

HYDRAENIDAE:

I. *Edaphobates puetzi* gen. et sp.n. from Sichuan

(Coleoptera)

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Abstract

Edaphobates puetzi gen. et sp.n. (Hydraenidae: Ochthebiinae) is described from China (Sichuan). This terrestrial species was collected from the floor of a rhododendron forest at ca. 2700 m a.s.l.

Key words: Coleoptera, Hydraenidae, Ochthebiinae, new genus, new species, China, Sichuan.

Introduction

During one of his recent visits to Vienna, our friend Andreas Pütz (Eisenhüttenstadt) brought with him a number of interesting Chinese beetles. Among these, there were three heavily encrusted females of an odd hydraenid, which he had sifted from soil of a rhododendron forest on a mountain pass in Sichuan. After the specimens had been cleaned it became obvious that they represented an undescribed genus. A few weeks later, a fourth specimen, collected by M. Schülke (Berlin) at the same location, was received by the senior author. Although this specimen is also a female we think that this new genus is so characteristic and peculiar that it deserves formal description, even in the absence of males.

Edaphobates gen.n.

TYPE SPECIES (by monotypy): *Edaphobates puetzi* sp.n.

DESCRIPTION: Habitus (Fig. 1). Dorsal surface strongly setose, partly covered with long stiff, apically curved setae; dorsal and ventral surface densely encrusted. Labrum distinctly wider than long; anteriorly distinctly arcuately emarginate and densely setose; surface smooth and glabrous anteriorly, densely sculptured and matt posteriorly, anterior and posterior portion sharply separated; posterior margin of labrum narrowly beaded. Epistomal suture evenly arcuate, narrow, slightly widened laterally. Labrum and clypeus more or less on same plane, not angulate. Clypeus strongly transverse. Frontoclypeal suture deeply impressed, but effaced at lateral margin of head. Frons very wide, with median gibbosity and a pair of distinct admedian longitudinal grooves lateral to median gibbosity; without ocelli (pale spot at anterolateral angle probably does not represent vestigial ocellus); compound eyes small, strongly protruding, situated on posterolateral process of frons. Neck region (retracted part of head) separated from anterior (exposed) part of head by distinct edge, sloping downwards anteriorly. Maxillary palpi short, penultimate maxillary segment distinctly inflated, ultimate segment thin and peg-like, shorter than penultimate segment. Antenna (Fig. 3) 9-segmented, about as long as anterior tibia; inserted in deep pit below frontoclypeal margin; scapus elongate, strongly bisinuous basally; pedicellus short, subquadrate, very slightly longer than wide; segment 3 very small and conspicuously

mushroom-shaped; segment 4 very small, weakly cupuliform; segments 5-9 forming loose pubescent club with long setae; segments 6-8 distinctly serrate. Mentum slightly wider than long, widest anteriorly; surface smooth and glabrous in anterior 0.4, distinctly impressed, rugosely punctate and dull, and slightly more narrow in posterior 0.6. Submentum short, transverse, distinctly impressed; posterior margin arcuately rimmed and then very steeply and vertically declivitous to gena. Genae with distinct antennal furrows anteroventrally to compound eyes and with conspicuous ridge lateral of maxillary groove; transverse genal ridge narrow, distinctly developed laterally, but completely concealed by submentum medially; confluent genal suture indicated by narrow glabrous line. Gula very short; posterolateral margin deeply grooved. Pronotum slightly wider than long, very strongly convex in cross section. Lateral parts widely explanate and declivitous, strongly retracted in basal 0.3; anterior corners widely rounded; lateral rim with denticles and microtubercles; anterior and posterior margin with narrow pronotal membrane. Ventral surface of prothorax almost completely densely pubescent; glabrous lateral portion of hypomerion reduced to narrow, strongly concave, distinctly oblique area, separated from hydrofuge part by strongly crested hypomerion carina, contiguous with lateral margin of pronotum in anterior half. Hypomerion antennal pocket very shallow; hypomerion antennal pocket setae and "antennal cleaner" absent. Postcoxal hypomerion process well-developed, not reaching prosternal intercoxal process. Prosternum very short in front of procoxae; intercoxal process strongly narrowed between procoxae; with small apical gibbosity. Mesoventrite (= preepisternum 2) with hydrofuge pubescence, except on well-developed, strongly reinforced anterior collar; median ridge only faintly indicated anteriorly; admedian ridges absent; intercoxal process broadly triangular, with few subapical microtubercles. Suture between ventrite and anepisternum 2 weakly indicated by faint ridge, latter effaced posteriorly. Mesocoxal cavities nearly conjunct; mesepimeron subtriangular, not broadly reaching mesocoxal cavity. Mesocoxae subglobular, widely separated, not projecting. Scutellar shield triangular, concealed underneath pronotum. Elytra well sclerotized, strongly convex in cross section and strongly declivitous apically; covering abdomen completely. Dorsal surface with 10 well defined rows of serial punctures (six rows between suture and shoulder). Inflexed lateral portion of elytra well-developed and wide, without pubescent portion. Inner surface of elytra and metanotum not examined. Metaventrite with distinct anterior, posterior and sublateral ridges; pubescence confined to lateral parts (lateral of sublateral ridge); disc deeply impressed in posterior half; katepisternal area deeply impressed; exposed part of anepisternum 3 very narrow, more or less firmly fused with preepisternum 3. Metacoxae strongly transverse, widely separated by deep intercoxal cavity and anterior extension of ventrite I. Hind wings present; length and venation not examined. Legs stout; tarsi rather short, 5-segmented. Abdomen with 10 tergites. Tergites VII and VIII strongly enlarged, with patches of distinct spicules. Tergite VIII with broad median longitudinal, weakly sclerotized groove and moderately long anterolateral apophyses. Tergite IX (Fig. 8) largely concealed by tergite VIII; lateral margins strongly inflected; anterolateral apophyses long; near posterior corners with conspicuous sharp-edged oval pits and long ingrowths (apodemes). Tergite X (Figs. 5, 6, 8) subtriangular, covered with setae; dorsal surface very strongly sclerotized except hyaline apical margin; lateral margin anterolaterally distinctly deflected.

Pleura with cuticular spicules.

Ventral surface of abdomen with six well-developed ventrites. Intercoxal sternite very small; lying deeply inside metaxocal cavity, visible only in detached abdomen. Lateral margins of ventrites and posterior border of metacoxal cavity not beaded. Dense pubescence confined to lateral portion of ventrite I. Ventrite I with conspicuous broad anteromedian (intercoxal) process. Intersegmental space of ventrites I-V deeply impressed. Ventrite V strongly enlarged. Ventrite VI (Fig. 7) very large; separated into anterior glabrous half and concave, sparsely pubescent posterior half by sinuous transverse ridge with three shallow pits.

Valvifers (Fig. 10) large and well-developed, with anterolateral condyles. Gonocoxites (Figs. 10 - 12) more or less completely concealed by ventrite VI; lateral halves narrowly contiguous at about posterior 0.4, proximally connected by hyaline membrane; apical margin with long setae; dorsal and ventral plates distinctly developed; dorsal plate concealed by valvifers in proximal half; ventral plate much shorter than dorsal plate, proximally widely separated from dorsal plate.

Vaginal area (Fig. 9) with several asymmetrical, more or less distinct vaginal sclerites.

Spermatheca (Fig. 9) with a very long distal portion, strongly curled apically.

DIFFERENTIAL DIAGNOSIS: The new genus is very distinctive. Besides the habitus (Fig. 1), *Edaphobates* is characterized by the combination of the following features (based on female): 1) dorsal surface with long stiff, apically curved setae, tubercles and thick dirt encrustations; 2) labrum smooth and glabrous anteriorly, densely sculptured and matt posteriorly, anterior and posterior portion sharply separated; 3) posterior margin of labrum narrowly beaded; 4) frons very wide, with median gibbosity and a pair of distinct admedian longitudinal grooves lateral to median gibbosity; 5) frons without ocelli; 6) compound eyes small, strongly protruding, placed on apex of posterolateral process of frons; 7) neck region (retracted part of head) separated from anterior (exposed) part of head by distinct edge, sloping downwards anteriorly; 8) maxillary palpi short, penultimate maxillary segment distinctly inflated, ultimate segment thin and peg-like, shorter than penultimate segment; 9) antennae 9-segmented; 10) mentum smooth and glabrous in anterior 0.4, distinctly impressed, rugosely punctate and dull, and slightly more narrow in posterior 0.6; 11) submentum short, transverse, distinctly impressed, apically vertically declivitous to gena (ventral view); 12) transverse genal ridge narrow, distinctly developed laterally, but completely concealed by submentum medially; 13) confluent genal suture indicated by narrow glabrous line; 14) gula very short; posterolateral margin deeply grooved; 15) pronotum with denticles laterally and with narrow pronotal membrane anteriorly and posteriorly; 16) glabrous lateral portion of hypomeron reduced to narrow, strongly concave, distinctly oblique area, separated from hydrofuge part by strongly crested hypomeral carina, contiguous with lateral margin of pronotum in anterior half; 17) hypomeral antennal pocket very shallow; 18) hypomeral antennal pocket setae and "antennal cleaner" absent; 19) procoxal cavities open posteriorly; 20) mesoventrite with hydrofuge pubescence and strongly reinforced anterior collar, intercoxal process broadly triangular, with few subapical microtubercles; 21) suture between mesoventrite and anepisternum 2 weakly indicated by faint ridge, which is effaced posteriorly; 22) mesocoxal cavities nearly conjunct; 23) mesocoxae subglobular, widely separated, not projecting; 24) elytra covering abdomen completely, with 10 rows of serial punctures; 25) inflexed lateral portion of elytra well-developed and wide, without pubescent portion; 26) metaventricle with distinct ridges, pubescence confined to lateral parts, disc deeply impressed in posterior half, anepisternum 3 very narrow, more or less firmly fused with preepisternum 3; 27) metacoxae widely separated by deep intercoxal cavity; 28) hind wings present; 29) legs stout; 30) abdominal tergites VII and VIII strongly enlarged (at least in female); 31) tergite VIII with broad median longitudinal groove; 32) tergite IX with conspicuous posterolateral oval pits; 33) tergite X strongly sclerotized, with broad hyaline apical margin; anterolaterally distinctly deflected; 34) pleura with cuticular spicules; 35) intercoxal sternite very small, lying deeply inside metaxocal cavity, visible only in detached abdomen; 36) hydrofuge pubescence of ventrites confined to lateral portion of ventrite I; 37) ventrite I with conspicuous broad impressed anteromedian (intercoxal) process; 38) intersegmental space of ventrites I-V deeply impressed; 39) ventrites V and VI strongly enlarged; 40) ventrite VI with sinuous transverse ridge and three shallow pits; 41) gonocoxites almost completely separated from each other, more or less completely concealed by ventrite VI, with fringe of setae along posterior margin, dorsal and ventral plates distinctly developed; dorsal plate distinctly separated transversally; 42) vaginal

area with several asymmetrical, more or less distinct vaginal sclerites; 43) spermatheca with very long distal portion, strongly curled apically.

DISTRIBUTION: This genus is known only from China (Sichuan).

ECOLOGY: This genus obviously is truly terrestrial, all specimens were collected from the forest floor. However, the microhabitat can be assumed to be very moist as the specimens were sifted from wet soil underneath a dense layer of moss.

DISCUSSION: The new genus is characterized by numerous unique apomorphies (e.g.: compound eyes on posterolateral process of frons; submentum deeply impressed and apically vertically declivitous to gena; transverse genal ridge completely concealed by submentum medially; ventrite I with broad impressed anteromedian process). One of the most conspicuous features of *Edaphobates* is the presence of oval pits on tergite IX; similar pits are found also on the head and abdomen of Elmidae (Larainae); their function is unknown, they may play a role in oviposition (note large size of egg, Fig. 4).

According to the current classification, *Edaphobates* clearly belongs to Ochthebiinae because of the shape of the maxillary palps. Within the subfamily it is related obviously with *Ochtheosus* PERKINS (see JÄCH 1998) with which it shares some apomorphies: e.g. shape of mentum, denticulation of lateral pronotal margin, ridges and median impression of metaventrite, broad median longitudinal groove of tergite VIII, ventrite VI with transverse ridge separating smooth anterior half from pubescent posterior half.

ETYMOLOGY: *Edaphos* (ἔδαφος, Greek: soil) and *bates* (βάτης, Greek: walker); referring to the fact that this genus lives in soil.

Edaphobates puetzi sp.n.

TYPE LOCALITY: Rhododendron forest on western flank of Erlangshan Pass, ca. 2700 m a.s.l., Luding County, Ganzi Tibet Autonomous Prefecture, Sichuan, China.

TYPE MATERIAL: **Holotype** ♀ (Naturhistorisches Museum Wien): "CHINA: W-Sichuan Ya'an Prefecture Tianquan Co., W Erlang Shan Pass \ 2780m, 21.VI.1999 29.51.27N, 102.15.47E leg. A. Pütz, sifted". **Paratypes:** 1 ♀ (Naturhistorisches Museum Wien) with same locality data as holotype; 1 ♀ (Naturhistorisches Museum Wien) with same locality data as holotype, except "29.VI.1999"; 1 ♀ (Naturhistorisches Museum Wien): "CHINA W-Sichuan 1999 Ganzi Tibet Aut. Pref., Luding Co. W Erlangshan-Pass, 2600 m 7 km SSE Luding, 29°51'N, 102°15'E, Kiefer [*Pinus*], Hasel [*Corylus*], Blüten [flowers] 29. VI., leg. M. Schülke".

DESCRIPTION (female): ca. 2.5 – 2.7 mm long, 1.1 – 1.2 mm wide. Dorsal surface strongly setose, covered with long stiff, apically curved setae, mainly on ridges, tubercles and margins of frons, pronotum and elytra; dorsal and ventral surface densely covered with dirt encrustations, which were removed from the holotype and two of the paratypes.

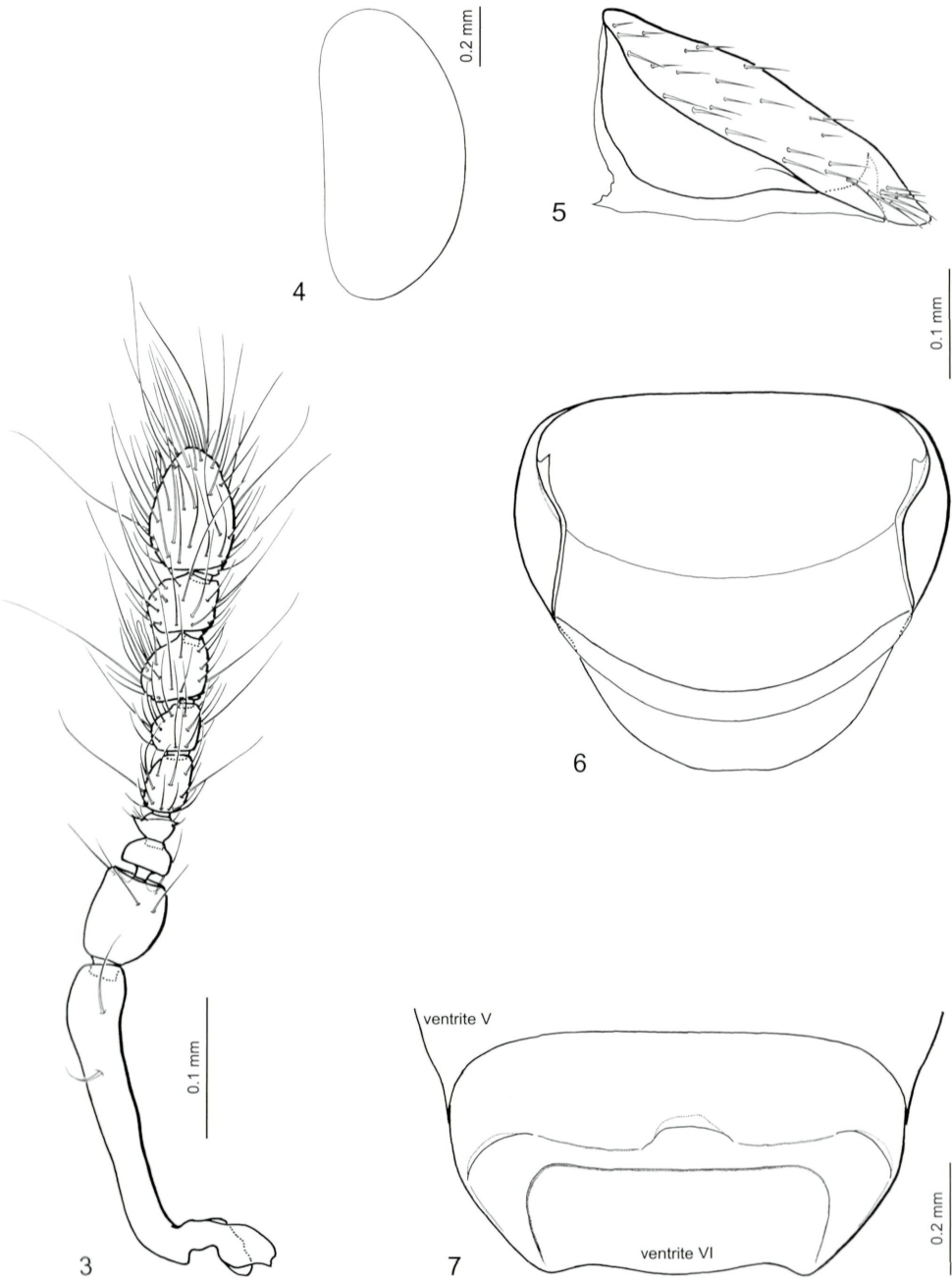
Head almost black, lateral margins paler brown; pronotum, elytra and body appendages brown. Labrum distinctly wider than long; anteriorly distinctly arcuately emarginate and densely setose; without anterolateral angles; surface smooth and glabrous anteriorly, densely sculptured and matt posteriorly, anterior and posterior portion sharply separated; posterior margin of labrum narrowly beaded. Epistomal suture evenly arcuate, narrow, slightly widened laterally. Labrum and clypeus more or less on same plane, not angulate. Clypeus strongly transverse, wide, medially smooth and glabrous, laterally microtuberculate. Frontoclypeal suture deeply impressed, but effaced at lateral margin of head. Frons very wide, with median gibbosity and pair of distinct admedian longitudinal grooves lateral of median gibbosity; surface smooth, with moderately widely spaced microtubercles; without ocelli; compound eyes small, strongly protruding, situated on posterolateral process of frons. Neck region (retracted part of head) separated from anterior (exposed) part of head by distinct edge, sloping downwards anteriorly.



Fig. 1: *Edaphobates puetzi*, habitus.



Fig. 2: Habitat of *Edaphobates puetzi* [photo: B. Březina]. Rhododendron forest on western flank of Erlangshan Pass, ca. 2700 m a.s.l., Luding County, Ganzi Tibet Autonomous Prefecture, Sichuan, China.



Figs. 4 - 7: *Edaphobates puetzi*; 3) antenna, 4) egg, 5) tergite X, lateral view, 6) same, ventral view; 7) ventrite VI, ventral view.

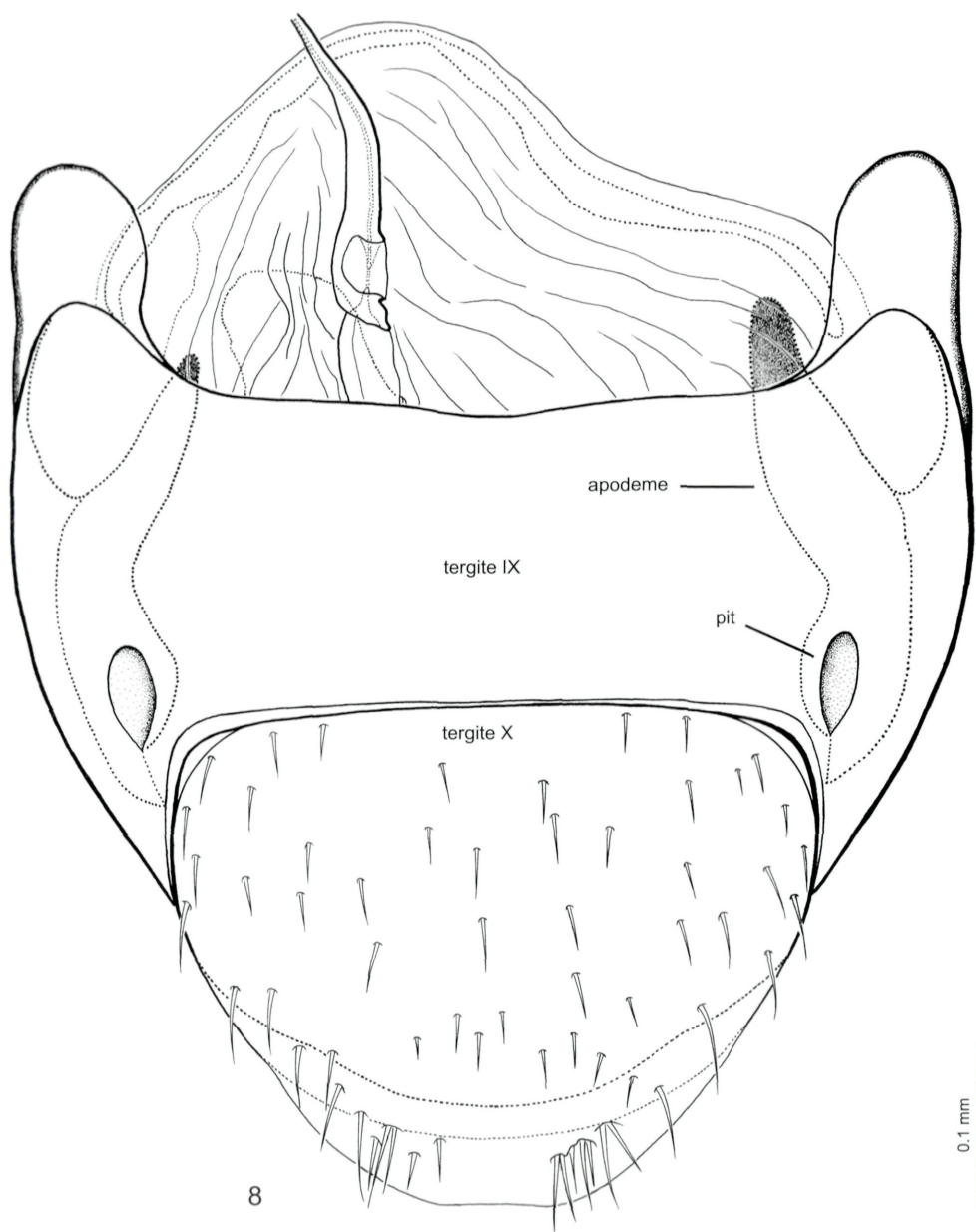


Fig. 8: *Edaphobates puetzi*, abdominal apex, dorsal view.

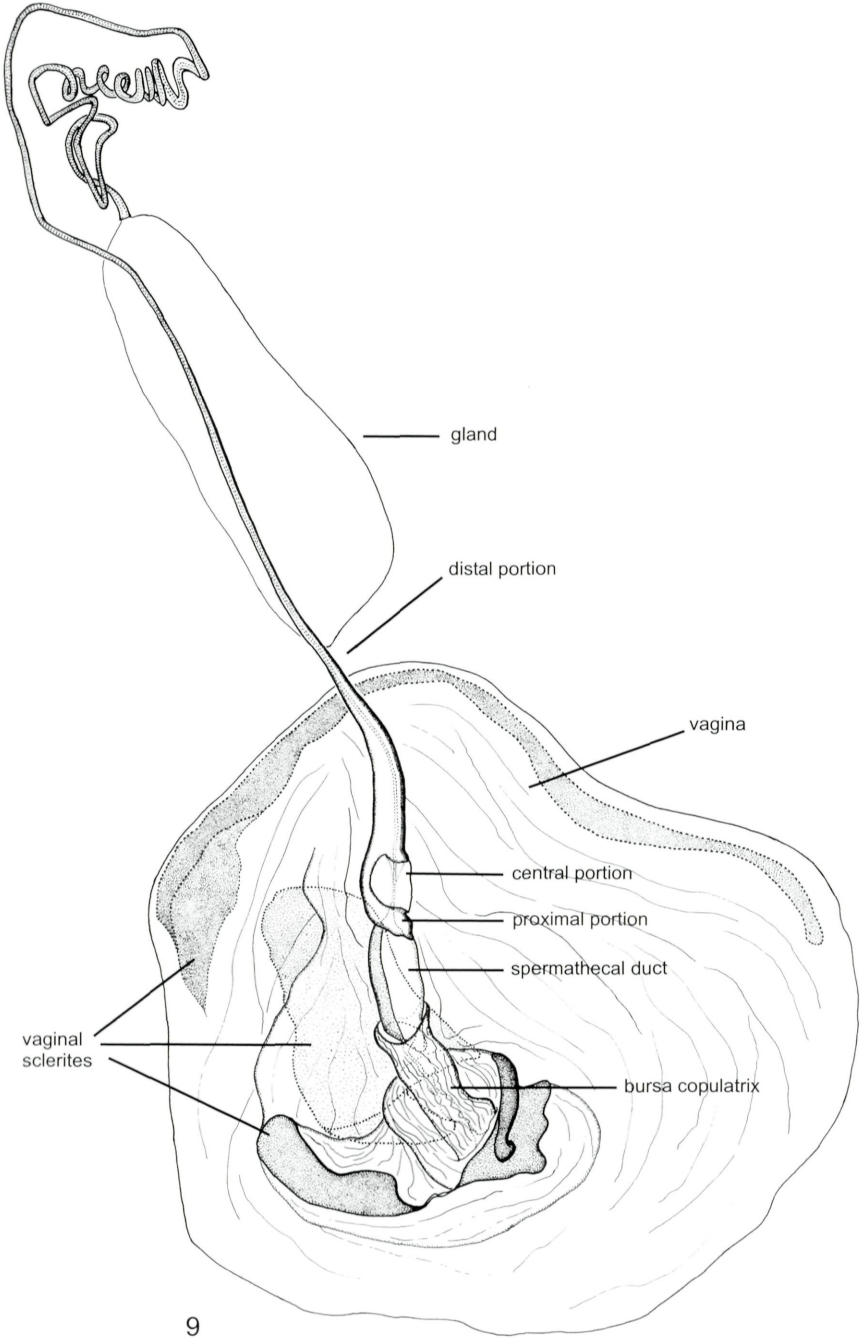


Fig. 9: *Edaphobates puetzi*, spermatheca and vaginal sclerites.

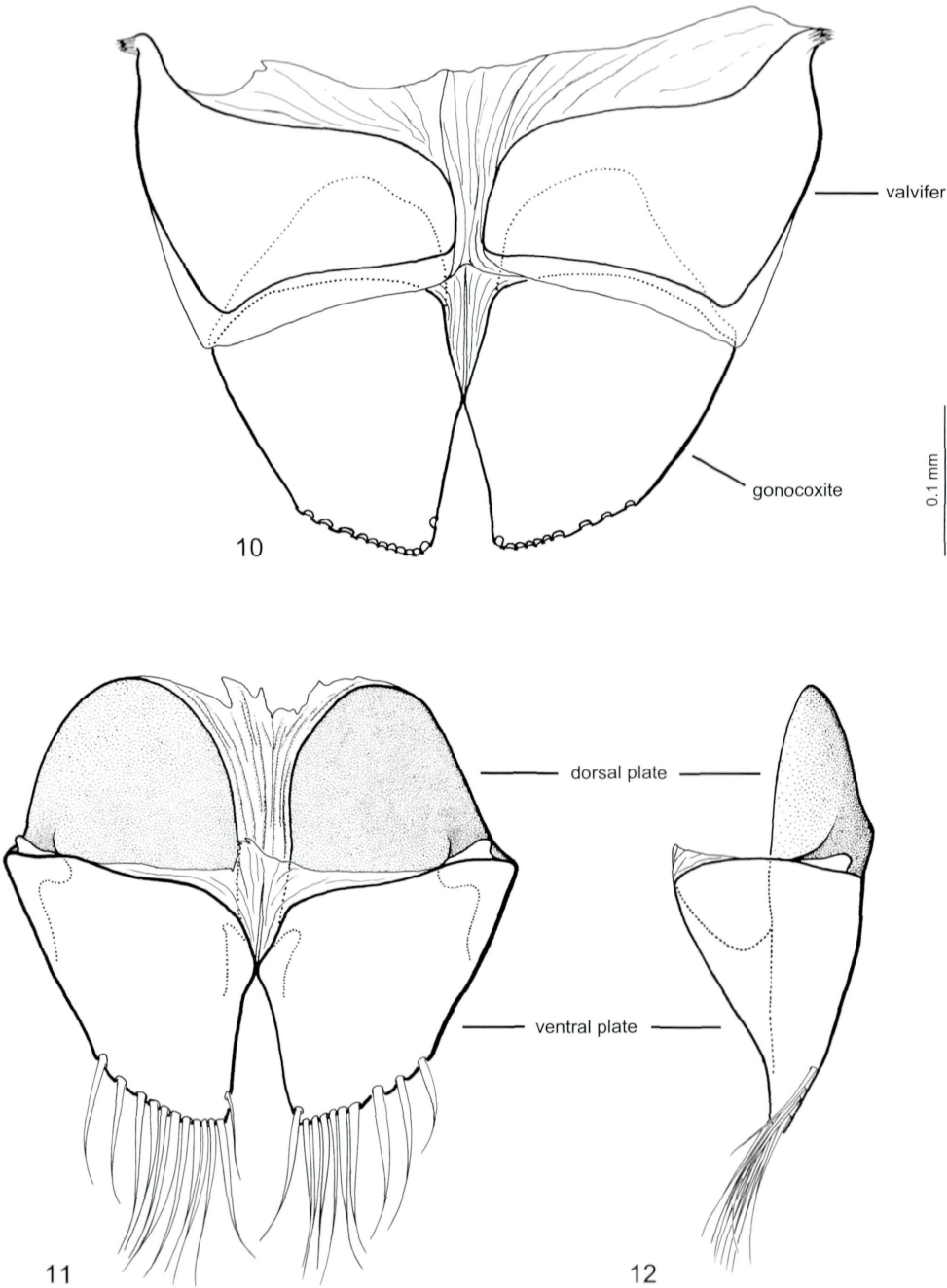


Fig. 10 - 12: *Edaphobates puetzi*, valvifer and gonocoxite; 10) dorsal view, 11) ventral view, 12) lateral view.

Maxillary palpi short, penultimate maxillary segment distinctly inflated, ultimate segment thin and peg-like, shorter than penultimate segment. Antenna (Fig. 3) 9-segmented, about as long as anterior tibia; inserted in deep pit below frontoclypeal margin; scapus elongate, strongly bisinuous basally; pedicellus short, subquadrate, very slightly longer than wide; segment 3 very small, conspicuously mushroom-shaped; segment 4 very small, weakly cupuliform; segments 5-9 forming loose pubescent club; segments 6-8 distinctly serrate. Mentum slightly wider than long, widest anteriorly; anterior margin densely setose; surface smooth and glabrous in anterior 0.4, distinctly impressed, rugosely punctate and dull, and slightly more narrow in posterior 0.6. Submentum short, transverse, distinctly impressed, matt; posterior margin arcuately rimmed and then very steeply and vertically declivitous to gena. Genae with distinct antennal furrows anteroventrally to compound eyes and with conspicuous ridge lateral of maxillary groove; transverse genal ridge narrow, distinctly developed laterally, but completely concealed by submentum medially; genal area posterior of transgenal ridge microreticulate, matt; confluent genal suture indicated by narrow glabrous line. Gula very short; posterolateral margin deeply grooved.

Pronotum slightly wider than long, very strongly convex in cross section. Lateral parts widely explanate and declivitous, strongly retracted in basal 0.3; anterior corners widely rounded; lateral rim with denticles and microtubercles; anterior and posterior margin with narrow pronotal membrane. Disc with pair of moderately large, admedian protuberances immediately behind middle, and with pair of weakly defined, admedian ridges; surface of disc moderately densely covered with large, deeply impressed punctures before and behind protuberances; interstices more or less glabrous, partly (especially on ridges and protuberances) covered with microtubercles. Surface of lateral ears with few deeply impressed punctures behind anterior margin, otherwise smooth and glabrous. Ventral surface of prothorax almost completely densely pubescent; glabrous lateral portion of hypomeron reduced to narrow, strongly concave, distinctly oblique area, separated from hydrofuge part by strongly crested hypomeral carina, contiguous with lateral margin of pronotum in anterior half. Hypomeral antennal pocket very shallow. Prosternum very short in front of procoxae; intercoxal process strongly narrowed between procoxae; with small apical gibbosity. Mesoventrite (= preepisternum 2) with hydrofuge pubescence, except on well-developed, strongly reinforced anterior collar; median ridge only faintly indicated anteriorly; admedian ridges absent; intercoxal process broadly triangular, with a few subapical microtubercles. Suture between ventrite and anepisternum 2 indicated weakly by faint ridge, which is effaced posteriorly. Mesocoxal cavities nearly conjunct; mesepimeron subtriangular, not broadly reaching mesocoxal cavity. Mesocoxae subglobular, widely separated, not projecting. Scutellar shield triangular, concealed under pronotum. Elytra well sclerotized, strongly convex in cross section and strongly declivitous apically; covering abdomen completely; lateral rim serrate. Dorsal surface with 10 well defined rows of serial punctures (six between suture and shoulder); serial punctures very large and deeply impressed, more or less strongly effaced on apical declivity; interstices smooth and glabrous; intervals 3, 5, 7, and 9 partly elevated to form short microtuberculate ridges. Elytral gutter very narrow. Inflected lateral portion of elytra well-developed and wide, without pubescent portion. Inner surface of elytra and metanotum not examined. Metaventrite with distinct anterior, posterior and sublateral ridge; pubescence confined to lateral parts (lateral of sublateral ridge); disc deeply impressed in posterior half; katapisternal area deeply impressed; exposed part of anepisternum 3 very narrow. Metacoxae strongly transverse, widely separated by deep intercoxal cavity and anterior extension of ventrite I. Hind wings present; length and venation not examined. Legs stout; tarsi rather short, 5-segmented.

Abdomen with 10 tergites. Tergites VII and VIII strongly enlarged, with patches of distinct spicules. Tergite VIII with broad median longitudinal, weakly sclerotized groove and moderately long anterolateral apophyses. Tergite IX (Fig. 8) largely concealed by tergite VIII; lateral

margins strongly inflected; anterolateral apophyses longer than those of tergite VIII, reaching anterior margin of tergite VIII; posterior corners with conspicuous sharp-edged oval pits, from which long ingrowths (apodemes) originate. Tergite X (Figs. 5, 6, 8) subtriangular, sparsely covered with short setae, latter more densely set near anterior corners; anteriorly subtruncate; dorsal surface very strongly sclerotized except hyaline apical margin; lateral margin anterolaterally distinctly deflected, with very narrow hyaline margin. Pleura with cuticular spicules. Ventral surface of abdomen with six well-developed ventrites. Intercoxal sternite very small, elongately triangular, posteriorly impressed; lying deeply inside metaxocal cavity, visible only in detached abdomen. Lateral margins of ventrites and posterior border of metacoxal cavity not beaded. Hydrofuge pubescence confined to lateral portion of ventrite I. Ventrite I with conspicuous broad anteromedian (intercoxal) extension with strongly raised lateral margins, deeply impressed in anterior half, forming part of intercoxal cavity. Intersegmental space of ventrites I-V deeply impressed. Ventrite V very large. Ventrite VI (Fig. 7) very large; glabrous and smooth in anterior half, concave and sparsely pubescent in posterior half; anterior and posterior half separated by sinuous transverse ridge with three shallow pits (one median and two sublateral).

Gonocoxite more or less completely concealed by ventrite VI; lateral halves anteriorly distinctly separated, contiguous at posterior 0.4, proximally connected by hyaline membrane; apical margin with long setae; dorsal and ventral plates distinctly developed; dorsal plate distinctly separated transversally near middle; ventral plate much shorter than dorsal plate, proximally widely separated from dorsal plate.

Vaginal area (Fig. 9) with several asymmetrical, more or less distinct vaginal sclerites.

Spermatheca (Fig. 9) with very long distal portion, latter strongly curled apically.

DISCUSSION: The male of *Edaphobates puetzi* still is unknown. An egg found in one of the females is very large and bean-shaped (Fig. 4).

HABITAT (see Fig. 2): The type specimens were sifted from black soil of an alpine rhododendron forest (with mossy floor and some single *Betula* trees), ca. 2700 m a.s.l. (exact elevation not recorded, because GPS measurements deviated between 2600 [29.VI.1999] and 2780 m [21.VI.1999]).

DISTRIBUTION: Known only from the type locality.

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Reference

Jäch, M.A., 1998: Synopsis of the genus *Ochtheosus* Perkins (Coleoptera: Hydraenidae). - *Kolcopterologische Rundschau* 68: 171-174.

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