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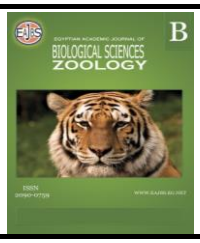

Three New Species of Mites (Acari: Acaridae and Histiostomatidae) from Manure and Dung- Hills, Assiut, Upper Egypt

Sayed A. Eraky; Rahma M. Abdel-Aziz and Tarek M. Abo-Elmaged
Plant Protection Department, Faculty of Agriculture, Assiut University, Assiut 71526 Egypt
E.Mail.: tarek.adam@agr.au.edu.eg

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ABSTRACT

Three new species (*Myianoetus manurei* n. sp, *Myianoetus assiuti* n. sp. and *Acotyledon shortisetoses* n. sp.) represented only by their hypopial nymphs (heteromorphic deutonymphs), extracted from manure and dung-hills, Assiut, Upper Egypt. The holotype deutonymph and paratype deutonymphs of each species are deposited in the Acari collection of Plant Protection Department, Faculty of Agriculture. Assiut University, Assiut 71526 Egypt. The descriptions and illustrations of the new species are given below.

INTRODUCTION

A few species belonging to the genera *Myianoetus* Oudemans, 1913 (*M. lili* Eraky, 1993) and *Acotyledon* Oudemans, 1903 (*A. lamiai* Eraky, 1998; *A. manur*i Eraky, 1999a; *A. nerminka* Eraky, 1999a; *A. longsetoses* Eraky, 1999b; *A. ahmadi* Eraky and Osman, 2008) are already described from the manure of animals and termite nests, Egypt. Hence the study herein presents descriptions and illustrations of three new species belonging to the genera *Myianoetus* and *Acotyledon* based on hypopial nymphs (heteromorphic deutonymphs), from the manure of animals and dung-hills.

MATERIALS AND METHODS

Mites inhabiting manure of animals and dung-hills were extracted from the farm of the Faculty of Agriculture, Assiut University, Assiut, Egypt. The collected materials yielded some mite species. Of these three deutonymphs pertaining to the genera, *Myianoetus* and *Acotyledon* proved to be new to science. The collected deutonymphs were cleared up in lactic acid, mounted in Hoyer's medium on a glass slide, dried in an oven at 50-55 ºC, ringed with nail polish, then examined under a phase-contrast of the microscope (Optika-Vision-lite_ENG-rev01, Italy), provided with camera and system of calibration of the micrometric slide, a drawing tube was also used when necessary. The examination of the collected deutonymphs showed some interesting morphological characters which did not appear in the described species of both genera. Measurements are given in micrometers (µm), each measurement shows the average for a number of individuals, followed (in parentheses) by a respective range. The deutonymphs of the three new species were described and illustrated. Nomenclature by Giffiths et al., 1990 was followed for idiosomal setae and Grandjean, 1939 for legs and legs chaetotaxy. Holotype deutonymph and two paratype deutonymphs (*M.*

manurei); two paratype deutonymphs (*M. assiuti*); five paratype deutonymphs (*A. shortsetoses*) were measured for gnathosoma, propodosoma, idiosoma, idiosomal chatotaxy; holotype deutonymph of each of the three new species was measured for legs and legs chaetotaxy.

RESULTS AND DISCUSSION

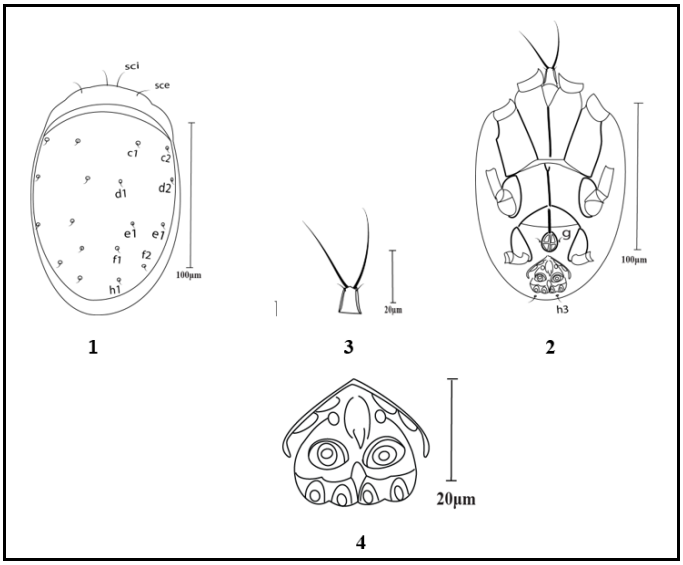
Myianoetus manurei n. sp.

Description of deutonymph (Figs. 1-8): Body elongated ovoid, 162 (158-166) long, 104 (100-108) wide.

Gnathosoma (Fig. 3): Subcapitular remnant 12 (10-14) long, 7 (5-9) wide, oblong but widened, its shape unusual in the described *Myianoetus* species. Palps not separated off, palpal solenidia (*ω*) 37 (34-40) arising directly from subcapitular apex, palpal supracoxal setae (*elcp*) 6 (5-7) positioned on less distance posterior and lateral of subcapitular apex.

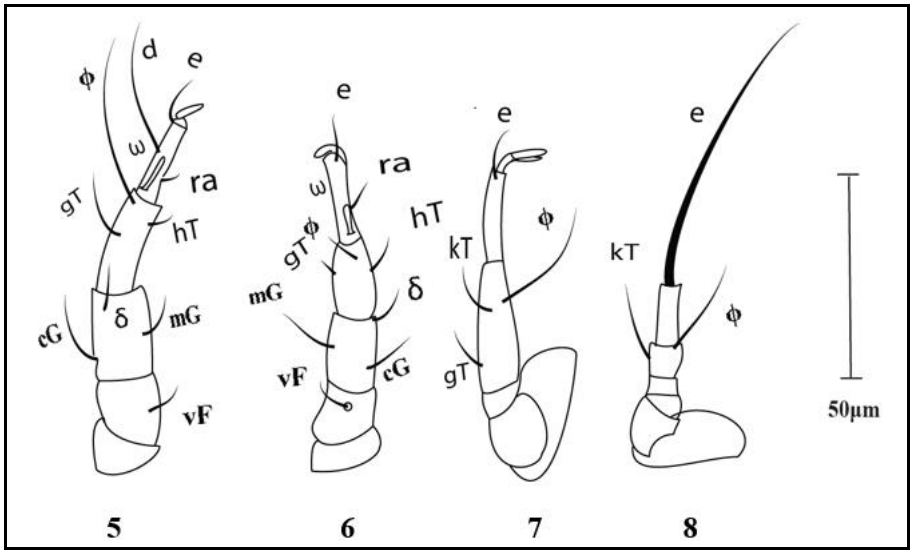
Venter (Fig. 2): Anterior apodemes of coxal fields I fused medially to form a long sternum, although the latter very long but not fused posteriorly with fused anterior and posterior apodemes II. Thus, coxal fields I open and coxal fields II closed. Anterior apodemes of coxal fields III and IV fused with posterior ones, posterior apodemes of coxal fields III and IV not connected with posterior sternal apodeme. Coxal fields III and IV closed. Posterior sternal apodeme long, ends by Y-shaped anteriorly, hardly fused with anterior apodemes of coxal fields III; genital opening surrounded by thick apodemes fused anteriorly with posterior sternal apodeme, posterior disconnected from adhering plate. Two pairs of genital papillae within the genital atrium. Genital setae *g* filiform positioned laterally of genital opening. Coxal fields I, III, IV without any sculptures (setae or alveoli). Adhering plate (Fig. 4) wider than long; positioned close to posterior body margin. The plate consisting of incomplete anterior broad margin, free laterally, surrounded anterior and medial portions of a thin margin adhering plate; anterior suckers very small, rounded and vestigial; median suckers large, with broad margin, internally surrounded a single alveoli; posterior lateral and median suckers comparatively ovoid, each with well-developed alveoli. Length of adhering plate 25 (22-28) long, 32 (29- 35) wide.

Dorsum (Fig,): Propodosoma approximately short, concaved laterally. Length of propodosoma: 11 (9-13) long, 89 (85-93) wide. Length of setae *sci* 8, *sce* 7 filiform, the internal pair positioned on anterior margin of propodosoma, external pair positioned posteriorly of the former in less distant of propodosomal margin. Dorsosejugal region smooth and tight. Propodosomal and hysterosomal surfaces smooth, without any sculptures. Hysterosoma with 10 pairs of short, filiform setae, at the same length, ranged for 3-4.



Figs. 1-4. *Myianoetus manurei* (Deutonymph): 1 dorsal side; 2 ventral side; 3 gnathosoma; adhering plate.

Legs (Figs.5-8): Legs slightly long, segments free; legs I-III with bifurcate embodied claws, legs IV clawless. Length of legs: legs I 107, II 94, III 71, IV 39. Length of tarsi: I 24, II 28, III 22, IV 15. Chaetotaxy of legs I-IV: o-1-2-2-3 (legs I); 0-1-2-2-2 (legs II); 0-0-0-1-1 (legs III); 0-0-0-0-1-1 (legs IV). All setae on legs I-IV, filiform short or long, except setae *e* of tarsi IV setiform. Length of legs chaetotaxy: setae *vF* I 11, *vF* II 13; setae *mG* 11, *cG* 15 (I), *mG* 14, *cG* 6 (II); *gT* 14, *hT* 7 (I), *gT* 7, *hT* 8 (II), *gT* 5, *kT* 10 (III), *kT* 18 (IV); setae *ra* 6, *d* 20, *e* 9 (I), setae *ra* 7, e 7 (II), setae *e* 9 (III), *e* 64 (IV). Solenidiotaxy of legs I-IV: 0-0-1-1-1 (I), 0-0-1-1-1 (II); 0-0-01-0 (III); 0-0-0-1-0 (IV). Length of solenidia: Legs I, ω 12 cylindrical; φ 43, δ 12 filiform; legs II, ω 10 clavate; φ 6, δ 8 filiform; legs III, φ 19 filiform; legs IV, φ 22 filiform.



Figs. 5-8. *Myianoetus manurei* (Deutonymph): 5 leg I; 6 leg II; 7 leg III; 8 leg IV.

Material examined: Holotype and 2 paratype deutonymphs extracted from the manure of animals, Assiut, Upper Egypt, leg. Rahma M. Abdel-Aziz, 5 Nov. 2018. Holotype and 2 paratype deutonymphs are deposited in the Acari

collection of Plant Protection Department, Faculty of Agriculture, Assiut University, Assiut 71526 Egypt.

Remarks :Owing to the unique shape of gnathosoma, the structure and chaetotaxy of idiosoma and legs and the structure of adhering plate and a very short dorsosejugal region, the new species may readily be separated from all other related congeners of the genus *Myianoetus* Oudemans, 1913 (e.g., *M.* muscarum (L. 1758); *M. dionychus* Mahunka, 1967; *M. kaszabi* Mahunka, 1967; *M. microti* Sevastianov, 1971; *M. szaboi* Mahunka, 1978; *M. longisetosus* Maŝàn and Kriŝtofic, 1992; and *M. lili* Eraky, 1993), the new species differs from all the above-mentioned species in having minute dorsal hysterosomal setae; concaved propodosoma; tight dorsosejugal region; the unique shape of gnathosoma; structure and chaetotaxy of legs.

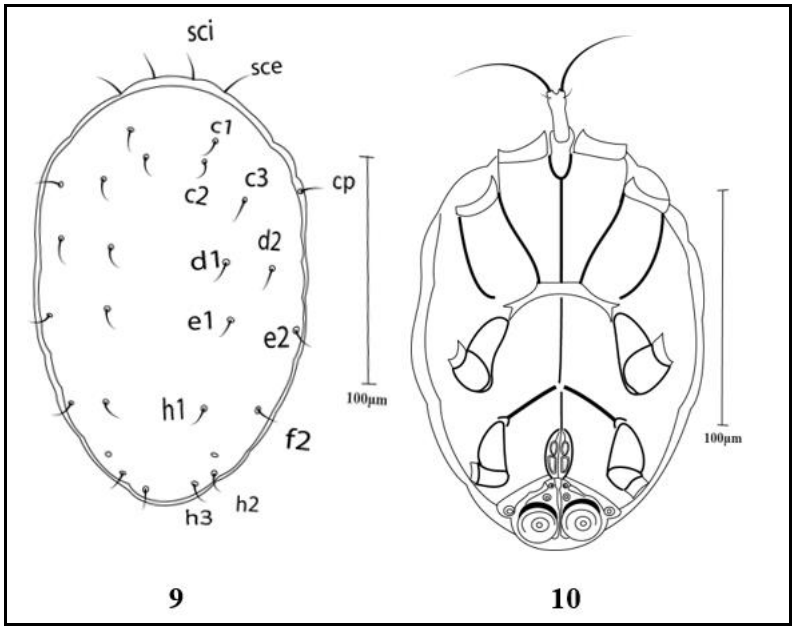
***Myianoetus assiuti* n. sp.**

Description of deutonymph (Figs. 9-14): Body elongated ovoid, wide in its shoulders, and gradually narrowing at the body end. An internal margin similar to body margin positioned adjacent to the latter and decurrently parallel with it. Length of idiosoma: 186 (176-196) long, 118 (110-126) wide.

Gnathosoma: Gnathosoma long and slim, normal in its shape. Subcapitular remnant 32 (29-35) long, 10 (8-12) wide. Palps 4 (3-5) long, 5 (4-6) wide, well separable, palpal solenidia (ω) 42 (39-45) arising apically, palpal supracoxal setae (*elcp*) 5 (4-6) positioned on palpal base.

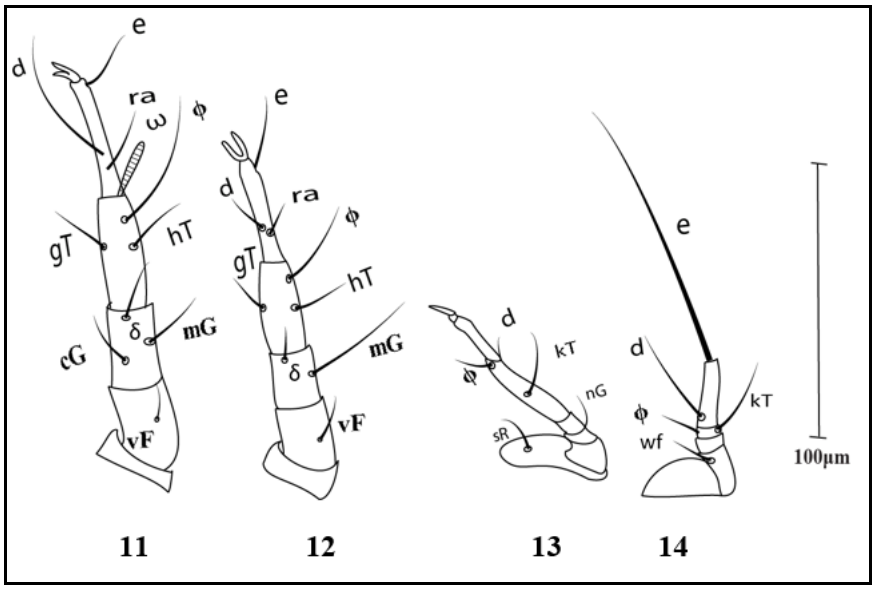
Venter (Fig. 10): Anterior coxal apodemes I fused medially to form a long sternum, the latter fused posteriorly with anterior apodemes II, III, and IV. Although posterior apodemes II long, but not connected with anterior ones in the middle. Anterior and posterior apodemes III and also for IV fused with each other medially; anterior apodemes III and IV fused medially to sternal apodeme, while posterior apodemes of coxal fields III and IV not connected with sternal apodeme medially; posterior sternal apodeme long; all coxal fields closed, except II. Genital opening elongated oval, surrounded by thick apodemes, fused anteriorly with posterior sternal apodeme, and fused posteriorly with adhering plate. Two pairs of genital papillae within the genital atrium. Genital setae *g* invisible. Coxal fields I, III, IV without any sculptures (setae or alveoli). Adhering plate wider than long; the periphery of very large central suckers with broad margin surrounded small suckers; anterior suckers very small and vestigial; a pair of suckers slightly larger than the anterior ones positioned medially, between anterior and central suckers; lateral suckers small but well developed. Adhering plate significantly extending backward with posterior body margin. Length of adhering plate: 37 (35-39) long, 57 (54-60) wide.

Dorsum (Fig, 9): Propodosoma very reduced. Length of setae *sci* 13, *sce* 15 setiform, both pairs positioned on anterior concaved body margin, inner pair situated anterior to outer ones. Dorsosejugal region is absent. Idiosomal surface smooth, without any sculpture. Hysterosoma with 12 pairs of short setiform setae, approximately at the same length, ranged for 12-14, except setae *h2* 7, *h3* 9. A pair of ovoid cupules *ip* situated posteriorly between setae *h1* and *h2*.



Figs. 9-10. *Myianoetus assiuti* (Deutonymph): 9 dorsal side; 10 ventral side.

Legs (Figs. 11-14): Legs slightly long, segments free; legs I-III with bifurcate empodial claws each, legs IV clawless. Length of legs: legs I 141, II 106, III 73, IV 48. Length of tarsi: I 36, II 31, III 23, IV 23. Chaetotaxy of legs I-IV: o-1-2-2-3 (legs I); 0-1-1-2-3 (legs II); 0-0-0-1-1 (legs III); 0-1-0-0-1-2 (legs IV). All setae on legs I-IV, filiform short or long, except *e* IV 91 setiform. Length of legs chaetotaxy: setae *vF* I 10, *vF* II 18; setae *mG* 18, *cG* 10 (I), *mG* 37 (II); *gT* 22, *hT* 18 (I), *gT* 10, *hT* 11 (II), *sR* 18, *nG* 9, *kT* 25 (III), *wF* 10, *kT* 19 (IV); setae *ra* 12, *d* 36, *e* 29 (I), setae *ra* 18, *d* 14, e 11 (II), setae *d* 11 (III), *d* 27 (IV). Solenidiotaxy of legs I-IV: 0-0-1-1-1 (I), 0-0-1-1-0 (II); 0-0-01-0 (III); 0-0-0-1-0 (IV). Length of solenidia : Legs I ω 20 cylindrical, φ 33, δ 12 filiform; legs II ω invisible, φ 17, δ 12 filiform; φ 19 legs III, φ 8 legs IV, both filiform.



Figs. 11-14. *Myianoetus assiuti* (Deutonymph): 11 leg I; 12 leg II; 13 leg III; 14 leg IV.

Material examined: Holotype and 2 paratype deutonymphs extracted from the manure of animals, Assiut, Upper Egypt, leg. Rahma M. Abdel-Aziz, 30 July 2019. Holotype and 2

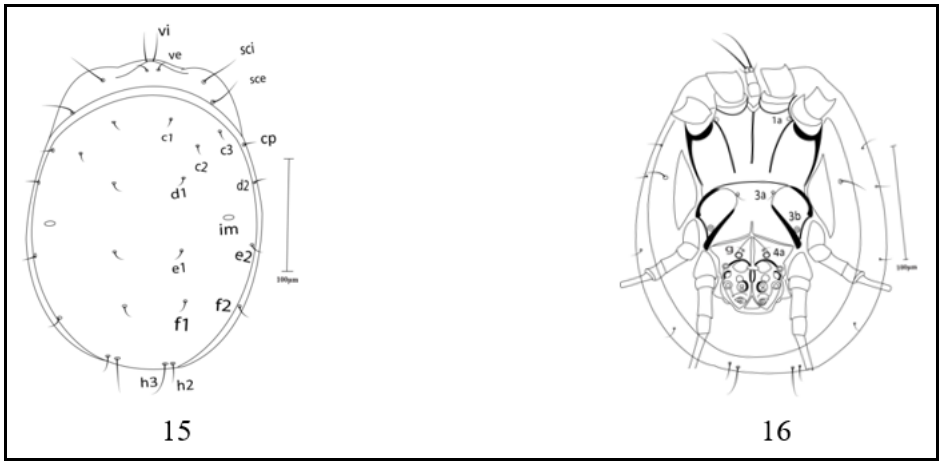
paratype deutonymphs are deposited in the Acari collection of Plant Protection Department, Faculty of Agriculture, Assiut University, Assiut 71526 Egypt.

Remarks: Owing to the peculiar shape of the new species (e.g., winding body margin, idiosmal chaetotaxy, the unique shape of adhering plate and its situation, the structure, and chaetotaxy of legs), the new species may readily be separated from all other described species of the genus *Myianoetus* Oudemans, 1913.

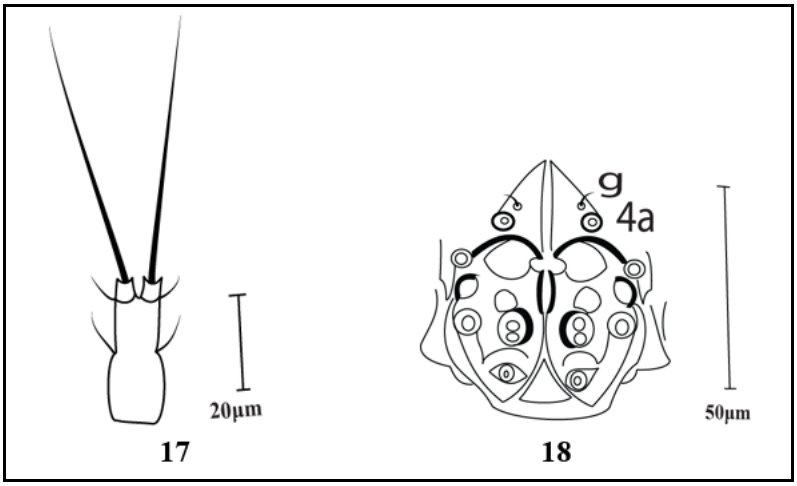
***Acotyledon shortisetoses* n. sp.**

Description of deutonymph (Figs. 15-22). Gnathosoma (Fig. 17). Subcapitular remnant 25 (23-27) long, 12 (11-13) wide, oblong, almost divided medially; palps short, but well separated off 5 (4-6) long, 3 (2-4) wide; apical palpal solenidia (ω) 45 (42-48) long and setiform; palpal supracoxal setae (*elcp*) 8 (7-9), subcapitular setae (*m*) 7 (6-8).

Dorsum (Fig. 15). Idiosoma 279 (272-286) long, 209 (204-214) wide. Body approximately ovoid, wide in the middle. Propodosoma and hysterosoma smooth, without any sculptures. Propodosoma anteriorly and posteriorly concaved. Propodosomal length: 29 (26-212) long, 144 (140-148) wide. All dorsal setae filiform. Internal vertical setae *vi* 24 (22-26), external vertical setae *ve* 9 (8-10), setae *vi* positioned anterior to propodosomal apex, external vertical setae *ve* located posterior to setae *vi*; internal scapular setae *sce* 16 (13-19) positioned lateral and posterior to internal scapular setae *sci* 23 (22-24). Dorsosejugal region smooth and tight. Hysterosoma with 12 pairs of short filiform setae ranged of 6-8, except setae *h2* 9 and *h3* 20. A pair of oval cupules *im* originated laterally between setae *d2* and *e2*.



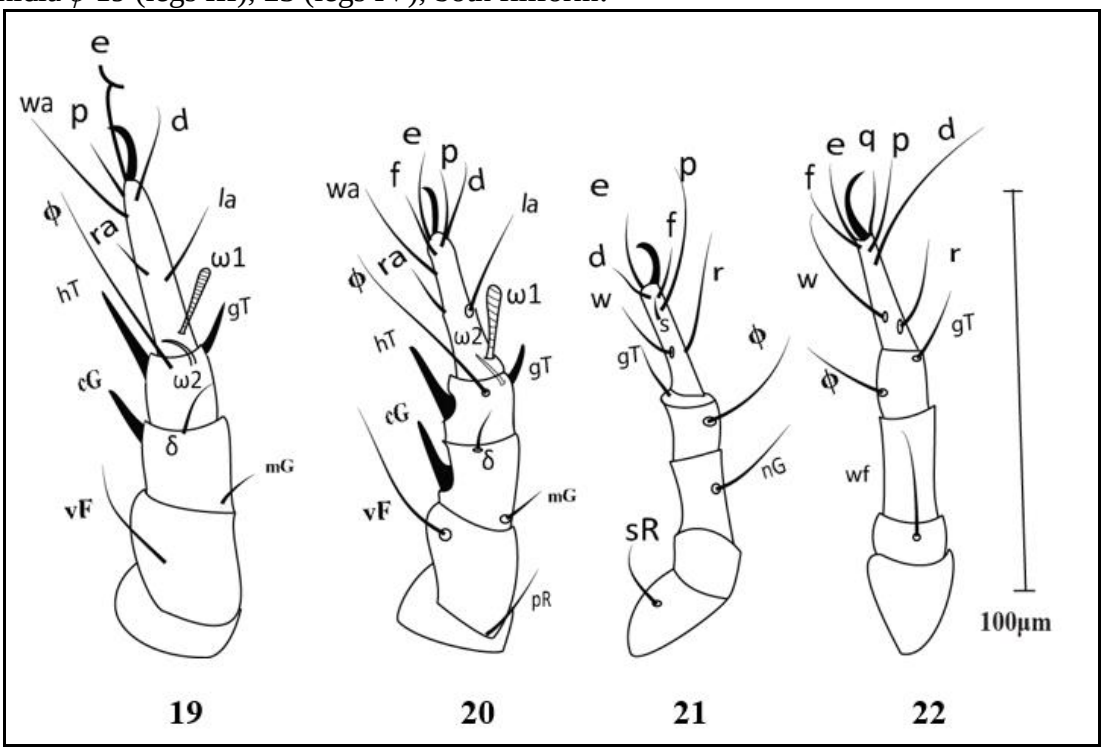
Figs. 15-16. *Acotyledon shortisetoses* (Deutonymph): 15 dorsal side; 16 ventral side.



Figs. 17-18. *Acotyledon shortisetoses* (Deutonymph): 17 gnathosoma; 18 ventral side.

Venter (Fig. 16). Anterior apodemes of coxal field I broad, joined at the midline to form a "Y-shaped" sternum, the latter short, ending free. Anterior apodemes of coxal fields II also short, ending free, not fused with posterior ones, accordingly coxal fields I, II open; anterior and posterior apodemes of coxal fields III long and broad, medially fused with each other by thin apodemes, thus coxal fields III closed; anterior apodemes of coxal fields IV fused together medially and to longitudinal posterior sternal apodeme; the latter ending free with very short extension anteriorly, coxal fields IV closed. Coxal fields I, III, and IV each with circular discs or alveoli (*1a*, *3b*, and *4a*) and very short filiform setae *3a* situated medially on coxal fields III margin; genital setae *g* positioned anterior and medial to *4a*. Adhering plate (Fig. 18), 44 (41-47) long, 51(49-53) wide, normal- developed, entirely filling a space between legs IV, situated on more distant far from posterior body margin. Anterior suckers large approximately oblong, without internal discs, a pair of small discs located on lateral sides of anterior suckers; median suckers smaller than anterior ones, consisting of sclerotized margin surrounding a pair of alveoli, a pair of approximately large alveoli situated on anterior margin of median suckers. Lateral and posterior suckers normal-developed.

Legs (Figs. 19-22). All legs with well-developed hooked empodial claws, arising apically, longer on legs IV. Length of legs: legs I 118, legs II 106, legs III 101, legs IV 105; tarsi I 48, tarsi II 40, tarsi III 36, tarsi IV 34. Trochanters II, III each with filiform setae (*pR* 14, *sR* 13). Femoral setation: 1-1-0-1: setae *vF* I, II (30, 42), *wF* IV 28, filiform. Genual setation: 2-2-1-0; setae *cG* I 17 , *cG* II 18, both spine-like, setae *mG* I 8, *cG* I4, both filiform, *nG* III 18 filiform. Tibial setation: 2-2-1-1; setae *gT* 12 and *hT* 23 (I) spine-like, setae *gT* 10 and *hT* 20 (II) spine-like, *gT* 9 III , *gT* 11 IV filiform. Tarsal setation: 6-7-7-7; all setae on tarsi I-IV filiform; setae *ra* 9, *la* 25, *wa* 30, *d* 27, *e* 22, *p* 10 (tarsi I); setae e on tarsi I with a crescent-like apices; on tarsi II, setae *ra* 15, *la* 25, *wa* 25, *d* 24, *p* 13, *e* 25, *f* 17; on tarsi III, setae *p*24, *f* 10, *d* 10, *e* 11, *s* 6, *w* 20, *r* 18 ; on tarsi IV, setae *r* 12, *f* 10, *w* 28, *q* 14, *e* 15, *d* 38, *p* 16. Group of solenidia: Solinidia ω1 11 clavate, ω2 10 curved and tapering, φ 45 filiform, σ 13, ε absent (legs I); solinidia ω1 14 clavate, ω2 9 tapering, φ 40 filiform, σ 8, ε absent (legs II); solinidia φ 19 (legs III), 23 (legs IV), both filiform.



Figs. 19-22. *Acotyledon shortisetoses* (Deutonymph): 19 leg I; 20 leg II; 21 leg III; 22 leg IV.

Material examined: Holotype and 5 paratype deutonymphs extracted from the manure of animals, Assiut, Upper Egypt, leg. Rahma M. Abdel-Aziz, 30 July 2019. Holotype and 5 paratype deutonymphs are deposited in the Acari collection of Plant Protection Department, Faculty of Agriculture, Assiut University, Assiut 71526 Egypt.

Remarks: The new species stands in many respects close to *Acotyledon nerminka* Eraky, 1999a (collected from the same locality), but differs from it by the shape of gnathosoma, propodosoma, and dorsosejugal region, the length of idiosomal setae, in addition to legs chaetotaxy.

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