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Key to the larval tiger beetles (Coleoptera: Cicindelidae) of Central Amazonian floodplains (Brazil)

by

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Abstract

A key to the larval instars of all tiger beetle species known to occur in Central Amazonian floodplains is provided, including 6 species/subspecies with previously unknown larvae. The key comprises *Phaeoxantha klugii*, *Ph. lindemannae*, *Ph. aequinoctialis aequinoctialis*, *Ph. a. bifasciata*, *Ph. limata*, *Tetracha spinosa*, *T. sobrina punctata*, *Cylindera suturalis*, *Odontocheila confusa*, *Pentacomia cribrata*, *Pe. egregia*, and *Pe. lacordairei*. Pronotum width and number of setae on galeomere I of all instars, diameter of tunnel openings for most species as well as descriptions of larval habitats are given.
Keywords: **Cicindelids, habitat, inundation, larvae, Amazon, Neotropics.**

Resumo

Apresenta-se uma chave para as larvas de todas as espécies de besouros cicindelídeos encontradas em áreas alagáveis na Amazônia Central, incluindo 6 espécies/subespécies com larvas até então desconhecidas. A chave inclui *Phaeoxantha klugii, Ph. lindemannae, Ph. aequinoctialis aequinoctialis, Ph. a. bifasciata, Ph. limata, Tetracha spinosa, T. sobrina punctata, Cylindera suturalis, Odontocheila confusa, Pentacomia cribrata, Pe. egregia* e *Pe. lacordairei*. São listadas a largura do pronoto, o número de setas de todos os estágios no galeomero I, o diâmetro da abertura dos túneis larvais da maioria das espécies, como ainda descrições dos habitats larvais.

Introduction

Tiger beetles have frequently been the focus of studies dealing with ecology, species coexistence, and conservation (cf. PEARSON 1988; PEARSON & CASSOLA 1992; PEARSON & JULIANO 1993; PAARMANN et al. 1998; CASSOLA & PEARSON 2000; ZERM et al. 2001). Researchers working on tiger beetles, however, are most often hampered by the lack of larval descriptions as larvae of most species are hitherto unknown (cf. PUTCHKOV & ARNDT 1994, 1997). Considerable knowledge of the floodplain tiger beetle fauna in the Manaus region has been accumulated, including larval descriptions of some species (ARNDT et al. 1996; RIBEIRO et al. 1996; ADIS & MESSNER 1997; AMORIM et al. 1997a, b; PUTCHKOV & ARNDT 1997; ADIS

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et al. 1998; ZERM & ADIS 2000, 2001). The aim of this study is to provide a key to the larval instars of all 11 species currently known to occur in floodplains near Manaus (cf. ADIS et al. 1998; ZERM & ADIS 2001a; ZERM et al. 2001).

Material and methods

In addition to previously described larvae included in this key (ARNDT et al. 1996, PUTCHKOV & ARNDT 1997) larvae of 6 species/subspecies were newly available. This larval material was obtained in 1997-1999 by the second author (M.Z.) from both rearing ex ovo in the laboratory and from larvae that were collected in the field and subsequently reared in the laboratory until the beetles hatched (*Tetracha spinosa* and *T. s. punctata* solely based on field material). Larvae or/and beetles were collected at the southern beach of Ilha de Marchantaria (3°14'34 S, 59°53'43 W; open whitewater area, first island in the Rio Solimões upstream from the confluence with the Rio Negro: *T. spinosa*, *T. s. punctata*, *Pentacomia cribrata*), at a beach on Ilha de Paciência (3°19'21 S, 60°11'16 W; open whitewater area, Rio Solimões, approximately 40 km upstream of its confluence with the Rio Negro: *Phaeoxantha aequinoctialis aequinoctialis*), and a large beach on the Rio Negro, locally called Praia Grande (3°01'59 S, 60°32'35 W; approximately 40 km upstream of Manaus, blackwater area: *Ph. lindemannae*, *Ph. a. bifasciata*, *Ph. limata*). Additional larvae of *Ph. limata* were collected at an open whitesand area ("campina") on terra firme near Reserva Florestal Adolpho Ducke (Sítio Bom Sossego, approx. 02°55' S, 59°59' W; km 19 on Manaus-Itacoatiara highway, AM-010). Most larval specimens of these species are in the Invertebrate Collection of INPA (Instituto Nacional de Pesquisas da Amazônia), Manaus, and in the collections of E. Arndt, M. Zerm, and J. Adis.

The specimens were preserved in 70% ethanol and studied under a stereo microscope at a magnification up to 50x. Some first and second instar specimens of smaller species were cleared in 10% KOH for 12 hours, transferred into a series of three water baths for two hours each to wash out the potassium hydroxide, then transferred in an ethanol/xylol series and finally mounted in Canada balsam on a microscope slide. This procedure allowed for ready examination under a phase contrast microscope at a magnification up to 400x and a detailed study of the cleared head capsule and pronotum. If not stated otherwise, all measurements of pronotum width and number of setae on galeomere I are from field material.

Diameters of larval tunnel openings given in Table 2 are mostly from field measurements obtained with a vernier gauge. Measurements from laboratory rearings were taken under a stereo microscope. The nomenclature follows WIESNER (1992 and pers. comm.), terms of morphology follow ARNDT et al. (1996) and LAWRENCE (1991). L_1, L_2, L_3 refer to the 1st, 2nd, and 3rd larval instars. Descriptions of larval habitats are derived from ZERM & ADIS (2001) and ADIS et al. (1998).

Key to the larvae

We provide a key to the 2nd and 3rd instar larvae. First instar larvae have a basic pattern of setae, and different species are similar to each other. The setal pattern is also normally distinct from that of subsequent larval instars. Nevertheless, it is possible to distinguish genera among first instars with the present key (except the *Odontocheila-Pentacomia* complex and *Megacephala* s.l. = *Phaeoxantha*, *Tetracha*) and to distinguish the first instars of most of the species with the help of pronotum width and characters given in Table 1.

First instar larvae can be distinguished from later instars by having only 1 seta on the medial margin of galeomere I (Fig. 3: mesal side), egg bursters mostly in shape of two teeth present in the posterior region of the frontale, and the posterior part of tergite V without setae. Usually, 2nd and 3rd larval instars have 2 and 3 setae on the medial margin of galeomere I, respectively. In *Phaeoxantha* and *Tetracha* species, however, the number of setae is variable and overlaps between 2nd and 3rd instars (Tab. 2). Nevertheless, it is often possible to determine the species and instar by combining the number of setae on galeomere I with pronotum width, other morphological characters provided in the key and by the habitats described below.

1 Gular suture characterized by a Y-shaped groove (Fig. 1A). Ventral double sclerite on prementum lacking, labial palpomere I on ventral side without spines but with several simple setae apically (Fig. 2A). Maxillary palpomere I with long spine on outer side (Fig. 3). Anterior, posterior and lateral part of abdominal tergite V fused (not as in Fig. 4). (*Megacephala* LATREILLE in widest sense, including *Tetracha* HOPE, *Phaeoxantha* CHAUDOIR). 2

- Gular suture ends in a T-shaped groove (Fig. 1B). Ventral double sclerite on prementum present, labial palpomere I on ventral side with 2-4 spines apically (Fig. 2B). Maxillary palpomere I without spine on outer side. All parts of tergite V separate (Fig. 4). (Cicindelini). 7

2 Pronotum with more than 100 short, white, in part flattened setae per half. Black bristles on galea and apical region of antennomeres I and II in strong contrast to yellow color of ventral side of head and head appendages.

a) Vertex ridge on dorsoposterior part of head including the lateral tubercle with 10 or more setae on each side; abdominal tergites distinct sclerotized without numerous small setae, only long setae present; caudolateral part of tergite V with 10 or more long setae in 3rd instar and 2 long setae in 2nd instar . . . . *Phaeoxantha aequinoctialis aequinoctialis* (DEJEAN)

b) Vertex ridge on dorsoposterior part of head including the lateral tubercle with 6 or less setae on each side; abdominal tergites little distinct with more than 20 small setae beside the long setae; caudolateral part of tergite V with 2 long setae in 2nd and 3rd instar . . . . *Phaeoxantha aequinoctialis bifasciata* (BRULLÉ)

- Pronotum with less than 80 setae per half. Ventral side of head often darker, black setae lacking or less obviously. 3

3 Median hook of abdominal tergite V with two small basal setae. Pronotum with several very long, filiform setae. Larvae of considerable size: pronotal width in L_3 >5.3 mm, in L_2 > 3.5 mm. 4

- Median hook of abdominal tergite V with a single basal seta. Pronotum without long, filiform setae. Larvae smaller: pronotal width in L_3 <<4.5 mm, in L_2 <<3.00 mm. 5

4 Larvae smaller (pronotal width in L_3 5.3-5.7 mm, in L_2 3.5-3.7 mm). Antennomeres I, II, galea and maxillary palps read brown (only visible in older specimens, young specimens with yellow appendages like the following species). . . . . *Phaeoxantha lindemannae* (MANDL)

- Larvae large (pronotal width in L_3 > 5.6 mm, in L_2 >3.6 mm). Antennomeres I, II, galea and maxillary palps yellow. . . . . *Phaeoxantha klugii* CHAUDOIR

5 All parts of abdominal tergite V, even in the middle, fused; original suture between lateral and anterior part of tergite still visible as dark line located directly under the long and thin median hook. Anterior part of tergite V multisetose with setae short and thin except one very long seta on each side near anterior margin. . . . . *Phaeoxantha limata* (PERTY)

- Left and right half of abdominal tergite V not fused, separate by a wide membranous region in the middle. Dark line on tergite V at the level of median hook lacking. Anterior part of tergite V not characterized by numerous short and one very long setae. 6

6 Pronotum yellowish brown with white posterio-lateral margin, each side with 6 black and 10-12 pale setae in L_3 or 6 black and 5-6 pale setae in L_2 respectively. Antenna slender, antennomere II about 2.7 times longer than wide. Larvae larger (see Table 2) . . . . *Tetracha sobrina* (DEJEAN) (ssp. *punctata* CASTELNAU)

- Pronotum metallic green with white posterio-lateral margin, each side with 6 black and >20 pale setae in L_3 or 6 black and 15-18 pale setae in L_2 respectively. Antenna stout, antennomere II about 1.6 times longer than wide. Larvae smaller (see Table 2). . . . . *Tetracha spinosa* (BRULLÉ)

7 (1) Median hooks of abdominal tergite V slender with 3 thin, long setae in L_2 and 4 in L_3; apical spine of inner hooks shorter than lateral setae. Labial palpomere II with 1 seta near middle of the segment. Head and pronotum with distinct metallic green lustre . . . . *Cylindera (Plectographa) suturalis* (FABRICIUS)

- Median hooks of abdominal tergite V less slender with 1-3 short bristles; apical spine of inner hooks longer than lateral setae (cf. Fig. 4). Labial palpomere II with 1 seta more or less in basal half of the segment. Head and pronotum without metallic lustre. 8

8 Anterior part of pronotum (Fig. 5) and posterior part of head with flattened black setae which are in striking contrast to the yellowish-brown color of the pronotum . . . . *Pentacomia* (s. str.) *egregria* (CHAUDOIR)
- Flattened setae of pronotum and head pale or lacking. 9
9 Median hooks of abdominal tergite V with 3 bristles in L_3 (Fig. 4), and with 2 in L_2. Larvae very small, pronotal width in L_3 <1.7 mm, in L_2 <1.13 mm . . . . *Pentacomia (Mesacanthina) cribrata* (BRULLÉ)
- Median hooks of abdominal tergite V with 1 or 2 bristles, larvae larger. 10
10 Several flattened setae (pale colored) on pronotum and posterior part of head. Median hooks always with 2 bristles. Pronotal width in L_3 about 3.08 mm, in L_2 about 1.88 mm . . . . *Odontocheila confusa* (DEJEAN)
- Flattened setae lacking, median hook in L_2 with a single short bristle; pronotal width in L_2 1,09 mm (only second instar and few material available). . . *Pentacomia (Poecilochila) lacordairei* (GORY)

Larval habitats and activity patterns

The tiger beetle species in the Manaus region can be assigned to several habitat types (cf. ADIS et al 1998; ZERM & ADIS 2001; ZERM et al. 2001). Only two species are currently known to occur both in floodplains and on terra firme uplands (*Ph. limata* and *Pe. lacordairei*). Floodplain habitats can be classified according to their water quality: species occur in either white- or blackwater floodplains, except for *T s. punctata* that inhabits both floodplain types. The three forest species from whitewater floodplains are also found in mixedwater (cf. AMARAL et al. 1997) inundation forests. Additionally, species are usually restricted to either non-forest habitats (here referred to as 'open areas') or to forests. Future studies might increase the number of species occurring in both white- and blackwater floodplains as the latter have not yet been sufficiently monitored. Sporadic collections of adult beetles of, e.g., *C. suturalis* indicate that this species might also occur in blackwater floodplains (ZERM & ADIS 2001).

Knowledge of the larval habitats of *C. suturalis*, *T. spinosa*, *Ph. limata*, *Pe. lacordairei*, and *O. confusa* is limited at present. All larvae are diurnal except for 2nd and 3rd instars of *Ph. klugii* and *Ph. lindemannae* that are nocturnal. For more details see ZERM et al. (2001), ZERM & ADIS (2001), and ADIS et al. (1998).

***Phaeoxantha aequinoctialis aequinoctialis*:**
Present at intermediate to low altitudes in whitewater floodplains. Large open patches without or with very sparse herbaceous vegetation, usually sandy sediments (= beaches). Larvae sometimes clustered along loamy ripples at sandy beaches.

***Phaeoxantha aequinoctialis bifasciata*:**
At high to low altitudes in blackwater floodplains. Large open patches without or with sparse herbaceous vegetation or scattered small trees, sandy sediments (= beaches). During rising water levels larvae have occasionally been observed running on the beach surface during daytime.

***Phaeoxantha klugii*:**
In whitewater floodplains. At higher but still inundated parts of open river banks that usually have a lower beach and a gentle slope connecting the two parts. At patches with sparse or without vegetation (at least at the beginning terrestrial phase). Larvae often clustered. In sandy or loamy sediments, frequently in manioc, corn or other plantations

and around farmer huts. Some larvae of *T. spinosa* occasionally found at the same sites.

***Phaeoxantha limata*:**
The larval habitat has not been found yet in blackwater floodplains but is expected to be on sandy sediments were adult beetles are common. On terra firme, larvae were located at encrusted spots of an open whitesand area (= campina).

***Phaeoxantha lindemannae*:**
In blackwater floodplains. At high, levee-like sand bars parallel to the river that are covered with shrubs and smaller trees (often by the small palm *Leopoldina pulchra*). Also at intermediate altitudes at forest edges behind the beach. Larvae often clustered. Occasionally in the vicinity of *P. a. bifasciata* but with little overlap.

***Tetracha sobrina punctata*:**
In white- and blackwater floodplains. On loamy patches without vegetation (at the beginning terrestrial phase) at intermediate altitudes. In the whitewater at open areas; opening of larval tunnels usually at the edges of cracks formed by the desiccating soil (those of 3rd instars often on the vertical wall of these cracks). Larvae of *Pe. cribrata* occur at the same patches occasionally. In the blackwater larvae were found in a sparse forest with bare soil (no litter layer and hardly any herbaceous vegetation). Although not yet found, larvae are assumed to occur in open mixedwater floodplains too, where adult beetles are common.

***Tetracha spinosa*:**
In whitewater floodplains. A few larvae were observed among larvae of *P. klugii* in sandy sediments.

***Pentacomia egregia*:**
At forest floor of white- and mixedwater floodplains. Often on slopes close to the forest edge with more light and little litter, frequently clustered at the base of tree trunks.

***Odontocheila confusa*:**
At forest floor in white- and mixedwater floodplains.

***Pentacomia cribrata*:**
In open whitewater floodplains. On loamy patches without vegetation (at the beginning terrestrial phase) at intermediate altitudes. Opening of larval tunnels usually at the edges of cracks formed by desiccating soils. Larvae of *T. s. punctata* occur occasionally at the same sites.

***Pentacomia lacordairei*:**
At forest floor in white- and mixedwater floodplains, as well as in terra firme forests.
***Cylindera suturalis*:**
At lower parts of open beaches in whitewater floodplains, on sandy sediments.

Discussion

PUTCHKOV & ARNDT (1997) described several larvae of *Megacephala* LATREILLE (s.l.) including three species also considered in the present paper. Due to misidentifications, larvae of *Ph. a. aequinoctialis* were described as "*M. spinosa*" and those of *Ph. a. bifasciata* as "*M. sobrina*" (perpetuated in ADIS et al. 1998). In the present study we correct this mistake on the basis of larvae reared ex ovo and larvae that were collected in the field and subsequently reared until the beetles hatched.

Despite the present knowledge of larvae of several species, it is not yet possible to distinguish the genera *Tetracha* and *Phaeoxantha*. Larvae of both taxa vary considerably.

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Table 1: Characters of first instar larvae of *Phaeoxantha* and *Tetracha*. First instar of *T. spinosa* was not available.

Species	Characters
Phaeoxantha klugii	Mandible dark brown (basal half) to black (tip); pronotum with 8 long, filiform setae; median hook of abdominal tergite V straight and long.
Phaeoxantha lindemannae	Mandible dark brown (basal half) to black (tip); pronotum with 8 long, filiform setae; median hook of abdominal tergite V straight and long.
Phaeoxantha aequinoctialis	Mandible light yellow with black tip; pronotum with white, in part flattened setae; median hook of abdominal tergite V less than 3 times longer than bristle.
Phaeoxantha limata	Mandible light brown in basal half, dark brown in apical half; pronotum with two black and several pale setae; median hook of abdominal tergite V straight and long, more than 3 times longer than bristle.
Tetracha sobrina ssp. *punctata*	Mandible uniformly red brown; pronotum without black setae; median hook of abdominal tergite V stout, about 2 times longer than bristle.

Table 2: Width of pronotum, diameter of tunnel opening, number of setae on galeomere I in the 3 larval instars (L_1-L_3), and habitat types. Measurements in mm; mean values and number of specimens in parenthesis. *Data from laboratory rearings. Data from previous publications: [a]ADIS et al. (1998), [b]ARNDT et al. (1996), [c]PUTCHKOV & ARNDT (1997).

Larval instar	Pronotum width	Diameter of tunnel opening	Number of setae on galeomere I
Phaeoxantha klugii (open whitewater floddplains)			
L_3	5.5-6.8 (6.2; n = 151)	7.8-9.5 (8.6; n = 20)	4-5 (rarely 6) (n = 21)
	5.53-5.92 (5.75; n = 10)[c]	8.2-9.5 (n = 30)[a]	
L_2	3.6-4.5 (3.8; n = 16)	5.3-6.1 (5.8; n= 20)	3-4 (rarely 5) (n = 16)
	3.56, 3.68 (n = 2)[c]	4.5-5.7 (n = 14)[a]	
L_1	2.2-2.6 (2.4; n = 31)	3.6-4.4 (3.9; n = 20)	1 (n = 31)
	2.37 (n = 1)[c]	2.5-3.0 (n = 3)[a]	
Phaeoxantha lindemannae (forest edges of blackwater floodplains)			
L_3	5.3-6.2 (5.7; n = 33)	6.8-10.0 (8.3; n = 29)	4-5 (rarely 6) (n = 33)
L_2	3.4-4.0 (3.6; n = 17)	5.6-6.9 (6.1; n = 6)	3-4 (rarely 5) (n = 17)
L_1	2.4-2.6 (2.5; n = 5)	3.25 (n = 1)*	1 (n = 9)
Phaeoxantha aequinoctialis aequinoctialis (open whitewater floodplains)			
L_3	4.6-5.1 (4.9; n = 14)	6.7-7.4 (7.0; n = 10)	3-4 (n = 14)
	4.52-4.82 (4.69; n = 4)[c]		
L_2	3.1-3.4 (3.3; n = 8)	4.4-5.0 (4.6; n = 11)	2 (rarely 3) (n = 8)
	3.19-3.25 (3.22; n = 4)[c]		
L_1	2.0-2.1 (2.1; n =9)	3.15-3.4 (3.2; n = 10)	1 (n = 9)
Phaeoxantha bifasciata (open blackwater floodplains)			
L_3	4.1-4.8 (4.5; n = 35)	5.5-7.2 (6.2; n = 7)	3-4 (n = 35)
	4.0-4.22 (4.13; n = 4)[c]	5.4-7.4 (n = 14)[a]	
L_2	2.9-3.4 (3.1; n = 20)	4.3-5.3 (4.78; n = 4)	2 (n = 20)
	2.78-2.96 (2.86; n = 4)[c]	3.8-5.3 (n = 31)[a]	
L_1	1.8-2.2 (2.0; n = 23)	3.3, 3.8 (n = 2)	1 (n = 23)
	1.6 (n = 1)[c]	1.4-3.7 (n = 31)[a]	
Phaeoxantha limata (open blackwater floodplains and open terra firme)			
L_3	2.2-2.5 (2.4; n = 6)	4.0-4.6 (4.3; n = 9)*	3 (n = 6)
	2.5-2.7 (2.6; n = 6)*		
L_2	1.5-1.8 (1.6; n = 4)	2.2-2.4 (2.3; n = 6)*	2 (n = 4)
	1.6-1.7 (1.7; n = 7)*		
L_1	1.0-1.2 (1.1; n = 7)*	1.5-1.9 (1.7; n = 6)*	1 (n = 7)
Tetracha spinosa (open whitewater floodplains)			
L_3	2.8-3.4 (3.2; n = 10)	4.4 (n = 1)	3-4 (n = 10)
L_2	1.8-1.9 (1.8; n = 7)	3.2-3.7 (3.4; n = 9)	3 (n = 7)

Table 2: Continuation.

Larval instar	Pronotum width	Diameter of tunnel opening	Number of setae on galeomere I
Tetracha sobrina punctata (open white- and blackwater floodplains)			
L_3	3.7-4.5 (4.1; n = 24)	5.4-6.7 (6.0; n = 10)	3-4 (rarely 5) (n = 13)
L_2	2.6-2.8 (2.7; n = 10)	4.1-4.5 (4.2; n = 4)	3 (n = 8)
L_1	1.7-1.8 (1.7; n = 11)	2.5-2.7 (2.6; n = 3)	1 (n = 13)
Cylindera suturalis (open whitewater floodplains)			
L_3	1.9-2.1 (2.0; n = 4)[b]	2.2-2.4 (2.3; n = 4)*	3 (n = 4)
L_2	1.3-1.4 (1.36; n = 4)[b]	-	2 (n = 4)
L_1	0.90 (n = 1)[b]	-	1 (n = 1)
Odontocheila confusa (forests of white- and mixedwater floodplains)			
L_3	3.08 (n = 1)[b]	-	3 (n = 1)
L_2	1.84, 1.92 (n = 2)[b]	-	3 (n = 1)
Pentacomia cribrata (open whitewater floodplains)			
L_3	1.6-1.8 (1.7; n = 12)	2.2-2.6 (2.4; n = 12) 1.95-2.3 (2.1; n = 10)*	3 (n = 14)
L_2	1.1-1.2 (1.16; n = 4)	1.4-1.8 (1.6; n = 7) 1.3-1.4 (1.4; n = 8)*	2 (n = 4)
L_1	0.6-0.7 (0.67; n = 15)*	0.9-1.0 (0.9; n = 12)*	1 (n = 15)*
Pentacomia egregria (forests of white- and mixedwater floodplains)			
L_3	2.08 (n = 1)[b]	-	3 (n = 1)
L_2	1.20 (n = 1)[b]	-	2 (n = 1)
L_1	0.65-0.68 (0.66; n = 4)[b]	-	1 (n = 4)
Pentacomia lacordairei (forests of white- and mixedwater floodplains, forests on terra firme)			
L_2	1.11 (n = 1)[b]	-	2 (n = 1)
L_1	0.70-0.74 (0.72; n = 7)[b]	-	1 (n = 7)

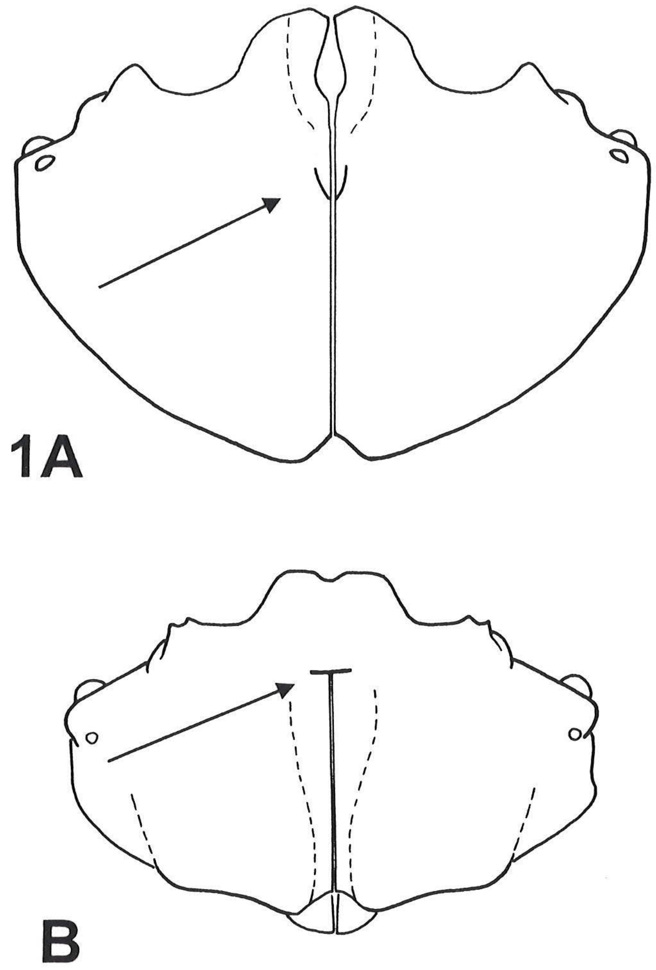

Fig. 1:
Head, ventral view. **1A**: *Tetracha* sp. Arrow: Y-shaped groove of gular suture.
B: *Pentacomia* sp. Arrow: gular suture ends in T-shaped groove.

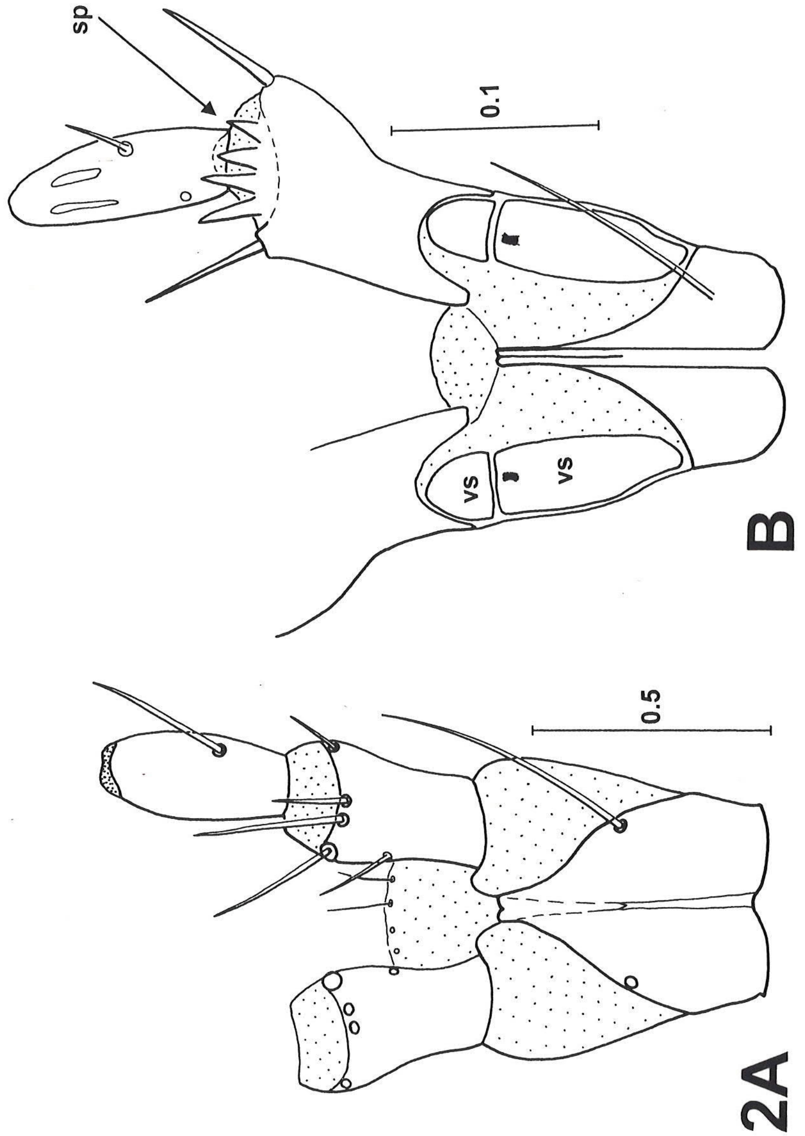

Fig. 2:
Labium, ventral aspect, L_3. **2A**: *Phaeoxantha lindemannae* (MANDL). **B**: *Pentacomia cribrata* (BRULLÉ). **vs** - ventral double sclerite, **sp** - spines on ventral side of labial palpomere I.

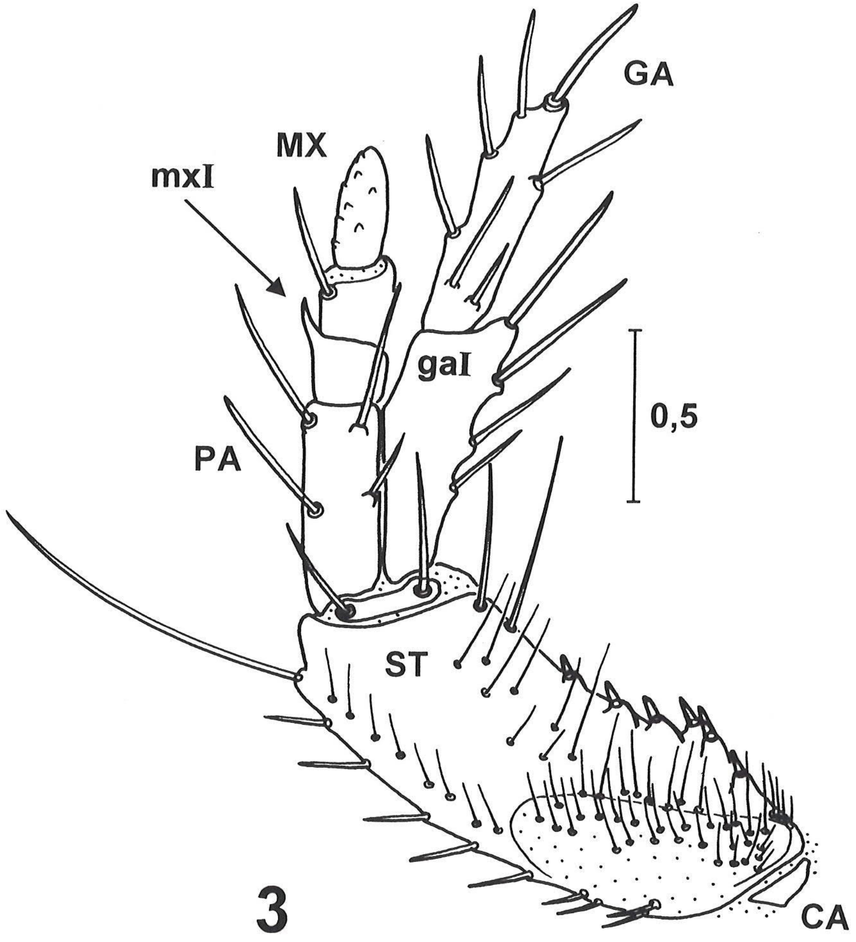

Fig. 3:
Maxilla, left side, dorsal aspect, L_2 of *Phaeoxantha lindemannae* (MANDL).
CA - cardo; **GA** - Galea; **gaI** - galeomereI (with 4 setae on mesal side); **MX** - maxillary palpus; **mxI** - maxillary palpomere I (with spine on outer side); **PA** - palpifer; **ST** - stipes.

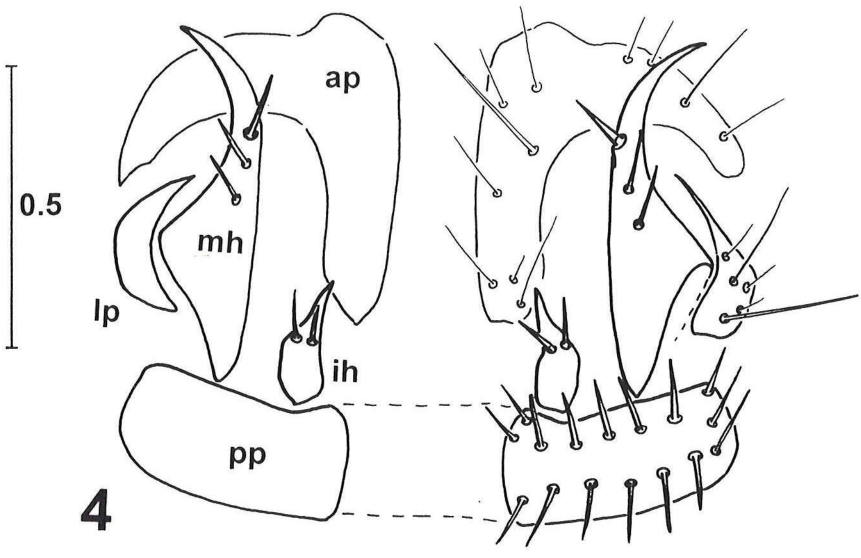

Fig. 4:
Abdominal tergite V, *Pentacomia cribrata* (BRULLÉ), L_3.
ap - apical part, **ih** - inner hook, **lp** - lateral part, **mh** - median hook, **pp** - posterior part.

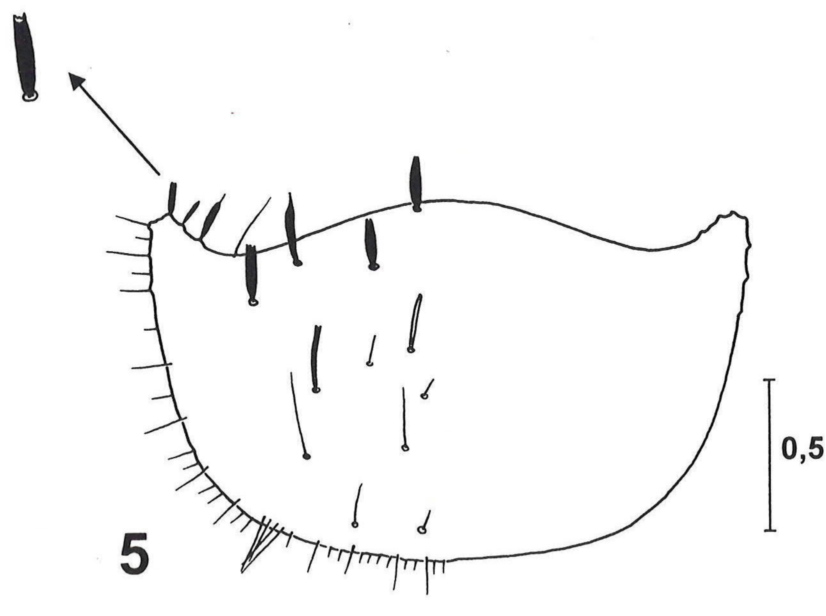

Fig. 5:
Pronotum, *Pentacomia egregria* (CHAUDOIR), L_3. Arrow: flattened setae, these setae are black in the figured species contrary to the white color of thin setae (redrawn from ARNDT et al. 1996).