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**HANSONIA, A NEW GENUS OF CARDIOCHILINE BRACONIDAE
(HYMENOPTERA) FROM COSTA RICA, WITH NOTES ON ITS BIOLOGY**

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Abstract.—*Hansonia chavarriai* Dangerfield, n. gen, n. sp., is described from specimens reared from the apatelodid moth *Hygrochroa firmiana* (Stoll) in the dry forest of the Guanacaste Conservation Area in northwestern Costa Rica. Its relationship to other cardiochiline genera is discussed, as is the available information concerning its biology.

Key Words: Braconidae, Cardiochilinae, parasitoid, Lepidoptera, Apatelodidae

As part of an inventory of the Lepidoptera larvae and their parasitoids in the tropical dry forest of the Guanacaste Conservation Area in northwestern Costa Rica (Janzen 1984, 1987, 1988, 1993; Gauld and Janzen 1994; Sharkey and Janzen 1995), an unusual cardiochiline braconid wasp species was reared from field-collected apatelodid larvae. Ongoing revisionary studies on the genera of Cardiochilinae by the senior author (including Whitfield and Dangerfield, in press) clarified that this species represents a genus new to science. Studies by two of the other authors had come independently to the same conclusion based on unreared specimens; thus we have combined efforts in this multiauthored report.

Below we provide a description of the new genus and species, along with notes on what is currently known of its biology. The biology of the subfamily as a whole in Costa Rica is reviewed by Shaw (1995); the subfamily Cardiochilinae can be keyed using either Shaw (1995) or Wahl and Shar-

key (1993). Morphological terminology largely follows that used in Huber and Sharkey (1993), except some features of the wing venation, for which the reader is referred to Wharton and Marsh (in press). The descriptions of the new genus and species should be attributed to the senior author.

DESCRIPTION

Hansonia Dangerfield, NEW GENUS

Type Species: *Hansonia chavarriai* Dangerfield, new species.

Generic diagnosis.—Among the world genera of Cardiochilinae, *Hansonia* might be most easily confused with species of *Bohayella* Belokobylskij, *Retusigaster* Dangerfield, Austin and Whitfield and *Brevicardiochiles* Dangerfield, Austin and Whitfield. It resembles *Bohayella* in its unusual elongate first metasomal tergite, but differs in having two apical clypeal tubercles and weakly decurved to straight ovipositor sheaths. From *Retusigaster* and *Brevicar-*

diochiles it differs in having all three of the above mentioned characters. The only other New World cardiochiline genus that possesses similarly short ovipositors and evenly sclerotized hypopygia is *Toxoneuron* Say, from which it differs by the two apical clypeal tubercles, the narrow first metasomal tergite and in the cup-like apical projection of the hind tibia in *Toxoneuron*.

The known distribution of *Hansonia* is from Jalisco, Mexico (based on questionable conspecific material seen by IM), south to Costa Rica.

***Hansonia chavarriai* Dangerfield, NEW SPECIES**

(Figs. 1–4)

Description.—*Body.* Medium-sized, pale yellow with black markings, relatively smooth; evenly infusate wings with yellow venation.

Head. Eyes with reduced pilosity represented as sparse minute interommatidial spines; two clypeal tubercles present; head visible surrounding eyes in anterior view; clypeus 2.4–2.7× as broad as high; face 2.0× as broad as high; eye: temple ratio 1:1.0–1:1.2; malar carina absent; glossa short, weakly bilobed at apex; galea short and broad; maxillary palp six-segmented, the basal segment reduced to a weakly-sclerotized plate; mandible bidentate; occiput 0.25–0.4× as deep as length of head; antennae separated by 0.7–0.85× width of antennal socket; antenna with 48 flagellomeres; scape 1.6–1.7× as long as broad.

Mesosoma. Notauli crenulate, well-defined, meeting posteriorly; medial scutum smooth; scutellar sulcus relatively broad, 1.9–2.7× as broad as long; apical scutellar cup absent; lateral lobes of scutellum smooth; propodeal areola appears complete, but is composed of lateral carinae which do not meet anteriorly but continue to the anterior margin of the propodeum; propodeum without medial longitudinal furrow, but with faint medial longitudinal carina present; epicnemial carina absent.

Legs. Hind tibia with slight apical projection, non cup-like; hind basitarsus slightly flattened basally but mostly cylindrical in cross-section; tarsal claws evenly pectinate.

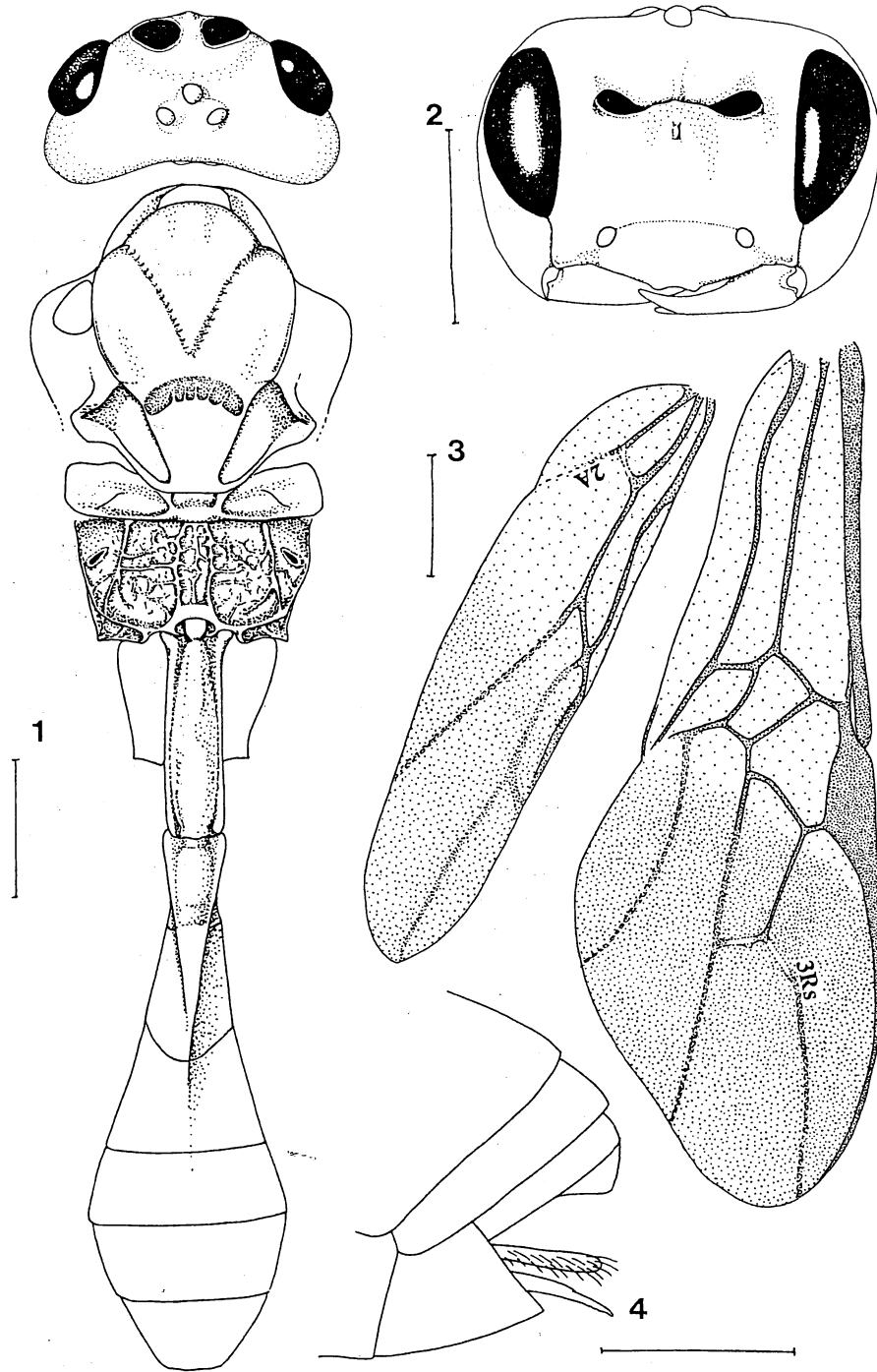
Wings. Fore wing with 1r absent, 3r absent, discal cell elongate, stigma 3.3–4.0× as long as wide, 3Rs with 135° angle 0.2× along length from base; hind wing with 2r-m absent, 2A present in basal one fifth, 7 hamuli present.

Metasoma. T1 3.5–4.0× as long as broad; median field of T2 2.2× as long as broad; laterotergites of T1–T3 at right angles to tergites giving the metasoma an anteriorly compressed or petiolate appearance in dorsal view; ovipositor sheaths evenly setose, 0.18–2.0× as long as hind tibia, 0.25× as broad as long, weakly decurved to straight along length; hypopygium acutely pointed at apex, evenly sclerotised throughout.

Holotype.—**Costa Rica:** 1 female, Guanacaste Province, Guanacaste Conservation Area, Sector Santa Rosa, Rio Cuajiniquil (N10°53', W85°37'), D. H. Janzen and W. Hallwachs, voucher specimen database (93-SRNP-2988) (see "Host" and "Biology" sections below for further information associated with this voucher number). Deposited at INBio, Costa Rica.

Paratypes.—**Costa Rica:** 2 females, Guanacaste Province, Guanacaste Conservation Area, Sector Santa Rosa, Sendero Natural (N10°51', W85°37'), 26 June 1977, Malaise trap, D. H. Janzen; 2 females, Guanacaste Province, Guanacaste Conservation Area, Sector Santa Rosa, Sendero Natural (N10°51', W85°37'), 28 May 1978, Malaise trap, D. H. Janzen; 1 female, Guanacaste Province, Santa Rosa National Park, 300 m, Malaise SE-6-C, Bosque San Emilio, deciduous forest 50 yr. old, 5 July 1986, full shade, I.D. Gauld (University of Wyoming). Deposited at INBio, USNM, BMNH, CNCI.

Host.—*Hansonia chavarriai* has been repeatedly reared from the last instar larvae of *Hygrochroa* (*Apatelodes*) *firmiana* (Stoll) (Apatelodidae).



Figs. 1-4. *Hansonia chavarriai*, female paratype. 1, Dorsal habitus. Anterior head. 3, Fore and hind wings. 4, Lateral view of metasomal apex. Scale lines = 1 mm.

Etymology.—The genus *Hansonia* is named in honor of Paul E. Hanson, Professor of Biology at the University of Costa Rica, in recognition of his intensive and long-term efforts to make the parasitic Hymenoptera of Costa Rica available for study.

Hansonia chavarriai is named in honor of Luis Felipe Chavarría Díaz, in recognition of his diligent pioneering efforts to develop and execute the biodiversity prospecting program for INBio in the Guanacaste Conservation Area.

BIOLOGY

The larva of *Hansonia chavarriai* emerges from the last instar larva of *Hygrochroa* (Apatelodes) *firmiana* (Stoll) (Apatelodidae) as it lies on the surface of the litter, where it has fallen after being killed by the larva of the parasitoid. Death of the host larva occurs many days to weeks after oviposition. Only one parasitoid larva develops per caterpillar. The parasitoid larva burrows into the loose surface leaves of the litter, and spins a golden to light brown ovoid cocoon (5–20 mm long and 7–10 mm diameter). The cocoon silk is lightly attached to the leaves by its glue. The outer wall of the cocoon is a thin, loose and baggy irregular layer around the inner wall of the cocoon. The inner wall of the cocoon is extremely tough, about 2 mm thick, hard and has very obvious shallow ridges (“fluting”) running the length of the hard inner wall of the cocoon. The inside surface of the inner cocoon wall is extremely hard and polished, almost appearing to be gold foil. The inner cocoon is reminiscent of a gigantic *Microplitis* Foerster (Braconidae: Microgastrinae) cocoon in that it is hard, fluted and ovoid.

The dry forest habitat occupied by *Hansonia chavarriai* has a six month rain-free dry season (December–May, Janzen 1993). Wasp larvae emerge from first generation apatelodid larvae toward the end of the first half of the rainy season (July), spin their cocoons, and remain as dormant larvae or

pupae in their cocoons through the remainder of the rainy season, all of the long dry season, and then eclose toward the end of the first month of the next rainy season. This means that they are eclosing about the time that the first generation of their caterpillar hosts are middle- to late-instars (June). *Hygrochroa firmiana* generally has but one generation a year, with the adult moths eclosing at the beginning of the rains (mid- to late May).

All certain rearings of *Hansonia chavarriai* have been from *Hygrochroa firmiana*. Of the 20 *H. firmiana* caterpillars found in the wild in 1978–1995 (from a total of more than 65,000 wild-caught larvae), 85% were parasitized by a single larva of *Hansonia chavarriai*. Nine of these *Hansonia* subsequently were eaten by as yet unidentified perilampid hyperparasitoids and seven died of unknown causes as prepupae or pupae in their cocoons, and the adults are thus unavailable for study. The distinctive cocoon enabled identification of the unemerged material. In two other cases of the total 131 apatelodid caterpillars found (10 species), a large wasp larva that could have been *H. chavarriai* (or *Enicospilus gamezi* Gauld) emerged from another species of apatelodid last instar larva but died without spinning a cocoon.

Hygrochroa firmiana eggs are laid in batches of 5–8 and the early instar larvae feed as a small group until the penultimate and ultimate instars, when they separate and go their own way. The caterpillars are covered with a dense coat of 3–4 mm very fine hairs that may be bright white, lemon yellow, bright lavender or silver gray. Whatever the color-morph of the caterpillar, it is flecked with widely-spaced tiny black dots on the surface of the hairs. Owing to the brightly-colored “fine-haired bottlebrush” appearance of the caterpillars, and their ostentatious behavior of walking around in the daytime on the upper surface of their host plant leaves and branches, it is assumed that they are either chemically toxic (they do not urticate) or Batesian mimics of

similar Megalopygidae caterpillars (which urticate strongly).

Larvae collected as early as the antepenultimate instar have been found to be parasitized by *Hansonia chavarriai* larvae, but it is not known if the wasps also oviposit in later instar larvae. At whatever instar they oviposit, the wasp has to be able to cope with an extremely hairy larva.

The parasitized larva abruptly stops feeding at full size but before it is a prepupa, dies, and falls to the litter. The cream-colored wasp larva emerges through the body wall of the caterpillar 3–5 days later. Were the wasp larva to wait until the caterpillar is a prepupa before killing (consuming) the caterpillar, it would still be emerging into the litter (rather than into a cocoon), because the moth prepupa pupates naked in the litter.

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