

Description of the male of *Hoploseius mariae* (Acari, Mesostigmata), an European ascid mite associated with wood-destroying fungi, with key to *Hoploseius* species

Peter MAŠÁN¹ & David Evans WALTER²

¹*Institute of Zoology, Slovak Academy of Sciences, Dúbravská cesta 9, SK-84506 Bratislava, Slovakia; e-mail: uzaepema@savba.sk*

²*Department of Entomology, The University of Queensland, St. Lucia, Qld 4072, Australia; e-mail: D. Walter@mailbox.uq.edu.au*

MÁŠÁN, P. & WALTER, D. E., Description of the male of *Hoploseius mariae* (Acari, Mesostigmata), an European ascid mite associated with wood-destroying fungi, with key to *Hoploseius* species. *Biologia, Bratislava*, 59: 527–532, 2004; ISSN 0006-3088.

The adults of *Hoploseius mariae* (Acari, Mesostigmata, Ascidae) are described and illustrated. The male of this species have not previously been described. Currently, *H. mariae* is known only from description of the females collected from the fruiting bodies of various wood-destroying shelf fungi (Holobasidiomycetidae, Aphylloporales) in Poland. Analysed material was found on fungus *Daedalea quercina* (Aphylloporales, Poriaceae) living on oak stems in south-west Slovakia (Central Europe). Some mite individuals also were collected on unidentified mycophilous erotyloid beetles (Coleoptera, Erotylidae) inhabiting *D. quercina*. Corrections to the setation of leg IV of *H. australianus* are also presented (femur IV = 6, femur II = 11). A key to identification of known *Hoploseius* species (females) is included.

Key words: Acari, mites, *Hoploseius mariae*, *Hoploseius australianus*, fungi, taxonomy, description, Slovakia.

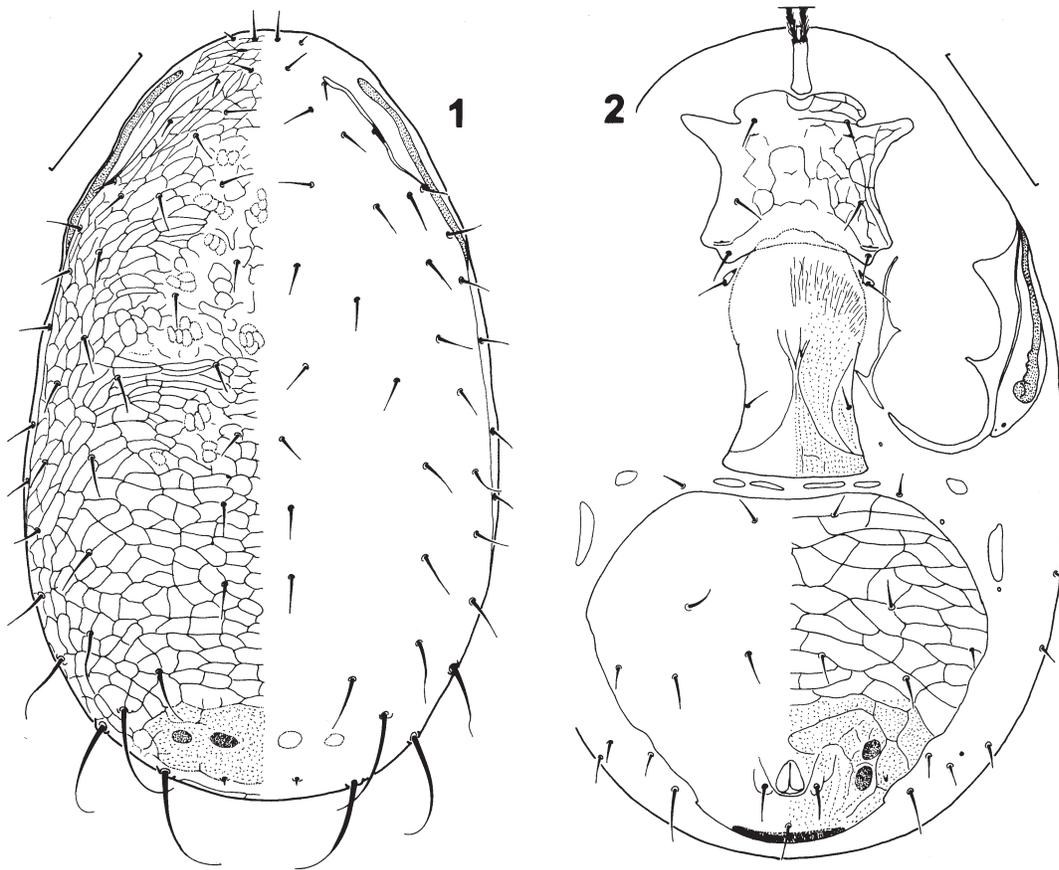
Introduction

The mites of the genus *Hoploseius* Berlese, 1914 inhabit fungicolous micro-habitats and have phoretic associations with mycetophagous flies (e.g. BERLESE, 1910; CHANT, 1963; LINDQUIST, 1963, 1965; BHATTACHARYYA, 1977, 2002; WALTER, 1998; GWIAZDOWICZ, 2002). Most *Hoploseius* have been collected from wood destroying polypore shelf fungi (Holobasidiomycetidae, Polyporales).

The genus *Hoploseius* Berlese, 1914 is very poor in species. Representatives of this genus are known from the Holarctic, Africa, India, Indone-

sia and Australia. At present, only 7 species are known from several continents of the world: *H. tenuis* Linquist, 1965 and *H. drosophili* (Chant, 1963) in N America (Mexico; USA), *H. cometa* (Berlese, 1910), *H. sitalaensis* Bhattacharyya, 1977 and *H. andamanensis* Bhattacharyya, 2002 in Asia (Sumatra, Java; India; Andaman and Nicobar Islands), *H. bakeri* Lindquist, 1963 in Africa (Congo), *H. australianus* Walter, 1998 in Australia (Queensland) and *H. mariae* Gwiazdowicz, 2002 in Europe (Poland).

For the Palaearctic, the genus was originally reported from Poland as *Hoploseius* sp. (GWIAZDOWICZ & ŁAKOMY, 2002), but afterwards de-



Figs 1–2. Female of *Hoploseius mariae*: 1 – dorsal view of idiosoma; 2 – ventral view of idiosoma. Scales 100 μm .

scribed as *H. mariae* Gwiazdowicz. To date, this is sole known European *Hoploseius* species and it is known only on the basis of females (GWIAZDOWICZ, 2002). The male of *H. mariae* has not previously been described.

Material and methods

Although extensive material of mesostigmatid mites was obtained by sampling various wood-destroying fungi in Slovakia (MASAN, 1998 and unpublished data), *Hoploseius mariae* was collected exclusively from wet hymenophorus of *Daedalea quercina* (L.) ex Fr. (det. I. Mihál). This fungus has strong affinity to various oaks (*Quercus* spp.) and it is abundantly distributed almost in all temperate regions of the Northern Hemisphere. It lives several years but its hymenophorus does not possess several strata as in other long-lasting Polyporales. The spawn of this fungus causes red-brown sap-rot of wood (trunks, stems, logs, timbers etc.; SVRČEK & VANČURA, 1987).

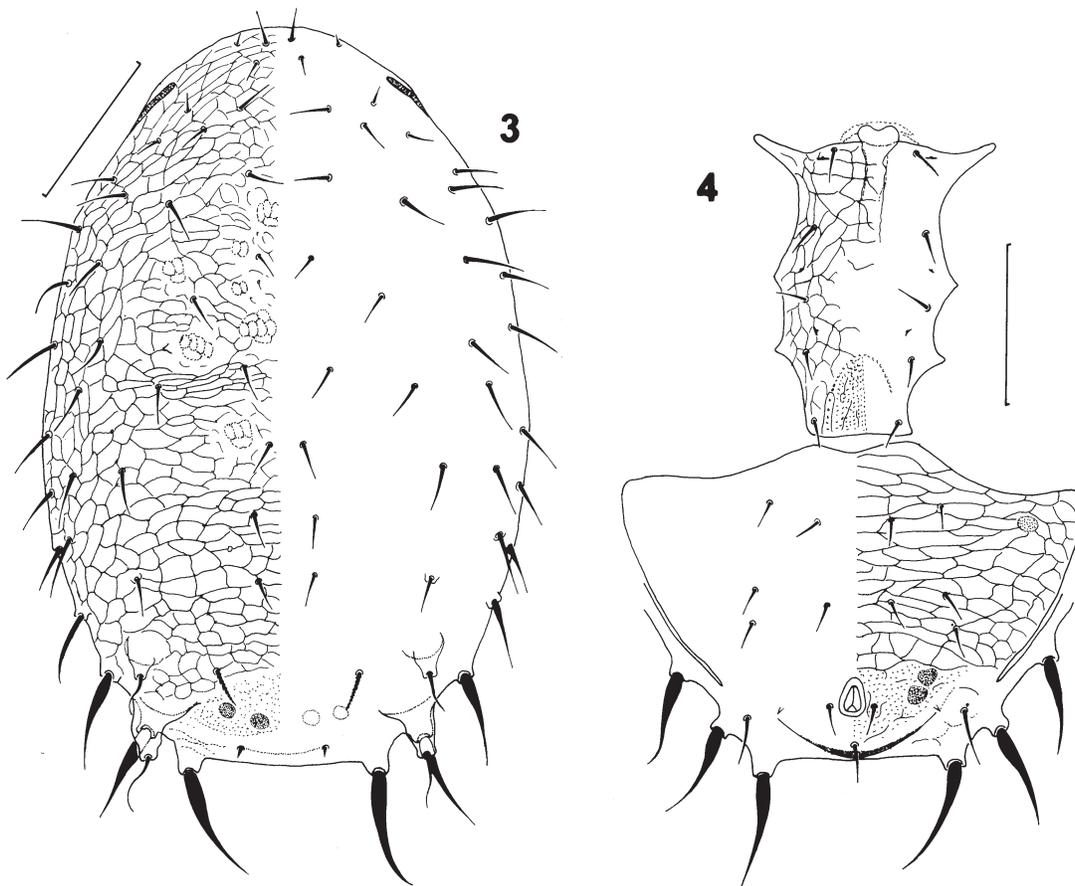
Individual specimens were extracted from fresh fruiting bodies by means of a modified Tullgren funnel extractor (photothermoextractor). The extraction was made for 48 hours with a 40-watt bulb. Some individuals were transferred from the fungi by a pincette with wetted tips into a test-tube with alcohol. Also, erotyloid beetles (Coleoptera, Erotylidae, non. det.) bearing attached females of the phoretic individuals were collected. No mites were found on old and desiccated fruiting bodies of *D. quercinus*.

For identification, the specimens were mounted on permanent microscopic slides, using gum-chloral medium (Liquido de Swan). The systems of notation used follow those of EVANS (1963) and LINDQUIST & EVANS (1965).

Hoploseius mariae Gwiazdowicz, 2002

Hoploseius mariae Gwiazdowicz, 2002: 220.

Description. Female (Figs 1, 2, 5, 6, 8, 9,



Figs 3-4. Male of *Hoploseius mariae*: 3 - dorsal view of idiosoma; 4 - ventral view of idiosoma. Scales 100 μm .

11). Idiosoma length and width of 15 measured specimens varied between 520 to 570 μm and 330 to 360 μm , respectively, however the length of 75% of the sample ranged from 530 to 550 μm .

Dorsum (Fig. 1). Dorsal shield entire, oblong, widest in posterior part, distinctly reticulated (only posterior margin with punctations and 2 pairs of oval ornaments) and bearing 35 pairs of setae. Most dorsal setae simple, needle-like and relatively short, but some posteriorly situated setae weakly tricarinate apically (this setal modification fully absent in some specimens) or slightly to considerably prolonged and attenuate apically (lengths of some dorsal setae are included in Tab. 1); dorsal setae z3 absent; setae J5 shortest (also setae z1), spine-like and slightly pilose; setae r2-r4 situated on lateral margin of shield, but setae r5-r6 and R1-R5 on soft membranous cuticle laterad shield.

Venter (Fig. 2). Tritosternum with slim base and strongly plumose laciniae inserted in microdenticulate collars. Ventral setae simple, needle-like and short. Sternal shield (90-115 μm long) weakly reticulated (net-like pattern more distinctly indicated on its lateral areas), connected with small reticulated presternal platelets and with 3 pairs of setae (st1-st3) and 2 pairs of pores. Metasternal platelets oval to drop-shaped, with a pore and seta st4. Genital shield slim, relatively long, truncate posteriorly, micropunctured and with a pair of setae st5. Endopodal plates developed in region of coxae III and IV. For elongate slot-like sclerites between genital and ventrianal shield present. Ventrianal shield (210-230 μm long) subpentagonal, distinctly reticulated (circumanal area also densely micropunctured) and bearing 5 pairs of preanal setae (JV1-JV3, ZV2-ZV3), 2 adanal setae and a simple postanal seta; small anus and narrow microdenticulated cribrum

Table 1. Lengths of some dorsal setae in females and males of *H. mariae* (5 females and 5 males measured) and *H. australianus* [partly according to WALTER (1998)].

Dorsal setae	Setal lengths in females (μm)		Setal lengths in males (μm)	
	<i>H. mariae</i>	<i>H. australianus</i>	<i>H. mariae</i>	<i>H. australianus</i>
j1	19–25	19–21	19–23	25
j4	19–21	19–21	18–20	24
J3	22–29	17–25	18–25	23
J4	35–40	41–49	19–23	32
S4	52–60	55–60	50–57	60
S5	69–78	55–60	60–73	70
Z4	77–98	80–90	33–39	40
Z5	77–92	74–75	60–80	80

present. Two pairs of metapodal platelets laying close to anterolateral margins of ventrianal shield, posterior one much larger. Peritrematal shield posteriorly connected with exopodal shield and anteriorly with dorsal shield; anterior tip of peritreme reaching almost to seta s1.

Gnathosoma (Fig. 5). Ventral side of hypostome with 4 pairs of simple and needle-like setae. Corniculi simple. Deutosternum (Fig. 5) with 9 rows of denticles. Palp apotele 2-tined. Digitus fixus of chelicera multidentate, with row of 13–14 teeth and distal extremity with enlarged and rounded anterior margin bearing curved row of 5–7 microdenticles (Fig. 6); digitus mobilis tridentate; pilus dentilis and cheliceral seta present. Tectum (Fig. 11) subtriangular, anterior margin considerably variable (smooth or slightly indented to trispinate).

Legs I and IV approximately equal in length, longer than others. Leg III shortest and with conspicuous and apically obtusely rounded spur on femur (Fig. 8); small spur also on genu present. Legs II stouter, conspicuous and strongly sclerotized spur on femur, genu and tibia present (Fig. 9). Setation of legs I-II-III-IV: coxae 2-2-2-1, trochanters 5-5-5-5, femora 12-11-6-6, genua 11-11-9-9 and tibiae 11-10-8-10.

Male (Figs 3, 4, 7, 10). Idiosoma length and width of 7 measured specimens varied from 435 to 460 μm and 300 to 345 μm , respectively.

Dorsum (Fig. 3). Dorsal shield oval, bearing 39 pairs of setae (including setae r5–r6 and R1–R2) and similarly net-likely ornamented as in female. Most dorsal setae simple, needle-like; some posteromarginal setae inserted on large to massive tubercles (S4–S5; Z2–Z5), thickened, spine-like (S4–S5; Z5) and attenuate apically (Z3–Z5, S3–S5); setae J4 slightly micropilose. Lengths of some dorsal setae are included in Tab. 1.

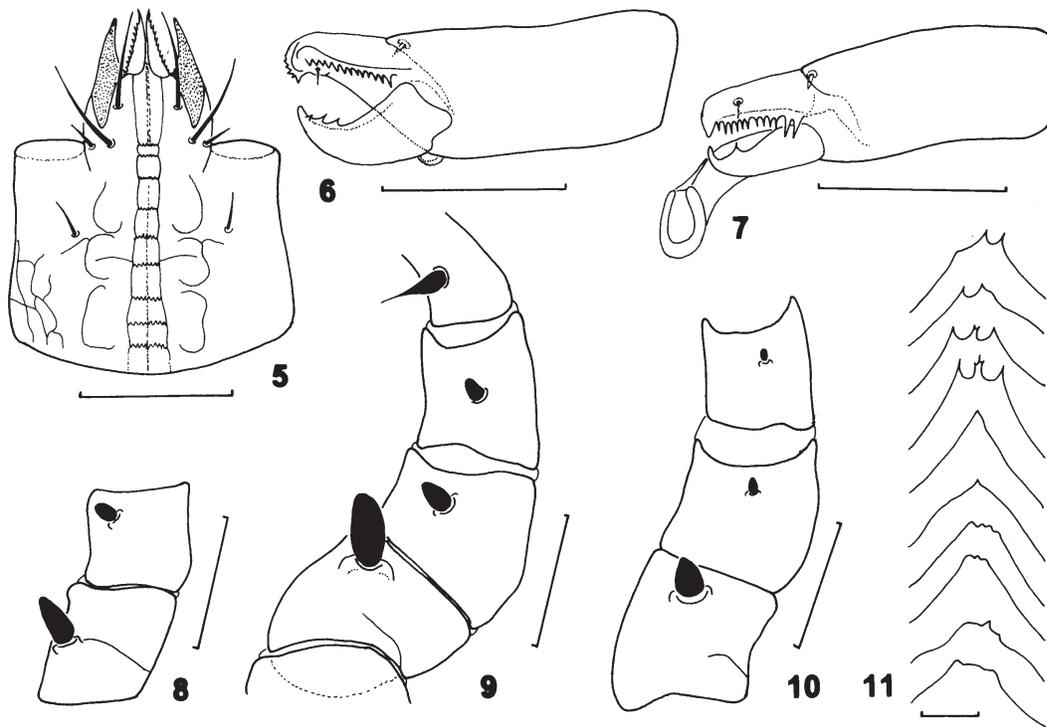
Venter (Fig. 4). All ventral setae simple and needle-like. Holoventral shield absent. Sternogenital shield (180–200 μm long) weakly reticulate and with fine punctations in epigynial area, bearing 5 pairs of setae and 3 pairs of pores. Sternogenital orifice distinctly indicated. Peritrematal shields as in female. Ventrianal shield (175–205 μm long) broader as in female, with net-like pattern (anteromedial meshes distinctly elongated) and fine punctations in circumanal area; bearing 6 pairs of ventral setae (JV1–JV3, JV5, ZV1–2), 2 adanal setae and a postanal seta. Ventrianal shield connected posteriorly with dorsal shield (separating lateral incisions not reaching to setae JV5).

Gnathosoma. Hypostome and tectum very similar to that of female. Digitus fixus of chelicera with row of 11–12 teeth and large distal tooth and unlike female with normal sharp tip (Fig. 7); digitus mobilis unidentate and with thick spermatodactyl straightened forward and bulbous apically; pilus dentilis and cheliceral seta present.

Setation of legs similar to that of female but sclerotized spurs on femur and genu of legs III absent. Spurs of legs II as in Fig. 10.

Material examined. SW Slovakia, Burda hills, Chľaba village (18°48' E, 48°10' N), 250 m a.s.l., 29.VII.2002, 26 ♀♀, 7 ♂♂ on *Daedalea quercina* L. in oak-hornbeam forest (Querco-Carpinetum); 2 ♀♀ on unidentified erotyloid beetles (Coleoptera, Erotylidae) collected on *D. quercina*, other data as in previous finding; SW Slovakia, Little Carpathians Mts, Bratislava city, Železná Studnička settl. (17°06' E, 48°11' N), 350 m a.s.l., 1.V.1997, 2 ♀♀ on *D. quercina* in oak forest (Quercetum).

In addition of *H. mariae*, the acarocoenosis of *D. quercina* was represented also by other mycophilous mesostigmatic ascid mites such as *Aceoseius muricatus* (C. L. Koch, 1839), *Zerconopsis remiger* (Kramer, 1876) and *Lasioseius ometes* (Oudemans, 1903). Ma-



Figs 5–11. *Hoploseius mariae*: 5 – ventral view of hypostome (female); 6 – chelicera (female); 7 – chelicera (male); 8 – apophyses of leg III (female); 9 – apophyses of leg II (female); 10 – apophyses of leg II (male); 11 – tectum and its modifications (female). Scales 50 μm (Figs 5–10), 100 μm (Fig. 11).

terial is deposited in the author's collection in the Institute of Zoology of the Slovak Academy of Sciences in Bratislava.

Differential diagnosis. Morphological characteristics of female (e.g. dorsal setae z3 absent, ventrianal shield with 5 pairs of preanal setae) indicate the mite *H. mariae* belongs to the *bakeri*-group species defined by LINDQUIST (1963). The most similar species is *H. australianus* described from white polypore shelf fungi (WALTER, 1998). Males of above mentioned species may be distinguished as follows: *H. mariae* – ventrolateral incision between ventrianal and dorsal shield not reaching posteriorly to seta JV5, length of dorsal shield between 435 and 460 μm , length of seta J4 (22–23 μm) < half distance J3–J4 (56–60 μm), tip of spermatodactyl 19–20 μm across at tip and with recurved lip; *H. australianus* – ventrolateral incision between ventrianal and dorsal shield reaching posteriorly beyond base of seta JV5, length of dorsal shield between 410 and 430 μm , length of seta J4 (32 μm) > half distance J3–J4 (60 μm), tip of

spermatodactyl 16 μm across at tip, without recurved lip. For differential diagnosis of individual *Hoploseius* females see identification key.

Remarks. The known species of the *bakeri*-group share a subcordate ventrianal shield bearing 11 setae and the suppression of dorsal shield seta z3. These mites are very similar morphologically, but can be distinguished by differences in size, the expression of hypertrophied ventral leg setae (spurs), lengths of dorsal setae, and the number of setae on the segments of leg IV. The Indian species *H. sita-laensis* is the only member of the group with suppressions of leg IV setae (3 setae lost on both genu and tibia IV compared to the examined species). WALTER's (1998) report of 7 setae on genu IV of *H. australianus* is an error (only 6 are present). Additionally, the setation of femur II should have read '10 + spur', as shown in his Fig. 11.

Key to *Hoploseius* species (females):

- 1 (2) Idiosoma slim, distinctly elongated; number of dorsal setae reduced (less than 35 pairs

- present) *H. tenuis* Lindquist, 1965
- 2 (1) Idiosoma oval; number of dorsal setae not reduced (at least 35 pairs present).
- 3 (6) Dorsal setae z3 present; ventrianal shield expanded and bearing 7 pairs of ventral setae (JV1–JV5, ZV2–ZV3).
- 4 (5) Ventrianal shield widened, considerably wider than long; larger metapodal shield subtriangular; medial dorsal setae tricarinate; length of idiosoma: 395–450 μm
 *H. cometa* (Berlese, 1910)
- 5 (4) Ventrianal shield regularly enlarged, approximately so wide as long; larger metapodal shield elongated, slim; medial dorsal setae simple; length of idiosoma: 580 μm
 *H. drosophilii* (Chant, 1963)
- 6 (3) Dorsal setae z3 absent; ventrianal shield subpentagonal and bearing 5 pairs of ventral setae (JV1–JV3, ZV2–ZV3).
- 7 (8) Genu IV with 6 setae, tibia IV with 7 setae *H. sitalaensis* Bhattacharyya, 1977
- 8 (7) Genu IV with 8–9 setae.
- 9 (10) Genu IV with 8 setae
 *H. andamensis* Bhattacharyya, 2002
- 10 (9) Genu IV with 9 setae, tibia IV with 10 setae.
- 11 (12) Idiosoma less than 465 μm in length; ventral seta on basifemur III setiform
 *Hoploseius bakeri* Lindquist, 1963
- 12 (11) Idiosoma larger, more than 465 μm in length; ventral seta on basifemur III modified, thickened and spurred.
- 13 (14) Ventral setae on genu III setiform; fixed digit of chelicera with longitudinal row of 11–12 denticles; seta J4 extending beyond insertion of Z4; length of idiosoma: 480–540 μm *H. australianus* Walter, 1998
- 14 (13) Ventral seta on genu III modified, spur-like; fixed digit of chelicera with longitudinal row of 13–14 denticles; seta J4 extending beyond insertion of Z4; length of idiosoma: 520–570 μm *H. mariae* Gwiazdowicz, 2002

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Acknowledgements

The research was supported by Slovak Agency for Sciences and Technics (Grant No. APVT-51-008402).

Received October 6, 2003

Accepted April 29, 2004