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Scarodytes roberti nov.sp. from Greece (Coleoptera, Dytiscidae)

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A b s t r a c t: *Scarodytes roberti* nov.sp. is described from the Peloponnesus and two other localities in Greece (Euboea island and Ioannina prefecture). A possible occurrence of the new species in the southern part of the Republic of Macedonia is discussed. On the Peloponnesus the new species is distributed over large parts, but is not the sole member of the genus occurring here. *Scarodytes halensis* (FABRICIUS 1778) also occurs on the peninsula, and it is found that both co-exist in least at one locality. The new species is externally similar to *S. halensis*, and less so to *Scarodytes pederzanii* ANGELINI 1973. The shape of its median lobe can be easily mixed up with that of these two species if not studied carefully enough. On the other hand molecular data show that the new species is no doubt closely related to *Scarodytes savinensis savinensis* (ZIMMERMANN 1933), *S. savinensis cercyrae* FERY & ŠŤASTNÝ 2007, *S. ruffoi* FRANCISCOLO 1961, and *S. antoni* FERY & ŠŤASTNÝ 2007, and is treated here as a new member of the *Scarodytes savinensis*-complex which was introduced in FERY & ŠŤASTNÝ (2007). The new species is illustrated by several figures, in particular the shape of the median lobe is compared with those of the other members of the *savinensis*-complex and that of *S. halensis*. Details about the distribution and ecology of the new species are provided.

K e y w o r d s: Coleoptera, Dytiscidae, *Scarodytes*, new species, molecular data, Greece, Republic of Macedonia.

Introduction

In April 1987 I collected on the Peloponnesus some *Scarodytes* which I preliminarily keyed to *S. halensis* (FABRICIUS 1778), but I was by no means sure about that determination. Since then I received from colleagues several specimens which were also collected on that peninsula, but I suspected that they might be *S. pederzanii* ANGELINI 1973 or even an unknown species. This was why I decided to collect new material for to study the molecules of the Peloponnesus population in the hope to find a solution for that problem. A two weeks trip to that peninsula in May 2010, together with my friend L. Hendrich (Berlin/Munich, Germany), resulted in a very large number of specimens, and colleague I. Ribera (Barcelona, Spain) indeed could state that the molecular data let no doubt that it is not only a new species, but – very surprisingly – closely related to the members of the *S. savinensis*-complex.

FERY & ŠŤASTNÝ (2007) stated that in several *Scarodytes* the shape of the male genitalia

is of minor value to separate species, except the species of the *S. savinensis*-complex which can easily be distinguished by studying the median lobe. That of the new species clearly separates it also from all other members of that complex, and at first glance it is rather similar to those of *S. halensis* and *S. pederzanii*, and can easily be mixed up without a careful study. The situation became more critical when I became aware that not only the new species, but also *S. halensis* occurs on the Peloponnesus and that both even co-occur in least at one locality. This is why I had to establish the sex of all specimens and to dissect all males, a procedure which is strongly recommended for future studies of material from the Peloponnesus. It is also recommended to collect and study *Scarodytes* from other parts of Greece and the Balkans because single specimens have been collected from two Greek localities outside this peninsula, and one specimen from the south of the Republic of Macedonia possibly belongs also to the new species.

The nomenclatural history of *Scarodytes* GOZIS (1914) is given in detail in FERY & ŠŤASTNÝ (2007) and shall not be repeated here. This Western Palaearctic genus contains at present the following eight species and two additional subspecies: *Scarodytes antoni* FERY & ŠŤASTNÝ 2007, *S. halensis halensis* (FABRICIUS 1787), *S. halensis fuscitarsis* (AUBÉ 1838), *S. malickyi* WEWALKA 1977, *S. margaliti* WEWALKA 1977, *S. nigriventris* (ZIMMERMANN 1919), *S. pederzanii* ANGELINI 1973, *S. ruffoi* FRANCISCOLO 1961, *S. savinensis savinensis* (ZIMMERMAN 1933) and *S. savinensis cercyrae* FERY & ŠŤASTNÝ 2007. The description of *S. roberti* nov.sp. raises the number of species to nine.

Material, methods and acknowledgements

The following codens for collections from which I have studied material are used in the text:

CGW.....coll. G. Wewalka, Vienna, Austria

CHF .....coll. H. Fery, Berlin, Germany (property of the NMW)

CHH.....coll. H. Hebauer, Rain, Germany

CLH .....coll. L. Hendrich, Berlin/Munich, Germany (property of the NMW)

CMT .....coll. M. Toledo, Parma, Italy

MNB.....Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (M. Uhlig, J. Frisch, B. Jaeger)

NMB.....Naturhistorisches Museum Basel, Switzerland (M. Brancucci)

NMPC.....Národní Muzeum, Prague, Czech Republic (J. Hájek)

NMW.....Naturhistorisches Museum Wien, Austria (M.A. Jäch)

SMNS .....Staatliches Museum für Naturkunde Stuttgart, Germany (W. Schawaller)

ZSM.....Zoologische Staatssammlung, München, Germany (M. Balke)

The following abbreviations are used in the text: **hw** (handwriting), **TL** (total length) and **MW** (maximum width). The aedeagus of the holotype was figured in wet condition (Figs 11-12). The terminology to denote the genitalia's orientation follows MILLER & NILSSON (2003). Label texts are cited in quotation marks; if labels texts are printed, then this is not

noted explicitly. Additional comments are given in square brackets. Co-ordinates are given in decimal notation. At those localities which have been visited by the author and L. Hendrich in May 2010 the co-ordinates were noted in the field by use of a Garmin Etrex GPS navigator and later controlled with Google Earth. The localities from which material is cited are marked in the map (Fig. 17) by capitals in filled circles for *S. roberti* nov.sp. and by numbers in filled squares for *S. halensis*. Localities where only females of (supposed) *S. roberti* nov.sp. have been found are indicated by small letters in filled circles. At locality L both species have been found together and this is why it is marked by an empty circle in a filled square. Localities, which are situated too close to mark them separately in the map, are denoted by the same symbol in the map (e.g. I_1, I_2, and I_3 as I). The Peloponnesus localities are arranged according to longitude in ascending order (from west to east). In the text the material is listed in the same order (except that from the type locality), and the localities are denoted by the respective capitals or numbers in braces. The reader must pay attention on the different coding of some localities; for instance specimens with label data "loc. 21" are represented in the map (Fig. 17) by the letter "K", what is marked in the text by "{K}". This map is based on "Microsoft Encarta World Atlas 2000". The Figs 7-10 of the median lobes in ventral view of four members of the *S. savinensis*-complex are taken from FERY & ŠŤASTNÝ (2007).

The co-occurrence of *S. roberti* nov.sp. and *S. halensis* questions the identity of females. Both species possess no "good" external characters which may be used for a safe separation. This is why I proceeded as follows: (1) females from localities where only males of one species have been found are assumed to belong also to that species; accordingly, females of the new species are then also accepted as paratypes; (2) the six females found at "Sentenikos spring" are all treated as belonging to the new species because one of them has been determined by molecular methods; (3) females from other localities where no males have been found are not considered paratypes; (4) if both species have been found together at a single locality or at localities of which I am not sure whether they are the same or only closely situated, then the females are not treated as paratypes.

The author thanks all colleagues mentioned above for their help. In particular, I thank my friend L. Hendrich for the wonderful and very successful collecting trip to the Peloponnesus in May 2010. Thanks go to V. Pesic (Podgorica, Montenegro) for the material that he placed at my disposal. Colleagues C. Rieger (Nürtingen, Germany) and R. Kinzelbach (Rostock, Germany) kindly communicated their collecting data. Thanks are also due to D. Bilton (Plymouth, UK) for the linguistic revision of an earlier version of this work. Special thanks are due to R. Alonso and I. Ribera (Barcelona, Spain) for the generously provided molecular data and analyses of the sequences of *S. roberti*, which were obtained with funds from project CGL2007-61665 to I. Ribera.

Description of the species

All members of *Scarodytes* are rather similar and resemble some of the genus *Nebrioporus* RÉGIMBART 1906. However, both genera can easily be separated by the reticulation of the venter: smooth and shiny between punctures in *Scarodytes*, but distinctly reticulated and matt in most *Nebrioporus*. Only *N. kilimandjarensis* (RÉGIMBART

1906) and *N. melanogrammus* (RÉGIMBART 1899) have the venter shiny (see TOLEDO 2009), however, the former is distributed in eastern Africa and the latter in China and northern India, and thus, far away from the distribution area of *Scarodytes*. Another separating character for both genera is the punctation of the metafemora: densely punctate in *Nebrioporus*, but provided only with a single longitudinal row of punctures in *Scarodytes*. In addition *Scarodytes* lacks a subapical spine on elytra, which is present in many *Nebrioporus*. Distinct sublateral longitudinal grooves on each side of the pronotum are not present (in contrast to a few similar members of *Oreodytes* SEIDLITZ 1887 and *Stictotarsus* ZIMMERMANN 1919; however, see notes in **Variability** section), and the posterior margin of the metacoxal processes is incised in the middle (see Fig. 37 in NILSSON & HOLMEN 1995). Below the male holotype of *Scarodytes roberti* nov.sp. is described in detail; female characters and the variability of some features are given separately.

***Scarodytes roberti* nov.sp.**

Type locality: Greece, S Peloponnesus, ca. 12 km NW Sparti, NE Kambos, 37.15319N 22.35353E, altitude ca. 294 m (Figs 15-16).
Type material: Holotype: ♂, "19.5.2010 Greece, S Peloponnese, ca. 12 km NW Sparti, NE Kambos, small stream, Fery & Hendrich leg. (loc. 17), 37.15319N 22.35353E, ca. 294 m", "Holotype, Scarodytes roberti nov.sp., Fery det. 2011" [red] {I_1} (NMW).
Paratypes: Greece, Peloponnesus: 421♂♂, 254♀♀, same collecting data as the holotype; 4♂♂ with additional labels: "IBE-RA 203", "IBE-RA 204", "IBE-RA 224" and "IBE-RA 225" respectively [hw I. Ribera] {I_1} (ZSM, CLH, CHF). 1♂, 1♀, "GR Peloponnes, Kiparissia 26.5.[19]87, leg. H. Hebauer" [ca. 37.25N 21.66E] {A} (CHH). 1♂, "Greece, Erimanthos, Diaselo, 350 mNN, leg. J. Frisch, Fulda, 23.3.1992", "Scarodytes halensis F., det. J. Frisch 1992" [both labels hw J. Frisch in part]{B} (MNB). **Notes**: Diaselo is situated at ca. 38.00N 21.69E, ca. 5 km N of Stavrodromi. 5♂♂, 4♀♀, "Greece, Erimanthos, Stavrodromi, 800 mNN, leg. J. Frisch, Fulda, 23.3.1992", "Scarodytes halensis F., det. J. Frisch 1992" [both labels hw J. Frisch in part] {C} (MNB). **Notes**: J. Frisch (Berlin, Germany) kindly communicated that the collecting site is situated some kilometres E of Stavrodromi. 3♂♂, 1♀, "15.5.2010 Greece, N Peloponnese, Erymanthos Mts, ESE Stavrodromi, betw[een]. Stavrodromi and Kato Drosia, shaded stream, Fery & Hendrich leg., 37.9270N 21.6977E, 320m (loc. 4)" {C} (Fig. 13) (CLH). 2♂♂, 3♀♀, "GR, Peloponnoso, strada Simopoulon-Lampeia, Torr. [= brook] m 650, a 4 km Bivio x Olympia, 4.8.1989, Toledo leg." [roughly estimated to 37.82N 21.77E] {D} (CMT, CHF). 1♂, 3♀♀, "GR, Peloponnisos, road Simopoolon-Lampeia 4.VIII.1989, Toledo M.", "small stream, 4 km before forking for Olympia m 650" {D} (CMT). 28♂♂, 25♀♀, "16.5.2010 Greece, Peloponnese, Afrodisio Mts, 13 km NW Kondovazena, small exposed stream, Fery & Hendrich leg. (loc. 8), ca. 37.83096N 21.94641E, ca. 681 m"; one male with additional "IBE-RA 205" [hw I. Ribera] {E} (CLH, CHF). 7♂♂, 7♀♀, "GR Peloponnes, Meligalas 16.6.[19]86, leg. H. Hebauer" [ca. 37.22N 21.97E] {F} (CHH, CHF). 5♂♂, 4♀♀, "GR Peloponnes, Daras/Panagitsa 27.5.[19]87/L. [= leg.] H. Hebauer" [Daras = Dara, Panagitsa = Panayítsa; ca. 37.78N 22.21E] {G} (CHH, CHF). 7♂♂, 3♀♀, "GR - Peloponnes (14), Taigetos-Geb. [= mountains], 30.9.1994, 15 km NE Kambos, 800 m, leg. H.R. Schönmann" [roughly estimated to 37.02N 22.30E] {H} (NMW, CHF). 12♂♂, 18♀♀, "19.5.2010 Greece, S Peloponnese, ca. 12 km NW Sparti, W Kambos, small stream & helocrene, Fery & Hendrich leg. (loc. 19), 37.14687N 22.34146E, ca. 350 m" {I_2} (CLH, CHF). 6♂♂, 8♀♀, "4.7.2007 GR Peloponn., Laconia pref., NE Evrotas river", "near Vivari spring, ca. 37.12N 22.46E, Pesic leg. (GR 26)", one male with additional "IBE-RA 231" [hw I. Ribera] (CHF). **Notes**: Most probably, the co-ordinates and the direction "NE" given on the labels are incorrect. The Evrotas river is situated in the NW of Sparti, and according to the "Internet" the Vivari spring (eventually identical with the Lagkeia spring) should be situated near Pellana (near {I_1}). 6♀♀, "4.7.2007 GR Pelopon., Laconia pref., NE Sparti, Sentenikos spring", "nr Zoros spring, ca. 37.17N 23.49E, Pesic leg. (GR 25)", one female with additional "IBE-RA 230" [hw I. Ribera] (CHF). The locality "Zoros spring" is situated near Pellana (information from the "Internet") which has the co-ordinates ca. 37.20N 22.32E. Thus, those given on the label should be incorrect and the locality situated near {I_1}. 2♂♂, 1♀, "GR, Peloponnes, Lakonien, Mistras, 10.7.[20]05, leg. Wewalka (GR 3)" [ca. 37.069N 22.375E], one

male with additional "MNCN AI 1232, DNA specimen" {J} (CGW). 134♂♂, 128♀♀, "19.5.2010 Greece, S Peloponnese, ca. 10 km N Sparti, ca. 4 km NE Selasia, large perm[anent]. stream, Fery & Hendrich leg. (loc. 21), 37.19293N 22.44445E, ca. 550 m" {K} (Fig. 14) (CLH, CHF). 1♂, "GR Peloponnes, Stimfalia 13.6.[19]86, leg. H. Hebauer" [ca. 37.84N 22.45E; ca. 600 m] {L}; found together with *S. halensis* (CHH). 1♂, "GR, Peloponnes, Korinthia, 5 km E Lake Stymphalia, 10.7.[20]05, leg. Wewalka (GR 4)" {L}; found together with *S. halensis* (CGW). 5♂♂, 11♀♀, "Gr. Pelopon. 10.6.2004, Sinora [= Synora] NW of Gythio [= Gytheio or also Yíthion], Skoupý leg." [ca. 36.796N 22.505E] {M} (NMPC). 1♂, 4♀♀, "12.4.1987 GR Peloponnesus, WNW Astros, S Kato Doliana, ca. 37.42N 22.68E, ca. 100 m, brook, Fery leg." {N} (CHF). 55♂♂, 55♀♀, "GR Peloponnes, Astros 14.6.[19]86, leg. H. Hebauer" [ca. 37.40N 22.70E] {N} (CHH, CHF). 2♂♂, 4♀♀, "GR Nomos Lakonias, 7 km SW Monemvasia, 10.7.1992, leg. Rieger" [36.65639N 22.99861E] {O} (SMNS, CHF).

Greece, extern Peloponnesus: 1♂, "Greece: Kipi [= Kipoi] (Epirus; Zagoria), 700 m, 27.VI.-1.VII.1981, B. & H. Malkin" [ca. 39.87N 20.78E; in Ioannina prefecture] {Y} (NMB). Specimen with parallel part of median lobe in ventral view rather short, but apex distinctly semicircular. 1♂, "1.7.2007 GR Evia [= Euboea], Ochi reg., nr Aetos (nr Karystos), Aetos stream, ca. 38.01N 24.45E, Pesic leg. (GR 17)", "IBE-RA 228" {Z} (CHF). **Notes**: All paratypes are provided with the respective red printed label. All specimens from CHH have an additional green label with printed "coll. H. Hebauer".

Specimens not considered paratypes (I am rather sure that at least some of the following specimens belong to *S. roberti* sp.n., but prefer not to designate them as paratypes because only females have been found.): 1♀, "17.5.2010 Greece, N Peloponnese, southern Panachaiko Mts, stream near Golemi, Fery & Hendrich leg. (loc. 12), 38.14574N 21.91051E, ca. 1025 m" {a} (CLH). 2♀♀, "GR - Peloponnes (8), 15 km SW Kalavrita, 23.9.1994, 850 m, leg. M. & E. Jäch" [roughly estimated to 37.9N 22.0E] {b} (NMW). 2♀♀, same data, but "leg. H. & R. Schönmann" {b} (NMW). 1♀, "19.5.2010 Greece, S Peloponnese, ca. 15 km NW Sparti, ca. 1 km E Kastoria, small river, under bridge, Fery & Hendrich leg. (loc. 20), 37.17120N 22.31769E, ca. 406 m" {I_3} (CHF). 1♀, "Griechenl. [= Greece] 29.4.[19]71, Tripolis [roughly estimated to 37.51N 22.37E], leg. Wewalka" {c} (CGW). 1♀, "Griechenl. Pelop., Akrokorinth, leg. Malicky 15.9.[19]71" [hw Wewalka] {d} (CGW). **Notes**: 4♂♂ and 7♀♀ from that locality are listed under *S. halensis* in WEWALKA (1977: 138). However, it proved to be impossible to track down these specimens except the one female.

Specimens which are keyed to *Scarodytes halensis*: 1♂, "GR Peloponnes, Stimfalia 13.6.[19]86, leg. H. Hebauer" [ca. 37.84N 22.45E] {L}; found together with *S. roberti* nov.sp. (CHF). 1♀, "GR, Peloponnes, Korinthia, 5 km E Lake Stymphalia, 10.7.[20]05, leg. Wewalka (GR 4)", "DNA number RA 233" {L}; found together with *S. roberti* nov.sp. (CGW). 2♂♂, 2♀♀, "Greece; 06.iv.1977, Peloponnes, Yíthion, 1,5 km südl. Abzweig Skala, Ardenolancada", one male with additional "Scarodytes halensis, det. Wewalka [19]78" {1} (CGW). **Notes**: The collector R. Kinzelbach (Rostock, Germany) kindly communicated the following locality data: ca. 36.7815N 22.5642E, altitude ca. 7 m, ca. 1.5 km N Yíthion (= Gythio or Gytheio). 13♂♂, 10♀♀, "GR Peloponnes, Nafplia/Stavropodi 23.5.[19]87, leg. H. Hebauer" [ca. 37.50N 23.04E, ca. 350 m] {2} (CHH, CHF).

Specimens which could not be keyed to one of the two species: 1♀, "GR, Peloponnes, Korinthia, 5 km E Lake Stymphalia, 10.7.[20]05, leg. Wewalka (GR 4)" {L}; found together with one male of *S. roberti* nov.sp. and one female of *S. halensis* (DNA specimen) (CGW). 1♀, "GR Peloponnes, Stimfalia 13.6.[19]86, leg. H. Hebauer" {L}; found together with *S. roberti* nov.sp. (CHH).

Notes: I have studied a male from the Republic of Macedonia which has the apex of its median lobe in ventral view distinctly semicircular so that one might be tempted to assign it to *S. roberti* nov.sp. On the other hand, before its tip the median lobe is slightly converging and not parallel, and the pronotum and elytra are rather roughly and densely punctured like in typical *S. pederzanii*. This specimen belongs to a series of *Scarodytes* which have been collected at the foot of Mount Pelister in a shaded brook ca. 1-2 m wide (personal communication by M. Jäch); the label data are: "YU-Maked. 21.7.[19]88, 6 km W Bitola, leg. M.A. Jäch (10)" [ca. 41.03N 21.28E] (locality indicated by a question mark in Fig. 17). This series contains 2♂♂ and 3♀♀ of *S. halensis* (females with red abdomen) and 3♂♂ and 1♀ (with black abdomen) of what shall be determined here as *S. pederzanii* "sensu lato" (cf. Wewalka 1977: 141). In addition, it seems to me

to be rather surprising (not impossible, however!) that three different species of *Scarodytes* coexist at the same locality. Thus, at present I have strong doubts that this specimen belongs to the new species and prefer to assign it to *S. pederzanii* (s.l.) until more material from that region has been studied.

H a b i t u s : Body elongate oval, more or less evenly vaulted (Fig. 1); in dorsal view lateral outline with a slight discontinuity at posterior angles of pronotum and base of elytra. Dorsal surface rather shiny due to fine punctation and lack of setae on large parts; with yellowish to reddish background colour and black spots on head and pronotum, and partially fused black vittae on elytra.

H e a d : Yellowish with slight tendency to reddish; next to inner side of each eye with a blackish spot; spots anteriorly narrower, reaching anterior margin of clypeus, posteriorly not fused with black vertex. Between eyes with two impressions (clypeal grooves); reticulation of head rather weak; on clypeus consisting of transverse lines, seldom forming complete meshes; behind consisting of small polygonal meshes, however, large area on frons smooth; in clypeal grooves and on black part of vertex reticulation more distinct. Punctation double, rather sparse; larger punctures very sparse on smooth part of frons; near eyes and before vertex smaller punctures absent. Head beside inner margin of eyes with a distinct line of impressed punctures. Setation on head absent.

P r o n o t u m : Background of same yellowish-reddish colour as head; anterior margin transparent and, thus, black vertex of head shining through; posterior margin narrowly blackish; disc with two large black spots, each composed of two fused smaller spots; lateral rim indistinctly darker than yellowish sides of pronotum beside. Base of pronotum as wide as base of elytra; maximum width at posterior angles; lateral margins evenly rounded, near anterior angles slightly more curved; posterior angles obtuse, shortly rounded. Rim at sides of pronotum distinct, broad near anterior angles, behind becoming smaller. Pronotum before posterior margin in mid weakly depressed; more laterally depression somewhat stronger, continued anteriad as longitudinal depression parallel to sides of pronotum. Between this depression and lateral rim slightly vaulted. Centre of disc with a small flat longitudinal impression, including a large puncture; in a small area around this impression without punctures. Surface of pronotum shiny, only between anterior margin and puncture line weakly reticulated, sides with almost imperceptible reticulation. Behind anterior margin with a row of very coarse punctures; before posterior margin with a more irregular puncture line and coarse punctures sparser. Punctation on disc and mid of base uniform, punctures of same size as larger punctures on head; distance between punctures somewhat larger than their diameter. Between anterior margin and puncture line punctation somewhat denser. Near sides punctation coarser and denser, in particular near posterior angles. In lateral depressions punctures densely arranged in weak longitudinal lines, these separated by very weak carina; structure appearing similar to a longitudinal groove (cf. notes in **Variability** section). Setation indistinct, consisting of very thin and rather short setae (length ca. that of two distances between punctures on disc); restricted to lateral depressions and sides of weak depression before base.

E l y t r a : Background yellowish, without tendency to reddish; suture darkened over entire length; each elytron with seven dark brown to black, partly fused longitudinal vittae, however, only inner four of them more or less complete, lateral ones considerably

reduced. Most vittae anteriorly shortened, only fourth vitta reaching base of elytra; base narrowly blackish between suture and fourth vitta; second vitta anteriorly longer than first and third. First and second vittae fused by two spots, situated shortly before and behind elytral mid length; second and third vittae fused by only one spot. First and second vittae fused also before apex. Fifth to seventh vittae reduced to two longitudinal spots each, fifth and seventh posteriad with prolongations; anterior spots of fifth and sixth fused as well as posterior ones of fifth to seventh vittae. In posterior fourth between dark sutural and first vittae with a narrow additional vitta (part of sutural vitta?). Sides of elytra in dorsal view more or less evenly rounded, near apex slightly more curved and indistinctly truncate. Maximum width somewhat before mid length of elytra. In lateral view margins weakly ascending to humeral angles, epipleura visible until shoulders. Punctation in anterior two thirds slightly finer and denser than on disc of pronotum, behind becoming somewhat coarser and denser. Two puncture lines on each elytron recognisable, inner one extern second vitta and reaching posteriorly until last fourth of elytra, second one extern fourth vitta and reaching only until mid length. In posterior half some punctures indicating a line next to suture; a very few further punctures on sides of elytra might be interpreted as rests of other puncture lines. Entire surface of elytra smooth. Setation largely absent; very fine, sparse and almost imperceptible transparent setae near base, on sides and near puncture lines; in posterior third denser, but still rather fine; length of setae ca. that of two or three distances between punctures on disc.

Ventral surface and appendages: Surface largely black; prothoracic and elytral epipleura yellowish; mouth parts, gula, sides of proventrite, femora, pro- and mesotibiae, and apical third of metacoxal processes light reddish brown; metatibiae light reddish brown in proximal third, dark brown in distal two thirds; apex of prosternal process (lanceolate blade) brownish; middle of second abdominal ventrite and hind margins of third to last abdominal ventrites transparently brownish. Pro- and mesotarsomeres largely darker brown on upper side; metatarsomeres darkened distally; pro- and mesofemora diffusely darkened in proximal half; antennomeres yellowish, progressively darkened distally beginning with sixth antennomere; last palpomeres blackish except proximal fourth.

Prosternal process weakly vaulted between procoxae, but without distinct transverse ridge. Behind procoxae lanceolate, with rather weakly vaulted smooth longitudinal carina; flat sides coarsely punctured and with setae; lateral margin indistinctly beaded. Metacoxal lines divergent anteriorly, ending shortly before posterior margin of metaventrite. Protibiae in contrast to *S. antoni* with outer margin almost straight (cf. Fig. 17 in FERY & ŠŤASTNÝ 2007). Third antennomere slightly shorter than fourth, both shorter than second and fifth.

Ventral surface shiny, without microreticulation except genae and posterior margin of metacoxae. Gula with some coarse punctures; genae distinctly reticulate except beside gula, provided with a deeply and sharply incised long groove somewhat behind posterior margin of eyes and some short wrinkles between inner margin of eyes and mouthparts. Prosternal process between anterior margin of proventrite and procoxae as well as on sides of lanceolate part roughly sculptured; rest of ventral surface densely covered with large punctures, distance between punctures mostly somewhat smaller than their diame-

ter; a small area one each side of midline of metaventrite and another one short before its posterior margin un-punctured. Punctation on middle of second and third ventrite less dense; last ventrite with denser punctation near anterior margin; sides and before apex very roughly sculptured, but in centre distance between punctures distinctly larger. Epipleura covered with dense and fine punctation, each with a rather short seta, thus, surface appearing matt although smooth between punctures. Sparse but longer setation present on anterior part of prosternal process, sides of its lanceolate part, metacoxal processes and third to sixth ventrites; middle of third to fifth ventrite with a large puncture, here originating a tuff of particularly long setae.

♂♂: Basal three pro- and mesotarsomeres distinctly expanded; second tarsomere broader than long; protarsal claws prolonged, more or less of same length as fifth protarsomere, slightly thickened (compared with those of females); length and shape resembling more those of *S. halensis* than the rather long and straight ones of e.g. *S. pederzanii* or *S. malickyi*; posterior claw slightly longer, curved in proximal third, at base provided with a tooth, more straight in distal two thirds, very shortly curved near apex; anterior claw almost evenly curved; mesotarsal claws only a little prolonged, evenly curved, posterior one very slightly longer. Median lobe of aedeagus (Fig. 11) in ventral view evenly tapering to short before apex, then more or less parallel (in contrast to *S. h. halensis* and *S. malickyi*) and apex rounded like a semicircle; in lateral view sinuate at apex. Parameres as in Fig. 12.

For comparison the median lobes in ventral view of the other members of the *savinensis*-complex plus that of *S. h. halensis* (specimen from Berlin, Germany) are given in Figs 6-10. While there is no problem to distinguish that of the new species from those of the other members of the complex, the shape of the lobe of *S. h. halensis* (Fig. 6) in ventral view – due to its rather narrow apex – can be mixed up with that of the new species (Fig. 11). However, with the necessary care it is finally rather easy to separate males of both taxa: sides of apex more or less parallel before tip and tip itself of semicircular shape in *S. roberti* nov.sp., while sides of lobe converging apically and tip more or less pointed and rounded only very shortly in *S. h. halensis*.

♀♀: Upper surface with same pattern as in males, but spots on pronotum more frequently dissolved into four spots. Brownish areas on ventral side often, but not always, larger than in males, however, abdomen never totally reddish as e.g. in Central European females of *S. h. halensis*. Head with entire surface reticulated, on pronotum reticulation more extended than in males, but always with a smooth area on disc; elytra without reticulation (as in males). Generally, sides of pronotum in posterior half and posterior angles more rounded than in males (compare Figs 4 and 5 with Figs 2 and 3). N o t e s : I have not been able to find distinct and constant differences in the shape of the lateral rim of the pronotum (cf. PEDERZANI 1990 and respective remarks in FERY & ŠŤASTNÝ 2007: 890). Ventral surface with punctures coarser on abdomen and metacoxal plates; abdominal ventrites in part with traces of reticulation between punctures. Pro- and mesotarsomeres as well as pro- and mesotarsal claws not modified. Protibiae of same shape as those of males. Gonocoxosterna and gonocoxae similar to those of *S. antoni* (see Figs 15 and 16 in FERY & ŠŤASTNÝ 2007).

M e a s u r e m e n t s : Holotype: TL: 4.2 mm, TL-h: 3.8 mm, MW: 2.25 mm,

TL/MW: 1.87, TL-h/MW: 1.69. Paratypes: TL: 3.7-4.4 mm, TL-h: 3.4-3.85 mm, MW: 2.0-2.4 mm, TL/MW: 1.78-1.91, TL-h/MW: 1.58-1.71.

V a r i a b i l i t y : The variability of *S. roberti* nov.sp. concerns mainly the pattern on the upper surface: the two spots on the pronotum vary in extension and are sometimes dissolved into two spots each; the fourth discal vitta on the elytra ends in a very few specimens short before the black base; the length of the spots of the fifth to seventh vittae varies also to some extent. The narrow additional vitta in posterior fourth rarely partly fused with sutural vitta. On the venter the brownish areas are sometimes larger than in the holotype. In males the shape of the anterior claws is rather variable, which are in several cases somewhat shorter, but in others also somewhat longer than in the holotype. The shapes of the sides of the pronotum and its hind angles vary also in both sexes, but on average are more rounded in females (see Figs 2-5). The shape of the apical part of the median lobe in ventral view is in some specimens parallel over a shorter length than given in Fig. 11. However, this parallel part is always present and the tip always has a semicircular shape which separates males of the new species easily from those of *S. halensis* (see Figs 11 and 6).

The setation of the upper surface makes special problems. All males and females from the type locality $\{I_1\}$ and the nearby locality $\{I_2\}$ have the pronotum and elytra in large parts without setation, and on the rest of the surface the setation is rather fine and not very conspicuous. From other localities I have studied specimens with similar setation, but also some with fine setae on the entire surface, and even a few with thicker and thus more conspicuous setae, more or less as known from other members of the genus (and in particular present in most *S. halensis* studied from the Peloponnesus). I cannot explain the lack of setae in most of the paratypes, in particular I was not able to realise any relation between collecting date and degree of setation. One might assume that the lack of setae might be due to the dissection of the genitalia, because the respective specimen is pressed with its upper surface on the ground of a rigid peace of plastic and the setae can be rubbed off. But a large majority of the females has not been dissected and shows, nevertheless, this lack of setation.

Of special interest for systematic considerations might be the following observation: The longitudinal sublateral depression near each side of the pronotum is in several specimens so distinct, that one might assume the existence of a groove (see Fig. 5). A closer inspection and comparison reveals that these "impressions" are not as strong as e.g. in *Oreodytes* or in *Stictotarsus*, but nevertheless present and surprisingly distinct. A similar observation has been already reported in the description of *S. antoni*, however, these grooves are in several specimens of the new species even more distinct than in the latter.

D i s t r i b u t i o n : So far *S. roberti* nov.sp. is known only from the Peloponnesus and two other localities (Euboea and Kipoi; see under type material). However, populations of *Scarodytes* in other parts of Greece should be studied to confirm and/or extend the known distribution of the new species. In particular, populations in the south of the Republic of Macedonia are of great interest, because so far it is not clear whether the new species occurs also in this region or not.

D e r i v a t i o n o m i n i s : The new species is named after Robert Fery, the older grandson of the author; the specific epithet is a noun in the genitive case.

E c o l o g y : The new species was collected by L. Hendrich and me in 2010 in the gravel and sand near the water edges of brooks with rather slowly running water, in mountainous regions of diverse altitudes (100-1000 m). The brooks where the species has been found in large numbers ({I_1} and {K}; see Figs 14-16) are situated between rocks, have a maximum depth of ca. 80 cm, a width of not more than ca. 3 m, little vegetation, and are in large parts exposed to the sun. The brook near Stavrodomi {C} is broader and shaded by the trees at its border (see Fig. 13). Same with the river at locality {I_3} where only a single female has been found. When collecting on the peninsula in May 2010 all brooks had sufficient water, however, several of them will certainly dry up in summer. Almost all specimens collected were well sclerotised and, thus, assumed to be mature. The specimens have been found together with the following other Hydradephaga (a few data other than from 2010 are included):

Agabus biguttatus (OLIVIER): **E**, **I_1**, **I_2**, **N**; *A. bipustulatus* (LINNAEUS): **I_1**, **I_2**; *A. conspersus* (MARSHAM): **I_2**; *A. didymus* (OLIVIER): **E**, **I_1**; *A. dilatatus* (BRULLÉ): **C**, **E**, **I_1**, **I_2**, **N**; *A. nebulosus* (FORSTER): **E**, **I_1**; *Bidessus calabricus* GUIGNOT, 1957: **Z**; *Colymbetes fuscus* (LINNAEUS): **E**, **K**; *Deronectes moestus inconspectus* (LEPRIEUR): **B**, **I_1**, **I_2**; *Graptodytes fractus* (SHARP): **I_1**, **I_2**; *Gyrinus caspius* MÉNÉTRIES: **E**; *G. dejeani* BRULLÉ: **K**; *G. substriatus* STEPHENS: **E**, **I_1**; *Hydroporus dobrogeanus* IENIŞTEA: **C**, **I_2**; *H. obsoletus* AUBÉ: **I_1**; *H. pubescens* (GYLLENHAL): **E**, **I_1**, **I_2**; *H. tessellatus* (DRAPIEZ): **C**, **E**, **I_1**, **I_2**; *Laccophilus hyalinus* (DE GEER): **C**, **I_2**, **K**; *Nebrioporus stearinus suavis* (SHARP): **E**, **I_2**, **K**; *Scarodytes halensis* (FABRICIUS): **L**.

Molecular methods and data

The soft tissue from the specimens was digested and the DNA isolated using extraction columns in the laboratory of I. Ribera (IBE, Barcelona), and stored in the DNA collection (see Table XX for the localities, voucher reference and GeneBank accession numbers of the extracted specimens). A fragment of ca. 800 bp of the 3' end of the gene cytochrome c oxidase I (*cox1*) was sequenced (see RIBERA et al. 2001 for details on the primers and sequencing conditions). The sequences were manually aligned and compared with published sequences of *S. savinensis* (see FERY & ŠŤASTNÝ 2007).

All specimens sequenced had identical haplotypes for the cox1 gene, with the only exception of the specimen MNCN-AI1232 from Lakonien (Table 1), which had a difference of two base-pairs (ca. 0.25 %). Differences with *S. savinensis savinensis* from Montenegro were of ca. 0.6 %.

Errata

Shortly after the publication of FERY & ŠŤASTNÝ (2007) appeared, the authors became aware of two mistakes in this work which shall be corrected here: (1) p. 880, fourth line of section "Type material": delete ", XXX"; (2) p. 881, fourth line of fifth section: replace "... **before** anterior margin..." by "... **behind** anterior margin...".

Zusammenfassung

Scarodytes roberti nov.sp. wird aus Griechenland beschrieben. Die neue Art wurde in größerer Anzahl auf dem Peloponnes gefunden, es liegen aber auch je ein Exemplar von der Insel Euböa und aus der Region Epirus vor. Ein mögliches Vorkommen im Süden der Republik Mazedonien kann vorerst nicht völlig ausgeschlossen werden. Die Art gehört zusammen mit *S. antoni* FERY & ŠŤASTNÝ 2007, *S. ruffoi* FRANCISCOLO 1961, *S. savinensis savinensis* (ZIMMERMAN 1933) and *S. savinensis cercyrae* FERY & ŠŤASTNÝ 2007 zum sogenannten *savinensis*-Komplex der Gattung. Weitere bisher bekannte Taxa der Gattung sind *S. halensis halensis* (FABRICIUS 1787), *S. halensis fuscitarsis* (AUBÉ 1838), *S. malickyi* WEWALKA 1977 *S. margaliti* WEWALKA 1977, *S. nigriventris* (ZIMMERMANN 1919) und *S. pederzanii* ANGELINI 1973. Mit der neuen Art enthält die Gattung nun neun Arten, von denen zwei jeweils in zwei Unterarten aufgeteilt sind. Die neue Art ist extern-morphologisch nicht mit Sicherheit von dem ebenfalls in Griechenland und Mazedonien beheimateten *S. halensis* zu trennen. Auch die Medianlobi beider Arten sowie der von *S. pederzanii* ähneln sich auf den ersten Blick, sind allerdings bei entsprechender Vergrößerung des Mikroskops eindeutig unterscheidbar. In Ventralansicht weicht die Form des Medianlobus der neuen Art von denen der anderen Arten des *S. savinensis*-Komplexes recht stark ab. Die Ergebnisse molekularer Untersuchungen belegen jedoch eindeutig die entsprechende Verwandtschaft. Daten über die Lebensweise der neuen Art sowie über die festgestellte Begleitfauna werden gegeben.

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Table 1: Specimens included in molecular analyses, with voucher reference and GenBank accession numbers.

voucher reference	species	locality	legit	accession number (*cox1*)
IBE-RA205	*Scarodytes roberti* nov.sp.	Afrodisio Mts, Kondovazena {E}	Fery & Hendrich	FR773507
IBE-RA203	*Scarodytes roberti* nov.sp.	NW Sparti, NE Kambos {I_1}	Fery & Hendrich	FR773505
IBE-RA204	*Scarodytes roberti* nov.sp.	NW Sparti, NE Kambos {I_1}	Fery & Hendrich	FR773506
IBE-RA224	*Scarodytes roberti* nov.sp.	NW Sparti, NE Kambos {I_1}	Fery & Hendrich	FR773508
IBE-RA225	*Scarodytes roberti* nov.sp.	NW Sparti, NE Kambos {I_1}	Fery & Hendrich	FR773509
MNCN-AI1232	*Scarodytes roberti* nov.sp.	Lakonia, Mistras {J}	Wewalka	FR773504
IBE-RA230	*Scarodytes roberti* nov.sp.	NE Sparti, Sentenikos spring	Pešić	FR773511
IBE-RA231	*Scarodytes roberti* nov.sp.	Evrotas river, Vivari spring	Pešić	FR773512
IBE-RA 228	*Scarodytes roberti* nov.sp.	Euboea, Ochi region {Z}	Pešić	FR773510
IBE-RA 233	*Scarodytes halensis*	Lake Stimfalia {L}	Wewalka	FR823509

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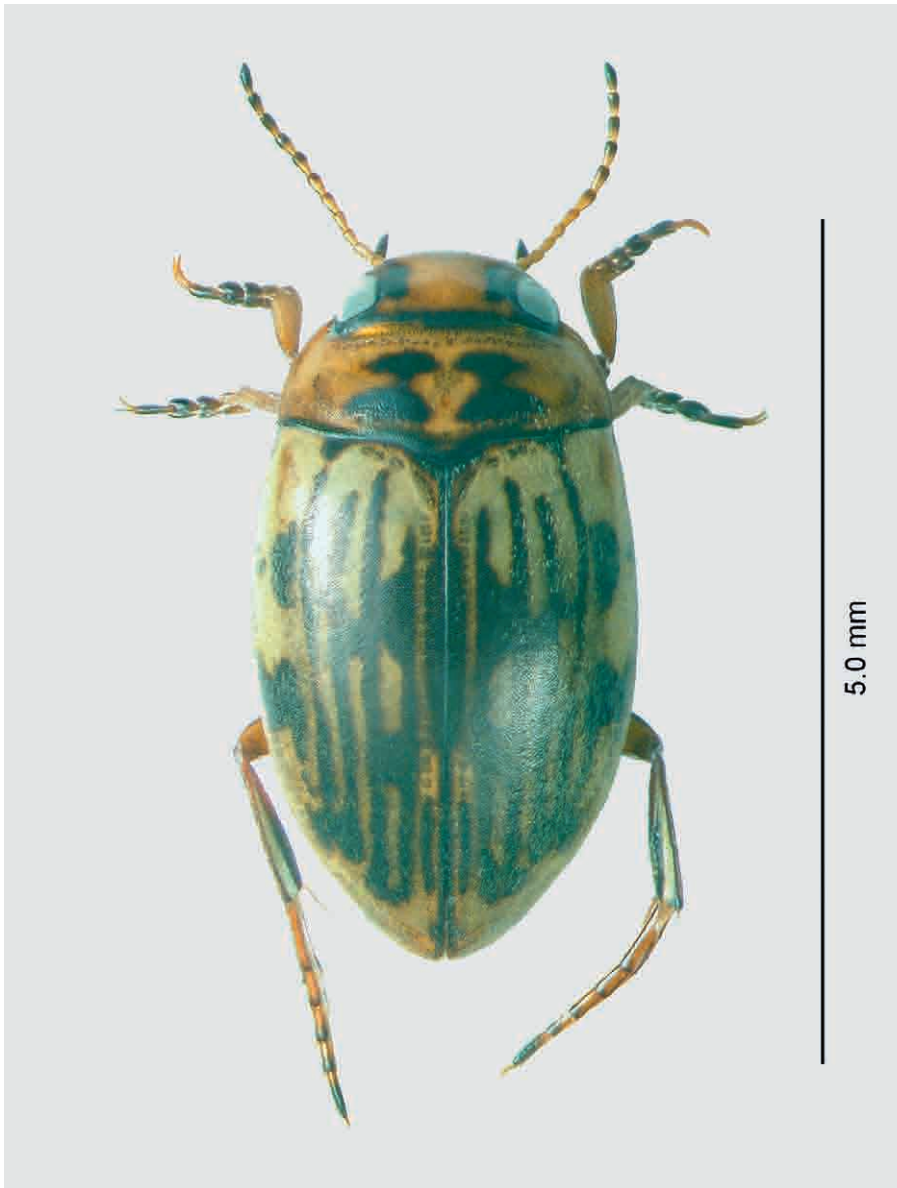
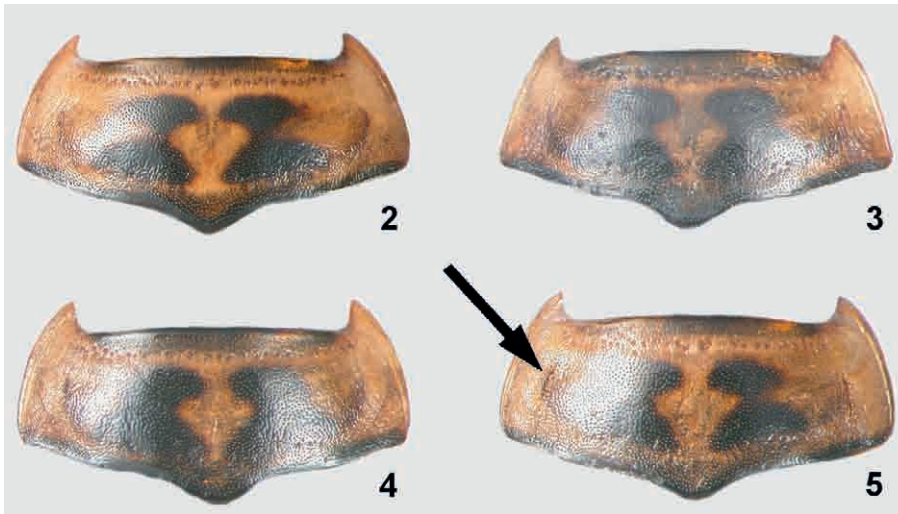
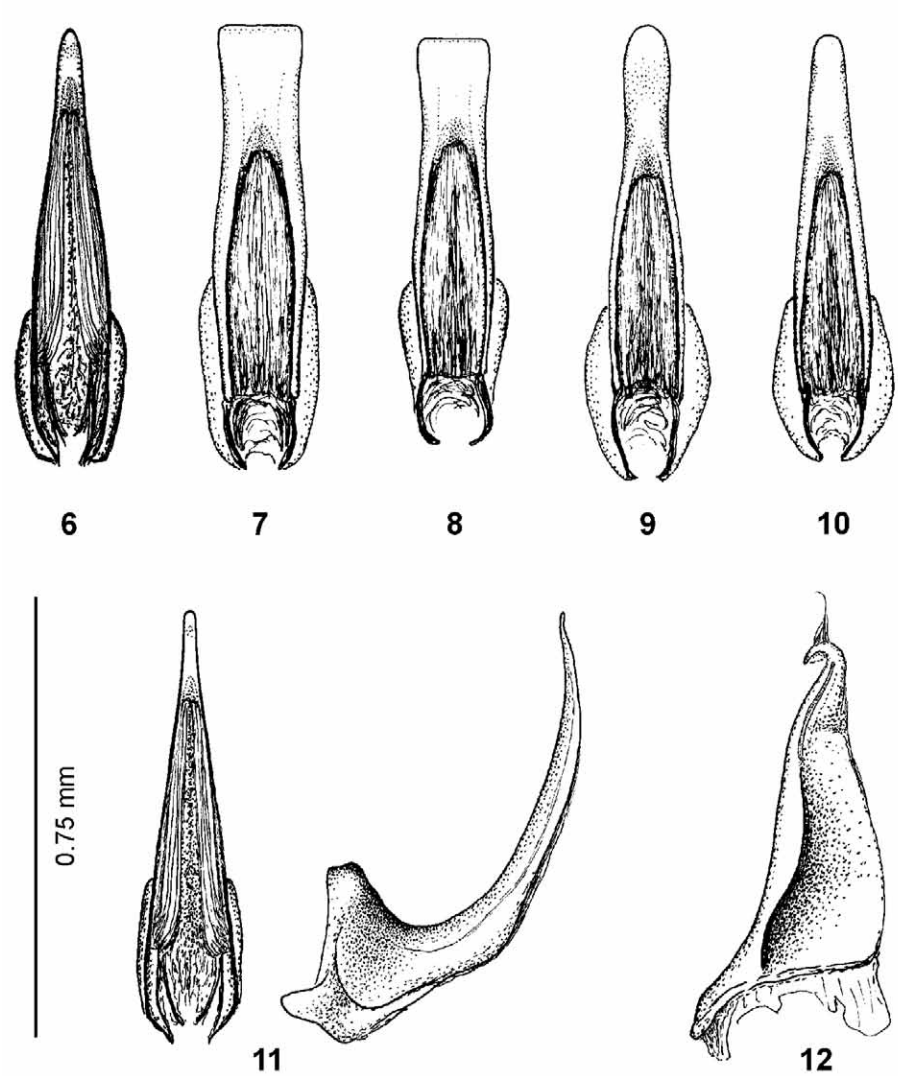


Fig. 1: Habitus of *Scarodytes roberti* nov.sp. (holotype).

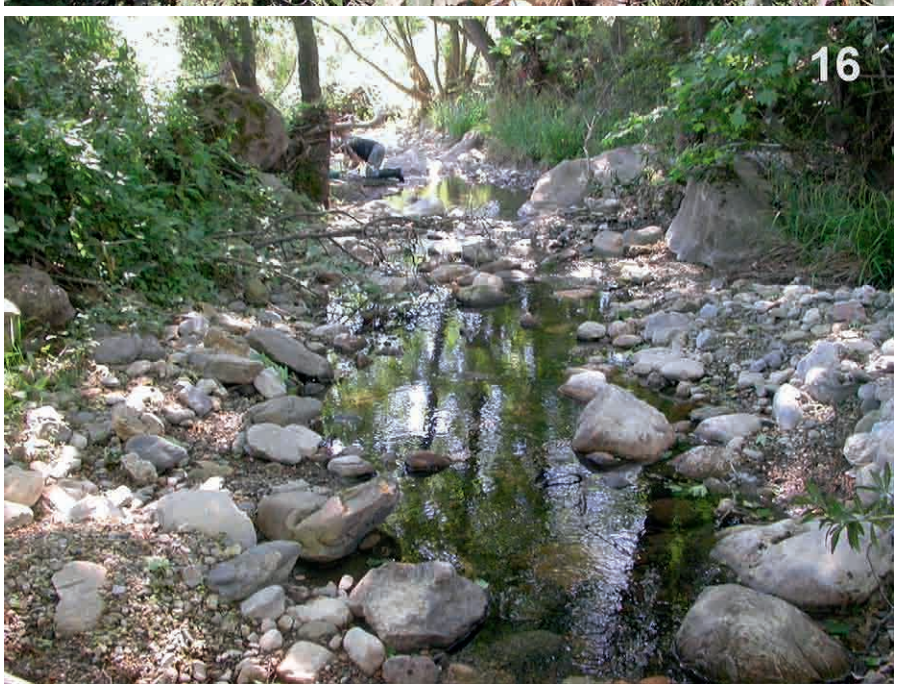


Figs 2-5: Pronotum of *Scarodytes roberti* nov.sp.: (**2**) male (holotype), (**3**) male (paratype), (**4**) female, (**5**) female with a rather strong sublateral depression, indicated by the arrow.



Figs 6-12: Median lobe of aedeagus in ventral view of: (**6**) *Scarodytes halensis halensis* (specimen from Berlin, Germany), (**7**) *S. savinensis savinensis*, (**8**) *S. savinensis cercyrae*, (**9**) *S. ruffoi*, (**10**) *S. antoni*. **Figs 11-12**: *Scarodytes roberti* nov.sp. (holotype): (**11**) median lobe in ventral and lateral view, (**12**) left paramere. (Figs **7-10** taken from FERY & ŠŤASTNÝ 2007).

Figs 13-14: Collecting sites of *Scarodytes roberti* nov.sp.: (**13**) shaded stream between Stavrodromi and Kato Drosia {C}, (**14**) small stream NW Kondovazena {E}.



Figs 15-16: Collecting sites of *Scarodytes roberti* nov.sp.: (**15**) small stream NE Kambos (locus typicus) {I_1}, (**16**) idem, but about 15 m upstream.

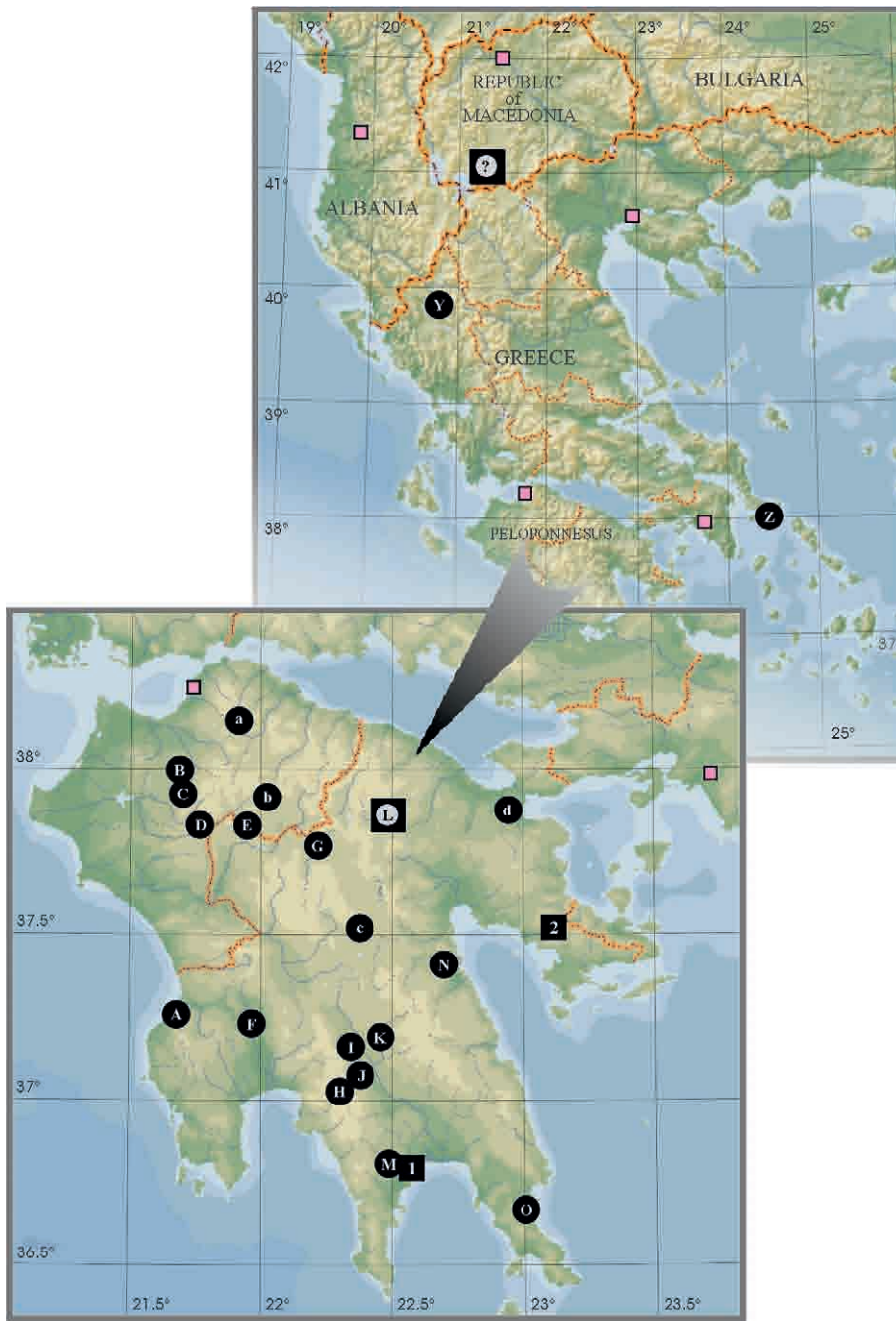


Fig. 17: Known records of *Scarodytes roberti* nov.sp. (filled circles with capitals) and *Scarodytes h. halensis* (squares with numbers); for other symbols confer text.