

**SYNONYMY OF SUBAESCHNA MARTIN, 1908  
WITH GYNACANTHA RAMBUR, 1842,  
AND A NEW SPECIES OF GYNACANTHA FROM PERU  
(ANISOPTERA, AESHNIDAE)**

D.R. PAULSON<sup>1</sup> and N. VON ELLENRIEDER<sup>2</sup>

<sup>1</sup> Slater Museum of Natural History, University of Puget Sound, Tacoma, WA 98416, United States  
e-mail: dpaulson@ups.edu

<sup>2</sup> Aquatic Bioassessment Laboratory, 2005 Nimbus Road, Rancho Cordova,  
CA 95670, United States  
e-mail: odo\_nata@hotmail.com

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*Subaeschna* Martin, 1908, is synonymized with *Gynacantha* Rambur, 1842, and its only sp., *S. francesca* Martin, 1909, becomes *Gynacantha francesca* (Martin). *G. bartai* sp. n. is described from 5 specimens (holotype ♂ and allotype ♀; Peru, Madre de Dios, Explorer's Inn; deposited in the NMNH, Washington, DC, USA) from southern Peru. It is characterized by very small size, unmarked thorax, straight cerci, and abdomen constricted in ♂ and unconstricted in ♀.

## INTRODUCTION

Discovery of a small brown species of *Gynacantha*, apparently undescribed, from southern Peru prompted us to examine specimens of all the small New World species of *Gynacantha* as well as other small neotropical aeshnids. The information in WILLIAMSON (1923) and the collections of R.W. Garrison and D.R. Paulson were sufficient for us to carry out this analysis. We have made no comparisons with the 65 nominal species of *Gynacantha* in the Old World (21 in Africa, 35 in Asia, and 9 in Australia, New Guinea, and Pacific islands), as there is no indication the two hemispheres have any species in common.

## STATUS OF SUBAESCHNA

The only other neotropical aeshnid that seems closely related to *Gynacantha* because

of its venation and the two-spined prolonged process on sternum 10 is the monotypic genus *Subaeschna* Martin, 1908 (VON ELLENRIEDER, 2002). When *S. francesca* was described (MARTIN, 1909), none of the very small species of *Gynacantha* was known, and *francesca* stood apart from the remainder of that genus. However, similarities among *francesca* and the smallest species of *Gynacantha* make it clear that *francesca* does not differ from these others in any characters significant at the generic level.

Characters named by MARTIN (1908, 1909) as diagnostic of *Subaeschna* are as follows: (1) wings long and very narrow, with open venation; (2) discoidal triangles narrow and elongate, of 5-6 cells; (3) median space free, submedian space with 7 and supratriangle with 4 crossveins; (4) subnodal sector bifurcate before pterostigma; (5) supplementary sector curved below, maximum 3 rows of cells between it and the subnodal; and (6) membranule rudimentary, not extending the length of the anal margin. The female was not known at the time of the description.

All of these characters are shared by one or more species of *Gynacantha*, and *francesca* lacks any difference from the small species of *Gynacantha* that could be regarded as generic. Its very small size is shared with *G. laticeps* and the new species described below; the extremely wide semicircular male auricles and marked constriction of abdominal segment 3 are shared with *G. auricularis* Martin, *G. caudata* Karsch, and *G. tenuis* Martin; the narrow wings are shared with *G. tibiata* Karsch; the character of R<sub>sp</sub>l separated from R<sub>s</sub> by only 3 rows of cells is shared with *G. caudata*, *G. laticeps*, *G. tenuis* and the new species; the character of hindwing supratriangle shorter than median space is shared with *G. caudata* and *G. laticeps*; and the anal loop with very few cells is shared with the new species (4-5 in *francesca*, 5-8 in the new species).

MARTIN's (1909) drawing shows metepimeral stripes that are very sinuous, differing from any American *Gynacantha*. Examination of our specimens with these stripes preserved shows they are in fact straight rather than sinuous and look much like the similar stripes on *G. klagesi*.

We thus consider *Subaeschna* Martin, 1908 a new junior synonym of *Gynacantha*, with *Gynacantha francesca* (Martin, 1909), new combination.

#### A NEW SPECIES FROM SOUTHEASTERN PERU

Explorer's Inn is an ecotourism lodge and nature preserve, part of the Tambopata National Reserve along the Río Tambopata near Puerto Maldonado, Madre de Dios, Peru. The Río Tambopata is a tributary of the Río Madre de Dios, which flows into the Río Marañón, which flows into the Amazon. The Tambopata region is thus at the upper edge of the Amazon basin, a zone known for its extremely high biodiversity. Indeed, more species of Odonata are known to occur at Explorer's Inn than anywhere else in the world (PAULSON, 1983). At present, the list of species totals 186 (D.R. Paulson, unpubl.) and includes 10 species of *Gynacantha*, two of them apparently undescribed. One of those species is described here.

## GYNACANTHA BARTAI SP. NOV.

## Figures 1-12

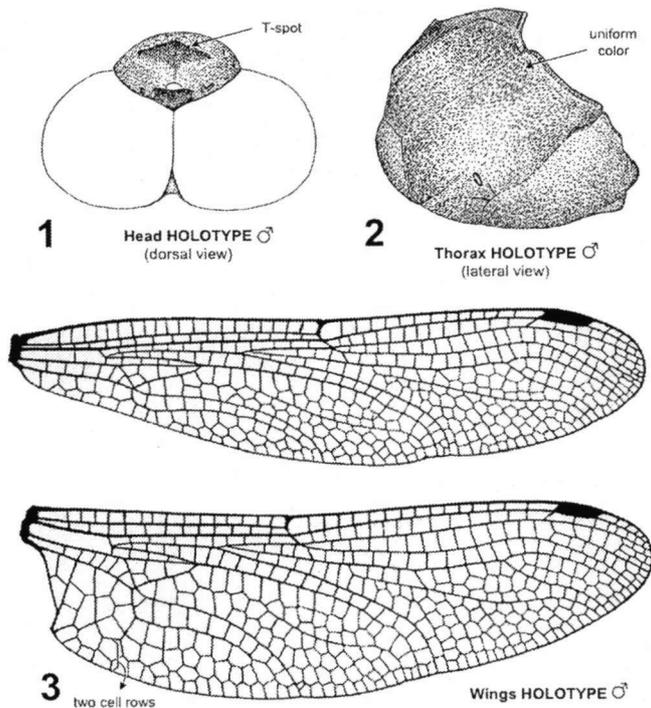
**Material** (all from Explorer's Inn, Tambopata Reserve, 39 km SW Puerto Maldonado, Madre de Dios, Peru (12°50'18" S, 69°17'59"W). — **Holotype** ♂: 1-IV-1982, J.M. Patt leg. — **Allotype** ♀: 7-VII-2002, D. Bárta leg. Both in National Museum of Natural History, Washington, D.C. — **Paratypes** ♀: 28-VI-1979, M. Perkins and P. Donahue leg. (No. 1, to International Odonata Research Institute, Gainesville, Florida); ♀: 10-VII-2002, D. Bárta leg. (No. 2, in University of Michigan Museum of Zoology, Ann Arbor, Michigan); ♀: 14-VII-2002, D.R. Paulson & N. Smith leg. (No. 3, in D.R. Paulson collection).

**Etymology**. — The species is named after Daniel B á r t a, a Czech musician and dragonfly photographer who accompanied DRP to Explorer's Inn in 2002, pointed out this interesting species, and wielded a long-handled net with sufficient skill to catch two of the three specimens taken on that visit.

**MALE (holotype)**. — **Head**. — Light brown; T-spot indicated as blackish diamond wider than long on postfrons, stem so fine as to be almost undetectable (Fig. 1).

**Thorax**. — Prothorax and pterothorax medium brown (Fig. 2). Legs orange, femur 1 dark brown distally, tarsus brown, spines black. Wings (Fig. 3) clear, pterostigmata light brown.

**Abdomen**. — Anterior half of segment 1 brown, posterior half pale green; remain-

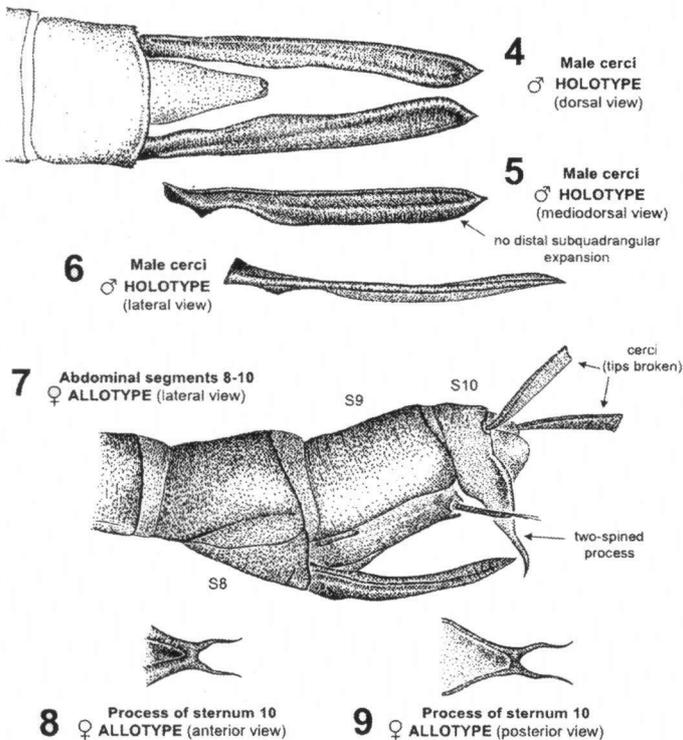


Figs 1-3. *Gynacantha bartai* sp. n.: (1) head; — (2) pterothorax; — (3) right wings — [Figures not to scale].

der of abdomen dark brown, paler beneath, with pale markings as follows: greenish on side of segment 2 anterior to transverse carina, also base of auricle; segment 2 mottled light brown and green on posterior half; pale brown triangles with greenish tinge, wider than long, just posterior to transverse carina on segments 4-8; appendages (Figs 4-6) almost black. See Figures 10-11 for structural details of genital fossa.

**FEMALE (allotype).** — Head, thorax, and abdomen entirely medium brown (in life eyes brown with pale green along posterodorsal rim, faint green wash overlying much of thorax, dull pale green on posterior half of segment 1 and dorsally at base of segments 2 and 3); T-spot and legs as in holotype. Pale triangles on abdomen faintly indicated on segments 3-8 (barely visible in life). Wings infumated with brown, pigment concentrated along veins; pterostigma as in male. See Figures 7-9 for structural details of two-spined process.

**WING VENATION (holotype, allotype, and 3 paratypes in order, including left-right variation).** — Forewing antenodals 18-20, 19-20, 18, 18, 20; hindwing antenodals 13-15, 15-16, 13-14, 13, 15-16; forewing postnodals 12-13, 12-14, 12, 11, 12-13; hindwing postnodals 13-15, 14, 14-15, 12-13, 14-15; forewing triangle cells 5, 5, 6, 5, 5;



Figs 4-9. *Gynacantha bartai* sp. n.: (4-6) male cerci; — (7) female abdominal tip; — (8-9) female process of sternum 10 — [Figures not to scale].

hindwing triangle cells 4, 4, 4-5, 4, 5; forewing supratriangle crossveins 3-4, 4, 5, 3-4, 5; hindwing supratriangle crossveins 3, 4, 4, 3, 4; anal loop cells 5, 5-6, 7, 6, 8. See Figure 3 for complete venation of male holotype.

**Measurements** (in mm; variation in paratype females indicated after allotype). — Total length ♂ 47, ♀ 47 (45); abdomen (excluding cerci) ♂ 35, ♀ 35 (34); cerci ♂ 4.2; hindwing ♂ 32, ♀ 33 (32-33); hindwing pterostigma ♂ 2.3, ♀ 2.3 (2.3-2.7).

## DISCUSSION

Although no mating pairs have been taken, we associate the male and the four females because of their many similarities.

*Gynacantha bartai* sp. n. with hindwing 32-33 mm, is best compared with the other small neotropical *Gynacantha* species with hindwing less than 40 mm: *G. adela* (38-43), *G. chelifera* (37), *G. convergens* (38-41.5), *G. francesca* (36-38), *G. laticeps* (32-37), and *G. tenuis* (38-46). Within that group it is the smallest species, fractionally smaller than *G. laticeps* and *G. francesca*, and because all three are distinctly smaller than the next smallest species, the latter two species are the only ones with which it might be confused. We know of no Old World species smaller than *bartai*, so it is presumably the smallest species in this large genus and one of the smallest of its family.

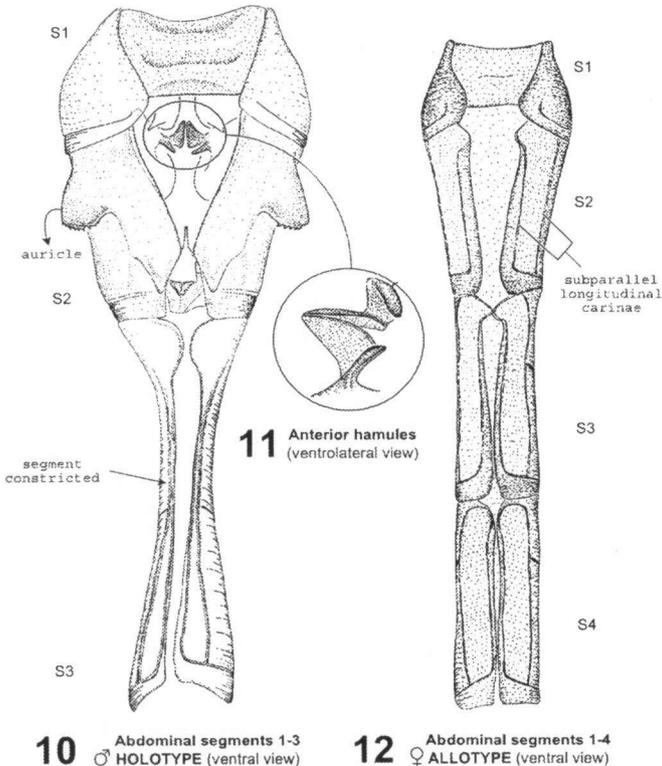
*G. bartai* differs from *G. caudata*, *G. tenuis* and *G. francesca* in thoracic color pattern (uniform in *bartai*, Fig. 2, patterned in the others) and in the number of cell rows between the hindwing margin and the anal loop (two in *G. bartai*, Fig. 3, one in the others). It differs from *G. adela* and *G. convergens* (with which it shares thoracic color and number of cells between the wing margin and the anal loop) in males by the auricles (Fig. 10) in lateral view extending beyond the level of the transverse carina at mid height, and in females by the longitudinal carinae on segment 2 subparallel (Fig. 12).

In addition to its small size, *G. bartai* also shares with *G. laticeps* an unpatterned thorax and the presence of two cell rows between the anal margin of the wing and the anal loop. Males of these two species differ in the third abdominal segment, unconstricted in *G. laticeps* and more strongly constricted in *G. bartai* (Fig. 10), and shape of cerci, with a distal subquadrangular expansion in *G. laticeps* lacking in *G. bartai* (Figs 4-5). Females of *G. bartai* and *G. laticeps* both have a relatively unconstricted abdomen base, with subparallel longitudinal carinae on segment 2 (Fig. 12), but can be distinguished because on segments 2-3 the dorsal carinae are no better defined than the ventral carinae in *G. laticeps* and much stronger than the ventral carinae in *G. bartai*. In addition, the legs are uniformly pale in *G. laticeps* but with darker tarsi in *G. bartai*. Both sexes of *G. francesca* have a strongly constricted abdomen base and darker legs than the other two small species, especially at the femur-tibia joint.

*G. bartai* is known only from Explorer's Inn; most specimens were taken at the lodge, but one was collected within mature forest 4 km from the lodge on the main trail to Cococochoa. The habitat is a mixture of terra firme and swamp forest, with rivers, small streams, and permanent and seasonal swamps. The specimens collected in 2002 were

all taken in late afternoon (16:30-16:50 h) on both sunny and cloudy days while flying over the lodge clearing near the forest edge. Forest trees blocked direct sunlight, but the lighting was daylight rather than dusk. Several other females, easily recognized by their size and shape and entirely brown wings, were seen but not captured. All flew back and forth about 3-5 m above the ground and remained on a regular beat in a circumscribed area no more than 10 m across. One hung up twice in the open under a 4-cm thick tree branch, then flew again. They were seen almost daily from 7-14 July but not any other afternoons from 15-30 July. The dusk flight of *Gynacantha* and *Triacanthagyna* diminished during that period as well, with no apparent cause. We have seen no other species of *Gynacantha* foraging in the open so long before dusk. At Explorer's Inn, dusk came at about 18:00 h and was accompanied by a movement of dusk-flying aeshnids that included at least *Gynacantha litoralis* Williamson, *G. membranalis* Karsch, *G. mexicana* Selys, *G. nervosa* Rambur, *Neuraeschna calverti* Kimmins, *Triacanthagyna satyrus* (Martin), and *T. septima* (Selys).

*G. bartai* was collected from 1 April to 14 July, its known flight period falling with-



Figs 10-12. *Gynacantha bartai* sp. n.: (10) male abdominal segments 1-3; — (11) male anterior hamules; — (12) female abdominal segments 1-4 — [(Figures not to scale)].

in the dry season, which lasts on average from April through September. This species, like some other members of its genus, may be present year-round, mating late in the dry season and ovipositing just before or just after the rains begin. The larvae are expected to develop through the rainy season and emerge toward its end, then spend the dry season as adults. Of the specimens examined, the April male has unpigmented wings, the June female moderately pigmented wings, and the three July females heavily pigmented wings, considered a sign of advancing age in aeshnids (CORBET, 1999).

The description of a new species and the inclusion of *francesca* in *Gynacantha* brings the total species number for that genus to 88, by far the most diverse genus of its family. The 10 species known from Explorer's Inn surely represent the greatest intrageneric diversity of any aeshnid genus at a single locality, and this emphasizes our frustration at how little we know about the biology of most of these species. The larva has been described for only four of these 10 species, *G. gracilis* (Burmeister) (SANTOS, 1973), *G. membranalis* Karsch (SANTOS et al., 1987), *G. mexicana* Selys (CARVALHO & FERREIRA, 1989), and *G. nervosa* (WILLIAMS, 1937), and for only *G. nervosa* is something known of the life history (WILLIAMS, 1937; PAULSON, 1999). The larva of *G. membranalis* is known to inhabit tree holes in Panama (FINCKE, 1992) and presumably does so in Peru. Much more field work is needed to enhance our increasing knowledge of the alpha taxonomy of neotropical Odonata.

#### ACKNOWLEDGEMENTS

We thank the many visitors to Explorer's Inn who were willing to wield a dragonfly net to aid in the documentation of its megadiverse odonate fauna, and our thanks extend especially to DAN BÁRTA, who helped acquire the type series. All of this dragonfly collecting would not have been possible without the foresight and generosity of MAX GUNTHER, the owner of Explorer's Inn. Finally, we thank ROSSER GARRISON for his unhesitating willingness to help with all matters taxonomic.

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