

FOUR NEW SPECIES OF THE GENUS *AMHYADESIA* FAIN AND GANNING, 1979 FROM THE INTERTIDAL ZONE OF SEVERAL INDO-PACIFIC ISLANDS (ACARI: HYADESIDAE)

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ABSTRACT—Four new species of genus *Amhyadesia* Fain and Ganning, 1979 (Acari: Hyadesiidae) are described from the intertidal zone of the Indian and Pacific Ocean. *Amhyadesia heterophallus* sp. n. was found in the Maledives and Philippines, *A. bursaria* sp. n. in New Caledonia, *A. longipilis* sp. n. and *A. pacifica* sp. n. from the Philippines.

INTRODUCTION

We describe herein four new species of the genus *Amhyadesia* (Hyadesiidae) found in the littoral samples which were donated to R.S. in connection to his research work on intertidal air-breathing arthropods. *Amhyadesia heterophallus* was collected from Male Atoll, Maledive Is., and from three localities in the Philippines. *A. bursaria*, very close to the former, was found only in the Pacific area—in New Caledonia. *A. longipilis* and *A. pacifica* were found in two islands in the Philippines.

This is the first record of the family Hyadesiidae for New Caledonia and the Maledives. Talker et al. (1981) did report for the first time the existence of Hyadesiidae in the Philippines but without a detailed determination. Their material received in part is included in the present investigation.

Abbreviations used herein are: BMNH = British Museum, Natural History, London; IRSNB = Institut royal des Sciences naturelles de Belgique; NMWA = Naturhistorisches Museum, Wien, Austria; ZMUH = Zoologisches Museum Universitat Hamburg, West Germany. Holotypes are in IRSNB. All measurements are given in microns.

Amhyadesia heterophallus spec. nov.

FEMALE (Figs. 1, 2, 5-8)—Holotype 415 long (idiosoma) and 248 wide. In 5 paratypes: 388 x 258 (larvigerous); 390 x 240; 405 x 255; 408 x 258 (larvigerous); 430 x 265 (larvigerous).

DORSUM—Propodonal shield wider (75) than long (15-20 in midline), with posterior margin concave. Cuticle behind shield distinctly punctate but slightly less than shield and covering almost entire

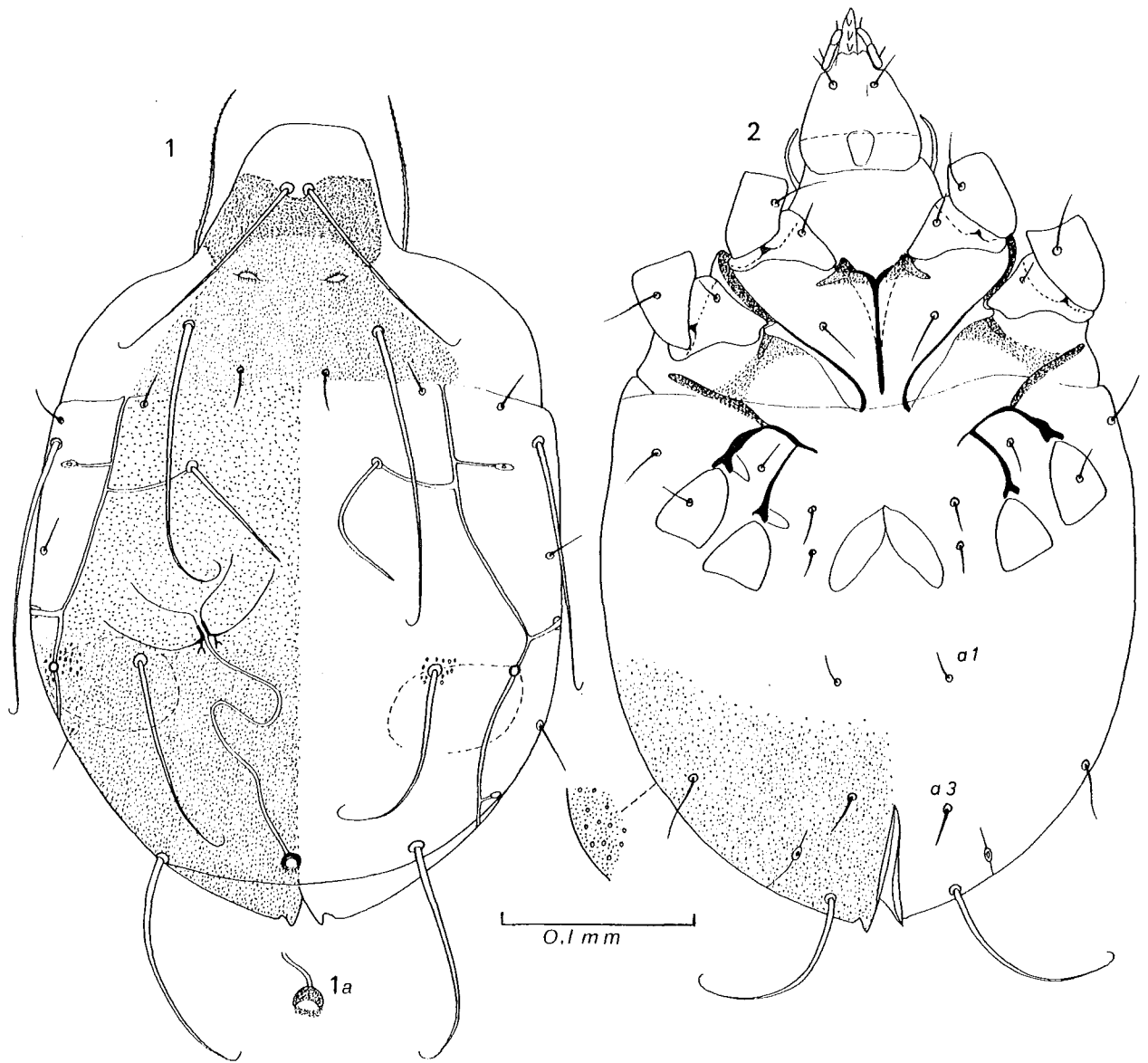
propodonotum except laterally. Hysteronotum completely punctate in middle between two main oil-grooves. In some places this punctate area bearing a number of small pits. These pits also present around oil glands orifices. Oil-grooves normally developed, not crossing sejugal furrow anteriorly. Bursa relatively very long (140), very thin, relatively well sclerotized, not dilated posteriorly and without striations. Copulatory orifice located dorsal at 25-30 in front of posterior extremity and surrounded by a sclerotized ring. Basal sclerite of spermatheca narrow, short (6 long) and well sclerotized.

VENTER—Posterior half of opisthogaster punctate. Sternum free, 54 long. Coxae I punctate anteriorly. Epimeres III-IV fused. Two pairs of genital setae (12 and 15 long) and two pairs of anal setae.

LEGS—Length of tarsi I-IV: 27-27-33-35 (apical spine not included). Length of claws I-IV: 7,5-7,5-17-17 (measured in straight line, basal part included in pretarsus not measured). Pretarsi I-IV: 30-30-18-18 long. Gnathosoma 78 long and 66 wide. Grandjean's organ curved, simple, relatively short.

CHAETOTAXY OF IDIOSOMA (length of setae)—*V* 108; *sc* 115; *sc e* 140; *d* 1 15; *d* 2 60; thick and subcylindrical; *d* 3 102, thick and attenuated apically; *d* 4 120, thick and attenuated apically; *h* 95; *l* 1 and *l* 2 15; *l* 3 18; *l* 4 20; *l* 5 95, thick and attenuated apically; *a* 1 12; *a* 3 15; *s cx* 85, barbed. Setae *v* 1, *sc e*, *h*, *d* 3, *d* 4 and *l* 5 have curved, hook-like apices. Setae *a* 2 and *d* 5 lacking. Five pairs of lyrifissures, 1 ventral (para-anal) and 4 dorsal or dorso-lateral.

LEG CHAETOTAXY—Tarsi I and II with a strong apical spine, a smaller subapical spine and 6 thin setae. Tarsi III and IV with 5 thin and unequal



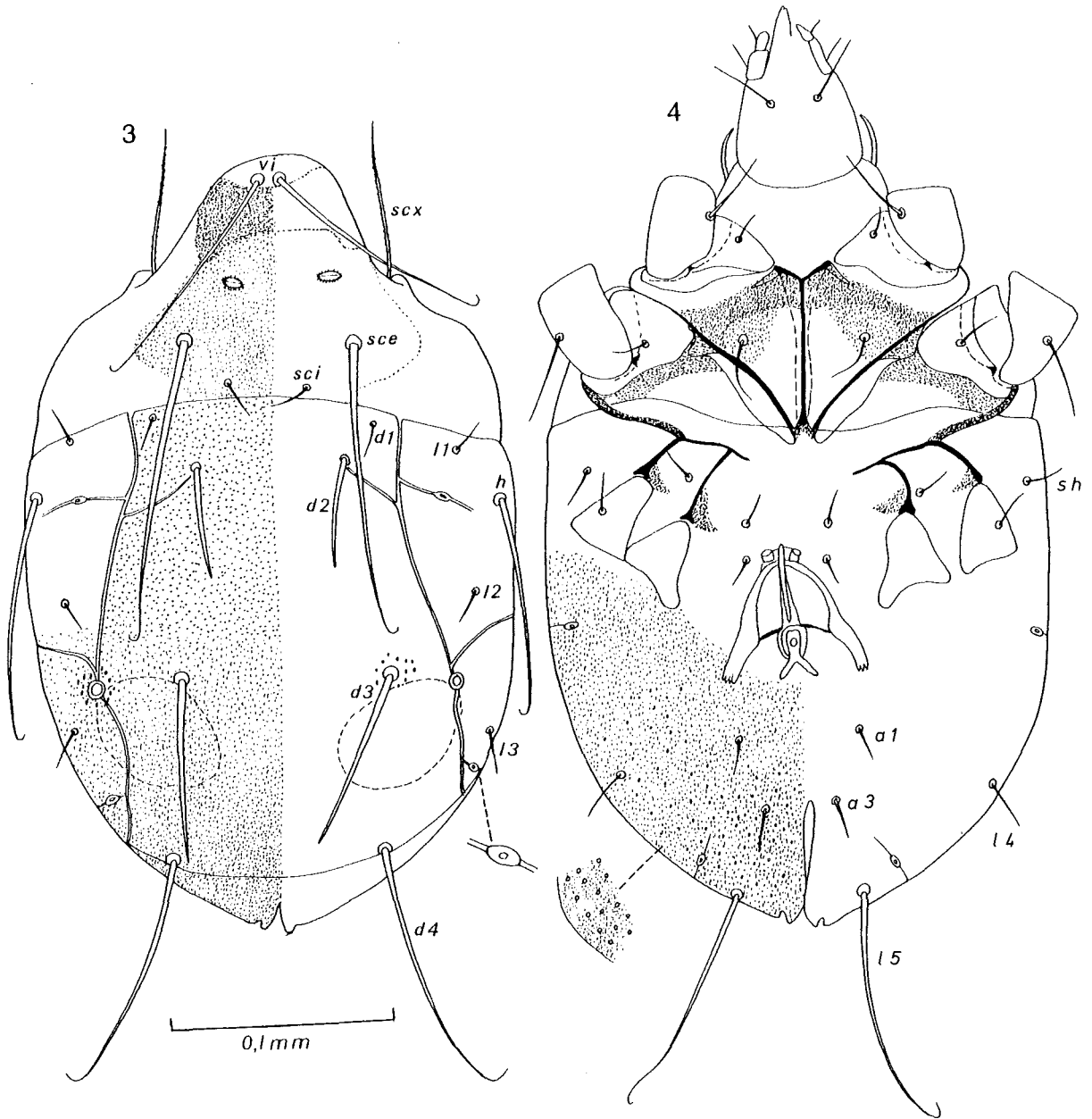
Figs. 1-2: *Amhyadesia heterophallus* sp. n., Female—Fig. 1, dorsal view; Fig. 2, ventral view; 1a, copulatory orifice.

setae and 3 subapical rather long spines (1 ventral and 2 lateral). Tibiae I and II with 1 very thick ventral spine and 1 lateral shortly barbed seta. Tibiae III and IV with a spine 10 long. Genua I and II with 2 setae, one of which is barbed. Solenidiotaxy: Tarsus I with $w 1$ longer (40) than $w 3$ (28); $w 2$ not observed. Solenidia of tibiae I to IV: 60-65-55-32 long respectively. Genu I with only one solenidion 35 long, that of genu II 18 long.

MALE (Figs. 3, 4 9-12)—Measurements of idiosoma in 3 paratypes (length x width): 348 x 215; 360 x 220; 363 x 225. Dorsum as in female but setae slightly shorter— $v i$ 100; $sc e$ 135; $d 2$ 50; $d 3$ 80; $d 4$ 100; h 80; $l 5$ 90; $a 1$ 18; $a 3$ 16, thicker than $a 1$. Coxae I with punctuation more developed than in female. Two

pairs of genital setae and 2 pairs of anal setae. Male organ more or less triangular, attenuated anteriorly and prolonged posteriorly by two lateral diverging processes; its maximum width 70. Two sclerotized ringlets present immediately in front of the organ representing 2 vestigial genital suckers. Length of tarsi I to IV: 24-24-24-24. A rounded ventro-apical sucker present on tarsi I, III and IV. Length of claws I to IV: 7,5-7, 5-15-15. Tarsi I with 5 thin setae and 1 strong spine. Tarsi II as tarsi I but with an additional subapical spine. Tarsi III and IV with 5 thin setae, 1 large apicoventral spine and 1 rounded process. Genu I as in female but 2 setae thicker and more distinctly barbed.

TRITONYMPH—Idiosoma 336 long and 210 wide. General characteristics as in female but without



Figs. 3-4: *Amhyadesia heterophallus* sp. n., Male—Fig. 3, dorsal view; Fig. 4, ventral view.

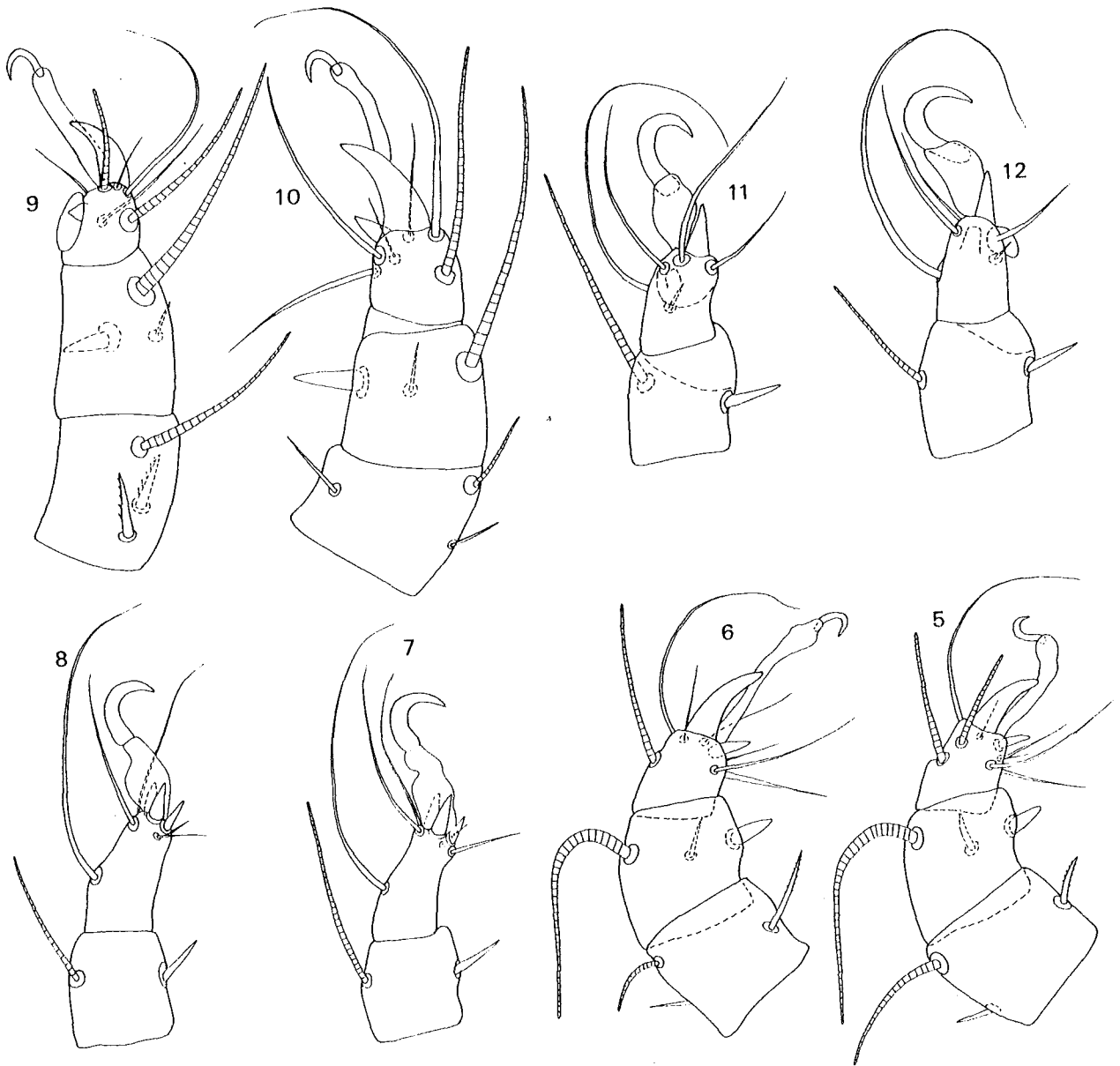
vulva or bursa. Trochanters I to III with a seta and tarsus I with w 3.

PROTONYMPH—Idiosoma in 2 paratypes 225 x 145 and 240 x 160. It differs from tritonymph by shorter setae and absence of trochanteral setae and of w 3.

LARVA—Unknown.

LOCALITIES—Holotype and 20 paratype females, 15 paratype males, 13 paratype tritonymphs and 4 paratype protonymphs from Villingili Island,

Male Atoll, Maldives, Indian Ocean (sample no. RS-1164) from calcareous algae on intertidal rocks, 8 February 1983. 2 paratype females and 1 paratype male from Maribago, Mactan Island, E Cebu, Philippines, Pacific Ocean (sample no. RS-1235) from intertidal rocks, 1981. 1 paratype female from Sabang Island, Philippines, Pacific Ocean, intertidal rocks (sample no. RS-1280), 1 paratype female from Pangasinan Island, Philippines; intertidal rocks (sample no. RS-1281). The specimens from RS-1280 and 1281 are mentioned by Talker et al. (1981) as *Hyadesia* sp.



Figs. 5-12: *Amhyadesia heterophallus* sp. n., Female—Fig. 5, leg I; Fig. 6, leg II; Fig. 7, leg III; Fig. 8, leg IV., Male—Fig. 9, leg I; Fig. 10, leg II; Fig. 11, leg III; Fig. 12, leg IV.

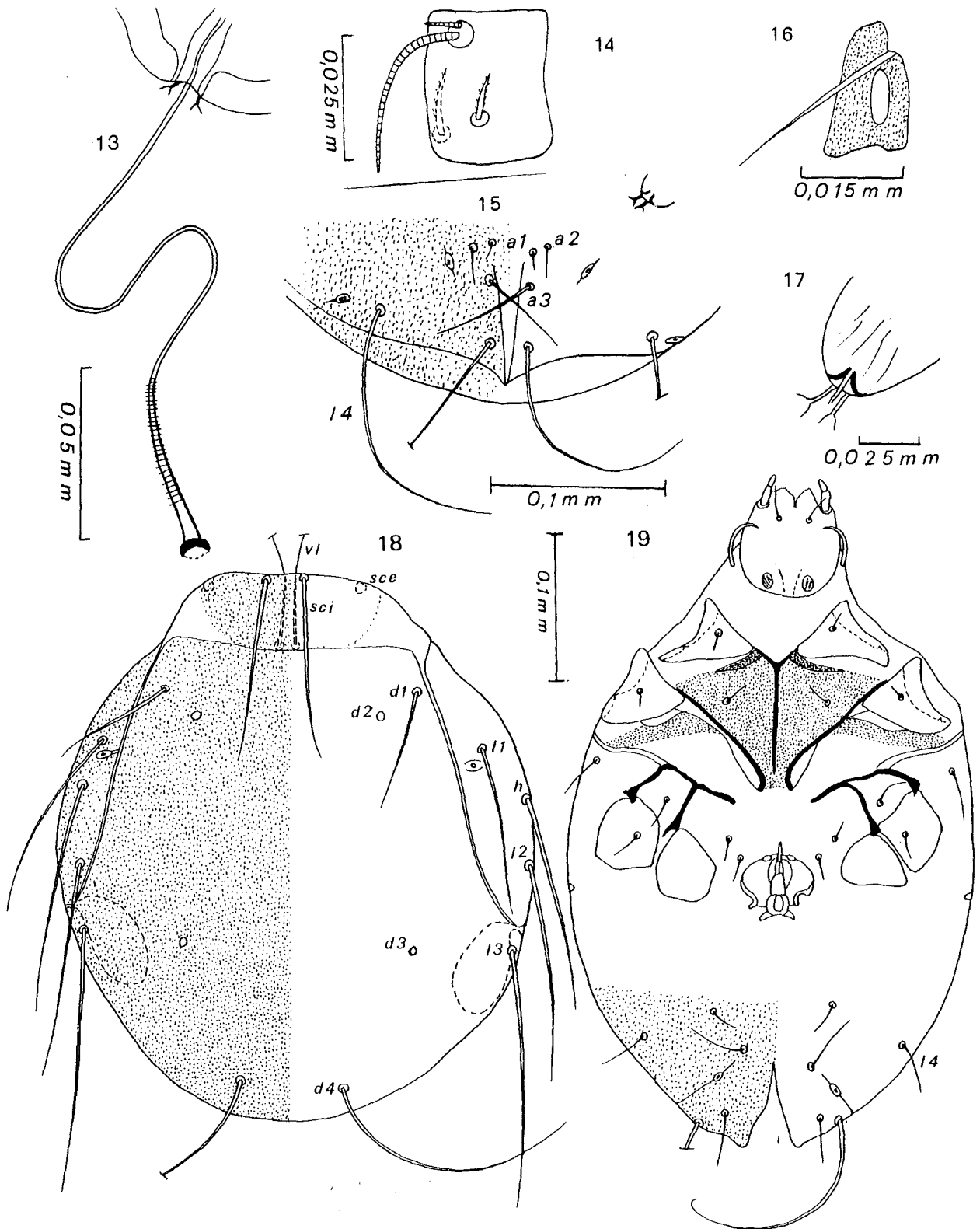
ECOLOGY—*A. heterophallus* is an intertidal species with a remarkable wide geographical distribution. Some of the specimens from Male Atoll observed alive in the laboratory in Graz shows a bright green gut content just after extraction from the original substratum by Berlese-Tullgren-funnels. Probably *A. heterophallus* is feeding on green algae as it is known also from other species in the genus (Fain & Schuster, in press).

DEPOSITION OF MATERIAL—Holotype female (No. IG 26644) and a paratype male in IRSNB. Paratypes: 2 females and 1 male in NMWA; 1 female and 1 male in ZMUH; 1 female and 1 male in BMNH; other paratypes in the collection of the authors.

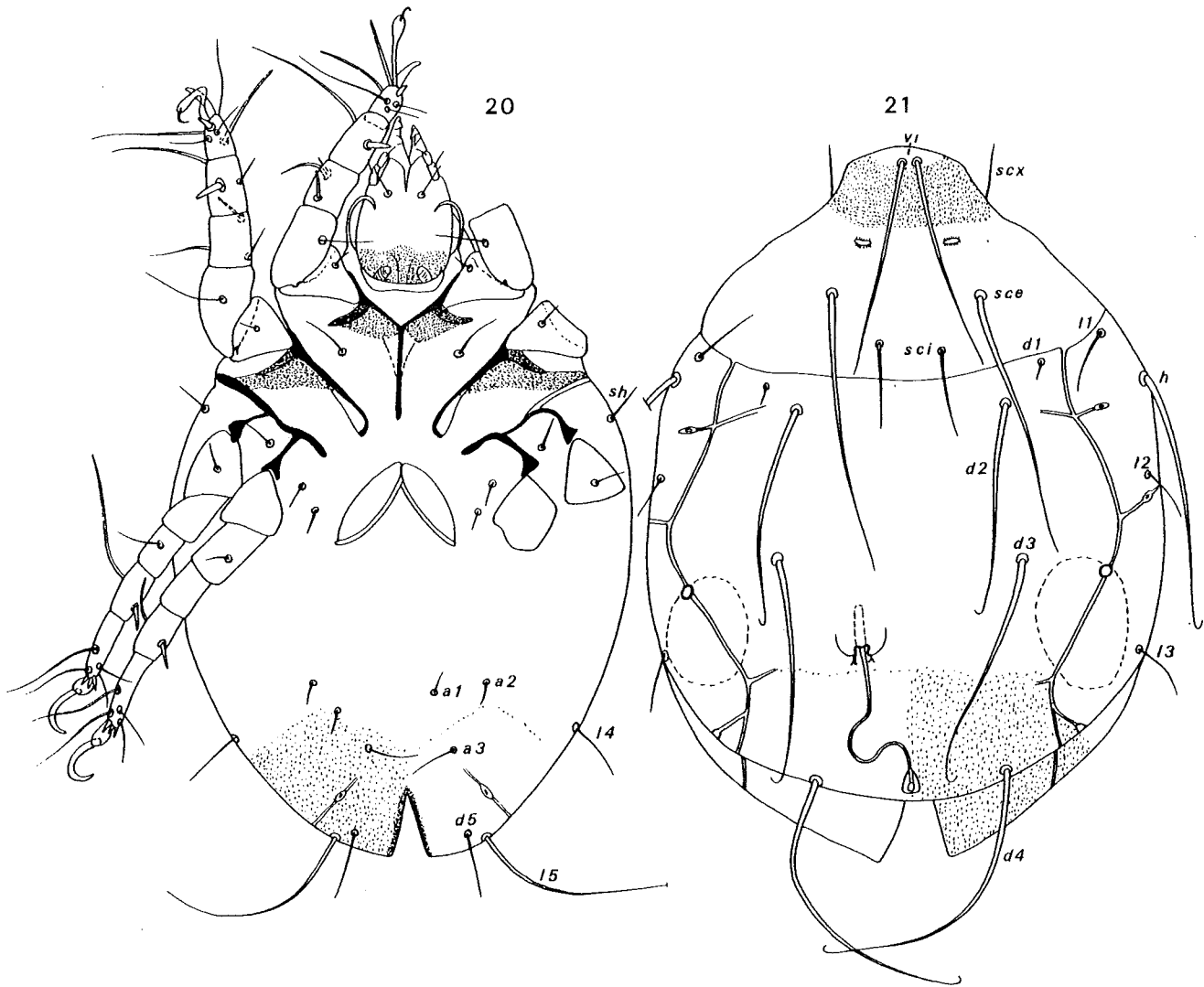
Amhyadesia bursaria spec. nov.

This species is close to *A. heterophallus* but can be distinguished by the following characters. In the female: 1. Bursa longer, with posterior third narrowly funnel-like and with thickened and striated walls; 2. Base of spermatheca not sclerotized; 3. Presence of two unequal solenidia on genu I. The male is larger than in *A. heterophallus* and has longer setae and slightly unequal tarsi.

FEMALE (Figs. 13-14)—Holotype 425 long, 285 wide. This specimen is in rather poor condition and most of the dorsal setae are lost. **DORSUM**—Propodotal shield and punctation as in *A. heterophallus*.



Figs. 13-14: *Amhyadesia bursaria* sp. n., Female—Fig. 13, bursa copulatrix and base of spermatheca; Fig. 14, genu I. Figs. 15-17: *Amhyadesia longipilis* sp. n., Female—Fig. 15, anal region; Fig. 16, *s cx* seta; Fig. 17, spermatheca. Fig. 18: *Amhyadesia longipilis* sp. n., Female—dorsal view. Fig. 19: *Amhyadesia pacifica* sp. n., Male—ventral view.



Figs. 20-21: *Amhyadesia pacifica* sp. n., Female—Fig. 20, ventral view; Fig. 21, dorsal view.

Length of setae: *vi* 117; *l* $\bar{1}$ and *sc* *i* 25; *scx* 88 (barbed). Grandjean's organ simple, 28 long. Bursa 185 long, its posterior dilated part 50 long. Walls of this dilated part thick and striated. Copulatory orifice dorsal, at 27 from posterior extremity. Base of spermatheca not sclerotized. Ventral surface of body and legs II to IV as in *A. heterophallus*, Gnathosoma, tarsi and tibiae of legs I missing. Length of tarsi II-IV 26-31-33. Claws 6, 5-15-15 long.

MALE—Idiosoma 410 long and 260 wide. Dorsum and venter as in *A. heterophallus*. Punctate area of posterior half of opisthogaster with numerous very small pits. These pits are less numerous dorsally and are also present around oil-glands orifices. Length of setae: *vi* 125; *sc* *e* 150; *sc* *i* 18-20; *h* 120; *d* *l* 21; *d* *2* 57; *d* *3* 33; *d* *4* 110; *l* *1* 15; *l* *2* 18; *l* *3* 18; *l* *4* 26; *l* *5* 125; *a* *1* 18; *a* *3* 16. Setae *scx* as in female. Length of tarsi I-IV 24-27-30-32. Genu I with only 1 solenidion 42 long and 2 thick and barbed apparently flattened setae

12 and 18 long respectively. Other characters as in *A. heterophallus*.

LOCALITY—Holotype female and paratype male from Noumea, between Baie des Citrons and Anse Vata, New Caledonia, Pacific Ocean (sample no. RS-503); from intertidal rocks partly covered with oysters; 7.ix.1967. No other specimens known.

REMARKS—*A. heterophallus* and *A. bursaria* are clearly distinguished from other known species of the genus *Amhyadesia* in both sexes by the punctate and non-pitted aspect of the propodeonotum behind the shield. The males differ by the characteristic shape of the genital organ with two postero-lateral diverging arms. Moreover the presence of only two pairs of genital setae in both sexes separates these species from *A. glynni* (Manson) and *A. californica* Fain & Ganning.

DEPOSITION OF MATERIAL—Holotype and paratype in IRSNB, no. IG 26646.

Amhyadesia longipilis spec. nov.

This species is represented by a single female in poor condition. It is partly crushed, anterior part of the body in front of scapular setae is folded and completely turned in ventral position and some setae are missing. It is, however, easily recognizable by unusual great length of the setae *l 1* to *l 5*, exceeding 120, and by heavy sclerotization of dorsal and ventral cuticle.

FEMALE (Figs. 15-19)—Holotype 435 long (including the folded anterior part) and 300 wide. **DORSUM**—completely covered by a strongly sclerotized and non-pitted punctation except lateral parts of propodonotum which are very lightly or non punctate. Oil grooves normally developed, apparently not crossing the sejugal furrow anteriorly. Bursa not sclerotized and not visible; sclerite of base of spermatheca small. Copulatory pore not observed.

VENTER—Posterior part of opisthogaster punctate as the dorsum. Genital area crushed, not observable. Organ of Grandjean curved 36 long

LEGS—Length of tarsi I-IV 27-27-35-41. Length of claws 6, 5-6, 5-17-17.

CHAETOTAXY OF IDIOSOMA—Length of setae *sc i* 135; *d 1* 75; *d 4* 210; *l 1* 120; *l 2* 130; *l 3* 180; *l 4* 80; *l 5* 180; *h* 170; *s h* 50; *a 1* 5; *a 2* (very thin); *a 3* 65; *s cx* 25. Setae *Sc e*, *d 2* and *d 3* broken. Setae *d 5* absent. Oil gland orifice situated between *l 2* and *l 3*, these setae located very close to each other.

CHAETOTAXY OF LEGS—Tarsi III and IV with 3 apical subequal spines and 5 thin setae. Tibia I with a small ventral spine, tibia II with a larger ventral spine; tibia III and IV with a stout subcylindrical seta 18 long. Genu 1 with 2 solenidia (3 and 40 long).

LOCALITY—Holotype female from Pang-an Island, Philippines; on intertidal rocks (sample no. RS-1281). This specimen was associated with a female of *A. hererophallus*.

REMARK—This species is clearly distinct from other species of *Amhyadesia* by the great length of most of the dorsal setae and by the strong sclerotization of the body.

DEPOSITION OF HOLOTYPE—In IRSNB no. IG 26645.

Amhyadesia pacifica spec. nov.

FEMALE (Figs. 20-25)—Holotype 480 long and 333 wide (idiosoma). In 2 paratypes 450 x 315 and 465 x 300.

DORSUM—Propodonotal shield much wider than long, followed by 2 lyrifissures. Oil-glands grooves normal in shape, not crossing sejugal furrow anteriorly. Posterior third or half of hysteronotum with a sclerotized punctation. Bursa well sclerotized, relatively short, opening located in posterior fourth of hysteronotum.

VENTER—Posterior third of opisthogaster with a poorly marked punctation. Two pairs of short genital setae and 3 pairs of anal setae. Organ of Grandjean curved, simple.

LEGS—Length of tarsi I-IV 36-36-47-55, of claws 9-9-23-24.

CHAETOTAXY OF IDIOSOMA—Length of setae: *v i* 130; *sc i* 60; *sc e* 200; *d i* 10 (very thin); *d 2* 150; *d 3* 165; *d 4* 210; *d 5* 36 (very thin); *l 1* 45; *l 2* and *l 3* 35; *l 4* 40; *l 5* 160; *h* 180; *a 1* and *a 2* 15; *a 3* 30-35.

CHAETOTAXY OF LEGS—Tarsi I-II with 6 thin, unequal, setae and 2 spines (a long and strong apical and much smaller ventral subapical). Tarsi III-IV with 5 thin setae and 3 subequal terminal spines. Tibiae I-II with a strong and rather long ventral spine and 1 thin and short setae. Tibiae III-IV with a narrow relatively short spine. Genu I with 2 unequal barbed spines and 2 unequal solenidia 8,5 and 50 long respectively. Solenidia of tibiae III and IV located closer to base than to apex of these segments.

MALE (Figs. 19, 26-29)—Length of paratype 420, width 270.

DORSUM—as in female but punctation of hysteronotum more developed and sclerotized.

VENTER—Posterior half of opisthogaster with well developed punctation. Two pairs of genital and 2 pairs of anal setae. Genital organ 48 wide. Length of tarsi I-IV 30-33-24-24, of claws 8, 5-8, 5-22-22.

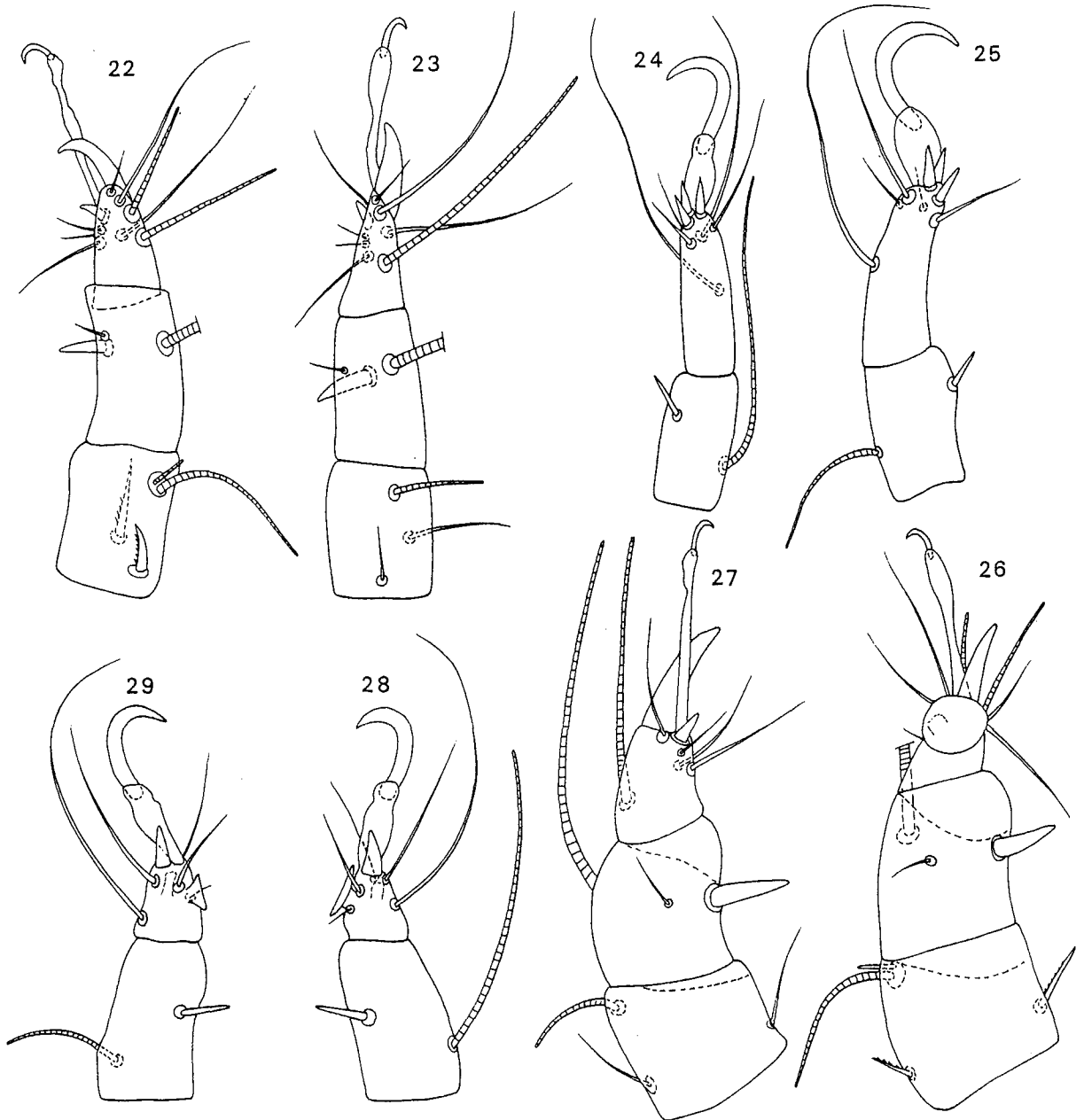
CHAETOTAXY—*v i* 135; *sc i* 60; *sc e* 225; *d 1* 10; *d 2* 150; *d 3* 190; *d 4* 225; *d 5* 40; *l 1* 42; *l 2* 40; *l 3* 28; *l 4* 40; *l 5* 170; *a 2* 15; *a 3* 30. Ventral setae of tibiae III-IV are true spines. Genu I with 2 very unequal solenidia. Solenidia of tibiae III and IV located in basal third of the segment.

NYMPHS AND LARVA—Unknown.

LOCALITY—Holotype and 2 paratype females and 6 paratype males from two places in Coconut Island, Camotes Sea, Philippines. From intertidal roots of mangrove, March 1983 (sample n° RS-1278).

REMARKS—This species differs from *A. glynni* and *A. californica* in the female by presence of 2 pairs of genital setae and 3 pairs of anal setae and presence of *d 5* setae. In these species there are 3 pairs of genital and 2 pairs of anal setae and *d 5* are absent. Fain and Ganning (1979) have erroneously confused seta *a 3* with *d 5*. The new species differs from *A. heterophallus* and *A. bursaria* in both sexes by presence of *d 5*, much greater length of setae *d 2*, *d 3* and *d 4* and basal location of solenidia of tibiae III-IV. The male differs by different shape of the genital organ.

DEPOSITION OF TYPES—Holotype in IRSNB, no. IG 26724. Paratypes in the collection of the authors.



Figs. 22-29: *Amhyadesia pacifica* sp. n., Female—Fig. 22, leg I; Fig. 23, leg II; Fig. 24, leg III; Fig. 25, leg IV. Male—Fig. 26, leg I; Fig. 27, leg II; Fig. 28, leg III; Fig. 29, leg IV.

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