THE OCCURRENCE OF SOME MITES OF THE FAMILY PHYTOSEIIDAE IN NEW ZEALAND, AND DESCRIPTIONS OF SEVEN NEW SPECIES

BY

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Many species in the family Phytoseiidae Berlese are now known, and several attempts have been made to revise their generic classification, some of which have resulted in a confusing subdivision into many genera and subgenera. In this paper the system proposed by PRITCHARD & BAKER (1962) is followed, which is relatively conservative and emphasises relationships rather than differences; the six genera *Typhlodromus*, *Amblyseius*, *Phytoseius*, *Chantia*, *Macroseius* and *Iphiseius* are recognised, and these can also be designated tribes. Their nomenclature of dorsal setae is also used which recognises the following setae, all paired : one vertical, one clunal, a lateral row (L) of up to eleven setae, a dorsocentral row (D) usually of four setae, a mediolateral row (M) of up to four setae, and two sublaterals (S) which are often on the lateral membrane instead of on the dorsal shield. SCHUSTER & PRITCHARD (1963) recognise the same tribes, but have designated as genera many of the subgenera of the previous paper.

In a recent study of orchard mites and their predators in New Zealand the most common species of phytoseiids on cultivated fruit trees were *Typhlodromus pyri* Scheut. (= *tiliae* Oudms.), *Amblyseius cucumeris* (Oudms.) (= *bellinus* (Wom.)) and *Amblyseius largoensis* (Muma) (COLLYER, 1964). *T. pyri* and *A. cucumeris* occurred mainly on non-indigenous plants in orchards and gardens and are therefore probably introduced species; *A. largoensis* was widely distributed on both cultivated and native bush plants and is more likely to be a native species.

In more general collecting nine other described species of Phytoseiidae not previously recorded from New Zealand were found, and an account of their occurrence is given here; in addition seven new species are described of which four are closely related. These species belong to the genera *Typhlodromus*, *Amblyseius* and *Iphiseius*. Some species of *Phytoseius* were found, but their specific identity is not certain.

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PRITCHARD & BAKER (1962) characterise the genus *Typhlodromus* as having the first sublateral setae present on the membrane of the female, and six pairs of lateral setae on the dorsal shield anterior to the second sublaterals ; in *Amblyseius* the anterior sublateral setae are on the membrane in the female, and only four pairs of lateral setae are anterior to the second sublaterals ; in *Iphiseius* the mites are strongly sclerotised, the lateral membrane is sclerotised and united with the dorsal shield, there are four pairs of anterior lateral setae and both pairs of sublateral setae are on the sclerotised lateral membrane of the female.

Type material of the seven new species described is in the British Museum (Natural History), and paratypes of *Typhlodromus novaezealandiae* sp. n. and *T. dachanti* sp. n. are in the collection of the Entomology Division, Auckland, New Zealand.

Typhlodromus tropicus Chant.

Known from Central and South America. Found in New Zealand on unsprayed apple (*Malus* sp.) near Auckland, and on blackberry (*Rubus* sp.) and other hedgerow plants at Havelock North.

Typhlodromus occidentalis Nesbitt.

Known from North America. Found once in New Zealand on an isolated apple tree by the roadside, Lake Wanaka, South Island.

Typhlodromus caudiglans Schuster.

Described from California, this species also occurs in England. It differs from *T. rhenanus* Oudms. by having L2 and L9 not noticeably short, the dorsum fairly smooth, and no macroseta on leg IV. In New Zealand it occurs widely but not abundantly on unsprayed and isolated apple trees in both the North and South Islands, also on varieties of *Citrus*, loquat (*Eriobotrya* sp.), copper beech (*Fagus* sp.), oak (*Quercus* sp.), hawthorn (*Crataegus* sp.) and *Metrosideros excelsa*. Like *T. rhenanus* it lives mainly on trees.

Amblyseius longispinosus (Evans).

Known from Indonesia, South America and Tasmania. In New Zealand it occurs commonly on cultivated strawberry (*Fragaria* sp.) in many localities from Roxburgh to Auckland ; also in the Auckland area on unsprayed apple, blackberry (*Rubus* sp.), *Lantana* sp., *Rosa* sp., clover (*Trifolium* sp.), cucumber (*Cucumis* sp.), in the bush on *Melicytus ramiflorus* and *Metrosideros excelsa*, and in glasshouses on maize (*Zea* sp.) and beans (*Phaseolus* sp.). This species is always associated with mites of the genus *Tetranychus*, and not with *Panonychus* or *Bryobia*.

Amblyseius perlongisetus Berl.

A number of mites which appear to belong to this species were found; they agree in general with the description by CHANT (1959). There are three macrosetae on leg IV, two on leg III, and one each on legs II and I. Known from the American continent, and found in New Zealand on unsprayed apple trees, *Leptospermum scoparium*, thistle and Norfolk Pine (*Araucaria* sp.) near Auckland.

Amblyseius exopodalis Kennett.

Found once on cultivated strawberry (*Fragaria* sp.) from Wanganui. It was compared with material supplied by C. E. KENNETT from strawberry in California and found to be identical.

Amblyseius mexicanus (Garman).
Fig. 1.

CHANT (1959) places *Amblyseius obturus* (Berl.) as described by ATHIAS-HENRIOT (1958) within *T. mexicanus*. The mites collected here resemble those of ATHIAS-HENRIOT, and also *T. obtusus* of WOMERSLEY (1954). However, seta L9 (180 μ) is longer than shown by CHANT or GARMAN. The male which has not been described previously is illustrated in Fig. 1. In addition to the three macrosetae on leg IV, there is one on genu III. This species is known from North and Central America, North Africa and Australia, and was found in New Zealand on unsprayed apple (*Malus* sp.) and plum (*Prunus* sp.) trees, and on plantain (*Plantago* sp.) and grass (Graminae) beneath orchard trees.

Amblyseius limonicus Garm. & McG.

This species was described from citrus in California. It is common in the North Island of New Zealand and in the Nelson area, on unsprayed apple (*Malus* sp.), plum and peach (*Prunus* sp.) and *Citrus*; on strawberry (*Fragaria* sp.) and various weeds with *Tetranychus lambi* P. & B., and on plantain (*Plantago* sp.), grass and various hedgerow and garden bushes.

Amblyseius ovalis (Evans).

This species was described from rubber in Malaya. In New Zealand it was found in bush country near Auckland on the evergreen plants *Vitex lucens* and *Melicytus ramiflorus*.

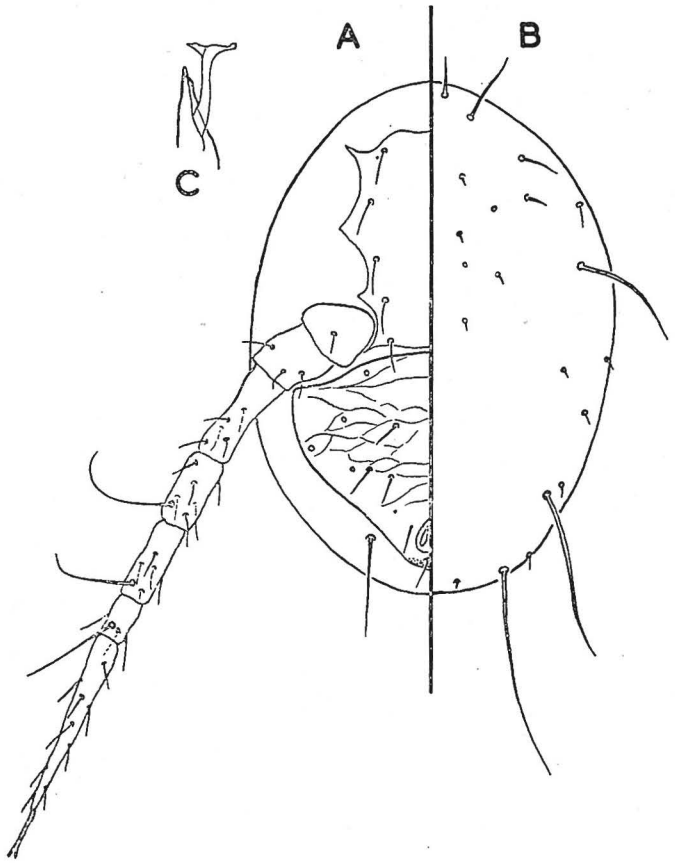

FIG. 1. — *Amblyseius mexicanus* (Garm.).
Male : A, ventral surface ; B, dorsal surface ; C, chelicera.

Typhlodromus novaezealandiae sp. n.
Fig. 2.

Female. Length 376-385 μ ; width 235-244 μ. Dorsal shield reticulated, with 19 pairs of setae, 11 in the lateral row, two mediolaterals, four dorsocentrals, and one pair each of verticals and clunals. The vertical setae and L3, L4, L5, L6, L7, L8, L9, and M1 are all short, approx. 20 μ in length ; L10 slightly shorter ; L1 slightly longer and almost double L2 which is noticeably short. All setae are thick ; M2 40 μ and L11 66 μ are also often serrated. Setae S1 and S2 on the interscutal membrane. Peritreme extends forward from the base of coxa IV to the vertical setae.

Ventrianal shield slightly longer than wide, with three pairs of preanal setae and a pair of pores. Four pairs of setae surrounding the ventrianal shield, the

posterior pair long (28 μ). Two pairs of metapodal plates, the inner pair very narrow. Spermatheca with long slender duct and bell-shaped cervix.

Gnathosoma with the fixed digit of the chelicera multidentate and with a pilus dentilis, the movable digit with 3-4 teeth. Leg IV somewhat shorter than the

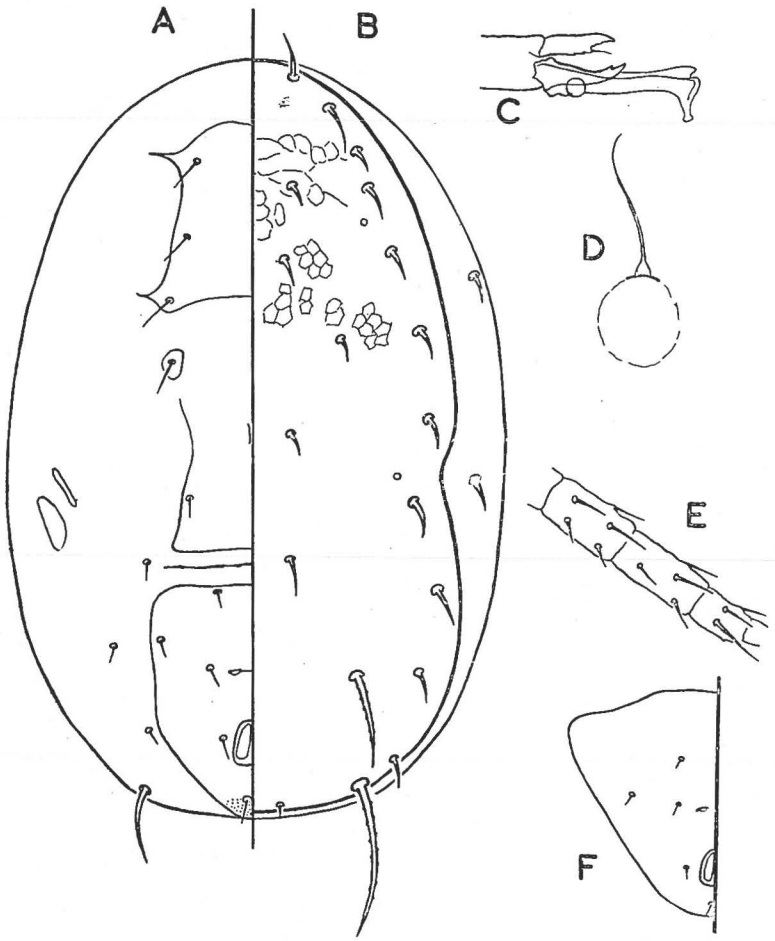

FIG. 2. — *Typhlodromus novaezealandiae*. Female : A, ventral surface ; B, dorsal surface ; D, spermatheca ; E, genu, tibia and basitarsus of leg IV. Male : C, chelicera ; F, ventrianal plate.

dorsal shield ; one very short macroseta on each of the genu, tibia and basitarsus, that on the basitarsus being the longest.

Male. Length 290 μ ; width 200 μ. Setae S1 and S2 on the dorsal shield. Ventrianal shield with three pairs of preanal setae and a pair of pores. The chelicera has a long spermatophoral process bifurcated at the tip. Leg IV with three short macrosetae.

Diagnosis. This species is distinguished from other species with eleven lateral setae by the short and stout setae, the relative lengths of L1 and L2, and the serrated L11. It is most similar to *T. nesbitti* Womersley, described from Australia.

Locality. The species was found commonly in the North Island on many native evergreen trees and shrubs, including tree ferns, *Leptospermum scoparium, Vitex lucens, Sophora tetraptera, Brachyglottis repanda, Elaeocarpus dentatus, Elatostema rugosum, Pseudopanax* sp., also on oak (*Quercus* sp.), loquat (*Eriobotrya* sp.), passion-fruit (*Passiflora* sp.) and neglected apple trees. Found once in the South Island at Alexandra.

Type material. Thirteen females and five males from pohutukawa (*Metrosideros excelsa*) on Kawau Island, off Northland, New Zealand.

Typhlodromus manukae sp. n.

Fig. 3.

Female. Length 404-415 μ; width 244-260 μ. Dorsal shield smooth with 19 pairs of setae, 11 in the lateral row, two mediolaterals, four dorsocentrals and one pair each of verticals and clunals. Setae L2, L6, L7, L8, L9, L10 short; the vertical setae, L1, L3, L4, L5, longer (27-44 μ). L1 three times as long as L2. M2 (50 μ) longer than L1, L11 long (134 μ). Setae all smooth. Setae S1 and S2 on interscutal membrane.

Ventrianal shield slightly longer than wide with three pairs of preanal setae. Four pairs of setae surrounding the ventrianal shield. Two pairs of metapodal plates, inner pair narrow. Spermatheca with long slender duct and bell-shaped cervix. Gnathosoma with the fixed digit of the chelicera multidentate. Leg IV slightly shorter than the dorsal shield, one macroseta on each of the genu, tibia and basitarsus, 66 μ, 63 μ and 44 μ respectively; one shorter macroseta on each of the genu and tibia of leg III.

Male. Not known.

Diagnosis. Similar to *T. novaezealandiae* sp. n., but larger and with smooth dorsum; the vertical setae and L1, L3, L4, L5, L11 longer. L1 three times as long as L2; L11 almost three times as long as M2.

Type material and Locality. Two females only, collected from manuka (*Leptospermum scoparium*) in the Waitakeres, near Auckland, New Zealand.

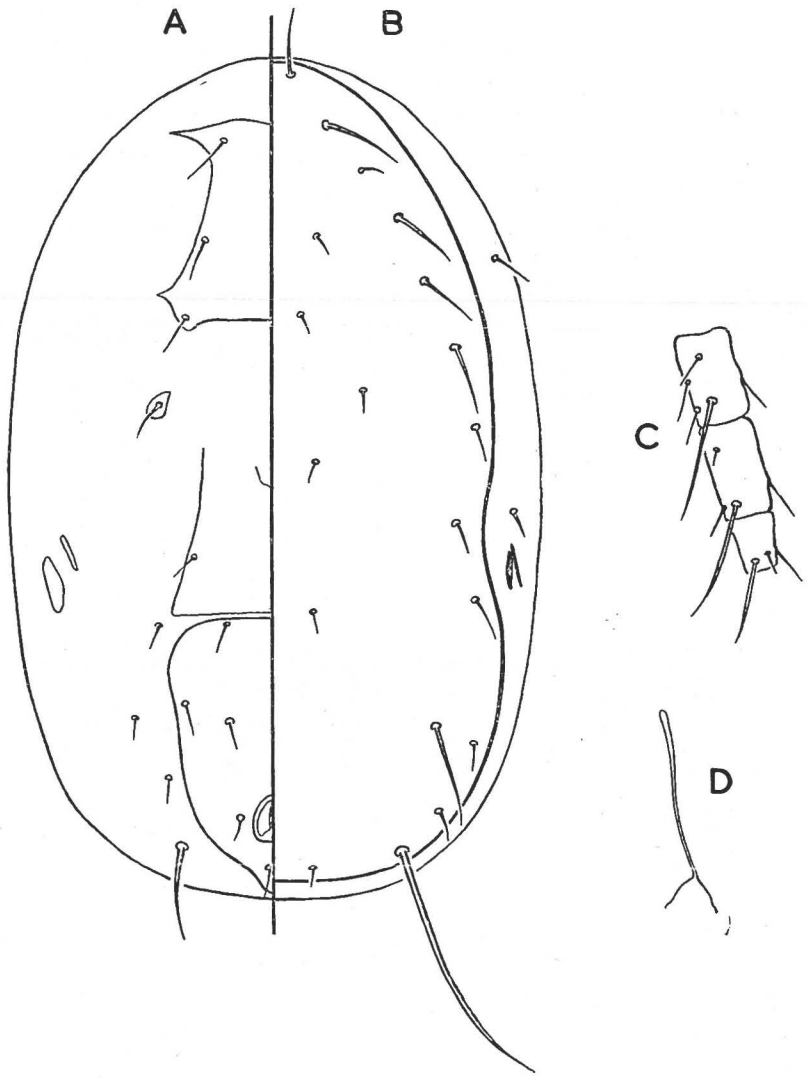

FIG. 3. — *Typhlodromus manukae*. Female : A, ventral surface ; B, dorsal surface ; C, genu, tibia and basitarsus of leg IV ; D, spermatheca.

Typhlodromus dachanti sp. n.

Fig. 4.

Female. Length 367-376 μ ; width 237-244 μ. Dorsal shield smooth with 19 pairs of setae, 11 in the lateral row, two mediolaterals, four dorsocentrals and one pair each of vertical and clunal setae. Setae L2, L4, L6, L7, L9, L10 short ; the vertical setae and L8 somewhat longer (20-25 μ) ; L1, L3, L5, longer and equal

in length (38-40 μ). M2 50 μ, and L11 100 μ. Setae all smooth. Setae S1 and S2 on interscutal membrane.

Ventrianal shield longer than wide, with three pairs of preanal setae and a pair of pores. Four pairs of setae surrounding the ventrianal shield. Two pairs of

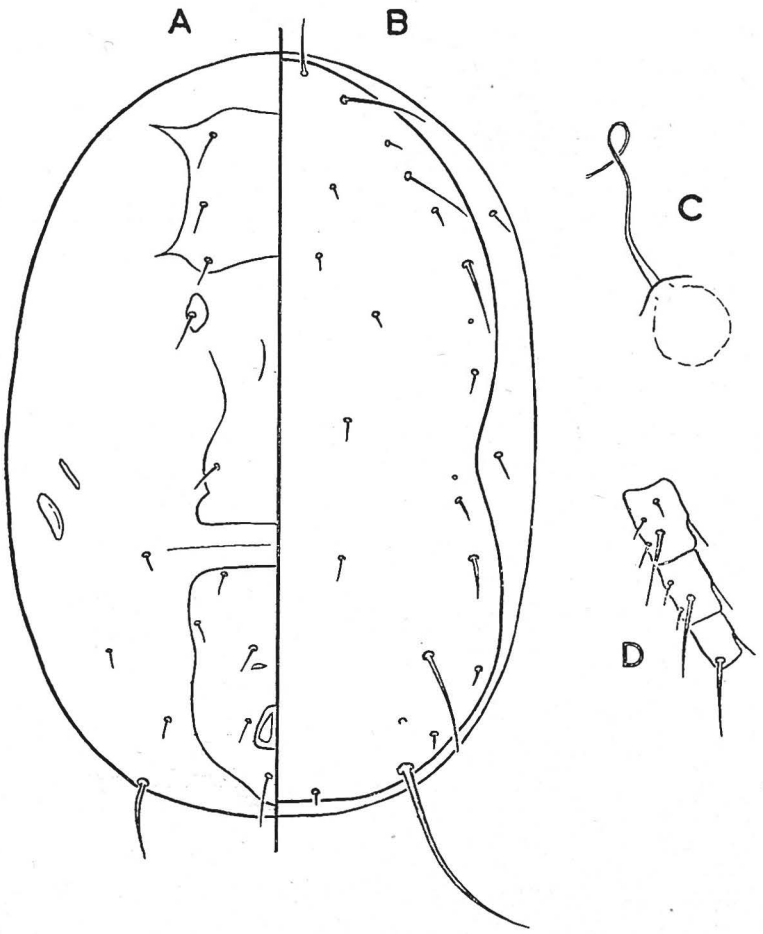

FIG. 4. — *Typhlodromus dachanti*. Female : A, ventral surface ; B, dorsal surface ; C, spermatheca ; D, genu, tibia and basitarsus of leg IV.

metapodal plates, the inner pair very narrow. Spermatheca with a long slender duct, and open cervix.

Gnathosoma with the fixed digit of the chelicera multidentate and the movable digit with one large tooth. Leg IV about equal in length to the dorsal shield, with one short macroseta on each of the genu, tibia and basitarsus, all similar in length ; one shorter macroseta on each of the genu and tibia of leg III.

Male. Length 285 μ ; width 200 μ. Setae on dorsal shield as in the female. Setae S1 and S2 also on shield. Ventrianal shield with four pairs of preanal setae and a pair of pores. Spermatophoral process on chelicera short and lobed.

Diagnosis. Eleven pairs of lateral setae, the relative lengths of L1-L5 being characteristic.

Locality. This species is common in the North Island, on native plants including bush lawyer (*Rubus* spp.), *Melicytus ramiflorus, Coprosma* spp., *Nothopanax* sp., *Pseudopanax* sp., *Brachyglottis repanda, Elaeocarpus dentatus,* and tree ferns. Also on *Melicytus ramiflorus* on the West Coast of the South Island.

Type material. Six females and one male from native bush, Waitakeres, near Auckland, New Zealand. This mite is named in honour of Dr. D. A. CHANT of St. Catherine's, Ontario.

Typhlodromus cottieri sp. n.

Fig. 5.

Female. Length 370 μ ; width 270 μ. Dorsal shield smooth with 19 pairs of setae, 11 in the lateral row, two mediolaterals, four dorsocentrals and one pair each of verticals and clunals. Setae L2, L4, L6, L7, L8, L9, L10 minute. L1 40 μ, L3 45 μ, L5 70 μ, M2 113 μ, L11 220 μ, all slender and smooth. Setae S1 and S2 on interscutal membrane.

Ventrianal shield longer than wide with three pairs of preanal setae. Four pairs of setae surrounding the ventrianal shield, posterior pair very long (100 μ). Two pairs of metapodal plates, inner pair very narrow. Spermatheca with a long slender duct and campanulate cervix.

Gnathosoma with fixed digit of the chelicera multidentate, and movable digit with three small teeth. Leg IV equal in length to dorsal shield, with one macroseta on each of the genu, tibia and basitarsus, that on the genu being longest ; one macroseta on genu III.

Male. Length 290-297 μ ; width 197-216 μ. Setae S1 and S2 on the dorsal shield. Ventrianal shield with four pairs of preanal setae. Spermatophoral process blunt and lobed.

Diagnosis. This species is similar to *T. dachanti* sp. n., but the differences in the lengths of some setae are more extreme. Setae L3, L5, L11 and M2 are longer, while setae L4, L6, L7, and L8 are shorter, than in *T. dachanti.*

Type material and Locality. Four females and two males from thistle, Waitakeres, near Auckland. This mite is named in honour of Dr. W. COTTIER, Director of the Entomology Division, Nelson, N. Z.

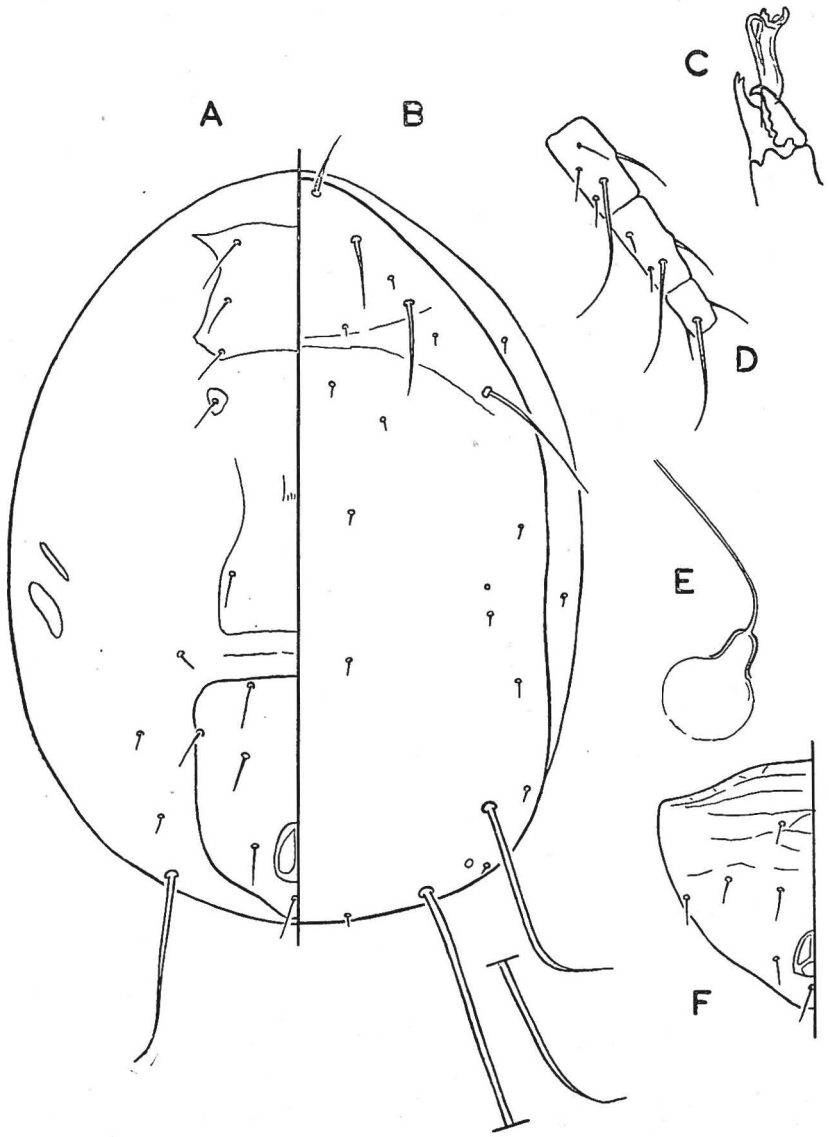

FIG. 5. — *Typhlodromus cottieri*. Female : A, ventral surface ; B, dorsal surface ; D, genu, tibia and basitarsus of leg IV ; E, spermatheca. Male : C, chelicera ; F, ventrianal shield.

Amblyseius harrowi sp. n.

Fig. 6.

Female. Length 338-357 μ ; width 194-197 μ. Dorsal shield smooth, with 17 pairs of setae, nine in the lateral row, two mediolaterals, four dorsocentrals and one pair each of verticals and clunals. Body somewhat brown in colour.

All setae fine and smooth, and very short except the vertical setae, M2 and L9, which are also fairly short. A number of pores on the dorsal shield. Setae S1 and S2 on the interscutal membrane.

Ventrianal shield longer than wide, with three pairs of preanal setae and a pair of pores. Four pairs of setae on the membrane surrounding the ventrianal shield. Two pairs of metapodal plates, inner pair narrow. Spermatheca with a dilated receptacle and trumpet-shaped neck.

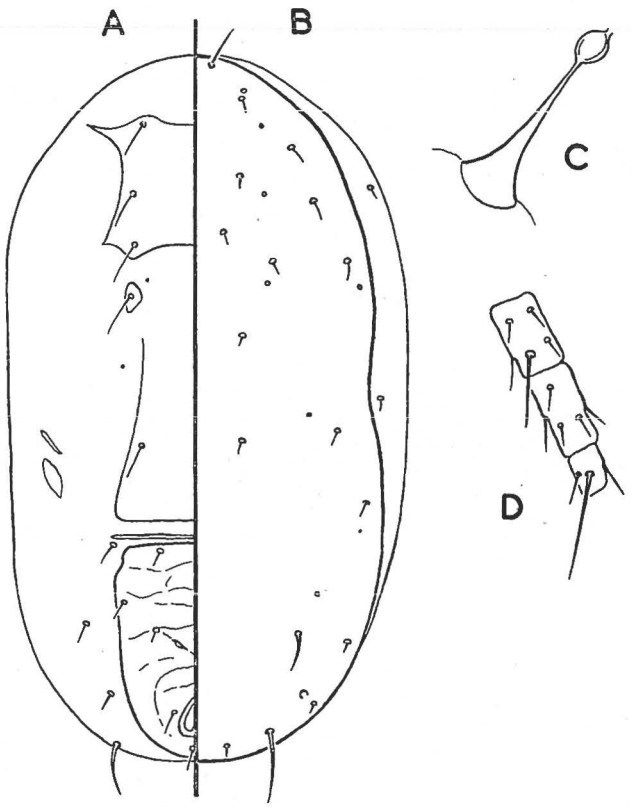

FIG. 6. — *Amblyseius harrowi*. Female : A, ventral surface ; B, dorsal surface ; C, spermatheca ; D, genu, tibia and basitarsus of leg IV.

Gnathosoma with the fixed digit of the chelicera with three small teeth, and the movable digit with no teeth. Leg IV similar in length to dorsal shield ; one macroseta on each of the genu and basitarsus, none on the tibia.

Male. Not known.

Diagnosis. Nine pairs of small lateral setae, three pairs of preanal setae on the ventrianal shield, and two macrosetae on leg IV.

Locality. Found on various orchard weeds in the North Island.

Type material. Three females from *Oxalis* sp. beneath apple trees, Plant Diseases Division, Auckland, New Zealand. This species is named in honour of Mr. K. M. HARROW of Plant Diseases Division.

Iphiseius bidibidi sp. n.

Fig. 7.

Female. Length 375 μ ; width 275 μ. Dorsal shield chitinised but smooth, rounded with no " waist " ; with 17 pairs of setae, nine in the lateral row, two mediolaterals, four dorsocentrals and one pair each of verticals and clunals ; S1 and S2 are on the sclerotised lateral membrane and appear to be on the dorsal shield.

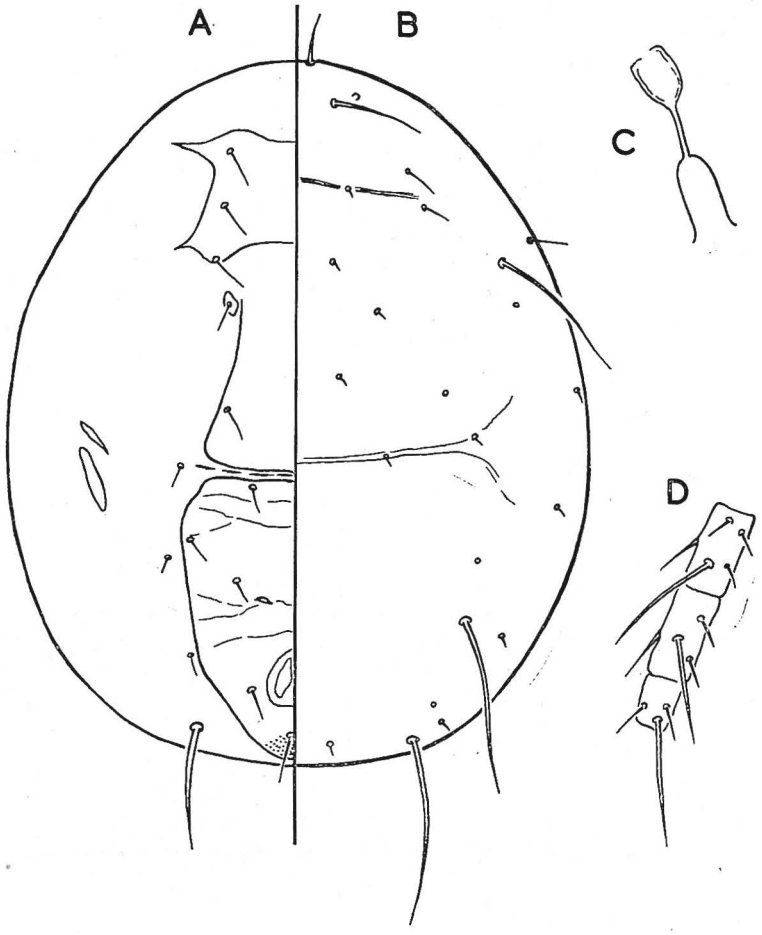

FIG. 7. — *Iphiseius bidibidi.* Female : A, ventral surface ; B, dorsal surface ; C, spermatheca ; D, genu, tibia and basitarsus of leg IV.

Setae L5, L6, L7, L8, all minute. L2 and L3 short and situated close to each other. L4, M2, and L9 all long (35-46 μ), twice as long as L1 which is twice as long as the vertical seta. Peritreme extends from the base of coxa IV to the vertical seta.

Ventrianal shield longer than wide, somewhat irregular in shape in the type specimen, with three pairs of preanal setae and a pair of pores. Two pairs of metapodal plates. Four pairs of setae surrounding the ventrianal shield, the posterior pair long. Spermatheca with swollen base to a short duct, and a long campanulate cervix.

Gnathosoma with the fixed digit of the chelicera with one large tooth and several small ones, movable digit with one very small tooth. Leg IV about the same length as the dorsal shield, with one macroseta on each of the genu, tibia and basitarsus, that on the genu being slightly longer.

Male. Not known.

Diagnosis. Dorsal shield rounded. Setae L2 and L3 very close together; L1, L4, M2 and L9 comparatively long.

Type material and Locality. One female collected on bidibid (*Acaena* sp.) with a Tetranychid mite, on roadside near Lake Paringa on the West Coast of the South Island of New Zealand.

Iphiseius acaridophagus sp. n.

Fig. 8.

Female. Not known.

Male. Body heavily sclerotised. Dorsal shield rounded, approx. 340 μ in length and 310 μ wide. Seventeen pairs of dorsal setae, nine in the lateral row, two mediolaterals, three dorsocentrals, one pair each of verticals and clunals, and also S1 on the sclerotised areas. L4, L9 and M2 stout and serrated; L4 and M2 55 μ, L9 slightly longer. L1 and L2 short, placed near to each other, L3 longer and placed nearer to L4 than is usual; L5-L8 short, M1 minute. The vertical setae presumably present but not visible in the type specimen. The first dorsocentral missing, and the third longer than the other dorsocentral setae.

Ventrianal shield with three pairs of preanal setae and a pair of small pores.

Gnathosoma with fixed digit of chelicera multidentate, moval be digit with one tooth and with a spermatophoral process. Leg IV somewhat longer than length of dorsal shield, with one short macroseta on each of the genu and tibia; one short macroseta on genu III.

Diagnosis. L4, L9 and M2 stout and serrated. L3 nearer to L4 than it is to L2. Third dorsocentral setae longer than other setae of the hexagonal area.

Type material and Locality. One male collected from bush lawyer (*Rubus* sp.) at Te Morepu, near Auckland. The species was feeding on an Acarid mite which lives in close family groups on the underside of *Rubus* leaves.

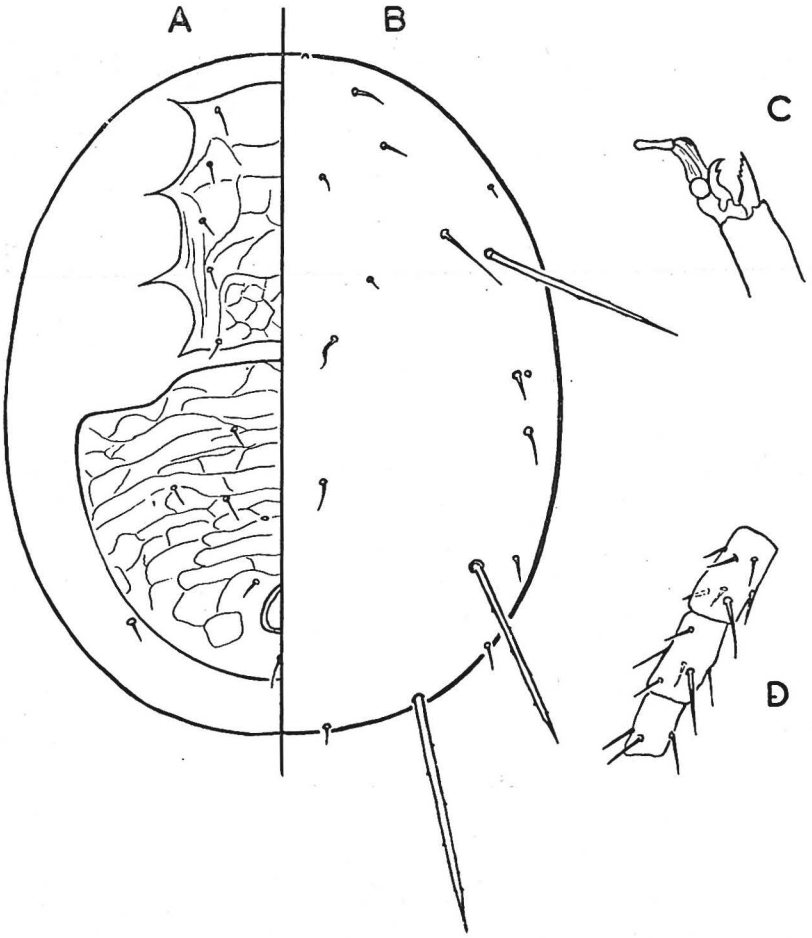

FIG. 8. — *Iphiseius acaridophagus.* Male : A, ventral surface ; B, dorsal surface ; C, chelicera ; D, genu, tibia and basitarsus of leg IV.

SUMMARY.

The occurrence in New Zealand is recorded of *Typhlodromus tropicus* Chant, *T. occidentalis* Nesbitt, *T. caudiglans* Schuster, *Amblyseius longispinosus* (Evans), *A. perlongisetus* Berl., *A. exopodalis* Kennett, *A. mexicanus* (Garman), *A. limonicus* Garm. & McG. and *A. ovalis* (Evans). The following new species are described : *Typhlodromus novaezealandiae, T. manukae, T. dachanti, T. cottieri, Amblyseius harrowi, Iphiseius bidibidi, I. acaridophagus.*

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