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THE SPIDER MITE FAMILY
TETRANYCHIDAE IN NEW ZEALAND
II — THE GENUS TETRANYCHUS

BY

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SUMMARY.

Six species of mites of the genus Tetranychus are recognised. They are Tetranychus urticae, T. cinnabarinus, T. ludeni, T. lambi, T. atlanticus and T. collyerae n. sp. This is believed to be the first recording of the species T. cinnabarinus, T. ludeni and T. atlanticus from New Zealand. Descriptions and keys for each species are provided, together with their known host range and distribution.

This is the second paper in a series on the spider mite fauna (Tetranychidae) of New Zealand, the first dealing with the genus Bryobia (MANSON 1967). Mites of the genus Tetranychus are widespread throughout New Zealand occurring on a variety of host plants. They include the most destructive of all mites, particularly the two spotted spider mite Tetranychus urticae which is known under a host of synonyms and over which much confusion exists.

The term “red spider” is used loosely by many people for almost any kind of mite that feeds on, or is seen on plants, and there is little awareness that different species are involved with possibly different host preferences and life histories. It is hoped that this paper will provide stimulus for further and more detailed studies of the group.

Factors which are favourable for the development of these mites are their small size, their concealed habits (most occurring on the undersurface of leaves), and the use of modern insecticides which frequently kill predators, leaving the mites themselves unharmed.

The outstanding work of PRITCHARD and BAKER (1955) was the first to give a comprehensive review of the genus Tetranychus on a world wide basis and this, together with the more recent work of BOUDREAUX (1956) and BOUDREAUX and DOSSE (1963), has formed a foundation for the present studies.

Historical Review.

THOMSON (1922) lists the spider mites known to occur in New Zealand up to that time and gives a brief account of the plants attacked. *Tetranychus telarius* (probably a misspelling for *T. telarius*) was reported as far back as 1873, the host plants being gooseberries, violets and primrose. It was also reported on apple trees, but THOMSON thought this was a mistake, the species being *Bryobia pratensis*.

*Tetranychus bimaculatus* Harvey, in 1910-11 was regarded as a menace to the successful growing of certain species of *Abies* in the Canterbury district. W. W. SMITH (1901) reported *T. telarius* as destructive to fruit trees.

These early reports are confusing as doubt occurs regarding the exact species to which they refer. For instance, it seems unlikely that *Abies* was being attacked by a species of *Tetranychus*, but more likely a species of *Oligonychus* which is partial to this host. However, it does seem that species of *Tetranychus* were present in New Zealand from very early times.

LAMB (1952) recorded the following species of *Tetranychus* from New Zealand: *Tetranychus telarius* (Linné), *Tetranychus bimaculatus* Harvey, *Tetranychus sexmaculatus* Riley, *Tetranychus althaeae* var. Hanstein.

He indicated that there was some doubt as to the occurrence of *Tetranychus telarius* here as many workers were in the habit of assigning various members of the Tetranychid complex to this species. In 1953 he recorded *Tetranychus urticae* from grape vines in glasshouses, and stated that red spider mites had been regarded as pests of grapes in glasshouses over recent years.

PRITCHARD and BAKER (1955) described the species *Tetranychus lambi* from New Zealand. *Tetranychus althaeae* and *Tetranychus bimaculatus* were given as synonyms for *T. telarius*, and *T. sexmaculatus* was removed to the genus *Eotetranychus*.

COTTIER (1956) stated that the red spider mite, *Tetranychus telarius* was widespread throughout New Zealand, attacking a variety of plants and was a major pest of strawberries and other hosts.

LAMB (1958) recorded a severe outbreak of *Tetranychus telarius* from several apple orchards and said that although the latter species had been known to occur on apple trees for many years, mass outbreaks had not previously been encountered on this host. E. COLLYER (1964) recorded the presence of *Tetranychus urticae* (= *telarius* L.) and *Tetranychus lambi* from New Zealand orchards.

Diagnostic Features of the Genus.

Mites of the genus *Tetranychus* are usually some shade of green or red and normally occur in colonies on the undersurface of the leaves of a great variety of plants. Webbing is often present and indicative of their occurrence.

The mites show great uniformity of structure, particularly the females, and
it is frequently necessary to observe both sexes before an accurate identification can be made.

The use of a good compound microscope with a phase contrast attachment is indispensable for studying such features as the aedeagus and claw structure.

*Tetranychus* mites can be recognised in that the opisthosoma bears only one pair of para-anal setae, in contrast to the two pairs of most other genera (figs. 3, 4). The tarsus of leg I bears two pairs of widely spaced duplex setae (fig. II d.). In the females, and on tarsi III and IV of the males, the empodium consists of three pairs of closely approximated ventrally directed hairs and in some species a dorsal spur is present on the empodium, known as the medio dorsal spur (fig. 42). Empodium I and II of the males is usually a shortened tridigitate appendage with or without a mediadorsal spur.

**Adult Female.**

The colour of adult summer females is of significance in species determination, as recent studies (Hussey and Parr, 1958; Monroe, 1962) have shown this to be genetically controlled.

There is no division between the propodosoma and hysterosoma. The dorsal body surface bears 13 pairs of long, slender, tapering, finely pubescent setae, 3 pairs occurring on the propodosoma and the remaining 10 pairs on the hysterosoma as follows: 3 pairs of dorsocentrals, 1 pair of humerals, 3 pairs of dorsolaterals, 2 pairs of sacrals and 1 pair of clunals (fig. 1). The protrusible stylophore and associated chelicerae are present at the anterior body margin as are the peritremes which are sharply hooked. Two pairs of eyes are present and the palpus is five segmented, terminating in a thumb claw complex. Integumentary striae are present on both body surfaces and also the legs. They may be broken or solid in outline, and the broken striae of some body areas consist of distinctive lobe shaped structures which may be of significance in species determination (Boudreaux and Dosse 1963).

Three main kinds of setae are present on the legs. Firstly, the tactile setae (fig. IIT) which are commonest, and occur on all leg segments are slender and finely pointed and they are usually embedded into a small pit or depression in the leg surface. On tibia I one of these setae is more slender than the normal type and the pit from which it arises is deeper with a thicker margin.

Secondly, the chemosensory, or sensory setae (fig. IIIS) which are thin walled structures, often with evident transverse striations. They are not embedded into the leg surface as is the case with the tactile setae. They occur on all tarsal segments and tibia I. Many are bluntly rounded at their distal extremity.

Thirdly, the duplex setae (fig. IIV) of which there are two pairs on tarsus I and one pair on tarsus II. These each consist of two intimately associated setae, the distal member being long and sensory and the proximal member short and tactile. Each tarsus terminates as a central empodium accompanied by two pairs of tenent hairs.
The number of setae on each leg segment appears to be constant for the genus, and excluding the duplex setae are as follows:

Tarsi I and II each with fourteen setae (including one sensory seta); tarsus III with ten setae (including one sensory seta); tarsus IV with eleven setae (including one sensory seta). Tibia I with ten setae (including one sensory seta); tibiae II and IV each with seven tactile setae; tibia III with six tactile setae. Genu I and II each with five tactile setae; genu III and IV each with four tactile setae. Femur I with ten tactile setae; femur II with six tactile setae; femora III and IV each with four tactile setae.

The number of setae for any particular leg segment of a species may vary occasionally from the typical number, and for this reason it is desirable to examine more than one specimen.

The ventral body surface is as figured (fig. 5). There are four pairs of mid ventral setae, two pairs of genital setae, two pairs of anal setae and one pair of para-anals. Coxae I and II each bear two setae and coxae III and IV one seta. The ventral body setae are more slender than those on the dorsal surface. The strongly wrinkled nature of the genital opening is characteristic of most mites of the family Tetranychidae.

Male.

Males are smaller than females, somewhat pear shaped in outline and tapering sharply posteriorly. The number and arrangement of setae on the dorsal and ventral body surfaces are similar to that of the female, except for the opisthosoma where the males possess four pairs of genito-anal setae (fig. 21). The reproductive organ of the male, known as the aedeagus is found near the posterior body margin. Its shape is often of great significance in the determination of different species of Tetranychus and to observe this accurately it is important that males be mounted in a lateral position, when the outline of the aedeagus should be clearly discernible. The peritreme is always strongly hooked. Dorsal and ventral body surfaces are with solid integumentary striae and no body lobes are present.

Leg setation is similar to that for females with the exception of tarsus and tibia I. Tarsus I normally bears sixteen setae (including three sensory setae) and tibia I, thirteen setae (including four sensory setae).

The palpus of the male (fig. 23) differs from that of the female in bearing on the dorsal surface of the second segment a short, stout, horn like structure, and also the terminal sensillum of the fifth segment is usually more slender.

Classification.

The classification used here is that based on the work of Pritchard and Baker (1955) who undertook the first comprehensive review of the spider mite family Tetranychidae and established a sound classification for the group, placing the genus Tetranychus in the subfamily Tetranychinae and the tribe Tetranychini.
This classification divided the genus *Tetranychus* into six major groups, although more recently Baker (1963, pers. comm.) recognised only three major groupings, the *Telarius* group, *Pacificus* group and *Canadensis* group, each one distinguished by the dorsal striation pattern of the female.

All the species dealt with here, except *T. lambi*, belong to the *Telarius* group, females being distinguished in that the integumentary striae run longitudinally between the third pair of dorso-central hysterosomals, and just posterior to this form a distinctive diamond shaped pattern (fig. 6). The mediodorsal spur of the empodium is either absent or very small.

A KEY TO THE SPECIES OF TETRANYCHUS KNOWN TO OCCUR IN NEW ZEALAND.

**Males.**

1. Knob of the aedeagus small, scarcely wider than the neck, rounded posteriorly .......................... *ludeni*

1. Knob of the aedeagus larger, distinctly wider than the neck, with a posterior angulation.  .... 2

2. Knob of the aedeagus very large, sharply angled posteriorly, broadly rounded anteriorly ................................................................. *atlanticus*

2. Knob of the aedeagus angled both posteriorly and anteriorly .................................................. 3

3. Knob of the aedeagus about twice as wide as the neck, the posterior angulation more acute than the anterior angulation ........................................ 4

3. Knob of the aedeagus slightly wider than the neck, both posterior and anterior projections similar......................................................... *urticae* or *cinabarinus*

4. Empodium II normal, with three pairs of ventrally produced hairs (fig. 24). Occurs on introduced plants ........................................ .......................... *lambi*

4. Empodium II with the three pairs of ventral hairs much shortened (fig. 25). Occurs on native plants ........................................................................................................ .......................... *collyerae* n. sp.

**Females.**

1. Adult summer females some shade of green ................................................................. 2

1. Adult summer females some shade of red ................................................................. 3

2. Body lobes present on both dorsal and ventral surfaces. Length of adult females about 395 ± 64 μ. .................................................................................. *lambi*

2. Body lobes present on dorsal surface only. Length of adult females about 469 ± 36 μ. . . . *urticae* or *atlanticus*.

3. Duplex setae of tarsus I widely spaced, the proximal pair being almost in a line with the proximal tactile setae (fig. 44). ........................................................................... *ludeni*

3. Duplex setae much closer together ........................................................................... 4

4. Occurring on introduced plants .................................................................................. *cinabarinus*

4. Occurring on native plants ........................................................................................................ .......................... *Collyerae* n. sp.
It will be noticed from the above key the importance of obtaining both sexes. *T. cinnabarinus* can only be separated from *T. urticae* by an examination of females, whereas *T. atlanticus* is distinguishable only in the male form.

*Tetranychus urticae* (Koch 1836)
(Figs. 1-3, 5-7, 11-22, 28).


For complete synonymy see Boudreaux and Dosse (1963).

The shape of the aedeagus is the distinguishing feature in the recognition of this species.

Adult summer females are usually greenish or yellowish in colour with a large internal dark coloured area on each side of the body from which is derived the common name “two-spotted mite”. As cooler weather approaches in autumn the females cease feeding and become orange. The dorsal body striae now become solid and lobes are lacking. Adults overwinter on grass, weeds, or under loose bark.

**Male**: Length of body 342 ± 46 μ (6 specs). Terminal sensillum of palpus about 2 1/2 times as long as wide. Each empodium with a dorsomedial spur, that on empodium I strongest. Aedeagus, with neck bent almost at right angles to the shaft, the knob being slightly wider than the neck, rounded and angled both anteriorly and posteriorly. Axis of the knob parallel or nearly so to that of the shaft.

**Female**: Colour of adult summer females greenish or yellowish usually with a large dark coloured spot on each side of the body. Length of body 469 ± 36 μ; greatest width of body 349 ± 28 μ (6 specs). Terminal sensillum of palpus about twice as long as broad. A small dorsomedial spur is present on empodium I, absent on other empodia. Body lobes on the dorsal surface are large and rounded, with some rather oblong. No lobes are visible on the ventral surface.

This is one of the commonest and most destructive mites occurring in New Zealand, up until recent years being commonly known as *Tetranychus telarius*. No comprehensive host list has been seen for this species in New Zealand and lists that are available give some doubt as to whether this is the species actually concerned. Hosts in New Zealand from which I have recorded it are:

*Aberia cafra*, apple (*Malus sylvestris*), azalea (*Azalea* sp.), black currant (*Ribes nigrum*), black nightshade (*Solanum nigrum*), *Buddleia* sp., *Calathea* sp., carrot (*Daucus carota*), *Chrysanthemum* sp., *Citrus* sp., *Convolvulus* sp., Cucumber (*Cucumis sativus*),...
PLATE I, FIGS. 1-10.
1. — Dorsal view of T. urticae; dp — dorsal propodosomals; dc — dorsocentrals; dl — dorsolaterals; h — humeral; s — sacrals; c — clunals; p — peritreme; e — eyes.
2. — Enlarged view of typical dorsal body setae.
4. — Enlarged view of opisthosoma of Eotetranychus; apa — anterior para-anal setae; ppa — posterior para-anal setae.
5. — Ventral view of female of T. urticae.
6. — Enlarged view showing details of striae between the third dorsocentral and inner sacral setae.
7. — Dorsal body lobes of T. urticae.
8. — Dorsal body lobes of T. cinnabarinus.
10. — Dorsal body lobes of T. lambi.
Dahlia sp., Delphinium sp., Dicentra sp., Diervilla sp., Dogwood (Cornus nuttalli), dwarf beans (Phaseolus sp.), elderberry (Sambucus nigra), fleabane (Erigeron canadensis), french beans (Phaseolus sp.), Fuchsia sp., Gardenia sp., geranium (Pelargonium sp.), grape (Vitis sp.), henbit (Lamium purpureum), Hevea braziliensis, Hibiscus sp., Hydrangea sp., Ipomoea sp., kapok tree (Eriodendron anfructuosum), kurrajong (Streblus diversiloba), leeks (Allium porrum), Lotus sp., Lotus ? corniculatus, lucerne (Medicago sativa), Maranta sp., Mandinadomestica, nectarine (Prunus persica nectarina) Oxalis sp., parsnip (Pastinaca sativa), Paspalum dilatatum, peach (Prunus persica), pomegranate (Punica granatum), poplar (Populus sp.), raspberry (Rubus idaeus), Rauwolfa serpentina, red clover (Trifolium pratense), roses (Rosa spp.), runner beans (Phaseolus coccineus), serradella (Ornithopus spp.), soya beans (Glycine soja), strawberry (Fragaria vesca), sweet corn (Zea mays), sycamore (Acer pseudoplatanus), tree lupin (Lupinus arboreus), violet (Viola sp.), walnut (Juglans sp.), white clover (Trifolium repens), wisteria (Wistaria sp.).

Overseas, this species is known from Africa, Argentina, Australia, Europe, Israel, Japan, North America and Turkey.

Tetranychus cinnabarinus (Boisduval)  
(Fig. 8).


For a complete synonymy see Boudreaux and Dosse (1963), who have made representations to the International Commission on Zoological Nomenclature for the name T. cinnabarinus to be replaced by T. telarius (L). At the time of writing the decision of this body has not been made known.

Male : Morphologically, the male is indistinguishable from that of T. urticae.

Female : Colour of summer adult females carmine. Dorsal body lobes differ from those of T. urticae in being slightly narrower and more pointed, and they are obviously more crowded together.

Specimens examined were taken from strawberries growing out of doors in Levin (M. Eales coll. 24-xx-61), where T. urticae was also found in association.

This species has not previously been recorded from New Zealand, but it seems likely it has been present for some years as Lamb (1953) described adults of T. urticae as varying in colour from pale yellow to bright red and it seems probable that the red form was T. cinnabarinus. Also, Collyer (1964) noted a small proportion
of summer populations of *T. urticae* on outdoor plants which were carmine, this being regarded as quite distinct from the orange hibernating form.

Overseas, *T. cinnabarinus* has been recorded from Africa, Argentina, Europe (only in glasshouses in the northern part), Hawaii, Japan, the Middle East and the Philippine Islands.

*Tetranychus ludeni* Zacher

(Figs. 9, 30, 37-38, 42, 44-45, 51-53).


The shape of the aedeagus is distinctive for this species (fig. 30), and the duplex setae of tarsus I of the female are unusual in being widely spaced (fig. 44).

**Male:** Length of body 342 ± 36 μm (6 specs). Terminal sensillum of palpus slightly more than twice as long as broad. Each empodium with a distinct dorsomedial spur, those on empodia I and II strongest. The knob of the aedeagus is small, rounded posteriorly and sharply angled anteriorly.

**Female:** Colour of adult summer female carmine. Length of body 482 ± 79 μm. Greatest width of body 372 ± 56 μm (7 specs). Terminal sensillum of palpus almost twice as long as broad. Dorsal body lobes triangular, sharply pointed and smaller than those of *T. urticae*. A small but distinct dorsomedial spur is present on all four empodia being most prominent on empodium I. Proximal pair of duplex setae of tarsus I almost in a straight line with the proximal tactile setae.

Pritchard and Baker (1955) placed *T. ludeni* in the Desertorum group along with two other species of *Tetranychus*, *T. gigas* and *T. desertorum*. In their remarks on the group they stated that females had been received from New Zealand on greenhouse tomatoes and strawberry. Apparently, males were not observed and it was not possible to place the mite specifically.

Two slides of female mites collected by Dr K. P. Lamb and held in the United States National Museum bear the following data — eggplant, Kaikohe, 3-II-47. It seems likely, that in both instances, the species concerned was *T. ludeni*, in which case it has been present in New Zealand for a number of years.

Material held in the collection of the Department of Agriculture, Levin, first records the species from strawberries, Auckland, 5-xii-58. It has since been encountered regularly and can be considered a pest species. One of the heaviest infestations seen was that by D. A. Slade in February 1963 on water melons at Muriwai. *T. ludeni* is now known to occur throughout the North Island sometimes in association with other spider mites. The following plants have been recorded as hosts, all growing out of doors:

*Aster* sp., cape gooseberry (*Physalis peruviana*), *Capsicum* sp., castor oil plant
Plate II, Figs. 11-20.

(Ricinus communis), cineraria (Senecio sp.), Convolvulus sp., cucumber (Cucumis sativus), dwarf runner beans (Phaseolus sp.), Fuchsia sp., Gerbera sp., kumara (Ipomoea batatas), lupin (Lupinus sp.), Mina lobata, parsnips (Pastinaca sativa), passionfruit (Passiflora edulis), pumpkins (Cucurbita pepo), strawberry (Fragaria vesca), water melon (Citrullus vulgaris).

Overseas, this species is known from Australia, France (in greenhouses), South America and the southern United States.

Tetranychus lambi Pritchard and Baker
(figs. 10, 24, 26, 33-36, 39-41, 43).


The shape of the aedeagus (figs. 33-36) together with the colour of live adult summer females (greenish) is distinctive for this species. Slide mounted specimens may be confused with those of T. collyerae n. sp. and the chief differences between the two species is summed up under the description of T. collyerae n. sp.

Male : Length of body 293 ± 18 μ (6 specs). Terminal sensillum of palpus almost three times as long as broad. All empodia lack a dorsomedial spur. Empodium I long and slender. The neck of the aedeagus is short, bent at a sharp angle to the shaft. The knob is sharply angled both anteriorly and posteriorly, but the posterior angulation is more attenuated and "beak-like". The axis of the knob is parallel to that of the shaft. Length of the axis usually 3.2 to 3.9 μ.

Female : Colour of adult summer females greenish. Length of body 395 ± 64 μ, greatest width of body 281 ± 41 (6 specs). Terminal sensillum of palpus about twice as long as broad. Body lobes large and rounded, and present on both dorsal and ventral surfaces. All empodia lack a dorsomedial spur.

This species was first collected by Dr K. P. LAMB in 1948 on strawberries and apple in the Auckland area. Dr E. COLLYER (1964) recorded it in the Auckland area from weeds, including clover (Trifolium sp.), dock (Rumex sp.) and spurge (Euphorbia sp.) as well as cultivated strawberry, apple and plum.

Further records are from beans (Phaseolus sp.), Buckland, Auckland (G. J. WILSON); red clover (Trifolium pratense), Wairakei (D. C. M. MANSON); strawberry (Fragaria vesca), Katikati (H. S. TAYLOR); bird's-foot trefoil (Lotus corniculatus), Mapua, Nelson (E. COLLYER); bidibid (Acaena sp.), Lake Paringa, South Island (E. COLLYER).

T. lambi is also known to occur in Australia.

Tetranychus collyerae n. sp.
(figs. 23, 25, 27 31-32).

This species is similar to T. lambi but differs in that live adult summer females are red instead of green and also in the host plant range, so far only being found on
Plate III, Figs. 21-36.
21. — Ventral view of male of *T. urticae*; 22. — Dorsal view of male of *T. urticae*; 23. — Palpus of male of *T. collyerae* n. sp. 24. — Empodium II of male of *T. lambi*; 25. — Empodium II of male of *T. collyerae* n. sp. 26. — Empodium I of male of *T. lambi*; 27. — Empodium I of male of *T. collyerae* n. sp. 28. — Enlarged view of peritreme of female of *T. urticae*; 29. — Aedeagus of *T. atlanticus*; 30. — Aedeagus of *T. ludeni*; 31. — Aedeagus of *T. collyerae* n. sp. from *Carpodetus serratus*; s : shaft; n : neck; k : knob; a : axis of knob; 32. — Aedeagus of *T. collyerae* n. sp. from *Melicytus ramiflorus*; 33, 34, 35 and 36. — Aedeagi of *T. lambi*. (Figs. 31-35 all to the same scale).
native plants in contrast to the introduced plants on which *T. lambi* has been taken.

Slide mounted specimens can be distinguished by the structure of empodium II of the male. In *T. lambi* the three pairs of proximoventral hairs of empodium II are normally produced (fig. 24), but in *T. collyerae* these hairs are much abbreviated (fig. 25). There is also a difference between empodium I of the males of the two species, that of *T. lambi* being longer and more slender (figs. 26, 27). Finally, the length of the axis of the knob of the aedeagus of *T. collyerae* is slightly greater, being 4.5 — 5.9 µ as compared to 3.2 — 3.9 µ for *T. lambi* (figs. 31-35).

**Male**: Length of body 326 ± 26 µ (6 specs). Terminal sensillum of palpus almost three times as long as broad.

Empodia sometimes with a small spur. Empodium I slightly shorter and thicker than that of *T. lambi* (fig. 27). Empodium II lacking the extended proximoventral hairs, characteristic of that of *T. lambi*. Shape of aedeagus indistinguishable from that of *T. lambi*. Length of axis of knob 4.5 — 5.9 µ.

**Female**: Colour of live adult summer females deep red or carmine. Length of body 416 ± 64 µ; greatest width of body 329 ± 33 µ (6 specs). Terminal sensillum of palpus slightly more than twice as long as broad. Body lobes large and rounded, present on both dorsal and ventral surfaces. Empodia of some specimens with a small dorsomedial spur, particularly empodia III and IV.

**Holotype**: Male, on *Melicytus ramiflorus*, Otaki Forks 20-i-63 (D. C. M. Manson).

**Paratypes**: Males and females from *M. ramiflorus*, Otaki Forks, 20-i-63, Manakau, Levin, 17-i-63 (M. Eales), Levin, 23-i-63, 26-i-63 and 8-ii-64 (D. C. M. Manson); *Coprosma robusta*, Tauranga, 30-v-64 (M. Hodgkins); *Myoporum laetum*, Te Pangu, Marlborough Sounds, 23-ii-64 (D. C. M. Manson), Clifton waterfront, 8-iv-65 (E. Collyer) (females only); *Carpodetus serratus*, Upper Pelorus River, 7-iii-65 (E. Collyer); *Astelia* sp., Lake Sylvester, Cobb Reservoir, 2-i-66 (E. Collyer).

Holotype male and paratypes in the collection of the Department of Agriculture, Levin. Paratypes also deposited at Entomology Division, Department of Scientific and Industrial Research, Nelson, and the United States National Museum, Washington D. C.

This species is probably widespread throughout New Zealand, occurring on a variety of native plants.

Specimens from *C. serratus* differ from those on *M. ramiflorus* in possessing small, but distinct empodial spurs and in the length of the axis of the knob being fractionally bigger. These spurs have been observed in both sexes, on all four empodia in the male, but more particularly on empodia III and IV in the female. This may suggest more than one species being present under the name of *T. collyerae*, but specimens of some females taken from ngaio, *M. laetum* also show these spurs, and until a more detailed study is undertaken it is felt these differences are best regarded as variations.

It is a pleasure to name this species in honour of Dr Elsie Collyer who was the first person to discover it and suspect it as being new.
PLATE IV, FIGS. 37-43.
37. — Tarsus and tibia I of male of T. ludeni; 38. — Tarsus and tibia II of male of T. ludeni;
41. — Tarsus and tibia I of male of T. lambi; 42. — Empodium I of female of T. ludeni; d. — dorsomedial spur; h. — empodial hairs; 43. — Terminal segment of palpus of male of T. lambi.
PLATE V. FIGS. 44-53.

44. — Tarsus and tibia I of female of *T. ludeni*; 45. — Terminal segment of palpus of female of *T. ludeni*; 46. — Terminal segment of palpus of male of *T. atlanticus*; 47. — Tarsus and tibia I of male of *T. atlanticus*; 48. — Tarsus and tibia II of male of *T. atlanticus*; 49. — Empodium II of male of *T. atlanticus*; 50. — Empodium I of male of *T. atlanticus*; 51. — Empodium I of male of *T. ludeni*; 52. — Empodium II of male of *T. ludeni*; 53. — Terminal segment of palpus of male of *T. ludeni*.

Tetranychus atlanticus McGregor
(Figs. 29, 46-50).


This species is distinguished by the shape of the aedeagus, the knob being
very large, sharply pointed posteriorly and broadly rounded anteriorly (fig. 29).

Male : Length of body 278 ± 13 μ (6 specs). Terminal sensillum of palpus
more than twice as long as broad. Each empodium with a dorsomedial spur, those
of tarsi I and II strongly produced, those of tarsi III and IV weaker, but still dis­
tinct. The neck of the aedeagus is short and slender, the knob large and the axis of
the knob at a slight angle to that of the shaft. The dorsal surface of the knob is
obtusely angulate, and it is important that the aedeagus be mounted in an exact
lateral position for this to be observed. Length of knob in relation to length of
dorsal margin of shaft 5.6 μ : 10.1 μ.

Female : Apparently indistinguishable from that of T. urticae.

The first specimens of this species were collected by Mr A. D. Lowe on polyan­
thus (Primula polyantha), Christchurch, 22-vi-64, in association with T. urticae.
Further specimens were received from Mr Lowe from the same host on 11-xi-64 and
12-i-65. A further specimen has been taken from strawberry, Levin on 19-i-65
(L. Marten).

Overseas, this species is known from Japan, South Africa, Turkey and the
United States. Pritchard and Baker (1955) state that it is found primarily on
low growing plants, and is a serious pest of cotton, alfalfa, beans, melon, clover,
strawberry, parsley and egg plant.

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