

A NEW MITE OF THE GENUS *THINOSEIUS* HALBT.
(GAMASINA : EVIPHIDIDAE) FROM THE CHATHAM ISLANDS
NEW ZEALAND

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Members of the genus *Thinoseius* inhabit decaying seaweed and other tidal debris above H.W.M. on rocky sea coasts and have been recorded from Europe, N. America and the Red Sea. In common with certain other Acari co-inhabiting such transient habitats, species of *Thinoseius* are frequently found on Amphipoda which they utilise for dispersal. The species described in this work was collected by Dr. G. W. RAMSAY on the Chatham Islands, New Zealand. This extends considerably the geographical range of the genus.

Fam. **Eviphididae** Berl.

genus *Thinoseius* Halbt.

Thinoseius Halbert (1920) *Proc. roy. Irish Acad.*, 25 (7) : 125-128.

Gammaridacarus Canaris (1962) *J. Parasit.*, 48 : 467-469.

Type : *Lasioseius fucicola* Halbt., 1920.

Larva with the normal nine pairs of podonotal setae but with only five pairs of opisthonotals (J₄, Z₃-Z₅, S₅) ; opisthogaster regionally sclerotized. Protonymph and deutonymph with the typical eviphidid dorsal idiosomal chaetotaxy and sclerotization. Setae j₂, s₅, s₆, r₂, r₃, r₅, J₂, J₃, J₅, Z₂, S₂, S₃ and S₄ added at the protonymphal stage and z₁, z₆, s₂ and a variable number of R setae at the deutonymphal stage. Marked sexual dimorphism in the form of the dorsal idiosomal setae and degree of dorsal sclerotization in the adults. Male with dorsal shield covering entire dorsum of idiosoma and bearing 30 pairs of setae ; female with

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shield incompletely covering dorsum and carrying 11-17 pairs of setae. Female usually with greater number of R setae than the male. Both sexes normally with an anal shield, rarely with ventro-anal shield in the female. Female without sclerotized sternal shield at the most a platelet bearing first pair of sternal setae and pores. Genital setae on or off genital shield. Peritreme extends up to or beyond level of anterior margin of coxae II; peritrematal shield free.

Chelicerae chelate-dentate in both sexes, with setae and fissures but lacking arthrodial processes. Spermadactyl hooked distally. Tectum capituli produced into 5 or more processes which may be denticulate distally, median process rarely pilose. Corniculi short, broad and grooved dorso-laterally to accommodate salivary styli. Hypostomal processes (internal malae) fleshy and fringed with simple processes; additional pair of acuminate seta-like lobes present in the male. Deutosternum with 5-6 transverse rows of denticles. Pedipalpal chaetotaxy (2-5-5-14-15), genu unideficient (al_2 lacking); apotele two-tined.

Segmentation of legs and distribution of lyrifissures normal; ambulacrum with two claws and pulvillus, pretarsal opercula of legs II-IV long and slender. Segmental chaetotaxy :

	I	II	III	IV
coxa.....	2	2	2	2
trochanter.....	5	5	5	5
femur	2-5/3-2	1-5/3-1	1-3/2-1	1-3/1-1
genu	1-3/2-2/1-2	1-3/1-2/1-2	1-2/1-2/1,0-1	1-2/1-2/0-1
tibia.....	1-3/2-2/1-2	1-2/1-2/1-2	1-1/1-2/1-1	1-1/1-2/1-1
tarsus	—	18	18	18

The chaetotaxy of the femur I and femur III are unique among the Eviphididae.

The following key to the adults of the genus *Thinoseius* includes all the described species of the genus except *Thinoseius schusteri* Hirschmann, 1966 which is known only from the deutonymph. The nomenclature for the dorsal idiosomal chaetotaxy is that proposed by Lindquist & Evans (1965) and is shown in fig. 2 A.

Key to adults of the genus Thinoseius Halbt.

Females.

1. First pair of sternal setae and pores situated on a sclerotized platelet which may be free or fused with the endopodal shields in the region of coxae II. 2
- First pair of sternal setae and pores on weakly sclerotized cuticle, never on a distinct platelet 4
2. Sclerotized platelet bearing first pair of sternal setae not fused with endopodal shields; tectum capituli produced into ten or more processes, median process pilose in its distal third; opisthogaster extensively sclerotized around the anal shield giving the appea-

- rance of a ventro-anal shield. Found in sand and *Durvillea* kelp, Chatham Is., New Zealand..... **T. ramsayi** sp. nov.
- Sclerotized platelet or strip bearing first pair of sternal setae fused with endopodal shields; tectum capituli produced into five processes which may be smooth or denticulate distally; opisthogaster with anal shield only..... 3
3. Dorsal shield bearing setae s4, s5, Z2 and Z3; dorsal setae simple or spine-like. Associated with *Orchestoidea* spp. on Pacific coast of N. America.....
T. brevisternalis (Canaris, 1962)
- Dorsal shield without setae s4, s5, Z2 and Z3 which are situated on the integument lateral to the shield; dorsal setae short, acuminate. In tidal debris, England....
T. acuminatus Evans, 1962
4. Dorsal idiosomal setae J3 lie considerably posterior to setae J2. In decaying seaweed and tidal debris, Germany, Iceland and England.... **T. spinosus** (Willmann, 1939)
syn. *Lasioseius spinatus* Sellnick, 1940
Lasioseius uncinatus Sellnick 1940
- Dorsal idiosomal setae J2 and J3 forming more or less a transverse row of four setae. 5
5. Dorsal idiosomal setae Z2 and Z4 situated on the dorsal shield. Seashore debris, Yugoslavia..... **T. kargi** Hirschmann, 1966
- Dorsal setae Z2 and Z4 lying off dorsal shield. In decaying seaweed and tidal debris, Eire and England..... **T. fucicola** (Halbert, 1920)
syn. *Thinoseius berlesei* Halbt., 1920

Males.

1. Dorsal idiosomal setae slender, smooth, none outstandingly long and thickened.. 2
- Certain dorsal idiosomal setae stout and spine-like, pectinate or whip-like in form. 3
2. Setae J2, J3 and J4 on the dorsal shield subequal in length..... **T. acuminatus**
- Setae J2 strong, spinose, J3 and J4 microsetae and less than one third the length of J2 **T. spinosus**
3. Dorsal idiosomal setae j4-6 stout, thorn-like and considerably longer than simple setae J2 and J4..... **T. brevisternalis**
- Dorsal setae j4-6 simple and essentially similar in form and length to J2 and J4.. 4
4. Dorsal shield with 10 pairs of stout setae of which 3 pairs (Z3 Z4 and S3) are thorn-like and 7 pairs (z4, s4,s5, Z2, Z5, S4 and S5) are stout basally but slender and whip-like in their distal halves; remaining dorsal setae simple..... **T. ramsayi**
- Dorsal shield with 9 pairs of stout pectinate setae (j1, j3, z4, s4, s5, Z5, S3, S4 and S5). 5
5. Postanal and paranal setae similar in form and subequal in length; tectum capituli produced into 5 processes which may be denticulate distally..... **T. kargi**
- Postanal seta considerably thicker and at least twice the length of the paranals; tectum capituli produced into more than 5 processes..... **T. fucicola**

Thinoseius ramsayi sp. nov.

Female : Idiosoma (850-920 μ . in length) is partially covered dorsally by a weakly sclerotized shield and bears 34 pairs of simple setae, including three pairs of marginals (*R* series). The dorsal shield which is reticulated and minutely punctured, carries 22 to 24 setae (j2-6, z4-6, J2-5) depending on whether none, one or both

of setae J5 are situated on the shield (fig. 1 A). Setae j1, s4, J5 and S2 are, respectively, 13 μ , 65 μ , 50 μ and 35 μ in length. The porotaxy of the dorsum is shown in the figure.

The tritosternum is bipartite with the laciniae pilose and the base longer than broad (fig. 1 E). The sternal region is weakly sclerotized and without differentiation into sternal and metasternal elements. Sternal setae I and associated pores are situated on a distinct platelet but setae II-IV and pores 2 and 3 occur on striated cuticle. All the endopodal shields are strongly developed and of characteristic shape : those between coxae I-II and II-III are free. The distance between st. 1 is about 52 μ and between st. 1 and 3 approximately 135 μ . Genital shield relatively small, flask-shaped, genital setae on integument flanking the shield, rarely on sclerotized lateral extensions of the shield.

Opisthogaster extensively sclerotized giving the appearance of a large ventro-anal shield (340 \times 430 μ) bearing four pairs of setae in addition to the anals. Outline of anal shield (185 \times 190 μ) readily defined from remainder of the ventro-anal shield. Two pairs of opisthogastric setae are situated posterior to the ventro-anal. There are no euanal setae. Four small platelets lie between the genital and ventro-anal shields. The metapodals are small and subcircular in outline. The peritrematal shields are well developed in the region of coxae II-IV and are free posteriorly, the peritremes extend to the level of the middle of coxae I.

Chelicerae three-segmented with segment I 80 μ and segment II 228 μ in length. Fixed digit tridentate with apex bifid, pilus dentilis short, simple : movable digit bidentate and about 70 μ in length (fig. 1 C). Dorsal seta simple, lyrifissures well-developed but arthrodial processes apparently absent. Basis capituli with a pair of capitular setae about 58 μ apart ; deutosternum with five distinct transverse rows of denticles (fig. 1 D).

Hypostome with the normal three pairs of setae ; distance between *hyp.* 2 about 75 μ . Corniculi stout and each grooved dorso-laterally to accommodate salivary stylus. Hypostomal process in the form of fleshy lobes fringed with simple processes. Labrum broad and spiculate. Tectum capituli (fig. 1 B) with strong pilose median processes and variously divided lateral processes. Median process of subcheliceral plate strongly sclerotized and trifid distally. Pedipalps typical for the genus ; chaetotaxy (2-5-5-14-15).

Leg I 650-700 μ in length ; segmental chaetotaxy of legs I-IV normal for the genus.

Michael's organ (" spermatheca ") with tubuli narrow and entering sacculus by way of small, inconspicuous rami.

Male : Idiosoma (760-880 μ \times 560-660 μ) with well sclerotized dorsal shield completely covering the dorsum of the mite (fig. 2 A). This shield bears 30 pairs of setae with j1-j6, z1, z2, z5, z6, s2, r2, r3, r5, s6, J2-J5 and S2 relatively short and simple (j1 = 32 μ , s2 = 37 μ and J5 = 25 μ) ; setae z4, s4, s5, Z2, Z5, S4 and S5 stout basally but long and whip-like in their distal halves (S4 = 250 μ) and Z3,

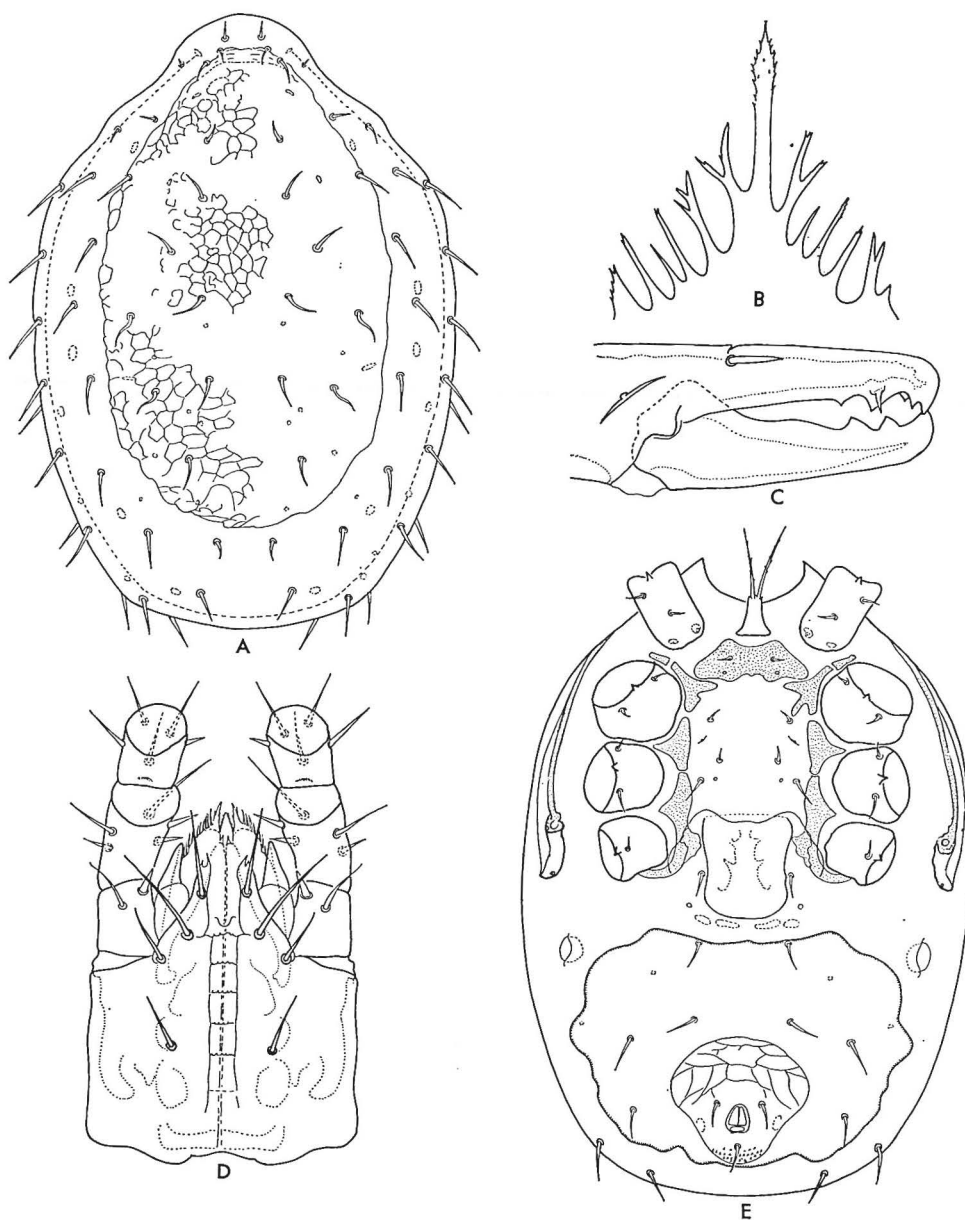


FIG. 1 : *Thinoiseius ramsayi* sp. nov., female.

A. — Dorsum of idiosoma. B. — Tectum capituli. C. — Chelicera external (antiaxial) view.
D. — Venter of gnathosoma. E. — Venter of idiosoma.

Z₄ and S₃ stout and thorn-like. Two pairs of marginal (R) setae are situated on the lateral integument.

Tritosternum essentially the same as in the female. Sternito-genital shield reticulated and punctured, bearing sternal setae 1-4 and three pairs of pores — distance between *st.* 1 = 40 μ , between *st.* 1 and 3 = 160 μ (fig. 2 E). This shield is fused with the endopodals in the region of coxae II and III. Genital setae situated on the integument between coxae IV and separated by a narrow sclerotized

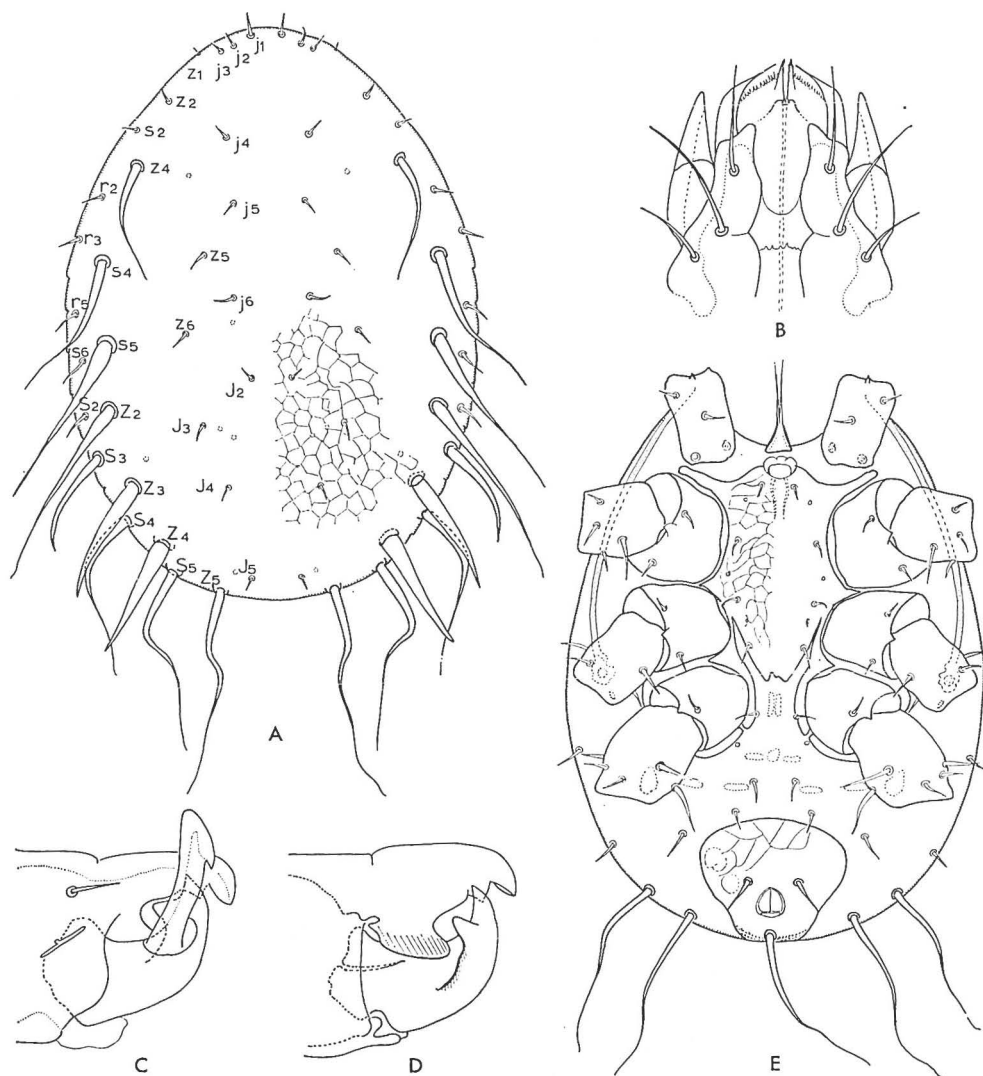


FIG. 2 : *Thinosseius ramsayi* sp. nov., male.

A. — Dorsum of idiosoma. B. — Venter of hypostome. C. — Chelicera external (antiaxial) view. D. — Chelicera internal (paraxial) view. E. — Venter of idiosoma.

platelet. Anal shield ($180 \times 200 \mu$) pyriform and with the normal three setae; post anal seta more than 3 times the length of the paranals. With five pairs of opisthogastric setae of which the two posterior pairs are long and whip-like terminally. Seven platelets on opisthogastric cuticle excluding the metapodals. Peritrematal shield weakly developed, not markedly produced posterior to the stigma; peritreme extending to the middle of coxa I.

Chelicerae with the fixed digit bearing a triangular distal tooth and a proximal blade-like process which fits into a distinct groove proximal to the tooth on the movable digit (fig. 2 C & D). The latter carries a spermadactyl of characteristic shape. Dorsal seta simple, lyrifissures normal, arthrodial processes lacking. Deutosternum with 5/6 transverse rows of denticles. Hypostome as in fig. 2 B. Tectum capituli multidentate with a stout distally pilose median process and a variable number of shorter lateral processes. Chaetotactic patterns of pedipalpal and leg segments as in the female. Certain dorsal and lateral setae of the legs long and whip-like. Setae *pv* on femur III, genu II and tibiae II-IV and setae *pd*₃ on tarsi II and III distinctly thickened and spinose.

Locality and Material: Twenty-four males and 18 females collected from sand and *Durvillea* kelp above HWM at Port Weeding, Chatham Islands, New Zealand by G. W. RAMSAY, 14 : II : 1967. The holotype female and paratypes (male and female) are deposited in the collections of the D.S.I.R., Division of Entomology, Nelson, New Zealand; paratypes in the collections of the British Museum (Nat. Hist.), London and the U.S. National Museum, Washington, D.C.

DISCUSSION.

The genus *Thinoseius* comprises a well-defined ecological and morphological group of species within the family Eviphididae. Ecologically all its members are inhabitants of tidal debris above H.W.M. on rocky sea coasts and the deutonymph, more rarely, the adults, are phoretic on Amphipoda. Species of *Thinoseius* are readily separated morphologically from other eviphidids by the nature of the chaetotaxy of the opisthonotum in the larva, by the chaetotaxy of the palp-genu and femora II and III in the deutonymph and adult, and by the strong sexual dimorphism affecting the form of the dorsal shield and dorsal idiosomal setae in the adults. The morphological differences at the adult stage alone were considered by EVANS (1954) to warrant the erection of a subfamily, *Thinoseiinae*, for the genus.

HIRSCHMANN (1966) in his revision of *Thinoseius* has considerably broadened the above concept of the genus by the inclusion of *Crassicheles concentricus* (Oudem.) and *C. holsaticus* (Willm.). I have examined the type material of *C. concentricus* and have found that this species lacks the characteristic leg and palpal chaetotaxy of *Thinoseius*. It appears to be more closely related to the *Copriphis-Alliphis* group than to *Thinoseius*. Provisionally, I propose retaining the genus *Crassi-*

cheles Karg, 1963 for its reception. I have not examined *C. holsaticus* but I am extremely doubtful whether this species is conspecific with members of the genus *Thinoseius*. *C. concentricus* and *C. holsaticus* are known from the deutonymph only.

The chaetotactic patterns of the pedipalpal and leg segments within the Eviphididae appear to provide stable criteria at the deutonymphal and adult stages for the separation of the genera. Although it is essential that all aspects of the biology and morphology of the species should be considered in the classification of the family, these chaetotactic characters do provide a basis for the practical classification of the group. They appear to support the existing classification based on other morphological criteria, and are particularly valuable in being applicable at the deutonymphal stage.

TABLE I : Chaetotactic patterns of nine leg segments of deutonymphs and adults of seven genera of the family EVIPHIDIDAE.

Leg Segment	Eviphis	Evimirus	Thinoseius	Copriphs and Alliphs	Scarabaspis	Crassicheles
Trochanter I.	5	5	5	6	6	6
Femur I.	2-5/3-2	2-5/3-2	2-5/3-2	2-5/4-2	2-5/3-2	2-5/4-2
Genu I.	1-3/2-2/1-2	1-3/1-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2
Tibia I.	1-3/2-2/1-2	1-2/1-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2	1-3/2-2/1-2
Femur II.	2-5/3-1	2-5/3-1	1-5/3-1	2-5/3-1	2-5/3-1	2-5/3-1
Genu II.	2-3/1-2/1-2	1-3/1-2/0-2	1-3/1-2/1-2	2-3/1-2/1-2	2-3/1-2/1-2	1-3/1-2/1-2
Tibia II.	2-2/1-2/1-2	1-1/1-2/1-2	1-2/1-2/1-2	2-2/1-2/1-2	2-2/1-2/1-2	1-2/1-2/1-2
Femur III.	1-3/1-1	1-3/1-1	1-3/2-1	1-3/1-1	1-3/1-1	1-3/1-1
Genu III.	1-2/1-2/0-1	1-2/1-2/0-1	1-2/1-2/1, 0-1	1-2/1-2/1-1	1-2/1-2/1-1	1-2/1-2/1-1

The seven genera I have examined (Table I) appear to fall into two major ecological groups. *Eviphis* Berl. and *Evimirus* Karg are predominantly inhabitants of static habitats such as forest humus, and there are no records of any developmental stage being phoretic on insects. The remaining five genera, however, occur almost exclusively in transient habitats such as manure and temporary accumulations of organic debris, and the deutonymphal and/or adult stages use co-inhabiting insects, particularly Coleoptera, for dispersal.

The deficiency in the chaetotaxy of the palpgenu (5 setae) in the deutonymph and adults of *Thinoseius* is unique among the Eviphididae and provides a reliable "spot" character for the recognition of its members. A study of the leg chaetotaxy of the seven genera has shown that nine segments are subject to intergeneric variation. Only two of the genera, *Copriphs* Berl. and *Alliphs* Halbt., have the same combination of setal patterns on these nine segments (Table I). The genus *Scarabaspis* Womersley differs from *Copriphs* and *Alliphs* in the chaetotaxy of

femur I only. *Evimirus* exhibits the greatest degree of variability in having four segments, genua and tibiae I & II, with a unique chaetotaxy for the family.

In the following key to the seven genera considered in this work, the chaetotactic criteria are applicable to the deutonymph as well as the adult.

1. Palpgenu in deutonymph and adult bearing five setae only ; femur II with one antero-lateral seta (al_2 lacking) ; femur III with seven setae ; female without sclerotized sternal shield, at least sternal setae II & III on unsclerotized cuticle ; dorsal shield in female reduced and not bearing more than 17 pairs of setae, normal in male with 30 pairs of setae. Sexual dimorphism affecting degree of sclerotization of the idiosoma and form of dorsal setae. Tectum capituli multidentate..... *Thinoseius* Halbt.
- Palpgenu in deutonymph and adults bearing six setae ; femur II with two antero-lateral setae (al_2 present), femur III with six setae ; female with well-defined sternal shield bearing sternal setae I-III ; dorsal shield in both sexes covering almost entire dorsum of idiosoma and normally with 30 pairs of setae ; without sexual dimorphism affecting degree of dorsal sclerotization and form of dorsal setae ; tectum capituli usually with a long median lance-like process, rarely multidentate..... 2
2. Genua and tibiae I with two ventral setae ; with three transverse rows of deutosternal denticles not bordered by lateral lines ; apotele three-tined ; dorsal setae jr and zi apparently lacking..... *Evimirus* Karg
- Genua and tibiae I with three ventral setae ; with four to six transverse rows of deutosternal denticles bordered by lateral lines ; apotele two-tined ; dorsal setae jr and zi present..... 3
3. Trochanter I with 5 setae, genu III with one ventral seta (pv lacking) ; chelicerae uropodine-like with slender shafts ; idiosoma strongly arched..... *Eviphis* Berl.
- Trochanter I with six setae, genu III with two ventral setae (pv present) ; chelicerae normal, shafts not conspicuously elongate ; idiosoma slightly convex, never strongly arched 4
4. Both setae on coxae I and the posterior seta on coxae II modified into oval sclerotized protuberances ; femur I with three ventral setae..... *Scarabaspis* Womersley
- Setae on coxae I and II setiform or spinose ; femur I with four ventral setae.... 5
5. Genua and tibiae I with one antero-lateral seta ; tectum capituli multidentate comprising a long median process and shorter lateral processes about one-half the length of the median process. Known only from deutonymph..... *Crassicheles* Karg
- Genua and tibiae I with two antero-lateral setae ; tectum capituli with long lance-like median process and with or without short lateral processes, not more than one-eighth length of median process..... 6
6. Palptarsus with two closely associated macroeupathidia distally ; both sexes with peritrematal shield strongly developed posterior to coxae IV.. *Copriphis* Berl.
- Palptarsus without such macroeupathidia ; both sexes with peritrematal shield not produced posterior to coxae IV..... *Alliphis* Halbt.

SUMMARY.

A new species of *Thinoseius* Halbt. is described from New Zealand. The genus is defined and a key is given to the known males and females. The classification of the Eviphididae is discussed and a key is presented for the identification of seven genera on the basis of deutonymphal and adult characters.

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