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First Record of *Penthalodes ovalis* (Dugès, 1834) in Agricultural Area with Notes on its Pest Status (Acari: Penthalodidae)

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The first record of species *Penthalodes ovalis* (Dugès, 1834) in agricultural habitat is presented in this paper. This is also the first record of the occurrence and damages on grown plants. The variability of the morphology and new data on the biology are given as well.

Keywords: Mite, new pest, agricultural area.

The species *Penthalodes ovalis* was described by Dugès (1834) as *Megamerus ovalis* from an unknown European locality, but the description of this species was very brief and incomplete (Kalúz, 2000). More than one hundred year later, Thor and Willmann (1941) have given a more detailed re-description about this species, but only using the available information from literature. Strandtmann (1971) presented a new description based on specimens collected in Alaska (USA). Baker (1990) discussed the morphology of mites of the superfamily Eupodoidea including *Penthalodes ovalis* and mentioned the investigated species which were collected in British regions, but the first exact re-description of the continental European species was presented by Kalúz (2000), who based his work on Slovakian and Turkish specimens. Kalúz (2000) mentioned numerous variables in the morphology among the earlier presented specimens (like shape of eye, shape of polygonal pattern on the dorsal integument and number of aggenital, genital and euanal setae. Later Jesionowska (2010) described Strandtmann's (1971) species as a new species (*Penthalodes alaskaensis* Jesionowska, 2010) and she presented another new species (*Penthalodes hawaiiensis* Jesionowska, 2010) which was mentioned as *Penthalodes ovalis* from Hawaii by Strandtmann and Goff (1978).

In this paper, we present the first record of this species in agricultural area with some notes on the morphology, biology and potential pest status.

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Materials and Methods

Specimens of *Pentholodes ovalis* (Dugès, 1834) were collected in Pont Saint-Martin (France) from radish and lettuce in April of 2017 with fine brush. The specimens were placed into plastic vials full of 70% alcohol. They were then placed into lactic acid for a week and after they were placed into cavity and half covered slides to study. After the study, the specimens were stored in alcohol again and deposited in the mite collection of Montpellier SupAgro — INRA Acarology collection, Montpellier, France (along with three permanent mounted slides) and in the mite collections of Zoology Department of Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, in the Natural History Museum, Geneva, Switzerland and in the Hungarian Natural History Museum. Nomenclature follows Kalúz's (2000) and Baker's (1990) works with some modifications. All measurements and scales are given in micrometers.

Results

Pentholodes ovalis (Dugès, 1834)

Short description of the French specimens

Idiosoma 460–480 long, 240–250 wide (n = 19). Surface covered by small oval globular designs arranged in rows.

Dorsal idiosoma (Fig. 1a). Epirostrum trilobed, wholly reticulate (Fig. 1b). Single pair of eyes present and situated at anterior end of V-shaped groove. Naso ca 13–15 long and ca 24–25 wide. Internal vertical setae (*iv*), short (ca 4–5) smooth and situated far from each other on central area of naso. External verticular setae *ev1* close to naso, *ev2* situated close to eyes. Trichobotria (T) long (ca 46–50), marginally pilose. 9 dorsal setae (*ev1*, *ev2*, *sc*, *c1*, *d1*, *e1*, *f1*, *f2* and *h1*) short (18–23) and tree-like. Setae *c1* and *d1* situated between the two branches of the V-shaped groove. Lyrifissures (*ia*, *im*, *ip*) transversal and narrow, their positions illustrated in Fig. 1a.

Ventral idiosoma (Fig. 1c). 13–17 pairs (in very variable number) of aggenital setae (ca 10–12), eight pairs of genital setae and seven pairs of eugenital setae present (Fig. 1d). Coxal formula 3-1-3-3. Anal opening large, rounded with two pairs of setae and one pair of lyrifissures (*ih*).

Gnathosoma (Figs. 1e–f). One pair of adoral (*ad*) setae curved and smooth, (4–5 long). Subcapitular setae pilose, *sbc1* and *sbc2* 9–10 long. Palp 95–100 long, palp setae pilose, setal formula 0-2-3-5 (Figs. 1h–i). Chelicerae (Fig. 1g) slender, 90–100 long.

Legs (Figs. 1j–k). All legs shorter than idiosoma. All legs with pilose setae, integumentum striated, with rhagidial organs (ω) and solenidia (ϕ , σ), their positions and numbers are illustrated on Figs. 1j (leg I) and 1k (leg II).

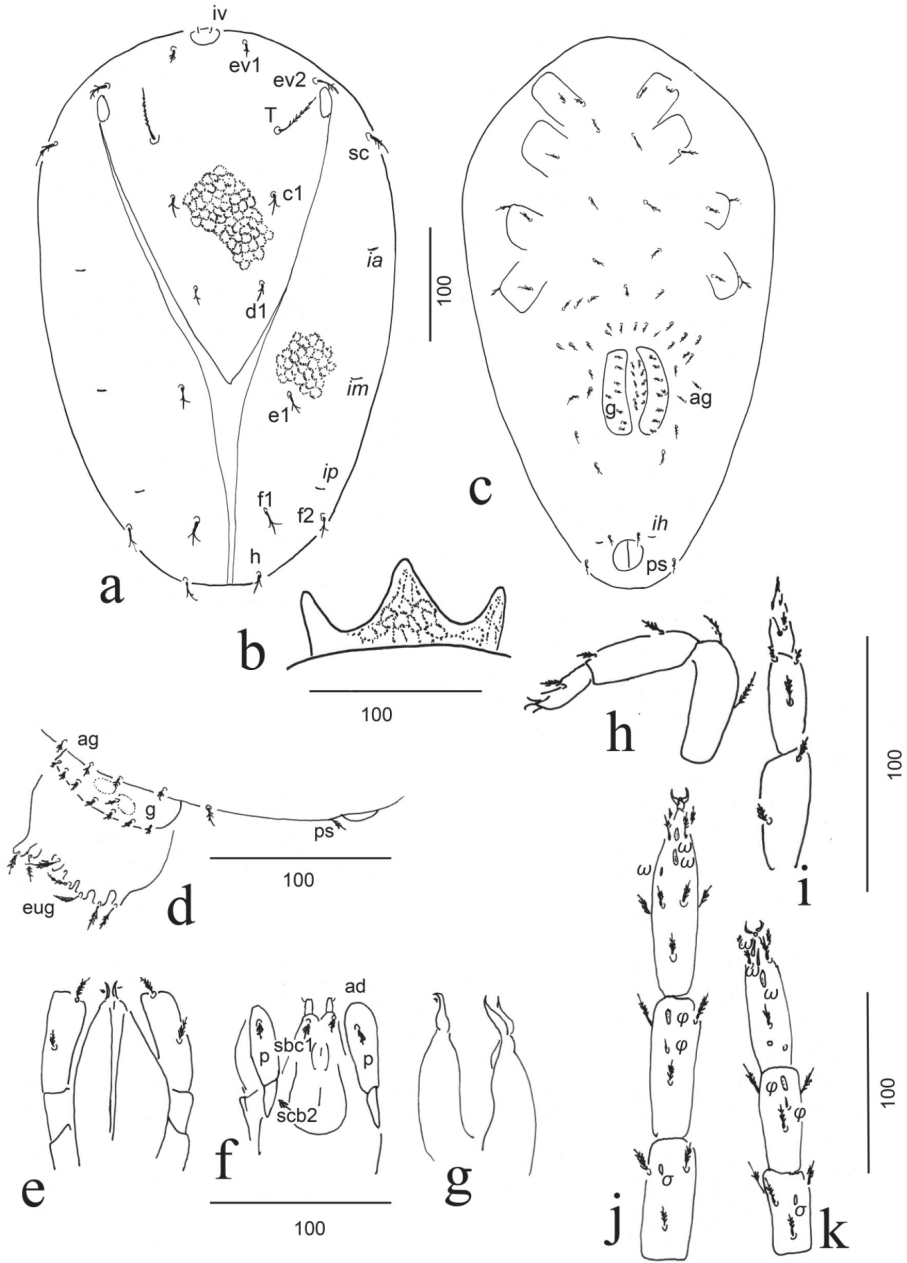


Fig. 1. *Penthalodes ovalis* (Dugès, 1834); a: idiosoma in dorsal view, b: epirostrum, c: idiosoma in ventral view, d: genital region in lateral view, e: gnathosoma in dorsal view, f: gnathosoma in ventral view (p = palp), g: chelicerae in dorsal view, h: palp in lateral view, i: palp in dorsal view, j: leg I in dorsal view, k: leg II in dorsal view.

Material examined

13 females. France. 44. Pont Saint-Martin, from *Lactuca sativa* L. and *Raphanus raphanistrum* (L.) Domin, 10. April 2017, leg. M. Lorne.

Notes to the biology and symptoms

The mites were found under plastic tunnels where radish, lettuce and lamb's lettuce were planted. The mites were collected from radish and also lettuce but only when there were radishes nearby. The mites were collected on leaves of the latter mentioned plants.

Notes to the occurrence

This species was reported by Haupt and Coineau (2002) from France, but it was collected in natural habitat in the Alber Massif, East-Pyrenees. The herewith presented new record is the first occurrences of this species in agricultural habitat in all over the world.

Discussion

The French specimens do not have differences in the number of eugenital setae (7 pairs) with the Slovakian and Turkish (Kalúz, 2000) ones. They however differ from the British specimens (6 pairs) (Baker, 1990). Similar phenomenon can be seen in the number of genital setae, nine pairs were found by Kalúz (2000), but eight were found in our specimens, and ten pairs in specimens studied by Baker (1990). On the other hand, the number of aggenital setae of the French specimens is higher (13–17 pairs), then the observed numbers (7–11 pairs) of the Slovakian and Turkish (Kalúz, 2000) specimens and the British ones (6 pairs) (Baker, 1990).

It is very interesting that the shape of idiosoma is rounded in Kalúz's (2000) illustrations, in contrast with our specimens and Baker's (1990) specimens, where it is narrow and oval. The reason of these differences can be the different investigations methods. Kalúz (2000) studied the mites on permanent slides and we investigated them in cavity and half covered slides. On permanent slides the mounted mites were under high pressure therefore the body shape was distorted, using the cavity slides in the observation, the body can preserve its original form.

Earlier, *P. ovalis* was recorded only from soil and mosses (see Kalúz, 2000), and till today there is no information about the pest status of this species. It would be important to clarify if *P. ovalis* occurrences on radish and lettuce were only occasional and sporadic accident and if they use these plants only as habitats or supports. Or if they really feed regularly on the lettuce and radish, and become recently a real pest mite.

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