were numerous on *C. ericoides*. Moreover, *D. chrysorrhoeus* and *T. c. custator* were collected over multiple years and seasons, and mating pairs were observed. All three pentatomoid species were taken almost exclusively on female rosemary plants and appeared not to be associated with *Smilax auriculata*, a vine that grew on rosemary at certain sites. Because many species of Pentatomidae (Panizzi et al. 2000) and Scutelleridae (Javahery et al. 2000) feed on fruits and seeds, the three species found on rosemary might feed similarly. I did not, however, observe feeding in the field. Assuming the bugs are frugivores on rosemary, is their feeding restricted to fleshy fruits, which often are unavailable or scarce when the pentatomoids are present on the plants, or can they feed on the smaller, dry fruits, as do the rhyarochromid bugs found on rosemary (A.G.W., unpubl. data)? Feeding on the shrub's vegetative structures also is possible. Evidence suggests that the occurrence of *D. chrysorrhoeus* and *T. c. custator* on rosemary is not incidental, but additional study is needed to determine whether they can complete their life cycles on rosemary (and, if so, the number of generations) and to clarify the role that this plant might play in the bugs' performance and fitness.

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