Genus	Vol. 8 (3-4): 755-764	Wrocław, 15 XII 1997

Description of *Oxychilus* (*Riedelius*) *wiktori* sp. n., with some notes on other West Balkan species of *Riedelius* (*Gastropoda*: *Pulmonata*: *Zonitidae*)

ADOLF RIEDEL
Museum and Institute of Zoology, Polish Academy of Sciences, Wilcza 64, 00-950 Warszawa, Poland

ABSTRACT. A new land snail species is described from Bosnia and Serbia. The description, especially that of genital structure, is longer than the average, since the characters observed are rather peculiar and may affect the view on the value of genital-morphological characters within *Riedelius* and *Oxychilus* as a whole. The possibility of unequivocal conchological identification of most W Balkan members of the subgenus *Riedelius* is questioned. A review of species of this subgenus and their presently known distribution is given.

Key words: malacology, new species, geographic distribution, West Balkan, *Gastropoda*, *Zonitidae*.

During an anatomical-taxonomic revision of species of the subgenus *Riedelius* HUDEC[1] (genus *Oxychilus* FITZINGER), I described a new species, *Oxychilus* (*Riedelius*) *serbicus*, of a very distinct structure of male copulatory organs (RIEDEL 1969). I compared the new species with *O.* (*R.*) *montivagus* (KIMAKOWICZ), distributed mainly in Banat in Romania, since the latter species, very similar conchologically, was mentioned (based on shell) also from Serbia. As a result, I referred earlier records of "*Hyalinia montivaga*" etc. from Serbia to *O. serbicus* (cf. RIEDEL 1969: 116, 120).

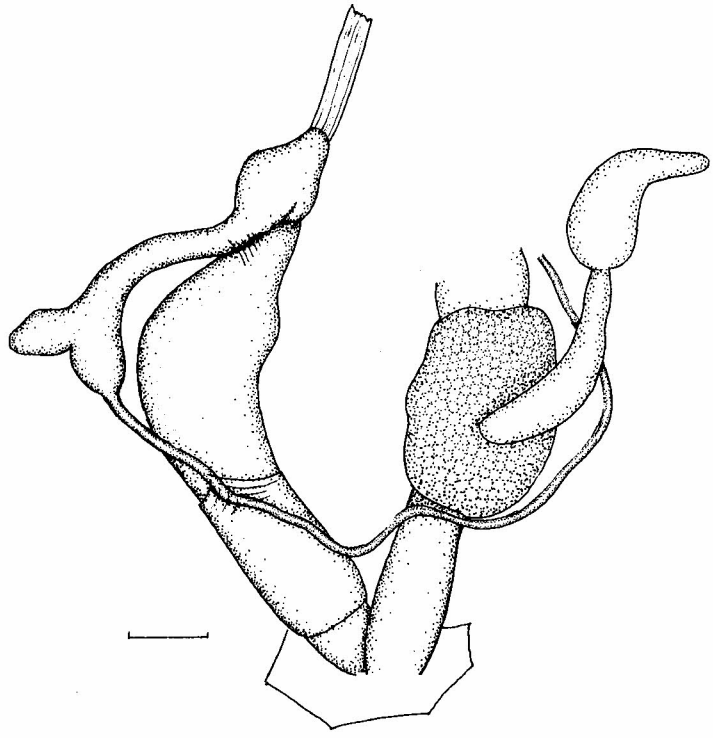
[1] Regarding the nomenclatural validity, or rather non-validity of the name *Riedelius* HUDEC, 1961 - see RIEDEL 1990: 528-529. I leave it to future or other malacologists to settle the matter formally. In my opinion change of the type species is a more rational solution than introducing a new name; especially that it follows from subjective synonymisation.

When determining zonitid materials collected in the former Yugoslavia in 1982-1983 by Prof. A. WIKTOR, I found that besides *O. serbicus*, another species was present in Bosnia and Serbia which was very close conchologically but differed in the structure of genitalia. It is described below as *O.* (*R.*) *wiktori* sp. n. Its existence renders it questionable if it is possible to properly identify also other W and S Balkan species of this group, based on the shell alone.

Oxychilus (*Riedelius*) *serbicus* RIEDEL, 1969

New material: Serbia: Titovo Uzice (locus typicus), vicinity of town, 800 m, bushes of *Fraxinus-Corylus*, 23.10 1982, A. WIKTOR leg. - 2 adults in alcohol (both dissected). Bosnia: Sarajevo, Jahorina Mts, 800-1200 m, 18.06. 1982, A. WIKTOR leg. - 3 subadults in alcohol (one dissected) and 3 shells; identification not quite certain.

The species was previously known only from the original description. At that time I had at my disposal only 3 alcohol-preserved specimens of which only one (holotype) was fully mature, one earlier (coll. A. J. WAGNER) preparation of genitalia and a dozen or so shells of various age from the type locality. Further specimens (shells) from the vicinity of Sarajevo were identified as *O. serbicus*, with a question mark.



1. *Oxychilus* (*Riedelius*) *serbicus* from Titovo Uzice, 1982 A. WIKTOR leg., genitalia. Scale bar 1 mm

The new material indicates that:

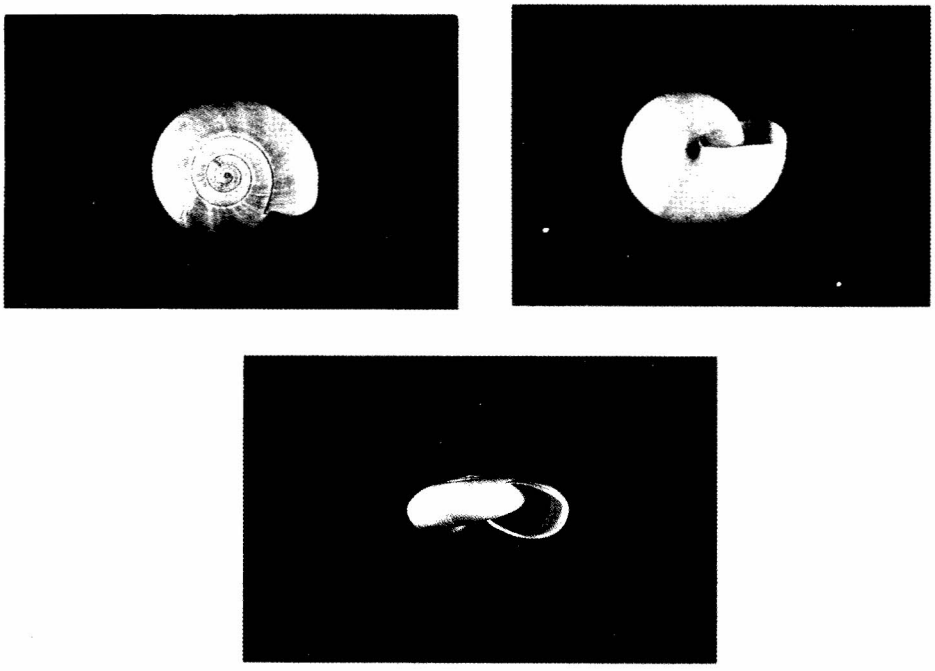
1. the original description -and figures of genitalia, with very much developed epiphallial caecum, are fully confirmed (cf. fig. 1);

2. populations from the nearest neighborhood of Sarajevo most probably represent *O. serbicus* (epiphallial caecum marked, lateral sac characteristic of *O. wiktori* absent), though the genitalia of the dissected specimen were at an early stage of development.

DISTRIBUTION

The species found in Titovo Uzice, most probably present also in the nearest neighborhood of Sarajevo. Other records from Serbia (cf. RIEDEL 1959) may pertain to both *O. serbicus* and *O. wiktori*.

Oxychilus (Riedelius) wiktori sp. n.



2-4. *Oxychilus (Riedelius) wiktori* sp. n., shell of the holotype, 2x. Photo T. PŁODOWSKI

LOCUS TYPICUS

Bosnia: in the Zvijezda Mts near Olovo (N of Sarajevo), ca. 800-1000 m a.s.l., humid Fagus forest, limestone.

MATERIAL

1. from the type locality, 15.06 1982 - 2 alcohol-preserved specimens, 1 of them (holotype) dissected; 2. Bosnia: Konjuh Mts near Kladanj (N of Sarajevo), 650 m, humid *Fagus* forest, limestone, 16.06 1982 - 2 alcohol-preserved adults (1 of them dissected) + 1 subad. and 1 juv. shells; 3. ibidem near Klaadnj, 700 m, rocks covered with bushes, limestone, 16.06 1982 - 1 adult (dissected) and 3 subad. in alcohol + 1 shell; 4. Serbia: Kremna W of Titovo Uzice, Tara Planina Mts, 1200-1300 m, *Abies-Fagus* forest, 24.10 1982 - 1 alcohol-preserved subad. (dissected). All specimens A. WIKTOR leg. Holotype and 2 dissected paratypes are kept at the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, the remaining paratypes at the Museum of Natural History, Wrocław University.

NOTE

Because of the presently unstable borders of some countries of the former Yugoslavia, placing particular localities in Bosnia or Serbia is in agreement with original labels and pertains to political situation of the 80s.

DERIVATIO NOMINIS

This interesting new species is named in honour of my friend Professor Andrzej WIKTOR (Wrocław), who collected zonitids in various Mediterranean countries especially for me, and who placed at my disposal his ample material.

DESCRIPTION

Shell (Figs 2-4) typical of the subgenus *Riedelius*, but at the same time devoid of distinct characters that would distinguish it from some other species of the group. Medium-sized for its subgenus, its width ca. 10.0-11.7 mm. Strongly flattened, spire barely elevated. 4.5-4.75 very poorly convex, wide and rapidly increasing whorls, the body whorl at aperture 2.7-3x wider than the penultimate (in immature specimens the difference is less pronounced). Suture very shallow. Body whorl in profile rather regularly rounded (like in *O. serbicus* and *O. montivagus* - RIEDEL 1969: figs 27 and 30), aperture strongly elongate almost horizontally, only very poorly oblique, its lower margin passes as a very flat arch into columellar margin. Underside of shell poorly convex, umbilicus very narrow, its inner whorls invisible; sometimes partly closed by the reflexed columellar margin of aperture.

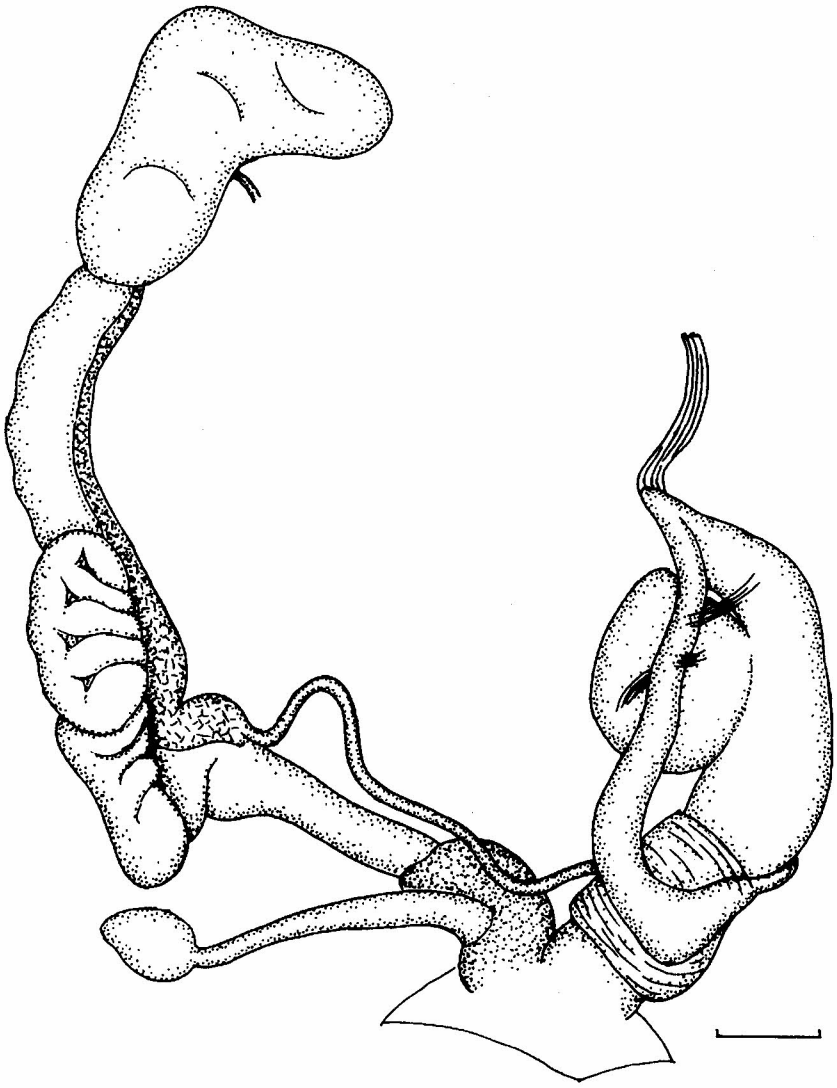
Holotype measurements: width 10.7 mm, height at perpendicular axis 4.8 mm, at oblique axis 4.2 mm; 4.5 whorls.

Shell pale, light yellowish, smooth and very strongly shiny, with no microsculpture except delicate growth lines.

O. wiktori differs from nearby distributed *O. serbicus* in smaller and lighter ("paler") shell, slightly more elevated spire, and - when specimens are of the same

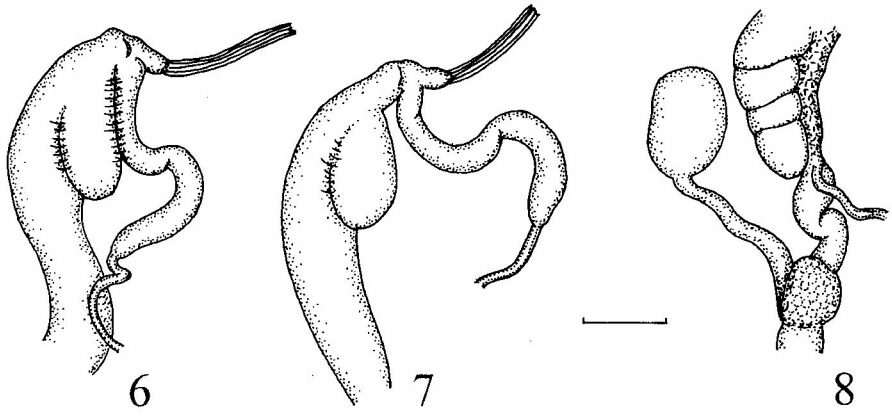
size - somewhat narrower umbilicus. The differences, however, are so slight that they do not allow unambiguous separation of the two species based on shell alone. The conchological differences between *O. wiktori* and some other, and somewhat farther distributed species of *Riedelius*, are not greater: e.g. *O. montivagus* from Banat and some populations of *O. juliae* from the island of Korfu.

Body. Whole body light creamy, sometimes with a slight bluish tint on the neck, head and mantle. Mantle provided with a small but usually distinct, tongue-like shell lobe. Retractor of the right ommatophore crosses genitalia.



5. *Oxychilus (Riedelius) wiktori* sp. n., genitalia of the holotype. Scale bar 1 mm

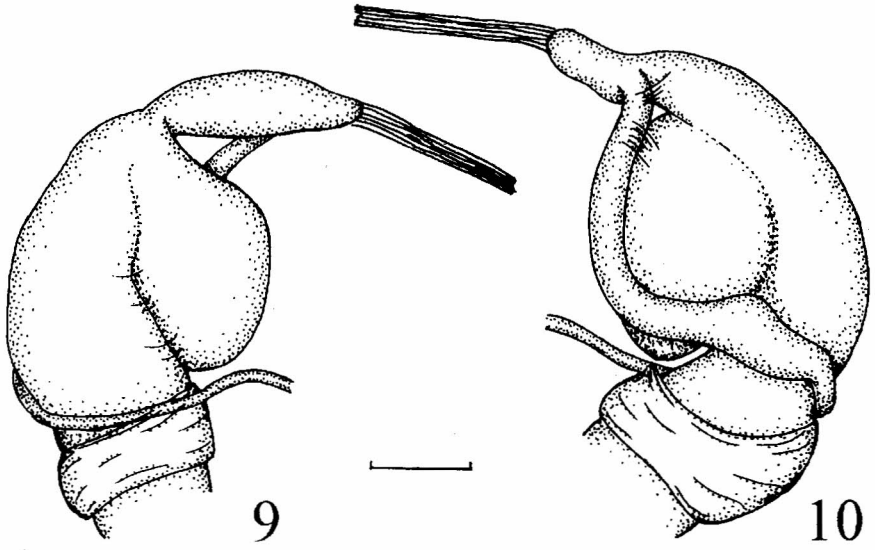
Reproductive system (Figs 5-11). Male reproductive organs are very characteristic, in their shape and structure of penis they depart from other species of the subgenus, but at the same time indicate appurtenance to this group. It should be also stressed that members of the subgenus *Riedelius*, even excluding (from the subgenus and also partly from *Oxychilus* s. str.) subgenus Mediterranea Clessin, differ from each other in their genital structure much more (cf. RIEDEL 1969, 1990, GITTENBERGER 1976) than e.g. species of subgenera *Oxychilus* s. str., *Ortizius* FORCART, *Longiphallus* RIEDEL, *Hiramia* PALLARY, etc. At the same time, variation of genitalia in some members of Riedelius is still poorly known, and in those better studied it appears to be wide.



6-8. *Oxychilus* (*Riedelius*) *wiktori* sp. n., genitalia of a subadult paratype from Kremna: 6, 7 - penis, 8 - female efferent ducts. Scale bar 1 mm

During dissection the male copulatory organs give an impression of an irregular lump, held together by membranes. The "proper" penis is thick and relatively short, cylindrical, strongly bent, narrowing distally, at the tip (flagellum) almost tapered. Proximal section of the penis is surrounded with a strong, folded "tendinous" envelope (I failed to recognize it with certainty in a subadult specimen from Kremna - figs 6, 7). Terminal flagellum very short, barely delimited, since epiphallus opens to penis laterally, but almost subterminally. Penial retractor long and thin, inserted apically on flagellum. On the concave side of penis, directed towards female ducts, there is a huge, sac-like structure (process) opening to the penis below epiphallus outlet and directed proximally, but so tightly adhering to the penis and connected with it by membranes, that it appears to form only a swelling almost on its whole length. The length of the process is over 1/3 penis length, width equal or even exceeding thickness of penis in its widest part. Epiphallus roughly as long as penis, thick, narrowing towards its outlet to penis, on the other end (before passing into vas deferens) on one side distinctly widened, as if swollen. The swelling externally differs distinctly from the huge caecum in *O.* (*R.*) *serbicus* (cf. fig.1), but is no doubt

homologous and plays the same role in spermatophore production (cf. RIEDEL 1980: fig.210 + a - epiphallus and spermatophore in *O. (Cellariopsis) deubeli* (A. J. WAGNER) = *orientalis* CLESSIN). After clearing the genitalia in xylol I could observe that the lumen of epiphallus in *O. wiktori* enters the swelling (Fig.11). The epiphallus is connected by muscle strands both with the penis proper and with its sac-like process, and sometimes so tightly pressed into the sac, that it forms a deep longitudinal groove on its surface.

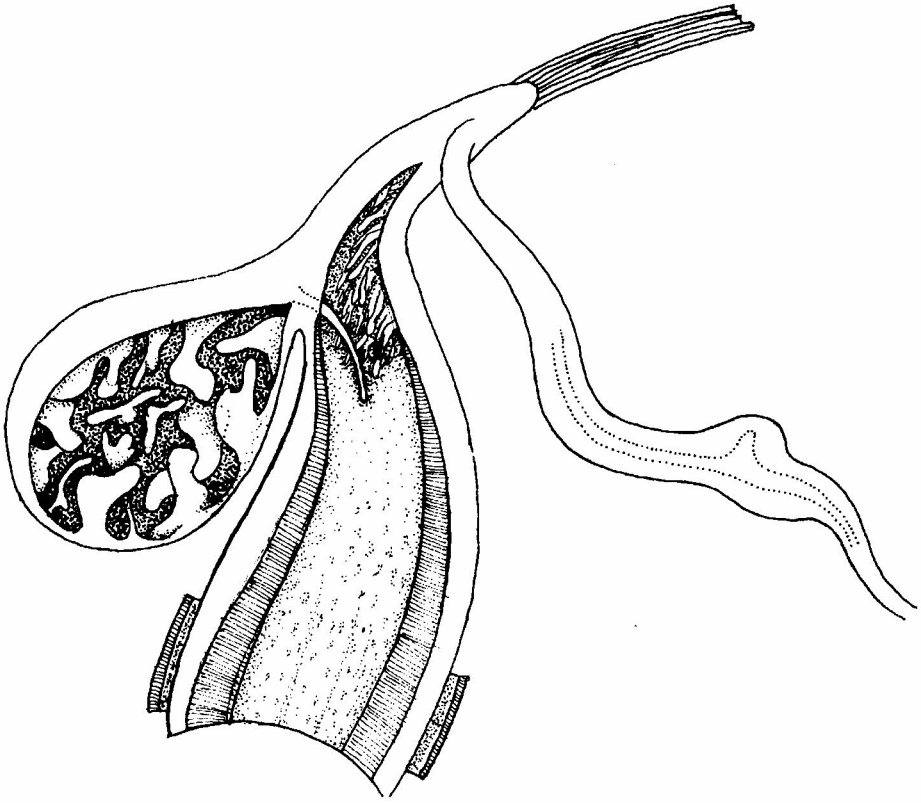


9, 10. *Oxychilus (Riedelius) wiktori* sp. n., penis of a paratype from the Konjuh Mts viewed from two sides. Scale bar 1 mm

Genital atrium absent, male and female efferent ducts have separate gonopores, though they are very close to each other, located in a single concavity of the body wall. Vagina very short, barely distinct, since spermatheca duct enters the female ducts very close to the female gonopore (distinct difference compared with *O. serbicus* and other members of the subgenus *Riedelius*). All or nearly all vagina is covered by a rather poorly developed gland, which covers also proximal portion of the oviduct and surrounds the outlet of spermatheca duct. Oviduct rather long (roughly 1/2-3/4 penis length) and fairly thick; spermatheca duct long (as long as oviduct) and thin, spermatheca small, elongate or roughly ovate. Spermoviduct relatively narrow, albumen gland (examined only in one specimen - holotype - Fig.5) small and more or less kidney-shaped.

Internal structure of penis was examined after its dissection, in one specimen from the neighborhood of Kladanj (Fig.11). Walls of proximal portion of penis extremely thick, distally they get somewhat thinner; lumen very narrow. No special structure in the inside, especially no papillae terminating with spines, characteristic

of most species of Riedelius; on inner walls only very small wrinkles. Only in the distal quarter of penis delicate, short, irregular, mostly longitudinal wrinkles. A single, white spine, long, somewhat bent, thin but hard, enters the penis from the lateral sac at whose outlet it is inserted. Numerous irregular, high and strongly flattened lobes hang from the walls of the sac to its rather spacious lumen.



11. *Oxychilus* (*Riedelius*) *wiktori* sp. n., paratype from the Konjuh Mts, internal structure of penis

Radula typical of the subgenus *Riedelius*; central tooth small, with a short mesocone. Formula:

10M/1 + 2L/3 + C/3 + 12 x 33.

TAXONOMIC REMARKS

Of all members of the subgenus *Riedelius* (sensu mihi, cf. RIEDEL 1990: 529) *O. wiktori*, despite distinct differences, in its genital structure most closely resembles *O. juliae* RIEDEL from the island of Korfu (cf. RIEDEL 1990: figs 31-37). It resembles the latter species in the external appearance of the penis (presence in *O. juliae* of a

sort of terminal-lateral additional penial "sac") and in its internal structure (absence of papillae terminating with spines, presence of only one, long, similarly situated spine). In my opinion these two species are the closest relatives.

O. wiktori (rudimentary caecum on epiphallus) presents a somewhat smaller but also significant similarity with *O. serbicus* (caecum very strongly developed). Within the zonitids, the presence of caecum on epiphallus is a rather exceptional character. It is present in some members of the Nearctic genus *Paravitrea* PILSBRY, of no closer relationship with the Palaearctic *Oxychilus* FIZTINGER. In the Palaearctic Zonitidae epiphallial caecum was found only in 3 species (including *O. wiktori*) of the genus *Oxychilus* (which comprises over 100 species): besides the two species already mentioned, only in *O. (Cellariopsis) deubeli* (A. J. WAGNER).

Distribution. At present *O. wiktori* is known mainly from the mountains Zvijezda and Konjuh north of Sarajevo, but at the same time also from the vicinity of Kremna in the Tara Planina Mts. It seems that in Bosnia and Serbia there are two species, hardly distinguishable conchologically: *O. wiktori* and *O. serbicus* (see above), of adjacent but separate distribution ranges.

The situation of one trying to identify the species is additionally complicated by the fact, that in adjacent areas there are more species of the group, also conchologically similar, of insufficiently studied distribution ranges that may at least partly overlap. For this reason it should be stressed that only anatomically confirmed identification of any given population can be regarded as fully reliable.

REVIEW OF SPECIES OF THE SUBGENUS *RIEDELIUS* AND THEIR KNOWN DISTRIBUTION

The subgenus *Riedelius* is a group of Balkan species, mainly SW Balkan, still poorly studied with respect to their taxonomy and dsitribution. The poor knowledge of distribution results mostly from the fact that identification of some species based on shell alone is uncertain. The only wider distributed and at the same time the best known species is *O. depressus*.

O. depressus (STERKI, 1880) inhabits all the Carpathians and E Alps, reaches W Alps, in the north to the Deutsche Mittelgebirge, Sudetes, Cracow-Częstochowa Upland and Roztocze in Poland (RIEDEL 1969). In the south it reaches northern Greece (RIEDEL 1992). In the former Yugoslavia recorded from the north (Slovenia) and south (Makedonia) (RIEDEL and VELKOVRH 1976); I know it also from scattered localities in Montenegro and Bosnia (W. J. M. MAASSEN leg.), but probably it does not reach the Adriatic coast. In Romania and Bulgaria, especially in caves, it occurs as a larger form (RIEDEL 1969) which may be confused with other species of the group.

O. montivagus (KIMAKOWICZ, 1890) inhabits Banat and the neighboring regions of Romania (RIEDEL 1969 and more recent data of A. NEGREA). Previous records from Serbia and Bosnia pertain probably to *O. serbicus* and/or *O. wiktori*.

O. serbicus RIEDEL, 1969 and *O. wiktori* sp. n. - see above

O. planorbis (MOLLENDORFF, 1899) [= *dautzenbergi* A. J. WAGNER]. It occurs in southern Dalmatia, western Herzegovina, western Montenegro (RIEDEL 1969), probably also in Albania (conchological identification - RIEDEL 1979 and further, unpublished and not confirmed anatomically). Data from Korfu (RIEDEL and VELKOVRH 1979) pertain no doubt to *O. juliae*.

O. planospiroides RIEDEL, 1969 [= *planospira* A. J. WAGNER] is subterranean (known mainly from caves) in W Montenegro and S Dalmatia (RIEDEL 1969, 1979, GITTENBERGER 1976, RIEDEL and VELKOVRH 1976).

O. juliae RIEDEL, 1990 inhabits the island of Korfu (RIEDEL 1990), probably also Epirus and Albania (unpublished data, based only on shell material).

O. (*Riedelius*?) sp. (nova?) - cf. RIEDEL 1992: 99. Probably a distinct, still undescribed species inhabiting northern and eastern(!) Greece. I know it from shells only (also from new, unpublished materials - from Epyrus, P. SUBAI leg.). Perhaps a part of them (from Epyrus) represent *O. juliae*. The problem requires anatomical-taxonomic studies on particular populations.

REFERENCES

GITTENBERGER, E., 1976. Vier wenig bekannte troglophile Schneckenarten aus Montenegro. Zoologische Mededelingen, Leiden, **49**: 273-283, 10 ff.

RIEDEL, A., 1969. Die Untergattungen *Morlina* A. J. WAGNER und *Riedelius* HUDEC der Gattung *Oxychilus* FITZINGER (*Gastropoda, Zonitidae*). Annales Zoologici, Warszawa, **27**: 91-131, 46 ff., 2 Karten, 1 t.

RIEDEL, A., 1979. Materialien zur Kenntnis der palaarktischen *Zonitidae* (*Gastropoda*). XII-XIV. Fragmenta Faunistica, Warszawa, **25**: 115-125, 2 ff., 1 t.

RIEDEL, A., 1980. Genera Zonitidarum. Dr. W. BACKHUYS, Publ. Rotterdam, 197 pp., 294 ff., 2 tt.

RIEDEL, A., 1990. Neue und wenig bekannte *Zonitidae* (*Gastropoda*) aus Griechenland. Annales Zoologici, Warszawa, **43**: 493-534, 37 ff., 2 tt.

RIEDEL, A., 1992. The *Zonitidae* (sensu lato) (*Gastropoda, Pulmonata*) of Greece. In: Fauna Graeciae, V. Athens, VIII + 194 pp., VII + 39 maps.

RIEDEL, A., VELKOVRH, F., 1976. Drei neue balkanische Zonitiden (*Gastropoda*) und neue Funde einiger seltener Arten. Bioloski Vestnik, Ljubljana, **24**: 219-227, 12 ff., 1 t.