

Table 2. (continued)

| Setae<br>or pores | Position | Setae<br>or pores | Position |
|-------------------|----------|-------------------|----------|
| FE9               | AV       |                   |          |
| FE10              | AVPr     |                   |          |
| FEa               | *P       |                   |          |
| FEb               | *APr     |                   |          |

Table 3. Differences in the character states of primary setae and pores on larval legs of selected genera of Nearctic Hydroporinae; (0) plesiotypic state, (1) apotypic state, (a) *Laccornis*, (b) *Desmopachria*, (c) *Liodessus*, (d) *Hydroporus s. str.*, (e) *Hydroporus (oblitus group)*, (f) *Hydroporus (Neoporus)*, (g) *Hygrotus*, (h) *Potamonectes*.

| Character states  | a | b | c | d | e | f | g | h |
|-------------------|---|---|---|---|---|---|---|---|
| 1- CO12 spiniform | 0 |   | 0 | 0 | 0 | 0 | 0 | 0 |
| CO12 setiform     |   | 1 |   |   |   |   |   |   |
| 2- TI7 spiniform  | 0 |   | 0 | 0 | 0 | 0 | 0 | 0 |
| TI7 setiform      |   | 1 |   |   |   |   |   |   |
| 3 TR2 present     | 0 |   |   | 0 | 0 | 0 |   |   |
| TR2 absent        | 1 | 1 |   | 1 | 1 |   |   |   |
| 4- FEa present    |   |   |   | 0 | 0 | 0 | 0 | 0 |
| FEa absent        | 1 | 1 | 1 |   |   |   |   |   |
| 5 setae simple    | 0 |   |   |   |   |   |   | 0 |
| setae compound    | 1 | 1 | 1 | 1 | 1 | 1 |   |   |

Table 3 summarizes the differences in the character states for the primary chaetotaxal pattern among genera of the Hydroporinae studied. Character states are presented here as plesiomorphic and apomorphic to underline apparent evolutionary tendencies, but these should be considered first order hypotheses. Because of the large number of genera in this subfamily, a comprehensive treatment should incorporate a larger number of species of a variety of genera and a larger number of characters.

The presence or absence of seta TR2 represents an interesting diagnostic character. Nilsson (1988) noticed that this seta is absent from the legs of *Bidessini* (*Bidessus* Sharp, *Yola* Des Gozis), *Hydrovatus* Motschulsky, *Hyphydrus* Illiger, and *Hygrotus* Stephens. If the absence of this seta from the legs of species of Nearctic representatives of *Hygrotus* is consistent with Nilsson's data, it is interesting to include in the group of hydroporine genera without TR2 some



strictly Nearctic lineages such as *Desmopachria* and *Liodesus*, and the subgenus *Neoporus* (*Hydroporus*). The absence of TR2 from the trochanter of third instar larvae of *Hydroporus* (*Neoporus*) *carolinus* (unpublish. data) reinforces the hypothesis that this seta is absent from all the species of *Neoporus*. Considering that until now a generic distinction among Nearctic *Hygrotus* and *Hydroporus* based on larval characters was not possible (Watts, 1970; Matta, 1983), it is noteworthy that, except for the subgenus *Neoporus*, the first instar larva of all the *Hydroporus* species studied can be discriminated from the first instar larva of the species of *Hygrotus* by the presence of this seta.

Larvae of *Desmopachria convexa* deviate farthest from the ancestral pattern. The setiform aspect of seta TI7 associated with the absence of seta TR2 and pore FEa is similar to that described for larvae of *Hyphydrus* species studied by De Marzo (1977) and Nilsson (1988). The similarities in the basal pattern of both genera are interesting given that Young (1980) and Biström (1982) have suggested that *Desmopachria* and its relatives should be removed from Hyphyrini and placed in a distinct tribe.

The only fundamental difference between the basal pattern proposed herein and that of Nilsson (1988) is incorporation of pore FEa (as defined in this paper) into the ancestral system of larvae of Hydroporinae. Two different hypotheses may be examined with respect to this pore. Hypothesis 1 is that the pore is part of the ancestral system of larvae of Dytiscidae and also of Hydroporinae since it seems homologous to the pore found in most larvae of Hydroporinae as well as in larval Carabidae (Bousquet and Goulet, 1984), Amphizoidae, and Hygrobiidae. There are certainly various interpretations of Adephagan phylogeny but if we accept the idea that Dytiscidae have evolved from a terrestrial carabid ancestor (Hammond, 1979; Ward, 1979; Nichols, 1985), and, even if this is more contested, that Trachypachidae, Dytiscidae, Amphizoidae, Hygrobiidae, and Noteridae could represent a monophyletic unit (Beutel and Roughley, 1988), it seems reasonable to accept pore FEa of the Hydroporinae as ancestral. Based on immature characters, the work of Ruhnau (1986) reinforces this hypothesis since he has shown that Amphizoidae, Hygrobiidae, and Dytiscidae share numerous striking synapomorphies. As a result, hypothesis 1 suggests that pore FEa was independently lost from Noteridae, as well as from *Laccornis*, *Liodesus*, and *Desmopachria*.

Hypothesis 2 is that pore FEa is not part of the ancestral pattern of either Hydroporinae or Dytiscidae. This appears to be the premise of Nilsson (1988) which is supported by the absence of this primary pore in first instar larvae of Haliplidae, Noteridae, and Gyrinidae and by the phylogenetic hypothesis that Noteridae are the sister-group of Dytiscidae (Kavanaugh, 1986). Such a viewpoint suggests thus that the presence of this pore in exactly the same position by larvae of independent families of Adephaga [as well as in most Dytiscidae (Nilsson, 1988)] could result from independent gains.

From both hypotheses, hypothesis 1 appears more acceptable since it seems more logical that pore FEa was lost independently rather than gained independently. In the light of this hypothesis, *Potamonectes griseostriatus* stands out as the species deviating least from the ancestral system proposed for the Hydroporinae. Nilsson (1988) has emphasized that the Holarctic *Laccornis oblongus* Stephens should present the most plesiomorphic condition within Hydroporinae and this is in accord with the previous conclusion of Wolfe (1985). The pattern of primary setae and pores of *Laccornis latens* could also be used as an argument to consider that FEa is an additional rather than an ancestral pore. In order to solve this apparent contradiction, additional larval characters are needed. A



study of the primary setae and pores of other structures such as those of the last abdominal segment and the urogomphi may assist in resolving this controversy.

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# REVISION OF THE GENUS *QUEDA* SHARP (COLEOPTERA: DYTISCIDAE)<sup>1</sup>

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## ABSTRACT

*This revision of the genus Queda Sharp, 1882 (occurring in Central and South America) is based on examination of adult specimens. The systematic position of the genus is briefly reviewed. Structural features of adults are described and figured. Q. youngi n.sp. is described from Panama, Venezuela and Brazil. A lectotype is designated for Q. compressa Sharp and Q. hydrovatoides Zimmermann.*

## INTRODUCTION

This revision is a part of a larger taxonomic study of members of the dytiscid tribe Hydrovatini of the subfamily Hydroporinae. Examination of material of the genus *Queda* revealed an undescribed species and additionally it was discovered that no lectotype designations were made for the two previously recognized species. Thus an evaluation of the present taxonomy of *Queda* Sharp is justified.

Few authors have discussed the systematics of the genus *Queda*. The genus was introduced by Sharp (1882), with only one species, *Q. compressa* Sharp. The genus *Queda* was assigned to Hydrovatini, a tribe which includes only two genera: *Queda* and *Hydrovatus* Motschulsky. According to Sharp (1882) adult members of this tribe are distinguished from other hydroporines by having the posterior coxal cavities widely separated, each with an elongate coxal excision, and extra rimal lobe. Since Sharp, few studies have been published, that deal with classification of *Queda*. Zimmermann (1921) introduced a second species. A phylogenetic investigation of some plesiomorphic hydroporines by Wolfe (1988) considered also the position of Hydrovatini and the two genera attributed to it. He concluded that *Hydrovatus* and the tribe Methlini could form a monophyletic unit, and that assignment of *Queda* to Hydrovatini may be uncertain (*cf.* also Wolfe 1985). With present state of knowledge, *Queda* could still be monophyletic, exhibiting characteristics not found in other Hydrovatini. I am, however, not able to decide if these character states are apomorphies or plesiomorphies - only that these characteristics distinguish *Queda* from the genus *Hydrovatus*.

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<sup>1</sup>Contribution to the study of Dytiscidae 51.



## MATERIAL AND METHODS

The material (in all 27 specimens) for the present study came from a number of collections abbreviated in the text as follows:

|      |   |
|------|---|
| BMNH | British Museum (Natural History), Cromwell Road, London, England (dr. Martin Brendell)      |
| CY   | Coll. Young, Indiana Univ., Dept. Biology, Bloomington, Indiana, USA (Prof. Frank N. Young) |
| MNHN | Museum National d'Histoire Naturelle, Rue de Buffon 45, Paris, France (Mlle Hélène Perrin)  |
| MZH  | Zoological Museum, University of Helsinki, N. Järnvägsg. 13, Helsingfors, Finland           |
| ZSM  | Zoologische Staatssammlung, Münchhausenstr. 21, München, FRG (dr. Gerhard Scherer)          |

The methods for examination of material and presentation of literature follow the same format as Biström (1982). Illustrations of genitalia are made with the technique explained in Biström (1988).

## TAXONOMY

### *Queda* Sharp

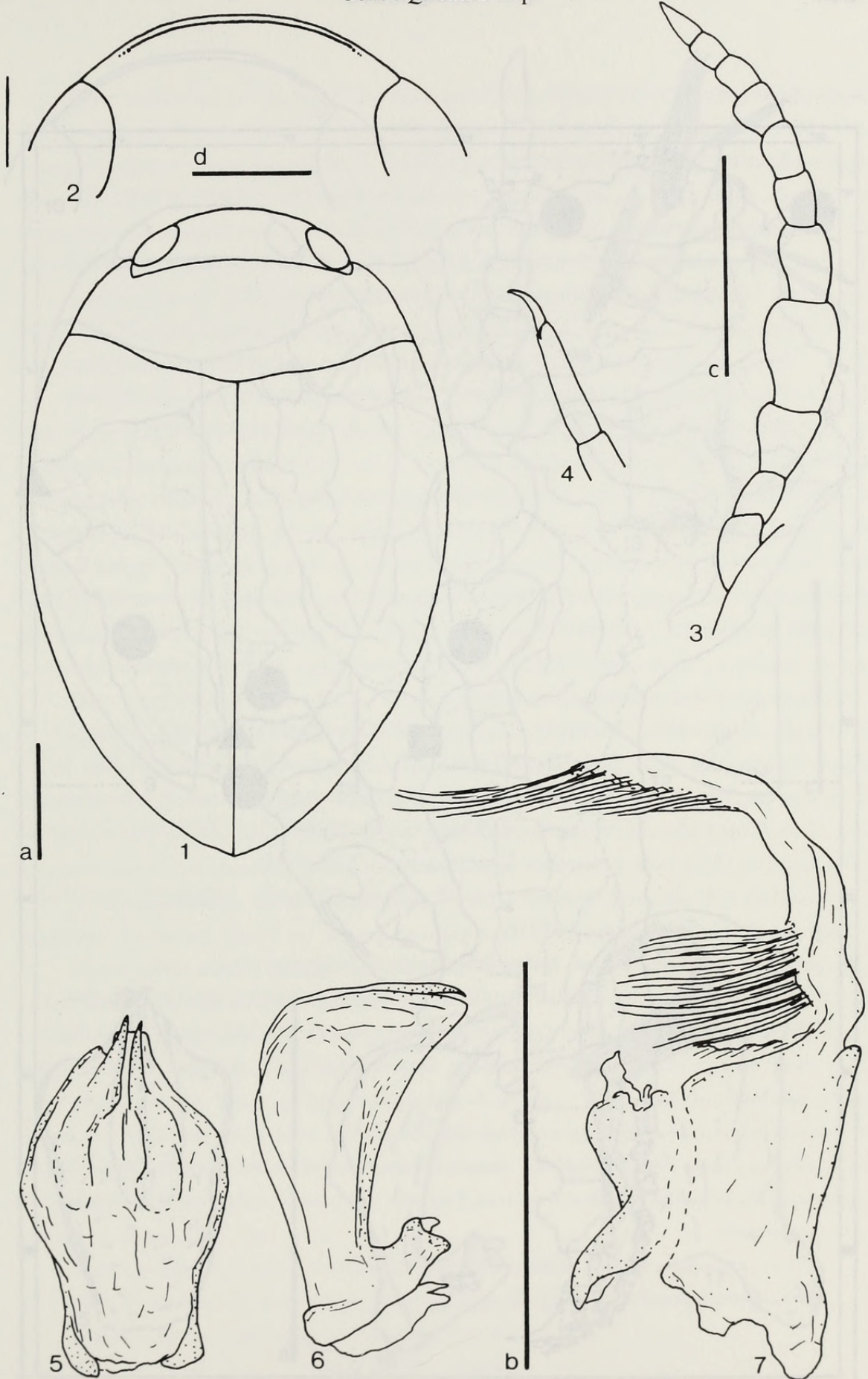
*Queda* Sharp 1882:320, 336, 849; Zimmermann 1919:126; 1920:36; Blackwelder 1944:75; Omer-Cooper 1965:93; Wolfe 1988:327-344. Type species: *Queda compressa* Sharp, 1882 by monotypy.

*Diagnosis of Hydrovatini and Queda*.—Hydroporines with base of trochanter partially concealed by apicolateral portion of metacoxal process, pronotum without longitudinal, lateral impressed lines, metatarsal claws, equal, prosternal process with apex broad, subtriangular or spatulate, mesocoxae widely separated, metacoxal process with posterior margin incised are assigned to Hydrovatini. Adult specimens of *Queda* are distinguished from these of *Hydrovatus* by form of the metacoxal excision, which in members of *Queda* are shorter in the longitudinal than in the transverse direction (Fig. 13, 21). Additionally, only the fringes of labrum are visible (in *Hydrovatus* labrum visibly exerted), and the body apically is not acuminate, as are most *Hydrovatus* species, and finally members of *Queda* always lack a stridulatory apparatus on ventral side of body (in males of some *Hydrovatus* species a distinct stridulatory apparatus visible on ventral side of body).

*Queda* is restricted geographically to Central and South America.

The natural history of *Queda* is unknown.





Figs. 1–7. *Queda compressa* Sharp. 1, habitus; 2, head; 3, male antenna; 4, apex of male metatarsus; 5, penis, dorsal view; 6, penis, lateral view; 7, paramere. Scale bars: Figs. 1 (a), 5–7 (b) = 1.0 mm; Figs. 2 (d), 3, 4 (c) = 0.5 mm.

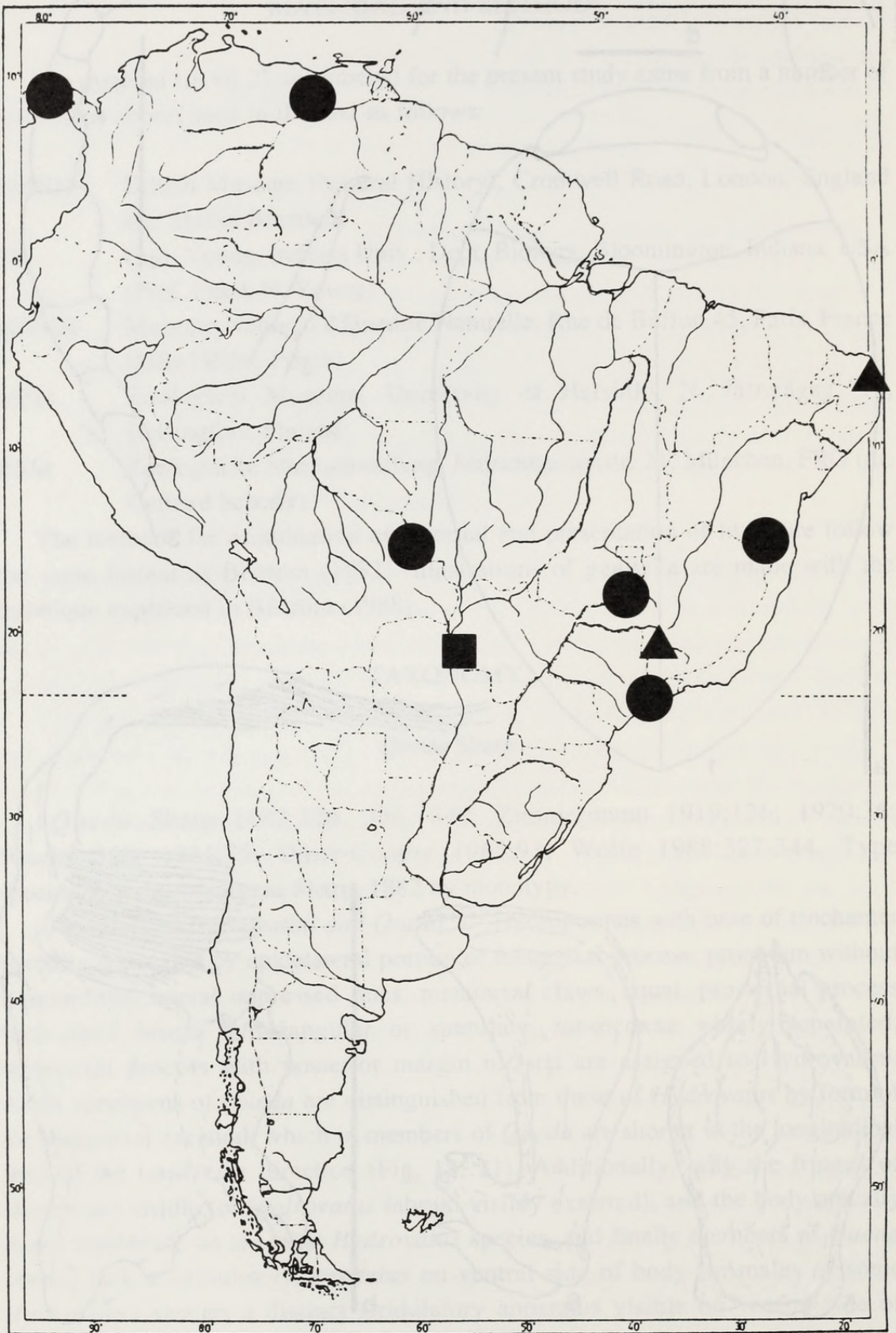
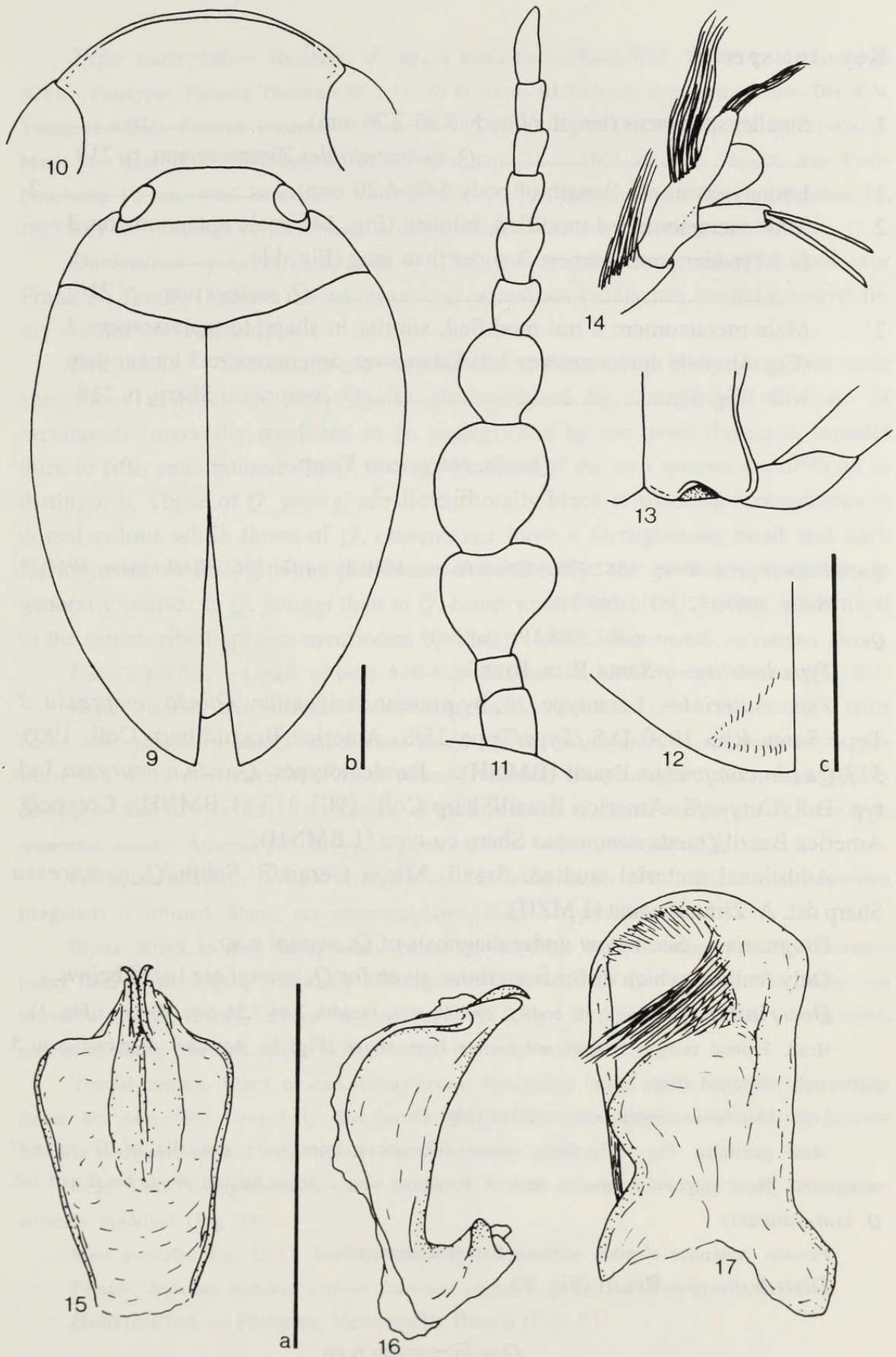


Fig. 8. Known distribution of *Queda* species. Symbols: triangle, *Q. compressa* Sharp; dot, *Q. youngi* n. sp.; square, *Q. hydrovatooides* Zimmermann.





Figs. 9-17. *Queda youngi* n.sp. 9, habitus; 10, head; 11, male antenna; 12, apex of elytron; 13, male metacoxal region.; 14, apex of male metatarsus; 15, penis, dorsal view; 16, penis, lateral view; 17, paramere. Scale bars: Figs. 11, 14-17 (a), 9 (b), 10, 12, 13 (c) = 1.0 mm.



## Key to species

- 1 Smaller specimens (length of body 2.50-2.76 mm).....  
 .....*Q. hydrovatoides* Zimmermann. p. 219
- 1' Larger specimens (length of body 5.00-6.20 mm).....2
- 2 Male metatarsomere 4 modified, bilobed (Fig. 14); male antennomeres 3 to 5 broader, antennomere 3 wider than long (Fig. 11).....  
 .....*Q. youngi* n.sp., p. 216
- 2' Male metatarsomere 4 not modified, similar in shape to metatarsomere 3 (Fig. 4); male antennomeres 3 to 5 narrower, antennomere 3 longer than wide (Fig. 3).....*Q. compressa* Sharp, p. 216

*Queda. compressa* Sharp

Figs. 1-7

*Queda compressa* Sharp 1882:336; Zimmermann 1920:36; 1921:206; Blackwelder 1944:75; Wolfe 1985:132-155; 1988:329.

*Queda conspersa*; Zimmermann 1921:191 (lapsus).

*Type locality*.— Santa Rita, Brazil.

*Type material*.— Lectotype, ♂, by present designation: *Queda compressa* ♂ Type Santa Rita 1850 D.S./Type/Type 25/S. America Brazil/Sharp Coll. 1905-313/*Queda compressa* Brazil (BMNH). - Paralectotypes. *Queda compressa* Ind. typ. D.S./Cotype/S. America Brazil/Sharp Coll. 1905-313 (1 BMNH); Cotype/S. America Brazil/*Queda compressa* Sharp co-type (1 BMNH).

Additional material studied. Brazil: Minas Gerais/F. Sahlb./*Q. compressa* Sharp det. A. Zimmermann (1 MZH).

*Diagnosis*.— See below under diagnosis of *Q. youngi* n.sp.

Only features which differ from those given for *Q. youngi* are listed below.

*Description*.— Length of body 5.20-5.48 mm, breadth 3.44-3.52 mm. Habitus (Fig. 1).

Head. Frontal margin at eyes not visible from above (Fig. 2). Antennal segments 3 to 5 moderately flattened (Fig. 3).

Legs. Metatarsus simple, not modified (Fig. 4).

Male genitalia: Fig. 5-7. Only minor differences from male genitalia of *Q. youngi* recognized. Their diagnostic value is unclear. Paramere with a dense hairtuft above basal part (cf. *Q. hydrovatoides*).

Female. Antennae slender, without flattened segments.

*Distribution*.— Brazil (Fig. 8).

*Queda. youngi* n.sp.

Figs. 9-17

*Type locality*.— Encruzilhada, Brazil.





Biström, Olof. 1990. "Revision of the Genus *Queda* Sharp (Coleoptera: Dytiscidae)." *Quaestiones entomologicae* 26(2), 211–220.

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