

WINKLERITES FODORI SP. N. AND SYSTEMATIC POSITION
OF DUVALIUS (DUVALIUS) FODORI SCHEIBEL
(COLEOPTERA, CARABIDAE, TRECHINAE)

GUÉORGUIEV, B. V.

National Museum of Natural History
1 Blvd. Tzar Osvoboditel, 1000 Sofia, Bulgaria. E-mail: bobivg@yahoo.com

Winklerites fodori sp. n. (type locality: massif of Rudoka, Shar Planina Mts, Republic of Macedonia), is described. Ten species of the genus, so far known, are arranged in four groups, three of them are defined here for the first time. The systematic position of *Duvalius (Duvalius) fodori* SCHEIBEL, 1937 is considered and the group “*fodori*” is proposed to encompass the species *D. fodori*, *D. strupii* and *D. vignai*. An explanation for the relationship between these three species and the only species of the subgenus *Platyduvalius* JEANNEL, 1929 is suggested.

Key words: Coleoptera, Carabidae, Palaearctic Region, Balkan Peninsula, taxonomy

INTRODUCTION

I had an opportunity to find and study two quite rare alpine and hypogean trechine beetles in the Coleoptera Collection of the Hungarian Natural History Museum, Budapest. The first of them belongs to a new species of the genus *Winklerites* JEANNEL, 1937. The genus is endemic to the Balkan Peninsula and until now included nine species from Bosnia-Herzegovina, Montenegro and Greece (GIACHINO 2001, ZABALLOS 2003: 240). Herein is described a tenth species originated from the Shar Planina Mt. in the Republic of Macedonia. Besides, a single specimen, bearing identical label data as the holotype of the new species, is assigned to a local endemic species of the genus *Duvalius* DELAROUZÉE, 1859. Until now this rare species was known only by its type and its systematic position was unstable.

MATERIAL AND METHODS

The specimens were boiled in water and the caudal part of the abdomen was removed to extract the genital apparatus. The latter was consecutively put in 10% KOH, acetic acid and glycerin. Figures were made with the aid of a drawing tube on a Carl Zeiss stereoscopic microscope. After the study the genital structures were deposited in Canada balsam droplet and were associated to the specimen from which they were extracted. All ratios measured were made with an ocular micrometer in a Carl Zeiss binocular microscope.

The material studied comes from the following four institutions (represented with their acronyms): DEI = Deutsches Entomologisches Institut, Eberswalder Müncheberg, Germany; HNHM = Hungarian Natural History Museum, Budapest, Hungary; NHMW = Naturhistorisches Museum Wien, Vienna, Austria; ZMHU = Museum für Naturkunde der Humboldt-Universität zu Berlin, Berlin, Germany.

Anillini JEANNEL, 1937

Winklerites fodori sp. n.

(Figs 1–3)

Type material. Holotype ♂ labelled: “Turcin plan. 1935.VII.26.” / “Turcin pl. 935.VII.26.” / “*Scotodipnus*“ / “Coll. Dr. J. FODOR“ / “Holotype, *Winklerites fodori* n. sp., B. GUÉORGUIEV det., 2006” (HNHM). Paratype ♀ labelled: “Macedonia Sar Planina Popova sapka” / “1935.VII.16. leg. Dr. J. FODOR“ / “Paratype, *Winklerites fodori* n. sp., B. GUÉORGUIEV det., 2006” (HNHM).

Diagnosis. The new species distinguishes itself from the other related species of the “*hercegovinensis*“ group by the particular shape of the aedeagus and the copulatory piece. The limited area of distribution may be also used as an additional special feature for species distinction.

Description of holotype. Moderately sized (length 2.1 mm, maximum width 0.7 mm) species of Anillini; pubescent short and sparse; microsculpture isodiametric, fine; cuticle lightly pigmented, colour pale testaceous. Last abdominal tergite, ventrite and right posterior leg missing.

Head moderate in size, dorsal surface smooth, impunctate; mandibles sharp-pointed, as long as one-third of head; antennae short, moniliform; eyes absent; supraorbital crest present as fine trace; penultimate palpomere of maxillary palp fusiform; frontal furrows moderately deep. Proportions: length of head / width of head as 1.3; length of head / length of pronotum as 1.15; width of head / width of pronotum as 0.72.

Pronotum slightly cordate, widest at anterior third; sides more convergent posteriorly than anteriorly, distinctly concave before posterior angles, margins not serrate in posterior half; anterior margin slightly concave, anterior angles not prominent; posterior margin slightly convex backward, posterior angles prominent, nearly rectangular; disc smooth, slightly convex, midline distinct, superficial; basal foveae superficial, impunctate; anterior and posterior marginal setae present. Proportions: width of pronotum / length of pronotum as 1.22.

Elytra elongate, coalesced along first half, irregularly punctato-striate; disc plane; apices separate and widely rounded; shoulders distinct, widely rounded; margins indistinctly serrate in anterior third; scutellary striola deep and oblique, other striae missing. Proportions: length of elytra / length of pronotum as 2.29; width of elytra / width of pronotum as 1.34; length of elytra / width of elytra as 1.4.

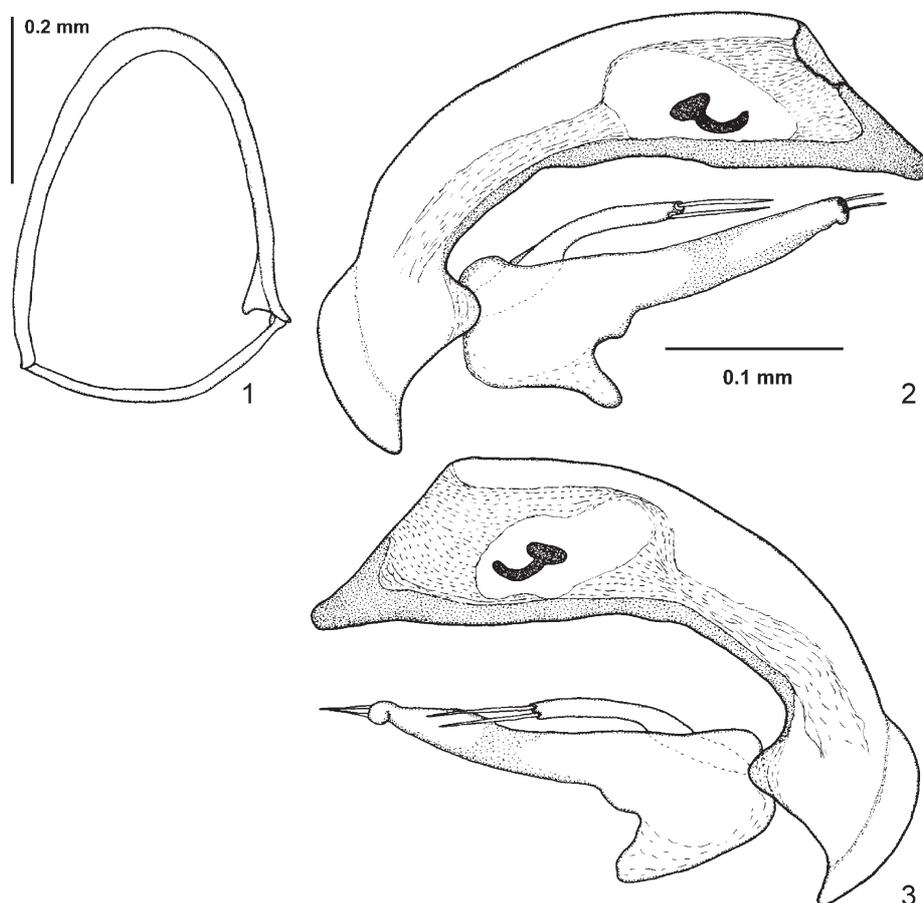
Legs long, pubescent, slender; tibiae and femora in fore and middle legs equally long, protibiae wider and very robust (especially in anterior parts) in comparison with mesotibiae and metatibiae, hind tibiae somewhat longer than hind femora.

Male genital armature. Ninth abdominal sternite (urite) ovate, short, consisting of two sclerites, briefly rounded in apical part and widely rounded in basal part (Fig. 1). Median lobe of aedeagus (Figs 2–3) in lateral view arcuate (less apically, more basally), apical part wider than basal part; both

basal and apical orifices concave; internal sac situated in subapical part; copulatory piece minute, strongly chitinized, hooked (turned with concave side to dorsum), consisting of fungiform distal and hooked proximal part; parameres asymmetrical, left paramere as long as two third of median lobe, having massive basal and thin apical parts bearing two short setae, right paramere weakly sclerotised, fine, apex with two long setae.

Chaetotaxy. Similar to that of the other species of the “*hercegovinensis*” group.

Description of paratype. Length 2.3 mm, maximal width 0.75 mm. Elytra covering all but apex of abdomen. Proportions: length of head / width of head as 1.25; length of head / length of pronotum as 1.1; width of head / width of pronotum as 0.71; width of pronotum / length of pronotum as 1.24; length of elytra / length of pronotum as 2.32; width of elytra / width of pronotum as 1.33; length of elytra / width of elytra as 1.4.



Figs 1–3. *Winklerites fodori* sp. n. 1 = ventral aspect of ninth postabdominal sternite, 2 = left lateral aspect of aedeagus, 3 = right lateral aspect of aedeagus. Scale bars = 0.2 mm (Fig. 1), 0.1 mm (Figs 2–3)

Habitat. Unknown. Probably as in the case of other congeners, it lives under large, deeply embedded stones in the subalpine and alpine belts.

Etymology. Named after the remarkable Hungarian collector, Dr. JENŐ FODOR for his long standing efforts to collect Palaearctic Carabidae.

Discussion. The intrageneric relations of *Winklerites* have been once a topic of discussion (CASALE *et al.* 1990). Currently at least four groups could be distinguished, three of them are defined here for the first time. The differentiation between these groups is based on the shape of aedeagus and several important external characters. Perhaps some of these lineages will deserve a rise to a separate subgenera in future, but a key moment for a right intrageneric construction is the description of the male sexual apparatus in four described species. No doubt, further research in the hypogaeal fauna of the region will lead to the discovery of new species from *Winklerites*, which will add new data on the systematics of the genus.

The “*hercegovinensis*” group seems to be quite homogeneous and includes *W. hercegovinensis* (WINKLER, 1925), *W. durmitorensis* NONVEILLER et PAVIČEVIĆ, 1987, *W. kuciensis* NONVEILLER et PAVIČEVIĆ, 1987 and *W. fodori* sp. n. The principal features uniting these taxa are the similar shape of the aedeagus, the similar shape and position of the copulatory piece and the presence of a distinct excision on the posterior lateral margin of elytron. Most likely, *W. paganettii* (J. MÜLLER, 1911), the type species of the genus, also belongs to this complex, but its male is unknown. The “*weiratheri*” group, defined by CASALE *et al.* (1990: 556), includes two closely related species, *W. weiratheri* (J. MÜLLER, 1935) and *W. lagrecai* CASALE, GIACHINO et ETONTI, 1990, having vicarious distribution in north-eastern Greece. The specific shape of their aedeagus, the position of the internal sac and the similar structure of the copulatory piece place both species close to each other. GIACHINO (2001) suggested that *W. vailatii* GIACHINO, 2001 also belongs to this group. However, the male of this species is unknown and therefore the exact systematic position of this species remains unsettled. *W. perpusillus* (ROTTENBERG, 1874), the only member of the “*perpusillus*” group, is an extraordinary species for its extremely minute corporal dimensions (it is perhaps the smallest European ground beetle), round shoulders and lack of distinct excisions on the posterior margins of elytra. However, its internal structure of aedeagus has not yet been examined, and the elytral chaetotaxy has not yet been studied in details. Only one species, *W. olympicus* CASALE, 1977, is the member of the “*olympicus*” group. The distinctly denticulate posterior sides of both pronotum and shoulders of the elytra, the presence of three discal pores on one elytron and the lack of distinct excision on the posterior margins of elytra place it separately from the other members of the genus. The male of this species remains unknown too. The characters of the

female genital armature are not widely used for species distinction owing to their homogeneous morphology. The shape of the ovipositor, even in *Winklerites* species of different groups, seems quite uniform (cfr. CASALE 1977, CASALE *et al.* 1990, NONVEILLER & PAVIĆEVIĆ 1987).

Trechini BONELLI, 1810

The *Duvalius* “*fodori*” species group

Notes. SCHEIBEL (1937a) originally placed *Duvalius fodori* SCHEIBEL, 1937 close to *D. brandisi* (GANGLBAUER, 1900) described from Bosnia-Herzegovina. The same author described *Duvalius strupii* SCHEIBEL, 1937 and pointed *D. fodori* as its only relative (SCHEIBEL 1937b). In spite of that, LANEYRIE (1970) placed both taxa among the *Duvalius* species “*incertae sedis*”. Later the two species were placed in different subgenera, the former in the “*pilifer*” group of subgenus *Duvaliotes* JEANNEL, 1928 (now junior synonym of subgenus *Bicharotrechus* BOKOR, 1922), and the latter in the “*longhii*” group of *Duvalius* s. str. immediately after *D. brandisi* (CASALE & LANEYRIE 1983). Recently, MORAVEC *et al.* (2003) put the species in question in the nominotypical subgenus. The critical study of the male genitalia of *D. fodori* and the descriptions of *D. fodori* and *D. strupii* demonstrated that they are closely related vicarious species. That is why they are grouped together in the “*fodori*” group, defined here. This group includes species with fine and slender median lobe (in lateral aspect); long internal sac with subapical, dorsal position in the median lobe; complex and unique structure of the copulatory piece; not fully reduced eyes with several functioning facets; plane dorsum of body; depigmented cuticle; posteriorly narrower pronotum with sharp and prominent hind angles; elytra short, wide and obtuse at apex. According to CASALE (1983: 249–250) *D. vignai* CASALE, 1983 is closely related to both species in question. Judging by the structure of the copulatory piece of *D. vignai* (CASALE 1983: 248, fig. 4), it could be supposed that this species is in relationship to *D. fodori* and *D. strupii*. For the time being, *D. vignai* is tentatively put in the “*fodori*” group. The three species of this complex may have distant relationship with *Duvalius* (*Platyduvalius*) *macedonicus* (J. MÜLLER, 1917). The subgenus *Platyduvalius* JEANNEL, 1929 includes one single species with the following characteristic features: copulatory piece neither well differentiated nor sclerotised; eyes not fully reduced and having several functioning facets; dorsum of body plane; cuticle depigmented; pronotum quite narrow in posterior part with sharp and prominent hind angles; elytra short, wide and obtuse at apex. In my opinion, the copulatory

piece of *D. fodori*, although constant in shape, is not up to par sclerotised, but faintly sclerotised, reticulate and consists of distinct denticulate lamellae. The state of this character of major importance supports the idea that the resemblance between the taxa from the “*fodori*” group and *D. macedonicus* may be the result of divergence.

Duvalius (Duvalius) fodori SCHEIBEL, 1937
(Figs 4–6)

Material studied. Macedonia. “Turcin plan. 1935.VII.4.” / “Turcin pl. 935.VII.4.” / “*Anophthal. macedonicus*; bei” / “Coll. Dr. J. Fodor” / “*Duvalius fodori* Scheibel, 1937 B. Guéorguiev det., 2006”, 1 ♂ (HNHM).

Notes. One unusual *Duvalius*-like specimen with the identification label “*Anophthal. macedonicus*” and Turchin Planina as locality of collecting was found in the HNHM. The identification is strange because *D. macedonicus* inhabits the massif of Baba (= Pelister) Planina only, whereas the Turchin Planina (an older name for the massif of Rudoka) is part of the Shar Planina. The specimen is in a quite poor state; pests have eaten the posterior upper part of the head, part of the pronotum and the left foreleg. However, its abdomen is well preserved. The subsequent study of the aedeagus proved that it is *D. fodori*. Apparently, although it had been collected together with the species type, the studied male is not identical with it because of differing identification label, differing place of collection and not extracted aedeagus. The depository of the type (syntype) is not indicated in the description, and it has not been found in HNHM. *D. fodori* was described on the basis of a single male from the vicinity of the Popova Shapka (SCHEIBEL 1937a: 14), in the massif of Rudoka. It was found under large stones deeply embedded in the ground in close proximity to snowdrift, at an altitude of 2200–2300 meters (SCHEIBEL 1937a). This fact suggests that the type locality is on the route between Popova Shapka (1800 m) and Titov Vrh (2743 m). The latter is the highest peak of the Shar Planina, and one of its older names is Golyam Turchin (DINCHEV & ATANASOV 1998).

Genital morphology. Ninth postabdominal sternite (urite) oblong, pointed ovate (Fig. 4). Median lobe of aedeagus in lateral view narrower than in dorsal view (Figs 5–6), laterally with fine bulb, narrower intermediate part and pointed apical part ending with curved upward tip, dorsally wide, right, apex subtriangular, round at tip; internal sac having dorsal, subapical position in median lobe; copulatory piece complex, faintly sclerotised, reticulate, consisting of more or less dense denticulate lamellae.

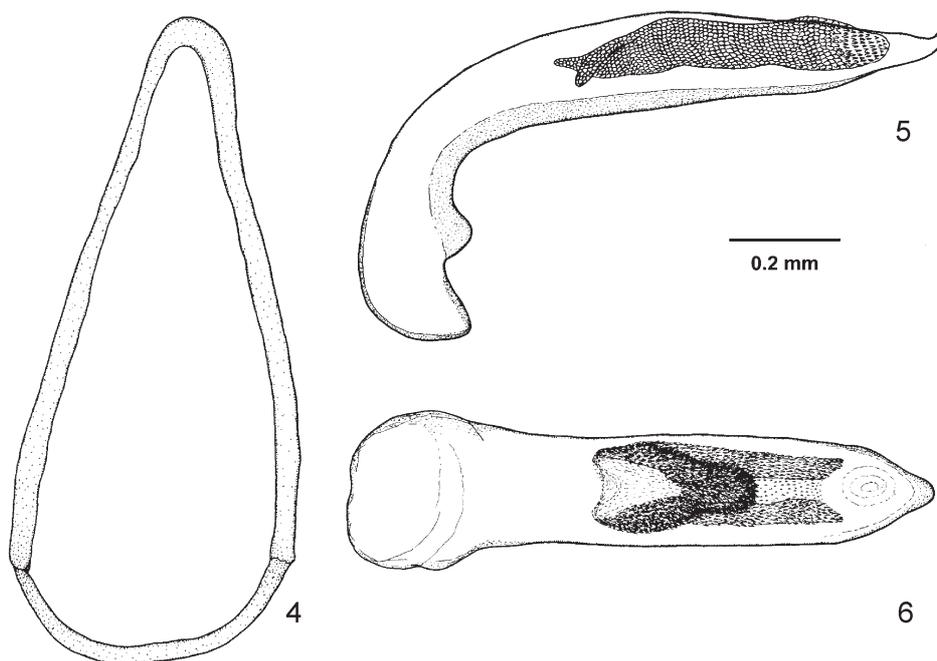
In my opinion, the differences in the genital figures here (Figs 4–6) and in the original description (SCHEIBEL 1937a: 14, Abb. 10) are artifacts due to optical peculiarities of the preparations and/or different style of drawing.

Duvalius (Duvalius) strupii SCHEIBEL, 1937

Material studied. Albania. “Korab” / “Albania leg. Bischoff 1936”, 17 specimens, 12 of them designated as syntypes (ZMHU).

Duvalius (Duvalius) vignai CASALE, 1983

Material studied. Macedonia. “Yu Makedonija Galičica 20.V.1982 1600 m”, 1 ♂ (NHMW).



Figs 4–6. *Duvalius (Duvalius) fodori* SCHEIBEL, 1937. 4 = 9th postabdominal sternite, 5 = lateral aspect of median lobe, 6 = dorsal aspect of median lobe. Scale bars = 0.2 mm

Subgenus *Platyduvalius* JEANNEL, 1929*Duvalius (Platyduvalius) macedonicus* (J. MÜLLER, 1917)

Material studied. Macedonia. “Pelisteri bei Bitola” / “Rambousek 1914” / “*macedonicus* Monastir Müll.”, 1 f. (NHMW); “Maced. Perister alpin. VII.–14 Dr. Rambousek”, 15 specimens (DEI, HNHM, NHMW, ZMHU).

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