

**Zeitschrift:** Archives des sciences et compte rendu des séances de la Société  
**Band:** 48 (1995)  
**Heft:** 2: Archives des Sciences

**Artikel:** Contribution to the knowledge of the East Asian Bryaxis (Coleoptera, Staphylinidae, Pselaphinae)  
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**DOI:** <https://doi.org/10.5169/seals-740253>

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CONTRIBUTION TO THE KNOWLEDGE  
OF THE EAST ASIAN *BRYAXIS*  
(COLEOPTERA, STAPHYLINIDAE, PSELAPHINAE)

BY

Serguei A. KURBATOV\* & Ivan LÖBL\*\*

(Ms reçu le 13.2.1995, accepté le 17.3.1995)

ABSTRACT

**Contribution to the knowledge of the East Asian *Bryaxis* (Coleoptera, Staphylinidae, Pselaphinae).** - Following new species from China are described and figured: *Bryaxis buddha*, *B. emeicus*, *B. panda*, *B. sacer*, *B. sacrificus*, *S. sichuanus*, *B. tienmushanum*, and *B. wolongensis*. Illustrations of the aedeagi of *Bryaxis holciki* and *B. smetanai* are given. A key to the Chinese species of *Bryaxis* is provided. The subgeneric names *Acropagus* Jeannel and *Bythiniana* Jeannel are placed in synonymy of *Bryaxis* Kugelann.

INTRODUCTION

*Bryaxis* Kugelann is, with some 260 described species, the largest Palaearctic pselaphine genus and one of the largest genera of the subfamily. Most of the described species are restricted to the Mediterranean subregion (sensu Franz, 1970), and many of them are known to be strict endemics. Thus, the group may have a potential for biogeographic studies. The genus exhibits a disjunct distribution. With the exception of *B. bulbifer* (Reichenbach) which is distributed from Western Europe to Lake Baikal, it is unknown from Central Asia and Siberia. The genus was not found in suitable habitats in the Hindukush and Himalaya ranges, while it appears to be diverse and relatively common in the Russian Far East, Korea and Japan (pers. obs.). To date, 35 species have been recorded from eastern Asia (Kurbatov, 1994; Nomura & Lee, 1993), but only 3 from China (Löbl, 1964; Jingke & Peng, 1993). The aim of the present paper is to supplement the descriptions of *B. holciki* Löbl and *B. smetanai* Löbl, and to describe eight additional species. The type material of the Chinese *B. heilongjiangensis* Jingke & Peng was not available for study, but the illustration suggests that the species may not be a *Bryaxis*. It is considered a *species inquirenda*.

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## MATERIAL AND METHODS

Most material has been taken from sieved litter in forest remnants. It is deposited in the Muséum d'histoire naturelle, Geneva (MHNG), Zoological Museum, Moscow (ZMUM), and private collection of S. Kurbatov, Moscow (CSKM).

The length of specimens is measured from the anterior clypeal margin to apex of the abdomen, the width refers to the maximal width of the measured body part, the length of eye and temple is as seen in dorsal view, the tentorial pits (=“fossettes interoculaires” in French terminology) refer to the dorsal pair of tentorial foveae, the scapal length refers to shortest interval between dorsobasal ridge and apical margin of scape, and the length of the following antennomeres is measured without the basal stalks.

Only homomorphous males are present in studied material.

## TAXONOMY

Nomura & Lee (1992) list within the synonymy of *Bryaxis* 25 names, including one misspelled (*Parabythus* Karaman) and seven invalid. Ten of these names have been originally introduced for groups of subgeneric rank, and all of them are based on West Palaearctic species. The East Palaearctic species have been placed either in one of the four following subgenera: *Bryaxis* s. str., *Bythobletus* Reitter (synonym of *Bryaxis* in Newton & Chandler, 1989), *Arcobythus* Jeannel, and *Bythiniama* Jeannel (Jeannel, 1958; Nomura & Lee, 1992, 1993), or they were not assigned to any subgenus (Löbl, 1964; Kurbatov 1985, 1989, 1990, 1994). The characters on which these subgenera are based, i.e. the presence of palpal tubercles, the presence and location of antennal glandular socle and the degree of complexity and sclerotisation of the internal sac of the aedeagus, are variable within the group (Kurbatov, 1994). The first two characters are often infra-specifically variable, and the presence, number and size of the palpal tubercles may vary on a single individuum (pers. obs.).

In the absence of phylogenetically significant characters defining the groups, following synonymies are proposed:

*Arcobythus* Jeannel, 1958, type species *Bryaxis frontalis* Jeannel, 1958, syn. nov.

*Bythiniama* Jeannel, 1958, type species *Bythinus japonicus* Sharp, 1874, syn. nov. of *Bryaxis* Kugelann (junior subjective synonyms).

Pselaphines commonly possess asymmetrical aedeagi which may exhibit bilateral inversion. Within the species examined in the present study, this feature is present in the three species having an asymmetrical internal sac, i. e. *B. emeicus*, *B. sacer* and *B. sichuanus*.

KEY TO THE *Bryaxis* OF CHINA

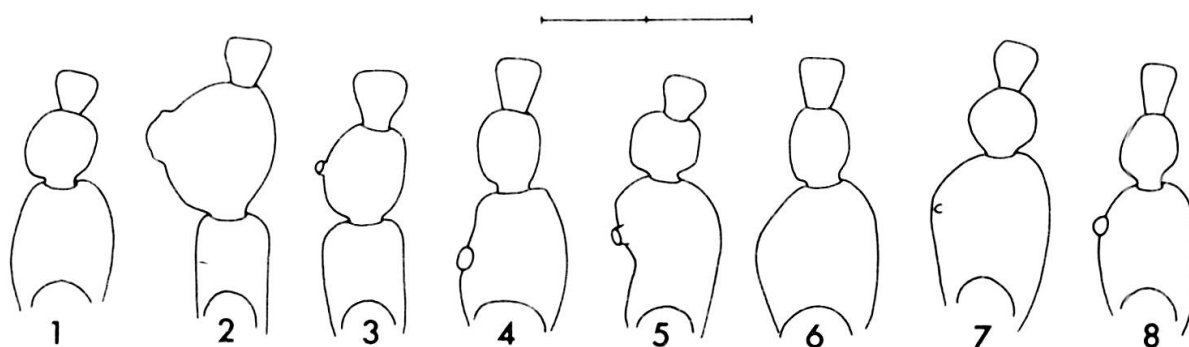
- |   |   |                            |
|---|---|----------------------------|
| 1 | Vertex without median ridge . . . . .                           | 2                          |
| - | Vertex with median ridge . . . . .                              | 4                          |
| 2 | Glandular socle present on scape, absent from pedicel in male . | <i>tienmushanus</i> sp. n. |

- Glandular socle present on pedicel, absent from scape in male . . . . . 3
- 3 Pedicel symmetrical, with distinct glandular socle situated in middle of anterior edge in male . . . . . *holciki* Löbl
- Pedicel asymmetrical, with minute glandular socle situated just behind basal third of anterior edge in male . . . . . *smetanai* Löbl
- 4 Glandular socle present on pedicel, absent from scape in male. . . . . 5
- Glandular socle present on scape, absent from pedicel in male. . . . . 6
- 5 Pronotal disc evenly very finely punctured, with punctures much smaller than those on vertex; glandular socle small . . . . . *panda* sp.n.
- Pronotal disc irregularly punctured, with punctures at least partly about as coarse as those on vertex; glandular socle large . . . . . *sacrificus* sp.n.
- 6 Elytral pubescence erect and conspicuously longer than that on pronotum . . . . . *buddha* sp.n.
- Elytral pubescence semi-erect or recumbent, about as long as that on pronotum. . . 7
- 7 Male scape with several erect setae bordering glandular socle . . . *wolongensis* sp.n.
- Male scape without erect setae . . . . . 8
- 8 Glandular socle situated about at midlength of male scape . . . . . *sacer* sp.n.
- Glandular socle situated distinctly behind midlength of male scape . . . . . 9
- 9 Internal sac of aedeagus with four hook-shaped sclerites . . . . . *sichuanus* sp.n.
- Internal sac of aedeagus with at least seven distinct sclerites . . . . . *emeicus* sp.n.

### ***Bryaxis tienmushanus* sp.n.**

Material. Holotype male: China, Zhejiang, Tienmushan, 29.IV.1993. leg. G. de Rougemont (MHNG).

Length 1.40 mm. Body reddish-brown, elytra slightly paler than thorax and abdomen. Pubescence fairly long, semi-erect. Frons with deep, punctured impression. Middle of anterior frontal margin slightly expanded, angulate. Frontoclypeus vertical, not expanded below, rounded mesally. Vertex distinctly convex, without median ridge; tentorial foveae situated behind level of anterior eye margin. Frons and vertex evenly, very densely and coarsely punctured; punctures separated by narrow ridges. Eye large, about as long as temple. Maxillary palp without tubercles. Antennae with segment 3 short, wider than long; antennomeres 4 to 8 equally large, about as wide as and shorter than 3; following larger, 9 and 10 each about 2 times as wide as long. Pronotum distinctly wider than long; lateral foveae situated in large impressions, joined with narrow, fairly deep lateral portion of antebasal sulcus; discal punctation slightly coarser than that on head, finer only near anterior margin; most punctures much larger than intervals, latter partly reduced to narrow ridges. Elytron with pubescence longer than that on pronotum and abdomen; discal impression absent; basal foveae about as large as interval between them; humeral hump distinct. Elytral punctation rather uniform, mostly consisting of well delimited punctures about as large as but much shallower than those on vertex, smaller than intervals; area behind basal foveae very finely punctured.



FIGS 1-8

Basal antennal segments in *Bryaxis*; 1. *B. tienmushanus* sp.n.; 2. *B. sacrificus* sp.n.; 3. *B. panda* sp.n.; 4. *B. buddha* sp.n.; 5. *B. wolongensis* sp.n.; 6. *B. sacer* sp.n.; 7. *B. emeicus* sp.n.; 8. *B. sichuanus* sp.n.  
Scale bar = 0.2 mm.

Male sexual characters. Basal antennal segments as Fig. 1. Scape 0.08 mm long, as long as wide; posterior and anterior sides almost symmetrical, slightly arcuate; with small dorsal impression extended from basal ridge to mid-length; glandular socle fairly large but short, cylindrical, obliquely truncate, situated at distal edge of the impression. Pedicel asymmetrical, on anterior side stronger narrowed toward apex than toward base, 0.06-0.07 mm wide, wider than long. Protibia straight, without particular sexual characters. Metatibia curved in apical half, with apical denticle. Aedeagus (Fig. 9) 0.34 mm long. Apical portion of parameres strongly narrowed and curved, each bearing a pair of long setae and a single short seta. Internal sac with symmetrical sclerites, lateral ones bifid and strongly narrowed apically.

### ***Bryaxis sacrificus* sp.n.**

Material. Holotype male: China, Shaanxi, Mt. Hua, 1900m, litter, 11.V.1994, leg. S. A. Kurbatov (MHNG). Paratypes: same data, 5 males and 9 females (MHNG, ZMUM, CSKM).

Length 1.40 - 1.50 mm. Body uniformly reddish-brown. Pubescence fairly long, recumbent. Frontal impression short and punctured. Anterior frontal edge rounded. Frontoclypeus not expanded below, almost vertical, rounded mesally. Vertex slightly convex, with median ridge extended from frontal impression to occiput, present on neck. Tentorial foveae situated in front of level of anterior eye margin. Eye about as long as temple. Frons and vertex with fairly fine, dense, very irregular punctation, most punctures larger than intervals between them; intervals flat or reduced to short ridges. Maxillary palp lacking tubercles. Antennae with pedicel subcylindrical: antennomeres 3 to 6 equally wide, 3 elongate, gradually widened toward apex, 3 to 6 of same size, each

as long as wide, 7 and 8 somewhat larger than preceding, 9 and 10 each about 1.5 times as wide as long. Pronotum as long as wide, with lateral foveae in small impressions; antebasal sulcus laterally strongly narrowed, joined with lateral foveae. Pronotal punctation very irregular, slightly or much coarser than that on vertex. Intervals between pronotal punctures flat, larger than punctures or more or less reduces, sometimes formed by narrow ridges. Punctation near apical pronotal margin finer than that on central area of disc. Elytron without discal impression; basal foveae somewhat smaller than interval between them; humeral hump distinct; discal punctation fine and dense, punctures abruptly deepened, somewhat smaller than intervals.

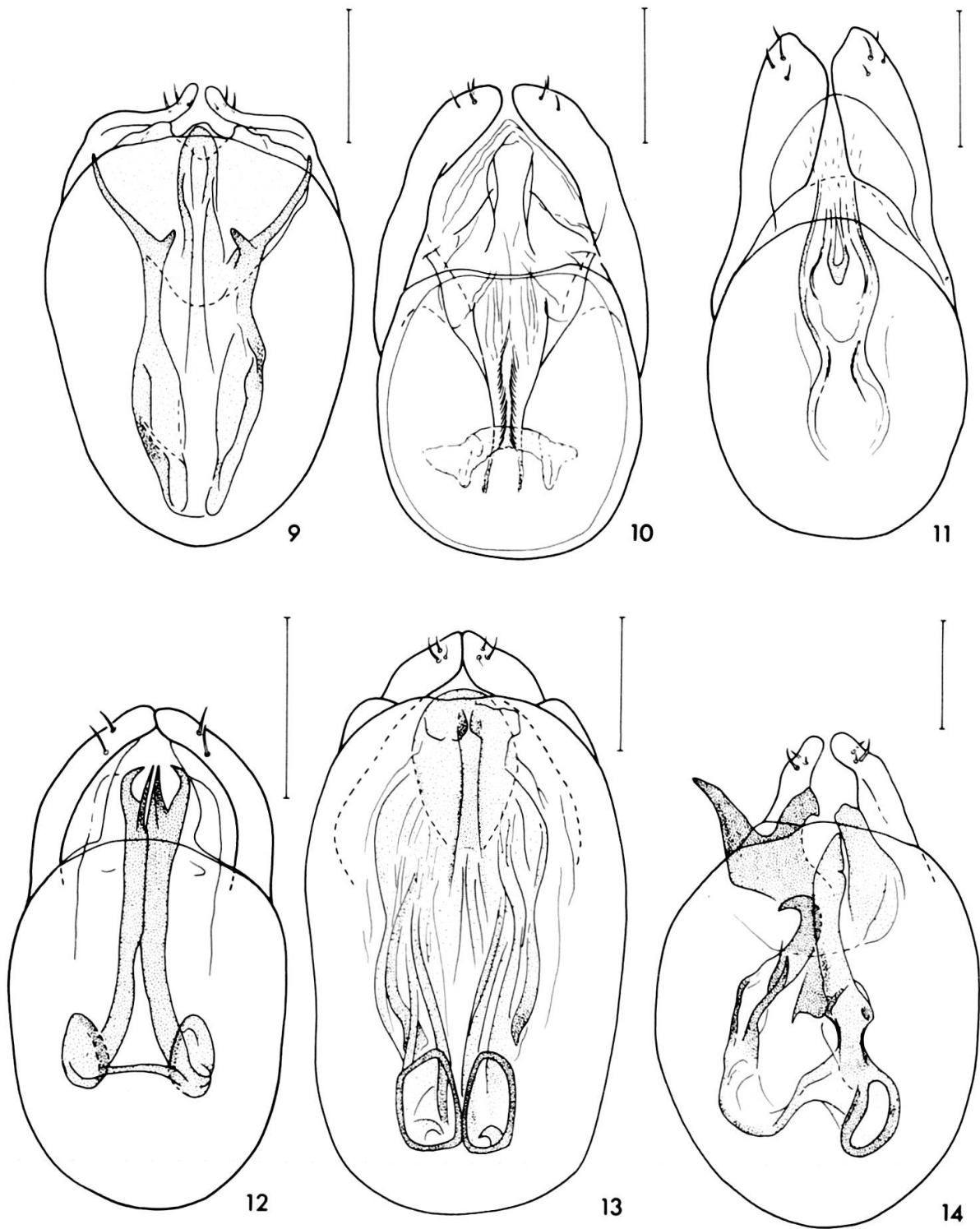
Male sexual characters. Basal antennal segments as in Fig. 2. Scape 0.05 - 0.06 mm long, simple, cylindrical, about 1.2 - 1.3 times as wide as long. Pedicel much larger than scape, about 2 times as long as latter, subglobular. Glandular socle stout, short, situated in middle of anterior side of pedicel, with basal portion cylindrical and margined, upper portion rounded. Protibia with apical fourth ventrally flattened. Metatibia with minute apical denticle. Aedeagus (Fig. 10) 0.35-0.36 mm long. Parameres widened apically, each with three long setae. Internal sac weakly sclerotised, symmetrical, bearing two long stalks connected at base and one medio-apical flat piece.

Female sexual characters. Scape cylindrical, about as large as in male. Pedicel cylindrical, about 1.5 times as long as wide, longer than scape.

### ***Bryaxis panda* sp.n.**

Material. Holotype male: China, Sichuan, Wolong Nat. Res., 1700m, litter, 17.V.1994, leg. S. A. Kurbatov (MHNG). Paratypes: same data, 6 males, 10 females (MHNG, ZMUM, CSKM).

Length 1.45 - 1.55 mm. Body uniformly reddish-brown. Pubescence recumbent, moderately long. Frons and vertex irregularly, densely and more or less coarsely punctured. Most punctures distinctly larger than intervals between them, intervals entirely flat or partly formed by ridges. Frontal impression deep, punctured. Anterior frontal margin rounded. Frontoclypeus not expanded below, rounded mesally. Vertex slightly convex, with median ridge extended from frontal impression to anterior portion of neck. Centres of tentorial foveae situated in level with anterior eye margin (female) or behind that level (male). Eye slightly longer than temple in male, shorter than temple in female. Maxillary palp lacking tubercles. Antenna with elongate pedicel; antennomere 3 about as long as wide, segments 4 to 8 of same size, each slightly wider than long, 9 and 10 about 1.5 times as wide as long. Pronotum as long as wide; antebasal sulcus strongly narrowed and shallow laterally, distinctly joined with large lateral foveae; discal punctation sparse and fine, much finer than that on frons and vertex, consisting of punctures much smaller than intervals; with a row of coarse and dense punctures along base. Elytron with short discal impression not extended behind level of humeral hump; basal foveae about as large as interval between them; discal punctation evenly fine and sparse, about as fine as that on pronotal disc, punctures much smaller than intervals between them.



FIGS 9-14

Aedeagi in *Bryaxis*; 9. *B. tienmushanus* sp.n.; 10. *B. sacrificus* sp.n.; 11. *B. panda* sp.n.; 12. *B. buddha* sp.n.; 13. *B. wolongensis* sp.n.; 14. *B. sacer* sp.n. Scale bar = 0.1 mm.

Male sexual characters. Basal antennal segments as Fig. 3. Scape cylindrical, 0.07 mm long, slightly wider than long. Pedicel elongate, 0.08 - 0.09 mm long, 0.07 mm wide, symmetrical, barrel-shaped, with small, cylindrical glandular socle truncate and not widened at apex, situated in middle of anterior side of pedicel. Elytron with distinct humeral hump. Protibia slightly but abruptly narrowed in apical third. Metatibia curved in apical half, with apical denticle. Aedeagus (Fig. 11) 0.38-0.40 mm long. Parameres wide, straight, inflexed dorsally, bearing four apical setae. Internal sac weakly sclerotised, with several very slender stylets.

Female sexual characters. Eye smaller. Shape and size of scape and pedicel as in male. Humeral hump almost absent.

### ***Bryaxis buddha* sp.n.**

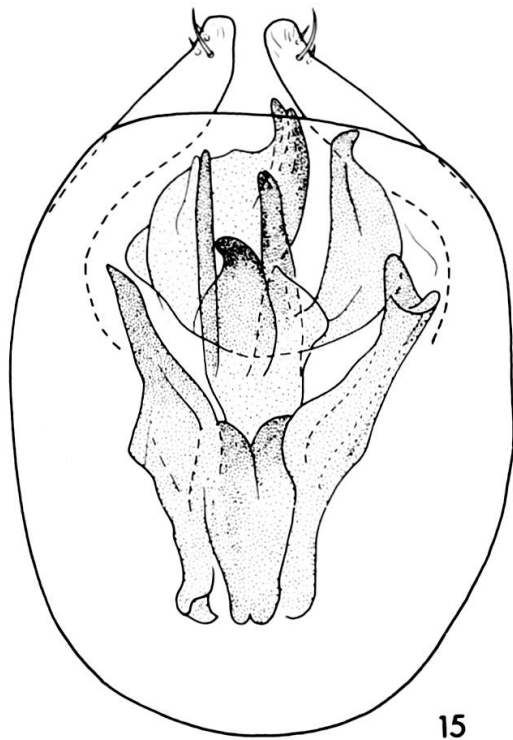
Material. Holotype male: China, Sichuan, Mt. Emei, 1800m, litter, 27.IX.1994, leg. S.A. Kurbatov (ZMUM). Paratypes: same data, 2 females (CSKM and MHNG).

Length 1.40-1.45 mm. Body uniformly reddish-brown. Pubescens long, semi-erect, setae curved, that on elytra conspicuously long and erect. Frontal impression deep, punctured. Anterior frontal edge somewhat angulate. Frontoclypeus expanded below, narrowed mesally, forming short mesal keel. Vertex slightly convex, with median ridge extended from frontal impression to occiput, absent from neck. Tentorial foveae in level with anterior eye margin. Eye about as long as temple. Frons and vertex with very dense and coarse punctation; punctures separated by narrow ridges. Maxillary palp lacking tubercles or with few indistinct tubercles on segment 3. Antenna with pedicel elongate oval; antennomeres 3 to 8 equally wide, 3 elongate, gradually widened toward apex, 4 to 8 as long as wide, 9 and 10 each about 1.5 times as wide as long. Pronotum wider than long, with lateral foveae in large impression, antebasal sulcus shallow and shortened laterally, indistinctly joined with lateral foveae; punctation similar to that on head. Several coarse punctures near upper hypomeral margin. Elytron with shallow discal impression evanescent toward middle; basal foveae smaller than interval between them; humeral hump indistinct; discal punctation fine and dense, punctures gradually deepened, smaller than intervals.

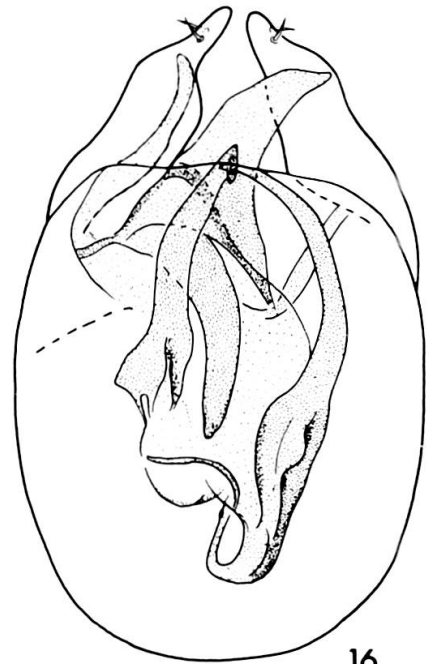
Male sexual characters. Basal antennal segments as in Fig. 4. Scape 0.09 mm long, slightly shorter than wide, widest in basal half, with dorsal surface weakly impressed basally, somewhat convex apically; glandular socle small, short, cylindrical, truncate and expanded at apex, situated in centre of dorso-anterior scapal edge. Ventral and posterior sides of scape convexly rounded; apical half of anterior scapal edge straight in dorsal view. Pedicel without sexual characters, in length not exceeding scapal width. Protibia lacking subapical notch. Metatibia with apical denticle. Aedeagus (Fig. 12) 0.28 mm long. Parameres evenly arcuate, wide, each with a pair of long setae. Internal sac with a pair of long sclerites joined basally by a narrow bridge and terminated apically by spine-like branches.

Female sexual characters. Scape slender, longer than wide, widest near base, as wide as pedicel long. Eyes as large as those in male.

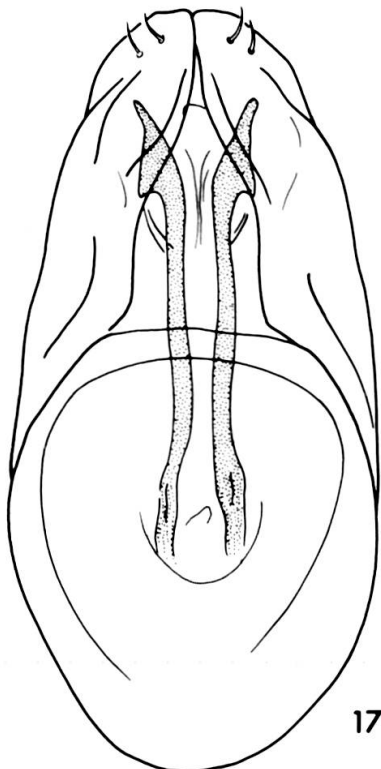




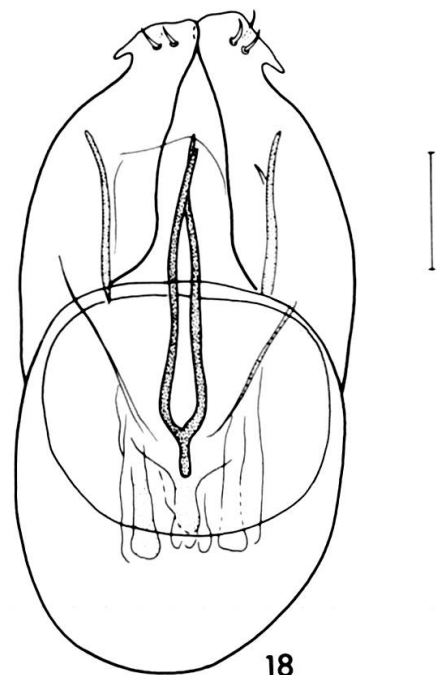
15



16



17



18

FIGS 15-19

Aedeagi in *Bryaxis*; 15. *B. emeicus* sp.n.; 16. *B. sichuanus* sp.n.; 17. *B. holciki* Löbl;  
18. *B. smetanai* Löbl. Scale bar = 0.1 mm.

**Bryaxis wolongensis** sp.n.

Material. Holotype male: China, Sichuan, Wolong Nat. Res., 900m, litter, 23.V. 1994, leg. S. A. Kurbatov (MHNG). Paratypes: same data, 1 male, 2 females; same but 500m, 16.V.1994, 8 males, 20 females (MHNG, ZMUM, CSKM).

Length 1.40-1.45 mm. Body more or less dark reddish-brown. Pubescence moderately long, semi-erect, that on abdomen recumbent. Frontal impression deep, punctured. Anterior frontal margin angulate. Frontoclypeus not expanded below, almost vertical, rounded mesally. Vertex moderately convex, with median ridge extended from frontal impression to occiput, distinct on neck. Tentorial foveae situated in level with anterior eye margin. Eye fairly small, about as long as temple in male, much shorter in female. Frons and vertex with punctuation very dense and coarse, intervals irregular, partly flat, mostly very narrow and formed by ridges. Maxillary palp lacking tubercles. Antenna with pedicel subglobular, small, about as long as wide. Antennomere 3 as long as wide, 4 to 8 almost of same size, each wider than long, 9 and 10 each about 2 times as wide as long. Pronotum wider than long, with lateral foveae in small impressions, joined with antebasal sulcus; latter strongly narrowed and becoming shallower laterally. Pronotal punctuation irregular, somewhat coarser and less dense than that on vertex, with intervals flat or partly formed by ridges, smaller than punctures. Elytron with basal foveae distinctly smaller than interval between them; discal impression absent; humeral hump distinct; discal punctuation fine and dense, consisting of shallow punctures mostly smaller than intervals, becoming much smaller and sparser near base.

Male sexual characters. Eye larger. Basal antennal segments as in Fig. 5. Scape 0.09-0.10 mm long, slightly longer than wide; posterior side almost straight in dorsal view, upper side swollen, except near base. Anterior scapal side flattened between base and subapical area; glandular socle large but extremely short, truncate, situated at apical margin of flattened area, bordered by few erect setae. Pedicel and protibia without sexual characters. Metatibia curved in apical half, with small apical denticle. Aedeagus (Fig. 13) 0.42 - 0.44 mm long. Parameres with posterior portion delimited by transverse ridge, each bearing two short and one long setae. Internal sac symmetrical, with complex basal stylets, weakly sclerotised central portion and flat apical plate.

Female sexual characters. Scape cylindrical, 0.08 mm long, 0.06 mm wide. Eye much smaller than in male.

**Bryaxis sacer** sp.n.

Material. Holotype male: China, Sichuan, Mt. Emei, ca 1400m, litter, 22.IX.1994, leg. S. A. Kurbatov (ZMUM). Paratypes: same data, 2 males, 4 females (ZMUM, MHNG, CSKM).

Length 1.45 - 1.55 mm. Similar to *B. buddha* from which it may be distinguished as follows: Frontoclypeus not expanded anteriorly, narrowed mesally and forming an almost vertical ridge. Median ridge of vertex extended over anterior part of neck.

Punctuation on frons and vertex less dense, intervals irregular, flat and narrow, smaller than punctures. Maxillary palp lacking tubercles. Antebasal pronotal sulcus distinctly joined with lateral foveae. Elytron with discal impression very short and inconspicuous; humeral hump distinct. Elytral punctuation very fine, pubescence about as long as that on pronotum, semi-erect.

Male sexual characters. Basal antennal segments as Fig. 6. Scape 0.10 mm long, widest behind middle, width slightly exceeding length. Dorsal scapal surface impressed basally, distinctly convex apically; posterior edge slightly, anterior edge strongly rounded. Glandular socle very small, situated near middle of anterior scapal edge with orifice oriented dorsally and without expanded margin. Pedicel and legs as in *B. buddha*. Aedeagus (Fig. 14) 0.44-0.47 mm long. Apical portion of parameres fairly narrow, bearing three uneven setae. Internal sac with asymmetrical, strongly sclerotised pieces forming a complex structure; apical extruded sclerite bifid.

Female sexual characters. Scape subcylindrical, hardly widened at base, 1.3 times as long as wide. Eyes slightly smaller than those in male.

#### ***Bryaxis emeicus* sp.n.**

Material. Holotype male: China, Sichuan, Mt. Emei, 700m, litter, 21.IX.1994, leg. S. A. Kurbatov (MHNG). Paratypes: same data, 9 males and 9 females; same but ca 1200m, 26.IX.1994, 1 male, 4 females (MHNG, ZMUM, CSKM).

Length 1.50 - 1.55 mm. In external characters very similar to *B. sacer*, but punctuation usually distinctly finer near apical margin of pronotum. Antebasal pronotal sulcus completely evanescent laterally and separated from lateral foveae or joined with them by a very narrow and shallow stria. Secondary sexual characters as in *B. sacer* but male with scapal glandular socle situated more apically and possessing slightly expanded margin (Fig. 7). Scape in female cylindrical. Aedeagus (Fig. 15), 0.37-0.40 mm long, basically similar to that in *B. sacer*, from which it differs in the shape of the parameres and sclerites of the internal sac.

#### ***Bryaxis sichuanus* sp.n.**

Material. Holotype male: China, Sichuan, Wolong Nat. Res., 500m, litter, 16.V. 1994, S. A. Kurbatov (MHNG). Paratypes: same data, 19 males, 15 females (MHNG, ZMUM, CSKM).

Length 1.4 - 1.5 mm. Similar to *B. sacer* but eye smaller, shorter than temple in both sexes, pedicel symmetrical, slightly longer than wide, pronotal punctuation very irregular, with intervals flat, mostly smaller than punctures, elytron without discal impression, very finely punctured near base. Male sexual characters: Basal antennal segments as in Fig. 8. Scape 0.08 mm long, about as long as wide, with anterior and posterior sides slightly convex; basal half of dorso-anterior surface shallowly impressed;

glandular socle fairly large, obliquely truncate and with widened margin, situated just posteriorly of the impression. Pedicel simple, suboval, slightly longer than wide, somewhat more narrowed toward apex than toward base. Protibia slightly, evenly arcuate. Metatibia slightly curved in apical portion, with apical denticle. Aedeagus (Fig. 16) 0.46-0.47 mm long. Parameres strongly narrowed toward tip, each with a pair of apical setae. Internal sac complex, asymmetrical, strongly sclerotised, with four protruding, hook-shaped pieces. Female sexual characters: Eye smaller than in male. Scape cylindrical, 0.09-0.1 mm long, about 1.3 times as long as wide.

### **Bryaxis holciki Löbl**

This species, known from Fukien, Kuatun, possesses similar male antennal characters as those in *B. panda*, from which it may be easily distinguished by the absence of the vertexal ridge. The scape in *B. holciki* is shorter, the pedicel is larger. The aedeagus (Fig. 17) is symmetrical, the internal sac bears a pair of stylets which shape is diagnostic.

### **Bryaxis smetanai Löbl**

The male in this species possesses a cylindrical scape and asymmetrical stout pedicel with minute glandular socle situated dorso-anteriorly, just behind the basal third of the segment. The shape of the aedeagal parameres (Fig. 18) is diagnostic. The internal sac bears slender stylets. The species is known from Zhejiang, Tienmushan.

## ACKNOWLEDGMENTS

Mrs Nicolette Lavoyer, Geneva, assisted with the drawings. Dr. Josef Jelinek, Prague, made the types of *Bryaxis holciki* and *B. smetanai* available for study. Our thanks are also due to Mr. Guillaume M. de Rougemont, London, for gift of material.

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