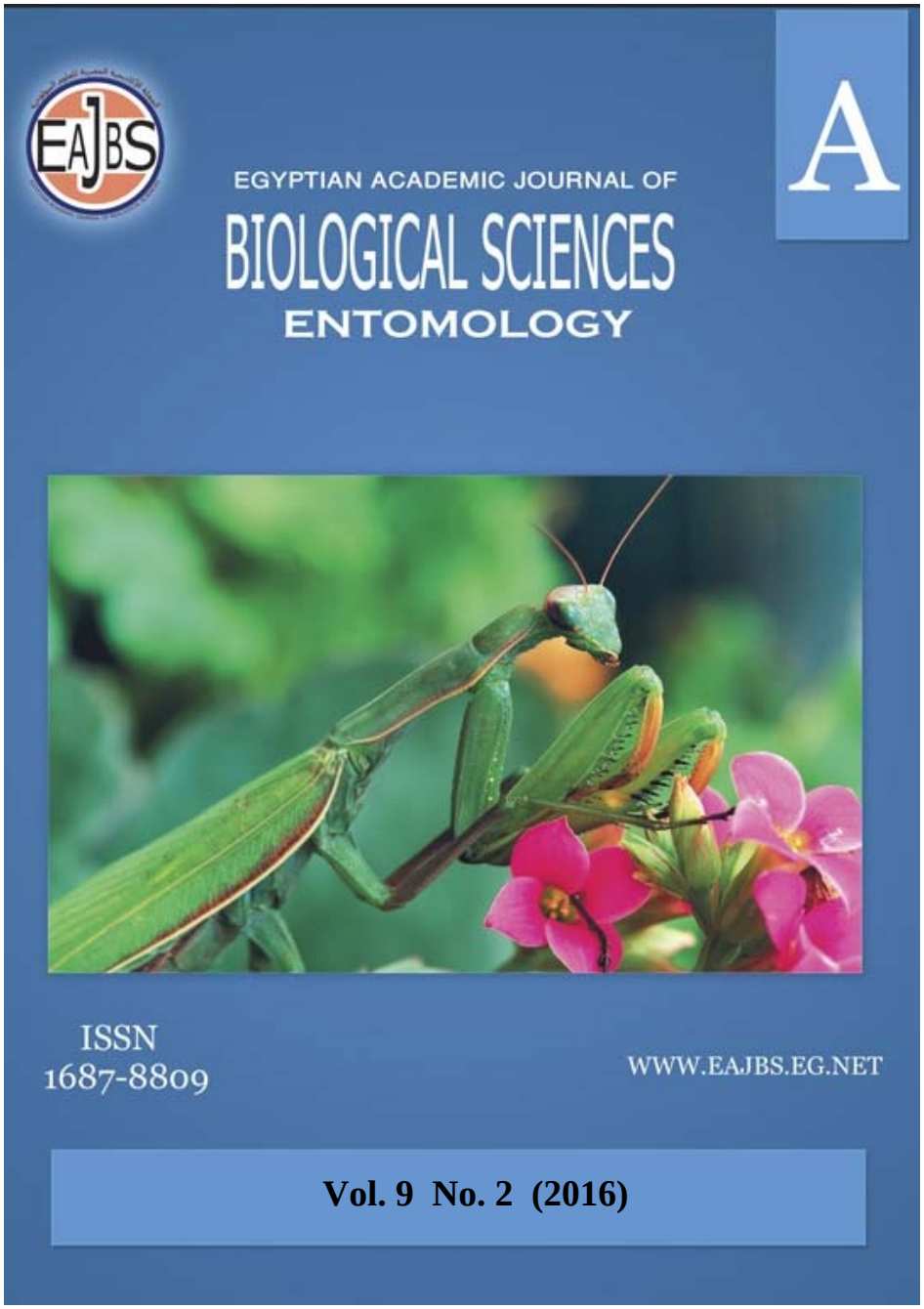

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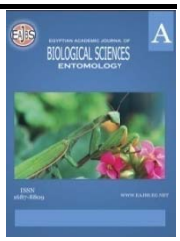

An Updated and Illustrated Review to the Identification of the Genera *Aceria* Keifer and *Eriophyes* Von Siebold (Acari : Eriophyidae) in Egypt

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ABSTRACT

This paper provides a synopsis of two genera from eriophyoid mites in Egypt, with an identification key to two genera (*Aceria* and *Eriophyes*) and 33 species; 30 of them belong to genus *Aceria* and 3 from genus *Eriophyes*. Ten synonyms of mite species and host plant were recorded. A new species, *Aceria rotundus* sp. nov. found on *Cyperus rotundus* L. (Cyperaceae Juss.) from Sohag province, Egypt was described and illustrate.

INTRODUCTION

The subfamily Eriophyinae consists of more than twenty seven genera, of which 20 consist of 3 or fewer species and 15 are presently monotypic (Lindquist,1996).

Genus *Aceria* comprised more than 700 species (De Lillo *et al*., 2010), which included more species compared to other eriophyid genera followed by genus *Eriophyes* with more than 250 species. However, only 30species of genus *Aceria* and three species of genus *Eriophyes* have been recorded in Egyptian fauna. In Egypt, during the second half of twentieth century, only single collective work surveyed phytophagous and predacious mites associated with their taxonomic keys (Zaher, 1984). From that date till now, the taxonomical keys of eriophyid mite in Egypt has not been up dated so that all *Aceria* species are still placed under genus *Eriophyes* (Hassan, 1934; Attiah, 1955; Soliman and Abou-Awad, 1978; Zaher *et al.*, 1978; Zaher and Abou-Awad, 1978; Abou-Awad, 1981; Zaher, 1984; Abou-Awad and Nasr, 1983[a]; Abou-Awad and Elsawi, 1993; Abou-Awad *et al.*, 2011, Halawa, 2015; Halawa and Mohamad, 2015; and Halawa *et al.*, 2015).

Amrine *et al.* (2003) stated that there would be an increase in research on superfamily Eriophyoidea and stated that the next few years will be an exciting time to conduct research on the Eriophyoidea as newer, more powerful computers and new taxonomic software are brought into use and the results will be shared among researchers all over the world.

Furthermore, de Lillo and Skoracka (2008) stated that the basic requirements are to update the knowledge of this important taxon.

Recently, Amrine conclusion have been achieved, whereas the recorded numbers of eriophyoid species were increased during period from 1996 to 2007, which presented seventy eriophyoid species described as new species per year (More than 50% of them have been found in China).Unfortunately, most of studies utilized random methods in terms of sample preservation, storage, specimen clearing, mounting, drawing, descriptive arrangements and other activities related to taxonomic/systematic investigations/publications (de Lillo *et al.*, 2010). As for other mites, eriophyoid taxonomic classification relies on the quality of studied specimens and morphological description.

On contrary, the microscopic size and micro structural details of these tiny and fragile mites presented inaccurate morphological characteristics (De Lillo *et al.*, 2010). Furthermore, the accuracy and correctness of descriptions and related drawings were affected by the methods used in processing, mounting and studying the mites. Currently, however, many descriptions and drawings still miss both standards and quality, even described by Keifer (Mohanasundaram, 1984), and thus many relevant taxonomic details may be permanently lost or obscured as a result. These deficiencies can lead to incorrect classification, sometimes unable to categorize under certain eriophyid species. For example, the prodorsal shield, scapular setae (sc) and coxal setae (1b) and (1a) of Ashieldophyes were not described clearly in Mohanasundaram (1984), which can cause considerable confusion. These shortcomings cannot be justified considering the quality of the microscopes and cameras recently available (De Lillo *et al.*, 2010).Moreover, description and illustration of same species differ from country to other, likely the result of handling eriophyoids and different tools (differences in preservative liquids, clearing medium, mounting medium and line drawings).In addition, Amrine and Manson (1996) listed the most important body parts that should be illustrated by line drawings. There is an attempt to standardize the layout for easier comparison between the different species, and find specific details in the drawings. While the same authors and Keifer (1975) reported strong recommendation son aspects of the knowledge required in the host-plant identification and the relationship between mite habit and hostplant. Particular attention should be paid during classification of the species, which rely mainly on morphology of the female; the morphology of male often helps to identity the protogyne or deutogyne situation of the female. This confusion probably explains the haphazard consecutive registration of new eriophoid species on the same plant, which might actually be the same species. For example, genus *Aceria* include 32 species recorded on plants of the genus *Acacia* (Leguminosae) worldwide (Meyer, 1990; Amrine and Stasny, 1994). An attention should be paid to the fact that, the eriophoid species attack specific plantand often extend to attack other members of the same plant family. Therefore, it can be concluded that there are some confusion about the author's eriophoid classification.

This paper revises the key, to facilitate classification for museum workers and for eriophyoidologists. Thus, the main target of this paper is producing an illustrated and updated key to all the known species of *Aceria* and *Eriophyes*genera in Egypt, in

addition to description of new species, *Aceriarotundus* collected from *Cyperusrotundus* in Egypt.

MATERIALS AND METHODS

This study is based on two portions:

Survey of *Aceria* and *Eriophyes* species associated with fruit trees in all Egyptian provinces during two years as part of a comprehensive work on Eriophyoid mites

The samples were collected during two years (2014 and 2015) from different orchards leaves, buds, branches and grass. The samples were individually bagged in tightly-closed plastic bags and transported directly to Plant Protection research Institute laboratory. Eriophoid mites were removed using a fine hairbrush under dissecting stereo-microscope, then preserved in 70% ethanol. Selected mites were cleared and mounted on micro-slides by using Keifer medium, according to Keifer (1975), then dried at 40°C for one week (Zhang, 2003) and finally examined under a Carl Zeiss compound microscope. The type materials are deposited as slide-mounted specimens in the mite collection of the Agricultural Research Centre, Plant Protection Research Institute, Fruit Acarology Department, Dokki, Egypt (ARC-PPRI). Eriophoid mites were identified to the specific genus using the key to the world genera by Amrine *et al.* (2003), and the species were identified using published descriptions of *Aceria* and *Eriophyes* species. In addition, the identified specimens were compared with the specimens present in the mite collection of the Cairo University and Plant Protection Research Institute (ARC).

Survey of literature

Survey of original scientific papers published on eriophyid mites from Egypt different libraries in Egyptian Universities and Research Centre. The generic classification used in this paper is of Amrine *et al*. (2003). We have checked most of the papers listed in the references (for a few papers, only the abstracts were seen and these were indicated as such). Figures of described species used in the illustrated key were adjusted and illustrated using Adobe illustrator program version CS6from published papers and the original authors were properly attributed.

RESULTS AND DISCUSSION

The taxonomical differences between genera *Aceria* Keifer and *Eriophyes* Von Siebold could be shortened in prodorsal shield tubercles and setae (sc) that directed to rear in genus *Aceria* (Fig. 1A) and directed forward in genus *Eriophyes* (Fig. 1B).

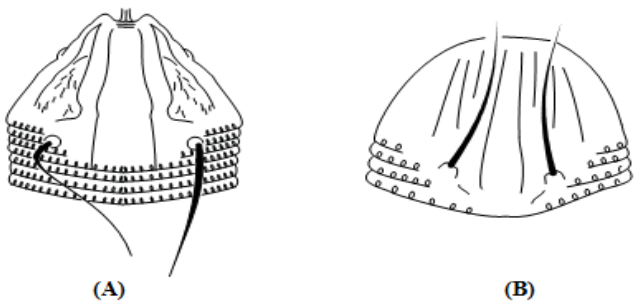


Fig. 1: Prodorsal shield: (A) *Aceria* Keifer; (B) *Eriophyes* Von Siebold

Synonyms:

Ten synonym species were recorded, six of them belong to *Aceria* and four from genus *Eriophyes*; they are:

Aceria cynodoniensis (Sayed, 1946) = *Aceria neocynodonis* Keifer, 1960.

Aceria eriobotryae (Keifer, 1938) = *Phyllocoptes eriobotryae* Kuang & Huang, 1992.

Aceria ficus (Cotté, 1920) = *Aceria fici* (Ewing, 1922).

Aceria kenyae (Keifer, 1966) = *Cisaberoptus kenyae* Keifer, 1966.

Aceria lycopersici (Wolffenstein, 1879) =*Phytoptus cladophthira* Nalepa, 1892.

Aceria ziziphi Mohanasundaram, 1990=*Aceria mauritianae* Amrine & Stasny, 1994= *Aceria ziziphi* (Corti, 1910).

Aceria arabicae Meyer, 1990 = *Aceria nilotica* (Abou-Awad & Nasr, 1983[b])

Eriophyes nalepi (Zaher & Abou-Awad, 1978) = *Phytoptus nalepi* Zaher & Abou-Awad, 1978.

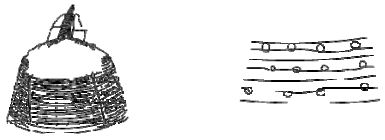
Eriophyes pyri (Pagenstecher, 1857) = *Phytoptus pyri* Pagenstecher, 1857

A- Key to species of genus *Aceria* Keifer in Egypt.

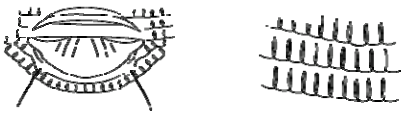
1. Featherclaw with 4- rayed…….....2

- Featherclaw with more than 4- rayed……..…..11

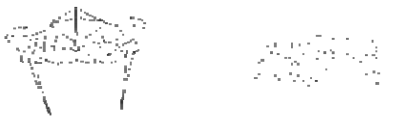
2. Median line of shield absent …….....3
-. Median line of shield present……....5
3. Shield with complete or incomplete admedian line; microtubercles elliptical or elongate ……...4



-. Shield without admedian line ; microtubercles rounded……..……*alba* Halawa (Fig., 2) recorded on *Sida alba* L. (Malvaceae)



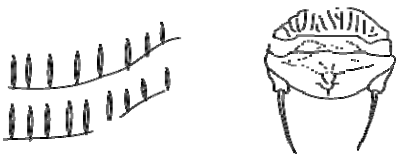
4. Female genital coverflap with 6 ridges; microtubercles elongate……. *alfierii* (Sayed) (Fig.,3) recorded on *Pluchea dioscoridis* (L.),(Asteraceae)



-. Female genital coverflap with 8 ridges; microtubercles elliptical ……....*olivi* Zaher & Abou Awad (Fig.,4) recorded on *Olea europaea* L., (Oleaceae)

5. Shield with complete median lines; microtubercles elliptical (ovoid) or elongate……... 6

-. Shield with incomplete median lines; microtubercles not as above……8

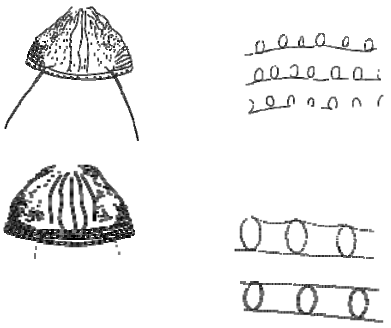


6. Microtubercles elongate; female genital flap with 15 longitudinal ridges.....*melongenus* Zaher & Abou Awad (Fig.,5) recorded on *Solanum melongena* L., (Solanaceae)

-. Microtubercles elliptical (ovoid); female genital flap with less than 15 longitudinal ridges.....7

7. Shield without complete sub-median line; microtubercles touch ring margin;.....*lycopersici* (Wolffenstein) (Fig.,6) recorded on *Solanum lycopersicum* L. (Solanaceae)

-. Shield with complete sub-median line; microtubercles located between two lines in all annular rings;…….*aegypticus* Rasmy & Abou-awad (Fig., 7) recorded on *Marrubium alysson* L.,(Lamiaceae)

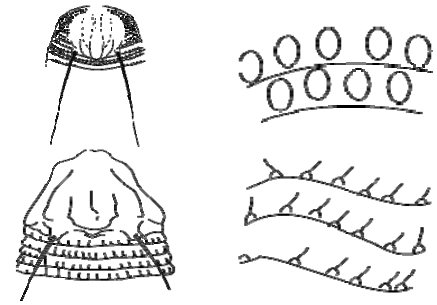


8. Shield with incomplete admedian lines; microtubercles spine or rounded …….....9

-. Shield with complete admedian lines; microtubercles elongate or rounded.....10

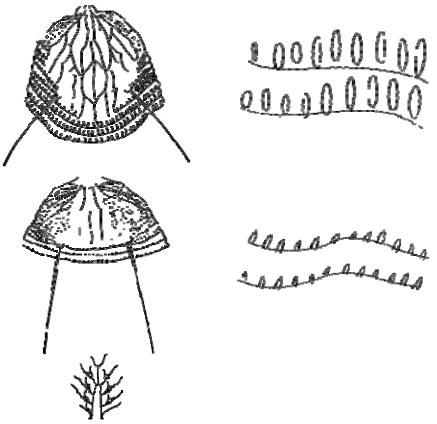
9. Broken admedian line exists and consists of many parts; microtubercles rounded.....*oleae* (Nalepa) (Fig., 8) recorded on *Olea europaea* L.,(Oleaceae)

-. Admedian line not broken; microtubercles spine ……..... *dioscoridis* (Soliman & Abou-Awad) (Fig., 9) recorded on *Pluchea dioscoridis* L., (Asteraceae)



10. Median and admedian lines connected by transverse dashes; microtubercles elongate……..*nilotica* (Abou-Awad & Nasr) (Fig.,10) recorded on *Cynodon dactylon* (L.) Pers.,(Poaceae)

-. Median and admedian lines not connected; microtubercles rounded……..*daturae* Soliman & Abou-awad (Fig.,11) recorded on *Datura stramonium* L., (Solanaceae)



11. Featherclaw with 5 rayed…….....12

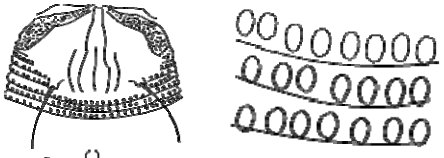
-. Featherclaw with more than 5 rayed……...17

12. Median line semi- or not broken …….....13

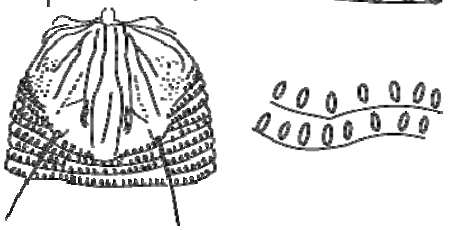
-. Median line broken…….....……...15

13. Shield with a small projection over the rostrum; microtubercles elongate ovoid ……..14

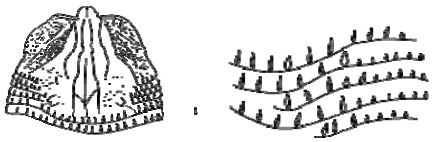
-. Shield without projection over the rostrum; microtubercles rounded , centred on annular ring……..…*sheldoni* Ewing (Fig., 12) recorded on *Citrus spp*., (Rutaceae)



14. Sub-median line branched into two branches at the base; microtubercles oval located between margins of annular rings ……*rodundus* n. sp. Halawa & Mohamad (Fig., 13) recorded on *Cyperus rotundus* L. (Cyperaceae Juss.)



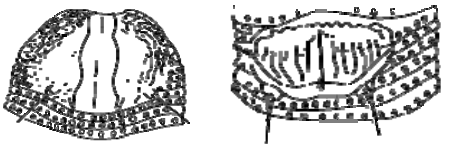
-. Sub-median line not branched at the base; microtubercles elongate ovoid located on posterior margins of annular rings…….*benghalensis* Soliman & Abou-awad (Fig., 14) recorded on *Ficus benghalensis* L.,(Moraceae)



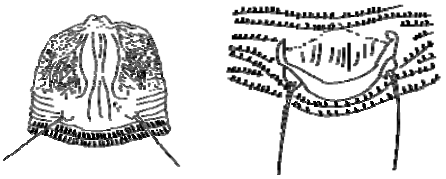
15. Broken median line straight not curved……...16

-. Broken median line curved……..17

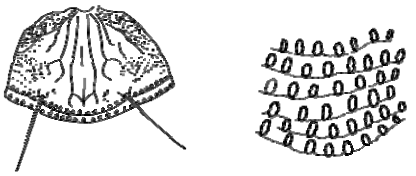
16. Broken median line consists of three parts; genital flap with 12 longitudinal rides……*mori* Keifer(Fig., 15) recorded on *Morus alba* L., (Moraceae)



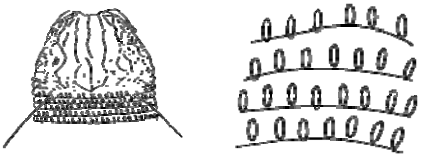
-. Broken median line consists of two parts; genital flap with 10 longitudinal rides……*sycamori* Soliman & Abou-awad (Fig., 16) recorded on *Ficus sycomorus* L., (Moraceae)



17. Sub-median lines branched at the end; microtubercles oval, centred and located in annular rings, which have sinuate margins……*ficus* Cotte (Fig., 17) recorded on *Ficus carica* L., (Moraceae)

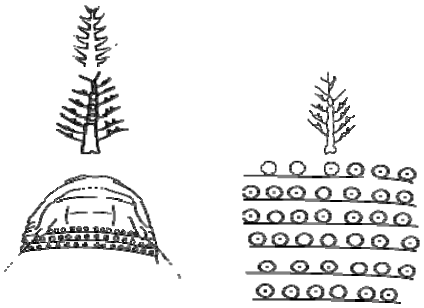


-. Sub-median lines curved converging; microtubercles oval, not located in annular rings; sinuate margins ……..……*eriobotryae* Keifer (Fig., 18) recorded *on Eriobotrya japonica* (Thunb.) Lindl., (Rosaceae)



18. Featherclaw with 6 rayed……19

-. Featherclaw with 7 rayed (or 6 rayed ending distally with a single median ray……22

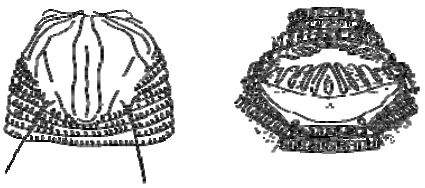


19-. Shield without median line ; microtubercles rounded……..…*acacia* Sayed, (Meyer 1990) (Fig., 19) recorded on *Acacia nilotica* (L.), (Fabaceae)

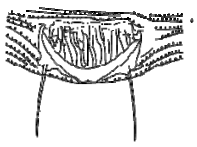
-. Shield with median line; microtubercles not as above ……..…….……...20

20. Shield with broken median lines; genital flap with not less than 10 ridges; U shape structure not existed …...…….……...21

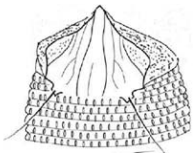
-. Shield with unbroken median lines; genital flap with 9 ridges; U shape existed at the basal of lines ……..… *mangiferae* (Sayed) (Fig., 20) recorded on *Mangifera indica* L.,(Anacardiaceae)

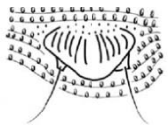


21. Median and admedian lines connected with transverse dashes; microtubercles ovoid; genital flap with 24 ridges ……..*neocynarae* (Keifer) (Fig., 21) recorded on (Fabaceae) *Cynara scolymus* L.,(Asteraceae)



-. Median and admedian lines not connected with transverse dashes; microtubercles elongate; genital flap with 11 ridges……....*saidi* Elhalawany & Ueckermann (Fig., 22) recorded on *Acacia nilotica* (L.), (Fabaceae)





22. Feather claw with 6 rayed and ending distally with a single median ray…….. *cynodoniensis* (Sayed) (Fig., 23) recorded on *Cynodon dactylon* (L.) (Poaceae)

-. Feather claw with 7 rayed…….……...23

23-.Shield cellular shaped on both sides ….....24

-. Shield not as above ……...…….27

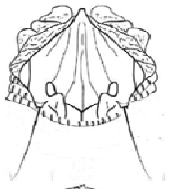
24-. Shield with more than two cells (network) on each side……*imperata* (Zaher & Abou-Awad) (Fig., 24) recorded on *Imperata cylindrica* (L.) Beauv.,(Poaceae)

-.Shield with two or less cells on each sides …..25

25. Shield with two cells (elongated, curved, striped) existed on each side …….…..…. *ziziphi* Mohanasundaram (Fig., 25) recorded on *Ziziphus spina-christi* Willd (Rhamnaceae)

-.Shield with one oval cell on each side…….26

26. Shield with one oval cell at the base of sub-median lines; sub-median lines present ……..*metwallii* Elhalawany & Ueckermann (Fig., 26) recorded on *Acacia nilotica* (L.), (Fabaceae)



-. Shield with one oval cell interrupted ad median lines; sub-median lines absen…....*awadi* Elhalawany & Ueckermann (Fig., 27) recorded on *Acacia nilotica* (L.), (Fabaceae)

27. Shield without median and admedian lines..…….. *dioicae* (Keifer) (Fig., 28) *Tamarix dioica* Roxb., (Tamaricaceae)

-. Shield with median and admedian lines …….28

28-. Median line ending with dart-shaped mark …… *aegyptiacacia* Elhalawany & Ueckermann (Fig., 29) recorded on *Acacia nilotica* (L.), (Fabaceae)

-. Median line not ending with transverse line …….……..29

29-. Genital flap with 12 ridges ……..*tulipae* (Keifer) (Fig., 30) recorded on *Allium sativum* L., (Liliaceae, Alliaceae)

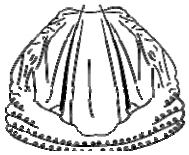
-. Genital flap with 9 ridges …… *aegyptiacus* (Soliman & Abou-Awad) (Fig., 31) recorded on *Allium sativum,* (Liliaceae, Alliaceae)

B- Key to species of genus *Eriophyes* Von Siebold in Egypt

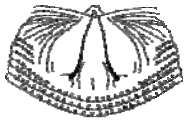
1. Feather claw with 5 rayed; genital flap with 6 ridges…..…….. *E. acanthus* Osman & Abo-Taka (Fig., 32) recorded on *Eranthemum pulchellum.,* (Acanthaceae)

-. Feather claw with 4 rayed; genital flap with more than 6 ridge……...2

2-. Genital flap with 9 ridges; shield with complete admedian line ……...…… *E. pyri* (Pagenstecher) (Fig., 33) recorded on *Pyrus communis* L.(Rosaceae)



-. Genital flap with 10 ridges; shield with incomplete admedian line…… *nalepi* (Zaher & Abou-Awad) (Fig., 34) recorded on *Pyrus communis* L.(Rosaceae)



***Aceria rodundus* sp. nov.**

(Fig. 13)

Diagnosis: Females of *Aceria rotundus* sp. nov. are similar to females of *Aceria cynodoniensis*(Sayed) in dorsal, ventral and leg but can be distinguished by existence of two branches at the base of sub-median line which are absent in *A. cynodoniensis*; feather claw with five rays in *A. rotundus*sp. nov. while it with six rays ending distally with a single median ray in *A. cynodoniensis*; genital coverflap of female with 6 longitudinal ridges in *A. rotundus* sp. nov. and with 8 longitudinal ridges in *A. cynodoniensis.*

Description: Females (n= 6). Body vermiform, 206(185-235) long, 53 (51-71) wide; color in life light yellow. Gnathosoma: projecting, slightly downwards, 19 (17-22) long; pedipalp coxal setae *ep*3 (2-4) long dorsal pedipalp genual setae *d*5 (4-5) long, subapical pedipalp tarsal setae *v*3(2-3) long. Chelicerae 19 (13-19) long, straight. Prodorsal shield: 40 (35-42) long, 50(46-54) wide. Scapular setae *Sc*43(39-34) long on scapular tubercles 5 (4-5) apart on a head of shield margin, directed to the rear margin, shield with ornamentation consists of incomplete median line, complete admedian line, four sub-median line, first sub-median line curved outward and branched into two branch posteriorly, sigma symbol shape existed between admedian line and first sub-median line posteriorly, second sub-median line doted, incomplete, third sub-median line incomplete, curved outward anteriorly, fourth sub-median line incomplete, existed in the middle of shield, lateral prodorsal shield area with granules posteriorly and lined with one or two line anteriorly. Frontal lope 13 (11-15) long. Legs: with all setae present. Leg I 42 (37-42) long; femur 12(10-12) long, venter basiformal setae *bv*5(4-6) long; genu 8 (6-8) long, antaxial genual setae *l''*16 (16-19) long; tibia 7 (5-7) long, paraxial tibial setae *l'*7(6-8) long; tarsus 8 (6-8) long, antaxial fastigial tarsal setae *ft''*20(19-22) long, paraxial fastigial tarsal setae *ft'*13 (13-14)

long, paraxial unguinal tarsal setae *u'*6 (6-7) long, solenidion straight slightly knobbed 10 (8-10) long; empodium entire 6 (5-6) long, 5 rayed. Leg II 35 (35-40) long; femur 11 (10- 11)long, venter basiformal setae *bv*8 (6-8) long; genu 9 (9-10) long , antaxial genual setae *l''*18 (17-18) long; tibia 9(7-9) long, paraxial tibial setae *l'*5(5-6) long; tarsus 6(5-6) long , antaxial fastigial tarsal setae *ft''* 21(19-21) long, paraxial fastigial tarsal setae *ft'*10(10-11) long, paraxial unguinal tarsal setae *u'*5 (5-7) long, solenidion straight slightly knobbed 9 (8-9) long; empodium entire 6(5-6)long, 5 rayed. Internal coxisternalapodeme a line 8 (8-10) long. Anterior setae on coxisternum I *1b*5(5-7) long, 2 (1-2) apart; proximal setae on coxisternum I *la*33 (30-33) long 12(10-12) apart; proximal setae on coxisternum II *2a*39 (36-40) long; distance between setae *1b* and *la*12(9-12)long. Opithosoma: with 72 (69-79) dorsal annuli, microtubercles oval. Ventral opithosoma with 64(62-76) annuli, with oval microtubercles; both dorsal and ventral microtubercles situated between margin of each annuli. Last 7 dorsal annuli smooth. Opithosoma setae *c2* 22(17-23) long 55(51-57) apart, on annulus 10 (8-10); opithosomal setae *d*37 (32-37) long, 43(39-43) apart, on annulus 32 (22-24); opithosomal setae *e*4 (2-4) long, 22 (20-23) apart, on annulus 52 (49-55); opithosomal setae *f*17(15-18) long, 21 (19-21) apart, on annulus 68 (65-71); opithosomal*h2*49 (40-49) long; opithosomal*h1*3 (3-5) long. Genital coverflap: 44 (40-46) wide, 39 (36-39) long, with 6 longitudinal ridges; proximal setae on coxisternum III *3a* 33 (30-34) long, 19 (16-20) apart.

Etymology: The new species name is derived from the scientific name of the hostplant *Cyperus rotundus* L.

Relation to host: The mites live on terminal buds of grass *Cyperus rotundus* L.

Type material: Holotype female,7 paratypes (5 females, 2males), ex. *Cyperus rotundus* L. (CyperaceaeJuss.).

Egypt: Sohag province, Shandawil district, 23 December 2015, coll. Dr. Azza Mohamad.

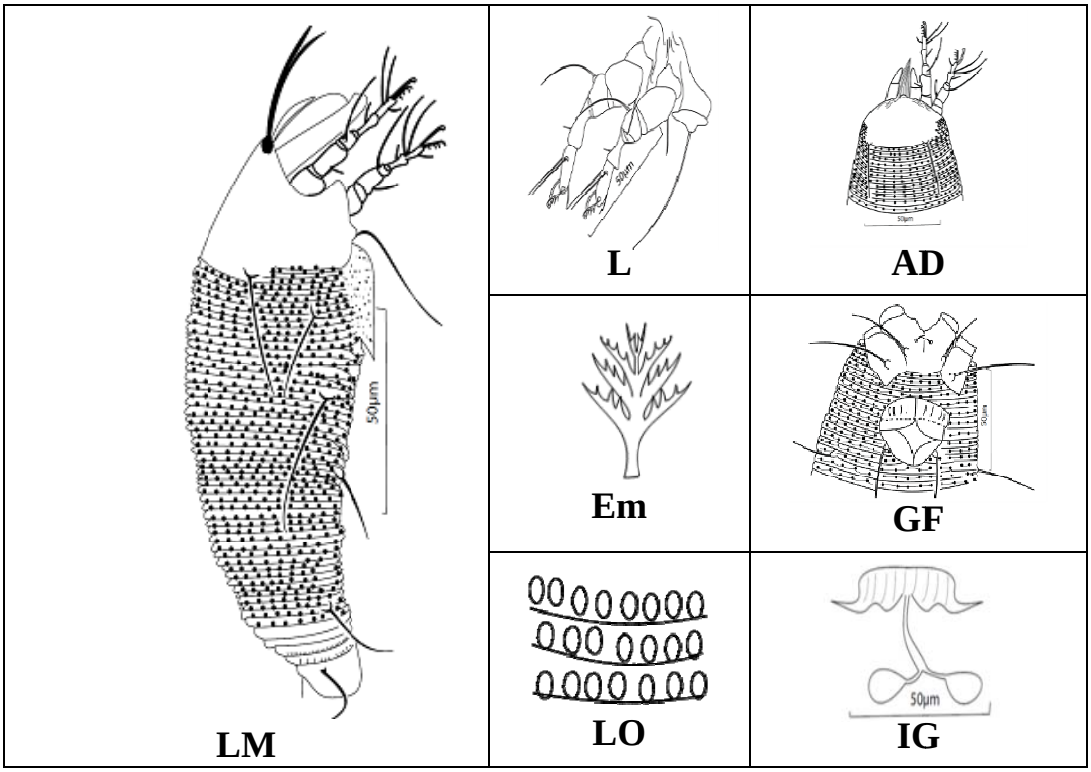


Fig. 2: *Aceria alba*: LM-Lateral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

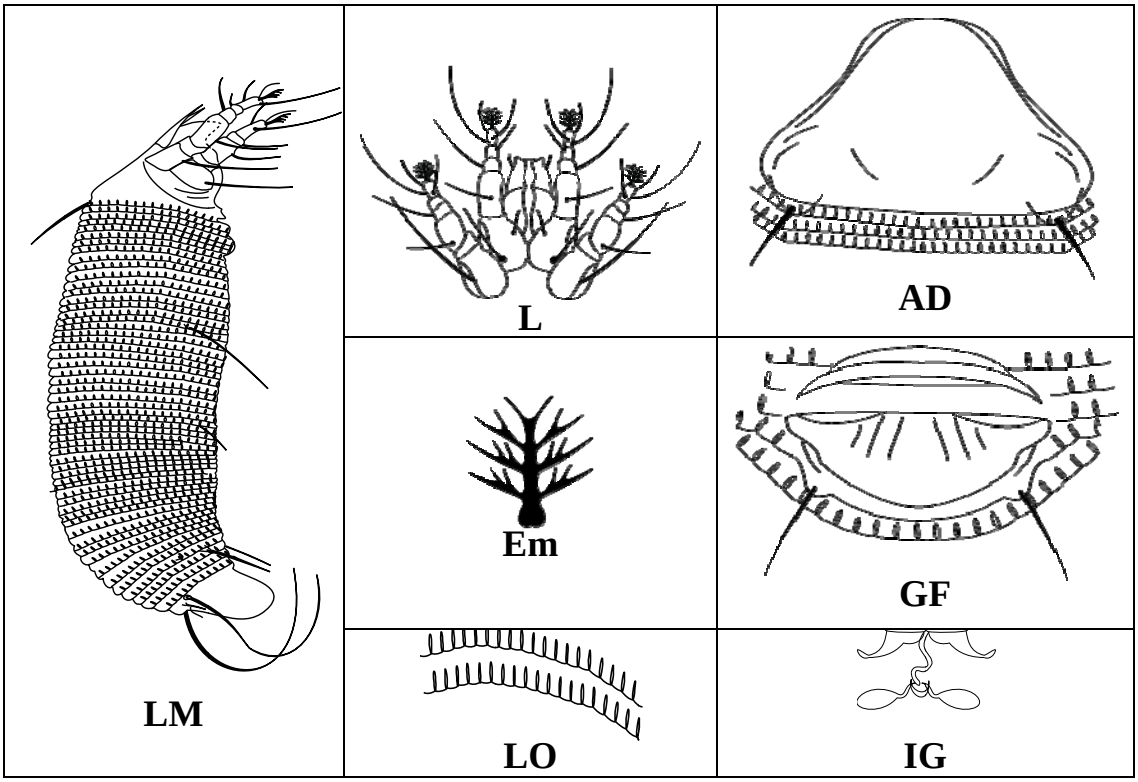


Fig. 3: *Aceria alfierii*: LM-Lateral view of female; L-Legs; em – empodium; Lo- microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia ;IG- female internal genitalia.

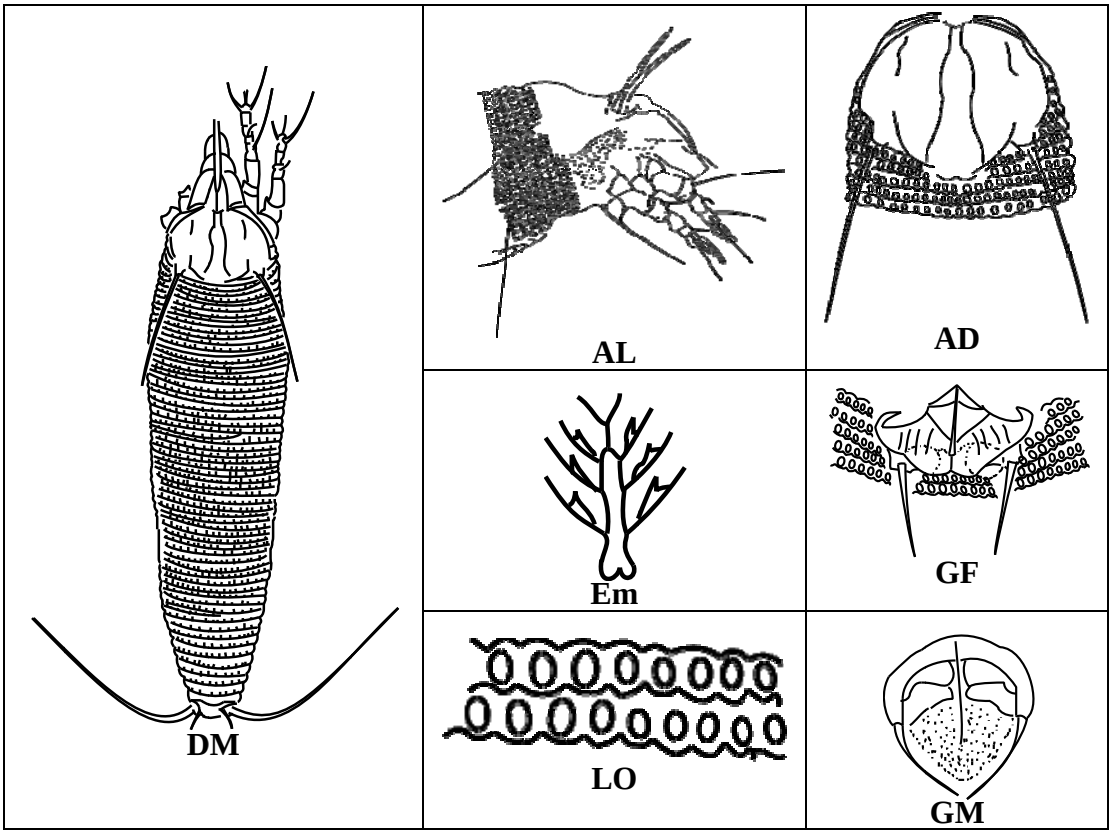


Fig. 4: *Aceria olivi*: DM-Dorsal view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM-male l genitalia.

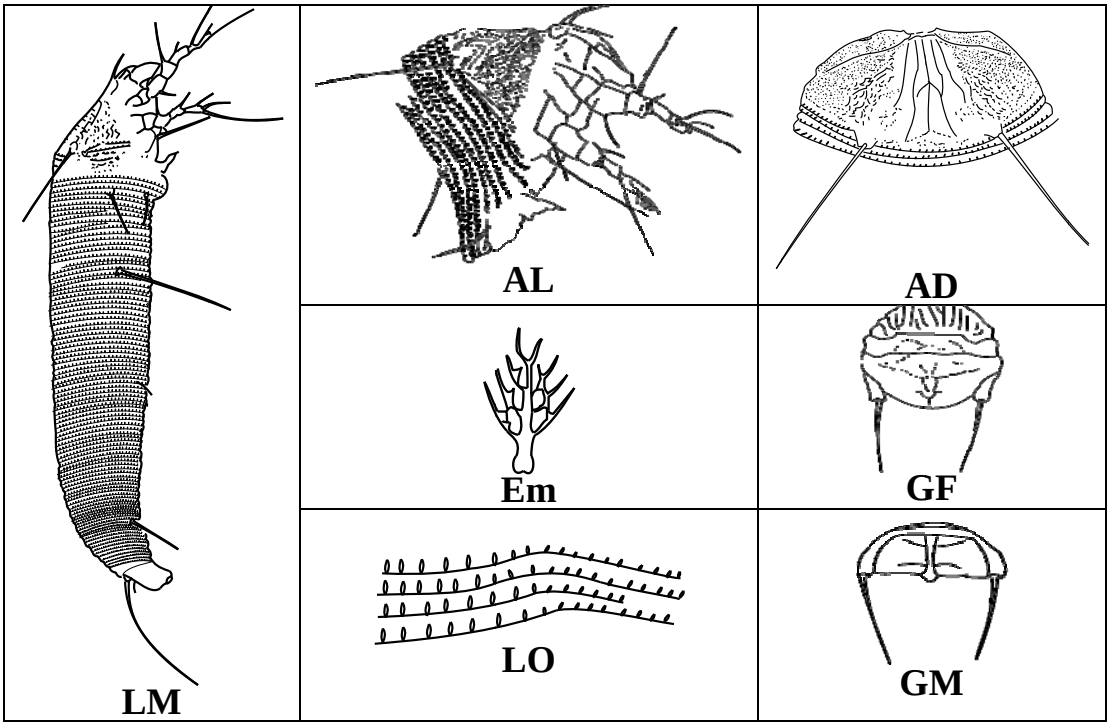


Fig. 5: *Aceria melongenus*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM-male genitalia.

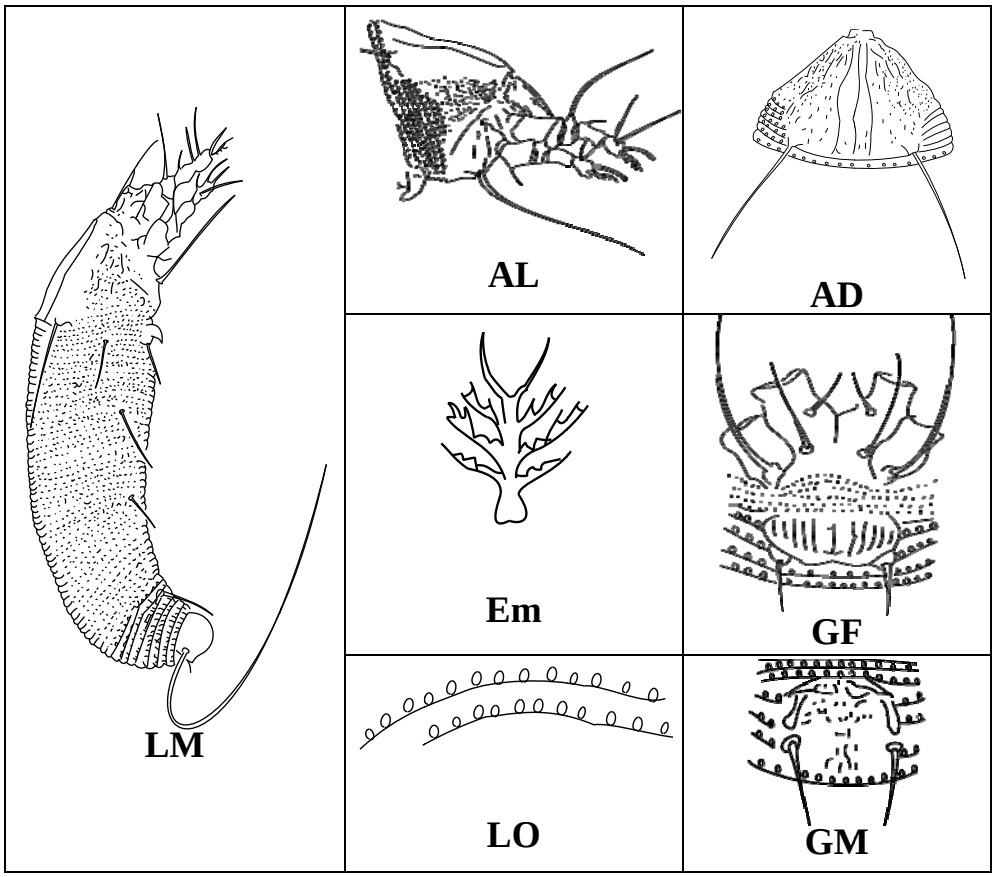


Fig. 6: *Aceria lycopersici*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM-male genitalia.

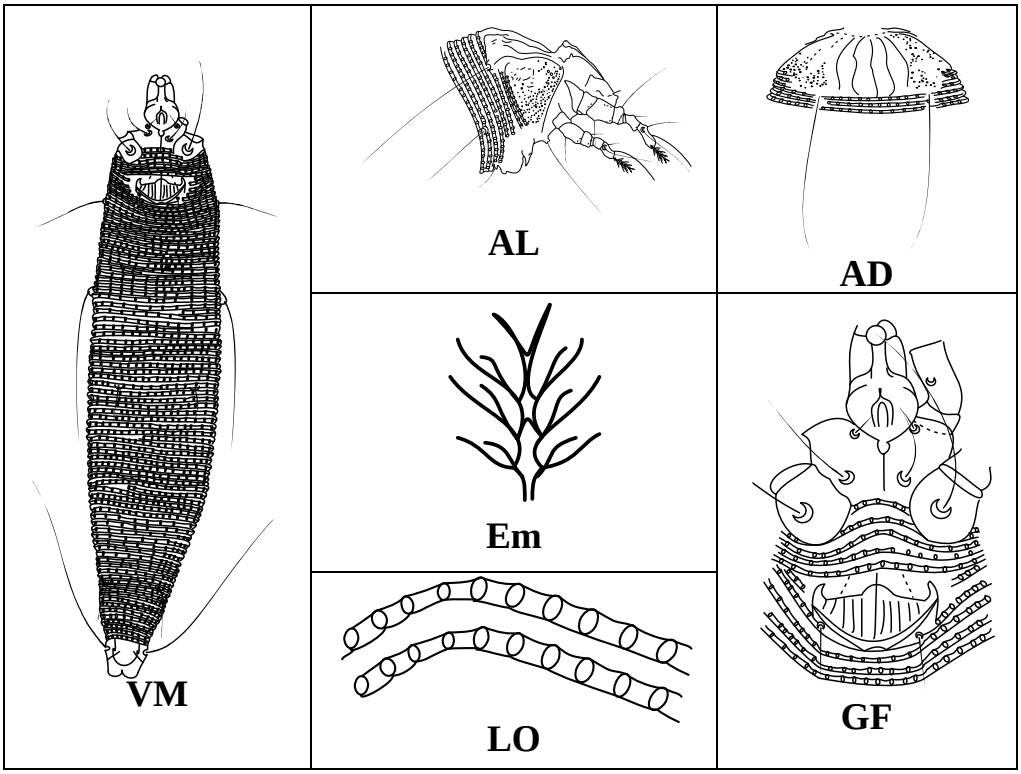


Fig. 7: *Aceria aegypticus*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia;

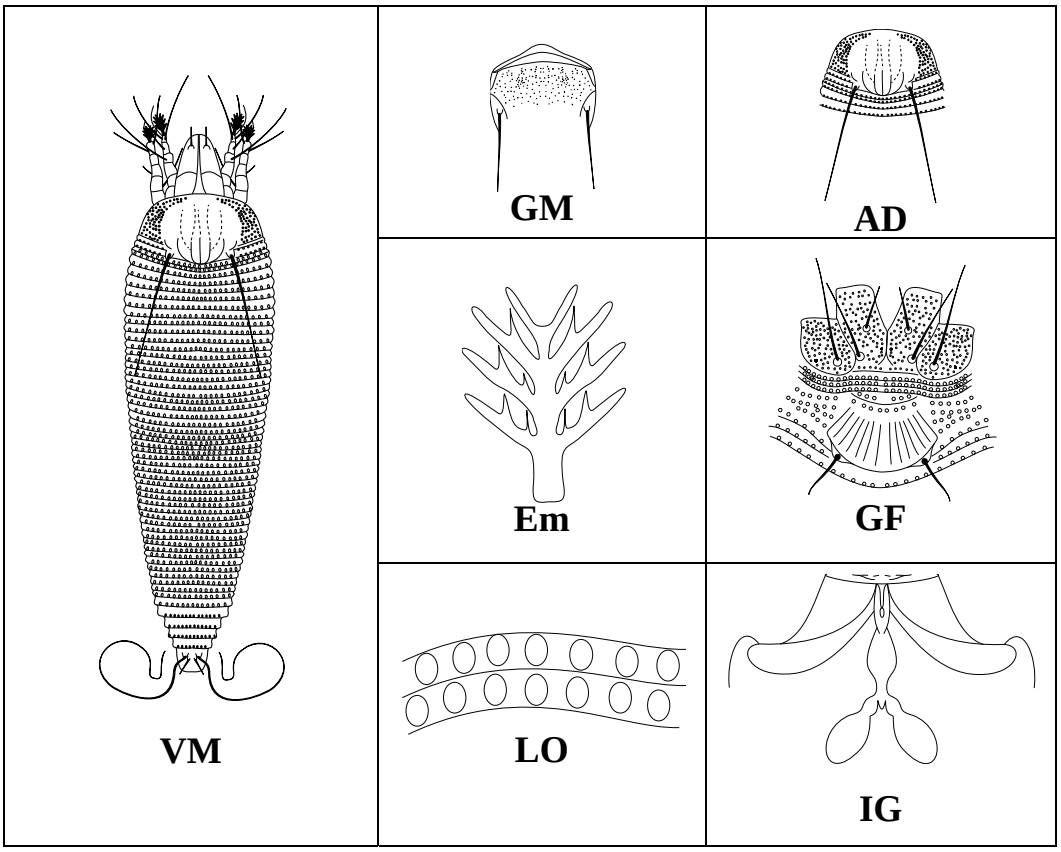


Fig. 8: *Aceria oleae*: DM-Dorsal view of female; GM – male gentalia; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

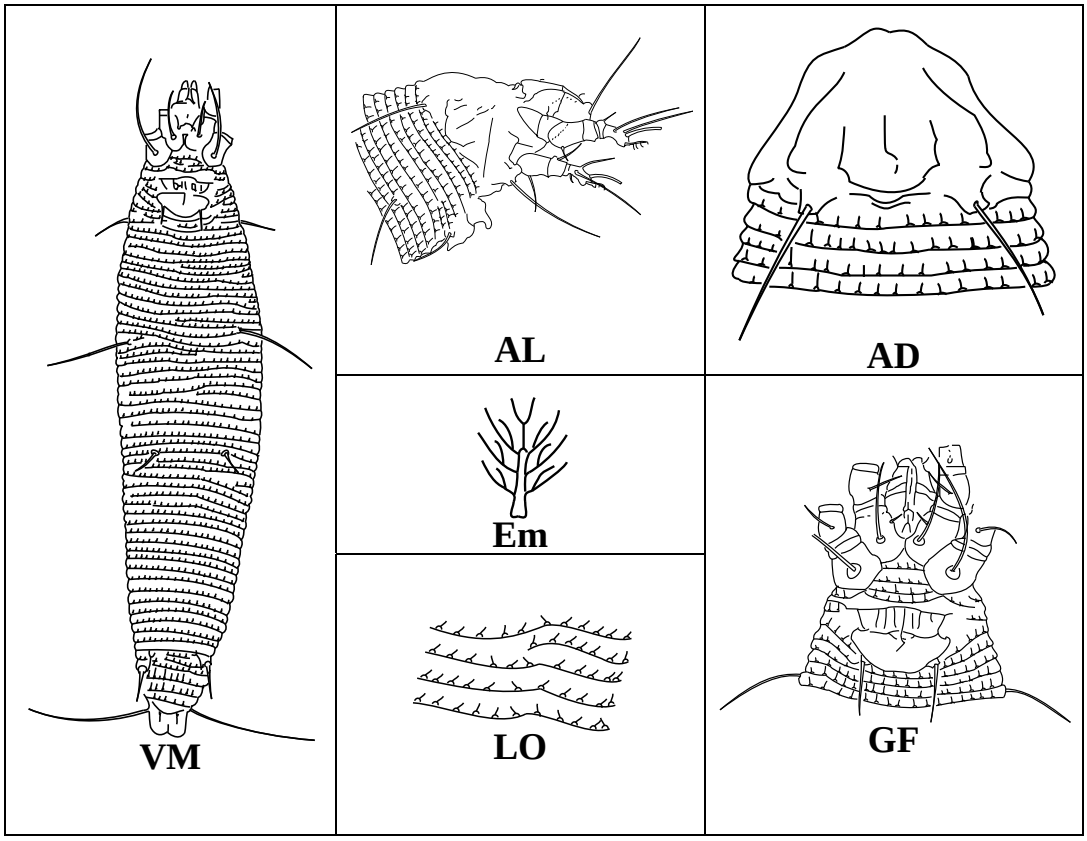


Fig. 9: *Aceria dioscoridis*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF – female genitalia.

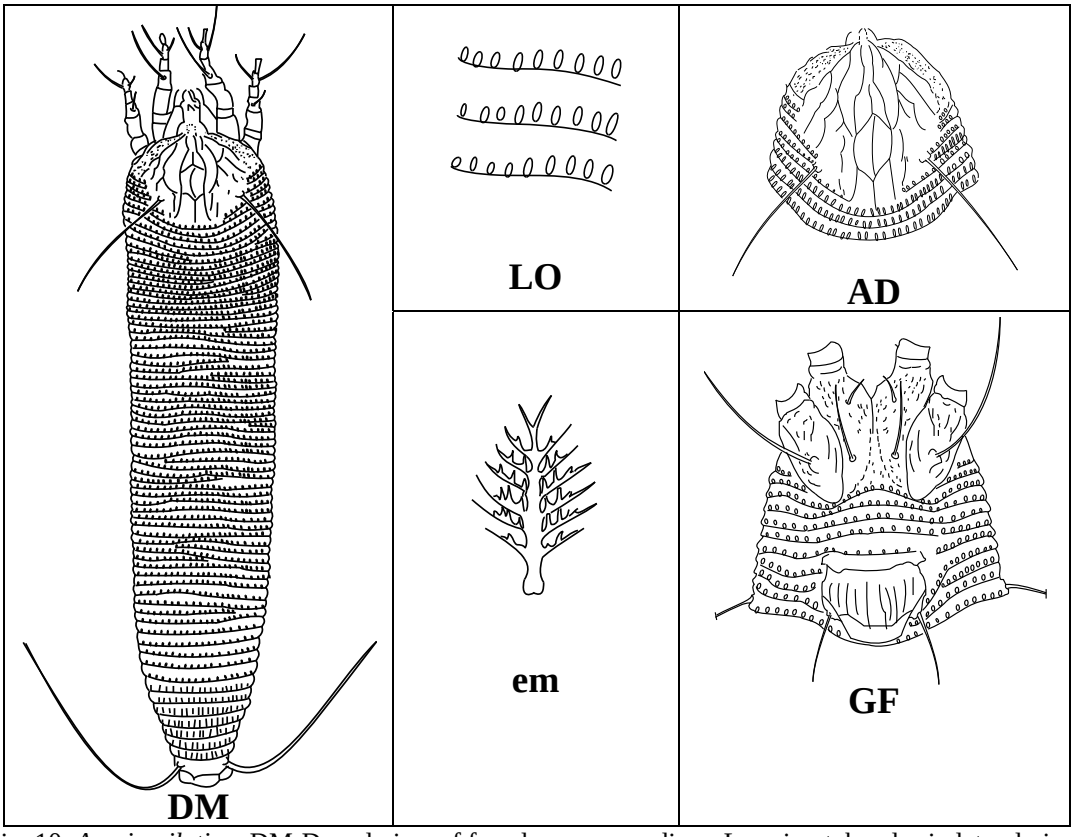


Fig. 10: *Aceria nilotica*: DM-Dorsal view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

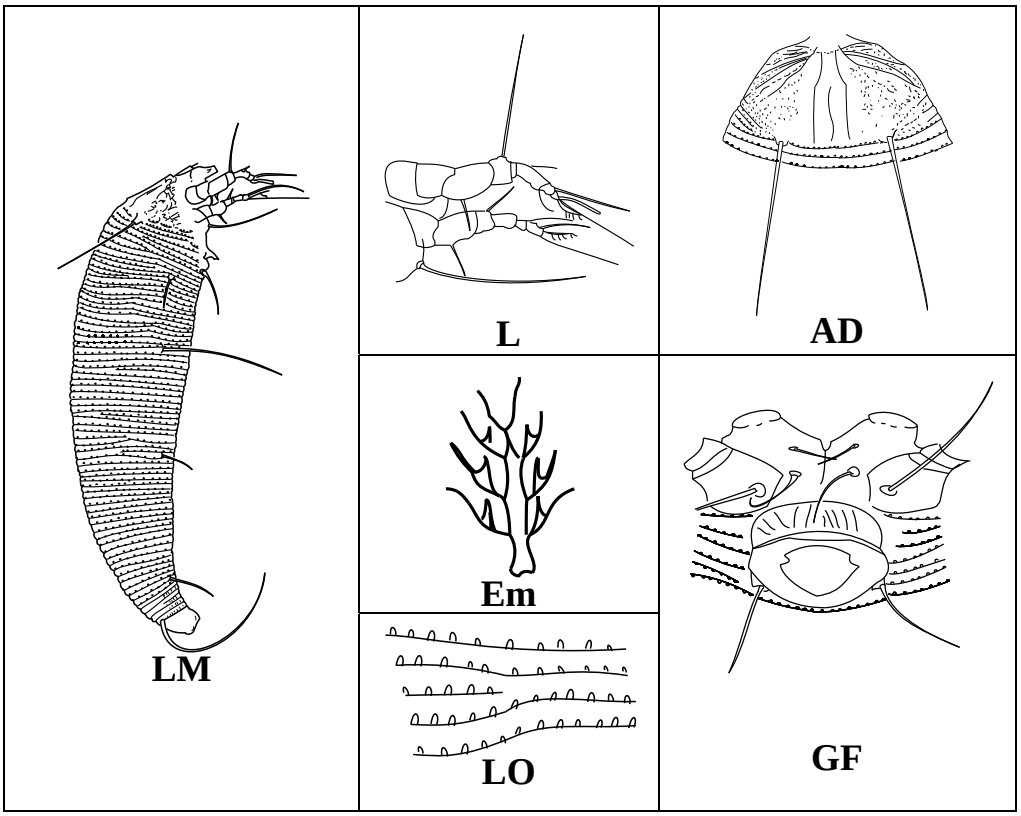


Fig. 11: *Aceria daturae*: LM-Lateral view of female; L-legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

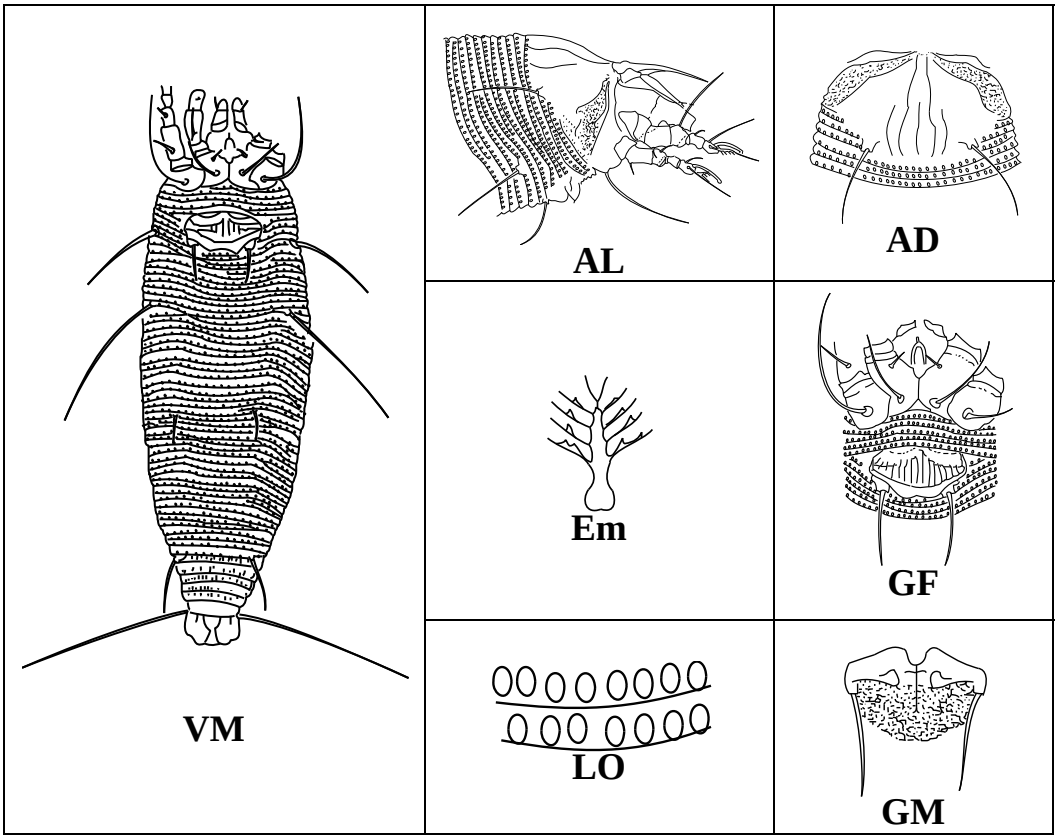


Fig. 12: *Aceria sheldoni*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM – male genitalia.

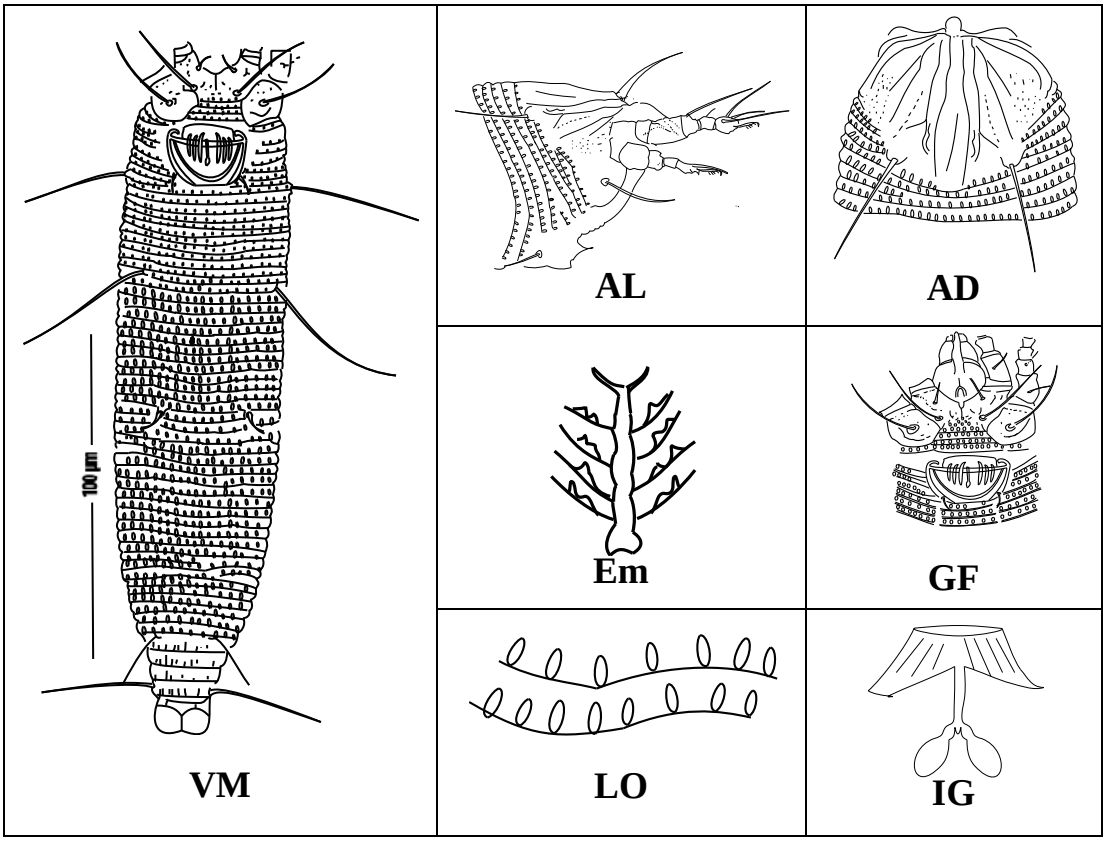


Fig. 13: *Aceria rotundus* n. sp.: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG – female internal genitalia.

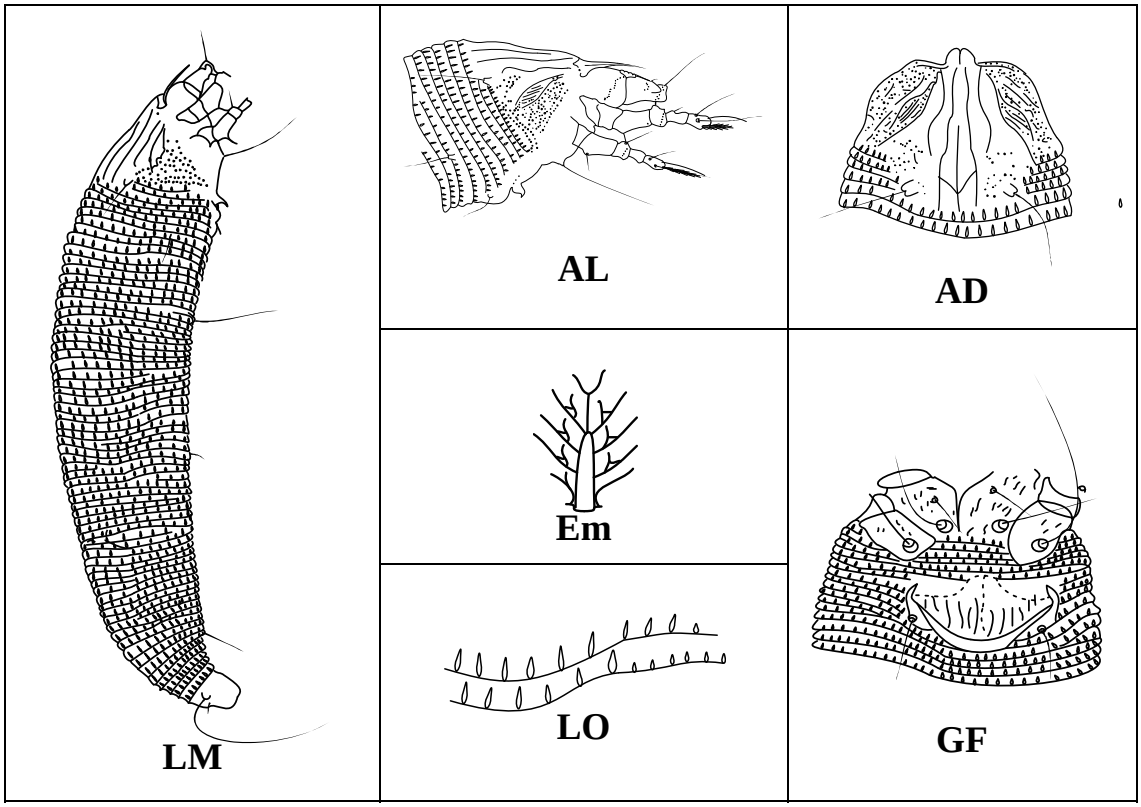


Fig. 14: *Aceria benghalensis*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

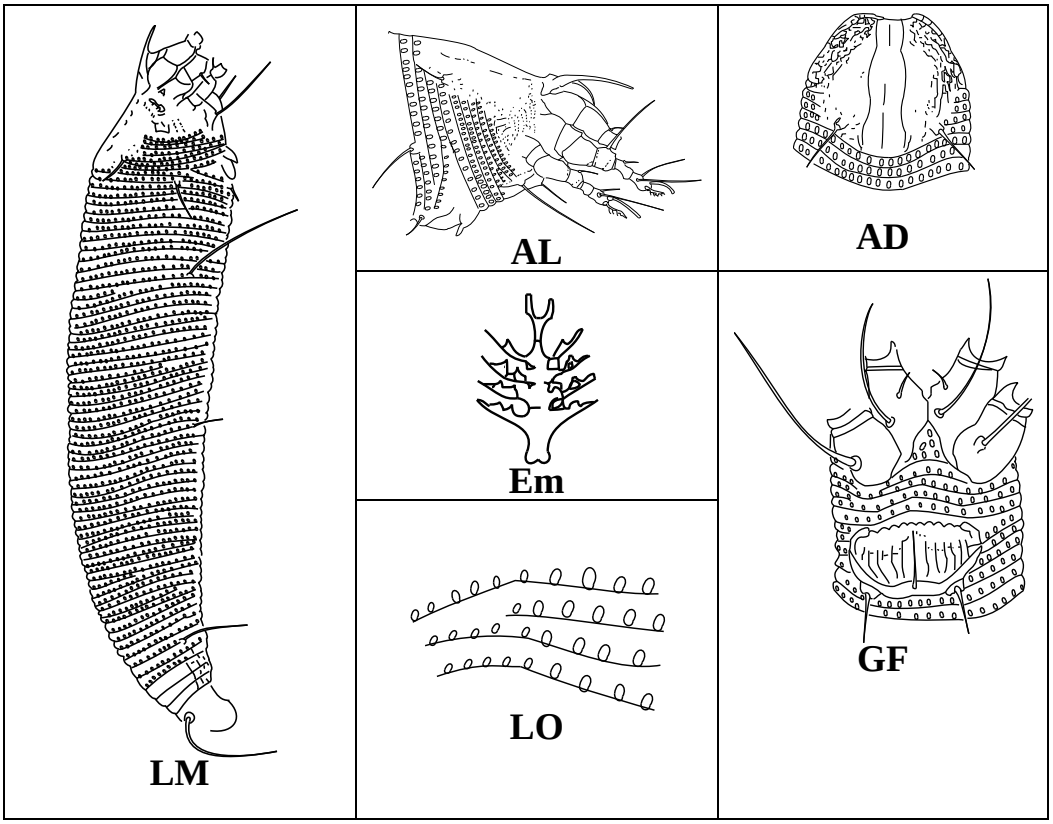


Fig. 15: *Aceria mori*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

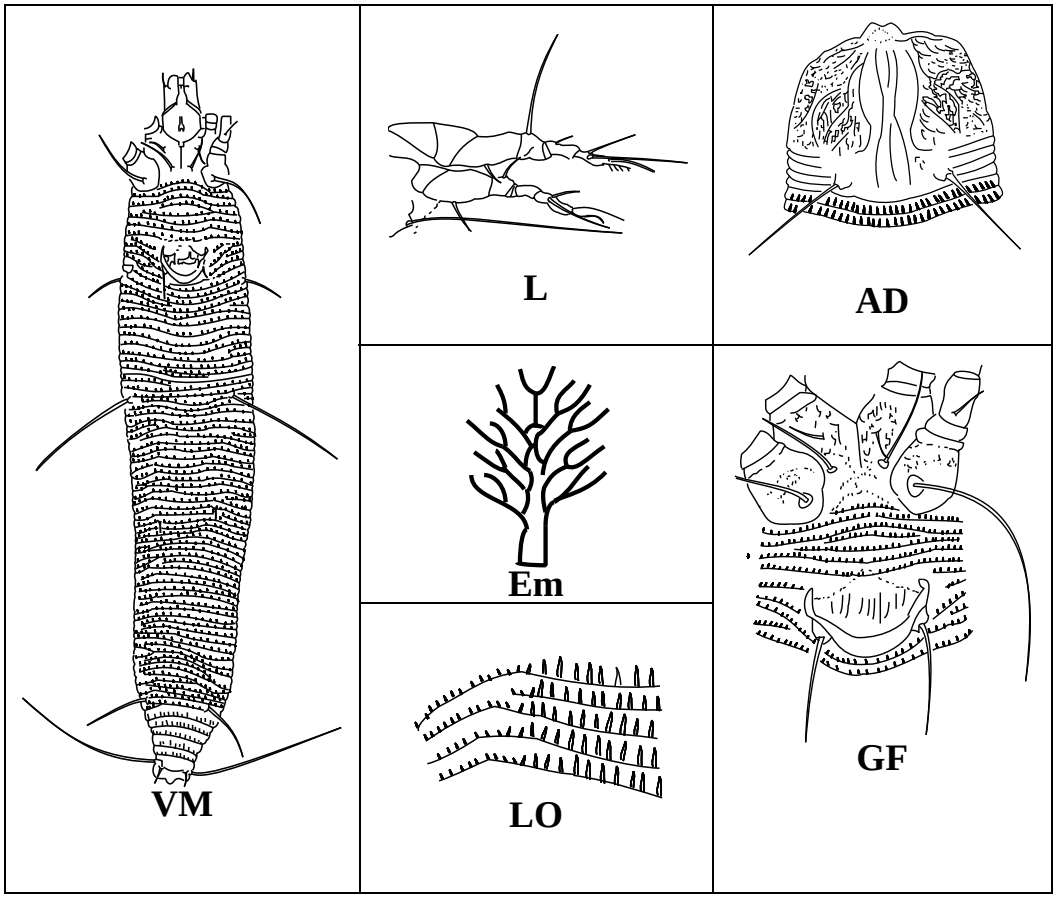


Fig. 16: *Aceria sycamori*: VM-Ventral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

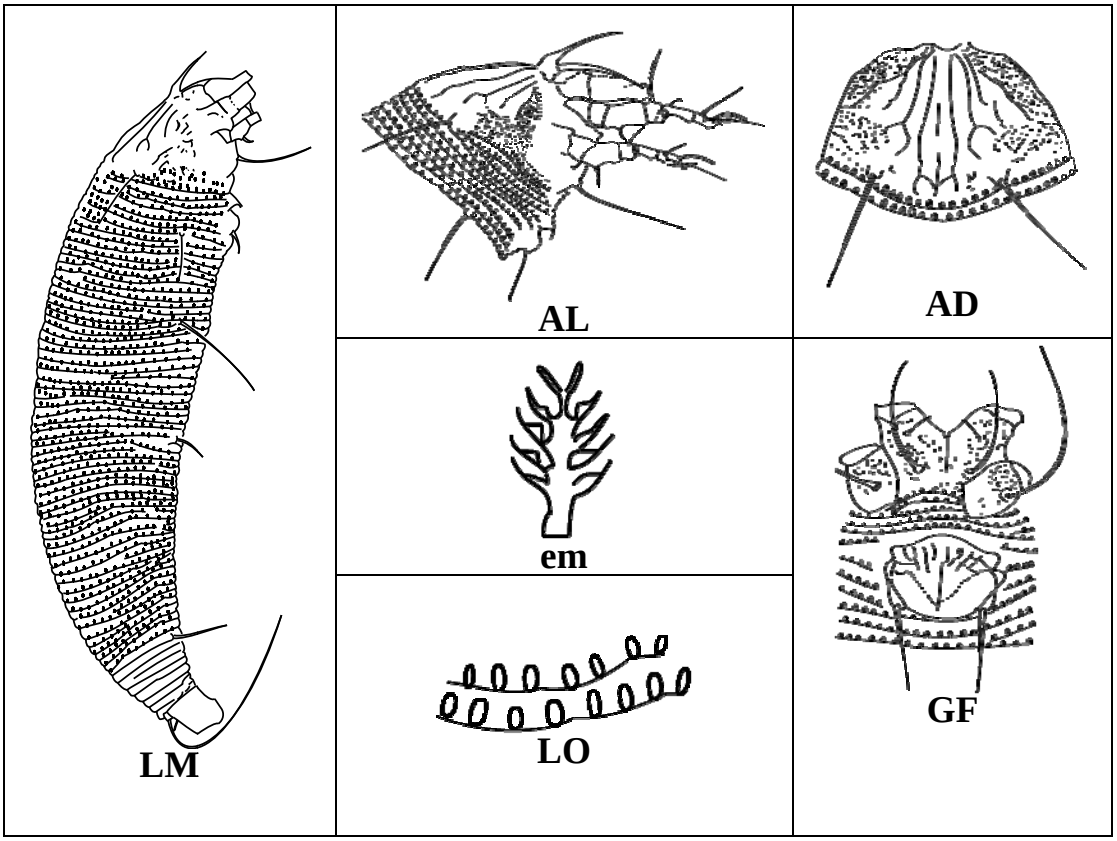


Fig. 17: *Aceria ficus*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

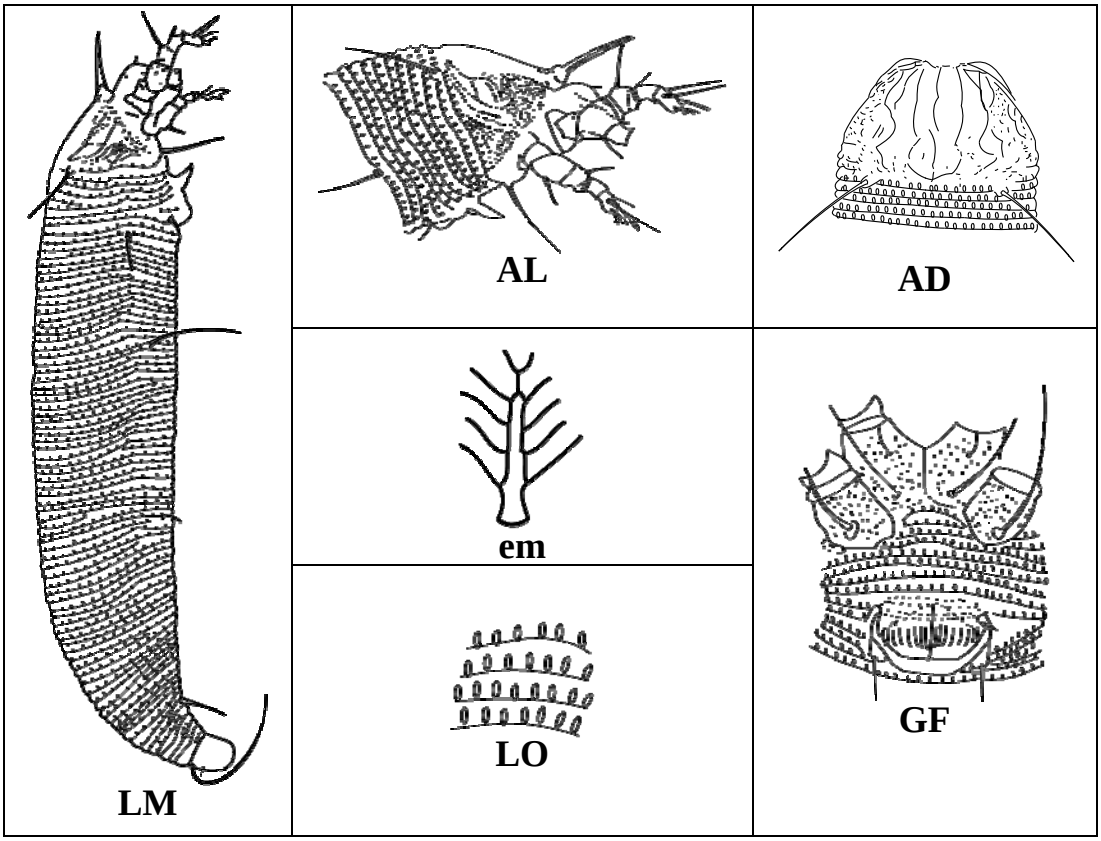


Fig. 18: *Aceria eriobotryae*: LM-Lateral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

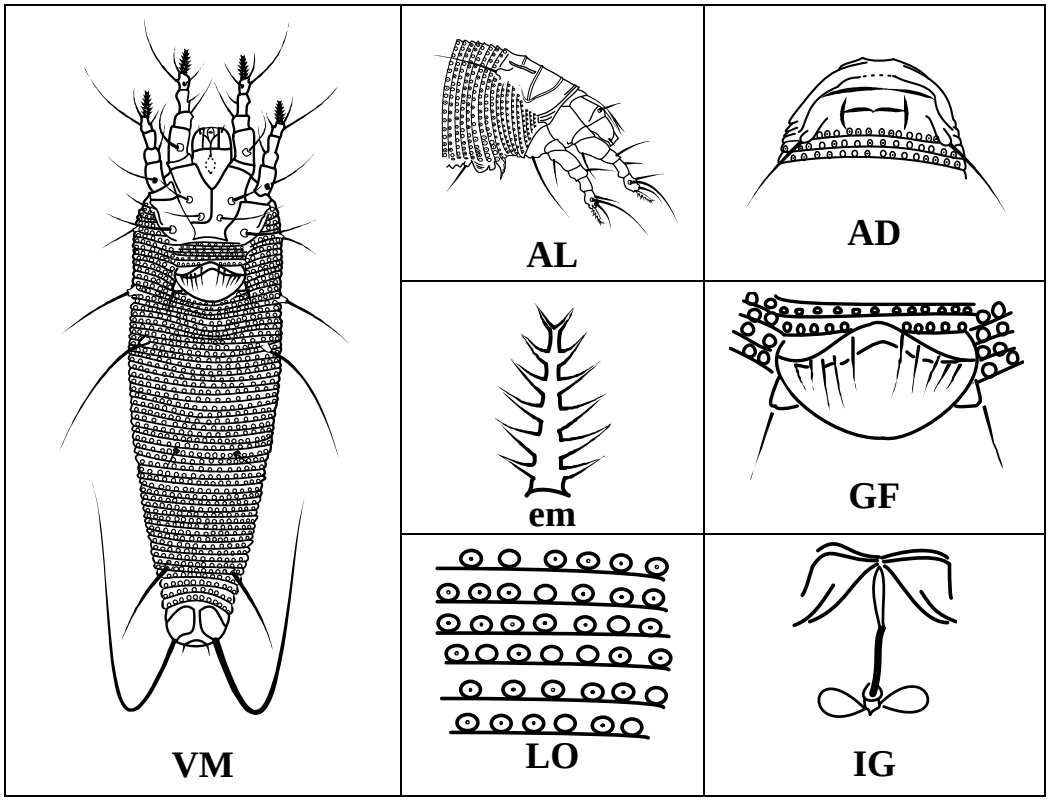


Fig. 19: *Aceria acaciae*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

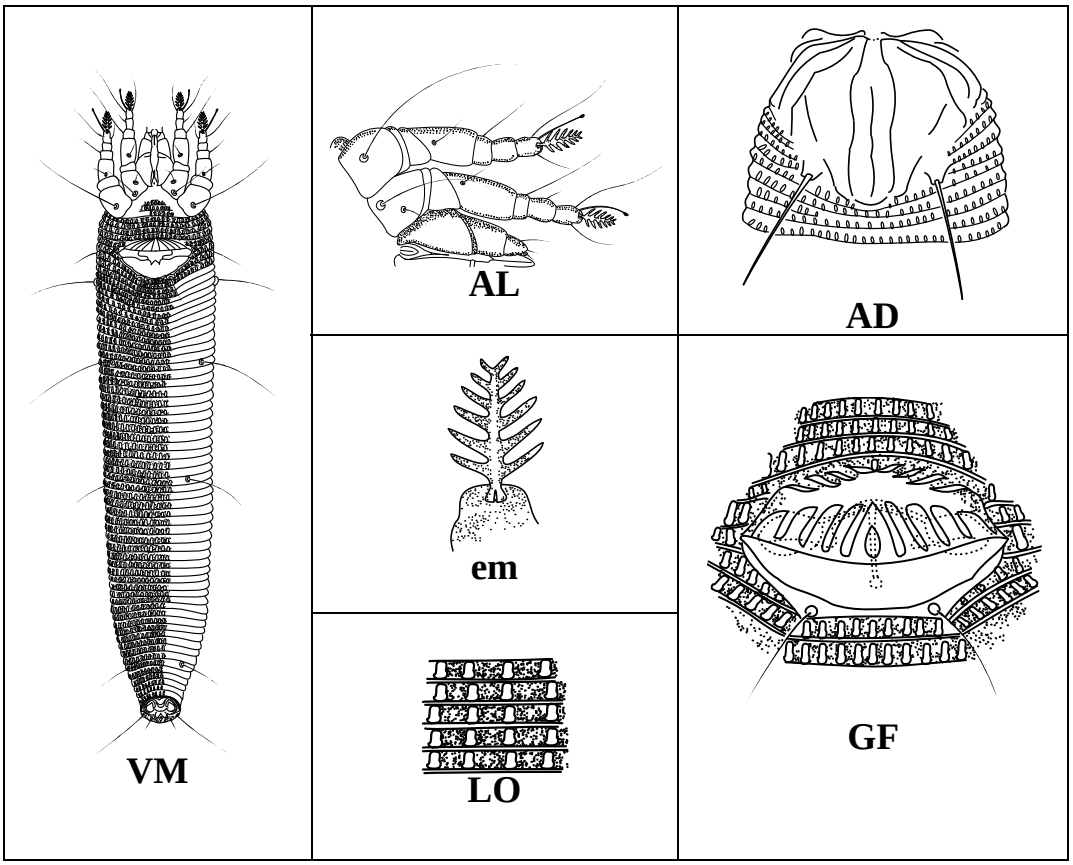


Fig. 20: *Aceria mangiferae*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

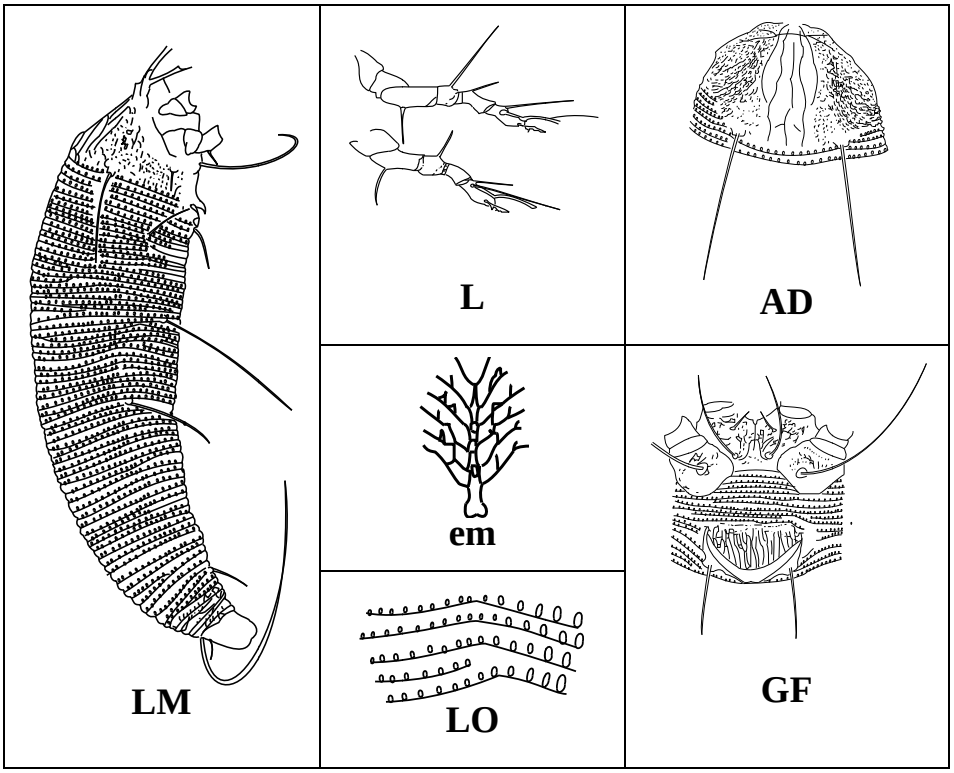


Fig. 21: *Aceria neocynarae*: LM-Lateral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

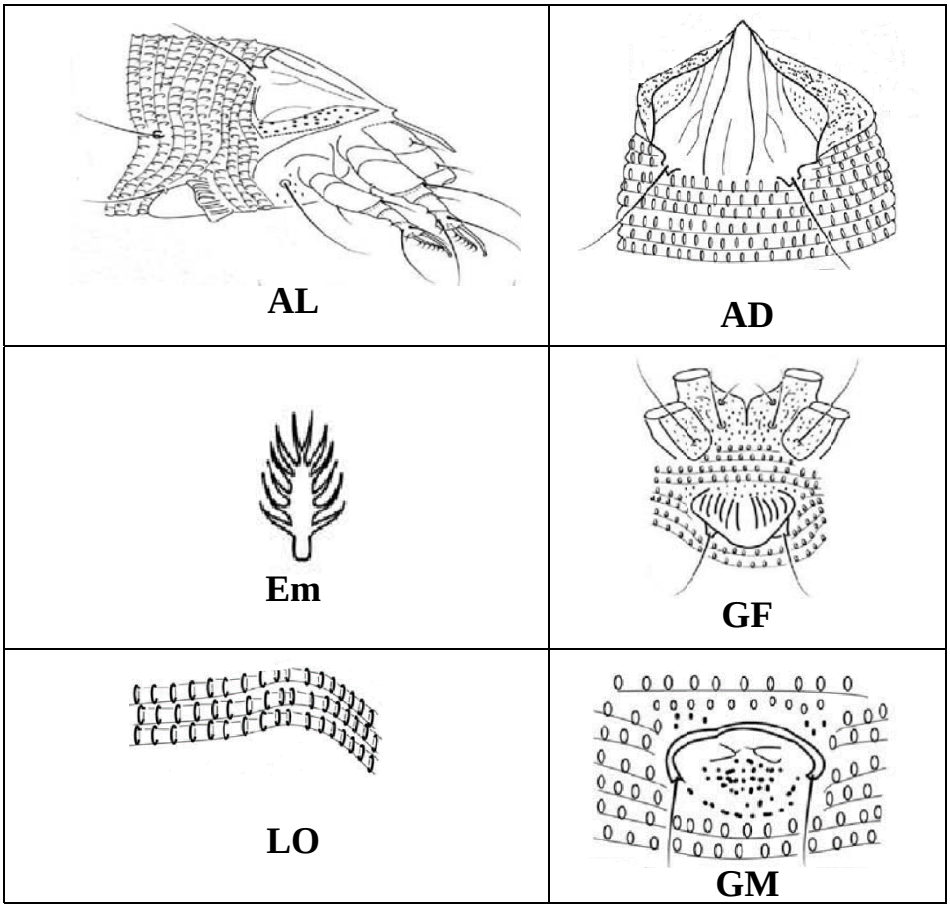


Fig. 22: *Aceria saidi*: AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM-male genitalia.

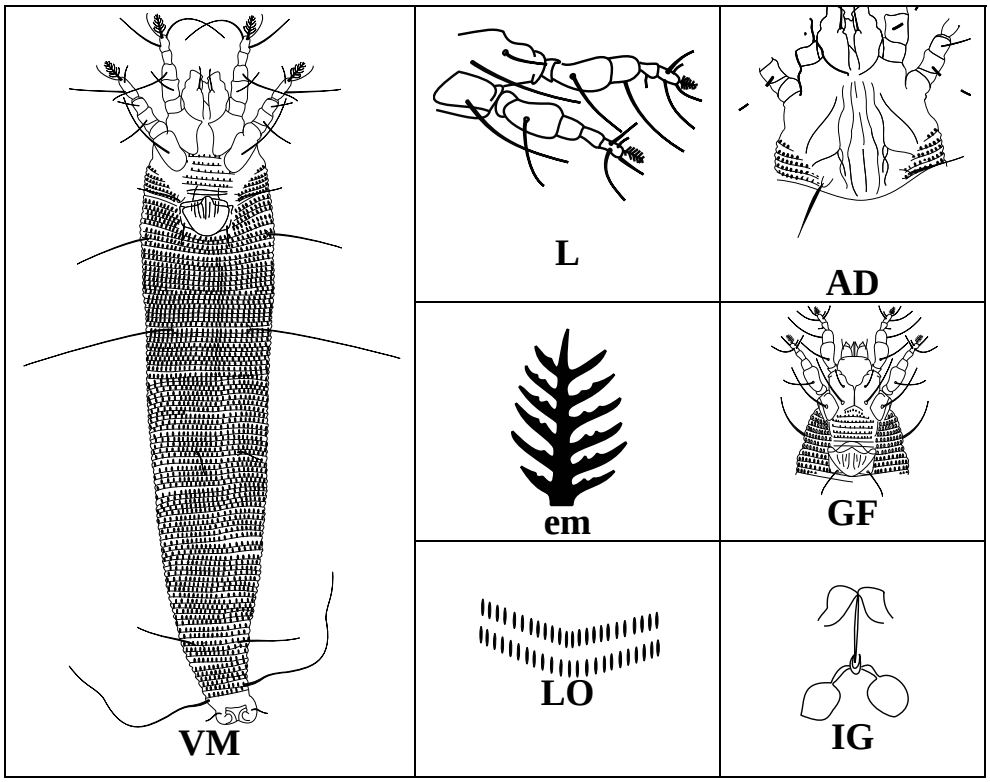


Fig. 23: *Aceria cynodoniensis*: VM-Ventral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

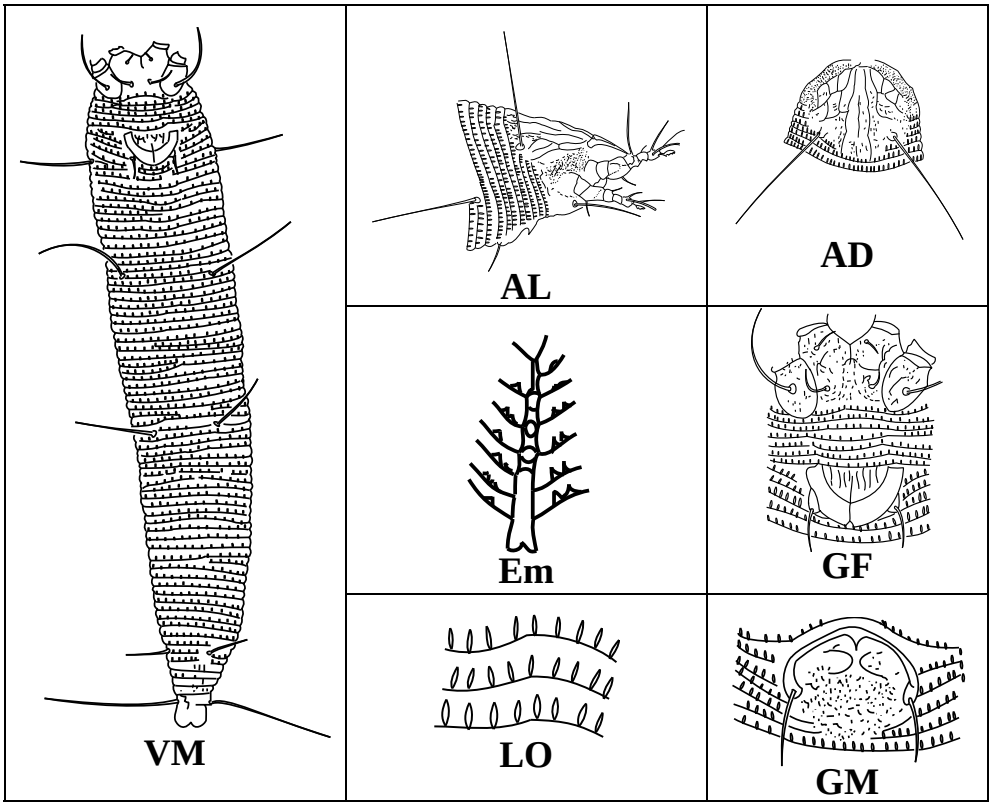


Fig. 24: *Aceria imperata*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; GM-male genitalia.

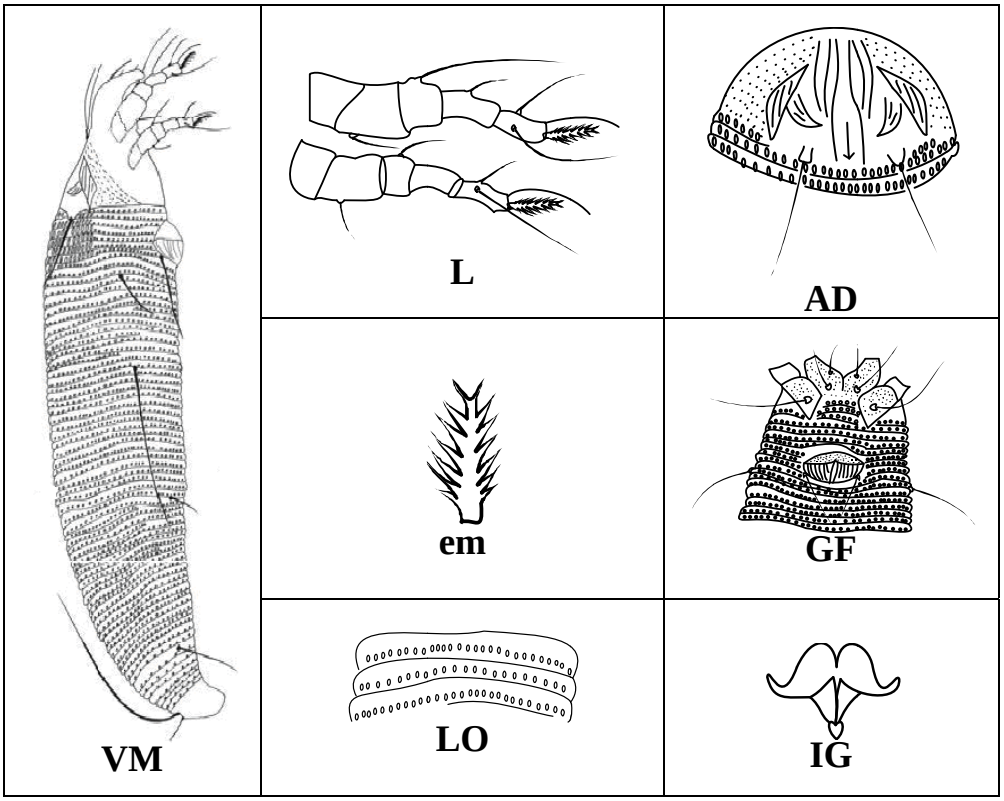


Fig. 25: *Aceria acaciae*: VM-Ventral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

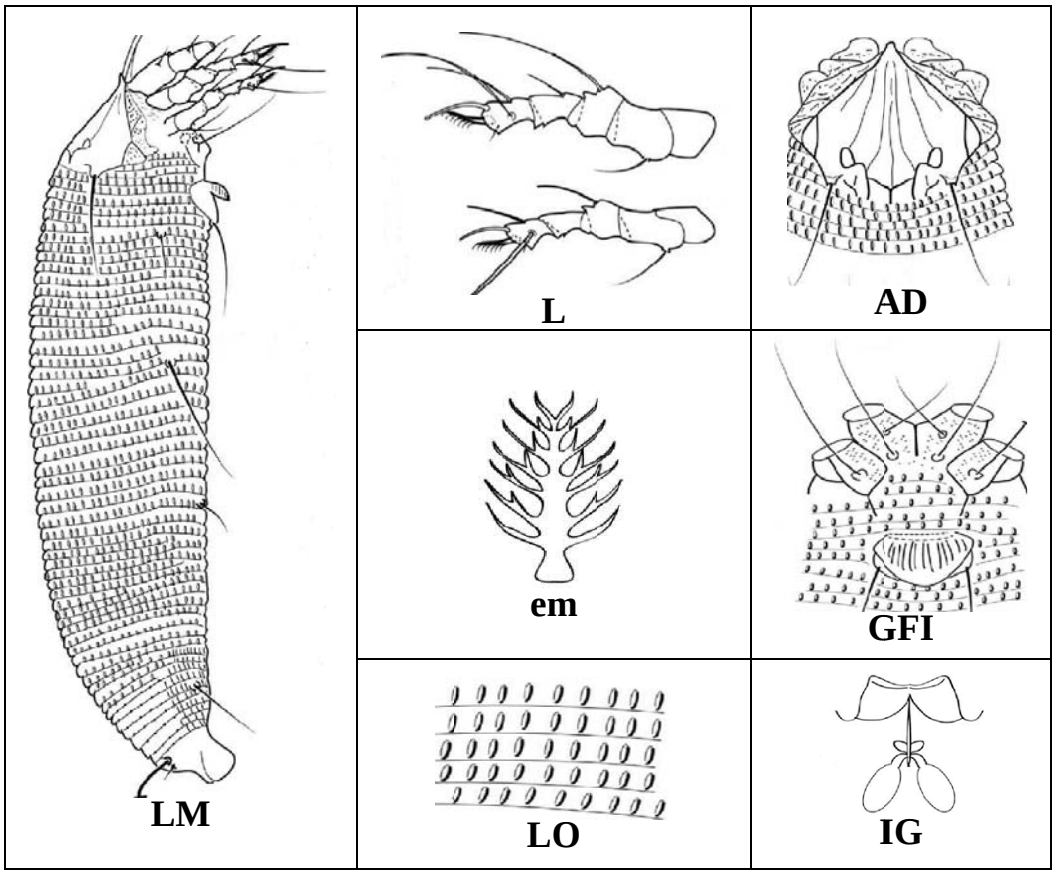


Fig. 26: *Aceria metwallii*: LM-Lateral view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

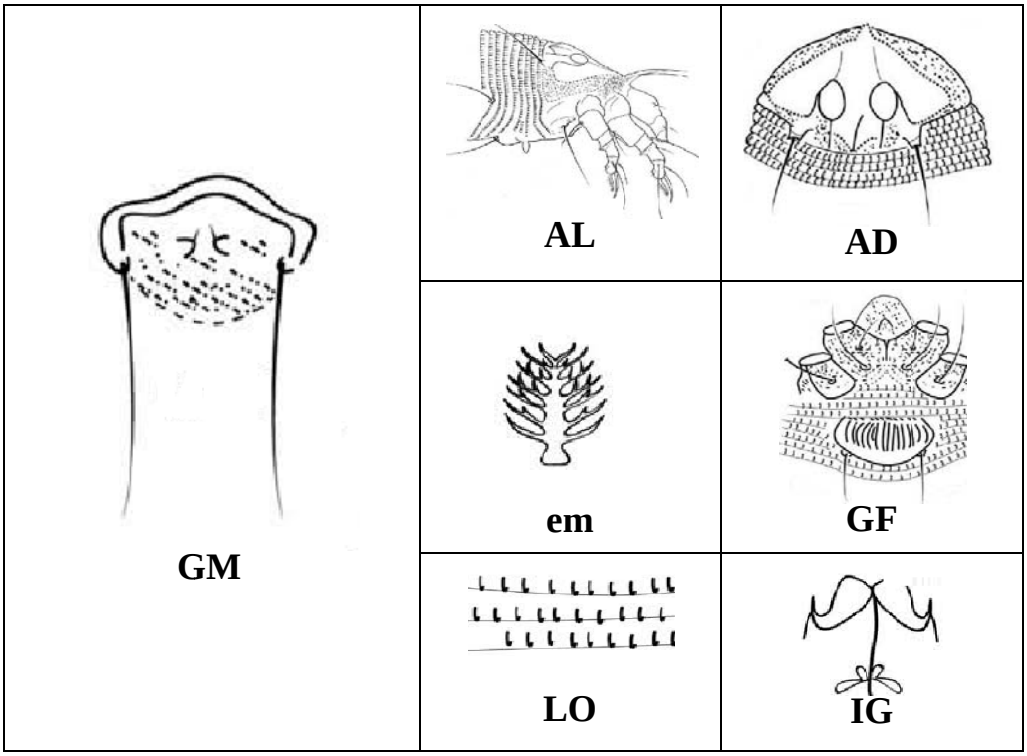


Fig. 27: *Aceria awadi:* GM-male genitalia; AL-antero-lateral view of female; em- empodium; Lo- microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG- female internal genitalia.

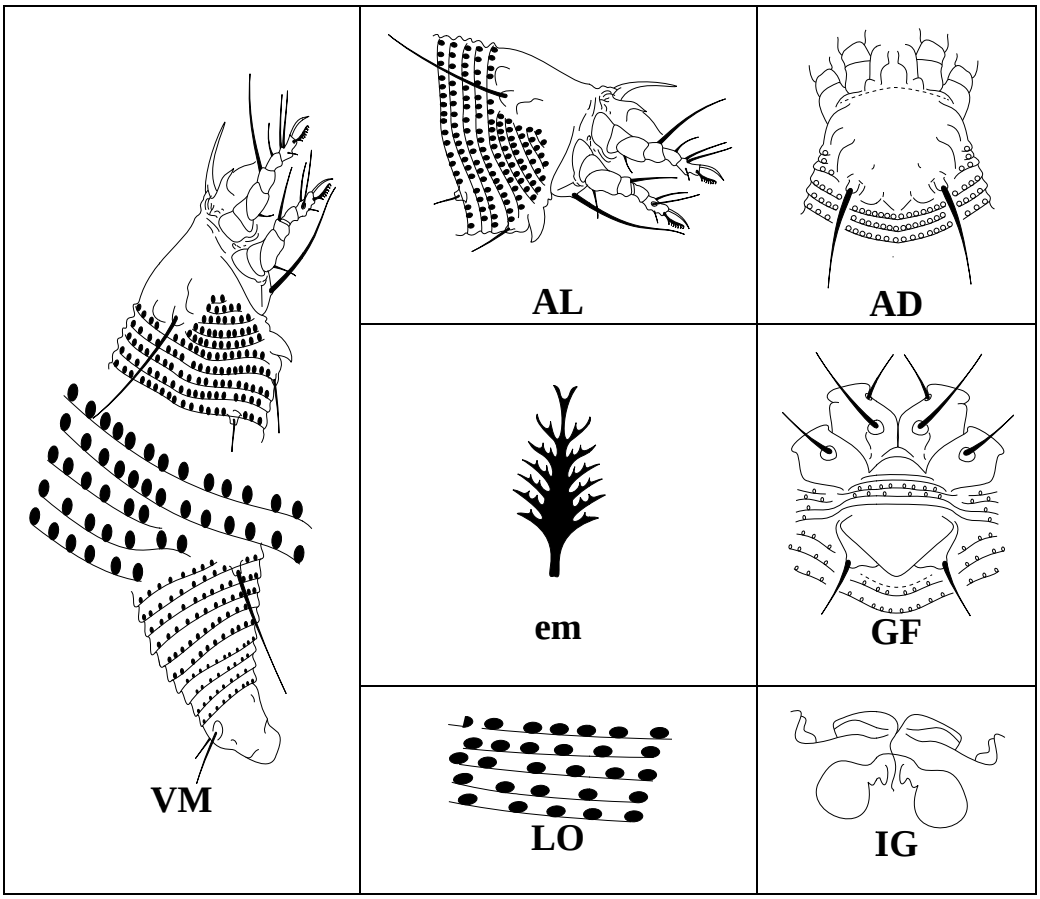


Fig. 28: *Aceria dioicae*: VM - Ventral view of female; AL- antero-lateral view of female; em – empodium; Lo - microtubercles in lateral view; AD- prodorsal shield; GF- female genitalia ; IG – female internal genitalia.

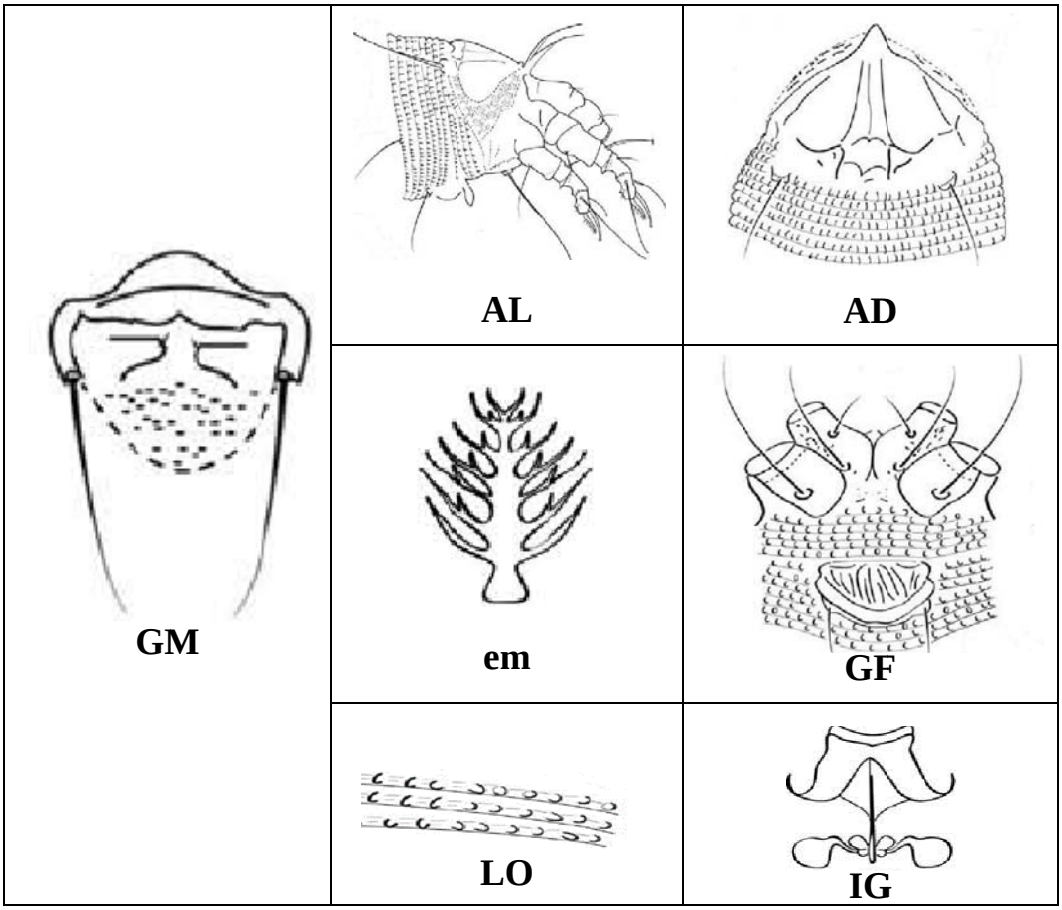


Fig. 29: *Aceria aegyptiacacia*: GM – male genital; AL - antero-lateral view of female; em- empodium; Lo – microtubercles in lateral view; AD – prodorsal shield; GF – female genitalia ;IG- female internal genitalia.

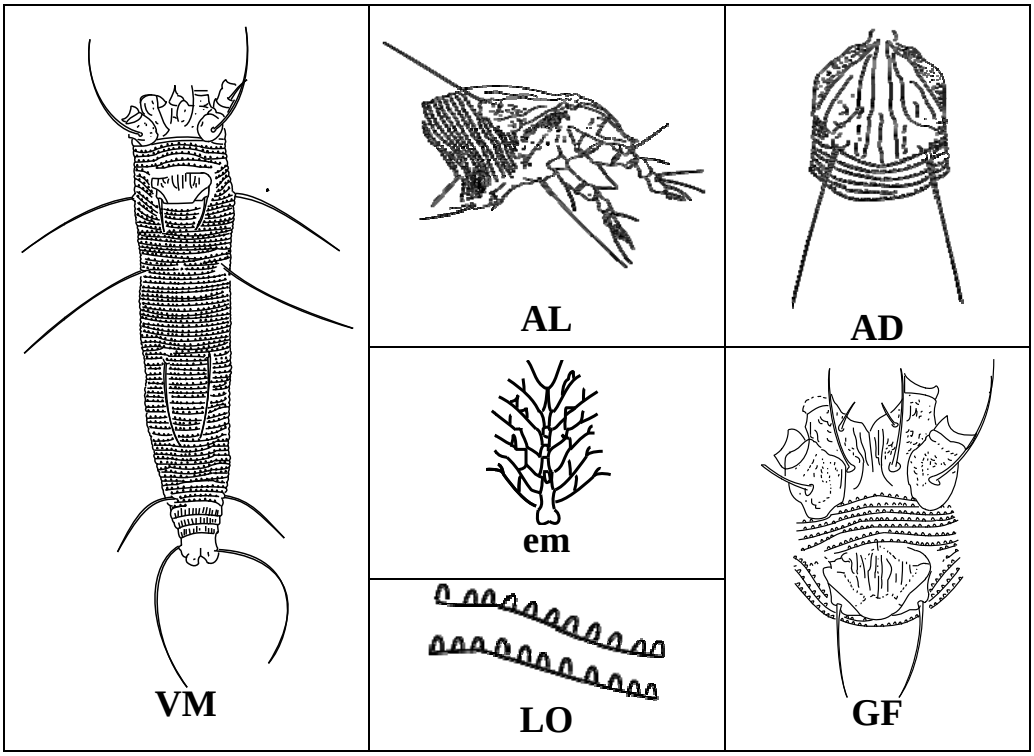


Fig. 30: *Aceria tulipae* VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia .

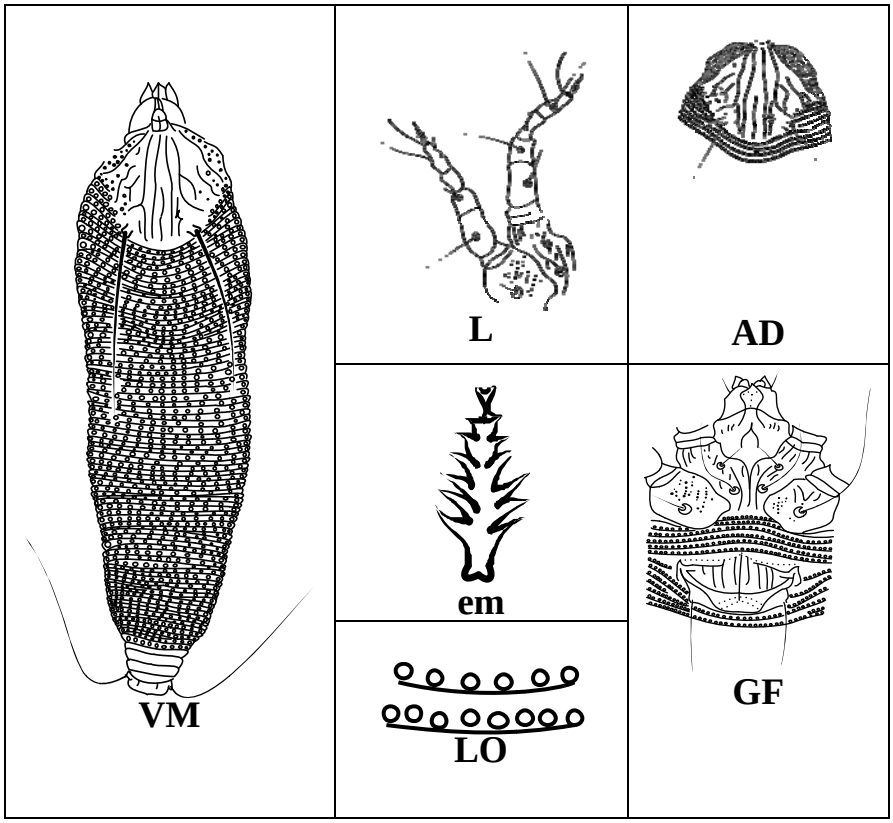


Fig. 31: *Aceria aegyptiacus*: DM-Dorsal view of female; L-Legs; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia .

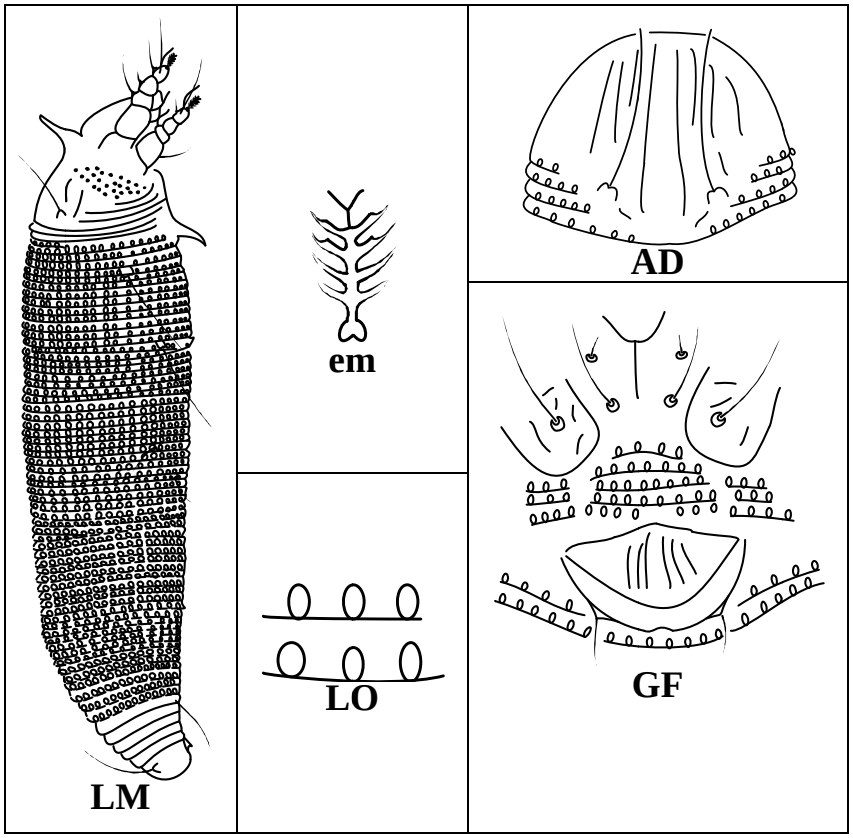


Fig. 32: *Eriophyes acanthus*: LM – Lateral view of female; em – empodium; Lo – microtubercles in lateral view; AD – prodorsal shield; GF – female genitalia .

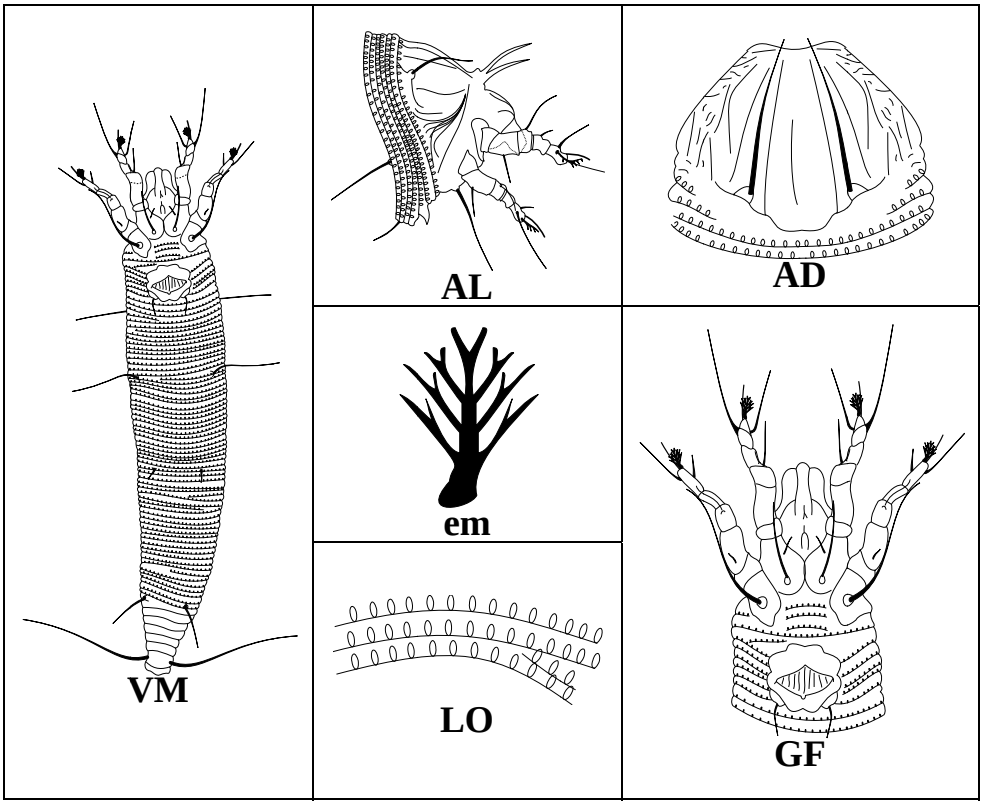


Fig. 33: *Eriophyes pyri*: VM-Ventral view of female; AL-antero-lateral view of female; em-empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia.

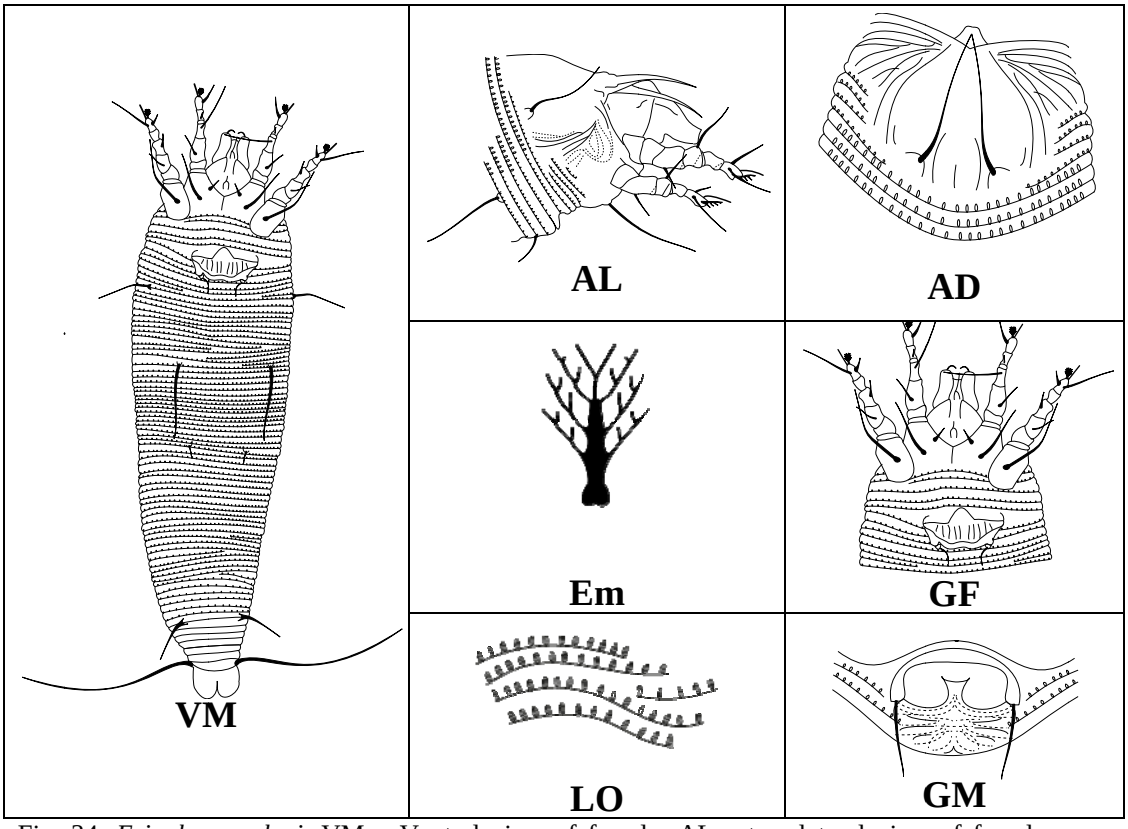


Fig. 34: *Eriophyes nalepi*: VM – Ventral view of female; AL-antero-lateral view of female; em – empodium; Lo-microtubercles in lateral view; AD-prodorsal shield; GF-female genitalia; IG-female internal genitalia.

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