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***Tricholimnichus* gen.n. and three new species from Borneo (Coleoptera: Limnichidae)**

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Abstract

Tricholimnichus gen.n. (Coleoptera: Limnichidae) and three new species, *T. maior* sp.n., *T. sabahensis* sp.n. and *T. minor* sp.n., are described from the island of Borneo (Oriental Region). The new genus seems to be closely related to the Afrotropical *Cyclolimnichus* DELÈVE.

Key words: Coleoptera, Limnichidae, taxonomy, new genera, new species, Oriental Realm, Asia.

Introduction

An undescribed genus (including three new species) of Limnichidae was discovered in the collections of the Naturhistorisches Museum in Wien. The genus seems to be closely related to the Afrotropical *Cyclolimnichus* DELÈVE, 1968, recently revised by HERNANDO & RIBERA (2000). The new genus and the three new species are described below.

Acknowledgements and Acronyms

We thank Manfred A. Jäch for allowing us to "collect" in the drawers of the NMW, and for comments on the manuscript. Special thanks are due to W. Zelenka for the habitus illustration.

NHM The Natural History Museum, London

NMW Naturhistorisches Museum, Wien

***Tricholimnichus* gen.n.**

Type species: *Tricholimnichus maior* sp.n.

DIAGNOSIS: Habitus as in Fig. 1. Body colour from brown to black. Body oval, strongly convex dorsally, flat ventrally, mesosternal plaque slightly convex. Head partially inserted in pronotum, which is excavated for its reception; covered by dense, short pubescence. Eyes well developed, elongate and only partially visible when head inserted in pronotum, dorsal margin of eyes finely bordered. Antennae with 11 segments, first globular, second cylindrical, wider and as long, or slightly shorter, than third; third cylindrical, narrowing towards apex; 4th to 9th subequal, slightly asymmetrical at apex; 10th laterally truncated (Figs. 2-4). Last segment of maxillary palpi truncate. Pronotum transverse, posterior margin tri-sinuate, crenulated; lateral margins bordered; anterior angles acute, with a sub-apical small indentation for the insertion of the antennae; surface of pronotum finely punctate, spaces between punctures smooth and shiny. Two types of pubescence, one short and recumbent, reddish in colour, covering entire surface; another long, erect and sparse. Scutellum subtriangular, sides slightly curved. Elytra strongly convex, with margins bordered; surface covered with irregular, well defined punctures, surface between punctures smooth and shiny. Two types of pubescence: one dense, short and recumbent, forming

an elytral design of nine small golden dots regularly arranged; another long, erect and sparse. Ventral surface of thorax with deep excavations for reception of legs. Thoracic hypomera at a different level, but not divided by a sulcus or carina, posterior apex with a structure (a gland?). Apex of prosternal process blunt, firmly inserted in mesosternum (Figs. 8-10). Epipleura anteriorly excavated for reception of medial legs; strongly narrowing from first abdominal segment to apex. Mesosternum with a fine medial longitudinal sulcus, finely and sparsely punctate, covered with short, recumbent pubescence. Abdomen covered with the same type of pubescence as mesosternum; last sternite strongly emarginated (Figs. 5-7). Legs long, femora slightly engrossed, longitudinally excavated for reception of tibiae.

SEXUAL DIMORPHISM: Males: Aedeagus not articulated, parameres folded inwards (looking as if they had a medial articulation), internal fold strongly lobed, forming structures of highly diagnostic value; parameres articulated with medial lobe by means of an expansion of the internal fold (Figs. 11-19).

Females: Ovipositor long; apical gonocoxites short and strongly acuminate (Figs. 20-22). Spiculum ventrale with long manubrium; distal plaque with two lateral expansions (Figs. 23-25). Bursa copulatrix globular, large, with large well sclerotised plaques with denticles. Spermatheca small. Spermathecal gland long, rolled around the spermatheca and the ductus (Figs. 26-27).

REMARKS: *Tricholimnichus* gen.n. has to be included in the subfamily Limnichinae as defined by BRITTON (1971) and WOOLDRIDGE (1975), because of its transverse metacoxa, tarsi with five segments, absence of oblique sulcus in the hypomera, and excavated ventral surface for the reception of the legs.

Within the subfamily Limnichinae, only *Tricholimnichus* gen.n. and the Afrotropical genus *Cyclolimnichus* have elytral pubescence forming well defined series of spots. They also have the posterior margin of the pronotum with the same type of crenulation, although an undescribed genus close to *Pelochares* within Limnichidae, and members of other Dryopoidea families (e.g. Chelonariidae, Ptilodactylidae and Psephenidae) apparently share this character. Other characters common to both genera are a similar body shape, last sternite emarginated, hypomera not separated by sulcus or carinae, and aedeagus not articulated. These characters are however present in other Limnichinae, being at present not possible to establish their phylogenetic status (a wider phylogenetic revision of the family Limnichidae is in preparation).

Tricholimnichus gen.n. and *Cyclolimnichus* can be clearly separated by the following characters: antennal segments long and parallel, slightly asymmetrical at apex (short and pyriform in *Cyclolimnichus*); dorsal pubescence with two types of setae, one short and recumbent and another long and erect (only short pubescence in *Cyclolimnichus*); presence of an apparently glandular structure in the posterior extreme of the hypomeral vertex (absent in *Cyclolimnichus*); last sternite with a large emargination (not emarginated in *Cyclolimnichus*); structure of parameres; median lobe long with very short struts (parameres without foldings, short median lobe with long struts in *Cyclolimnichus*) (see HERNANDO & RIBERA 2000 for a detailed description and illustration of *Cyclolimnichus*).

The structure of the aedeagus of *Tricholimnichus* gen.n., with foldings in the parameres that give the appearance of being articulated (having four parameres), is superficially similar to that of the Neotropical genus *Phalacrichus* SHARP. However, in the latter the aedeagus is genuinely articulated, and the "extra" parameres are expansions of the base of the aedeagus (see WOOLDRIDGE 1982).

DISTRIBUTION: So far only known from the island of Borneo.

ECOLOGY: According to the (scarce) data available the species of *Tricholimnichus* gen.n. seem to inhabit the riverside vegetation and the understorey of mixed dipterocarpous tropical forests.

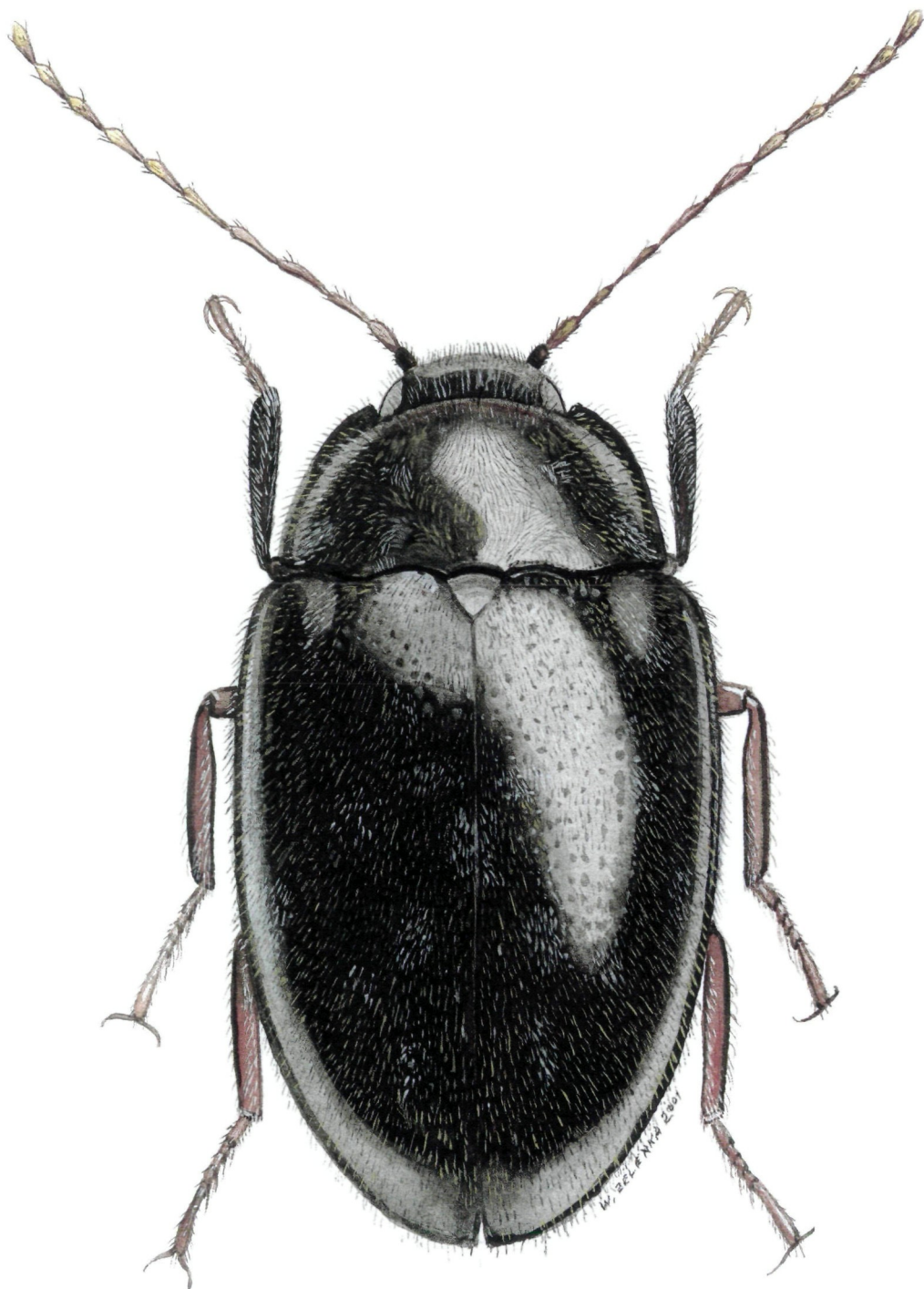
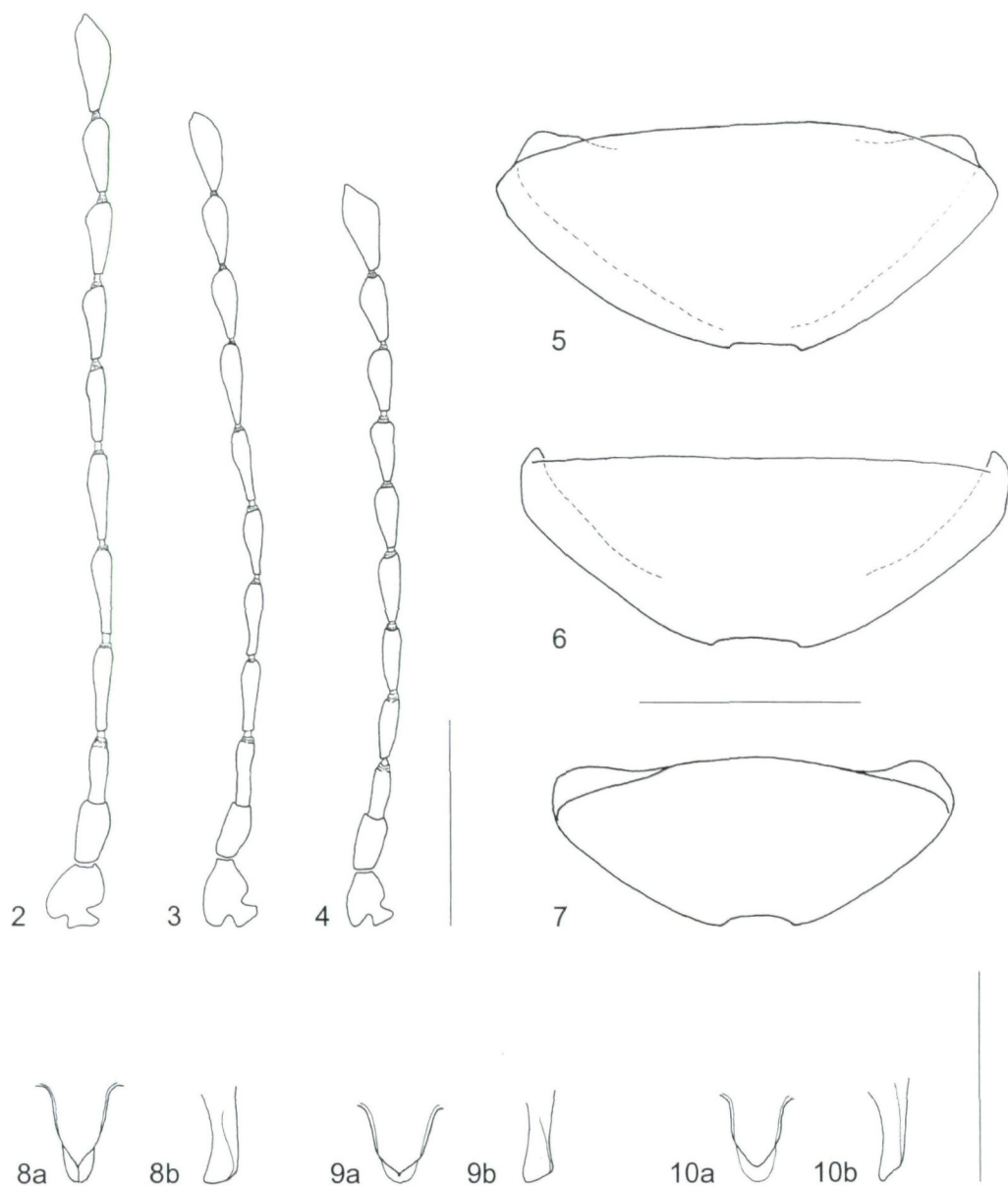
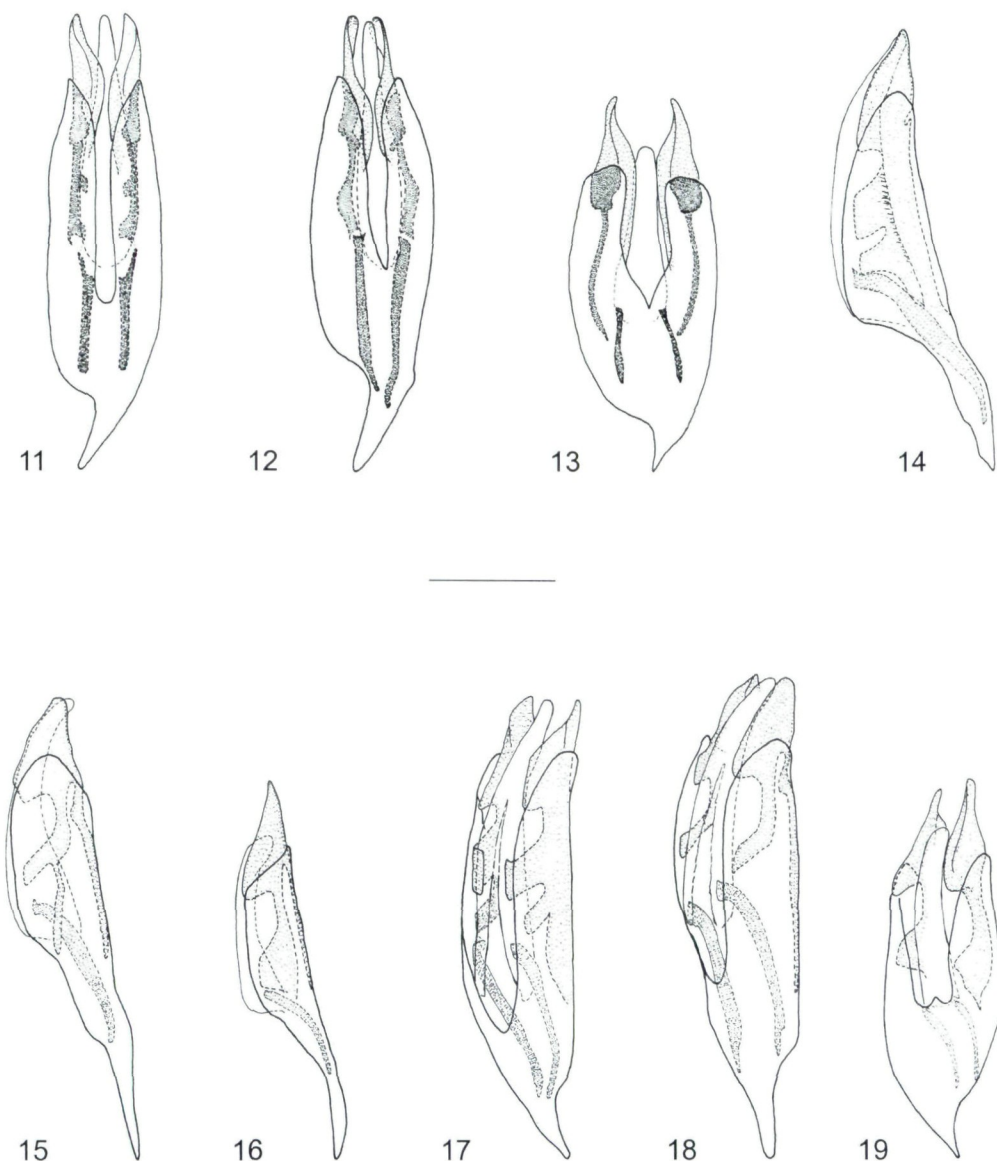


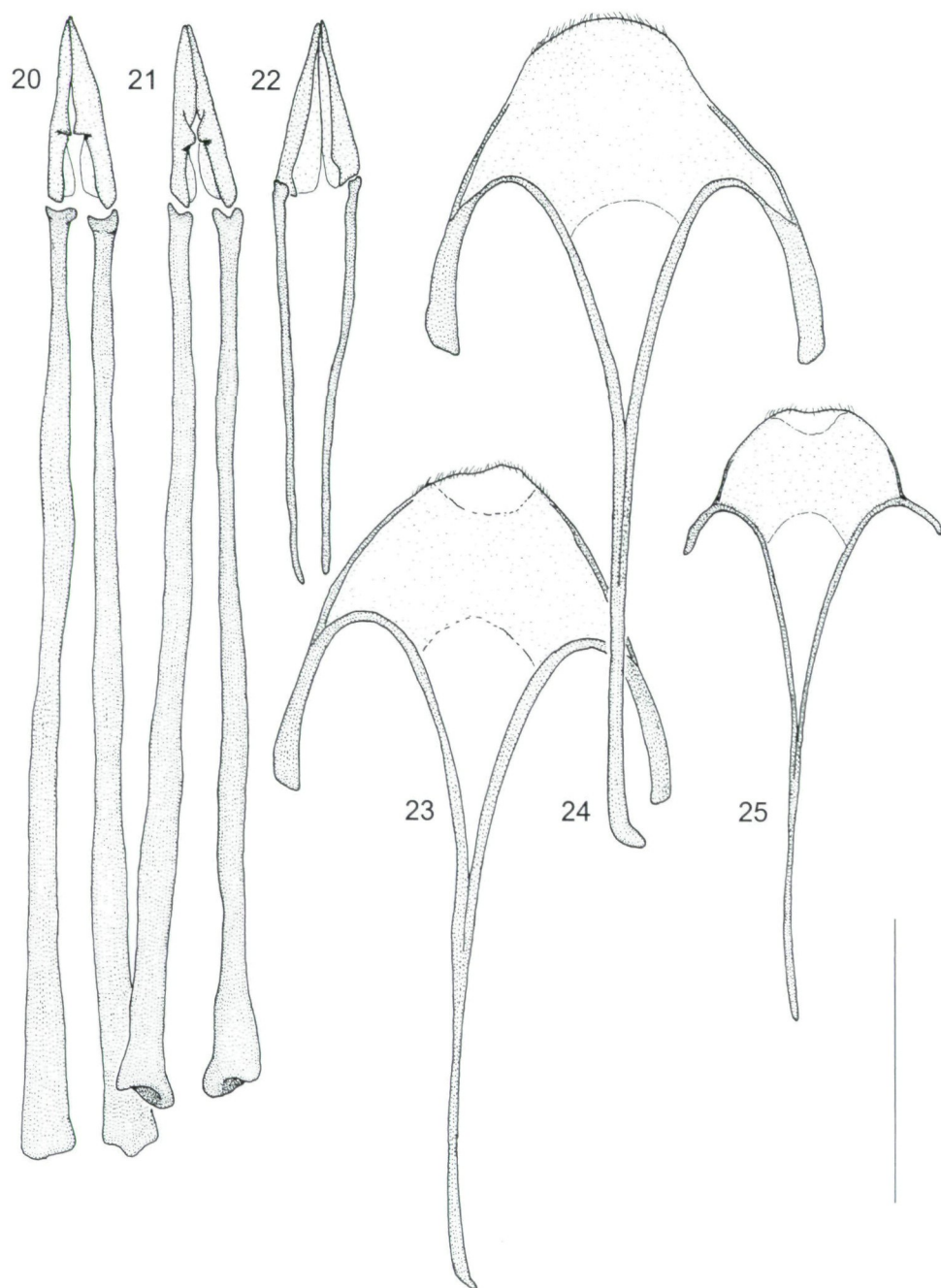
Fig. 1: Habitus of *Tricholimnichus maior* gen.n. et sp.n. (design by W. Zelenka)



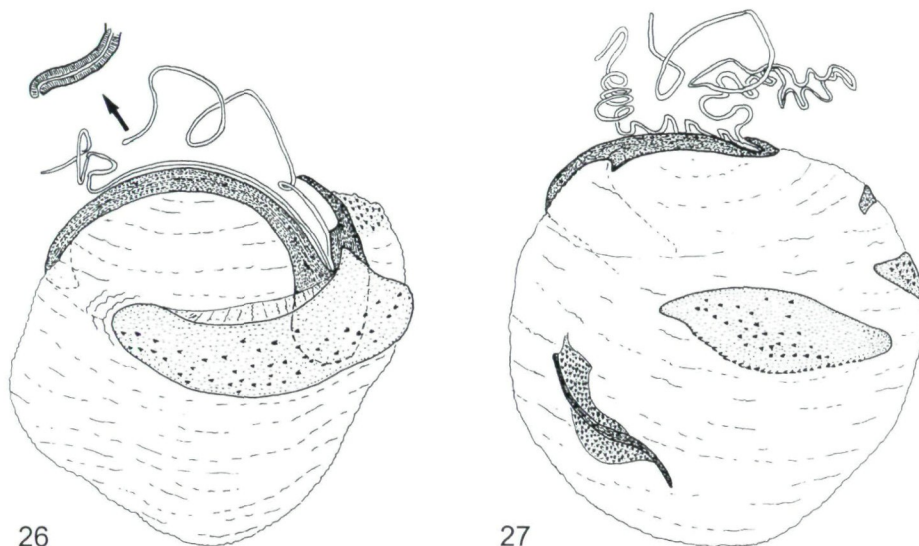
Figs. 2 – 10: *Tricholimnichus* gen.n., 2-4 antenna; 5-7 last abdominal sternite; 8-10 prosternal apophysis (a, ventral; b, lateral). 2, 5, 8, *T. maior* sp.n.; 3, 6, 9, *T. sabahensis* sp.n.; 4, 7, 10, *T. minor* sp.n. (traced from photographs). Scale bars, 0.5 mm.



Figs. 11 - 19: *Tricholimnichus* gen.n., aedeagus, ventral, lateral and dorsolateral views. 11, 14, 17, *T. maior* sp.n.; 12, 15, 18, *T. sabahensis* sp.n.; 13, 16, 19, *T. minor* sp.n. (traced from photographs). Scale bar, 0.2 mm.



Figs. 20 – 25: *Tricholimnichus* gen.n., 20-22, ovipositor; 23-25, spiculum ventrale. 20, 23, *T. maior* sp.n.; 21, 24, *T. sabahensis* sp.n.; 22, 25, *T. minor* sp.n. (traced from photographs). Scale bar, 0.5 mm.



Figs. 26 – 27: *Tricholimnichus* gen.n., spermatheca. 26, *T. maior* sp.n.; 27, *T. sabahensis* sp.n. (traced from photographs). Scale bar, 0.5 mm.

Tricholimnichus maior sp.n.

TYPE LOCALITY: Banjaran Crocker Mountains, Sabah province, Borneo, Malaysia.

TYPE MATERIAL: **Holotype** ♂ (NMW): "MALAYSIA - Sabah prov. / Banjaran Crocker Mts./ 16 km SW Gunung Alab / 4-9. V. 1996 alt. 790-850 m / M. Strba & R. Hergovits leg.", and holotype label. **Paratypes**: 36 exs., same locality and data (NMW); 3 exs. "E – MALAYSIA: Sabah / Batu Punggul Resort / 24-6.-1-7-1996 / Primary forest (11e)"; "Lower floor of / forest vegetation / Beating of undergrowth"; 14 exs, "SARAWAK (Borneo). / ca 40 km SE KAPIT / 03.1994, J. Kodada leg." (NMW); 4 exs., "SARAWAK (Borneo). / ca 40 km SE KAPIT / 3.1994, leg. J. Kodada" (NMW); 6 exs., "SARAWAK (Borneo). / ca 25 km E Kapit / III.1994, Kodada leg." (NMW); 1 ex., "MALAYSIA: Sarawak / ca. 80km S Kuching / Padawan, III. 1994 / leg. Kodada" (NMW); 1 ex., "MAL., Sarawak 1993 / Kelabit HL, Umg. Bario / 28.2., 1000-1200m / leg. M. Jäch (16)" (NMW); 1 ex., "MAL., Sarawak 1993 / 80km S Kuching, 18.2. / Kampung Ana Rais / leg. M. Jäch (4)" (NMW); 1 ex., "MALAYSIA, Sarawak / Mulu NP 3.3.1993 / leg. M. Jäch (19)" (NMW); 1 ex., "MAL. Sarawak 1993 / E Bandar Sri Amman / Batang Ai NP. 20.2. / leg. M. Jäch (9)" (NMW); 1 exs., "SARAWAK: Gunong / Mulu Nat. Park / R.G.S. Exped. 1977-78 / J.D. Holloway *et al.* / B.M. 1978-206", "Site 12. February / FEG 2, Mulu / 200m. 386469 / Mixed dipt. for. / Acl-understorey." (NHM); 1 ex. "SARAWAK: Gunong / Mulu Nat. Park / R.G.S. Exped. 1977-78 / J.D. Holloway *et al.* / B.M. 1978-206", "Site 18.March / W. Melinau Gorge / 100m. 428563 / Alluvial forest & / riverside veg. MV." (NHM).

DIAGNOSIS: Length 1.96 - 2.44 mm; maximum width 1.12 - 1.36 mm. Body colour dark brown to black. Head densely punctate, no space between punctures. Posterior margin of pronotum strongly crenulated; lateral margins strongly bordered. Elytra sub-parallel, apex acuminate, margins strongly bordered. Scutellum small. Prosternal apophysis narrow, with blunt apex and a small dorsal carina (Fig. 8). Mesosternum slightly convex, with a poorly defined longitudinal sulcus. Anterior apex of epipleura strongly excavated for the reception of legs. Antennae with second and third segments subequal in length (Fig. 2). Aedeagus as in Figs. 11, 14, 17, median lobe as long as parameres; parameres wide in lateral view; median lobe regularly narrowed towards the apex; apex blunt and slightly curved in lateral view; struts shorter than median lobe,

straight and pointing towards the ventral side. Female genitalia as in Figs. 20, 23; gonocoxite strongly acuminate and with ventral denticles; bursa copulatrix with a single sclerotised plaque; spermatheca with long ductus (Fig. 26).

REMARKS: The species is best characterised by the structure of the second and third segments of the antenna; the shape of the elytra (sub-parallel and acuminate at the apex); the narrow and dorsally carinated prosternal apophysis; and the structure of the male and female genitalia.

DISTRIBUTION: Sabah and Sarawak (Malaysia), in the island of Borneo.

***Tricholimnichus sabahensis* sp.n.**

TYPE LOCALITY: Batu Punggul Resort, Sabah province, Borneo, Malaysia.

TYPE MATERIAL: **Holotype** ♂ (NMW): "E – MALAYSIA: Sabah / Batu Punggul Resort / 24-6.-1-7-1996 / Primary forest (11e)"; "Lower floor of / forest vegetation / Beating of undergrowth", and holotype label. **Paratype** (NMW): 1 ♀, same locality and data as holotype.

DIAGNOSIS: Length 2.04 - 2.22 mm; maximum width 1.28 - 1.32 mm. Body colour dark brown to black. Head with strong, sparse punctation. Antenna with second segment shorter than third (Fig. 3). Posterior margin of pronotum strongly crenulated; lateral margins strongly bordered. Elytra oval; lateral borders fine; covered by large sparse punctures. Excavation of anterior apex of epipleura shallow. Scutellum large, sides strongly curved. Prosternal apophysis wide; apex round, somewhat acuminate, without carinae (Fig. 9). Mesosternum slightly convex, with a poorly defined longitudinal sulcus. Aedeagus as in Figs. 12, 15, 18, median lobe as long as the parameres; parameres narrow in lateral view; median lobe regularly narrowed towards apex; apex blunt and slightly curved in lateral view; struts almost as long as median lobe, straight and pointing towards ventral side. Female genitalia as in Figs. 21-24; gonocoxite strongly acuminate and with ventral denticles; bursa copulatrix with two large lateral sclerotised plaques; spermatheca with short ductus (Fig. 27).

REMARKS: The species seems to be close to *T. maior* sp.n., from which can be easily separated by the oval shape of the body; the less dense punctation of the head; the length of the second segment of the antenna; the larger scutellum, lateral margin of the elytra finer, prosternal apophysis short and broad, excavation of the epipleura shallow, and the structure of the male and female genitalia.

DISTRIBUTION: Sabah (Malaysia), Island of Borneo.

***Tricholimnichus minor* sp.n.**

TYPE LOCALITY: ca. 40 km SE Kapit, Sarawak province, Borneo, Malaysia.

TYPE MATERIAL: **Holotype** ♂ (NMW): "SARAWAK (Borneo). / ca 40 Km SE KAPIT / 03.1994, J. Kodada leg.", and holotype label. **Paratypes** (NMW): 4 exs., same locality and data as holotype.

DIAGNOSIS: Length 1.64 - 1.78 mm; maximum width 1.04 - 1.08 mm. Body colour pale brown. Head densely punctate, with space between punctures smaller than their diameter. Antenna with the last segment strongly asymmetric, with second and third segments subequal in length (Fig. 4). Posterior margin of pronotum finely crenulated; lateral margins finely bordered. Elytra sub-parallel, margins strongly bordered. Scutellum small. Prosternal apophysis short, with blunt apex, without dorsal carina; internal margin prominent in lateral view (Fig. 10). Mesosternum slightly convex, with longitudinal sulcus only visible in its posterior half. Anterior apex of epipleura strongly excavated for reception of legs. Aedeagus as in Figs. 13, 16, 19, median lobe as long as parameres; parameres narrow in lateral view; median lobe parallel-sided; apex blunt and curved in lateral view from ca. one third of its length; struts straight, shorter than

median lobe. Female genitalia as in Figs. 22-25; gonocoxite acuminate, without ventral denticles; spiculum ventrale with two short sclerotised lateral expansions. Spermatheca unknown.

REMARKS: The species is clearly recognisable for its smaller size; the sides of the pronotum finely bordered, with the basal crenulation also finely impressed; the mesosternal sulcus only visible in its posterior half; prosternal apophysis with a prominent internal margin in lateral view; and structure of the male and female genitalia.

DISTRIBUTION: Sarawak (Malaysia), island of Borneo.

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