

EPIMETOPIDAE: Synopsis of the genus *Eumetopus* BALFOUR-BROWNE (Coleoptera)

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Abstract

Eumetopus BALFOUR-BROWNE (Coleoptera: Epimetopidae) is revised taxonomically. All known species are treated and two new species are described: *Eumetopus asperatus* (CHAMPION) [India, Nepal], *E. bullatus* (SHARP) ["India"], *E. flavidulus* (SHARP) [Sri Lanka, India], *E. maindroni* (RÉGIMBART) [India], *E. acutimontis* sp.n. [China], and *E. tibialis* sp.n. [Thailand]. A lectotype is designated for *Eumetopus maindroni* (RÉGIMBART). A key to the species is provided. The family Epimetopidae is recorded for the first time from China, Thailand and Nepal.

Key words: Coleoptera, Epimetopidae, *Eumetopus*, new species, China, Thailand, Nepal.

Introduction

The hydrophiloid family Epimetopidae is comprised of three genera: *Epimetopus* LACORDAIRE, *Eupotemus* JI & JÄCH, and *Eumetopus* BALFOUR-BROWNE.

Epimetopus is restricted to the New World, *Eupotemus* occurs in Africa only, and *Eumetopus* is confined to the Oriental Region, where it was so far known only from India and Sri Lanka.

The genus *Eumetopus* was erected by BALFOUR-BROWNE (1949). Its type species is *Sepidulum bullatum* SHARP, 1874 (designated by BALFOUR-BROWNE 1949).

The present paper includes a taxonomic revision of *Eumetopus*, with a key and description of two new species. The known distribution of the genus is greatly widened - it is here recorded for the first time from China, Thailand and Nepal.

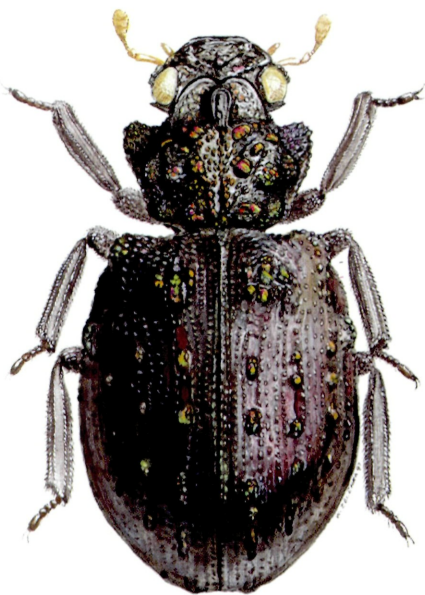
Material and methods

The material used for this study is based partly on specimens collected by the CWBS (deposited in the CASS and NMW) and type material and specimens from additional institutions (see below).

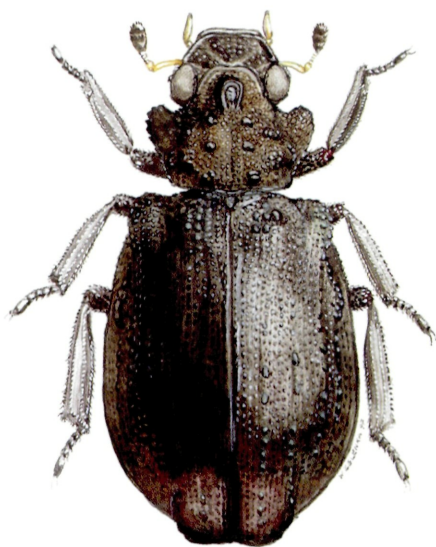
Specimens were examined with a Wild M5A stereoscopic microscope with direct lighting and a Wild M10 stereoscopic microscope with diffuse lighting. In addition, aedeagi were examined with an Olympus BH-2 microscope with transmitted light.

Aedeagal illustrations were drawn by the senior author with the aid of a drawing tube attached to an Olympus BH-2. Male genitalia were placed in concentrated lactic acid in a cavity slide for at least several hours before they were examined.

Female genitalia and hind wing venation have not been examined.



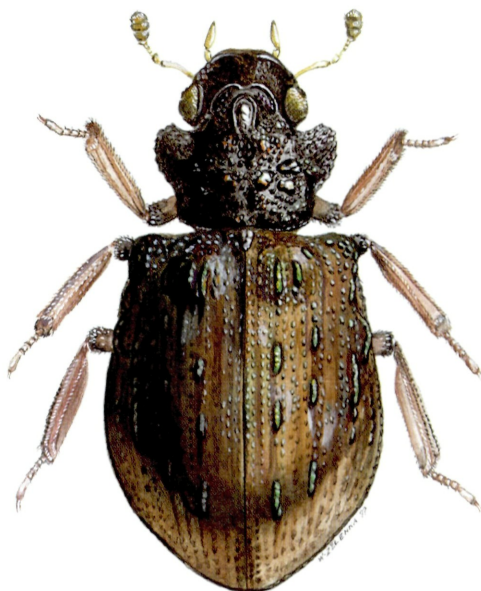
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4

Figs. 1 - 4: Habitus of 1) *Eumetopus bullatus*, holotype ♂; 2) *E. asperatus* ♀; 3) *E. flavidulus*, holotype ♀; 4) *E. acutimontis*, holotype ♂.

Acronyms & CWBS localities:

BML	The Natural History Museum, London [formerly: British Museum (Natural History)]
CASS	Chinese Academy of Sciences, Institute of Applied Ecology, Shenyang
CWBS	China Water Beetle Survey
MHC	Michael Hansen Collection, Copenhagen
MIINP	Muséum national d'Histoire naturelle, Paris
NME	Naturkundemuseum, Erfurt
NMW	Naturhistorisches Museum, Wien

CWBS loc. 204: **Hainan Province**; Ledong County; foot of Jianfeng Mountain, ca. 4 km E Jianfeng Town; river, ca. 5 - 10 m wide, fast flowing, through secondary forest, with big rock boulders, margins with rock pools, springfed pools and some seepage water, ca. 150 m a.s.l.; 22./24.I.1996; leg. Jäch, Ji & Wang (see Fig. 11).

CWBS loc. 216: **Hainan Province**; Wanning County; ca. 8 - 10 km W Dongxing Town; meandering river, crossing the Dongxing-Jianfeng road three times, ca. 3 - 6 m wide, slightly turbid, with sand and gravel, flowing through cultivated land (rubber plantations, village gardens, rice fields, bamboo groves); ca. 70 m a.s.l.; 26.I.1996; leg. Jäch, Ji & Wang.

***Eumetopus* BALFOUR-BROWNE, 1949**

Eumetopus BALFOUR-BROWNE 1949: 13. - HANSEN 1991.

Type species: *Sepidulum bullatum* SHARP, 1874, designated by BALFOUR-BROWNE (1949).

DESCRIPTION: Body form strongly convex. Dorsal surface (except labrum) conspicuously granulate and tuberculate. Coloration yellowish or brownish, often with metallic lustre.

Labrum short, anteriorly gently emarginate. Clypeus transverse, subtrapezoidal, widest across hind angles; vaulted medially, impressed laterally; anterior and lateral margin strongly deflexed, submarginally ridged; fronto-clypeal suture well demarcated, arcuate, continued posteriorly to form a median longitudinal groove. Frons partly concealed by anterior pronotal median projection. Eyes large, protruding; posteriorly emarginate (lateral view); anteriorly deeply divided horizontally by a conspicuous canthus. Antennae 9-segmented, club compact, pubescence of club composed of very short hairs. Maxillary palpi short, slightly shorter than width of labrum; terminal segment about as long as remaining segments, slightly asymmetrical.

Pronotum distinctly wider than long, widest near anterior corners; anteriorly with three projecting lobes, the median lobe being the widest and longest of these lobes; margin of median lobe strongly deflexed and ridged submarginally, often slightly excised anteriorly; upper surface of median lobe with a conspicuous umbilicate, elongate tubercle; lateral margin sinuately convergent to base, crenulate or denticulate; posterior angles obtuse or rectangular; disc with tubercles of varying size.

Scutellum small, elongate. Elytra strongly convex, strongly declivitous laterally and apically; with 10 punctate striae and with a short scutellary stria. Intervals 3, 5, 7, and 9 with several prominent, rounded or elongate, glabrous, often metallic tubercles; interval 4 with usually one such tubercle near base; interval 2 in at least one species with such a subbasal tubercle; shoulders prominent, area between suture and shoulders subbasally elevated; elytra shallowly transversally impressed posterior of subbasal elevation; lateral margin only very narrowly explanate; serrate at least anteriorly.

Mentum and submentum forming an almost right angle. Gula triangular. Prosternum short, medially carinate; procoxal cavities open posteriorly. Outer hypomeron very narrow, separated from inner hypomeron by a sharp ridge; inner hypomeron strongly concave. Metasternum rimmed anteriorly; with a transverse, elongate, conspicuously glabrous torus, distinctly tapering laterad, more or less widely interrupted laterally (tripartite), often produced into a short carina postero-medially.

Abdomen glabrous, with five ventrites; first ventrite very short.

Legs rather stout; with conspicuous squamous setae. Femora with obtuse tooth on ventral face. Tibiae with longitudinal ridges covered by squamous setae. Tarsi 5-segmented, setose ventrally; apical segment with bisetose empodium; claws rather small.

Aedeagus (Figs. 5 - 10): The aedeagal diversity within the genus is in sharp contrast with the external conformity of the known species. Median lobe (penis) usually slender; without distinct corona. Parameres usually well developed and wide, often divided into two distinct lobes. Phallobasis conspicuously long (always distinctly longer than penis), tubular, strongly curved (lateral view), strongly narrowed toward base.

Sexual dimorphism: Elytral intervals 2, 3 and 5 apically elevated in females of some species to form apical ridges or tubercles. Elytral apices more acuminate in females of some species. Tarsal segments (especially protarsal ones) of males usually wider, more densely setose, claws stronger. Female hind tibia more strongly compressed laterally in some species.

Larva: the larva of *Eumetopus* is unknown. The larva of *Epimetopus trogoides* (SHARP) was described by ROCHA (1967) and COSTA & al. (1988). The larva of *Epimetopus thermarum* was described by ROCHA (1969).

DIFFERENTIAL DIAGNOSIS: *Eumetopus* can be distinguished from *Eupotemus* and *Epimetopus* by numerous characters: e.g., by the short hairs of the antennal club, by the pronotum lacking distinct longitudinal ridges, by the absence of distinct elytral carinae, by the presence of a glabrous transverse metasternal torus, by the elongate phallobase.

ECOLOGY and BEHAVIOR: Very little is known about the ecology and behavior of Epimetopidae. *Epimetopus flavidulus* was collected "in a dried-up riverbed, hiding under stones that lay on fine moist sand with algae" (HANSEN 1991). The type locality of *E. acutimontis* (CWBS loc. 204) is described above (see also Fig. 11). However, we are not aware whether the two specimens were collected at the river margin, or in a rock pool or in one of the springfed pools close to the river. Although we spent a second day at the same locality we were unable to find additional specimens.

The species of *Eumetopus* seem to be associated with running water (or at least their margins). Females carry egg cases.

Specimens of *E. tibialis* were collected at light.

DISTRIBUTION (Fig. 12): So far known from Sri Lanka, India, Nepal (first record), Thailand (first record), China (first record).

Eumetopus bullatus (SHARP)

Sepidulum bullatum SHARP 1875: 249.

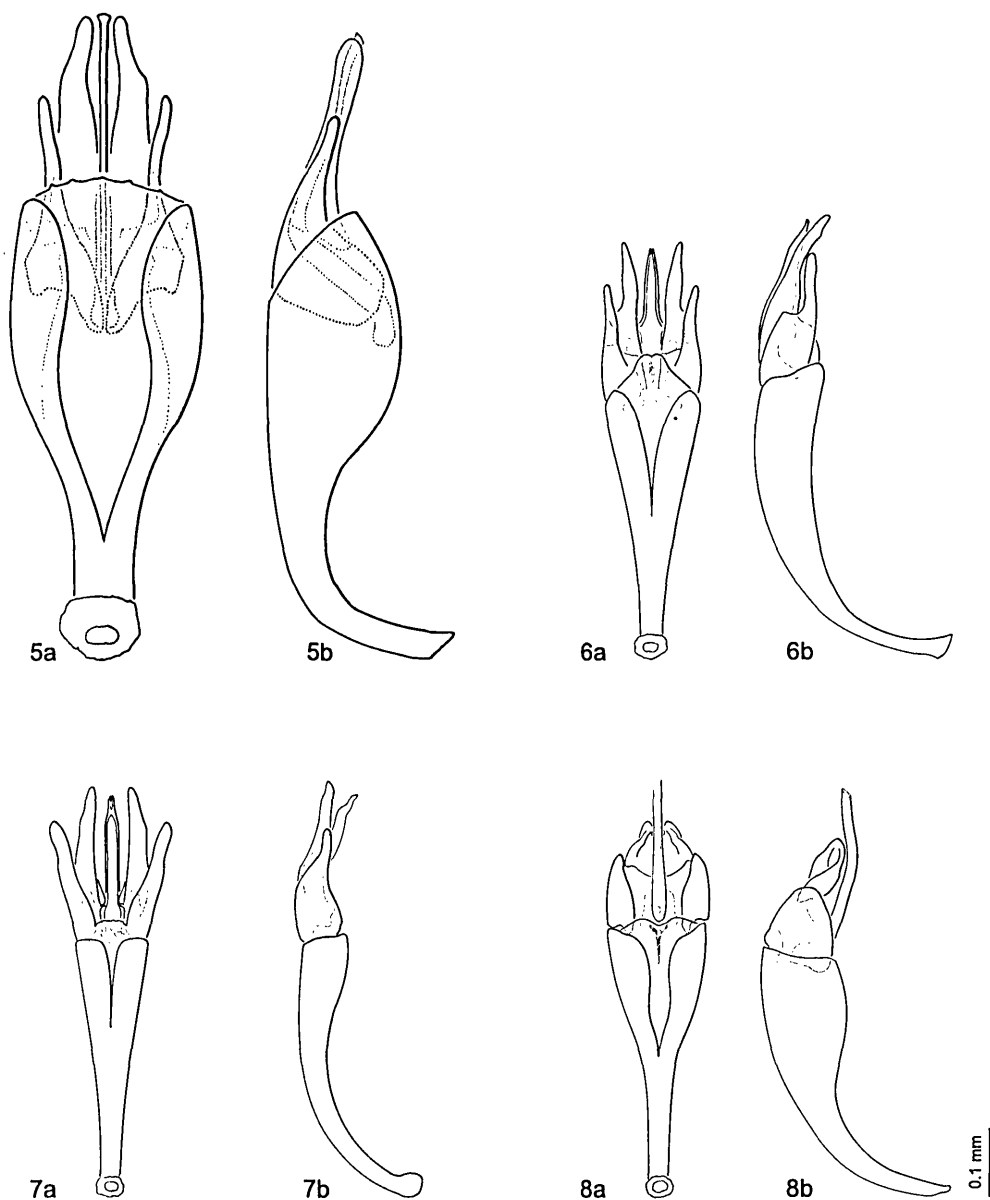
Epimetopus bullatus: SCHWARZ & BARBER 1917. - KNISCH 1924. - d'ORCHYMONT 1928.

Eumetopus bullatus: BALFOUR-BROWNE 1949.

TYPE LOCALITY: "India" (SHARP 1875).

TYPE MATERIAL: **Holotype** ♂, by monotypy (BML), examined: "Type H.T. \ India \ Sharp Coll. 1905-313. \ *Sepidulum bullatum* Type, D.S. \ Aedeagus drawn by P.D.Perkins 1992 \ Holotype *Eumetopus bullatus* (SHARP) vid. Jäch 1997". Two legs, one antenna and one maxillary palp are kept separately in a small plastic vial which is mounted on the same pin.

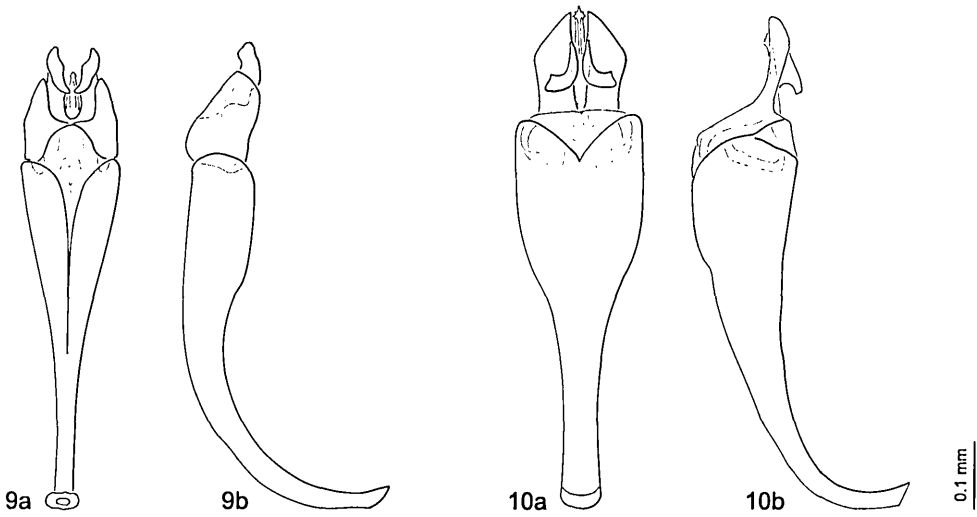
DIAGNOSIS: Habitus (Fig. 1). 4.0 - 4.3 mm long. Body dark brown to black. Elytral granules and tubercles prominent.



Figs. 5 - 8: Aedeagus of 5) *Eumetopus bullatus*, holotype, a) ventral view, b) same, lateral view; 6) *E. asperatus*, holotype, a) ventral view, b) lateral view; 7) *E. flavidulus*, specimen from Sri Lanka, a) ventral view, b) lateral view; 8) *E. acutimontis*, holotype, a) ventral view, b) ventral view.

Aedeagus (Fig. 5): Large and stout. Median lobe very slender, nearly parallel-sided, slightly longer than parameres. Parameres elongate, inner lobe robust, about as long as penis; outer lobe slender, distinctly shorter than penis. Phallobase distinctly widened caudally.

Female unknown.



Figs. 9 - 10: Aedeagus of 9) *Eumetopus tibialis*, holotype, a) ventral view, b) lateral view; 10) *E. maindroni*, holotype, a) ventral view, b) lateral view.

DISTRIBUTION (Fig. 12): So far known only from the type locality.

Eumetopus asperatus (CHAMPION)

Epimetopus asperatus CHAMPION 1919: 237. - KNISCH 1924. - d'ORCHYMONT 1933. - d'ORCHYMONT 1928.

Eumetopus asperatus: BALFOUR-BROWNE 1949.

TYPE LOCALITY: West Almora, Kumaon, Uttar Pradesh, India.

TYPE MATERIAL: **Holotype** ♂ (BML), examined: "Type H. T. \ Kumaon, W.Almora. India. H.G.C. \ 1919.-?8. \ *Epimetopus asperatus* Champ. \ Holotype *Eumetopus asperatus* (CHAMP.) vid. Jäch 1997". **Paratype** (BML): 1 ♂: "Sarju Valley, Kumaon, 5000ft. India. H.G.C. \ G.C. Champion. Brit.Mus. 1925-42. \ *Epimetopus asperatus* small Ch! \ Paratype *Eumetopus asperatus* (CHAMP.) vid. Jäch 1997".

The note made in the original description by CHAMPION (1919): "The description is taken from a single specimen, but others were subsequently taken in the same district" can be considered as a type designation. The number of paratypes is unknown.

ADDITIONAL MATERIAL EXAMINED:

INDIA: HIMACHAL PRADESH: 1 ♀ (BML): "Dhelu, Mandi, Punjab. 4500ft. H.G.C. \ B.M. 1927-92. G.C. Champion. \ *Epimetopus asperatus* ♀ Ch".

NEPAL: 1 ♂ (NME): "NÉPAL, Prov. Bheri, Katla-Khola S Dailekh 800 - 900 m NN 31.V.1995 leg.: J. Weipert".

DIAGNOSIS: Habitus (Fig. 2). 3.0 - 3.9 mm long. This species is quite deviating externally from the remaining species of the genus. Dark brown, almost black. Granules of pronotum and elytra well developed, prominent and densely arranged, but tubercles (especially of elytra) more or less effaced and inconspicuous.

Third and fifth elytral interval forming an apical ridge in female.

Aedeagus (Fig. 6): Long and slender. Median lobe long and slender, acuminate apically. Parameres elongate, distinctly bilobed; inner lobe slightly longer than penis, with conspicuous lateral tooth-like process near middle; outer lobe distinctly shorter than penis, abruptly attenuate near middle (lateral view) and recurved in apical half. Phallobase long and slender.



Fig. 11: CWBS loc. 204, Prof. L. Ji, background: Jianfang [= Sharp Peak] Mountain [Foto: M.A. Jäch].

DISTRIBUTION (Fig. 12): India (Uttar Pradesh, Himachal Pradesh), Nepal. First record for Himachal Pradesh and Nepal.

Eumetopus flavidulus (SHARP)

Epimetopus flavidulus SHARP 1890: 355. - SCHWARZ & BARBER 1917. - KNISCH 1924. - d'ORCHYMONT 1928. - d'ORCHYMONT 1933.

Eumetopus flavidulus: BALFOUR-BROWNE 1949.

TYPE LOCALITY: Kandy, Sri Lanka.

TYPE MATERIAL: Holotype ♀, by monotypy (BML), examined: "Type H.T. \ Kandy. 1,546-1,727 ft. 17-23.II.82. \ Ceylon. G. Lewis. 1910-320. \ 18.2.88 \ *Epimetopus flavidulus* Type.D.S. \ Spermatheca drawn by P.D. Perkins 1993 \ Holotype *Eumetopus flavidulus* (SHARP) vid. Jäch 1997". The abdomen is kept separately in a small plastic vial which is mounted on the same pin.

ADDITIONAL MATERIAL EXAMINED:

INDIA: 2 ♀♀ (NMW): "S-INDIA Kerala 300 m, Cardamom Hills, 50 km NW Pathanamthitta, nr Pambaiyar river (P1) / 27.-29.12.1993, 77°05'E / 09°25'N Boukal D. + Kejval Z. lgt."; 1 ♀ (NMW): "S-INDIA Kerala 300 m, Cardamom Hills, 50 km NW Pathanamthitta, nr Pambaiyar river (P1) / Larger Stream near Pambaiyar River, 27.-29.12.1993 (12), leg. Boukal & Kejval"; 1 ♂ (NMW): "INDIA: Orissa, dist. Ganjam, N Berhampur / Kalasandhapur, 20.-21.2.1994, leg. Kejval" (NMW). 1 ♂: "NE-INDIA: Meghalaya, W Garo Hills, Bagmara, ca. 100m / 25°11.5'N 90°38.5'E, 19. - 21. 5. 1996, leg. Jendek & Šauša".

SRI LANKA: 1 ♂ (MHC): "CEYLON, E. PROV, Arugam Bay, 3-17 / vii - 1985, Ole Mehl Leg. / M. Hansen".

DIAGNOSIS: Habitus (Fig. 3). 2.6 - 3.2 mm long. Elytra yellowish brown; head and pronotum black, strongly metallic. Elytral granules less prominent than in *E. bullatus* and *E. maindroni*.

Female: second and third elytral interval subapically elevated to form a short elongate tubercle; elytral apex more distinctly acuminate; hind tibia more strongly compressed laterally; tarsal segments (especially protarsal ones) less wide, less densely setose, claws less strong.

Aedeagus (Fig. 7): Slender. Median lobe very slender, nearly parallel-sided, acuminate apically. Parameres elongate, distinctly bilobed; inner lobe slightly longer and slightly wider than penis; outer lobe distinctly shorter than penis, slanting. Phallobase slender, not strongly widened apically.

DISTRIBUTION (Fig. 12): Sri Lanka, India (Kerala, Orissa, Meghalaya). First record for India.

Eumetopus acutimontis sp.n.

TYPE LOCALITY: CWBS loc. 204 (see Fig. 11).

TYPE MATERIAL: **Holotype** ♂ (CASS): "CHINA: Hainan (204) 4km E Jianfeng, 150m Jianfeng Mt., 1996 22./24.1., Ji & Wang". **Paratypes** (NMW): 1 ♀, same label data as holotype; 1 ♀ (CWBS loc. 216): "CHINA: Hainan (216) 8-10km W Dongxing 70m, 26.1.1996 leg. Ji & Wang".

DIAGNOSIS: Habitus (Fig. 4). 2.8 - 3.1 mm long. Externally, very similar to *E. flavidulus*. Metatibia distinctly compressed laterally in both sexes, more strongly in female than in male (female metatibia more strongly compressed than female metatibia of *E. flavidulus*). Second and third intervals not elevated apically in female.

Aedeagus (Fig. 8): Median lobe very long and slender, distinctly surpassing parameres (tip broken in holotype), slightly curved (lateral view). Parameres short and robust; not distinctly bilobed, but consisting of a basal, straight or slightly divergent part and an apical, distinctly convergent part (ventral or dorsal view). Phallobase strongly tapering toward base.

DISTRIBUTION (Fig. 12): So far known only from Hainan Island, Southeast China.

ETYMOLOGY: Named in reference to Jianfang [= Sharp Peak] Mountain (see Fig. 11) at the foot of which this species was collected.

Eumetopus tibialis sp.n.

TYPE LOCALITY: Mac Hong Son, North Thailand.

TYPE MATERIAL: **Holotype** ♂ (NMW): "N - THAILAND 1993 Mae Hong Son 1000m 16.-23.VI. leg. Schneider". **Paratypes** (NMW, CASS): 1 ♀: "NW-THAILAND 1992 Mae Hong Son Huai Sua Tao 11.-17.V. leg. Jan Strnad"; 10 exs.: "N-THAILAND, 10.-17.4. 18°48'N 98°57'E Chiang Mai, Zoo (Licht) leg. Chantaramongkol & Malicky 1989"; 3 exs.: "NW-THAILAND Chiang Mai (Zoo) 23.5.-1.6.1988 leg. Malicky (Licht)"; 1 ex.: "NW-THAILAND Chiang Mai (Zoo) 9.-16.5.1988 leg. Malicky (Licht)"; 2 exs.: "N-THAILAND, 18.-25.4. 18°48'N 98°57'E Chiang Mai, Zoo (Licht) leg. Chantaramongkol & Malicky, 1989"; 1 ex.: "NW-THAIL.:Chiang Mai 98°57'E 18°49'N, Zoo 24.-31.10.1988 Malicky & Chantaramongkol LF"; 2 exs.: "THAILAND, Mae Ping 24.-25.6.1991 leg. Malicky (Licht)".

ADDITIONAL MATERIAL EXAMINED: 1 ♀: Nepal, Godavari, 1992, leg. Jeniš (NMW); 1 ♀: "Schmidt-Göbel 1884." (NMW). On account of the strongly compressed hind tibiae and the non costate apical elytral intervals two and three, these specimens might belong to *E. tibialis*.

DIAGNOSIS: 2.6 - 3.4 mm long. Externally, very similar to *E. flavidulus* and *E. acutimontis*. Hind tibia even more strongly compressed in both sexes than in *E. acutimontis*. Second and third intervals not (or only very inconspicuously) elevated apically in female.

Aedeagus (Fig. 9): Median lobe short and slender. Parameres robust; distinctly bilobed, outer lobe more or less as long as penis, ventrally with a conspicuous tooth-like process, inner lobe distinctly surpassing penis, apically sinuous and slender, with a conspicuous tooth-like process. Phallobase very long, about three times as long as penis, very slender and strongly curved in basal half.

DISTRIBUTION (Fig. 12): So far known with certainty from North Thailand (Chiang Mai, Mac Ping, Mac Hong Son) only. It probably also occurs in Nepal.

ETYMOLOGY: Named in reference to the remarkably compressed hind tibiae.

Eumetopus maindroni (RÉGIMBART)

Epimetopus maindroni RÉGIMBART 1903: 338. - SCHWARZ & BARBER 1917. - KNISCH 1924. - d'ORCHYMONT 1928. - d'ORCHYMONT 1933.

Eumetopus maindroni: BALFOUR-BROWNE 1949.

TYPE LOCALITY: "Gengi" [= Gingee], NW of Pondicherry, Tamil Nadu, South India.

TYPE MATERIAL: **Lectotype** ♂ (MHNP), present designation, examined: "COROMANDEL, M. Maindron / GENJI, 25 aout - 15 sept., 1901 / MUSEUM PARIS, COROMANDEL, GENJI, M. MAINDRON 1902 / TYPE / *Epimetopus maindroni* Rig. typ., Determ. D. Dr Regimbart / LECTOTYPUS ♂ *E. maindroni* des. Ji & Jäch / Paralectotypus ♀ *E. maindroni* des. Ji & Jäch ". **Paralectotype** ♀ (NHMP): head and prothorax missing, mounted on the same pin as lectotype.

DIAGNOSIS: Lectotype ca. 2.5 mm long. Body dark brown to black. Elytral tubercles and granules well developed and prominent.

Paralectotype ♀ much larger than male; third elytral interval conspicuously raised apically, gradually widening toward apex.

Aedeagus (Fig. 10): Large. Median lobe quite slender in ventral view. Parameres wide, flattened dorso-ventrally, about as long as penis; not bilobed, but with conspicuous, oblique, parabolic, ventral velum. Phallobase about twice as long as penis.

DISTRIBUTION (Fig. 12): So far known only from the type locality.

Key to the species of *Eumetopus*

Although there are probably several good external characters to distinguish all known species of *Eumetopus*, this key is based mainly on aedeagal characters. Since we have so far seen only few "historical" (partly inadequately preserved) specimens of *E. bullatus* and *E. maindroni* our knowledge of the external morphology of these species is still incomplete. Females of *E. bullatus* are still unknown. Head and prothorax of the female of *E. maindroni* are still unknown. The specimens of *E. asperatus* are too inadequately preserved to allow a more thorough examination of all their body parts. We have not examined the underside of these species and we lack information on morphological variability.

- | | | |
|---|---|--------------------|
| 1 | Elytral intervals 3, 5, 7 and 9 with prominent tubercles (Figs. 1, 3, 4) | 2 |
| - | Tubercles of elytral intervals 3, 5, 7 and 9 not very prominent (Fig. 2) | <i>asperatus</i> |
| 2 | Penis approximately as long as parameres or shorter than parameres (Figs. 5 - 7, 9, 10) | 3 |
| - | Penis surpassing parameres distinctly (Fig. 8) | <i>acutimontis</i> |
| 3 | Penis approximately as long as parameres (Figs. 5 - 7, 10) | 4 |
| - | Penis shorter than inner lobe of parameres (Fig. 9) | <i>tibialis</i> |
| 4 | Parameres deeply bilobed, consisting of two long and slender parts (Figs. 5 - 7) | 5 |
| - | Parameres not bilobed, but with conspicuous parabolic, ventral velum (Fig. 10) | <i>maindroni</i> |
| 5 | Phallobase distinctly widened apically (Fig. 5) | <i>bullatus</i> |
| - | Phallobase only gently widened apically (Fig. 7) | <i>flavidulus</i> |



Fig. 12: Geographical distribution of *Eumetopus*.

Acknowledgements

Our sincere thanks are due to all curators of the collections mentioned above. The habitus drawings were made by Mr. W. Zelenka, Vienna. The project was supported in part by a grant ("Systematic and evolutionary Biology") of the Chinese Academy of Sciences.

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This bibliography is a compilation of all relevant taxonomic papers on Epimetopidae and includes also articles which are not cited in the running text.

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Jahr/Year: 1998

Band/Volume: [2](#)

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Artikel/Article: [Epimetopidae: Synopsis of the genus Eumetopus Balfour-Browne \(Coleoptera\) 195-205](#)