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On taxonomy and distribution of *Harpalus famelicus* TSCHIT. and two related species (Coleoptera, Carabidae)

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A b s t r a c t : By investigation of material and types of the species *Harpalus famelicus*, *H. strenuus* and *H. diligens*, all described by TSCHITSCHÉRINE in 1889, the exact distribution of these species could be elucidated. *H. famelicus* forms three subspecies, two of which are newly described here (*H. femelicus fanensis* n. ssp., *H. famelicus loxophonoides* n. ssp.). Lectotypes of all species are designated.

Introduction

The three species considered in this paper (*Harpalus famelicus, H. strenuus and H. diligens*) were described by TSCHITSCHÉRINE (1898), based on specimens from one or two localities in the Hissar-Darvas region (Tadjikistan). Up to now these species are very rare in collections and their exact distribution remained unknown. Our study of all available material, including types of all three species, and specimens collected in the last years, made it possible not only to detail their respective ranges but also to clarify that *H. famelicus* forms three subspecies, two of which are newly described here.

All three species are characterized by a combination of the following features: Body oblong, slender, with long legs and thin tarsi (unusual for *Harpalus*), dark coloration without any metallic tinge. Rather short metepisterna. Erected hairs on basal edge of elytrae. Pronotum without punctuation on disc and with short hairs on hind margin. The three penultimate abdominal sternites, except for two normal setae, bare or with

sparse, fairly short additional setae. Anal sternite without pronounced sexual dimorphism. Ventroapical tubercle of fore tibia with one spine at apex, outer lateral margin of fore tibia with three (rarely four) spines, middle tibia of male without subapical tubercle on inner surface. External intervals of elytra in two species (*H. diligens* and *strenuus*) with fine punctuation and short pubescence. Aedeagus asymmetric with rather short terminal lamella and disc-like or horseshoe-like capitulum at apex, armature of inner sac weakly developed and very various in the species, consisting of either one or two small spiny patches or one large and very short tooth near the middle, sometimes practically absent.

The species are apterous and have small distribution areas in the mountains of the Hissar-Darvas region, where they live in somewhat dry habitats at altitudes from 1000 up to almost 4000 m.

Phylogenetically they are closely related on the one hand to the species of the *gisellae* group (KATAEV 1990) from northern and western Tien Shan and Dzungarskij Alatau, and on the other hand to *H. arcuatus* TSCHIT. and *H. ingenuus* TSCHIT. from the mountain ranges of Peter-I-Mountains and Alai Mountains. All these species belong to the same phyletic branch as the very common *H. smaragdinus* (DFT.)

Material, Methods and Acknowledgement

This report is based on specimens coming from the following museum and private collections:

ZIN ..... Zoological Institut, Russian Academy of Science, Saint Petersburg, Russia (B.M. Kataev)

cBUL ..... Coll. P. Bulirsch, Lovosice, CS

cKOM ..... Coll. E.V. Komarov, Volgograd, Russia

cMICH ..... Coll. V.A. Michailov, Tshjurupinsk, Ukraine

cWR ..... Coll. D.W. Wrase, Berlin, Germany

We acknowledge with sincere thanks the assistance of these colleagues in providing specimens for study.

Total body length was measured from the anterior margin of clypeus to the elytral apex, the length of pronotum (LP) along its median line, the elytral length (LE) from the basal edge in the scutellar region to the apex of the sutural angle, the width of pronotum (WP) and elytra (WE) at their broadest point.

Results

Harpalus famelicus TSCHIT.

TSCHIT.: 1898: 177

Type material: Lectotype ♂ (present designation) with labels "Iskander-Kul, Mura Pass, Glasunov, 1892", "*Harpalus famelicus* m. Typ" (ZIN). 32 paralectotypes (♂ ♂ ♀ ♀): 9 specimens with the same data as the lectotype, the rest with labels "Iskander-Kul, Karakul-Daria, Glasunov, 1892" (all in ZIN).

Diagnosis: This species is easily distinguished from the other two by lack of punctuation and pubescence on the elytral intervals and usually also by the well defined hind angles of the pronotum. In these two characters it is superficially similar to the species of the *gisellae* group, but can be distinguished from them by a different penis structure and more slender body, among other characters.

Pronotum (Figs. 2, 3, 7) widest before middle, clearly constricted to basis, sides in basal half weakly rounded or straight, disc rather flat, basal fovea very weak, region of hind angles not convex. Elytral humeri rounded at apex, not angulate, scutellare pore and the single discal pore near stria 2 often absent. Armature of internal sac of penis (Figs. 12-23) consisting of only two small spiny patches. Body length 9,1-11,3 mm.

Distribution: The most widespread species of the three species dealt with here. Its area occupies the southern spurs of the Zeravshan Mountain range (Fan Mountains), Hissar Mountain range and the northern parts of the Karategin Mountain range (Fig. 33, III-V).

The species is very variable in geographical respect. We divide it into three subspecies which are well differentiated by the shape of terminal capitulum of the male genital and in some characters of external structure. It is remarkable that the variation of the shape of pronotum and elytra (but not of capitulum of penis) appears to be clinal. Figure 24 shows that the relative length of the elytra, expressed as ratio LE/WE, gradually increases in south-eastern direction (from the Fan Montains to the Karategin Mountains), and parallelly, the relative width of the pronotum, expressed as ratio WP/LP, decreases in the same direction. This means, that in eastward populations the body gradually becomes more and more slender.

Harpalus famelicus famelicus TSCHIT.

Diagnosis: Both morphologically and geographically the nominal subspecies, it occupies an intermediate position between the two other subspecies. Terminal lamella of penis comparatively short, capitulum hardly inclined to the main longitudinal axis (Figs. 16-19). Sides of pronotum (Fig. 3) usually straight before the somewhat sharp hind angles, which can be slighly blunted or very narrowly rounded at the tip; basal fovea and lateral flattened areas very weak, often absent. Sutural angle of elytra blunted in both sexes, fifth and seventh intervals without rows of punctures before apex; striae suberficial, very weakly impressed apically in male. Metepisterna rather short (Fig. 4). Indexes have average values: index WP/LP in ♂♀ 1,38-1,49 and index LE/WE 1,47-1,58 mm. Body length 9.2-10.3 mm.

Distribution: Known only from the northern macroslope of the Hissar Mountain range near Iskanderkul (Fig. 33, III).

Material: The type serie mentioned below and 3♂♂, all: S coast of Iskanderkul, 2400 - 2800 m. 2. 8. 1977, Medvedev (ZIN).

Harpalus famelicus fanensis **n. ssp.**

Type material: Holotype ♂, Zeravshan Mountain range, Fan Mountains, Kshtut, Dukdon Pass, 5.7.1908 (ZIN). Paratypes (9 specimens): 1♂, 2♀♀, same data as the holotype (ZIN); 1♀, Kshtut, 31.5.1908 (ZIN); 1♂, 1♀ Alaudin Lakes; July 1987; Oprchal (cBUL, cWR) L; 2♂♂, 1♀, Sacharnaya golova, 3500 m, 26.7.1964, Koštal (cWR, ZIN).

Diagnosis: Very similar to the nominate subspecies but terminal capitulum of aedeagus (Figs. 12-15) more extended dorsally and situated more transverse to the main longitudinal axis. Sutural angle of elytra slightly sharper. Pronotum (Fig. 2) and especially elytra relatively broader: WP/LP (♂♀) 1,41-1,50, LE/WE (♂♂) 1,44-1,49. Body length 9,1-10,4 mm. Habitus Fig. 1.

Distribution: The area of this subspecies is probably limited to the Fan Mountains (Fig. 33, IV).

Harpalus famelicus loxophonoides n. ssp.

Type material: Holotype ♂, Hissar Mountain range, Ansob Pass, 3300-3500 m, 20.7.1989, Vereschagina (ZIN). Paratypes (35 specimens): 22♂♂, 7♀♀, same data as the holotype (cWR, ZIN); 1♂, Dushanbe 1.7.1987, Paulus (cWR); 1♀, Varsob Gorge near Dushanbe, 2000 m, 19.7.1984, Wrase (cWR); 1♂, 1♀, Charangon, 1200 m, 10.7.1987, Miznikow (cWR); 2♂♂, Karategin Mountain range, Kamarou, tributary of Sarbog River, 2700 m, 6.7.1975, Medvedev (ZIN).

Diagnosis: Morphologically the most distinctive subspecies, which is easily distinguished from the other two by the following combination of characters: Terminal lamella of male genital clearly longer and with a fairly inclined horseshoe-like capitulum (Figs. 20-23). Seventh and also often fifth interval of elytra with a row of apical punctures. Metepisterna a little longer (Fig. 6). Sides of pronotum (Fig. 7) more converged to basis and often entirely rounded, hind angles generally more broadly rounded at apex, basal fovea and lateral flattened areas more distinct, often connected with each other on basis of pronotum. Sutural angle of elytra sharp in both sexes, sometimes with a slight tooth-like extension, striae more impressed. Pronotum and elytra relatively narrow and long: WP/LP (♂♀) 1,34 - 1,43, LE/WE (♂♂) 1,58-1,69. Body larger, 9,9-11,3 mm. Habitus Fig. 5.

Distribution: According to the material at hand this subspecies lives on the southern macroslope of the Hissar Mountain range and in the Karategin Mountains (Fig. 33, V).

Ecological note: The subspecies *H. famelicus loxophonoides* n. ssp. has some convergent resemblance in body shape with the species of *Loxophonus* REITT. (belonging also to the genus *Harpalus* LATR.) and even with some species of *Asioplatysma* KRYZH. (genus *Pterostichus* BON.), which both occur in similar habitats on stony mountain slopes. May be this phenomenon can be explained as an adaptation to living under such conditions.

Harpalus strenuus TSCHIT.

TSCHIT. 1898: 176.

Type material: Lectotype ♂ (present designation), with labels "Hissar et Karategin, VII - VIII - 96, Barschevskij" (in Russian); "*Harpalus sternuus* [error] m. Typ" (ZIN); 27 paralectotypes (♂ ♀), same data as the lectotype (ZIN).

The type serie was probably collected at the upper course of the Varsob River.

Diagnosis: Both this and the following species have punctuation on the external intervals of the elytra and broadly rounded hind angles on the pronotum. In these characters they are similar to *H. arcuatus* TSCHIT. and *H. ingenuus* TSCHIT., which differ however by a robust , large body, shorter metepisterna, a different structure of the male genital and other characters. Pronotum (Fig. 9) widest near the middle, hardly constricted to the basis, evenly rounded at sides, lateral flattened areas absent or very weak, basal fovea small and superficial. Elytral humeri obtuse, sometimes rounded at apex, sutural angle of elytra sharp or blunted, occasionally with a tooth-like extension in the female, striae superficial but slightly impressed before apex, two to four external intervals with fine punctuation and short pubescence (this character was not mentioned by TSCHITSCHÉRINE). Penis (Figs. 25-28) with transverse disc-like terminal capitulum extended dorsally, armature of internal sac either absent or consisting of one broad and short tooth near the middle, usually weakly sclerotizised (more distinct in specimens from Sorbo and Kamarou), and a small spiny patch on the right side (more distinct in specimens from Ansob Pass). Body length 7,7-9,7 mm.

Distribution: Southern macroslope of the Hissar Mountain range eastern of the Varsob Gorge, and Karategin Mountains (Fig. 33, II).

Material: Hissar Mountain range, Ansob Pass: 1 exs., 3600 m, 2.8.1947, Kiritshenko (ZIN); 3 exs., 3500 m, 4.8.1968 and summer 1976, Tshikatunov (ZIN); 2 exs., 3375 m, 28.7.1975, Terentiev (ZIN); 6 exs., 3300 - 3400 m, 20.7.1984, Rietsch, Wrase (cWR); 5 exs., 3300-3500 m, 20.7.1989, Vereschagina (ZIN); 27 exs., 3200-3600 m, 5.-9.7.1990, Wrase & Schülke (cWR). 3 exs., Romit, upper course of Sorbo River, Khakavdara, 7.7.1967, Michailov (cMICH, ZIN); 2 exs., Karategin Mountain range, Kamarou, tributary of Sarbog River, 3500 m, 18.7.1975, Medvedev (ZIN); 2 exs., S of Kamarou, 3500 m, 8.7.1975, Medvedev (ZIN).

Harpalus diligens TSCHIT.

TSCHIT. 1898: 175

Type material: Lectotype ♂ (present designation) with label "Karategin [=Peter-I-Mountain range, NW Sangvor, Puliysangin], 28.6.89 / Gr. [ombtshevskij]" and with bottom label (in common for the whole type serie) "*Harpalus diligens* m. Typ." (pinned by Kataev); 3 paralectotypes (1♂, 2♀♀) with the same data as the lectotype (ZIN).

Diagnosis: The species is very similar to *Harpalus strenuus* TSCHIT. but punctuation on elytra much more coarse and spread over five till seven external intervals. Metepisterna (Fig. 10) narrower. Pronotum (Fig. 11) rather constricted towards the basis, its maximum width before the middle, basal fovea deeper, sometimes finely rugose, region of hind angles convex. Elytral humeri rounded, not angulate, elytral striae superficial in female, a little impressed in males. Penis (Figs. 29-30) with oblique horseshoe-like terminal capitulum, in the middle part of the internal sac only one very short tooth with wide sole (very similar to that of *H. strenuus* TSCHIT.). Body narrower and more slender, length 8,4-9,5 mm.

Geographical variation: The terminal lamella of penis in specimens from the Khazratishokh Mountain range (Fig. 32) a little longer than in specimens from the Peter-I-Mountain range (Fig. 31).

Distribution: The species is found in the Peter-I-Mountain range and in the Khazratishokh Mountain range; it seems that its area is separated from the areas of the other species dealt with in this paper (Fig. 33, I).

Material: 10 exs., Peter-I-Mountain range, env. Ganishou, 3000-3500 m, 17.6.1969 and 8.7.1988, Komarov, Michailov (cKOM, cMICH, cWR, ZIN). 7 exs., Khazratishokh Mountain range, Choyliptuk Pass, 3000-3300 m, 14.7.1970, Michailov (cMICH, ZIN).

Note: *H. diligens* TSCHIT. and *strenuus* TSCHIT. are two allopatric and probably sister taxa which arrose as a result of the division of one ancestor species originally widely distributed from the Hissar Mountains to the Khazratisokh Mountains.

Zusammenfassung

Durch Untersuchung von Material der von TSCHITSCHÉRINE beschriebenen Arten *Harpalus familicus*, *H. strenuus* und *H. diligens* einschließlich der Typen kann die bisher noch nicht genau bekannte Verbreitung angegeben werden. *H. famelicus* bildet drei Unterarten, von denen zwei hier beschrieben werden (*H. famelicus fanensis* n. ssp., *H. famelicus loxophonoides* n. ssp.).Von allen drei Arten werden Lectotypen designiert.

References

KATAEV B.M. (1990): Ground beetles of the genus *Harpalus* LATR. of the group *gisellae* (Coleoptera, Carabidae). — Proceedings Zool. Inst. Leningrad, **211**: 17-27 (in Russian).

TSCHITSCHÉRINE T. (1898): Notes sur divers Harpalini paléarctiques. — Ann. Soc. Ent. France, **67**: 167 - 188.

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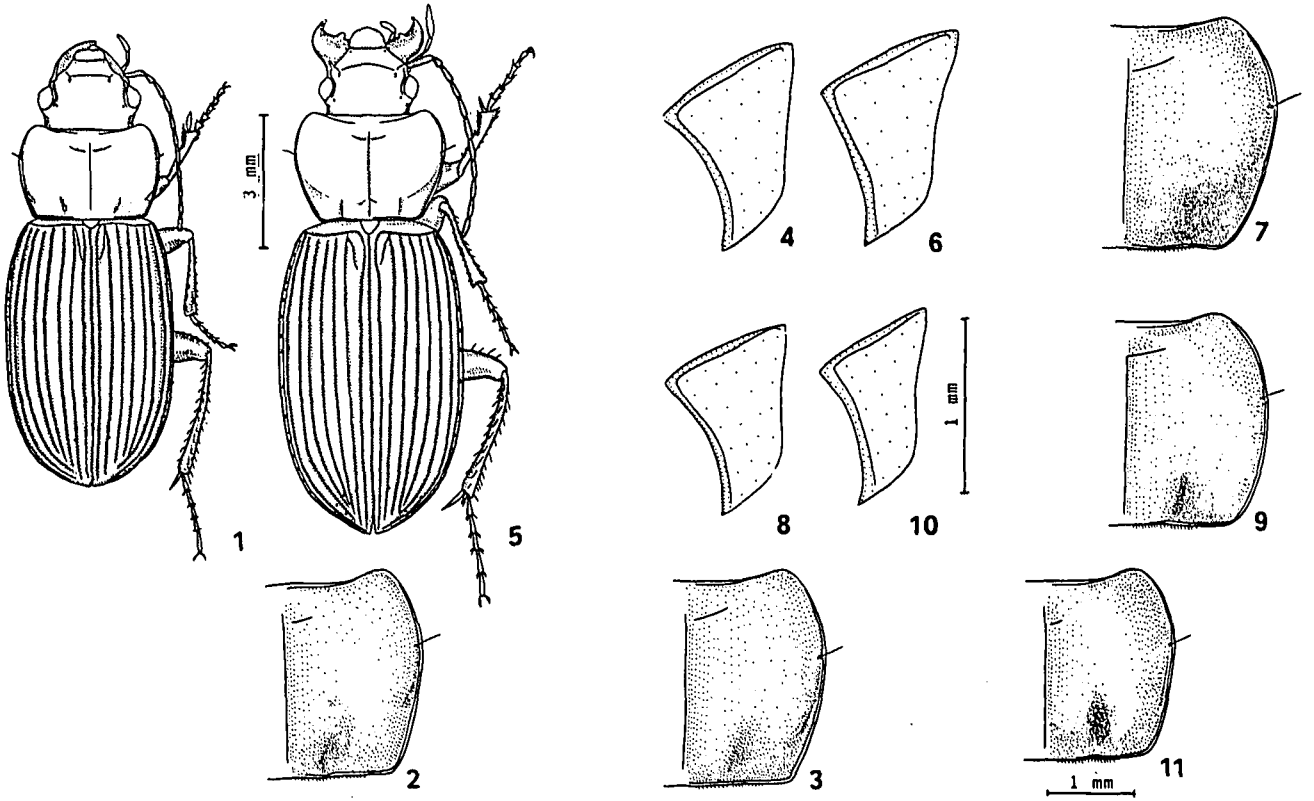
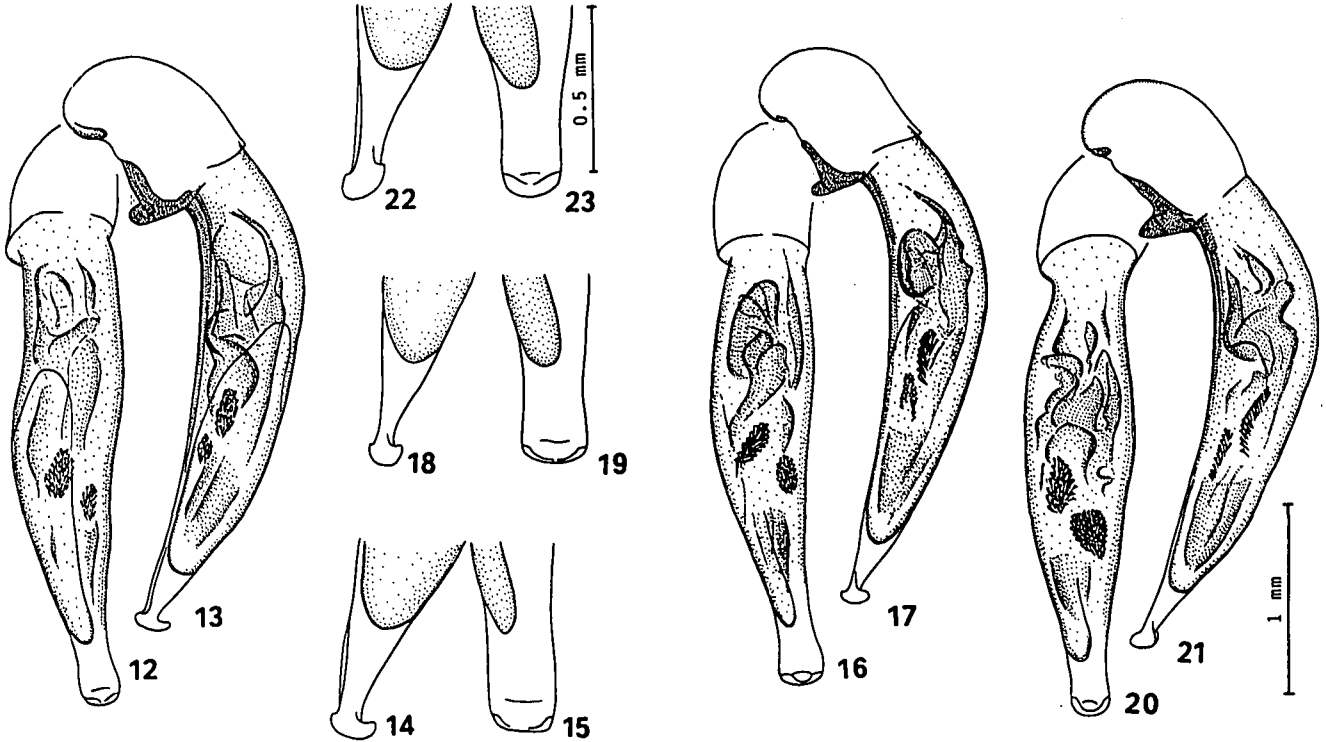


Figs. 1-11. *Harpalus*. 1, 5: general aspect, females; 2, 3, 7, 9, 11: right half of pronotum; 4, 6, 8, 10: left metapisterna. 1, 2: *H. famelicus fanensis* n. ssp. (1: Dukdon, paratype; 2: Sakharnaya golova). 3, 4: *H. famelicus famelicus* (3: Mura; 4: Karakuldaria). 5-7: *H. famelicus loxophonoides* n. ssp. (5: Varsob, 6, 7: Ansob); 8, 9: *H. strenuus* (paralectotype); 10, 11: *H. diligens* (Puliysangin, lectotype).



Figs. 12-23. *Harpalus famelicus*, penis.12, 15, 16, 19, 20, 23: dorsal view; 13, 14, 17, 18, 21, 22: view from left side. 12-15: *H. f. fanensis* n. ssp. (12, 13: Dukdon; 14, 15: Alaudin). 16-19: *H. f. famelicus* (16, 17: Mura; 18, 19: Karakuldaria). 20-23: *H. f. loxophonoides* n. ssp. (20, 21: Dushanbe; 22, 23: Ansob).

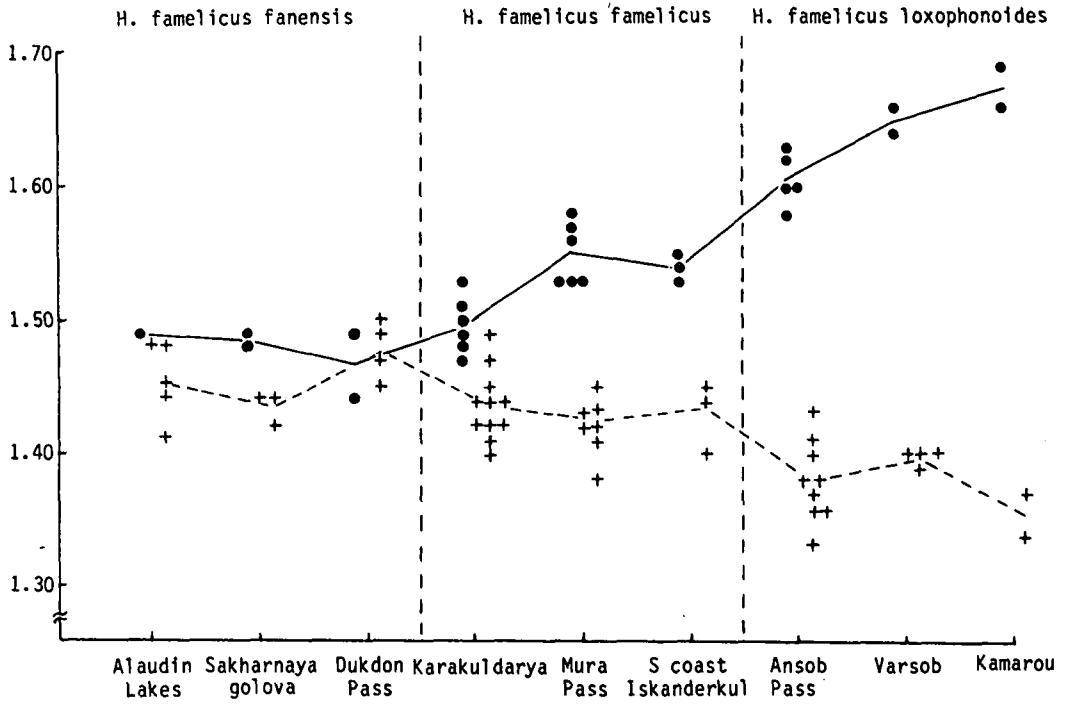
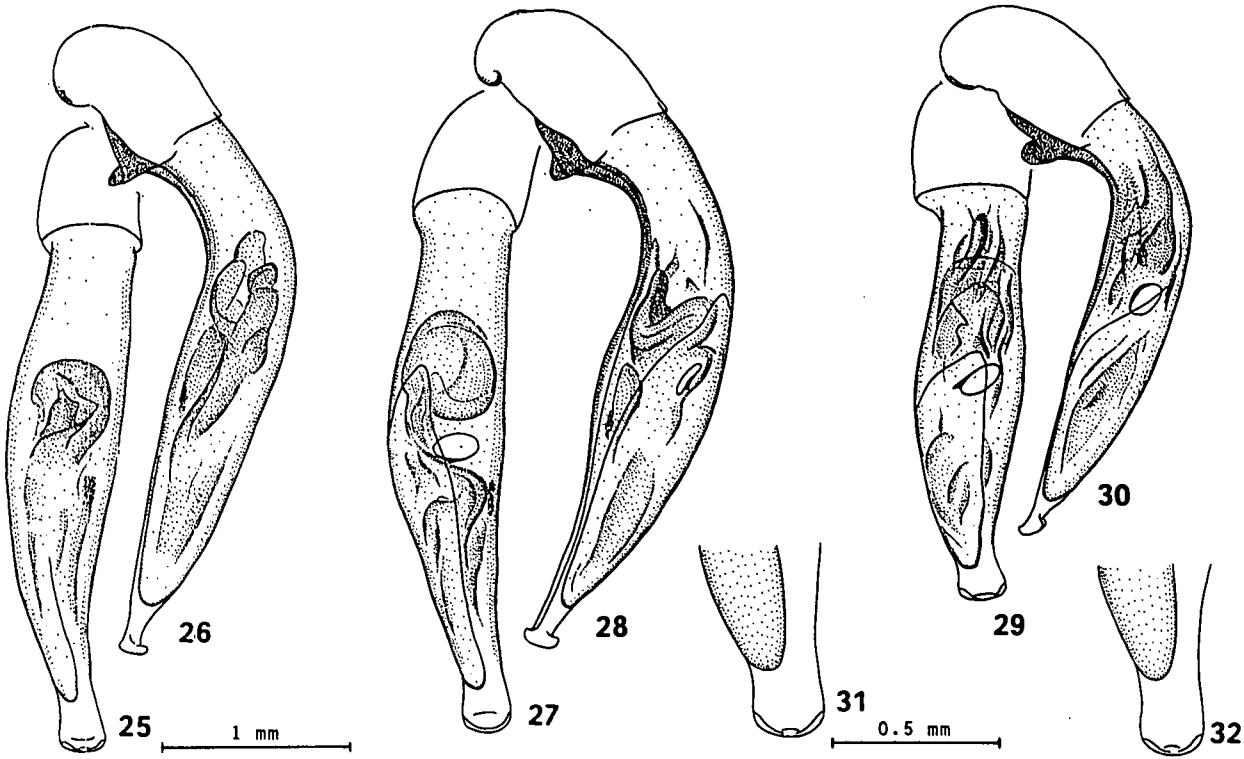


Fig. 24. Geographical variation of ratio width of pronotum to length of pronotum in males and females (crosses) and of ratio length of elytra to width of elytra in males (dots) in *H. famelicus* (each mark corresponds to one measured specimen, lines connect average values of each locality).



Figs. 25-32. *Harpalus*, penis. 25, 27, 29, 31, 32: dorsal view; 26, 28, 30: view from left side. 25-28: *H. strenuus* (25, 26: paralectotype; 27, 28: Sorbo). 29-32: *H. diligens* (29-31: Polyisangin, lectotype; 32; Choyliptuk).

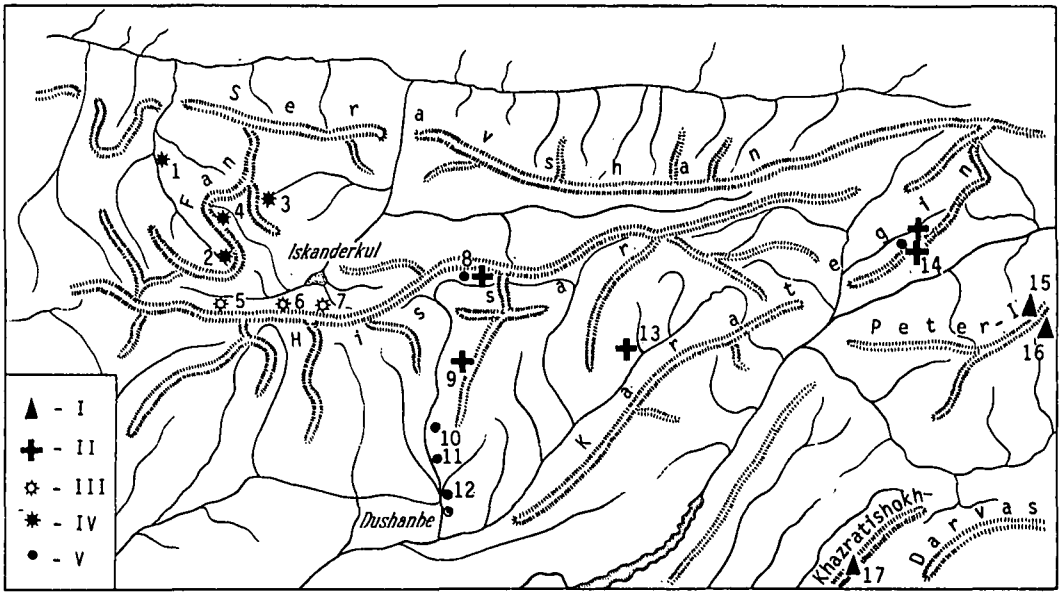


Fig. 33. *Harpalus*, distribution. I: *H. diligens*; II: *H. strenuus*; III: *H. famelicus famelicus;* IV: *H. famelicus fanensis* n. ssp.; V: *H. famelicus loxophonoides* n. ssp. (1 Kshtut; 2: Dukdon Pass; 3: Alaudin Lakes 4: Sakharnaya golova; 5: Karakuldaria; 6 Mura Pass; 7: S coast of Iskanderkul; 8: Ansob Pass; 9: Takob; 10: Charangon; 11: Varsob Gorge; 12: Dushanbe; 13: Khakavdara; 14: Kamarou; 15: Ganishou; 16: Poliysangin; 17: Choyliptuk Pass).