J. HYM. RES.
Vol. 13(2), 2004, pp. 228–233

A New Species and Host Association Biology of Neotropical *Compsobraconoides* Quicke (Hymenoptera: Braconidae)

JOSEPH FORTIER AND KENJI NISHIDA

(JF) Department of Biology, Saint Louis University, 2507 Laclede Ave., Saint Louis, MO 63103; email: fortier@slu.edu
(KN) Sistema de Estudios de Posgrado en Biología, Escuela de Biología, Universidad de Costa Rica, 2060 San José, Costa Rica; email: knishida@cariari.ucr.ac.cr

Abstract.—The new species ***Compsobraconoides cinnamomi* Fortier and Nishida** is described from Costa Rica. Specimens were obtained from galls on lower branches of *Cinnamomum cinnamomifolium* (Kunth) Kosterm that were caused by *Camptocheirus* Lacordaire (Coleoptera: Curculionidae). *Compsobraconoides* larvae were observed feeding on *Camptocheirus* larvae in galls.

Resumen.—La nueva especie ***Compsobraconoides cinnamomi* Fortier and Nishida** es descrito para Costa Rica. Especimenes fueron obtenidos de agallas en ramas de árboles de *Cinnamomum cinnamomifolium* (Kunth) Kosterm. Las agallas son inducidas por una especie de *Camptocheirus* Lacordaire (Coleoptera: Curculionidae). Larvas de *C. cinnamomi* fueron observadas alimentándose de larvas de *Camptocheirus* sp. en agallas.

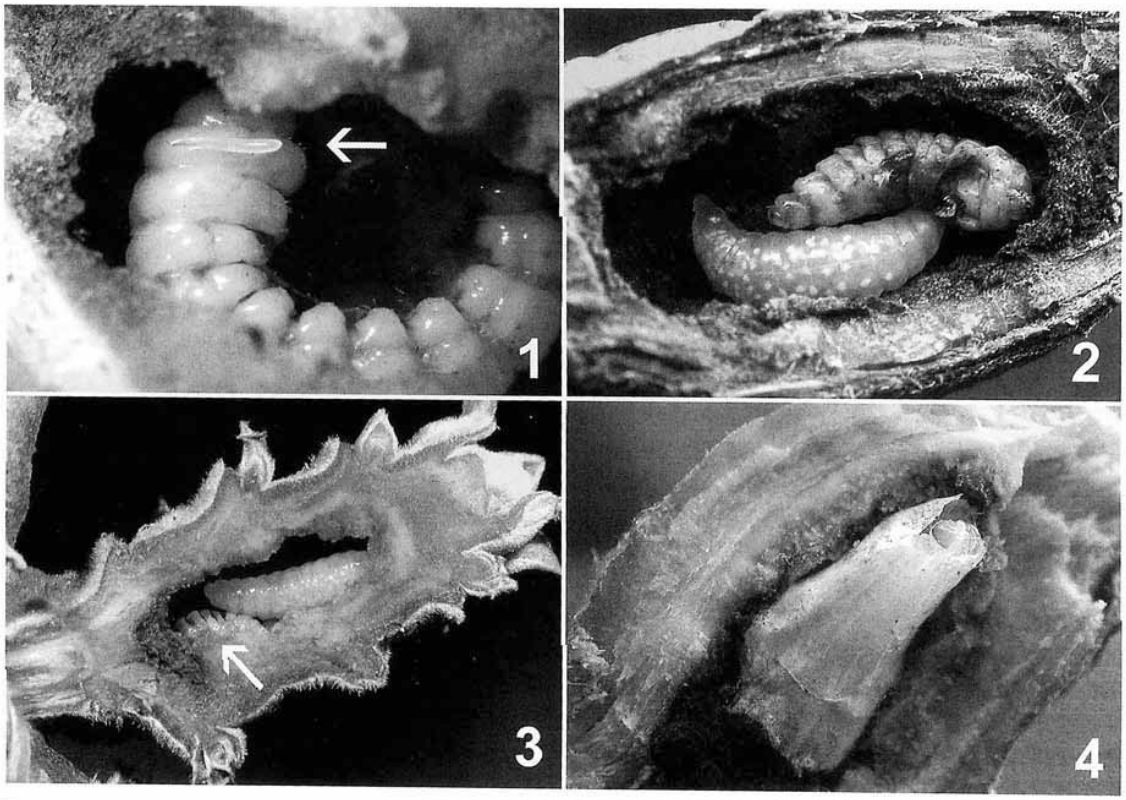
Of the cosmopolitan braconid subfamily Braconinae, which is composed of about 200 genera and 5000 species worldwide (Quicke 1988, Quicke and Sharkey 1989), *Compsobraconoides* Quicke is a moderately large, principally neotropical genus, occurring from the southern U.S. to South America including the Caribbean. The genus was erected by Quicke (Quicke and Sharkey 1989). A new species has been described by Quicke (Quicke and Sharkey 1989), as well as the new combination *Compsobraconoides albispina* (Cameron), formerly *Bracon albispina* Cameron.

Braconine females usually oviposit through substrate containing the host, usually attacking late larval instars. Hosts usually are concealed within living plant tissue, such as tree bark, stems of annual and biennial plants, galls, and seed heads. Some braconines attack casebearing hosts (Shaw and Huddleston 1991). Most braconines are idiobiont ectoparasitoids, and eggs are generally laid on the host's body, although first instar larvae are able to travel short distances to locate their hosts if necessary (Shaw and Huddleston 1991).

Prior to this study, one host record existed for an unidentified *Compsobraconoides* species from three species of *Azteca* ants (Dolichoderinae) colonizing domatia of *Cordia nodosa* Lam. (Boraginaceae) in Peru (Yu & Quicke 1997). This study represents the first host record for a described *Compsobraconoides* species, and the first association of a *Compsobraconoides* species with Coleoptera. Both host associations involve hosts in swollen plant tissue. Since *Azteca* ants do not occur in the United States, while *Compsobraconoides* does, it was obvious that *Compsobraconoides* must have other hosts.

MATERIALS AND METHODS

Galls induced by *Camptocheirus* Lacordaire sp. were collected in August and September, 2000, January, February, and June to August, 2001, and May, June, September, and November, 2002. Collections were made on the campus of the Univer-



Figs. 1–4. Biology of early stages of *Compsobraconoides cinnamomi*. 1, Egg located on third instar host larva (arrow). 2, Late instar *C. cinnamomi* larva feeding. 3, Mature last instar larva in host gall chamber (note arrow showing remaining host cadaver). 4, Pupa *in situ* (note one end of cocoon removed showing head).

sity of Costa Rica (elevation: 1150 m.) in San Pedro, San José, Costa Rica. The habitat on which the university campus is located was considered to be a moist premontane tropical forest (Holdridge 1967). However, it is now a large urbanized part of San José. The surrounding area is therefore highly altered. A few coffee plantations still remain in the area. Identification of *Camptocheirus* was made by C. H. Lyal, The Natural History Museum, London.

Stems with mature galls were collected from lower branches (approximately three to five m. from the ground) of three *Cinnamomum cinnamomifolium* (Kunth) Kosterm (Lauraceae) trees (height: ca. 15 m, tree base diameter ca. 77 to 184 cm) and were carried back to the entomological laboratory of the university (average room temp. 23 to 24 °C). The collected galls (about 120) were split in half longitudinally and observed. The galls were resealed when presented in any stage of the parasitoid (Figs. 1–4), and these were reared in transparent plastic bags.

RESULTS AND DISCUSSION

Two relatively small *Compsobraconoides cinnamomi* larvae (apparently late first or early second instar) were found attached to an immobile mature *Camptocheirus* larva in a gall that was collected on October 29, 2002. On November 2, 2002, only one larva was observed attached to the host larva and it measured ca. 5.5 mm (Fig. 2). The other larva did not survive. Six days later, on November 4, 2002, the *Compsobraconoides* larva appeared to finish feeding on the host, i.e. the larva was not attached to the host larva (Fig. 3). On November 5, 2002, the parasitoid larva began to spin the cocoon in the gall chamber. At

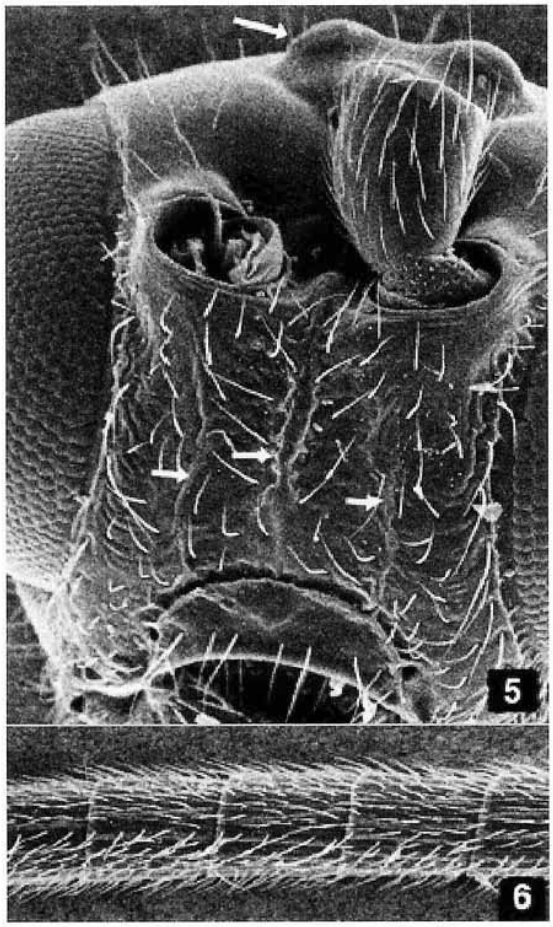
this time, the larva was approximately 6.5 mm long. The larva pupated within a few days; however the pupa did not survive until adult formation. From another rearing record, the pupal stage took approximately 10 days. A more or less recently developed pupa (Fig. 4) was collected on October 29, 2002; and the *Compsobraconoides cinnamomi* adult was flying in the plastic bag on November 6, 2002.

Evidently the adult chews through the hard gall wall in order to emerge from the gall. The gall wall was approximately 4–5 mm thick, fibrous, and relatively hard. A few dead adult *Compsobraconoides cinnamomi* individuals were observed in the gall. The time between the adult emergence and the emergence from the gall may possibly take more than a week since the host adult, *Camptocheirus* sp., takes five to fourteen days to tunnel.

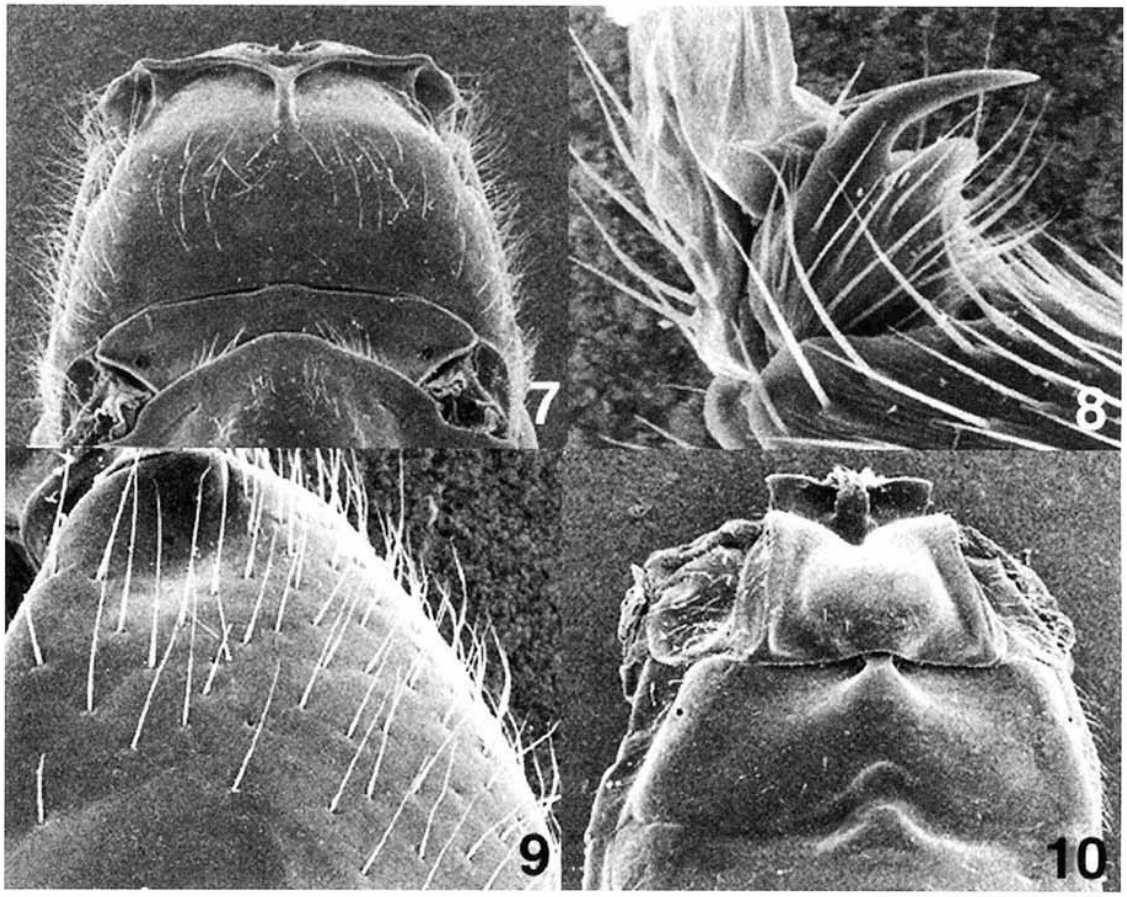
We estimate that approximately 10% of total (120) galls collected contained *Compsobraconoides cinnamomi.* However, fourteen mature galls were collected on May 10, 2003 of which six were parasitized by *C. cinnamomi.*

Compsobraconoides cinnamomi Fortier and Nishida, new species
(Figs 5–11)

Female.—Body color: nearly uniformly honey yellow, head black except for yellow clypeus, labrum, mandibles; mandibular tips black; yellow rim at dorsal eye margin; black antennae except yellow base of first flagellomere; front and middle legs with yellow coxae, trochanters, trochantelli, and tarsi, dark brown or black femora, tibiae brown or black except yellow at basal ends, hind coxae, trochanters and trochantelli honey yellow, hind femora honey yellow, hind tibiae, tarsi dark brown or black; wings dusky, stigma medium brown with white tip at basal margin, veins medium brown basally becoming lighter apically, fore-wing vein r-m unpigmented. Body length: 5.3–7.5 mm. Head: malar space shorter than basal width of mandible and about 0.25 length of eye; oral opening height 0.9 of width, width twice length of malar space, face shiny rugulose, three ridges, two extending from antennae to clypeus, one medial (Fig. 5); 39–43 flagellomeres, all slightly longer than wide (Fig. 6), ocelli small, diameter of postero-lateral ocellus less than ocell-ocular space (Fig. 5); frons nitid, sulcus running from point between anterior bases of antennae to anterior of anterior ocellus, bifurcating into two sulci that each terminate at points ventro-lateral of posterior ocelli; vertex, temples, and occiput nitid; palpus not swollen; mandibular tips overlapping when closed. Mesosoma:



Figs. 5–6. Head characteristics of *Compsobraconoides cinnamomi.* 5, Face. Note top arrow indicating small ocellus. Other arrows indicate facial carinae. 6, Flagellomeres.



Figs. 7–10. Mesothoracic and metathoracic structures and appendages. 7, Propodeum. 8, Hind tarsal claw. 9, Dorsal surface of hind coxa. 10, First and second metasomal tergites.

pronotum nitid, a sulcus on either side of antero-medial ridge running ventro-laterally, terminating at points in antero-lateral areas of pronotum, directly anterior to tegulae, posterior margin on each side of pronotum with a single notch about midway between where pronotum touches tegula and postero-ventral extremity of pronotum; scutum, scutellum nitid, notauli unsculptured, transverse scrobiculate sulcus dividing scutum and scutellum; mesopleuron nitid, broad sulcus running from point near pronotal notch to dorsalmost point of mesopleuron, anterior edge of sulcus carinate; metapleuron, propodeum smooth-punctate with long, silky white setae, median longitudinal carina in apical half or third (Fig. 7). Legs: tarsal claws without pectination but with somewhat pointed basal lobe (Fig. 8), inner spur of hind tibia about 0.5 length of hind basitarsus, hind coxa smooth-punctate with long, silky white setae (Fig. 9). Wings (Fig. 11): second submarginal cell of forewing elongate; 3RSa about 0.65 of 2M; vein r 0.4 length of 3RSa; 1cu-a contiguous with 1M; hindwing RS recurved, not reaching wing margin apically, thus marginal cell open, narrowest apically; 1RSa, 1RSb, r absent, thus RS runs basally to join R at costal cell, R1 ending just before wing apex; sub-basal cell small, M+CU 0.4 of M. Metasoma: all tergites nitid, translucent, 1st metasomal tergite quadrate, lateral flanges extending along lengths of sides of tergite, over spiracles, raised rounded structure in apical half of tergite, increasingly raised over surface of tergite

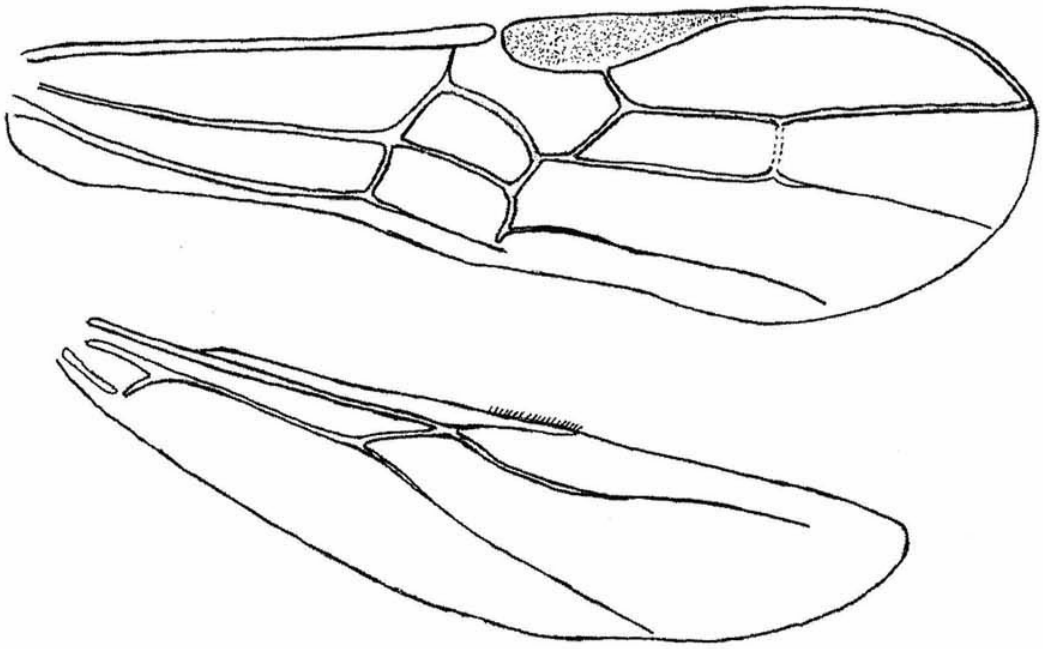


Fig. 11. Wings.

apically, highest point just basal of median point of apex (Fig. 10), 2nd metasomal tergite articulating with first by anteriorly projecting medial process that inserts under apical edge of rounded structure of first tergite, wide medial rounded notch in medial area of apex of 2nd tergite, 3rd tergite evenly convex, 4th and 5th tergites evenly, but more acutely convex, both with wide, shallow tranverse sulcus, 8th abdominal tergite with dark-brown cerci, cerci with long dark setae, setae longer than cercus, each cercus 0.06 mm. Ovipositor: about as long as metasoma, ovipositor sheath black with black setae along entire length.

Male.—Essentially as in female, except humeral plate black medially, in some tegula also black, Body length: 5.3–5.6 mm.

Holotype female.—COSTA RICA: San Jose, San Pedro, UCR campus, 1150 m., 30/V/2002–21/X/2002, ex: larva *Camptocheirus* sp. (Coleoptera: Curculionidae), from gall on *Cinnamomum cinnamomifolium*, K. Nishida. Deposited in USNM.

Paratypes.—COSTA RICA: two females, three males, same data as holotype. One male deposited in USNM. Two females and two males deposited in INBIO.

Distribution.—Known only from type locality in Costa Rica.

Biology.—Idiobiont ectoparasitoid of gall forming *Camptocheirus* sp. (Coleoptera: Curculionidae) on *Cinnamomum cinnamomifolium.*

Host distribution.—Costa Rica; recorded from Central Valley of Heredia (Suarez, 1992) and San José province.

Plant distribution.—*Cinnamomum cinnamomifolium*, formerly known as *Phoebe cinnamomifolia*, commonly occurs from elevations around 600 m up to about 1500 m in both the Pacific and the Atlantic slopes in Costa Rica. This plant species ranges from southern Mexico through Central America and into South America (Burger and van der Werff 1990).

Comments.—This species differs from *Compsobraconoides robustus* Quicke in having a black head, yellow clypeus, labrum,

mandibles, yellow base of first flagellomere, front and middle legs with yellow trochanters (Quicke and Sharkey 1989). It differs from *Compsobraconoides albispina* (Cameron) in having the second metasomal suture strongly arched medially, the head uniformly black, fore- and mid-tibiae yellow at basal ends rather than uniformly piceous, and hind femora entirely honey yellow rather than the apical 0.1 piceous (D. Quicke, personal communication). The host (*Camptocheirus* sp.) is a new species currently being worked on by C. H. Lyal and K. Nishida.

Etymology.—Named after host plant on which this species was found feeding on *Camptocheirus*.

ACKNOWLEDGMENTS

We thank Donald Quicke for help in revising the manuscript, and Scott R. Shaw for coordinating communication between the authors, and forwarding the specimens. We also thank Nancy Galvin for assistance with the scanning electron microscope, David Neeley for use of the Leica 9.5 stereomicroscope with drawing tube used for the wing drawings, and Peter Bernhardt for assistance and advice.

LITERATURE CITED

Burger, W. and H. van der Werff. 1990. Family # 80 Lauraceae, pp. 1–129. In *Fieldiana botany*, new series 23. W. Burger (ed.). Field Museum of Natural History, Chicago; v + 138 pp.

Holdridge, L. R. 1967. *Life zone ecology. Inter-American Institute for Cooperation on Agriculture (IICA).* San Jose, Costa Rica.

Quicke, D. L. J. 1988. Higher classification, biogeography and biology of the Braconinae (Hymenoptera: Braconidae). *In*: Gupta, V. K. (Ed.) *Advances in parasitic Hymenoptera research*: 117–138. Leiden.

Quicke, D. L. J. and M. J. Sharkey. 1989. A key to and notes on the genera of Braconinae (Hymenoptera: Braconidae) from America North of Mexico with descriptions of two new genera and three new species. *Canadian Entomologist* 121: 337–361.

Shaw, M. R. and T. Huddleston. 1991. Classification and biology of braconid wasps (Hymenoptera: Braconidae). *Handbooks for the Identification of British Insects* 7(11): 1–126.

Suarez, E. 1992. Las agallas de las ramas jóvenes de *Cinnamomum cinnamomifolium* (Lauraceae) inducidas por *Prionomerus* (Curculionidae) y su relación con avispas parasitoides y hormigas sucesoras. *Brenesia* 38, 137–145.

Yu, D. W. and D. L. J. Quicke. 1997. *Compsobraconoides* (Braconidae: Braconinae), the first hymenopteran ectoparasitoid of adult *Azteca* ants (Hymenoptera: Formicidae). *Journal of Hymenoptera Reserach* 6: 419–421.