

***Foveacheles unguiculata* n.sp.,
a New Rhagidiid Mite from the Central Alps
(Tyrol, Austria)**

(Acari: Prostigmata: Rhagidiidae)

from

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Synopsis: *Foveacheles (Usitorhagidia) unguiculata* n.sp. from the subnival alpine zone of the Ötztal Alps, North Tyrol, Austria, is described.

1. Introduction:

Predatory soil mites of the family Rhagidiidae are world-wide in distribution and inhabit various ecosystems. However, they prefer rather cool and moist habitats (STRANDTMANN 1971, ZACHARDA 1980, 1993). They may also be frequently found in high altitudes or high latitudes above timberline in uppermost parts of alpine, subnival and low nival zones with severe climatic conditions. There they occur under stones and in wet stony debris in shaded ground depressions frequently covered with snow as late as in mid-summer.

In the Alps, rhagidiid mites have been collected frequently. WILLMANN (1932, 1934) studied cave rhagidiids in the southeastern Alps region. Most collections of rhagidiid mites, however, have been collected in alpine subnival or nival zones that have probably attracted zoologists as habitats with unusual, rather severe climatic conditions where unusual creatures might also be expected. There rhagidiid mites have been collected by hand sorting on the soil surface or under stones at altitudes of 1500 - 3400 m. To date 23 species of rhagidiid mites have been reported from the Alps (FRANZ 1943, 1954, IRK 1939, JANETSCHEK 1959, 1993, MIHELČIĆ 1957, SCHMÖLZER 1962, SCHWEIZER & BADER 1963, THOR & WILLMANN 1941, WILLMANN 1951, 1953a, b, ZACHARDA 1980). Specific names that occur most frequently in these papers are *Rhagidia tericola* (C.L. KOCH), *R. intermedia* WILLMANN, *R. reflexa* (C.L. KOCH), *R. gigas* (CANE-STRINI) and *R. dalmatina* WILLMANN. However, most rhagidiids reported from the Alps in the above mentioned papers have been species of uncertain taxonomic placement because previous knowledge about them was so poor that reliable identification of them might not be possible. To date only *Poecilophysis pratensis* (C.L. KOCH), *P. wankeli* ZACHARDA, *Foveacheles osloensis* (THOR), *F. willmanni* ZACHARDA, *F. alpina* ZACHARDA, *Evadorhagidia janetscheki* (WILLMANN), *Shibaia longisensilla* (SHIBA) and *Thoria uniseta* (THOR) which were investigated during a revision of Willmann's collection (ZACHARDA 1980), are species confirmed to occur in the Alps.

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During field studies by Dr. K. Thaler and Mag. B. Knoflach (Institute of Zoology, Univ. Innsbruck) in the Central Alps an unknown rhagidiid mite of the genus *Foveacheles* was collected in a rocky habitat at altitudes of 2800 - 2900 m. Thanks to the collectors I had opportunity to study this material and describe the new species here.

2. Material and methods:

The material was collected by hand-sorting on a bare soil surface with small patches of alpine subnival vegetation. The mites were preserved in alcohol and later mounted in lactic acid in temporary microscopic preparations and examined under a standard light microscope under bright field without phase contrast.

Terminology follows that proposed by LINDQUIST and ZACHARDA (1987), and BAKER (1990), who applied new descriptive formats and morphological terminologies to the Rhagidiidae largely based on the works of GRANDJEAN (e.g., 1934, 1939). Measurement criteria follow those of ZACHARDA (1980).

3. Taxonomic and faunistic results:

Foveacheles (Usitorhagidia) unguiculata n. sp. (Figs 1 - 3)

Foveacheles Zacharda, 1980, p. 661.

Usitorhagidia Zacharda, 1980, p. 682.

Diagnosis:

Large adults, length of idiosoma 1280 μm . Proximal cheliceral seta inserted slightly distad of articulation of movable digit; tip of proximal seta reaches, or slightly overlaps insertion of distal seta. Rhagidial organ II consists of 3 separated rhagidial solenidia in tandem and 1 simple spiniform famulus positioned between 1st and 2nd proximal rhagidial solenidia antiaxially. Tarsal claws with strikingly large, sabre-shaped ventrobasal clawlets.

Description:

Adult female (1 examined). Length of idiosoma 1280 μm , ratio of leg I length to idiosomal length 1.41.

Gnathosoma:

Subcapitulum moderately slender, subtriangular (Fig. 1C); ratio of length to breadth 1.30; distal hypostomal lips with spiniform internal and serrate external malar processes; adoral setae nude; proximal subcapitular setae ciliate, external pair slightly longer than internal pair. Chelicerae robust, dorsal surface with saddle-shaped depression at level of bases of digits (Fig. 1A); cheliceral digits robust; fixed digit terminates in 3 cusps, smooth along masticatory surface; movable digit serrated along mid-third of masticatory surface. Chelicerae with 2 setae, proximal one inserted slightly distad of articulation of movable digit; tip of proximal seta reaches, or slightly overlaps, insertion of distal seta; tip of distal seta overlaps apex of fixed digit. Length of chelicera 346 μm , dorsoventral width 165 μm , length of movable digit 135 μm , length of proximal and distal cheliceral setae 39 - 49 and 59 μm , respectively, distance between their insertions 46 μm . Ratio of cheliceral length to dorsoventral width 2.09; ratio of length of movable digit to length of chelicera 0.39; ratio of length of movable digit to dorsoventral width of chelicera 0.82. Palpus robust, with relatively stout tarsus (Fig. 1D); ratio of length to width of tarsus 2.73. Length of palpal trochanter, femorogenu, tibia and tarsus 49 μm , 165 μm , 69 μm and 145 μm , respectively. Number of setae and solenidia (in brackets) on palpal trochanter, femorogenu, tibia and tarsus 0-2-3-10(1), respectively; tarsal solenidion simple, erect.

(In Fig. 1D only 9 ciliated setae are visible on the palpal tarsus because 1 of them, proximad of solenidion, is covered with the ciliated seta in this lateral aspect.)

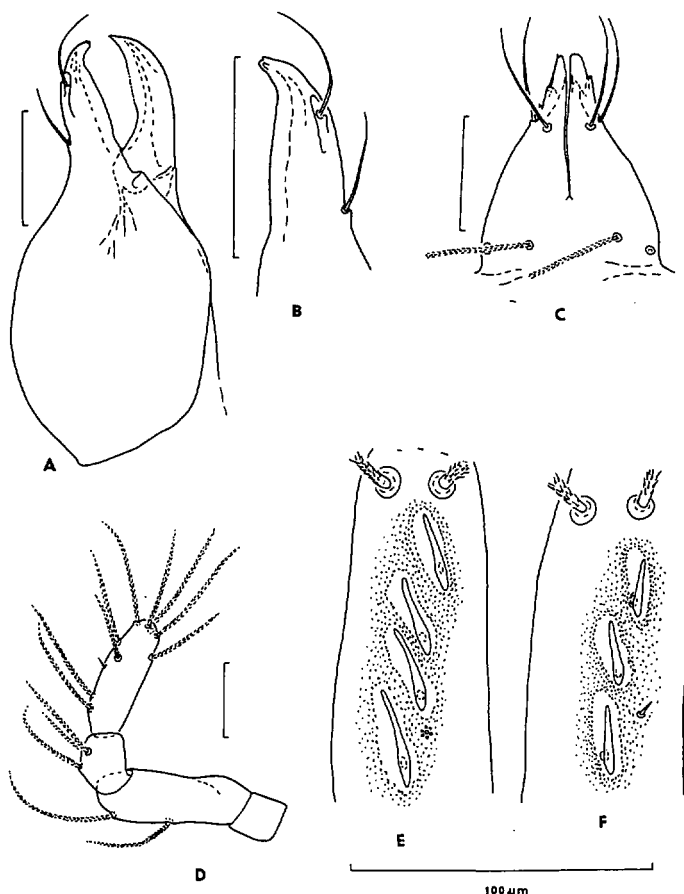


Fig. 1: *Foveacheles (Usitorhagidia) unguiculata* n. sp., adult female. A: Chelicera, lateral aspect. B: Insertion of cheliceral setae in detail, lateral aspect. C: Subcapitulum, ventral aspect. D: Palpus, lateral aspect. E: Rhagidial organ I, dorsal aspect. F: Rhagidial organ II, dorsal aspect. Bar scales for A - F: 100 µm.

Prodorsum:

Naso well-developed, with a pair of internal vertical setae v1. Bothridial setae sc1 filiform, finely pubescent. Length of setae: v1 torn off, v2 89 µm, sc1 148 µm, sc2 198 µm.

Opisthosomal dorsum:

Complement and arrangement of dorsal setae and cupules typical for Rhagidiidae; four pairs of cupules; ia positioned at level about midway between setae c1 and d1, im lateral and just anterior to setae e1, ip between setae e1 and f1, ih positioned ventrolaterally, almost laterad of posteriormost pair of aggenital setae. Length of setae: c1 109 µm; c2 214 µm; d1 100 µm; e1 102 µm; f1 torn off; f2 105 µm; h1 and h2 torn off.

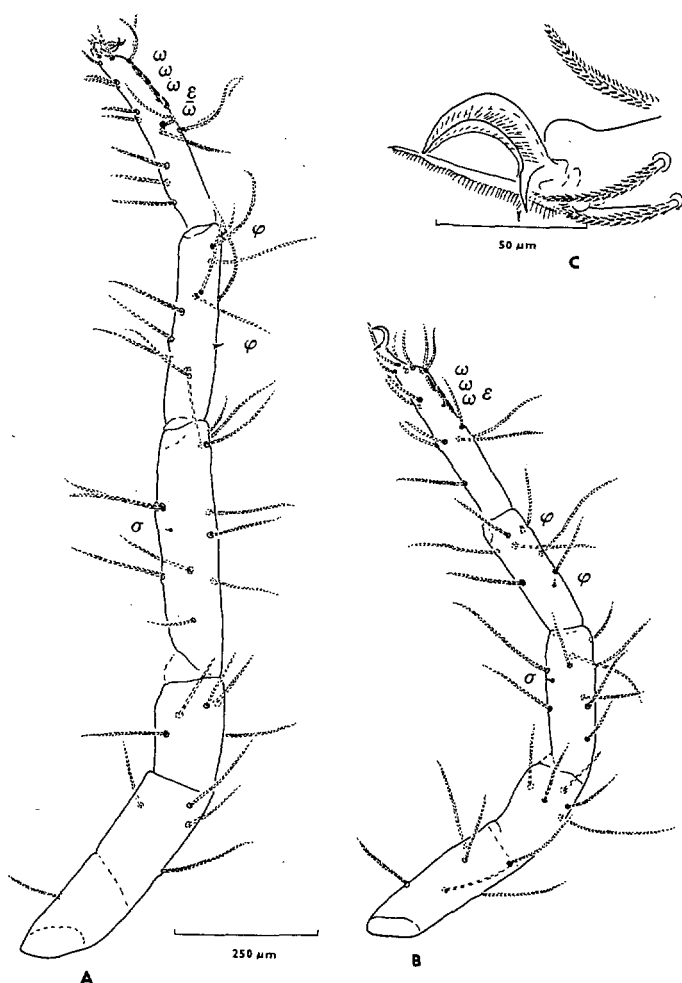


Fig. 2: *Foveacheles (Usitorhagidia) unguiculata* n. sp., adult female. A: Setal arrangement on leg I. B: Setal arrangement on leg II. C: Ventrobasal clawlets on claws on tarsus II. Bar scales for A, B: 250 μm and C: 50 μm .

Podosoma:

Coxisternal plates (epimeres) I, II, III, IV with 3-1-5-3 finely pubescent setae, respectively.

Genital region:

Genital valves each with 5 finely pubescent setae of similar length, about 50 μm , arranged evenly along medial edge of valve. Five pairs of aggenital (paragenital) setae of similar length, about 65 μm . Length of genital valves 165 μm .

Legs:

Leg I 1800 μm long, about 1.41 as long as idiosoma. Empodia all setulose, broadly oval in dorsoventral view, slightly longer than claws; claws each with large, sabre-shaped clawlet ventro-

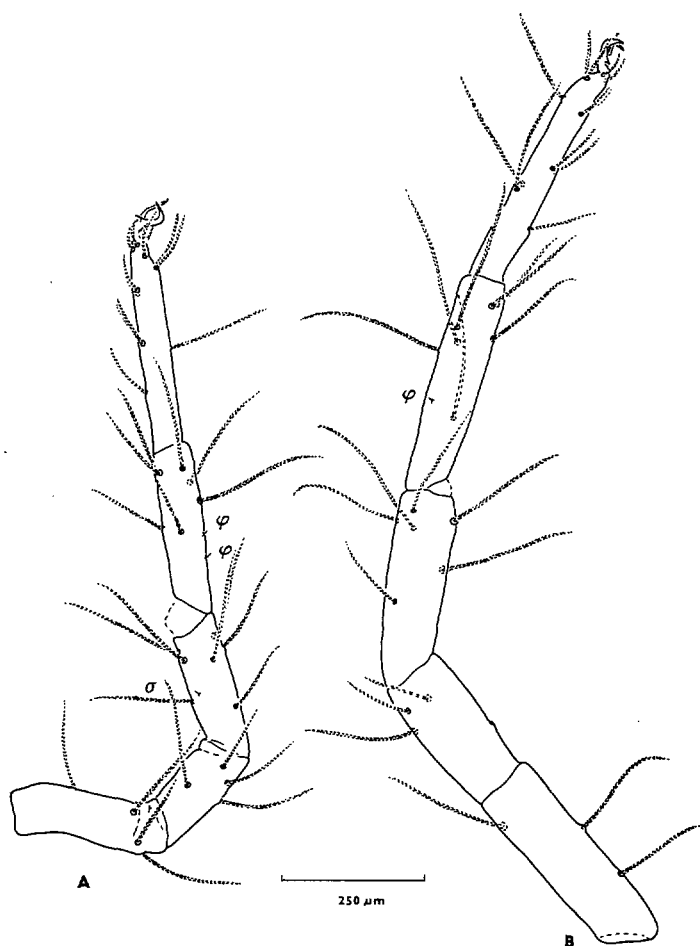


Fig. 3: *Foveacheles (Usitorhagidia) unguiculata* n. sp., adult female. A: Setal arrangement on leg III. B: Setal arrangement on leg IV. Bar scale: for A, B 250 μ m.

basally (Fig. 2C). Number of setae and solenidia (solenidia and famulus, ϵ , bracketed), respectively, on legs I - II - III - IV: trochanters 1-1-2-2; basifemora + telofemora 5+5-6+5-4+4-3+4; genua 11(1)-9(1)-7(1)-6; tibiae 11(2)-7(2)-7(2)-7(1); tarsi 19(4+ ϵ)-16(3+ ϵ)-14-14 (Figs. 2, 3).

Genu I with 1 erect, simple, lateroventral, medioproximal solenidium positioned proximad of 1st pair of distiventral setae; genu II with 1 small, simple, distiventral solenidium; genu III with 1 lateroventral, medial, small, simple solenidium. Tibia I with 1 small, dorsoproximal, erect simple solenidium, and 1 dorsodistal rhagidial solenidium partly recumbent in deeper depression; tibia II with 1 small, laterodorsal, medioproximal simple erect solenidium, and 1 small, lanceolate dorsodistal solenidium recessed in deep pit with small pore; tibia III with 2 erect, simple, laterodorsal, medioproximal solenidia arranged in tandem; tibia IV with 1 erect, simple laterodorsal, proximal solenidium. Tarsus I slender, its tip slightly truncated in lateral view, ratio length to width 5.50, with 4 oblique rhagidial solenidia lying in separate depressions, stellate famulus, ϵ , inserted between 1st and 2nd proximal rhagidial solenidium antiaxially (Fig. 1E); tarsus II with 3 rhagidial solenidia lying in tan-

dem in separate, slightly oblique depressions and small spiniform famulus, ϵ , positioned between 1st and 2nd proximal rhagidial solenidia antiaxially (Fig. 1F).

Affinities:

Foveacheles (Usitorhagidia) unguiculata n. sp. belongs to a group of species of the genus *Foveacheles* whose adults have rhagidial organs (I) consisting of 4 oblique, separate solenidia and stellate famulus positioned between 1st and 2nd proximal rhagidial solenidia, and rhagidial organs (II) consisting of 3 separate rhagidial solenidia and spiniform famulus. In this respect, the female of *F. unguiculata* is most similar to that of *F. (F.) incognita* ZACHARDA 1980, but it differs by having 5 setae on epimeres III, a small, partly recumbent, dorsodistal rhagidial solenidion on tibia I positioned in an open depression, and the cheliceral shears (ratio of length of movable digit to length of chelicera 0.39), palpal tarsus (ratio of length to width 2.73) and tarsus of leg I (ratio of length to width 5.50) relatively elongated. In *F. incognita*, 6 setae are on epimeres III, the dorsodistal solenidion on tibia I is positioned in a deep depression and resembles the lanceolate solenidion on tibia II (seen in lateral aspect), and the cheliceral shears (ratio length of movable digit to length of chelicera 0.37), palpal tarsus (ratio of length to width 2.17) and tarsus of leg I (ratio of length to width 5.20) are relatively shorter.

F. unguiculata is also similar to *F. (U.) arenaria* WILLMANN 1952, but its female differs from that of the latter species in having strikingly larger, sabre-shaped, ventrobasal clawlets on the claws, in the length of the proximal cheliceral seta whose tip does not reach the insertion of the distal cheliceral seta in *F. arenaria*, and in the antiaxial position of the spiniform famulus of rhagidial organ II, which in *F. arenaria* subtends the proximal rhagidial solenidion. In *F. unguiculata* the epimeral formula is 3-1-5-3, whereas in *F. arenaria* it is 3-1-6-3.

F. unguiculata also somewhat resembles *F. willmanni* ZACHARDA 1980, but in adults of the latter species the stellate famulus of rhagidial organ I is positioned between the 2nd and 3rd proximal rhagidial solenidia antiaxially, and the epimeral formula is 3-1-6-3.

Material examined:

Holotype, adult female, Austria, North Tyrol, the Ötztal Alps, Pitztal, Wildgrat 2974 m a.s.l., on bare ground, hand sorting, 4 August 1991, K. Thaler and B. Knoflach leg. Type material deposited in the Canadian National Collection of Insects and Arachnids, Centre for Land and Biological Resources Research, Agriculture Canada, Ottawa, under Type no. 21,814.

Etymology:

The species *unguiculata* is named to reflect the striking ventrobasal sabre-shaped clawlets on the claws. Feminine gender.

Remarks:

F. incognita was described by ZACHARDA (1980: 671) based on a specimen found in Willmann's collection and identified by Willmann as *Rhagidia intermedia* WILLMANN. There were no data on locality with that slide preparation, therefore the specific name *incognita* was used.

The specific name *intermedia* was frequently used by Willmann and other authors (FRANZ 1943, FRANZ 1954, JANETSCHKE 1959, MIHELČIČ 1957, SCHMÖLZER 1962, WILLMANN 1951, THOR and WILLMANN 1941) who studied or reported rhagidiid mites from the Alps. However, under the name *intermedia* a few different species were found even in Willmann's collection (cf. *F. willmanni* ZACHARDA, *F. incognita* ZACHARDA, *Rhagidia gigas* (CANESTRINI) (ZACHARDA 1980: 667, 671, 569, resp.). Identifications presented by other authors are also uncertain. Because *F. incognita* is similar to *F. unguiculata* and *F. willmanni* from the Alps, I suppose that the type specimen of *F. incognita* was collected also in the Alps. In any case, further

comparative morphological studies on more numerous material of *F. incognita*, *F. unguiculata* and *F. willmanni* are needed to improve knowledge on their interspecific relations and taxonomical status.

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