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The predatory mite genus *Lasioseius* Berlese, 1916 (Acari, Gamasina)

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Abstract

The cosmopolitan predatory mite genus *Lasioseius* is described morphologically and taxonomically. Aspects of the biology and ecology of the species are explained.

Lasioseius Berlese belongs to the family Podocinidae Berlese, 1916, which includes the closely related genera *Hoploseius* Berlese, *Andregamasus* Costa, *Aceodromus* Muma, *Podocinum* Berlese, *Podocinella* Evans & Hyatt, *Neojordensia* Evans, and *Aceoseius* Sellnick.

The genus *Lasioseius* is divided into 5 subgenera: *Lasioseius* s. str., *Borinquolaelaps* Fox, 1946 n. comb., *Crinidens* Karg, 1980 n. comb., *Cuspiacus* n. subgen., and *Endopodalius* n. subgen. Keys to subgenera and to the 156 species are presented. 13 new species from rain forests of Ecuador are described. All species are illustrated with regard to species-specific characters.

Zusammenfassung

Die Raubmilbengattung *Lasioseius* Berlese, 1916 (Acari, Gamasina) – Die Arten der weltweit verbreiteten Gattung *Lasioseius* werden morphologisch und taxonomisch beschrieben und Erläuterungen zu ihrer Biologie gegeben.

Lasioseius Berlese gehört zusammen mit den nahe verwandten Gattungen *Hoploseius* Berlese, *Andregamasus* Costa, *Aceodromus* Muma, *Podocinum* Berlese, *Podocinella* Evans & Hyatt, *Neojordensia* Evans und *Aceoseius* Sellnick zur Familie Podocinidae Berlese, 1916.

Die Gattung *Lasioseius* wird in 5 Untergattungen eingeteilt: *Lasioseius* s. str., *Borinquolaelaps* Fox, 1946 n. comb., *Crinidens* Karg, 1980 n. comb., *Cuspiacus* n. subgen., und *Endopodalius* n. subgen. Die Bestimmungsschlüssel enthalten die Untergattungen und 156 Arten. Aus dem Regenwald von Ecuador werden 13 neue Arten beschrieben. Alle Arten der Gattung sind mit Abbildungen illustriert, die charakteristische Artmerkmale zeigen.

Introduction

The predatory mite genus *Lasioseius* Berlese, 1916 is one of the most diverse genera of the Cohors Gamasina. *Lasioseius* displays many primitive characters, such as body setation, setae form, configuration and ornamentation of female shields, etc. Furthermore, the genus is ecologically highly variable and, in soil habitats, mites of this genus are among the most abundant representatives of the mesofauna. It is, therefore, not surprising, that in the past 20 years more than 80 new species of the genus *Lasioseius* have been described, especially from tropical regions. Further new species from the tropical rain forest of Ecuador, gathered by A. Zicsi, University of Budapest, initiated our taxonomic investigations of *Lasioseius*. This genus was revised by KARG (1980), and he treated 70 species in his worldwide key. Due to the numerous new species we decided to again revise the genus *Lasioseius* on the basis of present knowledge.

The original descriptions of all species referred to in this paper were studied, the type-material of 39 species was examined and new morphological data were included. Nevertheless, this monograph on the genus *Lasioseius* partly remains a revision of literature data.

Biology and postembryonic development

The species of the genus *Lasioseius* Berlese are distributed worldwide. However, investigations of the Sub-Antarctic region are still lacking. Most of the species inhabit the upper soil layers of forests, meadows and arable fields (CHRISTIAN 1993, KARG 1993). Furthermore, nests of rodents and birds are also known to be inhabited by *Lasioseius* species. Investigations of moist rain forests have shown that several species are able to live on leaves of different trees (WALTER & LINDQUIST 1997). In regard to these, we have added specific information in the keys to the *Lasioseius* species.

As a rule, the species of the genus *Lasioseius* are predatory. They feed on Collembola, on soil-inhabiting mites such as *Tyrophagus* spec. and *Tarsonemus* spec. as well as on nematodes. On leaves, they feed predominately on spider mites and rust mites. However, there are observations that some species of the genus also feed on fungi. In particular, mouth parts of species with a longer row of closely set teeth on the digitus fixus of the chelicerae can be used to crush fungal hyphae (WALTER & LINDQUIST 1989). Regarding feeding experiments, it seems that fungi serve as a supplemental food resource.

The postembryonic development comprises the stages: Larva, protonymph, deutonymph and adult (Figs I, II). Development requires 9 to 19 days from egg to adult depending on temperature. Below 10 °C development stagnates with the protonymph (Tab. 1).

Tab. 1 Postembryonic development of *Lasioseius berlesei* (Oudemans, 1938) (after KARG 1962)

Temp. (°C)	Developmental periods (d)			
	Larva	Protonymph	Deutonymph	Total
18 – 20	2 – 3	3 – 4	4 – 8	9 – 15
14	4	6 – 7	6 – 8	16 – 19
9	4 – 9	14 – 37	no further development (4-month observation period)	
4 – 5	no development (10-month observation period)			

Morphology and chaetotaxy

The dorsum of deutonymphs and adults is covered by a holonotal shield. The venter of females is characterised by a sternal shield bearing 3 pairs of setae, a pair of metasternal plates each with a simple seta, a genital shield bearing one pair of setae and a ventro-anal shield with mostly 5 – 7 pairs of setae (rarely 1 – 3). The male venter is covered by a sternum (5 pairs of setae) and a ventro-anal shield (Fig. II).

The transverse series of setae on the idiosoma are residues of the ancestral body segments developed in all groups of Articulata (KAESTNER 1956, EVANS 1992, MORITZ 1993). The gnathosoma consists of the cheliceral and pedipalpal segment which lacks dorsal setae. The podosoma includes the 4 segments of legs and is fused with the genital segment. This can be seen by 5 pairs of setae (st1 to st5) distinctly recognisable on the venter (Fig. II). During ontogenesis, deviations arise concerning the positions of dorsal pairs of setae. One pair of setae on the vertex (s1) tends to move into a position posterior to i1. In species of Gamasina in a more plesiomorphic condition this character shows the normal position (Fig. IIIa), whereas in *Lasioseius* the position of the setae pair s1 has changed (Fig. IIIb). On the opisthosoma, 5 distinct dorsal transverse series of setae also indicate 5 body segments.

Due to this arrangement of setae, we refer in the comparative morphology to 5 series of setae on the anterior half of the dorsum (i1 – i5, z1 – z5, s1 – s5) as well as to 5 series on the posterior half of the dorsum (I1 – I5, Z1 – Z5, S1 – S5).

At the margins of the idiosoma, there is a varying number of setae (3 – 12 pairs) which cannot be assigned to certain transverse series. These r- and R-setae are mostly localised on a membrane lateral to the holodorsal shield (Fig. II).

Systematics and determination

The genus *Lasioseius* was erected by BERLESE in 1916. As the type species of the genus, he referred to *Seius muricatus* Berlese ex Koch (erroneously spelt *S. musicatus*). The species *Seius muricatus* Berlese ex Koch, 1887 is not identical with the species *Seius muricatus* C. L. Koch, 1839, therefore much confusion exists concerning the publication of the name *Typhlodromus berlesei* by OUDEMANS, 1938 as a nomen novum for the species *Seius muricatus* described by BERLESE in 1887. A diagnosis of the genus *Lasioseius* was not published by BERLESE (1916), and consequently some species are wrongly included in other genera.

WALTER & LINDQUIST (1989, 1997) referred the genus *Lasioseius* to the Ascidae sensu LINDQUIST & EVANS (1965). In our view, the family concept of 1965 does not conform with the results of phylogenetic investigations. In connection with ecological investigations the phylogeny of the Gamasina was studied and used for their classification. Consequently, families and superfamilies were characterised by synapomorphies according to the methods of HENNIG (1950, 1979). The Gamasina were subdivided into 6 superfamilies (KARG 1998a). Keys for the determination of 17 families, 13 subfamilies, 203 genera and about 1000 species were proposed (KARG 1993, CHRISTIAN & KARG 1998). Concerning the Ascidae sensu LINDQUIST & EVANS (1965), the results showed that this group comprised 21 genera belonging to various families. WALTER (1998) also emphasised that: »The Ascidae sensu Lindquist & Evans is not monophyletic«.

The Ascidae Oudemans s. str. must be separated from the Ameroseiidae Evans, Phytoseiidae Berlese, Podocinidae Berlese, and the Halolaelapidae Karg. The genus *Lasioseius* belongs to the Podocinidae Berlese, 1916. This family includes the following closely related genera: *Lasioseius* Berlese, 1916, *Hoploseius* Berlese, 1914, *Podocinum* Berlese, 1882, *Podocinella* Evans & Hyatt, 1957, *Aceoseius* Sellnick, 1941, *Aceodromus* Muma, 1961, *Neojordensia* Evans, 1957, and *Andregamasus* Costa, 1965. Keys for their determination were proposed by KARG (1993).

The sperm access system in adult female *Lasioseius* is of the phytoseioid type (EVANS 1992). The complexity and specificity of the sperm access system makes it a useful diagnostic character at the species level (WALTER & LINDQUIST 1997). At a higher phylogenetic level, the sperm access systems are obviously insignificant because both the phytoseioid type and the laelaptoid type can be found within various families or even genera (KARG 2003).

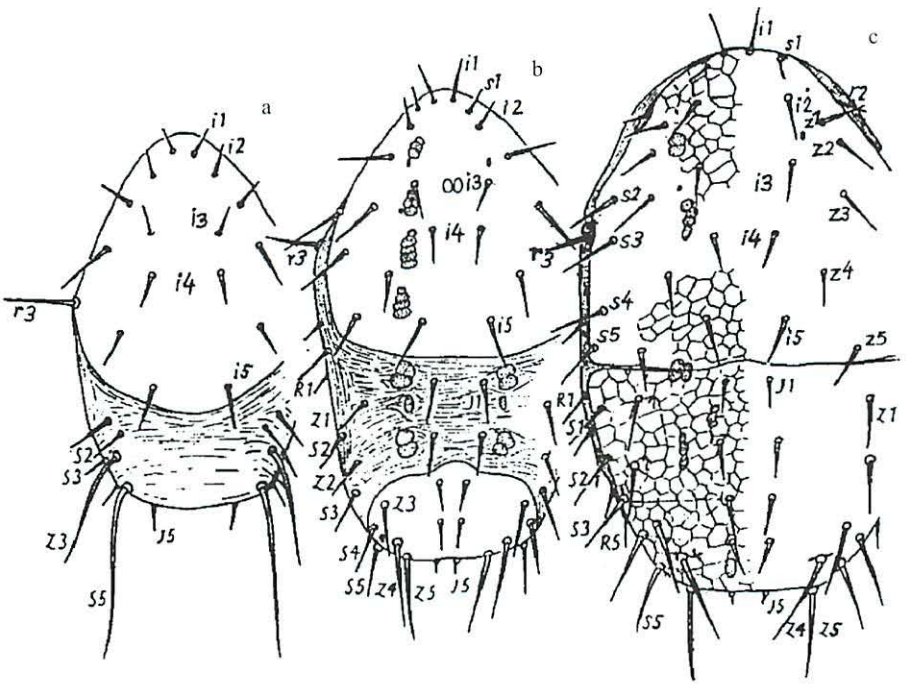

Fig. 1 *Lasioseius* Berlese dorsal: a larva, b protonymph, c deutonymph

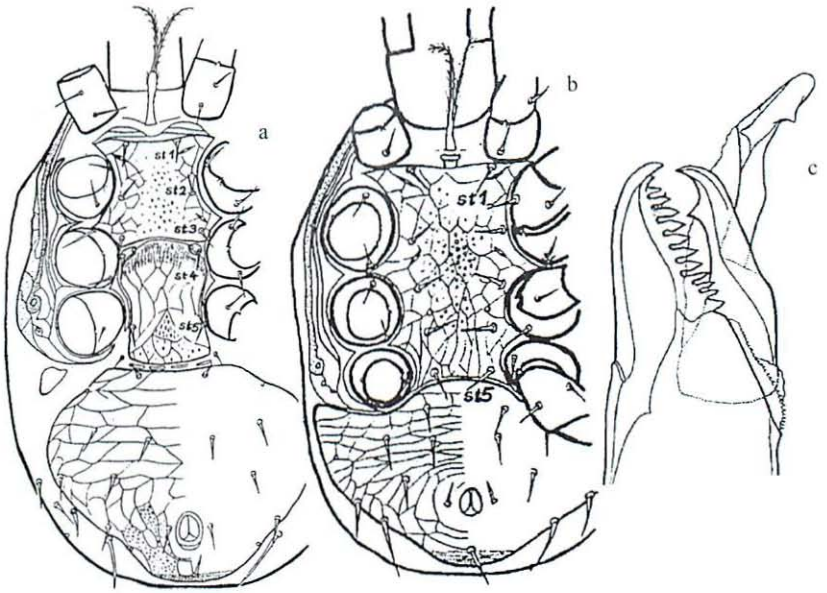

Fig. II *Lasioseius* Berlese ventral: a female, b male, c chelicera of male

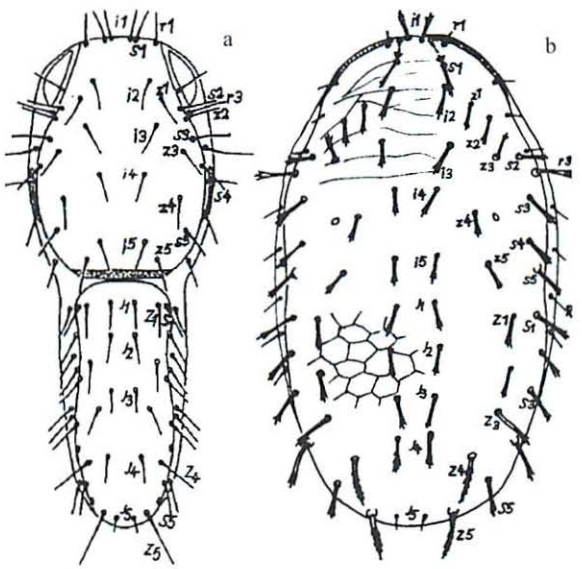

Fig. III dorsal chaetotaxy: a *Protogamasellopsis* Evans & Purvis, b *Lasioseius* Berlese

Diagnosis of the genus *Lasioseius*

Lasioseius Berlese, 1916

Type species: *Seius muricatus* Berlese ex Koch, 1887

not *Seius muricatus* C. L. Koch, 1839
= *Typhlodromus berlesei* Oudemans, 1938
= *Lasioseius aba* Baker & Wharton, 1952
= *Lasioseius sylvestris* Pinchuk, 1972

Adults and deutonymph with holodorsal shield; dorsal setae mostly conspicuously trispinate, partly acicular; however, caudal dorsal setae frequently pectinate, posterior half of dorsum with a maximum of 15 pairs of setae, 1 – 12 pairs of setae on the membrane lateral to the holodorsal shield: r- and R-setae, however marginal seta r3 (= humeral seta) conspicuous and situated on the dorsal shield. Females with ventrianal shield bearing 5 – 7 pairs of setae (exceptionally 1 – 3 pairs), adanal setae inserted anteriorly behind the margin of the anus; tectum mostly with 3 branches or 3 groups of points, sometimes irregularly denticulate. Corniculi strong, sometimes split; 8 hypognathal rows, first row smooth, 7 rows multidenticulate; movable digit of chelicerae in most subgenera with 3 teeth, in one subgenus with 5 teeth, fixed digit of chelicerae with a setiform pilus dentilis and with a saw-like dental row of teeth, spermatodactyl of males shaped like a finger. Legs II – IV with median lobes of pulvilli rounded; genu III with 8 or 9 setae; femora I and II with 12 and 11 setae, respectively.

The genus *Lasioseius* consists of 5 subgenera:

Lasioseius s. str., *Borinquolaelaps* Fox, 1946 n. comb., *Crinidens* Karg, 1980 n. comb., *Cuspiacus* n. subgen., and *Endopodalius* n. subgen.

Subgenera of *Lasioseius*, keys to species complexes and species, descriptions of new species

Abbreviations and information for use of the keys:

Ids: idiosoma, ds: dorsal seta(e), ps: postanal seta, te: tectum, ventral: ventrianal shield; all measurements in µm, idiosoma size given as length or length x width in µm.

The keys are presented in a form in which the number with a specific character state is followed by the species related to by this character state; the alternative character state appears after these species; the number of the alternative character state is always given in brackets:

1(6) Character »a«

2(3) Specific character »b« (species one)

3(2) Alternative specific character »b«

4(5) Individual character »c« (species two)

5(4) Alternative individual character »c« (species three)

6(1) Alternative character »a«

The keys refer to the characters of females, males are illustrated if known.

Habitats of the species are usually litter and soil; in particular cases details are mentioned.

Key to characters of the subgenera with type species

1(2) Endopodal plates of coxae III and coxae IV fused and extraordinarily wide taking up the area between coxae, genital shield and sternal shield. Digitus mobilis of the chelicerae with 5 teeth, median branch of tectum long and split terminally:

Endopodalius n. subgen. (p. 134)

Type species: ***Lasioseius (Zygoseius) alter*** Vitzthum, 1925 – Note: It was proved that the genus determination by Vitzthum did not apply to the species. *Zygoseius* is not congeneric and is not related to *Lasioseius* (LINDQUIST & EVANS 1965). *Zygoseius* is a genus of the family Halolaelapidae (KARG 1998b).

– Key 3 for the determination of the known species.

2(1) Endopodal plates inconspicuous, digitus mobilis mostly with 3 teeth, margin of tectum diversely shaped.

3(4) Only one metapodal plate on each side of the body behind coxae IV. Dorsal setae at most acicular or pectinate, rarely trispinate:

Lasioseius Berlese, 1916 s. str. (p. 107)

Type species: ***Typhlodromus berlesei*** Oudemans, 1938

– Keys 1 and 2 for the determination of the known species grouped into two species complexes.

4(3) Metapodal plates divided into two little plates (the two plates are sometimes fused), dorsal setae acicular or trispinate or pectinate.

5(6) Anus remarkably large, length of anus = 1/4 to 1/3 of the length of the ventrianal shield; ventrianal shield bearing 5 pairs of setae. A number of dorsal setae trispinate:

Borinquolaelaps Fox, 1946 n. comb. (p. 141)

Type species: ***Borinquolaelaps dentatus*** Fox, 1946

– Key 4 for the determination of the known species.

6(5) Anus not remarkably large, ventrianal shield with 5 – 7 pairs of setae, dorsal setae trispinate or acicular.

7(8) A number of dorsal setae trispinate:

Crinidens Karg, 1980 n. comb. (p. 148)

Type species: ***Lasioseius corticeus*** Lindquist, 1971

– Keys 5, 6 and 7 for the determination of the known species grouped in three species complexes.

8(7) Most dorsal setae acicular, some caudal setae pectinate:

Cuspiacus n. subgen. (p. 205)

Type species: ***Lasioseius helvetius*** Chant, 1958 – Note: *Criniacus* Karg, 1980 is a synonym of *Hoploseius* Berlese because the type species *L. drosophili* Chant, 1963 belongs to the genus *Hoploseius* Berlese, 1914

– Keys 8 and 9 for the determination of the known species grouped in two species complexes.

Subgenus *Lasioseius* Berlese, 1916 s. str.

Type species: *Typhlodromus berlesei* Oudemans, 1938

According to the type species, the subgenus *Lasioseius* Berlese, 1916 s. str. includes species with only one metapodal plate on each side of the body behind coxae IV but no extraordinary wide endopodal plates of coxae III and IV and the digitus mobilis mostly with 3 teeth.

The subgenus is grouped into two species complexes distinguished from one another by the following character:

Metapodal plates about as large as the anus: *Lasioseius-berlesei*-complex: **Key 1**

Metapodal plates 3 to 12 times larger than the anus: *Lasioseius-inguinalis*-complex: **Key 2**

Key 1: The known species of the *Lasioseius-berlesei*-complex (including a new species from Ecuador)

1(46) Posterior margin of sternal shield nearly straight, sternal setae thin and acicular.

2(29) Ventra bearing 3 – 6 pairs of setae.

3(4) Ventra with 3 pairs of setae, ids = 442 (Figs 1.1.1. – 1.1.4.):

L. allii Chant, 1958

– Europe, Africa.

4(3) Ventra with 4 – 6 pairs of setae.

5(20) Ventra with 4 – 5 pairs of setae.

6(9) Dorsum with a median, longitudinal elevation from ds i3 to I1 or to I3, anterior border of dorsum heavily sclerotised.

7(8) Ventra with 5 pairs of setae, nearly quadrate, ds short, no seta of the i- or I-series reaching the next seta of the series, anterior margin of dorsum drawn out into a blunt prow, ids = 528 (Fig. 1.2.):

L. frontalis Evans & Sheals, 1959

– Indonesia.

8(7) Ventra with 4 pairs of setae, triangular, no metapodal plates visible, ds longer, several setae reaching the next setae of the series, border of dorsum angularly obtuse, ids = 475 (Fig. 1.3.):

L. polydesmophilus Evans & Sheals, 1959

– Indonesia.

9(6) Dorsum without a median elevation.

10(11) Ventra longer than wide, sternal shield medially with a layered-like structure, most ds tricarinate, caudal ds pectinate, ids = 455 (Fig. 1.4.):

L. sinensis, Bei & Yin, 1995

– China, Cinar Liaoning Province, Kaiyuan County.

11(10) Ventra as wide as long or wider than long.

12(13) Ventra as wide as long; caudal setae of venter acicular; te with 3 well-developed processes, pointed distally; ids = 510 (Fig. 1.5.):

L. rühmi Hirschmann, 1972

– Chile, near Valdivia from *Araucaria*, together with bark beetles.

13(12) Ventra wider than long.

14(15) Sternal shield reticulate, te with 3 short processes, ids = 363 (Fig. 1.6.):
L. carrisseensis Aswegen & Loots, 1969
– Africa, Carrisse park near the Lauchime river.

15(14) Sternal shield smooth or punctate.

16(19) Sternal shield smooth.

17(18) Te with 3 short branches, equal in length, distally serrate, ids = 452 – 457 (Fig. 1.7.):
L. qianensis Gu & Wang, 1990
– China, Duyun City from *Apodemus agrarius* and Zhenning County, from *Rattus norvegicus*.

18(17) Te with 3 long branches, distally serrate, middle branch 2x as long as the lateral branches, ids = 600 – 610 (Fig. 1.8.):
L. imitans (Berlese, 1910)
syn.: *Ameroseius imitans* Berlese, 1910
– India.

19(16) Sternal shield punctate, te with 3 short broad branches, the middle branch longer than the lateral branches, the branches distally serrate, ds relatively long, ds I4 = distance I4 – Z4, ids = 408 (Fig. 1.9.):
L. trifurcipilus Gu & Guo, 1996
– China.

20(5) Ventra with 6 pairs of setae.

21(22) Ds I5 as long as i5, i1 thickened, middle branch of te bifid, lateral branches simple, ids = 379 – 425 (Figs 1.10.1. – 1.10.2.):
L. kirai Ishikawa, 1976
– Malaysia.

22(21) Ds I5 tiny, 1/5 to 1/3 the length of i5, te smooth or with 3 branches or serrate.

23(24) Anterior margin of te smooth, ds trispinate with serrate margin, sternal setae 1 almost half as long as sternal setae 2 and 3, ids = 410 x 254 (Figs 1.11.1. – 1.11.2.):
L. kshamae Bhattacharyya, 2003
– India, West Bengal.

24(23) Te with 3 branches or serrate.

25(28) Te with 3 branches, number of ds not reduced.

26(27) Branches of te pointed and slender, ds pectinate, distally expanded, ds i1 remarkably long: length = I3, ids = 555 – 587 (Fig. 1.12.):
L. epicrioides (Krantz, 1962)
syn.: *Hyattella epicrioides* Krantz, 1962
– Africa, Garamba.

27(26) Branches of te short and broad, apically serrate, most of ds acicular, caudal ds pectinate, i1 = 2/3 the length of I3, ids = 493 – 533 (Fig. 1.13.):
L. punctatus Gu & Huang, 1990
– China.

28(25) Te serrate, number of ds reduced, without I2 and I3, Z5 (= 77) = 3x the length of I4, Z4 = S5 = 71, all ds faintly serrate, ids = 396 (Fig. 1.14.):
L. annandalei Bhattacharyya & Bhattacharyya, 2001
– India, Gulmarg, Jamma and Kshmir.

29(2) Ventra bearing 7 pairs of setae.

30(37) Dorsum with distinctly reduced number of setae: lacking 2 pairs of I-setae on posterior half of dorsum.

31(32) Dorsum without ds I3 and I4, I1 as long as i5, ids = 440 – 570 (Figs 1.15.1. – 1.15.3.):

L. berlesei (Oudemans, 1938)
syn.: *Seius muricatus* Berlese ex Koch, 1887; *Typhlodromus berlesei* Oudemans, 1938; *L. aba* Baker & Wharton, 1952; *L. sylvestris* Pinchuk, 1972
– Europe.

32(31) Dorsum without I2 and I3 or without I2 and I5.

33(36) Dorsum without I2 and I3.

34(35) Setae of the ventra nearly equal in length, only ps short: = ½ the length of the adanal setae, ds Z3 = 3½x the length of I4, ids = 352 (Figs 1.16.1. – 1.16.2.):

L. parberlesei Bhattacharyya, 1968
– India.

35(34) Seta V1 of the ventra remarkably short: = ½ the length of V2, ps long: = 2x the length of adanal setae, sternal shield and ventra reticulate, ds I4 very short: = ½ the length of I1 and ⅓ the length of i5, te with 3 short broad branches distally serrate, ids = 419 – 436 (Fig. 1.17.):

L. paucispathus Gu & Wang, 1990
– China, Guizhou Province, from *Rattus norvegicus*.

36(33) Dorsum without I2 and I5, caudal setae of dorsum and venter distally furcate, metapodal plates like small rods, sternal shield and ventra reticulate, ids = 715 (Fig. 1.18.):

L. schizopilus Gu & Huang, 1990
– China, Shaanxi Province, from *Rattus nitidus*.

37(30) Number of ds not reduced.

38(43) Ventra remarkably wide, length : width = 4 : 6 to 4 : 7.

39(40) Dorsum with net structure consisting of interconnecting tubercles, ids = 354 – 389 (Fig. 1.19.):

L. dundoensis Aswegen & Loots, 1969
– Africa

40(39) Dorsal net structure consisting of simple lines.

41(42) Metapodal plates nearly circular, ids = 500 (Fig. 1.20.):

L. miscellus n. sp.
– Ecuador.

42(41) Metapodal plates oval, ids = 355 (Fig. 1.21.):

L. camudembelensis Aswegen & Loots, 1969
– Africa.

43(38) Ventra a little wider than long, length : width = 4 : 5 to 5 : 6.

44(45) Ds acicular, ids = 410 – 430 (Fig. 1.22.):

L. lawrencei (Evans, 1958)
syn.: *Proctolaelaps* (*Neojordensia*) *lawrencei* Evans,1958
L. frondeus Karg, 1965; *L. berlesei* sensu WESTERBOER, 1963
– Europe.

45(44) Ds tricarinate, ids = 410 (Fig. 1.23.):

L. diffindatus n. nom. pro *L. kargi* Christian, 1990
– Europe.

46(1) Posterior margin of sternal shield arcuately excavated, the anterior pair of sternal setae thick and thorn-like.

47(50) Anterior region of dorsal shield with 7 – 9 thick thorn-like setae, ventra with 3 pairs of setae.

48(49) Most of the ds acicular, ds i2 and i3 thorn-like, ds Z5 = 3 – 4x the length of I4, ids = 460 (Fig. 1.24.):

L. bispinosus Evans 1958
– Europe.

49(48) Marginal and caudal ds and ds of the vertex trispinate, ds i2, i3 and i4 thorn-like, ds Z5 = 3 – 4x the length of I4, ids = 539 (Fig. 1.25.):

L. parabispinosus Kandil 1980
– Hungary, Maco area.

50(47) Anterior region of dorsal shield without thorn-like setae. Most of the ds trispinate, ventra rectangular and with 3 pairs of setae, ds Z5 = 4 – 5x the length of I4, ids = 508 (Fig. 1.26.):

L. zicsii Kandil, 1980
– Hungary, Maco area.

Subgenus *Lasioseius* Berlese, 1916 s. str.

Lasioseius-berlesei-complex

Lasioseius allii Chant, 1958

(Figs 1.1.1. – 1.1.4.)

CHANT, D. A. (1958): Descriptions of six new species of *Garmania* Nesbitt and *Lasioseius* Berlese (Acarina, Aceosejidae). – Can. J. Zool. **36**: 383 – 390

Holotype: United States National Museum, Washington D. C. (USA)

Paratypes: Entomology laboratory, Belleville (Canada)

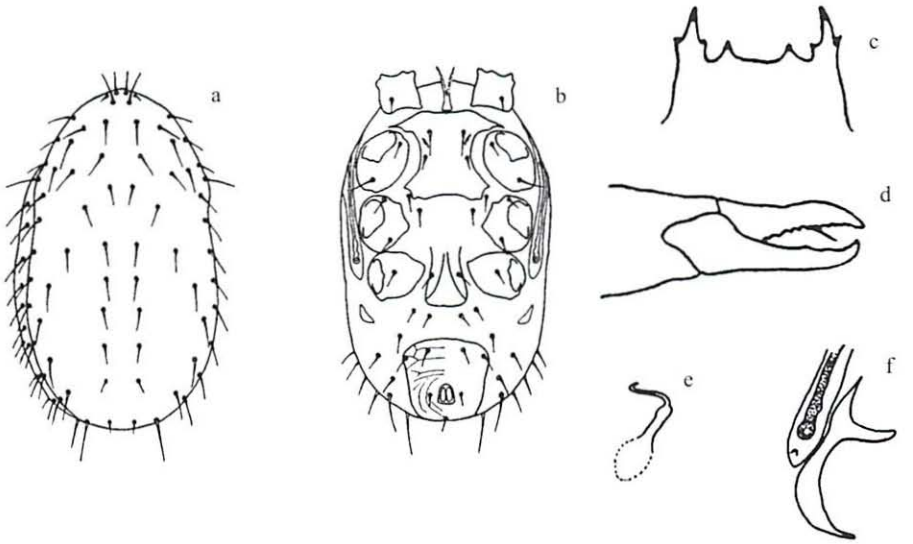

Fig. 1.1.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e spermatheca, f peritrema (a, b, d CHANT 1958; c, e, f CHANT 1963)

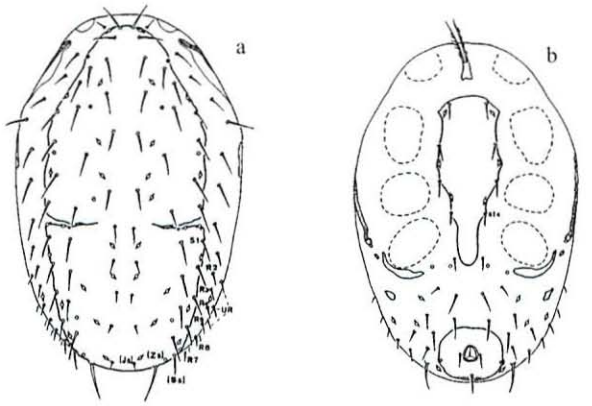

Fig. 1.1.2. **Deutonymph:** a dorsal, b ventral (a, b LINDQUIST & EVANS 1965)

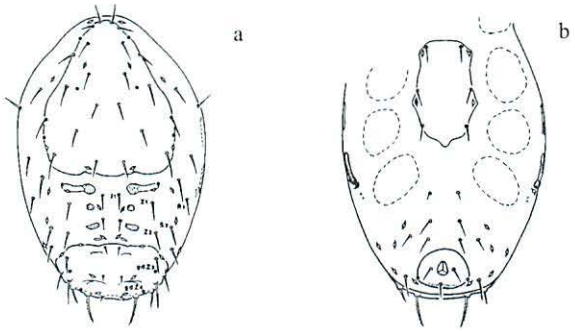

Fig. 1.1.3. **Protonymph:** a dorsal, b ventral (a, b LINDQUIST & EVANS 1965)

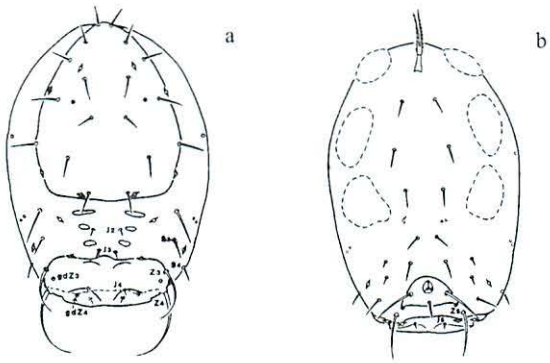

Fig. 1.1.4. **Larva:** a dorsal, b ventral (a, b LINDQUIST & EVANS 1965)

Lasioseius frontalis Evans & Sheals, 1959

(Fig. 1.2.)

EVANS, G. O. & J. G. SHEALS (1959): Three new mesostigmatic mites associated with millipedes in Indonesia. – Entomol. Ber. (Amsterdam) **19**: 107 – 111

Types: British Museum (Natural History), London (United Kingdom)

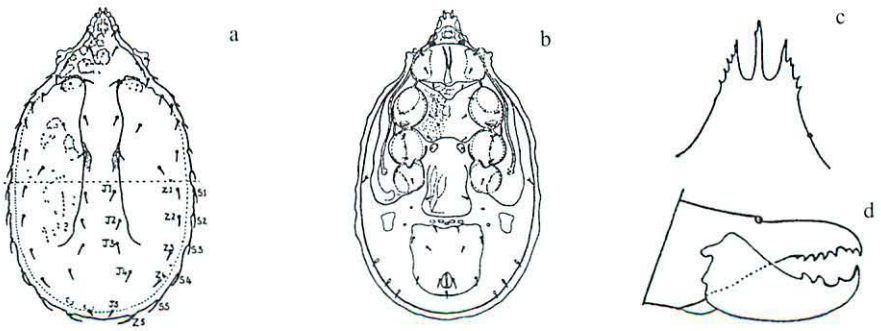

Fig. 1.2. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d EVANS & SHEALS 1959)

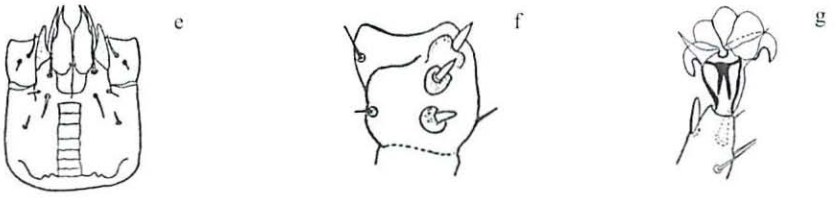

Fig. 1.2. (cont.) **Female:** e hypostome, f femur I, g tarsus II (e – g EVANS & SHEALS 1959)

Lasioseius polydesmophilus Evans & Sheals, 1959

(Fig. 1.3.)

EVANS, G. O. & J. G. SHEALS (1959): Three new mesostigmatic mites associated with millipedes in Indonesia. – Entomol. Ber. (Amsterdam) **19**: 107 – 111

Types: British Museum (Natural History), London (United Kingdom)

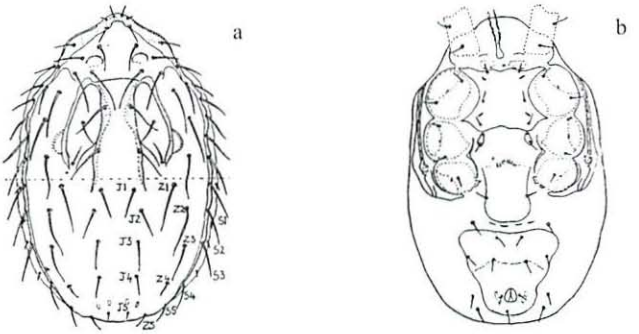

Fig. 1.3. **Female:** a dorsal, b ventral (a, b EVANS & SHEALS 1959)

Lasioseius sinensis Bei & Yin, 1995

(Fig. 1.4.)

BEI, N. & S. YIN (1995): A new species and two new records of the genus *Lasioseius* (Acari, Ascidae) from China. [Orig. Chin.] – Entomotaxonomia **17** (2): 152 – 154

Types: Department of Plant Protection, Shenyang Agricultural University (China)

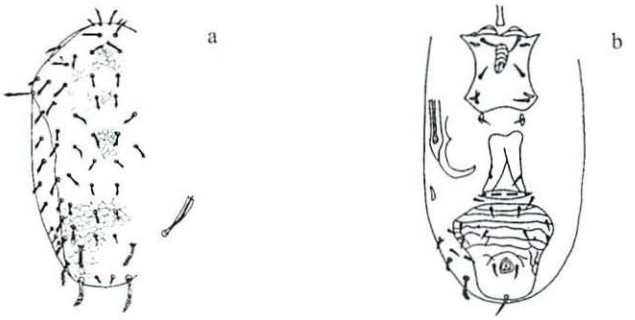

Fig. 1.4. **Female:** a dorsal, b ventral (a, b BEI & YIN 1995)

Lasioseius rühmi Hirschmann, 1972

(Fig. 1.5.)

HIRSCHMANN, W. (1972): Gangsystematik der Parasitiformes Teil 104. Von Dr. W. Rühm während seiner Tätigkeit an der Univ. Austral de Chile (Valdivia) gesammelte Araukarien-Milben aus Südchile u. Südbrasilien. – Acarologie **17**: 29 – 33

Types: Zoologische Staatssammlungen München (Germany)

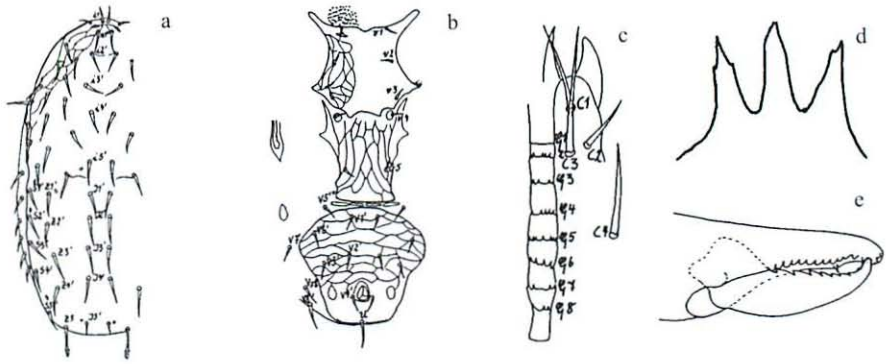

Fig. 1.5. **Female:** a dorsal, b ventral, c hypostome, d tectum, e chelicera (a – e HIRSCHMANN 1972)

Lasioseius carrisseensis Aswegen & Loots, 1969

(Fig. 1.6.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskap. Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

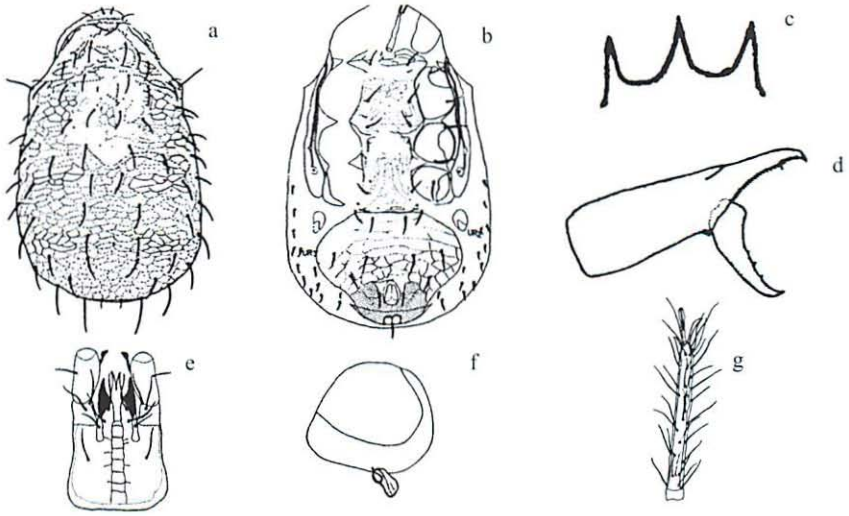

Fig. 1.6. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca, g tarsus I (a – g ASWEGEN & LOOTS 1969)

Lasioseius qianensis Gu & Wang, 1990

(Fig. 1.7.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184

Holo- and paratypes: Department of Parasitology, Guiyang Medical College (China)

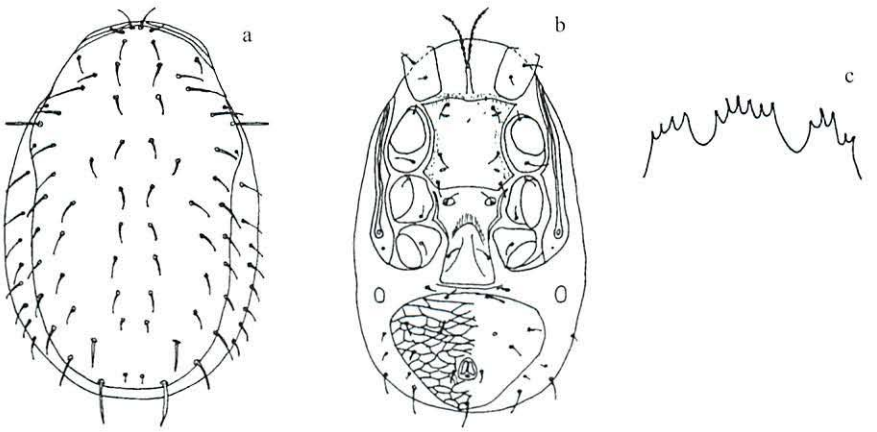

Fig. 1.7. **Female:** a dorsal, b ventral, c tectum (a – c modified after GU & WANG 1990)

Lasioseius imitans (Berlese, 1910)

(Fig. 1.8.)

BERLESE, A. (1910): Brevi diagnosi gi generi e specie nuovi di Acari. – Redia **6**: 346 – 388

Types: Berlese Acaroteca, Experimental Institute of Agricultural Zoology, Florence (Italy)

Synonym: *Ameroseius imitans* Berlese, 1910

Brevi diagnosi gi generi e specie nuovi di Acari. – Redia **6**: 346 – 388

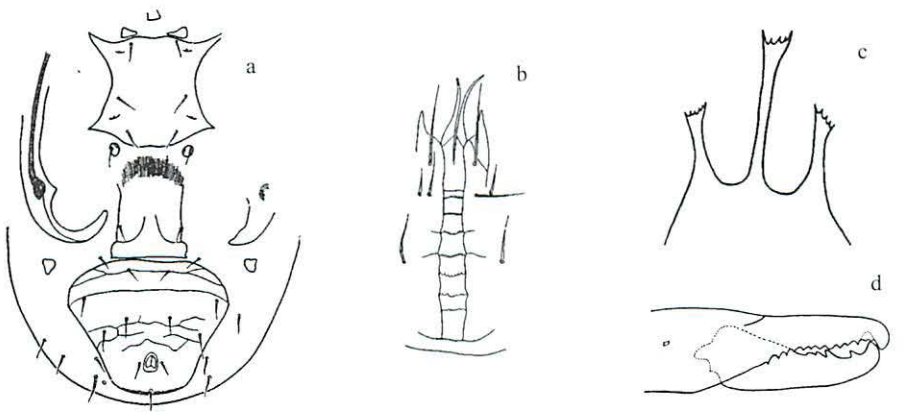

Fig. 1.8. **Female:** a ventral, b hypostome, c tectum, d chelicera (a – d WESTERBOER 1963)

Lasioseius trifurcipilus Gu & Guo, 1996

(Fig. 1.9.)

Gu, Y. M. & X. G. Guo (1996): A new species and a new record of *Lasioseius* from China (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **21** (1): 39 – 44

Holotype: Department of Parasitology, Medical College, Nanjing University (China)

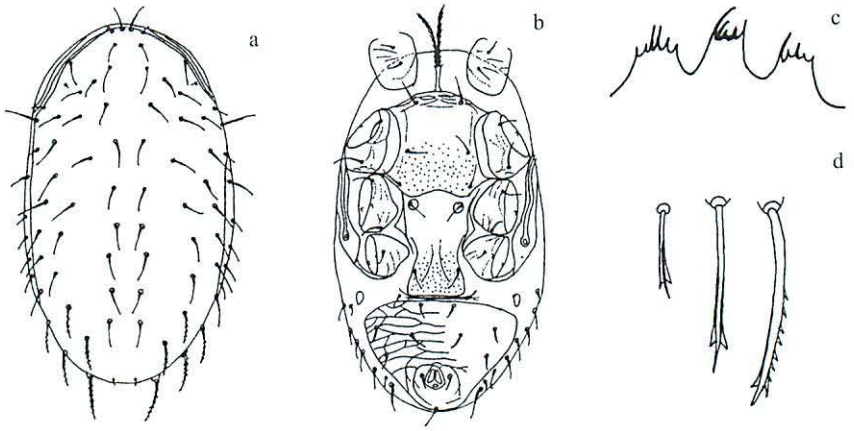

Fig. 1.9. **Female:** a dorsal, b ventral, c tectum, d dorsal setae (a – d modified after Gu & Guo 1996)

Lasioseius kirai Ishikawa, 1976

(Figs 1.10.1. – 1.10.2.)

Ishikawa, K. (1976): Taxonomic investigation on mesostigmatid mites (Acarina) from Pasoh Forest Reserve, Malay Peninsula. – Nature and Life in Southeast Asia **7**: 231 – 252

Holo- and paratypes: Biological Laboratory, Matsuyama Shinomone Junior College (Japan)

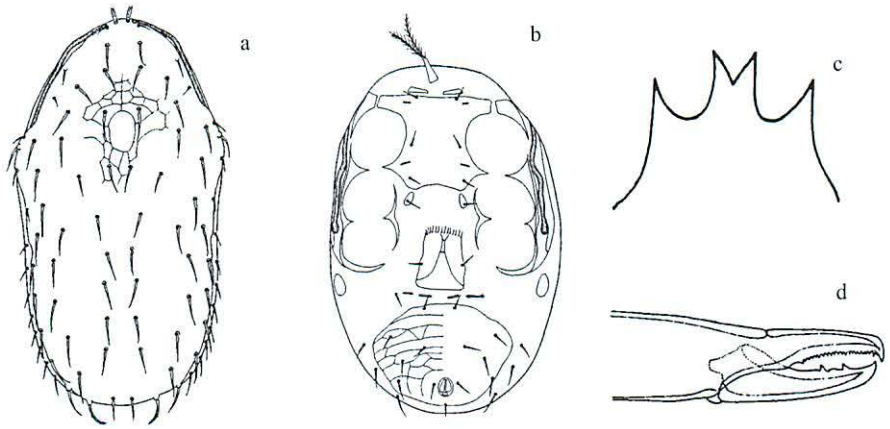

Fig. 1.10.1. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d Ishikawa 1976)

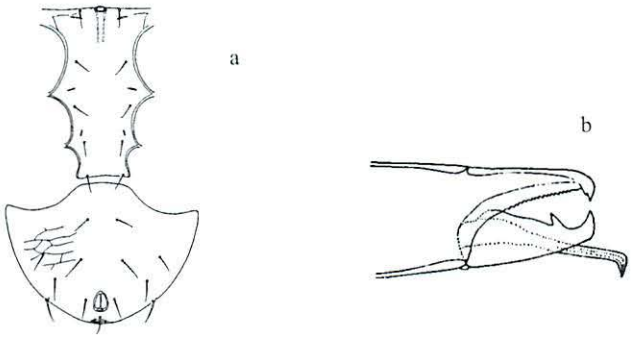

Fig. 1.10.2. **Male:** a ventral, b chelicera (a, b ISHIKAWA 1976)

Lasioseius kshamae Bhattacharyya, 2003

(Figs 1.11.1. – 1.11.2.)

BHATTACHARYYA, A. K. (2003): Two new species of Ascidae (Acarina, Mesostigmata) from India. – Zootaxa **189**: 1 – 10

Holo- and paratypes: National Zoological Collection, Zoological Survey of India, Calcutta (India)

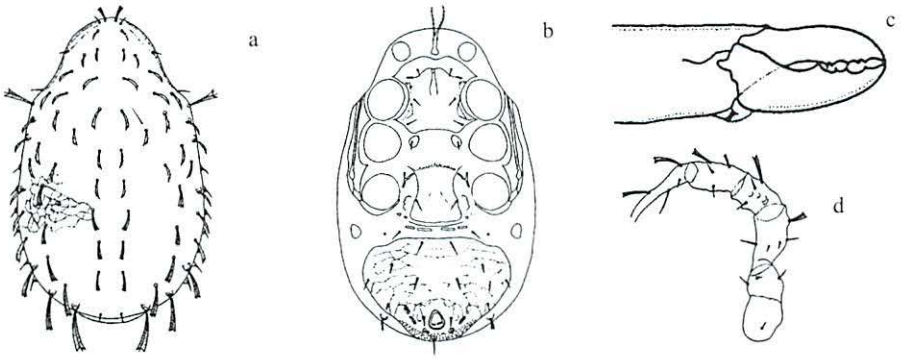

Fig. 1.11.1. **Female:** a dorsal, b ventral, c chelicera, d leg IV (a – d BHATTACHARYYA 2003)

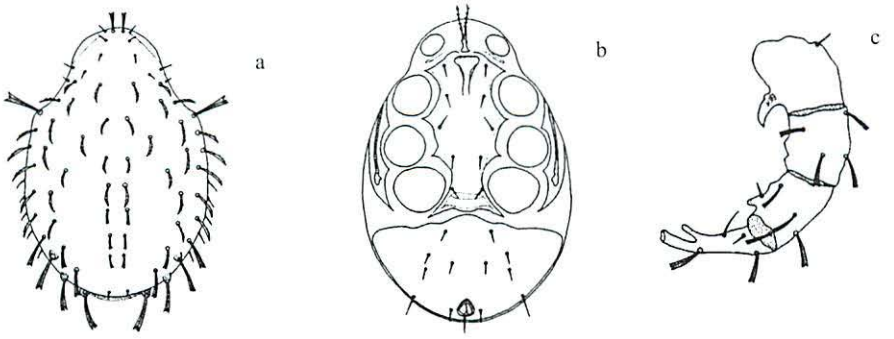

Fig. 1.11.2. **Male:** a dorsal, b ventral, c leg IV (a – c BHATTACHARYYA 2003)

Lasioseius epicrioides (Krantz, 1962)

(Fig. 1.12.)

KRANTZ, G. W. (1962): Acari. Free-living Mesostigmata. II. – Family Aceosejidae. – Parc National De La Garamba-Mission H. De Saeger **34**: 3 – 29

Holotype: Institute of National Parks of the Congo and Ruanda-Urundi, Brussels (Belgium)

Paratypes: United States National Museum, Washington D. C. (USA), British Museum (Natural History), London (United Kingdom), Potchefstroom University, Potchefstroom (South Africa)

Synonym: *Hyattella epicrioides* Krantz, 1962
Acari. Free-living Mesostigmata. II. – Family Aceosejidae. – Parc National De La Garamba-Mission H. De Saeger **34**: 3 – 29

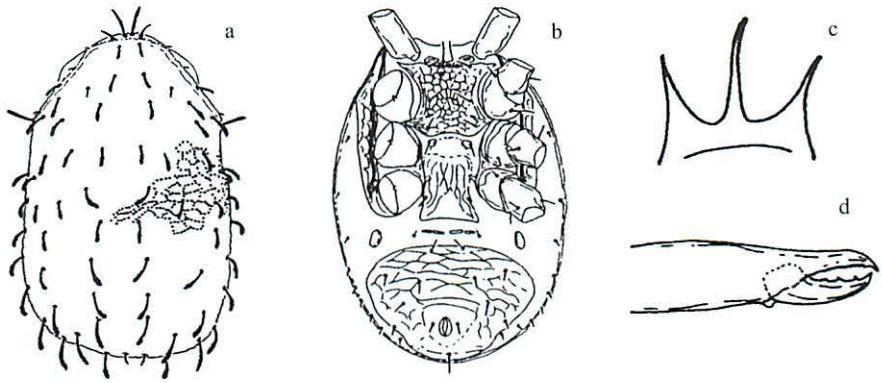

Fig. 1.12. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KRANTZ 1962)

Lasioseius punctatus Gu & Huang, 1990

(Fig. 1.13.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184

Holo- and paratypes: Health and Anti-Epidemic Station of Shanxi Province (China)

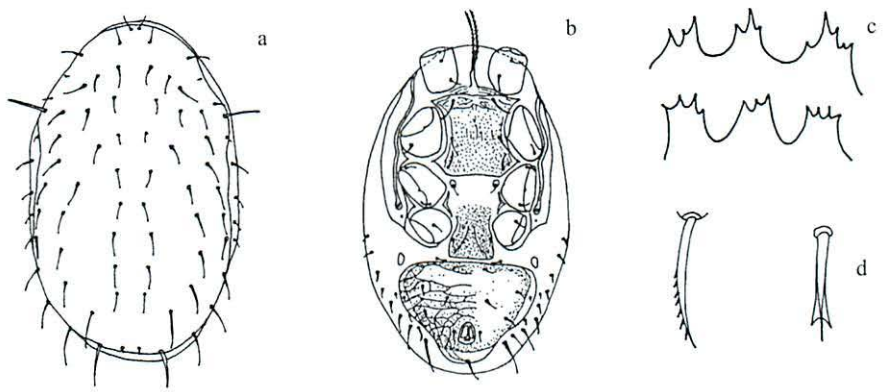

Fig. 1.13. **Female:** a dorsal, b ventral, c tectum, d dorsal setae (a – d modified after GU & HUANG 1990)

Lasioseius annandalei Bhattacharyya & Bhattacharyya, 2001

(Fig. 1.14.)

BHATTACHARYYA, A. K. & S. K. BHATTACHARYYA (2001): A new species of the genus *Lasioseius* Berlese (Acari, Gamasida, Ascidae). – Rec. zool. Surv. India **99** (1 – 4): 23 – 26

Holo- and paratypes: Zoological Survey of India, Calcutta (India)

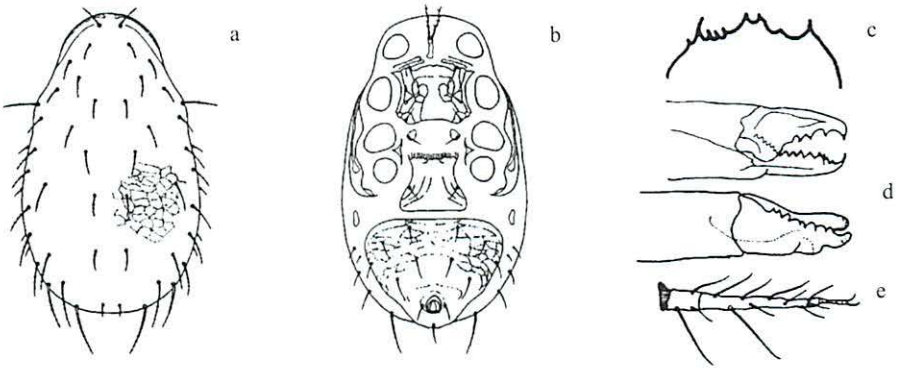

Fig. 1.14. **Female:** a dorsal, b ventral, c tectum, d chelicera, e tarsus IV (a – e BHATTACHARYYA & BHATTACHARYYA 2001)

Lasioseius berlesei (Oudemans, 1938)

(Figs 1.15.1. – 1.15.3.)

OUDEMANS, A. C. (1938): Wetenschappelijke Mededeelingen. – Tijdschr. Entomol. **81**: 2 – 57

Types: deposition unknown to the authors

Synonyms: *Seius muricatus* Berlese ex Koch, 1887

Acari, Myriapoda & Scorpiones hucusque in Italia Reperta. – Padova **5** (41): 1 – 10

Typhlodromus berlesei Oudemans, 1938

Wetenschappelijke Mededeelingen. – Tijdschr. Entomol. **81**: 2 – 57

Lasioseius aba Baker & Wharton, 1952

An introduction to Acarology. – Macmillan Co, New York: 1 – 465

Lasioseius sylvestris Pinchuk, 1972

Neue Arten gamasider Milben (Parasitiformes, Gamasoidea). [Orig. Russ.] – Izv. Akad. Nauk Moldav. SSR, Ser. biol. i chem. nauki **3**: 60 – 71

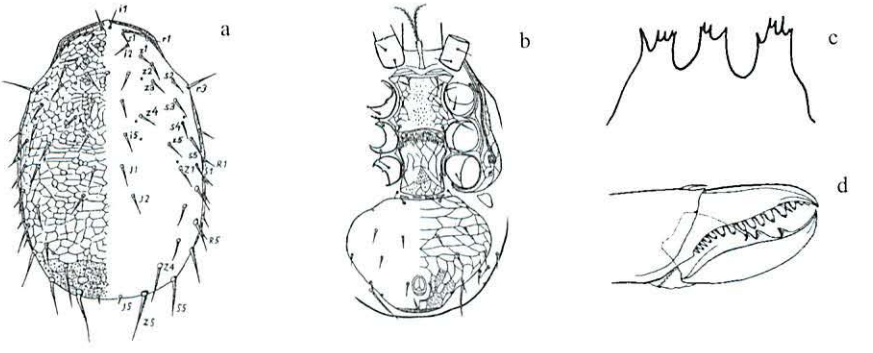

Fig. 1.15.1. **Female:** a dorsal, b ventral, c tectum, d chelicera (a, b, d KARG 1962; c KARG 1993)

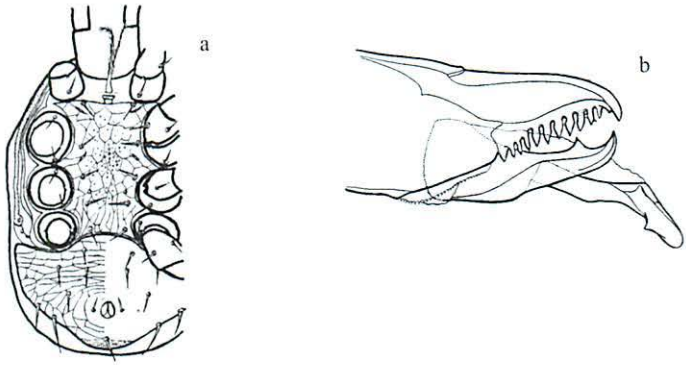

Fig. 1.15.2. **Male:** a ventral, b chelicera (a, b KARG 1962)

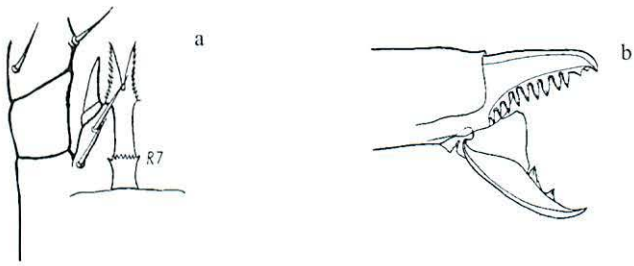

Fig. 1.15.3. **Larva:** a hypostome, b chelicera (a, b KARG 1962)

Lasioseius parberlesei Bhattacharyya, 1968

(Figs 1.16.1. – 1.16.2.)

BHATTACHARYYA, S. K. (1968): Studies in Indian mites (Acarina, Mesostigmata). 6. Six records and descriptions of nine new species. – Acarologia **10** (4): 527 – 549

Holo- and paratypes: Zoological Survey of India, Calcutta (India)

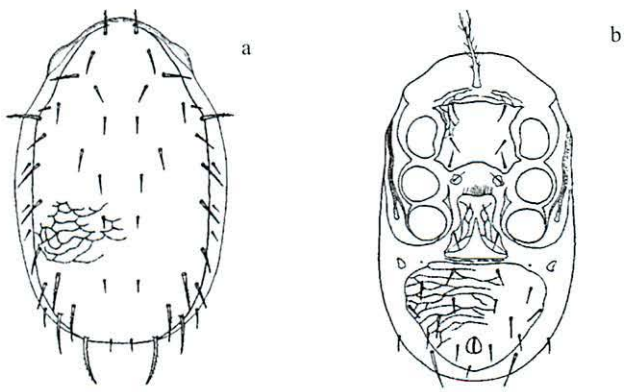

Fig. 1.16.1. **Female:** a dorsal, b ventral (a, b BHATTACHARYYA 1968)

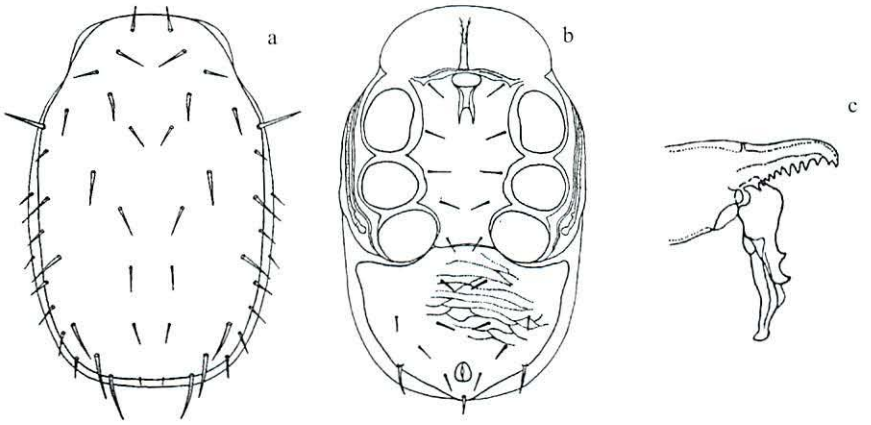

Fig. 1.16.2. **Male:** a dorsal, b ventral, c chelicera (a – c BHATTACHARYYA 1968)

Lasioseius paucispathus Gu & Wang, 1990

(Fig. 1.17.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184

Holo- and paratypes: Department of Parasitology, Guiyang Medical College (China)

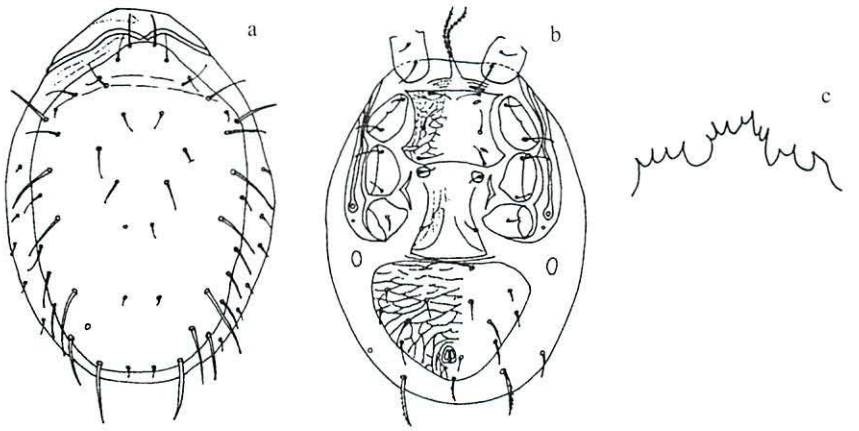

Fig. 1.17. **Female:** a dorsal, b ventral, c tectum (a – c modified after GU & WANG 1990)

Lasioseius schizopilus Gu & Huang, 1990

(Fig. 1.18.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184

Holo- and paratypes: Health and Anti-Epidemic Station of Shanxi Province (China)

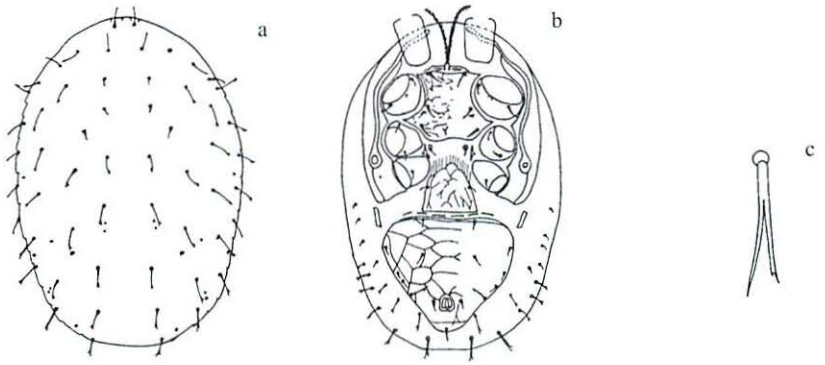

Fig. 1.18. **Female:** a dorsal, b ventral, c dorsal seta (a – c modified after GU & HUANG 1990)

Lasioseius dundoensis Aswegen & Loots, 1969

(Fig. 1.19.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

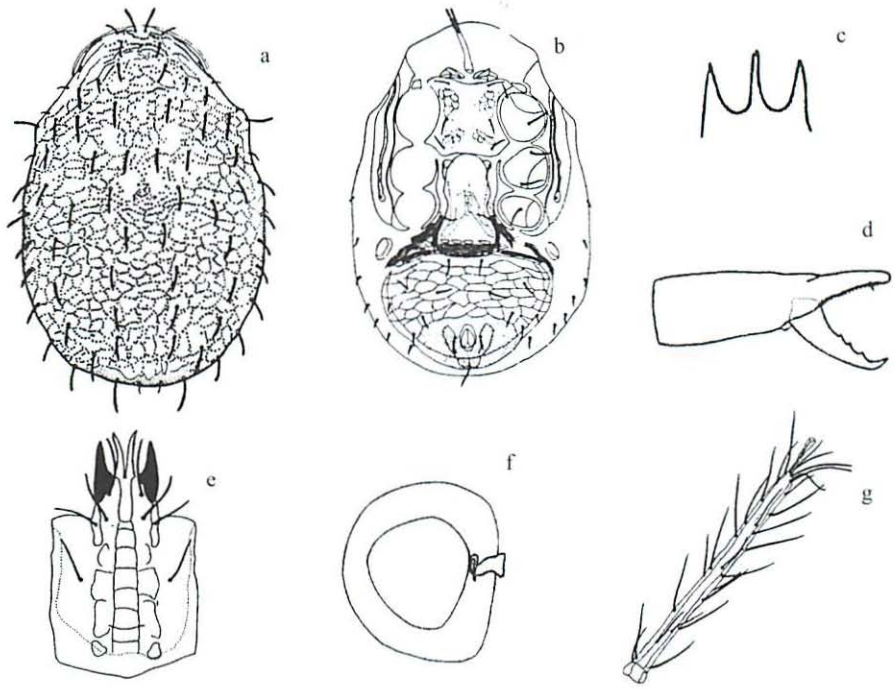

Fig. 1.19. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca, g tarsus I (a – g ASWEGEN & LOOTS 1969)

Lasioseius miscellus n. sp.

(Fig. 1.20.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, 13 km from Quito, 3100 m a.s.l., couch grass and soil

Paratypes: 4 ♀

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by a remarkably wide ventra bearing 7 pairs of setae, long trispinate ds and te with 3 branches.

Ids ♀ 500 x 300, dorsum reticulate, ds relatively long, most setae reaching the next seta of the series, mostly trispinate, i1 = 33, i2 = 36, i3 = 30, i4 = 25, I2 = 35, I3 = 37, I4 = 35, Z4 = 55, Z5 = 65, r3 = 42, ds S2 to S5 and Z4, Z5 pectinate. Sternal shield medially smooth, lineate along lateral margins, 2 pairs of pores, presternal area without structures, surface of ventra reticulate, behind the anus punctate, metapodal plates nearly circularly; ventral setae mostly 20 long, however V7 and V8 very short (= 7) and ps = 30, diameter anus = 30. Digitus fixus of chelicera with 16 – 18 teeth, middle branch of te slender and split terminally, lateral branches broader with a marginal point. Legs: I = 480, II = 380, III = 350, IV = 510.

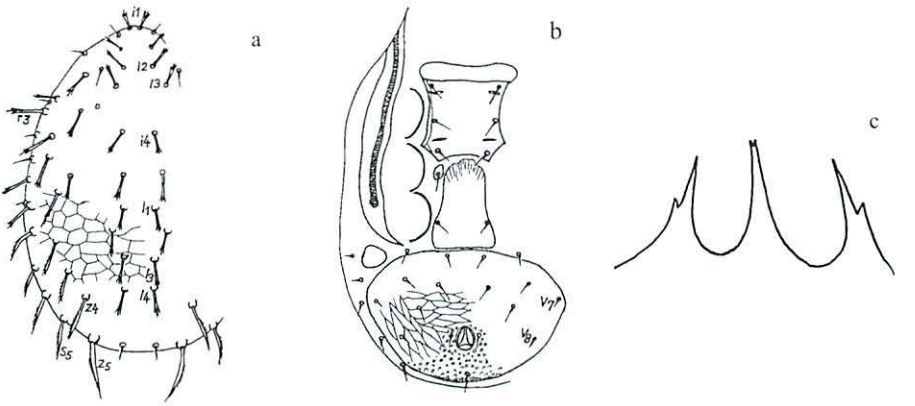

Fig. 1.20. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

Lasioseius camudembelensis Aswegen & Loots, 1969

(Fig. 1.21.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

Paratypes: Institute for Zoological Research, Potchefstroom University (South Africa)

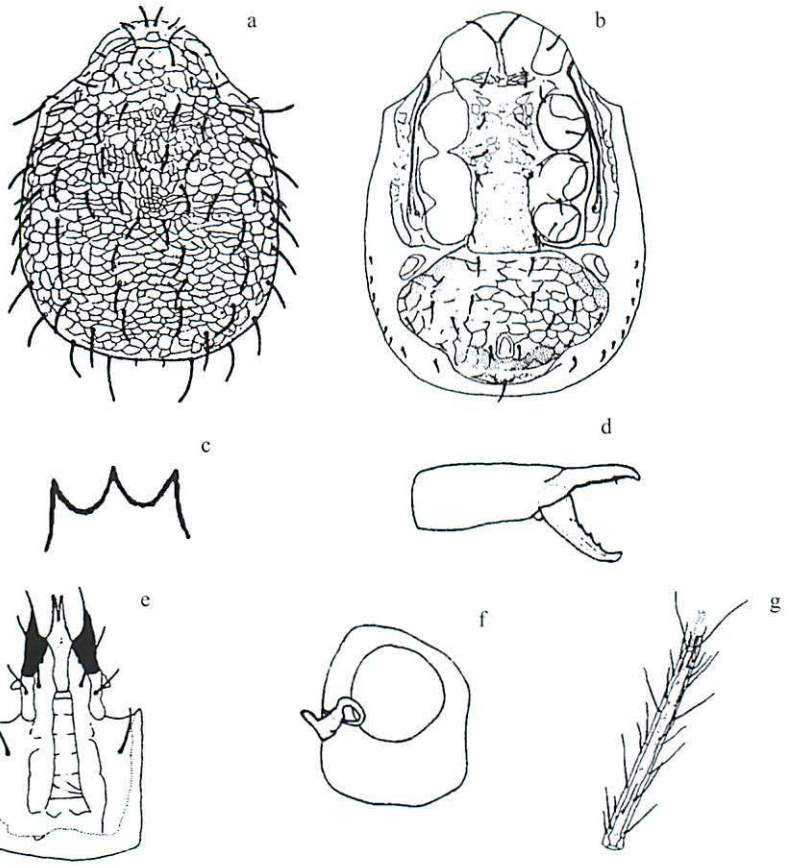

Fig. 1.21. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca, g tarsus I (a – g ASWEGEN & LOOTS 1969)

Lasioseius lawrencei (Evans, 1958)

(Fig. 1.22.)

EVANS, G. O. (1958): A revision of the British Aceosejinae (Acarina, Mesostigmata). – Proc. zool. Soc. Lond. **131** (2): 177 – 229

Types: British Museum (Natural History), London (United Kingdom)

Synonyms: *Proctolaelaps* (*Neojordensia*) *lawrencei* Evans, 1958

A revision of the British Aceosejinae (Acarina, Mesostigmata). – Proc. zool. Soc. Lond. **131** (2): 177 – 229

Lasioseius frondeus Karg, 1965

Larvalsystematische und phylogenetische Untersuchung sowie Revision des Systems der Gamasina Leach, 1915 (Acarina, Parasitiformes). – Mitt. Zool. Mus. Berl. **41** (2): 193 – 340

Lasioseius berlesei sensu WESTERBOER, 1963

Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.): Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

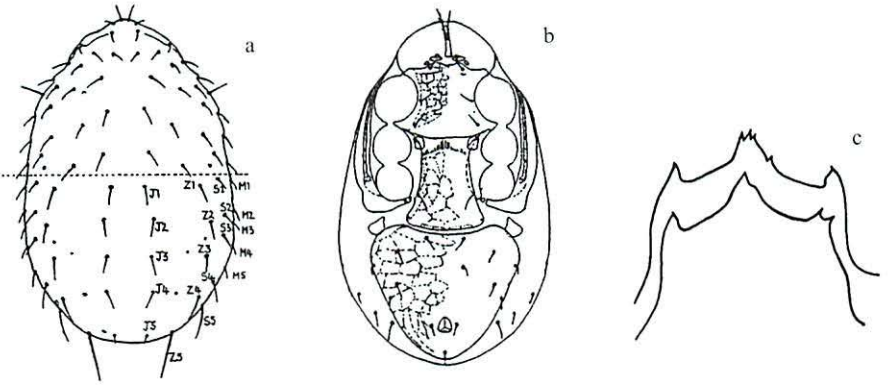

Fig. 1.22. **Female:** a dorsal, b ventral, c tectum (a, b EVANS 1958; c KARG 1993)

Lasioseius diffindatus n. nom. pro *L. kargi* Christian, 1990
(Fig. 1.23.)

CHRISTIAN, A. (1990): Zur Kenntnis der Raubmilbengattung *Lasioseius* Berlese 1916, Beschreibung einer neuen Art (Acarina, Mesostigmata). – Abh. Ber. Naturkundemus. Görlitz **63** (11): 31 – 34

Holotype: Staatliches Museum für Naturkunde Görlitz (Germany)

Synonym: *Lasioseius kargi* Christian, 1990
Zur Kenntnis der Raubmilbengattung *Lasioseius* Berlese 1916, Beschreibung einer neuen Art (Acarina, Mesostigmata). – Abh. Ber. Naturkundemus. Görlitz **63** (11): 31 – 34

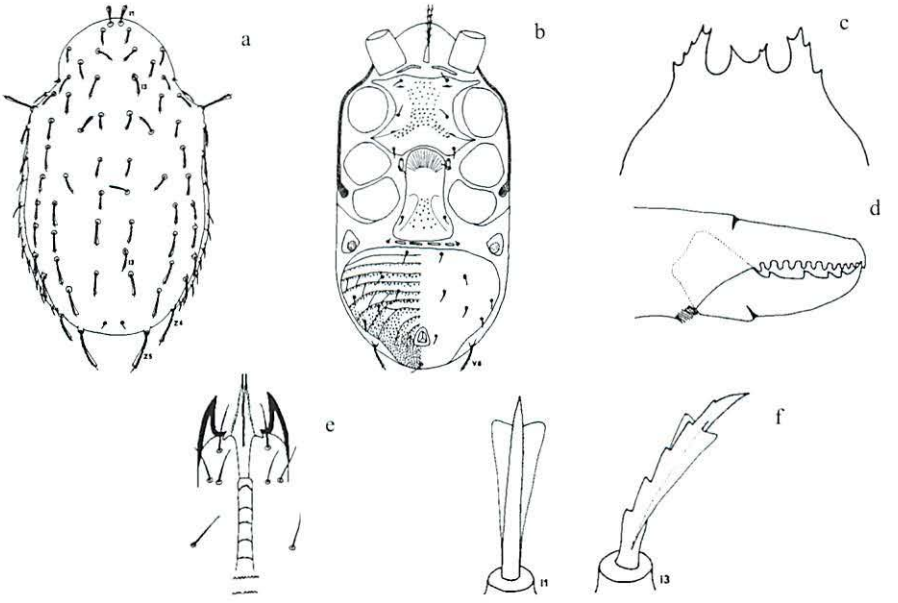

Fig. 1.23. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f dorsal setae i1, i3 (a – f CHRISTIAN 1990)

Lasioseius bispinosus Evans, 1958

(Fig. 1.24.)

EVANS, G. O. (1958): A revision of the British Aceosejinae (Acarina, Mesostigmata). – Proc. zool. Soc. Lond. **131** (2): 177 – 229

Holotype: British Museum (Natural History), London (United Kingdom)

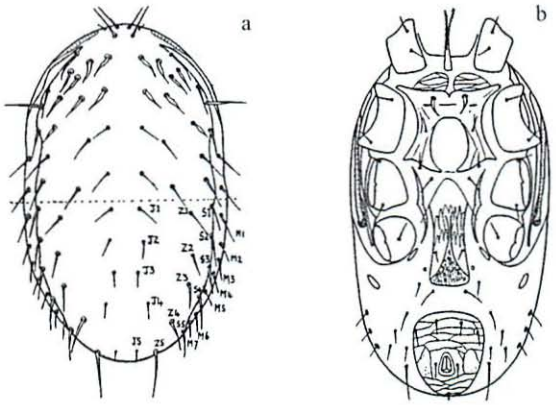

Fig. 1.24. **Female:** a dorsal, b ventral (a, b EVANS 1958)

Lasioseius parabispinosus Kandil, 1980

(Fig. 1.25.)

KANDIL, M. M. (1980): Three new *Lasioseius* species from Hungary (Acari, Mesostigmata, Podocinidae). – Fol. Entomol. Hung. **61** (33): 75 – 86

Holotype: Hungarian Natural History Museum, Budapest (Hungary)

Paratypes: Hungarian Natural History Museum, Budapest (Hungary), Faculty of Agricultural Sciences at Moshtorhor, Kalyobiah University (Egypt)

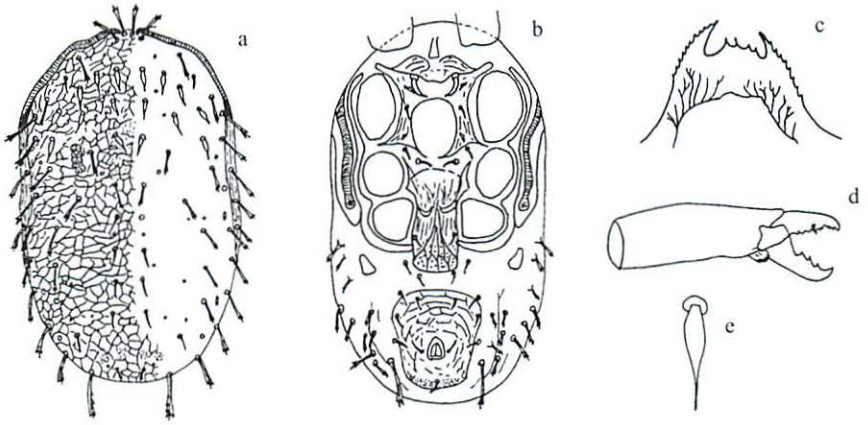

Fig. 1.25. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal seta (a – e modified after KANDIL 1980)

Lasioseius zicsii Kandil, 1980

(Fig. 1.26.)

KANDIL, M. M. (1980): Three new *Lasioseius* species from Hungary (Acari, Mesostigmata, Podocinidae). – Fol. Entomol. Hung. **61** (33): 75 – 86

Holotype: Hungarian Natural History Museum, Budapest (Hungary)

Paratypes: Hungarian Natural History Museum, Budapest (Hungary), Faculty of Agricultural Sciences at Moshtorhor, Kalyobiah University (Egypt)

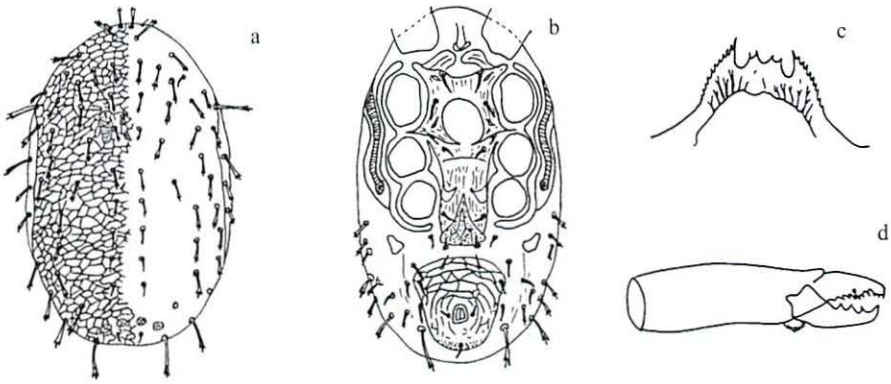

Fig. 1.26. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d modified after KANDIL 1980)

Key 2: The known species of the *Lasioseius-inguinalis*-complex (including a new species from Ecuador)

1(8) Ventra bearing 5 – 6 pairs of setae.

2(7) Ventra with 5 pairs of setae.

3(6) Ventra remarkably wide, length : width = 4 : 6 to 4 : 7.

4(5) Ds long, most ds longer than the distances to the next ds of the series, te with 3 terminally split branches, ids = 535 – 590 (Fig. 2.1.):

L. quinisetosus Lindquist & Karg, n. nom. pro *Cheiroseius inguinalis* Karg, 1977

– Chile, near Santiago, between roots and algae.

5(4) Ds shorter, no ds reaching the next ds of the series, te with 3 points, ids = 451 (Fig. 2.2.):

L. uluguruensis Aswegen & Loots, 1969

– Africa, Tanganyica from forest soil.

6(3) Length : width of ventra = 4 : 5, margin of te minutely denticulate, ids = 525 (Fig. 2.3.):

L. americanus Chant, 1963

– Ecuador, on bananas.

7(2) Ventra with 6 pairs of setae, length : width = 2 : 3, te with 3 short processes, ids = 451 (Fig. 2.4.):

L. musunguensis Aswegen & Loots, 1969

– Africa, near Luna de Carvalho from forest soil.

8(1) Ventra bearing 7 – 8 pairs of setae.

9(10) Ventra with 8 pairs of setae, margin of te truncate, denticulate, ds mostly barbed and tricarinate, ids = 490 – 500 (Fig. 2.5.):

L. zaluckii Walter & Lindquist, 1997

– Australia, Queensland, from *Pyrethrum*, tropical rain forest.

10(9) Ventra with 7 pairs of setae.

11(14) Metapodal plates reticulate.

12(13) Length of ds i4 = distance i4 – i5, te with 3 very short processes, ids = 385 – 394 (Fig. 2.6.):

L. longisetus Aswegen & Loots, 1969

– Africa.

13(12) Length of ds i4 = ½ the distance i4 – i5, te with 3 tongue-like branches, ids = 560 (Fig. 2.7.):

L. inguinalis Karg, 1976

– South America.

14(11) Metapodal plates not reticulate.

15(16) Metapodal plates dotted in the centre, ds i4 = ⅓ the distance i4 – i5, te with 3 long pointed processes, ids = 550 (Fig. 2.8.):

L. punctocentralis n. sp.

– Ecuador.

16(15) Surface of metapodal plates smooth, ds i4 = ½ the distance i4 – i5, te with 3 short points, ids = 540 (Fig. 2.9.):

L. carvalhoi Aswegen & Loots, 1969

– Africa.

Subgenus *Lasioseius* Berlese, 1916 s. str.

Lasioseius-inguinalis-complex

Lasioseius quinisetosus Lindquist & Karg n. nom. pro *Ch. inguinalis* Karg, 1977

(Fig. 2.1.)

KARG, W. (1977): Neue Arten der Raubmilbenfamilie Ascidae Oudemans, 1905 (Acarina, Parasitiformes) aus Chile. – Mitt. Zool. Mus. Berl. **53** (2): 285 – 302

Types: Hungarian Natural History Museum, Budapest (Hungary)

Synonym: *Cheiroseius inguinalis* Karg, 1977

Neue Arten der Raubmilbenfamilie Ascidae Oudemans, 1905 (Acarina, Parasitiformes) aus Chile. – Mitt. Zool. Mus. Berl. **53** (2): 285 – 302

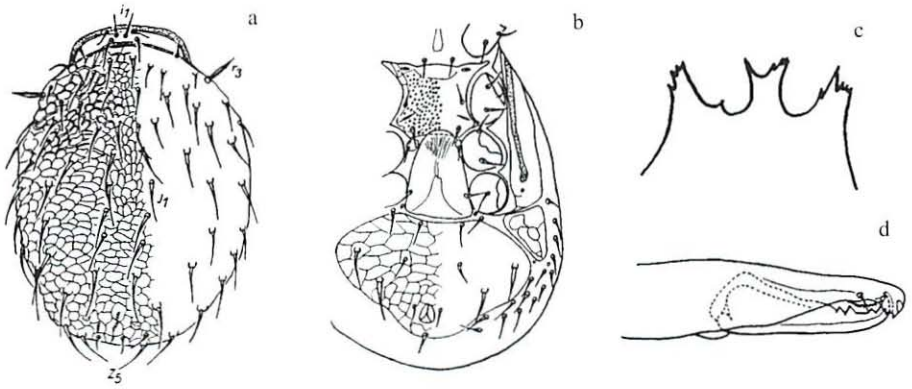

Fig. 2.1. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KARG 1977)

Lasioseius uluguruensis Aswegen & Loots, 1969

(Fig. 2.2.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museé Royal l' Afrique Centrale, Tervuren (Belgium)

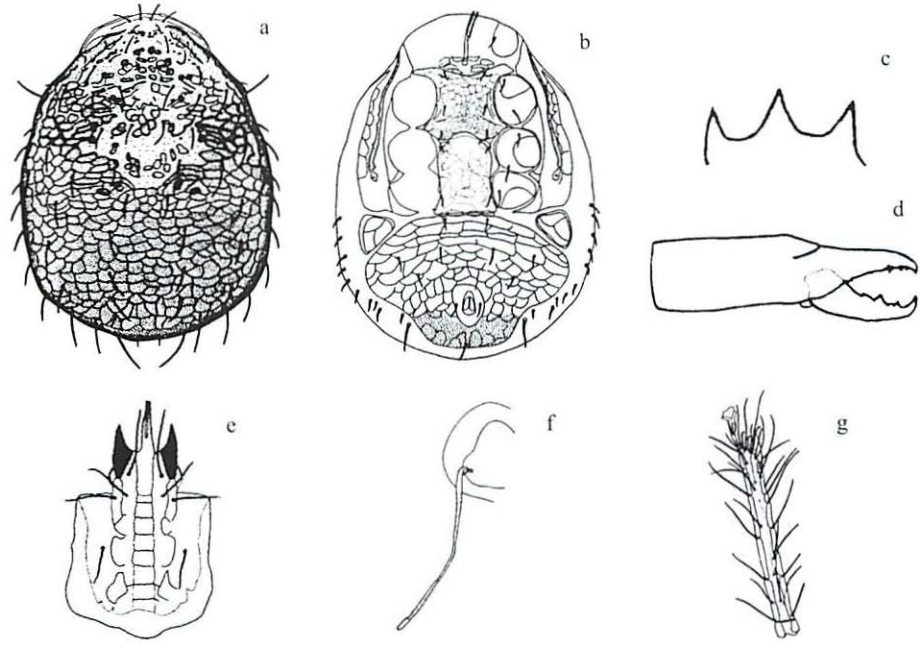

Fig. 2.2. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca, g tarsus I (a – g ASWEGEN & LOOTS 1969)

Lasioseius americanus Chant, 1963

(Fig. 2.3.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Types: United States National Museum, Washington D. C. (USA)

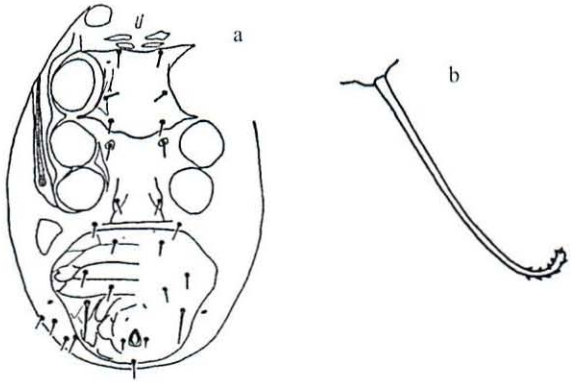

Fig. 2.3. **Female:** a ventral, b dorsal seta Z5 (a, b CHANT 1963)

Lasioseius musunguensis Aswegen & Loots, 1969

(Fig. 2.4.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

Paratypes: Institute for Zoological Research, Potchefstroom University (South Africa)

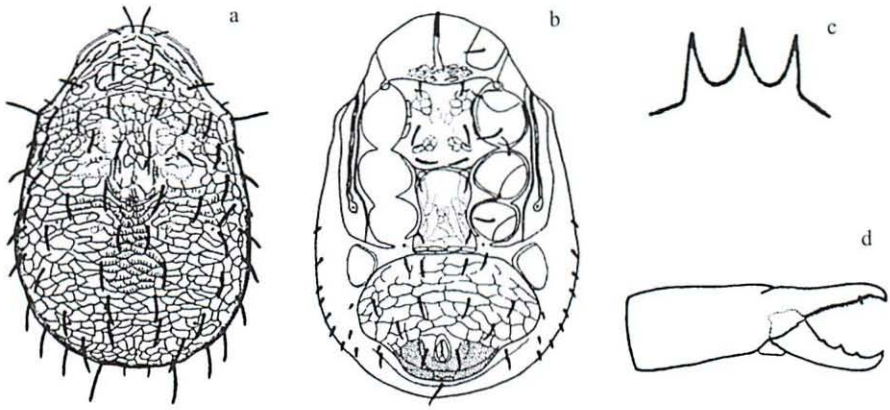

Fig. 2.4. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d ASWEGEN & LOOTS 1969)

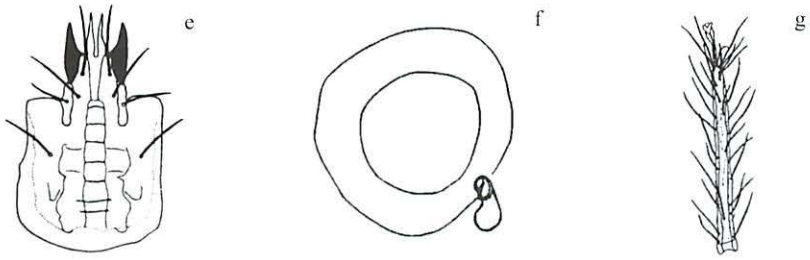

Fig. 2.4. (cont.) **Female:** e hypostome, f spermatheca, g tarsus I (e – g ASWEGEN & LOOTS 1969)

Lasioseius zaluckii Walter & Lindquist, 1997

(Fig. 2.5.)

WALTER, D. E. & E. E. LINDQUIST (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): The *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

Holotype: Queensland Museum, South Brisbane (Australia)

Paratypes: Department of Entomology, University of Queensland, St. Lucia (Australia), Canadian National Collection, Ottawa (Canada)

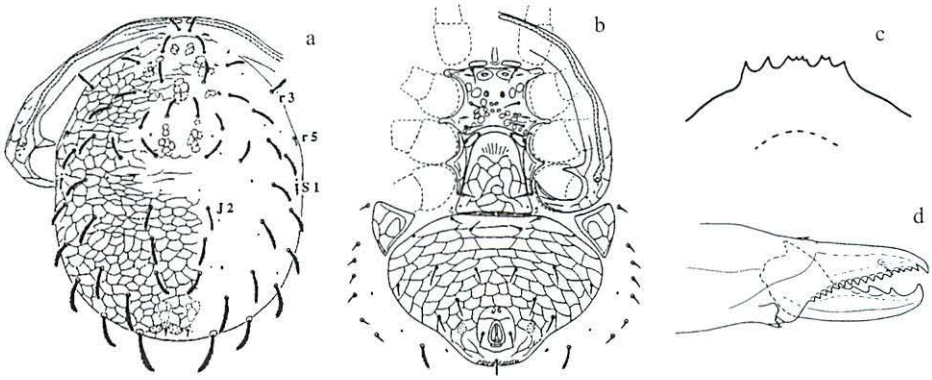

Fig. 2.5. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d WALTER & LINDQUIST 1997)

Lasioseius longisetus Aswegen & Loots, 1969

(Fig. 2.6.)

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

Paratype: Institute for Zoological Research, Potchefstroom University, South Africa

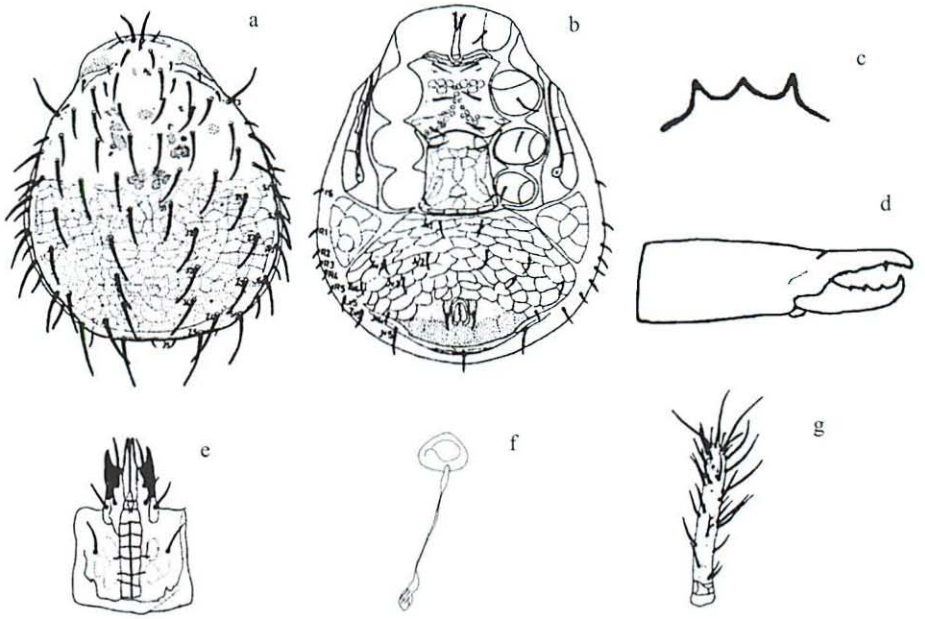

Fig. 2.6. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca, g tarsus I (a – g ASWEGEN & LOOTS 1969)

Lasioseius inguinalis Karg, 1976

(Fig. 2.7.)

KARG, W. (1976): Zur Kenntnis der Überfamilie Phytoseioidea Karg, 1965. – Zool. Jb. Syst. **103**: 505 – 546
Holotype: Hungarian Natural History Museum, Budapest (Hungary)

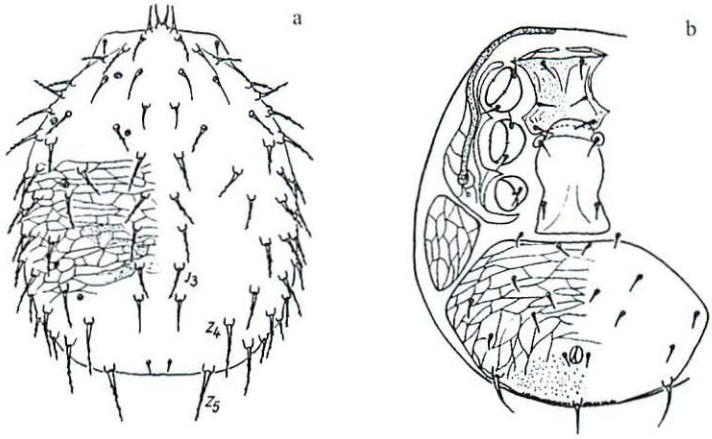

Fig. 2.7. **Female:** a dorsal, b ventral (a – b KARG 1976)

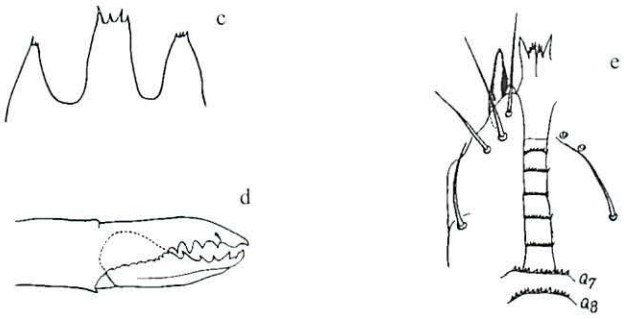

Fig. 2.7. (cont.) **Female:** c tectum, d chelicera, e hypostome (c – e KARG 1976)

Lasioseius punctocentralis n. sp.

(Fig. 2.8.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, lava flow of Antisanilla, moss from flat, horizontal stones

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by metapodal plates that are 3 times as large as the anus and dotted in the centre, by a ventra bearing 7 pairs of setae and a te with 3 long branches.

Ids ♀ 550 x 360, dorsum distinctly reticulate, most ds acicular, only i1, I2, r3 and I4 trispinate, ds S4, S5, i5 and Z5 pectinate, most ds relatively short, Z5 lengthened, i1 = 35, i2 = 35, i3 = 30, i4 = 25, i5 = 30, I1, I2, I3, I4 = 30 – 32, I5 = 15, r3 = 45, Z5 = 50, setae of venter mostly = 25. Sternal shield smooth, presternal with only two projections, ventra large and broad, 190 long, 290 wide. Digitus fixus of the chelicera with 16 teeth, middle branch of te remarkably sharpened, lateral branches distally serrate. Legs: I = 430, II = 410, III = 370, IV = 520.

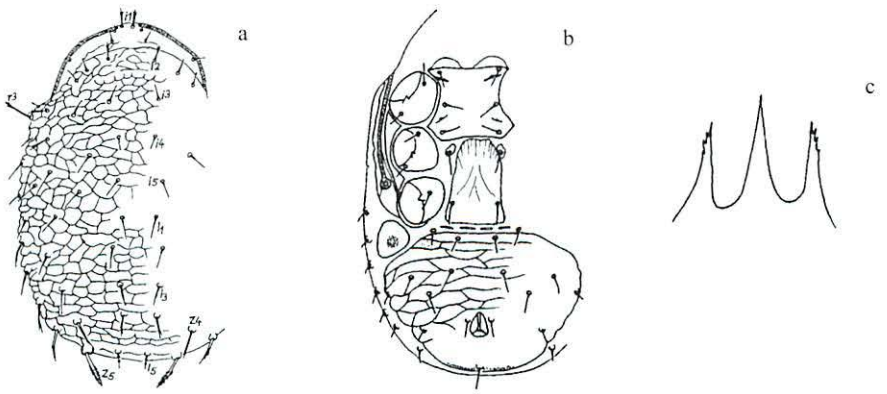

Fig. 2.8. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

Lasioseius carvalhoi Aswegen & Loots, 1969

(Fig. 2.9.)

Aswegen, P. I. M. van & G. C. Loots (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskaplike Bydraes van die P. U. vir C. H. O., Reeks B: Natuurwetenskappe **3**: 1 – 25

Holotype: Museu do Dundo-Luanda (Angola)

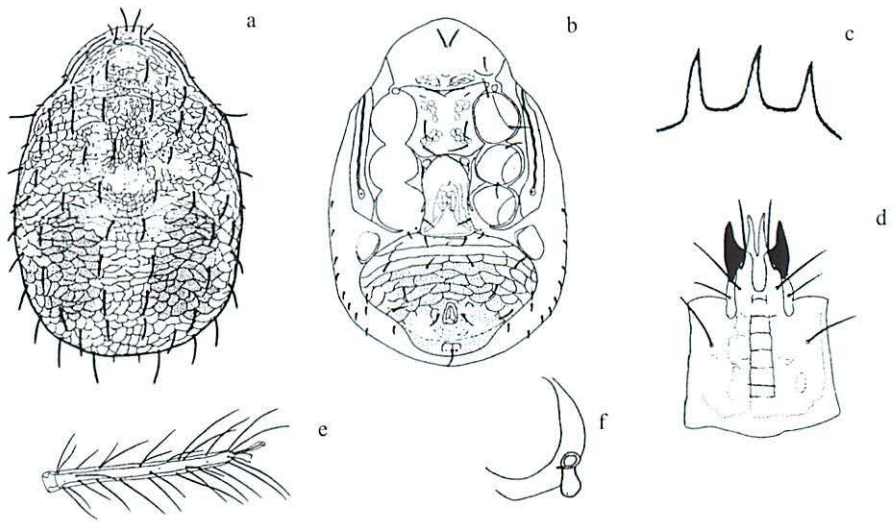

Fig. 2.9. **Female:** a dorsal, b ventral, c tectum, d hypostome, e tarsus I, f spermatheca (a – f Aswegen & Loots 1969)

Subgenus *Endopodalius* n. subgen.

Type species: *Lasioseius* (*Zygoseius*) *alter* Vitzthum, 1925

The subgenus includes species having extraordinarily wide endopodal plates of coxae III and IV, a digitus mobilis of the chelicerae with 5 teeth and a long and terminally split median branch of the tectum.

Key 3: The known species of *Endopodalius* n. subgen.

1(10) One pair of metapodal plates developed, ventra nearly quadrangular or hexagonal.

2(5) Ds relatively long: i5 = the distance i5 – I1 or longer.

3(4) Lateral processes of te smooth, length of ds Z5 = I3, ids = 546 (Fig. 3.1.):
L. convexus Krantz, 1962
– Africa, Garamba.

4(3) Lateral processes of te serrate, ds Z5 = ⅔ the length of I3, ids = 460 (Figs 3.2.1. – 3.2.2.):
L. araucariae Hirschmann, 1972
– South Brazil.

5(2) Ds shorter, i5 = about ½ the distance i5 – I1.

6(7) Metapodal plates nearly circular, postanal seta and setae V3 longer than the anus, ids = 600 – 685 (Fig. 3.3.):

L. humberti Athias-Henriot, 1959
– Africa, Algeria.

7(6) Metapodal plates oval, postanal seta and V3 = about as long as the anus.

8(9) Ds I1, I2 and I3 reaching the next seta of the series, 3 pairs of praeendopodal plates, ids = 487 – 525 (Figs 3.4.1. – 3.4.2.):

L. vitzthumi Westerboer, 1963
– locality not known.

9(8) Ds I1, I2 and I3 shorter than the distances between them, 2 pairs of praeendopodal plates, ids = 540 – 581 (Fig. 3.5.):

L. tectus (Hyatt, 1964)
syn.: *Zygoseius tectus* Hyatt, 1964
– Venezuela.

10(1) No metapodal plates developed, ventra triangular.

11(14) Ids = 580 – 600 long, leg I relatively short (= 485 – 420).

12(13) Ventra bearing 5 pairs of setae, one pair of praeendopodal shields present, poststigmatal extension of the peritrematal shield prolonged around coxae IV and reaching the endopodal shield, ds I1 and I2 longer than their distances, ds Z5 longer than Z4, ids = 580 (Fig. 3.6.):

L. hirschmanni n. nom.* pro *Zygoseius alter* sensu BHATTACHARYYA, 1969
– India.

13(12) Ventra with 7 pairs of setae, two pairs of praeendopodal shields present, poststigmal extension of peritrematal shield not surrounding coxae IV, ds I1 and I2 shorter than their distance, ds Z5 shorter than Z4, ids = 590 (Fig. 3.7.):

L. alter Vitzthum, 1925
– Sumatra.

14(11) Ids = 700 long, leg I as long as the ids, ventra nearly twice as broad as long (Fig. 3.8.):

L. scutalis (Banks, 1914)**
syn.: *Hypoaspis scutalis* Banks, 1914
– Brazil, on Scarabaeidae.

* We devote the species to Dr Werner Hirschmann († Oct. 1993). He investigated the type of *Lasioseius* (*Zygoseius*) *alter* Vitzthum exactly and in detail. Discussing systematic problems in connection with previous studies of the genus *Lasioseius*, he drew our attention to the different features of the species: *L. alter* Vitzthum is not identical with *Z. alter* sensu BHATTACHARYYA.

** Our classification of *Lasioseius scutalis* is based on LINDQUIST & EVANS (1965), who pointed out that *Hypoaspis scutalis* belongs to the *Lasioseius alter* group. The line beside the genital shield in Banks' drawing indeed shows the widely developed endopodal plate.

Subgenus *Endopodalius* n. subgen.

Lasioseius convexus Krantz, 1962

(Fig. 3.1.)

KRANTZ, G. W. (1962): Acari. Free-living Mesostigmata. II. Family Aceosejidae. – Parc National De La Garamba, Mission H. De Saeger **34**: 3 – 29

Holotype: Institute of National Parks of the Congo and Ruanda-Urundi, Brussels (Belgium)

Paratypes: United States National Museum, Washington D. C. (USA), British Museum (Natural History), London (United Kingdom)

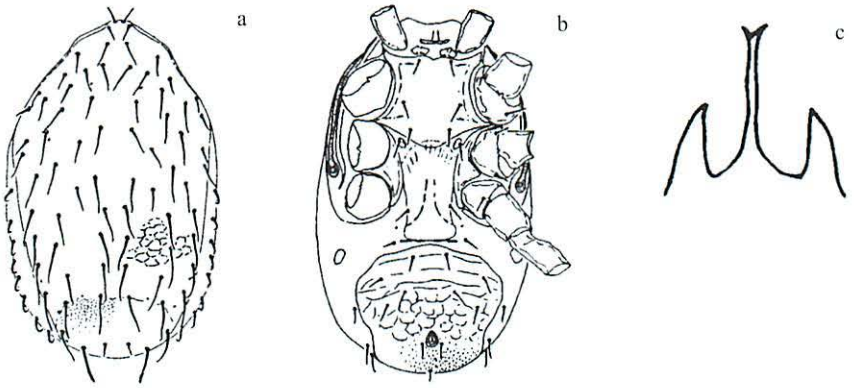

Fig. 3.1. **Female:** a dorsal, b ventral, c tectum (a – c KRANTZ 1962)

Lasioseius araucariae Hirschmann, 1972

(Figs 3.2.1. – 3.2.2.)

HIRSCHMANN, W. (1972): Gangsystematik der Parasitiformes Teil 104. Von Dr. W. Rühm während seiner Tätigkeit an der Univ. Austral de Chile (Valdivia) gesammelte Araukarien-Milben aus Südchile u. Südbrasilien. – Acarologie **17**: 29 – 33

Types: Zoologische Staatssammlungen München (Germany)

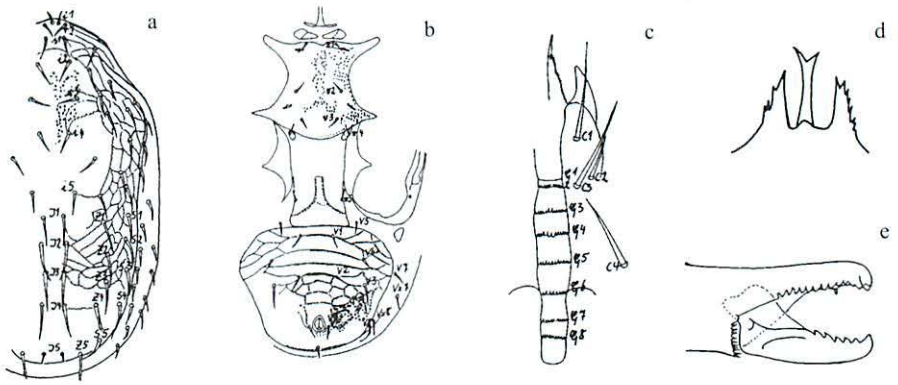

Fig. 3.2.1. **Female:** a dorsal, b ventral, c hypostome, d tectum, e chelicera (a – e HIRSCHMANN 1972)

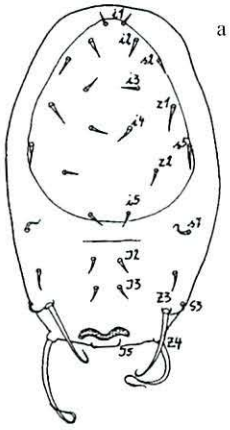

Fig. 3.2.2. **Larva:** a ventral (a HIRSCHMANN 1972)

Lasioseius humberti Athias-Henriot, 1959

(Fig. 3.3.)

ATHIAS-HENRIOT, C. (1959): Phytoseiidae et Aceosejidae (Acarina, Gamasina) d' Algérie. III. Contribution au Aceosejinae. – Bull. Soc. Hist. Nat. Afr. N. **50**: 158 – 195

Syntypes: Laboratoire d'Acarologie de l'Ecole Pratique des Hautes Etudes, Paris (France)

Paratypes: Laboratoire de Zoologie Agricole de l'Ecole Nationale d'Agriculture d'Alger porte l'indication (Egypt)

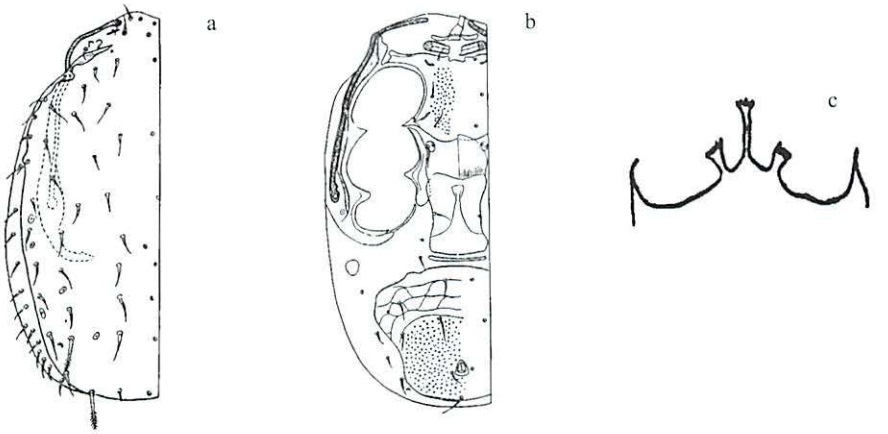

Fig. 3.3. **Female:** a dorsal, b ventral, c tectum (a – c ATHIAS-HENRIOT 1959)

Lasioseius vitzthumi Westerboer, 1963

(Figs 3.4.1. – 3.4.2.)

WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

Types: deposition unknown to the authors

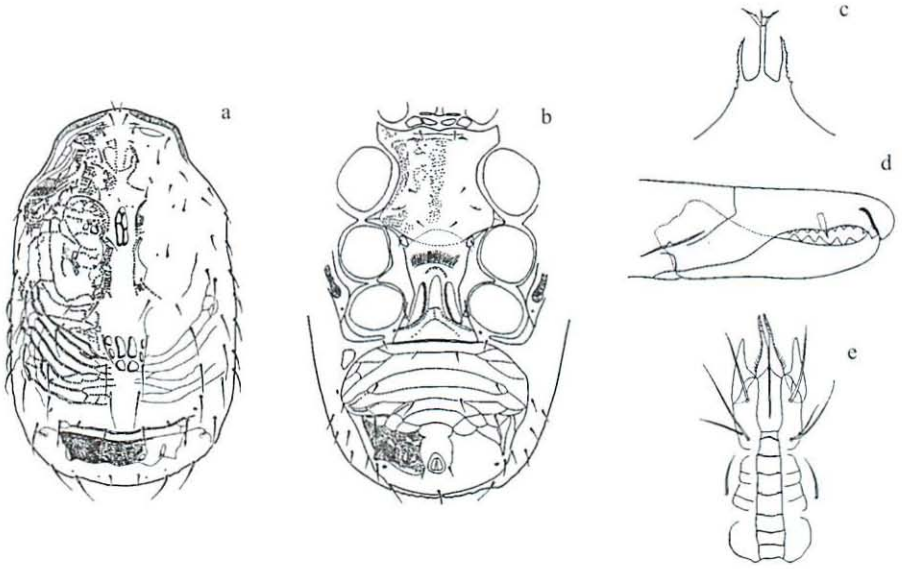

Fig. 3.4.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome (a – e WESTERBOER 1963)

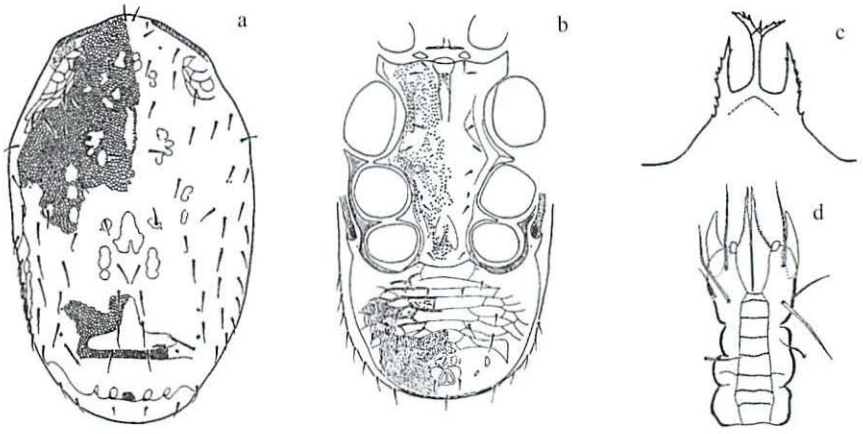

Fig. 3.4.2. **Male:** a dorsal, b ventral, c tectum, d hypostome (a – d WESTERBOER 1963)

Lasioseius tectus (Hyatt, 1964)

(Fig. 3.5.)

HYATT, K. H. (1964): A collection of Mesostigmata (Acari) associated with Coleoptera and Hemiptera in Venezuela. – Bull. Br. Mus. nat. Hist. (Zool.) **11** (7): 465 – 509

Holo- and paratypes: British Museum (Natural History), London (United Kingdom)

Synonym: *Zygoseius tectus* Hyatt, 1964

A collection of Mesostigmata (Acari) associated with Coleoptera and Hemiptera in Venezuela. – Bull. Br. Mus. nat. Hist. (Zool.) **11** (7): 465 – 509

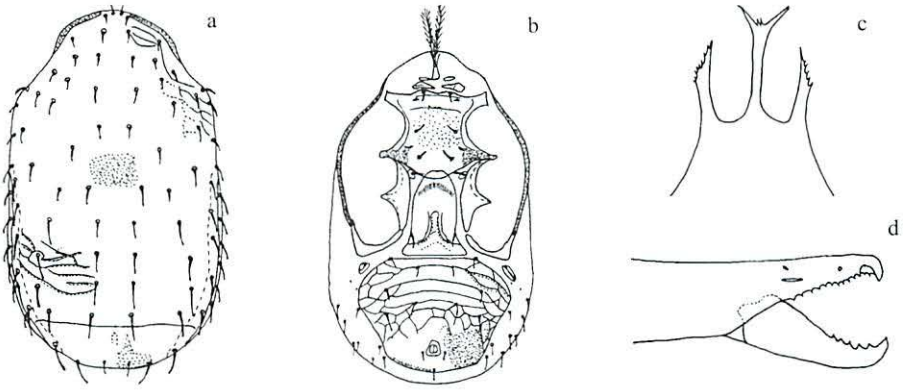

Fig. 3.5. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d modified after HYATT 1964)

Lasioseius hirschmanni n. nom. pro *Z. alter* sensu BHATTACHARYYA, 1969

(Fig. 3.6.)

BHATTACHARYYA, S. K. (1969): Studies on Indian mites (Acarina, Mesostigmata). 7. Six species found under bark in North East Frontier Agency. – Zool. Jb. Syst. **96** (1): 69 – 80

Types: deposition unknown to the authors

Synonym: *Zygoseius alter* sensu BHATTACHARYYA, 1969

Studies on Indian mites (Acarina, Mesostigmata). 7. Six species found under bark in North East Frontier Agency. – Zool. Jb. Syst. **96** (1): 69 – 80

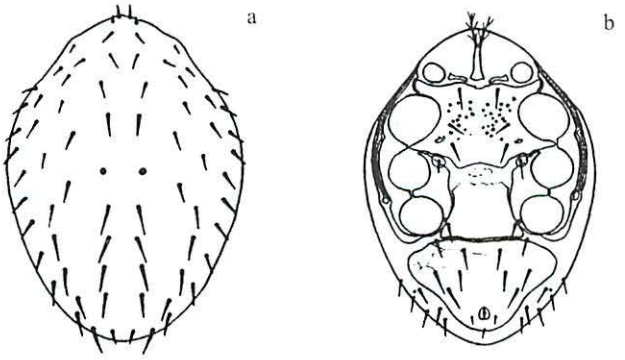

Fig. 3.6. **Female:** a dorsal, b ventral (a – b BHATTACHARYYA 1969)

Lasioseius alter Vitzthum, 1925

(Fig. 3.7.)

VITZTHUM, H. (1925): Fauna sumatrensis, Beitrag Nr. 5: Acarinae. – Suppl. Entomol. **11**: 1 – 78
Types: deposition unknown to the authors

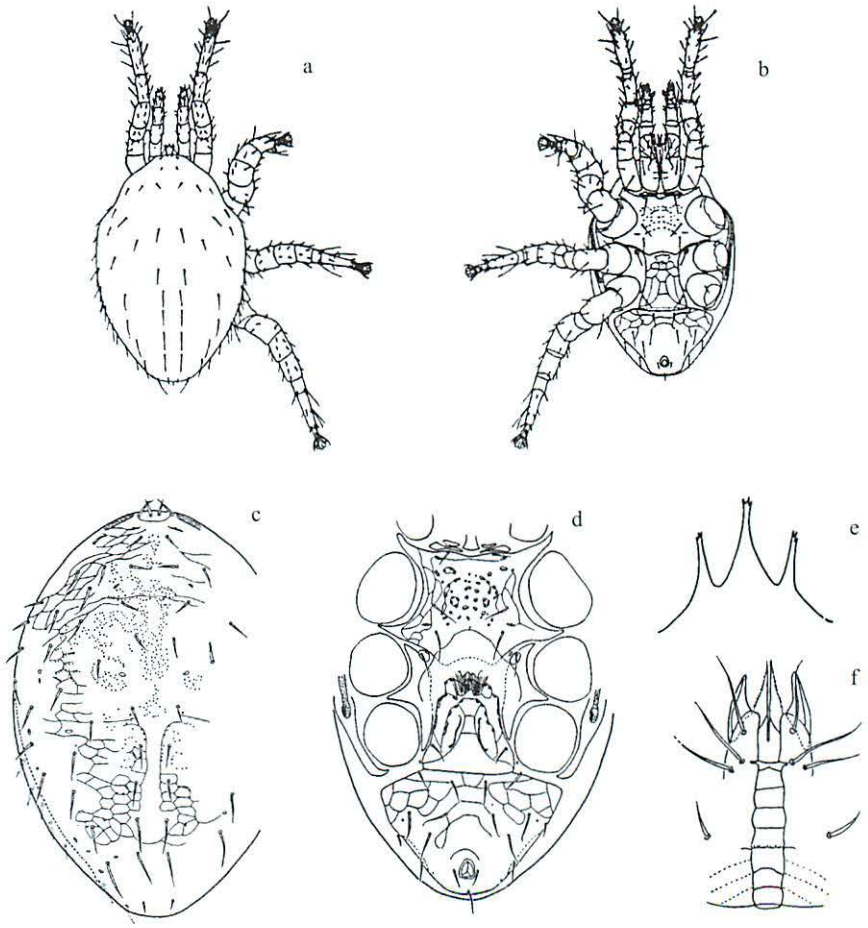

Fig. 3.7. **Female:** a dorsal, b ventral, c dorsal, d ventral, e tectum, f hypostome (a, b VITZTHUM 1925; c – f WESTERBOER 1963)

Lasioseius scutalis (Banks, 1914)

(Fig. 3.8.)

BANKS, N. (1914): The Stanford Expedition to Brazil, 1911. Acarians from Brazil. – Psyche **21** (5): 160 – 162
Types: deposition unknown to the authors
Synonym: *Hypoaspis scutalis* Banks, 1914
The Stanford Expedition to Brazil, 1911. Acarians from Brazil. – Psyche **21** (5): 160 – 162

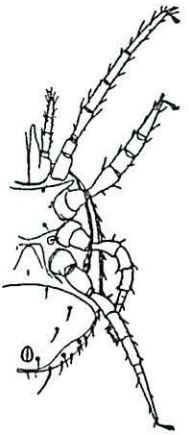

Fig. 3.8. **Female:** a ventral (a BANKS 1914)

Subgenus *Borinquolaelaps* Fox, 1946 n. comb.

Type species: *Borinquolaelaps dentatus* Fox, 1946

According to the type species, the subgenus *Borinquolaelaps* n. comb. includes species having a remarkably large anus and a number of tricarinate setae on the dorsum.

Key 4: The known species of the subgenus *Borinquolaelaps* Fox, 1946 n. comb.

1(4) The two metapodal shields fused, but the two plates still recognisable; most ds pectinate.

2(3) Leg IV (= 480) distinctly longer than the ids, ds Z5 = 45, ids = 370 (Fig. 4.1.):
L. pellitus Karg, 1994
– Galapagos.

3(2) Leg IV (= 391) distinctly shorter than the ids, ds Z5 = 65 – 74, ids = 443 (Figs 4.2.1. – 4.2.2.):
L. athiashenriotae De Leon, 1963
– North America, Louisiana.

4(1) The two metapodal shields clearly separated; most ds simple or tricarinate.

5(14) Margin of te polydont.

6(9) Ventra remarkably broad, length : width = about 4 : 5.

7(8) Most ds tricarinate, sternal shield with an oval-shaped structure, ids = 450 – 470 (Fig. 4.3.):
L. multidentatus Karg, 1994
– Galapagos.

8(7) Most ds simple, sternal shield smooth, ids = 358 (Fig. 4.4.):
L. nomus Athias-Henriot, 1959
– North Africa.

9(6) Ventra about as long as wide.

10(11) Sternal shield with a large oval-shaped structure, most ds tricarinate, ventra = 150 long and 150 broad, macrochaetae on leg IV = 70 – 80, ids = 440 (Fig. 4.5.):

L. leptoscuti Karg, 1994

– Galapagos.

11(10) Sternal shield without oval-shaped structure.

12(13) Most ds relatively short, i4 = ½ – ⅓ the distance of i4 – i5; I1, I2, I3 and I4 shorter than the distances between them, sternal shield smooth, length of ventra = 120 – 130, macrochaetae on leg IV = 60 – 65, ids = 370 – 390 (Figs 4.6.1. – 4.6.2.):

L. trigonus Karg, 1994

– Galapagos.

13(12) Most ds long, i4 = longer than ½ the distance between i4 – i5, ds I1 reaches I2, I2 reaches I3, I3 reaches I4, sternal shield with a longitudinally directed structure, length of ventra = 150, macrochaetae on leg IV = 90 – 100, ids = 407 (Figs 4.7.1. – 4.7.2.):

L. analis Evans, 1958

– Africa.

14(5) Margin of te trispinate or with lateral groups of little points.

15(16) Margin of te trispinate, sternal shield without a circular structure, ds relatively short and robust, scimitar-like, i4 = ½ the distance between i4 – i5; ds I1, I2, I3 and I4 shorter than their distances, ids = 500 (Fig. 4.8.):

L. dentatus (Fox, 1946)

syn.: *Borinquolaelaps dentatus* Fox, 1946

– Puerto Rico.

16(15) Margin of te with lateral points, sternal shield with a circular structure.

17(18) Ventra as long as wide, ds I2 = ½ the distance between I2 – I4, I3 = I3 – I4, leg I shorter than the ids, leg IV with macrochaetae = 70 – 90, ids = 400 – 470 (Fig. 4.9.):

L. operculi Karg, 1980

– Venezuela.

18(17) Ventra broader than long, ds relatively long, I2 = the distance between I2 – I4, Z4 = the distance between Z4 – Z5, ds I3 is lost, leg I longer than the ids, ids = 490 (Fig. 4.10.):

L. dupliramus Karg, 1994

– Galapagos.

Subgenus *Borinquolaelaps* Fox, 1946 n. comb.

Lasioseius pellitus Karg, 1994

(Fig. 4.1.)

Karg, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216

Types: Museum für Naturkunde Berlin (Germany)

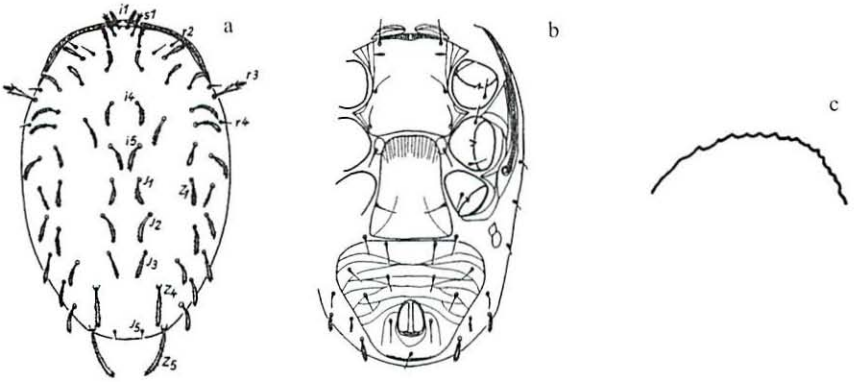

Fig. 4.1. **Female:** a dorsal, b ventral, c tectum (a – c Karg 1994)

Lasioseius athiashenriotae De Leon, 1963

(Figs 4.2.1. – 4.2.2.)

De Leon, W. (1963): A new genus and twelve new species of mites from Mexico and southeast United States (Acarina, Blattisocidae). – Fla. Entomol. **46** (2): 197 – 207

Types: deposition unknown to the authors

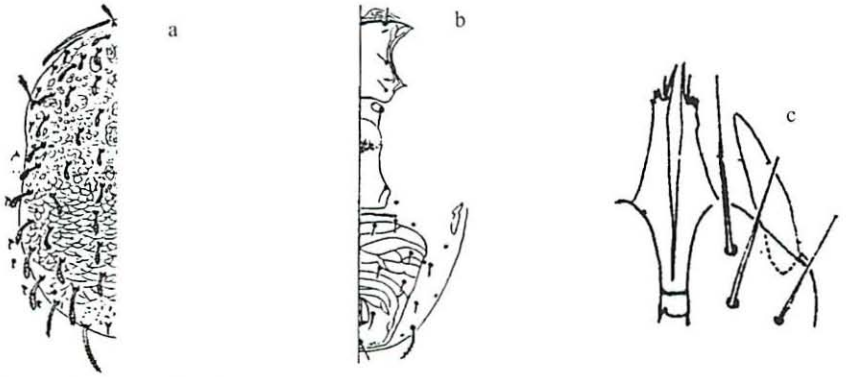

Fig. 4.2.1. **Female:** a dorsal, b ventral, c hypostome (a – c De Leon 1963)

Fig. 4.2.2. **Male:** a spermatodactyl (a De Leon 1963)

Lasioseius multidentatus Karg, 1994

(Fig. 4.3.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216

Types: Museum für Naturkunde Berlin (Germany)

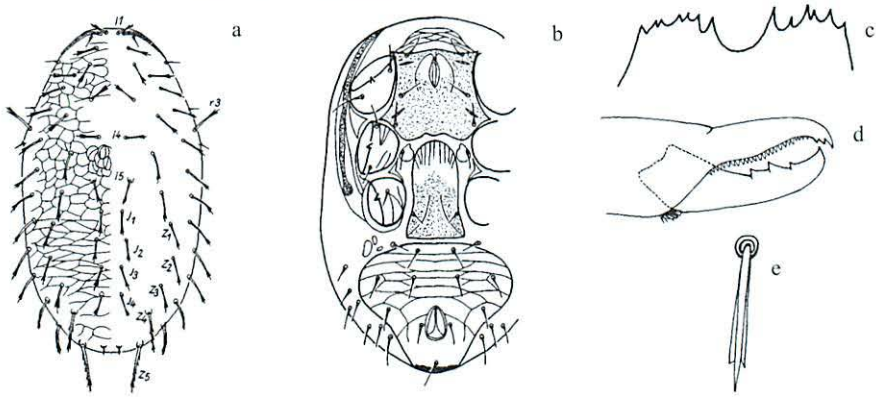

Fig. 4.3. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal seta I4 (a – e KARG 1994)

Lasioseius nomus Athias-Henriot, 1959

(Fig. 4.4.)

ATHIAS-HENRIOT, C. (1959): Phytoseiidae et Aceosejidae (Acarina, Gamasina) d' Algérie. III. Contribution au Aceosejinae. – Bull. Soc. Hist. Nat. Afr. N. **50**: 158 – 195

Holotype: deposition unknown to the authors

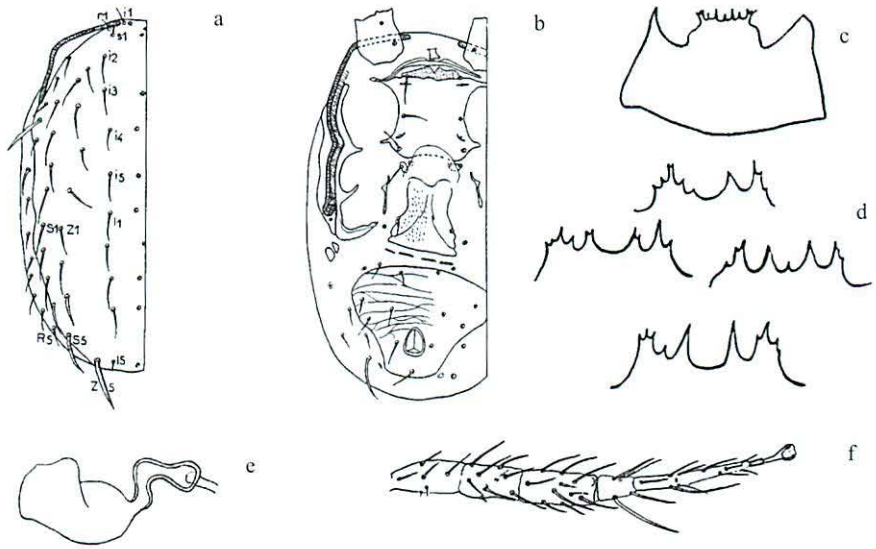

Fig. 4.4. **Female:** a dorsal, b ventral, c tectum, d variations of the tectum, e spermatheca, f leg IV (a – c, e ATHIAS-HENRIOT 1959; d, f HURLBUTT 1971)

Lasioseius leptoscuti Karg, 1994

(Fig. 4.5.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216
Types: Museum für Naturkunde Berlin (Germany)

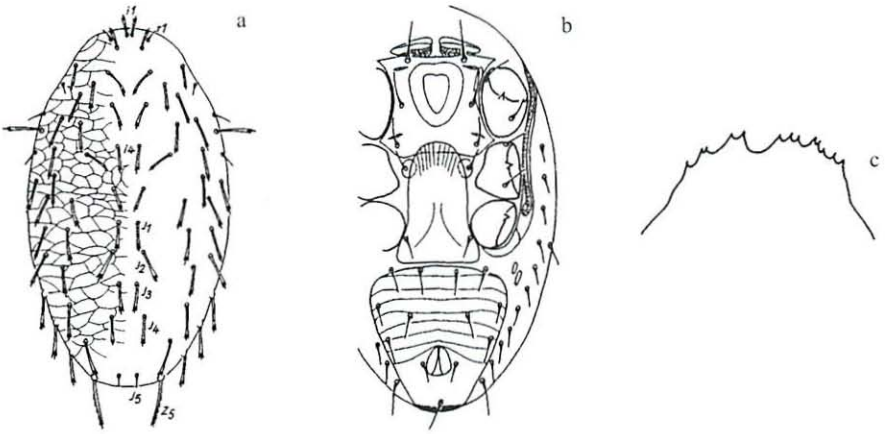

Fig. 4.5. **Female:** a dorsal, b ventral, c tectum (a – c KARG 1994)

Lasioseius trigonus Karg, 1994

(Figs 4.6.1. – 4.6.2.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216
Types: Museum für Naturkunde Berlin (Germany)

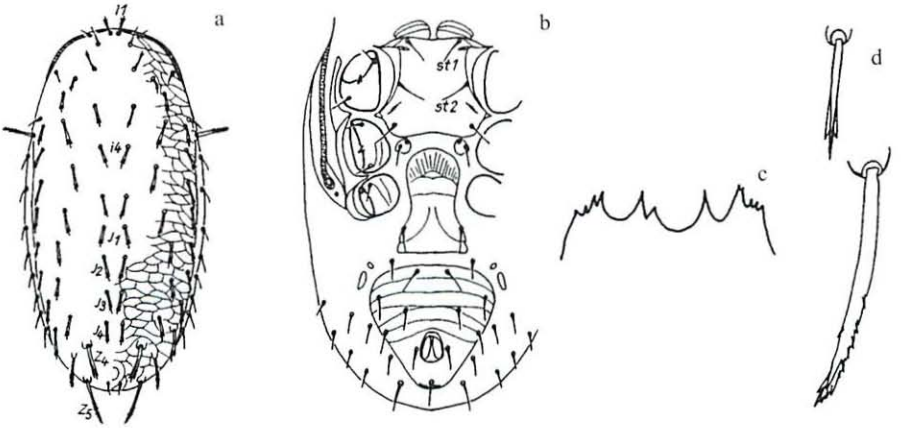

Fig. 4.6.1. **Female:** a dorsal, b ventral, c tectum, d dorsal setae I3, Z5 (a – d KARG 1994)

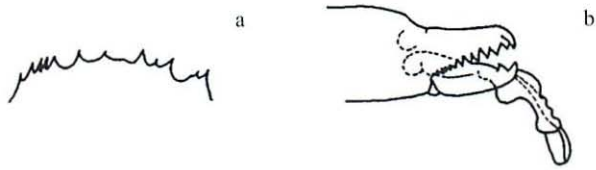

Fig. 4.6.2. **Male:** a tectum, b chelicera (a, b KARG 1994)

Lasioseius analis Evans, 1958

(Figs 4.7.1. – 4.7.2.)

EVANS, G. O. (1958): Some mesostigmatic mites from a nest of social spiders in Uganda. – Ann. Mag. Nat. Hist. **1**: 580 – 590

Holotype: British Museum (Natural History), London (United Kingdom)

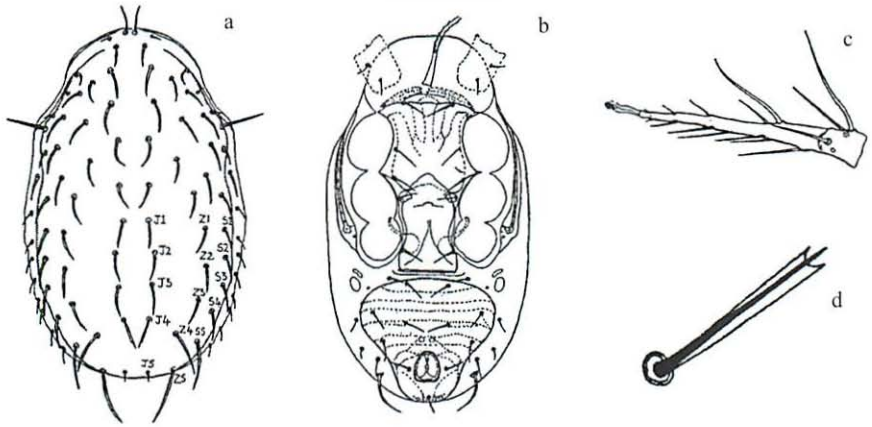

Fig. 4.7.1. **Female:** a dorsal, b ventral, c tarsus IV, d dorsal seta (a – d EVANS 1958)

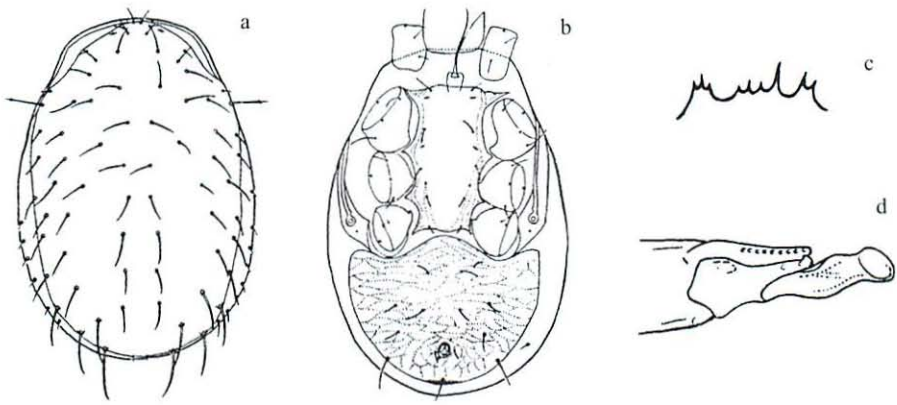

Fig. 4.7.2. **Male:** a dorsal, b ventral, c tectum, d chelicera (a – d GU & GUO 1996)

Lasioseius dentatus (Fox, 1946)

(Fig. 4.8.)

Fox, I. (1946): A new genus, *Borinquolaelaps*, and new species of mites from rats in Puerto Rico. – J. Parasitol. **32** (5): 445 – 452

Types: Department of Medical Zoology, School of Tropical Medicine, San Juan (Puerto Rico)

Synonym: *Borinquolaelaps dentatus* Fox, 1946

A new genus, *Borinquolaelaps*, and new species of mites from rats in Puerto Rico. – J. Parasitol. **32** (5): 445 – 452

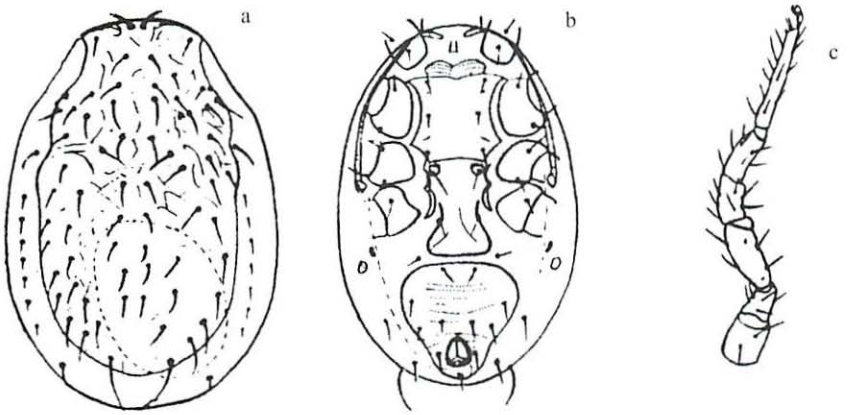

Fig. 4.8. **Female:** a dorsal, b ventral, c leg I (a – c Fox 1946)

Lasioseius operculi Karg, 1980

(Fig. 4.9.)

Karg, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367

Types: Museum für Naturkunde Berlin (Germany)

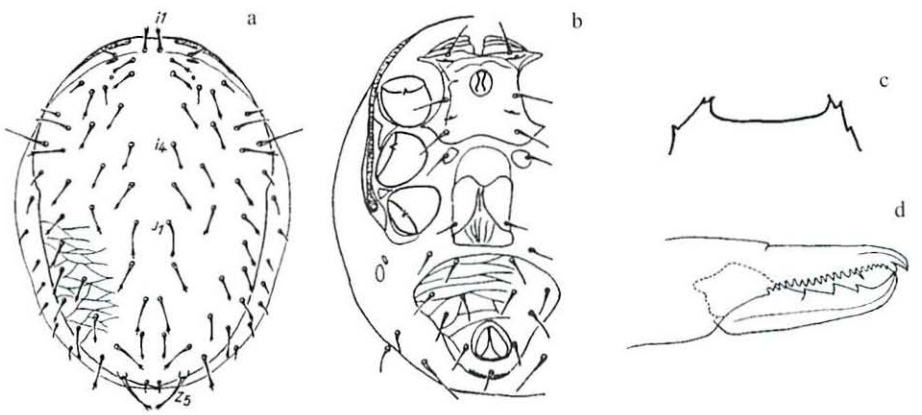

Fig. 4.9. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d Karg 1980)

Lasioseius dupliramus Karg, 1994

(Fig. 4.10.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216

Types: Museum für Naturkunde Berlin (Germany)

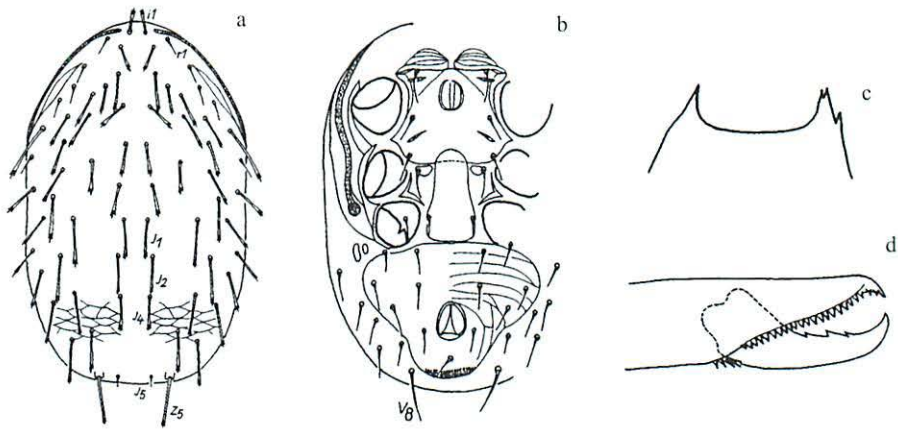

Fig. 4.10. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KARG 1994)

Subgenus *Crinidens* Karg, 1980 n. comb.

Type species: *Lasioseius corticeus* Lindquist, 1971

The subgenus includes species having tricarinate setae on the dorsum, a ventra bearing 5 – 7 pairs of setae and without a remarkably large anus.

The subgenus is grouped into three species complexes with the following distinguishing features:

Ventra with 6 – 7 pairs of setae:

Lasioseius-ometisimilis-complex: **Key 5**

Ventra with 5 pairs of setae and leg I shorter than the idiosoma:

Lasioseius-ometes-complex: **Key 6**

Ventra with 5 pairs of setae and leg I longer than the idiosoma, tarsus IV mostly with macrochaetae:

Lasioseius-glomerulus-complex: **Key 7**

Key 5: The known species of the *Lasioseius-ometisimilis*-complex (including 7 new species from Ecuador)

1(4) Number of ds reduced.

2(3) Posterior region without I2 and I4, ids = 253 – 271 (Fig. 5.1.):

L. sagittarius Ishikawa, 1976

– Malaysia.

3(2) Posterior region of I-setae series without I2 and I3, ds I1 and I4 = the length of i5, Z5 = 65, leg I = 383, leg IV = 418, ids = 360 – 395 (Fig. 5.2.):
L. peritremus Nasr & Abou-Awad, 1987
– Egypt.

4(1) Number of ds not reduced.

5(8) The two metapodal plates fused, but the platelets still visible.

6(7) Most of ds smooth and acicular, but i1, r3, I3 and I4 tricarinate, I5, Z4, Z5 and S5 pectinate, leg I = 370, ids = 400 – 420 (Figs 5.3.1. –5.3.2.):
L. breviacutus n. sp.
– Ecuador.

7(6) Most of ds tricarinate, leg I = 363 – 398, ids = 434 – 470 (Figs 5.4.1. – 5.4.3.):
L. spectabilis De Leon, 1963
– North America.

8(5) The two metapodal plates clearly separate.

9(28) Margin of te with three well developed branches.

10(23) Nearly all ds tricarinate.

11(14) The first pair of sternal setae localised anteriorly to the shield.

12(13) Dorsally, many small tubercles form a network structure, the whole sternal shield dotted, length of I4 = ½ the distance between I4 – I5, ids = 500 (Figs 5.5.1. – 5.5.2.):
L. epicriodopsis De Leon, 1963
– North America.

13(12) Dorsally, lines form a net-like structure, sternal shield only posteriorly dotted, length of I4 = the distance between I4 – I5, leg I = 350, leg II = 312, leg III = 307, leg IV = 475, ids = 390 – 448 (Fig. 5.6.):
L. tomokoae Ishikawa, 1969.

14(11) The first pair of sternal setae on the shield.

15(16) The middle branch of te twice as long as the lateral branches, dorsum strongly reticulate, ids = 635 (Fig. 5.7.):
L. lacunosus Westerboer, 1963
– Europe.

16(15) The middle branch of te about as long as the lateral branches, dorsum weakly reticulate.

17(18) Ventra remarkably wide, width : length = 4 : 3, tricarinate form of ds clearly visible, sternal shield with two oval structures next to one another, middle branch of te three-pronged, leg I = 450, ids = 470 – 510 (Figs 5.8.1. – 5.8.2.):
L. cochlearis n. sp.
– Ecuador.

18(17) Ventra only slightly wider than long, ds weakly tricarinate and short, no seta reaching the next seta of the series, middle branch of te cuspidate.

19(20) Ventra with a remarkably long postanal seta (= 46), lateral processes of te furcate, leg I = 500, ids = 540 – 570 (Fig. 5.9.):

L. postanalis n. sp.
– Ecuador.

20(19) Postanal seta not prolonged: 25 – 33, lateral processes of te terminally three-pronged or serrate.

21(22) Lateral processes of te serrate, middle point shorter than the lateral processes, leg I = 450, most ds tricarinate, however Z4 and Z5 pectinate, ids = 460 – 500 (Fig. 5.10.):

L. laciniatus n. sp.
– Ecuador.

22(21) Lateral processes of the te three-pronged, middle point a little longer than the lateral branches, caudal ds I4, Z4, Z5, S4 and S5 pectinate, ids = 450, (Fig. 5.11.):

L. tricuspidis n. sp.
– Ecuador.

23(10) Only ds i1, r3 and 3 – 6 pairs of setae of the posterior region of dorsum tricarinate.

24(25) Sternal shield and genital shield with fine comma-like structures, middle branch of te three-pronged, distally broadened, ids = 410 – 430 (Figs 5.12.1. – 5.12.2.):

L. fissurae Karg, 1980
– Venezuela.

25(24) Sternal shield and genital shield smooth, middle process of te distally cuspidate.

26(27) Middle process of te longer than the lateral processes, ventra 225 wide, 140 long, ids = 420 – 450 (Fig. 5.13.):

L. patellae n. sp.
– Ecuador.

27(26) Middle process of te very short: = 1/3 the length of the lateral processes, ventra 220 wide, 170 long, ids = 490 (Fig. 5.14.):

L. cynari Chant, 1963
– North America.

28(9) Margin of te irregularly serrate, or undulate.

29(30) Leg I remarkably long (about 900), tarsus I = 300 – 320, tibia I = 160, ventra broad, length : width = 4 : 7, ids = 535 – 565 (Figs 5.15.1. – 5.15.2.):

L. podocinoides Berlese, 1916
– Africa.

30(29) Leg I not so long.

31(32) Peritremata extend behind the stigma, many tubercles dorsally form a net-like structure, leg I very short (= 250), ids = 410 (Fig. 5.16.):

L. floralis Karg, 1976
– Chile.

32(31) Peritremata never extend behind the stigma.

33(36) Ds I5 about as long as ds I1 and I2.

34(35) Caudal ds relatively long: I5 = 36, I4 = 41, Z5 = 64, ids = 530 (Figs 5.17.1. – 5.17.2.):

L. japonicus Ehara, 1965

– Japan.

35(34) Caudal ds relatively short, Z4 shorter than the distance between Z4 – Z5, I4 shorter than ½ the distance between I4 – I5, ids = 550 – 570 (Fig. 5.18.):

L. penicilliger Berlese, 1916 sensu HUGHES, 1961

– Europe.

36(33) Ds I5 remarkably shorter than the other setae of the I-series.

37(38) The tricarinate forms of ds consist of thin bristles, margin of te serrate, ids = 520 – 533 (Figs 5.19.1. – 5.19.2.):

L. furcisetus Athias-Henriot, 1959

– North America, Europe.

38(37) Dorsum with well developed tricarinate ds.

39(42) Sternal shield with a circular or net-like structure.

40(41) Sternal shield with a circular stucture, most ds 32 – 53 long, Z5 = 64, ventra broad, width : length = 3 : 2, lateral processes of te long, no middle point, leg I = 460, ids = 460 (Fig. 5.20.):

L. oculus Karg, 1980

– Venezuela.

41(40) Sternal shield with a median longitudinal net-like pattern, lateral points of te shorter than the middle point, ids = 520 (Figs 5.21.1. – 5.21.2.):

L. ometisimilis Hirschmann, 1963

– Europe.

42(39) Sternal shield smooth, most ds 20 – 25 long, Z5 = 50, te with a short middle point, leg I = 400, ids = 420 (Fig. 5.22.):

L. pluracuspidis n. sp.

– Ecuador.

Subgenus *Crinidens* Karg, 1980 n. comb.

Lasioseius-ometisimilis-complex

Lasioseius sagittarius Ishikawa, 1976

(Fig. 5.1.)

ISHIKAWA, K. (1976): Taxonomic investigation on mesostigmatid mites (Acarina) from Pasoh Forest Reserve, Malay Peninsula. – Nature and Life in Southeast Asia **7**: 231 – 252

Holo- and paratypes: Matsuyama Shinomone Junior College (Japan)

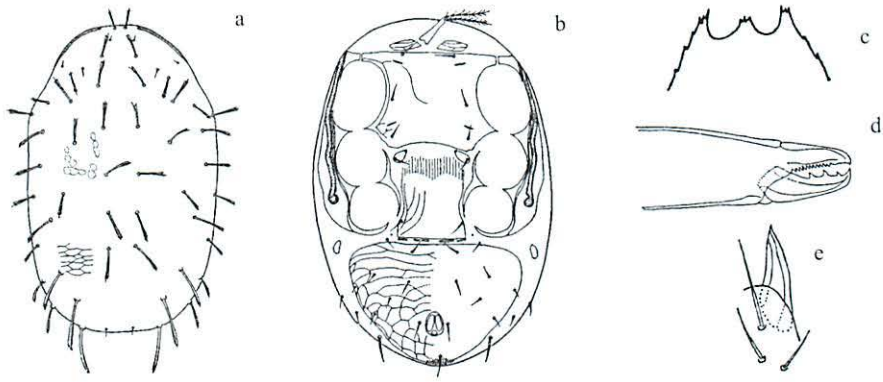

Fig. 5.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e corniculus (a – e ISHIKAWA 1976)

Lasioseius peritremus Nasr & Abou-Awad, 1987

(Fig. 5.2.)

NASR, A. K. & B. A. ABOU-AWAD (1987): Description of some ascid mites from Egypt (Acari, Ascidae). – Acarologia **28** (1): 27 – 35

Holo- and paratypes: National Research Centre, Dokki-Cairo (Egypt)

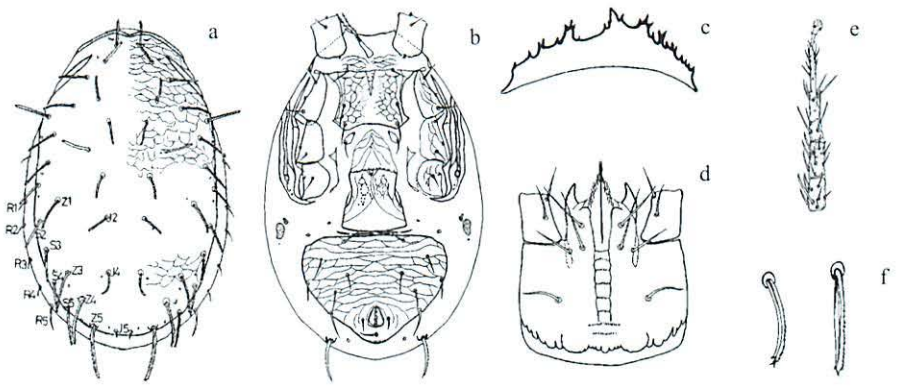

Fig. 5.2. **Female:** a dorsal, b ventral, c tectum, d hypostome, e leg IV, f dorsal setae (a – f NASR & ABOU-AWAD 1987)

Lasioseius breviacutus n. sp.

(Figs 5.3.1. – 5.3.2.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, near Antisana, 3300 m a.s.l., brookside pasture, moss and soil

Paratypes: 8 ♀, 1 ♂, 1 deutonymph; lava flow of Antisanilla: 7 ♀, 2 deutonymphs

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by very short ds, mostly acicular, and by a connected pair of metapodal plates.

Ids ♀ 400 – 420 x 250 – 280, dorsum reticulated, most ds smooth and 15 – 16 long, however ds i1 and r3, I3, I4, Z2 and Z3 tricarinate, Z4, Z5, S4 and S5 pectinate, i1 = 24, r3 = 35, i4 = 18, I3, I4 = 20, Z4 = 36, Z5 = 45, S5 = 30, sternal shield anteromedially with a crevice-like structure, sternal setae 10 – 24 long, ventra reticulate, length : width = 7 : 10, ps = 30 long and pectinate, te with a long middle point, legs: I = 400, II = 330, III = 310, IV = 410, tarsus IV with 2 macrochaetae 40 and 42 long. Ids ♂ 420 x 230, spermatodactyl spoon-like, distally rounded.

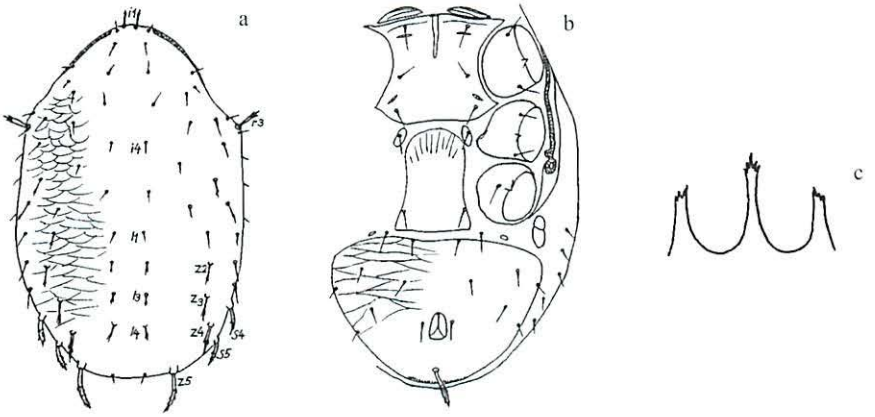

Fig. 5.3.1. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

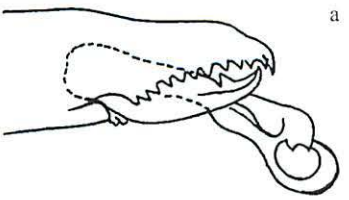

Fig. 5.3.2. **Male:** a chelicera (a original drawing by the authors)

Lasioseius spectabilis De Leon, 1963

(Figs 5.4.1. –5.4.3.)

De Leon, D. (1963): A new genus and twelve new species of mites from Mexico and southeast United States (Acarina, Blattisocidae). – Fla. Entomol. **46** (2): 197 – 207

Types: deposition unknown to the authors

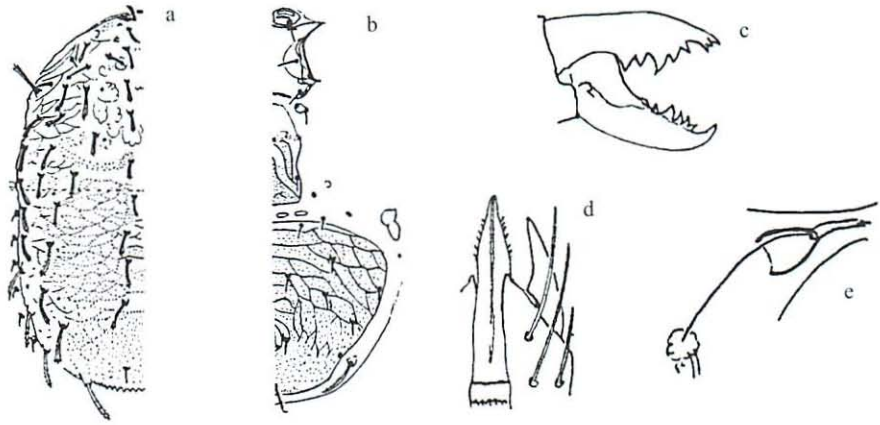

Fig. 5.4.1. **Female:** a dorsal, b ventral, c chelicera, d hypostome, e spermatheca (a – e De Leon 1963)

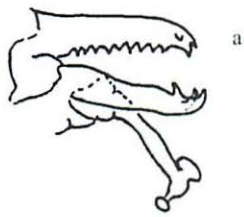

Fig. 5.4.2. **Male:** a chelicera (a De Leon 1963)

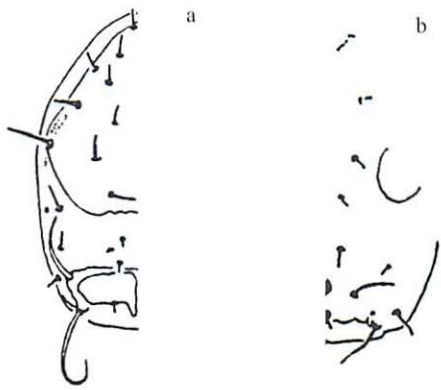

Fig. 5.4.3. **Larva:** a dorsal, b ventral (a, b De Leon 1963)

Lasioseius epicriodopsis De Leon, 1963

(Figs 5.5.1. – 5.5.2.)

De Leon, D. (1963): A new genus and twelve new species of mites from Mexico and southeast United States (Acarina, Blattisocidae). – Fla. Entomol. **46** (2): 197 – 207

Types: deposition unknown to the authors

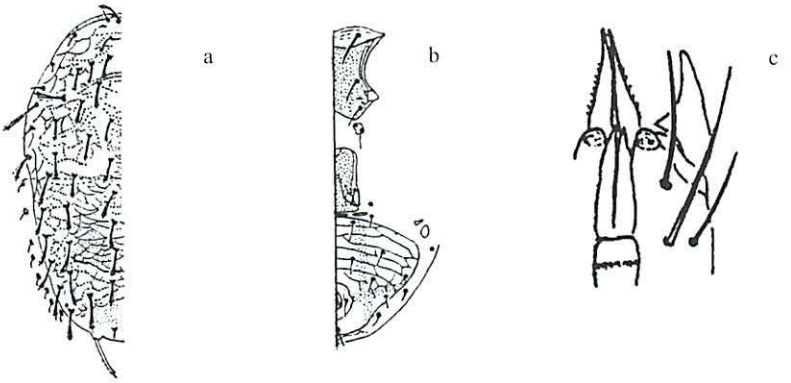

Fig. 5.5.1. **Female:** a dorsal, b ventral, c hypostome (a – c De Leon 1963)

Fig. 5.5.2. **Male:** a spermatodactyl (a De Leon 1963)

Lasioseius tomokoae Ishikawa, 1969

(Fig. 5.6.)

Ishikawa, K. (1969): Studies on the mesostigmatid mites in Japan. IV. Family Blattisocidae Garman. – Rep. Res. Matsuyama Shinonome Jr. Coll. **4** (1): 111 – 139

Holo- and paratypes: Biological Laboratory, Matsuyama Shinomone Junior College, Matsuyama (Japan)

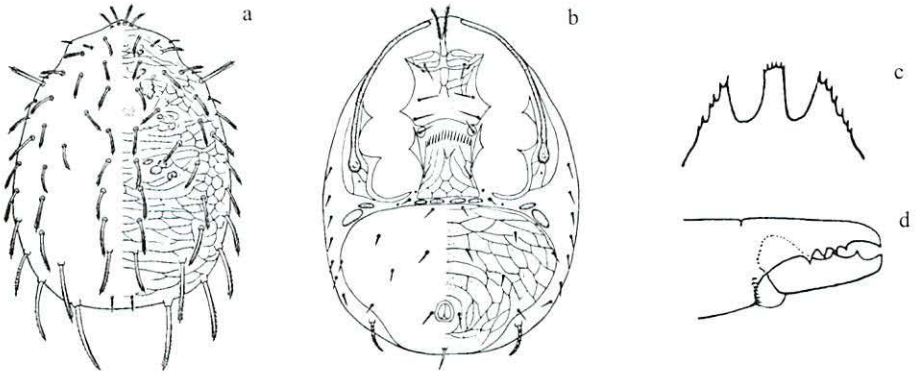

Fig. 5.6. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d Ishikawa 1969)

Fig. 5.6. (cont.) **Female:** e hypostome, f pedipalpus (e – f ISHIKAWA 1969)

Lasioseius lacunosus Westerboer, 1963

(Fig. 5.7.)

WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

Types: deposition unknown to the authors

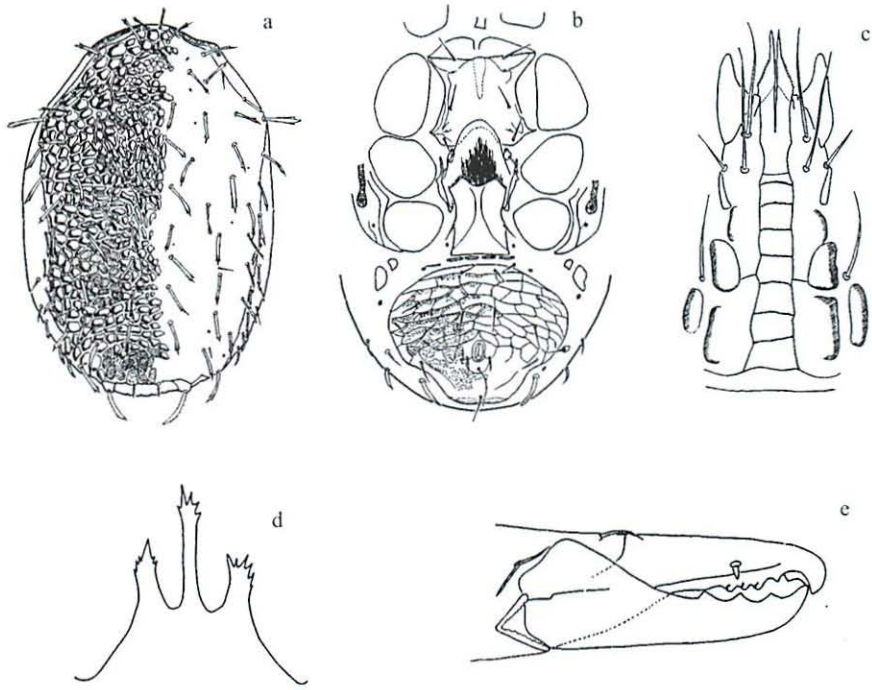

Fig. 5.7. **Female:** a dorsal, b ventral, c hypostome, d tectum, e chelicera (a – e WESTERBOER 1963)

Lasioseius cochlearis n. sp.

(Figs 5.8.1. – 5.8.2.)

Holotype: ♀ Ecuador 1989, prov. Imbabura, 53 km from Otavalo, 285 m a.s.l., moss hanging from trees and in moss from flat stones

Paratypes: 10 ♀, 10 ♂, 4 deutonymphs

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by clearly visible tricarinate ds, a remarkably broad ventra, two oval structures on the sternal shield and a thin middle branch of te that is terminally tricuspid.

Ids ♀ 470 – 510 x 290 – 340, dorsum posteriorly reticulate, most ds clearly tricarinate however Z4, Z5, S4 and S5 pectinate, i1 = 30, s1 = 25, i3 = 25, i4 = 20, I1 = 25, I2 = 26, I3 = 30, I4 = 35, r3 = 40, Z4 = 42, Z5 = 60, sternal shield medially with two oval structures, setae 22 – 25 long, ventra 150 long, 200 wide, with 7 pairs of setae, mostly 18 – 22 long, only V7 = 8, ps = 35 long, one of the metapodal plate 3 times as large as the other plate, te with a very thin middle branch that is terminally tricuspid, lateral branches serrate, digitus fixus of the chelicera with 15 – 16 teeth, legs: I = 450, II = 350, III = 300, IV = 500. Ids ♂ 360 – 380 x 200 – 250, spermatodactyl like a ring, ids deutonymph 400 x 220.

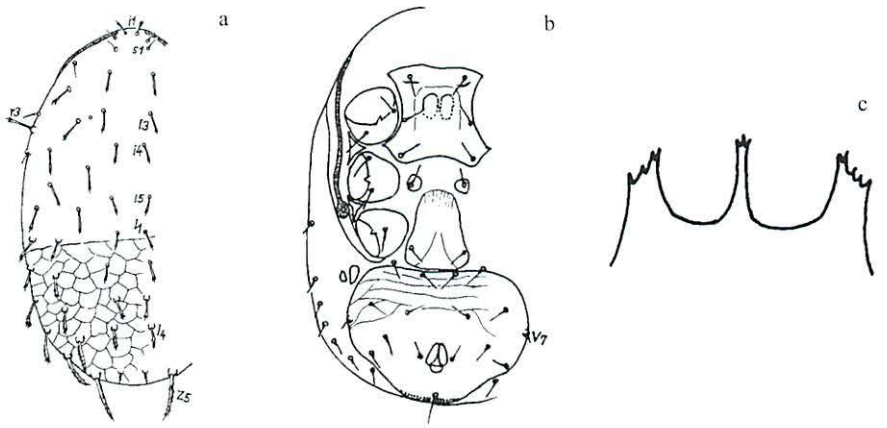

Fig. 5.8.1. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

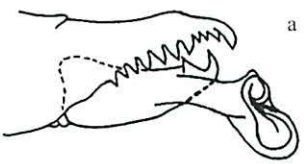

Fig. 5.8.2. **Male:** a chelicera (a original drawing by the authors)

Lasioseius postanalis n. sp.

(Fig. 5.9.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, near Antisana, 3300 m a.s.l. an roots spanning over waterfalls and from moss

Paratype: 1 ♂

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by relatively short ds that are weakly tricarinate, a remarkably long postanal seta and furcate lateral processes of the tectum.

Ids ♀ 540 – 570 x 320 – 340, dorsum reticulate, most ds short: i1 = 32, i4 = 25, I1 = 27, I3 = 32, I4 = 37, ds r3 longer: = 53, caudal setae pectinate and long: = 60 – 65, I5 = 17, sternal shield smooth, sternal setae 28 – 33 long, genital shield punctate, ventra reticulate, with 7 pairs of setae, mostly 30 long, however adanal setae = 20, marginal setae = 12 and ps = 46, middle point of te cuspidate, lateral branches furcate, digitus fixus of chelicera with 15 teeth, legs: I = 500, II = 420, III = 400, IV = 540.

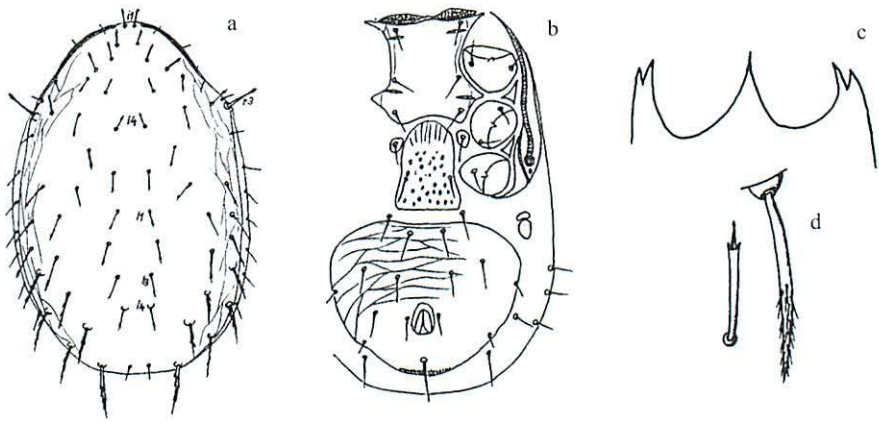

Fig. 5.9. **Female:** a dorsal, b ventral, c tectum, d dorsal setae (a – d original drawings by the authors)

Lasioseius laciniatus n. sp.

(Fig. 5.10.)

Holotype: ♀ Ecuador 1990, prov. Pichinca, near Quito, 2250 m a.s.l., from moss

Paratypes: 2 ♀, 1 ♂

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by a triangular ventra, distinct trispinate short ds and a te with 3 branches of equal length, middle branch pointed, lateral processes serrate.

Ids ♀ 460 – 500, posterior half of dorsum weakly reticulate, anterior half with transverse lines, most ds short, 20 – 25 long and trispinate, however ds r3 = 40, I4 = 33, Z4 = 40, Z5 = 60, Z4 and Z5 pectinate, anterior margin and posterior area of sternal shield punctate, prestern-al with two projections, genital shield with comma-like structures, ventra reticulate, bearing 7 pairs of setae, ventra 160 long, 200 wide, setae of venter mostly 18 – 25 long, however two marginal setae of ventra only 10 long and the ps = 26 long, lateral branches of te distally ser-

rate, middle branch pointed, legs: I = 450, II = 380, III = 330, IV = 500, praetarsus I relatively long (= 25) with reduced claw (= 5), claws of legs II – IV = 12 long.

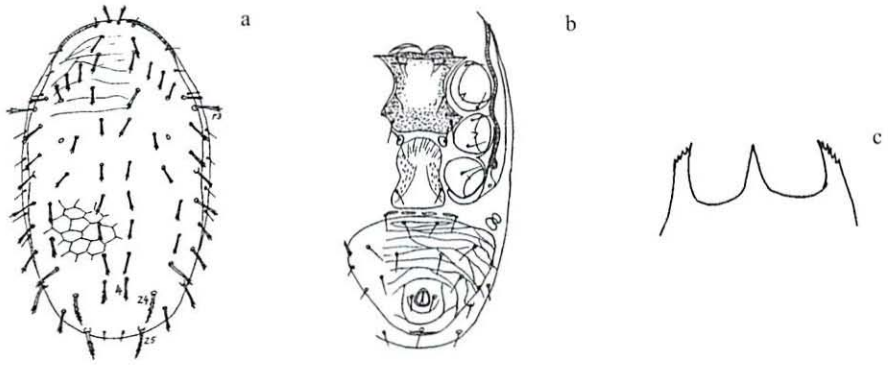

Fig. 5.10. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

***Lasioseius tricuspidis* n. sp.**

(Fig. 5.11.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, primary forest, »hanging litter« and large withered mossy leaves

Paratypes: 2 ♀

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Distinctive in having short slightly tricarinate ds and three-pronged lateral branches of te, ventra with short setae.

Ids = 450 x 270, dorsum reticulate, ds short: no seta reaching the next seta of the series, i1 = 25, i4 = 20, r3 = 35, I1 = 20, I3 = 25, I4 = 30, Z4 = 40, Z5 = 50, S4 = 35, S5 = 40, most ds slightly tricarinate, however I4, Z4, Z5, S4 and S5 pectinate, sternal shield with a scale-like pattern, sternal setae 20 long, ventra with 5 pairs of setae, mostly = 20 long, ps = 30, ventra 145 long, 185 wide, te with cuspidal median process and three-pronged lateral branches, legs: I = 430, II = 390, III = 350, IV = 490, tarsus IV with macrochaetae.

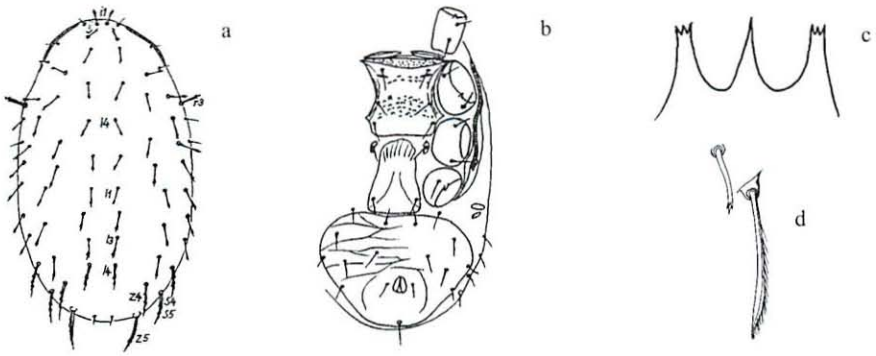

Fig. 5.11. **Female:** a dorsal, b ventral, c tectum, d dorsal setae (a – d original drawings by the authors)

Lasioseius fissurae Karg, 1980

(Figs 5.12.1. – 5.12.2.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Types: Museum für Naturkunde Berlin (Germany)

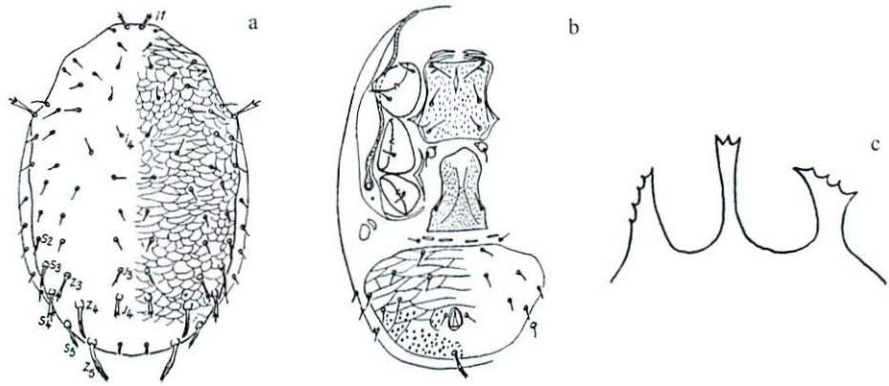

Fig. 5.12.1. **Female:** a dorsal, b ventral, c tectum (a – c KARG 1980)

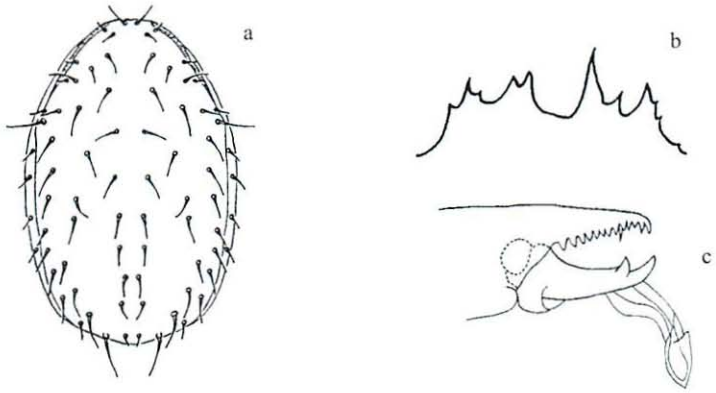

Fig. 5.12.2. **Male:** a dorsal, b tectum, c chelicera (a – c KARG 1980)

Lasioseius patellae n. sp.

(Fig. 5.13.)

Holotype: ♀ Ecuador 1989, prov. Carchi, 2600 m a.s.l., tussocks of dry grass, leaves and litter

Deposition of type: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by short acicular ds on the anterior half of the dorsum and thick, long and caudally pectinate ds on the posterior half of dorsum, middle branch of te cuspidate.

Ids ♀ 420 – 450 x 260 – 280, dorsum reticulate, ds of anterior half mostly short and acicular, only i1 and i3 tricarinate, caudal ds (Z3, Z4, Z5, S5) thick and pectinate, also the short ds I5 pectinate, some ds of the posterior half of dorsum tricarinate: S2, S3, Z1, I3 and I4, various length of ds: i1 = 24, i2 = i3 = 15, i4 = 14, i5 = 15, I2 = 18, I3 = 22, I4 = 30, r3 = 35, Z1

= 18, Z2 = 20, Z3 = 38, Z4 = 40, Z5 = 46, sternal shield smooth, ventra reticulate, 140 long, 225 wide, with 7 pairs of setae, V1 = 17, V2 = 20, marginal setae 7 – 10 long, ps = 27 and pectinate, one of the metapodal plates 4 times as long as the other plate, middle branch of te cuspidate and longer than the lateral branches, these terminally serrate, digitus fixus of chelicera with 14 – 16 teeth, spermatheca like a short funnel, legs: I = 370, II = 300, III = 250, IV = 400.

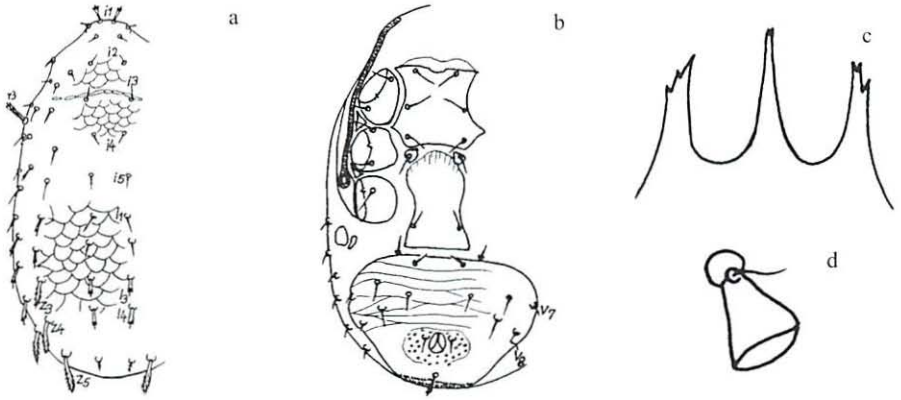

Fig. 5.13. Female: a dorsal, b ventral, c tectum, d spermatheca (a – d original drawings by the authors)

Lasioseius cynari Chant, 1963

(Fig. 5.14.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: United States National Museum, Washington D. C. (USA)

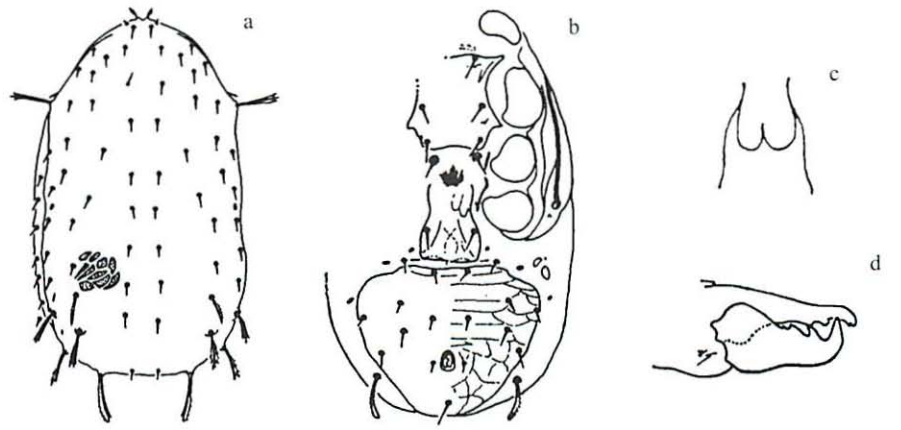

Fig. 5.14. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d CHANT 1963)

Lasioseius podocinoides Berlese, 1916

(Figs 5.15.1. – 5.15.2.)

Berlese, A. (1916): Centuria prima di Acari nuovi. – Redia **12**: 19 – 67
Types: Berlese Acaroteca, Istituto Sperimentale per la Zoologia Agraria, Florence (Italy)

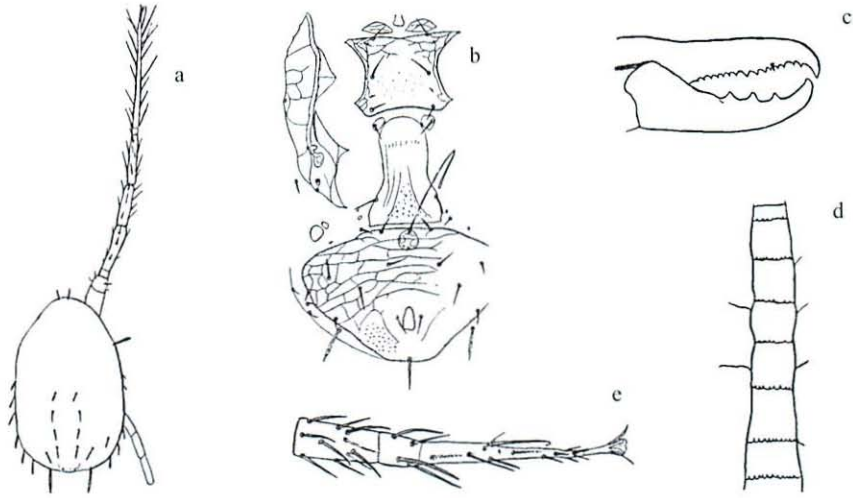

Fig. 5.15.1. **Female:** a dorsal, b ventral, c chelicera, d hypostome, e leg IV (a – e Hurlbutt 1971)

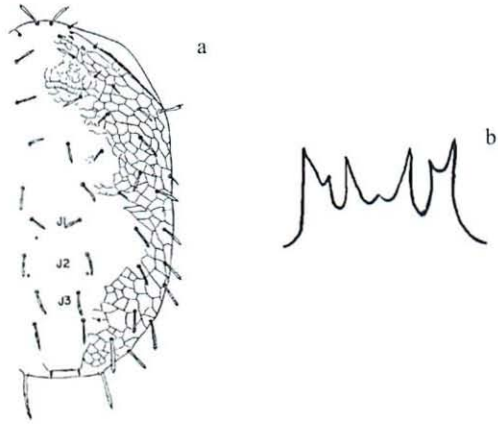

Fig. 5.15.2. **Male:** a dorsal, b tectum (a, b Hurlbutt 1971)

Lasioseius floralis Karg, 1976

(Fig. 5.16.)

Karg, W. (1976): Zur Kenntnis der Überfamilie Phytoseioidea Karg, 1965. – Zool. Jb. Syst. **103**: 505 – 546
Holotype: Hungarian Natural History Museum, Budapest (Hungary)

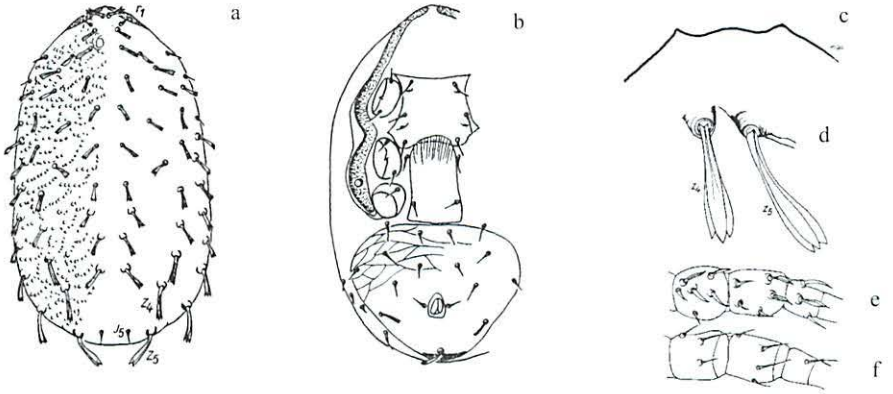

Fig. 5.16. **Female:** a dorsal, b ventral, c tectum, d dorsal setae Z4, Z5, e leg IV dorsal, f leg IV ventral (a – f KARG 1976)

Lasioseius japonicus Ehara, 1965

(Figs 5.17.1. – 5.17.2.)

EHARA, S. (1965): A new species of *Lasioseius* Berlese (Acarina, Blattisocidae) from mite culture. – Acta Arachnol. **19** (2): 25 – 28

Holo- and paratypes: Zoological Institute, Faculty of Sciences, Hokkaido University (Japan)

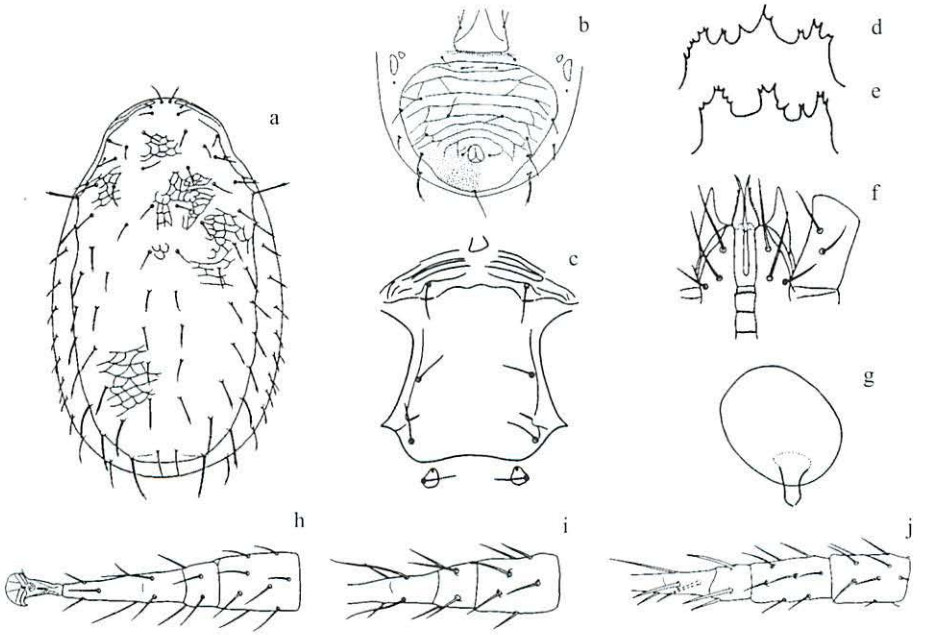

Fig. 5.17.1. **Female:** a dorsal, b ventral, c sternum, d, e tectum, f hypostome, g spermatheca, h leg II, i leg III, j leg IV (a – j EHARA 1965)

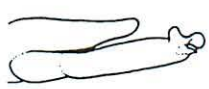

Fig. 5.17.2. **Male:** a spermatodactyl (a EHARA 1965)

Lasioseius penicilliger Berlese, 1916 sensu HUGHES, 1961

(Fig. 5.18.)

BERLESE, A. (1916): Centuria prima di Acari nuovi. – Redia **12**: 19 – 67
Types: deposition unknown to the authors

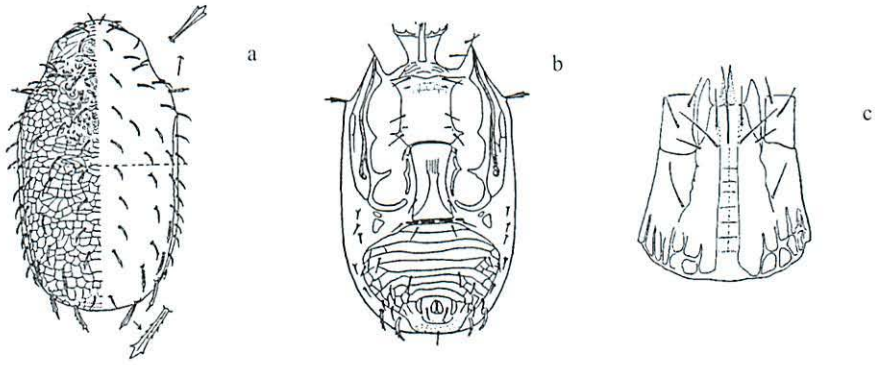

Fig. 5.18. **Female:** a dorsal, b ventral, c hypostome (a – c HUGHES 1961)

Lasioseius furcisetus Athias-Henriot, 1959

(Figs 5.19.1. – 5.19.2.)

ATHIAS-HENRIOT, C. (1959): Phytoseiidae & Aceosejidae (Acarina, Gamasina) d' Algérie. III. Contribution au Aceosejinae. – Bull. Soc. Hist. Nat. Afr. N. **50**: 158 – 195
Syntypes: Laboratoire d'Acarologie de l'Ecole Pratique des Hautes Etudes, Paris (France)
Paratypes: Laboratoire de Zoologie Agricole de l'Ecole Nationale d'Agriculture d'Alger porte l'indication (Egypt)

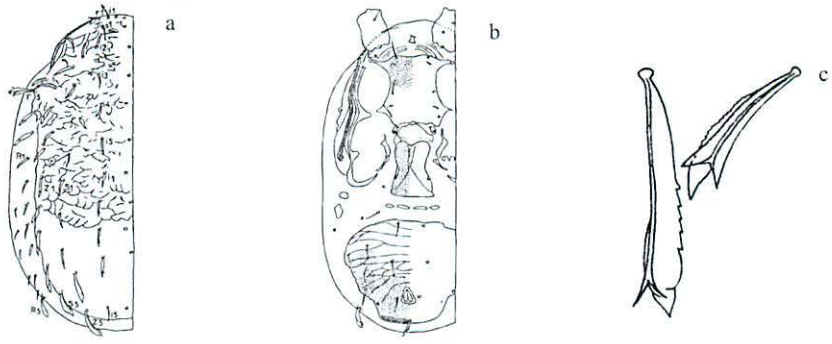

Fig. 5.19.1. **Female:** a dorsal, b ventral, c dorsal setae (a – c ATHIAS-HENRIOT 1959)

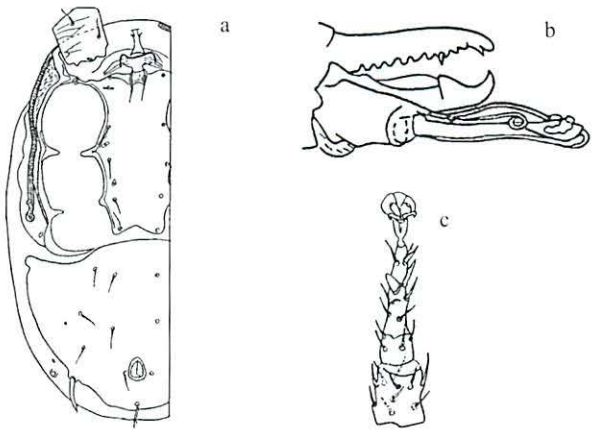

Fig. 5.19.2. **Male:** a ventral, b chelicera, c leg II (a – c ATHIAS-HENRIOT 1959)

Lasioseius oculus Karg, 1980

(Fig. 5.20.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Types: Museum für Naturkunde Berlin (Germany)

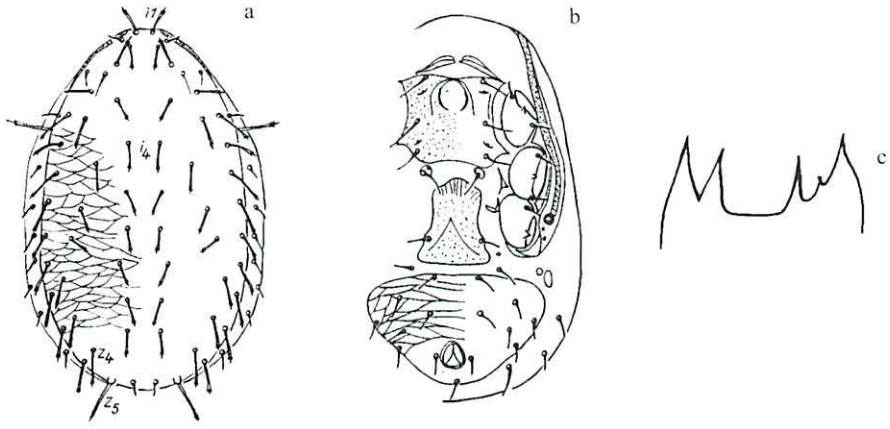

Fig. 5.20. **Female:** a dorsal, b ventral, c tectum (a – c KARG 1980)

Lasioseius ometisimilis Hirschmann, 1963

(Figs 5.21.1. – 5.21.2.)

HIRSCHMANN, W. in WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.): Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450
Types: Zoologische Staatssammlungen München (Germany)

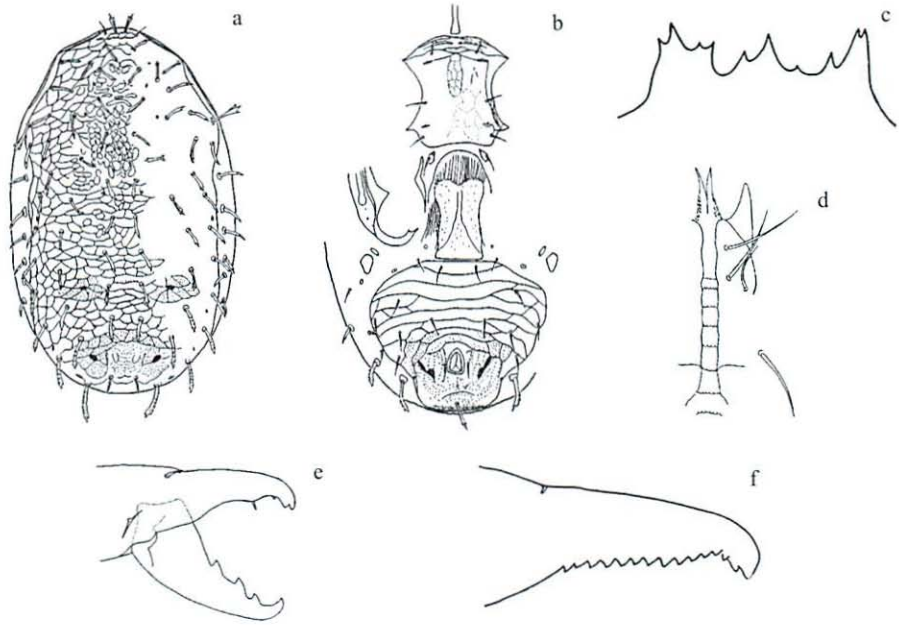

Fig. 5.21.1. **Female:** a dorsal, b ventral, c tectum, d hypostome, e chelicera, f digitus fixus (a – f HIRSCHMANN 1963)

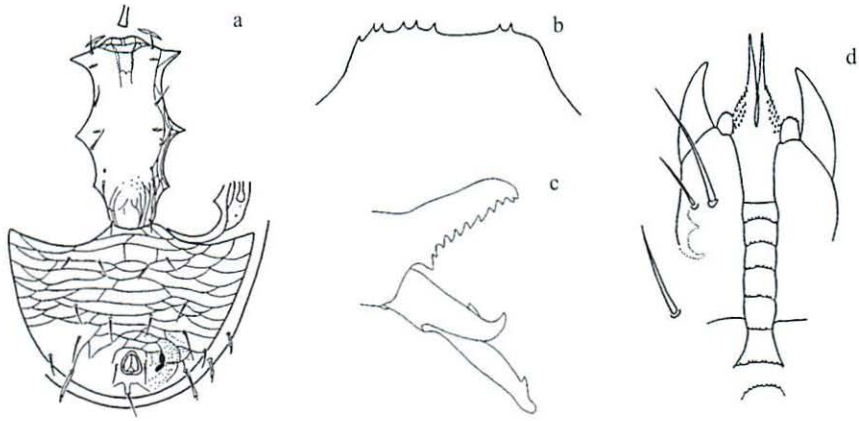

Fig. 5.21.2. **Male:** a ventral, b tectum, c chelicera, d hypostome (a – d HIRSCHMANN 1963)

Lasioseius pluracuspidis n. sp.

(Fig. 5.22.)

Holotype: Ecuador 1990, prov. Pichinca, near Alluriguin, 700 m a.s.l., rain forest, moulding, lying tree trunk

Deposition of type: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by relatively short tricarinate ds with serrate margins, te with serrate margin showing a single short middle point, leg I about as long as the idiosoma.

Ids 400 – 420 x 200 – 210, most ds short and tricarinate, shoulder setae r3 remarkably longer, caudal setae long and pectinate, i1 = 25, i4 = 20, r3 = 45, I1 = 20, I2 = 25, I4 = 20, I5 = 10, Z4 = 45, Z5 = 50, sternal shield smooth, presternal region lineate, sternal setae 25 – 30 long, digitus fixus of chelicera with 20 teeth, te with serrate margin, but a short separate middle point, legs: I = 400, II = 380, III = 360, IV = 500, macrochaetae on tarsus: 60 and 40 (metatarsus) long.

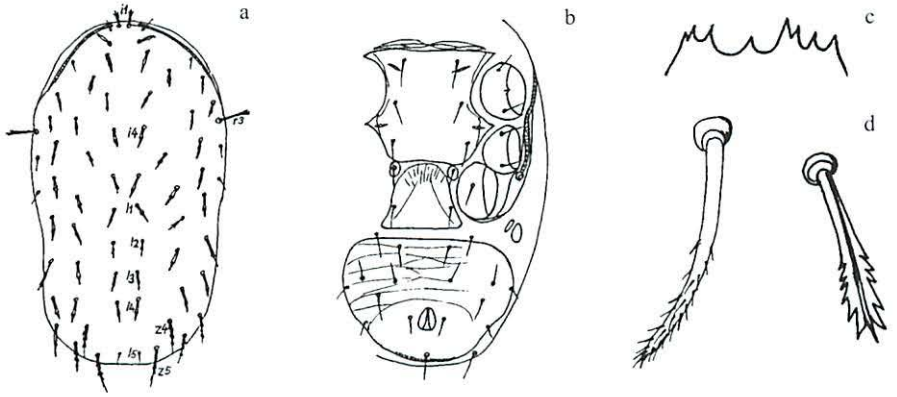

Fig. 5.22. **Female:** a dorsal, b ventral, c tectum, d dorsal setae (a – d original drawings by the authors)

Key 6: The known species of the *Lasioseius-ometes*-complex (including a new species from Ecuador)

1(20) Margin of te serrate or smooth.

2(3) Only a few ds tricarinate (r3, Z4, Z5), caudal ds pectinate, ventra broader than long, surface of sternal shield with many dots, ds Z5 = 60, r3 = 52, leg I = 335 – 390, leg IV = 478 – 481, ids = 405 – 430 (Fig. 6.1.):

L. scapulatosimilis Karg, 1980

syn.: *L. scapulatus* sensu ATHIAS-HENRIOT, 1959

– North Africa.

3(2) Most ds tricarinate.

4(19) Ds Z5 and sometimes Z4 and caudal S-setae pectinate.

5(10) Only ds Z5 and sometimes S5 are pectinate.

6(9) Ventra as long as wide or longer than wide.

7(8) Ventra about as long as wide, most ds moderately short (16 – 24) and weakly tricarinate, ds Z4 and Z5 longer (33 – 37), te coarsely denticulate, digitus fixus of chelicerae with a row of 5 – 6 teeth, leg I = 330 – 335, leg IV = 305 – 330, ids = 378 – 421 (Figs 6.2.1. – 6.2.2.):

L. kinikinik Walter & Lindquist, 1989

– North America, Colorado.

8(7) Ventra longer than wide, ds Z5 pectinate, margin of te smooth, Z5 = 3x length of i4, ids = 370 (Fig. 6.3.):

L. quadrisetosus Chant, 1960

– India, Assam at Burnihat on *Citrus*.

9(6) Ventra distinctly broader than long, in the middle of sternal shield an oval-shaped structure with a net pattern, ds i4 = 40, Z4 = 60, Z5 = 75, S5 = 60, leg I = 400 – 410, ids = 570 – 590 (Fig. 6.4.):

L. zerconoides Willmann, 1954

– Europe.

10(5) Beyond ds Z5, also other caudal ds pectinate.

11(16) Ventra broader than long or as long as wide.

12(15) In the middle of the sternal shield a structure of two parallel longitudinal lines or an oval-shaped reticulate structure.

13(14) Parallel lines on sternal shield, ds Z4 = 55, Z5 = 58, leg I = 340, leg IV = 410, ids = 390 – 415 (Figs 6.5.1. – 6.5.2.):

L. bilineatus Karg, 1976

– Chile.

14(13) An oval-shaped reticulate structure on the sternal shield, Z4 = 52, Z5 = 55, leg I = 380 – 400, leg IV = 420 – 430, ids = 430 – 450 (Fig. 6.6.):

L. cortisimilis Karg, 1994

– Galapagos.

15(12) Surface of sternal shield with many dots, leg I = 470, leg IV = 548, ids = 534 (Fig. 6.7.):

L. mumai De Leon, 1963

– North America, from fungus on *Magnolia*.

16(11) Ventra longer than wide.

17(18) Surface of sternal shield smooth, I1, I2 and I3 not reaching the next seta of the series, ds Z4 = 38 – 59, Z5 = 60 – 87, ids = 330 – 460 (Figs 6.8.1. – 6.8.2.):

L. cuppa Walter & Lindquist, 1997

– Australia, Queensland, from leaves in a montane tropical rain forest.

18(17) Surface of sternal shield reticulate, ds I1 and I2 reaching the next seta of the series, s1, z2 short (= 20), ids = 330 – 350 (Fig. 6.9.):

L. wondjina Walter & Lindquist, 1997

– Australia, from leaves in a lowland tropical rain forest.

19(4) Caudal ds as well as the other ds tricarinate, surface of sternal shield with fine comma-like structures, leg I = 390 – 400, leg IV = 410, ids = 440 – 654 (Figs 6.10.1. – 6.10.5.):

L. corticeus Lindquist, 1971

– North and South America.

20(1) Margin of te with some longer branches, as a rule most ds tricarinate.

21(24) Te with 3 smooth branches.

22(23) Ds Z5 (= 52) about 1½ times as long as i4, dorsum with scaly structures, leg I = 390, ids = 430 (Fig. 6.11.):

L. queenslandicus (Womersley, 1956)

syn.: *Platyseius queenslandicus* Womersley, 1956, *L. athiasae* Nawar & Nasr, 1991

– Australia.

23(22) Ds Z5 remarkably long, about 3 times as long as ds i4 and distally pectinate, on the margin of the dorsum 4 pairs of distinct accessory plates, ids = 470 (Fig. 6.12.):

L. meridionalis Chant, 1963

– North America, on bulb roots and orchid plants.

24(21) Other form of te.

25(52) Margin of te with 2 – 4 branches or groups of points, branches may be split terminally.

26(51) All branches of te split terminally.

27(28) Sternal shield with posterior margin deeply excavated to level of setae pair st2, te with 3 – 4 groups of points, ids = 560 – 580 (Figs 6.13.1. – 6.13.5.):

L. ometes (Oudemans, 1903)

syn.: *Hypoaspis ometes* Oudemans, 1903

– Europe, tunnel of wood-boring beetles.

28(27) Posterior margin of sternal shield nearly straight.

29(30) Dorsum covered with little tubercles, sternal shield medially with a structure consisting of a net-like pattern, ids = 330 – 350 (Fig. 6.14.):

L. tuberculatus Karg, 1980

– Ecuador.

30(29) Dorsum without tubercles, mostly with net-like structures.

31(32) Ds I5 (= 36) longer than i1, as long as I1, ids = 410 (Fig. 6.15.):

L. manyarae Hurlbutt, 1972

– Africa, Tanzania.

32(31) Length of ds I5 reduced, shorter than i1.

33(38) The first seta pair of the sternal shield (st1) located separately on jugular shields, sternal shield with a structure consisting of a net pattern.

34(35) Ds Z3 nearly reaching ds S5, median point of te longer than lateral branches, branches of te longer than broad, length of anus : length of ventra = 1 : 5, 7 macrochaetae on leg IV = 43, ds I1, I2, I3 and I4 = 30, Z5 = 50, ids = 390 – 430 (Figs 6.16.1. – 6.16.2.):

L. fimetorum Karg, 1971

– Europe.

35(34) Length of ds Z3 = ⅔ the distance between Z3 and S5, median point of te as long as or shorter than the lateral branches.

36(37) Median point of te as long as the lateral branches, the three branches as long as wide, length of anus : length of ventra = 1 : 6, macrochaetae on leg IV = 35, ds Z5 = 47, ids = 430 (Figs 6.17.1. – 6.17.2.):

L. sugawarai Ehara, 1964

– Japan.

37(36) Median point of te shorter than the lateral branches, the three branches longer than wide, length of anus : length of ventra = 1 : 7.6, ids = 421 (Fig. 6.18.):

L. tridentatus Baker, Delfinado & Abbatiello, 1976

– North America.

38(33) The first seta pair of the sternal shield (st1) located on the shield.

39(40) Ventra remarkably broad, length : width = 3 : 4, margin of te with 3 – 4 groups of points, ds Z4 = 47, Z5 = 50, leg I = 310 – 340, leg IV = 320 – 360, ids = 330 – 380 (Figs 6.19.1. – 6.19.2.):

L. rostratus Karg, 1996

– New Caledonia.

40(39) Ventra about as long as wide.

41(42) Te with 3 branches, relatively long and slender, terminally finely furcate; ds terminally broad and tricarinate, sternal shield with calix-like structure, ids = 360 (Fig. 6.20.):

L. plumatus Karg, 1980

– Venezuela.

42(41) Branches of te formed otherwise.

43(46) Margin of te with 3 branches.

44(45) Middle branch of te terminally trispinate, twice as long as lateral branches; most ds 30 – 34, Z5 = 47, ids = 400 (Figs 6.21.1. – 6.21.2.):

L. liuchungfui Samsinak, 1964

– China, province Canton, in caves of *Neotermes*.

45(44) Te with long pointed branches having variably toothed margins, ds remarkably short, slightly trifid, length of i3 = 1/3 the distance i3 – i4, I1 = 1/2 the distance I1 – I2, Z5 about as long as the other setae but thicker and more distinctly tricarinate, ids = 590 – 625 (Figs 6.22.1. – 6.22.5.):

L. elegans Fain, Hyland & Aitken, 1977

– Trinidad, from flowers of *Heliconia trinidatis*.

46(43) Te with 2 – 3 broad groups of points.

47(48) Te with 2 groups of points, ds relatively long, I2, I3, Z2, Z3 and Z4 reaching the next seta of the series, Z5 = 54, ids = 360 – 379 (Fig. 6.23.):

L. sewai Nasr & Abou-Awad, 1987

– Egypt, Sewa, New Valley province.

48(49) Te with 3 groups of points, ds relatively short, no seta reaching the next seta of the series.

49(50) Sternal shield on the anterior half medially with two longitudinal rows of quadrangular sculptures, ds spatulate serrate, distally trispinate, relatively short, I1 = 1/2 the distance of I1 – I2, leg I = 422, ids = 484 (Fig. 6.24.):

L. kargi Kandil, 1980

– Hungary, various localities: Velem, Vértes, Szendehely, Németbánes, Sikfőcut.

50(49) Sternal shield medially punctate, ds slender trispinate, I1 = ⅔ the distance I1 – I2, ids = 466 – 490 (Fig. 6.25.):

L. neometes McGraw & Farrier, 1969
– North America, from *Dentroctonus* sp.

51(26) Only the middle branch of te is split terminally, lateral branches simple and smooth, ds Z5 and r3 longer than the other ds, ids = 385 – 423 (Fig. 6.26.):

L. nambirimae Krantz, 1962
– Africa.

52(25) Margin of te with a pair of lateral points, te in the middle with 1 – 2 smooth points or irregularly serrate.

53(58) Te with 2 smooth median points.

54(55) Ventra remarkably broader than long, length : width = 3 : 4, ds Z4 = 55, Z5 = 55, sternal shield with many fine dots, leg I = 360, leg IV = 470, ids = 370 – 380 (Figs 6.27.1. – 6.27.2.):

L. tetraspinosus Karg, 1980
– Cuba.

55(54) Ventra about as long as broad.

56(57) Surface of sternal shield with many fine dots, ds relatively long, all setae of posterior half of dorsum reaching the next seta of the series, Z4 = 75, Z5 = 67, leg I = 420, leg IV = 530, ids = 460 (Fig. 6.28.):

L. euarmatus Karg, 1994
– Galapagos, from ferns.

57(56) Anterior margin of sternal shield with an incision in the middle, ds short, no seta of posterior half of dorsum reaching the next seta of the series, ds Z4 = 41, Z5 = 48, leg I = 390, leg IV = 400, (Fig. 6.29.):

L. inconspicuus Westerboer, 1963
– Europe.

58(53) Te in the middle with one smooth point or irregularly serrate.

59(62) Te with one smooth median point, most ds tricarinate, ds Z4 and Z5 terminally broad and serrate.

60(61) Shoulder setae r3 remarkably long, as long as the caudal setae Z5 (= 42), sternal shield on the anterior half with a median field with a net-like structure, ids = 370 (Figs 6.30.1. – 6.30.2.):

L. reticulatus Bhattacharyya, 1968
– India, West Bengal.

61(60) Shoulder setae r3 shorter than the caudal setae, sternal shield punctate, caudal ds Z4 = 45, Z5 = 51, ids = 435 (Fig. 6.31.):

L. thermophilus Willmann, 1942
– Europe near a thermal spring.

62(59) Te in the middle irregularly serrate, dorsum with relatively short but distinctly tricarinate ds, including the caudal setae, ds Z5 = 50 long, sternal shield smooth, ventra length : width = 6 : 7, ids = 400 – 420 (Fig. 6.32.):

L. serradentis n. sp.
– Ecuador.

Subgenus *Crinidens* Karg, 1980 n. comb.

Lasioseius-ometes-complex

Lasioseius scapulatosimilis Karg, 1980

(Fig. 6.1.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Holotype: Laboratoire d'Acarologie de l'Ecole Pratique des Hautes Etudes, Paris (France)
Synonym: *Lasioseius scapulatus* sensu ATHIAS-HENRIOT, 1959
Phytoseiidae & Aceosejidae (Acarina, Gamasina) d' Algerie. III. Contribution au Aceosejinae. – Bull. Soc. Hist. Nat. Afr. N. **50** (5/6): 158 – 195

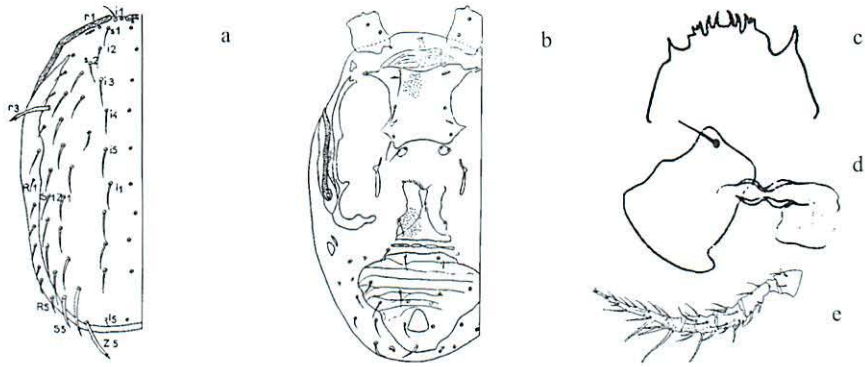

Fig. 6.1. **Female:** a dorsal, b ventral, c tectum, d spermatheca, e leg IV (a – e ATHIAS-HENRIOT 1959)

Lasioseius kinikinik Walter & Lindquist, 1989

(Figs 6.2.1. – 6.2.2.)

WALTER, D. E. & E. E. LINDQUIST (1989): Life history and behavior of mites in the genus *Lasioseius* (Acari, Mesostigmata, Ascidae) from grassland soils in Colorado, with taxonomic notes and description of a new species. – Can. J. Zool. **67**: 2797 – 2813
Holotype: United States National Museum, Washington D. C. (USA)
Paratypes: Canadian National Collection of Insects and Arachnids, Ottawa (Canada), Field Museum of Natural History, Chicago (USA)

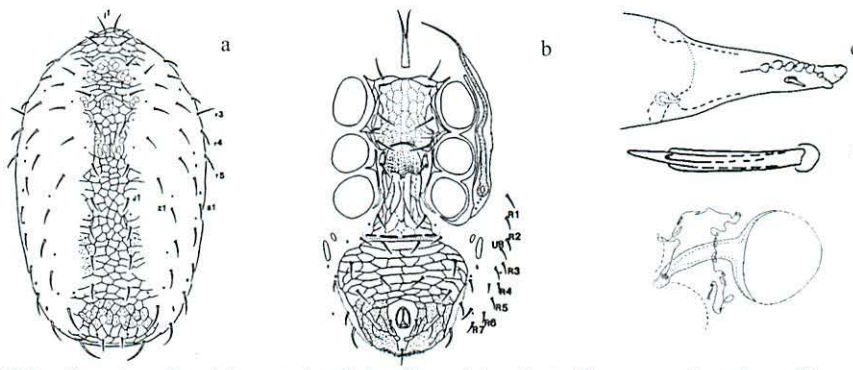

Fig. 6.2.1. **Female:** a dorsal, b ventral, c digitus fixus, d dorsal seta I3, e spermatheca (a – e WALTER & LINDQUIST 1989)

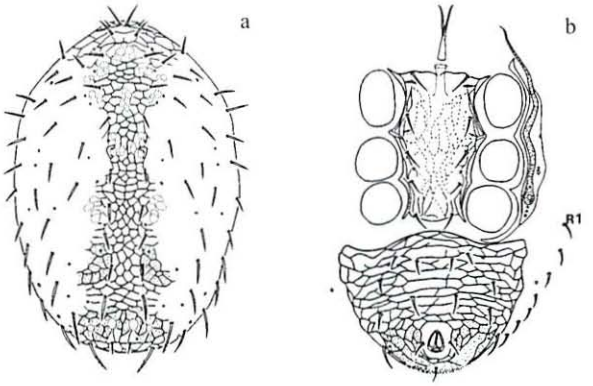

Fig. 6.2.2. **Male:** a dorsal, b ventral (a, b WALTER & LINDQUIST 1989)

Lasioseius quadrisetosus Chant, 1960

(Fig. 6.3.)

CHANT, D. A. (1960): Descriptions of five new species of mites from India (Acarina, Phytoseiidae, Aceosejidae). – Can. Entomol. **92**: 58 – 65

Holotype: Canadian National Collection, Belleville (Canada)

Paratypes: Canadian National Collection, Belleville (Canada), Citrus Experiment Station, Riverside, California (USA)

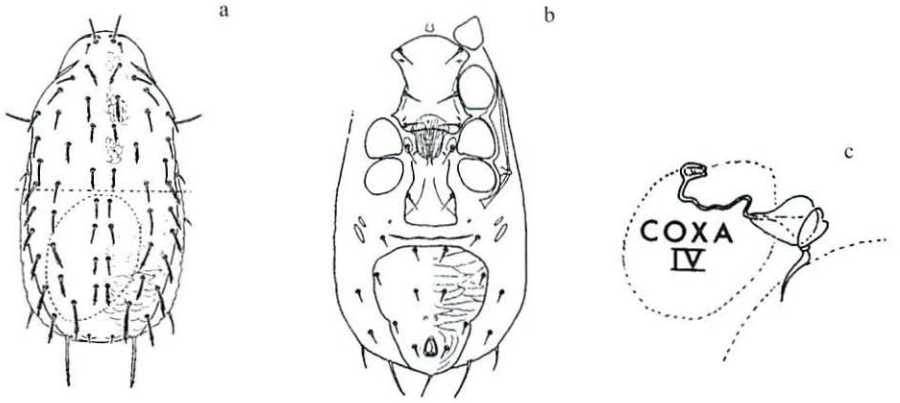

Fig. 6.3. **Female:** a dorsal, b ventral, c spermatheca (a – c CHANT 1960)

Lasioseius zerconoides Willmann, 1954

(Fig. 6.4.)

WILLMANN, C. (1954): Mährische Acari, hauptsächlich aus dem Gebiete des Mährischen Karstes. – Cesk. Parasit. **1**: 213 – 268

Types: Zoologische Staatssammlung München (Germany)

Note: This species was examined and new figures drawn based on the original material of C. Willmann.

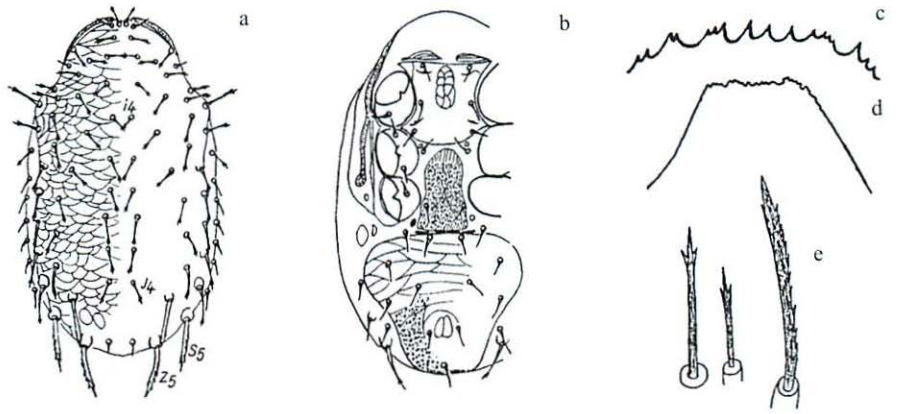

Fig. 6.4. **Female:** a dorsal, b ventral, c, d tectum, e dorsal setae (a – c KARG 1980; d, e WILLMANN 1954)

Lasioseius bilineatus Karg, 1976

(Figs 6.5.1. – 6.5.2.)

KARG, W. (1976): Zur Kenntnis der Überfamilie Phytoseioidea Karg, 1965. – Zool. Jb. Syst. **103**: 505 – 546

Types: Hungarian Natural History Museum, Budapest (Hungary), Museum für Naturkunde Berlin (Germany)

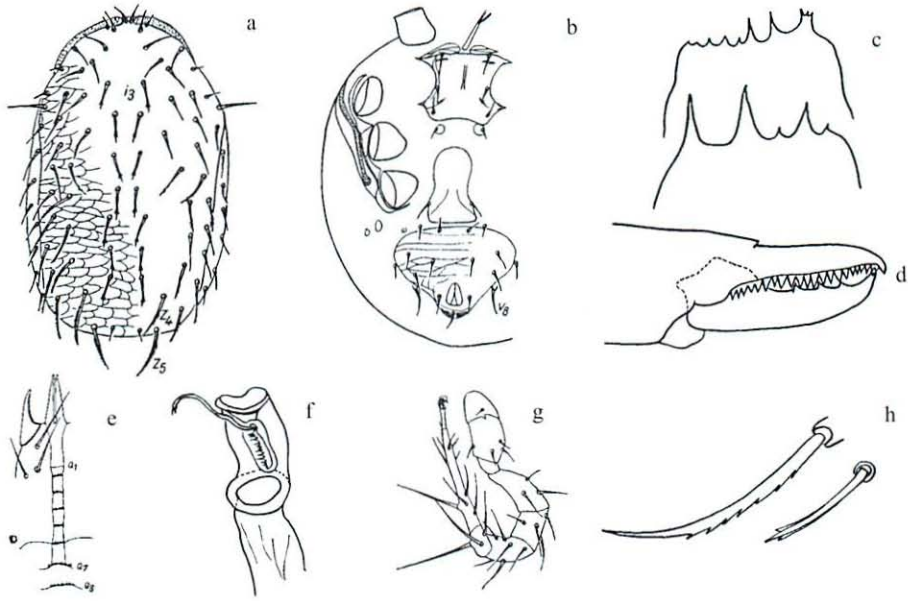

Fig. 6.5.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermateca, g leg IV, h dorsal setae Z4, i3 (a – h KARG 1976)

Fig. 6.5.2. **Male:** a tectum, b chelicera (a, b KARG 1976)

Lasioseius cortisimilis Karg, 1994

(Fig. 6.6.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216
Types: Museum für Naturkunde Berlin (Germany)

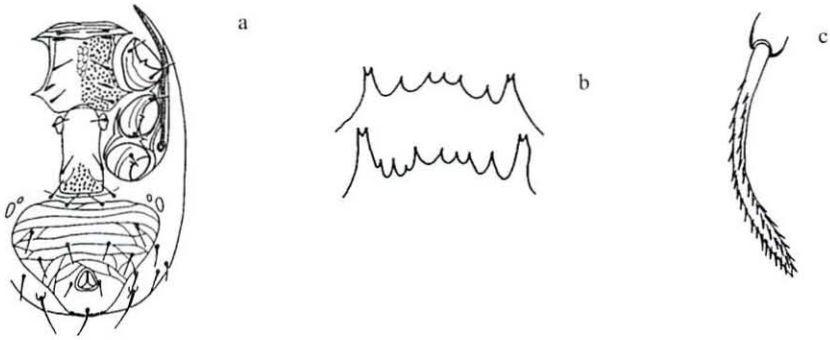

Fig. 6.6. **Female:** a ventral, b tectum, c dorsal seta Z5 (a – c KARG 1994)

Lasioseius mumai De Leon, 1963

(Fig. 6.7.)

DE LEON, W. (1963): A new genus and twelve new species of mites from Mexico and southeast United States (Acarina, Blattisocidae). – Fla. Entomol. **46** (2): 197 – 207
Types: deposition unknown to the authors

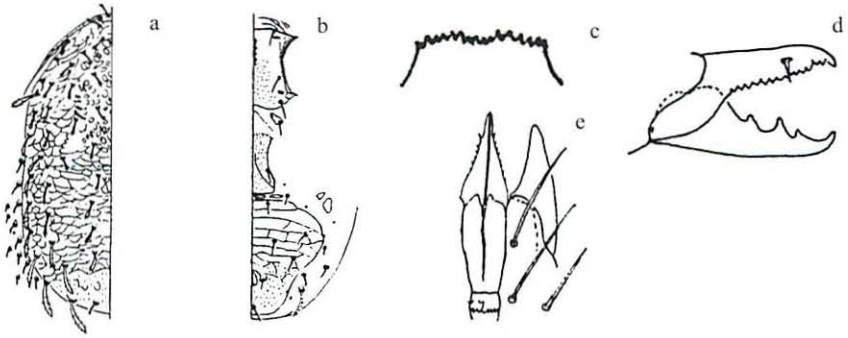

Fig. 6.7. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome (a – e DE LEON 1963)

Lasioseius cuppa Walter & Lindquist, 1997

(Figs 6.8.1. – 6.8.2.)

WALTER, D. E. & E. E. LINDQUIST (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): the *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

Holotype: University of Queensland Institute Collection, Department of Zoology and Entomology, St. Lucia, Queensland (Australia)

Paratypes: Queensland Department of Primary Industry, Meiers Road, Indooroopilly, University of Queensland Institute Collection, Department of Zoology and Entomology, St. Lucia, Queensland (Australia)

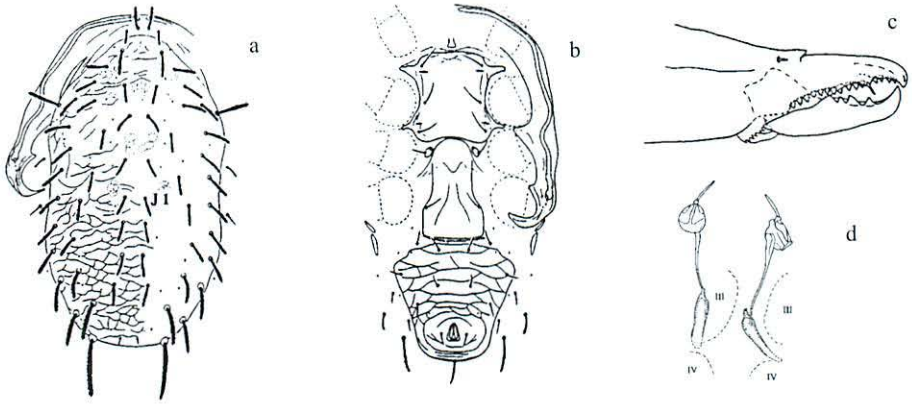

Fig. 6.8.1. **Female:** a dorsal, b ventral, c chelicera, d spermatheca (a – d WALTER & LINDQUIST 1997)

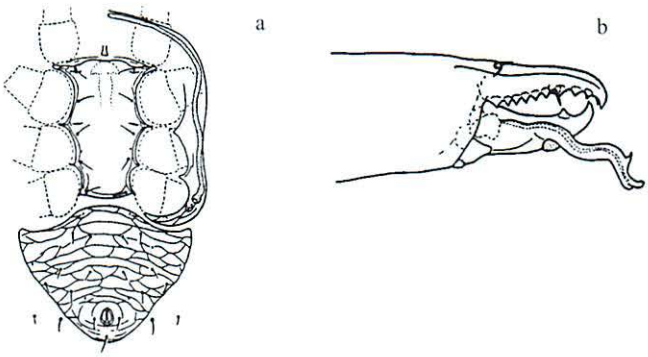

Fig. 6.8.2. **Male:** a ventral, b chelicera (a, b WALTER & LINDQUIST 1997)

Lasioseius wondjina Walter & Lindquist, 1997

(Fig. 6.9.)

WALTER, D. E. & E. E. LINDQUIST (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): the *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

Holotype: University of Queensland Institute Collection, Department of Zoology and Entomology, St. Lucia, Queensland (Australia)

Paratypes: Queensland Department of Primary Industry, Meiers Road, Indooroopilly, University of Queensland Institute Collection, Department of Zoology and Entomology, St. Lucia, Queensland (Australia)

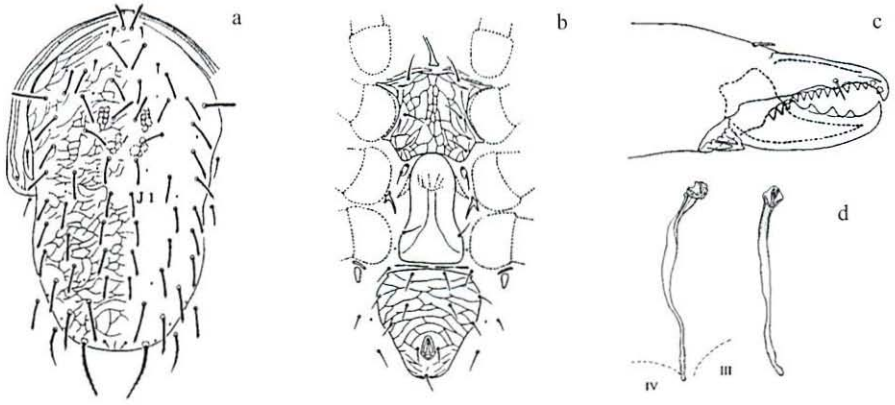

Fig. 6.9. **Female:** a dorsal, b ventral, c chelicera, d spermatheca (a – d WALTER & LINDQUIST 1997)

Lasioseius corticeus Lindquist, 1971

(Figs 6.10.1. – 6.10.5.)

LINDQUIST, E. E. (1971): New species of Ascidae (Acarina, Mesostigmata) associated with forest insect pests. – Can. Entomol. **103**: 919 – 942

Holotype: United States National Museum, Washington D. C. (USA)

Paratypes: Canadian National Collection, Ottawa (Canada), Southern Forest Experiment Station, Pineville, United States National Museum, Washington D. C. (USA)

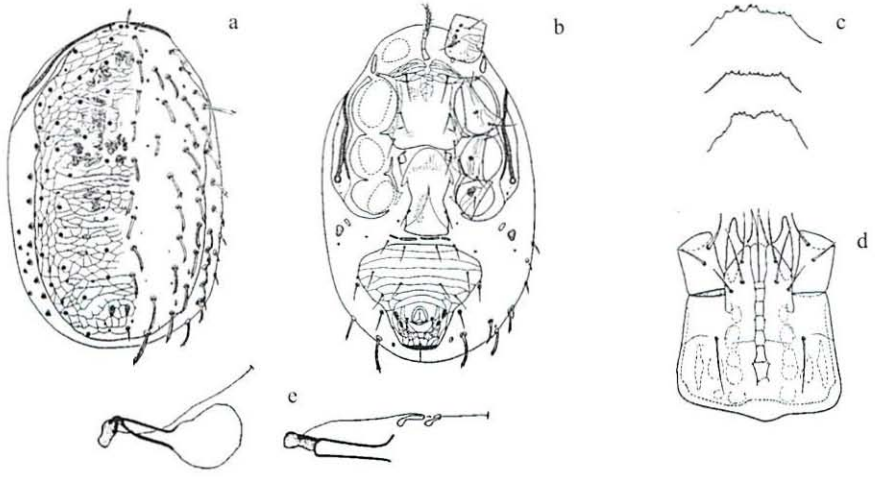

Fig. 6.10.1. **Female:** a dorsal, b ventral, c tectum, d hypostome, e spermatheca (a – e LINDQUIST 1971)

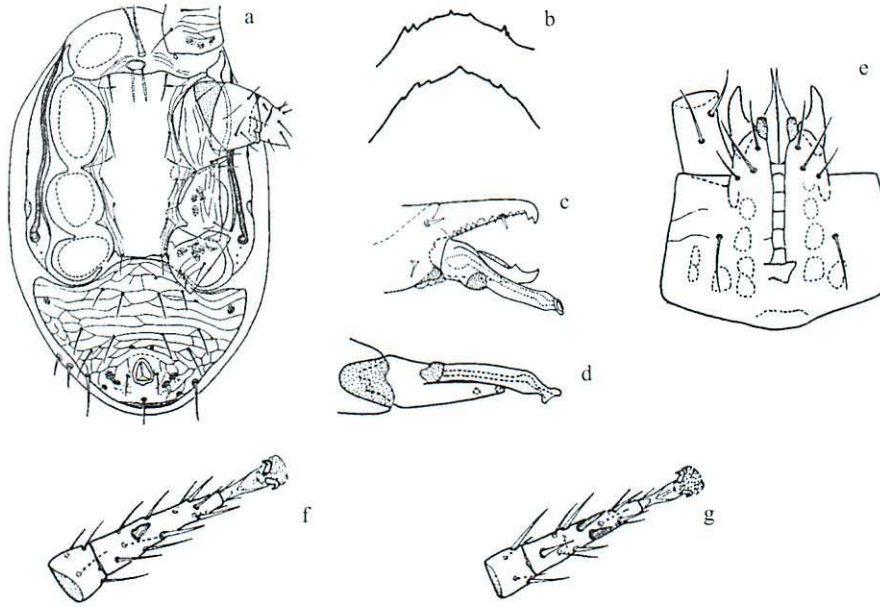

Fig. 6.10.2. **Male**: a ventral, b tectum, c, d chelicera, e hypostome, f tarsus II, g tarsus III (a – g LINDQUIST 1971)

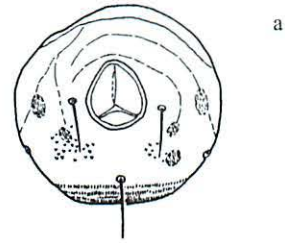

Fig. 6.10.3. **Deutonymph:** a anal shield (a LINDQUIST 1971)

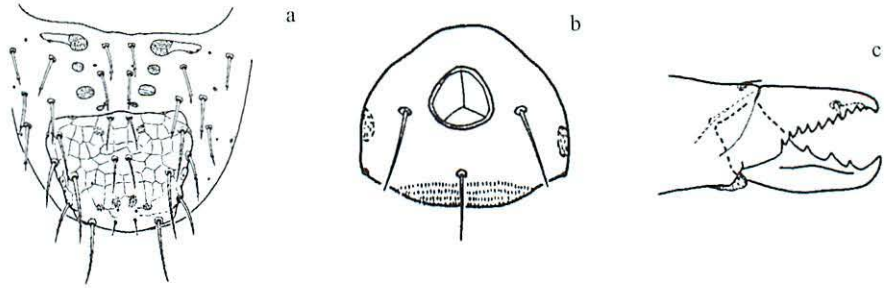

Fig. 6.10.4. **Protonymph:** a dorsal, b anal shield, c chelicera (a – c LINDQUIST 1971)

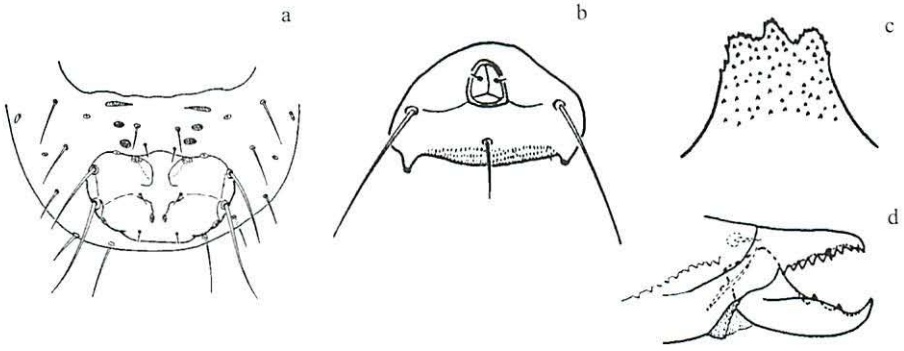

Fig. 6.10.5. **Larva:** a dorsal, b anal shield, c tectum, d chelicera (a – d LINDQUIST 1971)

Lasioseius queenslandicus (Womersley, 1956)

(Fig. 6.11.)

WOMERSLEY, H. (1956): On some new Acarina-Mesostigmata from Australia, New Zealand and Guinea. – J. Linn. Soc., Zool. **42** (288): 505 – 599

Types: South Australian Museum, North Terrace, Adelaide (Australia)

Synonyms: *Platyseius queenslandicus* Womersley, 1956
On some new Acarina-Mesostigmata from Australia, New Zealand and Guinea. – J. Linn. Soc., Zool. **42** (288): 505 – 599

Lasioseius athiasae Nawar & Nasr, 1991
Lasioseius athiasae, a new species from Egypt (Mesostigmata, Ascidae). – Acarologia **32** (4): 303 – 310

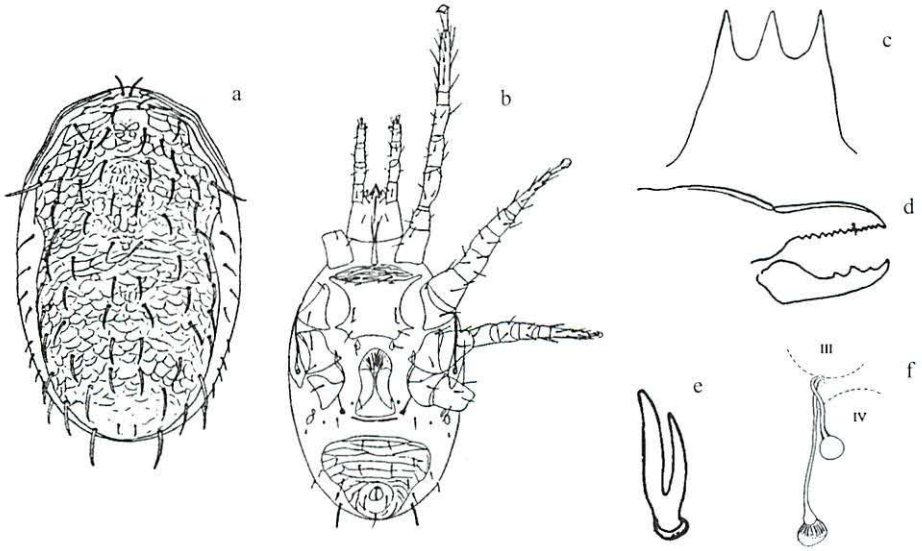

Fig. 6.11. **Female:** a dorsal, b ventral, c tectum, d chelicera, e seta on palpal tarsus, f spermatheca (a – e WOMERSLEY 1956; f WALTER & LINDQUIST 1997)

Lasioseius meridionalis Chant, 1963

(Fig. 6.12.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: United States National Museum, Washington D. C. (USA)

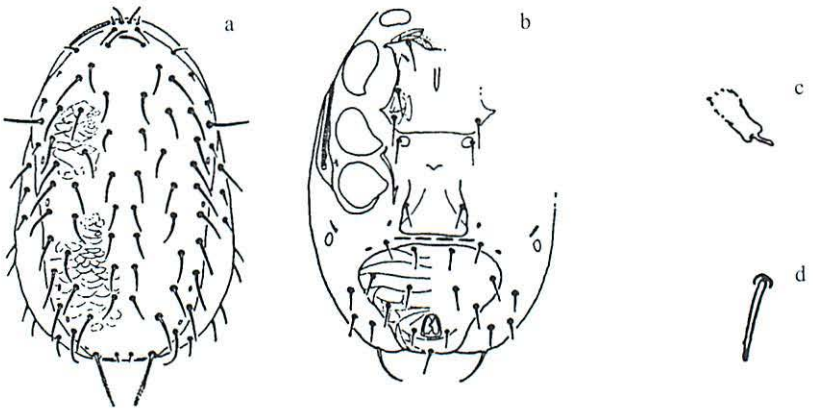

Fig. 6.12. **Female:** a dorsal, b ventral, c coxal gland, d seta (a – d CHANT 1963)

Lasioseius ometes (Oudemans, 1903)

(Figs 6.13.1. – 6.13.5.)

OUDEMANS, A. C. (1903): Acarologische Aanteekeningen VIII. – Entomol. Ber. (s-Gravenhage) **1** (14): 100 – 103

Types: deposition unknown to the authors

Synonym: *Hypoaspis ometes* Oudemans, 1903
Acarologische Aanteekeningen VIII. – Entomol. Ber. (s-Gravenhage) **1** (14): 100 – 103

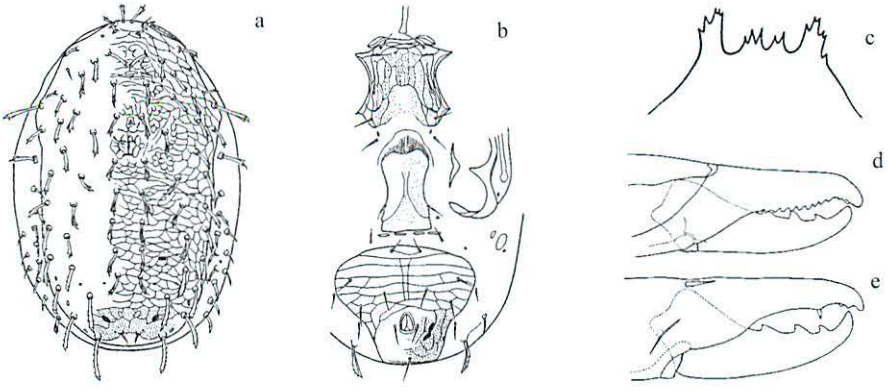

Fig. 6.13.1. **Female:** a dorsal, b ventral, c tectum, d chelicera from inside, e chelicera from outside (a – e WESTERBOER 1963)

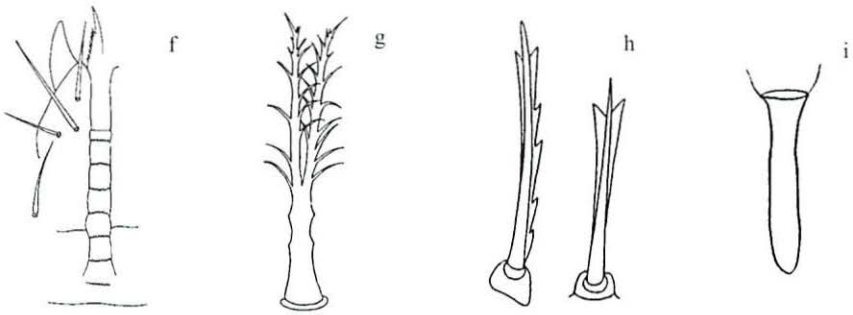

Fig. 6.13.1. (cont.) **Female:** f hypostome, g tritosternum, h dorsal setae, i spermatheca (f – g WESTERBOER 1963; h VITZTHUM 1923; i ATHIAS-HENRIOT 1961)

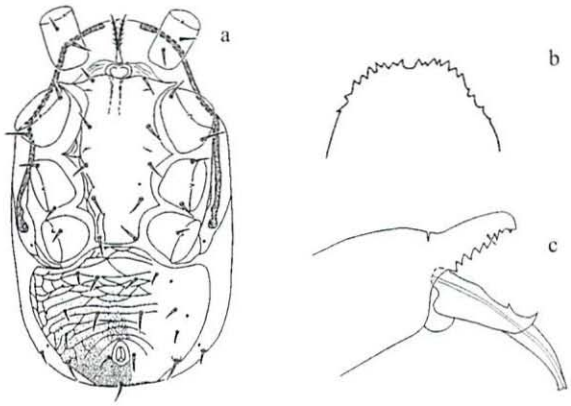

Fig. 6.13.2. **Male:** a ventral, b tectum, c chelicera (a – c GWIAZDOWICZ 2003)

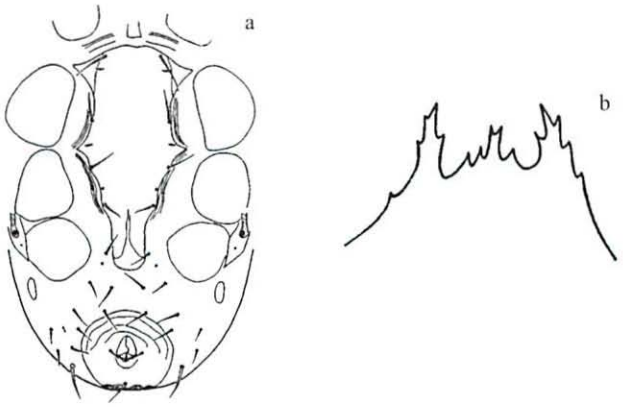

Fig. 6.13.3. **Deutonymph:** a ventral, b tectum (a, b WESTERBOER 1963)

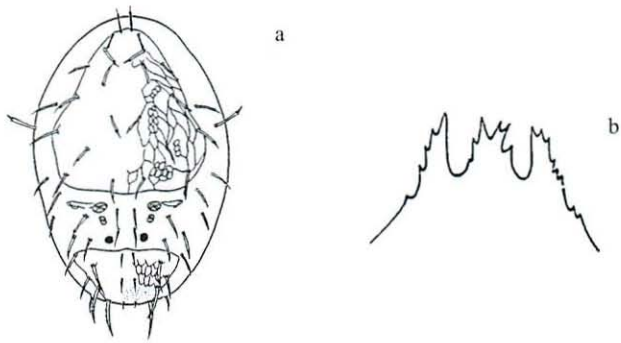

Fig. 6.13.4. **Protonymph:** a dorsal, b tectum (a, b WESTERBOER 1963)

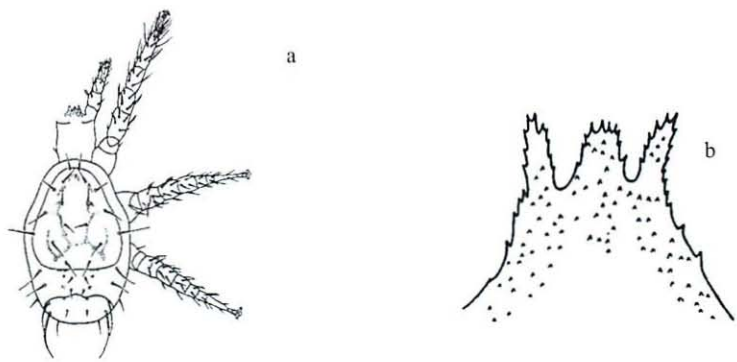

Fig. 6.13.5. **Larva:** a dorsal, b tectum (a, b WESTERBOER 1963)

Lasioseius tuberculatus Karg, 1980

(Fig. 6.14.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Types: Museum für Naturkunde Berlin (Germany)

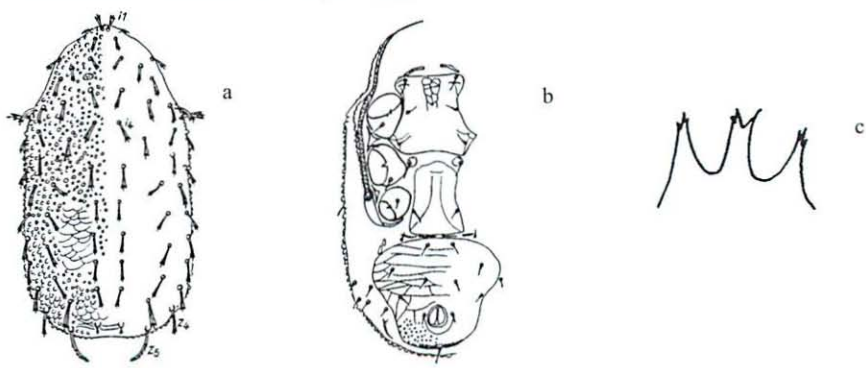

Fig. 6.14. **Female:** a dorsal, b ventral, c tectum (a – c KARG, 1980)

Lasioseius manyarae Hurlbutt, 1972

(Fig. 6.15.)

HURLBUTT, H. W. (1972): Ascinae and Podocinidae (Acarina, Mesostigmata) from Tanzania. – Acarologica **13** (2): 280 – 300

Holotype: United States National Museum, Washington D. C. (USA)

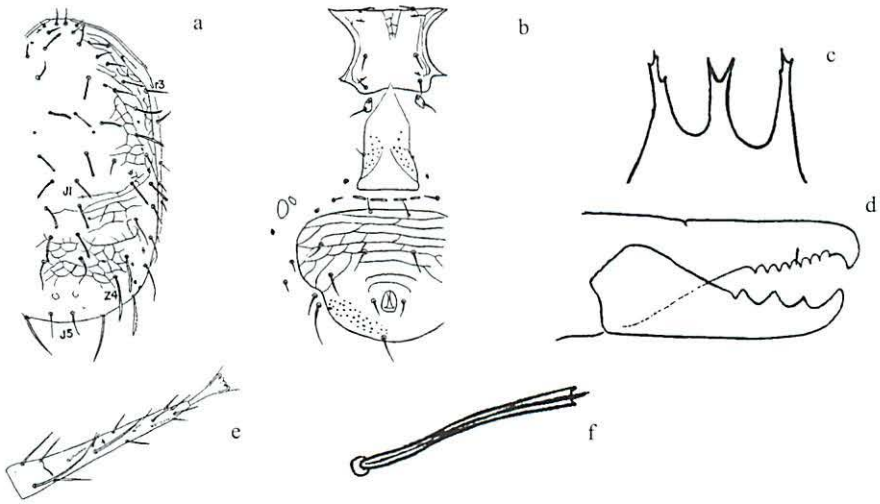

Fig. 6.15. **Female:** a dorsal, b ventral, c tectum, d chelicera, e tarsus IV, f dorsal seta (a – f HURLBUTT 1972)

Lasioseius fimetorum Karg, 1971

(Figs 6.16.1. – 6.16.2.)

KARG, W. (1971): Acari (Acarina, Milben; Unterordnung Anactinochaeta [Parasitiformes]): Die freilebenden Gamasina (Gamasides), Raubmilben. – In: DAHL, F., M. DAHL & F. PEUS (eds): Die Tierwelt Deutschlands und der angrenzenden Meeresteile. 59. Teil, Gustav Fischer Verlag, Jena: 1 – 475

Types: Museum für Naturkunde Berlin (Germany)

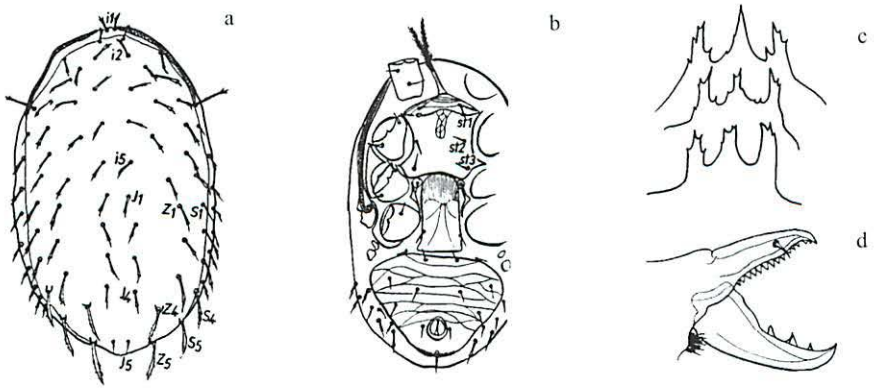

Fig. 6.16.1. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KARG 1971)

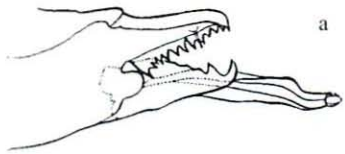

Fig. 6.16.2. **Male:** a chelicera (a KARG 1971)

Lasioseius sugawarai Ehara, 1964

(Figs 6.17.1. – 6.17.2.)

EHARA, S. (1964): Some mites of the families Phytoseiidae and Blattisocidae from Japan (Acarina, Mesostigmata). – J. Fac. Sci. Hokkaido Univ., Ser. 6, Zool. **15** (3): 378 – 394

Types: Zoological Institute, Faculty of Science, Hokkaido University (Japan)

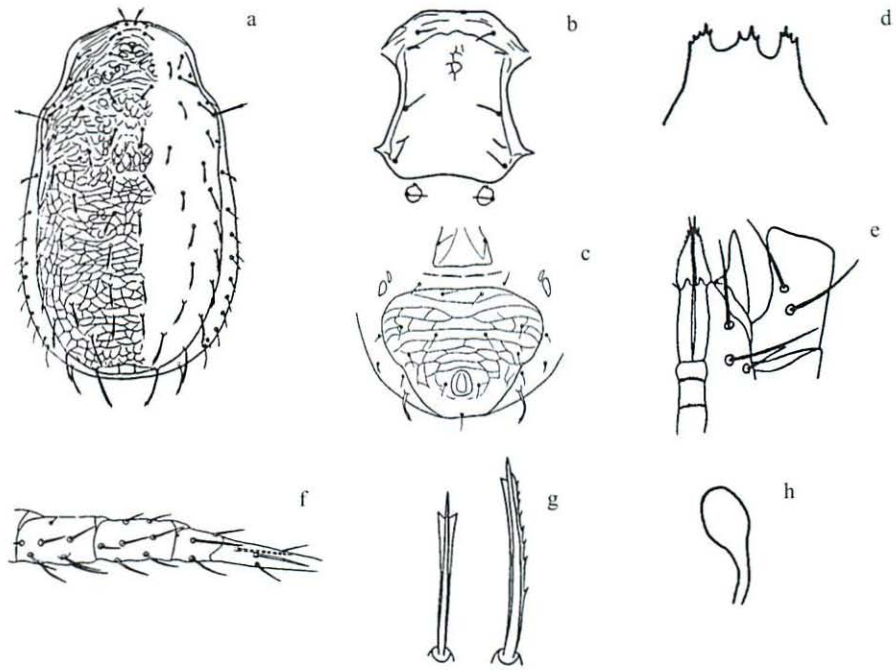

Fig. 6.17.1. **Female:** a dorsal, b sternal shield, c ventral, d tectum, e hypostome, f leg IV, g dorsal setae, h spermatheca (a – g EHARA 1964)

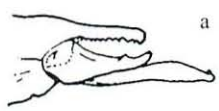

Fig. 6.17.2. **Male:** a chelicera (a LEE & LEE 1998)

Lasioseius tridentatus Baker, Delfinado & Abbatiello, 1976

(Fig. 6.18.)

BAKER, E. W., M. D. DELFINADO & M. J. ABBATIELLO (1976): Terrestrial mites of New York II. Mites in Bird's nests (Acarina). – J. N. Y. Entomol. Soc. **84** (1): 48 – 66

Holo- and paratypes: New York State Museum and Science Service, Albany, New York (USA), United States National Museum, Washington D. C. (USA)

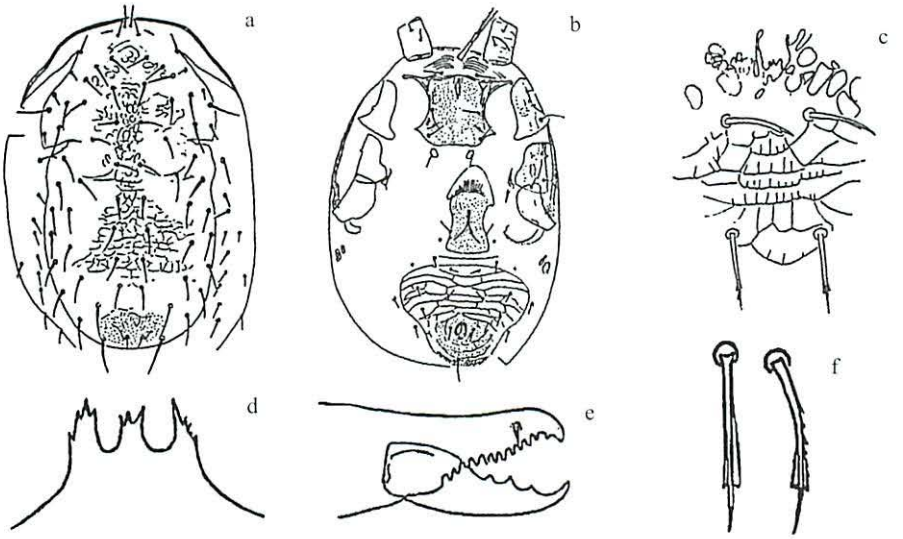

Fig. 6.18. **Female:** a dorsal, b ventral, c detail of dorsal reticulation, d tectum, e chelicera, f dorsal setae (a – f BAKER, DELFINADO & ABBAITELLO 1976)

Lasioseius rostratus Karg, 1996

(Figs 6.19.1. – 6.19.2.)

KARG, W. (1996): Neue Arten aus Raubmilbengattungen der Gamasina Leach (Acarina, Parasitiformes) mit Indikatoren zum Entwicklungsalter. – Mitt. Zool. Mus. Berl. **72** (1): 149 – 195

Types: Museum für Naturkunde Berlin (Germany)

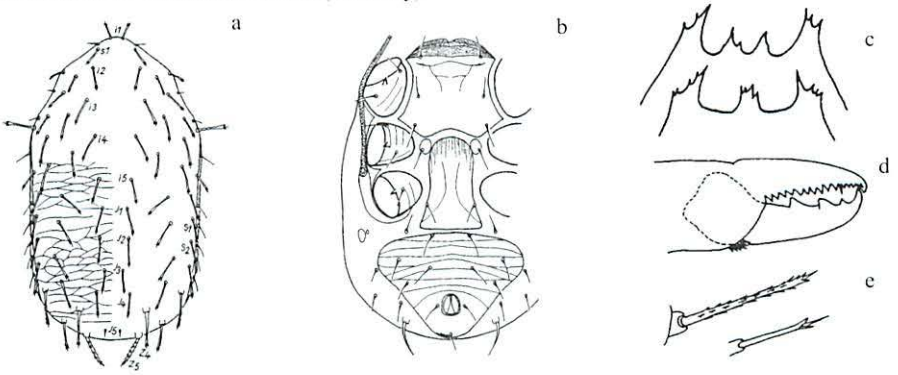

Fig. 6.19.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal setae (a – e KARG 1996)

Fig. 6.19.2. **Male:** a tectum, b chelicera (a, b KARG 1996)

Lasioseius plumatus Karg, 1980

(Fig. 6.20.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Types: Museum für Naturkunde Berlin (Germany)

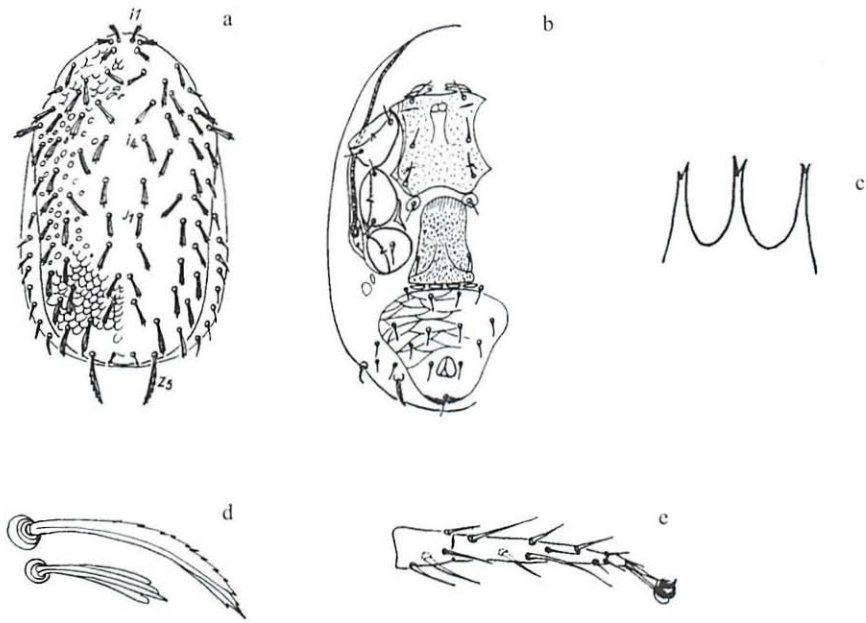

Fig. 6.20. **Female:** a dorsal, b ventral, c tectum, d dorsal setae I1, Z5, e tarsus IV (a – e KARG 1980)

Lasioseius liuchungfui Samsinak, 1964

(Figs 6.21.1. – 6.21.2.)

SAMSINAK, K. (1964): Termitophile Milben aus der VR China. I. Mesostigmata. – Entomol. Abh. (Dres.) **32**: 33 – 52
Holotype: Zoological Institute, Chinese Academy of Sciences, Peking-Haitien (China)

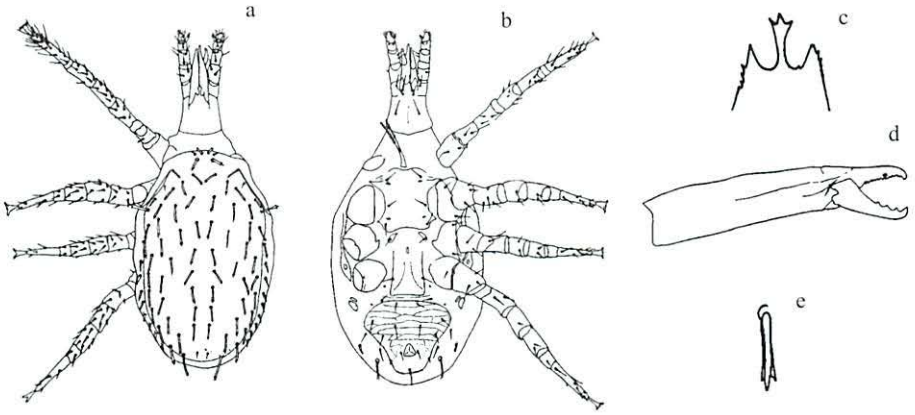

Fig. 6.21.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal seta (a – e SAMSINAK 1964)

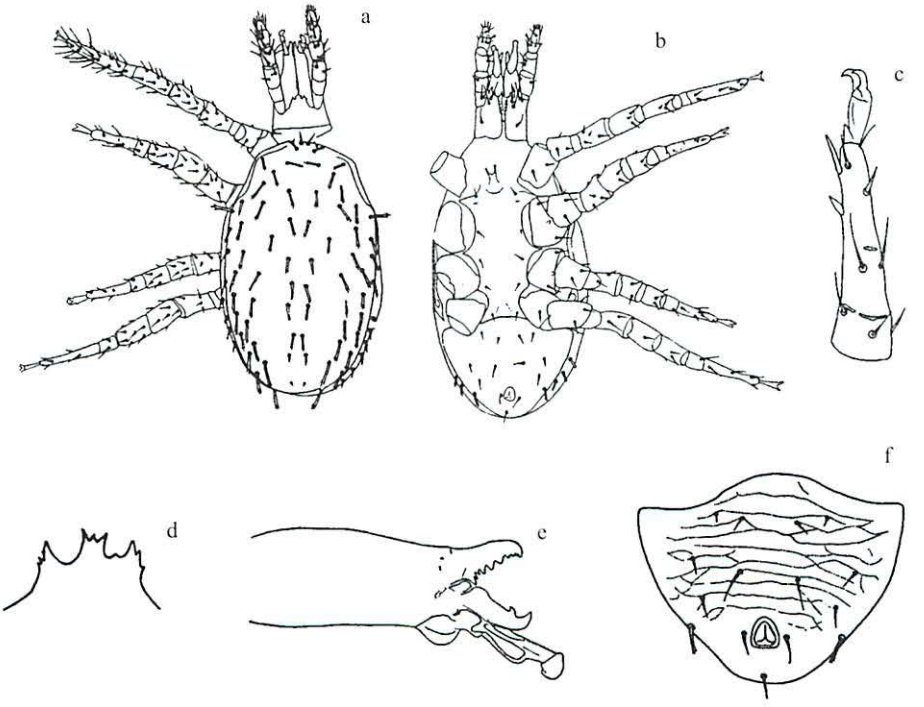

Fig. 6.21.2. **Male:** a dorsal, b ventral, c tarsus, d tectum, e chelicera, f ventrianal shield (a – f SAMSINAK 1964)

Lasioseius elegans Fain, Hyland & Aitken, 1977

(Figs 6.22.1. – 6.22.5.)

Fain, A., K. E. Hyland & T. H. G. Aitken (1977): Nouveaux acariens Ascidae (Mesostigmata) phoretiques dans les fosses nasales de colibris. Note preliminaire. – Bull. Ann. Soc. R. Ent. Belg. **113**: 184 – 186

Holotype: United States National Museum, Washington D. C. (USA)

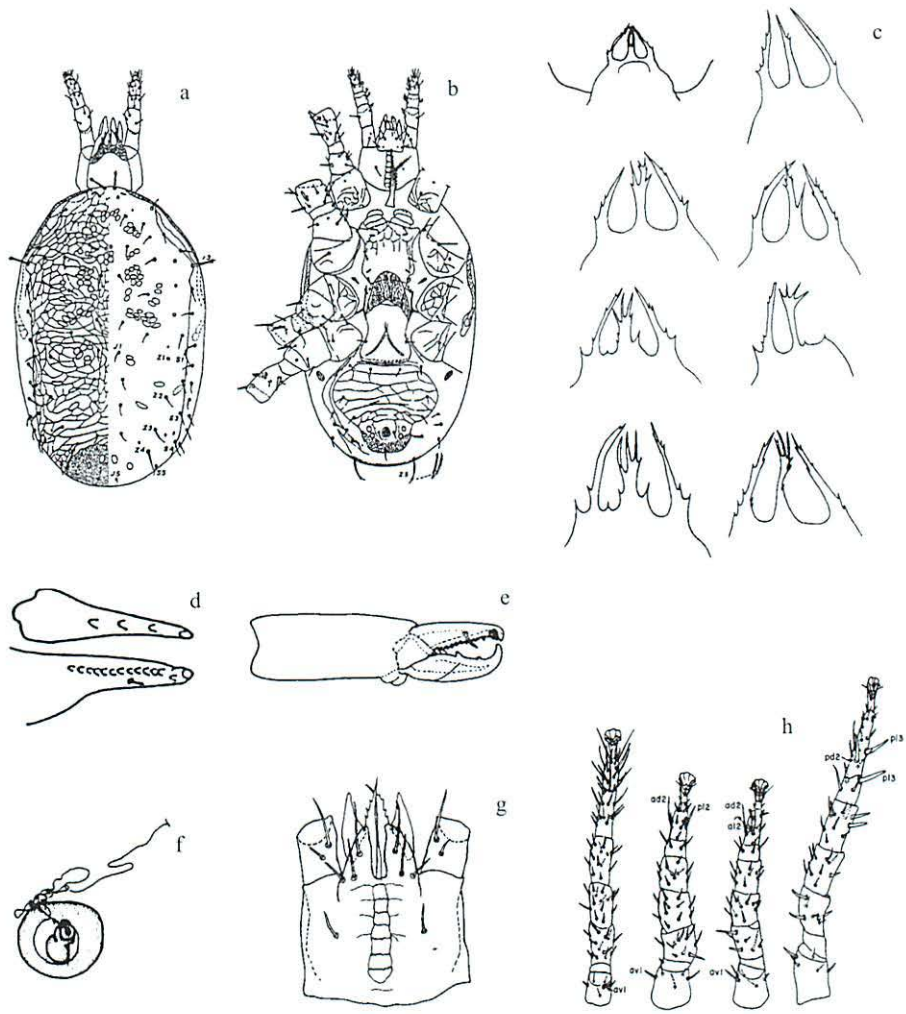

Fig. 6.22.1. **Female:** a dorsal, b ventral, c tectum, d, e chelicera, f spermatheca, g hypostome, h tarsus I – IV (a, b, d Fain, Hyland & Aitken 1977; c, e – h Naeem, Dobkin & OConnor 1985)

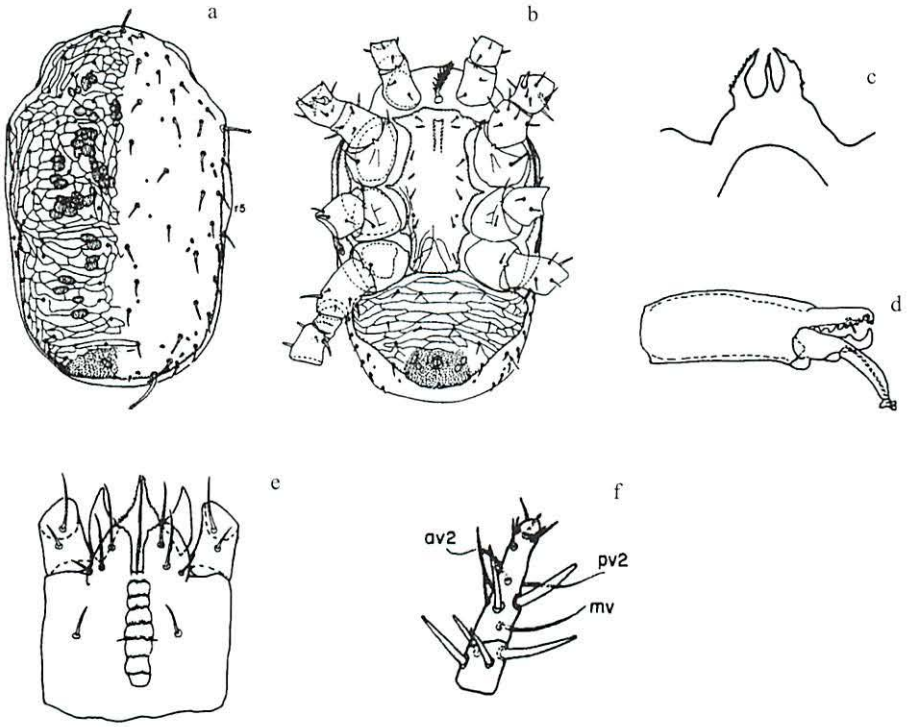

Fig. 6.22.2. **Male:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f tarsus IV (a – f NAEEM, DOBKIN & OCONNOR 1985)

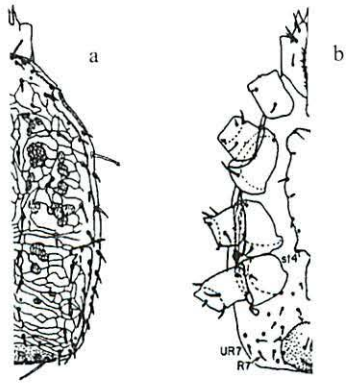

Fig. 6.22.3. **Deutonymph:** a dorsal, b ventral (a, b NAEEM, DOBKIN & OCONNOR 1985)

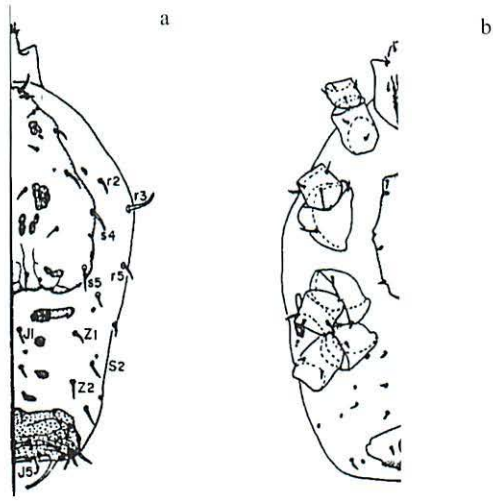

Fig. 6.22.4. **Protonymph:** a dorsal, b ventral (a, b NAEEM, DOBKIN & OCONNOR 1985)

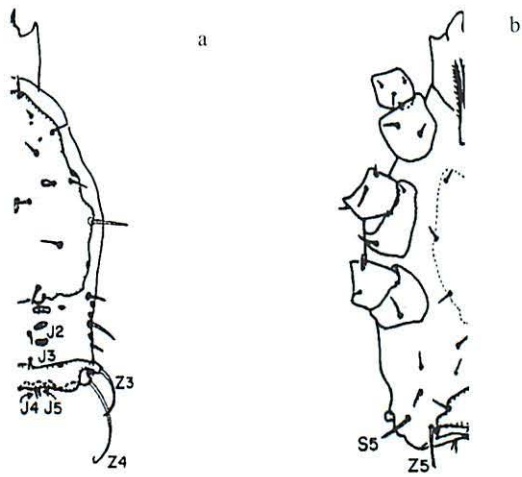

Fig. 6.22.5. **Larva:** a dorsal, b ventral (a, b NAEEM, DOBKIN & OCONNOR 1985)

Lasioseius sewai Nasr & Abou-Awad, 1987

(Fig. 6.23.)

NASR, A. K. & B. A. ABOU-AWAD (1987): Description of some ascid mites from Egypt (Acari, Ascidae). – Acarologia **28** (1): 27 – 35

Holotype: National Research Centre, Dokki-Cairo (Egypt)

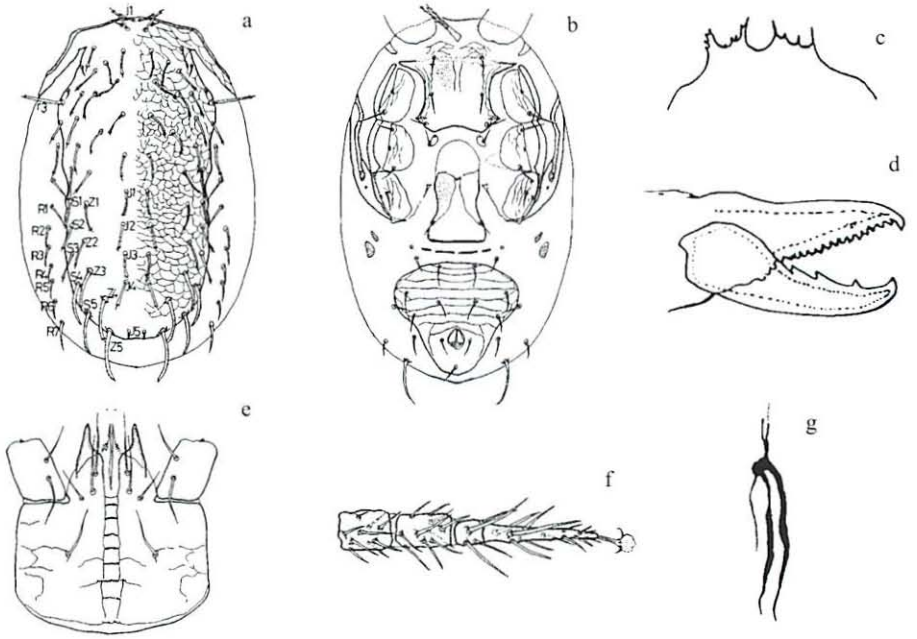

Fig. 6.23. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f leg IV, g spermatheca (a – g NASR & ABOU-AWAD 1987)

Lasioseius kargi Kandil, 1980

(Fig. 6.24.)

KANDIL, M. M. (1980): Three new *Lasioseius* species from Hungary (Acari, Mesostigmata, Podocinidae). – Folia Entomol. Hung. **61** (33): 75 – 86

Holotype: Hungarian Natural History Museum, Budapest (Hungary)

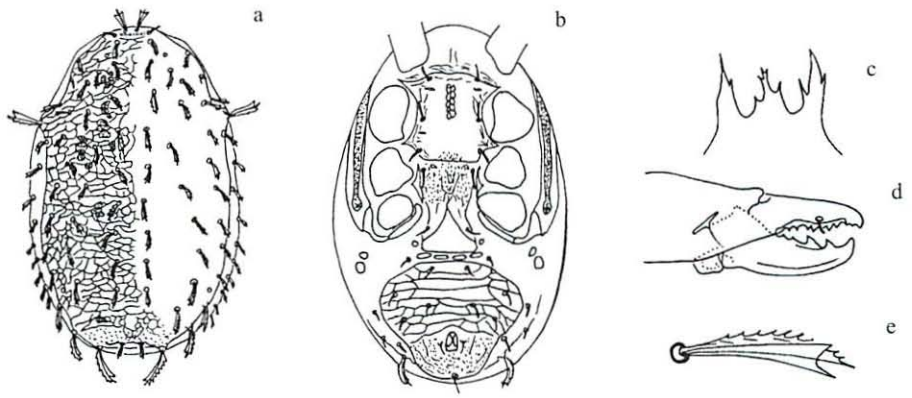

Fig. 6.24. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal seta (a – e modified after KANDIL 1980)

Lasioseius neometes McGraw & Farrier, 1969

(Fig. 6.25.)

McGraw, J. R. & M. H. Farrier (1969): Mites of the superfamily Parasitoidea (Acarina, Mesostigmata) associated with *Dendroctonus* and *Ips* (Coleoptera, Scolytidae). – NC Agric. Exp. Stn. Tech. Bull. **192**: 1 – 162

Holotype: United States National Museum, Washington D. C. (USA)

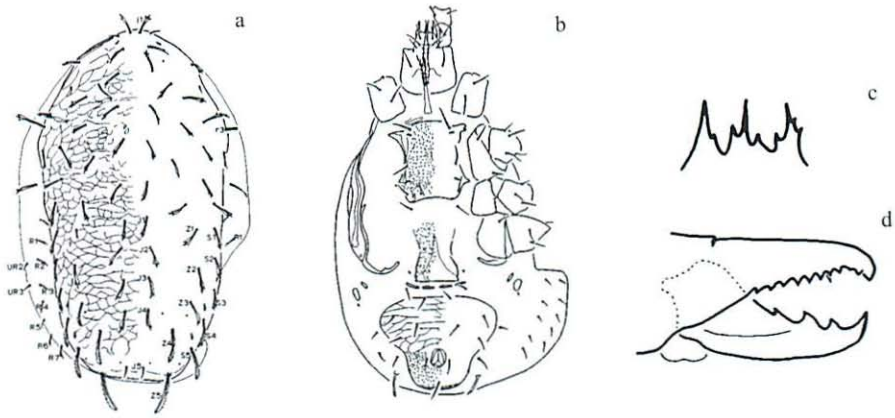

Fig. 6.25. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d McGraw & Farrier 1969)

Lasioseius nambirimae Krantz, 1962

(Fig. 6.26.)

Krantz, G. W. (1962): Acari. Free-living Mesostigmata. II. – Family Acrosejidae. – Parc National De La Garamba, Mission H. De Saeger **34**: 3 – 29

Holotype: Institute of the National Parks of Congo and Ruanda-Urundi, Bruxelles (Belgium)

Paratypes: United States National Museum, Washington D. C. (USA), British Museum (Natural History), London (United Kingdom)

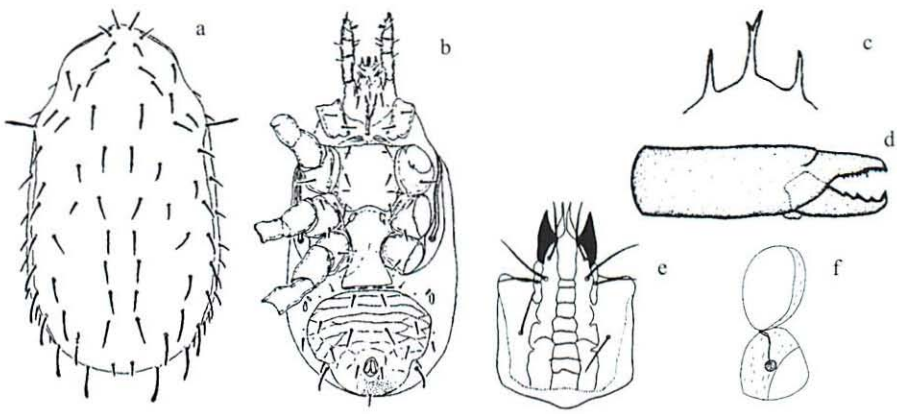

Fig. 6.26. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca (a – c Krantz 1962; d – f Aswegen & Loots 1969)

Lasioseius tetraspinosus Karg, 1980

(Figs 6.27.1. – 6.27.2.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Types: Museum für Naturkunde Berlin (Germany)

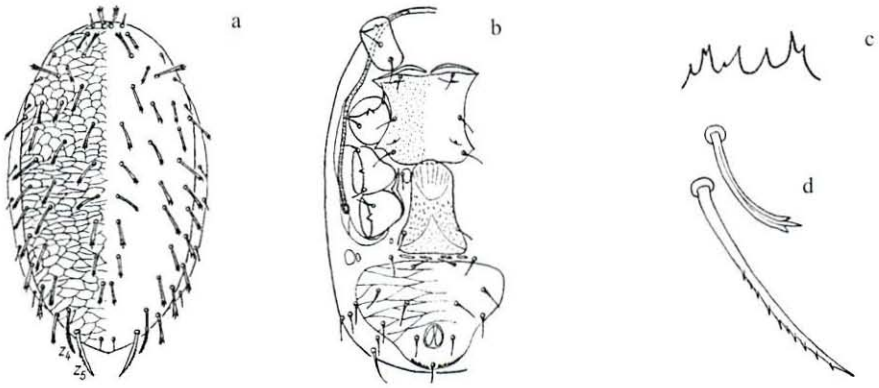

Fig. 6.27.1. **Female:** a dorsal, b ventral, c tectum, d dorsal setae I1, Z5 (a – d KARG 1980)

Fig. 6.27.2. **Male:** a tectum, b chelicera (a, b KARG 1980)

Lasioseius euarmatus Karg, 1994

(Fig. 6.28.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216
Types: Museum für Naturkunde Berlin (Germany)

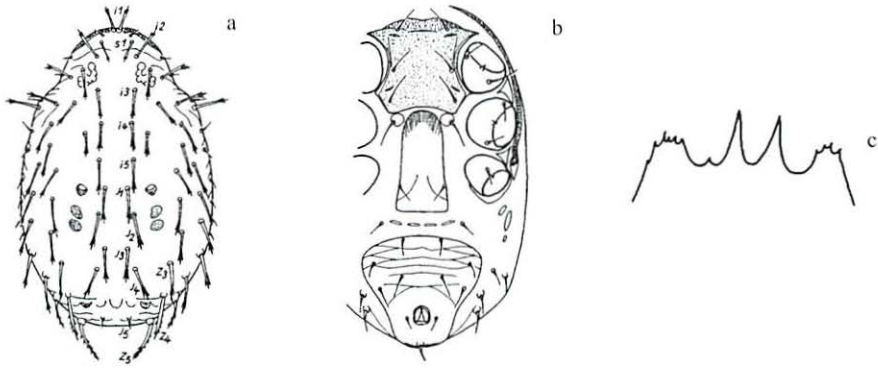

Fig. 6.28. **Female:** a dorsal, b ventral, c tectum (a – c KARG 1994)

Lasioseius inconspicuus Westerboer, 1963

(Fig. 6.29.)

WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

Types: deposition unknown to the authors

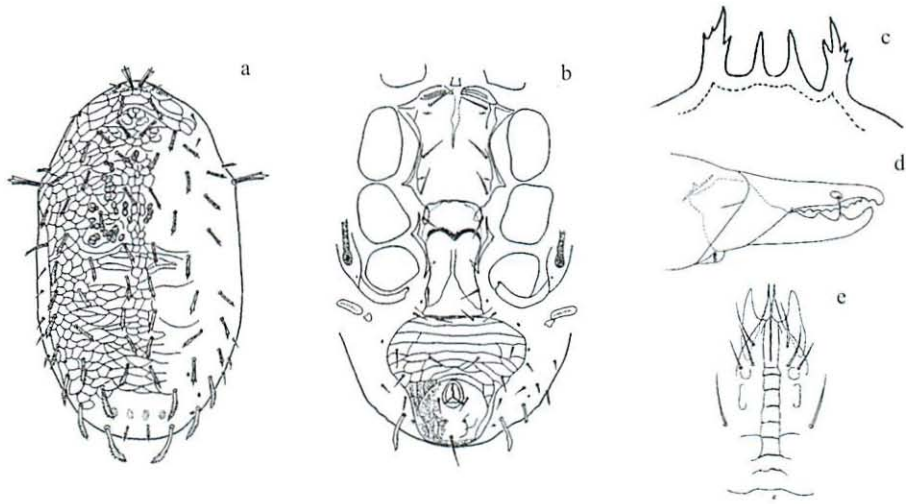

Fig. 6.29. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome (a – e WESTERBOER 1963)

Lasioseius reticulatus Bhattacharyya, 1968

(Figs 6.30.1. – 6.30.2.)

BHATTACHARYYA, S. K. (1968): Studies in Indian mites (Acarina, Mesostigmata). 6. Six records and descriptions of nine new species. – Acarologia **10** (4): 527 – 549

Holo- and paratypes: Zoological Survey of India, Calcutta, West Bengal (India)

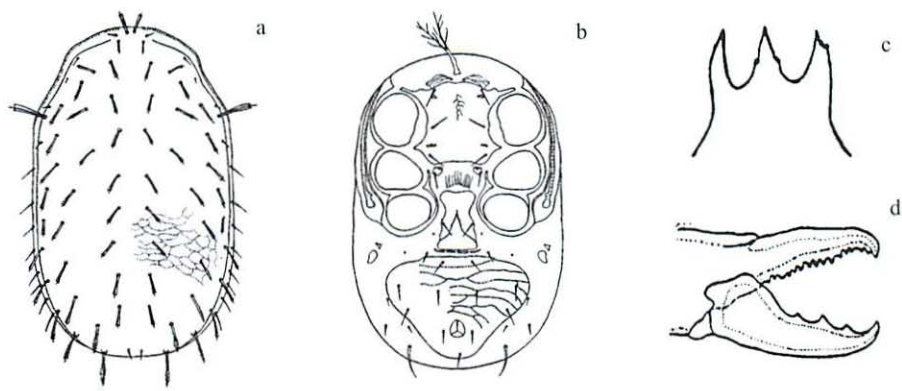

Fig. 6.30.1. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d BHATTACHARYYA 1968)

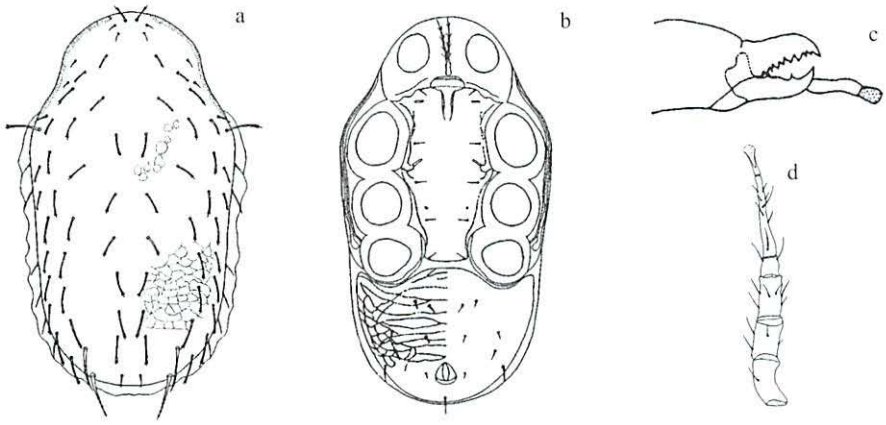

Fig. 6.30.2. **Male:** a dorsal, b ventral, c chelicera, d leg IV (a – d BHATTACHARYYA & SANYAL 2002)

Lasioseius thermophilus Willmann, 1942

(Fig. 6.31.)

WILLMANN, C. (1942): Milben aus deutschen Mineralquellen. – Zool. Anz. **139**: 237 – 247
Types: Zoologische Staatssammlungen München (Germany)

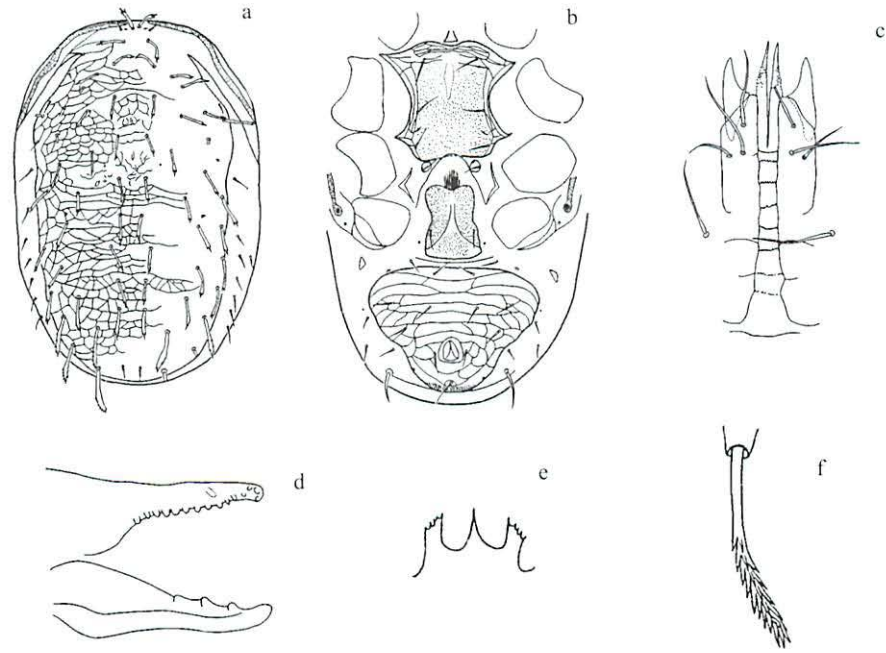

Fig. 6.31. **Female:** a dorsal, b ventral, c hypostome, d chelicera, e tectum, f dorsal seta (a – d WESTERBOER 1963; e, f WILLMANN 1942)

Lasioseius serradentis n. sp.

(Fig. 6.32.)

Holotype: ♀ Ecuador, prov. Pichinca, between Pifo and Papallacta, 4100 m a.s.l., plants creeping to 2 m height on a tree

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by distinctly tricarinate ds, including the caudal ds, and by an irregularly serrate te with longer lateral points.

Ids ♀ 400 – 420 x 240 – 260, dorsum slender and reticulate, most ds distinctly tricarinate, most ds relatively short, 22 – 26 long, caudal setae longer: I4 = 30, Z4 = 35, S5 = 40, Z5 = 50, sternal shield smooth, sternal setae 24 long, presternal region lineate and punctate, ventra length : width = 6 : 7, with 5 pairs of setae, 20 – 24 long, ventral seta pair V8 = 40 long, one of the metapodal plates tiny, the other plate 5 times as large, margin of te serrate in the middle, long lateral points 4x as long as the middle points, legs: I = 370, II = 270, III = 250, IV = 410, no macrochaetae present.

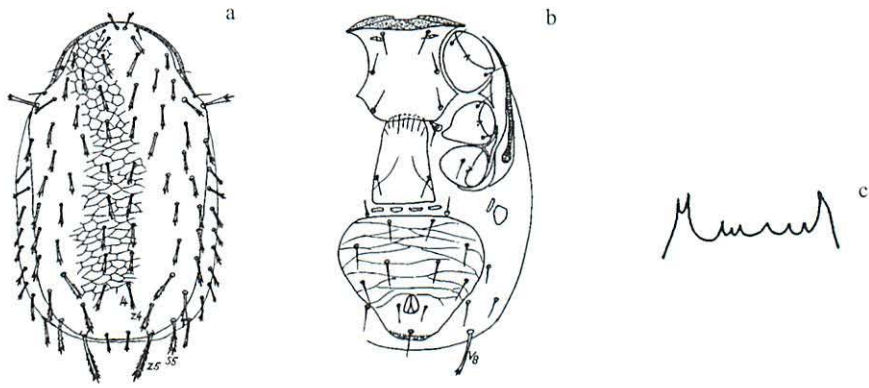

Fig. 6.32. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

Key 7: The known species of the *Lasioseius-glomerulus*-complex (including a new species from Ecuador)

1(2) Ventra extremely reduced, bearing only one pair of setae; most ds short (21 – 26) however Z4 = 30 – 37 and Z5 = 40 – 47, surface of sternal shield smooth, margin of te with sparse denticles, ids = 318 – 343 (Figs 7.1.1. – 7.1.2.):

L. quandong Walter & Lindquist, 1997

– Australia, Queensland, on leaves of tropical and subtropical rain forest trees.

2(1) Ventra not reduced, bearing 5 pairs of setae.

3(8) Leg IV remarkably long: = $1^1/_3$ – $1^2/_3$ times the length of the idiosoma.

4(5) Leg IV = 900 – 1000, most ds short and acicular, however i1, i2, z3, r3, s5 and Z5 thick, 60 – 90 long and tricarinate, ds Z4 thick (= 70) but smooth, sternal shield without ornamentation, ids = 624 (Figs 7.2.1. – 7.2.2.):

L. peterfuldi Ohmer, Fain & Schuchmann, 1991

– Colombia, La Planada, from angiosperm flowers (Zingiberaceae and Lorantaceae).

5(4) Leg IV = 500 – 700.

6(7) Surface of sternal shield densely punctate, leg I = 450, leg IV = 620, tarsus IV with long macrochaetae (110 – 160), te with a serrate margin, ids = 430 – 440 (Fig. 7.3.):
L. saltatus Karg, 1980
– Brazil.

7(6) The middle of the sternal shield with a circular structure, leg I = 400, leg IV = 510, macrochaetae on tarsus IV = 80 – 100, te with 3 groups of points, ids = 400 – 410 (Fig. 7.4.):
L. eupodis Karg, 1994
– Galapagos.

8(3) Leg IV not so remarkably long.

9(12) Ventra broad, length : width = 1 : 1.24 to 1 : 1.29.

10(11) Te with 3 terminally split branches, surface of sternal shield with many dots, ds Z5 = 60, leg I = 520, leg IV = 510, ids = 490 – 520 (Fig. 7.5.):
L. tridentis Karg, 1979
– Argentina.

11(10) Te with 4 branches, most ds 30 – 35 long, weakly tricarinate, however r3 = 50, Z5 = 50, ventrianal shield length : width 1 : 1.29, leg I = 450, leg IV = 500 with long macrochaetae (= 80 – 90 long), ids = 400 – 410 (Fig. 7.6.):
L. tenuidentis n. sp.
– Ecuador.

12(9) Ventra not so broad, length : width = 1 : 0.8 to 1 : 1.16.

13(14) Dorsum anteriorly with a net-like structure consisting of many little tubercles, sternal shield reticulate, ventrianal shield length : width = 1 : 1.16; digitus fixus of chelicera with 17 teeth, dorsal seta Z5 = 85, leg I = 770, leg IV = 741, ids = 620 (Fig. 7.7.):
L. americanellus (De Leon, 1944)
syn.: *Hyattella americanella* De Leon, 1944
– North America.

14(13) Dorsal net-like structure consisting of fine lines, sternal shield without net-like structure.

15(16) Most dorsal setae conspicously trispinate, digitus fixus of chelicera with 25 – 30 teeth, te with 4 branches: 2 in the middle smooth, 2 lateral branches with serrate margins, the middle of the sternal shield with a circular structure, ds Z5 = 40, ventrianal shield length : width = 1 : 1.10, leg I = 420, leg IV = 500, ids 360 – 370 (Fig. 7.8.):
L. glomerulus Karg, 1979
– Argentina.

16(15) Most of dorsal seta only slightly trispinate, digitus fixus of chelicera with 10 teeth, dorsal seta Z5 = 73 – 88, ventrianal shield length : width = 1 : 0.85; leg I = 400 – 425, ids = 385 – 410 (Figs 7.9.1. – 7.9.2.):
L. frankbakkeri Faraji & Karg, 2005
– France, weeds in the herbaceous layer of an apple orchard.

Subgenus *Crinidens* Karg, 1980 n. comb.

Lasioseius-glomerulus-complex

Lasioseius quandong Walter & Lindquist, 1997

(Figs 7.1.1. – 7.1.2.)

WALTER, D. E. & E. E. LINDQUIST (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): the *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

Holotype: Department of Entomology, University of Queensland, St. Lucia (Australia)

Paratypes: Australian National Collection, CSIRO Division of Entomology, Canberra (Australia); Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

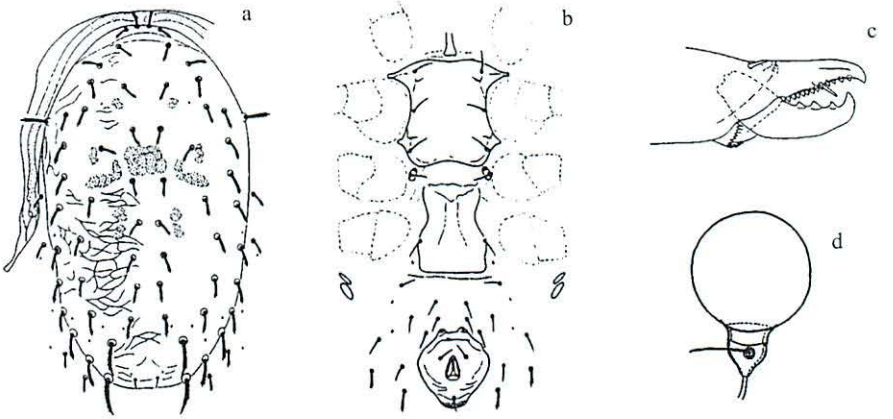

Fig. 7.1.1. **Female:** a dorsal, b ventral, c chelicera, d spermatheca (a – d WALTER & LINDQUIST 1997)

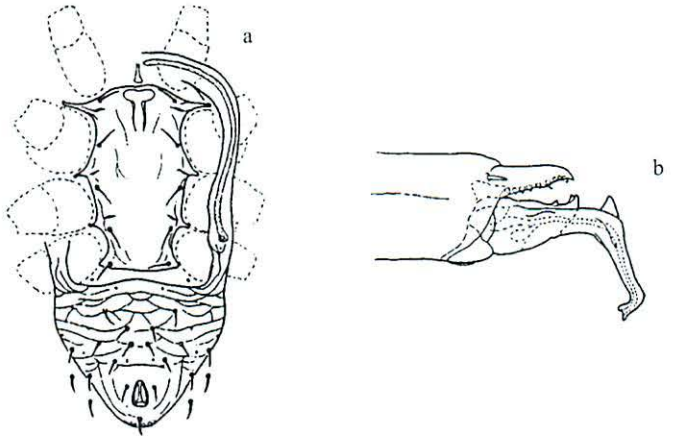

Fig. 7.1.2. **Male:** a ventral, b chelicera (a, b WALTER & LINDQUIST 1997)

Lasioseius peterfuldi Ohmer, Fain & Schuchmann, 1991

(Figs 7.2.1. – 7.2.2.)

OHMER, C., A. FAIN & K. L. SCHUCHMANN (1991): New ascid mites of the genera *Rhinoseius* Baker & Yunker, 1964 and *Lasioseius* Berlese, 1923 (Acari, Ascidae) associated with hummingbirds or hummingbird-pollinated flowers in Colombia. – J. Nat. Hist. **25** (2): 481 – 498

Holotype: Zoologisches Forschungsinstitut und Museum Alexander Koenig, Bonn (Germany)

Paratypes: L'Institut Royal des Sciences Naturelles, Bruxelles (Belgium)

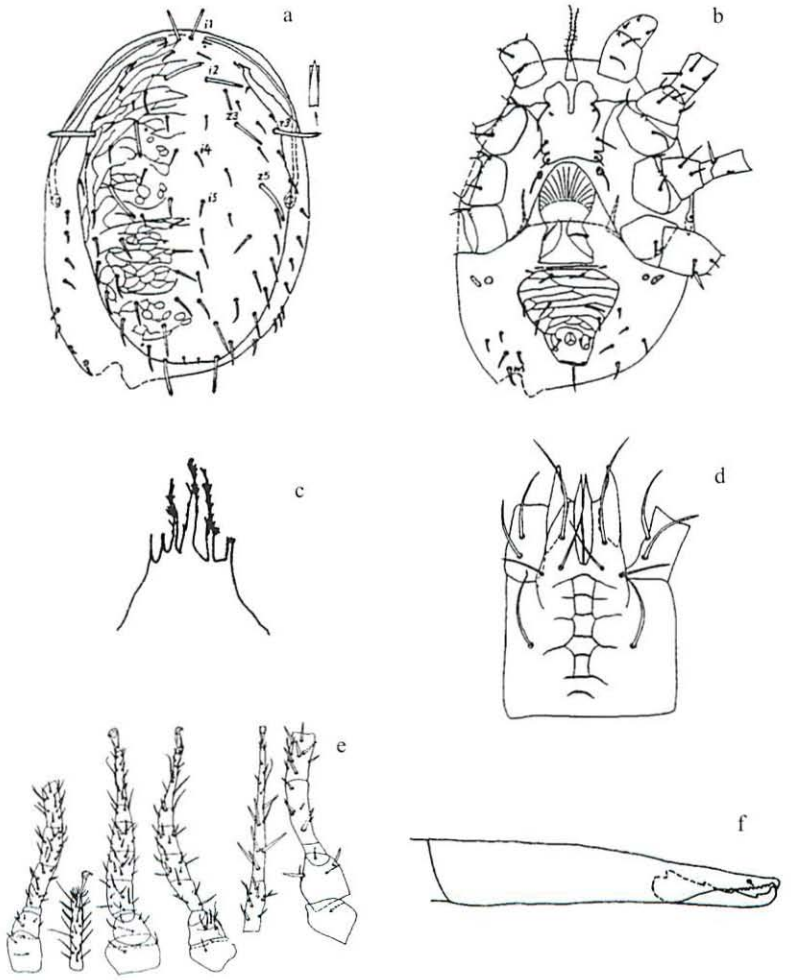

Fig. 7.2.1. **Female:** a dorsal, b ventral, c tectum, d hypostome, e leg I – IV, f chelicera (a – f OHMER, FAIN & SCHUCHMANN 1991)

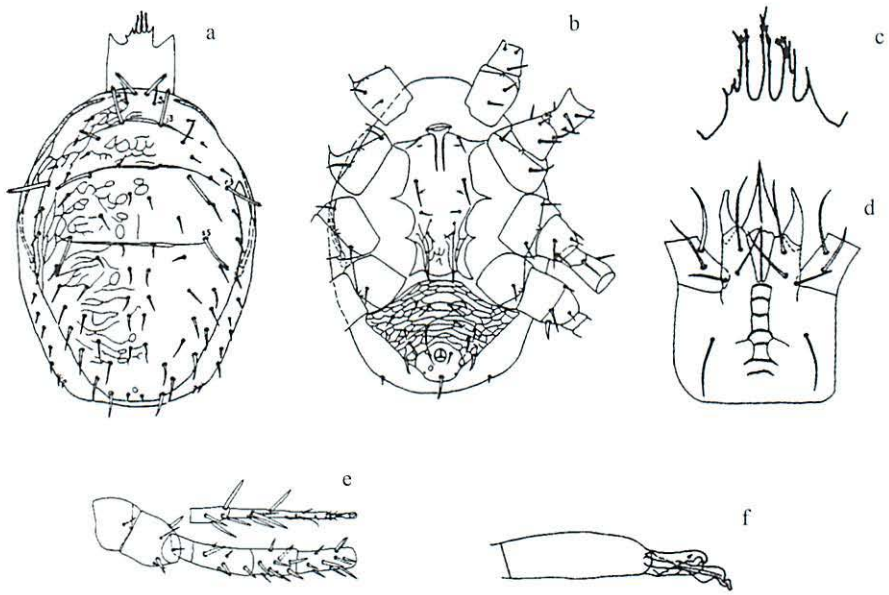

Fig. 7.2.2. **Male:** a dorsal, b ventral, c tectum, d hypostome, e leg IV, f chelicera (a – f OHMER, FAIN & SCHUCHMANN 1991)

Lasioseius saltatus Karg, 1980

(Fig. 7.3.)

KARG, W. (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367
Holotype: Hungarian Natural History Museum, Budapest (Hungary)
Paratypes: Museum für Naturkunde Berlin (Germany)

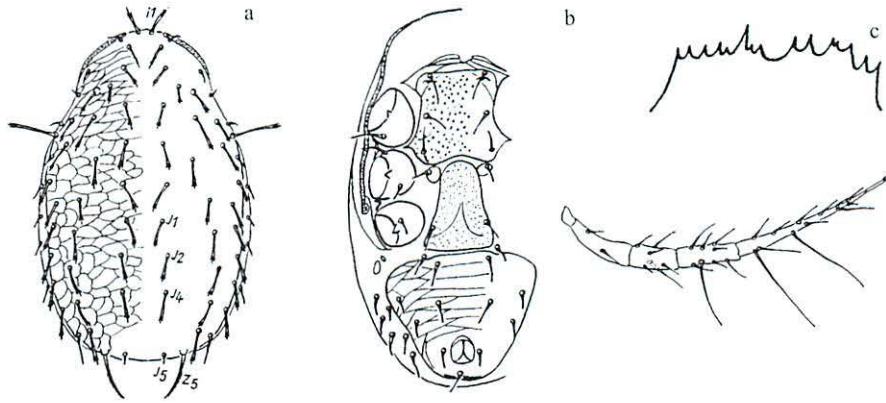

Fig. 7.3. **Female:** a dorsal, b ventral, c tectum, d leg IV (a – d KARG 1980)

Lasioseius eupodis Karg, 1994

(Fig. 7.4.)

KARG, W. (1994): Raubmilben der Cohors Gamasina Leach (Acarina, Parasitiformes) vom Galapagos-Archipel. – Mitt. Zool. Mus. Berl. **70** (2): 179 – 216

Types: Museum für Naturkunde Berlin (Germany)

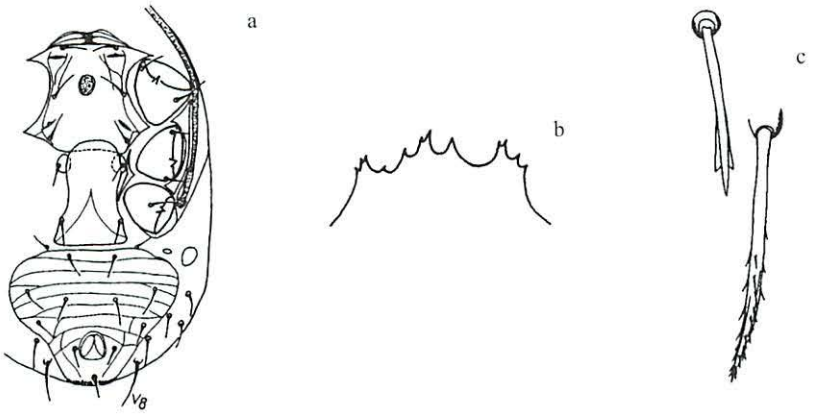

Fig. 7.4. **Female:** a ventral, b tectum, c dorsal setae I4, Z5 (a – c KARG 1994)

Lasioseius tridentis Karg, 1979

(Fig. 7.5.)

KARG, W. (1979): Zur Kenntnis der Milbengattungen *Lasioseius* Berlese, 1916, *Proprioseiopsis* Muma, 1961, *Podocinum* Berlese, 1882 und *Proctolaelaps* Berlese, 1923 (Acarina, Parasitiformes). – Deut. Entomol. Z., N. F. **26** (1 – 3): 1 – 8

Holotype: Hungarian Natural History Museum, Budapest (Hungary)

Paratypes: Museum für Naturkunde Berlin (Germany)

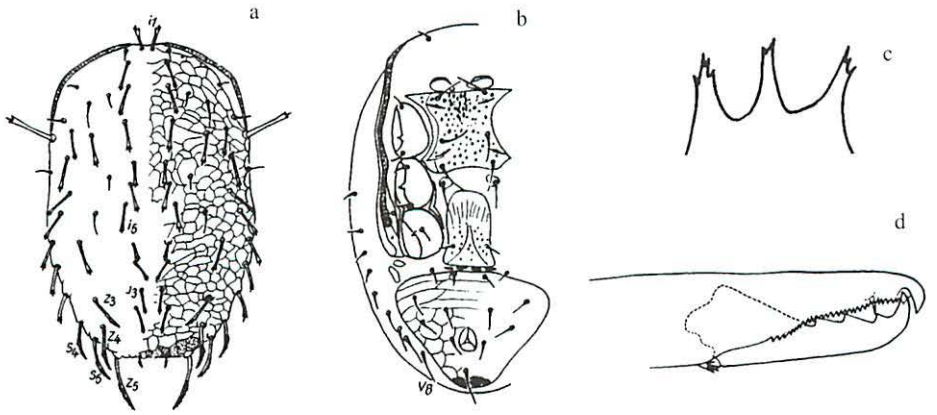

Fig. 7.5. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KARG 1979)

Lasioseius tenuidentis n. sp.

(Fig. 7.6.)

Holotype:♀ Ecuador 1989, prov. Pichinca, near Las Palmeras, 1850 m a.s.l., primary forest, large withered, mossy leaves

Paratype: 4 ♀, 1 ♂, 3 deutonymphs

Types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by slightly tricarinate ds, setae on the posterior half of dorsum reaching the bases of the next setae of the series, by a broad triangular ventra with 5 pairs of setae and a te with 4 branches.

Ids ♀ 400 – 470 x 220 – 300, dorsum weakly reticulate, most ds slightly tricarinate and 30 – 34 long: i1 = 30, i4 = 35, I1 = 34, I2 = 33, I3 = 32, I4 = 34, the shoulder setae longer (r3 = 50), also the caudal setae (S5 = 38, Z4 = 45), ds Z5 pectinate and 50 long, marginal setae (r- and R-setae) short (= 15) and acicular, sternal shield anteriorly punctate and lineate along the lateral margins, presternal region lineate, sternal setae 27 – 32 long, ventra 115 long and 160 wide, with transverse lines and 5 pairs of setae 22 – 24 long, ps = 26 long, lateral branches of te serrate, the two medial branches cuspidate, between the branches short points visible, digitus fixus of the chelicera with 25 teeth, legs: I = 450, II = 360, III = 350, IV = 500, tarsus IV with 2 macrochaetae, 80 and 90 long.

Ids ♂ 300 x 180, ids deutonymph 290 x 170.

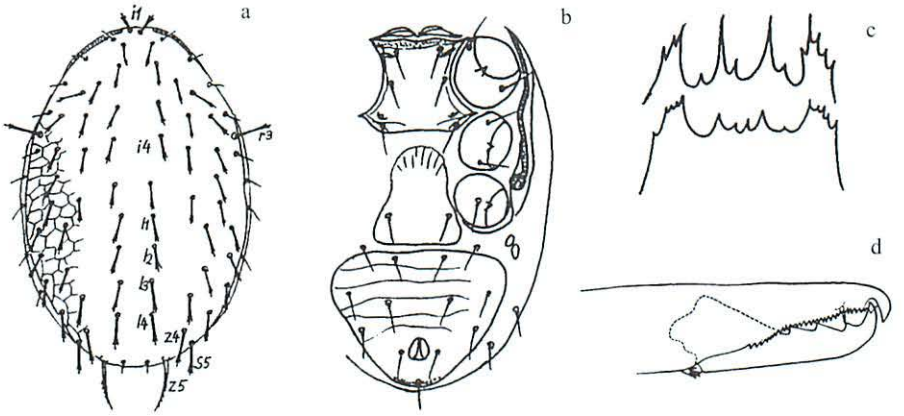

Fig. 7.6. **Female:** a dorsal, b ventral, c tectum, d dorsal seta (a – d original drawings by the authors)

Lasioseius americanellus (De Leon, 1944)

(Fig. 7.7.)

De Leon, D. (1944): Four new *Sejus*, a new *Zerconopsis*, and a new *Hyattella* from the United States (Acarina, Blattisocidae). – Fla. Entomol. **47**: 103 – 108

Types: deposition unknown to the authors

Synonym: *Hyattella americanella* De Leon, 1944

Four new *Sejus*, a new *Zerconopsis*, and a new *Hyattella* from the United States (Acarina, Blattisocidae). – Fla. Entomol. **47**: 103 – 108

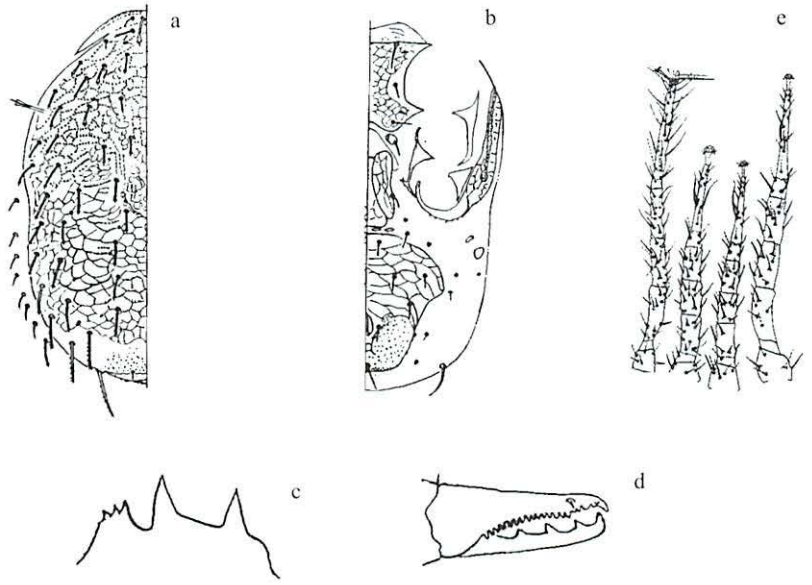

Fig. 7.7. **Female:** a dorsal, b ventral, c tectum, d chelicera, e tarsus I – IV (a – e DE LEON 1944)

Lasioseius glomerulus Karg, 1979

(Fig. 7.8.)

KARG, W. (1979): Zur Kenntnis der Milbengattungen *Lasioseius* Berlese, 1916, *Proprioseiopsis* Muma, 1961, *Podocinum* Berlese, 1882 und *Proctolaelaps* Berlese, 1923 (Acarina, Parasitiformes). – Deut. Entomol. Z., N. F. **26** (1 – 3): 1 – 8

Holotype: Hungarian Natural History Museum, Budapest (Hungary)

Paratypes: Museum für Naturkunde Berlin (Germany)

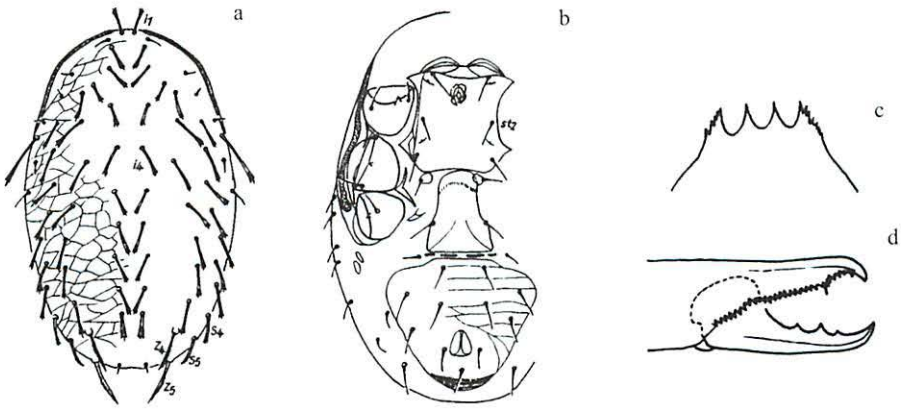

Fig. 7.8. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d KARG 1979)

Lasioseius frankbakkeri Faraji & Karg, 2005

(Figs 7.9.1. – 7.9.2.)

FARAJI, F. & W. KARG (2005): A new species of *Lasioseius* Berlese from France (Acari, Podocinidae). – Int. J. Acarol. **31** (2): 113 – 117

Holotype: Muséum National d'Historie Naturelle de Paris (France)

Paratypes: Muséum National d'Historie Naturelle de Paris (France), Natural History Museum, London (United Kingdom), National Museum of Natural History, Leiden (The Netherlands)

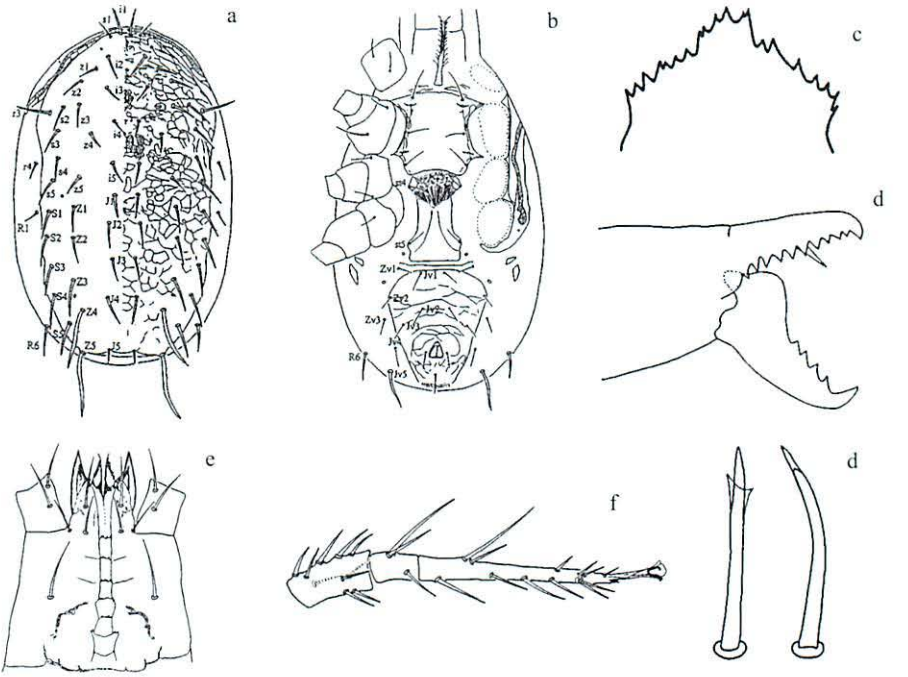

Fig. 7.9.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f leg IV, g dorsal setae (a – e FARAJI & KARG 2005)

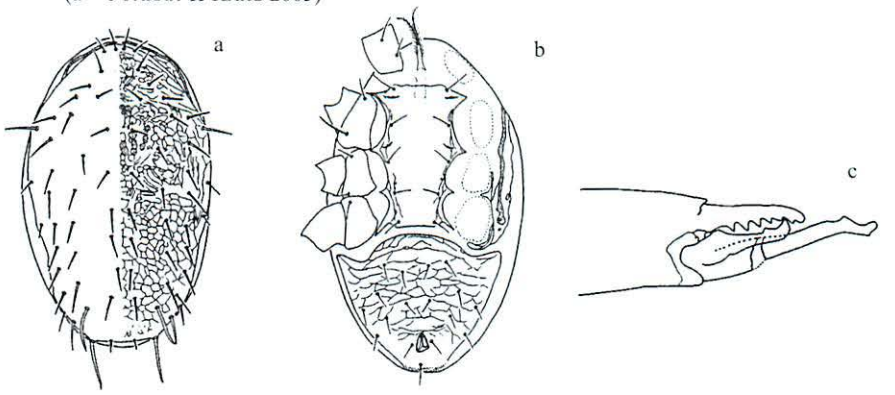

Fig. 7.9.2. **Male:** a dorsal, b ventral, c chelicera (a – c FARAJI & KARG 2005)

Subgenus *Cuspiacus* n. subgen.

Type species: *Lasioseius helvetius* Chant, 1958

The subgenus includes species having mostly acicular setae on the dorsum and a smaller or larger number of pectinate setae. The species of the subgenus are grouped in two species complexes with the following distinguishing features:

All of the setae on the dorsum acicular, not tricarinate:

***Lasioseius-helvetius*-complex: Key 8**

A number of setae on the dorsum pectinate:

***Lasioseius-matthyssei*-complex: Key 9**

Key 8: The known species of the *Lasioseius-helvetius*-complex

1(2) Ventra remarkably longer than wide, 140 long and 113 wide, most ds as long as the distances between their bases, ids = 442 (Fig. 8.1.):

L. helvetius Chant, 1958
– Switzerland.

2(1) Ventra wider than long or about as long as wide.

3(4) Ventra with 4 pairs of setae; all ds short and smooth, however r3 and i1 longer (= 2x the length of i4) and suggesting a tricarinate tip; te with 4 – 5 irregular tapering extensions, leg I and leg II longer than the dorsum, ids = 635 – 690 (Figs 8.2.1. – 8.2.2.):

L. chelaserratus Naeem, Dobkin & OConner, 1985
– Trinidad.

4(3) Ventra with 5 – 7 pairs of setae.

5(16) Ventra with 5 pairs of setae.

6(7) No protruding shoulder setae r3, te with lateral serrated branches, ids = 550 (Fig. 8.3.):

L. multisetus Chant, 1963
– North America.

7(6) Shoulder setae r3 clearly protruding from idiosoma.

8(9) The first sternal seta pair st1 on separate plates, ds relatively long, i5, I1, I2 and I3 reaching the next seta of the series, ids = 520 (Fig. 8.4.):

L. dendroctoni Chant, 1963
– North America, Oregon.

9(8) Sternal seta pair st1 on the sternal shield.

10(13) Ds long, on the posterior half of dorsum ds longer than the distances between them within their series.

11(12) Lateral margins of ventra remarkably concave, ds r3 and Z5 longer than other ds, ids = 520 – 560 (Fig. 8.5.):

L. safroi (Ewing, 1920)
syn.: *Seius safroi* Ewing, 1920
– North America, Oregon.

12(11) Ventra only slightly concave laterally, ds r3 shorter than other ds, ds Z5 longer, ids = 437 – 460 (Figs 8.6.1. – 8.6.3.):

L. liaohaorongae Ma, 1996
– China, Jilin Province.

13(10) Ds shorter than the distances between the neighbouring setae of a longitudinal series.

14(15) Ventra remarkably broad, triangular, 140 long, 175 wide, ids = 510 (Fig. 8.7.):

L. subterraneus Chant, 1963,
syn.: *L. queenslandicus* Domrow, 1956 not *L. queenslandicus* Womersley, 1956
– North America.

15(14) Ventra about as long as wide, most ds short: ds i5 = ½ the distance between i5 and I1, however posterior region of dorsum with 4 pairs of long and spinose setae = 3x longer than I4, ids = 495 – 517 (Fig. 8.8.):

L. durumae Krantz, 1962
– Africa, Garamba.

16(5) Ventra with 7 pairs of setae.

17(20) Number of ds reduced, without I2 and I3.

18(19) Ds i1 remarkably long: = 2½x the length of i5, shoulder setae (r3) longer than i2, ids = 452 (Fig. 8.9.):

L. spatulus Gu & Wang, 1990
– China, Guizhou province, from *Rattus norvegicus*.

19(18) Ds i1 as long as i5, shoulder setae (r3) shorter than i2, ids = 400 (Figs 8.10.1. – 8.10.2.):

L. terrestris Menon & Ghai, 1968
– India, near Delhi, on wheat.

20(17) Number of ds not reduced, ventra remarkably broad, sternal shield ornamented with rows of punctula, ids = 530 (Fig. 8.11.):

L. oblongus (Ewing, 1909)
syn.: *Gamasus oblongus* Ewing, 1909
– North America, Illinois.

Supplement:

To the species complex belongs further *Lasioseius angustus* Evans & Sheals, 1959 – Indonesia from millipedes; however it is only known from the male, characterised by tiny setae of the dorsum and stout vertical setae i1 (Fig. 8.12.).

Subgenus *Cuspiacus* n. subgen.

Lasioseius-helvetius-complex

Lasioseius helvetius Chant, 1958

(Fig. 8.1.)

CHANT, D. A. (1958): Descriptions of six new species of *Garmania* Nesbitt and *Lasioseius* Berlese (Acarina, Aceosejidae). – Can. J. Zool. **36**: 383 – 390

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

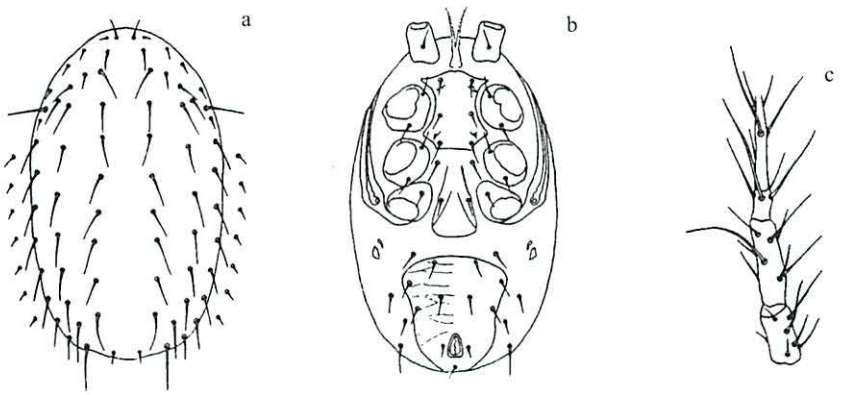

Fig. 8.1. **Female:** a dorsal, b ventral, c tarsus IV (a – c CHANT 1958)

Lasioseius chelaserratus Naeem, Dobkin & OConnor, 1985

(Figs 8.2.1. – 8.2.2.)

NAEEM, S., D. S. DOBKIN & B. M. OCONNOR (1985): *Lasioseius* mites (Acari, Gamasida, Ascidae) associated with hummingbird-pollinated flowers in Trinidad, West Indies. – Int. J. Entomol. **27** (4): 338 – 353

Holotype: United States National Museum, Washington D. C. (USA)

Paratypes: Canadian National Collection of Insects and Arachnida, Ottawa (Canada), Museum of Zoology, University of Michigan, Ann Arbor (USA)

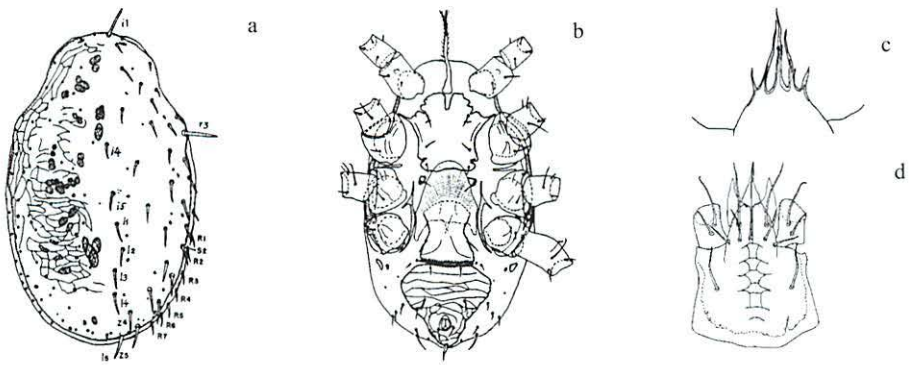

Fig. 8.2.1. **Female:** a dorsal, b ventral, c tectum, d hypostome (a – d NAEEM, DOBKIN & OCONNOR 1985)

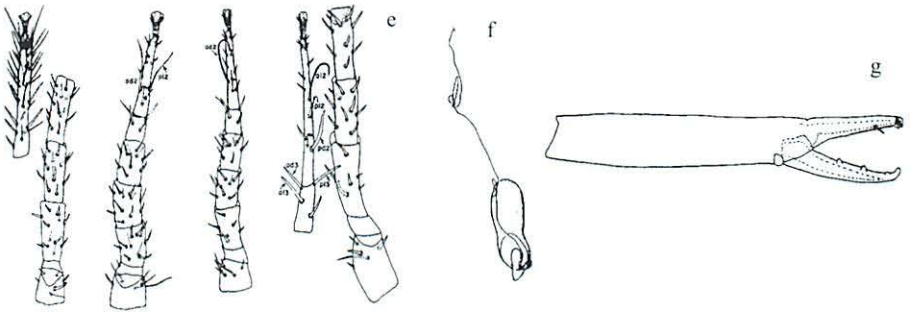

Fig. 8.2.1. (cont.) **Female:** e leg I – IV, f spermatheca, g chelicera (e – g NAEEM, DOBKIN & OCONNOR 1985)

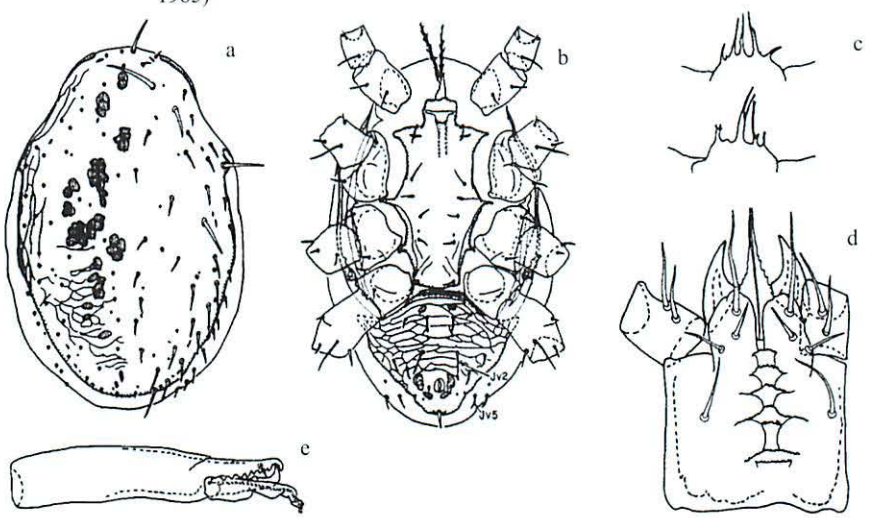

Fig. 8.2.2. **Male:** a dorsal, b ventral, c tectum, d hypostome, e chelicera (a – e NAEEM, DOBKIN & OCONNOR 1985)

Lasioseius multisetus Chant, 1963

(Fig. 8.3.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: United States National Museum, Washington D. C. (USA)

Fig. 8.3. **Female:** a tectum (a CHANT 1963)

Lasioseius dendroctoni Chant, 1963

(Fig. 8.4.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

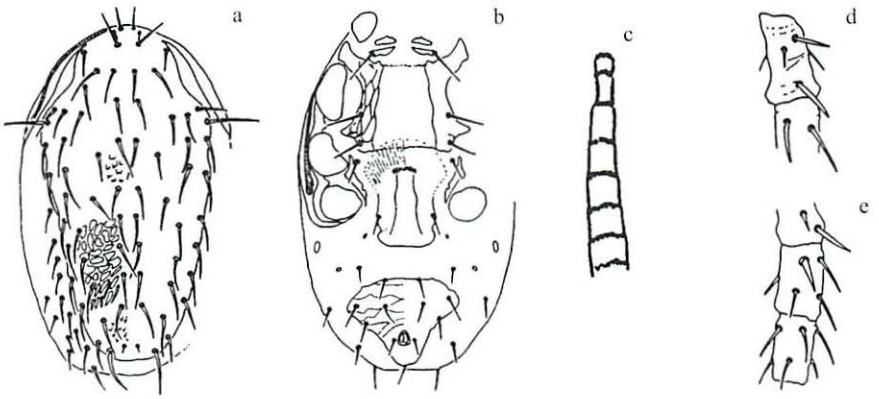

Fig. 8.4. **Female:** a dorsal, b ventral, c hypostome, d leg III, e leg IV (a – e CHANT 1963)

Lasioseius safroi (Ewing, 1920)

(Fig. 8.5.)

EWING, H. E. (1920): New predaceous and parasitic mites of the superfamily Gamasoidea, Acarina. – Entomol. News Philad. **31** (10): 286 – 293

Lectotype: United States National Museum, Washington D. C. (USA)

Synonym: *Seius safroi* Ewing, 1920
New predaceous and parasitic mites of the superfamily Gamasoidea, Acarina. – Entomol. News Philad. **31** (10): 286 – 293

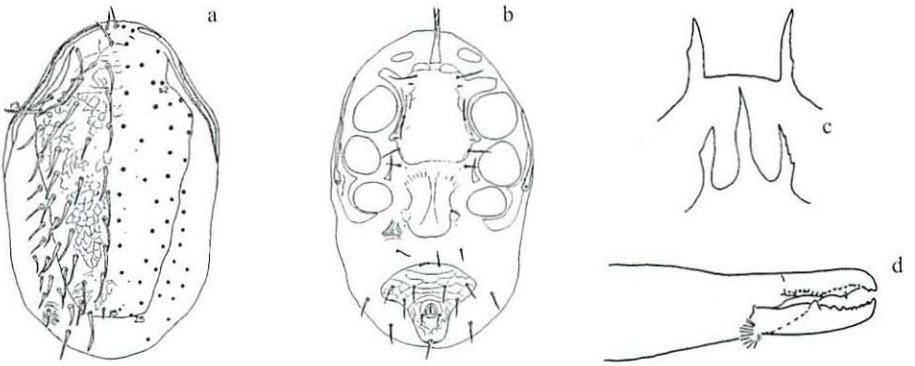

Fig. 8.5. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d HENNESSEY & FARRIER 1988)

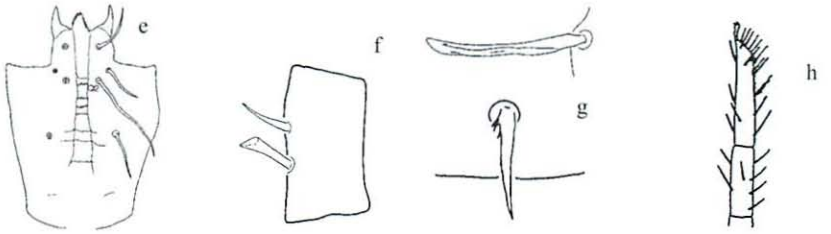

Fig. 8.5. (cont.) **Female:** e hypostome, f palpgenu, g dorsal setae r3, l4, h tarsus (e – g HENNESSEY & FARRIER 1988; h EWING 1920)

Lasioseius liaohaorongae Ma, 1996

(Figs 8.6.1. – 8.6.3.)

MA, L. M. (1996): A new species of *Lasioseius* and a new species of *Asca* (Acari, Aceosejidae, Rhodacaridae). [Orig. Chin.] – Acta Arachnol. Sin. **5** (1): 42 – 45

Types: National Base of Plague and Brucellosis Control, Baicheng City, Jilin Province (China)

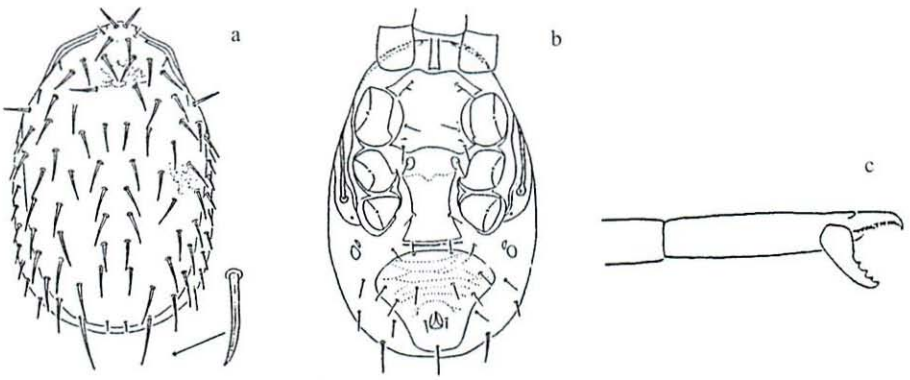

Fig. 8.6.1. **Female:** a dorsal, b ventral, c chelicera (a – c MA 1996)

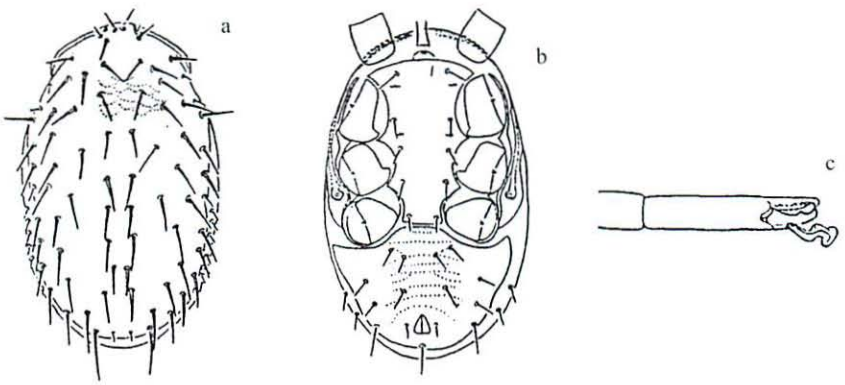

Fig. 8.6.2. **Male:** a dorsal, b ventral, c chelicera (a – c MA 1996)

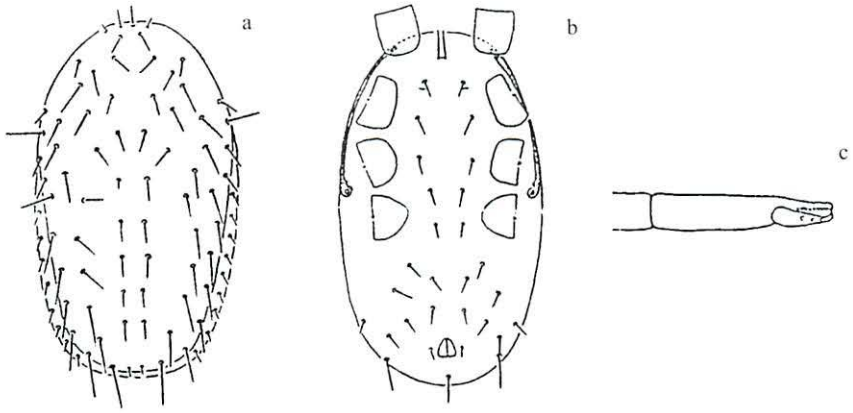

Fig. 8.6.3. **Deutonymph:** a dorsal, b ventral, c chelicera (a – c MA 1996)

Lasioseius subterraneus Chant, 1963

(Fig. 8.7.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: United States National Museum, Washington D. C. (USA)

Synonym: *Lasioseius queenslandicus* Domrow, 1956 not *Lasioseius queenslandicus* Womersley, 1956 Some Acarina Mesostigmata from the Great Barrier Reef. – Proc. Linn. Soc. N. S. Wales **81** (3): 197 – 216

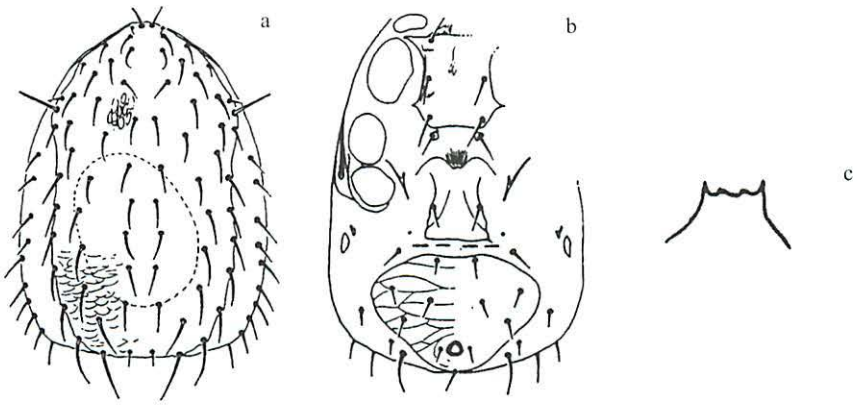

Fig. 8.7. **Female:** a dorsal, b ventral, c tectum (a – c CHANT 1963)

Lasioseius durumae Krantz, 1962

(Fig. 8.8.)

KRANTZ, G. W. (1962): Acari. Free-living Mesostigmata. II. Family Aceosejidae. – Parc National De La Garamba, Mission H. De Saeger **34**: 3 – 29

Holotype: Institute of the National Parks of Congo and Ruanda-Urundi, Bruxelles (Belgium)

Paratypes: United States of National Museum, Washington D. C. (USA), British Museum (National History), London (United Kingdom)

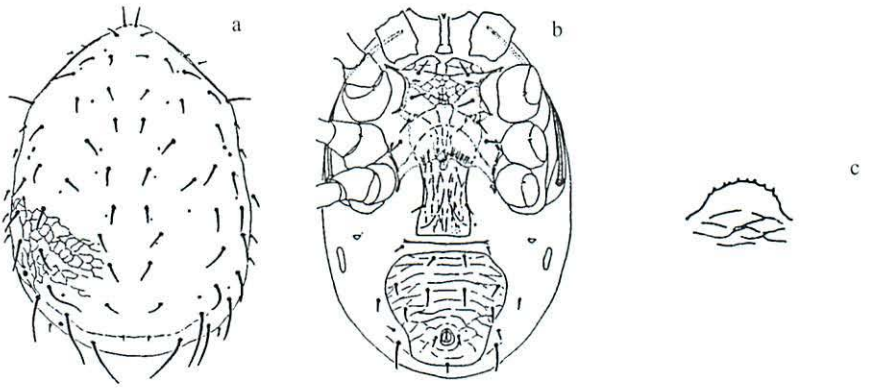

Fig. 8.8. **Female:** a dorsal, b ventral, c tectum (a – c KRANTZ 1962)

Lasioseius spatulus Gu & Wang, 1990

(Fig. 8.9.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184

Holotype: Department of Parasitology, Guiyang Medical College (China)

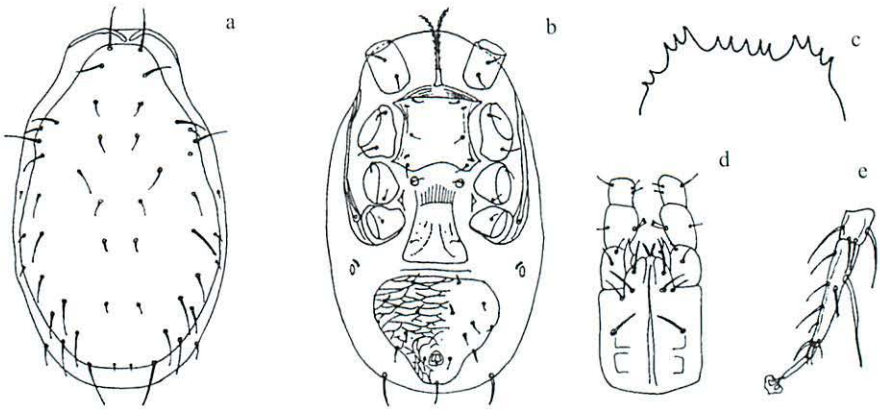

Fig. 8.9. **Female:** a dorsal, b ventral, c tectum, d hypostome, e tarsus IV (a – e modified after GU & WANG 1990)

Lasioseius terrestris Menon & Ghai, 1968

(Figs 8.10.1. – 8.10.2.)

MENON, M. G. R. & S. GHAI (1968): Further records of the distribution of *Petrobia latens* (Mueller) (Acarina, Tetranychidae) a pest of wheat in India together with the description of a new species of predatory mites on the same. – Indian J. Entomol. **30** (1): 77 – 79

Holo- and paratypes: National Pusa Collection, Indian Agriculture Research Institute, New Delhi (India)

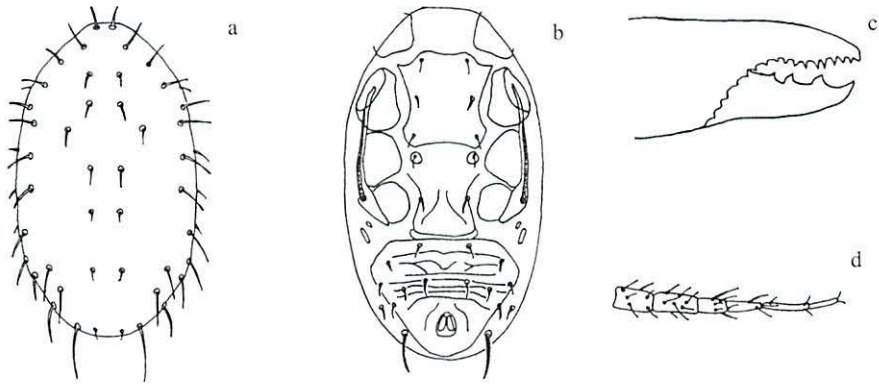

Fig. 8.10.1. **Female:** a dorsal, b ventral, c chelicera, d leg IV (a – d modified after MENON & GHAI 1968)

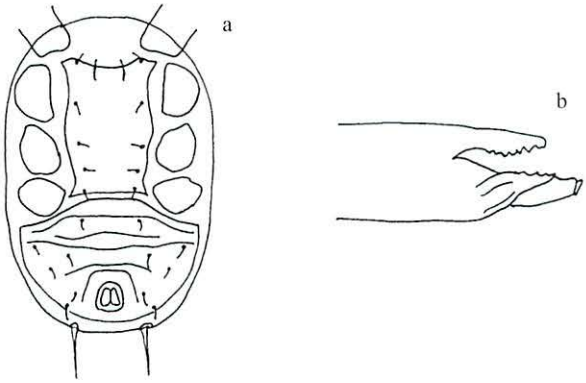

Fig. 8.10.2. **Male:** a ventral, b chelicera (a, b modified after MENON & GHAI 1968)

Lasioseius oblongus (Ewing, 1909)

(Fig. 8.11.)

EWING, H. E. (1909): New North American Acarina. – Trans. Ac. Sci. St. Louis **18**: 53 – 77

Lectotype: Illinois State Laboratory of Natural History (USA)

HENNESSEY, M. K. & M. H. FARRIER (1988): Systematic revision of thirty species of free-living, soil-inhabiting Gamasine mites (Acari, Mesostigmata) of North America. – NC Agric. Res. Serv. Tech. Bull. **285**: 1 – 123

Synonym: *Gamasus oblongus* Ewing, 1909

New North American Acarina. – Trans. Acad. Sci. St. Louis **18**: 53 – 77

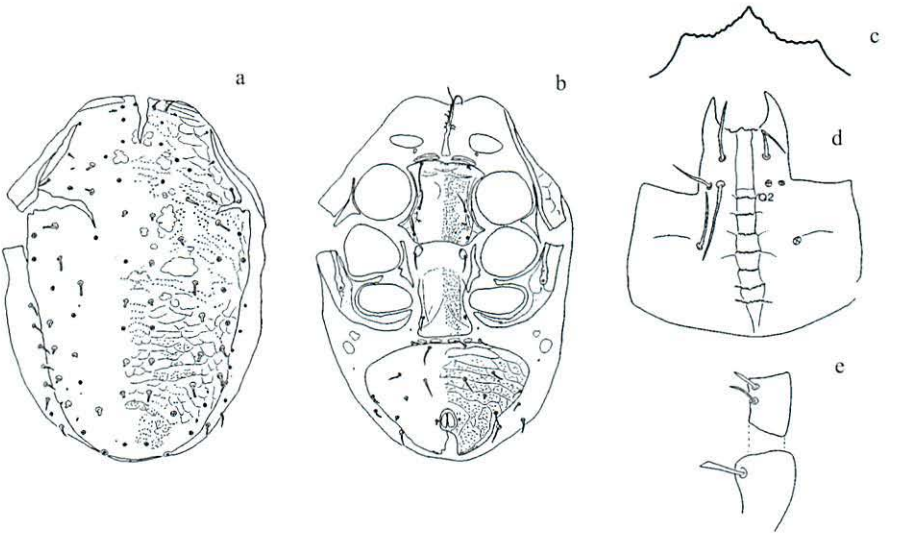

Fig. 8.11. **Female:** a dorsal, b ventral, c tectum, d hypostome, e palpfemur, palpgenu (a – e HENNESSEY & FARRIER 1988)

Lasioseius angustus Evans & Sheals, 1959

(Fig. 8.12.)

EVANS, G. O. & J. G. SHEALS (1959): Three new mesostigmatic mites associated with millipedes in Indonesia. – Entomol. Ber. (Amst.) **19**: 107 – 111

Holotype: British Museum (Natural History), London (United Kingdom)

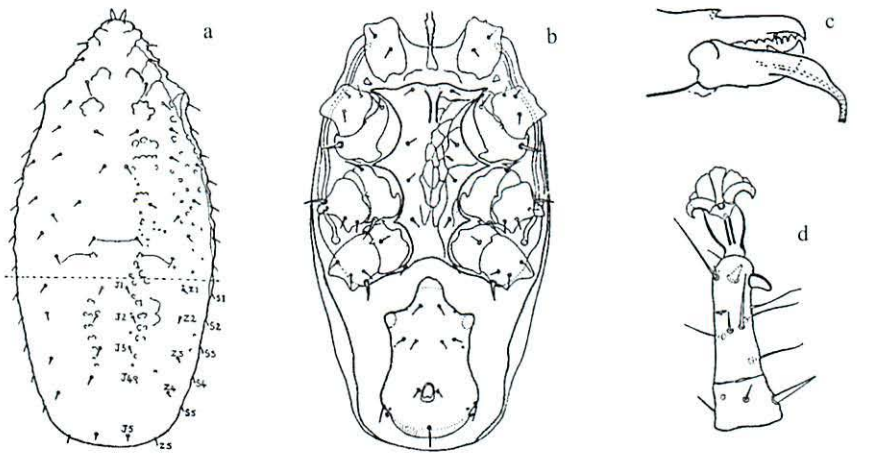

Fig. 8.12. **Male:** a dorsal, b ventral, c chelicera, d tarsus (a – d EVANS & SHEALS 1959)

Key 9: The known species of the *Lasioseius-matthyssei*-complex (including two new species from Ecuador)

1(18) Most ds pectinate, ds Z5 = 1½ – 3 times the length of i4.

2(7) Number of ds reduced, posterior half of dorsum without I3 or I1 and I3.

3(6) Dorsum without I1 and I3, ventra with 7 pairs of setae.

4(5) Ventra remarkably broader than long, width : length = 5 : 4 to 3 : 2, ds Z4 = 69 – 73, Z5 = 75, leg I = 400 – 420, leg IV = 475 – 530, ids = 425 – 470 (Fig. 9.1.):

L. youcefi Athias-Henriot, 1959

syn.: *L. proteae* Ryke, 1964; *L. paucisetosus* Westerboer, 1963; *L. mcgregori* Chant, 1963;

n. syn.: *L. lasiodactyli* Ishikawa, 1969

– Eurasia, Africa, North America.

5(4) Ventra only slightly broader than long, width : length = 4 : 3½, ds Z4 = 54, Z5 = 63, leg I = 427, leg IV = 436, ids = 353 – 395 (Figs 9.2.1. – 9.2.2.):

L. lindquisti Nasr & Abou-Awad, 1987

– Egypt.

6(3) Dorsum without I3, ventra with 5 pairs of setae, the two metapodal plates fused forming a tear-drop shaped shield, ids = 400 (Fig. 9.3.):

L. matthyssei Chant, 1963

– Honduras, on guava.

7(2) Ds I1 – I5 developed on posterior half of dorsum.

8(13) Ventra very broad, bearing 7 pairs of setae.

9(12) Peritreme with poststigmatic projection, both metapodal plates linked or close to each other.

10(11) Ds i2 to i5 and I1 to I5 remarkably short and thin: i3 = ½ the distance i3 – i4, I1 = ⅔ the distance I1 – I2, digitus fixus of the chelicerae with 16 – 20 teeth, ids = 480 – 560 (Figs 9.4.1. – 9.4.2.):

L. confusus Evans, 1958

syn.: *Platyseius nidus* Pinchuk, 1972

– Eurasia, North America.

11(10) Ds longer and stronger, i3 = the distance between i3 and i4, I1 = the distance I1 – I2, digitus fixus of chelicerae with 17 – 19 little teeth, ventra triangular, ids = 540 – 609 (Fig. 9.5.):

L. daanensis Ma, 1996

– China, ex the nest of *Cricetulus barabensis*.

12(9) Peritreme without poststigmatic projection, digitus fixus of the chelicerae only with 5 big teeth, peritremata not lengthened, ventra broadly oval, leg I = 395, ids = 525 (Fig. 9.6.):

L. formosus Westerboer, 1963

– Europe, manure.

13(8) Ventra bearing 5 – 6 pairs of setae.

14(17) Ds relatively short, length of ds i4 = the distance between the pair, Z5 = 2x the length of i4.

15(16) Ds I1 to I4 not reaching the next setae of the series, Z4 not reaching Z5, te with 3 branches, ids = 483 – 506 (Figs 9.7.1. – 9.7.5.):

L. jilinensis Ma, 1996

– China, Jilin Province, ex the nest of *Mus musculus*.

16(15) Ds longer (mostly = 35), ds I1 to I4 reaching the next setae of the series, Z4 reaching Z5, Z5 = 56, macrochaetae of tarsus IV = 88 – 92, ids = 394 (Fig. 9.8.):

L. scapulatus Kennett, 1958

– North America, on *Paria* eggs on strawberry.

17(14) Ds longer, length of ds i4 = the distance between i4 and i5, however Z5 = only 1½x i4, most ds = 40 – 60, Z5 = 70, leg I = 520 and without macrochaetae, ids = 418 (Fig. 9.9.):

L. boomsmai Womersley, 1956

– South Australia, from under bark among faeces of bark-boring beetles, ex rain forest litter.

18(1) Only S-setae respectively Z-setae of the posterior half of dorsum pectinate.

19(32) Ventra bearing 7 pairs of setae.

20(25) Number of ds reduced, posterior half of dorsum without ds I2 and I3.

21(22) Ds i4 and i5 as long as z3, Z4 = 48, Z5 = 80 long, ids = 394 – 423 (Fig. 9.10.):

L. punjabensis Bhattacharyya & Sanyal, 2002

– India, Punjab.

22(21) Ds i4 and i5 conspicuously shorter than z3.

23(24) Ds i4 and i5 half as long as z3, Z5 remarkably strong, Z1 = 3x the length of I1, ids = 459 (Fig. 9.11.):

L. wangi Ma, 1988

– China, Fuisong County, Jilin Province, in nest of *Apodemus agrarius* Pallas.

24(23) Ds i4 and i5 very short, z3 = 3x the length of these setae, Z5 = 5x the length of i4, ids = 525 (Fig. 9.12.):

L. phytoseioides Chant, 1963

– North America, Lousiana, on clover.

25(20) Number of ds not reduced.

26(27) Peritreme with poststigmatic projection, te with 3 groups of points, setae of sternal shield and of ventra very short, ds Z4 = 57, Z5 = 65 – 67, ids = 520 (Fig. 9.13.):

L. mirabilis Christian & Karg, 1992

– Europe, Germany, soil surface of planted slag heap.

27(26) Peritreme not lengthened behind stigma.

28(29) Ventra extremely broad, length : width = 4 : 7, te with 3 serrate branches, ids = 681 (Fig. 9.14.):

L. multispathus Gu & Huang, 1990

– China, on *Apodemus sylvaticus*.

29(28) Ventra not so broad, length : width = 4 : 4 to 3 : 4, posterior S- and Z-setae as well as ds r3 lanceolate and partly pectinate.

30(31) Sternal shield densely dotted, ventra 220 long and 270 wide, te with 3 groups of points, ids = 600 (Fig. 9.15.):

L. lanciolatus Chant, 1963

– North America, on a grape bud in a greenhouse.

31(30) Sternal shield reticulate, ventra 200 long and 255 wide, ids = 550 (Fig. 9.16.):

L. krantzi Chant, 1963

– North America, on tulip bulbs and on *Oncidium* sp.

32(19) Ventra bearing 5 – 6 pairs of setae.

33(52) Ventra with 5 pairs of setae.

34(43) Ventra distinctly longer than wide.

35(38) Posterior half of dorsum without ds I2.

36(37) Posterior ds Z4 and Z5 strong and pectinate = 4x as long as ds I1, sternal setae st1 positioned on the sternal shield, ids = 402 (Figs 9.17.1. – 9.17.4.):

L. chenpengi Ma & Yin, 1999

– China.

37(36) Only ds Z5 strong and pectinate = 4x as long as ds I1, furthermore i1 and r3 pectinate = 2 – 3x as long as I1, sternal setae st1 positioned anterior to the sternal shield, ids = 540 (Figs 9.18.1. – 9.18.2.):

L. cinnyris Fain & Mariaux, 1991

– Africa, Ivory Coast, from *Nectarinia cuprea*.

38(35) Posterior half of dorsum with 5 pairs of I-setae: I1 to I5.

39(40) Ds r3 and Z5 very strong, club-shaped and serrate, length of Z5 = 4x I4, most other ds very short, ids = 325 (Fig. 9.19.):

L. traveni Walter & Lindquist, 1997

– Australia, Queensland, from leaf of *Maesa* sp., tropical rain forest.

40(39) All ds acicular, thin, however caudal setae weakly pectinate, humeral setae may be tricarinate.

41(42) Caudal ds Z4 not longer than the distance Z4 – Z5, ds Z3 = $^2/_3$ the distance Z3 – Z4, humeral setae acicular, ds Z4 = 59, Z5 = 68 = $2^1/_2$x I4, te denticulate, ids = 462 (Fig. 9.20.):

L. triangularis Bhattacharyya & Sanyal, 2002

– India, Tanil Nadu.

42(41) Caudal ds Z4 longer than the distance Z4 – Z5, ds Z3 as long as Z3 – Z4, humeral setae tricarinate, Z4 = 63, Z5 = 69, leg I = 398, leg IV = 460, ids = 405 (Figs 9.21.1. – 9.21.2.):

L. porulosus De Leon, 1963

– North America, on *Leucothoe* sp. and on nettle.

43(34) Ventra as long as wide or wider than long.

44(45) Ventra about as long as wide, most ds very short and peg-like, however ds Z5 extremely thickened and serrate = 10x as long as the short ds, te with smooth margin, ids = 408 (Fig. 9.22.):

L. fleschneri Chant, 1963

– Honduras, on plants.

45(44) Ventra distinctly wider than long.

46(47) The first pair of sternal setae (st1) on weakly sclerotised praeendopodal plates, te trispinate, ids = 425 (Fig. 9.23.):

L. arboreus Chant, 1963

– North America, Maryland, on black locust (*Robinia* sp.) and from soil.

47(46) The first pair of sternal setae on the sternal shield.

48(49) Ds relatively long, on the posterior half of the dorsum each setae reaching the next seta of the series, te with 4 branches, ventra triangular, Z4 longer than Z5, ids = 330 – 350 (Fig. 9.24.):

L. plenosetosus n. sp.

– Ecuador.

49(48) Ds shorter, most ds not reaching the next setae of the series, te with 3 branches.

50(51) Sternal shield as wide as long, length : width of ventra = 4 : 6, ids = 550 – 567 (Fig. 9.25.):

L. medius Gu & Guo, 1994

– China, on *Apodemus chevrieri* and on various species of *Rattus*.

51(50) Sternal shield longer than wide, length : width of ventra = 4 : 5, ids = 417 – 450 (Fig. 9.26.):

L. praevius Gu & Guo, 1994

– China, on *Crocidura attenuata*, *Eothenomys miletus* and *Mus caroli*.

52(33) Ventra with 6 pairs of setae.

53(54) Ds short, no seta reaching the next seta of the series, Z5 = length of Z4, i3 = 2 – 4x the length of i4, ventra transverse oval length : width = 8 : 11, with small anus, ids = 376 (Fig. 9.27.):

L. garambae Krantz, 1962

– Africa, Garamba.

54(53) Ds on the posterior half of dorsum reaching the next setae of the series, ds Z5 longer than Z4, ds i3 a little longer than i4, ventra triangular 180 long and 230 wide, ds Z4 = 45, Z5 = 82, leg I = 560, leg IV = 590, te with 3 terminally split branches, ids = 510 – 550 (Figs 9.28.1. – 9.28.2.):

L. pluvius n. sp.

– Ecuador, Province Pichinca.

Subgenus *Cuspiacus* n. subgen.

Lasioseius-matthyssei-complex

Lasioseius youcefi Athias-Henriot, 1959

(Fig. 9.1.)

ATHIAS-HENRIOT, C. (1959): Phytoseiidae & Aceosejidae (Acarina, Gamasina) d' Algerie. III. Contribution au Aceosejinae. – Bull. Soc. Hist. Nat. Afr. N. **50** (5/6): 158 – 195

Syntypes: Laboratoire d'Acarologie de l'Ecole Pratique des Hautes Etudes, Paris (France)

Paratypes: Laboratoire de Zoologie Agricole de l'Ecole Nationale d'Agriculture d'Alger porte l'indication (Egypt)

Synonyms: *Lasioseius proteae* Ryke, 1964

Acarina associated with *Protea* flowers in Cape Province. – J. Ent. Soc. S. Afr. **26** (2): 337 – 354

Lasioseius paucisetosus Westerboer, 1963

Die Familie Podocinidae, Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

Lasioseius mcgregori Chant, 1963

The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Lasioseius lasiodactyli Ishikawa, 1969 new synonym

Studies on the mesostigmatid mites in Japan. IV. Family Blattisocidae Garman. – Rep. Res. Matsuyama Shinonome Jr. Coll. **4** (1): 111 – 139

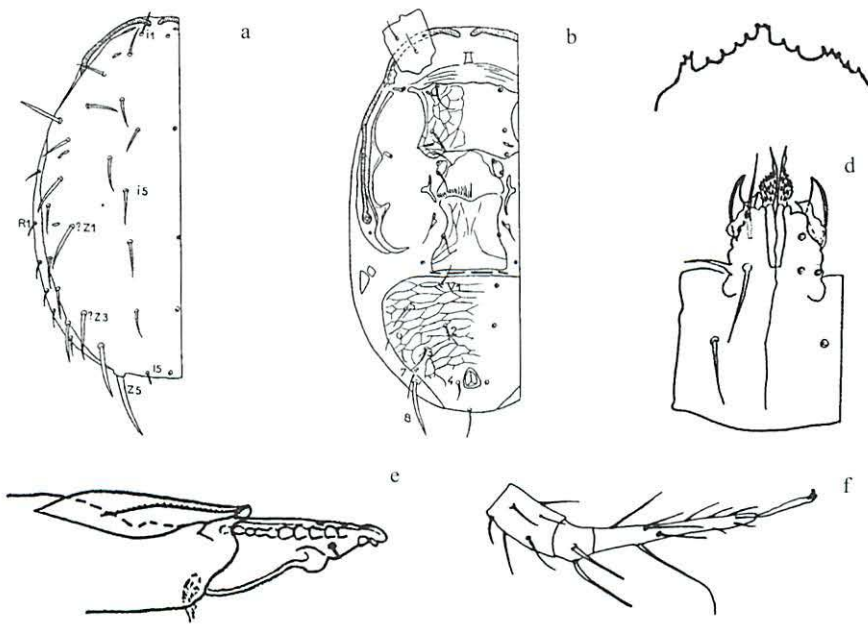

Fig. 9.1. **Female:** a dorsal, b ventral, c tectum, d hypostome, e chelicera, f tarsus IV (a – d ATHIAS-HENRIOT 1959; e, f LEE & LEE 1998)

Lasioseius lindquisti Nasr & Abou-Awad, 1987

(Figs 9.2.1. – 9.2.2.)

NASR, A. K. & B. A. ABOU-AWAD (1987): Description of some ascid mites from Egypt (Acari, Ascidae). – Acarologia **28** (1): 27 – 35

Holotype: National Research Centre, Dokki-Cairo (Egypt)

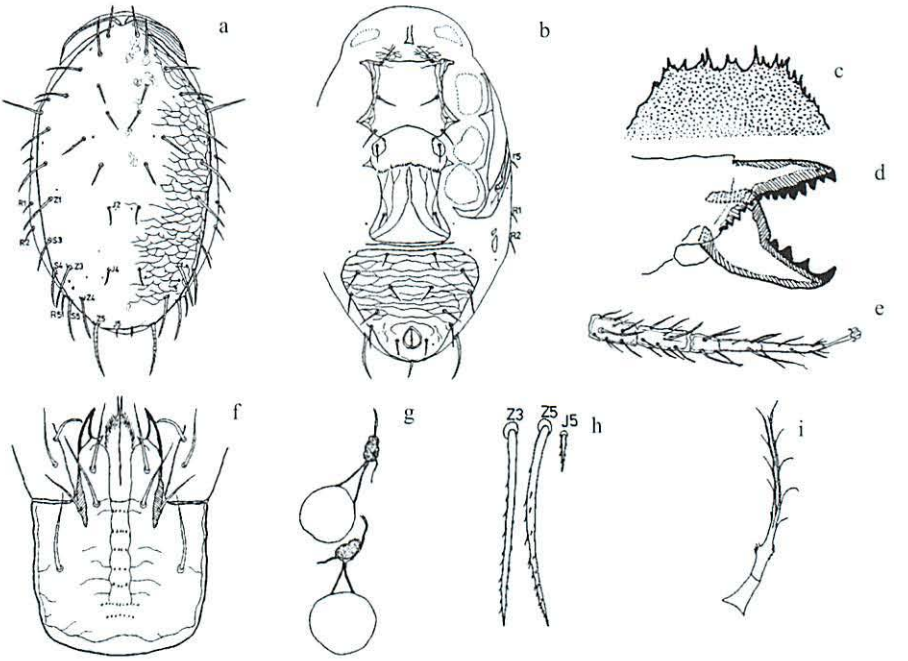

Fig. 9.2.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e leg IV, f hypostome, g spermatheca, h dorsal setae Z3, Z5, I5, i tritosternum (a – i NASR & ABOU-AWAD 1987)

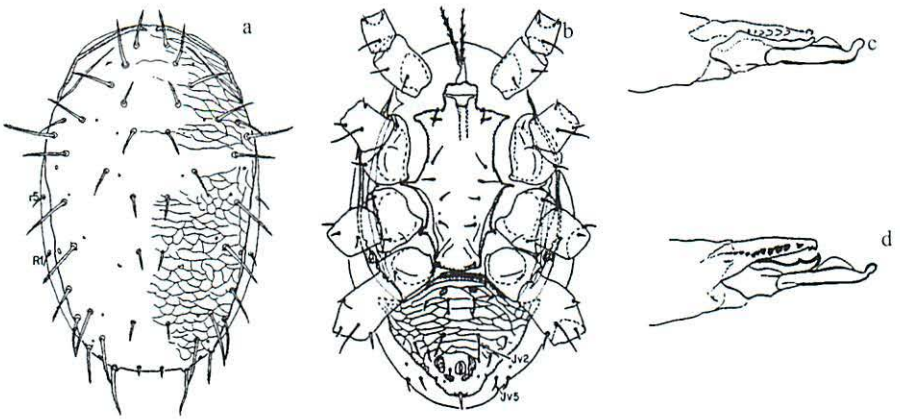

Fig. 9.2.2. **Male:** a dorsal, b ventral, c, d chelicera (a – d NASR & ABOU-AWAD 1987)

Lasioseius matthyssei Chant, 1963

(Fig. 9.3.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

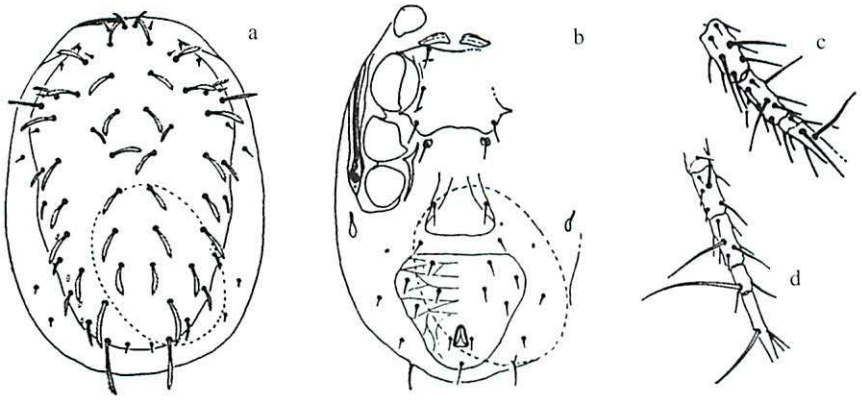

Fig. 9.3. **Female:** a dorsal, b ventral, c leg III, d leg IV (a – d CHANT 1963)

Lasioseius confusus Evans, 1958

(Figs 9.4.1. – 9.4.2.)

EVANS, G. O. (1958): A revision of the British Aceosejinae (Acarina, Mesostigmata). – Proc. zool. Soc. Lond. **131** (2): 177 – 229

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

Synonym: *Platyseius nidus* Pinchuk, 1972

Neue Arten gamasider Milben (Parasitiformes, Gamasoidea). [Orig. Russ.] – Izv. Akad. Nauk Moldav. SSR, Ser. biol. i chem. nauki **3**: 60 – 71

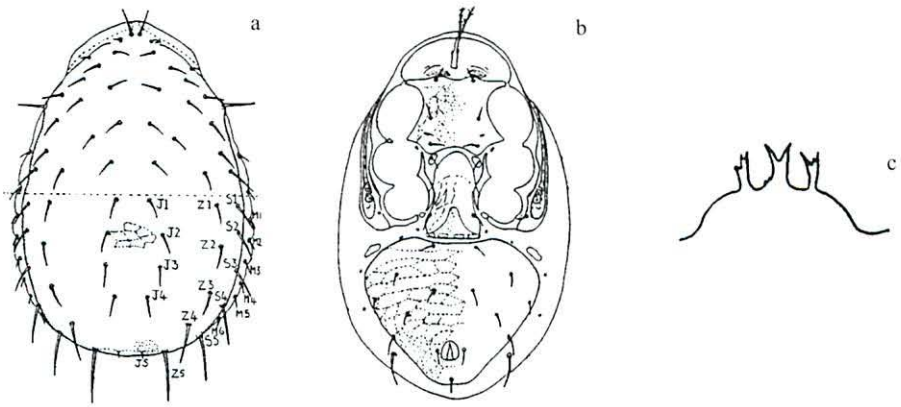

Fig. 9.4.1. **Female:** a dorsal, b ventral, c tectum (a, b EVANS 1958, c ATHIAS-HENRIOT 1961)

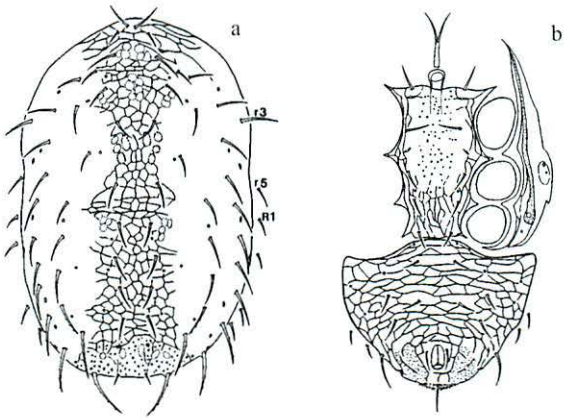

Fig. 9.4.2. **Male:** a dorsal, b ventral (a, b WALTER & LINDQUIST 1989)

Lasioseius daanensis Ma, 1996

(Fig. 9.5.)

MA, L. M. (1996): Two new species of the genus *Lasioseius* and one new species of the genus *Cheiroseius* (Acari, Mesostigmata, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **21** (3): 312 – 316
Types: National Base of Plague and Brucellosis Control, Baicheng City, Jilin Province (China)

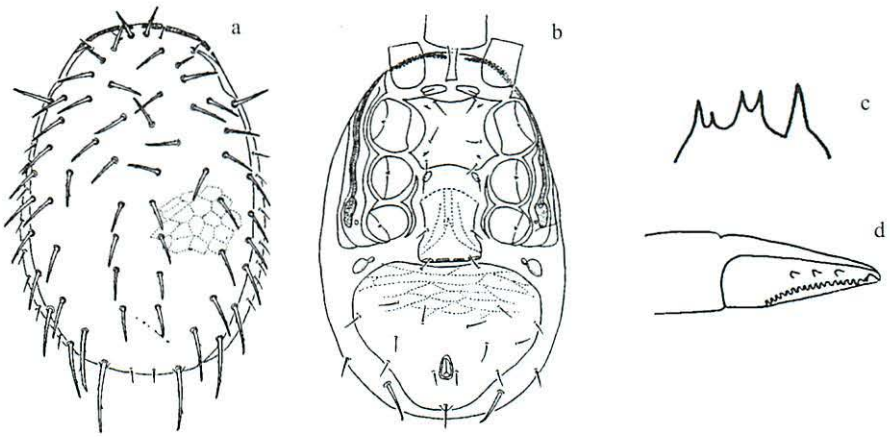

Fig. 9.5. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d MA 1996)

Lasioseius formosus Westerboer, 1963

(Fig. 9.6.)

WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450
Types: deposition unknown to the authors

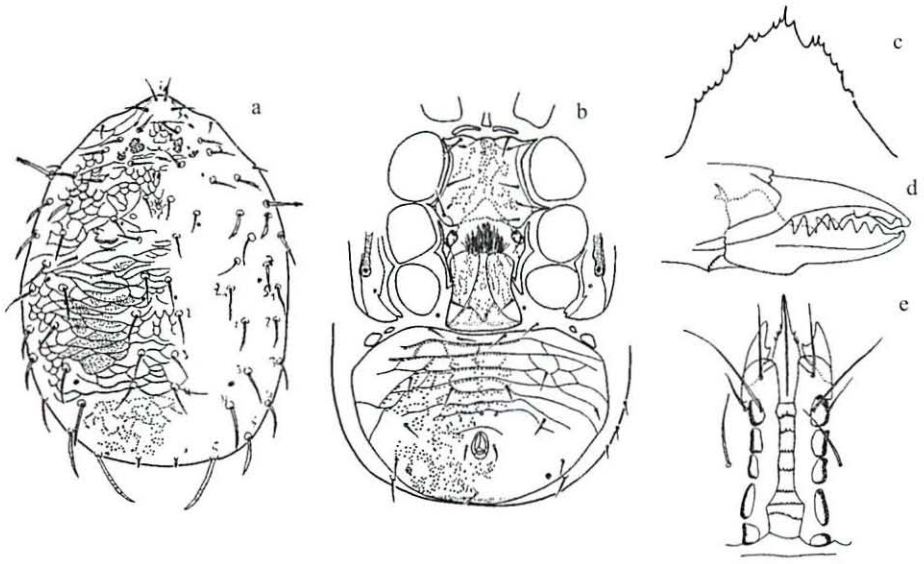

Fig. 9.6. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome (a – e WESTERBOER 1963)

Lasioseius jilinensis Ma, 1996

(Figs 9.7.1. – 9.7.5.)

MA, L. M. (1996): Two new species of the genus *Lasioseius* and one new species of the genus *Cheiroseius* (Acari, Mesostigmata, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **21** (3): 312 – 316
Types: National Base of Plague and Brucellosis Control, Baicheng City, Jilin Province (China)

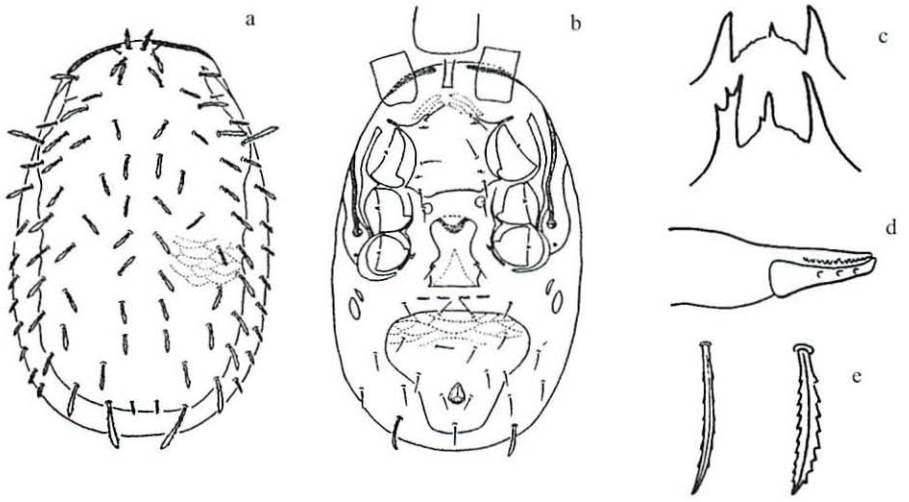

Fig. 9.7.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e dorsal setae (a – e MA 1996)

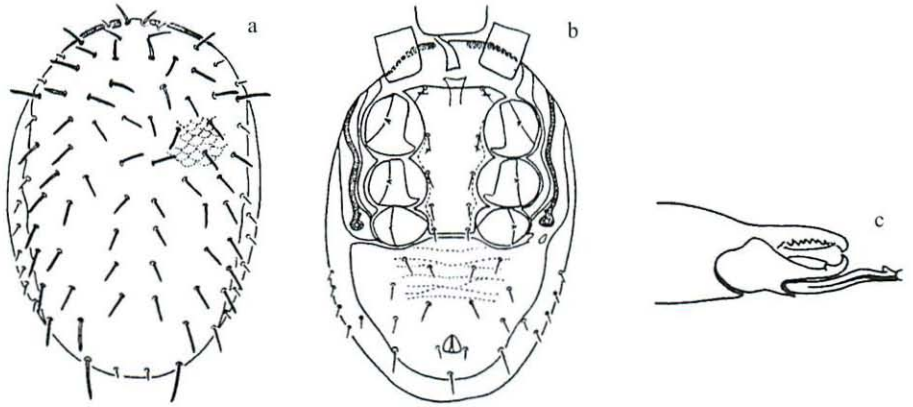

Fig. 9.7.2. **Male:** a dorsal, b ventral, c chelicera (a – c MA 1997)

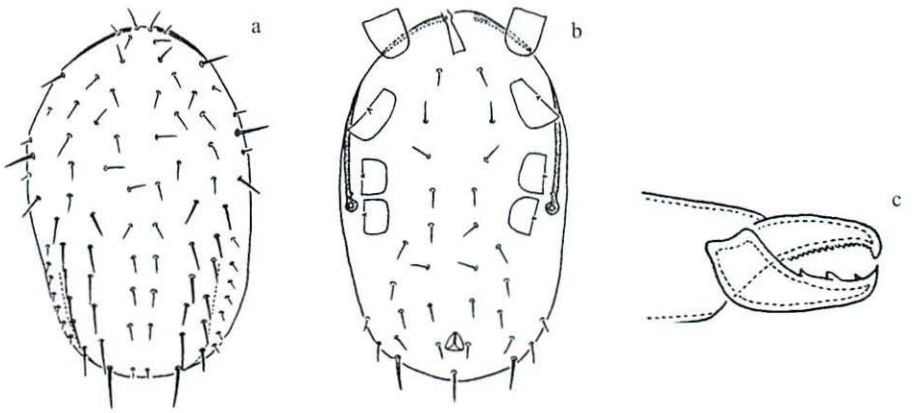

Fig. 9.7.3. **Deutonymph:** a dorsal, b ventral, c chelicera (a – c MA 1997)

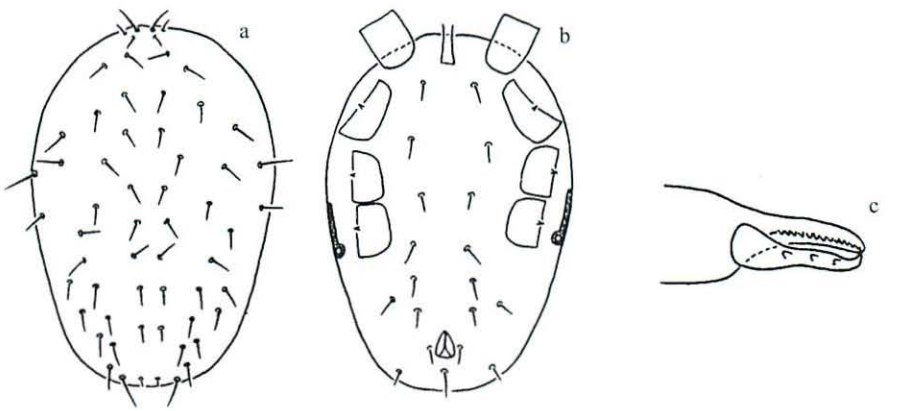

Fig. 9.7.4. **Protonymph:** a dorsal, b ventral, c chelicera (a – c MA 1997)

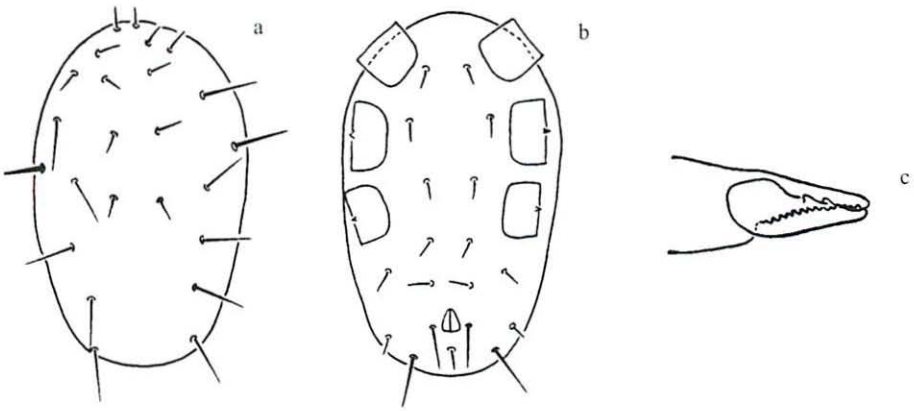

Fig. 9.7.5. **Larva:** a dorsal, b ventral, c chelicera (a – c MA 1997)

Lasioseius scapulatus Kennett, 1958

(Fig. 9.8.)

KENNETT, C. E. (1958): Some predacious mites of the subfamilies Phytoseiinae and Aceosejinae (Acarina, Phytoseiidae, Aceosejidae) from Central California with description of new species. – Ann. Entomol. Soc. Am. **51**: 471 – 479

Holo- and paratypes: United States National Museum, Washington D. C. (USA), California Insect Survey (USA)

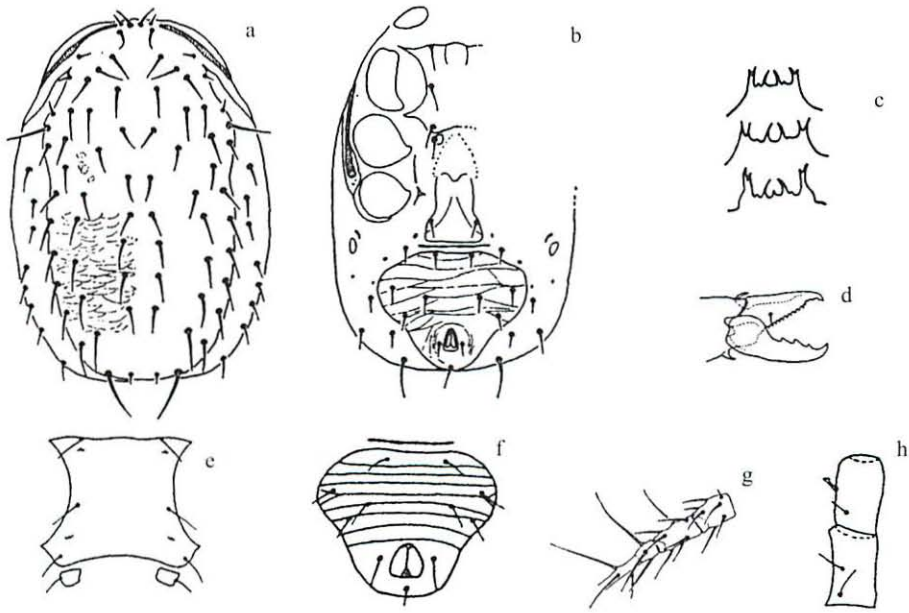

Fig. 9.8. **Female:** a dorsal, b ventral, c tectum, d chelicera, e sternal shield, f ventrianal shield, g leg IV, h palpus (a – d, g CHANT 1963; e, f, h KENNETT 1958)

Lasioseius boomsmai Womersley, 1956

(Fig. 9.9.)

WOMERSLEY, H. (1956): On some new Acarina-Mesostigmata from Australia, New Zealand and Guinea. – J. Linn. Soc., Zool **42** (288): 505 – 599

Holotypes: South Australian Museum, North Terrace, Adelaide (Australia)

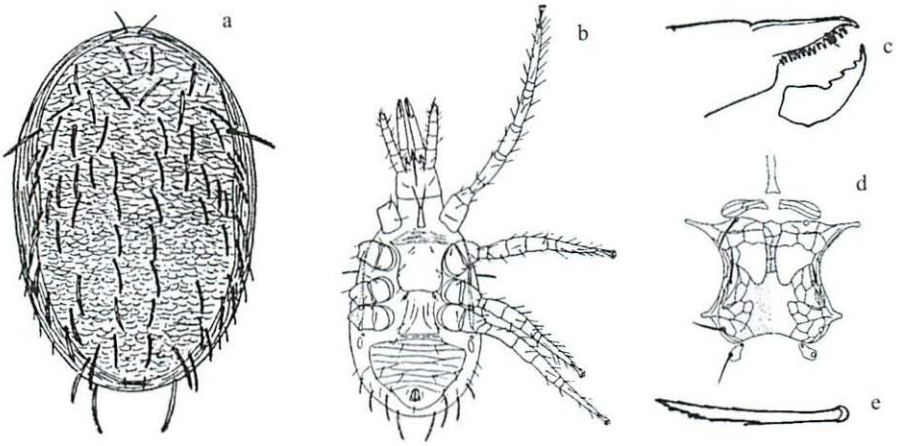

Fig. 9.9. **Female:** a dorsal, b ventral, c chelicera, d sternal shield, e dorsal seta (a – c, e Womersley 1956, d Walter & Lindquist 1997)

Lasioseius punjabensis Bhattacharyya & Sanyal, 2002

(Fig. 9.10.)

BHATTACHARYYA, A. K. & A. K. SANYAL (2002): New data on mites of the genus *Lasioseius* (Mesostigmata, Ascidae) in India along with the description of two new species. – Acarina **10** (1): 51 – 56

Holo- and paratypes: National Zoological Collection, Zoological Survey of India, Calcutta (India)

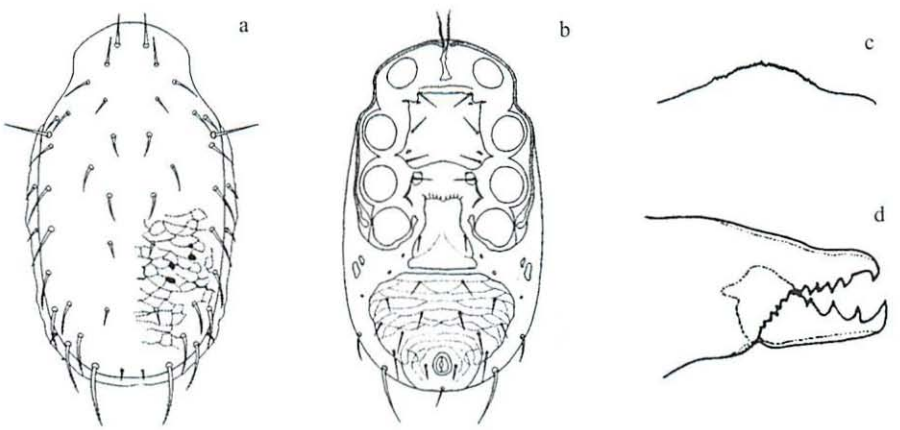

Fig. 9.10. **Female:** a dorsal, b ventral, c tectum, d chelicera (a – d BHATTACHARYYA & SANYAL 2002)

Lasioseius wangi Ma, 1988

(Fig. 9.11.)

MA, M. L. (1988): Three new species of Gamasina from China (Acari, Mesostigmata). [Orig. Chin.] – Acta Zootaxon. Sin. **13** (2): 147 – 150

Holotype: First Institute of Endemic Diseases Research, Jilin Province (China)

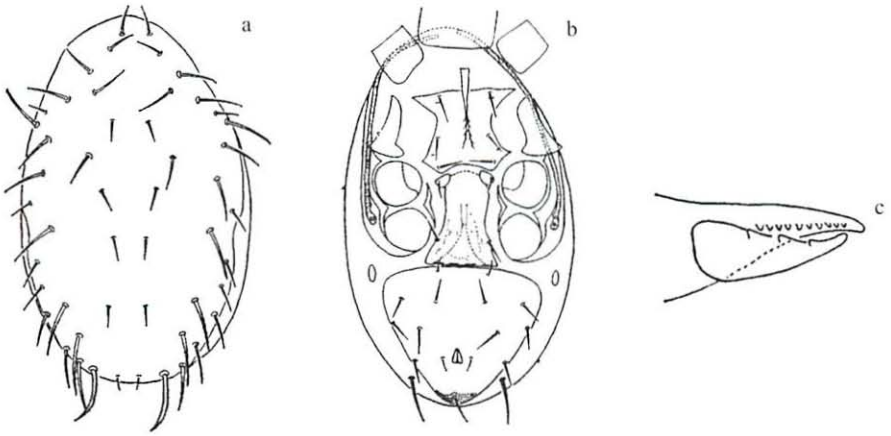

Fig. 9.11. **Female:** a dorsal, b ventral, c chelicera (a – c MA 1988)

Lasioseius phytoseioides Chant, 1963

(Fig. 9.12.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Types: United States National Museum, Washington D. C. (USA)

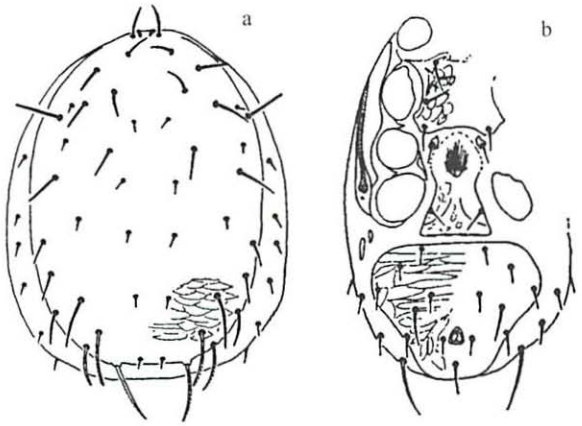

Fig. 9.12. **Female:** a dorsal, b ventral (a, b CHANT 1963)

Lasioseius mirabilis Christian & Karg, 1992

(Fig. 9.13.)

CHRISTIAN, A. & W. KARG (1992): *Lasioseius mirabilis* n. sp. (Acarina, Mesostigmata), eine neue Raubmilbenart von den Berzdorfer Halden. – Abh. Ber. Naturkundemus. Görlitz **66** (7): 3 – 8
Holotype: Staatliches Museum für Naturkunde Görlitz (Germany)

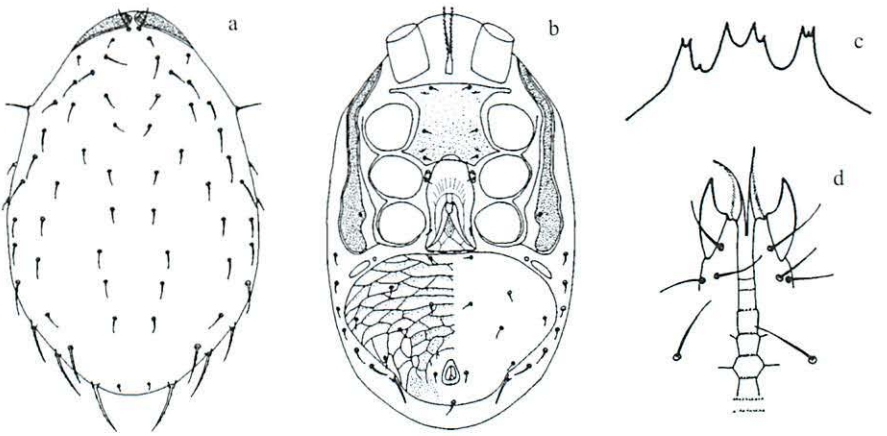

Fig. 9.13. **Female:** a dorsal, b ventral, c tectum, d hypostome (a – d CHRISTIAN & KARG 1992)

Lasioseius multispathus Gu & Huang, 1990

(Fig. 9.14.)

GU, Y. M., J. S. WANG & C. A. HUANG (1990): Six new species of the genus *Lasioseius* (Acari, Aceosejidae). [Orig. Chin.] – Acta Zootaxon. Sin. **15** (2): 174 – 184
Holotype: Department of Parasitology, Guiyang Medical College (China)

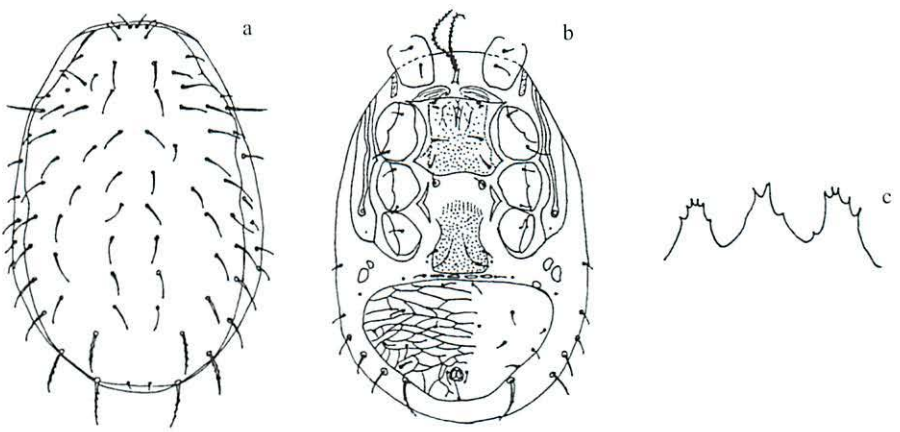

Fig. 9.14. **Female:** a dorsal, b ventral, c tectum (a – c modified after GU & HUANG 1990)

Lasioseius lanciolatus Chant, 1963

(Fig. 9.15.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

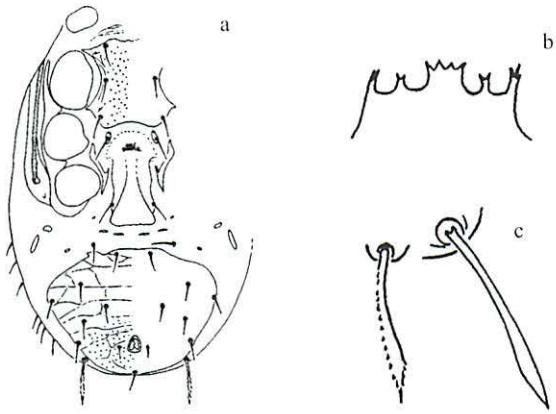

Fig. 9.15. **Female:** a ventral, b tectum, c dorsal setae Z, S (a – c CHANT 1963)

Lasioseius krantzi Chant, 1963

(Fig. 9.16.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

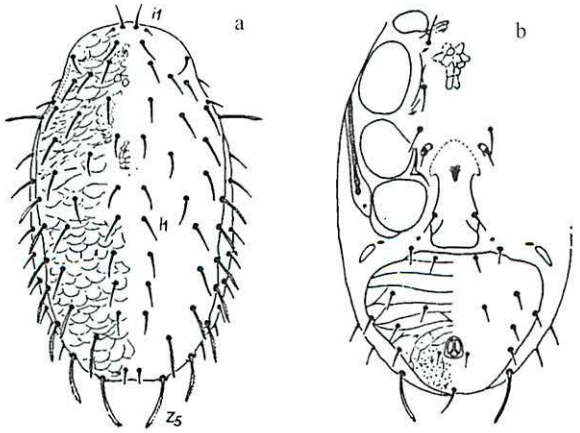

Fig. 9.16. **Female:** a dorsal, b ventral (a, b CHANT 1963)

Lasioseius chenpengi Ma & Yin, 1999

(Figs 9.17.1. – 9.17.4.)

MA, L. M. & X. Q. YIN (1999): Four new species and two new record genera of the family Aceosejidae from China (Acari, Gamasina). [Orig. Chin.] – Acta Arachnol. Sin. **8** (1): 1 – 7

Holo- and paratypes: National Base of Plague and Brucellosis Control, Baicheng City, Jilin Province (China)

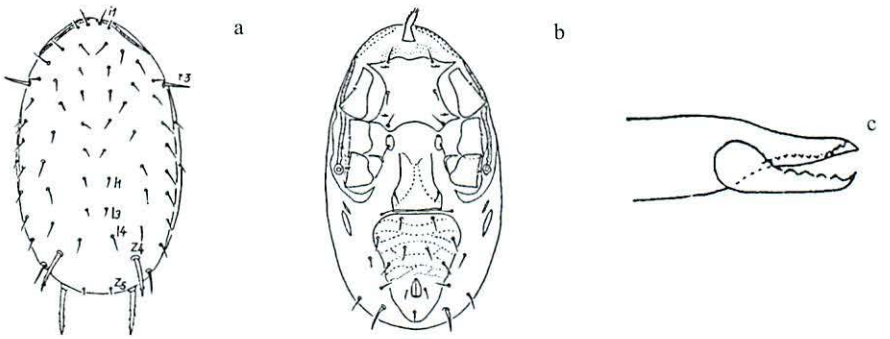

Fig. 9.17.1. **Female:** a dorsal, b ventral, c chelicera (a – c MA & YIN 1999)

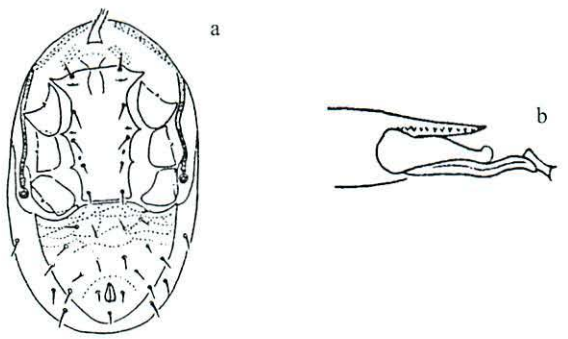

Fig. 9.17.2. **Male:** a ventral, b chelicera (a, b MA & YIN 1999)

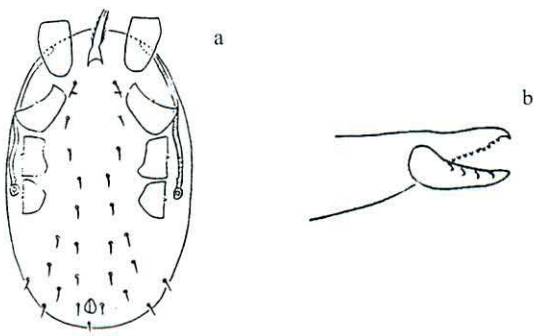

Fig. 9.17.3. **Deutonymph:** a ventral, b chelicera (a, b Ma & Yin 1999)

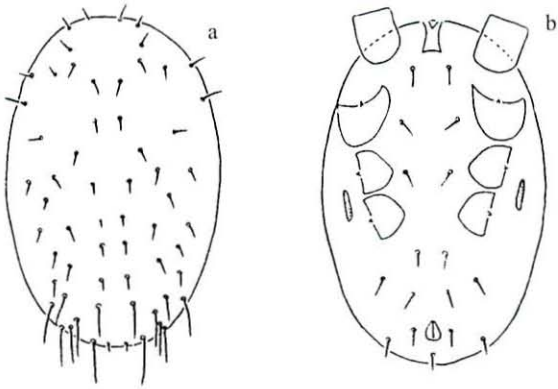

Fig. 9.17.4. **Protonymph:** a dorsal, b ventral (a, b MA & YIN 1999)

Lasioseius cinnyris Fain & Mariaux, 1991

(Figs 9.18.1. – 9.18.2.)

FAIN, A. & J. MARIAUX (1991): Notes sur deux Acariens mesostigmatiques (Acari, Mesostigmata) associés à des Souïmangas (Oiseaux, Nectariniidae) de Côte d'Ivoire. – Rev. suisse Zool. **98** (2): 319 – 324

Holotype: Musée de Tervuren (Belgium)

Paratypes: Muséum d'Histoire Naturelle, Genève (Switzerland), British Museum (Natural History), London (United Kingdom), Collection A. Fain, Bruxelles (Belgium)

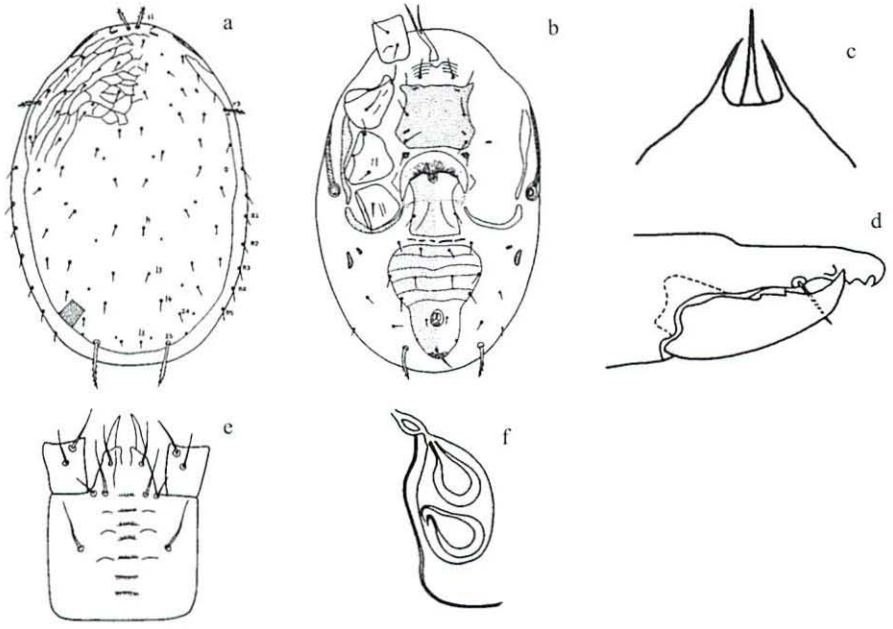

Fig. 9.18.1. **Female:** a dorsal, b ventral, c tectum, d chelicera, e hypostome, f spermatheca (a – f FAIN & MARIAUX 1991)

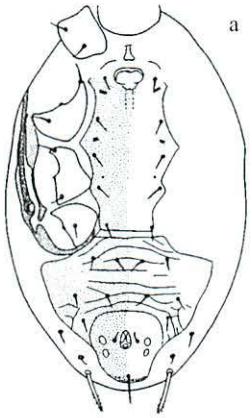

Fig. 9.18.2. **Male:** a ventral (a FAIN & MARIAUX 1991)

Lasioseius traveni Walter & Lindquist, 1997

(Fig. 9.19.)

WALTER, D. E. & E. E. LINDQUIST (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): the *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

Holotype: Department of Entomology, University of Queensland, St. Lucia (Australia)

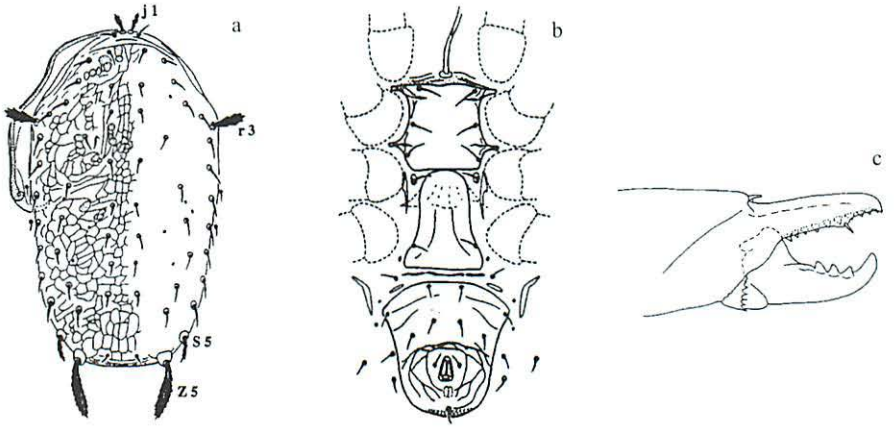

Fig. 9.19. **Female:** a dorsal, b ventral, c chelicera (a – c WALTER & LINDQUIST 1997)

Lasioseius triangularis Bhattacharyya & Sanyal, 2002

(Fig. 9.20.)

BHATTACHARYYA, A. K. & A. K. SANYAL (2002): New data on mites of the genus *Lasioseius* (Mesostigmata, Ascidae) in India along with the description of two new species. – Acarina **10** (1): 51 – 56

Holo- and paratypes: National Zoological Collection, Zoological Survey of India, Calcutta (India)

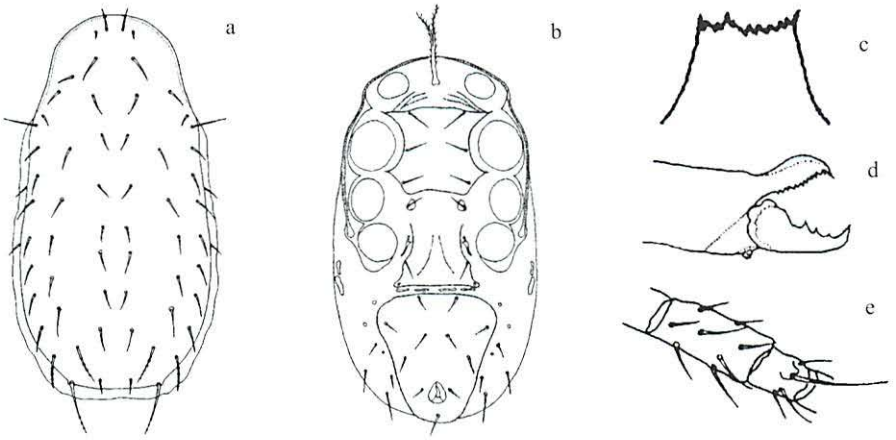

Fig. 9.20. **Female:** a dorsal, b ventral, c tectum, d chelicera, e genu, tibea IV (a – e BHATTACHARYYA & SANYAL 2002)

Lasioseius porulosus De Leon, 1963

(Figs 9.21.1. – 9.21.2.)

DE LEON, D. (1963): A new genus and twelve new species of mites from Mexico and southeast United States (Acarina, Blattisocidae). – Fla. Entomol. **46** (2): 197 – 207

Types: deposition unknown to the authors

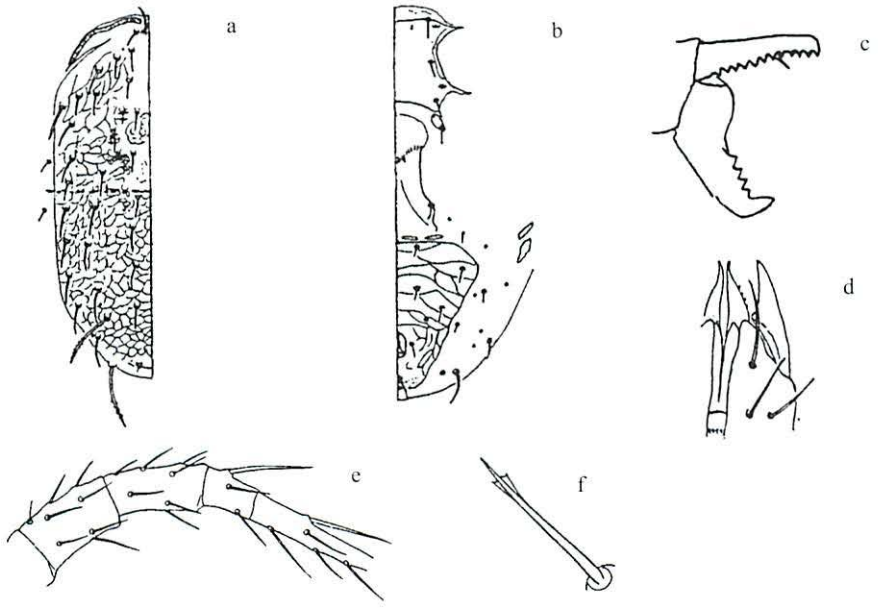

Fig. 9.21.1. **Female:** a dorsal, b ventral, c chelicera, d hypostome, e leg IV, f dorsal seta (a – d DE LEON 1963; e, f EHARA 1964)

Fig. 9.21.2. **Male:** a chelicera, b spermathodactyl (a LEE & LEE 1998; b EHARA 1964)

Lasioseius fleschneri Chant, 1963

(Fig. 9.22.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: Canadian National Collection of Insects and Arachnida, Ottawa (Canada)

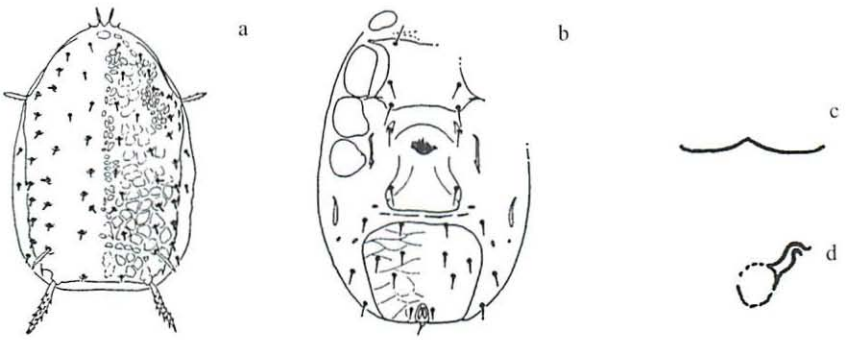

Fig. 9.22. **Female:** a dorsal, b ventral, c tectum, d spermatheca (a – d CHANT 1963)

Lasioseius arboreus Chant, 1963

(Fig. 9.23.)

CHANT, D. A. (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

Holotype: United States National Museum, Washington D. C. (USA)

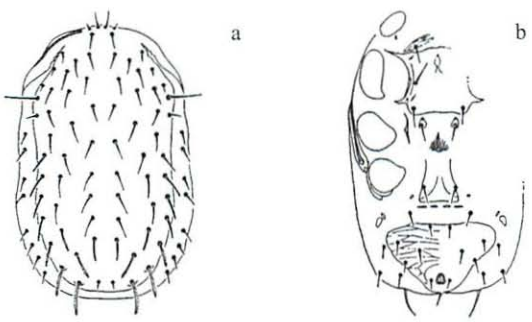

Fig. 9.23. **Female:** a dorsal, b ventral (a – b CHANT 1963)

Lasioseius plenosetosus n. sp.

(Fig. 9.24.)

Holotype: ♀ Ecuador 1990, near Loreto, coffee plantation, litter

Paratype: 1♀

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by long ds, ds Z4 longer than Z5, ds on the posterior half of dorsum weakly serrate, te with 4 points.

Ids♀330 – 350 x 190 – 200, dorsum reticulate, most ds reaching the next setae of the series, 30 – 35 long, however i1 = 25, r3 = 45, Z4 = 50, Z5 = 45, setae of venter 20 – 25 long, sternal shield smooth, presternal plates lineate, ventra 150 wide and 100 long, triangular with 5 pairs of setae, te with 4 points that are equal in length, lateral points serrate, middle points cuspidate, digitus fixus of chelicera with 20 – 22 teeth, legs: I = 400, II = 280, III = 270, IV = 420.

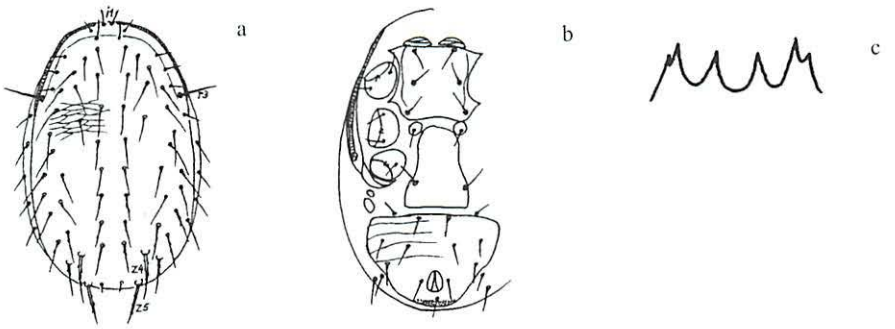

Fig. 9.24. **Female:** a dorsal, b ventral, c tectum (a – c original drawings by the authors)

Lasioseius medius Gu & Guo, 1994

(Fig. 9.25.)

Gu, Y. M. & X. G. Guo (1994): Two new species of the genus *Lasioseius* from China (Acari, Ascidae). [Orig. Chin.] – Acta Arachnol. Sin. **3** (2): 86 – 90

Types: Department of Parasitology, Medical School, Nanjing University (China)

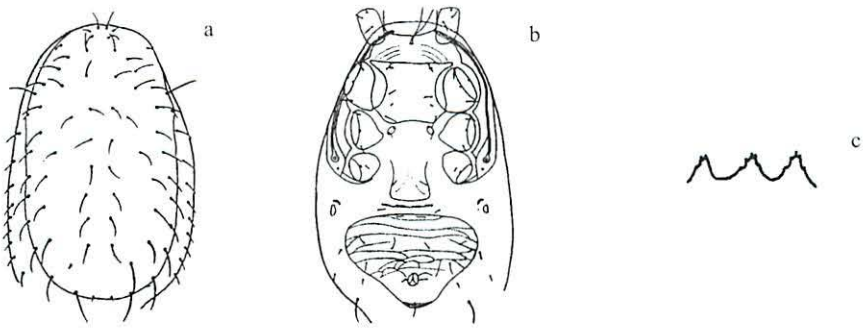

Fig. 9.25. **Female:** a dorsal, b ventral, c tectum (a – c Gu & Guo 1994)

Lasioseius praevius Gu & Guo, 1994

(Fig. 9.26.)

Gu, Y. M. & X. G. Guo (1994): Two new species of the genus *Lasioseius* from China (Acari, Ascidae). [Orig. Chin.] – Acta Arachnol. Sin. **3** (2): 86 – 90

Types: Department of Parasitology, Medical School, Nanjing University (China)

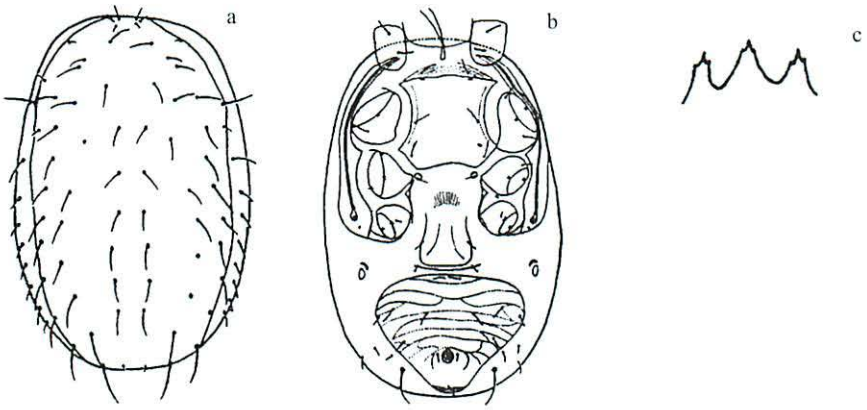

Fig. 9.26. **Female:** a dorsal, b ventral, c tectum (a – c Gu & Guo 1994)

Lasioseius garambae Krantz, 1962

(Fig. 9.27.)

Krantz, G. W. (1962): Acari. Free-living Mesostigmata. II. Family Aceosejidae. – Parc National De La Garamba, Mission H. De Saeger **34**: 3 – 29

Holotype: Institute of National Parks of the Congo and Ruanda-Urundi, Bruxelles (Belgium)

Paratypes: United States National Museum, Washington D. C. (USA)

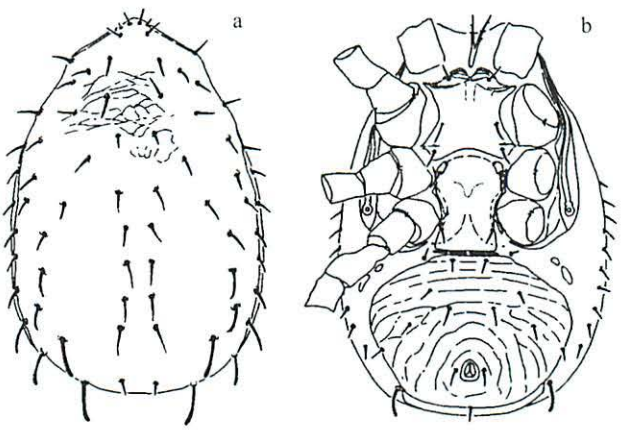

Fig. 9.27. **Female:** a dorsal, b ventral (a, b Krantz 1962)

Lasioseius pluvius n. sp.

(Figs 9.28.1. – 9.28.2.)

Holotype: ♀ Ecuador 1989, prov. Pichinca, between Pifo and Papalacta, 4100 m a.s.l., moss from soil, grass and withered plant debris from under bushes

Paratypes: 4 ♀, 5 ♂

Deposition of types: Staatliches Museum für Naturkunde Görlitz (Germany)

Characterised by having longer setae on the posterior half of the dorsum than on the anterior half, most ds acicular, only the caudal ds Z5 pectinate, ventra with 6 pairs of setae.

Ids ♀ 510 – 550 x 330 – 350, dorsum reticulate, ds of the anterior half mostly 25 – 30 long except ds r3 (= 60), ds of the posterior half of dorsum 38 – 82 long, except ds I5 (= 27), i1 = 35, s1 = 25, i3 = 30, i4 = 25, r3 = 60, I5 = 38, I2 = 40, I3 = 43, I4 = 40, Z4 = 45, Z5 = 82, S5 = 50, te with 3 branches, sternal shield medially smooth, lineate along lateral margins, presternal region punctate, sternal setae 40 – 50 long, digitus fixus with 15 – 16 teeth, ventra nearly triangular, reticulate with 6 pairs of 25 long setae, ps = 35 long, ventra 180 long, 230 wide, legs: I = 560, II = 480, III = 440, IV = 590.

Ids ♂ 400 – 420 x 230 – 280, spermatodactyl like a finger with a button-like end.

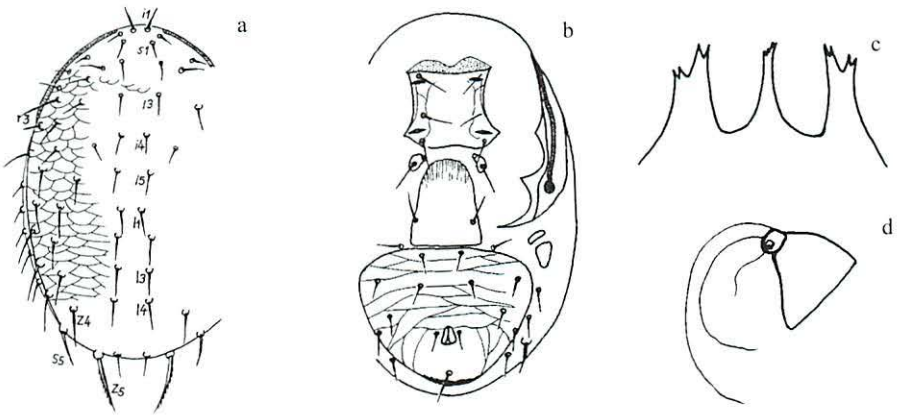

Fig. 9.28.1. **Female:** a dorsal, b ventral, c tectum, d spermatheca (a – d original drawings by the authors)

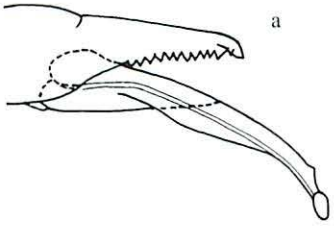

Fig. 9.28.2. **Male:** a chelicera (a original drawing by the authors)

Excluded species

The following species belong to other genera.

Lasioseius alpinus Schweizer, 1949
to *Proctolaelaps* Berlese, 1923 – syn. of *P. pygmaeus* (J. Müller, 1859)
Lasioseius aurora Vitzthum, 1925
to *Proctolaelaps* Berlese, 1923 = *P. aurora* (Vitzthum, 1925)
Lasioseius bakeri Chant, 1958
to *Blattisocius* Keegan, 1944 = *B. bakeri* (Chant, 1958)
Lasioseius borealis var. *temperatus* Berlese, 1916
to *Cheiroseius* Berlese, 1916 – syn. of *Ch. borealis* (Berlese, 1904) ??
Lasioseius capillatus Berlese, 1916
to *Platyseius* Berlese, 1916 – syn. of *P. subglaber* (Oudemans, 1903)
Lasioseius cetratus Sellnick, 1940
to *Arctoseius* Sig Thor, 1930 = *A. cetratus* (Sellnick, 1940)
Lasioseius conviva Berlese, 1916
to *Proctolaelaps* Berlese, 1923 – syn. of *P. pygmaeus* (J. Müller, 1859)
Lasioseius dentriticus Berlese, 1918
to *Paragarmania* Nesbitt, 1951 = *P. dentritica* (Berlese, 1918)
Lasioseius drosophili Chant, 1963
to *Hoploseius* Berlese, 1914 = *H. drosophili* (Chant, 1963)
Lasioseius eccoptogasteris Vitzthum, 1923
to *Garmaniella* Westerboer, 1963 = *G. eccoptogasteris* (Vitzthum, 1923)
Lasioseius fucicola Halbert, 1920
to *Thinoseius* Halbert, 1920 = *Th. fucicolus* (Halbert, 1920)
Lasioseius glaber var. *curtipes* Halbert, 1923
to *Cheiroseius* Berlese, 1916 = *Ch. curtipes* (Halbert, 1923)
Lasioseius gracilis Halbert, 1923
to *Ameroseius* Berlese, 1904 = *A. gracilis* (Halbert, 1923)
Lasioseius hystrix Hirschmann & Rühm, 1953
to *Proctolaelaps* Berlese, 1923 – syn. of *P. fiseri* Samsinak, 1960
Lasioseius hystrix Vitzthum, 1923
to *Proctolaelaps* Berlese, 1923 = *P. hystrix* (Vitzthum, 1923)
Lasioseius innumerabilis Berlese, 1918
to *Proctolaelaps* Berlese, 1923 – syn. of *P. pygmaeus* (J. Müller, 1859)
Lasioseius insularis Willmann, 1952
to *Arctoseius* Sig Thor, 1930 = *A. insularis* (Willmann, 1952)
Lasioseius jüradeus Schweizer, 1949
to *Proctolaelaps* Berlese, 1923 = *P. jüradeus* (Schweizer, 1949)
Lasioseius listrophorus Berlese, 1916 sensu Schweizer, 1924
to *Platyseius* Berlese, 1916 – syn. of *P. subglaber* (Oudemans, 1903)
Lasioseius longisetosus Postner, 1951 in lit.
to *Proctolaelaps* Berlese, 1923 = *P. longisetosus* (Postner, 1951)
Lasioseius major Halbert, 1923
to *Plesiosejus* Evans & Hyatt, 1960 = *P. major* (Halbert, 1923)
Lasioseius marinus Willmann, 1952
to *Amblyseius* Berlese, 1914 = *A. marinus* (Willmann, 1952)

Lasioseius michaeli Halbert, 1923
to *Plesiosejus* Evans & Hyatt, 1960 – syn. of *P. italicus* (Berlese, 1905)
Lasioseius muestairi Schweizer, 1949
to *Zerconopsis* Hull, 1918 = *Z. muestairi* (Schweizer, 1949)
Lasioseius mutilus Berlese, 1916
to *Cheiroseius* Berlese, 1916 = *Ch. mutilus* (Berlese, 1916)
Lasioseius polonicus Willmann, 1949
to *Amblyseius* Berlese, 1914 – syn. of *A. alpinus* Schweizer, 1922
Lasioseius pulvisculus Berlese, 1920
to *Arctoseius* Sig Thor, 1930 – syn. of *A. minutus* (Halbert, 1915)
Lasioseius salinus Halbert, 1920
to *Leioseius* Berlese, 1916 = *L. salinus* (Halbert, 1920)
Lasioseius similis Schweizer, 1949
to *Blattisocius* Keegan, 1944 = *B. similis* (Schweizer, 1949)
Lasioseius sphagni Halbert, 1923
to *Cheiroseius* Berlese, 1916 – syn. of *Ch. laelaptoides* (Berlese, 1887)
Lasioseius spinosus Willmann, 1939
to *Thinoseius* Halbert, 1920 = *T. spinosus* (Willmann, 1939)
Lasioseius tarsalis Berlese, 1918
to *Blattisocius* Keegan, 1944 = *B. tarsalis* (Berlese, 1918)
Lasioseius tenuipes sensu SCHWEIZER, 1922
to *Plesiosejus* Evans & Hyatt, 1960 – syn. of *P. major* (Halbert, 1923)
Lasioseius ventritrichosus Schweizer, 1949
to *Proctolaelaps* Berlese, 1923 – syn. of *P. pygmaeus* (J. Müller, 1859)
Lasioseius venustulus Berlese, 1916
to *Arctoseius* Sig Thor, 1930 = *A. venustulus* (Berlese, 1916)
Lasioseius yadongensis Ma & Wang, 1997
to *Mirabulbus* Liu & Ma, 2001 = *M. yadongensis* (Ma & Wang, 1997)
Lasioseius yini Bai, Fang & Chen, 1995
to *Hoploseius* Berlese, 1914 = *H. yini* (Bai, Fang & Chen, 1995)

Species inquirendae

L. bengalensis Chatterjee & Gupta, 2003
L. brevisternus Berlese, 1916
L. consocius Berlese, 1916
L. cristatus Hull, 1925
L. fissuratus Berlese, 1916
L. fissuratus var. *nostras* Berlese, 1916
L. floridensis Berlese, 1916
L. grandis Berlese, 1916
L. jugatus Hull, 1925
L. magnanalis Sig Thor, 1930
L. mexicanus (Banks, 1905)
L. nivalis Schweizer, 1961

L. paliger Berlese, 1916
L. parapodicus Berlese, 1916
L. parvanalis Sig Thor, 1930
L. parvulus Berlese, 1916
L. pusillus Berlese, 1916
L. setosulus Berlese, 1916
L. similis Berlese, 1916
L. spinatus Sellnick, 1940

References

The literature list includes references to drawings that are additionally presented with the original drawings from the descriptions of the respective species. The references of the original descriptions are listed with the species.

ASWEGEN, P. I. M. VAN & G. C. LOOTS (1969): The genus *Lasioseius* (Mesostigmata, Acari) in the Ethiopian region. – Wetenskap. Bydraes van die Potchefstroomse Univ. **3**: 1 – 25

– (1961): Mesostigmata (Urop. excl.) édaphiques méditerranéens (Acomorpha, Anactinotrichida). Premiere série. – Acarologia **3** (4): 381 – 509

BAI, X. L., L. FANG & B. F. CHEN (1995): A new species of the genus *Lasioseius* (Acari, Ascidae) from Ningxia, China. [Orig. Chin.] – Entomotaxonomia **17** (1): 59 – 62

BANKS, N. (1905): Descriptions of some new mites. – Proc. Ent. Soc. Wash. **7** (2/3): 133 – 142

BERLESE, A. (1887): Acari, Myriapoda et Scorpiones hucusque in Italia Reperta. – Padova 5, **41**: 1 – 10

– (1916): Centuria prima di Acari nuovi. – Redia **12**: 19 – 67

– (1918): Centuria quarta di Acari nuovi. – Redia **13**: 115 – 192

– (1920): Centuria quinta di Acari nuovi. – Redia **14**: 143 – 195

BHATTACHARYYA, A. K. & A. K. SANYAL (2002): New data on mites of the genus *Lasioseius* (Mesostigmata, Ascidae) in India along with the description of two new species. – Acarina **10** (1): 51 – 56

CHANT, D. A. (1958): Descriptions of six new species of *Garmania* Nesbitt and *Lasioseius* Berlese (Acarina, Aceosejidae). – Can. J. Zool. **36**: 383 – 390

– (1963): The subfamily Blattisocinae Garman (= Aceosejinae Evans) (Acarina, Blattisocidae Garman) (= Aceosejidae Baker & Wharton) in North America, with descriptions of new species. – Can. J. Zool. **41**: 243 – 305

CHRISTIAN, A. (1993): Untersuchungen zur Entwicklung der Raubmilbenfauna (Gamasina) der Halden des Braunkohlentagebaues Berzdorf / OL. – Abh. Ber. Naturkundemus. Görlitz **67** (2): 2 – 64

– & W. KARG (1998): Berichtigung von Fehlern zur Monographie über Raubmilben (Gamasina) aus der Reihe »Die Tierwelt Deutschlands«. – Abh. Ber. Naturkundemus. Görlitz **70** (2): 204 – 208

EHARA, S. (1964): Some mites of the families Phytoseiidae and Blattisocidae from Japan (Acarina, Mesostigmata). – J. Fac. Sci. Hokkaido Univ., Ser. 6, Zool. **15** (3): 378 – 394

EVANS, G. O. (1992): Principles of Acarology. C A B International, Wallingford, 565 pp.

GU, Y. M. & X. G. GUO (1996): A new species and a new record of *Lasioseius* from China (Acari, Aceosejidae). – Acta Zootaxon. Sin. **21** (1): 39 – 44 (in Chinese)

GUPTA, S. K. (2003): A monograph on plant predatory mites of India. Part 2. Order: Mesostigmata. – Mem. Zool. Surv. India **20** (1): 1 – 185

GWIAZDOWICZ, D. J. (2003): Description of male of *Lasioseius ometes* (Oudemans) (Mesostigmata, Ascidae). – Int. J. Acarol. **29** (3): 289 – 290

HALBERT, J. N. (1920): The Acarina of the Seashore. – Proc. Roy. Irish Acad. (B) **35** (7): 106 – 152

– (1923): Notes on Acari, with description of new species. – J. Linn. Soc., Zool. **35**: 363 – 392

HENNESSEY, M. K. & M. H. FARRIER (1988): Systematic revision of thirty species of free-living, soil-inhabiting Gamasine mites (Acari, Mesostigmata) of North America. – NC Agric. Res. Serv. Tech. Bull. **285**: 1 – 123

HENNIG, W. (1950): Grundzüge einer Theorie der phylogenetischen Systematik. – Deutscher Zentralverlag Berlin 1950, 370 pp.

– (1979): Phylogenetic systematics. – University of Illinois Press Urbana, 263 pp.

HIRSCHMANN, W. & W. RÜHM (1953): Milben und Fadenwürmer als Symphoristen und Parasiten des Buchdruckers. – Mikrokosmos **43** (1): 1 – 10

HUGHES, A. M. (1961): The mites of stored food. – Min. Agric. Fish. Lond., Techn. Bull. **9**: 1 – 287

HULL, J. E. (1925): XXIV. – Acari of the family Gamasidae: new and rare British species. – Ann. Mag. Nat. Hist. **15**: 201 – 219

HURLBUTT, H. W. (1971): Ascinae and Podocinidae (Acarina, Mesostigmata) from Tanzania. – Acarologia **13** (2): 280 – 300

KAESTNER, A (1956): Lehrbuch der speziellen Zoologie, Teil 1, Wirbellose. Gustav Fischer Verlag, Jena: 485 – 658

KARG, W. (1962): Zur Systematik und postembryonalen Entwicklung der Gamasiden (Acarina, Parasitiformes) landwirtschaftlich genutzter Böden. – Mitt. Zool. Mus. Berl. **38** (1): 23 – 119

– (1980): Die Raubmilbengattung *Lasioseius* Berlese, 1916. – Zool. Jb. Syst. **107**: 344 – 367

– (1993): Acari (Acarina), Milben. Parasitiformes (Anactinochaeta). Cohors Gamasina Leach. Raubmilben. – In: Zoologisches Museum Berlin (eds), DAHL, F. (Begr.), Die Tierwelt Deutschlands und der angrenzenden Meeresteile. 59. Teil. Gustav Fischer Verlag, Jena, 523 pp.

– (1998a): Zur Kenntnis der Eugamasides Karg mit neuen Arten aus den tropischen Regenwäldern von Ecuador (Acari, Parasitiformes). – Mitt. Mus. Naturk. Berl., Zool. Reihe **74** (2): 185 – 214

– (1998b): Neue im Boden lebende Arten der Raubmilbengattung *Zygoseius* Berlese, 1916. – Abh. Ber. Naturkundemus. Görlitz **70** (2): 165 – 173

– (2003): Neue Raubmilbenarten aus dem tropischen Regenwald von Ecuador mit einem kritischen Beitrag zur Merkmalsevolution bei Gamasina (Acarina, Parasitiformes). – Mitt. Mus. Naturk. Berl., Zool. Reihe **79** (2): 229 – 251

KOCH, C. L. (1839): Deutschlands Crustaceen, Myriapoden und Arachniden. Ein Beitrag zur deutschen Fauna. – Regensburg **24**: 11

LEE, S. Y. & W. K. LEE (1998): Four mites of the genus *Lasioseius* (Acari, Mesostigmata, Ascidae) from Korea. – Korean J. Syst. Zool. **14** (1): 13 – 19 (in Korean)

LINDQUIST, E. E. & G. O. EVANS (1965): Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina, Mesostigmata). – Mem. Entomol. Soc. Can. **47**: 1 – 64

MA, L. M. (1997): Morphological descriptions on male and immature stages of *Lasioseius jilinensis* (Acari, Mesostigmata, Aceosejidae). – Acta Entomol. Sin. **40** (2): 334 – 336 (in Chinese)

– & S. R. WANG (1997): A new species of the genus *Pachylaelaps* and a new species of the genus *Lasioseius* from Xizang, China. (Acari, Pachylaelaptidae, Aceosejidae). – Acta Zootaxon. Sin. **22** (1): 29 – 32 (in Chinese)

MORITZ, M. (1993): Unterstamm Arachnata. – In: GUNER, H. E., M. MORITZ & W. DUNGER (eds.), Kaestner - Lehrbuch der speziellen Zoologie I/4. Band I: Wirbellose Tiere. Teil 4: Arthropoda (ohne Insecta), 4. Aufl., 1279 pp.

NAEEM, S., D. S. DOBKIN & B. M. OCONNOR (1985): *Lasioseius* mites (Acari, Gamasida, Ascidae) associated with hummingbird-pollinated flowers in Trinidad, West Indies. – Int. J. Entomol. **27** (4): 338 – 353

OUDEMANS, A. C. (1938): Wetenschappelijke Mededeelingen. – Tijdschr. Entomol. **81**: 2 – 57

POSTNER, M. (1951): Biologisch-ökologische Untersuchungen an Hummeln und deren Nestern und biologische Beobachtungen an Hummelmilben. – Diss. Univ. Erlangen, 106 pp.

SCHWEIZER, J. (1922): Beitrag zur Kenntnis der terrestrischen Milbenfauna der Schweiz. – Verh. naturf. Ges. Basel **33**: 23 – 112

– (1924): Beiträge zur Kenntnis der Tierwelt norddeutscher Quellgebiete. Acarina (Landmilben). – Arch. Hydrobiol. **15**: 125 – 132

– (1949): Die Landmilben des Schweizerischen Nationalparkes, 1. Teil. Parasitiformes Reuter, 1909. – Ergeb. wiss. Unters. schweiz. Natl.park, N. F. **2**: 1 – 99

– (1961): Die Landmilben der Schweiz (Mittelland, Jura und Alpen). Parasitiformes Reuter. – Denkschr. Schweiz. Naturf. Ges. **84**: 1 – 207

SELLNICK, M. (1940): Die Milbenfauna Islands. – Göteb. Kungl. Vet. Samh. Handl. (B) **6** (5): 1 – 129

SIG THOR (1930): Beiträge zur Kenntnis der Invertebratenfauna von Svalbard. – In: HOEL, A. (ed.), Norges Svalbard-og Ishavs-Undersokelser. – Skrifter om Svalbard og Ishavet **27**: 1 – 155

VITZTHUM, H. (1923): Acarologische Beobachtungen, 7. Reihe. – Arch. Naturges. (A) **89** (2): 97 – 181

– (1925): Fauna sumatrensis, Beitrag Nr. 5: Acarinae. – Suppl. Entomol. **11**: 1 – 78

WALTER, D. E. (1998): *Ectoantennoseius kitchingi*, n. gen., n. sp. (Acari, Ascidae) from the rainforest canopy in Australia and a cladistic hypothesis about its relationships. – Int. J. Acarol. **24** (1): 45 – 51

– & E. E. LINDQUIST (1989): Life history and behavior of mites in the genus *Lasioseius* (Acari, Mesostigmata, Ascidae) from grassland soils in Colorado, with taxonomic notes and description of a new species. – Can. J. Zool. **67**: 2797 – 2813

– & – (1997): Australian species of *Lasioseius* (Acari, Mesostigmata, Ascidae): the *porulosus* group and other species from rainforest canopies. – Invertebr. Taxon. **11**: 525 – 547

WESTERBOER, I. (1963): Die Familie Podocinidae Berlese, 1916. – In: STAMMER, H. J. (ed.), Beiträge zur Systematik und Ökologie mitteleuropäischer Acarina, Band II, Mesostigmata 1. Akad. Verlagsgesellschaft, Leipzig: 179 – 450

WILLMANN, C. (1939): Terrestrische Acari der Nord- und Ostseeküste. – Abh. Naturw. Ver. Bremen **31**: 521 – 550

– (1949): Beiträge zur Kenntis des Salzgebietes von Ciechocinek. 1. Milben aus den Salzwiesen und Salzmooren von Ciechocinek an der Weichsel. – Veröff. Mus. Nat.-Völker-Handelsk. Bremen (A) **1**: 106 – 135

– (1952): Die Milbenfauna der Nordseeinsel Wangerooge. – Veröff. Inst. Meeresf. Bremerhaven **1** (2): 139 – 186

Index of species and subgenera

Bold-italic page numbers refer to keys, bold-faced page numbers refer to figures, in standard type face page numbers refer to subgenera, type species for the genus and the subgenera, synonyms, excluded species, species inquirendae.

Deposition of types:

Holotypes and paratypes are deposited in the scientific collections of the Staatliches Museum für Naturkunde Görlitz.

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