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FIRST RECORD OF THE MITE FAMILY HYADESIIDAE (ACARI, ASTIGMATA) FROM THE MADEIRA ARCHIPELAGO

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With 11 figures on 4 illustrations

ABSTRACT. Two representatives of the mite family Hyadesiidae are recorded from the intertidal zone of the Madeira Archipelago: *Amhyadesia madeirensis* nov. spec. and *Hyadesia verrucosa* Fain & Schuster, 1985. The new species is described, ecological data are added. A key is given to the genus *Amhyadesia* Fain & Ganning, 1979.

RESUMO. Dois representantes da família de Ácaros Hyadesiidae são assinalados da zona intertidal do Arquipélago da Madeira: *Amhyadesia madeirensis* esp. nov. e *Hyadesia verrucosa* Fain & Schuster, 1985. É descrita a espécie nova e são fornecidos dados ecológicos. É apresentada uma chave para o género *Amhyadesia* Fain & Ganning, 1979.

INTRODUCTION

The terrestrial microarthropod fauna of the intertidal zone of Madeira Archipelago was quite unknown. Now we can report the occurrence of two representatives of the mite family Hyadesiidae. Both species were collected during littoral field studies by R.S. in the year 1983. *Hyadesia verrucosa*, found on two islands of the archipelago, was known only from

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the Adriatic Sea. The second species, a new one, also found on two islands but not in the same localities, belongs to the genus *Amhyadesia*.

Several new species have been described recently in the genus *Amhyadesia* and we think it is useful to give herein a new key to this genus including the species which is described below.

KEY TO THE GENUS *AMHYADESIA* FAIN AND GANNING, 1979

FEMALES

- (N.B. 1. The female of *A. costaricensis* is not known)
 2. The measurements are in μm)
 3. This key completes our previous key given in Fain, 1981)

1. With 3 pairs of genital setae. Hysteronotal shield strongly punctate and pitted. Setae *sci*, *d1* to *d4*, *l1* to *l4* and *sh* thick and spinous. 2.
 With 2 pairs of genital setae (this number is not known for *A. longipilis*). Hysteronotal shield punctate but not pitted. Setae *sci*, *d1* to *d4*, *l1* to *l4* and *sh* either all attenuated apically and flexible or some of them being spinous. 3.
2. Punctuation of hysterosoma with very numerous and minute pits. Lengths of setae: *sci* 60; *d1* 45; *d2* 85; *d3* 90; *d4* 63; *l1* to *l4* from 40 to 45.
 *A. glynni* (Manson, 1963)
 Punctuation of hysterosoma with numerous and large pits. Lengths of setae *sci*, *d1* to *d4*, *l1* to *l4* from 20 to 32. *A. californica* Fain & Ganning, 1979.
3. Lengths of setae *l2* from 130 to 190, of setae *l3* from 180 to 220. Setae *s cx* 20 to 25 long. 4.
 Lengths of setae *l2* and *l3* not exceeding 40 and 48 respectively. Setae *s cx* 50 to 85 long. 5.
4. Three pairs of anal setae. All dorsal setae finely attenuated apically and flexible. Setae *sci* and *l1* longer (135 and 120); setae *sh*, *l2*, *l3* and *l4* shorter (50, 130, 180 and 180 respectively). Setae *l2* and *l3* 48 apart. Claws I-II 6.5, III-IV 17 long. Propodonotum punctate behind the shield. Bursa not observed.
 *A. longipilis* Fain & Schuster, 1984.
 Two pairs of anal setae. Setae *sci*, *d1*, *d2* and *l1* are spines. Setae *sci* and *l1* shorter (95 and 80); setae *sh*, *l2*, *l3* and *l4* longer (160-180, 190, 220 and 230 respectively). Setae *l2* and *l3* 105 apart. Claws I-IV, 10.5-10.5-24-24 long. Propodonotum not punctate behind the shield. Bursa 215 long.
 *A. madeirensis* sp.n.
5. Dorsal setae (*sci*, *s ce*, *d1* to *d4*, *l1* to *l5*, *h* and *sh*) finely attenuated apically and flexible. 6.
 Some of these dorsal setae are cylindrico-conical and spinous. 8.
6. With 3 pairs of anal setae. Setae *d5* present. Genu I with 2 unequal solenidia. Tarsi long (I-II 35, III 48, IV 52), with relatively short claws I-II 9.5, III 21.5, IV 24). *A. pacifica* Fain & Schuster, 1984.

- With either 1 or 2 pairs of anal setae. Setae *d* 5 lacking. Tarsi shorter (I 25 to 26, II 26 to 27, III 33 to 39, IV 36 to 46) with relatively longer claws (I-II 9 to 13, III-IV 20 to 27) 7.
7. Genu I with 1 solenidion. With 2 pairs of anal setae. Tarsi III-IV 39 and 46 long respectively; claws I-II 12-13, III-IV 27. Setae *sci* 45, *d* 2 60, *l* 4 42. Setae *l* 5 not thickened at their base and situated ventrally. *A. bermudana* Fain & Schuster, 1983.
- Genu I with 2 unequal solenidia. With 1 pair of anal setae. Tarsi III and IV 33 and 36 long respectively. Claws I-II 9 to 10; III-IV 20 to 21. Setae *sci* 80, *d* 2 100 to 120, *l* 4 70. Setae *l* 5 with a thick base and situated terminally. *A. atlantica* Fain & Schuster, 1983.
8. The setae *sci*, *d* 1, *d* 2, *l* 1, *l* 2, *l* 3 and *l* 4 are cylindrico-conical and spinous. Anterior tarsi distinctly shorter than posterior tarsi (ratio 1 : 1.5). *A. brasiliensis* Fain & Schuster, 1984.
- Only setae *d* 2 are cylindrico-conical and spinous, the other setae being attenuated apically and flexible. Anterior tarsi only slightly shorter than anterior ones (ratio 1 : 1.16 to 1 : 1.3). 9.
9. Bursa uniformly thin, not inflated nor thickened in its posterior third and not striated. *A. heterophallus* Fain & Schuster, 1984.
- Bursa longer, its posterior third funnel-like, with thickened and striated walls. *A. bursaria* Fain & Schuster, 1984.

MALES

(N.B. : The male of *A. longipilis* is unknown.)

1. Genital organ with two postero-lateral diverging arms. 2.
Genital organ without postero-lateral arms. 3.
2. Idiosoma 343 to 363 long. *A. heterophallus* Fain & Schuster, 1984.
Idiosoma 410 long. *A. bursaria* Fain & Schuster, 1984.
3. With 3 pairs of genital setae. Dorsal punctation pitted. Setae *sci*, *d* 1 to *d* 4, *l* 1 to *l* 4 and *sh* are spines not exceeding 69 in length. 4.
With 2 pairs of genital setae. Dorsal punctation not pitted. Setae *sci*, *d* 1 to *d* 4, *l* 1 to *l* 4 and *sh* either all attenuated apically and flexible or some of them being spinous. 5.
4. Lengths of setae *d* 2 to *d* 4 51 to 69. Lengths of tarsi I-II 21 of tarsi III-IV 18. Lengths of claws I-II 9, of claws III-IV 18. Hysteronotal shield with numerous small pits. *A. glynni* (Manson, 1963)
Setae *d* 2, *d* 3 and *d* 4 shorter (27 to 36). Claws much longer (anterior 18, posterior 39). Hysteronotal shield with numerous large pits.
... .. *A. californica* Fain & Ganning, 1979.

5. All dorsal setae finely attenuated apically and flexible. ... 6.
Some dorsal setae cylindrico-conical and spinous. ... 8.
6. Coxae I punctate only in their anterior half. With 2 pairs of anal setae. Absence of *d 5*. Only one solenidion on genu I. Tarsi II, III and IV subequal in length (27 to 30), tarsus I 21. ... *A. bermudana* Fain & Schuster, 1983.
Coxae I completely punctate. With either 1 or 2 pairs of anal setae. Setae *d 5* present or absent. Genu I with 2 solenidia. Anterior tarsi distinctly longer than posterior tarsi. ... 7.
7. With 1 pair of anal setae. Setae *d 5* lacking. Setae *l 5* with a dilated base. Lengths of *d 2* 60, *d 3* 110, *d 4* 150. Lengths of tarsi: I 22, II 25, III 19, IV 18. Solenidia of tibiae III and IV situated in the middle of these segments. ... *A. atlantica* Fain & Schuster, 1983.
With 2 pairs of anal setae. Setae *d 5* present. Setae *l 5* not dilated at its base. Lengths of *d 2* 150, *d 3* 195, *d 4* 225. Lengths of anterior tarsi 30 and 33, of posterior tarsi 24. Solenidia of tibiae III and IV situated in the basal third of these segments ... *A. pacifica* Fain & Schuster, 1984.
8. Coxae I completely punctate. Only setae *d 2*, *d 3* and *d 4* being spinous. With 1 pair of anal setae. Setae *d 5* lacking. Anterior tarsi distinctly longer (25) than posterior tarsi (18 and 16). ... *A. costaricensis* Fain & Schuster, 1984.
Coxae I punctate in its anterior half or third. Setae *sci*, *d 1*, *d 2* and *l 1* are spinous; setae *d 3* and *d 4* being either spinous or with attenuated apex. With 2 pairs of anal setae. Anterior tarsi distinctly shorter than posterior tarsi. ... 9.
9. Setae *sh* short (18). Setae *l 2* and *l 4* spinous and shorter (30 and 50-60). Setae *d 5* lacking. Length of dorsal setae: *sci* 48, *d 2* 90, *d 3* 125, *d 4* 150, *l 1* 25-30, *l 3* 50, *l 5* 180. Setae *a 3* 42, spinous. In some specimens *d 3* and *d 4* are spinous and shorter (100-110). ... *A. brasiliensis* Fain & Schuster, 1984.
Setae *sh* very long (150). Setae *l 2* and *l 4* attenuated at apex and flexible and much longer (165 and 200). Setae *d 5* present (30). Dorsal setae much longer: *sci* 69, *d 2* 130, *d 3* 215, *d 4* 240, *l 1* 63, *l 3* 210, *l 5* 250. Setae *a 3* 160, piliform. ... *A. madeirensis* sp.n.

***Amhyadesia madeirensis* spec. nov.**

F e m a l e (figs. 1, 2, 4 - 7): Idiosoma in holotype 495 long and 375 wide. In 4 paratypes these measurements are : 540 x 350; 525 x 380; 498 x 339; 474 x 340. **D o r s u m** : Propodonotal shield wider (85) than long (22 in the midline). Cuticle behind the shield not punctate. Hysteronotum punctate in posterior two thirds. Oil grooves very lateral. The anterior main groove crosses the sejugal furrow and runs obliquely in front of setae *l 1*, ending on the lateral margin of the body. Bursa 225 long, beginning dorsally close to the posterior margin of the body. **V e n t e r** : Posterior part of the opisthogaster punctate. Sternum loosely connected to the epimeres II by narrow punctate bands. Coxae I and II with small punctated areas in their

anterior third. Epimeres III and IV fused. Two pairs of genital setae, and two pairs of very unequal anal setae, the anterior 30-35 long, the posterior 160 to 200 long. Organ of Grandjean 27 long, with anterior third bifid. Legs : Length of tarsi I-IV (apical spine not included) : 36-36-45-48. Maximum length of claws (in straight line, including basal part fixed in the pretarsus) : 10.5 - 10.5 - 24 - 24.

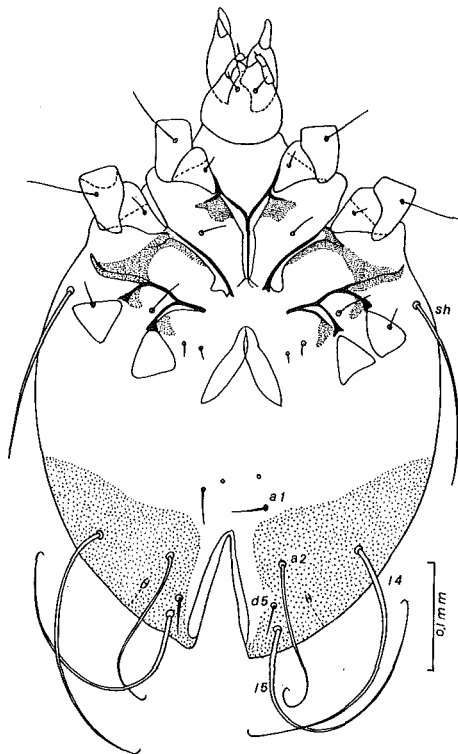


Fig. 1.—*Amhyadesia madeirensis* sp.n. Female in ventral view.

Chaetotaxy of idiosoma (length of setae) ; *vi* 150; *sc i* 90; *sc e* 225; *d 1* 30-40; *d 2* 140-150; *d 3* 210; *d 4* 240; *d 5* 33-40; *l 1* 75; *l 2* 190; *l 3* 220; *l 4* 230; *l 5* 260; *h* 225; *sh* 180; *sc x* 20; *a 3* 150. The setae *sc i*, *d 1*, *d 2* and *l 1* are spines. The setae *l 2* and *l 3* are 105 apart. In a paratype female, slightly larger in size (length 525), the length of these setae are : *vi* 160; *sc i* 100; *sc e* 250; *d 1* 35; *d 2* 150-165; *d 3* 225; *d 4* 250-280; *d 5* 30; *l 1* 90; *l 2* 180; *l 3* 225; *l 4* 240; *l 5* 270; *h* 240; *sh* 170-180.

Leg chaetotaxy: Tarsi I-II with a strong apical spine, a smaller subapical spine and 7 thin setae. Tarsi III-IV with 4 thin setae and 4 apical or subapical spines. Tibiae I-II with a thick ventral spine and 1 lateral thick seta strongly barbed. Tibiae III-IV with a ventral spine, thicker on tibia III than on tibia IV. Genua I-II with 1 lateral barbed seta and 1 dorsal smaller also barbed seta. Genu III-IV with 1-0 seta. Femora I-IV with 1-1-0-1 setae.

Solenidiotaxy: Tarsi I with ω 1 slightly longer (40) than ω 3 (35); ω 2 is very short (6). Tarsus II with ω 1 60 long; Tibiae I-IV with solenidions 108-112-90-50 long respectively. Genu I with 2 solenidions (7 and 45 long). Genua II-III with 1 solenidion (12 and 10 long).

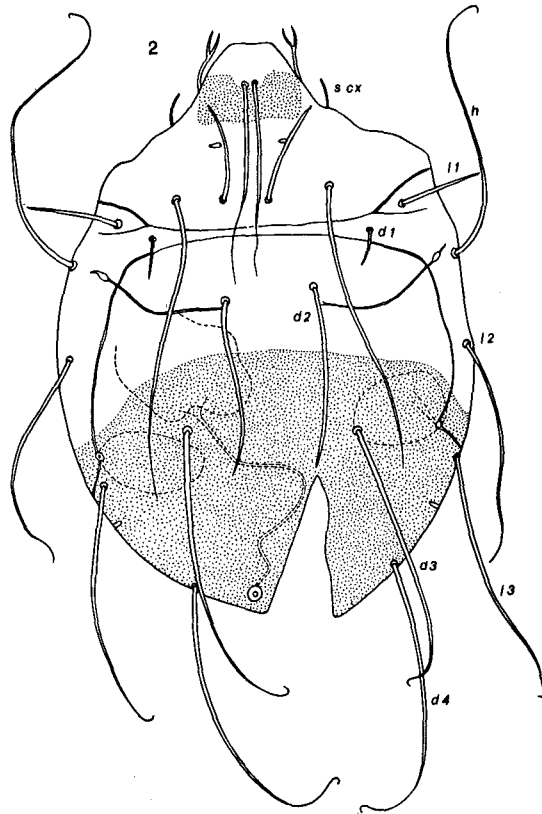


Fig. 2.—*Amhyadesia madeirensis* sp.n. Female in dorsal view.

Male (figs. 3, 8-11): Length and width of idiosoma in 3 paratypes: 420 x 291; 412 x 285; 405 x 275. Dorsum as in the female. Propodotal shield 18 long and 68 wide. Length of setae: *vi* 145; *sc i* 69; *sc e* 210;

d 1 28; *d* 2 130; *d* 3 215; *d* 4 240; *d* 5 25; *l* 1 63; *l* 2 165; *l* 3 210; *l* 4 200; *l* 5 250; *h* 210; *sh* 150; *sc* x shortly barbed, 18; *a* 1 27; *a* 3 160. Venter: Coxae I-IV with small punctate areas as in the female. Genital organ more or less hexagonal, maximum width 46. Penis short (27) and thick. There are 2 pairs of small genital setae. Legs: Length of tarsi I-IV (apical spine not included) 22-30-40-42. Tarsi I, III and IV with a subapico-ventral sucker. Other segments as in the female.

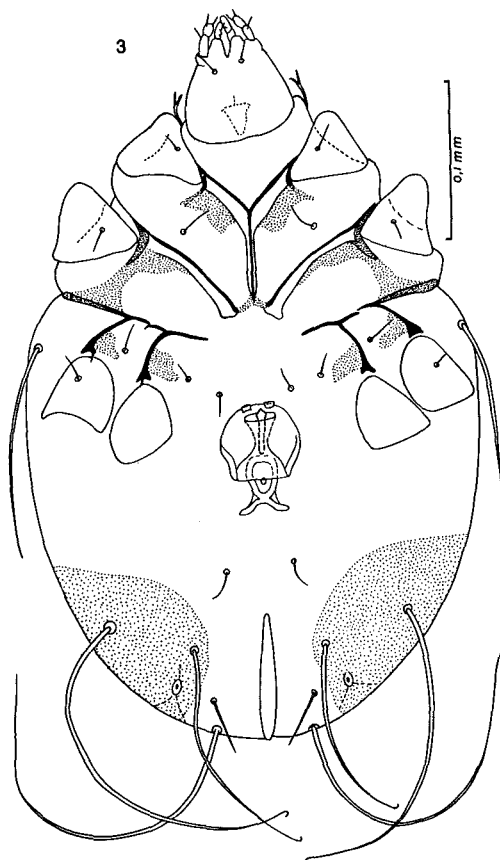
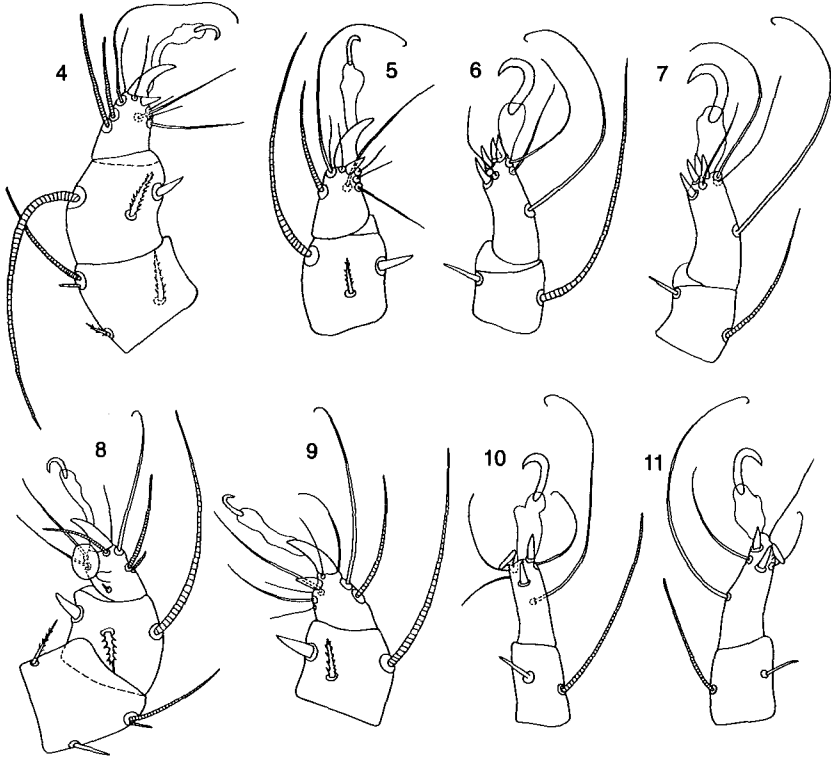


Fig. 3. — *Amhyadesia madeirensis* sp. n. Male in ventral view.

Remarks

This new species is clearly distinguished from all the known species of *Amhyadesia*, in both sexes, by the abnormally great length of the setae *sh*; in the female it is distinguished by the presence of 4

stout apico-ventral spines on tarsi III and IV. It is the most close to *A. longipilis* (described from Philippines and represented by only the female), however, it differs from it, in addition to the two characters cited above, by the following characters: shorter *sci* and *l1* (95 and 80, for 135 and 120 in *A. longipilis*); longer *sh*, *l2*, *l3* and *l4* (150-180, 190, 220 and 230, for 50, 130, 180 and 180 in *A. longipilis* respectively); the greater



Figs. 4-11. — *Amhyadesta madeirensis* sp.n.: Legs I to IV (apical segments) of female : leg I (4), II (5), III (6) and IV (7); of male : leg I (8), II (9), III (10) and IV (11).

distance between *l2* and *l3* (105, for 48 in *A. longipilis*); presence of 2 pairs of anal setae against 3 pairs in *A. longipilis*; greater length of claws I-IV; greater length of tarsi I-II (36 instead of 27); absence of punctation in the area situated behind propodonotal shield.

Localities

All the specimens were collected from the rocky coast of the Madeira Archipelago in 1983. Holotype and 15 paratypes female, 13

paratypes male, 10 paratypes tritonymph and 2 paratypes protonymph from Madeira proper east of Caniçal (sample locality Mad-14); intertidal and supralittoral rocks, 26 August.

1 paratype female from Madeira proper Ponta do Garajau (Mad-08); littoral rocks covered with chthamalids, 23 August.

2 paratypes male and 1 protonymph from Porto Santo, Fonte da Areia on the northwest coast (Mad-15); intertidal rocks, covered with various algae, 27 August.

Holotype in Institut royal des Sciences naturelles de Belgique, Bruxelles.

Ecology

Several samples collected on the locus typicus show that the new species is concentrated in the upper intertidal zone where various algae, especially green algae, are growing, and also in the lower part of the supralittoral fringe which is covered with chthamalids in high density. It can be stated that the vertical distribution of *A. madeirensis* is very similar to the distribution of other species of this genus.

The food of littoral species of Hyadesiidae includes in general a large amount of green algae (Schuster, 1979, Fain & Schuster, 1984b, 1985). Observations made on live individuals of *A. madeirensis* and also examination of the gut content confirm this statement.

Hyadesia verrucosa Fain & Schuster, 1985

With the findings in two islands of the Madeira Archipelago in 1983 listed below, this species is recorded for the first time in the Atlantic Ocean.

Localities

1 specimen from Porto Santo, Ponta da Calheta (sample Mad-17); beginning of the rocky coast near the southwestern border of the long sandy beach; intertidal rocks covered with green and red algae, 27 August.

5 specimens from Deserta Grande (Ilhas Desertas), southwest coast (Mad-03); littoral rocks in the intertidal zone, covered with various algae, and in the lower supralittoral fringe covered with chthamalids; 20 August.

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ERRATA

The following errors should be corrected in our paper: Fain, A. and Schuster, R. 1984: *Intern. J. Acarology* 10: 103-111.:

1. The length of setae *l* 4 in *A. longipilis* should be 180 μm (and not 80 μm)
2. Seta *d* 3 of *A. bursaria* ♂ is 100 μm long (and not 33 μm as published)

