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**A new genus and species of stridulating wasp
from Costa Rica
(Hymenoptera: Sphecidae, Gorytini).**

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Abstract

The new genus and species *Paraphilanthus costaricae* gen. nov. and sp. nov. is described from Costa Rica, and its taxonomic affinities and biogeography discussed. Key words: Sphecidae, neotropical, biogeography.

Zusammenfassung

Eine neue Gattung und Art werden aus Costa Rica beschrieben: *Paraphilanthus costaricae* gen. nov. and sp. nov. Verwandtschaftliche Beziehungen und Biogeographie werden besprochen.

Introduction

This genus, apparently endemic to Central America, is a rare case indeed. At first sight this wasp could easily be mistaken for a species of North American *Philanthus*, on account of its size, colour pattern, gastral constrictions and coarse puncturation; however, it is at once distinguished by its possession of two mid-tibial spurs, whereas all philanthine genera possess but a single one.

Depository abbreviation: BMNH The Natural History Museum, London [British Museum (Natural History)].

Paraphilanthus costaricae gen. nov. and sp. nov.

Description

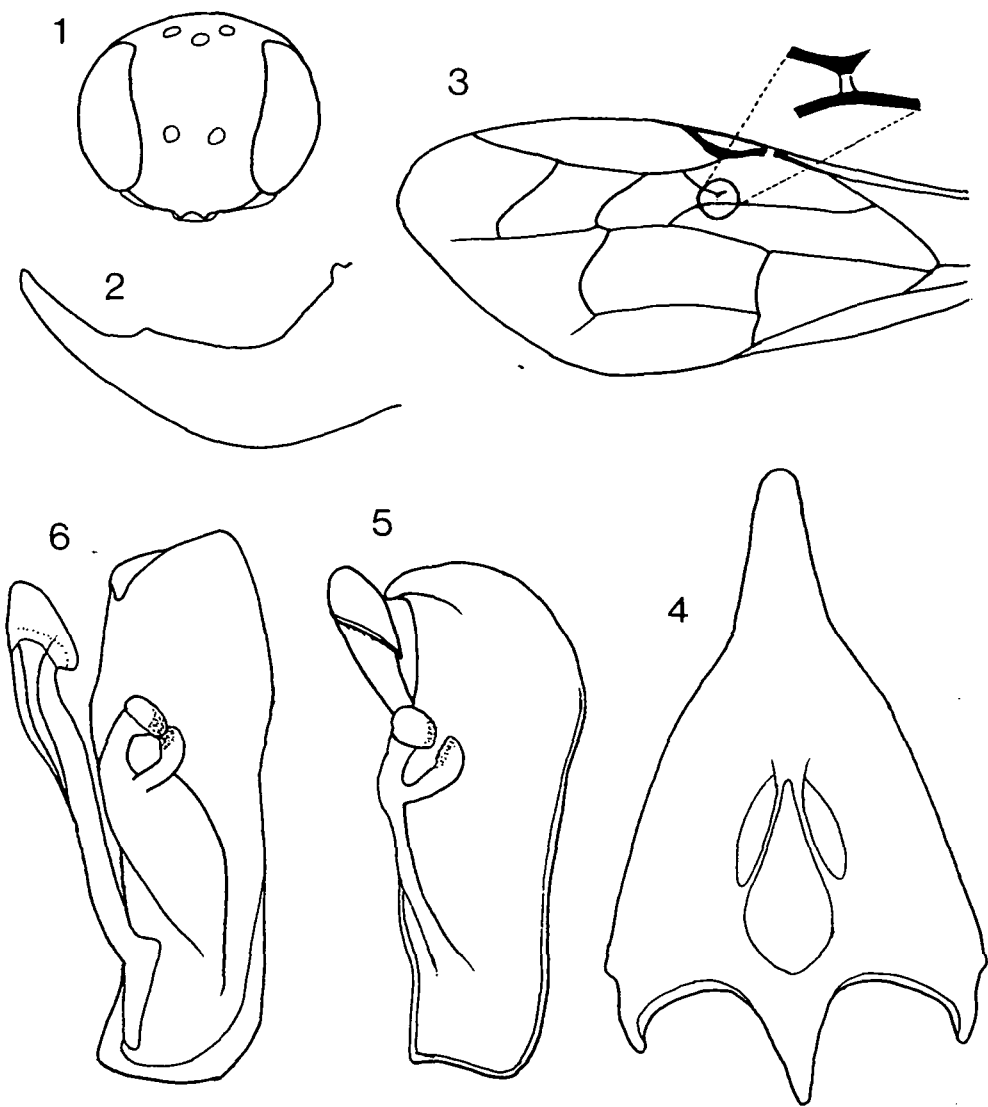
Note. Characters estimated to be of generic value are marked: > ... <.

Male. Body length 11-12 mm, robust. Black; yellow are: most of the lower face including mandible, and most of first 2 antennal segments; a dorsal band on the pronotum, humeral tubercles, a patch on anterior mesopleuron and a small spot below, most of legs, postscutellum, apical bands on all gastral tergites, broadest on first, all broader laterally (all sternites completely black).

> Inner orbits weakly convergent clypead (fig. 1), moderately emarginate above <. A median groove runs from ocellar area to antennal socket area. Antennal segment 3 slightly longer than 4. Flagellum segments, except last 3, with narrow, polished, longitudinal, brown lines beneath. Clypeus with a pair of small teeth centrally. Mandible (fig. 2) with 1 rather small internal tooth, about 1/3 from apex; externally with a weak, concave, obtuse angle near base. Mesoscutum with pair of pre-apical, closely-spaced tubercles, low but transversely sharp-edged. Head and thorax with moderately strong and dense punctures.

> Prescutellar sulcus with imperfect foveae. Mesopleuron with omaulus in the form of a fairly strong carina, with a narrow punctate groove behind; obsolescent well before meeting short, strong acetabular carina; episternal sulcus strong, scrobal sulcus strong but broken, meeting the episternal sulcus at a right angle. Forewing (fig. 3) with radial cell pointed on costa; with 3 submarginal cells <, but the division between first and second is very unusual: vein 1r approaches RS+M very closely then turns sharply outwards, ending in a pigmented point directed anteroproximad; at the angle, 1r is joined to RS+M by a short vein whose centre section is unpigmented, where a wing-fold crosses it. The projection continues unpigmented, and is apparently a vestigial vein running approximately parallel to the wing fold (see also BOHART's fig. 157A of *Clitemnestra chilensis*); indeed, in all the genera belonging to this group (in BOHART 1976: 483, keying out through couplet 2) there is a distinct proximad-directed angle near the posterior end of 1r; > SMC2 receives both recurrent veins < (as in BOHART fig. 157A); > hindwing with jugal lobe about three times as large as tegula, and medial vein diverging well beyond cu-a < (as in BOHART fig. 157A). The radial, all three submarginal and first discoidal cells are all lightly infuscate. > Mid tibia with 2 strong spurs. Metapostnotum < very finely, sparsely punctate, polished, > divided by a strong, median furrow, and falling almost vertically away from postscutellum <; its junction with the propodeum a deep furrow with transverse ribs; propodeum bulging, polished, with few, very coarse punctures; > spiracular groove deep <, foveolate; median and lateral grooves of basal triangle deep. Gaster: > tergites with strong constrictions between <; strongly, densely punctate, and each with a narrow, apical band of short, dense hairs; T.1 with strong lateral carina; basal half of sternite 1 with extremely strong median carina, which is semicircular in profile; S.3 with a broad basal band (slightly narrower centrally) of extremely fine sculpture with prismatic reflections (a stridulatory organ); S.4 also has a basal, transverse band of microsculpture, but it differs in appearance from that on S.3. S. 3-5 with rather short, dense, apical, pale golden fimbriae across most of their width, thinnest on 3; only a small, central tuft on S.6. Whole body with rather short, silvery hair, dense on clypeus. > S. 8 (fig. 4) broadly triangular, gradually tapered to a simple, rounded point <; genitalia as in figs 5,6.

Female unknown.



Figs 1-6 *Paraphilanthus costaricae* gen. nov. & sp. nov.:

- 1, head in face view (x 12); 2, left mandible (x 50);
 3, left fore wing (x 12) with enlarged section (x 50); 4, sternite 8 (x 50);
 5, 6, genitalia right half, ventral view and inner side respectively (x 50).

Comparisons with other genera

Argogorytes. The new genus agrees with *Argogorytes* in all the characters given in BOHART's (1976: 491) diagnosis of the genus, except as follows (*Argogorytes* information in parentheses; but not all characters are necessarily regarded as of generic value here - see description above):

Antenna with narrow, polished tyloidea beneath (similar to those in some *Argogorytes*, although Bohart states of *Argogorytes*, "Male antenna simple, no depressions or polished areas beneath last four articles"*). 3rd antennal segment slightly longer than 4th (the reverse). A median, impressed line runs from anterior ocellus to antennal socket area (absent). Prescutellar sulcus with imperfect fovea (distinctly foveate). Omaulus fairly strong, obsolescent ventrad (strong throughout). Jugal lobe of hindwing about three times as large as tegula (twice). Spiracular groove very strong, deeply foveate, continued dorsad to join groove delimiting propodeal enclosure (deep, broad, but poorly-defined; foveate only between spiracle and propodeal enclosure). Propodeal enclosure with median groove very deep throughout (very fine, deep only just before anterior margin). S.2 in profile slightly elongate but otherwise of usual, shallowly arcuate shape (strongly, angularly elevated posteriorly). S.8 long, narrow, exerted (similar but more strongly so).

*True of only some species; the character occurs in several different forms in *Argogorytes* and is often difficult to see; for example, in *fairmairei*, *fargeii*, *hispanicus*, *mystaceus* (all European), *areatus* (Brazil), and an unnamed species in BMNH (Philippines) tyloidea are present on all flagellar segments except the last four; but in *rufomixtus*, *secernendus* (both Australian), *carbonarius* (New Zealand) and "*nigrifrons*" [possibly misidentified] (USA) tyloidea are present on all segments.

Neogorytes. The differences between the new genus and *Argogorytes* are valid also between it and *Neogorytes*; in addition, *Neogorytes* differs from both genera in that its omaulus is obsolete before reaching the pronotal lobe; the first gastral segment is pedunculate; and the hindwing media diverges very abruptly.

Olgia (*bensoni*). In the middle of the mesonotum (in both sexes) is a single, pointed tubercle reminiscent of the pair in *Paraphilanthus*, but placed more anteriorly than those. This character is not mentioned by DE BEAUMONT (1953).

Various characters of *Paraphilanthus* compared with those of other genera.
(Note only female *Neogorytes* available).

Similar configuration of the inner orbits is found in *Neogorytes* and *Argogorytes*. The mandible has a single, inner tooth also in *Argogorytes*, *Neogorytes*, *Olgia* and *Austrogorytes*. The unusual configuration of the first abscissa of vein 1-r in the forewing in *Paraphilanthus* is found in similar form in *Neogorytes* and most *Austrogorytes*; also in *Argogorytes* *secernendus* (Australian); and is more-or-less similar in other *Argogorytes* species. It is not found in *Olgia*, *Harpactus* (as *Dienoplus* in BOHART - see PULAWSKI 1985), nor *Argogorytes*.

Male sternal fimbriae are found also in many *Austrogorytes*; in *Argogorytes* and *Handlirschia* (the last not represented in BMNH but illustrated by BOHART 1976, fig. 170 C); in the genus *Foxia* (Nyssonini); and in certain Philanthinae e.g. *Philanthus crabroniformis*, but in this last case the fimbriae are more diffuse and not restricted to the apical margins of the sternites.

Since stridulatory organs were found in the new genus, a brief search was carried out in BMNH material for similar organs in genera more-or-less closely related to the new genus. The results were as follows (all the organs are basal on the segments mentioned):

Argogorytes: females of the following species in BMNH have S.3 with a rather broad, transverse stridulatory area and S.4 with a narrower one: *areatus* (Brazil), *nigrifrons* (USA) and three unnamed species from Venezuela, Guyana and Brazil. The male of an unnamed species (Philippines) has a very narrow organ at the base of S.4 (pulled well out); the female has organs at the base of S.3 & S.4. An unnamed female from Hong Kong has organs similar to those of the female from the Philippines. *Austrogorytes frenchii* (Australia) male has a transverse, oval area at the base of S.4. No stridulatory organs were found in *Olgia bensoni* (male) (N Africa) (gaster extended); *Argogorytes fairmairei*, *fargeii*, *hispanicus*, *mystaceus* (both sexes in all cases) (all Palaearctic). Samples of species from the following genera (regarded as being the next most closely related to the new genus) were checked, but no stridulatory organs were found: *Ochleroptera*, *Clitemnestra*, *Harpactus* (in BOHART (1976) as *Dienoplus* - see PULAWSKI 1985), *Hapalomellinus*, *Exeirius*, *Neogorytes*.

It is interesting that stridulatory organs have also recently been found (COOPER 1993 a, b) in both sexes of the gorytin genera *Pterogorytes*, *Ammatomus* and *Tanyoprymnus*; the fourth genus of this closely-related group, *Handlirschia*, probably also possesses this character, but it is not represented in BMNH; although none of the authors who have published on this genus (HANDLIRSCH 1889: 467; KOHL 1896: 425; GESS 1973; BOHART 1976: 508) mention the character, it is easily overlooked.

Discussion

It is evident from the foregoing that *Paraphilanthus* is most closely related to *Argogorytes* and *Neogorytes*; however, it also shares certain unusual characters with other genera within the tribe Gorytini. These characters appear to represent reversals.

The recent recognition of stridulatory organs in this and another group of genera within the tribe indicates the need for an updated, phylogenetic analysis of the group, although it would unacceptably expand the scope of the present paper to do so here. Further indications of this need are that the limits of some genera have become blurred (for example, in BMNH are specimens of undescribed species which are more-or-less intermediate between the two closely-related genera *Ochleroptera* and *Clitemnestra*). Any future analysis should also take into account at least mandibular dentition and occurrence of male sternal fimbriae.

Biogeography

Since its closest relative is *Argogorytes*, which is of world-wide distribution (except that it is still unknown from the Ethiopian region), this genus (like its other close relative *Neogorytes* in the Andes) appears to be a relict. As far as I am aware, it is the only genus of neotropical Hymenoptera endemic to Central America. Dr I.D. GAULD (pers. comm.) knows of no genus of similar status in the very large family Ichneumonidae. Conversely, however, South America (the tropical part as much as the temperate) does have many small genera not found in Central America. This immediately raises

the question, "Where were the ancestors of this new genus before its current habitat in Central America (the most recently-formed part of the Americas) existed?" Since the area is today part of the neotropical region, one might perhaps assume that the genus spread from South America, and that the remainder of the population (perhaps in the Amazon basin) subsequently became extinct. However, it seems more likely that this genus formerly inhabited a southern, climatically near-tropical extreme of North America (in this case, Mexico) before Central America came into existence. It is interesting to compare this situation with that of *Tanyoprymnus moneduloides* (PAK-KARD); this is another monotypic, relict gorytin genus most closely related to the Old-world genus *Ammatomus*. As *Tanyoprymnus* is found in most of low-lying eastern and southern U.S.A. and into Mexico, it may have found refuge in Florida and subsequently radiated from there.

Material

Holotype male. Costa Rica, Guanacaste province, Santa Rosa National Park, 300 m, vi.1984 (JANZEN & HALLWACHS) (Instituto Nacional de Biodiversidad, Costa Rica).

Paratypes. 2 males, Guanacaste province, Barra Honda National Park, 200 m, dry forest, v.1988 [Malaise trap] (GAULD & MITCHELL) (BMNH & National Museum of Natural History, Washington D.C.).

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