MACROCHELES VERNALIS BERLESE, 1887: SUPPLEMENT TO THE DESCRIPTION OF MALE FROM MOROCCAN POPULATION

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MACROCHELIDAE
MACROCHELES VERNALIS
MALE
GLABER GROUP
MOROCCO

SUMMARY: The male of *Macrocheles vernalis* was studied from the progeny of phoretic females collected on the Moroccan dung beetle *Scarabaeus sacer*. New data on *M. vernalis* description and its biology are given. The position of this opportunistic and widely distributed Mediterranean species is discussed.

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(BERLESE, 1887)
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MAROC

RÉSUMÉ : Le mâle de *Macrocheles vernalis* est décrit à partir de la descendance de femelles phorétiques collectées sur des *Scarabaeus sacer* du Maroc. La place de cette espèce opportuniste et très largement distribuée en région méditerranéenne est examinée et de nouvelles données sont fournies.

INTRODUCTION

Macrocheles vernalis (Berlese, 1887) (= *Holostaspis vernalis* Berlese, 1887) was originally described from Italian specimens. This species was found common phoretic on several large scarab hosts: *Gymnopleurus azureus* Fabr., *G. caffer* Fahr, *G. unicolor* Fahr., *Scarabaeus affinis* Brulle, *S. carinatus* Gebler, *S. cristatus* Fabr., *S. gangeticus* Cast., *S. pius* (Illiger), *S. punctipollis* Latr., *S. sacer* L., *S. semipunctatus* Fabr. (EVANS & HYATT, 1963, CICOLANI, 1983). The distribution of *M. vernalis* extends from far East (Armenia, Turkmenistan and China) to Mediterranean Basin (FIG. 1) and has been reported from both Palaearctic and Ethiopian regions (respectively France, Italy, Greece, Romania and Arabia, Liberia, Uganda, Senegal and Nigeria) (EVANS & HYATT, 1963). We collected it recently from Morocco (HALOTI *et al.*, 2004). Few data are available on the morphology of the male gender, though it provides useful characters for sibling species recognition, when the females are not or hardly recognizable by conspicuous characters.

Male *M. vernalis* is described here for the first time about one century after female description. This note participates in the study of the coprophilous macrochelids around the Western Mediterranean Basin.

MATERIAL AND METHODS

Phoretic females of *M. vernalis* were collected alive from the ventral surface of the roller beetle *Scarabaeus sacer* L. Dung beetles were collected in April

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FIG. 1: *M. vernalis* distribution region.

2004 in the Mamora forest (34°13N; 6°30W) (Morocco). Females were reared under laboratory conditions in individual cylindrical plastic boxes (84 × 54 mm) and fed with nematodes present in cattle dung. Progeny was filled and conserved in 70% ethanol, cleared 24 hours in lactic acid, and dissected under stereoscopic microscope. Specimens were mounted either on temporary or permanent slides with lactic acid and Hoyer's medium. Observations were made with a microscope (Leitz Dialux 20 EB). Measures: a 480 Motic digital Camera driven with Motic Image Plus software 2.0 was used for all measurements.

Type material: Five individuals are deposited in the Muséum national d'Histoire naturelle de Paris (France). Other specimens in the laboratory collections, Montpellier (France).

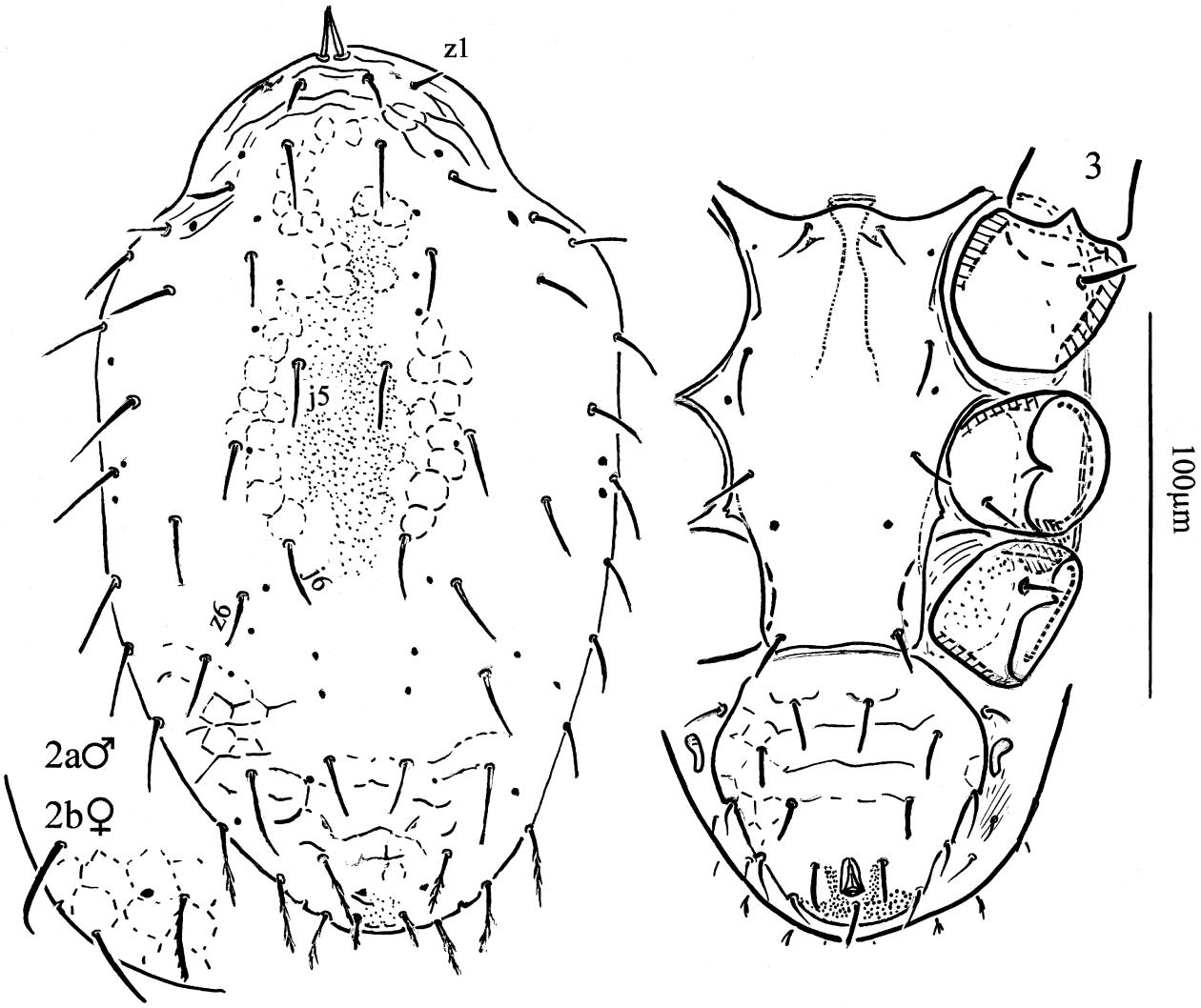

FIG. 2-3. *M. vernalis* .2a. — male dorsal shield; 2b. — female dorsal shield, detail; 2c. — male, ventral view

MALE DESCRIPTION

Family ***Macrochelidae*** Vitzthum, 1930
Genus ***Macrocheles*** Latreille, 1829
***Holostaspis* vernalis** Berlese, 1887
Macrocheles vernalis, Evans & Hyatt, 1963, p. 375, figs 126-129

Male: dorsal shield length: 401-441 µm (n=3); maximal width: 250-267 µm (n=3). Body surface: yellowish brown.

Female: dorsal shield length: 610-777 µm (n=7); maximal width: 363-430 µm (n=7). Body surface: yellowish brown.

Male: Dorsal shield (FIG. 2) ornamental pattern with punctuated and irregular reticulations, punctuation and reticulation weakened medially; lateral and posterior margin irregularly crenulated; 28 pairs of dorsal setae; vertical setae *j1* smooth, joined distally, bases *j1* nearby; *J5*, *Z5*, *S5*, *Z4* and *Z2* pilose, others are simple. *J5*, *Z5* and *S5* are pilose for most of length; *Z4*, *Z2* are distally pilose, *r2* and *r3* distally irregular.

Venter (FIG. 3): tritosternum well developed, with a pair of pilose *laciniae*. Sternoventral shield with 4 pairs of setae and 3 pairs of pores; all the setae simple; length 218-225 μm, maximal width between coxae II and III: 88-103 μm (n=2). Surface without ornamentation.

Genital orifice on anterior margin of the shield. Ventrianal shield as wide as long (132-147 μm and 124-149 μm, respectively) (n=2); 3 pairs of preanal setae, one pair of paranal setae and one postanal seta; all the setae simple; surface with some concentric ornamentations attenuated in the central region. Cribrum forwarded by lateral paranal extensions. One pair of setae on anterior sclerite.

Gnathosoma (FIG. 4, 5): well developed and sclerotized. Three pairs of hypostomatic setae and one paracoxal; all the setae simple; deutosternal groove with 5 rows of denticles. Palp chaetotaxy: trochanter, femur and genu 2-5-6 with 2 femoral and 3 tibial setae short and stout. Palptarsus with a trifid process, and complex of distal setae with 3 robust, curved and long olfactive setae. Epistome (FIG. 5) with a median process and a pair of lateral processes, *glaber* like; median lobe bifurcated distally. Chelicera: male fixed digit (FIG. 4) with two large teeth and two distal teeth, *pilus dentilis*, and a terminal hook. A dorsal seta, usual lyriform organs; movable digit with one large tooth, a terminal hook; spermatodactyl long and strongly curved, with large canal: length 55-57 μm (n=2); arthrodial brush strongly pilose; movable digit length: 41-45 μm (n=2).

Legs (FIG. 6, 7): Tarsi II to IV with developed ambulacra and claws. Most of segments of every leg with simple setae, dorsal setae on leg IV pilose. Femur II with a large spur (FIG. 6); genu and tibia II setae with a small protuberance; femur IV with a setigerous ventral spur and non-setose posterolateral protuberance (FIG.7).

DISCUSSION

Among *Macrocheles* genus, the *glaber* group becomes more and more heterogeneous due the large number of species clustered together. The species that were aggregated to this group (GLIDA & BERTRAND, 2003) have widened the range of *glaber* group characters. The *glaber* group was originally defined by FILIPPONI & PEGAZZANO (1962) including *Macrocheles glaber* (Müller), *M. perglaber* Filipponi & Pegazzano and *M. scutatus* (Berlese). To provide phylogenetic information, the group definition should be based on synapomorphies and sexual dimorphism allows discrimination and recognition between sibling species (e.g. *M. glaber* & *M. perglaber*). Consequently, the apomorphic characters are provided by the female gender (chelicerate teeth, characteristic epistome, procurved line and sessile saccule). The ornamentation of sternal or dorsal shield of the female (which can be considered apomorphic) could be affected by adaptive processes, especially by the strength of the link with one preferential host and the host's traits of life. *Macrocheles vernalis* female exhibits a masked procurved line, *glaber* like epistome and sacculi, but ornamentation of the sternal shield lacks. This species could be considered as belonging to the *glaber* group *sensu lato,* the differences (apomorphies) could be the consequences of the specialization on large phorionts. This path was followed by the *scutatus* subgroup (WALTER & KRANTZ 1992).

All the widely distributed species belonging to the *glaber* group share analogous ecological preferences. *Macrocheles vernalis* differs from the opportunistic species by the preferential hosts (*Scarabaeus* and *Gymnopleurus* species). However even if the hosts are widely distributed, they are ecologically specialized: from fine sand dunes (*Scarabaeus semipunctatus*) to silty sand (*S. sacer* and *S. puncticollis*) and silty clay soils (*S. pius*). We can speculate that the lack of morphological specific characters of the female of *M. vernalis* (poor ornamentation, lack of setae pilosity) could reveal a hidden diversity. The description of males (sibling species discriminating criterion) from geographically distant habitats is needed to test the homogeneity of the taxonomic level. Since the narrow definition of *glaber* group by FILIPPONI & PEGAZZANO (1962), it will be necessary to review its contours. Considering the morphological characters, *M. vernalis* can be integrated in the actual *glaber* group *sensu lato*. Specialization on large roller beetles may explain the derived characters (ie: weakness of sclerotization) analogous path followed by stenoxenous species (ie: *pisentii* group). It corresponds to the definition given to the *scutatus* subgroup (WALTER &

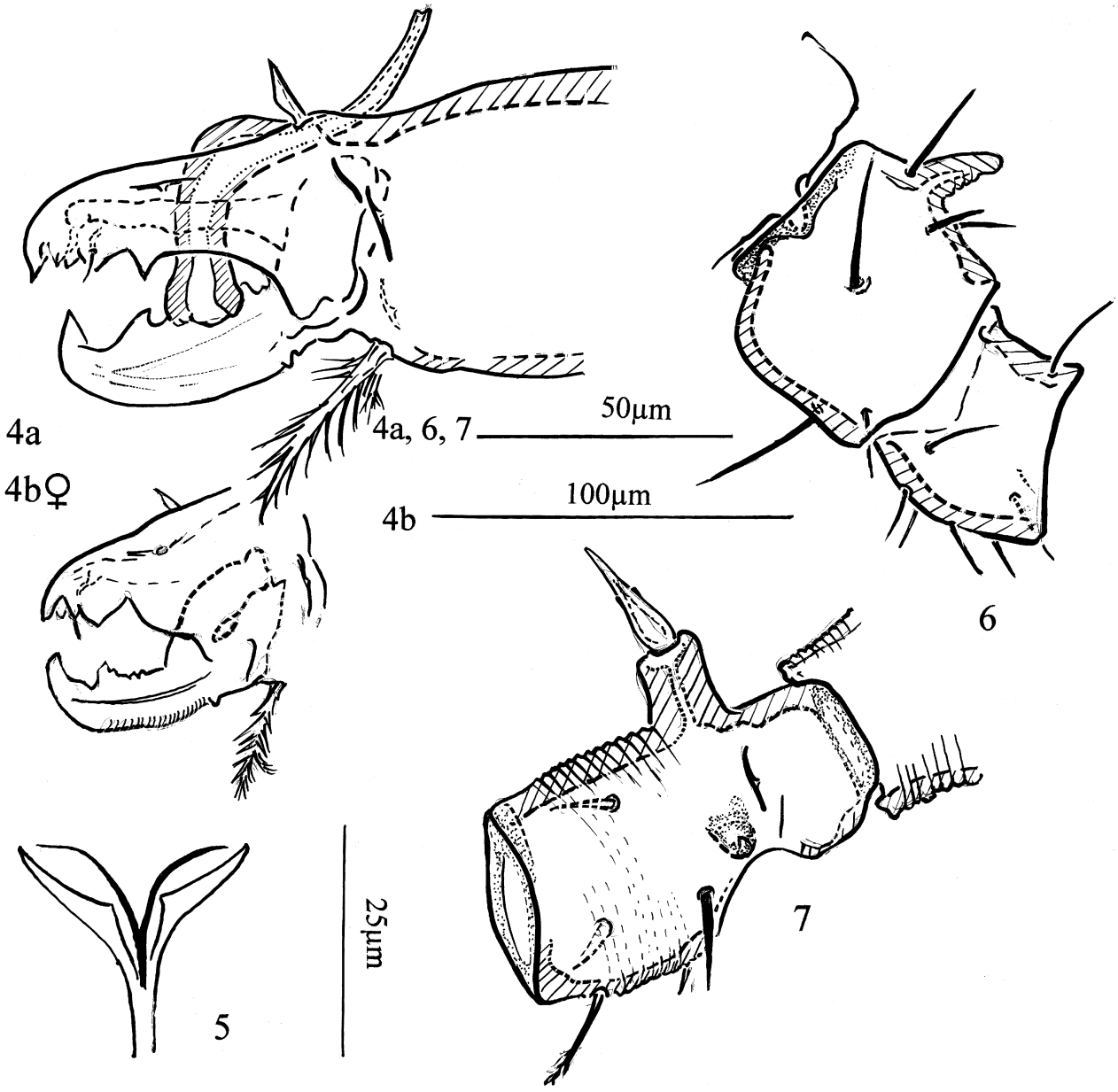

FIG. 4-7 : *M. vernalis*. 4. — Chelicera male (4a) and female (4b).5. — Epistome, 6. — PII male femur and genu, 7. — PIV, femur lateral view.

A — Male criterions of *glaber*-group	Male of *M. vernalis*
Separate sternogenital and ventrianal shield	Yes
V 3 to 6 pairs of ventrianal setae	Yes
Dorsal shield crenulated posteriorly	Yes
At least 28 pairs of setae	Yes
Legs II and IV with ventral spurs	Yes
B — Females criterions of *glaber* group	Female of *M. vernalis*
Ventrianal shield subtriangular, reticulate	Yes
Dorsal shield with procurved line	Medially masked
28 pairs of dorsal setae	Yes
Sessile sacculi	Yes
C — *scutatus* subgroup	
Reduction of ornamentation of sternogenital shields	Yes
Weakness of ventrianal ornamentation	Yes
Ventrianal shield : length>width	Yes
Metasternal shield narrow	Yes

Table 1: *Glaber*-group: common characters of species, and scutatus subgroup(from Krantz, 1981, Walter & Krantz, 1992))

Krantz 1992). This subgroup gathers both opportunistic and stenoxenous species, specialized on large Scarabaeini.

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