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A TUNISIAN SLUG *MILAX GASULLI* ALTENA, 1974 AND ITS MORPHOLOGY (MOLLUSCA: GASTROPODA: MILACIDAE)

ANDRZEJ WIKTOR[1], INDITHAR ABBES[2]

[1]Museum of Natural History, Wrocław University, Sienkiewicza 21, 50-335 Wrocław, Poland (e-mail: awiktor@biol.uni.wr.pl)
[2]Research Unit: Biodiversity and Population Biology, Superior Institute of Applied Biological Sciences, 9 Rue Zouhaier Essafi La Rabta, 1007 Tunis, Tunisia (e-mail: Inditharabbes@yahoo.fr)

ABSTRACT: Based on recently collected material from Tunisia, redescription of *Milax gasulli* Altena, 1974 is provided in order to differentiate it from other species of the genus. Distinctive features are essentially the shape of stimulator and the spermatophore.

KEY WORDS: *Milax gasulli*, Milacidae, slugs, Tunisia

INTRODUCTION

Information on Tunisian slugs is very scanty. Work in progress is aimed at describing their diversity and distinctive features of some of the species. The family Milacidae includes a small number of morphologically and anatomically similar species. However, the spermatophore structure is known in almost all members of this family (WIKTOR 1987a). Its specificity and the absence of intra-specific variation make it a taxonomically useful character.

Until now *Milax gasulli* Altena, 1974 was known only from the original description based on two specimens (holotype and one paratype). Both were collected from the some locality in Tunisia. The aim of this paper is to redescribe *M. gasulli* in detail, and to provide some new information on its distinctive features. Notes on its ecology and incompletely studied distribution are included as a basis for further research.

Milax gasulli Altena, 1974

Milax gasulli Altena,1974: Basteria 38: 103–108, figs 1–3. Locus typicus: Zaghouan. Templo de las aguas. Tunis. Leg. GASULL. Holotype and 1 paratype in Rijksmuseum van Natuurlijke Historie. Leiden. No. 9006.

Material examined: Jouf, 30.01.03, leg. INDITHAR ABBES: 4 specimens; Barrage Lebna. 13.11.2007, leg. INDITHAR ABBES – 3 juvenile specimens.

External appearance. The external appearance of the species has no distinctive features. The measurements of the largest specimen (after preservation in alcohol) are 46 mm total length, 8 mm width, 12 mm mantle length. The shape and proportions of the body are not distinctive.

The colour of live slugs is black to grey, with yellowish spots which are more or less distinct on the mantle. After preservation the back is uniform grey without spots or any other pattern. The sole is cream-coloured. The keel is distinct, reaching the posterior edge of the mantle, of the same colour as the rest of the back.

Genitalia (Figs 1–5). Characters that are useful for species identification are found only in the distal part of the genitalia: the vas deferens is very thin, and connected apically and symmetrically with the epiphallus. The epiphallus is thick, cylindrical and with rounded distal part. The penis is short, ring-shaped and clearly wider than epiphallus. The penial retractor muscle is very thin and inserted laterally to epiphallus at about half of its length. The spermatheca has the shape of a thick and gently rounded cylinder. It is surrounded by

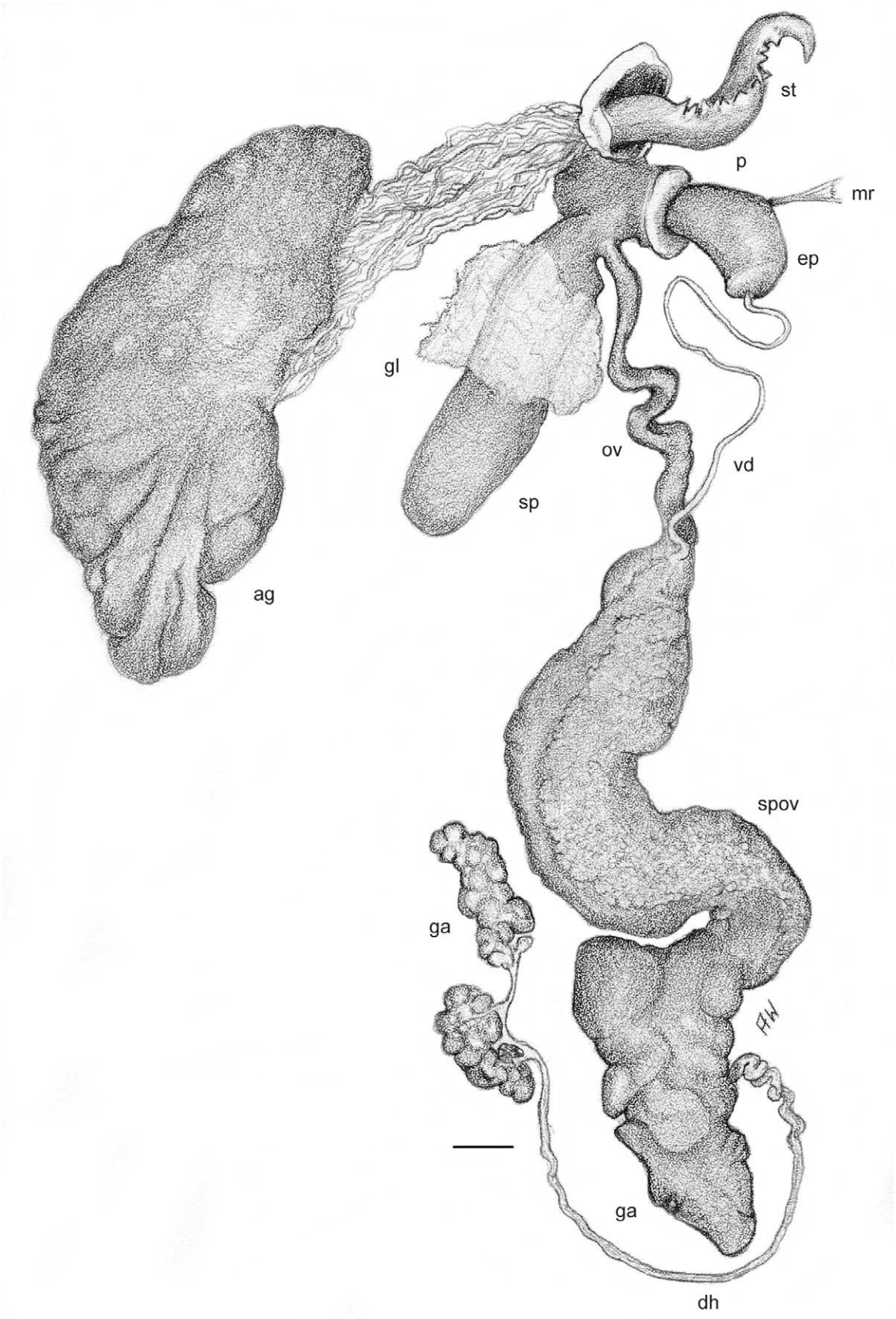
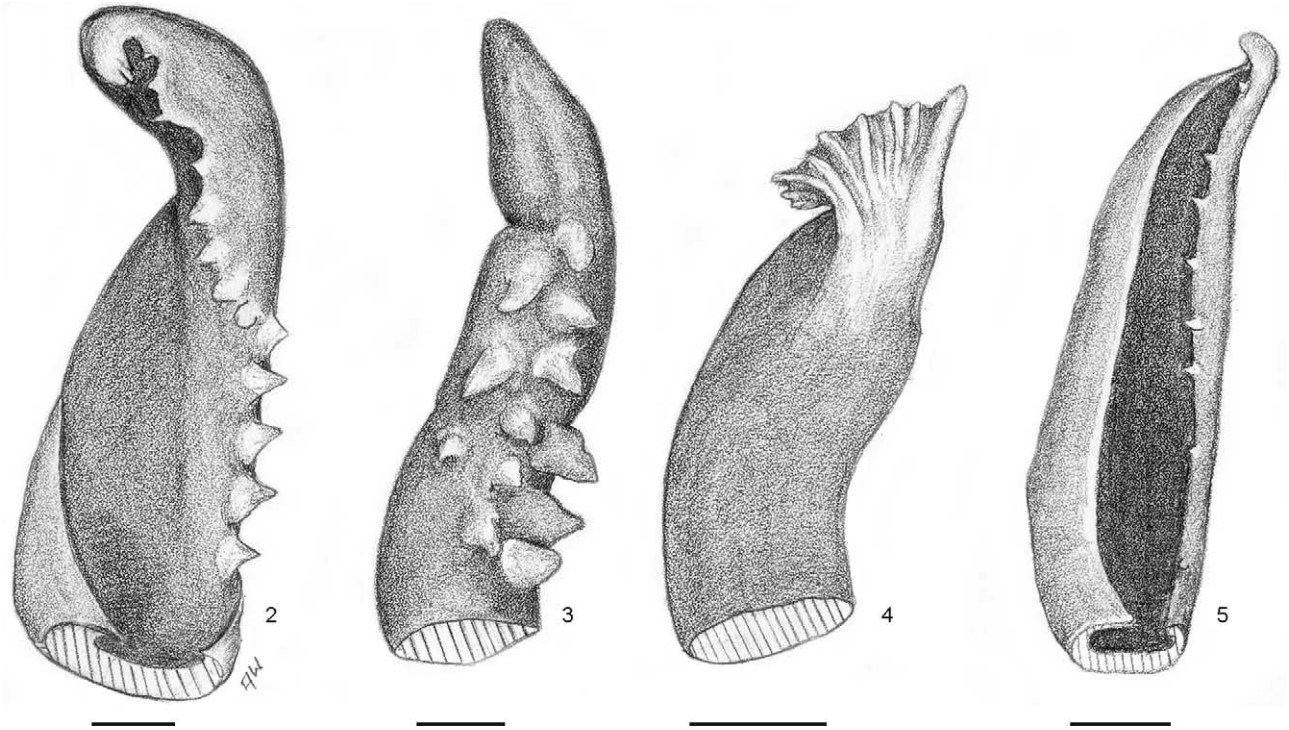


Fig. 1. *Milax gasulli* – reproductive system. Specimen from Jouf: ag – atrial gland, dh – ductus hermaphroditicus, ep – epiphallus, ga – glandula albuminalis, gl – "gel", ov – oviductus, mr – musculus retractor penis, p – penis, vd – vas deferens, sp – spermatheca, spov – spermoviductus, st – stimulator (drawing A. WIKTOR). Scale bar 1 mm



Figs 2–5. Various stimulators of North African milacids:. 2 – *Milax gasulli*, specimen from Jouf; 3 – *M. nigricans* from Bani Mitir station (Tunisia); 4 – *M. ater* from Constantine (Algeria); 5 – *Milax gagates* from Bni Atir (Tunisia) (drawing A. WIKTOR). Scale bar 1 mm

a gelatinous substance (or a structure) of unknown function and origin. The substance/structure has not been observed in any other *Milax*. ALTENA (1974: figs 1, 2) also noticed this "gel" and called it vaginal gland. The spermatheca duct is very short. The genital atrium is small and connected by numerous thin tubes with the large atrial gland. The stimulator is very characteristic, long and thin, slightly concave, with a row of structures presenting different shapes; spines are located in a more or less even row on the whole edge of the stimulator (Fig. 2).

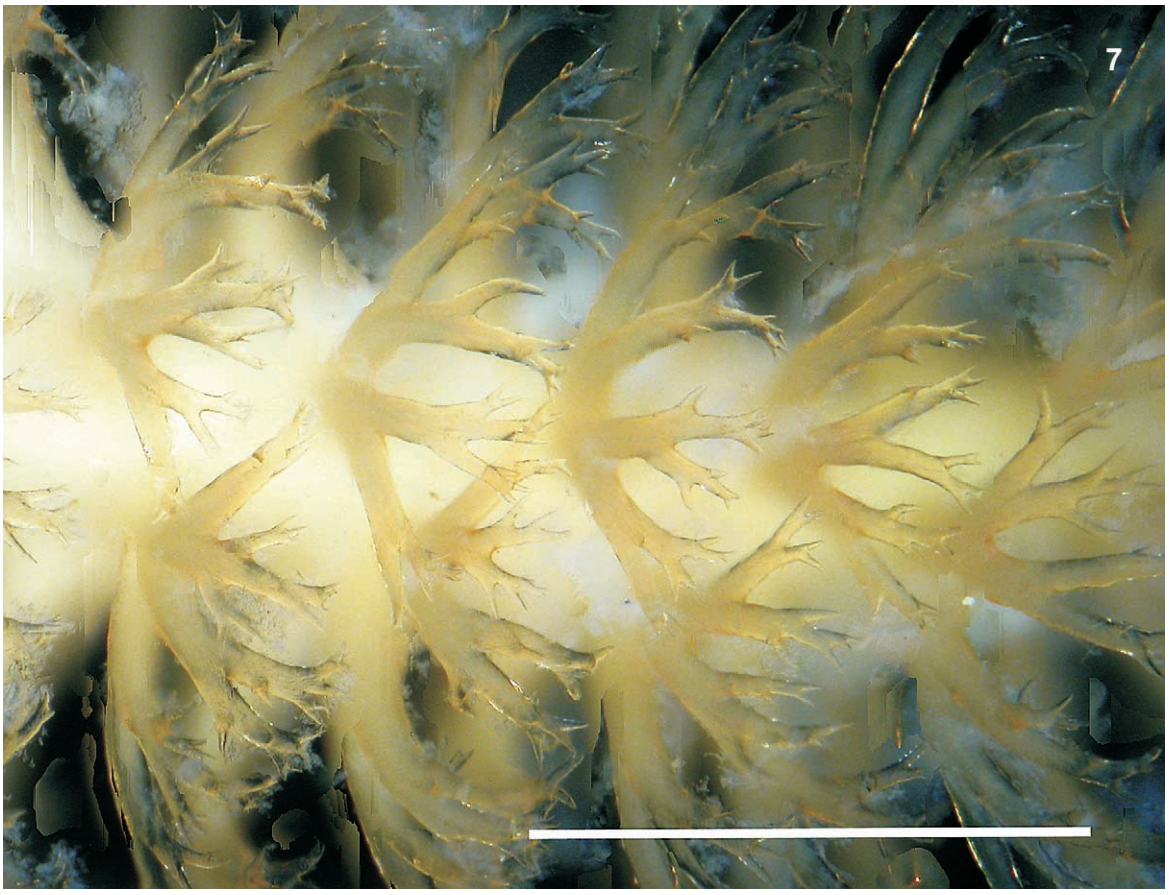
Spermatophore (Figs 6, 7). The shape of this structure is difficult to describe. It was isolated from the receiver's spermatheca (specimen collected in Jouf).

Habitat. The examined specimens were collected from a damp microhabitat under calcareous rocks; the soil was essentially clayey. The vegetation included mainly *Malva sylvestris*, *Urtica urens*, *Galactites tomentosa*, *Chrysenthemum coronarium*, *Anacyclus clavatus*, *Arisarum vulgare*, *Cutandia divaricata*, *Bromus mollis*, *Rapistrum rugosum* and *Silene inflata*.

Distribution. The distribution of *M. gasulli* seems to be very restricted. Out of the 41 examined localities it was found in four (Fig. 8), all in a small region of north-eastern Tunisia with prevailing sub-humid to semi-arid climate. The localities are geographically close to the type locality. These preliminary results indicate that *M. gasulli* may be endemic to northern Tunisia or that it is a form of *M. nigricans* (Schultz, 1836). The latter conjecture can be tested only with molecular studies.

Remarks. The spermatophore of the studied species differs from such structures in other species of the family Milacidae (WIKTOR 1987a, b). Unfortunately, we still do not know the shape of the spermatophore of the Algerian *M. ater* (Collinge, 1895). The genitalia of *M. gasulli* are similar to those of another three North African species: *M. gagates* (Draparnaud, 1801), *M. nigricans* (Schulz, 1836) and *M. ater* (Collinge, 1895). However there are easy to separate based on the shape of stimulator (see Figs 2–5). Only sometimes the stimulator of *M. gasulli* is similar to that of *M. gagates,* when on its edge some small spines occur (see Fig. 5). Such spines are present in *M. gasulli* from Barrage Lebna. However, they are larger than those in *M. gagates*. The body of *M. gagates* is deep black while *M. gasulli* from Barrage Lebna has a grey body. The stimulator surface in *M. gagates* is mostly smooth and without any spines, while the body is blackish-grey or black.

According to ALTENA (1974), several species names of North African milacids exist in the literature. They are *M. eremiophilus* Bourguignat, 1863, *M. scaptobius* Bourguignat, 1863, *Amalia cabiliana* Pollonera, 1891 and *M. gagates mediterrana* Cockerell, 1891. Their descriptions however are so rudimentary that it is impossible to ascertain to which species they refer. The chance of solving the mystery is very small because we could not find any type material, and no illustrations or photographs exist. Therefore, we use the name *M. gasulli* Altena, 1974, since the characters mentioned by that author are unambiguous and were also confirmed during our studies.



Figs 6, 7. Spermatophore *of Milax gasulli.* Scale bar 1 mm (photo M. WANAT)

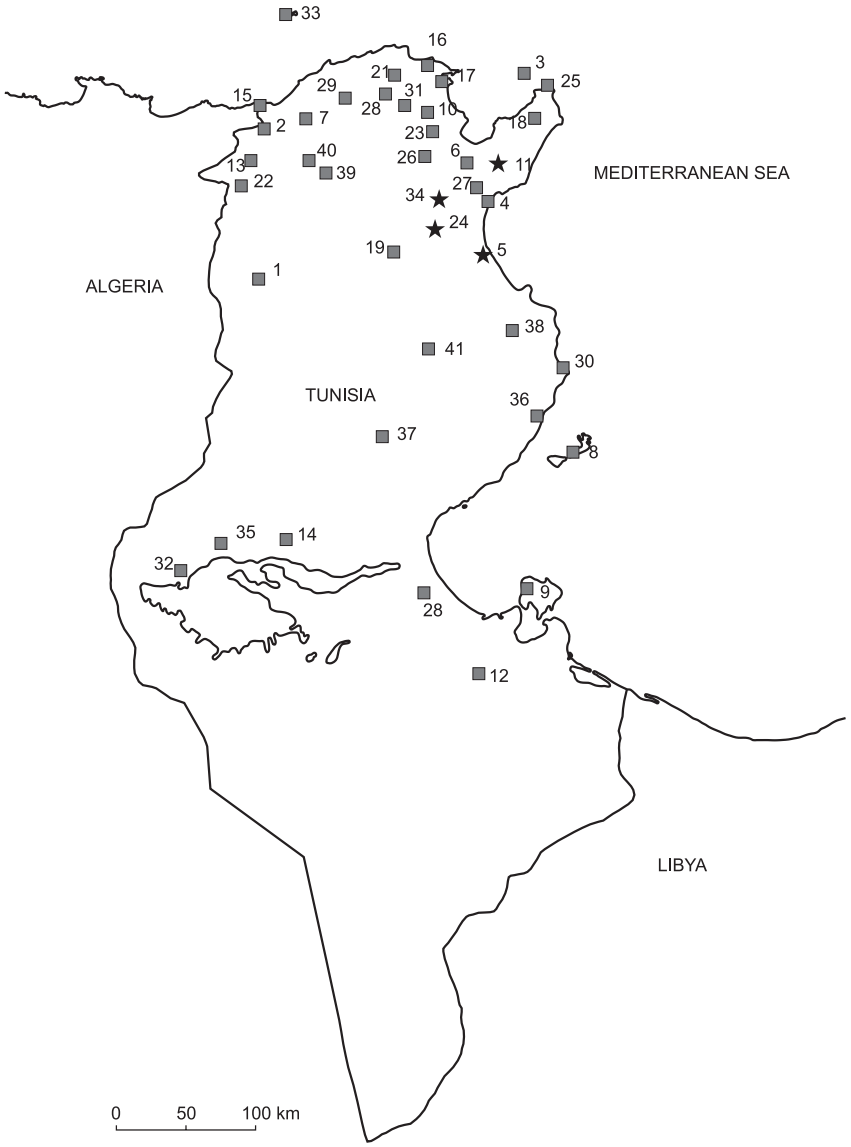


Fig. 8. Map of the examined localities and the geographical distribution of *Milax gasulli* – localities with *M. gassulli* (asterisks) and other examined localities (squares) (drawing I. ABBES): 1 – El Kef; 2 – Aďn Draham; 3 – Zembra Island; 4 – Bouficha; 5 – Aďn Errahma; 6 – Djebel Resas; 7 – Nefza; 8 – Kerkennah Isles; 9 – Djerba Island; 10 – Parc ennahli; 11 – Barrage Lebna; 12 – Medenine; 13 – Beni Mtir; 14 – Dghoumes oasis; 15 – Tabarka; 16 – Cap zebib; 17 – Sidi Thebet; 18 – Dar chichou; 19 – Djebel Mansour; 20 – Chenini oasis; 21 – Ghar el Melh; 22 – Fďja National Park; 23 – Tunis (Ibn khldoun); 24 – Jouf; 25 – Hawaria; 26 – Oudhna; 27 – Bir Bouregba; 28 – Ichkeul National Park; 30 – Monastir; 31 – Mateur; 32 – Tozeur oasis; 33 – Jalta Island; 34 – Zaghouan; 35 – Degueche oasis; 36 – Sfax; 37 – Bouhedma National Park; 38 – Kondaar; 39 – Djebel El jouza; 40 – Beja; 41 – Sbikha

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