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# ADDITIONS TO THE MOROCCAN ORIBATID MITE FAUNA, WITH A SUPPLEMENTARY DESCRIPTION OF *XENILLUS CLAVATOPILUS* (ACARI: ORIBATIDA: LIACARIDAE)

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ABSTRACT: An annotated checklist of oribatid mite taxa collected from Morocco in 1994 and 1997 is provided. We have registered 20 species, 18 genera and 16 families. One species of the family Liacaridae, *Xenillus clavatopilus* Mihelčič, 1967, is redescribed, on the basis of specimens from Marocco. Morphological differences between Moroccan and Spain specimens of this species are presented.

KEY WORDS: Oribatida, *Xenillus clavatopilus*, supplementary description, fauna, checklist, Morocco

## INTRODUCTION

The oribatid mite fauna of Morocco is poorly studied (Grandjean 1932, 1933; Mahunka 1980; Gil-Martín et al. 1992; Subías et al. 1992, 1994; Subías and Arillo 2001; Subías and Shtanchaeva 2011a, b). The primary goal of this paper is to present an annotated checklist of identified oribatid taxa collected by O. Majzlan from Morocco in 1994 and 1997.

One of the identified species is *Xenillus clavatopilus* Mihelčič, 1967, of the family Liacaridae, which is distributed in the West Mediterranean (Subias 2004, online version 2012). This species was described by Mihelčič (1967) based on material from Spain, and later redescribed by Pérez-Íñigo (1997). However, the original description and redescription are incomplete (lacking information about the leg setation and solenidia, length of morphological structures, gnathosoma). Hence, the secondary goal of this paper is to redescribe and illustrate *Xenillus clavatopilus* based on the Moroccan material, and to note morphometric differences from the Spanish population.

## MATERIALS AND METHODS

The oribatid mite fauna have been recorded from two sites of Morocco:
— MOR-1: Central Morocco, 33°25′ N, 05°10′ E, 1700 m above sea level, Azrou env., ceder forest; in soil, 7.06.1994, collected by O. Majzlan.
— MOR-2: Central Morocco, 33°25′ N, 05°10′ E, 1710 m above sea level, Azrou env., ceder forest; in soil, 9.06.1997, collected by O. Majzlan.

Specimens were mounted in lactic acid on temporary cavity slides for measurement and illustration. All body measurements are presented in micrometers. Body length was measured in lateral view, from the tip of the rostrum to the posterior edge of the ventral plate. Notogastral width refers to the maximum width in dorsal aspect. Lengths of body setae were measured in lateral aspect.

Formulae for leg setation are given in parentheses according to the sequence trochanter–femur–genu–tibia–tarsus (famulus included). Formulae for leg solenidia are given in square brackets according to the sequence genu–tibia–tarsus.

Terminology used in this paper mostly follows that Norton and Behan-Pelletier (2009).

## RESULTS

In the course of taxonomic identification of Moroccan oribatid mite material we have registered 20 species, 18 genera and 16 families. An annotated checklist of recorded oribatid taxa is presented below. It indicates the specific localities where they were collected, and notes their overall known distribution[1].

### Checklist of oribatid mites

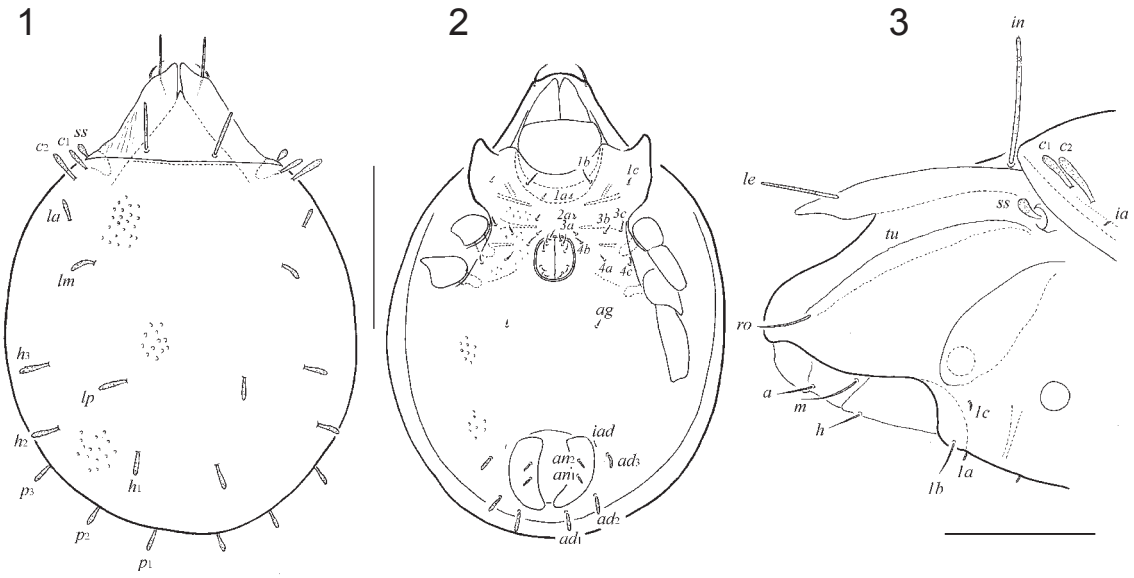
**Camisiidae**
— *Camisia spinifer* (Koch, 1835). Locality: MOR-1. Distribution: semicosmopolitan
— *Heminothrus peltifer* (Koch, 1839). Locality: MOR-1. Distribution: semicosmopolitan

**Damaeidae**
— *Damaeus* sp. Locality: MOR-1, MOR-2

Eremaeidae
— *Eueremaeus oblongus* (Koch, 1835). Locality: MOR-1, MOR-2. Distribution: Holarctica and China

**Oribellidae**
— *Pantelozetes paolii* (Oudemans, 1913). Locality: MOR-2. Distribution: Holarctica and Java Island

[1] See Subías (2004, online version 2012)




Figs 1–3. *Xenillus clavatopilus* Mihelčič, 1967, adult: 1 — dorsal view; 2 — ventral view, gnathosomal setae and legs (except basal parts of legs III, IV) not shown; 3 — lateral view of prodorsum, legs I, II not shown. Scale bars 400 μm (1, 2); 200 μm (3).

**Oppiidae**

— *Dissorhina ornata* (Oudemans, 1900). Locality: MOR-1. Distribution: Holarctica and Eastern Africa

**Carabodidae**

— *Carabodes areolatus* Berlese, 1916. Locality: MOR-1. Distribution: Palearctica

**Tectocepheidae**

— *Tectocepheus velatus* (Michael, 1880). Locality: MOR-1. Distribution: cosmopolitan

**Liacaridae**

— *Xenillus clavatopilus* Mihelčič, 1967. Locality: MOR-1, MOR-2. Distribution: Mediterranea west

**Scutoverticidae**

— *Scutovertex sculptus* Michael, 1879. Locality: MOR-1, MOR-2. Distribution: Palearctica and New Zealand

**Phenopelopidae**

— *Eupelops plicatus* (Koch, 1835). Locality: MOR-1, MOR-2. Distribution: Holarctica

**Oribatellidae**

— *Oribatella quadricornuta* (Michael, 1880). Locality: MOR-1, MOR-2. Distribution: Holarctica

**Achipteriidae**

— *Achipteria* sp. Locality: MOR-1.

**Mycobatidae**

— *Minunthozetes semirufus* (Koch, 1841). Locality: MOR-1, MOR-2. Distribution: Holarctica and Canada

**Chamobatidae**

— *Chamobates borealis* Trägårdh, 1902. Locality: MOR-1, MOR-2. Distribution: Palearctica

— *Chamobates cuspidatus* (Michael, 1884). Locality: MOR-2. Distribution: Holarctica and Seychelles Islands

**Oribatulidae**

— *Oribatula tibialis* (Nicolet, 1855). Locality: MOR-1, MOR-2. Distribution: Holarctica and India

— *Zygoribatula excavata* Berlese, 1916. Locality: MOR-1. Distribution: Mediterranea

— *Zygoribatula undulata* Berlese, 1916. Locality: MOR-1. Distribution: pantropics and subtropics

**Galumnidae**

— *Allogalumna parva* (Berlese, 1916). Locality: MOR-2. Distribution: Mediterranea

The majority of recorded species have a wide geographical distribution: Palearctica and Holarctica (nine species) or (semi-)cosmopolitan (five species). Three species can be included in the Mediterranean oribatid mite group.

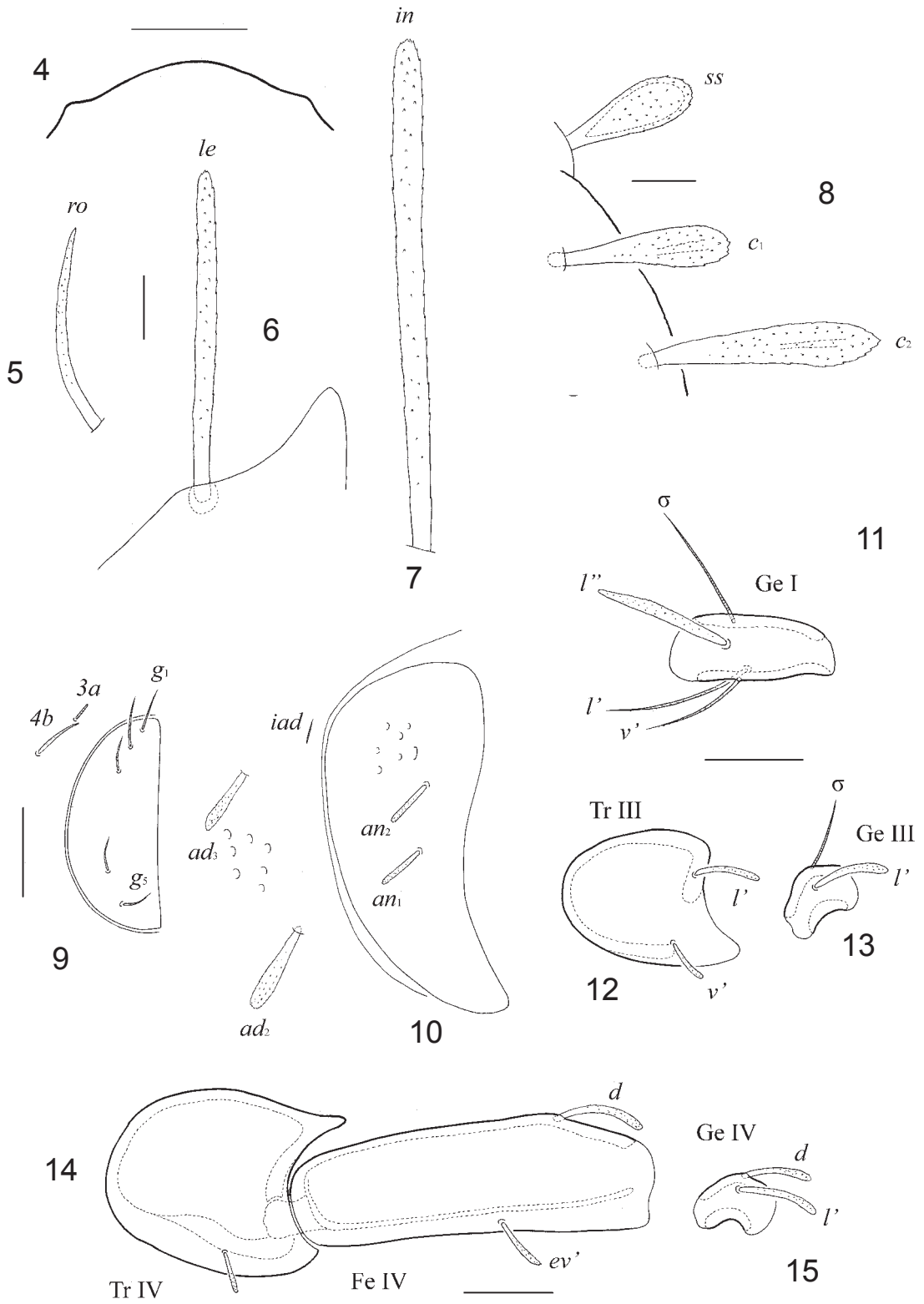
## Description of Moroccan *Xenillus clavatopilus* Mihelčič, 1967

Figs 1–15

**Description**. **Measurements**. Body size: length 1128 (three specimens); notogaster width 846–863 (three specimens).

**Integument**. Body color yellowish-brown to brown. Surface of notogaster, epimeral and anogenital regions foveolate (diameter of foveolae up to 12). Lateral parts of lamellae with poorly visible striae.

**Prodorsum** (Figs 1, 3–8). Rostrum rounded, with two small lateral tubercles (Fig. 4). Lamellae




Figs 4–15. *Xenillus clavatopilus* Mihelčič, 1967, adult: 4 — rostrum; 5 — rostral seta; 6 — lamellar seta; 7 — interlamellar seta; 8 — sensillus and notogastral setae $c_1$ and $c_2$; 9 — genital plate, right, and epimeral setae *3a*, *4b*; 10 — anal plate, right, and adanal setae $ad_2$ and $ad_3$; 11 — leg genu I, left, antiaxial view; 12 — leg trochanter III, left, antiaxial view; 13 — leg genu III, left, antiaxial view; 14 — leg trochanter IV and femur IV, left, antiaxial view; 15 — leg genu IV, left, antiaxial view. Scale bars 50 μm (4, 9–15); 20 μm (5–8).

little longer than of half of the prodorsum (see in lateral view), connected medially at base of cusps by conical tubercle. Lamellar cusps shorter than length of lamella. Outer cuspidal dens absent. Inner cuspidal dens well developed, wide, triangular, blunt-ended; without indentation between

Table 1.
Leg setation and solenidia of *Xenillus clavatopilus* Mihelčič, 1967

| Leg | Trochanter | Femur | Genu | Tibia | Tarsus |
|---|---|---|---|---|---|
| I | *v′* | *d, (l), bv″, v″* | *(l), v′*, σ | *(l), (v)*, $\varphi_1$, $\varphi_2$ | *(ft), (tc), (it), (p), (u), (a), s, (pv), (v), (pl), e,* $\omega_1$, $\omega_2$ |
| II | *v′* | *d, (l), bv″, v″* | *(l)*, σ | *(l), (v)*, φ | *(ft), (tc), (it), (p), (u), (a), s, (pv),* $\omega_1$, $\omega_2$ |
| III | *l′, v′* | *d, l′, ev′* | *l′*, σ | *l′, (v)*, φ | *(ft), (tc), (it), (p), (u), (a), s, (pv)* |
| IV | *v′* | *d, ev′* | *d, l′* | *l′, (v)*, φ | *ft″, (tc), (p), (u), (a), s, (pv)* |

Roman letters refer to normal setae (*e* — famulus), Greek letters refer to solenidia. One apostrophe (′) marks setae on anterior and double apostrophe (″) setae on posterior side of the given leg segment. Parentheses refer to a pair of setae.

Table 2.
Variability of some morphological characters of *Xenillus clavatopilus* Mihelčič, 1967

| Character | Moroccan specimens (our data) | Spain specimens (see Mihelčič 1967) | Spain specimens (see Pérez-Íñigo 1997) |
|---|---|---|---|
| Body size | 1128 × 846–863 | 950–1250 × 560–940 | 900–1020 × 600–820 |
| Lamellar cusps | Little not reaching of the anterior margin of rostrum | Considerably not reaching the anterior margin of rostrum | Reaching the anterior margin of rostrum |
| Relation of sensilli and notogastral setae $c_1$, $c_2$ | Sensilli shorter than $c_1$, $c_2$ | Sensilli longer than $c_1$, $c_2$ | Sensilli longer than $c_1$, $c_2$ |
| Position of notogastral setae *lp* and $h_2$ | $h_2$ removed from *lp* | $h_2$ removed from *lp* | $h_2$ near *lp* |
| Morphology of anal setae | Weakly dilated distally | Well dilated distally | Well dilated distally |

outer and inner cuspidal dens. Rostral setae (*ro*, 65–69) setiform, with antero-medially curved tip, slightly barbed. Lamellar setae (*le*, 98–102) thickened, straight, slightly barbed, directed anteriorly. Interlamellar setae (*in*, 159) similar to lamellar setae, except thicker and directed upwards. Sensilli (*ss*, 41–45) shortest setae on prodorsum, clavate, slightly barbed. Sensillar stalk shorter than rounded head. Exobothridial setae and their alveoli not evident. Tutoria (*tu*) long.

**Notogaster** (Figs 1, 3, 8). Anterior notogastral margin straight. Eleven pairs of notogastral setae developed. All setae short, dilated distally, slightly barbed. Setae $c_2$ longest on notogaster (73–82), others shorter (57–73). Lyrifissures *ia*, *im*, *ip*, *ih*, *ips* and opisthonotal gland openings located in normal position for *Xenillus*, but poorly visible.

**Gnathosoma**. Typical for *Xenillus* (Schatz 2004; Ermilov, Kalúz 2012). Subcapitulum longer than wide: 278 × 225. Subcapitular setae setiform, barbed; *m* (73) longer than *a* (53) and *h* (41). Adoral setae (36) setiform, barbed. Palps (180) with setation 0–2–1–3–9(+ω). Solenidion thick, pressed to surface of palptarsus, not attached to eupathidium. Distal setae very short. Chelicerae (311) with two setiform, barbed cheliceral setae; *cha* (102) longer than *chb* (73). Trägårdh's organ distinct.

**Epimeral region** (Fig. 2). Epimeral setal formula 3–1–3–3. All setae slightly barbed. Setae *1b* longest (49), setiform; medial setae *1a*, *2a*, *3a* shortest (10–12), blunt-ended; setae *1c*, *3b*, *3c*, *4a*, *4b*, *4c* longer than medial setae (28–32), setiform.

**Anogenital region** (Figs 2, 9, 10). Five pairs of genital ($g_1$, $g_2$ 32, $g_1$–$g_5$ 24), one pair of aggenital (24–28), two pairs of anal (32–36) and three pairs of adanal ($ad_1$, $ad_2$ 53, $ad_3$ 45) present, all slightly barbed. Genital and aggenital setae setiform, anal setae thickened and weakly dilated distally, adanal setae dilated distally. Lyrifissure *iad* in paranal position.

**Legs** (Figs 11, 12). Formulae of leg setation and solenidia: I (1–5–3–4–20) [1–2–2], II (1–5–2–4–15) [1–1–2], III (2–3–1–3–15) [1–1–0], IV (1–2–2–3–12) [0–1–0]; homology of setae and solenidia indicated in Table 1. Setae setiform or dilated distally, slightly barbed. Famulus short, blunt-ended. Solenidia setiform.

**Remarks**. Moroccan specimens (our data) of *Xenillus clavatopilus* are similar in general appearance to those from Spain (Mihelčič 1967; Pérez-Íñigo 1997), but there are several morphometrical differences. These include: body size;

length of lamellar cusps; length of sensilli and notogastral setae, morphology of anal setae (see Table 2). We believe these differences represent intraspecific (perhaps geographical) variability, and the full range of data should be considered in any future identification of *Xenillus clavatopilus*.

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## REFERENCES

Ermilov, S.G. and Kalúz, S. 2012. Two new species of oribatid mites (Acari: Oribatida) from Ecuador. *Systematic and Applied Acarology*, 17 (3): 269–280.

Gil-Martín, J. Subías, L.S. and Arillo, A. 1992. Oribatidos de Marruecos y Sahara Occidental. I: O. Inferiores (Acari, Oribatida, Macropylina). *Graellsia*, 48: 53–63.

Grandjean, F. 1932. La family Protoplophoridae (Acariens). *Bulletin de la Société Zoologique de France*, 57: 10–36.

Grandjean, F. 1933. Oribates le l'Afrique du Nord (1re Série). *Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord*, 24: 308–323.

Mahunka, S. 1980. Neue und interessante Milben aus dem Genfer Museum XLII. Erster Beitrag zur Kenntnis der Oribatiden-Fauna der Höhlen Marokkos (Acari: Oribatida). *Revue suisse de Zoologie*, 87 (3): 797–805.

Mihelčič, F. 1967. Einige neue Oribatiden aus xerothermen boden zentralspaniens. *Eos*, 42: 517–525.

Norton, R.A. and Behan-Pelletier, V.M. 2009. Oribatida. *In*: G.W. Krantz, D.E. Walter (Eds). A Manual of Acarology: Lubbock, Texas Tech University Press. Chapter 15; p. 430–564.

Pérez-Íñigo, C. 1997. Acari. Oribatei, Gymnonota I. *In*: Ramos, M.A. et al., editors. Fauna Iberica: Museo Nacional de Ciencias Naturales Press, Madrid, 374 p.

Subías, L.S. 2004. Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes: Oribatida) del mundo (excepto fósiles). *Graellsia*, 60 (número extraordinario): 3–305. Online version accessed in February 2012. 564 pp.; http://www.ucm.es/info/zoo/Artropodos/Catalogo.pdf

Subías, L.S. and Arillo, A. 2001. Nuevas especies de Carabodidae (Acariformes, Oribatida) Iberomagrebíes. *Graellsia*, 57 (1): 73–83.

Subías, L.S. and Shtanchaeva, U.Ya. 2011a. Un Nuevo subgénero, seis nuevas especies y dos nuevas subspecies del género *Rhinoppia* Balogh, 1983 (Acari, Oribatida, Oppiidae, Medioppiinae) de la Península Ibérica y de Marrucos. *Boletin de la Real Sociedad Espanola de Historia Natural*, 105: 1–10.

Subías, L.S. and Shtanchaeva, U.Ya. 2011b. Descripción de *Oxymystroppia phylloseta* n. gen., n. sp. de Marrucos y de *Corynoppia hispanica* n. sp. del sur de España (Acari, Oribatida, Oppiidae). *Boletin de la Asociacion Espanola de Entomologia*, 35 (3–4): 315–323.

Subías, L.S., Arillo, A. and Gil-Martín, J. 1992. Consideraciones biogeograficas sobre los oribatidos (Acari, Oribatida) de Marruecos y Sahara Occidental. *In*: Alemany, A., editor. *Historia Natural*, 91: 189–202.

Subías, L.S., Arillo, A. and Gil-Martín, J. 1994. Oribátidos de Marruecos y Sahara Occidental. II. Listado de especies (Acari, Oribatida). *Boletin de la Real Sociedad Espanola de Historia Natural* (*Seccion Biologica*), 91 (1–4): 129–134.