

Zeitschrift: Entomologica Basiliensia
Herausgeber: Naturhistorisches Museum Basel, Entomologische Sammlungen
Band: 12 (1988)

Artikel: A revision of the genus Bilyella n. gen. (Coleoptera, Melyridae, Dasytinae)
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DOI: <https://doi.org/10.5169/seals-980626>

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Entomologica Basiliensia	12	435–467	1988	ISSN 0253-2484
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A revision of the genus *Bilyella* n. gen. (Coleoptera, Melyridae, Dasytinae)

by K. Majer

Abstract: the genus *Bilyella* n. gen. from Central Asia (Iran, Afghanistan, the U.S.S.R., Kashmir, Pakistan) is described, illustrated and discussed, basic interspecific relationships are outlined. The genus contains 19 species, 18 of them are described as new: *Bilyella unispina*, *bipartita*, *basiunguis*, *breviunguis*, *ursus*, *felis*, *maleci*, *javrozae*, *apis*, *saccata*, *vaginata*, *stilet*, *pecten*, *femina*, *brevispina*, *spinosa*, *furcata*, *simplex* spp. n. The species *Bilyella gracilitarsis* (Reitter, 1902) (formerly classified with the genus *Dasytiscus* Kiesw.) is the type-species of this genus.

Holomorphological dissection of the species has brought some excellent morphological discoveries, e.g. unusual structure of phallus being without phallic tube; the spines of internal sac are transformed into surprising formations, these are probably without analogy within Coleoptera. Similarly, females have broadly modified sclerites in bursa copulatrix. *Bilyella* has also other distinctive characters, e.g. extremely reduced tormal processes in labrum, constricted terminal segment of maxillary palpi, etc.

Key words: Coleoptera Melyridae Dasytinae – Central Asia – taxonomy – new genus – new species – description.

Introduction

Examining a very abundant material of the genus *Dasytiscus* Kiesw. s. lato from Central Asia lent me by Dr M. Brancucci (Natural History Museum, Basel) I noticed at first sight small (2–3 mm) numerous specimens resembling representatives of the subgenus *Haplothrix* Schilsky (genus *Dasytiscus* Kiesw.) but their first evident and distinctive external character was the bisinuate pronotal base.

Dissecting first specimens, I was very surprised by the genital structure in both sexes. Additional dissections led me to the ascertainment that the species belong to a new, undescribed genus. Similarly surprising was the statement that 18 from 19 species are new for science, due to the extraordinary external uniformity of most species I formerly assumed there could be at most 2 or 5 species. Finally, the problem was solved: in contrast to the very similar external appearance, the characters on genitalia are distinctive, stable and easy to evaluate as good specific characters in both sexes.

Abbreviations used

KMB	= Karel Majer, University of Agriculture, Brno (private collection)
NHMB	= Naturhistorisches Museum, Basel (Dr M. Brancucci)
NMP	= Národní Muzeum, Praha (Dr J. Jelínek)
TMB	= Természettudományi Muzeum, Budapest (Dr Z. Kaszab)
AL	= length of antenna
EL	= maximal length of elytra
EW	= maximal width of elytra
HW	= maximal width of head
PL	= maximal length of pronotum
PW	= maximal width of pronotum

Descriptive part

I am not giving a key to species; it would have to be exclusively based upon genital characters – the illustrations are better understandable than the key, each specimen must be dissected.

Bilyella n. gen.

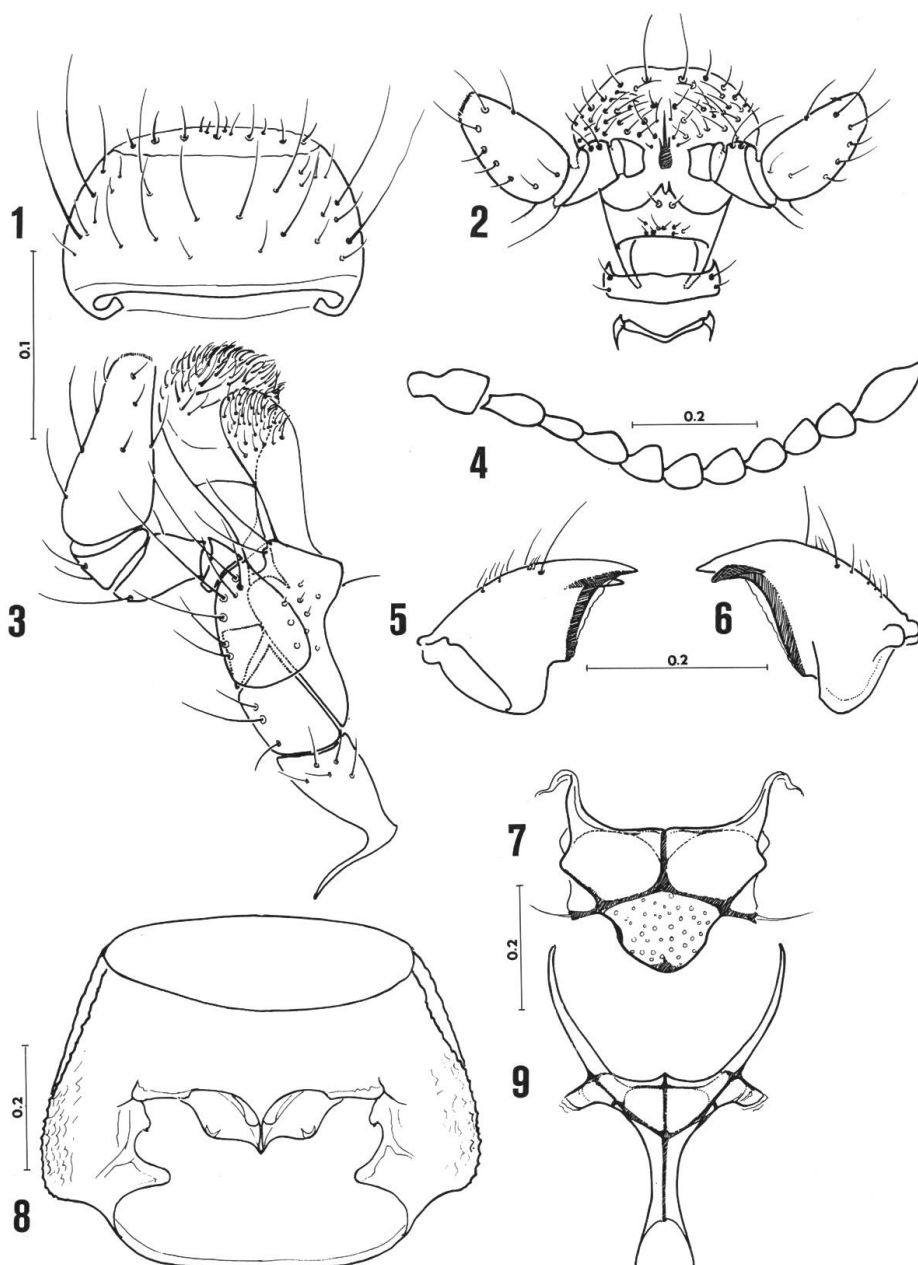
Type-species: *Dasytiscus gracilitarsis* Reitter, 1902 (present designation).

Gender: feminine.

Derivatio nominis: the genus is dedicated to my friend Dr Svato-pluk Bílý of the National Museum, Prague (Czechoslovakia).

Differential diagnosis. Pronotal base bisinuate (Figs 29–60). Terminal processes in labrum extremely reduced (Fig. 1). Terminal segments of maxillary palpi constricted (Fig. 3). Wings (Fig. 11): complete set of anal veins and transverse anal vein present, vein A1 strongly reduced. Elytral epipleura reaching basal quarter of elytra (Fig. 14). Tarsomeres equal in width and subequal in length (tarsomere 4 shorter than adjoining ones) (Figs 16, 17). Male sternum VIII without median process (Figs 72–74). Spicular fork with distinct sternum IX (Figs 63–65). Tegmen (Figs 83–94) with two long linguiform formations at base, apex shortly bilobate. Phallus (Figs 95–111): phallic tube absent, spines of internal

sac transformed into various, mostly elongate formations substituting functionally the phallus. Females with well developed, shortly ciliate bursa copulatrix bearing various sclerotized formations (Figs 112–132).



Figs 1–9: *Bilyella gracilitarsis* (Reitt.), ♂: 1, labrum. 2, labium. 3, left maxilla. 4, right antenna. 5, mandible, ventral view. 6, mandible, dorsal view. 7, mesoscutellum, dorsal view. 8, prothorax, ventral view. 9, metendosternite. (Scale in mm.)

Description: The genus includes only small species (2–3.5 mm) with extremely uniform, cylindrical or subcylindrical body. Integument flatly, regularly, very densely punctate; punctures mostly forming transverse wrinkles; pubescence very short and completely recumbent, relatively easy to be rubbed-off (Fig. 10). Colouration black, mostly with scarcely conspicuous metallic reflexes (plumbeous or greenish); extremities mostly pale in contrast with dark body colouration.

Sexual dimorphism very poorly developed externally, females somewhat more convex and dilated posteriorly, also the outline of pronotum often different but these characters are indistinct in many species (except *Bilyella vaginata*, *B. brevispina*, *B. spinosa*, and *B. furcata* where the sexes are different in shape, nearly as in subg. *Dasytidius* Schilsky).

Eyes not very prominent (Fig. 10). Labrum with tormal processes extremely reduced (Fig. 1). Terminal segment of maxillary palpi slightly constricted and tapering apex (Fig. 3). Mandibles with foliaceous cutting edge and bifurcate apices (Figs 5–6). Antennae (Figs 4, 21–28) with conical to submoniliform joints, 6th mostly inconspicuously smaller and more slender than adjoining joints, apical one mostly ovoid, rarely slightly, asymmetrically compressed or constricted. Shape of antennal joints depends on the state of mounting a specimen—thus their importance as specific character is limited.

Pronotum (Figs 29–60) never bordered, always transverse, bisinuate at base; sides almost straight to broadly rounded, pronotum therefore always converging forwardly; contour of pronotum is not very stable inside the species, nevertheless, suitable as additional specific character; apex of pronotum straight to arcuate. Prosternum (Fig. 8) without pleurosternal suture; intercoxal process very slender, prosternal apophysis crescent; cryptosternum rounded; hypomera with fine and flat, denticulate structure at sides; lateral margins of pronotum finely crenate. Mesoscutellum as figured (Fig. 7). Metendosternite (Fig. 9) without tendons, stalk and furcal arms slender and long, lamina little extensive, short.

Metanotum (Fig. 13) with conspicuously reduced armature. Wings (Fig. 11) with Rc well developed; set of anal veins complete but the veins not sharply marked, rather shadowy; transverse anal vein present; A1 strongly reduced into a short rudiment. Elytra (Fig. 14) with narrow epipleura reaching basal quarter of elytra.

Legs (Figs 16–17) with hind tarsomeres and apices of all tibiae spinulose; tarsomeres unequal, 4 shorter than adjoining; tarsal claws (Fig.

15) dilated at base. Mesosternum (Fig. 12) bipartite, its process long and slender; discriminial line on metasternum nearly complete; mesepisternum with adumbrated dividing line.

Male pygidium (Figs 66–68) mostly conical, basal corners slender, apex broad. All sternites free, male sternum VII straight at apex (Fig. 70) or emarginate (Figs 18, 69, 71); male sternum VIII crescent, mostly shallowly emarginate at apex (Figs 72–74). Spicular fork with filiform proper fork; sternum IX membranous (Fig. 64), nearly crescent (Fig. 65) or anchor-shaped (Fig. 63). Tegmen of unusual shape: base occupies the greatest portion of tegmen which is formed by two sclerites: (a) the dorsal one is linguiform, (b) the ventral one is bigger than latter but convex (Figs 83–94).

Phallus occupies the all abdominal length (compare Figs 18 and 19), in many specimens is stuck out the abdomen. The phallus (Figs 95–111) without phallic tube, spines of internal sac are connate and transformed into various (often marvellous) formations; there is differentiable a basal portion (being predominantly flat) and the apical one (being extraordinarily variable in shape).

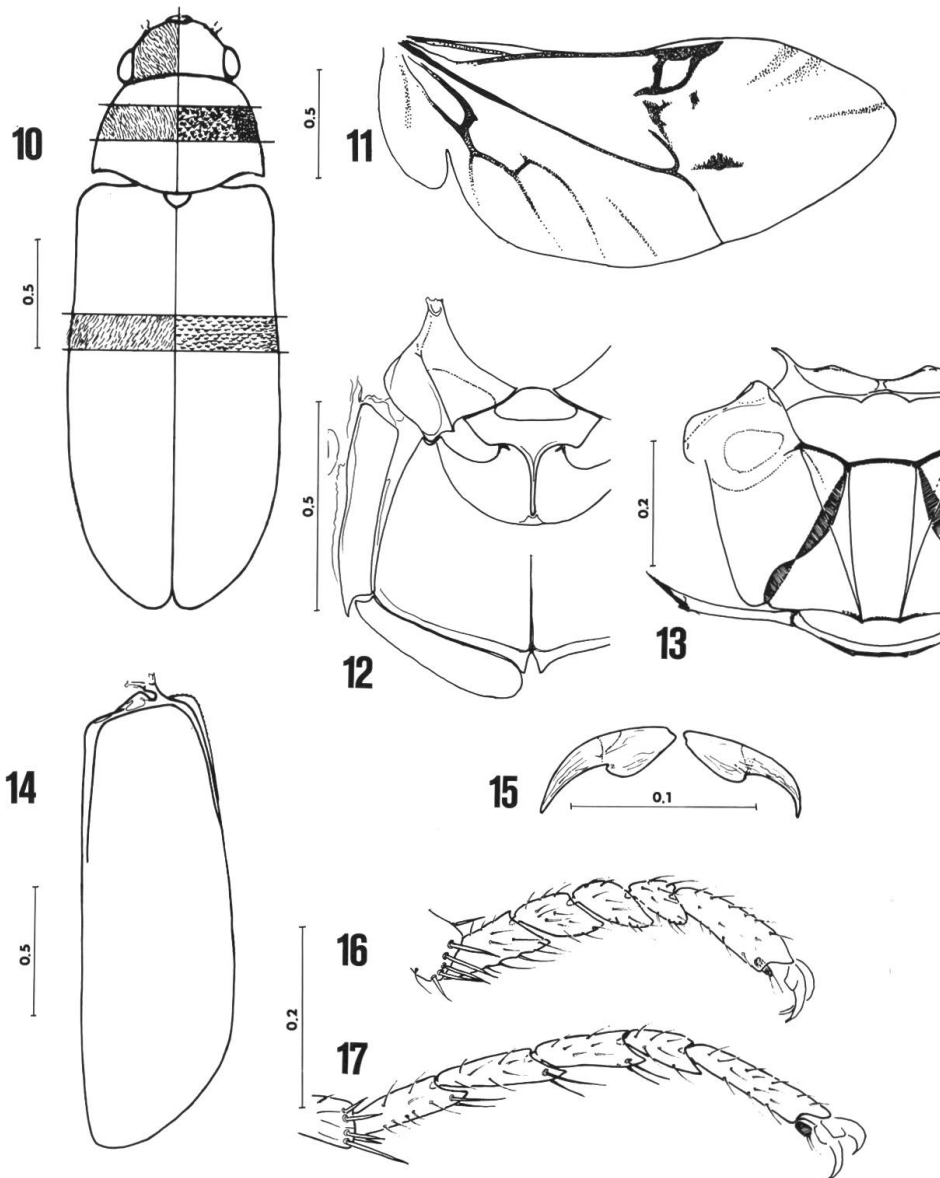
Female pygidium (Figs 76–80) is often broadly modified in shape (chiefly apex) and thus usable as good specific character. Female sternum VII straight at apex, rarely with an indicated tip (Fig. 75). Female sternum VIII (Figs 81–82) with a long, curved filiform spiculum ventrale; proper body of sternum always crescent, sometimes with curved lines in the middle of both sides (Fig. 82).

Bursa copulatrix (Figs 112–132) always developed very well and shortly ciliate nearly on the whole innerside; there are sclerites of various shape and number developed, exceptionally the vagina is even sclerotized (Figs 125, 126). Receptaculum seminis (spermatheca) developed probably in all species but (for the sake of its softness and membranous nature) it has been observed only in *B. javrozae* (Fig. 122) and *B. femina* (Fig. 128). Ovipositor (Fig. 20) with sparse ciliation, coxital styli parallelsided; there are no distinct specific characters.

Remarks: As for the phyletic origin of the sclerites in bursa copulatrix found in this genus, common paired laminae dentatae undoubtedly were their predecessors. This is evident mainly in the sclerites which are grown together only at base e.g. *B. furcata* (Fig. 131). Apart from such sclerites, e.g. *B. gracilitarsis* Reitt. (Figs 188–120) possesses those entirely coalescent. Such cases, as e.g. *B. apis* (Fig. 123) or *B. bipartita* (Fig. 113) also a secondary disintegration may be the matter, chiefly in the species *B. stilet* (Fig. 127). The case of the sclerotization of vagina

(Figs 125–126) can be evaluated as extreme autapomorphy. The sclerites are very constant in shape, similarly as the phallus, unless these were damaged in the course of copulation (compare Figs 119:120 and Figs 125:126). These contingencies make determination difficult.

As the phalli are always completely asymmetrical their positional orientation is problematic. If the base of phallus is not inflated, the orientation given as «dorsal» or «side» may be incorrect.



Figs 10–17: *Bilyella gracilitarsis* (Reitt.), ♂: 10, body outline, semischematic picture (left pubescence, right puncturation). 11, right metathoracic wing. 12, meso- and metasternum, ventral view. 13, metanotum, dorsal view. 14, left elytron, ventral view. 15, front tarsal claws, frontal view. 16, front tarsus, side view. 17, hind tarsus, side view. (Scale in mm.)

1. *Bilyella unispina* n. sp. Figs 29, 30, 63, 83, 84, 95, 112.

It is recognizable only by the shape of sternum IX, phallus and sclerite in bursa copulatrix.

Legs (femora slightly darkened) and antennal segments 2–4 (5) pale. Integument with flat microsculpture, almost polished; pubescence rather coarse and more recumbent. Antennae nearly as in *B. maleci* but segment 5 almost angulate on innerside. Pronotum not very strongly convex, pronotal surface more polished than elytra and head. Elytra transversely, flatly wrinkled with distinct microsculpture, nearly dull.

♂: Pronotum as in Figure 29. Pygidium broad, almost semicircular. Sternum VII broadly and shallowly emarginate. Sternum VIII narrow, crescent-shaped. Spicular fork (Fig. 63) with anchor-shaped sternum IX. Tegmen slightly asymmetrical, namely its ventral part (Figs 83, 84). Phallus with sizable terminal and short claw-like spines (Fig. 95).

Measurements: Length/AL = 2.96–3.13; AL/PL = 0.88–0.99; EL/EW = 1.62–1.65; EL/PL = 2.94–3.20; EW/PW = 1.29–1.30; PW/PL = 1.42–1.50; PW/HW = 1.29–1.38; Length = 1.91–2.00 mm; Width = 0.61–0.78 mm.

♀: Pronotum as figured (Fig. 30). Pygidium semicircular. Sternum VII slightly and shortly tapered. Sternum VIII narrow, crescent. Bursa copulatrix (Fig. 112) with single, flat, bipartite, distally pointed, formation.

Measurements: Length/AL = 3.05–3.64; AL/PL = 1.24–1.45; EL/EW = 1.63–1.76; EL/PL = 3.00–3.05; EW/PW = 1.28–1.35; PW/PL = 1.31–1.33; PW/HW = 1.31–1.44; Length = 2.20–2.30 mm; Width = 0.91–0.96 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 23 paratypes (NHMB, 4 paratypes KMB) bear locality data: “J. Klapperich, Paghmangebirge, 2100 m, 14.VI.53, Afghanistan”. 1 paratype (NHMB) labelled: «J. Klapperich, Paghmangebirge, 2300 m, 30.V.52, O Afghanistan». 3 paratypes (NHMB): “Pagmangeb. 2400 m, 6.VII.52, Afgh., J. Klapperich”.

Derivatio nominis: the name refers to the shape of phallus and bursa copulatrix.

Distribution (Fig. 134): E Afghanistan.

2. *Bilyella bipartita* n. sp. Figs 31, 113.

This species is externally scarcely distinguishable from other species (only by its structure in bursa copulatrix).

♀: Strongly convex species. Pronotum as figured (Fig. 31). Legs and

antennal segments 2–4 pale. Antennal segments submoniliform. Pygidium semicircular. Sternum VII nearly straight at apex. Sternum VIII crescent, slightly crooked in middle and notched. Bursa copulatrix with two sclerites: (a) elongate, bearing long, thorn-shaped formation, (b) semicircular, bordered unilaterally (Fig. 113).

Measurements. Length/AL = 3.54; AL/PL = 1.33; EL/EW = 1.58; EL/PL = 3.21–3.27; EW/PW = 1.39–1.43; PW/PL = 1.40–1.48; PW/HW = 1.27–1.29; Length = 2.13–2.30 mm; Width = 0.92–0.96 mm.

Types: holotype ♀ (NHMB), 1 paratype ♀ (NHMB) labelled: “J. Klapperich, Tangi-Gharuh, 1600 m, am Kabulfluss, 10.V.52, O-Afghanistan”.

Derivatio nominis: the name refers to the bipartite sclerite in bursa copulatrix.

Distribution (Fig. 134): E Afghanistan.

3. *Bilyella basiunguis* n. sp.

Figs 32, 33, 96, 114.

Very slender, feebly convex species with no distinct sexual dimorphism. Body surface with distinct microsculpture, scarcely lustrous. Antennal segment 2–3 and legs pale.

♂: Pronotum as figured (Fig. 32). Pygidium almost semicircular. Sterna VII and VIII nearly straight at apex. Sternum IX anchorshaped. Tegmen nearly symmetrical, straight at base. Phallus of a very peculiar build: the main, very long and slender spine bears a claw-like formation at basal half and three short spines at distal half (Fig. 96).

Measurements: Length/AL = 2.93–3.04; AL/PL = 1.55–1.61; EL/EW = 1.79–1.88; EL/PL = 3.39–3.53; EW/PW = 1.35–1.36; PW/PL = 1.43–1.46; PW/HW = 1.23–1.24; Length = 2.22–2.35 mm; Width = 0.78–0.96 mm.

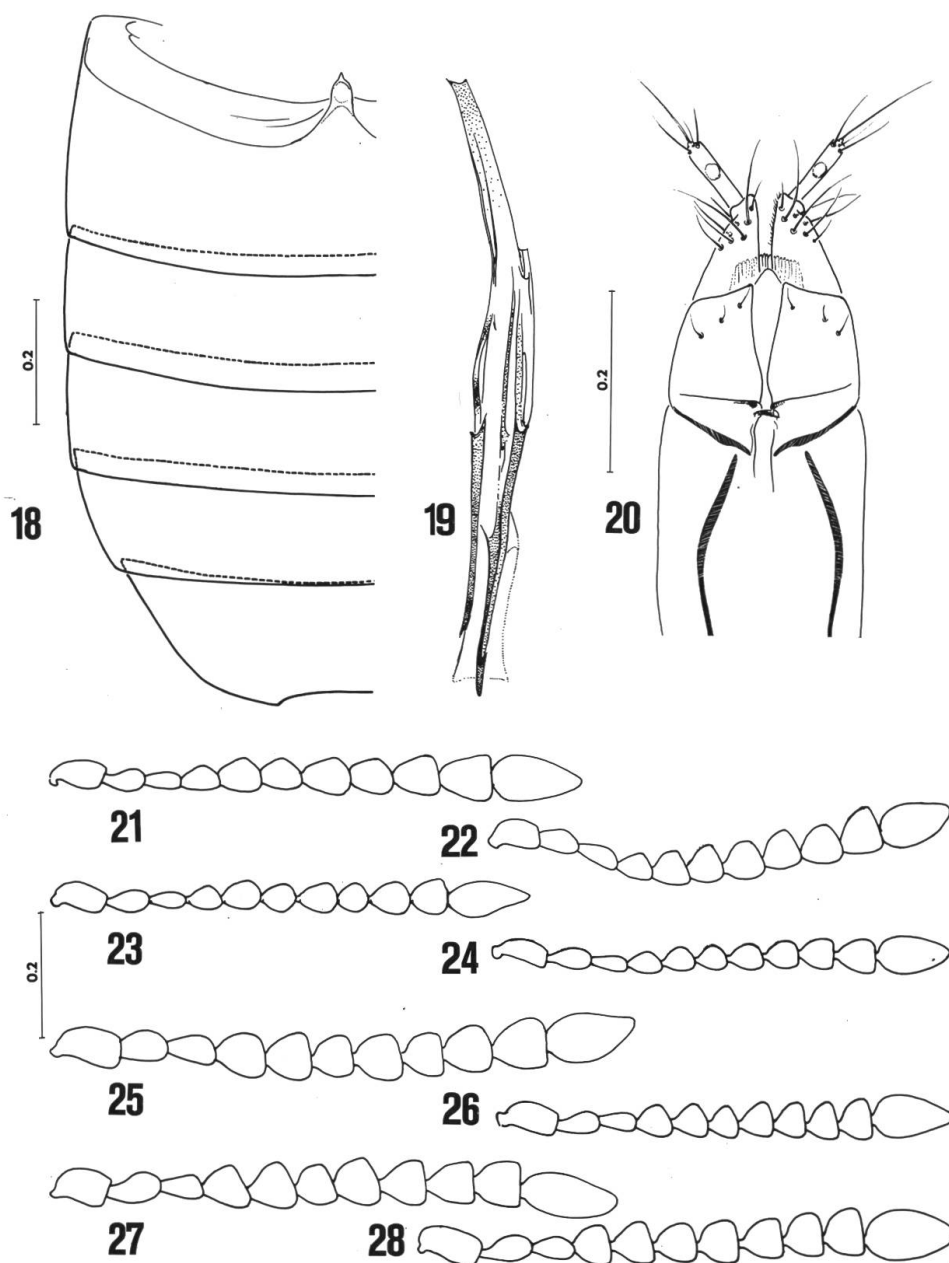
♀: Pronotum as figured (Fig. 33). Pygidium transversely semicircular with nearly straight apex. Sternum VII shortly pointed at apex. Sternum VIII narrow, crescent. Sclerite in bursa copulatrix almost triangular, irregularly and flatly serrate on perimeter and feebly papillate on its surface (Fig. 114).

Measurements: Length/AL = 3.27–3.31; AL/PL = 1.24–1.39; EL/EW = 1.73–1.75; EL/PL = 3.50–3.63; EW/PW = 1.37–1.48; PW/PL = 1.39–1.42; PW/HW = 1.30–1.34; Length = 2.08–2.56 mm; Width = 0.87–1.13 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 36 paratypes (NHMB, 6 ex. in KMB) are labelled: “J. Klapperich, Schiva, Hochsteppe, 2800 m, 12.VII.53, Badakschan, NO-Afghanistan”.

Derivatio nominis: the name refers to the conspicuous claw-like formations in the basal half of phallus.

Distribution (Fig. 134): Afghanistan.



Figs 18–28: 18–20. *Bilyella gracilitarsis* (Reitt.): 18, male sternum I–VII. 19, phallus, dorsal view. 20, ovipositor, dorsal view. 21–28. Male right antennae of: 21, *Bilyella ursus* n. sp. 22, *B. gracilitarsis* (Reitt.). 23, *B. maleci* n. sp. 24, *B. saccata* n. sp. 25, *B. vaginata* n. sp. 26, *B. stilet* n. sp. 27, *B. brevispina* n. sp. 28, *B. furcata* n. sp. (Scale in mm.)

4. *Bilyella breviunguis* n. sp.

Figs 34, 35, 97, 115.

This species is externally hardly distinguishable from *B. basiunguis*, both species have slender, long body, *B. breviunguis* is rather smaller.

♂: Pronotum as in Fig. 34. Pygidium slightly transverse, conical to semicircular. Sternum VII and VIII nearly straight at apex. Spicular fork with anchor-shaped sternum IX. Tegmen almost symmetrical, base arcuate. Phallus of single structure: in middle with a claw-like formation (Fig. 97).

Measurements: Length/AL = 2.96–3.15; AL/PL = 1.48–1.76; EL/EW = 1.65–1.70; EL/PL = 3.28–3.54; EW/PW = 1.33–1.34; PW/PL = 1.48–1.54; PW/HW = 1.31–1.34; Length = 2.04–2.30 mm; Width = 0.83–0.92 mm.

♀: Pronotum as figured (Fig. 35). Pygidium semicircular. Sternum VII subarcuate at apex. Sternum VIII crescent. Bursa copulatrix with a single sclerite (Fig. 115).

Measurements: Length/AL = 3.00–3.45; AL/PL = 1.43–1.55; EL/EW = 1.50–1.79; EL/PL = 3.18–3.43; EW/PW = 1.36–1.39; PW/PL = 1.45–1.48; PW/HW = 1.31–1.42; Length = 2.39–2.52 mm; Width = 0.91–1.02 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 6 paratypes (NHMB, 2 ex in KMB) with locality data: “J. Klapperich, Darufulun b. Kabul, 1800 m, 11.VI.53, Afghanistan”.

Derivatio nominis: the name refers to the short, claw-shaped formation situated in the middle of phallus.

Distribution (Fig. 134): E Afghanistan.

5. *Bilyella ursus* n. sp.

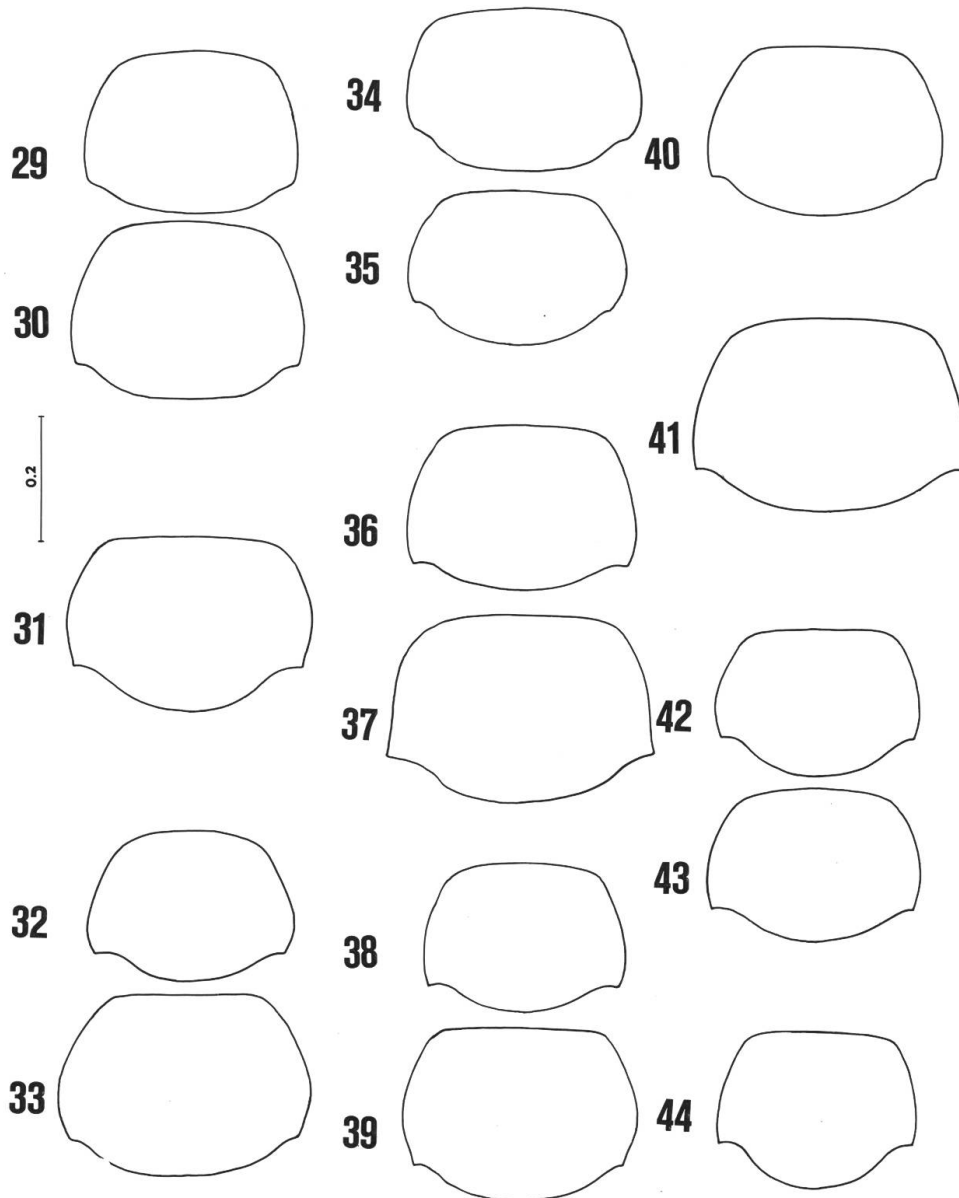
Figs 21, 36, 37, 98, 116.

Relatively short and more strongly convex, somewhat less lustrous than *B. breviunguis*. Antennal segments 2–3–4 and legs pale. Antenna with joints slightly conical (Fig. 21).

♂: Pronotum as figured (Fig. 36). Pygidium nearly semicircular. Sterna VII and VIII inconspicuously emarginate at apex. Spicular fork with anchor-shaped sternum IX. Tegmen nearly symmetrical, parallel-sided. Phallus of a single structure; distally bears very conspicuous, sizable, heavily sclerotized, claw-shaped formation (Fig. 98).

Measurements: Length/AL = 2.90–3.08; AL/PL = 1.53–1.55; EL/EW = 1.74–1.90; EL/PL = 3.10–3.35; EW/PW = 1.30–1.36; PW/PL = 1.21–1.36; PW/HW = 1.23–1.25; Length = 2.13–2.39 mm; Width = 0.78–0.96 mm.

♀: Pronotum as figured (Fig. 37). Pygidium nearly semicircular. Sternum VII subarcuate at apex. Sternum VIII crescent. Sclerite in bursa copulatrix infundibular, in addition with a complex inner structure (Fig. 116).



Figs 29–44: Outline of pronotum of: 29, *Bilyella unispina* n. sp., ♀. 30, ditto, ♀. 31, *B. bipartita* n. sp., ♀. 32, *B. basiunguis* n. sp., ♂. 33, ditto, ♀. 34, *B. breviunguis* n. sp., ♂. 35, ditto, ♀. 36, *B. ursus* n. sp., ♂. 37, ditto, ♀. 38, *B. felis* n. sp., ♂. 39, ditto, ♀. 40, *B. gracilitarsis* (Reitt.), ♂. 41, ditto, ♀. 42, *B. apis* n. sp., ♂. 43, ditto, ♀. 44, *B. saccata* n. sp., ♂. (Scale in mm.)

Measurements: Length/AL = 3.62–4.00; AL/PL = 1.38–1.44; EL/EW = 1.73–1.91; EL/PL = 3.30–3.43; EW/PW = 1.24–1.37; PW/PL = 1.41–1.52; PW/HW = 1.37–1.39; Length = 2.30–2.78 mm; Width = 1.02–1.11 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 10 paratypes (NHMB, 2 ex. KMB) with locality data: “J. Klapperich, Mars, Panchjir, 2400 m, 10.VI.53, Afghanistan”. 1 paratype: “Sarekanda, 2800 m, 22.VII.53, Gebirge, Badakschan, NO Afghanistan, J. Klapperich”. 23 paratypes labelled (NMP, 3 ex. KMB): “N Iran, 2400 m, 8 km NE Ziaran, 10.–16.VII.1977, Loc. no. 400, Exped. Nat. Mus. Praha”. 3 paratypes (NMP): “N Iran, 4.–9.VII.1977, Kandavan-pass 2700–2900 m, S-slope, Loc. no. 395, Exped. Nat. Mus. Praha”. 1 paratype (NMP): “N Iran, Abbasabad, 14.VIII.1970, Loc. no. 93, Exp. Nat. Mus. Praha”. 1 paratype (NMP): “N Iran, 8 km W Gachsar, 6.–8.7.1977; Loc. no. 396, Exped. Nat. Mus. Praha”.

Derivatio nominis: the name refers to the big, claw-shaped formation at the apex of phallus resembling a bear claw.

Distribution (Fig. 134): E Afghanistan, N Iran.

6. *Bilyella felis* n. sp.

Figs 38, 39, 99, 117.

This species resembles *B. ursus* n. sp. by its slender bodyshape; body surface with microsculpture, little lustrous. Antennal segments 2–3 (4–5) and legs pale. Antennae slender, segments subconical to submoniliate.

♂: Pronotum as figured (Fig. 38). Pygidium broadly semicircular. Sternum VII straight with shallow deltoid depression. Sternum VIII as in *B. ursus*. Spicular fork with filiform sternum IX. Tegmen nearly symmetrical and parallelsided, base subarcuate. Phallus bifurcate, left arm bears a nodule, the right one claw-shaped formation (Fig. 99).

Measurements: Length/AL = 3.04–3.07; AL/PL = 1.44–1.60; EL/EW = 1.66–1.70; EL/PL = 2.94–3.33; EW/PW = 1.26–1.28; PW/PL = 1.37–1.46; PW/HW = 1.28–1.38; Length = 1.83–2.22 mm; Width = 0.87–0.96 mm.

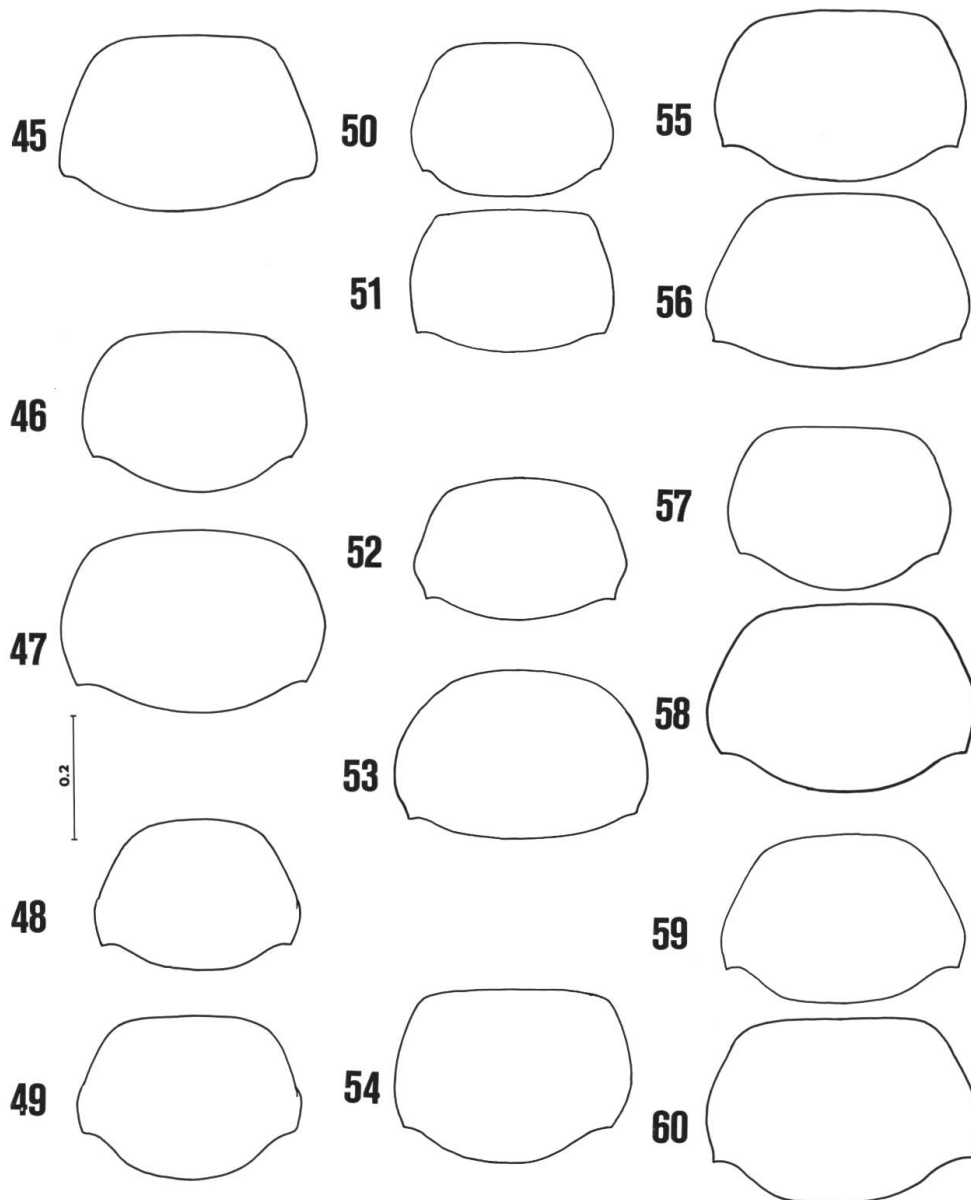
♀: Pronotum as in Fig. 39. Pygidium broadly semicircular. Sternum VII straight. Sternum VIII crescent. Sclerite in bursa copulatrix with a denticulate line (Fig. 117).

Measurements: Length/AL = 3.54–3.60; AL/PL = 1.30–1.32; EL/EW = 1.65–1.88; EL/PL = 3.10–3.21; EW/PW = 1.25–1.39; PW/PL = 1.39–1.41; PW/HW = 1.34–1.39; Length = 2.26–2.50 mm; Width = 0.96–1.00 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 9 paratypes (NHMB; 2 ex KMB) bear locality data: "Sarobi, 900 m, a. Kabulfluss, 12.VI.52, Afgh., J. Klapperich".

Derivatio nominis: the name refers to the shape of apex of phallus resembling a cat claw.

Distribution (Fig. 134): E Afghanistan.



Figs 45–60: Outline of pronotum of: 45, *Bilyella saccata* n. sp., ♀. 46, *B. vaginata* n. sp., ♂. 47, ditto, ♀. 48, *B. stilet*, n. sp., ♂. 49, ditto, ♀. 50, *B. pecten* n. sp., ♂. 51, ditto, ♀. 52, *B. femina* n. sp., ♂. 53, ditto, ♀. 54, *B. brevispina* n. sp., ♂. 55, *B. spinosa* n. sp., ♂. 56, ditto, ♀. 57, *B. furcata* n. sp., ♂. 58, ditto, ♀. 59, *B. simplex* n. sp., ♂. 60, ditto, ♀. (Scale in mm.)

7. *Bilyella gracilitarsis* Reitter n. comb.

Figs 1–20, 22, 40, 41, 64, 66, 72, 76, 81, 85, 86, 100, 118–120.

Dasytiscus gracilitarsis REITTER, 1902, Wien. Ent. Zeitg. 21:210.

Dasytiscus (*Haplothrix*) *gracilitarsis* sensu PIC, 1937, Coleopt. Cat. 10/155: 52.

It differs from all species by the structure of genitalia and relatively slender antennae.

Legs (femora darkened) and antennal joints 2–4 (or 3–4) pale. Pubescence very short, yellowish. Pronotum mostly with feeble preapical transverse depression. Head and pronotum mostly with microsculpture, therefore scarcely lustrous; in another case (holotype ♂) without microsculpture and polished; elytra mostly polished, bearing dense and fine puncturation which partially forms transverse wrinkles. Antennal joints relatively slender. For general morphological orientation see Figs 1–20.

♂: Antennae (Fig. 22) and pronotum (Fig. 40) as figured. Pygidium nearly rounded (Fig. 66). Sternum VII (Fig. 18) with shallow emargination. Sternum VIII (Fig. 72) nearly straight at apex. Spicular fork with single sternum IX (Fig. 64). Dorsal part of tegmen truncate, the ventral one lanceolate (Figs 85, 86). Phallus (Figs 19, 100) composed of two sinuate spines.

Measurements: Length/AL = 3.11–3.33; AL/PL = 1.50–1.55; EL/EW = 1.86–2.03; EL/PL = 3.27–3.55; EW/PW = 1.20–1.23; PW/PL = 1.44–1.50; PW/HW = 1.29–1.30; Length = 2.26–2.78 mm; Width = 0.86–1.09 mm.

♀: Pronotum as figured (Fig. 41). Pygidium (Fig. 76) broadly rounded with dentate basal corners. Sternum VII straight at apex. Sternum VIII narrow, crescent-shaped. Ovipositor as figured (Fig. 20). Bursa copulatrix with single, flat formation with irregular contour, the irregularity depends probably on the fact if the copulation has been realized (Figs 118–120).

Measurements: Length/AL = 3.32–3.68; AL/PL = 1.29–1.39; EL/EW = 1.55–1.63; EL/PL = 3.23–3.29; PW/PL = 1.33–1.36; EW/PW = 1.43–1.46; PW/HW = 1.23–1.33; Length = 2.26–2.91 mm; Width = 1.13–1.14 mm;

Distribution (Fig. 134): the U.S.S.R. (Tadzhikistan, Uzbekistan).

Types: Holotype ♂ (TMB) labelled: “Buchara” (white label, Reitter’s MS); “gracilitarsis m. 1902” (white label, Reitter’s MS); “Buchara” (white label, printed); “Coll. Reitter” (white label, printed).

Additional material studied: USSR, Uzbekistan, Ugam Mts., 800–1000 m, 70 km NE Tashkent, Ak-Tash, 26.–27.VI.1981, K. Majer

leg., 4 ex. (2 in NHMB, 2 in KMB); Tian-Shan, Chatkalski hrebet, Bolshoi Chingan, 25.–27.VI.1980, K. Schön leg., 1 ex. (KMB); Tadzhikistan, Varzob (near Dushanbe), 17.VII.1982, B. Malec leg., 1 ♀ (KMB).

Remarks: It cannot be excluded that the holotype ♂ forms an independent species having polished pronotal surface. The differentnesses in phallus in the both formae, i.e. the holotype and other specimens are imperceptible and, from the viewpoint of specific characters used, not important. In the sole female specimen (Fig. 120) is the sclerite in bursa copulatrix quite different, but, as supposed, this depends upon the state being after copulation in that female specimen.

8. *Bilyella maleci* n. sp.

Figs 23, 101, 121.

It differs from *B. gracilitarsis* by the antennae more serrate, pronotum polished, structure of terminalia different.

Legs (femora and praetarsi darkened) and antennal segments 2–3 (4) pale. Pubescence as in *B. gracilitarsis*. Antennae with joints more transverse. Pronotal puncturation somewhat coarser than in *B. gracilitarsis*, interspaces between punctures polished. Elytra with very fine microsculpture therefore little lustrous.

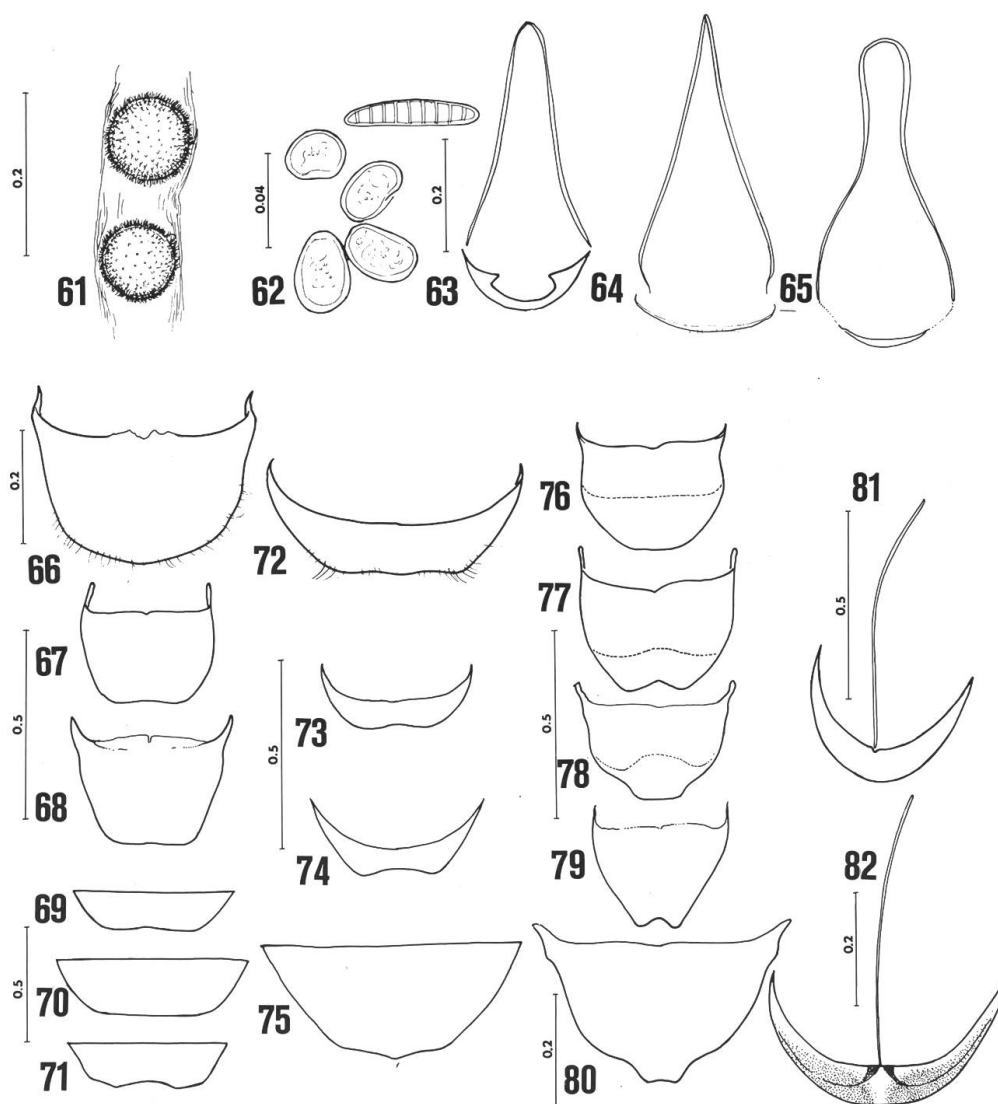
♂: Antennae as figured (Fig. 23). Pygidium, sterna VII, VIII, and tegmen as in *B. gracilitarsis*. Phallus similar to that in *B. gracilitarsis* but knotted in middle (Fig. 101).

Measurements: Length/AL = 3.14–3.23; AL/PL = 1.48–1.59; EL/EW = 1.76–2.09; EL/PL = 3.21–3.61; EW/PW = 1.42–1.50; PW/PL = 1.30–1.41; PW/HW = 1.26–1.42; Length = 2.17–2.61 mm; Width = 0.96–1.00 mm.

♀: Pygidium, sterna VII and VIII as in *B. gracilitarsis* but sclerite in bursa copulatrix of different shape (Fig. 121). Some Diatomaceae and pollen grains were found in the foregut of one female specimen (Fig. 62).

Measurements: Length/AL = 2.80–3.47; AL/PL = 1.35–1.55; EL/EW = 1.66–1.88; EL/PL = 3.20–3.33; EW/PW = 1.33–1.45; PW/PL = 1.41–1.43; PW/HW = 1.32–1.40; Length = 1.32–1.40 mm; Width = 0.88–1.22 mm

Types: Holotype ♂ (NHMB) labelled: “Tajikistan, 17.VII.82, Varzob, p. Dušanbe, Malec leg”. Allotype ♀ (NHMB) and 9 paratypes (KMB) with the same locality data. 2 ♂ (KMB) with data: “USSR, Tadzhikistan, Hissar Mts. 1300–1800 m, 30 km N Dushanbe, 19.VI.1981, Gushara, Varzob river, Karel Majer”. 1 ex. (KMB) labelled: “USSR, Tadzhikistan, 30 km N Dushanbe, 1800 m, confl. Varzob-Sioma rivers, 17.VIII.1981,



Figs 61–82: 61–62. Pollen grains and Diatomaceae in foregut of: 61, *Bilyella unispina* n. sp. 62, *B. maleci* n. sp. 63–65. Spicular fork of: 63, *B. unispina* n. sp. 64, *B. gracilitarsis* (Reitt.). 65, *B. stilet* n. sp. 66–68. Female pygidium of: *B. gracilitarsis* (Reitt.). 67, *B. vaginata* n. sp. 68, *B. brevispina* n. sp. 69–71. Male sternum VII of: 69, *B. stilet* n. sp. 70, *B. spinosa* n. sp. 71, *B. furcata* n. sp. 72–74. Male sternum VIII of: 72, *B. gracilitarsis* (Reitt.). 73, *B. vaginata* n. sp. 74, *B. furcata* n. sp. 75. Female sternum VII of *B. femina* n. sp. 76–80. Female pygidium of: 76, *B. gracilitarsis* (Reitt.). 77, *B. vaginata* n. sp. 78, *B. stilet* n. sp. 79, *B. pecten* n. sp. 80, *B. femina* n. sp. 81–82. Female sternum VIII of: 81, *B. femina* n. sp. 82, *B. gracilitarsis* (Reitt.). (Scale in mm.)

Karel Majer”.

Derivatio nominis: this species is dedicated to my friend, Ing. B. Malec, who has collected a greater part of the type-material.

Distribution (Fig. 134): the U.S.S.R. (Tadzhikistan).

9. *Bilyella javrozae* n. sp.

Fig. 122.

It differs from *B. gracilitarsis* and *B. maleci* merely by the shape of the sclerite in bursa copulatrix.

Holotype ♀: Externally identical with *B. gracilitarsis* and *B. maleci* but the sclerite in bursa copulatrix is abbreviated, nearly quadrate (Fig. 122).

Measurements: Length/AL = 3.38; AL/PL = 1.37; EL/EW = 1.51; EL/PL = 3.10; EW/PW = 1.40; PW/HW = 1.32; Length = 2.35 mm; Width = 0.96 mm.

Types: Holotype ♀ labelled: “USSR, Tadzhikistan, 1981, Hissar Mts., 1300–1500 m., 50 km NEE Dushanbe, 18.VI., Karel Majer, Kafirnigan river, Yavroz” (photographed printed label).

Derivatio nominis: it is named after its type locality, i.e. Yavroz near Dushanbe.

Remarks: This species is externally identical with *B. maleci*, the raison d'être of *B. javrozae* remains open henceforth. The shape of sclerite in bursa copulatrix may be only the matter of an extreme variability. However, any analogical case has not been found among the species examined.

Distribution (Fig. 134): the U.S.S.R. (Tadzhikistan).

10. *Bilyella apis* n. sp.

Figs 42, 43, 102, 123.

It is recognizable by distinct developing of sexual dimorphism, viz. males have pronotum distinctly more slender and elytra parallel-sided.

Integument with no distinct microsculpture, therefore lustrous. Legs (femora darker) and antennal joints 2–3 paler; in the holotype ♂ is the whole antenna dark. Antennae slender, submoniliform.

Holotype ♂: Pronotum as figured (Fig. 42). Pygidium nearly semi-circular. Sternum VII straight at apex. Sternum VIII inconspicuously emarginate at apex. Spicular fork with filiform, crescent sternum IX. Tegmen asymmetrical, nearly the same as in *B. vaginata*. Phallus composed of three parts (Fig. 102).

Measurements: Length/AL = 3.35; AL/PL = 1.96; EL/EW = 1.69;

EL/PL = 3.69; EW/PW = 1.52; PW/PL = 1.42; PW/HW = 1.19; Length = 2.35 mm; Width = 0.89 mm.

♀: Pronotum as figured (Fig. 43). Pygidium semicircular. Sternum VII subarcuate at apex. Sternum VIII narrow, crescent-shaped. Bursa copulatrix with bipartite formation, its structure resembles honeycomb (Fig. 123).

Measurements: Length/AL = 2.93; AL/PL = 1.67; EL/EW = 1.61–1.67; EL/PL = 3.33–3.67; EW/PW = 1.48–1.50; PW/PL = 1.39–1.40; PW/HW = 1.21–1.38; Length = 2.39–2.43; Width = 1.00–1.08 mm.

Types: Holotype ♂, allotype ♀ (NMP) and 2 paratypes (1 ♀ NMP, 1 ♀ KMB) labelled: “E Iran, 2100 m, Taftan, Tamandan, 20.IV.1973, Loc. no. 167, Exp. Mus. Nat. Praha”.

Derivatio nominis: the name refers to the structure of sclerites in bursa copulatrix, resembling a honeycomb.

Distribution (Fig. 134): SE Iran.

11. *Bilyella saccata* n. sp.

Figs 24, 44, 45, 103, 124.

It is distinguishable from *B. gracilitarsis* and related species by its terminalia.

Legs (femora not darkened) and antennal joints 2–4 (–5) pale. Integument scarcely lustrous. Antennae submoniliform (Fig. 24).

♂: Pronotum as figured (Fig. 44). Pygidium broadly semicircular. Sternum VII nearly straight at apex, exceptionally shallowly emarginate. Sternum VIII straight at apex. Spicular fork with filiform sternum IX. Tegmen asymmetrical, incurved. Phallus relatively broad, posteriorly with two flamelike spines (Fig. 103).

Measurements: Length/AL = 2.92–3.04; AL/PL = 1.59–1.61; EL/EW = 1.62–1.70; EL/PL = 2.87–3.28; EW/PW = 1.30–1.33; PW/PL = 1.40–1.42; PW/HW = 1.31–1.34; Length = 2.00–2.22 mm; Width = 0.79–0.86 mm.

♀: Pronotum as figured (Fig. 45). Pygidium semicircular, truncate at apex. Sternum VII arcuate at apex. Sternum VIII narrow, crescent-shaped. Bursa copulatrix with sclerite composed of three lobes which form a complex formation with celliform structure (Fig. 124).

Measurements: Length/AL = 3.53–3.84; AL/PL = 1.49–1.54; EL/EW = 1.71–1.79; EL/PL = 3.33–3.42; EW/PW = 1.26–1.27; PW/PL = 1.37–1.53; PW/HW = 1.38–1.41; Length = 2.42–2.67; Width = 1.00–1.05.

Types: Holotype ♂, allotype ♀ (NHMB) and 226 paratypes (NHMB; 20 ex. in KMB) with locality data: “J. Klapperich, Jalalabad, 500 m,

Afghanistan, 30.III.53".

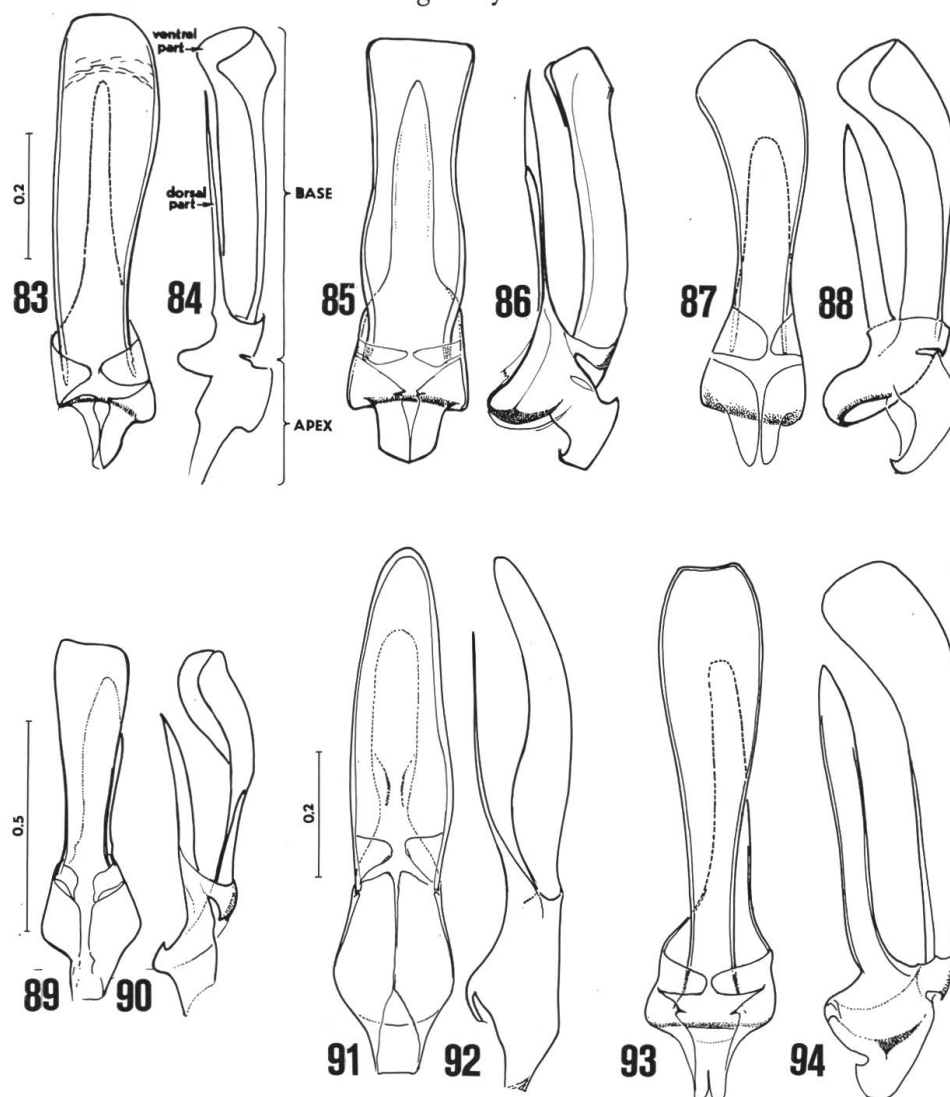
Derivatio nominis: the name refers to the shape of sclerite in bursa copulatrix and the shape of a greater portion of phallus.

Distribution (Fig. 134): E Afghanistan.

12. *Bilyella vaginata* n. sp.

Figs 25, 46, 47, 67, 73, 77,
89, 90, 104, 125, 126.

This species is externally nearly identical with *B. furcata* n. sp. from which it differs in having very different build of terminalia.



Figs 83–94: Tegmen of: 83, *Bilyella unispina* n. sp., ventral view. 84, ditto, side view. 85, *B. gracilitarsis* (Reitt.), ventral view. 86, ditto, side view. 87, *B. saccata* n. sp., ventral view. 88, ditto, side view. 89, *B. vaginata* n. sp., ventral view. 90, ditto, side view. 91, *B. stilet*, n. sp., ventral view. 92, ditto, side view. 93, *B. furcata* n. sp., ventral view. 94, ditto, side view. (Scale in mm.)

from which it differs in having very different build of terminalia.

Antennal joints (Fig. 25) rather more transverse than those in *B. furcata*, in other external characters fully corresponds with it.

♂: Pronotum as figured (Fig. 46). Pygidium nearly transversely oblong, almost straight at apex. Sternum VII subarcuate at apex. Sternum VIII nearly the same as in *B. furcata* but its emargination shallower (Fig. 73). Spicular fork with anchor-shaped sternum IX as in *B. unispina*, (Fig. 63). Tegmen slightly asymmetrical, apex of ventral part slightly obliquely truncate (Figs 89, 90). Phallus composed of two main long and three small short spines (Fig. 104).

Measurements: Length/AL = 2.81–3.00; AL/PL = 1.72–1.86; EL/EW = 1.72–1.78; EL/PL = 3.38–3.64; EW/PW = 1.34–1.40; PW/PL = 1.45–1.50; PW/HW = 1.22–1.28; Length 2.21–2.34; Width = 0.91–0.96 mm.

♀: Pronotum as figured (Fig. 47). Pygidium shallowly emarginate to nearly straight at apex (Fig. 77). Sternum VII arcuate at apex. Sternum VIII crescent. Bursa copulatrix with particularly sclerotized vagina and some additional sclerites situated distally from it (Figs 125–126).

Measurements: Length/AL = 3.42–3.45; AL/PL = 1.43–1.55; EL/EW = 1.71–1.75; EL/PL = 3.50–3.78; EW/PW = 1.36–1.39; PW/PL = 1.42–1.45; PW/HW = 1.32–1.35; Length = 2.61–3.22 mm; Width = 1.00–1.22 mm.

Types: Holotype ♂, Allotype ♀ (NHMB) and 32 paratypes (NHMB, 5 paratypes in KMB) with locality data: “Ladakh, Zojila-Drass, 18.VII.1976, 3300–3000 m, W. Wittmer”. 5 paratypes (NHMB) with data: Kashmir, Gulmarg–Tangmarg, 2650–2300 m, 3.VII.1976, W. Wittmer. 3 ex (NHMB) bear data: Kashmir, Sonamarg, 17.VII.1976, 2600–2750 m, W. Wittmer. 1 paratype (NHMB): Kashmir, Margan Pass, 20.VII.1980, 3000 m, Aspöck, Rausch. 1 paratype (NHMB): Pakistan, Lalazar, 3.–5.VII.1979, 3000 m, W. Wittmer. 1 ex.: Jammu, Sarkandu-Inchan, 2350–2500 m, 18.VII.1980, W. Wittmer (NHMB).

Derivatio nominis: the name refers to the sclerotized vagina.

Distribution (Fig. 134): Kashmir, NE Pakistan.

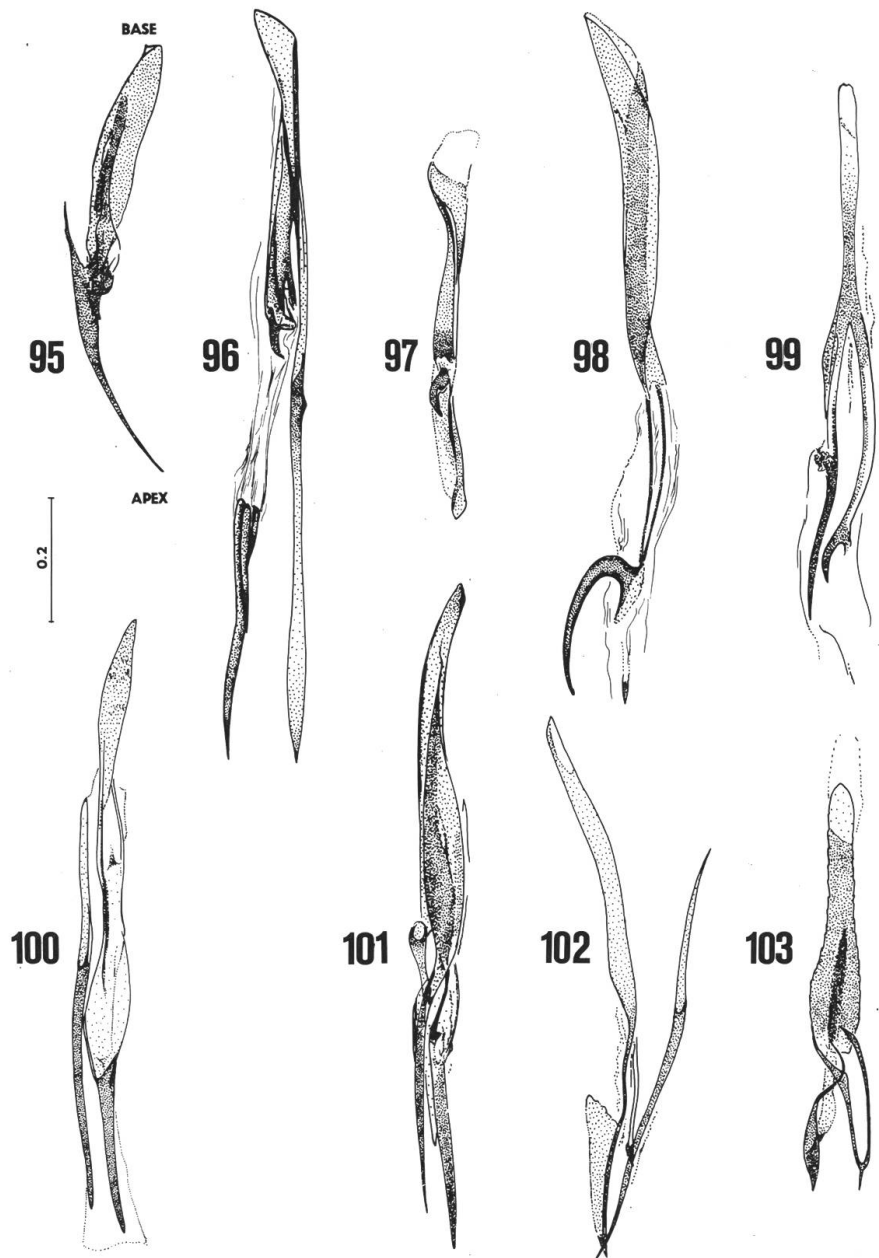
13. *Bilyella stilet* n. sp. Figs 26, 48, 49, 65, 69, 78, 91, 92, 105, 127.

It is distinguishable only by the structure of genitalia and the light scape of antennae.

Legs and antennal segments (scape somewhat darkened) 1–4 light. Integument with indistinct microsculpture, therefore little lustrous. Pubescence very fine and mostly obliquely arranged. Antennae with termi-

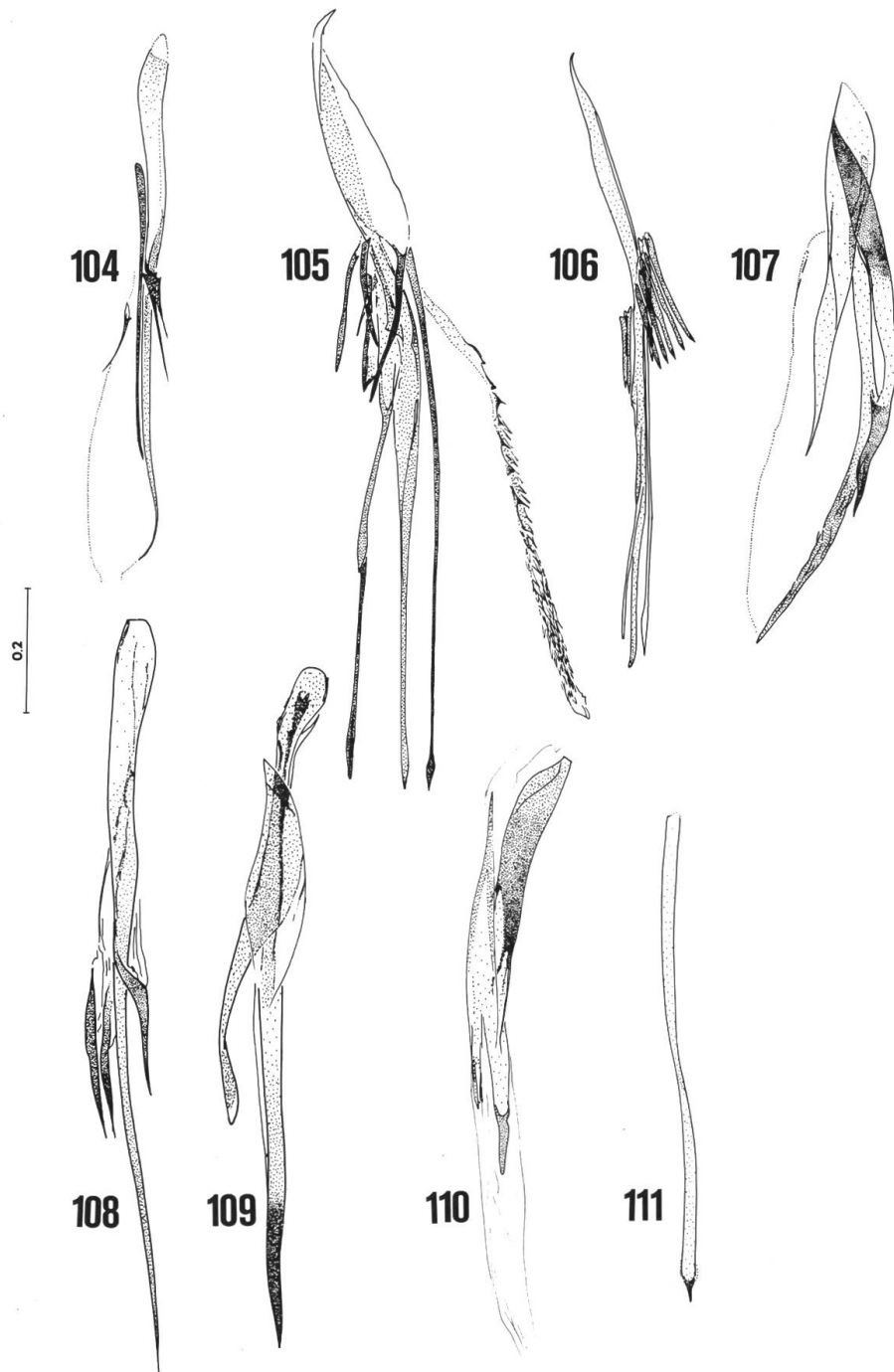
nal joints serrate and feebly transverse (Fig. 26). Pronotum strongly converging forwardly, hind pronotal angles more pronounced in female.

Holotype ♂: Pronotum as figured (Fig. 48). Pygidium tapered, straight at apex. Sternum VII shallowly emarginate (Fig. 69). Sternum VIII feebly emarginate at apex. Spicular fork with crescent sternum IX



Figs 95–103: Phallus, side view of: 95, *Bilyella unispina* n. sp. 96, *B. basiunguis* n. sp. 97, *B. breviunguis* n. sp. 98, *B. ursus* n. sp. 99, *B. felis* n. sp. 100, *B. gracilitarsis* (Reitt.). 101, *B. maleci* n. sp. 102, *B. apis* n. sp. 103, *B. saccata* n. sp. (Scale in mm.)

(Fig. 65). Tegmen with linguiform both dorsal and basal parts (Figs 91, 92). Phallus of a very complicated structure resembling mosquito stilet (Fig. 105).



Figs 104–111: Phallus, side view of: 104, *Bilyella vaginata* n. sp. 105, *B. stilet* n. sp. 106, *B. pecten* n. sp. 107, *B. femina* n. sp. 108, *B. brevispina* n. sp. 109, *B. spinosa* n. sp. 110, *B. furcata* n. sp. 111, *B. simplex* n. sp. (Scale in mm.)

Measurements: Length/AL = 3.04; AL/PL = 1.52; EL/EW = 1.70; EL/PL = 1.51; EW/PW = 1.49; PW/PL = 1.60; PW/HW = 1.30; Length = 2.13 mm; Width = 0.89 mm.

Allotype ♀: Pronotum as figured (Fig. 49). Pygidium constricted at apex (Fig. 78). Sternum VII nearly straight, sternum VIII narrow, crescent. Bursa copulatrix with very complicated structure of sclerites in the region of vagina (Fig. 127).

Measurements: Length/AL = 3.33; AL/PL = 1.43; EL/EW = 1.55; EL/PL = 3.18; EW/PW = 1.44; PW/PL = 1.43; PW/HW = 1.33; Length = 2.17 mm; Width = 0.98 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) labelled: "Pakistan, Khagan, Kawai, 1450–1800 m, 15.VI.1977, W. Wittmer & M. Brancucci".

Derivatio nominis: the structure of phallus in this species resembles a mosquito stilet.

Distribution (Fig. 134): NE Pakistan.

14. *Bilyella pecten* n. sp.

Figs 50, 51, 79, 106, 130.

It is similar to *B. stilet* n. sp. by the structure of phallus and female terminalia, reliably distinguishable from it only by the structure of terminalia.

Legs, femora darkened and antennal joints 2–3(–4) pale. Integument with fine microsculpture, nearly dull. Pubescence whitish to silver. Antennal joints submoniliform to slightly conical, resembling those in *B. maleci* n. sp. Pronotal sides slightly conical forwards, nearly parallelsided in male and more distinctly rounded in female.

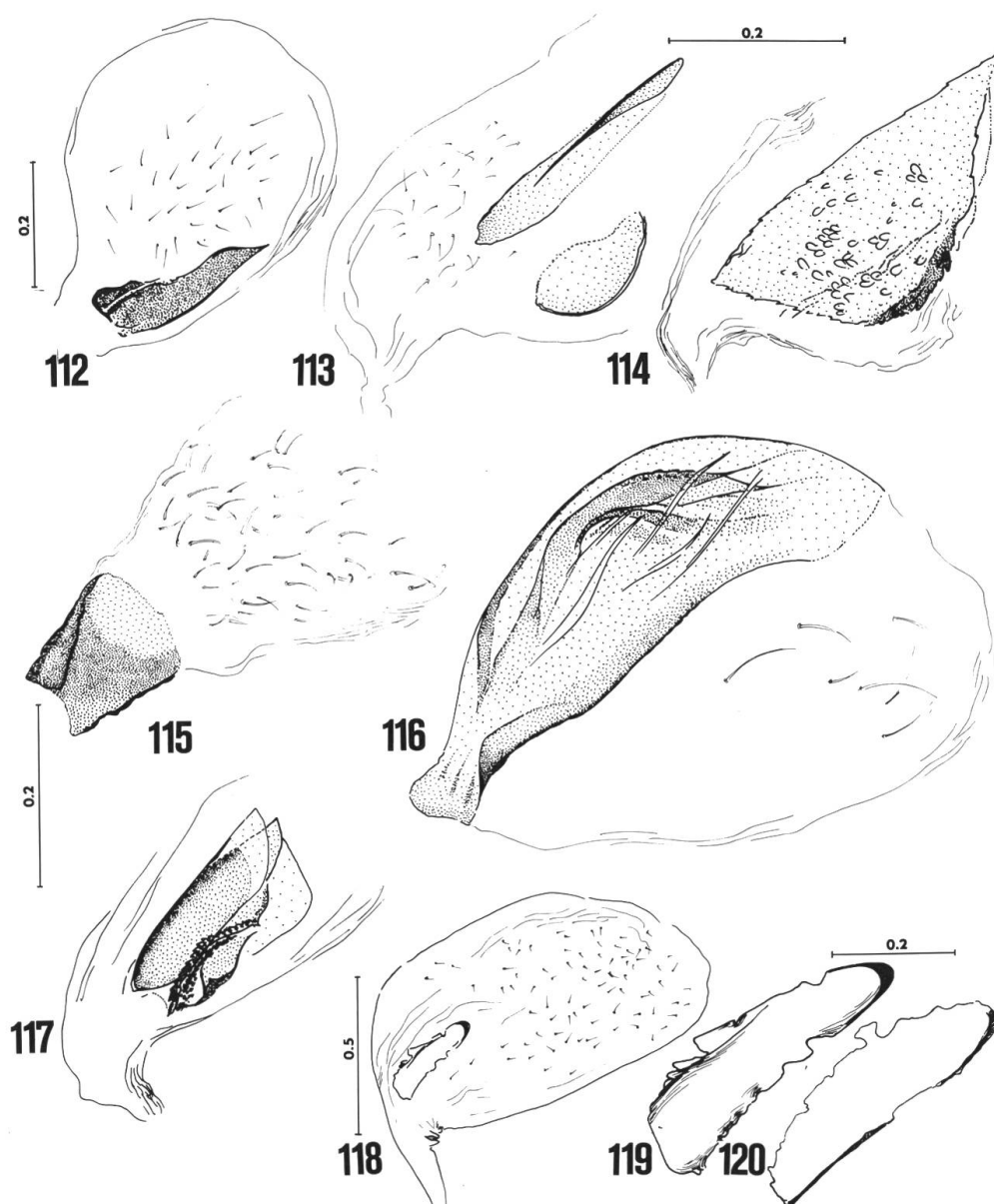
♂: Pronotum as figured (Fig. 50). Pygidium transverse, tapered, subarcuate at apex. Sternum VII nearly straight. Sternum VIII transversely crescent. Spicular fork with short, crescent sternum IX nearly as in *B. stilet*. Tegmen as in *B. stilet*. Phallus with 8 short spines in middle, arranged into a comb, terminal spines resemble those in *B. stilet* n. sp. (Fig. 106).

Measurements: Length/AL = 2.82–2.88; AL/PL = 1.53–1.67; EL/EW = 1.61–1.68; EL/PL = 3.15–3.21; EW/PW = 1.47–1.50; PW/PL = 1.37–1.48; PW/HW = 1.23–1.27; Length = 2.00–2.17 mm; Width = 0.78–0.87 mm.

♀: Pronotum as figured (Fig. 51). Pygidium distinctly tapered, emarginate at apex (Fig. 79) nearly as in *B. femina* n. sp. Sternum VII shortly pointed at apex as in *B. femina* n. sp. Sternum VIII crescent. Bursa copulatrix (Fig. 130) with a complicated structure at its aperture;

vagina resembling that in *B. stilet* n. sp.

Measurements: Length/AL = 3.29–3.40; AL/PL = 1.42–1.55; EL/EW = 1.54–1.73; EL/PL = 3.15–3.47; EW/PW = 1.46–1.52; PW/PL = 1.33–1.48; PW/HW = 1.25–1.37; Length = 2.20–2.39 mm; Width = 0.91–1.09 mm.



Figs 112–120: Bursa copulatrix with sclerites of: 112, *Bilyella unispina* n. sp. 113, *B. bipartita* n. sp. 114, *B. basiunguis* n. sp. 115, *B. breviunguis* n. sp. 116, *B. ursus* n. sp. 117, *B. felis* n. sp. 118–120, *B. gracilitarsis* Reitt. (119– enlarged sclerite; 120– different sclerite of another specimen). (Scale in mm.)

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 19 paratypes (NHMB) and 5 paratypes (KMB) with locality data: "Afghanistan, Bazarak, 2200 m, Panchirtal, 27.VI.1952, J. Klapperich".

Derivatio nominis: the name refers to the set of spines in the middle of phallus resembling comb.

Distribution (Fig. 134): E. Afghanistan.

15. **Bilyella femina** n. sp. Figs 52, 53, 75, 80, 82, 87, 88, 107, 128.

The species is remarkable by its strongly (transversely as well as longitudinally) convex pronotum and peculiar structure of female terminalia.

Relatively small, strongly convex species. Pubescence whitish, short, not wholly recumbent, rather suberect. Antennal joints resembling those in *B. saccata* n. sp. (Fig. 24). Interspaces among punctures on pronotum with imperceptible flat microsculpture, lustrous. Microsculpture of elytra more conspicuous, the elytra therefore less lustrous.

♂: Pronotum as figured (Fig. 52). Pygidium broadly rounded at apex, as in *B. vaginata* n. sp. Sternum VII straight at apex, sternum VIII and spicular fork as in *B. gracilitarsis* (Reitt.) (Fig. 72). Tegmen asymmetrical, its ventral portion arched (Figs 87, 88). Phallus composed of three parts, two of them irregularly sinuate at apex (Fig. 107).

Measurements: Length/AL = 2.79–2.88; AL/PL = 1.12–1.58; EL/EW = 1.71–1.72; EL/PL = 3.29–3.46; EW/PW = 1.30–1.44; PW/PL = 1.40–1.46; PW/HW = 1.31–1.33; Length = 1.83–1.91 mm; Width = 0.77–0.85 mm.

♀: Pronotum as figured (Fig. 53). Pygidium constricted and emarginate at apex (Fig. 80). Sternum VII shortly pointed at apex (Fig. 75). Sternum VIII narrow, crescent with two incurved lines (Fig. 82). Bursa copulatrix without sclerites, its basal part (vagina) supported by three line-like formations (Fig. 128).

Measurements: Length/AL = 2.87–3.00; AL/PL = 1.47–1.53; EL/EW = 1.58–1.62; EL/PL = 2.89–3.00; EW/PW = 1.33–1.38; PW/PL = 1.39–1.67; PW/HW = 1.29–1.37; Length = 1.81–1.37 mm; Width = 0.74–0.96 mm.

Types: Holotype ♂, allotype ♀ and 626 paratypes (NHMB, 20 ex. in KMB) are labelled: "Afghanistan, Bashgultal, 1500 m, Kamu, Nuristan, 26.IV.1953, J. Klapperich." 8 paratypes (NHMB) labelled: "Afghanistan, Kutiau, 1550 m, Nuristan, 22.V.1953, J. Klapperich"; 3 paratypes (NHMB): "Afghanistan, Asman, 900 m, Kunartal, 3.IV.1953, J.

Klapperich”.

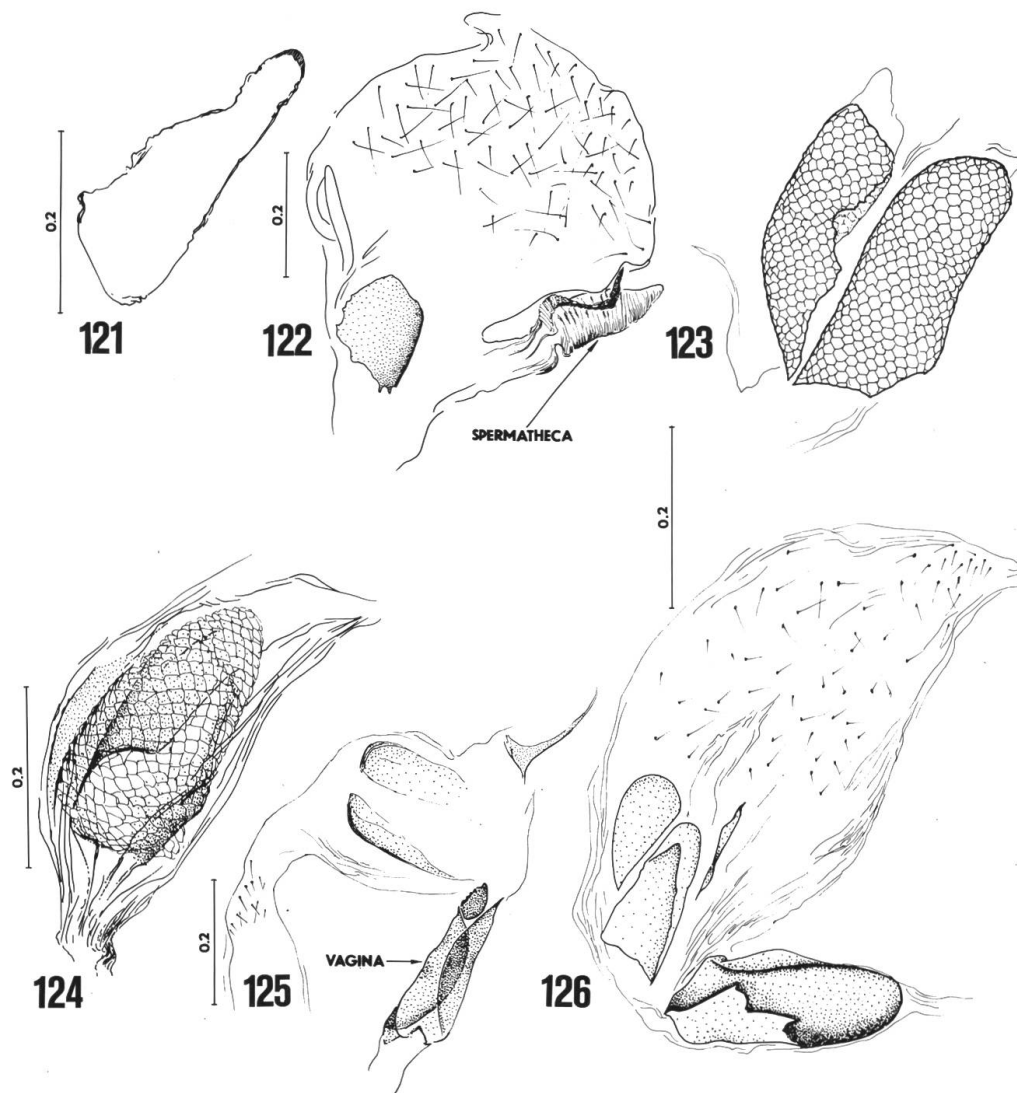
Derivatio nominis: the shape refers to the very particular structure of female terminalia including the shape of pygidium.

Distribution (Fig. 134): E Afghanistan.

16. ***Bilyella brevispina* n. sp.**

Figs 27, 54, 68, 108.

It is externally nearly identical with *B. furcata* from which it differs by the shape of phallus.



Figs 121–126: Bursa copulatrix with sclerites: 121, *Bilyella maleci* n. sp (enlarged sclerite). 122, *B. javrozae* n. sp. 123, *B. apis* n. sp. 124, *B. saccata* n. sp. 125–126, *B. vaginata* n. sp. (126, another specimen with vagina damaged after copulation.) (Scale in mm.)

It resembles a representative of the subgenus *Dasytidius* Schils (genus *Dasytiscus* Kiesw.) similarly as *B. furcata*. Body surface almost lustrous. Legs femora darkened and antennal segments 2 and 3 pale. Antenna with slightly conical segments (Fig. 27).

♂: Pronotum as figured (Fig. 54). Pygidium trapezoidal (Fig. 68). Sternum VII distinctly emarginate at apex. Sternum VIII shallowly emarginate at apex. Spicular fork with sternum IX nearly filiform. Tegmen slightly asymmetrical, resembling that of *B. saccata*. Phallus composed of one long central and three collateral short spines (Fig. 108).

Measurements: Length/AL = 2.79–2.90; AL/PL = 1.77–1.79; EL/EW = 1.88–1.94; EL/PL = 3.44–3.58; EW/PW = 1.35–1.42; PW/PL = 1.45–1.50; PW/HW = 1.23–1.24; Length = 2.22–2.61 mm; Width = 0.86–0.96 mm.

Types: Holotype ♂ and 1 paratype ♂ (NHMB) labelled: “Kashmir, Lahinvan, 21.VII.1980, 3000–2600 m, W. Wittmer”.

Derivatio nominis: the name refers to three short spines in the middle of phallus.

Distribution (Fig 134): Kashmir.

17. *Bilyella spinosa* n. sp. Figs 55, 56, 70, 109, 129.

Slender species somewhat resembling a representative of the subgenus *Dasytidius* Schils. Body surface with no distinct microsculpture therefore lustrous. Antennal segments 2–3, legs (femora darkened) pale. Antenna with submoniliform segments.

Holotype ♂: Pronotum as figured (Fig. 55). Pygidium nearly semi-circular. Sternum VII nearly straight at apex (Fig. 70). Sternum VIII slightly emarginate at apex. Spicular fork with filiform sternum IX. Tegmen slightly arched, nearly straight at base. Phallus composed of two parts (Fig. 109).

Measurements: Length/AL = 3.13; AL/PL = 1.67; EL/EW = 1.78; EL/PL = 3.27; EW/PW = 1.32; PW/PL = 1.53; PW/HW = 1.31; Length = 2.52 mm; Width = 0.96 mm.

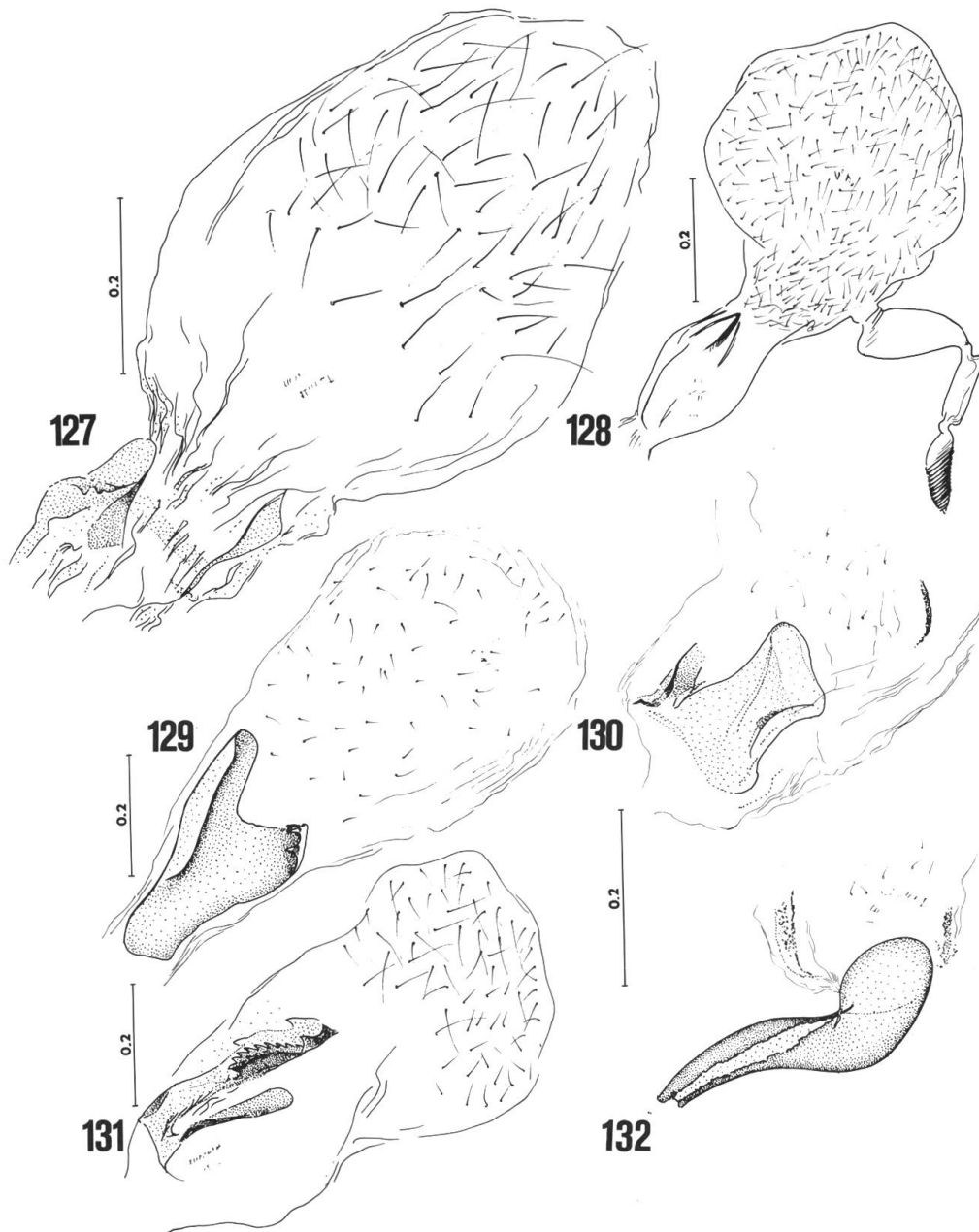
♀: Pronotum as figured (Fig. 56). Pygidium semicircular. Sternum VII arcuate at apex. Sternum VIII crescent. Sclerite in bursa copulatrix split, with several denticles at one side (Fig. 129).

Measurements: Length/AL = 3.43–3.59; AL/PL = 1.35–1.40; EL/EW = 1.50–1.75; EL/PL = 3.35–3.44; EW/PW = 1.34–1.38; PW/PL = 1.50–1.62; PW/HW = 1.29–1.35; Length = 2.30–2.61 mm; Width = 0.96–1.09 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 4 paratypes (NHMB, 1 ex. KMB) labelled: "Pakistan, Swat, Kalam, 5.VI.1978, 2000/2400 m, W. Wittmer".

Derivatio nominis: the name refers to the very long spine in phallus.

Distribution (Fig. 134): NE Pakistan.



Figs 127–132: Bursa copulatrix with sclerites: 127, *Bilyella stilet* n. sp. 128, *B. femina* n. sp. 129, *B. spinosa* n. sp. 130, *B. pecten* n. sp. 131, *B. furcata* n. sp. 132, *B. simplex* n. sp. (Scale in mm.)

18. *Bilyella furcata* n. sp. Figs 28, 57, 58, 71, 74, 93, 94, 110, 131.

It is remarkable by the long and stout extremities and the structure of genitalia in both sexes.

Legs (femora mostly darkened) and antennal segments 2–3 pale. Integument with fine microstructure, scarcely lustrous, pubescence not very dense. Antennae long, robust, moniliform, joints mostly feebly transverse (Fig. 28).

♂: Pronotum as figured (Fig. 57). Pygidium conical, rather transversely oblong, its apex subarcuate. Sternum VII slightly tapered and shallowly emarginate at apex (Fig. 71). Sternum VIII shallowly emarginate at apex (Fig. 74). Spicular fork with filiform sternum IX. Tegmen asymmetrical, its ventral part symmetrically linguiform, dorsal part nearly parallelsided (Figs 93, 94). Phallus composed of broad, basal and short, split, asymmetrical, terminal portions terminating to ductus ejaculatorius (Fig. 110).

Measurements: Length/AL = 2.86–2.96; AL/PL = 1.55–1.61; EL/EW = 1.57–1.63; EL/PL = 3.16–3.49; EW/PW = 1.38–1.44; PW/PL = 1.34–1.45; PW/HW = 1.22–1.26; Length = 2.17–2.35 mm; Width = 0.91–0.95 mm.

♀: Pronotum as figured (Fig. 58). Pygidium broadly semicircular. Sternum VII subarcuate at apex. Sternum VIII narrowly crescent. Bursa copulatrix with split sclerite being serrate on margins (Fig. 131).

Measurements: Length/AL = 3.41–3.52; AL/PL = 1.41–1.58; EL/EW = 1.74–1.81; EL/PL = 3.18–3.35; EW/PW = 1.31–1.42; PW/PL = 1.37–1.48; PW/HW = 1.31–1.33; Length = 2.52–2.69 mm; Width = 0.96–1.17 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB), 5 paratypes (NHMB) with locality data: Pakistan, Khagan V., Naran, 2370–2750 m, 23.VI.1977, W. Wittmer & M. Brancucci. 7 paratypes (NHMB, 3 ex. KM) bear locality data: "Pakistan, Swat, Matitlan, 13.VI.1978, 2250/2650 m, W. Wittmer".

Derivatio nominis: the name refers to the furcate shape of phallus and sclerite in bursa copulatrix.

Distribution (Fig. 134): NE Pakistan.

19. *Bilyella simplex* n. sp.

Figs 59, 60, 111, 132.

It is remarkable by the angulate sides of pronotum (Figs 59, 60). Phallus is of an extremely simple structure. Antennal segments 2–4 (–5) and legs pale. Antennae slender, joints submoniliform. Body surface with microsculpture slightly lustrous.

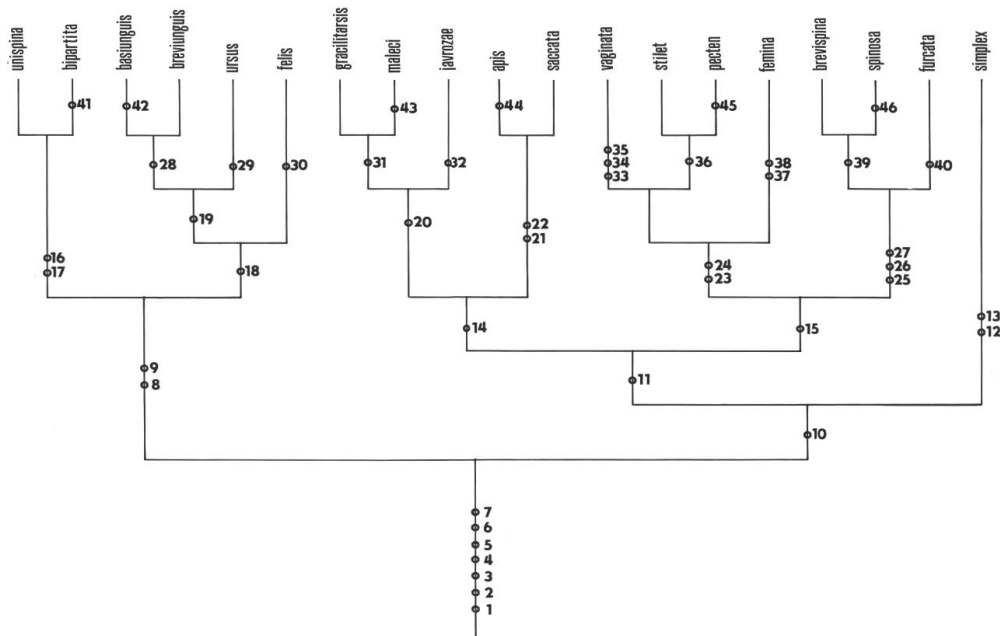


Fig. 133: Cladogram of the genus *Bilyella* n. gen. Numerals are expressive to individual apomorphies: 1. Tormal processes in labrum extremely reduced (Fig. 1). 2. Terminal segment of maxillary palpi constricted (Fig. 3). 3. Pronotal base bisinuate (Figs 29–60). 4. Phallic tube absent (Figs 95–103). 5. Sclerites in bursa copulatrix present (Figs 112–132). 6. Tegmen of unusual shape (Figs 93–94). 7. Male sternum IX present (Figs 63–65). 8. Male sternum IX anchor-shaped (Fig. 63). 9. Phallus with claw-shaped formation (Figs 95–99). 10. Phallus composed of elongate and sinuate spines (Figs 100–111). 11. Phallus composed of numerous spines (Figs 100–110). 12. Cornucopian sclerite present (Fig. 132). 13. Phallus ribbon-shaped. 14. Female sternum VIII notched in the middle of base. 15. Male sternum VII more or less emarginate at apex (Figs 69, 71). 16. Sclerite bipartite. 17. Tegmen asymmetrical (Fig. 83). 18. Phallus with distinct claw (Figs 96–99). 19. Base of phallus obliquely truncate (Figs 96–98). 20. Sclerites flat (Figs 118–122). 21. Phallus compressed, flat (Figs 102, 103). 22. Sclerites with celliform structure (Figs 123, 124). 23. Female pygidium modified (constricted and/or emarginate at apex) (Figs 77–80). 24. Female sternum VIII with curved median line (Fig. 82). 25. Sexual dimorphism externally well developed, species of an “Dasytidius” bodyshape. 26. Male sternum VII distinctly emarginate at apex (Fig. 71). 27. Sclerites split and denticulate (Figs 129, 131). 28. Base of phallus differentiated (Figs 96, 97). 29. Claw in phallus distant (Fig. 98). 30. Claw in phallus connate (Fig. 99). 31. Sclerite entire. 32. Sclerite abbreviated. 33. “Dasytidius” bodyshape (convergent character, see 25). 34. Number of spines reduced (Fig. 104). 35. Vagina sclerotized (Figs 125–126). 36. Sclerites numerous (Figs 127, 130). 37. Sclerites reduced (Fig. 128). 38. Pronotum strongly convex. 39. Main spine very long (Figs 108, 109). 40. Spines abbreviated (Fig. 110). 41. Sclerites separated (Fig. 113). 42. Tripartite apical spine distant (Fig. 96). 43. Phallus with nodosity in middle (Fig. 101). 44. Tegmen asymmetrical at apex. 45. Spines arranged as comb (Fig. 106). 46. Tegmen asymmetrical at apex (convergent character, see 44).

♂: Pronotum as figured (Fig. 59). Pygidium nearly semicircular. Sternum VII subarcuate. Sternum VIII nearly straight at apex, very shallowly emarginate. Spicular fork with filiform sternum IX. Tegmen slightly asymmetrical, arcuate at base. Phallus formed only by single, sinuate, ribbon-like, apically pointed, formation (Fig. 111).

Measurements: Length/AL = 3.18–3.21; AL/PL = 1.58–1.65; EL/EW = 1.71–1.93; EL/PL = 3.15–3.28; EW/PW = 1.11–1.30; PW/PL = 1.47–1.55; PW/HW = 1.33 – 1.53; Length = 2.26–2.43 mm; Width = 0.83–0.96 mm.

♀: Pronotum as figured (Fig. 60). Pygidium semicircular. Sternum VII distinctly arcuate at apex. Sternum VIII crescent, slightly crooked. Bursa copulatrix with a very peculiar, cornucopian sclerite having an irregular slot (Fig. 132).

Measurements: Length/AL = 3.75; AL/PL = 1.39; EL/EW = 1.55; EL/PL = 3.35; EW/PW = 1.35; PW/PL = 1.57; PW/HW = 1.42; Length = 2.56 mm; Width = 1.04 mm.

Types: Holotype ♂ (NHMB), allotype ♀ (NHMB) and 5 paratypes (NHMB, 2 ex. KMB) labelled: Afghanistan, Nuristan, Baschgultal, Achmede Dewane, 2700 m, 23.VII.1952, J. Klapperich. 2 paratypes (NHMB) with locality data: "Afghanistan, Nuristan, Baschgultal, Peschawurde, 2200 m, 21.7.1952, J. Klapperich".

Derivatio nominis: the name refers to a very simple structure of the phallus.

Distribution (Fig. 134): E Afghanistan, NW Pakistan.

Discussion

I do not know any similar case within the Melyridae and, perhaps in Coleoptera at all, where is the phallus transformed in such a degree against to the basic evolutionary plan of the family. Similarly, the enormous length of the phallus (cf. Figs 18 and 19) has not analogy within Coleoptera. These morphological features have led me to the opinion that the genus will form a respective tribe or another major subgroup after a reclassification of the genus *Dasytiscus* Kiesw. s.lato.

Bilyella belongs to the Irano-Turanian faunistic elements. Usually, there is no more than a single species of this genus on each locality.

I consider the phylogeny of this genus formerly to be split of its ancestral species into allopatric subspecies. In the course of further evolution, the habitus was almost unaltered and the development was point-



Fig. 134: Distribution of the genus *Bilyella* n. gen. The numerals are expressive to the serial numbers of species used in the descriptive part.

ed to a radiating morphology of genitalia in both sexes i.e. the structure of the phallus and sclerites in bursa copulatrix. I suppose there is no prospect to species progress in evolution; the genus appears to be deviation within the Dasytinae.

For the sake of a very limited number of utilizable specific characters, nothing than a mere cladogram (Fig. 133) can be used in order to demonstrate presumed interspecific relationships. Nevertheless, there are some distinctive phyletic lineages, e.g. *basiunguis-breviunguis-ursus*; *gracilitarsis-maleci-javrozae*; *apis-saccata*; and *vaginata-stilet-pecten-femina*. The systematic position of *B. simplex* is evidently isolated, probably also that of *B. felis*.

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