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Three new species of the genus *Acanthomastix* MAHUNKA, 1972 from United States and Poland (Acari: Dolichocybidae)

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(With 18 figures)

Abstract

Three new species of the genus *Acanthomastix* Mahunka, 1972 are described and figured: *A. ornatus* and *A. elegans* spp. n. phoretic on *Hylobius pales* (Herbst) (Insecta: Curculionidae) from USA and *A. minor* sp. n. from rotten fir bark in Poland. The genus *Acanthomastix* is rediagnosed according to supposed nonsexual female dimorphism, already known from its sister genus Formicomotes Sevastianov, 1980. Specific status and some aspects of biology within the genus are briefly discussed.

Keywords: Acari, Dolichocybidae, new taxa, dimorphism.

Introduction

Dolichocybids still remain an infrequently encountered family of heterostigmatic mites, and much data is still needed before their life habits can be assessed. The discovery here of two American species (*Acanthomastix ornatus* sp. n. and *A. elegans* sp. n.) phoretic on the common weevil *Hylobius pales* and the probable close association of *A. minor* sp. n. with the ant *Myrmica ruginodis* indicates again that insect relationships are common in dolichocybids and perhaps obligatory in their subfamily Formicomotinae.

Methods and Nomenclature

Mites of the two newly discovered American species were removed from dead weevil material, cleared in lactophenol, and mounted on slides in Berlese medium. The new Polish species female was found using the Tullgren-Berlese funnel, and mounted on a slide with Swan medium. All specimens were viewed with phase contrast Zeiss (Peraval) microscope; measurements of a holotype are given first with parenthetical data expressing the variability of selected paratypes. When no data is included in parentheses, characters variation reflects distortion due to mounting rather than true variability.

Nomenclature used below is derived from papers of Lindquist 1977, 1986, 1987 and Magowski 1988. Names of collection where the type material is stored are abbreviated as follow: United States Museum of Natural History - USNM; USDA Southern Forest Experiment Station - SFES; Zoological Museum of Hamburg University - ZMHU; Department of Animal Taxonomy and Ecology Collection - DATE; Canadian National Collection - CNC.

Descriptions

Acanthomastix ornatus sp. n.
(Figs 1-6)

Diagnosis: Gnathosoma with palpcoxal setae laterally near the base of each palpus. Palpgenual setae slightly longer than the half of the stylophore length. Subcapitular setae about 2/3 as long as half of the width of subcapitulum. Setae of the opisthosomal dorsum (including c_2 moved to the venter) smooth, slender, moderately short and delicate. Setae f inserted on the tergite EF anteriad of the level of setae e bases. Setae h_1 delicate, only slightly longer than the distance between its bases. Dorsal shielding covered with conspicuous sparse dimpled ornament. All legs with claws similar in size, and one short, thick seta on femur. Empodia on legs II-IV stalked, little longer than claws, with small sucker distally each.

Description: Gnathosoma (Figs 1a, 2): rounded subquadrangular in shape, 26.5 (23.9-27.7)*) long dorsally (stylophore), 31.5 (27.7-32.8) long ventrally (subcapitulum) and 31.5 (29-32.8) wide, i.e. approximately as long as wide. Stylophore with evident markings of longitudinal division and equipped with medial apodematal structure. One pair of dorsal gnathosomal setae on the posterial half of the stylophore. Movable cheliceral digits (cheliceral stylets) placed medioventrally in the apex of its fused bases, sickle shaped, conspicuous, little shorter than the 1/3 of the stylophore length. Subcapitulum with a pair of slender ventral setae, 8.8 (7.6-10.1) long, i.e. about 2/3 as long as the half of the subcapitulum width. Palpcoxal setae short, bluntly ended, located near lateral articulations of palpi. A medium-sized pharyngeal structure

*) 7 paratypes measured, all measurements in µm.

visible internally along the medioventral midline of gnathosoma; its length 13.9 (12.6-) and width 3.8 (-5.0). Lateral sides of pharynx indistinctly undulated, in some paratypes weak lateral dentation can be observed; no lateral lobes, characteristic for most dolichocybids, were noticed. Palptrochanter reduced, palpfemur united with palpgenu without signs of suture. Palpfemoral seta small, tapering; palpgenual one 15.1 (14.5-16) long, slightly longer than the half of the stylophore length but shorter than the whole palpus. Each palpal tibiotarsus with one small solenidion, one small clublike seta and doubled toothlike process (probably setigerous) near the small palptibial claw, which is inserted apically and directed medially. Palpi located convergently but ends of the claws directed rather in opposition to each other.

Dorsal side (Fig. 1): Idiosoma wide-oval in outline, 180.2 (172.6-195.3) long, 128.5 (112.1-131) wide. Prodorsal shield (PrS) subtriangular, 75.6 (71.8-76.9) long, 109.6 (92 -) wide, expanding anteriorly in a rounded hood over the base of gnathosoma. Lateral edges convex as well as the posterior free margin overlapping the C tergite with irregularly undulated ridge. There are three pairs of setae inserted on the prodorsal shield: v_1 23.9 (21.4-) long, tapering slender, located 30.2 (26.5-31.5) apart, v_2 17.6 (17.0-18.3) long, blunt ended, 25.2 (22.7-26.5) apart and sc_2 18.3 (16.4 -) long, slender, pointed, 65.5 (61.7-66.8) apart, i.e. about 3.5 times shorter than the distance between its bases. The latter setae (sc_2) approximately as long as setae v_2, but about 1/3 of its length shorter than the longest v_1. Setae sc_2 located on the posterior half of the prodorsum close to the transverse midline of the shield. A pair of sinuses (probably vestiges of bothridial structures) visibly opens behind the bases of v_1 setae on the anterolateral edges of PrS and ends at the v_2 bases all under the outer surface of the shield. No vestiges of the sc_1 setae (sensilli) visible. A transverse, diffused apodematal structure present on the inner surface in the posterior half of the PrS. The C tergite subdivided into dorsomedial shield and lateral weakly sclerotized parts (originated from the rigid shieldlets) integrated with venter. Dorsomedial C shield bears a pair of setae c1 13.9 (12.6-14.5) long and 41.6 (32.8-45.4) apart i.e. three times shorter than the distance between its bases. Setae c_2 on discrete ventral sclerites 12.6 (11.3-) long, slender, smooth, pointed, placed 92.6 (90.7-100.1) apart, clearly anteriad of c_1 bases level. Tergite D with a pair of setae d slender, pointed, 12.0 (10.1-) long, 89.5 (76.7-) apart and a pair of cupules ia located anteromediad of d bases, under the free posterior margin of the C tergite. EF tergite with two pairs of setae; f slender but rather stiff, 7.6 (5.7-) long, 26.5 (22.7-30.2) apart (i.e. in a distance of its 4 lengths), setae e slender, pointed, 10.7 (8.8-) long (less than twice longer as f), and located posterolaterad of f bases, 55.4 (52.9-59.2) apart, in a distance of its 5-6 lengths. A pair of cupules im present laterad of f bases but more medially than e bases, well anteriad of both, under the free margin of D tergite. Segment H with two pairs of setae located ventroterminally and a pair of dorsal cupules ih anterolaterad of h_2. Setae h_1 small, rather slender, pointed, 11.3 (10.8-12.6) long, 10.1 (8.8-) apart, little longer than the distance between its bases; setae h_2 the longest of all body setae, 74.3 (68-) long, slender whiplike, 18.9 (17.6-20.2) apart, nearly 7 times as long as h_1 and about as long as the 1/3 of idiosomal length. Dorsal surface covered with dimpled puncta, clear and relatively sparse, weakened on

anteromedial parts of tergite; tergite H with its ornament inconspicuous, in some specimens invisible. Free posterial margins of tergites show very delicate indistinct longitudinal striation.

Ventral side (Fig. 2): Medial corners of trochanters of the first pair of legs divided by the distance of 15. Apodemes 1 and anteromedial apodeme united into one Y-shaped structure with each branch (both anterial and posterial) ending with internal nodules. Anterial branches arched, each as long as posterial branch. Posteriad of medial apodeme coxal plates I divided, and coxal plates II entirely divided medially by the area of soft integument. Apodemes 2 curved medially, not uniting with anteromedial apodeme, equipped with internal nodules at anterolateral ends. Each of the coxal plates II in its posterior part projecting into a free subrectangular flap with broadly rounded angles, slightly overlapping the same of the next plate medially with small rounded lobe. Trochanters II divided by the distance of 56.7. Coxal setae 1b 6.3 (-6.9) long, 26.5 (25.2-29) apart, setae 2a (on coxal plates II) 7.6 (6.3-) long, 30.2 (-34.0) apart. Propodosomal coxal region separated from the metapodosomal by the area of soft, transversely folded integument. Trochanters III divided by the distance of 69.3 and trochanters IV by the distance of 58. Apodemes 3 weakly pronounced, posteromedial apodemes weak, but visible on the medial ridges of united transversely coxal plates III and IV. Apodemes 4 conspicuous, apodemes 5 weak. Coxal plates III and IV divided medially by the band of soft, densely striated integument. Coxal plates IV ended posteriorly by the free semiellip-soidal lobes, relatively narrow, slightly overlapping medially in its posterior half (in incompressed specimens). Setae 3b 7.6 (6.9-8.2) long, 30.2 apart, and setae 4a 6.3 (-7.6) long, 25.2 apart. All setae on the coxal plates slight, pointed and smooth. Aggenital platelets discrete, rounded, with posteromedial parts somewhat more sclerotized and surrounded by the area of soft, striated integument. Each platelet with aggenital seta 6.3 (-6.9) long, 29 apart, similar to the setae on coxal plates. Pseudanal platelet small, triangular with short longitudinal anal slit. A second slit visible between aggenital platelets leads to the weakly sclerotized flesh-walled channel (bursa copulatrix?) accompanied by two pairs of small grainlike glandular structures. A soft wide tube can be noticed inside the terminal part of opisthosoma between aggenital plates and posterior lobes of coxal plates IV.

Legs (Figs 3-6): Shorter than the half of the maximum idiosomal width; leg I with suckerlike, rounded sessile empodium placed ventrodistally on tarsus. Tarsi of legs II, III and IV equipped with small, stalked empodium with disclike sucker apically, inserted between claws, but only little longer (approx. 1/3) than the claws length. Claws of all legs similar in sizes, sickle shaped, approximately 6.3 long and 2 wide; those of leg I slightly stronger than on following tarsi. All genua about twice wider than long, (IV more quadrangular in view), with one thornlike anterolateral seta l' little longer or subequal to its segment length. All femora with one short spinelike seta posteroventrally.

Leg I (Fig. 3) setation: 8(2)-5(2)-1-1 (respectively for tarsus, tibia, genu and femur, number of solenidia expressed parenthetically). Whole leg I 45.4 (42.8-47.9) long, its tarsus 13.2 (12.6-15.1) long (measured from the apex to the base of segment). Setae tc', pv' and ft' grouped

closely to one another on the lateral surface of distal part of tarsus; tc' and ft' subequal in length (both little shorter than the tarsus width) tapering, pointed; seta pv' placed more ventrally, twice shorter, more rodlike but pointed. Seta p' short, thornlike, inserted dorsally, pv" short and thornlike as well, but placed closer to the midline of segment ventrally; tc" and pl" on posterolateral surface of segment, tc" as long as the combined length of tibia and tarsus, three times longer than pl", attenuate; both slender and pointed. Seta ft' placed more dorsally near the clavate shorter solenidion ω_1. The solenidion ω_2 clavate, stalked, prominent, with striated head 6.3 long, 2.5 wide, located dorsally near the proximal border of segment. Tibia 1/3 wider than long, with three short (shorter than its segment length) tapering thornlike pointed setae (l' and d closer to each other, l" on the posterolateral surface) and one attenuated ventral v" seta; tibial sensory cluster consists of the shortest clavate ϕ_2 solenidion, the k eupathidion (the longest of all cluster members -6.9) and clavate ϕ_1 5.7 long.

Leg II (Fig. 4) setation: 5(1)-3(1)-1-1. Whole leg 46.6 (41.6-47.9) long, its tarsus 13.2 (12.6-15.1) long, about twice longer than wide basally with four robust spinelike setae (apparently thicker than claws: pv' shorter and pv", tc', pl" longer and stouter) and long attenuate seta tc" as long as the combined length of tibia and tarsus. Large ω solenidion with clavate, transversely striated head slightly thicker than ω_2 on tarsus I; 6.3 long, located dorsoposteriorly near the base of its segment. Tibia II with two spinelike setae: l' thicker about as long as its segment width, d little thinner, (placed posterodorsally above the level of solenidion ϕ - 4.8 long), and long attenuate seta v" placed ventrally.

Leg III (Fig. 5) setation: 5-3(1)-1-1. Leg III length 45.4 (-47.9), tarsus 12.6 (10.2-13.5) long, about 1.5 times longer than wide with four stout spinelike setae (pv", pv', pl", tc') and one long attenuate tc" shorter than combined length of tibia and tarsus. Tibia III with two spinelike setae (l', d), one attenuate long ventral v" and the solenidion ϕ.

Leg IV (Fig. 6) setation: 4-3(1)-1-1. Leg IV more slender than preceding ones, 46.6 (41.6-50.4) long, its tarsus 13.9 (11.3-) long, less than twice as long as wide, with three spinelike setae (tc' missing in relation to preceding tarsi) and one long, attenuate seta tc" markedly shorter than the combined length of tibia and tarsus. Tibia with two spinelike, one attenuated seta and one solenidion ϕ smaller than those on other legs.

Males unknown.

Type material: Holotype, ♀, USA.: Florida, Olustee, in tree stump, phoretic under elytra of *Hylobius pales* (Herbst) (Ins.: Curculionidae), 2. 1966, Merkel leg., USNM. Paratypes, 32♀, same data as holotype: 2♀ USNM; 11♀ SFES; 7♀ W. L. Magowski, DATE; 7♀ ZMHU; 5♀ CNC.

Acanthomastix elegans sp. n.
(Figs 7–12)

Diagnosis: Gnathosoma with palpcoxal setae absent. Palpgenual setae nearly as long as the stylophore length. Subcapitular setae as long as half of the width of subcapitulum. Setae of the opisthosomal dorsum (excluding c_1) stiff, more solid, moderately short. Setae f inserted on the tergite EF posteriad of the level of setae e bases. Setae h_1 stiff, blunt, 1.5 times longer than the distance between their bases. Dorsal shielding covered with inconspicuous sparse ornament. All legs with claws similar in sizes, and one stouter seta on femur. Empodia on legs II–IV stalked, little longer than claws, with small sucker distally each.

Description: Gnathosoma (Figs 7a, 8): rounded subquadrangular in shape, 23.9 (18.9–)*) long dorsally (stylophore), 27.7 (25.2–) long ventrally (subcapitulum) and 26.5 (22.7–) wide, i.e. slightly longer than wide. Stylophore with markings of longitudinal division and equipped with weak medial apodematal structure. One pair of dorsal gnathosomal setae on the transverse midline of the stylophore. Movable cheliceral digits (cheliceral stylets) placed medioventrally in the apex of its fused bases, sickle shaped, conspicuous, as long as the 1/3 of the stylophore length. Subcapitulum with a pair of slender ventral setae, 13.9 (11.3–) long i.e. about as long as the half of the subcapitulum width. Palpcoxal setae absent. A medium sized pharynx visible internally near the medioventral midline of gnathosoma; its length 12.6 (11.3–13.2) and width 4.4 (3.8–5.0). Lateral sides of pharynx indistinctly undulated, and weakly laterally dentated. No distinct lateral lobes were found. Palptrochanter reduced, palpfemur united with palpgenu. Palpfemoral seta small tapering, palpgenual one 18.9 (17.6–19.5) long, nearly as long as the stylophore length and little longer than the whole palpus. Each palpal tibiotarsus with one small solenidion, one small clublike seta and toothlike process near the small palptibial claw, which is inserted apically and directed medially. Palpi located convergently with ends of the claws directed opposite to each other.

Dorsal side (Fig. 7): Idiosoma oval-elongated in outline, 158.8 (152.5–161.3) long, 104.6 (93.2–108.4) wide. Prodorsal shield (PrS) subtriangular, 65.5 (62.4–) long, 89.5 (79.4–) wide expanding anteriorly in a rounded hood over the base of gnathosoma (incompressed specimens only). Lateral edges convex as well as the posterior free margin overlapping the C tergite with weakly undulated ridge. There are three pairs of setae inserted on the prodorsal shield: v_1 20.2 (19.5–21.4) long, tapering slender, located 22.7 (–23.9) apart, v_2 15.8 (14.5–16.4) long, blunt ended, 17.6 (15–18.9) apart and sc_2 18.9 (17.6–19.5) long, slender, pointed, 52.9 (50.4–54.2) apart, i.e. little less than 3 (2.8) times shorter than the distance between its bases. The latter setae subequal to setae v_1, and about 1/5 of its length longer than the v_2. Setae sc_2 located nearly on the transverse midline of the shield. A pair of sinuses visibly opens laterad of the bases of v_1 setae on the anterolateral edges of PrS and ends laterad of the v_2 bases under the surface of the shield. No vestiges of the sc_1 setae visible. A transverse diffused

*)5 paratypes measured.

apodematal structure present on the inner surface in the posterior half of the PrS. The C tergite subdivided into dorsomedial shield and lateral weakly sclerotized parts integrated with venter. Dorsomedial C shield bears a pair of setae c_1 13.9 (13.2–15.1) long, stiff tapering and pointed, and 35.3 (32.8–37.8) apart i.e. 2.5 times shorter than the distance between its bases. Setae c_2 on discrete ventral sclerites 15.1 (13.9–16.4) long, stiff, finely barbed, pointed, placed 84.4 (75.6–88.2) apart, clearly anteriad of c_1 bases level. Tergite D with a pair of setae d stiff, barbed, pointed, 12.6 (–13.9) long, 64.3 (61.7–69.3) apart and a pair of cupules ia located anteromediad of d bases, under the free posterior margin of the C tergite. EF tergite with two pairs of setae; f pointed, barbed, stiff, 8.2 (–9.5) long, 23.9 (22.0–29.0) apart (i.e. in a distance of its 3 lengths), setae e stiff, barbed, pointed, 12.6 (–14.5) long (about 1.5 times longer than f), and located anterolaterad of f bases, 51.7 (45.4–56.7) apart, in a distance of its 4 lengths. A pair of cupules im present laterad of f bases but mediad of e bases, well anteriad of both, under the free margin of D tergite. Segment H with two pairs of setae located ventroterminally and a pair of dorsal cupules ih anteriad of h_2. Setae h_1 stiff, blunt, longer than any other setae on tergites C, D, EF, 18.9 (17.6–19.5) long, 12.0 (11.3–12.6) apart, nearly twice longer than the distance between its bases; setae h_2 the longest of all body setae, 81.9 (75.6–92.0) long, slender whiplike 22.7 (21.4–) apart, more than 7 times longer than h_1 and about as long as the 1/2 of idiosomal length. Dorsal surface nearly smooth, covered with sparse, indistinct puncta, weaker on anteromedial parts of tergite; tergite H with its ornament invisible. Free posterial margins of tergites show very delicate indistinct longitudinal striation.

Ventral side (Fig. 8): Medial corners of trochanters of the first pair of legs divided by the distance of 14. Apodemes 1 and anteromedial apodeme united into one Y-shaped structure with each branch (both anterial and posterial) ending with internal nodules. Anterial branches arched, each as long as the half of posterial branch length. Posteriad of medial apodeme coxal plates I divided, and coxal plates II entirely divided medially by the area of soft integument. Apodemes 2 curved medially, not uniting with anteromedial apodeme, equipped with internal nodules at its anterolateral ends. Each of the coxal plates II has its posterior part projecting into free subrectangular flap with broadly rounded angles. Trochanters II divided by the distance of 40.3. Coxal setae 1b 8.2 (7.6–) long, 22.1 (20.2–23.9) apart, setae 2a 8.8 (8.2–) long, 25.2 (23.9–26.5) apart. Propodosomal coxal region separated from the metapodosomal by the area of soft, transversely folded integument. Trochanters III divided by the distance of 60.5 and trochanters IV by the distance of 47.9. Apodemes 3 distinct, posteromedial apodemes weak, but visible on the medial ridges of united transversely coxal plates III and IV. Apodemes 4 and 5 conspicuous. Coxal plates III and IV divided medially by the band of soft, densely striated integument. Coxal plates IV ended posteriorly by the free semiellipsoidal lobes, slightly overlapping medially in its posterior half. Setae 3b 8.8 (8.2–) long, 29.0 apart, and setae 4a 8.2 (6.9–8.8) long, 22.7 apart. All setae on the coxal plates stiff, pointed. Aggenital platelets, rounded, covered with indistinct puncta, with posteromedial parts somewhat more sclerotized and surrounded by the area of soft, folded integument. Each platelet with aggenital seta 5.7 (–6.3) long, 24 apart, apparently shorter than

the setae on coxal plates. Pseudanal platelet small, triangular with short longitudinal anal slit. A sclerotized flesh-walled channel accompanied by one pair of small grainlike glandular structures opens between aggenital plates. A soft wide tube can be noticed between aggenital plates and posterior lobes of coxal plates IV internally.

Legs (Figs 9-12): Shorter than the half of the maximum idiosomal width, leg I with suckerlike, rounded sessile empodium placed ventrodistally on tarsus. Tarsi of legs II, III and IV equipped with short, stalked empodium with disclike sucker apically, inserted between claws, but only little longer than the claws length. Claws of all legs similar in sizes, sickle shaped, usually 6.3 long and 2 wide; those of leg I stronger than on following tarsi. All genua about twice wider than long, with one thornlike anterolateral seta l' little longer or subequal to its segment length. All femora with one spinelike seta posteroventrally.

Leg I (Fig. 9) setation: 8(2)-5(2)-1-1. Whole leg I 40.3 (25.3-) long, its tarsus 11.3 (13.2-) long. Setae tc', pv' and ft' on the dorsolateral surface of distal part of tarsus; tc' and pv' subequal in length (both its 1/3 length shorter than the tarsus width) tapering, pointed; seta ft' placed more dorsoventrally, 1/3 longer, pointed. Seta p' short, thornlike, inserted dorsally, pv" short and thornlike as well, but placed on the proximal half of segment ventrally; tc" and pl" on posterolateral surface of segment, tc" nearly as long as the combined length of genu, tibia and tarsus, three times longer than pl", attenuate; both slender and pointed. Seta ft" placed more dorsally near the clavate shorter solenidion ω_1. The solenidion ω_2 clavate, stalked, large, with striated head 6.0 long, 2.5 wide located dorsolaterally near the proximal border of segment. Tibia somewhat wider than long, with three short (shorter than its segment length) tapering thornlike setae (l' and d closer to each other, l" on the posterolateral surface) and one attenuated ventral v" seta; tibial sensory cluster contains the shortest clavate ϕ_2 solenidion, the k eupathidion (the longest of all cluster members -6.9) and clavate ϕ_1 -6.5 long, apparently longer than ω_2 on tarsus.

Leg II (Fig. 10) setation: 5(1)-3(1)-1-1. Whole leg 39.1 (35.3-) long, its tarsus 12.6 (11.3-) long, about 1.5 times longer than wide, with four robust spinelike setae (twice longer than wide, thicker than claws) and long attenuate seta tc" as long as the combined length of tibia and tarsus. Large ω solenidion with clavate, transversely striated head as thick as ω_2 on tarsus I; 5.7 long, located dorsolaterally near the base of its segment. Tibia II with two strong setae: l' thicker, shorter than its segment width, d little shorter, thinner, (placed posterodorsally above the level of solenidion ϕ- 3.2 long), and long attenuate seta v" placed ventrally.

Leg III (Fig. 11) setation: 5-3(1)-1-1. Leg III length 39.1 (36.5-), tarsus 11.3 (10.1-) long, about twice longer than wide with four stout spinelike setae (pv", pv', pl", tc') and one attenuate tc" markedly shorter than combined length of tibia and tarsus but about 1/3 of tarsus length longer than this segment. Tibia III with two spinelike setae (l' longer than d), one attenuate long ventral v" and the small solenidion ϕ.

Leg IV (Fig. 12) setation: 4-3(1)-1-1. Leg IV more slender than other ones, 41.6 (36.5-) long, its tarsus 12.6 (10.7-13.2) long, 1.5 times as long as wide, with three spinelike setae (tc' missing) and one long, attenuate seta tc" shorter than the combined length of tibia and tarsus. Tibia with two spinelike, one attenuated seta and one solenidion ϕ much smaller than those on other legs.

Males unknown.

Type material: Holotype, ♀, USA: North Carolina, Durham, on the intersegmental area of tergum *Hylobius pales* (Herbst), together with undetermined nematodes, 4. 5. 1972, Shabel leg., USNM. Paratypes, 10♀, same data as holotype: 2♀ USNM; 1♀ SFES; 1♀ W. L. Magowski DATE; 3♀ ZMHU; 3♀ CNC.

Acanthomastix minor sp. n.
(Figs 13-18)

Diagnosis: Gnathosoma with palpcoxal setae laterodorsally near the base of each palpus. Palpgenual setae slightly shorter than the stylophore length. Subcapitular setae nearly 2/3 as long as half of the width of subcapitulum. Setae of the opisthosomal dorsum (including c_2) smooth, pointed, moderately short and very delicate. Setae f inserted on the tergite EF anteriad of the level of setae e bases. Setae h_1 stiff, pointed, 1.5 times longer than the distance between its bases. Dorsal shielding covered with conspicuous sparse dimpled ornament. Leg I claws similar in sizes, legs II, III, IV with anterial claws twice larger than the posterior ones. One slender pointed seta on femora I, II, III; femur IV without setae. Empodia on legs II-IV stalked, prominent 3 times longer than larger of the claws, with large sucker distally each.

Description: Gnathosoma (Figs 13a, 14): rounded subquadrangular 20.2*) long dorsally (stylophore), 25.2 long ventrally (subcapitulum) and 25.2 wide, i.e. approximately as long as wide. Stylophore with clear sign of longitudinal division and equipped with medial apodematal structure. One pair of short dorsal gnathosomal setae on the anterial half of the stylophore. Movable cheliceral digits (cheliceral stylets) placed medioventrally in the apex of its fused bases, sickle shaped, conspicuous, as long as the 1/4 of the stylophore length. Subcapitulum with a pair of slender ventral setae 7.6 long i.e. less than the 2/3 as long as the half of the subcapitulum width. Palpcoxal setae short, stout blunt, located over lateral articulations of palpi. An internal pharynx near the medioventral axis of gnathosoma; its length 10.1 and width 3.8. Lateral sides of pharynx weakly lobate. Palptrochanter reduced, palpfemur joined with palpgenu immovably, though indistinct suture can be noticed on medioventrad surface of a palpus. Palpfemoral seta small tapering, palpgenual one 15.1 long, slightly shorter than the stylophore length apparently longer than the whole palpus. Each palpal tibiotarsus with one small solenidion, one small clublike seta and one lobelike process

*) holotype measured.

apically near the tiny palptibial claw, which is inserted apically. Palpi located convergently with claws directed the same way.

Dorsal side (Fig. 13): Idiosoma roundish oval in outline, 151.2 long, 115.9 wide. Prodorsal shield (PrS) semicircular, 68.0 long, 114,7 wide expanding anteriorly into a broadly rounded roof over the most of gnathosoma. Lateral edges convex; the posterior free margin nearly straight, overlaps the C tergite with weakly, irregularly undulated ridge. There are three pairs of setae inserted on the prodorsal shield: v_1 25.2 long, tapering slender, located 27.7 apart, v_2 13.9 long, truncated, 21.4 apart and sc_2 18.9 long, slender, pointed, 78.8 apart, i.e. more than 4 times shorter than the distance between its bases. The latter setae (v_1) approximately twice longer than setae v_2, but about 1/4 of its length longer than sc_2 setae. Setae sc_2 located on the anterior half of the prodorsum close to the transverse midline of the shield. A pair of sinuses opens laterad of bases of v_1 setae on the anterolateral edges of PrS and ends slightly laterad of the v_2 bases under the surface of the shield. No vestiges of the sc_1 setae present. The C tergite subdivided into dorsomedial shield and lateral parts, shifted to the venter. Dorsomedial shield C bears a pair of setae c_1 13.9 long and 52.9 apart i.e. nearly 4 times shorter than the distance between its bases. Setae c_2 on discrete ventral sclerites 12.6 long, slender, smooth, pointed, inserted 81.9 apart, clearly anteriad of c_1 bases level. Tergite D with a pair of setae d slender pointed, 11.3 long, 97.0 apart and a pair of cupules ia located anteromediad of d bases, under the free posterior margin of the C tergite. EF tergite with two pairs of setae: f slender, pointed, stiff, 5.7 long, 22.7 apart (i.e. in a distance equal to its 4 lengths), setae e slender, pointed, 18.8 long (only slightly longer than f), and located posterolaterad of f bases, 50.4 apart, in a distance of its 6 lengths. A pair of cupules im slightly laterad of f bases but well mediad of e bases, anteriad of both, under the free margin of D tergite. Segment H with two pairs of setae located ventroterminally and a pair of dorsal cupules ih anteriad of h_2. Setae h_1 small, rather stiff, pointed, longer than any of setae on tergites C, D, EF (but c_1, 12.0 long, 8.8. apart, little longer than the distance between its bases. Setae h_2 the longest of all body setae, 42.8 long, rather stiff, blunt, 17.6 apart, about 3.5 times as long as h_1 and conspicuously shorter than the 1/3 of idiosomal length. Dorsal surface covered with sparse, dimpled puncta, weaker on marginal parts of tergite; tergite H with is ornament inconspicuous. Free posterior margins of tergites with very delicate, poorly visible longitudinal striation.

Ventral side (Fig. 14): Medial corners of trochanters of the first pair of legs divided by the distance of 15.1. Apodemes 1 and anteromedial apodeme united into one Y-shaped structure with anterial branches ending with internal nodules. Anterial branches arched, each as long as the half of the posterial branch. Posteriad of medial apodeme coxal plates I divide, and coxal plates II entirely divided medially. Apodemes 2 curved medially, not uniting with anteromedial apodeme, equipped with internal nodules at anterolateral ends. Each of the coxal plates II in its posterior part projecting into free concave, undulated margin with small, acute flaplike process near the medial axis of body and with broadly rounded medial lobes slightly overlapping the same of the next plate medially. Trochanters II divided by the distance of 47.9. Coxal

setae 1b 5.0 long, 21.4 apart, setae 2a (on coxal plates II) 6.9 long, 25.2 apart. Propodosomal coxal region separated from the metapodosomal by the narrow area of soft, densely striated integument. Trochanters III divided by the distance of 55.4 and trochanters IV by the distance of 52.9. Apodemes 3 well pronounced, posteromedial apodemes weak, poorly visible. Apodemes 4 strong, apodemes 5 inconspicuous. Coxal plates III and IV tightly connected medially. Coxal plates IV ended posteriorly by the free semiellipsoidal lobes, relatively broad, slightly overlapping medially in its posterior half. Setae 3b 5.0 long, 26.5 apart, and setae 4a 5.0 long, 20.2 apart. All setae on the coxal plates short, weak, pointed and smooth. Aggenital platelets widely ellipsoidal, covered with tiny puncta, with marginal parts somewhat more sclerotized and surrounded by the area of soft densely striated integument. Each platelet with aggenital setae 2.5 long, 25.2 apart, similar to the setae on coxal plates. Pseudanal platelet small, triangular with short longitudinal anal slit. A sclerotized flesh-walled channel accompanied by one pair of small glands opens between aggenital plates posteromedially.

Legs (Figs 15–18): Shorter than the half of the maximum idiosomal width, leg I with suckerlike, rounded sessile empodium placed ventrodistally on tarsus. Tarsi of legs II, III and IV equipped with large, stalked empodia (about as large as its tarsi) with prominent disclike sucker apically, inserted between claws. Claws of leg I similar in sizes, sickle shaped, approximately 5.0 long and 2 wide; claws on legs II–IV dissimilar, anterior one twice larger than the posterior one. All genua wider than long (III and IV more quadrangular in dorsoventral view), with one tapering anterolateral setae l' little longer (IV) or subequal to its segment length. Femora I–III with one slender, pointed seta posteroventrally. Femur IV without setae. Setae on legs segments stout but mostly not spine or thornlike.

Leg I (Fig. 15) setation: 8(2)–5(2)–1–1. Whole leg I 36.5 long, its tarsus 12.6 long. Setae pv' and ft' on the dorsolateral surface of distal part of tarsus; tc' laterally on the transverse midline of the tarsus, tc' and ft' subequal in length (both shorter than the tarsus width) tapering, pointed; seta pv' placed more ventrally, twice shorter than its segment width, pointed. Seta p' short, thornlike, inserted dorsally, pv" short and thornlike as well, but weaker than p', placed closer to the base of segment ventrally; tc" on posterolateral surface of segment, as long as the combined length of genu, tibia and tarsus, nearly four times longer than ft", attenuate; seta ft" placed more dorsally; both slender and pointed. Seta pl" placed ventrally, slender, subequal to ft". The small solenidion ω_1 shorter than the solenidion ω_2: clavate, stalked, large with striated head 6.3 long, 2.5 wide, located posterolaterally near the proximal border of segment. Tibia wider than long, with three short (shorter than its segment length) tapering pointed setae (l' on anterolateral, d on dorsal and l" on the posterolateral surfaces) and one attenuated ventral v" setae; tibial sensory cluster contains the shortest clavate ϕ_2 solenidion, the k eupathidion, 7.6 long, and clavate ϕ_1 6.9 long, subequal to ω_2 on tarsus.

Leg II (Fig. 16) setation: 5(1)–3(1)–1–1. Whole leg 35.3 long, its tarsus 11.3 long, about 1.5 times longer than wide with four stout, tapering setae (not thicker than claws) pv', pv", pl" shorter, tc' longer and

stouter, and long attenuate setae tc" shorter than the combined length of tibia and tarsus. Large ω solenidion with clavate, transversely striated head as thick as ω_1 on tarsus I; 5.0 long, located dorsally near the base of its segment. Tibia II with two stout setae: l' thicker shorter than its segment length, d little shorter, placed posterodorsally, slightly above the level of solenidion φ (3.2 long), and attenuate setae v" placed ventrally.

Leg III (Fig. 17) setation: 5-3(1)-1-1. Leg III length 39.1, tarsus 8.8 long, about 1.5 times longer than wide with four stout setae (pv", pv', pl", tc') and one long attenuate tc" shorter than combined length of tibia and tarsus. Tibia III with two spinelike setae (l', d), one attenuate long ventral v" (as long as the tarsus) and the solenidion φ.

Leg IV (Fig. 18) setation: 4-3(1)-1-0. Leg IV more slender than preceding legs, 39.1 long, its tarsus 11.3 long, 1.5 times longer than wide, with three spinelike setae (tc' missing) and one long, attenuate seta tc" markedly shorter than the combined length of tibia and tarsus. Tibia with two spinelike, one attenuated setae and one solenidion φ, similar to that on legs II and III.

Males unknown.

Type material: Holotype, ♀, Poland: Kielce Distr., Świętokrzyskie Mts., Święty Krzyż, southern slope; in mixed forest (beech, hornbeam, plane trees), from rotten bark of dead fir (*A. alba* P. Miller) infested with a large number of workers *Myrmica ruginodis* Nylander (Ins.: Formicidae), 7. 7. 1987, W. L. Magowski leg, ZMHU).

Discussion

Based on the recent discovery of the nonsexual female dimorphism within the genus *Formicomotes* Sevastianov, 1980 (a member of the same subfamily, Magowski 1988), we speculate that similar phenomenon may take place among *Acanthomastix* Mahunka, 1972 as well. Despite the lack of direct evidence (i.e. observation of different morphs within one population), some data from the area of morphology and habitat preferences provisionally substantiate this view. All three newly described forms certainly share the following morphological properties with the Y morph of *Formicomotes heteromorphus* Magowski, 1988:
- idiosoma less than twice as long as wide,
- posterior margin of prodorsal shield overlaps C tergite,
- posterior outgrowths of coxal plates II,
- setae h_2 shorter than the half of the body length,
- empodia of legs II-IV stalked.

Similarly, the type species of the genus, *A. spinipes* Mahunka, 1972, is comparable to the X morph of *F. heteromorphus* by following features:
- body elongate, more than twice longer than wide,
- setae h_2 much longer than the half of body length,
- empodia of legs II-IV sessile (according to drawings in Mahunka 1972).

Apart from morphology, both American species were found phoretic on a curculionid beetle, and the Polish one in the sample strongly infested by ants, whereas New-Guinean type species was found in the sample of rain forest litter.

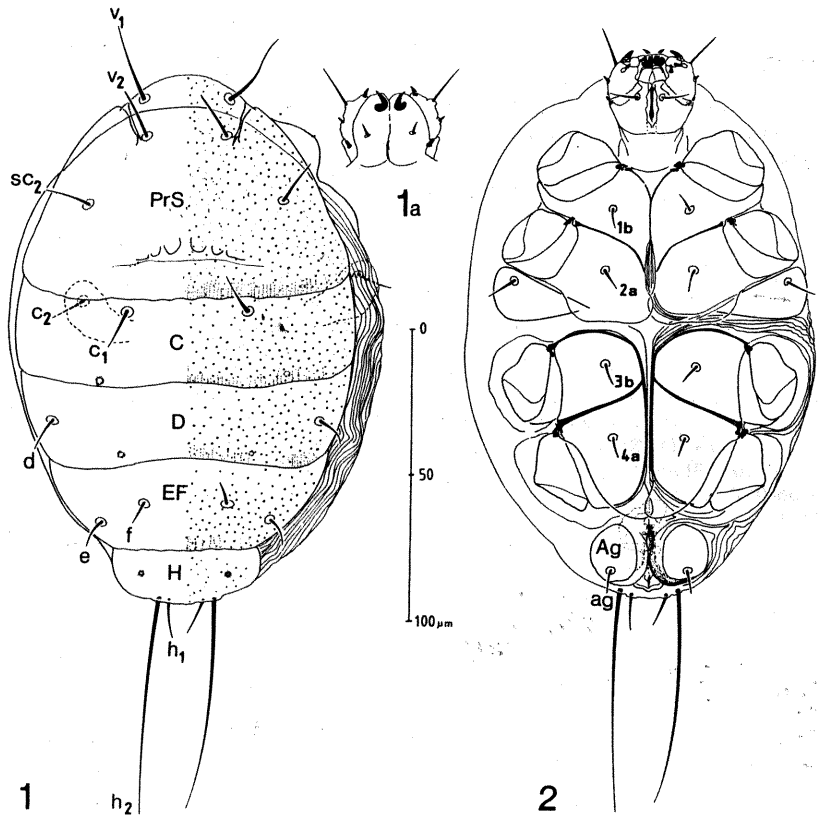
Because both *A. ornatus* and *A. elegans* spp. n. are similar morphologically and were found on the same species of host, it is disputable whether they are distinct species, subspecies or variant forms of the same species. Due to the lack of sufficient data for dolichocybids and other taxa of pyemotoid-pygmephoroid stock, the only remaining possibility is the use of morphological subspecies criterion elaborated by Lindquist 1968, in the revision of Iponemus Beer et Nucifora, 1965 (Tarsonemidae) for species and subspecies level, which may be referable to other heterostigmatic taxa.

Despite their morphological similarity, apparent close kinship and their geographic distribution, the use of Lindquist's criterion to the number and quality of morphological features justifies the specific ranking of considered forms. As the elytral internal surface and the space within intersegmental area of tergum constitutes close but different habitats that can be an additional support for that view. Similarly, the speciation that occurred in this case could be compared to the differentiation of similar habitats on the insect body that caused the rise of species of *A. carapis* Hirst, 1921 (Tarsonemidae) parasitizing honey bee: *A. externus* Morgenthaler, 1931, *A. dorsalis* Morgenthaler, 1934 and *A. woodi* Rennie, 1921. Apart from these reasons, the crucial clarification of this problem needs further study.

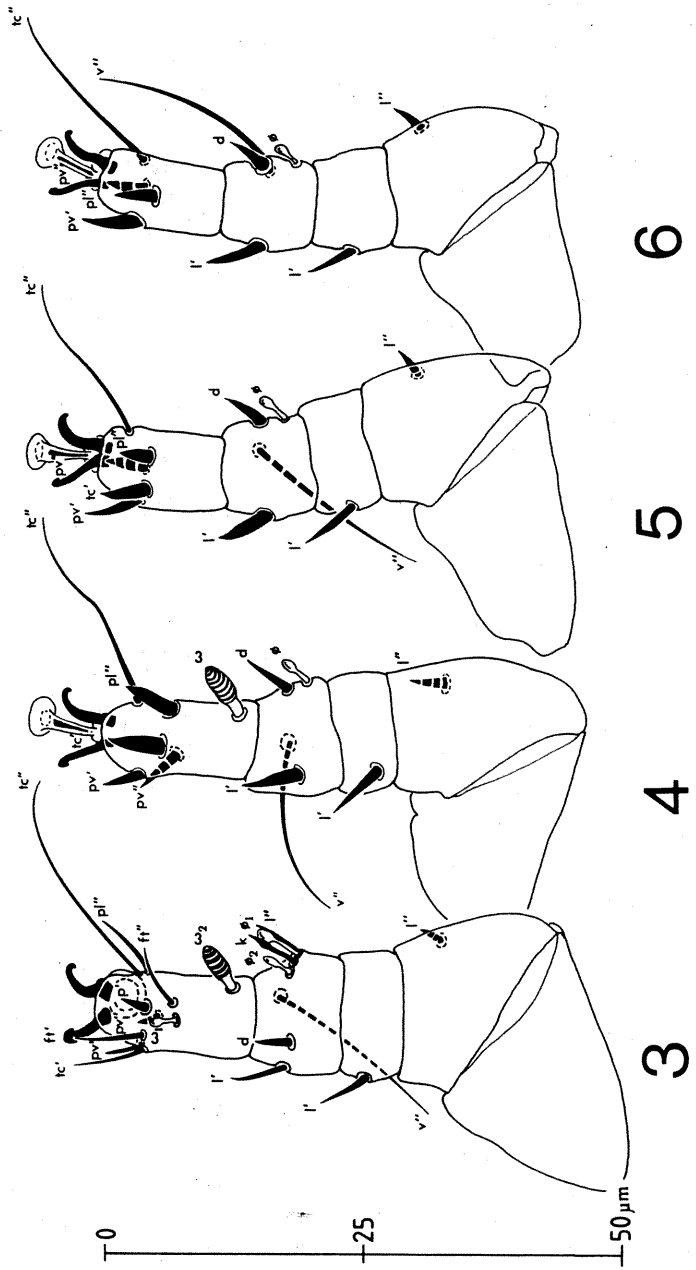
Because of the above new material, we propose the following revision of the original diagnosis of *Acanthomastix*. According to cladistic systematics, special attention should be paid to apomorphic features unique to *Acanthomastix* solely (preceded by asterisk*) rather than to synapomorphies of Formicomotinae or plesiomorphies (both used in original diagnosis).

Acanthomastix Mahunka, 1972

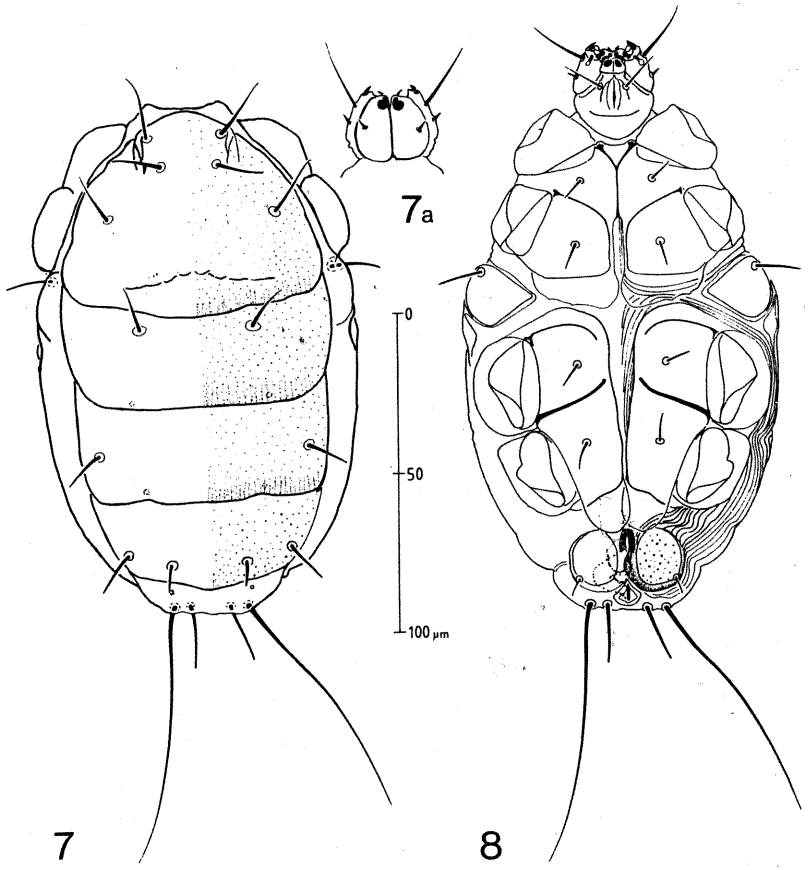
Diagnosis:
* Pharynx without lateral lobes,
- a pair of sinuses (of bothridial origin) opens on the anterolateral edges of the prodorsal shield ending at the v_2 bases (mistakenly called "stigmata and peritrema" in the original diagnosis),
* lateral shieldlets of the tergite C (bearing setae c_2) entirely independent, shifted to the ventral side and placed anteriad of the level of c_1 setae,
- dimpled ornament of dorsal surface,
- all solenidia emergent,
- spinosity of tarsal setae usually well pronounced (II-IV)
* setae pv" usually spinose or at least as short as other tarsal setae (excl. tc") on legs II-IV.



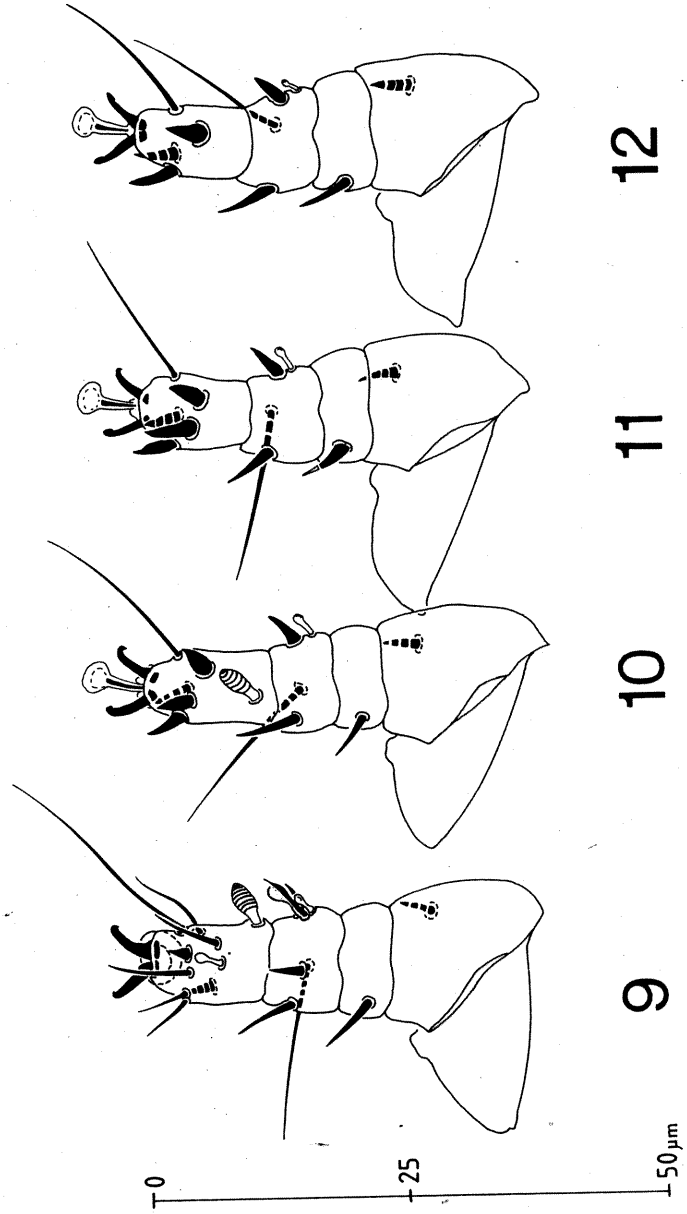
Figs 1–2: *Acanthomastix ornatus* sp. n. holotype female. 1: dorsal side; 1a: gnathosoma, dorsal view; 2: ventral side.



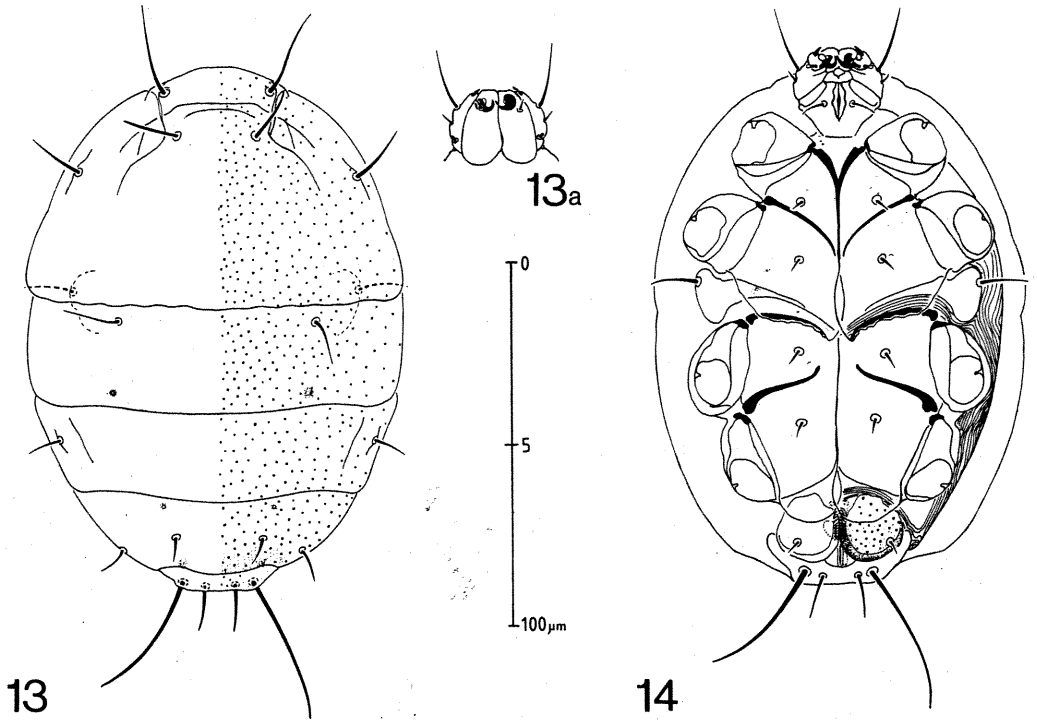
Figs 3–6: *Acanthomastix ornatus* sp. n. holotype female. 3: leg I; 4: leg II; 5: leg III; 6: leg IV.



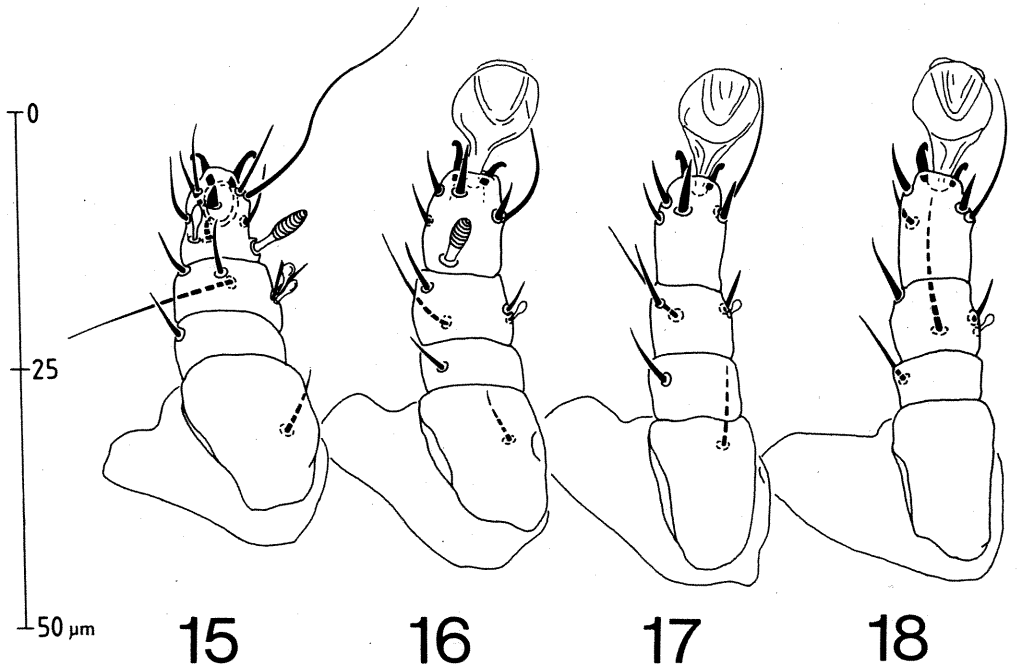
Figs 7–8: *Acanthomastix elegans* sp. n. holotype female. 7: dorsal side; 7a: gnathosoma; dorsal view; 8: ventral side.



Figs 9–12: *Acanthomastix elegans* sp. n. holotype female. 9: leg I; 10: leg II; leg III; 12: leg IV.



Figs 13-14: *Acanthomastix minor* sp. n. holotype female. 13: dorsal side; 13a: gnathosoma, dorsal view; 14: ventral side.



Figs 15-18: *Acanthomastix minor* sp. n. holotype female. 15: leg I; 16: leg II; 17: leg III; 18: leg IV.

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