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Snežana V. Stanković[1]

TANDONIA SAPKAREVI SPEC. NOV. (GASTROPODA: MILACIDAE) NEW SLUG OF MACEDONIA

Abstract

In order to define the anatomic differences of specimens "light and dark" of *Tandonia albanica* Soós, 1924. (Wiktor, 1996) in author's oldest collection of slugs, it was need to study all samples of *Tandonia* species found of the same locality.

Two *Tandonia* species was found in Ohrid City. One species of them, *Tandonia sp. n.* in non-reproductive stadium was very similar to *T. albanica.* Analysis of the genital systems of the all found specimens show presence of new species for the science *T. sapkarevi* sp.n. By author's opinion, there are not specimens of two-color body "anatomically different" in *T. albanica* as WIKTOR (1996) stated of the specimens from Ohrid.

Key word: Taxonomy, Milacidae, *Tandonia sapkarevi* sp.n., Macedonia.

[1] National Institution Macedonian Museum of Natural History, Boulevard Ilinden, 86, 1000 Skopje, Macedonia.

TANDONIA SAPKAREVI SPEC. NOV. (GASTROPODA: MILACIDAE) NOVA VRSTA IZ MAKEDONIJE

Izvod

Sa ciljem da se utvrde anatomske razlike između „svetlih i tamnih primeraka" *Tandonia albanica* Soós, 1924, koje je Wiktor (1996) uočio na svom materijalu iz Ohrida, bilo je potrebno proučiti sav materijal iz autorove kolekcije i sakupiti nove primerke sa lokaliteta u Ohridu.

Proučavanjem starog i novo sakupljenog materijala sa istovetnog staništa, nađene su dve vrste iz roda *Tandonia* od kojih je jedna vrsta, Tandonia n. sp. u ne-reproduktivnom stadijumu, vrlo slična sa *T. albanica*. Analizom genitalnog aparata nađenih primeraka utvrđena je nova vrsta za nauku, *T. sapkarevi* n.sp. Po mišljenju autora, ne postoje primerci dve različite obojenosti tela kod *T.albanica* kao što je Wiktor (1996) konstatovao kod primeraka iz Ohrida.

Ključne reči: Taksonomija**,** Milacidae, *Tandonia sapkarevi* sp.n., Makedonija.

INTRODUCTION

The presence of the species from the genera *Tandonia* Lessona & Pollonera, 1882 in the diversity of slugs in R.Macedonia can be seen from the researches of ANDRZEJ WIKTOR (1996). For the regions of former Yugoslavia plus Albania, 19 taxa are mentioned, 6 of which can be found in Macedonia. The Balkan is one of the three centers for speciation of slugs. The other ones are Caucasus and Iberian Peninsula (WIKTOR, 1996). According to WIKTOR (1997) Macedonia is one of the three Balkan speciation centers (for Milacidae family), and the other two are the Greek archipelagos and Asia Minor.

A larger number of *Tandonia* species in Macedonia should be expected. The analysis of the descriptions for some of them, shows that there are many species with unclear taxonomic status due to shortage of researches or identification defaults. The confusion appears in the processing of juvenile specimen or the ones collected in late spring or summer. Undefined terms "dunkle / helle Form" by RÄHLE (1974) have been used (for *Milax sp*.), also, RÄHLE (1977) for *Milax clerxi*

(later synonimized as *T. albanica*). WIKTOR (1996) mentioned "deeply black / grey-brown-beige" specimens for *T. albanica* of Ohrid. It is much better to avoid these unclear definitions of forms.

In order to determine the species status of *Tandonia* species, diagnostic characters of reproductively mature and male phase specimens with spermatophor and developed accessory glands, are needed.

They are the most resistant to the change during the fixation in conservancy. The identification is secure and there is no confusion with the morphological marks.

Enclosed to the above are the results from our researches. In order to define the anatomic differences of the "light and dark specimens" of *Tandonia albanica* Soos, 1924, found in Ohrid, according to WIKTOR (1996), the author of this study defined new species for the science *T. sapkarevi* n. sp. Some useful findings contribute for clarification of *Tandonia* species.

MATERIALS AND METHOD OF WORK

The investigated material is collected during the years 1994, 1996 and 2001-2003, on the same locality, in urban region of Ohrid (Macedonia). The study overcome: *in sity*, *ex sity*, live, narcotized and conserved specimens to determine the change in the external morphology. To describe the internal morphology of the genital system, vivisection and dissection of reproductive non-fertile and fertile specimen was made.

The change of color pattern and appearance of "two color forms" of all *Tandonia* species collected at the same habitat is observed in a laboratory. A special attention is paid to the morphological change in the appearance of genitals during the conservation.

RESULTS

During the revision of the Collection "Gastropoda nuda" of the National Institution Macedonian Museum of Natural History, Skopje, in the material collected from Ohrid in 1994 and 1996, and identified as *Tandonia albanica* Soós 1924, some diagnostic characters different from the description of the type species are noticed.

Initiated by the statement of WIKTOR (1996) for specimens with "Coloration of two kinds" i intend that our specimens belong to one of

those two forms. I have started researches in order to find the other form because the interpretations were "These two colors forms are not anatomically similar but also they copulate with each other". Among the material that was already collected I did not find samples of the two forms (lighter and darker). However I have noticed a (spermatophor inside bursa) in the only one exemplar from November 1994, dissected incompletely with destroyed accessory glands (Fig. I). Later, the collected materials on September 20, 1996, were not suitable for dissection due to the strong fixation and strong body contractions, and accessory glands were destryed.

The objective of these researches was to study new, adequately collected material, and to identify of the wrongly determined species 10 years ago. The accent was put on the study of sexually mature specimens in the reproduction period.

All conserved samples to collect 2001/2002. processed in alcohol (70%) had not morphological difference in the body color. As a result of this come necessary to observe living samples.

During the field researches of slugs from the same habitat, the specimens of *Tandonia budapestensis* and *Tandonia* n. sp. were found together. The investigation *in sity* has shown that they can not be easily differentiate. At the time of collection (8:00 am, November 6, 2003 before a rain) all slugs were under leaves, contracted, with dark grey color on the back and the body parts, with black spots or marks, beige foot, not showing any particular difference in the color or height of the keel.

A distinction can be made *w*ithin the considerate review of the live collected specimens in laboratory conditions. On sunlight day, November 2003, living specimens *T. budapestensis* changed the color from grey with orange marks to orange with dark grey and black marks. The keel was more orange in *T. budapestensis*, while *Tandonia* n. sp. had more whitish. This can be noticed only with the precision observation of live slugs, because the color of the conserved material is dark due to the demolishing of yellow and orange color in alcohol. That is known for *Tandonia* species. Conserved samples are black from tentacles to foot. By my opinion WIKTOR (1996) had specimens in his material from two different species, stating "… not anatomically similar but also they copulate"? It is contradictory. (Page 23:1996). I believe that there were subadult and in non-reproductive period. They hadn't spermatophor. The collection time is not mentioned, suppose is May 1982, when col-

lector, **Adolf Riedel** visited Macedonia. It is clear that WIKTOR had doing with a different species. By his states specimens were anatomically different. It is clear they couldn't copulate.

The anatomical characteristics of all collected specimens were uniformed and referred to diagnostic characters of type species *Tandonia albanica* Soós, 1924.

T. sapkarevi n. sp. differs from other species of genus by compact non-transparent accessory glands that as a ring cover the ductus bursa copulatoris and oviductus. Also, a spermatophor in a form of stick with fringed hooks on the proximate curved part (Fig. I.6; II.6). There are differences in the form and length of the penis with the epiphallus, and the length of the oviductus and the spermateca.

The other organs of the male and female genital system of *T. sapkarevi* n. sp. change the appearance, depending on contracting in the conservancy. If the alcohol percentage is more than 40% the penis and the oviductus are shortened and thick. The skin thickness and the keel height depend on the muscle contractions. *In vivo* keel could be on the same level with the skin. The keel height also depends on fixation in the conservancy. Sometimes, if the sample is conserved in a strong preservative during elongated body condition, the keel have zigzag form.

These clearly indicate that when a taxonomic status of *Tandonia* species is determined, reproductively mature and male phase specimens with well-developed genital organs, accessory glands and spematophor should be covered. The difference between *T. albanica* by description of WIKTOR (1982, 1987, 1996) and *T. sapkarevi* sp.n. is clear: spermatophor of the last one species is in a shape of a walking stick with fringed hooks on the proximal part. *T. albanica* has spermatophor like a cigarette with 4 horns on the proximal part and fringed hooks on the distal part. The differences between these two species, also are accessory glands. They are significant and the most stable diagnostic characters.

Very similar to *T. sapkarevi* n. sp. is *T. totevi* (Wiktor, 1975). According available literature (WIKTOR 1975; 1983; 1987) there are similarity in the color of body, mantle and foot, also in accessory glands. The difference is in the length of the keel, *T. sapkarevi* n. sp., till the mantel. T. *totevi* has 1cm short kill, on the apical part of the body. Other differences are enfolded, as a ring and attached with one narrowing, accessory glands in *T. sapkarevi sp. n*. *T. totevi* has a longer and curved epiphallus. A spermatophor of *T. totevi* is not known.

Above mentioned differences separate *Tandonia sapakrevi* sp. n. from other species.

We suppose that WIKTOR (1996; p. 23) had specimens from two different species, stating "…not anatomically similar but also they copulate"? It is contradictory. I believe that were subadult and in non-reproductive period. They hadn't spermatophor. It is clear that WIKTOR had doing with a different species.

Tandonia sapkarevi n. sp.

Figs. I-II

Diagnosis:

A big slug. Length 55-60 mm, width 7-13 mm, mantle is bigger than 1/3 of the body length. Ashen-gray back and mantle with black dots. Keel is paler. A body sides and sole are creamy. Accessory glands in the form of ring adhering closely to oviductus and spermateca ductus. Spermatophor is likely walking stick with fringed hooks (Figs. I and II).

Description of holotype:

Body dimension: length 60 mm, width 13 mm, mantle 20 mm (live specimens). Coloration of the body is ashen gray with black dots on the beck. Creamy sole and body side. Keel is whitish-yellow, reach the posterior edge of the mantle.

Genitalia: (Fig. II)

Male copulatory organ is cylindrical, twice smaller than the spermateca. Spermateca oval elongated with blurred apex into spermoviductus, attaches to small thin muscle retractor. Vas deferens, thin and long, apically open to the epiphallus. Between penis and epiphallus, to the slight construction, a strong muscle retractor attaches. Into beginning of spermateca there is rained, strong papilla. Spermatophor, 10 mm long, resembling walking stick has the same dimension as spermateca (together ductus). On his distal curved part there are big hooks, with four dichotomous branches. More than 2/3 of posterior part is smooth thin to the apex.

Female copulatory organ: vagina short, oviductus (free part) tubular, long as a mail copulatory organ and together with spermateca ductus enter into the atrium. Accessory glands are ring - form, closely adhering to oviductus and spermateca ductus.

Bionomics: Unknown. Maybe synanthrope.I collected it in the private urban garden.

Distribution: Known only from locus typicus.

Examined material: 36 ex.

Holotype: Ohrid city, leg. Snežana V.Stanković and E.Stojkoska, 6 Nov. 2003. (No.MNHM Gastropda 2799. Maced. Nat. Hist. Mus., Skopje).

Pratypes: Ohrid city, leg. S.V.Stanković and E.Stojkoska, 6 Nov. 2003. (7 ex). (No.MNHM Gastropda 2800/7 Maced. Nat. Hist. Mus., Skopje).

Other material: Ohrid city, R. Macedonia, Nov.1994,1 exp.(leg. S. V. Stanković).

Ohrid city, 20 Sept. 1996, 6 exp, leg. Jonce Šapkarev; Ibid., Oct. 2001, 6 exp.(leg.Blaga Šapkareva); Ibid., Sept. 2002, 15 exp. (leg.Blaga Šapkareva).

Etymology: In honour of my professor and mentor Ph. Dr **Jonče Šapkarev** who introdused me in the field researches.

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TANDONIA SAPKAREVI SPEC. NOV. (GASTROPODA, MILACIDAE) NOVA VRSTA GOLAČA IZ MAKEDONIJE

Rezime

Prilikom revizije stare zbirke Gastropoda nuda iz Prirodonaučnog muzeja Makedonije u Skoplju, kod prethodno determinisanog materijala *Tandonia albanica* Soós, 1924, autorica je naišla na problem u potvrđivanju identiteta. Smatrajući da ima jednu od dva tipa: svetlih ili tamnih primeraka, prema Wiktorovom nalazu iz 1996 godine, našla je spermatofor sasvim različit od imenovane vrste. Tražeći takve primerke na istom lokalitetu, naišla je na dve vrste *Tandonia* koje je nekoliko godina proučavala kroz sakupljeni materijal iz reproduktivnog i prereproduktivnog perioda. Materijal je proučavan *ex sity* i *in sity,* sa opservacijom i disekcijom konzervisanog i narkotizovanog materijala. Pri tome nije našla *T. albanica*, već primerke *T. budapestensis* i *Tandonia* spec. nov. koju je kasnije komparacijom genitalija sa tipskom vrstom (*T. albanica*) i bliskom vrstom *T. totevi* Wiktor, 1986, izdvojila kao novu vrstu za nauku, *Tandonia sapkerevi* n.sp. Proučavajući *Tandonia* primerke preporučuje da se identifikacija izvodi uz pomoć reproduktivno zrelih primeraka u muškoj fazi kada poseduju spermatofor i razvijene akcesorne žlezde. Ova dva karaktera su stabilna, odnosno signifikantna za izdvajanje vrsta iz roda *Tandonia. T. budapestensis* kada se nalaze u istoj zoocenozi može da navede kolekcionara, po-

gotovu onoga koji se ne bavi proučavanjem golača, na pogrešne zaključke kada dolazi do pojave svetlih i tamnih primeraka, koje se anatomski razlikuju ali kopuliraju. Autor ovog rada pretpostavlja da je takav slučaj sa Wiktorovim (1996) primercima *T. albanica* iz Ohrida.

Na kraju ovog rada je data dijagnoza i opis nove vrste golača iz Makedonije *Tandonia sapkarevi* spec. nov. nađene u gradskom regionu Ohrida.

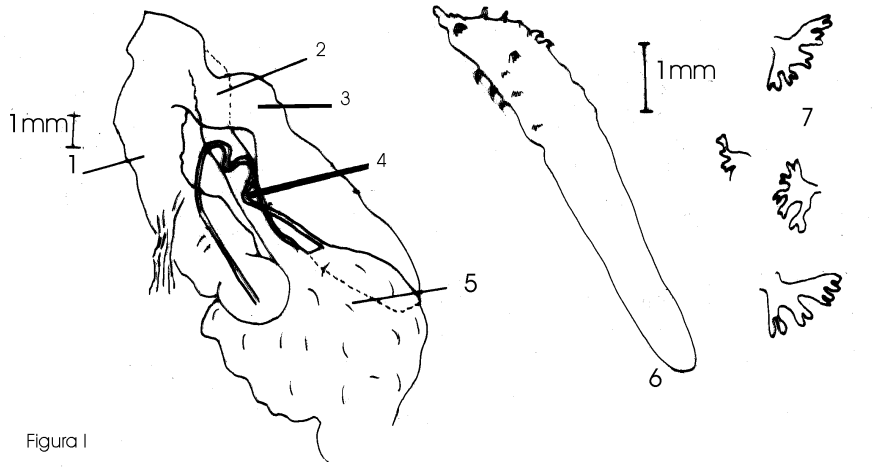

Fig. I. Genitalia of *Tandonia sapkarevi* sp. n., (destroyed accessory gland), collected in Nov. 1994: 1. penis, 2. oviductus, 3. ductus bursa copulatoris, 4. vas deferens, 5. spermoviductus, 6. spermatophor, 7. fringed hooks.
Fig. I. Genitalije *Tandonia sapkarevi* sp. n. (uništene akcesorne žlezde), sakupljen novembra, 1994: 1. muški polni organ, 2. jajovod, 3. odvodni kanal semene kese, 4. spermovod, 5. spermojajovod, 6. spermatofor, 7. prstaste kukice.

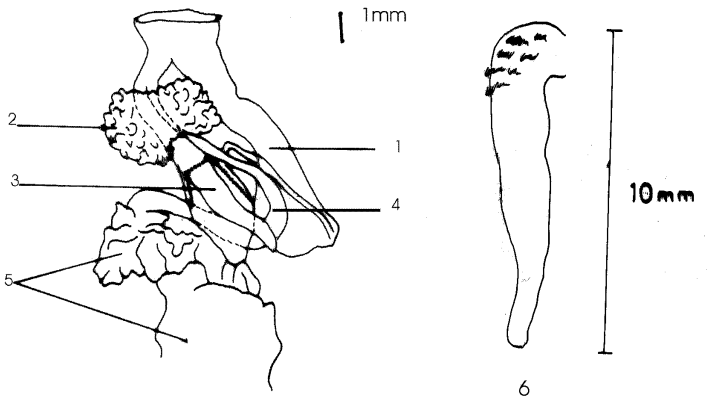

Figura II

Fig. II. Genitalia of *T. sapkarevi* sp. n. (holotyp): 1. penis; 2 accessory gland, 3. spermatophor in bursa copulatoris, 4. oviductus 5. spermoviductus, 6. spermatophor.

Fig. II. Genitalije *T. sapkarevi* sp. n. (holotyp): 1. muški polni organ, 2. akcesorne žlezde, 3. spermatofor u semenoj kesici, 4. jajovod, 5. spermojajovod, 6. spermatofor.