

THE *BRYAXIS* OF TAIWAN (COLEOPTERA: STAPHYLINIDAE: PSELAPHINAE)

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ABSTRACT - The tribe Bythinini is, unlike other diverse pselaphine groups, restricted to the temperate north hemisphere. Its most speciose genus, *Bryaxis* Kugelann, is known only from areas generally considered to be parts of the Palaearctic realm. Nevertheless, the genus is well represented in the mountains of Taiwan with 19 species, all of which are new. The species are described and illustrated.

KEY WORDS: Staphylinidae, Pselaphinae, *Bryaxis*, taxonomy, Taiwan

INTRODUCTION

Bryaxis Kugelann is one of the important Palaearctic pselaphine genera in terms of number of species; it is particularly diverse in the Mediterranean area. Although new species are still found occasionally in Europe, and many undescribed species from Turkey and from the Caucasus are represented in the Geneva collection, the West Palaearctic members of the group appear rather adequately known at alpha-taxonomic level. The low number of species of *Bryaxis* described from the eastern portion of the Palaearctic realm may indicate species paucity, or poor knowledge. The genus is virtually absent from America and unrecorded from areas traditionally considered as parts of the Oriental realm (e.g. Darlington, 1957; Lattin, 1967; Müller, 1981), including Taiwan.

Presently, 15 species of *Bryaxis* are recorded from Japan (Jeannel, 1958; Nomura, 1995), 10

from Far East Russia (Kurbatov, 1994), 13 from South and North Korea (Löbl, 1977; Nomura & Lee, 1993), and 10 or 11 from continental China (Kurbatov & Löbl, 1995). The possibility that such figures may not be representative, and in fact be too low, is suggested by this study. In the collections, made in Taiwan by A. Smetana and J. & S. Klapperich, we have recognized 19 species of *Bryaxis*, all new. They are described below. The reduced metathoracic wings and the small eyes of females, as well as the occurrence of most of these species at high altitudes, indicate pronounced species endemism.

The relatively high number of Bythinini in the mountainous areas of Taiwan is surprising since the tribe is absent from the Himalaya and Hindukush, as well as from the highest mountains of Borneo and Sumatra (senior author, personal observation).

Several species groups have been defined (e.g. Jeannel, 1950; Poggi, 1992; Sabella, 1989), but the relationships within the genus are still

obscure. We do not want to speculate here about the relationships of the Taiwanese species. However, several facts should be pointed out. The Taiwanese *Bryaxis* are, unlike those of other East Asian countries, fairly similar to each other in external characters. All have in common: the frontoclypeus vertical mesally and not expanded ventrally; the temples rounded, the pronotal disc and elytron finely punctate; similar shape of legs, male protibiae excepted. All but *B. unicus* have the pronotal antebasal sulcus joined with lateral foveae. Most have the maxillary palps with apical portion of 2nd segment and the 3rd segment distinctly tuberculate ventrally. One of their more striking features is the uniformity in the shape of the male scape and especially that of the pedicel, which is simple in all species. One species, *B. unicus*, has, unlike other East Asian congeners gradually narrowed and apically truncate parameres, and appears phylogenetically isolated. *Bryaxis paiwan* and *B. mandarinus* have aedeagal characters similar to those in *B. affinis* Sharp. Three species, *B. alishanus*, *B. planifer* and *B. auritus*, have aedeagi with parameres widened apically and may form a monophyletic group. Most species, i.e. *B. hokkiensis*, *B. yushanensis*, *B. ami*, *B. hakka*, *B. pingtungensis*, *B. alayai*, *B. coelestis*, *B. taiwanus*, *B. bellax*, *B. tarokanus*, *B. tychothythynoides*, and *B. alesi*, possess parameres with a dorsal lobe. The only other East Asian species with this character is *B. wolongensis* Kurbatov & Löbl from Sichuan (Kurbatov & Löbl, 1995). These species have a complex internal sac and may constitute another monophyletic group. Among these, the first four species share the extruded and strongly asymmetrical rods of the internal sac. *Bryaxis alayai*, *B. coelestis*, *B. taiwanus*, *B. tarokanus*, *B. tychothythynoides*, and *B. alesi* have in common the abruptly curved outer subapical sensillum on the paramere; this sensillum is strongly thickened basally in the last three species.

The male gular characters have been

inconsistently used in the taxonomy of the group. They are difficult to describe or illustrate when complex, and the relatively high proportion of species known from a single male specimen makes it difficult to use SEM to provide micrographs. However, the Taiwanese *Bryaxis* exhibit considerable variation in gular structures and therefore an attempt has been made to describe them.

MATERIAL AND METHODS

The specimens collected by A. Smetana have been sifted and extracted from samples in Moczarski/Winkler devices (Löbl, 1992). The holotypes are deposited in the National Museum of Natural Science, Taichung, Taiwan (NMNS), all paratypes in the Muséum d'histoire naturelle, Geneva (MHNG). The holotypes of the species presently known only from single specimens are deposited temporarily in the MHNG.

The localities mentioned in this paper are mapped in Smetana, 1995.

The length of the body is measured from the anterior edge of the frontoclypeus to the apex of the abdomen; the length of scape refers to the shortest distance between its dorsobasal ridge and apical edge, that of the following antennomeres does not include the length of the basal stalk. The width of the head is measured at posterior eye margin, that of the frons at widest point of the frontal lobe, that of the pronotum at the maximum width. Punctuation on the head refers to the dorsal surface only.

Only homomorphous males are present in the studied material.

RESULTS

Key to Taiwanese species of *Bryaxis*

1. Frontoclypeus strongly narrowed mesally to form a keel 2
- Frontoclypeus moderately narrowed, rounded or flattened mesally 4

2. Pronotum with antebasal sulcus entire, joined with lateral foveae 3
 - Pronotum with antebasal sulcus replaced by two small impressions not joined with lateral foveae *B. unicus* sp. n.
3. Frontal impression as wide as half of width of frons *B. bellax* sp. n.
 - Frontal impression as wide as one third of width of frons *B. pingtungensis* sp. n.
4. Dorsal tentorial pits absent, vertex without trace of terminal points of tentorium 5
 - Dorsal tentorial pits present, if reduced, terminal points of tentorium traceable as impressions 11
5. Frontal impression as wide as one third of width of frons 6
 - Frontal impression as wide as one fourth of width of frons *B. coelestis* sp. n.
6. Male scape with glandular socle 7
 - Male scape without glandular socle *B. tarokanus* sp. n.
7. Median ridge of vertex absent *B. taiwanus* sp. n.
 - Median ridge of vertex present, albeit sometimes very low and/or shortened 8
8. Median ridge of vertex shortened 9
 - Median ridge of vertex entire 10
9. Vertex evenly very finely punctate *B. mandarinus* sp. n.
 - Middle portion of vertex coarsely punctate *B. alayai* sp. n.
10. Anterior edge of frons angulate, projecting *B. paiwan* sp. n.
 - Anterior edge of frons truncate, not projecting *B. raptor* sp. n.
11. Male pronotum in middle more coarsely punctate than near lateral edges *B. planifer* sp. n.
 - Middle of pronotum in both sexes very finely punctate 12
12. Pedicel wider than long 13
 - Pedicel as long as wide, or longer than wide 14
13. Male protibia without subapical denticle *B. auritus* sp. n.
 - Male protibia with subapical denticle *B. ami* sp. n.
14. Male protibia without subapical denticle *B. tychothythinoides* sp. n.
 - Male protibia with distinct subapical denticle 15
15. Aedeagus with parameres widened apically, lacking dorsal lobe *B. alishanus* sp. n.
 - Aedeagus with parameres narrowed apically, with dorsal lobe 16
16. Aedeagus with sclerites of internal sac long, asymmetrical and extruded 17
 - Aedeagus with sclerites of internal sac short, symmetrical, not extruded *B. alesii* sp. n.
17. Antennomere 3 distinctly longer than wide 18
 - Antennomere 3 about as long as wide *B. yushanensis* sp. n.
18. Aedeagus with lateral margins of parameres concave behind dorsal lobe *B. hokkiensis* sp. n.
 - Aedeagus with lateral margins of parameres convex behind dorsal lobe *B. hakka* sp. n.

Bryaxis unicus sp. n.

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawushan ridge, 2800-2910 m, 28.IV. 1992, A. Smetana (T 105).

Description: Length 1.65 mm. Body, femora, tibiae, antennal segments 1-10 and palps uniformly reddish-brown, antennal segment 11 and tarsi lighter. Pubescence fairly long, semierect or erect on head, semierect on pronotum, recumbent on elytra and abdomen.

Head 0.28 mm wide. Frons 0.17 mm wide. Frontal impression deep, about as wide as one third of width of frons, well delimited, gradually narrowed and evanescent posteriorly. Anterior edge of frons subangulate. Mesal vertical portion of frontoclypeus strongly

narrowed to form an obtuse ridge. Antennal tubercles distinct. Vertex slightly convex, with median ridge strongly shortened, distinct on neck only. Dorsal tentorial pits in foveiform impressions, with anterior margins at level of anterior eye margin. Eye small, consisting of 14-15 ommatidia. Punctuation very dense and coarse on lateral portions of frons, and on anteriolateral and medioapical portions of vertex, sparse and very fine on center of vertex and on temples, absent from antennal tubercles and posterior portion of frontal impression, coarse on anterior portion of frontal impression. Maxillary palp with apex of segment 2 and most of segment 3 tuberculate ventrally.

Gular area swollen, slightly convex, indistinctly delimited laterally, without median ridge, abruptly flattened anteriorly, forming an almost vertical surface reaching margin of postmentum; with conspicuous, dense and coarse punctures near mouthparts. Pubescence long, recumbent, not arranged in rows.

Scape 0.10 mm long, 0.07 mm wide, subparallel in dorsal view, flattened ventrally; anterior edge slightly convex, posterior edge almost straight; glandular socle short, fairly large, situated before centre, apex truncate and expanded around orifice. Pedicel 0.07 mm long, longer than wide, slightly asymmetrical. Segment 3 distinctly shorter than pedicel, longer than wide; segments 4 to 8 each as wide as 3, slightly wider than long, almost of same length; segment 9 about 1.3 times as wide as long; segment 10 1.5 times as wide as long; segment 11 about 1.7 times as long as wide, slightly longer than segments 8 to 10 combined.

Pronotum 0.44 mm long, 1.2 times as wide as long. Area around lateral foveae not impressed. Antebasal sulcus reduced, replaced by two shallow impressions separated by a narrow ridge. Discal punctuation sparse, consisting mostly of very fine punctures, but with a few larger, very shallow discal punctures; coarse antebasal punctures absent.

Elytron with basal foveae slightly larger than half of interval between them. Humeral

protuberance absent. Punctuation dense, very fine, with punctures distinctly larger than those on pronotal disc (large pronotal punctures excepted).

Protibia narrowed apically, with deep subapical notch forming a denticle. Metatibia with large apical denticle.

Aedeagus (text-fig. 1) 0.54 mm long. Basal bulb of median lobe relatively narrow. Parameres slender, gradually narrowed toward apex, lacking dorsal lobe; each with two pairs of subapical hair-like sensilla, dorsal sensilla curved, somewhat thicker than ventral sensilla. Internal sac with long sclerites forming a proximally narrowed complex; with two conspicuous extruded apical plates, joined mesally.

Habitat: Moss and various debris under bushes in an *Abies* forest.

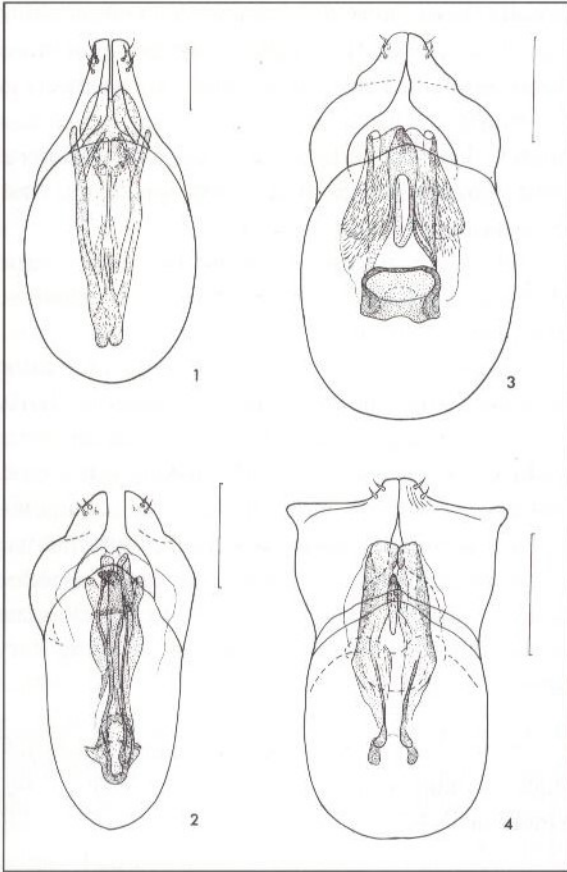
Bryaxis paiwan sp. n.

Holotype: ♂, Taiwan, Nantou Hsien, Houhuan-shan, Kuenyang, 3050 m, 4.V. 1991, A. Smetana (T 63).

Description: Length 1.45 mm. Body, legs, antennae and palps uniformly pale ochraceous. Pubescence fairly long, recumbent, longer and semierect on vertex.

Head 0.29 mm wide. Frons 0.17 mm wide. Frontal impression deep, well delimited, wider than one third of width of frons, with arcuate posterior edge. Anterior edge of frons angulate, projecting. Mesal vertical portion of frontoclypeus rounded. Antennal tubercles hardly raised. Vertex slightly convex, with median ridge entire, but extremely low and hardly visible. Dorsal tentorial pits absent. Eye small, relatively flat, consisting of 11 ommatidia. Punctuation dense and fine on frons, including frontal impression and antennal tubercles, sparse and extremely fine on vertex. Maxillary palp with apical portion of segment 2 and large portion of segment 3 tuberculate.

Gular area strongly swollen, indistinctly delimited laterally, without median ridge,



Text-figures 1-4.

Aedeagi of *Bryaxis* in dorsal view; 1. *B. unicus* sp. n.; 2. *B. paiwan* sp. n.; 3. *B. mandarinus* sp. n.; 4. *B. alishanus* sp. n. Scale bar = 0.1 mm.

slightly projecting anteriorly, overlapping (ventral view) deeply impressed postoral area. Anterior edge of gular area arcuate, with a tuft of short setae bent toward posterior edge of mentum. Pubescence fairly long, recumbent, not arranged in rows.

Scape 0.10 mm long, slightly longer than wide, flattened anteriorly, swollen dorsally, with anterior edge straight between base and apical third, rounded in apical third; glandular sole small, cylindrical, truncate and expanded around orifice, situated at level of widest point near anterior edge. Pedicel 0.06 mm long, about as long as wide, symmetrical. Segment 3

shorter than pedicel, longer than wide; segments 4 to 8 as wide as segment 3, wider than long; segments 4 and 5 longer than following segments; segment 9 about 1.5 times as long as wide; segment 10 twice as long as wide; segment 11 about 1.6 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.41 mm wide, about 1.2 times as wide as long. Lateral foveae in impressions. Antebasal sulcus evenly narrow, well delimited anteriorly and posteriorly, partly interrupted by low median keel. Discal punctation sparse and extremely fine, punctation behind antebasal sulcus dense, less fine; coarse antebasal punctures absent.

Elytron with basal foveae somewhat smaller than interval between them. Humeral protuberance absent. Punctation fine and very shallow, coarser than that on pronotal disc.

Protibia weakly notched subapically, without denticle. Metatibia with apical denticle.

Aedeagus (text-fig. 2) 0.30 mm long, conspicuously slender. Parameres narrow, curved, lacking dorsal lobe, with distinctly delimited distal portion; each bearing a pair of hair-like, subapical sensilla similar in shape and size. Internal sac with a complex of long, slender sclerites, and one unpaired central sclerite abruptly curved at tip.

Habitat: In moist to wet moss, vegetation and various debris near small creek and seepage in a coniferous forest (*Abies kawakamii*).

Bryaxis mandarinus sp. n.

Holotype: ♂, Taiwan, Nantou Hsien, Nenkaoshan, 2.5 km SW Tenchi Hut, 2720 m, 6.V. 1992, A. Smetana (T 115).

Description: Length 1.7 mm. Body and antennal segments 1 to 10 uniformly light brown; legs, antennal segment 11 and palps lighter. Pubescence fairly long, erect on head, semierect on pronotum and elytra, recumbent on abdomen.

Head 0.28 mm wide. Frons narrow, 0.15 mm

wide. Anterior edge of frons projecting and angulate. Frontal impression deep, well delimited, slightly narrower than one third of width of frons, rounded posteriorly. Mesal vertical portion of frontoclypeus narrowed, forming a flat ridge. Antennal tubercles hardly raised. Vertex slightly convex, with median ridge strongly reduced, only distinct on apical inclined portion. Dorsal tentorial pits absent. Eye small, consisting of 8-9 ommatidia. Punctuation sparse and very fine on vertex and on posterior portion of frons, dense and less fine on anterior portion of frons, antennal tubercles included, consisting of poorly delimited punctures. Frontal impression almost impunctate. Maxillary palp with apical portion of segment 2 and most of segment 3 tuberculate ventrally.

Gular area similar as in *B. unicus* but with two short, narrow tufts of setae converging anteriorly, arising from middle of anterior edge of swollen portion; latter with anterior very shallow median impression. Scape 0.14 mm long, 0.11 mm wide, swollen dorsally, widened ventroanteriorly, with slightly impressed anterior surface, anterior edge angulate; glandular socle short, cylindrical, obliquely truncate, at apex widened, situated at widest point, just behind second third of length. Pedicel 0.06 mm long, hardly longer than wide, slightly asymmetrical. Segment 3 slightly shorter than pedicel, almost as wide as long; segments 4-8 each as wide as segment 3, wider than long, almost equally long; segment 9 about as wide as pedicel, 1.5 times as wide as long; segment 10 1.6 times as wide as long; segment 11 about 1.5 times as long as wide, somewhat shorter than segments 7 to 10 combined.

Pronotum 0.42 mm wide, 1.2 times as wide as long. Lateral foveae situated in large, shallow impressions. Antebasal sulcus deep, well delimited posteriorly, not clearly delimited anteriorly, slightly widened and interrupted in middle by a minute keel. Discal punctuation sparse and very fine, consisting of punctures slightly larger than those on vertex, much

smaller than intervals between them. Punctuation near base irregular and dense, several punctures bordering antebasal sulcus relatively coarse.

Elytron with basal foveae slightly smaller than interval between them. Humeral protuberance absent. Punctuation sparse and fine, coarser than that on pronotal disc.

Protibia without subapical notch and denticle. Metatibia with relatively conspicuous, flat apical denticle.

Aedeagus (text-fig. 3) 0.36 mm long. Median lobe fairly wide. Parameres fairly slender, strongly curved; distal portion more lightly sclerotized, well delimited; each paramere with a pair of flattened, hair-like subapical sensilla subequal in size. Internal sac with proximal sclerotized ring and rounded apical sclerite covering a central, elongate piece. Membranes of internal sac bearing very fine spicules.

Habitat: Moss, rotting wood, bark and various debris along large fallen trees in mature *Abies* forest, with undergrowth of bushes and bamboo.

Bryaxis alishanus sp. n.

Holotype: ♂, Taiwan, Alishan, 2400 m, 10.VI. 1977, J. & S. Klapperich.

Paratypes: 5 ♂, ♀, same data as holotype.

Description: Length 1.45 mm. Body reddish-brown, tarsi, apical antennal segments and maxillary palps slightly lighter. Pubescence fairly long, semierect, recumbent on abdomen.

Head 0.28-0.29 mm wide. Frons 0.19 mm wide. Frontal impression wider than one third of width of frons, deep, well delimited, with rounded posterior edge. Anterior edge of frons slightly prominent, weakly subtriangular. Mesal vertical portion of frontoclypeus rounded. Antennal tubercles slightly raised. Vertex convex. Dorsal tentorial pits in foveiform impressions, with centers situated behind level of anterior eye margin. Median ridge of vertex entire but low. Eye prominent, consisting of

24-26 ommatidia. Punctuation sparse and fine on antennal tubercles, mesal portion of frons and posteriolateral portion of vertex; dense and coarse on remaining frontal surface and near ridge of vertex. Coarse punctures mostly larger than intervals between them. Maxillary palp with apical portion of segment 2 and most of segment 3 tuberculate ventrally.

Gular area flattened, projecting anteriorly to form a narrow, parallel-sided and medially sulcate process, overlapping impressed postoral area and postmentum; lateral edges of process continuing posteriorly as sharp, strongly diverging ridges, anterior angles projecting dorsally and forming two denticles. Median gular ridge hardly distinct, bearing long, recumbent setae orientated anteriorly; most of gular area glabrous.

Scape 0.12 mm long, 0.08-0.09 mm wide, widest near middle, swollen dorsally, with outer edge slightly rounded, inner surface irregularly flattened; glandular socle short, relatively thick, obliquely truncate, expanded around orifice, situated near anterior edge, at level of widest point. Pedicel 0.06-0.07 mm long, distinctly longer than wide, slightly asymmetrical. Segment 3 as long as or slightly shorter than pedicel, distinctly longer than wide; segments 4 and 5 longer than wide or as long as wide; segments 6 to 8 as long as wide or slightly wider than long; segment 9 slightly wider than long; segment 10 about 1.5 times as wide as long; segment 11 almost twice as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.39-0.41 mm wide, about 1.1 times as wide as long. Lateral foveae in large impressions. Antebasal sulcus well delimited posteriorly, widened in middle, partly separated by low median ridge. Discal punctuation sparse and very fine; punctuation behind antebasal sulcus dense and coarse.

Elytron with basal foveae about as large as half of interval between them. Humeral protuberance fairly well developed. Punctuation very fine, more distinct than that on pronotal disc.

Protibia narrowed in apical portion, with deep subapical notch forming a strong denticle. Metatibia with apical denticle.

Aedeagus (text-fig. 4) 0.29 mm long. Median lobe fairly wide. Parameres with distal portion strongly widened, each with outer and inner apical angles forming similarly large rounded lobes, and with a pair of equally large, hair-like subapical sensilla. Internal sac complex, with slender basal stylets inflexed ventroproximally and joined to a pair of wide, laterally curved plates and to a central elongate sclerite; membranes lacking spicules.

Habitat: unknown.

Bryaxis planifer sp. n.

Holotype: ♂, Taiwan, Nantou Hsien, Meifeng, 2130 m, 12.V. 1991, A. Smetana (T 78).

Paratypes: 2 ♂♂, 2 ♀♀, same data as holotype.

Description ♂: Length 1.35-1.50 mm. Body, legs and palps uniformly light brown. Pubescence fairly long, recumbent, semierect on vertex.

Head 0.24 mm wide. Frons 0.17 mm wide. Frontal impression well delimited, as wide as one third of width of frons, with posterior edge subtriangular. Anterior frontal edge transverse or slightly arcuate. Mesal vertical portion of frontoclypeus rounded. Antennal tubercles distinctly raised, impunctate. Vertex convex. Dorsal tentorial pits in foveiform impressions, situated at level of anterior eye margin. Median ridge of vertex more or less shortened, only visible at level of tentorial pits or extended to level of posterior eye margin. Eye large, prominent, consisting of 28-30 ommatidia. Frontal impression finely punctate. Punctuation coarse and very dense on remaining surface of frons and on vertex; punctures well delimited and much larger than intervals between them. Maxillary palp lacking tubercles, or segment 3 with minute ventral tubercles.

Gular area slightly swollen, with two shallow anteriolateral impressions, delimited

laterally by sharp arcuate ridges, extending anteriorly and overlapping postoral area; anterior edge rounded, with two small flat lobes projecting over postmentum and with a minute adoral vertical ridge bearing two vertical hair-like sensilla. Median gular ridge present but short, distinct near ventral tentorial pit; pubescence long, irregular, recumbent.

Scape 0.09 mm long, about as long as wide and twice as long as pedicel, dorsoventrally flattened, with dorsal surface impressed to form an oval, impunctate, sharply delimited area. Anterior scapal edge almost evenly rounded; glandular socle slender, subcylindrical, expanded around orifice, situated just before middle of anterior edge. Pedicel simple, as long as wide, somewhat asymmetrical. Segment 3 as long as pedicel, elongate; segments 4 to 8 of same size, each about as wide as segment 3; segment 9 about 1.3 times as wide as long; segment 10 1.5 times as wide as long; segment 11 slightly more than 1.5 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.34 mm wide, slightly wider than long. Lateral fovea situated in a small impression. Antebasal sulcus deep, well delimited, slightly narrowed laterally, not interrupted in middle. Punctuation on large central portion of disc irregular, consisting of punctures mostly shallow and indistinctly delimited, partly larger than intervals between them and smaller as or upto as large as punctures on vertex. Lateral portion of disc very finely and sparsely punctate. Punctuation near base dense and fine, punctures bordering posterior edge of antebasal sulcus similarly dense and coarse as those on vertex.

Elytron with basal foveae slightly smaller than interval between them. Humeral protuberance distinct. Punctuation very fine and sparse on anterior third, similar to that on lateral portions of pronotum; becoming coarser posteriorly and consisting of very shallow punctures.

Protibia with distinct subapical notch and small denticle. Metatibia with small apical

denticle.

Aedeagus (text-fig. 5) 0.25 mm long. Median lobe fairly wide. Parameres strongly widened, similar to those of *B. alishanus*, but with outer apical lobe much larger than inner apical lobe. Internal sac with rounded basal sclerotized structures joined to a complex of apical sclerites; apices of straight central and curved lateral sclerites situated at same level.

Female: Eye smaller, consisting of 12-13 ommatidia. Vertex very finely punctate. Maxillary palp with apical portion of segment 2 and most of segment 3 distinctly tuberculate ventrally. Scape subcylindrical, longer than wide. Pronotal disc entirely, very finely punctate; coarse punctures margining antebasal sulcus absent.

Habitat: Moss and humus on large fallen trees in old primary broad-leaved evergreen forest.

Bryaxis auritus sp. n.

Holotype: ♂, Taiwan, Kaohsiung Hsien, Meishan, 1010 m, 23.IV. 1992, A. Smetana (T 97).

Description: Length 1.25 mm. Very similar to *B. planifer* but differs by: Vertex with median ridge entire, extending over neck; dorsal tentorial pits situated behind level of anterior eye margin; punctuation on vertex very fine, finer than that on frons. Scape 0.08 mm long, widened anteriorly, widest behind middle. Anteriodorsal surface of scape flattened. Glandular socle cylindrical, not expanded around orifice, situated at widest point of scape at anterior edge of flattened area. Pedicel slightly wider than long. Segment 3 slightly longer than wide; segments 4 to 8 each as wide as segment 3; segments 7 and 8 slightly shorter than segments 4 and 5; segments 9 and 10 each about twice as wide as long; segment 11 about 1.7 times as long as wide. Pronotum 0.32 mm wide, with discal punctuation evenly sparse and very fine. Protibia lacking subapical denticle.

Aedeagus (text-fig. 6) 0.22 mm long. Parameres as in *B. planifer*; internal sac with

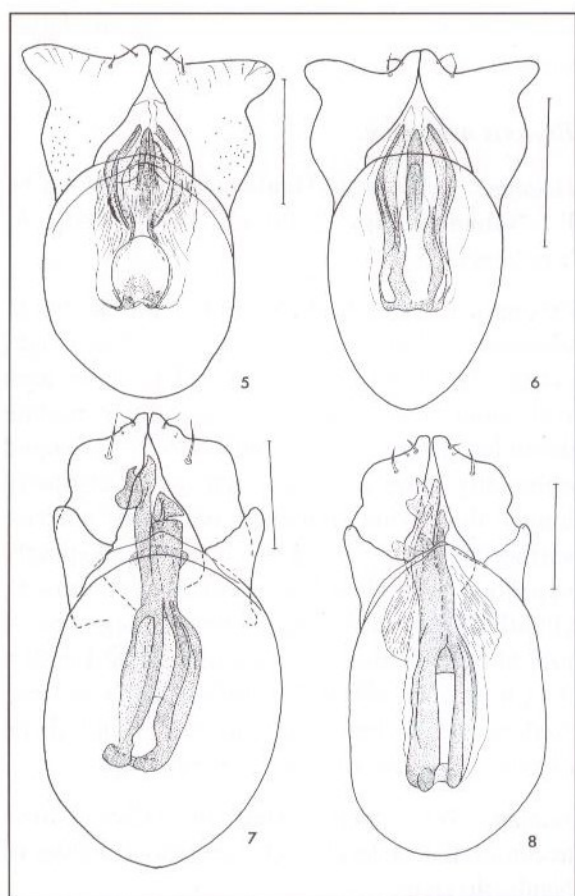
larger central and lateral sclerites, latter joined proximally; rounded basal structures absent.

Habitat: In dead vegetation along edges of a plum orchard.

***Bryaxis hokkiensis* sp. n.**

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawushan, above Kuai-Ku Hut, 2750 m, 22.V. 1991, A. Smetana (T 89).

Description: Length 1.50 mm. Body, femora, tibiae, basal antennal segments and palps uniformly reddish-brown, antennal segment 11



Text-figures 5-8.

Aedeagi of *Bryaxis* in dorsal view; 5. *B. planifer* sp. n.; 6. *B. auritus* sp. n.; 7. *B. hokkiensis* sp. n.; 8. *B. yushanensis* sp. n. Scale bar = 0.1 mm.

and tarsi slightly lighter. Pubescence fairly long, semierect on head and pronotum, recumbent on elytra and abdomen.

Head 0.27 mm wide. Frons 0.19 mm wide. Frontal impression as wide as one third of width of frons, shallow, well delimited, with posterior edge V-shaped. Anterior margin of frons inclined, slightly rounded. Mesal vertical portion of frontoclypeus rounded. Antennal tubercles distinctly raised. Vertex convex, with median ridge entire, fine. Dorsal tentorial pits in foveiform impressions, with posterior margins at level of anterior eye margin. Eye fairly large, consisting of 16-17 ommatidia. Punctuation coarse and very dense on lateral portions of frons, including antennal tubercles; punctures much larger than intervals. Frontal impression very finely punctate. Vertex irregularly punctate; punctures along median ridge denser and larger than most punctures near eye. Maxillary palp with apical portion of segment 2 and most of segment 3 ventrally tuberculate.

Gular area strongly swollen, with anterior surface impressed and smooth, situated below level of slightly impressed postoral area, separated from latter by a sharp arcuate ridge. Latter interrupted in middle and bearing two vertical apophyses arising at inner edges. Median ridge present but low and fairly wide. Pubescence long, recumbent, orientated straight and obliquely anteriorly.

Scape 0.10 mm long, swollen dorsally, widest in middle, almost as wide as long, with anterior edge angulate; basal half of anterior surface impressed and smooth; glandular socle small, narrow, situated in centre of anterior surface, with tip truncate, not extended around orifice. Pedicel 0.06 mm long, slightly longer than wide, slightly asymmetrical. Segment 3 distinctly longer than wide; segments 4 to 8 wider than long, segments 4 and 5 longer than segments 6 to 8; segment 9 about 1.5 times as long as wide; segment 10 twice as long as wide; segment 11 1.6 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.43 mm wide, 1.2 times as wide as long. Lateral foveae each situated in a deep impression. Antebasal sulcus narrow, well delimited, not interrupted in middle. Discal punctation sparse and extremely fine; punctation near base coarse and very dense, similar to that on lateral portions of frons.

Elytron with basal foveae 1.5 times as large as interval between them. Humeral protuberance distinct. Punctation dense, consisting of shallow, poorly delimited punctures.

Protibia with deep subapical notch forming a fairly large denticle. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 7) 0.41 mm long. Median lobe large. Parameres fairly wide, narrowed apically; each with a large dorsal lobe, sinuate apical margin, one large dorsal, one smaller ventral, and one minute ventral hair-like sensillum. Internal sac with slender, strongly sclerotized, arcuate arms joined proximally and in middle. Apical half of sclerites straight, separated in three rods less sclerotized near tip. Tip of two rods widened and strongly asymmetrically hook-shaped. Membranes of internal sac partly bearing extremely fine spicules.

Habitat: Moss, vegetational and other debris along edges of seepage in open coniferous forest with dense undergrowth of deciduous bushes.

Bryaxis yushanensis sp. n.

Holotype: ♂, Taiwan, Chiai Hsien, Yushan N. P., Mun-Li Cliff, 2700 m, 27.IV. 1990, A. Smetana (T 28).

Description: Length 1.60 mm. Head, pronotum and elytra uniformly reddish-brown, abdomen slightly darker, legs, palps and antennae lighter. Similar to *B. hokkiensis* but different as follows: Eye consisting of 19 ommatidia. Anterior surface of strongly swollen gular area abruptly flattened, smooth and almost vertical; arcuate postoral ridge not interrupted in middle

and without apophysis; median ridge distinct, gular pubescence orientated obliquely anteriorly and laterally. Scape with widest point and glandular socle situated more apically, behind middle. Pedicel 0.05 mm long, hardly longer than wide. Antennal segment 3 shorter, as long as wide; segments 4 to 8 of almost same size, slightly less than twice as wide as long; segments 9 and 10 each slightly more than twice as long as wide. Pronotum 0.41 mm wide, not quite 1.2 times as wide as long. Aedeagus (text-fig. 8) 0.40 mm long, with sclerites of internal sac narrower and with tip differently shaped than those of *B. hokkiensis*.

Habitat: Rotting wood, bark and other debris around bases of large trees and along fallen trees in old primary mixed forest.

Bryaxis ami sp. n.

Holotype: ♂, Taiwan, Hualien Hsien, Taroko N. P., Nanhushi Hut, 2200 m, 11.V. 1990, A. Smetana (T 53).

Description: Length 1.55 mm. Similar to *B. yushanensis* but different as follows: Eye larger, consisting of about 30 ommatidia. Gular area with anterior arcuate ridge bearing two minute denticles near middle; pubescence orientated obliquely anteriorly. Scape narrower, distinctly longer than wide, flattened on entire anterior surface, with glandular socle distinctly expanded around orifice. Pedicel symmetrical, slightly wider than long. Antennal segments 4 to 8 about 1.6 times as wide as long. Pronotum 0.41 mm wide, about 1.1 times as wide as long. Aedeagus 0.34 mm long, parameres and shape of sclerites of internal sac as in text-fig. 9.

Habitat: Wet deep layers of fallen leaves accumulated at large rocks on gravel banks of Nanhushi river.

Bryaxis hakka sp. n.

Holotype: ♂, Taiwan, Taichung Hsien, Hsiaohsueh Shan, 2650-2750 m, 1.V. 1990, A. Smetana (T34).

Description: Length 1.65 mm. Very similar to preceding three species but different as follows: Middle of anterior frontal edge slightly projecting, triangular. Eye as in *B. ami*, consisting of 29 ommatidia. Gular area with abruptly inflexed anterior portion, almost reaching level of mentum; arcuate anterior ridge contiguous, without denticles or apophysis; median ridge distinct; gular pubescence long, erect. Scape 0.13 mm long, 0.09 mm wide, widest behind middle, swollen dorsally in posterior portion, with shallowly impressed anteriodorsal surface; anterior and posterior edges slightly rounded; glandular socle distinctly widened around orifice, situated

at level of widest point. Pedicel 0.07 mm long, hardly longer than wide. Antennal segment 3 slightly longer than wide; segments 4 to 8 subequal, each slightly wider than long; segments 9 and 10 about twice as wide as long; segment 11 1.5 times as long as wide. Aedeagus (text-fig. 10) about 0.36 mm long, parameres and sclerites of internal sac similar to those of *B. ami* (the bulb of the median lobe is weakly sclerotized and deformed in this teneral specimen).

Habitat: Wet debris under vegetation on small seepage in treeless slope.

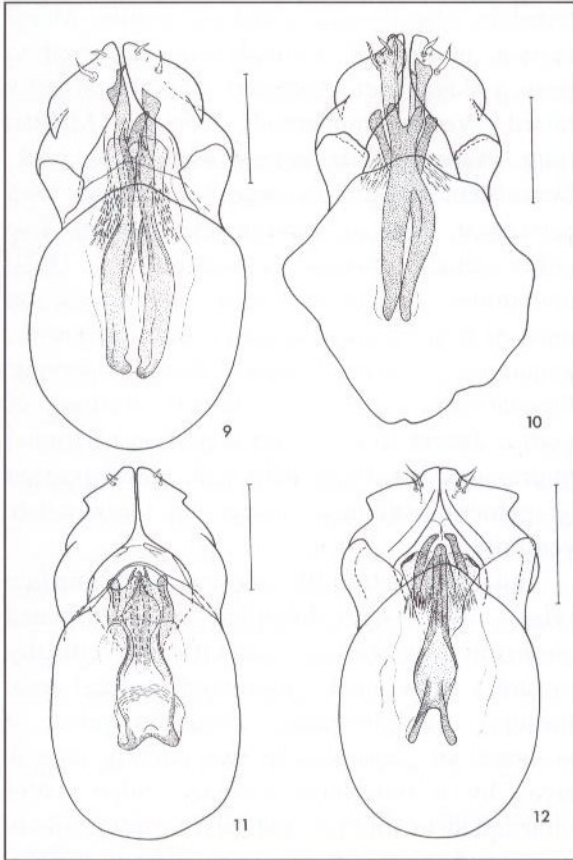
***Bryaxis raptor* sp. n.**

Holotype: ♂, Taiwan, Nantou Hsien, Houhuan-shan, Kuenyang, 3050 m, 29.IV. 1990, A. Smetana (T 30).

Description: Length 1.45 mm. Body uniformly reddish-brown, maxillary palps, legs and antennae lighter. Pubescence fairly long and semierect on head and pronotum, longer on posterior portion of vertex; short and recumbent on elytra and abdomen.

Head 0.28 mm wide. Frons 0.17 mm wide. Frontal impression deep, well delimited, as wide as one third of width of frontal lobe, with posterior edge rounded. Anterior margin of frons truncate. Mesal vertical portion of frontoclypeus forming a flat ridge. Antennal tubercles distinctly raised. Vertex convex, median ridge almost entire but extremely fine. Tentorial pits absent. Eye small, consisting of 9-10 ommatidia. Punctuation extremely fine on vertex and in frontal impression, very fine on posterior portion of frons, dense and coarse on each side of frontal impression. Maxillary palp with segment 3 tuberculate ventrally.

Gular area raised (ventral view), rounded and wide, not clearly delimited laterally, slightly projecting anteriorly and not overlapping postoral area; anterior surface abruptly, almost vertically inclined toward mouthparts; edge bearing two small trichomes converging



Text-figures 9-12.

Aedeagi of *Bryaxis* in dorsal view; 9. *B. ami* sp. n.; 10. *B. hakka* sp. n.; 11. *B. raptor* sp. n.; 12. *B. pingtungensis* sp. n. Scale bar = 0.1 mm.

antieriad. Pubescence short, recumbent, irregular.

Scape 0.09 mm long, in dorsal view longer than wide and gradually thickened toward apical third; strongly widened ventrally and wider than long in frontal view; ventral edge angulate. Anterior surface of scape irregularly impressed; glandular socle small, narrow, with truncate, expanded apex, situated at widest point close to edge. Pedicel 0.06 mm long, hardly longer than wide, somewhat asymmetrical. Segment 3 slightly longer than wide, distinctly shorter than pedicel; segments 4 to 8 each about 1.5 times as wide as long and about as wide as segment 3; segments 9 and 10 about twice as wide as long; segment 11 as long as segments 7 to 10 combined, 1.5 times as long as wide.

Pronotum 0.42 mm wide, almost 1.3 times as wide as long. Lateral fovea situated in a small deep impression. Antebasal sulcus deep, well delimited, not interrupted in middle. Discal punctation as fine as that on vertex, hardly visible. Punctation between base and antebasal sulcus dense, rather coarse, irregular, partly confluent.

Elytron with basal foveae each about as large as half of interval between them. Humeral protuberance distinct. Punctation dense and shallow, punctures mostly larger than intervals between them.

Protibia lacking subapical notch and denticle. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 11) 0.34 mm long. Median lobe fairly wide. Parameres without distinct sclerotized dorsal lobe; each almost obliquely truncate near tip, abruptly notched subapically, with a pair of approximate, short, subapical hair-like sensilla on dorsal side. Internal sac complex, with curved and thickened basal portion, followed by a short, slightly sclerotized area, two lateroapical pieces extended mesally, two strongly sclerotized, central sclerites joined apically, and two slightly sclerotized admesal sclerites; membranes lacking spicules.

Habitat: Moss, old bark and other debris around trees in a coniferous forest (*Abies kawakamii*).

***Bryaxis pingtungensis* sp. n.**

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawu-shan ridge, 2800-2910 m, 28.IV. 1992, A. Smetana (T 105).

Description: Length 1.50 mm. Body entirely reddish-brown, legs, antennae and palps slightly lighter. Pubescence long, recumbent, partly semierect on head, vertex with few long erect setae.

Head 0.28 mm wide. Frons 0.18 mm wide. Frontal impression deep, well delimited, as large as one third of width of frons, with posterior edge V-shaped. Anterior frontal edge angulate, slightly projecting in middle. Mesal vertical portion of frontoclypeus narrowed to form a sharp keel. Antennal tubercles slightly raised. Vertex moderately convex. Median ridge evanescent on vertex, distinct on neck. Dorsal tentorial pits in large impressions, with centers at level of anterior eye margin. Eye rather small, convex, consisting of 18-20 ommatidia. Punctation dense and coarse on most of frons and on median portion of vertex, punctures much larger than intervals. Punctation very fine on lateral portions of vertex, absent from posterior portion of frontal impression. Maxillary palp with apical portion of segment 2 and most of segment 3 tuberculate ventrally.

Gular area strongly swollen, with median ridge not clearly delimited and shortened posteriorly; anterior surface inflexed vertically toward a transversely impressed postoral area. Postoral area flattened, about in level of postmentum, separated in two equally narrow areas by a transverse arcuated ridge; latter interrupted in middle, and bearing two minute vertical denticles. Setae arising from median ridge conspicuous, yellow, directed horizontally and obliquely.

Scape 0.09 mm long, about 1.2 times as long as wide, subcylindrical; glandular socle short,

very narrow at base, with apex truncate and expanded around orifice, situated just before apical third of anterior surface, near ventral edge. Pedicel 0.06 mm long, longer than wide, slightly asymmetrical. Segment 3 much shorter than segment 2, almost as wide as long; segments 4-8 each as wide as segment 3, wider than long; segments 9 and 10 each about twice as wide as long; segment 11 1.6 times as long as wide, as long as segments 7-10 combined.

Pronotum 0.42 mm wide, 1.2 times as wide as long. Lateral foveae in large impressions. Antebasal sulcus deep, widened toward centre, well delimited posteriorly, with anterior edge distinct in middle, indistinct laterally; median ridge present, extending posteriorly to basal pronotal edge. Discal punctation very sparse and extremely fine. Punctation near base fairly dense, not as fine as discal punctation, punctures along antebasal sulcus relatively coarse.

Elytron with basal foveae about half as large as interval between them. Humeral protuberance distinct. Punctation sparse and very fine, punctures much smaller than intervals.

Protibia with distinct subapical notch and distinct denticle. Metatibia with strong apical denticle.

Aedeagus (text-fig. 12) 0.32 mm long. Median lobe fairly large. Parameres with prominent tip, wide and slightly oblique subapical margin; dorsal lobe distinct, large; each with two approximate dorsal and one ventral, slender subapical hair-like sensilla. Internal sac with long, narrow median sclerite bifid proximally, weakly sclerotized ventral plate and two slender apical sclerites; membranes bearing extremely fine spicules.

Habitat: Moss and various debris under bushes in *Abies* forest.

***Bryaxis alayai* sp. n.**

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawushan ridge 2800-2910 m, 28.IV. 1992, A.

Smetana (T 105).

Paratype: 2 ♂♂ as holotype; 1 ♀ Pingtung Hsien, Peitawushan, above Kuai-Ku Hut, 2750 m, 22.V. 1991, A. Smetana (T 89).

Description: Length 1.40 mm. Body reddish-brown, legs, palps and antennomere 11 lighter. Pubescence recumbent, fairly long, semierect on vertex.

Head 0.25 mm wide. Frons 0.17 mm wide. Frontal impression deep, well delimited, with U-shaped posterior edge. Anterior edge of frons subtriangular. Mesal vertical portion of frontoclypeus rounded. Antennal tubercles indistinct. Vertex convex. Dorsal tentorial pits absent. Median ridge distinct only on posterior portion of vertex, extremely low, or almost completely reduced anteriorly. Eye prominent, consisting of 11 or 12 ommatidia. Punctation on frons, including frontal impression, on antennal tubercles and on most of vertex dense and coarse, with punctures usually much larger than intervals between them. Punctation on lateral portion of vertex much finer and sparser than on centre of vertex. Segments 2 and 3 of maxillary palp with minute ventral tubercles.

Gular area swollen, delimited by two oblique lateral ridges, projecting anteriorly and overlapping postmental impression; anterior edge of swollen area with central denticle and two trichomes orientated dorsally. Median gular ridge absent. Pubescence recumbent, irregular.

Scape 0.08 mm long and wide, thickened apically, widest just before apical third (dorsal view), then narrowed, with outer and inner edges rounded; glandular socle small, cylindrical, perpendicular to longitudinal scapal axis, with obliquely truncate apex, not widened around orifice, situated at middle of anterior edge. Pedicel 0.06 mm long, almost as wide as long, asymmetrical. Segment 3 slightly longer than wide, shorter than pedicel; segments 4 to 8 equally large, strongly transverse; segments 9 and 10 each about twice as wide as long, segment 11 about 1.5 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.36 mm wide, about 1.1 times as wide as long. Lateral fovea situated in small impression. Antebasal sulcus sharply delimited posteriorly, widened in middle portion, not interrupted in centre. Discal punctation sparse and very fine, punctation on mediobasal area dense and coarse.

Elytron with basal foveae each as large as half of interval between them. Humeral protuberance absent. Punctation very fine, somewhat less fine than that in pronotal disc.

Protibia with apical portion flattened and with minute subapical notch; subapical denticle absent. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 13) 0.27-0.28 mm long. Median lobe large. Parameres sinuate apically; each abruptly emarginate apicad of large dorsal lobe, bearing two pairs of hair-like sensilla. Dorsal sensilla approximate and long, ventral sensilla very short and more distant. Internal sac with slender central sclerite and with a pair of arcuate basal sclerites; membranes bearing long, very dense spicules.

Habitat: Moss and various debris under bushes and along edges of a seepage in a *Abies* forest.

Bryaxis coelestis sp. n.

Holotype: ♂, Taiwan, Nantou Hsien, Yushan N. P., 2 km W Pai-Yun Hut, 3350 m, 16.V. 1991, A. Smetana (T 84).

Paratype: ♂ same data but 1.8 km W Pai-Yun Hut, 3375 m, 33.V. 1991 (T 85).

Description: Length 1.45-1.50 mm. Body entirely reddish-brown, legs, antennae and palps paler. Pubescence short, recumbent, longer and oblique on vertex.

Head 0.26 mm wide. Frons 0.15 mm wide. Anterior frontal edge weakly rounded. Frontal impression shallow, not well delimited posteriorly, about as wide as one fourth of width of frons. Mesal vertical portion of frontoclypeus moderately narrowed, slightly rounded. Antennal tubercles indistinct. Vertex convex. Dorsal tentorial pits and median ridge

of vertex absent. Eye convex, consisting of 11 to 13 ommatidia. Punctation dense and coarse on anterior portion of frons, sparse and mostly very fine on remaining surface of head; posterior portion of frontal impression impunctate. Maxillary palp lacking tubercles, or with a few minute tubercles on ventral side of 3rd segment.

Gular area raised (ventral view), flat, wide, sharply delimited laterally, narrowed anteriorly, impressed anterolaterally, projecting anteriorly to form a process overlapping impressed postoral area; anterior edge of process projecting in middle and bearing two stout setae orientated dorsally. Median ridge and transverse impression absent. Pubescence irregular, recumbent.

Scape 0.09 mm long, as long as wide, swollen dorsally, slightly narrowed toward base in dorsal view, with anterior edge straight in basal two thirds, then rounded; posterior edge slightly rounded; glandular socle small, narrow, obliquely truncate and widened around orifice, situated at widest point near anterior edge. Pedicel 0.065 mm long, almost as long as wide, asymmetrical. Segment 3 slightly wider than long; segments 4 to 8 about as wide as segment 3, each distinctly wider than long; segment 9 almost twice as wide as long; segment 10 somewhat more than twice as wide as long; segment 11 almost 1.5 times as long as wide, somewhat longer than segments 8 to 10 combined.

Pronotum 0.40 mm wide, about 1.2 times as wide as long. Lateral foveae situated in small impressions. Antebasal sulcus shallow, interrupted in middle, not well delimited posteriorly. Punctation evenly sparse and very fine, similar to that on vertex.

Elytron with basal foveae somewhat smaller than interval between them. Humeral protuberance absent. Punctation sparse and very fine, less fine than on pronotum.

Protibia flattened apically, with minute subapical notch, lacking denticle. Metatibia with small apical denticle.

Aedeagus (text-fig. 14) 0.27-0.28 mm long. Median lobe large. Parameres each with large, weakly sclerotized dorsal lobe, minute subapical notch overlapped by a small lobe, and with two dorsal and one ventral subapical sensilla. Dorsal sensilla approximate; outer with wide base, abruptly curved and narrowed, inner hair-like. Ventral hair-like sensilla short. Internal sac with sclerotized structures forming a pair of apical spines, one quadrifid central piece and a main large piece, joined to lateral vesicles bearing spicules.

Habitat: Floor debris, mouldy wood and bark along fallen trees in old, primary coniferous

forest (*Abies* sp.), with dense undergrowth of bamboo.

***Bryaxis taiwanus* sp. n.**

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawu-shan trail at 1500 m, I.V. 1992, A. Smetana (T 110).

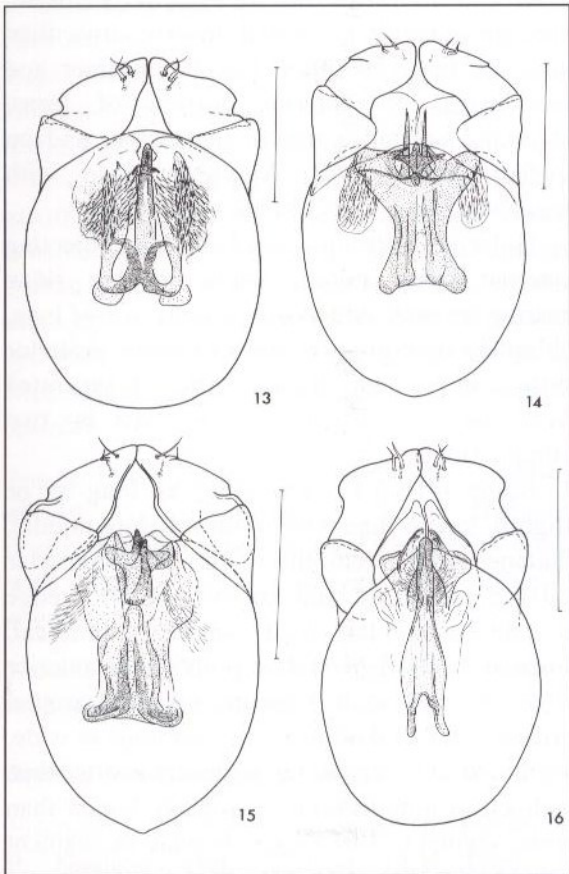
Paratype: ♂ same data as holotype.

Description: Length 1.2-1.3 mm. Body uniformly reddish-brown, legs, antennae and palps lighter. Pubescence fairly long, semierect on head, pronotum and elytra, recumbent on abdomen.

Head 0.24 mm wide. Frons 0.17-0.18 mm wide. Frontal impression deep, well delimited, wider than one third of width of frons, with posterior edge arcuate. Anterior frontal margin arcuate. Mesal vertical portion of frontoclypeus fairly wide, rounded. Antennal tubercles indistinct. Vertex slightly convex; median ridge and dorsal tentorial pits absent. Eye large, prominent, consisting of about 20 ommatidia. Punctuation mostly coarse and very dense, with intervals much smaller than punctures and partly reduced to narrow ridges. Punctuation in frontal impression and on lateral portions of vertex sparser and finer. Maxillary palp with apical portion of 2nd segment and most of 3rd segment tuberculate ventrally.

Gular area similar to that in *B. coelestis* but not impressed anteriolaterally.

Scape 0.09 mm long, as long as wide, widest in middle, with anterior surface impressed medially, anterior edge arcuate; glandular socle short, cylindrical, with apex truncate, expanded along orifice, orientated obliquely anteriorly, situated at level of widest point, near anterior edge. Pedicel 0.06 mm long and wide, almost symmetrical. Segment 3 as long as wide, about as long as two thirds of pedicel; segments 4 to 8 each as wide as segment 3, wider than long, segments 4 and 5 longer than segments 6, 7 or 8; segments 9 and 10 about 1.5 times as wide as long; segment 11 about 1.5 times as long as



Text-figures 13-16.

Aedeagi of *Bryaxis* in dorsal view; 13. *B. atayai* sp. n.; 14. *B. coelestis* sp. n.; 15. *B. taiwanus* sp. n.; 16. *B. bellax* sp. n. Scale bar = 0.1 mm.

wide and as long as segments 7 to 10 combined.

Pronotum 0.36-0.38 mm wide, about 1.2 times as wide as long. Lateral fovea in small impression. Antebasal sulcus deep, well delimited posteriorly, interrupted in middle by a minute ridge. Discal punctation in middle coarser than near lateral edges (holotype) or evenly very fine (paratype). Punctation near base very dense and more or less coarse.

Elytron with basal foveae each about as large as two thirds of interval between them. Humeral protuberance distinct. Punctation entirely very fine, shallow.

Protibia straight, with arcuate dorsal edge, narrowed apical fourth; subapical notch minute. Metatibia with apical denticle.

Aedeagus (text-fig. 15) 0.22 - 0.23 mm long. Median lobe large. Parameres each with a large dorsal lobe, followed by a small emargination; strongly narrowed toward apex; margin between emargination and tip almost oblique; tip not prominent. Sensilla of parameres similar to those in *B. coelestis*. Internal sac with complex, thick basal portion; apical portion with two simple, elongate sclerites partly overlapping a large trifid sclerite (inverted in the paratype). Membranes bearing extremely fine spicules, forming relatively compact lateral areas.

Habitat: Various debris, fallen leaves and rotting wood along fallen trees in old broad-leaved evergreen forest.

Bryaxis bellax sp. n.

Holotype: ♂, Taiwan, Taichung Hsien, Hsiao-hsueh Shan, 2650-2750 m, 1.V. 1990, A. Smetana (T 34).

Paratypes: 8 ♂♂, 7 ♀♀ same data as holotype.

Description ♂: Length 1.40 mm. Body uniformly light reddish-brown, or abdomen somewhat darker. Legs, antennae and palps lighter than body. Pubescence long, recumbent, semierect on head.

Head 0.26-0.27 mm wide. Frons 0.17-0.19 mm wide. Frontal impression deep, sharply delimited, with posterior edge V-shaped, almost as wide as half of width of frons. Anterior frontal edge triangulate in middle, truncate laterally. Mesal vertical portion of frontoclypeus narrowed to form a sharp prominent keel. Antennal tubercles conspicuously high. Vertex convex. Dorsal tentorial pits in impressions, with centers at level of anterior eye margin. Median ridge entire, or more or less reduced, sometimes completely absent from posterior portion of vertex, or from area near frontal impression. Eye prominent, consisting of about 20 ommatidia. Punctation on posterior portion of frons and on vertex dense, irregularly coarse; punctures sharply delimited, mostly larger than intervals between them. Punctation finer and less dense on anterior portion of frons, including on entire frontal impression, and on surface above eyes. Maxillary palp with segments 2 and 3 tuberculate ventrally.

Gular area strongly swollen, not projecting anteriorly, with raised, sharp median ridge bearing on each side a conspicuous row of long, obliquely diverging, recumbent setae. Anterior surface impressed, strongly inflexed, separated from narrow, vertical postoral area by two oblique ridges.

Scape 0.10-0.11 mm long, as long as or slightly longer than wide, widest before middle, flattened dorsoventrally, with dorsoanterior surface impressed and smooth, anterior edge arcuate; glandular socle small, cylindrical, situated at level of widest point, near anterior edge; apex of socle truncate, widened around orifice. Pedicel 0.06 mm long, as long as wide, asymmetrical. Segment 3 distinctly shorter than pedicel, as long as wide or slightly longer than wide; segments 4 to 8 each as wide as segment 3 and wider than long, segments 4 and 5 longer than segments 6, 7 and 8; segments 9 and 10 each about twice as long as wide; segment 11 1.5 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.37-0.38 mm wide, about 1.1-1.2 times as wide as long. Lateral foveae situated in impressions. Antebasal sulcus sharply delimited posteriorly, not clearly delimited anteriorly, not interrupted in middle. Discal punctation sparse and very fine, punctation near base dense and fairly coarse.

Elytron with basal foveae distinctly smaller than interval between them. Humeral protuberance indistinct. Punctation very fine, shallow, denser than on pronotal disc, near base about as fine as on pronotal disc, elsewhere slightly less fine.

Protibia with shallow subapical notch, without denticle on inner side. Metatibia with apical denticle.

Aedeagus (text-fig. 16) 0.25-0.26 mm long. Median lobe fairly large. Parameres each with large dorsal lobe, followed by a wide emargination; apical margin rounded, tip slightly prominent; with two dorsal and one ventral subapical hair-like sensilla; ventral sensillum shorter and narrower than dorsal sensilla. Internal sac with long, proximally curved, bifid piece joined to a slender medioapical sclerite, with a pair of narrow extruded sclerites and a ventroapical plate. Membranes with extremely fine subapical spicules.

Female: Eye smaller, not prominent, consisting of 10 to 12 ommatidia. Scape flattened dorsoventrally, subcylindrical in dorsal view, with almost parallel anterior and posterior edges.

Habitat: Wet debris under vegetation on small seepage in treeless slope.

Bryaxis tarokanus sp. n.

Holotype: ♂, Taiwan, Hualien Hsien, Taroko N. P., Nanhushi Hut, 2220 m, 12.V. 1990, A. Smetana (T 55).

Description: Length 1.35 mm. Body and scape entirely reddish-brown, legs, palps and antennal segments 2 to 11 lighter. Pubescence

moderately long, semierect, recumbent on abdomen.

Head 0.24 mm wide. Frons 0.16 mm wide. Frontal impression shallow, not delimited posteriorly. Anterior edge of frons slightly rounded. Mesal vertical portion of frontoclypeus rounded, fairly wide. Antennal tubercles slightly raised. Dorsal tentorial pits absent. Vertex convex, with median ridge distinct although strongly shortened, about as long as eye, reaching posteriorly level of eye centre. Eye small, prominent, consisting of 13 - 14 ommatidia. Punctation very dense and fairly coarse on lateral portions of frons, including anterior portion of frontal impression, more or less dense and very shallow on posterior portion of frons and most of vertex, extremely fine on posteriolateral portion of vertex. Maxillary palp with apical portion of 2nd segment and ventral surface of 3rd with inconspicuous tubercles.

Gular area raised (ventral view), flat, wide, with one short posteriomedian and two very short anteriomedian ridges; projecting anteriorly to form a process overlapping impressed postoral area. Anterior edge of process swollen, expanded dorsally, with two flat vertical denticles. Pubescence consisting of few long recumbent setae.

Scape 0.08 mm long, hardly longer than wide, widest behind middle, with anterior edge strongly convex, posterior edge almost straight, flattened ventrally, swollen apicodorsally; glandular socle absent. Pedicel 0.06 mm long, elongate, asymmetrical. Segment 3 longer than wide; segments 4 to 8 wider than long, segments 4 and 5 slightly larger than following ones; segments 9 and 10 each about twice as wide as long; segment 11 about 1.5 times as long as wide, slightly longer than segments 7 to 10 combined.

Pronotum 0.36 mm wide, not quite 1.2 times as wide as long. Lateral fovea in a impression. Antebasal sulcus deep, sharply delimited posteriorly, wide in middle, gradually narrowed laterally, with median ridge minute, not extending toward basal margin. Discal

punctuation sparse and very fine; punctuation behind antebasal sulcus dense and coarse.

Elytron with basal foveae each about as large as two thirds of interval between them. Humeral protuberance indistinct. Punctuation sparse and very fine, similar to that on pronotal disc.

Protibia slightly narrowed apically; subapical notch and denticle absent. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 17) 0.31 mm long. Basal bulb of median lobe large. Parameres each bearing a small dorsal lobe, not emarginate but with distinctly concave margin behind; tip not prominent; with three dorsal and one ventral subapical sensilla. Outer dorsal sensillum conspicuously thick basally and abruptly curved; middle dorsal sensillum fairly approximate to outer, long, slender, hair-like; inner dorsal and ventral sensilla short, hair-like. Internal sac with two pairs of elongate sclerites curved and joined proximally, and one medioapical denticle joined to a large plate; membranes bearing spicules.

Habitat: Moist moss and various debris on and along large fallen trees in old coniferous forest.

***Bryaxis tychobythinoides* sp. n.**

Holotype: ♂, Taiwan, Pingtung Hsien, Peitawushan, Kuai-Ku Hut, 2130 m, 27.IV. 1992, A. Smetana (T 101).

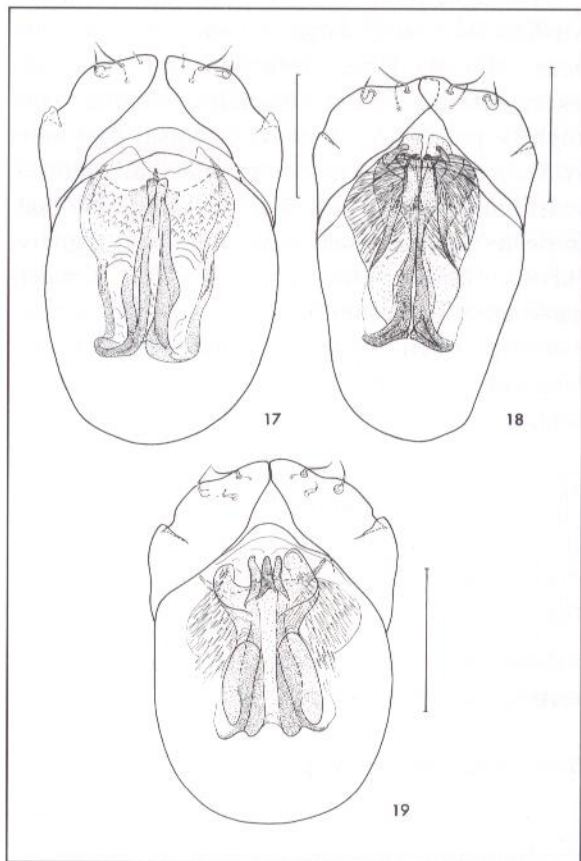
Paratypes: 1 ♂, 1 ♀ as holotype; 3 ♂♂ and 1 ♀, same data but 2125 m (T 102); 3 ♂♂, 2 ♀♀, same data but 2135 m, 30.IV. 1992 (T 108).

Description ♂: Length 1.25-1.30 mm. Body, femora and antennae uniformly reddish-brown, last antennal segment, tibiae and tarsi slightly lighter. Pubescence fairly long, recumbent; longer, semierect on vertex.

Head 0.25 mm wide. Frons 0.16 mm wide. Frontal impression shallow, well delimited, somewhat wider than one third of width of frons, with posterior edge V-shaped. Anterior edge of frons slightly rounded, not expanded in

middle. Mesal vertical portion of frontoclypeus wide, rounded. Antennal tubercles distinctly raised. Vertex convex, with very fine, more or less evanescent, posteriorly shortened median ridge. Dorsal tentorial pits distinct, in impressions, with centers at level of anterior eye margin. Eye convex, consisting of 13 ommatidia. Punctuation dense and fairly coarse on frons and on mesal portion of vertex, irregular, fine and rather sparse in frontal impression; lateral portions of vertex very finely punctate. Apex of segment 2 and most of segment 3 of maxillary palp with ventral tubercles.

Gular area slightly swollen, projecting



Text-figures 17-19.

Aedeagi of *Bryaxis* in dorsal view; 17. *B. tarokanus* sp. n.; 18. *B. tychobythinoides* sp. n., 19. *B. alesi* sp. n. Scale bar = 0.1 mm.

antieriad to form a gradually narrowed process overlapping flat postoral area and postmentum. Lateral edges of process oblique, anterior edge angulate ventrally (arcuate in frontal view), with two rounded vertical denticles raising dorsally. Median ridge low, distinct, bearing moderately long recumbent setae orientated anteriorly.

Scape almost 0.10 mm long, 0.07 mm wide, gradually thickened toward apical third, swollen dorsally, flattened ventrally, with posterior edge almost straight, with anterior edge straight between base and apical third, rounded in apical third; glandular socle minute, very narrow, cylindrical, hardly widened around truncate apex, situated at level of widest scapal point, near anterior edge. Pedicel about as long as scape wide, distinctly longer than wide, slightly asymmetrical. Segment 3 almost as long as pedicel wide, distinctly longer than wide; segments 4 to 8 about as wide as segment 3, subequal, each slightly wider than long, segment 9 about 1.3 times as wide as long, segment 10 1.6 times as wide as long, segment 11 almost twice as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.36 mm wide, about 1.2 times as wide as long. Lateral foveae in small impressions. Antebasal sulcus sharply delimited apically, partly interrupted by minute median ridge, narrowed laterally. Mediobasal ridge absent. Discal punctation sparse and very fine, consisting of very shallow punctures indistinctly delimited, punctation behind antebasal sulcus dense and coarse.

Elytron with basal foveae each as large as half of interval between them. Humeral protuberance absent. Discal punctation very fine, consisting of well delimited punctures.

Protibia flattened apically, with minute subapical notch, lacking subapical denticle. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 18) 0.26-0.27 mm. Basal bulb of median lobe fairly large. Parameres not emarginate behind small dorsal lobes, irregularly narrowed toward apex, with tip not

prominent; each bearing two dorsal and one ventral subapical sensilla; outer dorsal sensillum thick basally, strongly curved, inner dorsal sensillum hair-like, distant and long, ventral sensillum shorter. Internal sac with two elongate, parallel sclerites, weakly sclerotized apical lobes; membranes bearing long, relatively conspicuous spicules.

Female: Eye consisting of 11 ommatidia. Scape slightly smaller, subcylindrical in dorsal view. Elytron without humeral protuberance.

Habitat: Forest floor litter and moss on fallen trees in an original broad-leaved forest with intermixed cedars.

Bryaxis alesi sp. n.

Holotype: ♂, Taiwan, Kaohsiung Hsien, Kuan-shan trail above Kaunshanchi Riv., 2550 m, 21.IV. 1992, A. Smetana (T 96).

Paratypes: 4 ♂♂, 2 ♀♀, same data as holotype.

Description ♂: Length 1.25-1.35 mm. Body uniformly reddish-brown, legs, antennae and palps lighter. Pubescence moderately long, recumbent, that on head semierect.

Head 0.25-0.26 mm wide. Frons 0.18-0.19 mm wide. Frontal impression deep, wider than one third of width of frons, rounded and more or less well delimited posteriorly. Anterior edge of frons obtusely angulate. Antennal tubercles slightly raised. Mesal vertical portion of frontoclypeus wide. Vertex distinctly convex. Dorsal tentorial pits present and situated in impressions, in front of level of anterior eye margin, or absent and replaced by very shallow impressions. Median ridge of vertex distinct, extended from occiput to level of dorsal tentorial pits, or more or less reduced, or absent in specimens lacking dorsal tentorial pits. Eye small, prominent, consisting of 12 to 14 ommatidia. Punctation conspicuously variable, very dense and coarse on entire frons and vertex and consisting of sharply delimited punctures separated by narrow ridges (holotype,

2 paratypes), or more or less fine and consisting partly of shallow, not well delimited punctures. Maxillary palp with apical portion of segment 2 and most of segment 3 tuberculate ventrally.

Gular area swollen, similar to that in *B. tychobythinoides* but lateral edges of process arcuate and inflexed dorsally, and anterior edge notched in middle. Median ridge absent, pubescence irregular.

Scape 0.09 mm long, about 0.08 mm wide, slightly widened apically, widest shortly before apex, swollen dorsally, flattened ventrally; anterior and posterior edges slightly rounded in dorsal view; glandular socle very short, truncate and widened around apex, situated at middle of anterior edge. Pedicel 0.06-0.07 mm long, distinctly longer than wide, asymmetrical. Segment 3 elongate; segments 4 to 8 wider than long, each almost of same size; segments 9 and 10 each about twice as wide as long; segment 11 times as long as wide, as long as segments 7 to 10 combined.

Pronotum 0.37-0.38 mm wide, 1.2 times as wide as long. Lateral fovea in a depression. Antebasal sulcus deep, well delimited basally, wide in middle, narrowed laterally, not interrupted in middle; mediobasal ridge absent. Discal punctuation sparse and very fine; punctures bordering posterior edge of antebasal sulcus dense and relatively coarse.

Elytron with basal foveae each about as large as half of interval between them. Humeral protuberance very low. Punctuation very fine, slightly more distinct than that on pronotal disc.

Protibia with distinct subapical notch forming a small denticle. Metatibia with distinct apical denticle.

Aedeagus (text-fig. 19) 0.25 mm long. Basal bulb of median lobe large. Parameres very similar to those in *B. tychobythinoides* but with two short, ventral hair-like sensilla. Internal sac with three medioapical sclerites and wide apical plate joined to two large, proximally incurved pieces; membranes bearing distinct spicules.

Female: Head hardly smaller, 0.24 mm wide,

frons 0.18 mm wide. Eye consisting of 9 or 10 ommatidia. Elytron with basal foveae slightly more approximate, humeral protuberance absent.

Habitat: Floor litter in original, mixed broad-leaved and coniferous forest.

Etymology: The specific name is patronymic, honoring Dr. Aleš Smetana who collected so many interesting beetles on his expeditions.

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臺灣的 *BRYAXIS* 屬
(鞘翅目：隱翅蟲科：蟻塚蟲亞科)

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摘 要

本文描述發現於臺灣高山地區隱翅蟲科蟻塚蟲亞科的 *Bryaxis* 屬的 19 個新種，文中並附其生殖器之插圖。

關鍵詞：隱翅蟲科、蟻塚蟲亞科、*Bryaxis*、分類學、臺灣