

VIKTOR KEREZSI^a - BALÁZS KISS^a - FERENC DEUTSCH^a - JENŐ KONTSCHÁN^aFIRST RECORD OF *BLATTISOCIUS MALI* (OUDEMANS, 1929) IN HUNGARY ASSOCIATED WITH THE DROSOPHILID FLY *PHORTICA SEMIVIRGO* (MÁCA, 1977)^a Plant Protection Institute, Centre for Agricultural Researches, Hungarian Academy of Sciences, H-1525 Budapest, P.O. Box 102, HungaryCorresponding Author: Jenő Kontschán; kontschan.jeno@agrar.mta.huKerezsi V., Kiss B., Deutsch F., Kontschán J. – First record of *Blattisocius mali* (Oudemans, 1929) in Hungary associated with the drosophilid fly *Phortica semivirgo* (Máca, 1977).The mite *Blattisocius mali* (Oudemans, 1929), as a new phoretic associate of drosophilid fly *Phortica semivirgo* (Máca, 1977), is firstly reported from Hungary. The host is known as a potential vector of nematode eyeworm infestation, *Thelazia callipaeda* Railliet & Henry, 1910.

KEY WORDS: Mites, phoresis, fly.

INTRODUCTION

The males of drosophilid fruitflies of *Phortica* genus usually feed on the lacrimal secretions of animals and humans and play a role in the transmission of the canine thelaziosis nematode (*Thelazia callipaeda* Railliet & Henry, 1910), which parasitizes the conjunctival sac of dogs, cats, wild carnivores and sometimes even humans (MÁCA and OTRANTO, 2014). This canine thelaziosis nematode has been known as oriental eyeworm since its original geographical distribution is in the Far East where it is widely distributed. For now, *T. callipaeda* is in expansion in large parts of Europe from Spain to Hungary (MARINO *et al.*, 2018, FARKAS *et al.*, 2018). In Europe, *Phortica variegata* (Fallén, 1823) is the only confirmed vector of the canine thelaziosis nematode, however, the other *Phortica* species, *Ph. semivirgo* (Máca, 1977), is also mentioned as a potential vector (MÁCA and OTRANTO, 2014).

Till today several mite species are recorded from different groups of flies (SAMŠIŇÁK, 1979, 1989, PEROTTI and BRAIG, 2009, MUMCUOGLU and BRAVERMAN, 2010, PEREZ-LEANOS *et al.*, 2017), but the mites associated with drosophilids are scarcely investigated. Despite the fact that the first co-occurrence of mites with drosophilid flies are known from the Miocene and Upper Eocene (25-40 MYA) (POINAR and GRIMALDI, 1990, ROSS 1998), only a few recent cases of associations are presented (POINAR and GRIMALDI, 1990, LEHTINEN and ASPI, 1992, PEREZ-LEANOS *et al.*, 2017).

In the framework of a local faunistic study on drosophilids, some mite specimens were found on the body of *Phortica semivirgo*. This mite species was the blattisociid *Blattisocius mali* (Oudemans, 1929) which was not reported from Hungary till today. The association of *B. mali* with drosophilid flies is poorly-known, only LEHTINEN and ASPI (1992) presented some records from Finland, but nobody found the association of this mite with the drosophilid fly *Ph. semivirgo*.

MATERIALS AND METHODS

Two of the three investigated female mite specimens were found attached to two females of *Phortica semivirgo*

collected by bottle traps containing red wine and apple vinegar. The traps were installed at 56 localities in Hungary. In the faunistic survey 250 *Phortica* individuals (88 females and 73 males of *Ph. semivirgo* respectively) were caught and examined. The third mite specimens were attached to a male of *Ph. semivirgo*, which was caught by an insect net when approaching to human eye. Collecting dates and localities of the three mite specimens: 1) from female host, 08/05/2018, Budapest (Hungary), 47°22'45"N, 19°03'05"E (motorway rest area); 2) from female host, 07/28/2018, Pilisvörösvár (Hungary), 47°37'58"N, 18°52'55"E (forest edge); 3) from male host, 09/20/2018, Budapest (Hungary), 47°32'31"N, 18°56'58"E (forested area).

The collected drosophilids and mites were placed in 96% ethanol. Before examination, the collected mites were separated from the flies and they were placed to a slide into lactic-acid for a few days to clear them properly for identification. The investigated specimens were studied under scientific light microscope (Leica 1000DM). The drawings were made by using drawing tube of Leica DM1000. The investigated specimens are deposited in the Department of Zoology, Plant Protection Institute, Centre for Agricultural Researches of Hungarian Academy of Sciences. Measurements are given in µm.

RESULTS

Blattisocius mali (Oudemans, 1929)
(Fig. I).

DIAGNOSIS – Idiosoma: Oval, color yellowish-brown, length 500-510, width 352-355. Length of legs: I 390-450, II 358-392, III 352-361, IV 474-480, chelicera: 134-136. Dorsal shield undivided and without midlateral incisions. Dorsal setae ca 48-60, smooth and needle-like, sculptural pattern on dorsal shield reticulate (Fig. I, 1). Sternal shield with 3 pairs of setae, st4 situated on soft cuticle. Metasternal shields absent. Ventrianal shield subtriangular, its anterior margin concave, bearing 3-4 pairs of ventral setae

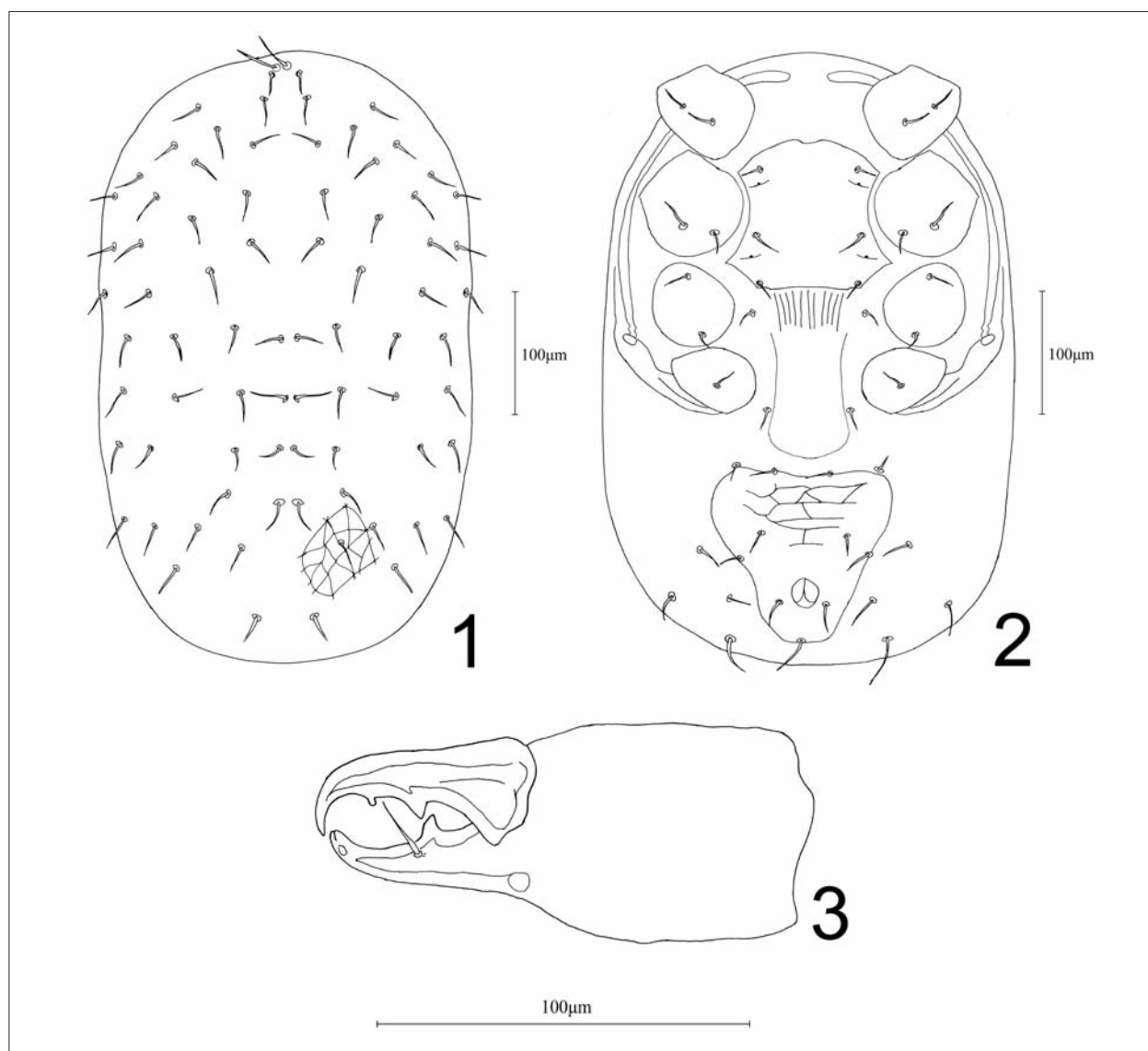


Fig. 1 – *Blattisocius mali*, from Hungary, female, 1. dorsal view of idiosoma, 2. ventral view of idiosoma, 3. lateral view of chelicera.

and with one pair of adanal and one postanal setae. Adanal setae inserted at level of posterior margin of anal opening. Peritrematic shield slender, posterior part curved and reaching to posterior margin of coxae IV (Fig. I, 2). Chelicera robust, movable digit with a bigger and a smaller tooth, fixed digit with a central tooth and a filiform pilus dentilis (Fig. I, 3).

DISTRIBUTION – Europe and North-Africa (KARG, 1993), China and Taiwan (ZHANG and FAN, 2010), India (MODAK *et al.*, 2004) and Turkey (ÇAMAK *et al.*, 2011). This species is reported from North-America as well (FARRIER and HENNESSEY, 1993), originally described as *Lasioseius (Paragarmania) bakeri* Chant, 1958 and synonymized with *Blattisocius mali* by HAINES (1978), which was also collected in an association with the North-American drosophilid, *Drosophila hexastigma* Patterson & Mainland, 1944 (PEREZ-LEANOS *et al.*, 2017).

BIOLOGY – This species occurs in agricultural areas (on plants and in soil) and in natural habitats as well (KARG,

1993). Very often occurs in stored product as well (e.g. apricot, fig, corn, wheat, sunflower, oat, bran, raisin, hazelnut) (ÇAMAK *et al.*, 2011), where it is an important predator of pest astigmatid mites (DE MORAES *et al.*, 2015). However, it was rarely found in association with drosophilid flies (LEHTINEN and ASPI, 1992; CHANT, 1958, PEREZ-LEANOS *et al.*, 2017).

INFESTATION RATE – Considering all examined *Phortica* specimens, the infestation rate (2/250) was less than 1 %. Both female mite specimens were attached to the leg in the case of female host, which is similar to observation of LEHTINEN and ASPI (1992) in other drosophilid flies, but the male host specimen carried its phoront on the ventral part of thorax (Fig. II).

DISCUSSION

The mite species, *Blattisocius mali* was collected on the body of the drosophilid flies, namely *Drosophila littoralis*

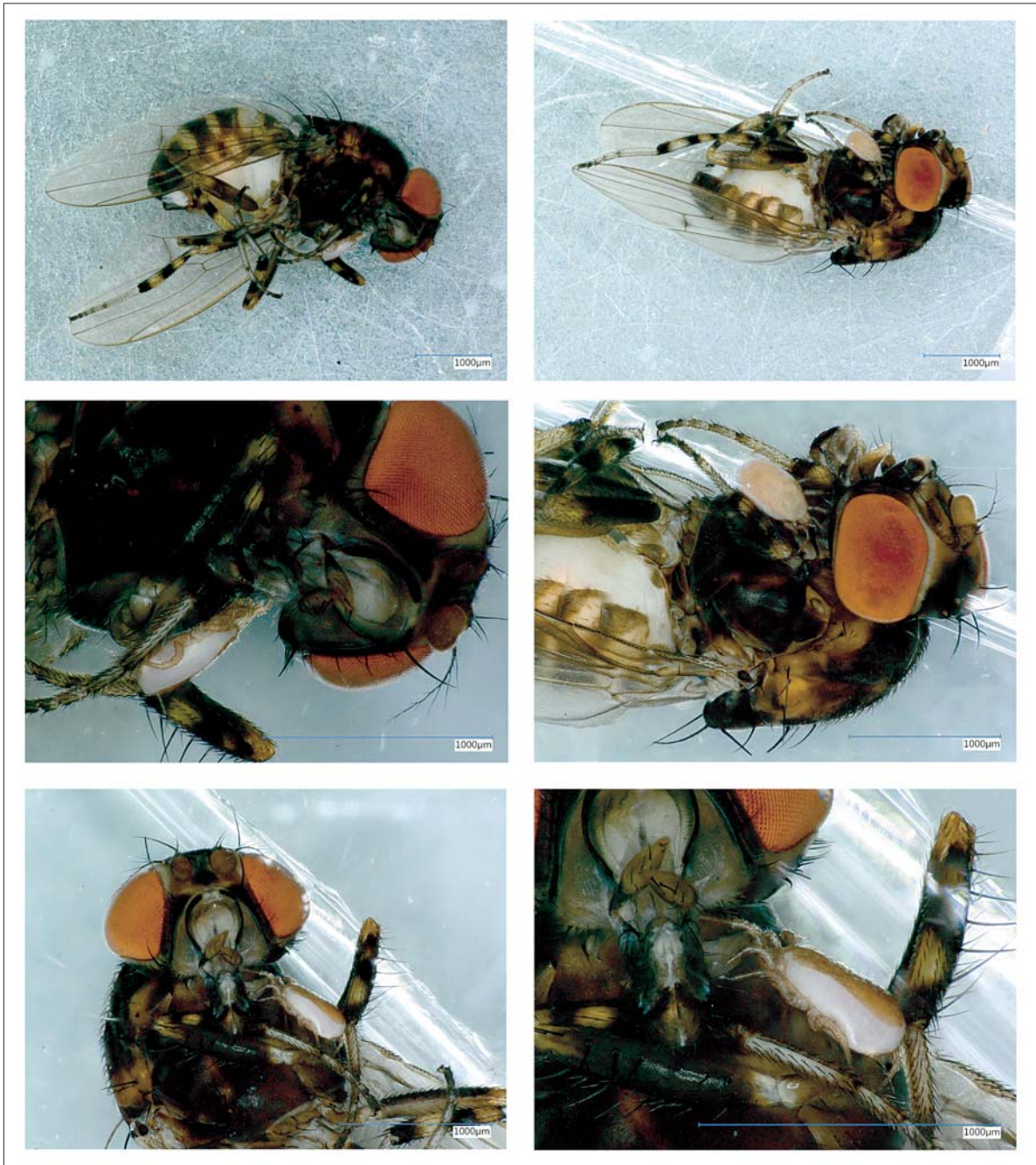


Fig. II – *Blattisocius mali* attached to the drosophilid fly *Phortica*.

Meigen, 1830; *D. montana* Stone, Griffen & Patterson, 1941; *D. lummei* Hackman, 1972; *D. ezoana* Takada & Okada, 1958; *D. transversa* Fallén, 1823 and *D. subarctica* Hackman, 1969 (LEHTINEN and ASPI, 1992). These drosophilids belong to the subfamily Drosophilinae, contrary with the Hungarian host *Phortica semivirgo* which belongs to subfamily Steganinae. Our record is the first confirmed occurrence of this mite on drosophilid fly *Ph. semivirgo* and it is the first record of the *B. mali* associated with a member of the subfamily Steganinae. The three incidences of these mites collected on *Ph. semivirgo*, in contrast with the lack of such observations on thousands of *Drosophila suzukii* (Matsumura, 1931) and *D. melanogaster* Meigen, 1830 examined under microscope in the framework of the same projects (Kiss B., personal communication), may suggest that some factor specifically predisposes *Ph. semivirgo* for this type of acarian infestation.

Unfortunately, the biology of *Ph. semivirgo* and *B. mali* are both poorly known for forming more concrete hypothesis on the nature of such potential predisposition.

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