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Fauna of New Zealand
Number 5

Eriophyinae
(Arachnida: Acari: Eriophyoidea)

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Front cover: The mite depicted is *Aceria gersoni* n.sp. (contrast-enhanced negative image from a scanning electron micrograph by Dr Uri Gerson)

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ABSTRACT

A total of 60 species of eriophyine mites are described and figured. This total comprises the 30 species hitherto known from New Zealand and 30 newly recorded ones, of which 29 are new to science. They are grouped into six genera, of which two - *Asetilobus* and *Ramaculus* - are new.

Six new combinations are proposed: *Acalitus australis*, *Acalitus avicenniae*, *Acalitus cottieri*, *Acalitus taurangensis*, *Aceria calyptegiae*, and *Asetilobus hodgkinsi*.

Host-plant records and other collection data are listed for each mite species.

The remaining 49 species of New Zealand Eriophyoidea are keyed, described, and illustrated in *Fauna of New Zealand* number 4, where the superfamily as a whole is introduced and discussed, and an appendix list of host-plant/mite associations is given.

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INTRODUCTION

Fauna of New Zealand number 5, covering subfamily Eriophyinae of the Eriophyoidea, is a continuation of number 4 (Manson 1984) and must be used in conjunction with it. Number 5 stands alone solely as regards having its own list of references. All the broader aspects of eriophyine biology and guidelines to descriptive terminology must be sought in number 4, where all other eriophyoid taxa known from New Zealand are listed, described, and discussed.

The Eriophyinae are a major group in New Zealand, contributing 60 species to the total known eriophyoid fauna of 109 species. The genera *Acerimina*, *Asetilobus* n.gen., and *Ramaculus* n.gen. are each represented by only a single species. The other three genera recognised here are proportionately - or perhaps disproportionately - large: *Acalitus* with 15 species, *Aceria* with 29, and *Eriophyes* with 13.

Fifty-five species cause damage to the host plant in the form of galls, leaf erinea, 'witches brooms', or plant deformation of some kind. *Aceria tulipae* is one of the most important economic species known.

KEY TO GENERA OF ERIOPHYINAE KNOWN FROM NEW ZEALAND

- 1 First coxal tubercles and setae absent 2
 - First coxal tubercles and setae present 3
- 2 Foretibial seta absent; 2nd ventral seta absent (p. 53) .. *Ramaculus*
 - Foretibial seta present; 2nd ventral seta present (p. 41) .. *Acerimina*
- 3 Foreleg with tibial and femoral setae absent (p. 7) .. *Acalitus*
 - Foreleg with either or both of these setae 4
- 4 Second ventral seta absent (p. 42) .. *Asetilobus*
 - Second ventral seta present 5
- 5 Dorsal setae directed posteriorly (p. 19) .. *Aceria*
 - Dorsal setae directed upwards, ahead, or medially (p. 43) .. *Eriophyes*

DESCRIPTIONS

Genus *Acalitus* Keifer

Acalitus Keifer, 1965: 2. Type-species
Acalitus iedi Keifer, 1965.

Body fusiform; rings subequal dorsoventrally. Rostrum short. Dorsal shield without an anterior lobe; dorsal tubercles near rear shield margin or on it, directing setae posteriorly. Legs with the normal segmentation; forefemoral and foretibial setae absent; occasionally no seta on hind genu; featherclaw simple. Coxae with 3 pairs of setiferous tubercles; forecoxal tubercles further ahead than usual. Coxal field and genital coverflap frequently granulate. Abdomen with all standard setae.

REMARKS. The absence of the forefemoral and foretibial setae, together with the advanced position of the first coxal tubercles and the frequently granular nature of the coxae and genital coverflap, should distinguish genus *Acalitus*.

Fifteen species are here recorded from New Zealand, most of them causing some damage to the host plant, mainly in the form of leaf erinea or galls on leaf, bud, or stem. A number of these species had previously been placed in the genus *Aceria*.

KEY TO SPECIES OF ACALITUS KNOWN FROM NEW ZEALAND

- 1 Featherclaw 3-rayed (occasionally 4-rayed); ventral half of body usually with spine-like microtubercles; lateral seta and 1st ventral seta very short (5-6 μ m and 8-16 μ m long respectively). Forming a leaf erineum on *Nothofagus fusca* *spinus*
 - Not with this combination of characters 2
- 2 Hind genu without a seta; hind claw (1) very long, at least about twice as long as foreclaw 3
 - Not with this combination of characters 4

- 3 Dorsal shield unornamented. On
(2) *Macropiper excelsum* *excelsus*
- Dorsal shield ornamented, usually
with admedians and 2 lateral oval
areas visible. On *Coprosma* spp.
..... *cottieri*
- 4 Second ventral seta more than 24 μ m
(2) long 5
- Second ventral seta less than 20 μ m
long 8
- 5 Genital coverflap with crescentic
(4) scoring. On boysenberry and black-
berry (*Rubus* spp.) *essigi*
- Genital coverflap with longitudinal
or diagonal markings 6
- 6 Featherclaw 4-rayed. On boysenberry
(5) (*Rubus* sp.) *orthomera*
- Featherclaw 5-rayed. Not on boysen-
berry 7
- 7 Dorsal shield with lateral dash-like
(6) lines and with granular markings near
dorsal tubercles. Forming a leaf
erineum on *Carpodetus serratus*
..... *carpatus*
- Dorsal shield with lateral granulation
but no granular markings near dorsal
tubercles. On *Pittosporum tenuifolium*
..... *kohus*
- 8 Sternal line forked posteriorly; gen-
(4) ital coverflap, coxae, and sternal
area unornamented; 1st coxal setae
about 1 μ m long. Forming bud galls
on *Nothofagus* *morrisoni*
- Not with this combination of char-
acters 9
- 9 Dorsal shield with a prominent lateral
(8) band of granulation; hind coxae and
genital coverflap unornamented. For-
ming a leaf erineum on mangrove
(*Avicennia resinifera*) *avicenniae*
- Not with this combination of char-
acters 10
- 10 Median line on dorsal shield absent
(9) or, if present, only on rear third of
shield. Forming leaf pouch galls or
a leaf erineum on *Nothofagus* spp.
..... *lowei*
- Median line complete or nearly com-
plete 11
- 11 Featherclaw 5-rayed 12
(10) Featherclaw 4-rayed 13
- 12 Body rings numbering 67-78; 2nd ven-
(11) tral seta 4-5 μ m long; genital seta
3-4 μ m long. Forming a leaf erineum
on *Vitex lucens* *australis*
- Body rings numbering 52-61; 2nd ven-
tral seta 9-11 μ m long; genital seta
8-9 μ m long. Forming leaf galls on
Coprosma acerosa and *C. intertexta*
..... *intertextus*
- 13 Dorsal shield seta less than 20 μ m
(11) long; body rings numbering more than
61. Forming a leaf erineum on *Rubus*
schmideloides *rubensis*
- Dorsal shield setae more than 20 μ m
long; body rings numbering less than
61 14
- 14 Sternal line absent; dorsal shield
(13) usually with 1 submedian line. For-
ming leaf galls on *Coprosma* spp.
..... *dissimus*
- Sternal line present; dorsal shield
with usually 2 submedian lines. For-
ming purplish papillate galls on
Coprosma tenuicaulis *taurangensis*

***Acalitus australis* (Lamb) new combination**

Figures 1-8

Aceria australis Lamb, 1952: 359.

FEMALE (description from 6 specimens, 4 of them type specimens). Length 114-174 μm , width 39-42 μm , depth 39-48 μm . Vermiform; white. Rostrum 18 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 18-19 μm long, 28 μm wide, ornamented with a median line, admedians, and 2 weak submedians, the inner one very short; a prominent band of granulation visible in lateral view. Dorsal tubercles on rear shield margin, 16-18 μm apart; dorsal setae 15-19 μm long, directed posteriorly.

Foreleg 16-19 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 5-6 μm long, with a 5-rayed featherclaw. Hind leg 16-18 μm long; tibia 3 μm long; tarsus 5-6 μm long; claw 6-7 μm long. Hind coxae with granular markings; 1st coxal seta 3-5 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternum with short, wavy lines intermixed with a few granules.

Abdomen with about 67-78 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 8-19 μm long. Ventral setae: 1st on about ring 23, 16-23 μm long; 2nd on about ring 39, 4-5 μm long; 3rd on about 7th ring from rear, 10-13 μm long. Accessory caudal seta usually just visible. Genitalia 18 μm wide, 9-11 μm long. Coverflap with granulation anteriorly, longitudinal lines posteriorly; genital seta 3-4 μm long.

MALE. Present.

TYPE DATA. Described from *Vitex lucens* (puriri; Verbenaceae), Auckland, 26 August 1949, E. Bray (holotype slide and 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides, plus non-type examples from *Vitex lucens*: Auckland, 24 Jun 1974; Anihinau Reserve, Takapuna, 7 Jun 1979; Te Henga, Bethells, 19 Oct 1980; Tauranga, 8 Sep 1939; Te Puke, 8 Apr 1975; Lower Hutt, 30 Nov 1981.

AK, BP, (HB), WN / - .

Forming a leaf erineum.

REMARKS. There is no uniquely distinctive character for *A. australis*; the key characters should be adequate for identification. The type material has been remounted, and the dorsal and ventral views (Figures 1 and 7) are drawn from the holotype slide. The dorsal shield pattern is weak and variable.

Lamb (1960) records this species from Hastings, HB, in November 1950.

***Acalitus avicenniae* (Lamb) new combination**

Figures 9-15

Aceria avicenniae Lamb, 1952: 350.

FEMALE (description from 6 specimens). Length 105-138 μm , width 33-44 μm , depth 31-39 μm . Fusiform. Rostrum 12-14 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 14-29 μm long, 19-28 μm wide; ornamentation consisting of longitudinal lines - a median line, admedians, and about 3 submedians; lateral shield margins granulate; dorsal tubercles arising from rear shield margin, 13-19 μm apart; dorsal setae 9-13 μm long, directed posteriorly.

Foreleg 15-26 μm long; tibia 3-5 μm long; tarsus 4-8 μm long; claw 6-7 μm long; featherclaw 5-rayed. Hind leg 13-24 μm long; tibia 3-6 μm long; tarsus 4-8 μm long; claw 6-8 μm long. Coxae with a few granulations between 3rd setae, otherwise unmarked; 1st coxal seta 5-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 50-65 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 7, 8-25 μm long. Ventral setae: 1st on about ring 18, 23-38 μm long; 2nd on about ring 30, 8-11 μm long; 3rd on about 7th ring from rear, 8-21 μm long. Accessory caudal seta present. Genitalia 12-24 μm wide, 7-12 μm long. Coverflap with some granules anteriorly, unmarked posteriorly; genital seta 4-11 μm long.

MALE. Present.

TYPE DATA. Described from *Avicennia resinifera* (mangrove; Verbenaceae), Auckland, 19

January 1950, K. P. Lamb (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus non-type examples from *Avicennia resinifera*: Tapotupotu Bay, Cape Reinga, 1 Feb 1977; Ngunguru, Whangarei, 17 Mar 1976; Birdsalls Road, Whangateau Matakana, Warkworth, Apr 1979; Auckland Harbour, Dec 1938; Rangitoto Island, 12 Jun 1954; Romuera, 8 Sep 1957; Mangere, 30 May 1970; Meola Road swamp, Auckland, 8 Oct 1973; Pollen Island, Waitemata Harbour, 7 Oct 1980; Little Muddy Creek, Titirangi, May 1983.

ND, AK / - .

Forming an erineum, usually on leaf undersurface.

REMARKS. *Acalitus avicenniae* is a short, plump species with the coxae and genital coverflap unmarked, and known only from mangrove in Auckland and Northland areas. The holotype slide has been remounted. The male specimen on it, from which Lamb's drawings have probably been made, belongs to another genus. It is difficult to obtain good slide mounts of *A. avicenniae* from dried plant material, particularly dorso-ventral views. Collections made in the 1950s are mentioned by Lamb (1960, p. 136).

Acalitus carpatus new species

Figures 16-23

FEMALE (description from 6 specimens). Length 101-162 μm , width 41-44 μm , depth 34-38 μm . Fusiform. Rostrum 12-14 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 19-22 μm long, 36-39 μm wide; ornamentation consisting of a median line, admedians, and 3 slightly curved submedians on anterior half; lateral shield areas with dash-like lines; vicinity of dorsal tubercles granular; dorsal tubercles on rear shield margin, 17-22 μm apart; dorsal setae 18-20 μm long, directed posteriorly.

Foreleg 21-24 μm long; tibia 3-4 μm long; tarsus 5 μm long; claw 4-5 μm long; featherclaw 5-rayed. Hind leg 16-18 μm long; tibia 2-3 μm long; tarsus 4-5 μm long; claw 6-8 μm long. Coxae granulate; 1st coxal seta 3-4 μm long; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a

line through the 3rd tubercles. Sternal line absent.

Abdomen with about 69-82 microtuberculate rings; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 11, 14-16 μm long. Ventral setae: 1st on about ring 25, 25-31 μm long; 2nd on about ring 47, 28-31 μm long; 3rd on about 9th ring from rear, 12-14 μm long. Accessory caudal seta 1-2 μm long. Genitalia 16-18 μm wide, 9-10 μm long. Coverflap granulate anteriorly, with longitudinal markings posteriorly; genital seta 3-4 μm long.

MALE. Present.

TYPE DATA. From *Carpodetus serratus* (putaweta; Saxifragaceae): Tautuku Beach, Catlins area, 24 January 1957, J. M. Dingley (holotype slide and 1 paratype slide, NZAC; 4 paratype slides, PLNZ); Auckland, May and November 1951, E. Bray (2 paratype slides, PLNZ); Upper Hutt, 1 April 1952, A. J. Healy (paratype slide, PLNZ).

MATERIAL EXAMINED. Type series only.

AK, WN / SL.

Forming a leaf erineum.

REMARKS. *Acalitus carpatus* is similar to *A. kohus*, from which it can be distinguished by having lateral dash-like markings on the dorsal shield, instead of granules, and granular markings near the dorsal shield tubercles (absent in *kohus*).

The markings on the discal area of the dorsal shield are not clearly visible on the holotype, and were drawn from another specimen. Also, the dorsal setae of the holotype are directed forwards, instead of backwards, as seems to be more usual.

Acalitus cottieri (Lamb) new combination

Figures 24-31

Aceria cottieri Lamb, 1952: 358.

Acalitus tenuis Manson, 1970: 534.

FEMALE (description from 6 specimens, including 2 from the holotype slide). Length 108-168 μm , width 33-45 μm , depth 38-48 μm . Fusiform. Rostrum 12-18 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 18-21 μm long, 27-33 μm

wide; ornamentation not strongly impressed, consisting of admedians, a partially complete submedian, and 2 oval lateral areas, the inner one largest; some granules anteriorly; in lateral view, a granular band above coxae; dorsal tubercles arising from rear shield margin, prominent, 16-21 μm apart; dorsal setae 18-24 μm long, directed posteriorly.

Foreleg 16-20 μm long; tibia 2-3 μm long; tarsus 4-5 μm long; claw 4-5 μm long, with a 5-rayed featherclaw. Hind leg 14-17 μm long; genu without a seta; tibia 2 μm long; tarsus 4 μm long; claw 9-10 μm long. Coxal and sternal areas with some granulation; 1st coxal seta 4-5 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 54-64 rings, all microtuberculate except for about the last 6; microtubercles large, elongate-oval, on rear ring margin. Lateral seta on about ring 8, 15-21 μm long. Ventral setae: 1st on about ring 16, 23-35 μm long; 2nd on about ring 28, 23-29 μm long; 3rd on about 7th ring from rear, 10-15 μm long. Accessory caudal seta just visible. Genitalia 15-18 μm wide, 9-12 μm long. Coverflap with longitudinal markings, and with granules anteriorly; genital seta 5-9 μm long.

MALE. Present.

TYPE DATA. From *Coprosma robusta* (Rubiaceae) fruit galls, Purewa, Auckland, June 1949, D. McKenzie (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus the following non-type examples. *Coprosma cuneata*: ex bud galls, Port Ross, Auckland Islands, 8 Nov 1954; ex bud galls on young growth, Beeman Camp, Campbell Island, 30 Nov 1975. *Coprosma linariifolia*: ex stem galls, Tihoi, 10 Dec 1979. *Coprosma linariifolia* x *parviflora*: ex bud galls, Waitangi Valley, Waiouru, 8 Aug 1943. *Coprosma parviflora*: ex stem galls, Montgomery Park, Banks Peninsula, 18 Sep 1960; Roxburgh, Sep 1971. *Coprosma propinqua*: ex bud galls, Awakino River, Dargaville, 1949; ex stem galls, Kaihere, near Morrinsville, 12 Jul 1949; ex stem galls, Tauhara Forest, Taupo, 18 Feb 1975; ex bud galls, swamp forest near Foxton, 17 Apr 1932; Levin, 15 Dec 1964; ex witches brooms, Puhipuhi Valley, Kaikoura, 31 Aug 1970. *Coprosma*

pseudocuneata: ex bud galls, National Park, 1159 m, Nov 1949. *Coprosma robusta*: Riverhead, Auckland, 10 Jul 1964, J. Dingley. *Coprosma* sp.: ex bud galls, Dunedin, 26 Oct 1958. *Coprosma tenuicaulis*: ex cladode stem galls, Tauranga, 14 Oct 1965.

ND, AK, WO, BP, TO, WI, WN / KA, MC, CO, DN / Auckland Is, Campbell I.

Normally forming stem or bud galls.

REMARKS. The most distinctive features of *Acalitus cottieri* are the extremely long hind claw (about twice as long as the fore-claw) and the lack of a seta on the hind genu. It can be distinguished from the closely related *A. excelsus* mainly by the presence of dorsal shield markings and by the respective host plants.

The presence of a male on the holotype slide could not be confirmed. One specimen was possibly a male, but the mount was in too poor a condition for me to be certain. Males of this common, widespread species were observed, however, in several other collections.

Acalitus dissimus new species

Figures 32-39

FEMALE (description from 6 specimens). Length 113-156 μm , width 43-49 μm , depth 48 μm . Fusiform. Rostrum 17-18 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 24-28 μm long, 33-48 μm wide; ornamentation consisting of a median line, admedians, a posteriorly diverging submedian line, and a short, curved line running almost transversely between the submedian line and the lateral shield margin; anterior shield margin produced into a small, triangular apex; dorsal tubercles slightly ahead of rear shield margin, 20-26 μm apart; dorsal setae 26-31 μm long, directed posteriorly.

Foreleg 24-28 μm long; tibia 5 μm long; tarsus 6 μm long; claw 4-5 μm long; feather-claw 4-rayed. Hind leg 22-25 μm long; tibia 4 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae granulate; 1st coxal seta 4-7 μm long; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 56-60 rings, all microtuberculate except for about the last 5;

microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 16-23 μm long. Ventral setae: 1st on about ring 20, 50-60 μm long; 2nd on about ring 34, 10 μm long; 3rd on about 6th ring from rear, 15-18 μm long. Accessory caudal seta absent. Genitalia 19-20 μm wide, 11-14 μm long. Coverflap granulate anteriorly and with longitudinal markings posteriorly; genital seta 6-9 μm long.

MALE. Not seen.

TYPE DATA. From *Coprosma foetidissima* (Rubiaceae), Dun Mountain track, Nelson, 6 November 1969, J. S. Dugdale (holotype slide and 2 paratype slides, NZAC; 12 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus the following non-type examples. *Coprosma lucida*: *Nothofagus* forest near Upper Hutt, 9 Dec 1952. *Coprosma robusta*: Riverhead, Auckland, 10 Jul 1964; Wharanui, near Blenheim, 11 Nov 1956. *Coprosma* sp.: Belmont, 1933 (no other data); Otara, Invercargill, 31 Jan 1956.

AK, WN / NN, MB, SL.

Forming small leaf galls up to 0.5 mm in diameter, mainly on upper leaf surfaces.

REMARKS. Distinctive features of *Acalitus dissimus* are the dorsal shield pattern, granular coxae, and the absence of a sternal line.

Lamb (1960) records a gall mite from leaf pocket galls on *Coprosma foetidissima* taken at National Park on 3 May 1951 by E. Bray; this could be the same species. No dried material has been available for examination.

Acalitus essigi (Hassan)

redberry mite

Figures 40-47

Eriophyes essigi Hassan, 1928: 380.

Aceria essigi (Hassan). Keifer, 1952: 28.

Acalitus essigi (Hassan). Keifer, 1965: 15 (note).

FEMALE (description from 6 specimens). Length 120-159 μm , width 40-45 μm , depth 36-44 μm . Vermiform; white. Rostrum 16-19

μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 22-25 μm long, 35-40 μm wide, strongly ornamented with a median line, admedians, about 3 submedians, and a lateral line; dorsal tubercles on rear shield margin, 17-18 μm apart; dorsal setae 15-19 μm long, directed posteriorly.

Foreleg 22-24 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 5 μm long; feather-claw 4-rayed. Hind leg 20-22 μm long; tibia 2-3 μm long; tarsus 4-5 μm long; claw 8-9 μm long. Coxal area granulate; 1st coxal seta 3-5 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 57-73 rings, all microtuberculate except for about the last 6, where the microtubercles are very small; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 8, 15-20 μm long. Ventral setae: 1st on about ring 23, 38-50 μm long; 2nd on about ring 43, 31-39 μm long; 3rd on about 6th ring from rear, 12-18 μm long. Accessory caudal seta absent. Genitalia 14-15 μm wide, 7-11 μm long. Coverflap granulate anteriorly and with crescentic markings posteriorly; genital seta 6-8 μm long.

MALE. Not seen.

TYPE DATA. Described from *Rubus thyrsanthus* (Himalaya blackberry; Rosaceae), Berkeley, California, U.S.A. (location of type material unknown).

MATERIAL EXAMINED. Non-type examples from *Rubus* sp. (blackberry) (Nelson, 3 Mar 1964) and *Rubus* hybrid cv. Boysen (boysenberry) (Governor's Bay, Christchurch, 14 Jan 1972; Hastings, 6 Feb 1969 and 4 Jan 1980; Earnscliffe, 2 Mar 1972).

HB / NN, MC, CO.

Living in the buds and fruit, where feeding activity delays ripening of the drupelets. Sometimes causing 'redberry disease', in which infested fruit becomes swollen and bright red.

REMARKS. The strong dorsal shield design, four-rayed featherclaw, and long second ventral seta (31-39 μm) help to distinguish *Acalitus essigi*. It is very close to *A.*

orthomerus, but differs in having crescentic rather than longitudinal markings on the coverflap.

Hamilton (1948) was first to record this mite from New Zealand, and gave an account of its biology and life cycle. It has been recorded also from the U.S.A. (California) and England.

Acalitus excelsus new species

Figures 48-53

FEMALE (description from 5 specimens). Length 115-146 μm , width 43-49 μm , depth not discernible. Fusiform. Rostrum 15 μm long, curved down; antapical seta absent. Dorsal shield subtriangular, 23-25 μm long, 38-40 μm wide, unornamented; dorsal tubercles prominent, arising from rear shield margin, 15-21 μm apart; dorsal setae 35-38 μm long, directed posteriorly.

Foreleg 22-25 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 3-4 μm long; featherclaw 5-rayed. Hind leg 18-20 μm long; tibia 2-3 μm long; tarsus 5-6 μm long; claw 11-13 μm long. Coxae unornamented apart from a few lines on anterior coxae; 1st coxal seta 4-5 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternum with 2 longitudinal lines.

Abdomen with about 46-61 microtuberculate rings; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 7, 23-26 μm long. Ventral setae: 1st on about ring 19, 20-35 μm long; 2nd on about ring 34, 20-40 μm long; 3rd on about 7th ring from rear, 10-13 μm long. Accessory caudal seta usually barely visible about 1-2 μm long. Genitalia 16-18 μm wide, 9-11 μm long. Coverflap with longitudinal markings, and with granulations anteriorly; genital seta 9-11 μm long.

MALE. Present.

TYPE DATA. From *Macropiper excelsum* (pepper tree; Piperaceae), Buller Road, Levin, 4 April 1964, A. Ward (holotype slide, PLNZ).

MATERIAL EXAMINED. Type slide only.

WN / - .

A leaf vagrant causing no apparent damage.

REMARKS. The extreme length of the hind claw, the lack of ornamentation on the dorsal shield, the prominent dorsal tubercles, and the unusual structure of the internal genitalia clearly separate *Acalitus excelsus* from any other species. It is very close to *A. cottieri* but can be distinguished by the key characters.

Acalitus intertextus new species

Figures 54-61

FEMALE (description from 10 specimens). Length 124-163 μm , width 46-54 μm , depth 46-56 μm . Fusiform. Rostrum 16-18 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 24-26 μm long, 32-43 μm wide; ornamentation consisting of a median line, admedians, and 2 or 3 irregular submedians; sometimes a transverse, diagonal or curved line anterior to each dorsal tubercle; lateral shield areas granulate; dorsal tubercles on rear shield margin, 19-24 μm apart; dorsal setae 18-23 μm long, diverging posteriorly.

Foreleg 21-23 μm long; tibia 4-5 μm long; tarsus 5 μm long; claw 4-5 μm long; featherclaw 5-rayed. Hind leg 19-20 μm long; tibia 3 μm long; tarsus 4-5 μm long; claw 6-8 μm long. Coxae heavily granulate; 1st coxal seta 3-4 μm long; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 52-61 microtuberculate rings; microtubercles oval, between rings or on rear ring margin. Lateral seta on about ring 8, 14-24 μm long. Ventral setae: 1st on about ring 19, 38-53 μm long; 2nd on about ring 34, 9-11 μm long; 3rd on about 6th ring from rear, 9-11 μm long. Accessory caudal seta just visible. Genitalia 16-18 μm wide, 13-16 μm long. Coverflap with granulations anteriorly and a few longitudinal or diagonal markings posteriorly; genital seta 8-9 μm long.

MALE. Present.

TYPE DATA. From *Coprosma intertexta* (Rubiaceae): Cass, Canterbury, 21 March 1974,

B. P. J. Molloy (holotype slide, 5 paratype slides, and dried material, PLNZ; 1 paratype slide, NZAC) and *Coprosma acerosa*, Okains Bay, Banks Peninsula, 20 May 1974, B. P. J. Molloy (6 paratype slides, and dried material, PLNZ; 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type series only.

- / MC.

Forming very small (about 0.5 mm long), raised, dark reddish, roughened, elongate galls mainly on leaf undersurfaces. In one instance nearly the whole of one leaf margin was swollen and discoloured from mite attacks.

REMARKS. The following characters should help to distinguish *Acalitus intertextus*: the dorsal shield design, with granulate lateral areas; the heavily granulate coxae and sternum; the five-rayed featherclaw; and the greater length of the hind claw relative to the foreclaw. It is very similar to *A. australis*, but can be separated by the key characters.

Acalitus kohus new species

Figures 62-69

FEMALE (description from 6 specimens).

Length 112-143 μm , width 46 μm , depth 34-43 μm . Vermiform. Rostrum 18-19 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 24 μm long, 31 μm wide; ornamentation consisting of a median line, slightly curved admedians not quite reaching full length of shield, and 2 short, diagonal submedians; lateral shield margins granulate; dorsal tubercles arising from rear shield margin, 19 μm apart; dorsal setae 17-25 μm long, directed posteriorly.

Foreleg 19-24 μm long; tibia 3-4 μm long; tarsus 4-5 μm long; claw 6-7 μm long, with a 5-rayed featherclaw. Hind leg 17-21 μm long; tibia 2-4 μm long; tarsus 4-5 μm long; claw 9-10 μm long. Coxae granulate; 1st coxal seta 5-6 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 55-66 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 7, 13-

22 μm long. Ventral setae: 1st on about ring 22, 32-44 μm long; 2nd on about ring 38, 25-37 μm long; 3rd on about 6th ring from rear, 11-18 μm long. Accessory caudal seta just visible, about 1 μm long. Genitalia 15-19 μm wide, 9-11 μm long. Cover-flap with a few diagonal lines; genital seta 4-6 μm long.

MALE. Not seen.

TYPE DATA. From *Pittosporum tenuifolium* (kohuhu; Pittosporaceae), Auckland, 22 March 1972, B. M. May (holotype slide, PLNZ; 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides only.

AK / - .

Associated with *Aceria tenuifoliae* in an erineum in leaf rolls.

REMARKS. *Acalitus kohus* is similar to *A. carpatus*, but can be distinguished by the longer first ventral seta (32-44 μm , cf. 25-31 μm), the presence of lateral granulations on the dorsal shield instead of dash-like lines, and the absence of any markings near the dorsal tubercles.

The only good dorsoventral view of this species was marred by damage near the third coxal setae; this is shown in Figure 68.

Acalitus lowei Manson

Figures 70-85

Acalitus lowei Manson, 1972: 354.

FEMALE (description from 6 specimens on holotype and paratype slides). Length 111-180 μm , width 49-65 μm , depth 37-56 μm . Fusiform. Rostrum 12-17 μm long, curved down; antapical seta 2-5 μm long. Dorsal shield subsemicircular, 20-23 μm long, 35-46 μm wide; ornamentation comprising a median line on rear third of shield, complete, subparallel admedian lines that diverge slightly posteriorly and 2 or 3 incomplete submedian lines which sometimes are branched or looped; dorsal tubercles on rear shield margin, 14-25 μm apart; dorsal setae 11-18 μm long, directed posteriorly.

Foreleg 17-22 μm long; tibia 2-4 μm long; tarsus 3-6 μm long; claw 5 μm long, with a 4-rayed featherclaw. Hind leg 16-20 μm long; tibia 2-3 μm long; tarsus 3-5 μm

long; claw 7-8 μm long. Anterior coxae with granules on inner side; posterior coxae almost unornamented; 1st coxal seta 3-4 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles closer together than the 2nd, which arc ahead of a line through the 3rd tubercles. Sternum with several short longitudinal lines.

Abdomen with about 50-55 microtuberculate rings; microtubercles rounded, usually on rear ring margin. Lateral seta on about ring 8, 7-22 μm long. Ventral setae: 1st on about ring 19, 26-40 μm long; 2nd on about ring 33, 5-7 μm long; 3rd on about 6th ring from rear, 10-16 μm long. Accessory caudal seta absent. Genitalia 16-19 μm wide, 8-13 μm long. Coverflap with granulations anteriorly, longitudinal markings posteriorly; genital seta 3-7 μm long.

MALE. None in type material, but present in other collections.

TYPE DATA. Described from *Nothofagus solandri* (Fagaceae), Staveley, near Methven, 13 December 1968, A. D. Lowe (holotype slide, 3 paratype slides, and dried material, PLNZ).

MATERIAL EXAMINED. Type series, plus the following non-type examples. *Nothofagus cliffortioides*: National Park, Mar 1955, striate galls; Ruapehu, 21 Nov 1978, globular and striate galls; Cass, 21 May 1959, striate galls; Craigieburn Forest Park, 26 Jun 1973, globular galls. *Nothofagus fusca*: Paddy's Knob, Lake Rotoiti, Nelson, 12 Oct 1969, striate galls; Tawhai Forest, Reefton, 24 Sep 1971, globular galls; Lake Wakatipu, 21 Mar 1979, leaf erineum and striate galls; Mavora Lakes, 31 Jan 1973, globular galls. *Nothofagus menziesii*: Minginui State Forest, 10 May 1974, globular galls; Kaingaroa State Forest, Matea, 2 Mar 1981, leaf erineum (with *Aceria waltheri*); Urewera National Park, near Lake Waikaremoana, 31 May 1974, globular galls; Simonin Pass, Olivine Range, 1036 m, 23 Jan 1975, globular galls; Mavora Lakes, 31 Jan 1973, globular galls; West Arm, Lake Manapouri, 18 Jan 1970, leaf erineum. *Nothofagus solandri*: Riwaka, 3 and 10 Feb 1966, striate and globular galls; Ashley State Forest, 11 Nov 1973; beech forest remnant, Wallaceville, Upper Hutt, 18 Dec 1952, striate galls; Otaki Gorge, 12 Jul 1974, striate and globular galls. *Notho-*

fagus ? *solandri*: Whangamoia Saddle, Nelson, 21 Jun 1942, globular galls. *Nothofagus truncata*: Lake Rotoiti, 22 Apr 1968, leaf erineum; Gibbs Spur, Wangapeka, Nelson, 9 Oct 1965, globular galls; Whakamarino Valley, 26 Sep 1965, globular galls.

TO, GB, WN / NN, BR, WD, NC, MC, OL, FD.

Commonly forming leaf pouch galls on either leaf surface, though predominantly on undersurface. Two main types of gall occur - a thin-walled striate gall up to 1 mm in diameter, such as that from which the type material was obtained, and a larger (up to 2 mm diameter), rounded, greenish, globular gall which may occur in association with the first. Some galls, particularly from *Nothofagus menziesii*, are more flattened than the typical globular type. However, there are also several records of *A. lowei* being associated with a leaf erineum, and it is unusual to have one species of mite associated with two distinct types of leaf damage.

REMARKS. *Acalitus lowei* is such a variable species that it is difficult to diagnose accurately. The occurrence of leaf pouch galls or, less commonly, a leaf erineum on *Nothofagus* species is an indication of its presence. The dorsal shield has the median line incomplete or absent, and there is no sternal line.

Since the original description, examination of further material has emphasised the variability of this species. Differences have been noticed in the following structures.

Dorsal shield markings. The type material usually has a short median line, admedians, and perhaps two lateral lines. Some specimens, however, have no shield markings, and others have no lateral lines and the median and admedians present in varying degrees.

Body microtubercles. Variable, from oval to spine-like.

Featherclaw. Four-rayed or five-rayed. Originally described as four-rayed on specimens from *N. solandri*, but from other species of *Nothofagus* it is more usually five-rayed. On all specimens but one from *N. truncata* it is four-rayed.

Sternal markings. Variable, from short, wavy lines to just an aggregate of granules; on some specimens there are no markings.

Coxal markings. There may be no coxal markings, or granules may be present, particularly on the hind coxae.

Genital area. The genital flap may be smooth or have short, irregular, longitudinal markings. In a few instances the coverflap appears almost to have crescentic markings. The area immediately anterior to the coverflap may be smooth or markedly granulate.

Claws. The hind claw may be considerably longer than the foreclaw or only slightly longer. In a few instances there is no appreciable difference in claw length.

Accessory caudal seta. If present, this is very small.

Specimens from leaf galls, *N. menziesii*, Simonin Pass (WD) clearly show two forms of mite. One form has the area immediately anterior to the coverflap granulate, as are the hind coxae; the featherclaw is four-rayed, and the claws are approximately the same length. The second form is completely unornamented on the coverflap, on the area immediately anterior to it, and on the sternal and coxal areas; the featherclaw is usually five-rayed, and the hind claw is slightly but distinctly longer than the foreclaw.

One wonders whether deuteroecy may be involved in *A. lowei*, but males seem to be as variable as the females. This species obviously requires much more study; it is possible that a complex of species may exist.

Of the two specimens illustrated, one is from the type material and the other from globular galls, *Nothofagus truncata*, Whakamarino Valley (GB). These appear to be distinct species, but the existence of intermediate forms makes separation almost impossible.

Acalitus morrisoni Manson

Figures 86-93

Acalitus morrisoni Manson, 1970: 537.

FEMALE (description from 6 specimens on holotype and paratype slides). Length 138-186 μ m, width 39-42 μ m, depth 40-51 μ m. Vermiform. Rostrum 12-15 μ m long, curved down; antapical seta absent. Dorsal shield subsemicircular, 16-19 μ m long, 32-36 μ m

wide; ornamentation consisting of 2 central longitudinal lines and a submedian line, though in some instances markings absent; dorsal tubercles arising from rear shield margin, 16-18 μ m apart; dorsal setae 21-24 μ m long, directed posteriorly.

Foreleg 17-19 μ m long; tibia 3-4 μ m long; tarsus 5 μ m long; claw 3-4 μ m long; featherclaw 4-rayed or 5-rayed. Hind leg 16-17 μ m long; tibia 2-3 μ m long; tarsus 5 μ m long; claw 5-6 μ m long. Coxae unornamented; 1st coxal seta minute (about 1 μ m long), about level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternum with central longitudinal line forked posteriorly.

Abdomen with about 71-76 microtuberculate rings; microtubercles rounded, on rear ring margin. Lateral seta on about ring 10, 13-20 μ m long. Ventral setae: 1st on about ring 22, 46-51 μ m long; 2nd on about ring 42, 2-4 μ m long; 3rd on about 6th ring from rear, 18-22 μ m long. Accessory caudal seta about 1 μ m long. Genitalia 13-14 μ m wide, 7-9 μ m long. Coverflap almost completely unornamented; anterior to coverflap are 2 subtriangular areas each with a few coarse granules; genital seta 1-3 μ m long.

MALE. Present.

TYPE DATA. Described from *Nothofagus solandri* (black beech; Fagaceae), Staveley, near Methven, 16 January 1968, A. D. Lowe (holotype slide and 2 paratype slides, PLNZ).

MATERIAL EXAMINED. Type slides, plus the following non-type examples. *Nothofagus cliffortioides*: Ruapehu, 24 Jan 1979. *Nothofagus fusca*: Queen's Park, Invercargill, 23 Mar 1964; Tobin's Creek, Inangahua Valley, 20 Apr 1972. *Nothofagus truncata*: Dumedin, 13 Jul 1951.

TO / NN-BR, MC, DN, SL.

Forming bud galls up to 20 mm in diameter.

REMARKS. Distinctive characters of *Acalitus morrisoni* are the lack of ornamentation on the coxae and genital coverflap, the forked sternal line, and the two subtriangular areas anterior to the genital coverflap (although this latter character is not always clearly visible). This species can be

distinguished from *A. lowei* by its much shorter first coxal setae.

A. morrisoni is variable in size and in microtubercle shape. In some specimens, particularly from *Nothofagus fusca*, the microtubercles are almost spine-like. In some specimens from *N. solandri* the microtubercles towards the posterior end of the abdomen approach this condition. In some specimens from *N. fusca* the subtriangular areas anterior to the genitalia have not been seen, but this may be due to the poor condition of the slide mounts; otherwise they appear identical.

Acalitus orthomerus (Keifer)

boysenberry bud mite

Figures 94-100

Aceria orthomera Keifer, 1951: 94.

Acalitus orthomera (Keifer). Keifer, 1965: 15 (note).

FEMALE (description from 7 specimens). Length 135-156 μm , width 45-49 μm , depth 45-49 μm . Vermiform. Rostrum 14-16 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 26-29 μm long, 41-43 μm wide; ornamentation consisting of a median line, admedians, about 3 submedians, and a faint lateral line; lateral and posterolateral areas with some light granulation; dorsal tubercles slightly ahead of rear shield margin, 17-19 μm apart; dorsal setae 18-22 μm long, directed posteriorly.

Foreleg 20-23 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 4-5 μm long, with a 4-rayed featherclaw. Hind leg 19-21 μm long; tibia 2-3 μm long; tarsus 4-5 μm long; claw 8-10 μm long. Coxal area granulate; 1st coxal seta 6-7 μm long, slightly behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 75-81 rings, all microtuberculate except for about the last 6, where microtubercles are almost absent; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 8, 13-18 μm long. Ventral setae: 1st on about ring 24, 40-50 μm long; 2nd on about ring 44, 32-42 μm long; 3rd on about 7th ring

from rear, 12-15 μm long. Accessory caudal seta absent. Genitalia 17-22 μm wide, 9-17 μm long. Coverflap granulate anteriorly, with longitudinal markings posteriorly; genital seta 6-10 μm long.

MALE. Not seen.

TYPE DATA. Described from *Rubus vitifolius* (California blackberry; Rosaceae), Sacramento, California, U.S.A. (holotype slide and 5 paratype slides, California State Department of Agriculture, Sacramento).

MATERIAL EXAMINED. Non-type examples from *Rubus* hybrid cv. Boysen (boysenberry), Auckland, 11 Sep 1980; Hastings, 6 Feb 1969 and 4 Jan 1980.

AK, HB / - .

Hastings samples associated with *Acalitus essigi*, the host fruit showing a typical 'redberry' effect. *A. orthomerus* may thus be a contributing factor in redberry disease.

REMARKS. *Acalitus orthomerus* is similar to *A. essigi*, from which it is distinguished by having longitudinal markings instead of crescentic scoring on the coverflap.

This species was first recorded in New Zealand by Manson (1972). Further search here may reveal a much wider distribution. Specimens from California, the type (and only other known) locality, are bigger (180-200 μm long) than those so far taken in New Zealand. Keifer (1952) states that in California, on boysenberry, this mite damages shoots and causes warty outgrowths at the base of drupelets.

Acalitus rubensis Manson

Figures 101-108

Acalitus rubensis Manson, 1970: 536.

FEMALE (description from 6 type specimens). Length 114-141 μm , width 37-47 μm , depth 40-45 μm . Fusiform. Rostrum 15-19 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 21-26 μm long, 34-38 μm wide; ornamentation usually clearly visible; comprising a slightly wavy median line, an admedian, and 2 submedian lines, the outer line tending to fork or loop posteriorly (some specimens have more than 2 submedian lines, but the additional ones are usually much weaker); granular areas

present laterally; dorsal tubercles arising from rear shield margin, 17-22 μm apart; dorsal setae 12-19 μm long, directed posteriorly.

Foreleg 20-24 μm long; tibia 3-5 μm long; tarsus 5-6 μm long; claw 5-6 μm long; featherclaw 4-rayed. Hind leg 18-22 μm long; tibia 2-4 μm long; tarsus 4-5 μm long; claw 6-8 μm long. Anterior coxae and inner side of posterior coxae lightly granulate; 1st coxal seta 3-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent, but sternal area lightly granulate and with some broken longitudinal lines.

Abdomen with about 64-81 rings, all microtuberculate except for about the last 5 or 6; microtubercles elongate, rounded, touching rear ring margin. Lateral seta on about ring 8, 12-14 μm long. Ventral setae: 1st on about ring 23, 31-50 μm long; 2nd on about ring 43, 7-15 μm long; 3rd on about 6th ring from rear, 13-18 μm long. Accessory caudal seta minute (about 1 μm long). Genitalia 16-18 μm wide, 11-13 μm long. Coverflap with granulations at base, longitudinal lines posteriorly; genital seta 6-9 μm long.

MALE. Not seen.

TYPE DATA. Described from *Rubus schmideloides* (Rosaceae), Levin, 31 May 1966, D. C. M. Manson (holotype slide and 3 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Rubus schmideloides*, Levin, 7 May 1967, and ex forest remnant, Trontham, Upper Hutt, 25 Mar 1953.

WN / -.

Forming an crineum on leaf undersurfaces.

REMARKS. The dorsal shield design, four-rayed featherclaw, and number of body rings (64-81) should help to distinguish *Acalitus rubensis* from other species.

Acalitus spinus new species

Figures 109-116

FEMALE (description from 6 specimens). Length 124-148 μm , width 40-49 μm , depth 40-44 μm . Fusiform. Rostrum 15-18 μm long, curved down; antapical seta absent. Dorsal shield subsemicircular, 20-22 μm long, 30-40 μm wide; ornamentation virtually absent, but occasional traces of admedians visible; dorsal tubercles on rear shield margin, 19-30 μm apart; dorsal seta 10-14 μm long, directed posteriorly.

Foreleg 20-24 μm long; tibia 4 μm long; tarsus 5-6 μm long; claw 5-6 μm long; with a 3-rayed (occasionally 4-rayed) featherclaw. Hind leg 19-21 μm long; tibia 3 μm long; tarsus 5-6 μm long; claw 5-8 μm long. Coxae unornamented; 1st coxal seta 3-4 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles rather closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line just visible.

Abdomen with about 48-54 rings, all microtuberculate except for about the last 5; microtubercles on about dorsal half of body large, rounded, those on ventral half or one-third of body spine-like. Lateral seta on about ring 4, 5-6 μm long. Ventral setae: 1st on about ring 14, 8-16 μm long; 2nd on about ring 27, 4-6 μm long; 3rd on about 6th ring from rear, 8-13 μm long. Accessory caudal seta 2-3 μm long. Genitalia 16 μm wide, 13-14 μm long. Coverflap unornamented; genital seta 4-6 μm long.

MALE. Not seen.

TYPE DATA. From *Nothofagus fusca* (Fagaceae), Globe Hill trial plots, Tawhai Forest, Reefton, 24 September 1971, New Zealand Forest Service (holotype slide, 1 paratype slide, and dried material, NZAC; 6 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

- / BR.

Causing an crineum on leaf undersurfaces.

REMARKS. *Acalitus spinus* is readily recognised; the spine-like microtubercles on the ventral half of the body, short body setae, three-rayed featherclaw, and almost complete lack of ornamentation on the dorsal shield, coxal and sternal areas, and genital cover-

flap are distinctive. Occasional specimens appear to have the microtubercles completely rounded rather than spine-like.

***Acalitus taurangensis* (Manson) new combination**

Figures 117-124

Aceria taurangensis Manson, 1965: 138.

Vasates taurangensis (Manson). Manson, 1967: 51.

FEMALE (description from 6 type specimens). Length 114-144 μ m, width 45-48 μ m, depth 48-54 μ m. Fusiform. Rostrum 17-19 μ m long, curved down; antapical seta absent. Dorsal shield subsemicircular, 23-26 μ m long, 36-37 μ m wide; ornamentation consisting of a median line, admedians, and usually 2 or 3 submedians, the lateral submedian sometimes forked; lateral shield margins granulose; dorsal tubercles on rear shield margin, 20-21 μ m apart; dorsal setae 23-26 μ m long, directed posteriorly.

Foreleg 19-21 μ m long; tibia 4 μ m long; tarsus 5-6 μ m long; claw 4 μ m long; feather-claw 4-rayed. Hind leg 17-19 μ m long; tibia 3 μ m long; tarsus 4-5 μ m long; claw 6-8 μ m long. Coxae granulate; 1st coxal seta 3-4 μ m long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked posteriorly.

Abdomen with about 47-58 microtuberculate rings; microtubercles rounded. Lateral seta on about ring 6, 18-25 μ m long. Ventral setae: 1st on about ring 19, 51-62 μ m long; 2nd on about ring 32, 10-11 μ m long; 3rd on about 6th ring from rear, 16-19 μ m long. Accessory caudal seta sometimes visible. Genitalia 16-18 μ m wide, 9-10 μ m long. Coverflap with granulations anteriorly, longitudinal markings posteriorly; genital seta 6-9 μ m long.

MALE. Present.

TYPE DATA. Described from *Coprosma tenuicaulis* (Rubiaceae), Tauranga, 30 May and 26 July 1964, M. Hodgkins (holotype slide, 7 paratype slides, and dried material, PINZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Coprosma tenuicaulis*, Upper Hutt, 2 Apr and 17 Dec 1952.

BP, WN / - .

Forming purple papillate galls 1-2 mm across, mainly on upper leaf surfaces.

REMARKS. *Acalitus taurangensis* is very similar morphologically to *A. dissimus*, from which it can be separated by the key characters. The purple galls are highly distinctive, and probably the best character for its recognition.

Genus *Aceria* Keifer

Aceria Keifer, 1944: 22. Type-species *Eriophyes tulipae* Keifer, 1938.

Eriophyes von Siebold *sensu* Newkirk & Keifer, 1971: 1.

Body worm-like; rings subequal dorsoventrally. Rostrum of moderate size. Dorsal shield without anterior lobe, or with the lobe extremely small. Dorsal tubercles near or on rear shield margin, directing setae posteriorly. Legs with normal segmentation (except for *waitheri*, which lacks a foretibial seta). Featherclaw simple. Coxae with 3 pairs of setiferous tubercles. Abdomen with all standard setae. Internal apodeme usually of normal length.

REMARKS. *Aceria* is a genus of 'normal' eriophyoid mites distinguished by the positioning of the dorsal tubercles near to or on the rear shield margin, with the setae directed posteriorly. It is of worldwide distribution, and is the largest eriophyoid genus in New Zealand, with 29 species. Of these, 26 are associated with some type of plant damage. The wheat curl mite (*Aceria tulipae*), economically the most important species of eriophyoid, is found here.

The key for determination of the different species has not been easy to compile, and it is advisable to check the full description to confirm identity.

**KEY TO SPECIES OF ACERIA
KNOWN FROM NEW ZEALAND**

- 1 Featherclaw 2-rayed or 3-rayed 25
- Featherclaw with more than 3 rays 2

- 2 Microtubercles absent from postero-
(1) dorsal half of abdomen. On *Hebe stricta*
..... *strictae*
- Not as above 3
- 5 Microtubercles absent from ventral
(2) part of abdomen between about lateral
seta and 1st ventral seta. Associated
with webbing on undersurface of fern
leaves *gersoni*
- Microtubercles present on ventral area
between lateral seta and 1st ventral
seta. Not associated with webbing
..... 4
- 4 Body rings divided into tergites and
(3) sternites 27
- Body rings not so divided 5
- 5 Featherclaw 7-rayed 28
(4) Featherclaw not 7-rayed 6
- 6 Internal genitalia thick, bar-like;
(5) genital seta more than 30 μ m long.
On *Salicornia australis* *rubifaciens*
- Not with this combination of charac-
ters 7
- 7 Dorsal shield setae more than 40 μ m
(6) long. On *Olearia furfuracea* *mayae*
- Dorsal shield setae less than 40 μ m
long. On hosts other than *O. furfur-*
acea 8
- 8 Genital coverflap and coxae unornamen-
(7) ted. On *Myoporum laetum* (ngaio)
..... *healyi*
- Not as above 9
- 9 Featherclaw 4-rayed 10
(8) Featherclaw 5-rayed or 6-rayed 12
- 10 Second ventral seta more than 30 μ m
(9) long. On *Fagus sylvatica* (copper
beech) *hagleyensis*
- Second ventral seta less than 15 μ m
long 11
- 11 Accessory caudal seta present; lateral
(10) seta less than 20 μ m long. On *Meliclytus*
ramiflorus (whiteywood) *melicyti*
- Accessory caudal seta absent; lateral
seta more than 20 μ m long. On *Lepto-*
spermum scoparium (manuka) *manukae*
- 12 Dorsal shield setae close together
(9) (12-13 μ m apart); dorsal setae conver-
ging; dorsal shield ornamentation con-
sisting mainly of irregular, dash-like
lines. On *Nothofagus menziesii*
..... *simonensis*
- Not with this combination of charac-
ters 13
- 13 Coxae unornamented; 2nd coxal tubercles
(12) closer to 1st coxal tubercles than to
3rd, and well ahead of a line through
3rd tubercles. On *Gleichenia circinata*
..... *gleicheniae*
- Not with this combination of charac-
ters 14
- 14 Dorsal shield subtriangular, with a
(13) small anterior lobe and usually a lat-
eral 'eye spot'; shield ornamentation
comprising longitudinal lines and
dashes; featherclaw 5-rayed. On
Elaeocarpus dentatus (hinau)
..... *titirangiensis*
- Not with this combination of charac-
ters 15
- 15 Featherclaw 6-rayed; accessory caudal
(14) seta absent. On *Sophora microphylla*
(kowhai) *microphyllae*
- Not with this combination of charac-
ters 16

- 16 Dorsal shield subtriangular, with a
(15) characteristic pattern of solid lines.
On *Haloragis erecta* *victoriae*
- Not with this combination of charac-
ters 17
- 17 Accessory caudal seta absetn; 2nd ven-
(16) tral seta very short (1-3 μm long);
1st coxal tubercles very close to 2nd
tubercles. On *Plagianthus betulinus*
.... *plagianthi*
- Accessory caudal seta present; 2nd
ventral seta usually more than 4 μm
long; 1st coxal tubercles not usually
close to 2nd tubercles 18
- 18 Coxae unornamented. On *Melicope*
(17) *simplex* *melicopis*
- Coxae with granular markings. On hosts
other than *Melicope* 19
- 19 Dorsal shield with a strongly impressed
(18) lateral line and 2 or 3 distinctive
lateral 'cells'; posterior 10 body
rings largely without microtubercles.
On *Pittosporum tenuifolium*
.... *tenuifolii*
- Not with this combination of characters
.... 20
- 20 Dorsal shield ornamentation prominent,
(19) consisting largely of dash-like mark-
ings; featherclaw 6-rayed 21
- Not with this combination of characters
.... 22
- 21 Dorsal setae less than 20 μm long; 2nd
(20) ventral setae more than 15 μm long.
Usually on *Pimeliae* spp. *pimeliae*
- Dorsal setae 20-29 μm long; 2nd ven-
tral setae 9-13 μm long. On *Haloragis*
depressa *depressae*
- 22 Body rings less than 60 in number;
(20) dorsal shield ornamentation weak or
absent. On *Carmichaelia* spp.
.... *carmichaeliae*
- Not with this combination of charac-
ters 23
- 23 Lateral seta less than 28 μm long. On
(22) *Citrus* *sheldoni*
- Lateral seta more than 28 μm long. On
hosts other than *Citrus* 24
- 24 Genital seta 15-24 μm long; dorsal
(23) shield ornamentation weak. On *Cli-*
anthus or *Lotus* *clianthi*
- Genital seta 7-13 μm long; dorsal
shield ornamentation strong. On
Korthalsella spp. *korelli*
- 25 Featherclaw 2-rayed; dorsal setae ex-
(1) tending almost full length of abdomen.
On *Ulmus* *bipedis*
- Not with this combination of charac-
ters 26
- 26 Foretibial seta absent; 1st ventral
(25) seta 36-38 μm long. On *Nothofagus*
menziesii *waltheri*
- Foretibial seta present; 1st ventral
seta 6-11 μm long. On *Juglans* spp.
(walnut) *erinca*
- 27 Dorsal shield subtriangular, unorna-
(4) mented. On *Calystegia* spp.
.... *calystegiae*
- Dorsal shield subsemicircular, orna-
mented. On *Stellaria parviflora*
.... *parvensis*
- 28 Dorsal setae 51-68 μm long. On
(5) Liliaceae and Gramineae *tulipae*
- Dorsal setae 30-34 μm long. On
Salix caprea *capreae*

Aceria bipedis new species

Figures 125-132

FEMALE, protogyne (description from 3 specimens). Length 181-191 μm , width 65 μm , depth 64-75 μm . Fusiform; whitish. Rostrum 17-21 μm long, curved down; antapical seta 6 μm long. Dorsal shield subsemicircular, 38 μm long, 46 μm wide; ornamentation comprising median and admedian lines, visible on basal half of shield, and a weak submarginal line; dorsal tubercles situated ahead of rear shield margin, 25 μm apart; dorsal setae 102 μm long, directed posteriorly.

Foreleg 38-43 μm long; tibia 9 μm long, with a seta 8-11 μm long at about two-fifths; tarsus 9-12 μm long; claw 6-8 μm long, knobbed; featherclaw 2-rayed. Hind leg 37-38 μm long; tibia 6-7 μm long; tarsus 9-10 μm long; claw 7-8 μm long. Coxae apparently unornamented; 1st coxal seta 5-6 μm long, just behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 57-66 microtuberculate rings; microtubercles small, rounded. Lateral seta on about ring 8, 16-21 μm long. Ventral setae: 1st on about ring 22, 33-40 μm long; 2nd on about ring 39, 13-17 μm long; 3rd on about 5th ring from rear, 30-38 μm long. Accessory caudal seta 4 μm long. Genitalia 23 μm wide, 15 μm long. Coverflap unornamented; genital seta 10-14 μm long.

FEMALE, deutogyne (description from 3 dorso-ventrally mounted specimens). Length 124-164 μm , width 54-55 μm . Fusiform; whitish. Rostrum not clearly discernible; antapical seta 6 μm long. Dorsal shield subsemicircular, its rear margin slightly 'V'-shaped; shield 35-36 μm long, 33-45 μm wide, almost unornamented, though there may be a few lightly impressed lines near anterolateral margins, an irregular 'V'-shaped marking at rear margin extending between the dorsal tubercles, and indications of a median line and admedians; dorsal tubercles ahead of rear shield margin, 18-20 μm apart; dorsal setae 87-109 μm long, directed posteriorly.

Foreleg 37-41 μm long; tibia 7-9 μm long, with a seta 7 μm long at about two-fifths; tarsus 8-9 μm long; claw 6-7 μm long, not knobbed; featherclaw 2-rayed.

Hind leg 34-35 μm long; tibia 6-7 μm long; tarsus 8-10 μm long; claw 6 μm long. Coxae with 2 'V'-shaped lines between 2nd setae, otherwise unornamented; 1st coxal seta 6-7 μm long, just behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 54-60 microtuberculate rings; dorsally, microtubercles greatly suppressed and difficult to see, and rings appearing as narrow bands. Lateral seta on about ring 8, 15-21 μm long. Ventral setae: 1st on about ring 21, 28-34 μm long; 2nd on about ring 37, 12-16 μm long; 3rd on about 6th ring from rear, 36-39 μm long. Accessory caudal setae 4 μm long. Genitalia 20-22 μm wide, 9-12 μm long. Coverflap unornamented; genital seta 10-12 μm long.

MALE. Not seen.

TYPE DATA. From *Ulmus* sp. (Ulmaceae), Kimberley Road, Levin, 5 December 1975, D. C. M. Manson (holotype slide and 2 paratype slides (1 protogyne, 1 deutogyne), PLNZ; 2 paratype slides (1 protogyne, 2 deutogynes), NZAC).

MATERIAL EXAMINED. Type series only.

WN / - .

A leaf vagrant; associated with *Abacopetes ulmivagrans* on leaf undersurfaces.

REMARKS. The extremely long dorsal shield setae, reaching almost the full length of the body, and the two-rayed featherclaw immediately distinguish *Aceria bipedis*.

Aceria calystegiae (Lamb) new combination

Figures 133-139

Vasates calystegiae Lamb, 1952: 351.

FEMALE (description from 5 type specimens). Length 213-306 μm , width 66-89 μm , depth 75-78 μm . Fusiform; pale orange. Rostrum 23-25 μm long, curved down; antapical seta 7-10 μm long. Dorsal shield subtriangular, 32-39 μm long, 52-69 μm wide, completely smooth; dorsal tubercles arising from rear shield margin, 27-32 μm apart; dorsal setae 40-52 μm long, directed posteriorly.

Foreleg 38-42 μm long; tibia 9-12 μm long, with a seta 7-8 μm long at about one-third; tarsus 7-9 μm long; claw 7-10 μm long, knobbed; featherclaw 5-rayed or 6-rayed. Hind leg 36-39 μm long; tibia 8-10 μm long; tarsus 7-9 μm long; claw 7-10 μm long. Coxae unornamented; 1st coxal seta 8-13 μm long, almost level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line short.

Abdomen with about 50-65 rings divided into tergites and sternites; tergites either without microtubercles or with very small microtubercles, sternites microtuberculate; microtubercles rounded, just behind anterior ring margin. Lateral seta on or about ring 8, 25-34 μm long. Ventral setae: 1st on about ring 18, 37-45 μm long; 2nd on about ring 34, 18-20 μm long; 3rd on about 5th ring from rear, 20-27 μm long. Accessory caudal seta 3-5 μm long. Genitalia 21-27 μm wide, 13-18 μm long. Coverflap with lightly impressed but distinct longitudinal markings; genital seta 17-22 μm long.

MALE. Present.

TYPE DATA. Described from *Calystegia sepium* (Convolvulaceae), Auckland, 2 February 1950, K. P. Lamb (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus the following non-type examples. *Calystegia soldanella*: Hoki Beach, Levin, 28 Mar 1977. *Calystegia* sp.: Lyttelton Harbour, 24 Jan 1955; mouth of Tasman Stream, Three Kings Islands, 26 Nov 1970. *Calystegia tuguriorum*: Mt Alexander, 12 Dec 1943; Karamea, near mouth of Heaphy River, 25 Nov 1971; Stephens Island, Feb 1971. *Calystegia ? tuguriorum*: Remuera, Auckland 12 Aug 1952. *Convolvulus ? arvensis*: Auckland, 22 Nov 1982. *Convolvulus* sp.: Three Kings Islands, 12 Nov 1970.

Three Kings Is / AK, WN / SD, NN, NC, MC.

Forming leaf pouch galls.

REMARKS. *Aceria calystegiae* is a very distinctive species, readily distinguished by the differentiation between tergites and sternites, smooth, subtriangular dorsal shield, and lack of coxal ornamentation. Lamb (1960, p. 123) gives additional records for it.

Aceria capreae new species

Figures 140-146

FEMALE (description from 7 specimens). Length 180-222 μm , width 51-54 μm , depth 48-60 μm . Fusiform; yellowish. Rostrum 21-25 μm long, curved down; antapical seta 4-6 μm long. Dorsal shield subsemicircular, 27-29 μm long, 47-50 μm wide; ornamentation as follows - a dash-like median line on basal half of shield; admedians narrowing anteriorly, widening at about half length, converging slightly, then widening to form dash-like lines basally; 1 or 2 dash-like submedians joining admedians anteriorly, diverging slightly until obliquely angled at about half length; 2 or 3 connecting, dash-like longitudinal lines between submedians; anterolateral shield areas with about 6 or 7 dash-like parallel lines; granules present on basal half of shield, between admedians and submedians; dorsal tubercles on rear shield margin, 25-27 μm apart; dorsal setae 30-34 μm long, directed posteriorly.

Foreleg 31-33 μm long; tibia 7-9 μm long, with a seta 6 μm long at about one-fifth; tarsus 6 μm long; claw 6-8 μm long; featherclaw 6-rayed or 7-rayed. Hind leg 28-30 μm long; tibia 6-7 μm long; tarsus 6 μm long; claw 7-8 μm long. Coxae with dash-like ornamentation; 1st coxal seta 5-6 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 63-70 microtuberculate rings; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 9, 13-18 μm long. Ventral setae: 1st on about ring 24, 46-54 μm long; 2nd on about ring 45, 18-23 μm long; 3rd on about 6th ring from rear, 20-23 μm long. Accessory caudal seta 3-4 μm long. Genitalia 18-19 μm wide, 11 μm long. Coverflap with longitudinal markings; genital seta 13-23 μm long.

MALE. Not seen.

TYPE DATA. From *Salix caprea* (common willow; Salicaceae), Aokautere, Palmerston North, 20 January 1972, C. van Kraayenoord (holotype slide and 4 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

WN / - .

Associated with rosetting of the shoot apex.

REMARKS. The dorsal shield design, together with the six-rayed or seven-rayed feather-claw, should serve to distinguish *Aceria capreae*.

Aceria carmichaeliae Lamb

Figures 147-154

Aceria carmichaeliae Lamb, 1952: 353.

FEMALE (description from 6 type specimens). Length 137-204 μm , width 46-51 μm , depth 42-60 μm . Vermiform. Rostrum 20 μm long, curved down; antapical seta 4-5 μm long. Dorsal shield subsemicircular, 23-24 μm long, 30-45 μm wide; ornamentation faint, almost absent, often consisting of 4 lightly impressed longitudinal lines - admedians and 1 submedian; dorsal tubercles on rear shield margin, 18-20 μm apart; dorsal setae 15-21 μm long, directed posteriorly.

Foreleg 21-24 μm long; tibia 4-5 μm long, with a seta 4-5 μm long at about one-quarter; tarsus 5-6 μm long; claw 6 μm long; featherclaw 5-rayed or 6-rayed. Hind leg 19-22 μm long; tibia 4-5 μm long; tarsus 5 μm long; claw 6-8 μm long. Coxae ornamented with large granules; 1st coxal seta 4-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are slightly ahead of a line through the 3rd tubercles. Sternal line forked.

Abdomen with about 44-54 rings, all microtuberculate except for about the last 6 or 7; microtubercles large, rounded, in middle of ring. Lateral seta on about ring 7, 19-21 μm long. Ventral setae: 1st on about ring 16, 41-53 μm long; 2nd on about ring 28, 6-10 μm long; 3rd on about 6th ring from rear, 15-19 μm long. Accessory caudal seta 4-5 μm long. Genitalia 14-16 μm wide, 11-13 μm long. Coverflap with longitudinal markings; genital seta 10-13 μm long.

MALE. None on holotype slide, but seen in other material.

TYPE DATA. Described from *Carmichaelia subulata* (Leguminosae), Waipara, June 1949, P. A. Lush (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus the following non-type examples. *Carmichaelia aligeza*: Lincoln, 13 Aug 1979. *Carmichaelia angustata*: Rahu Scenic Reserve, near Reefton, 16 Dec 1976. *Carmichaelia australis*: Laingholm, Auckland, 12 Feb 1945; Auckland west coast (no other data), 24 Oct 1948. *Carmichaelia egmontiana*: North Egmont, 13 Mar 1971. *Carmichaelia onysii*: on shingle, Rangitata River, 11 Jan 1970. *Carmichaelia orbiculata*: National Park, 28 Jan 1953. *Carmichaelia ovata*: Hurunui, 1 Apr 1975. *Carmichaelia* sp.: National Park, Mar 1955; Otari Plant Museum, Wellington, Aug 1982; Charwell River, Inland Kaikoura Range, 11 May 1968; South Brighton, Christchurch, 29 Nov 1954; Price's Valley, Banks Peninsula, 4 May 1975. *Carmichaelia violaceae*: Waipara, Jun 1949.

AK, TO, TK / BR, NC, MC(-SC).

Forming stem or bud galls up to 25 mm in diameter.

REMARKS. The almost complete lack of markings on the dorsal shield, together with the granulate coxae and five-rayed or six-rayed featherclaw, help distinguish *Aceria carmichaeliae*. It shows some similarity to *A. microphyllae* but can be differentiated by its possession of an accessory caudal seta and fewer body rings (44-54, cf. 64-75).

Several specimens clearly show a thick, bar-like structure at the anterior part of the apodeme of the internal genitalia (Figure 154). The illustrations are from specimens collected on *Carmichaelia egmontiana* at North Egmont (TK).

Aceria clianthi Lamb

Figures 155-161

Aceria clianthi Lamb, 1952: 354.

FEMALE (description from 6 specimens). Length 156-249 μm , width 54-57 μm , depth 45-60 μm . Fusiform; pale pink. Rostrum μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, 24-29 μm long, 31-42 μm wide; ornamentation usually comprising several lightly impressed longitudinal lines - a median, submedians, and laterals; some granulation laterally; dorsal tubercles just anterior to rear shield margin, 21-24 μm apart; dorsal setae 21-24 μm long, directed posteriorly.

Foreleg 25-30 μm long; tibia 5-6 μm long, with a seta 4-7 μm long at about one-third; tarsus 6-8 μm long; claw 7-9 μm long; featherclaw 5-rayed. Hind leg 22-27 μm long; tibia 4-6 μm long; tarsus 6-7 μm long; claw 9 μm long. Coxae granulose; 1st coxal seta 7-8 μm long, slightly ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked.

Abdomen with about 60-80 rings, all microtuberculate except for about the last 6; microtubercles rounded, on rear ring margin. Lateral seta on about ring 9, 29-41 μm long. Ventral setae: 1st on about ring 19, 55-63 μm long; 2nd on about ring 36, 10-19 μm long; 3rd on about 7th ring from rear, 21-28 μm long. Accessory caudal seta 4-6 μm long. Genitalia 19-23 μm wide, 11-15 μm long. Coverflap with longitudinal markings; genital seta 15-24 μm long.

MALE. Not seen.

TYPE DATA. From *Clianthus puniceus* (Papilionaceae), Auckland, 16 September 1949, Department of Agriculture (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus the following non-type examples. *Clianthus puniceus*: Wellington, 28 Jul 1970; Otari Plant Museum, Wellington, Sep 1972; Invercargill, 5 Mar 1964. *Clianthus* sp.: Napier, 1 Jun 1982; DSIR Botany Division, Christchurch, 1 Apr 1969; near Port Chalmers, 16 Dec 1943. *Lotus corniculatus*: DSIR Grasslands Division, Palmerston North, 17 Aug 1974.

AK, WI, WN / MC, DN, SL.

Forming 'witches brooms'.

REMARKS. *Aceria clianthi* has no very distinctive characters, but the almost smooth dorsal shield, five-rayed featherclaw, and large granules on the coxae should help to distinguish it.

There are two main differences from the original description: the featherclaw is five-rayed, not four-rayed; and the coxae are granulose rather than smooth. The record from *Lotus corniculatus* is somewhat unusual, since eriophyids are frequently very host-specific. However, Dr M. B. Forde has informed me that several *Clianthus* shrubs were growing within 180 metres of

the *Lotus* plants until a few months before the mites were collected, so the infestation may have originated from these.

Aceria depressae new species

Figures 162-169

FEMALE (description from 6 specimens). Length 148-228 μm , width 49-59 μm , depth 53-59 μm . Fusiform; brownish. Rostrum 16-21 μm long, curved down; antapical seta 6-7 μm long. Dorsal shield subsemicircular, 25-28 μm long, 37-41 μm wide; ornamentation clearly demarcated, usually consisting of dash-like lines, as follows. A median line; slightly curved admedians, narrowing at about two-thirds their length before diverging basally; and submedians running about two-thirds length of shield, subparallel for about one-third of shield length, diverging slightly, then converging; lateral shield areas strongly granulose; dorsal tubercles on rear shield margin, 22-23 μm apart; dorsal setae 20-29 μm long, directed posteriorly.

Foreleg 26-29 μm long; tibia 6 μm long, with a seta 6 μm long at about one-quarter; tarsus 6 μm long; claw 6 μm long; featherclaw 6-rayed. Hind leg 24-28 μm long; tibia 5 μm long; tarsus 6 μm long; claw 6-8 μm long. Coxae granulate; 1st coxal seta 6 μm long, almost level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line double.

Abdomen with about 53-67 rings, all microtuberculate except for about the last 6; microtubercles rounded, almost touching rear ring margin. Lateral seta on about ring 8, 20-29 μm long. Ventral setae: 1st on about ring 21, 28-38 μm long; 2nd on about ring 35, 9-13 μm long; 3rd on about 7th ring from rear, 18-21 μm long. Accessory caudal seta 4-5 μm long. Genitalia 18-20 μm wide, 14-18 μm long. Coverflap with longitudinal markings; genital seta 13-16 μm long.

MALE. Present.

TYPE DATA. From *Haloragis depressa* (Haloragaceae), Egmont-Stratford plateau, at edge of scrub, 4 March 1971, F. C. Duguid (holotype slide and 11 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series, plus non-type examples from *Haloragis* sp., Waitane Lagoon, 1 Nov 1956.

TK / SL.

Causing malformation and swelling of the flower tips (type material) and leaf galls (material from Waitane Lagoon).

REMARKS. *Aceria depressae* is similar to *A. pimeliae* and *A. victoriae*. The dash-like shield ornamentation, extensive lateral shield granulation, and short second ventral seta (9-13 μ m) should distinguish it.

Aceria erinea (Nalepa)

walnut erineum mite

Figures 170-176

Phytoptus tristriatus erineus Nalepa, 1891: 162.

Eriophyes tristriatus erineus (Nalepa). Keifer, 1938: 184.

Eriophyes erineus (Nalepa). Keifer, 1940: 25; 1971: 2.

Aceria erinea (Nalepa). Keifer, 1952: 27.

FEMALE (description from 6 specimens). Length 165-258 μ m, width 39-48 μ m, depth 38-60 μ m. Vermiform; whitish or yellowish. Rostrum 15-18 μ m long, curved downwards; antapical seta 2 μ m long. Dorsal shield subsemicircular, 20-21 μ m long, 26-29 μ m wide, unornamented. Dorsal tubercles on rear shield margin, 15-20 μ m apart; dorsal setae 16-19 μ m long, directed posteriorly.

Foreleg 22-23 μ m long; tibia 3-4 μ m long, with a seta 2 μ m long at about one-fifth; tarsus 5-6 μ m long; claw 6-8 μ m long, with a 3-rayed featherclaw. Hind leg 19-21 μ m long; tibia 3 μ m long; tarsus 5-6 μ m long; claw 6-8 μ m long. First coxal seta 1-3 μ m long, ahead of anterior coxal approximation; 2nd setiferous coxal tubercles well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 52-62 microtuberculate rings; microtubercles elongate-oval, close-set, prominent, in centre of ring or on rear ring margin. Lateral seta on about ring 5, 8-11 μ m long. Ventral setae: 1st on about ring 17, 6-11 μ m long; 2nd on about ring 29, 4-9 μ m long; 3rd on about 5th ring from rear, 6-11 μ m long. Acces-

sory caudal seta 5-6 μ m long. Genitalia 14-16 μ m wide, 8-13 μ m long. Coverflap smooth; genital seta 4 μ m long, on a prominent tubercle.

MALE. Not seen.

TYPE DATA. Described from *Juglans regia* (walnut; Juglandaceae), (?) Austria. No further data; location of type material unknown.

MATERIAL EXAMINED. The following non-type examples. *Juglans regia*: DSIR Plant Diseases Division, Auckland, 11 Jan 1951. Mt Albert, Auckland, 4 Nov 1981. *Juglans* sp: Auckland, 6 Apr 1938; Palmerston North, 21 Jan 1932; Levin, 6 Nov 1975; Lower Hutt, 25 Nov 1970; Nelson, 15 Mar 1972; Blenheim, 17 Dec 1969; Christchurch, 19 Nov 1954; Queenstown, 14 Nov and 21 Dec 1972; Gore, 24 Apr 1964; "Southland", Apr 1950.

AK, WI, WN / NN, MB, MC, OL, SL.

Causing a whitish, furry, blister-like erineum on leaf undersurface.

REMARKS. The distinctively darkish body tubercles, smooth dorsal shield, three-rayed featherclaw, and prominent genital tubercles are diagnostic of *Aceria erinea*.

Walnut leaves damaged by this mite are unsightly, but the damage seldom reaches economically significant levels.

The species has been recorded also in the U.S.A., the U.K., Austria, and Australia.

Aceria gersoni new species

Figures 177-184

FEMALE (description from 4 specimens). Length 156-169 μ m, width 56-57 μ m, depth 66 μ m. Fusiform; white. Rostrum 18-23 μ m long, curved down; antapical seta 2-6 μ m long. Dorsal shield subrectangular, its anterior margin in the form of a shallow 'V'-shape; shield 23-28 μ m long, 42-49 μ m wide; shield unornamented except for a weak longitudinal line directed anteriorly from each dorsal tubercle, and dash-like markings at base between dorsal tubercles; dorsal tubercles on rear shield margin, 28-29 μ m apart; dorsal setae 32-43 μ m long, directed posteriorly.

Foreleg 20-22 μ m long; tibia 4-5 μ m long, with a seta 1-2 μ m long at about mid-

length; tarsus 4 μm long; claw 5-6 μm long, knobbed; featherclaw 5-rayed. Hind leg 20-21 μm long; tibia 4-5 μm long; tarsus 4-5 μm long; claw 6-7 μm long. Coxae unornamented; 1st coxal seta 4 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line usually present, forked posteriorly.

Abdomen with about 53-58 microtuberculate rings, but area between 1st and 2nd ventral setae devoid of microtubercles; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 9, 55-81 μm long. Ventral setae: 1st on about ring 19, 63-69 μm long; 2nd on about ring 30, 9-13 μm long; 3rd on about 6th ring from rear, 12-13 μm long. Accessory caudal seta 2-3 μm long. Genitalia 19-20 μm wide, 12 μm long. Coverflap with longitudinal markings; genital seta 2 μm long.

MALE. Present.

TYPE DATA. From *Dicksonia squarrosa* (whoki; Dicksoniaceae), Kaimai Range near Matamata, 7 December 1982, U. Gerson (holotype slide, NZAC; 1 paratype slide, PLNZ).

MATERIAL EXAMINED. Type slides only.

BP / - .

Found under small areas of whitish webbing on undersurface of pinnae.

REMARKS. The lack of microtubercles on the ventral body surface between the first and second ventral setae, together with the shape of the dorsal shield and its almost complete lack of ornamentation, should distinguish *Aceria gersoni*. The association with webbing is unusual, and is the first record of this type of habitat for New Zealand.

The mite is named for Dr Uri Gerson, who discovered it and drew it to my attention.

Aceria gleicheniae new species

Figures 185-191

FEMALE (description from 6 specimens). Length 165-243 μm , width 48-72 μm , depth 40-66 μm . Fusiform. Rostrum 15-19 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield semicircular, 21-25

μm long, 38-49 μm wide; ornamentation consisting of some lateral granulation and longitudinal lines - a short median line on anterior half of shield, admedians running about two-thirds length of shield and curved outwards basally, and 3 or 4 slightly curved submedians; dorsal tubercles on rear shield margin, 18-22 μm apart; dorsal setae 21-33 μm long, directed posteriorly.

Foreleg 25-27 μm long; tibia 4-5 μm long, with a seta 6-8 μm long at about one-third; tarsus 5-6 μm long; claw 5-6 μm long; featherclaw 5-rayed. Hind leg 24-26 μm long; tibia 4 μm long; tarsus 5-6 μm long; claw 6-8 μm long. Coxae unornamented; 1st coxal seta 6-9 μm long, slightly behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 94-104 microtuberculate rings; microtubercles elongate-oval, on rear ring margin, those of posterior 6 or 7 rings more narrowed. Lateral seta on about ring 10, 24-30 μm long. Ventral setae: 1st on about ring 24, 45-57 μm long; 2nd on about ring 45, 40-51 μm long; 3rd on about 8th ring from rear, 14-22 μm long. Accessory caudal seta 4 μm long. Genitalia 17-22 μm wide, 10-15 μm long. Coverflap with longitudinal markings; genital seta 10-19 μm long.

MALE. Not seen.

TYPE DATA. From *Gleichenia circinata* (Gleicheniaceae), Tiwai Swamp, Bluff, 21 September 1973, G. Collett (holotype slide and 10 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series, plus non-type examples from *Gleichenia dicarpa*, Otaki, 9 Mar 1953, and *Gleichenia* sp., Stockton Plateau, Westport, Jul 1979.

WN / WD, SL.

Causing frond malformation on *G. circinata* and galls up to 3 mm diameter on lower surface of pinnae of *G. dicarpa*.

REMARKS. The five-rayed featherclaw, lack of coxal ornamentation, and closeness of the second coxal tubercles to the first tubercles should help to distinguish *Aceria gleicheniae*. Occasional specimens have a six-rayed featherclaw. Specimens from

Gleichenia dicarpa usually have fewer abdominal rings than those from *G. circinata* (70-80, cf. 94-104); otherwise they appear identical.

Lamb (1960, p. 121) records a gall mite (*Aceria* sp.) from *G. circinata*; I have not seen this material.

Aceria hagleyensis new species

Figures 192-196

FEMALE (description from 3 specimens, all dorsoventral mounts). Length 136-144 μm , width 44-45 μm . Fusiform. Rostrum 19-21 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield semicircular, 21-24 μm long, 34-37 μm wide; ornamentation faint, but with indications of admedians, 2 or 3 submedians, and a lateral line; shield lines thick, fragmentary; dorsal tubercles slightly ahead of rear shield margin, 14-16 μm apart; dorsal setae 12-14 μm long, converging posteriorly.

Foreleg 26-28 μm long; tibia 5 μm long, with a seta 4-5 μm long at about mid-length; tarsus 6 μm long; claw 7-8 μm long; feather-claw 4-rayed. Hind leg 24-25 μm long; tibia 4 μm long; tarsus 5-6 μm long; claw 9 μm long. Coxae with large granules; 1st coxal seta 4-6 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line double.

Abdomen with about 64-65 rings, all microtuberculate except for the last 8 or 9, which are without microtubercles dorsally; microtubercles oval, on rear ring margin (less obviously so on about the anterodorsal third of the abdomen). Lateral seta on about ring 9, 20-23 μm long. Ventral setae: 1st on about ring 23, 52-55 μm long; 2nd on about ring 38, 39-52 μm long; 3rd on about 6th ring from rear, 11-12 μm long. Accessory caudal seta 0.5-1.5 μm long. Genitalia 18-19 μm wide, 6-8 μm long. Coverflap with longitudinal markings; genital seta 11-15 μm long.

MALE. Not seen.

TYPE DATA. From *Fagus sylvatica* (copper beech; Fagaceae), northern side of Hagley Park, Christchurch, 27 January 1976, D. C.

M. Manson (holotype slide and 1 paratype slide, PLN2; 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides only.

- / MC.

Occurring on leaf undersurface, but causing no apparent damage.

REMARKS. The faintly 'spotted' nature of the dorsal shield design, converging dorsal setae, and long second ventral setae (39-52 μm) should distinguish *Aceria hagleyensis*.

Aceria healyi Manson

Figures 197-203

Aceria healyi Manson, 1970: 533

FEMALE (description from 6 type specimens): Length 111-207 μm , width 48-63 μm , depth 48-60 μm . Fusiform. Rostrum 24-31 μm long, curved down; antapical seta 6 μm long. Dorsal shield subsemicircular, 23-25 μm long, 44-55 μm wide, almost unornamented except for a few peripheral markings, as illustrated (Figure 198); dorsal tubercles on rear shield margin, 25-29 μm apart; dorsal setae 21-28 μm long, directed posteriorly.

Foreleg 21-30 μm long; tibia 5-7 μm long, with a seta 4-5 μm long at about one-third; tarsus 5-6 μm long; claw 6-8 μm long, with a 4-rayed featherclaw. Hind leg 20-26 μm long; tibia 4-5 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae unornamented; 1st coxal seta 7-10 μm long, almost level with anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are slightly ahead of a line through the 3rd tubercles. Sternum with a central longitudinal line.

Abdomen with about 52-73 rings, all microtuberculate except for about the last 6; microtubercles rounded, fairly widely spaced, on or nearly on posterior ring margin. Lateral seta on about ring 9, 16-21 μm long. Ventral setae: 1st on about ring 20, 21-38 μm long; 2nd on about ring 31, 9-10 μm long; 3rd on about 5th ring from rear, 11-19 μm long. Accessory caudal seta 2-4 μm long. Genitalia 16-21 μm wide, 12-15 μm long. Coverflap unornamented; genital seta 7-11 μm long.

MALE. Present.

TYPE DATA. Described from *Myoporum laetum* (ngaio; Myoporaceae), near Akaroa, Banks Peninsula, 15 January 1968, A. J. Healy (holotype slide and 2 paratype slides, PLNZ) and Dunlucc, Clarence River, 8 May 1966, A. J. Healy (3 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Myoporum laetum* Three Kings Islands, 12 Nov to 1 Dec 1970; Hapuka River, near Kaikoura, 7 Jan 1972.

Three Kings Is / - / MB, KA, MC.

Associated with pustule-like galls, mainly on leaf undersurface.

REMARKS. The almost complete absence of markings on the genital flap, coxae, and dorsal shield should distinguish *Aceria healyi*.

Aceria korelli new species

Figures 204-211

FEMALE (description from 7 type specimens). Length 141-195 μm , width 45-51 μm , depth 47-59 μm . Fusiform. Rostrum 17-19 μm long, curved down; antapical seta 6 μm long. Dorsal shield subsemicircular, 23-27 μm long, 36-45 μm wide; ornamentation consisting of a median line, admedians that bulge out slightly at the base, and 2 slightly curved submedians on anterior two-thirds of shield; lateral shield areas granulose or with thick, dash-like markings; dorsal tubercles on rear shield margin, 18-22 μm apart; dorsal setae 15-38 μm long, directed posteriorly.

Foreleg 18-25 μm long; tibia 5-6 μm long, with a seta 5-7 μm long at approximately a quarter; tarsus 5-6 μm long; claw 5-6 μm long; featherclaw 5-rayed. Hind leg 18-24 μm long; tibia 4-5 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae granular; 1st coxal seta 6-10 μm long, slightly ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 60-71 rings, all microtuberculate except for about the last 6; microtubercles rounded, on rear ring margin. Lateral seta on about ring 9, 37-64 μm long. Ventral setae: 1st on about

ring 19, 36-69 μm long; 2nd on about ring 33, 5-8 μm long; 3rd on about 6th ring from rear, 18-20 μm long. Accessory caudal seta 3-4 μm long. Genitalia 17-20 μm wide, 8-13 μm long. Coverflap with longitudinal markings; genital seta 7-13 μm long.

MALE. Present.

TYPE DATA. From *Korthalsella lindsayi* (Loranthaceae), Price's Valley, Banks Peninsula, 3 September 1973, B. P. J. Molloy (holotype slide and 9 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series, plus non-type examples from *Korthalsella clavata* (Peel Forest, 17 Jun 1976), *K. lindsayi* (Price's Valley, Banks Peninsula, 4 Oct 1976), and *K. salicornioides* (no data).

- / MC, SC.

Forming leaf galls.

REMARKS. The granular coxae and numerous granular and dash-like lines on the lateral shield areas should help to distinguish *Aceria korelli*.

Lamb (1960, p. 128) records a gall mite (*Aceria* sp.) causing swollen inflorescence buds up to 2 mm in diameter taken from *Korthalsella lindsayi* on Banks Peninsula, 20 August 1955. This was possibly the species described here.

Aceria manukae Lamb

Figures 212-218

Aceria manukae Lamb, 1952: 356.

FEMALE (description from 5 specimens). Length 165-216 μm , width 42-51 μm , depth 35-42 μm . Fusiform; white. Rostrum 18-19 μm long, curved down; antapical seta 3-5 μm long. Dorsal shield subsemicircular, 21-25 μm long, 30-33 μm wide; ornamentation variable, in some examples almost absent, but generally comprising a median line, admedians, and 2 or 3 submedians, the lines seldom traversing the entire shield; lateral shield margins granulose; dorsal tubercles arising from rear shield margin, 19-22 μm apart; dorsal setae 16-20 μm long, directed posteriorly.

Foreleg 22-23 μm long; tibia 4-5 μm long, with a seta 4-5 μm long at about one-third;

tarsus 5-6 μm long; claw 6 μm long; feather-claw 4-rayed. Hind leg 19-23 μm long; tibia 4-5 μm long; tarsus 5 μm long; claw 7-8 μm long. Coxae with granular markings; 1st coxal seta 5-7 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 60-62 rings, all microtuberculate except for about the last 5; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 25-33 μm long. Ventral setae: 1st on about ring 18, 43-59 μm long; 2nd on about ring 35, 4-5 μm long; 3rd on about 6th ring from rear, 14-16 μm long. Accessory caudal seta absent. Genitalia 18-20 μm wide, 10-11 μm long. Coverflap with longitudinal markings; genital seta 8-9 μm long.

MALE. Present.

TYPE DATA. Described from *Leptospermum scoparium* (manuka; Myrtaceae), Whakatane, 29 July 1949, M. Simpson (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus non-type examples from *Leptospermum scoparium*, near Waipoua, 3 Sep 1970; Dannevirke, Aug 1951; Wellington, 27 Jan 1955.

ND, (CL), BP, (TO), (HB), RI-WA, WN / - .

Sometimes causing 'witches brooms' on the stems of the host plant.

REMARKS. *Aceria manukae* has no particularly distinctive characters. The combination of a four-rayed featherclaw, distinctly granulate coxae, and a lateral seta more than 20 μm long, together with the host plant, will serve to identify it.

Lamb (1960, p. 130) gives records from Tairua, Waihi, Coromandel, Whakatane, Kairangaroa State Forest, Waiouru, and Wairoa.

Aceria mayae new species

Figures 219-226

FEMALE (description from 6 specimens). Length 162-210 μm , width 51-60 μm , depth 52-62 μm . Fusiform; mainly white, with the barest trace of pale orange or pale brown.

Rostrum 19-21 μm long, curved down; antapical seta 6-8 μm long. Dorsal shield subsemicircular, 27-32 μm long, 45-50 μm wide; ornamentation strongly impressed; median line complete; admedians subparallel to median line, often diverging slightly at rear; 1st submedian interrupted at about half or two-thirds, sometimes recurved; 2nd and 3rd submedians present; a few coarse granulations near lateral margins; dorsal tubercles on rear shield margin, 24-27 μm apart; dorsal setae 46-55 μm long, directed posteriorly.

Foreleg 30-32 μm long; tibia 6-7 μm long, with a seta 6-8 μm long at about one-third; tarsus 6-8 μm long; claw 8-10 μm long, with a 5-rayed featherclaw. Hind leg 27-30 μm long; tibia 5-6 μm long; tarsus 6-8 μm long; claw 7-9 μm long. Coxae almost unornamented, at most with a few dash-like markings; 1st coxal seta 7-9 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line double.

Abdomen with about 58-64 rings, all microtuberculate except for about the last 5; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 31-37 μm long. Ventral setae: 1st on about ring 20, 43-54 μm long; 2nd on about ring 35, 12-14 μm long; 3rd on about 5th ring from rear, 25-29 μm long. Accessory caudal seta 6-8 μm long. Genitalia 21-22 μm wide, 8-13 μm long. Coverflap with longitudinal markings; genital seta 11-14 μm long.

MALE. Not seen.

TYPE DATA. From *Olearia furfuracea* (Compositae), Chelsea, Auckland, 10 November 1970, Mr Beatson (holotype slide and 6 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series only.

AK / - .

Causing 'witches brooms'.

REMARKS. The strongly impressed shield ornamentation, long dorsal shield setae, and almost complete lack of coxal ornamentation should serve to distinguish *Aceria mayae*. The structure of the internal genitalia is unusual (Figure 226), and quite different from that of any other species.

Aceria melicopis new species

Figures 227-234

FEMALE (description from 6 specimens). Length 128-156 μm , width 47-50 μm , depth 44-47 μm . Fusiform. Rostrum 19-22 μm long, curved down; antapical seta 4 μm long. Dorsal shield subsemicircular, 19-22 μm long, 31-40 μm wide, almost completely unornamented, the few light longitudinal lines and lateral granulations often difficult to observe; dorsal tubercles on rear shield margin, 17-20 μm apart; dorsal setae 16-21 μm long, directed posteriorly.

Foreleg 22-25 μm long; tibia 4-6 μm long, with a seta 4 μm long at about one-third; tarsus 5-6 μm long; claw 6 μm long; feather-claw 5-rayed. Hind leg 22-24 μm long; tibia 4-5 μm long; tarsus 5-6 μm long; claw 6-7 μm long. Coxae unornamented; 1st coxal seta 4-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are slightly ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 52-55 rings, all microtuberculate except for about the last 5; microtubercles rounded, on rear ring margin. Lateral seta on about ring 8, 15-22 μm long. Ventral setae: 1st on about ring 17, 30-41 μm long; 2nd on about ring 29, 6-7 μm long; 3rd on about 6th ring from rear, 17-21 μm long. Accessory caudal seta 2-4 μm long. Genitalia 16-18 μm wide, 7-10 μm long. Coverflap with longitudinal markings; genital seta 9-12 μm long.

MALE. Present.

TYPE DATA. From *Melicope simplex* (Rutaceae), Price's Valley, Banks Peninsula, 4 May 1975, F. C. Duguid (holotype slide and 8 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series only.

- / MC.

Causing deformed shoot tips.

REMARKS. The lack of coxal ornamentation, almost complete absence of dorsal shield markings, and comparatively small number of body rings should help to distinguish *Aceria melicopis*.

Aceria melicyti Lamb

Figures 235-242

Aceria melicyti Lamb, 1953: 380.

FEMALE (description from 5 type specimens). Length 159-174 μm , width about 44 μm (in 1 specimen only), depth 42-46 μm . Fusiform; whitish or pinkish. Rostrum 16-19 μm long, curved down; antapical seta 4-5 μm long. Dorsal shield subtriangular, 19-29 μm long, about 39 μm wide (1 only); ornamentation very faint, almost absent, comprising about 5 lightly impressed longitudinal lines; dorsal tubercles on rear shield margin, about 19 μm apart (1 only); dorsal setae 26-30 μm long, directed posteriorly.

Foreleg 21-24 μm long; tibia 5 μm long, with a seta 3-4 μm long at about one-third; tarsus 5 μm long; claw 5-6 μm long; feather-claw 4-rayed. Hind leg 18-20 μm long; tibia 5 μm long; tarsus 4-5 μm long; claw 6 μm long. Coxae with dash-like markings; 1st coxal seta 4-5 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 54-57 microtuberculate rings; microtubercles rounded, almost touching rear ring margin. Lateral seta on about ring 10, 14-16 μm long. Ventral setae: 1st on about ring 20, 18-38 μm long; 2nd on about ring 33, 6-8 μm long; 3rd on about 6th ring from rear, 13-16 μm long. Accessory caudal seta 2 μm long. Genitalia 18 μm wide (1 only), 8-10 μm long. Coverflap with longitudinal markings; genital seta 6-7 μm long.

MALE. Not seen.

TYPE DATA. Described from *Melicytus ramiflorus* (whiteywood; Violaceae), Rangitoto Island, Auckland, 25 June 1950, E. Bray (holotype slide and 4 paratype slides, NZAC).

MATERIAL EXAMINED. Type series only.

AK / - .

Associated with flower galls.

REMARKS. The almost complete absence of dorsal shield ornamentation, the four-rayed featherclaw, and the short lateral seta (less than 20 μm) should distinguish *Aceria melicyti*.

Of the thirty mites present in the type material only five are *A. melicyti*; the rest are *Ramaculus mahoe*. The holotype slide has seven specimens, three of which are *A. melicyti*.

Aceria microphyllae new species

Figures 243-249

FEMALE (description from 6 specimens). Length 120-159 μm , width 45-49 μm , depth 35-39 μm . Fusiform. Rostrum 16-19 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, 20-24 μm long, 28-29 μm wide; ornamentation consisting of lateral granules and several faint longitudinal lines; central area unornamented except for some faint granules basally; dorsal tubercles ahead of rear shield margin, 14 μm apart; dorsal setae 20-26 μm long, directed posteriorly.

Foreleg 22-23 μm long; tibia 5 μm long, with a seta 4-7 μm long at about two-fifths; tarsus 4-5 μm long; claw 5-6 μm long, with a 6-rayed featherclaw. Hind leg 19-21 μm long; tibia 4 μm long; tarsus 4-5 μm long; claw 8 μm long. Coxae granulose, the granules elongate on fore coxae; 1st coxal seta 6 μm long, slightly ahead of anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line dagger-shaped.

Abdomen with about 64-75 rings, all microtuberculate except for about the last 6; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 17-19 μm long. Ventral setae: 1st on about ring 22, 28-38 μm long; 2nd on about ring 38, 9-13 μm long; 3rd on about 6th ring from rear, 14-18 μm long. Accessory caudal seta absent. Genitalia 16-19 μm wide, 10-11 μm long. Coverflap with longitudinal markings, and with some granules anteriorly; genital seta 9-10 μm long.

MALE. Present.

TYPE DATA. From *Sophora microphylla* (kowhai; Papilionaceae), tourist gardens, Lake Wakatipu, 16 January 1951, S. A. Rumsey (holotype slide and 1 paratype slide, NZAC; 8 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

- / OL.

Causing a leaf erineum.

REMARKS. The six-rayed featherclaw, lack of an accessory caudal seta, and rather unusual dorsal shield design should distinguish *Aceria microphyllae*. The internal genitalia were not clearly visible, and have therefore not been drawn.

Lamb (1960, p. 129) referred to this mite, although he did not describe it.

Aceria parvensis Manson

Figure 250-256

Aceria parvensis Manson, 1972: 351.

FEMALE (description from 7 type specimens). Length 150-183 μm , width 63 μm , depth 58-65 μm . Robust fusiform; pale orange. Rostrum 20-26 μm long, curved down; antapical seta 6-8 μm long. Dorsal shield subsemicircular, with a short, blunt, anterior lobe, 31-38 μm long, 53-60 μm wide; ornamentation as follows: a median line on posterior half of shield; admedians forked posteriorly, a transverse line joining junction of fork and median line; 2 submedians, the 1st extending about two-thirds length of shield and meeting, or almost meeting, lateral fork of admedian, the 2nd sometimes branched posteriorly; a clearly demarcated lateral line outside these and, lateral to this, some granulation; occasional dash-like markings on basal part of shield; in some specimens lines lateral to the 1st submedian are missing, and 'dashes' may be quite extensive; dorsal tubercles on rear shield margin, 25-29 μm apart; dorsal setae 38-52 μm long, directed posteriorly.

Foreleg 37-41 μm long; tibia 10-11 μm long, with a seta 7-9 μm long at about one-quarter; tarsus 6-8 μm long; claw 6-8 μm long; featherclaw 7-rayed. Hind leg 33-38 μm long; tibia 8-9 μm long; tarsus 6-8 μm long; claw 7-8 μm long. Coxae with dash-like markings that are most evident on forecoxae, almost absent on hind coxae; 1st coxal setae 6-8 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are just ahead of a line through the 3rd tubercles. Sternal line dagger-shaped.

Abdomen with about 59-63 rings divided into tergites and sternites; tergites with

microtubercles either absent or faintly demarcated; sternites with rounded microtubercles on rear ring margin; posterior 5 or 6 rings without microtubercles. Lateral seta on about ring 8, 33-42 μm long. Ventral setae: 1st on about ring 21, 40-45 μm long; 2nd on about ring 41, 13-16 μm long; 3rd on about 6th ring from rear, 27-29 μm long. Accessory caudal seta 1-4 μm long. Genitalia 22-25 μm wide, 12-15 μm long. Coverflap with longitudinal markings; genital seta 12-14 μm long.

MALE. Present.

TYPE DATA. Described from *Stellaria parviflora* (Caryophyllaceae), Coppermine Creek, Maharahara West, north of Woodville, 12 January 1969, F. C. Duguid (holotype slide, 3 paratype slides, and dried material, PLNZ).

MATERIAL EXAMINED. Type series only.

RI / - .

Causing bud deformation.

REMARKS. The differentiation into tergites and sternites, together with the seven-rayed featherclaw, is distinctive of *Aceria parvensis*. The presence of a small anterior shield lobe is unusual, but the lobe is thought not to be sufficiently prominent to warrant removal of this species to a separate genus.

Aceria pimeliae new species

Figures 257-264

FEMALE (description from 7 specimens). Length 126-189 μm , width 44-56 μm , depth 40-46 μm . Fusiform. Rostrum 16-18 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, with a small, triangular anterior lobe, 23-26 μm long, 34-35 μm wide; ornamentation consisting of dash-like lines - a median line, admedians, and 2 submedians which run almost two-thirds the length of the shield; outer submedian slightly curved; lateral shield areas granulose; dorsal tubercles on rear shield margin, 19-20 μm apart; dorsal setae 13-17 μm long, directed posteriorly.

Foreleg 21-25 μm long; tibia 4-5 μm long, with a seta 6-8 μm long at about one-third; tarsus 5-6 μm long; claw 6 μm long; feather-claw 6-rayed. Hind leg 21-24 μm long; tibia

4-5 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae granulose; 1st coxal seta 6-8 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked.

Abdomen with about 66-73 rings, all microtuberculate except for about the last 6, which are almost devoid of microtubercles; microtubercles rounded, slightly elongate, on rear ring margin. Lateral seta on about ring 7, 20-38 μm long. Ventral setae: 1st on about ring 22, 33-46 μm long; 2nd on about ring 37, 19-25 μm long; 3rd on about 7th ring from rear, 19-24 μm long. Accessory caudal seta 4-5 μm long. Genitalia 17-19 μm wide, 11-16 μm long. Coverflap with longitudinal markings, and with granulation anteriorly; genital seta 10-15 μm long.

MALE. Present.

TYPE DATA. From *Pimelea* sp. (Thymelaceae), Cass, 3 April 1957, C. J. Burrows (holotype slide and 2 paratype slides, NZAC; 2 paratype slides, PLNZ); *Pimelea arenaria*, Yellow Bluffs, Chatham Islands, 6 March 1967, (9 paratype slides, PLNZ); and *Pimelea prostrata*, Kaimanawa Range, 17 April 1955, J. M. Dingley (2 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

TO / NC / Chatham Is.

Causing 'witches broom' formations.

REMARKS. *Aceria pimeliae* is very similar to *A. depressae*, from which it can be distinguished by the different lengths of the dorsal and second ventral setae (13-17 μm and 19-25 μm respectively for *pimeliae*, 20-29 μm and 9-13 μm for *depressae*).

The collection from *Pimelea prostrata* is referred to by Lamb (1960, p. 136, "? gall-mite").

Aceria plagianthi new species

Figures 265-271

FEMALE (description from 4 specimens). Length 133-183 μm , width 43-48 μm , depth 33 μm . Fusiform. Rostrum 17-19 μm long, curved down; antapical seta 3-4 μm long. Dorsal shield subsemicircular, 21-23 μm long,

27-34 μm wide; ornamentation consisting of a few lightly impressed longitudinal lines, almost absent in some specimens - a short, basal median line, admedians, a submedian, and a lateral line may be discernible; dorsal tubercles on rear shield margin, 14-16 μm apart; dorsal setae 31-35 μm long, directed posteriorly.

Foreleg 25-28 μm long; tibia 4-6 μm long, with a seta 2-3 μm long at about one-third; tarsus 5-6 μm long; claw 6-7 μm long, with a 5-rayed featherclaw. Hind leg 23-24 μm long; tibia 4-5 μm long; tarsus 5-6 μm long; claw 6-7 μm long. Coxae granulose; 1st coxal seta 4 μm long, just behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd and very close to thorn; 2nd tubercles well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 52-65 rings, all microtuberculate except for about the dorsal half of the last 9; microtubercles oval, on rear ring margin. Lateral seta on about ring 7, 13-20 μm long. Ventral setae: 1st on about ring 20, 21-25 μm long; 2nd on about ring 36, 1-3 μm long; 3rd on about 8th ring from rear, 17-22 μm long. Accessory caudal seta absent. Genitalia 15-18 μm wide, 10-11 μm long. Coverflap with longitudinal markings; genital seta 4 μm long.

MALE. Present.

TYPE DATA. From *Plagianthus betulinus* (Malvaceae), Price's Valley, Banks Peninsula, 4 May 1975, P. C. Duguid (holotype slide and 4 paratype slides, PINZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series only.

- / MC.

Associated with *Eriophyes plaginus* in a deformed inflorescence.

REMARKS. The extremely short second ventral setae (1-3 μm long), the solid nature of the dorsal half of the last nine body rings, and the closeness of the first and second coxal tubercles are distinctive of *Aceria plagianthi*.

Aceria rubifaciens Lamb

Figures 272-278

Aceria rubifaciens Lamb, 1953: 371.

FEMALE (description from 6 type specimens). Length 201-279 μm , width 57-66 μm , depth 54-69 μm . Vermiform. Rostrum 18-27 μm long, curved down; antapical seta 6-7 μm long. Dorsal shield subsemicircular, 23-28 μm long, 41-50 μm wide, smooth, almost unornamented except for a few lines laterally and basally; dorsal tubercles on rear shield margin, 25-26 μm apart; dorsal setae up to 44 μm long (mostly broken), directed posteriorly.

Foreleg 25-26 μm long; tibia 3-5 μm long, with a seta 6-8 μm long at about mid length; tarsus 7-8 μm long; claw 7-8 μm long; with a 4-rayed featherclaw. Hind leg 24-25 μm long; tibia 3-4 μm long; tarsus 6-8 μm long; claw 7-8 μm long. Coxae unornamented; 1st coxal setae 7-10 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 62-79 rings, all microtuberculate except for about the last 5; microtubercles rounded, on rear ring margin. Lateral seta on about ring 11, 38-43 μm long. Ventral setae: 1st on about ring 22, 79-91 μm long; 2nd on about ring 35, 31-41 μm long; 3rd on about 5th ring from rear, 24-26 μm long. Accessory caudal seta 6-9 μm long. Genitalia 19-21 μm wide, 11-13 μm long. Coverflap with longitudinal markings; genital seta 37-53 μm long.

MALE. Present.

TYPE DATA. Described from *Salicornia australis* (Chenopodiaceae), Waitemata Harbour, Auckland, 19 March 1948, K. P. Lamb (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide only.

AK / - .

Causing and occupying shoot galls.

REMARKS. The unusually thick, bar-like structure of the internal genitalia, in conjunction with an almost complete lack of ornamentation on the dorsal shield and coxae, will distinguish *Aceria rubifaciens*.

***Aceria sheldoni* (Ewing)**

citrus bud mite

Figures 279-284

Eriophyes sheldoni Ewing, 1937: 193.

Aceria sheldoni (Ewing). Keifer, 1952: 35.

FEMALE (description from 6 specimens). Length 117-192 μm , width 51-54 μm , depth 45-51 μm . Fusiform; whitish, yellowish, or orange. Rostrum 21-22 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, 24 μm long, 35-43 μm wide; ornamentation weak and indistinct - median line either absent or incomplete; admedians usually present; submedian line sometimes faintly present; lateral shield areas granulose; dorsal tubercles on rear shield margin, 23 μm apart; dorsal setae 13-14 μm long, directed posteriorly.

Foreleg 23-25 μm long; tibia 5 μm long, with a seta 4-5 μm long at about a quarter; tarsus 5-6 μm long; claw 6 μm long; feather-claw 5-rayed. Hind leg 19-21 μm long; tibia 4 μm long; tarsus 5 μm long; claw 7 μm long. Coxae distinctly granulose; 1st coxal setae 6 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked.

Abdomen with about 66-75 rings, all microtuberculate except for about the last 6; microtubercles rounded, resting on rear ring margin. Lateral seta on about ring 8, 17-25 μm long. Ventral setae: 1st on about ring 20, 41-44 μm long; 2nd on about ring 35, 9-11 μm long; 3rd on about 5th ring from rear, 18-19 μm long. Accessory caudal seta 3-4 μm long. Genitalia 19-20 μm wide, 13 μm long. Coverflap with longitudinal markings; genital seta 9-11 μm long.

MALE. Not seen.

TYPE DATA. Described from *Citrus limonia* (lemon; Rutaceae), Santa Paula, California, U.S.A. (United States National Museum, Washington, D.C., No. 1276).

MATERIAL EXAMINED. Non-type examples from *Citrus* sp., Whangarei, 28 Oct 1966.

ND, (AK, BP, GB) / - .

Damaging citrus buds and causing deformation of leaves and fruit.

REMARKS. The weak dorsal shield design, short dorsal setae, and five-rayed feather-claw should distinguish *Aceria sheldoni*.

Harrison (1955) states that the mite was first found in New Zealand on Lisbon lemon fruit in a domestic orchard at Mount Albert, Auckland, in December 1953. It has also been recorded from around Tauranga and Gisborne. Although it may occur on a range of citrus cultivars, it is principally a pest of lemons. Overseas it has been recorded widely in Africa, around the Mediterranean, and in Indonesia, Australia, Argentina, Brazil, and the U.S.A. (Hawaii, California, Florida).

***Aceria simonensis* new species**

Figures 285-300

FEMALE, protogyne (description from 5 specimens). Length 111-158 μm , width 42-50 μm , depth 50 μm . Fusiform. Rostrum 11-16 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, 24-28 μm long, 32-40 μm wide, with a slight, blunt anterior protuberance; ornamentation consisting mainly of short, irregular longitudinal lines; in some examples admedians can be detected, these usually joining posteriorly to form a distinctive 'U'-shape; dorsal tubercles arising from rear shield margin, directed diagonally inwards, 12-13 μm apart; dorsal setae 10-12 μm long, converging posteriorly.

Foreleg 26-29 μm long; tibia 5-6 μm long, with a seta 4-6 μm long at about mid length; tarsus 4-6 μm long; claw 5-6 μm long, with a 5-rayed featherclaw. Hind leg 25-26 μm long; tibia 4-5 μm long; tarsus 4-5 μm long; claw 5-6 μm long. Coxae with dash-like markings; 1st coxal seta 4-5 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 58-66 microtuberculate rings; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 8, 15-19 μm long. Ventral setae: 1st on about ring 26, 24-30 μm long; 2nd on about ring 43, 6-11 μm long; 3rd on about 6th ring from rear, 13-16 μm long. Accessory caudal seta absent. Genitalia 19-20 μm wide, 8-12 μm long. Coverflap granulose

anteriorly, and with longitudinal markings posteriorly; genital seta 6-9 μm long.

FEMALE, deutogyne (description from 10 specimens). Length 148-175 μm , width 41-44 μm , depth 43-49 μm . Vermiform. Rostrum 14-19 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, with a triangular anterior lobe, 25-31 μm long, 35-37 μm wide; ornamentation generally weak; traces of a median line, admedians, and submedians sometimes evident, and sometimes 2 or 3 faint, dash-like lines at anterolateral corners; dorsal tubercles strongly outlined, the inner line - which is produced anteriorly for a varying distance - together with a strong transverse line between the tubercles forming a prominent 'U'-shape; tubercles on rear shield margin, 13-14 μm apart; dorsal setae 11-14 μm long, usually converging posteriorly.

Foreleg 25-28 μm long; tibia 5-6 μm long, with a seta 5-7 μm long at about mid length; tarsus 5 μm long; claw 4-6 μm long, knobbed; featherclaw 5-rayed. Hind leg 23-26 μm long; tibia 4-5 μm long; tarsus 5 μm long; claw 4-6 μm long. Coxac with dash-like markings, mainly around fore coxal; 1st coxal seta 4-5 μm long, almost level with anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 36-45 smooth tergites and 44-52 microtuberculate sternites; microtubercles oval, on rear ring margin. Lateral seta on about sternite 6, 10-16 μm long. Ventral setae: 1st on about sternite 21, 20-25 μm long; 2nd on about sternite 32, 7-10 μm long; 3rd on about 5th ring from rear, 8-15 μm long. Accessory caudal seta absent. Genitalia 13-20 μm wide, 11-15 μm long. Coverflap with granules anteriorly, longitudinal markings posteriorly; genital seta 6-9 μm long.

MALE. Present.

TYPE DATA. From *Nothofagus menziesii* (Fagaceae), Simonin Pass, Olivine Range, 1030 m, 30 January 1975, J. S. Dugdale (holotype slide, NZAC; 5 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Nothofagus menziesii*: Roaring Meg, Kawarau Gorge, 240 m, 17 Mar

1975 (deutogynes); Dusky State Forest, 18 Mar 1974.

- / WD, FD, CO.

Associated with a dark brown or black erineum on leaf undersurfaces.

REMARKS. Distinctive characters of *Aceria simonensis* are the dorsal shield pattern, closeness of the dorsal tubercles, and converging nature of the dorsal setae.

It is unusual to find deuteroecy in eriophyoids with an evergreen host, but Keifer (1976, p. 19) has shown that this can occur. The deutogyne of *A. simonensis* differs from the protogyne mainly in the suppression of the dorsal microtubercles, the reduced number of tergites and sternites, the presence of a triangular anterior shield lobe, and the reduced dorsal shield markings. Also, some deutogynes have a weak mid-dorsal longitudinal ridge or trough for part of their length. Features that support the existence of deuteroecy are the occurrence together of both forms in a leaf erineum; only the protogyne form has been found to have a corresponding male; and the closeness of the dorsal shield tubercles together with the converging nature of the setae (both unusual features) is apparent in both forms. In some deutogynes faint microtubercles occur on the tergites.

Specimens of *Aceria waltheri* were found associated with *A. simonensis* in all the material examined.

Aceria strictae new species

Figures 301-308

FEMALE (description from 6 specimens). Length 150-173 μm , width 59-61 μm , depth 58 μm . Fusiform; whitish, sometimes with pink or orange tints. Rostrum 25-29 μm long, curved down; antapical seta 7-9 μm long. Dorsal shield subsemicircular, 29-31 μm long, 45-49 μm wide, unornamented except for granules laterally. Dorsal tubercles on rear shield margin, 28-29 μm apart; dorsal setae 30-33 μm long, directed posteriorly.

Foreleg 31-34 μm long; tibia 6-9 μm long, with a seta 3-4 μm long at about one-third; tarsus 7-8 μm long; claw 8 μm long; featherclaw 4-rayed. Hind leg 29-33 μm long; tibia 6 μm long; tarsus 6-8 μm long; claw 8-9 μm long. Coxal and sternal area with light

granulation; 1st coxal seta 8-9 μm long, a little behind anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are slightly ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 46-51 tergites and 54-57 sternites; rings completely microtuberculate about as far as 2nd ventral seta, but thereafter tergites completely smooth and sternites microtuberculate; microtubercles rounded, on rear ring margin. Lateral seta on about ring 7, 21-24 μm long. Ventral setae: 1st on about ring 19, 28-36 μm long; 2nd on about ring 32, 7-10 μm long; 3rd on about 5th ring from rear, 21-24 μm long. Accessory caudal seta 2-4 μm long. Genitalia 20-21 μm wide, 15-16 μm long. Coverflap unornamented, though immediately anterior to it are 2 weakly outlined subrectangular areas with faint granulation; genital seta 9-13 μm long.

MALE. Present.

TYPE DATA. From *Hebe stricta* var. *stricta* (Scrophulariaceae), Otaki, 4 June 1974, F. C. Duguid (holotype slide and 9 paratype slides, PLNZ; 2 paratype slides, NZAC).

MATERIAL EXAMINED. Type series only.

WN / - .

Causing an abnormal proliferation at the tips of the twigs. In the type material shoots were stunted and rosetted, and some had died. Both shoots and leaves were blackened, presumably as a result of the feeding activities of the mites.

REMARKS. The most distinctive feature of *Aceria strictae* is the absence of microtubercles on the posterior dorsum of the abdomen. Also worth noting is the lack of ornamentation on the genital coverflap.

Aceria tenuifolii new species

Figures 309-316

FEMALE (description from 3 specimens). Length 110-145 μm , width 37 μm , depth 39 μm . Vermiform. Rostrum 11-15 μm long, curved down; antapical seta 3-4 μm long. Dorsal shield subsemicircular, with a small, triangular anterior lobe, 19-20 μm long, 23 μm wide; ornamentation consisting of a median

line, admedians, 2 or 3 short, irregular submedians, and a lateral line from which arise 2 short, diagonally transverse lines forming 2 or 3 distinctive 'cells' on the lateral shield areas; dorsal tubercles on rear shield margin, 15-17 μm apart; dorsal setae 13-16 μm long, directed posteriorly.

Foreleg 21-22 μm long; tibia 4 μm long, with a seta 4 μm long at about one-third; tarsus 4-5 μm long; claw 4-6 μm long, with a 6-rayed featherclaw. Hind leg 18 μm long; tibia 3-4 μm long; tarsus 4-5 μm long; claw 5-6 μm long. Coxae with dash-like markings; 1st coxal seta 5-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 62-64 rings, all microtuberculate except for about the last 10, which are largely without microtubercles dorsally and laterally; microtubercles oval, on rear ring margin. Lateral seta on about ring 7, 12-13 μm long. Ventral setae: 1st on about ring 20, 30-38 μm long; 2nd on about ring 33, 4-6 μm long; 3rd on about 6th ring from rear, 10-11 μm long. Accessory caudal seta 3-4 μm long. Genitalia 16-17 μm wide, 9-11 μm long. Coverflap with longitudinal markings; genital seta 10-13 μm long.

MALE. Present.

TYPE DATA. From *Pittosporum tenuifolium* (kohuhu; Pittosporaceae), Auckland, 22 March 1972, B. M. May (holotype slide and 2 paratype slides, PLNZ; 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides only.

AK / - .

Associated with *Acalitus kohus* in an erineum in leaf rolls.

REMARKS. The dorsal shield ornamentation is distinctive, particularly the more heavily impressed lateral line and associated 'cells'. The lack of microtubercles on the dorsal and lateral surfaces of the last ten body segments is also distinctive.

Aceria titirangiensis Lamb

Figures 317-323

Aceria dactylonyx titirangiensis Lamb,
1953: 373.

FEMALE (description from 6 type specimens). Length 119-135 μm , width 26-35 μm , depth 28-30 μm . Vermiform. Rostrum 10-14 μm long, curved down; antapical seta 1-3 μm long. Dorsal shield subtriangular, with a short, triangular anterior lobe; shield 16-19 μm long, 17-26 μm wide; ornamentation consisting of a series of longitudinal lines and dashes of varying intensity, and usually a distinctive 'eye spot' laterally, though this not always evident; dorsal tubercles on rear shield margin, 14-15 μm apart; dorsal setae 9-14 μm long, directed posteriorly.

Foreleg 17-19 μm long; tibia 4 μm long, with a seta 2-4 μm long at about one-third; tarsus 4-5 μm long; claw 5-6 μm long, with a 5-rayed featherclaw. Hind leg 16-17 μm long; tibia 2-3 μm long; tarsus 4 μm long; claw 5-6 μm long. Coxac with granular markings; 1st coxal seta 5-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line usually absent.

Abdomen with about 70-81 rings, reducing ventrally to about 59-62 rings; all rings microtuberculate, but microtubercles fading over last 6 rings; microtubercles elongate, on rear ring margin. Lateral seta on about ring 10, 8-12 μm long. Ventral setae: 1st on about ring 23, 15-23 μm long; 2nd on about ring 40, 5-6 μm long; 3rd on about 7th ring from rear, 8-11 μm long. Accessory caudal seta just visible. Genitalia 13-14 μm wide, 9 μm long. Coverflap with longitudinal markings; genital seta 4-6 μm long.

MALE. Not seen in type slides, but present in other material.

TYPE DATA. Described from *Elaeocarpus dentatus* (hinau; Elaeocarpaceae), Titirangi, Auckland, 18 June 1950, E. Bray (holotype slide and 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides, plus the following non-type examples. *Elaeocarpus dentatus*: Puketi Forest, 3 Nov 1981; Marama Valley, Auckland, 25 Nov 1971; Goat Hill, Huia, 27 Dec 1971; Coromandel, Dec 1955; Coromandel saddle, 2000 m, 13 Feb 1979;

Buller Rd, Levin, 23 Mar 1964; Ohau track, Levin, 5 Jun 1972; Florida Rd Native Bush Reserve, Levin, 13 Jun 1963; Tararua Range near Otaki, 8 Aug 1976; Otaki Forks, 12 Jun 1983; Kaitoke, Upper Hutt, 23 Apr 1973; Hochstetter Forest, 4 Mar 1983; Mahinapua State Forest, 9 Mar 1972. *Elaeocarpus hookerianus*: Mamaku, 31 Jul 1979; Hurakia State Forest, 5 May 1981; West Arm, Lake Manapouri, 19 Jan 1970. *Knightia excelsa*: Mamaku, 10 Apr 1980. *Quintinia serrata*: Mangakino-Tihoi area, State Forest 98, 9 Mar 1977.

ND, AK, CL, BP, TO, WN / BR, WD, FD.

Forming an erineum on leaf undersurfaces.

REMARKS. The dorsal shield design, presence of an 'eye spot', and granulate coxae should distinguish *Aceria titirangiensis*.

This mite appears to have two main forms, and could be deuterogynous. Normally the foreclaw is about the same length as the hind claw, but in two specimens on the holotype slide (out of nine examined) the hind claw is almost twice as long as the foreclaw. This variation was also observed in other material. The 'eye spot' of this form also tends to be less pronounced. The three males examined were all of the typical form, with the claws about equal in length, the dorsal shield markings distinctive and clearly impressed, and a clearly defined 'eye spot'.

Specimens examined from material other than the type slides were sometimes considerably longer, measuring up to 207 μm .

Specimens from *Elaeocarpus hookerianus* may eventually prove to be distinct. Their coxae are less granulate, and the dorsal shield design is slightly different.

Drawings of this species are taken in the main from non-type material, largely because greater clarity of detail is apparent on these slide mounts.

A. titirangiensis is here promoted to specific rank because the features cited by Lamb (1953) - different lengths of the second ventral and lateral setae, coupled with different host species - are in my opinion sufficiently distinctive to warrant it.

Aceria tulipae (Keifer)

wheat curl mite

Figures 324-331

(also figures 3-8, 10, 11, and 13 in *FNZ* 4)

Eriophyes tulipae Keifer, 1938: 185.

Aceria tulipae (Keifer). Keifer, 1952: 33.

FEMALE (description from 6 specimens). Length 234-279 μm , width 54-66 μm , depth 57-63 μm . Fusiform; white. Rostrum 21-24 μm long, curved down; antapical seta 9-11 μm long. Dorsal shield subsemicircular, 39-42 μm long, 39-51 μm wide; ornamentation consisting of a short median line on posterior one-third, admedian lines running the full length of the shield, an occasional short line outside the admedians posteriorly, and usually 3 diverging submedians; lateral shield areas with dash-like markings; dorsal tubercles on rear shield margin, 24-29 μm apart; dorsal setae 51-68 μm long, directed posteriorly.

Foreleg 39 μm long; tibia 7-9 μm long, with a seta 11-13 μm long at about one-third; tarsus 8-9 μm long; claw 10-11 μm long; featherclaw 7-rayed. Hind leg 36 μm long; tibia 6-7 μm long; tarsus 9 μm long; claw 10-11 μm long. Coxae with dash-like markings; 1st coxal seta 7-14 μm long, a little behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are just ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 81-86 microtuberculate rings; microtubercles rounded, on rear ring margin. Lateral seta on about ring 9, 49-51 μm long. Ventral setae: 1st on about ring 24, 54-66 μm long; 2nd on about ring 48, 35-56 μm long; 3rd on about 5th ring from rear, 22-38 μm long. Accessory caudal seta 4-5 μm long. Genitalia 22-27 μm wide, 15-18 μm long. Coverflap with longitudinal markings; genital seta 22-25 μm long.

MALE. Present.

TYPE DATA. Described from *Tulipa* sp. (Liliaceae), Sacramento, California, U.S.A. (holotype slide originally in collection of California Department of Agriculture, Sacramento; possibly no longer in existence).

MATERIAL EXAMINED. The following non-type examples. *Allium ascalonicum* (shallot):

Blenheim, in store, 20 Apr 1970. *Allium sativum* (garlic): Blenheim, Mar-May 1970, 29 Apr 1971, 6 Jul 1973; Pukekohe, 10 Sep 1974. Pasture: Parkes Farm, 88-Valley, Nelson, 14 Mar 1972. Also examples intercepted entering New Zealand on *A. sativum*: ex Borneo, 21 Apr 1971; Fiji, 6 Dec 1970; India, 23 Feb 1972; Italy, 10 Apr 1971; Tanzania, 11 Dec 1970; U.K., 14 Jun 1971.

AK / NN, MB.

On bulbs feeding between the bulb layers, scarifying and drying the surfaces. In the field causing a twisting and streaking of the leaves and dwarfing of the plants.

REMARKS. Its large size, shield ornamentation, long body setae, and seven-rayed featherclaw are distinctive characters of *Aceria tulipae*.

This species was first recorded in New Zealand by Manson (1970). It is now regarded as one of the most economically important eriophyoid mites. All the New Zealand records from garlic relate to stored bulbs; the mite has not yet been found on garlic in the field here. Overseas (Oldfield 1970) it is known to be a vector of wheat streak mosaic virus and wheat spot mosaic virus. It also causes kernel red streak in corn (Nault *et al.* 1967).

A. tulipae is also known from South and North America, Europe, and India. It could well be cosmopolitan, occurring wherever garlic is grown.

Aceria victoriae Ramsay

Figures 322-337

Aceria victoriae Ramsay, 1958: 460.

FEMALE (description from 6 type specimens). Length 156-189 μm , width 43-60 μm , depth 54-63 μm . Fusiform. Rostrum 19-21 μm long, curved down; antapical seta 5 μm long. Dorsal shield subtriangular, 28-30 μm long, 30-38 μm wide; ornamentation consisting of longitudinal lines - a broken median line running entire length of shield, admedians which bulge outwards at about two-thirds and then curve inwards to join median line near posterior shield margin, and 2 submedians on anterior two-thirds of shield, sometimes branching; dorsal tubercles on rear shield margin, 21-23 μm apart; dorsal setae 15-20 μm long, directed posteriorly.

Foreleg 26-28 μm long; tibia 5-6 μm long, with a seta 4-5 μm long at about a quarter; tarsus 7-8 μm long; claw 7-8 μm long, knobbed; featherclaw 5-rayed or 6-rayed. Hind leg 24-25 μm long; tibia 5 μm long; tarsus 6-7 μm long; claw 7-8 μm long. Coxae with granular markings; 1st coxal seta 7-10 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 67-69 microtuberculate rings; microtubercles rounded, on rear ring margin. Lateral seta on about ring 11, 35-49 μm long. Ventral setae: 1st on about ring 25, 41-55 μm long; 2nd on about ring 41, 14-20 μm long; 3rd on about 7th ring from rear, 16-24 μm long. Accessory caudal seta 4-5 μm long. Genitalia 20-21 μm wide, 14 μm long. Coverflap with longitudinal markings; genital seta 15-23 μm long.

MALE. Present.

TYPE DATA. Described from *Haloragis erecta* (Haloragaceae), Victoria University Botany Department glasshouse, Wellington, 24 April 1956, 22 June 1956, 9 September 1956, G. W. Ramsay (12 slides as follows: holotype female, 2 paratype females, and 2 paratype males, NMNZ; 3 paratype females and 1 paratype male, NZAC; 1 paratype female, J. T. Salmon collection; 2 paratype females, Victoria University Zoology Department; also 5 tubes containing preserved non-type galls and mites, NMNZ).

MATERIAL EXAMINED. Type series only.

WN / - .

Causing bud galls.

REMARKS. The dorsal shield design and six-rayed featherclaw are distinctive of *Aceria victoriae*.

Ramsay (1958) gives additional information on the biology and distribution of this species.

Aceria waltheri (Keifer)

beech bud mite

Figures 338-353

Eriophyes waltheri Keifer, 1939: 417.

Aceria waltheri (Keifer). Keifer, 1952: 34.

FEMALE, protogyne (description from 6 specimens). Length 133-209 μm , width 44-55 μm , depth 40-53 μm . Vermiform. Rostrum 15-21 μm long, curved down; antapical seta 4-5 μm long. Dorsal shield subsemicircular, 24-26 μm long, 38 μm wide, almost completely unornamented, though some specimens show an indication of the median line and admedians on the basal half of the shield, and there may be a weak lateral line; dorsal tubercles on rear shield margin, 19-20 μm apart; dorsal setae 19-24 μm long, directed posteriorly.

Foreleg 20-21 μm long; tibia 3-5 μm long, without a seta; tarsus 4-5 μm long; claw 6 μm long; featherclaw 3-rayed. Hind leg 19-20 μm long; tibia 3-4 μm long; tarsus 4-5 μm long; claw 8 μm long. Coxae with a few granules near midline, otherwise unornamented; 1st coxal seta 5-6 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 57-64 microtuberculate rings; microtubercles oval, on or slightly ahead of rear ring margin. Lateral seta on about ring 6, 13-18 μm long. Ventral setae: 1st on about ring 16, 36-38 μm long; 2nd on about ring 33, 30-38 μm long; 3rd on about 6th ring from rear, 14-19 μm long. Accessory caudal seta absent. Genitalia 18 μm wide, 13-14 μm long. Coverflap granulate anteriorly, otherwise almost unornamented; genital seta 6-9 μm long.

FEMALE, deutogyne (description from 5 specimens). Length 130-199 μm , width 50-56 μm , depth 51-59 μm . Vermiform. Rostrum 19 μm long, curved down; antapical seta absent. Dorsal shield subtriangular, 25-29 μm long, 45 μm wide; ornamentation consisting of a very short, basal median line, admedians running almost entire length of shield and converging anteriorly, submedians sometimes present as short, faintly impressed anterior lines, and sometimes a short, diagonal line anterior to each dorsal tubercle; dorsal tubercles slightly ahead of rear shield

margin, 24-25 μm apart; dorsal setae 16-20 μm long, diverging posteriorly.

Foreleg 23-25 μm long; tibia 4 μm long, without a seta; tarsus 6-8 μm long; claw 6-8 μm long; featherclaw 3-rayed. Hind leg 21-24 μm long; tibia 3-4 μm long; tarsus 5-7 μm long; claw 6-8 μm long. Coxae unornamented; 1st coxal seta 4 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 46-53 microtuberculate rings; microtubercles oval, ahead of rear ring margin, those on tergites much fainter than those on sternites or even absent. Lateral seta on about ring 8, 13-15 μm long. Ventral setae: 1st on about ring 18, 16-33 μm long; 2nd on about ring 32, 19-38 μm long; 3rd on about 6th ring from rear, 15-16 μm long. Accessory caudal seta absent. Genitalia 19-21 μm wide, 14-16 μm long. Coverflap with 2 subtriangular markings; genital seta 9-10 μm long.

MALE. Present.

TYPE DATA. Described from *Nothofagus menziesii* (Fagaceae), San Francisco, California, U.S.A. (holotype slide and 4 paratype slides originally in collections of California State Department of Agriculture, Sacramento, now probably destroyed (Keifer 1952, p. 4)).

MATERIAL EXAMINED. The following non-type examples. *Nothofagus fusca*: Urewera National Park, 8 Feb 1979, ex leaf erineum with *Nothacus tuberculatus*. *Nothofagus menziesii*: Kawiti, 18 Jan 1965; Minginui State Forest, 10 May 1974; Ben Nevis, Nelson, 21 Dec 1969; Boulder Lake, Nelson, 23 Oct 1968; Simonin Pass, 1030 m, Olivine Range, 30 Jan 1975; Dusky State Forest, 18 Mar 1974; West Arm, Lake Manapouri, 25 Jan 1970; Silver Peaks, Dunedin, 23 Mar 1951.

ND, BP, GB / NN, WD, FD, DN.

Associated with a leaf erineum in material from Minginui State Forest, Simonin Pass, and Dusky State Forest and with leaf galls from Minginui State Forest and Simonin Pass. The other specimens ex *N. menziesii* were from 'witches broom' formations on the terminal twigs.

REMARKS. The three-rayed featherclaw and

lack of a foretibial seta are distinctive of *Aceria waltheri*.

The present description of the protogyne is from specimens collected at Boulder Lake, Nelson (23 October 1968), and agrees quite well with the original description. The deutogyne is described from Dusky State Forest material. This is the first record of a deutogyne for this species; deutogynes are unusual on evergreen host plants. The original description of this species was from 'witches brooms', and its occurrence in leaf erineum and leaf galls is puzzling. However, associated with this species in most leaf erineum was *Aceria simonensis*, which is possibly the causal agent of the erineum.

A. waltheri was introduced into California from New Zealand (Keifer 1952, p. 34).

Genus *Acerimina* Keifer

Acerimina Keifer, 1957: 242. Type-species *Acerimina cedrelae* Keifer, 1957.

Body worm-like; rings subequal dorsoventrally. Rostrum short. Dorsal shield without an anterior lobe; dorsal tubercles on rear shield margin, directing setae posteriorly. Legs with all standard segments and setae; featherclaw simple. First coxal tubercles and setae absent. Abdomen with all standard setae. Female genitalia with internal apodome of moderate length.

REMARKS. The absence of the first coxal tubercles and setae is the most distinctive feature of genus *Acerimina*, which is otherwise identical with *Aceria*. This is the first record of the genus from New Zealand.

Acerimina pyrosiae new species

Figures 354-361

FEMALE (description from 6 specimens). Length 173-191 μm , width 54-59 μm , depth 53 μm . Fusiform. Rostrum 16 μm long, curved down; antapical seta 2-3 μm long. Dorsal shield subsemicircular, 22-25 μm long, 36-38 μm wide, unornamented except for a few basal granules and faint, short lines on disc; dorsal tubercles on rear shield mar-

gin, 20-24 μm apart; dorsal setae 19-23 μm long, directed posteriorly.

Foreleg 23-24 μm long; tibia 4-5 μm long, with a seta 3-4 μm long at about mid length; tarsus 5-6 μm long; claw 7-8 μm long; featherclaw 4-rayed. Hind leg 19-23 μm long; tibia 4-5 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae unornamented; 1st coxal tubercles and setae absent; 2nd tubercles well ahead of a line through the 3rd tubercles. Sternal line very faint.

Abdomen with about 77-84 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 7, 20-38 μm long. Ventral setae: 1st on about ring 22, 28-40 μm long; 2nd on about ring 34, 5-6 μm long; 3rd on about 8th ring from rear, 8-14 μm long. Accessory caudal seta 3-4 μm long. Genitalia 21-23 μm wide, 13-16 μm long. Coverflap granulose anteriorly and sometimes with a few faint longitudinal markings; genital seta 3-5 μm long.

MALE. Present.

TYPE DATA. From *Pyrrosia serpens* (Polypodiaceae), Rotorua, 23 October 1957, J. Rawlings (holotype slide and 1 paratype slide, NZAC; 5 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

BP / - .

Forming brown 'witches brooms'.

REMARKS. The absence of the first coxal setae and the almost complete lack of ornamentation on the dorsal shield and coxae are together distinctive of *Acerimina pyrrosiae*.

This is probably the species mentioned by Lamb (1960, p. 121) as *Aceria* sp.

Asetilobus new genus

TYPE-SPECIES *Eriophyes hodgkinsi* Manson, 1965.

(The name *Asetilobus* alludes to the absence of the second ventral seta; gender masculine.)

Body fusiform; rings subequal dorsoventrally. Rostrum moderately long. Dorsal shield subsemicircular, with a narrow, bluntly pointed anterior projection. Dorsal tuber-

cles ahead of rear shield margin, directing setae upwards and medially. Legs with normal segmentation and setation; featherclaw simple. Coxae with the usual 3 pairs of setiferous tubercles. Abdomen with no 2nd ventral seta. Female genitalia with internal apodeme of normal length.

REMARKS. This genus most closely resembles *Stenacis* Keifer in the nature of the anterior shield projection. However, it differs in lacking the second ventral seta and in having the dorsal tubercles well ahead of the rear shield margin, with the setae directed upwards and medially.

Asetilobus hodgkinsi (Manson) new combination

Figures 362-369

Eriophyes hodgkinsi Manson, 1965: 133.

Phyllocoptes hodgkinsi (Manson). Manson, 1967: 51.

FEMALE (description from 5 specimens). Length 141-225 μm , width 48-69 μm , depth 50-63 μm . Fusiform; whitish, though some specimens with orange or pale brown colouring. Rostrum 26-29 μm long, curved down; antapical seta 3-4 μm long. Dorsal shield subsemicircular, with a narrow, bluntly pointed anterior lobe; shield 28-38 μm long, 45-61 μm wide, ornamented with numerous longitudinal dash-like lines; dorsal tubercles well ahead of rear shield margin, 14-19 μm apart; dorsal setae 8-10 μm long, directed medially.

Foreleg 25-30 μm long; tibia 5 μm long, with a seta 5-6 μm long at about mid length; tarsus 5-6 μm long; claw 5-6 μm long, knobbed; featherclaw 4-rayed or 5-rayed. Hind leg 23-29 μm long; tibia 3-5 μm long; tarsus 5-6 μm long; claw 11-14 μm long, knobbed. Coxae with dash-like markings; 1st coxal setae 5-6 μm long, slightly behind anterior coxal approximation; 1st setiferous coxal tubercles slightly closer together than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line double, sometimes weak.

Abdomen with about 61-69 microtuberculate rings, the posterior 10-12 broader than the rest, with microtubercles less pronounced; microtubercles rounded, on rear ring margin. Lateral seta on about ring 5, 27-34 μm long. Ventral setae: 1st on about ring 19, 27-48

µm long; 2nd absent; 3rd on about 6th ring from rear, 18-25 µm long. Accessory caudal seta absent. Genitalia 21-26 µm wide, 13-18 µm long. Coverflap with longitudinal markings; genital seta 4-9 µm long.

MALE. Not seen.

TYPE DATA. Described from *Vitex lucens* (puriri; Verbenaceae), Tauranga, 9 January and 7 February 1964, M. Hodgkins (holotype slide, 4 paratype slides, and dried material, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Vitex lucens*, Lady Alice Island (Motumuka), Hen and Chickens group, mixed forest, 17 Oct 1971.

ND, BP / - .

Causing pimple-shaped pocket galls (2-3 mm diameter) on both leaf surfaces, often adjacent to the main vein.

REMARKS. The generic characters - lack of a second ventral seta and presence of a narrow anterior shield lobe - immediately distinguish *Asctilobus hodgkinsi*.

Genus *Eriophyes* von Siebold

Eriophyes von Siebold, 1851: 89. Type-species *Phytoptus pyri* Pagenstecher, 1857 (here designated; see Remarks and p. 51).

Phytoptus Dujardin, 1851 *sensu* Newkirk & Keifer, 1971: 2.

Body worm-like or fusiform; rings subequal dorsoventrally. Rostrum short. Dorsal shield without an anterior lobe, or at most with an extremely small lobe; dorsal setae directed upwards, ahead, or medially. Legs with normal segmentation; all standard leg setae usually present; featherclaw simple. Coxae with the usual 3 pairs of setiferous tubercles. Abdomen with all standard setae. Female genitalia with internal apodeme of normal length.

REMARKS. The original type-species of this genus, *Eriophyes vitis*, was placed in genus

Colomerus by Newkirk & Keifer (1971). This view has been followed here, as '*Eriophyes vitis*' is not congeneric with a substantial majority of species in the present genus. There is consequently a vacancy for a new type-species. Dr E. E. Lindquist (pers. comm.) has suggested *Phytoptus tiliae* and *Phytoptus pyri*, both of Pagenstecher, 1857, as alternatives. The latter name is here selected to fill this gap.

KEY TO SPECIES OF *ERIOPHYES* KNOWN FROM NEW ZEALAND

- 1 Featherclaw 3-rayed; 1st coxal tubercles almost adjacent to 2nd tubercles. From leaf erineum on *Parsonsia* *parsonsiae*
- Not with this combination of characters 2
- 2 Forefemoral seta absent. On (?)
(1) *Podocarpus totara* *totarae*
- Forefemoral seta present 3
- 3 Abdomen with body rings divided into
(2) tergites and sternites. From pocket galls on *Muehlenbeckia* spp. *lambi*
- Abdomen with body rings regular for the greater part of its length 4
- 4 Featherclaw 6-rayed; coxae virtually
(3) unornamented. From distorted flower buds on *Planchonella novo-zelandica* *planchonellus*
- Not with this combination of characters 5
- 5 Dorsal shield tubercles situated well
(4) ahead of rear shield margin; dorsal setae short (7-9 µm). From bud galls on *Dracophyllum* spp. *dracophylli*
- Dorsal shield tubercles situated not far (if at all) ahead of rear shield margin; dorsal setae much longer 6

- 6 Lateral area of dorsal shield with
(5) elongate-oval bar-like markings; genital coverflap and coxae unornamented.
On *Plagianthus betulinus* *plaginus*
- Not with this combination of characters 7
- 7 Genital coverflap unornamented 8
(6) Genital coverflap with longitudinal markings 9
- 8 First ventral seta 23-29 μm long.
(7) Forming a leaf erineum on *Hoheria sexstylosa* *sexstylosae*
- First ventral seta 43-52 μm long.
Causing stem galls on *Hoheria* spp. *hoheriae*
- 9 Dorsal setae long (32-49 μm); coxae
(7) almost unornamented. From swollen leaf buds on *Racoulia tenuicaulis* *duguidae*
- Dorsal setae usually less than 30 μm long; coxal ornamentation obvious 10
- 10 Featherclaw 4-rayed 11
(9) Featherclaw 5-rayed 12
- 11 Lateral seta 12-16 μm long. On apple
(10) (*Malus pumila*) *mali*
- Lateral seta 20-38 μm long. On pear
(*Pyrus communis*) *pyri*
- 12 Body microtubercles usually spine-
(10) like; lateral seta 25-31 μm long; 2nd ventral seta 11-15 μm long. On *Cassinia* spp. *leptophyllae*
- Body microtubercles elongate-oval; lateral seta 15-16 μm long; 2nd ventral seta 5-6 μm long. On *Paratrophis* spp. *paratrophis*

Eriophyes dracophylli Lamb

Figures 370-376

Eriophyes dracophylli Lamb, 1953: 374.

FEMALE (description from 4 type specimens). Length 210-240 μm , width 45-48 μm , depth 43-45 μm . Vermiform; white. Rostrum 18-19 μm long, curved down; antapical seta 4 μm long. Dorsal shield semicircular, 26-29 μm long, 37-43 μm wide, with a characteristic pattern of thick, dash-like lines, as follows: a median line on basal half of shield; admedians subparallel to median line, converging and meeting anteriorly; a submedian line arising about halfway along admedian lines and produced diagonally forwards, and lateral to this, near shield margin, sometimes another irregular line; anterolateral shield margins with dash-like markings; dorsal tubercles well ahead of rear shield margin, 17-18 μm apart; dorsal setae 7-9 μm long, directed anteriorly.

Foreleg 23-25 μm long; tibia 3-5 μm long, with a seta 4 μm long at about one-third; tarsus 5-6 μm long; claw 6 μm long; featherclaw 5-rayed. Hind leg 22-23 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 7 μm long. Coxae with granular markings; 1st coxal setae 3-4 μm long, slightly behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 58-63 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 6, 18-22 μm long. Ventral setae: 1st on about ring 20, 33-40 μm long; 2nd on about ring 35, 3-5 μm long; 3rd on about 7th ring from rear, 13-19 μm long. Accessory caudal seta about 2 μm long. Genitalia 20-22 μm wide, 8-12 μm long. Coverflap with longitudinal markings; genital seta 5-7 μm long.

MALE. Present.

TYPE DATA. Described from *Dracophyllum recurvum* (?hybrid; Epacridaceae), Tongariro National Park, 2 July 1950, E. Bray (holotype slide and 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides, plus non-type examples from *Dracophyllum subulatum*, upper Waikato River, 29 Mar 1943. The following dried plant material - mainly Lamb's (1960) original material from which

this species was described - was examined also, but no mites were found. *Dracophyllum pronum*: Mt Dobson, 1520 m, 16 Jan 1959. *D. subulatum*: Waitangi Valley, Waiouru, 8 Aug 1943; Rotorua, 12 Aug 1950; upper Mohaka River valley, Kaimanawa Range, 1 Jun 1953. *Dracophyllum* sp.: National Park, Jul 1951; Waihothonu track, National Park, 28 Jan 1954.

TO / - .

Causing and occupying bud galls.

REMARKS. The short dorsal shield setae and dorsal shield ornamentation are distinctive of *Eriophyes dracophylli*.

The type material has been remounted, and the original holotype slide material has been put on to two slides. Accurate measurement of body setae has been difficult, as the setae seldom lie flat. Lamb (1953) states that this species is common in the Tongariro National Park area.

Eriophyes duguidae Manson

Figures 377-383

Eriophyes duguidae Manson, 1972: 353.

FEMALE (description from 6 type specimens). Length 126-189 μm , width 45-56 μm , depth 36-48 μm . Fusiform; brownish. Rostrum 21-24 μm long, curved down; antapical seta 4-5 μm long. Dorsal shield subsemicircular, 24-27 μm long, 44-45 μm wide; ornamentation comprising a short, basal median line and admedians, faintly discernible anteriorly in some specimens, a weak, irregular, oval area lateral to this, and irregular, dash-like and granular lines on anterolateral shield areas; dorsal tubercles ahead of rear shield margin, 17-21 μm apart; dorsal setae 32-49 μm long, directed anteriorly.

Foreleg 25-27 μm long; tibia 5-6 μm long, with a seta 4-5 μm long at about mid length; tarsus 5-6 μm long; claw 7-8 μm long; featherclaw 4-rayed or 5-rayed. Hind leg 24-25 μm long; tibia 4-5 μm long; tarsus 4-5 μm long; claw 7-9 μm long. Coxae almost unornamented; 1st coxal setae 3-6 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked posteriorly.

Abdomen with about 56-68 microtuberculate rings; microtubercles fading over last 5 or

6 rings, rounded, on rear ring margin. Lateral seta on about ring 11, 20-24 μm long. Ventral setae: 1st on about ring 23, 27-29 μm long; 2nd on about ring 37, 14-17 μm long; 3rd on about 5th ring from rear, 22-25 μm long. Accessory caudal seta absent. Genitalia 19-20 μm wide, 8-10 μm long. Coverflap with a few light longitudinal markings; genital seta 8-10 μm long.

MALE. Present.

TYPE DATA. Described from *Raoulia tenuicaulis* (Compositae), Coppermine Creek, Maharahara West, north of Woodville, 12 January 1969, F. C. Duguid (holotype slide and 2 paratype slides, PLNZ; 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides only.

RI / - .

Causing swollen leaf buds.

REMARKS. The dorsal shield ornamentation and long dorsal setae are distinctive of *Eriophyes duguidae*.

Eriophyes hoheriae Lamb

lacebark gall mite

Figures 384-390

Eriophyes hoheriae Lamb, 1952: 355.

FEMALE (description from 6 specimens). Length 156-201 μm , width 60-69 μm , depth 48-61 μm . Fusiform. Rostrum 13-17 μm long, curved down; antapical seta 1-2 μm long. Dorsal shield subsemicircular, 25-29 μm long, 48-51 μm wide, with a small, triangular anterior lobe; ornamentation consisting only of admedians and 2 or 3 submedians of varying intensity, some quite short; dorsal tubercles slightly ahead of rear shield margin, 17-21 μm apart; dorsal setae 13-24 μm long, directed anteriorly.

Foreleg 25-26 μm long; tibia 5-6 μm long, with a seta 3 μm long at about one-quarter; tarsus 5-6 μm long; claw 7-8 μm long, knobbed; featherclaw 4-rayed. Hind leg 23-24 μm long; tibia 4 μm long; tarsus 6-7 μm long; claw 7-8 μm long. Coxae unornamented; 1st coxal seta 1-2 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line

through the 3rd tubercles. Sternal line forked posteriorly.

Abdomen with about 54-64 rings, all microtuberculate except for about the last 5; microtubercles elongate-rounded, on rear ring margin. Lateral seta on about ring 8, 18-21 μm long. Ventral setae: 1st on about ring 19, 43-52 μm long; 2nd on about ring 31, 7-10 μm long; 3rd on about 6th ring from rear, 13-16 μm long. Accessory caudal seta 1-2 μm long. Genitalia 19-20 μm wide, 11-13 μm long. Coverflap unornamented; genital seta 6-8 μm long.

MALE. Present.

TYPE DATA. Described from *Hoheria populnea* (lacebark; Malvaceae), Auckland, 9 September 1940, C. S. W. Reid (holotype slide, NZAC).

MATERIAL EXAMINED. Type slide, plus the following non-type examples. *Hoheria angustifolia*: Dunedin, 31 Mar 1966. *Hoheria lyalli*: Kea Point track, Hermitage, Hooker Valley, 31 Mar 1977. *Hoheria populnea*: New Lynn, 6 Nov 1952; Remuera, Aug 1949; Titi-rangi, 2 Dec 1949; Opakeke, Papakura, 13 Nov 1957; Palmerston North, 20 Nov 1957, 3 Dec 1965; Dunedin, 26 Oct 1958. *Hoheria* sp.: Te Araroa, Oct 1952; Kelburn Park, Wellington, 18 Nov 1964.

AK, GB, WI, WN / MK, DN.

Causing typical roughened stem galls 10-20 mm in diameter.

REMARKS. The lack of coxal ornamentation, smooth coverflap, and presence of only a few longitudinal lines on the dorsal shield are distinctive of *Eriophyes hoheriac*.

This is probably one of the commonest eriophyids occurring in New Zealand. Its large, unsightly galls are readily recognisable, and seem to cause no great damage to the plant.

Eriophyes lambi Manson

Figures 391-397

Eriophyes lambi Manson, 1965: 135.

Phyllocoptes lambi (Manson). Manson, 1967: 51.

FEMALE (description from 6 type specimens). Length 189-207 μm , width 51-63 μm , depth 52-65 μm . Fusiform; orange. Rostrum 17-22

μm long, curved down; antapical seta 6-7 μm long. Dorsal shield semicircular, 27-32 μm long, 48-53 μm wide; ornamentation very faint, sometimes absent, consisting at most of admedians and a few irregular lateral lines; dorsal tubercles ahead of rear shield margin, 20-22 μm apart; dorsal setae 21-25 μm long, directed anteriorly.

Foreleg 30-32 μm long; tibia 7-8 μm long, with a seta 4-5 μm long at about a quarter, tarsus 6-8 μm long; claw 6-8 μm long, with a 5-rayed featherclaw. Hind leg 28-30 μm long; tibia 6-7 μm long; tarsus 6-7 μm long; claw 6-8 μm long. Coxae usually with a few large granules, but these almost absent in some specimens; 1st coxal seta 5-7 μm long, slightly ahead of anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 38-49 rings; tergites smooth, occasionally with faint microtubercles; sternites microtuberculate except on about the last 5 rings; microtubercles rounded, usually on rear ring margin. Lateral seta on about ring 6, 18-24 μm long. Ventral setae: 1st on about ring 14, 40-52 μm long; 2nd on about ring 24, 7-10 μm long; 3rd on about 6th ring from rear, 11-20 μm long. Accessory caudal seta absent. Genitalia 20-23 μm wide, 10-12 μm long. Coverflap with longitudinal bar-like markings on anterior half, these varying in intensity between individuals, and almost absent in some; genital seta 10-19 μm long.

MALE. Not seen.

TYPE DATA. Described from *Muehlenbeckia australis* (Polygonaceae), Mangahao, Shannon, 19 April 1964, D. C. M. Manson (holotype slide and 3 paratype slides, PLN2).

MATERIAL EXAMINED. Type slides, plus the following non-type examples. *Muehlenbeckia australis*: between Turangi and National Park, 15 Feb 1979; Palmerston North, 25 Mar 1951; Greytown, 17 Mar 1953; Silverstream, Hutt Valley, 6 Feb 1953; Roaring Meg, Kawarau Gorge, 17 Mar 1975. *Muehlenbeckia axillaris*: Governors Bush, The Hermitage, 4 Feb 1972; Ahuriri Valley, beyond Birchwood, 790 m, 23 Jan 1966. *Muehlenbeckia complexa* Karekare, Auckland, May 1951; Wairarapa, 17 Mar 1953; Dunedin, 18 Mar 1959. *Muehlenbeckia complexa* var. *trilobata*: Rakaia River, 18 Sep 1955. *Nothofagus menziesii*: Roaring Meg, Kawarau Gorge, 17 Mar 1975.

AK, TG, WI, WN, WA / MC, MK, CO, DN.

On *Muehlenbeckia* forming reddish pocket galls on leaf surfaces; on *Nothofagus menziesii* associated with a leaf erineum.

REMARKS. The division of the body into tergites and microtuberculate sternites, the long dorsal shield setae, and the unusual bar-like markings on the anterior half of the genital coverflap are together distinctive of *Eriophyes lambi*.

An occasional specimen has the body completely microtuberculate, with no differentiation between tergites and sternites.

The record from *Nothofagus menziesii* seems quite out of character, but as far as I can determine is authentic.

Eriophyes leptophyllae new species

Figures 398-405

FEMALE (description from 6 specimens).

Length 141-185 μm , width 40-50 μm , depth 41-46 μm . Fusiform. Rostrum 16-18 μm long, curved down; antapical seta 3-4 μm long. Dorsal shield subsemicircular, 21-28 μm long, 33-34 μm wide; ornamentation consisting mainly of longitudinal lines - a median, admedians, and 2 or 3 submedians; lateral shield areas with short lines; dorsal tubercles ahead of rear shield margin, 14-19 μm apart; dorsal setae 21-30 μm long, directed anteriorly.

Foreleg 21-28 μm long; tibia 4-5 μm long, with a seta 3-4 μm long at about mid length; tarsus 5-6 μm long; claw 6-8 μm long, with a 5-rayed featherclaw. Hind leg 20-26 μm long; tibia 4 μm long; tarsus 5-6 μm long; claw 9 μm long. Coxae with a few dash-like markings, but these sometimes absent; 1st coxal seta 5-9 μm long, just behind anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 62-75 microtuberculate rings; microtubercles spine-like, projecting posteriorly; occasional specimens with rounded microtubercles. Lateral seta on about ring 10, 25-31 μm long. Ventral setae: 1st on about ring 22, 34-41 μm long; 2nd on about ring 37, 11-15 μm long; 3rd on about 5th ring from rear, 20-29 μm long. Accessory caudal seta absent. Genitalia 14-20

μm wide, 10-15 μm long. Coverflap with longitudinal markings; genital seta 8-12 μm long.

MALE. Present.

TYPE DATA. From *Cassinia leptophylla* (Compositae), Boulder Bank, Nelson, 29 March 1973, G. W. Ramsay (holotype slide and 2 paratype slides, NZAC; 6 paratype slides, PLNZ); *Cassinia fulvida*, Christchurch, 5 October 1964, J. S. Sheppard (1 paratype slide, PLNZ) and Moorpark, Takaha Hill, 23 August 1964, G. W. Ramsay (3 paratype slides, PLNZ); *Cassinia retorta*, Bethells Beach, Auckland, 8 November 1952, S. A. Rumsey (1 paratype slide, PLNZ); and *Cassinia vauvilliersii*, Brothers Range, Canterbury, 915 m, 1 November 1958, N. T. Moar (2 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Cassinia fulvida*, Lake Pearson, near Cass, 5 Oct 1964, and *C. vauvilliersii*, Cowan Ridge, 1525 m, 1 Nov 1964.

AK / NN, NC, MC, WD.

Forming bud galls on *Cassinia leptophylla* and *C. vauvilliersii* (Cowan Ridge), deformed buds on *C. fulvida*, and 'witches brooms' on *C. retorta* and *C. vauvilliersii* (Brothers Range).

REMARKS. The strongly impressed dorsal shield ornamentation, usually spine-shaped body microtubercles, five-rayed featherclaw, and dash-like coxal markings should distinguish *Eriophyes leptophyllae*.

This species shows some variability, mainly in the shape of the microtubercles. Some specimens have rounded microtubercles and lack shield ornamentation, and one might suspect this to be an instance of deuteroecy. However, several males examined were also variable in this respect, so at present I regard the differences simply as variation of no taxonomic significance. A study of the biology and life cycle of this species would be of interest, however.

Eriophyes mali Burts

Figures 406-413

Eriophyes mali Burts, 1970: 44.

FEMALE (description from 7 specimens). Length 135-150 μm , width 42-57 μm , depth 50-52 μm . Fusiform; pale yellow. Rostrum 25-26 μm long, curved down; antapical seta 3-4 μm long. Dorsal shield subsemicircular, 21-25 μm long, 40-43 μm wide; ornamentation lightly impressed - admedians, 1 short submedian, and several lateral lines, mostly granulose; dorsal tubercles almost on rear shield margin, 12-14 μm apart; dorsal setae 16-21 μm long, directed anteriorly.

Foreleg 23-26 μm long; tibia 5-6 μm long, with a seta 4 μm long at about one-fifth; tarsus 5-6 μm long; claw 6 μm long; feather-claw 4-rayed. Hind leg 22-25 μm long; tibia 3-4 μm long; tarsus 5-6 μm long; claw 7-8 μm long. Coxae with large, faint granules; 1st coxal seta 5-6 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternum with a double longitudinal line.

Abdomen with about 67-86 rings, all microtuberculate except for about the last 5 or 6; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 12-16 μm long. Ventral setae: 1st on about ring 23, 20-33 μm long; 2nd on about ring 37, 2-8 μm long; 3rd on about 6th ring from rear, 11-26 μm long. Accessory caudal seta 5-6 μm long. Genitalia 14-20 μm wide, 7-9 μm long. Coverflap with longitudinal markings; genital seta 5-9 μm long.

MALE. Present.

TYPE DATA. Described from *Malus pumila* (apple; Rosaceae), Wenatchee, Washington, U.S.A. (holotype slide in collection of Department of Entomology, Washington State University, Pullman; 5 paratype slides in personal collection of E. C. Burts).

MATERIAL EXAMINED. Non-type examples from *Malus pumila*, Levin, 12 Jan 1964 and 21 Apr 1975.

WN / - .

Causing leaf blisters; frequently occurring on apple buds and under the bud scales.

REMARKS. *Eriophyes mali* and *E. pyri* are similar. The most practical criterion for their separation is host specificity, but there are differences in New Zealand specimens in the length of the second ventral setae and lateral setae and the number of body rings, these being distinctly greater for *E. pyri*. Details of these measurements are shown in Appendix 1(a).

I have followed Burts (1970) in designating the species from apple as distinct. However, a comparison of his measurements of *E. mali* for U.S.A. specimens as compared to mine for New Zealand specimens shows differences - see Appendix 1(b).

The most reliable morphological difference between *E. mali* and *E. pyri* seems to be in the length of the lateral seta, which is always longer in *E. pyri*.

Eriophyes paratrophis Lamb

Figures 414-420

Eriophyes paratrophis Lamb, 1953: 378.

FEMALE (description from 4 specimens). Length 125-159 μm , width 38-50 μm , depth 31 μm . Vermiform. Rostrum 16-18 μm long, curved down; antapical seta 1-4 μm long. Dorsal shield semicircular, 24-26 μm long, 31-49 μm wide; ornamentation consisting of longitudinal lines - a median, admedians, and about 3 submedians; lateral shield areas granulate; dorsal tubercles slightly ahead of rear shield margin, 13-15 μm apart; dorsal setae 22-23 μm long, directed forward.

Foreleg 25 μm long; tibia 5-6 μm long, with a seta about 2-4 μm long at about one-third; tarsus 4-6 μm long; claw 4-6 μm long; featherclaw 5-rayed. Hind leg 22-23 μm long; tibia 4 μm long; tarsus 4-6 μm long; claw 5-6 μm long. Coxae granulose, with a few longitudinal lines between 2nd coxal setae; 1st coxal seta 3-4 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles about as far apart as the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 66-68 rings, all microtuberculate except for the last 5 or 6; microtubercles elongate-oval, on rear ring margin. Lateral seta on about ring 9, 13-18 μm long. Ventral setae: 1st on about ring 22, 21-38 μm long; 2nd on about ring

38, 5-6 μm long; 3rd on about 6th ring from rear, 14-15 μm long. Accessory caudal seta 2 μm long. Genitalia 16-20 μm wide, 8-12 μm long. Coverflap with longitudinal markings; genital seta 5-6 μm long.

MALE. Present.

TYPE DATA. Described from *Paratrophis microphylla* (Moraceae), Levin, December 1949, A. Lush (holotype slide and 1 paratype slide, NZAC).

MATERIAL EXAMINED. Type slides, plus non-type examples from *Paratrophis banksi*, Ruamahua-iti Island, The Aldermen, 9 Nov 1972, and *Paratrophis microphylla*, Maud Island, Pelorus Sound, 22 Oct 1967.

CL, WN / SD.

Causing 'witches brooms', though the material from Pelorus Sound has bud galls.

REMARKS. The distinctive dorsal shield ornamentation with longitudinal lines and lateral granulation, together with the granulose coxae, should distinguish *Eriophyes paratrophis*.

Lamb's original illustrations of this species do not show the female dorsal shield or coxal area, both having characters important in diagnosis. The examples described here came from the same dried material as the type slides.

Lamb's original specific epithet '*paratrophis*' is here changed to '*paratrophis*', the grammatically correct form in combination with *Eriophyes*.

Eriophyes parsonsiae new species

Figures 421-428

FEMALE (description from 5 specimens). Length 163-225 μm , width 56-66 μm , depth 64-66 μm . Fusiform. Rostrum 23 μm long, curved down; antapical seta 5-6 μm long. Dorsal shield subsemicircular, 35-40 μm long, 54-56 μm wide; ornamentation varying in intensity, but generally as follows: a short, basal median line curving to meet admedians; admedians running almost full length of shield; 2 short submedians anteriorly, running about a quarter to a third of shield length; a transverse line at base of these, which also crosses admedians, forming 5 large, subrectangular 'cells' on

anterior part of shield; a line, often forked at about one-third, running towards dorsal seta from a point on transverse line between inner submedian and admedian; some granulation on shield margins, particularly at posterolateral corners; dorsal tubercles ahead of rear shield margin, 25 μm apart; dorsal setae 8-13 μm long, directed upwards and medially.

Foreleg 30-31 μm long; tibia 6-7 μm long, with a seta 13-16 μm long at about a third; tarsus 6-8 μm long; claw 5-6 μm long, with a 3-rayed featherclaw. Hind leg 28-30 μm long; tibia 5-6 μm long; tarsus 8 μm long; claw 7-8 μm long. Coxae unornamented; 1st coxal seta 4-5 μm long; 1st setiferous coxal tubercles almost adjacent to the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 70-78 microtuberculate rings; microtubercles elongate-oval, on rear ring margin, fainter and more widely spaced on dorsal half of abdomen. Lateral seta on about ring 7, 23-25 μm long. Ventral setae: 1st on about ring 21, 53-58 μm long; 2nd on about ring 38, 13-14 μm long; 3rd on about 8th ring from rear, 19-26 μm long. Accessory caudal seta absent. Genitalia 25-26 μm wide, 15-16 μm long. Coverflap granulose basally, otherwise without ornamentation; genital seta 4-6 μm long.

MALE. Present.

TYPE DATA. From *Parsonsia heterophylla* (Apocynaceae), Riwaka, Nelson, 18 November 1969, J. S. Dugdale (holotype slide, 2 paratype slides, and dried material, NZAC; 8 paratype slides, PLNZ) and Smith's Bush, Auckland, 16 October 1948, J. M. Dingley (1 paratype slide, PLNZ); and from *Parsonsia* sp., mixed forest, Haywards, 19 May 1953, A. J. Healy (5 paratype slides, PLNZ) and Upper Hutt, 4 May 1953, A. J. Healy (1 paratype slide, PLNZ).

MATERIAL EXAMINED. Type series only.

AK, WN / NN.

Causing a leaf erineum.

REMARKS. The extreme length of the fore-tibial seta (13-16 μm) and the positioning of the first coxal tubercles, which are almost immediately adjacent to the second tubercles, are together distinctive of *Eriophyes parsonsiae*.

Lamb (1960, p. 122, no. 7 and no. 10) refers to this species under the term "gallmite".

Eriophyes plaginus new species

Figures 429-436

FEMALE (description from 6 specimens). Length 154-224 μm , width 31-45 μm , depth 43-44 μm . Vermiform; white. Rostrum 16-18 μm long, curved down; antapical seta 3 μm long. Dorsal shield subtriangular, sharply pointed anteriorly, 20-21 μm long, 25-28 μm wide; ornamentation almost absent dorsally - a trace of admedians and lateral lines sometimes discernible; viewed laterally, ornamentation consists of rather striking elongate-oval bar-like structures; dorsal tubercles on rear shield margin, 14-16 μm apart; dorsal setae 15-19 μm long, directed anteriorly.

Foreleg 20-23 μm long; tibia 4-5 μm long, with a seta 3 μm long at about one-third; tarsus 5 μm long; claw 6 μm long; with a 4-rayed featherclaw. Hind leg 19-21 μm long; tibia 4 μm long; tarsus 5 μm long; claw 6-8 μm long. Coxae unornamented; 1st coxal seta 1-2 μm long, on a small tubercle ahead of anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line forked.

Abdomen with about 62-67 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 14-18 μm long. Ventral setae: 1st on about ring 19, 41-51 μm long; 2nd on about ring 34, 7-10 μm long; 3rd on about 6th ring from rear, 11-13 μm long. Accessory caudal seta 1-2 μm long. Genitalia 14-15 μm wide, 8-9 μm long. Coverflap unornamented; genital seta 5-6 μm long.

MALE. Present.

TYPE DATA. From *Plagianthus betulinus* (Malvaceae), Christchurch, 22 February 1952, K. P. Lamb (holotype slide and 1 paratype slide, NZAC; 9 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Plagianthus betulinus*, Price's Valley, Banks Peninsula, 14 May 1975, and Peel Forest, 10 Nov 1976.

(WN) / MC, SC.

Causing 'witches brooms' on Christchurch material and deformed inflorescences on material from Banks Peninsula and South Canterbury.

REMARKS. The lateral bar-like markings on the dorsal shield, lack of coxal ornamentation, and minute first coxal setae, which are well advanced and situated on prominent tubercles, should distinguish *Eriophyes plaginus*.

Lamb (1960, p. 129) records a "gallmite" which could well be this species: ex *Plagianthus betulinus*, Trentham, 19 May 1953; and ex *Plagianthus betulinus* x *divaricatus*, Lyttelton, 18 May 1954.

The exact orientation of the dorsal shield setae has been difficult to determine. In 40 specimens (80 setae) examined, 51 setae were directed either upwards or forward, 27 were directed posteriorly, and 2 were undefinable. Examination of only a few specimens could easily result in this species being placed in *Aceria*.

Eriophyes planchonellus new species

Figures 437-444

FEMALE (description from 6 specimens). Length 160-219 μm , width 42-44 μm , depth 42-43 μm . Vermiform; white. Rostrum 18-22 μm long, curved down; antapical seta 1-3 μm long. Dorsal shield subsemicircular, 20-24 μm long, 32-33 μm wide; ornamentation consisting of longitudinal lines - a median, admedians, 2 or 3 submedians, and a lateral line; dorsal tubercles on rear shield margin, 13-14 μm apart; dorsal setae 13-19 μm long, directed anteriorly.

Foreleg 20-24 μm long; tibia 4-5 μm long, with a seta 4-5 μm long at about mid length; tarsus 4-5 μm long; claw 5-6 μm long, with a 6-rayed featherclaw. Hind leg 18-22 μm long; tibia 3-4 μm long; tarsus 4-5 μm long; claw 8-9 μm long. Coxae unornamented; 1st coxal seta 5-6 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles further apart than the 2nd, which are just ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 69-86 rings, all microtuberculate except for about the last 5; microtubercles elongate-oval, on rear

ring margin. Lateral seta on about ring 8, 17-22 μm long. Ventral setae: 1st on about ring 18, 30-37 μm long; 2nd on about ring 39, 2-4 μm long; 3rd on about 6th ring from rear, 15-19 μm long. Accessory caudal seta absent. Genitalia 15-19 μm wide, 10-11 μm long. Coverflap with longitudinal markings; genital seta 4-6 μm long.

MALE. Present.

TYPE DATA. From *Planchonella novo-zelandica* (Sapotaceae), Destruction Gully, Huia, 31 October 1974, B. M. May (holotype slide and 1 paratype slide, NZAC; 8 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

AK / - .

Causing distorted flower buds.

REMARKS. The six-rayed featherclaw, longitudinal shield markings, and lack of coxal ornamentation are together distinctive of *Eriophyes planchonellus*.

Eriophyes pyri (Pagenstecher)

pear leaf blister mite

Figures 445-451

Phytoptus (?) *pyri* Pagenstecher, 1857: 48.

Eriophyes piri (Pagenstecher). Keifer, 1938: 139.

Eriophyes pyri (Pagenstecher). Keifer, 1952: 37.

FEMALE (description from 8 specimens). Length 135-195 μm , width 45-57 μm , depth 43-55 μm . Fusiform; pale yellow. Rostrum 21-28 μm long, curved down; antapical seta 3-6 μm long. Dorsal shield subsemicircular, 26-32 μm long, 44-50 μm wide; ornamentation somewhat variable, lightly impressed - a basal median line running about one-quarter length of shield, admedians, and a few irregular lines lateral to these; lateral shield areas granulose, with upswept lateral lines; dorsal tubercles slightly ahead of rear shield margin, 10-13 μm apart; dorsal setae 20-28 μm long, directed anteriorly.

Foreleg 28-37 μm long; tibia 6-8 μm long, with a seta 6-8 μm long at about one-fifth; tarsus 6-8 μm long; claw 5-7 μm long, with

a 4-rayed featherclaw. Hind leg 25-33 μm long; tibia 5-6 μm long; tarsus 6-8 μm long; claw 7-9 μm long. Coxae with thick, dash-like markings; 1st coxal seta 6-8 μm long, behind anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line present.

Abdomen with about 71-113 microtuberculate rings; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 20-38 μm long. Ventral setae: 1st on about ring 25, 17-65 μm long; 2nd on about ring 44, 7-14 μm long; 3rd on about 7th ring from rear, 22-28 μm long. Accessory caudal seta 5-9 μm long. Genitalia 19-21 μm wide, 8-14 μm long. Coverflap with longitudinal markings; genital seta 6-19 μm long.

MALE. Present.

TYPE DATA. Described from *Pyrus communis* (pear; Rosaceae), Germany. No other data; type material lost.

MATERIAL EXAMINED. Non-type examples from *Pyrus communis*: Matangi, Hamilton, 15 Feb 1951; Palmerston North, 17 Nov 1966; Levin, 11 and 21 Oct 1966; Waikanae, 13 Nov 1976; Wellington, ? date.

WO, WI, WN / - .

Attacking developing leaves, resulting in blister formation.

REMARKS. *Eriophyes pyri* is very similar to *E. mali*, from which it can be separated by the length of the second ventral setae and lateral setae and the number of body rings (see Remarks under *E. mali*, and Appendix 1).

This species has apparently been present in New Zealand for many years, for Thomson (1922) states that it was very common here in 1896 and 1897. Burts (1970) gives an account of it, and of the closely related *E. mali* (under the name *Phytoptus mali*).

E. pyri has also been recorded from North and South America, Europe, Egypt, and Australia.

—S—

***Eriophyes sexstylosae* new species**

Figures 452-459

FEMALE (description from 6 specimens). Length 129-198 μm , width 40-50 μm , depth 39-46 μm . Fusiform. Rostrum 14-16 μm long, curved down; antapical seta 2-3 μm long. Dorsal shield subsemicircular, with a small, triangular anterior lobe, 18-25 μm long, 31-44 μm wide; ornamentation consisting of longitudinal lines - admedians, 1 or 2 submedians, and a few short laterals; dorsal tubercles ahead of rear shield margin, 13-15 μm apart; dorsal setae 13-23 μm long, directed anteriorly.

Foreleg 20-24 μm long; tibia 4-6 μm long, with a seta 3 μm long at about one-quarter; tarsus 5 μm long; claw 6 μm long; feather-claw 4-rayed. Hind leg 18-21 μm long; tibia 3-4 μm long; tarsus 4-5 μm long; claw 6 μm long. Forecoxae sometimes with a few faint lines and granules; coxae otherwise unornamented; 1st coxal seta 2-4 μm long, about level with anterior coxal approximation; 1st setiferous coxal tubercles slightly further apart than the 2nd, which are ahead of a line through the 3rd tubercles. Sternal line forked posteriorly.

Abdomen with about 55-66 microtuberculate rings; microtubercles on last 5 rings less distinct, smaller; microtubercles elongate-rounded, on rear ring margin. Lateral seta on about ring 8, 13-14 μm long. Ventral setae: 1st on about ring 18, 23-39 μm long; 2nd on about ring 32, 5-9 μm long; 3rd on about 6th ring from rear, 6-14 μm long. Accessory caudal seta 1-3 μm long. Genitalia 18-19 μm wide, 8-11 μm long. Coverflap unornamented; genital seta 4-9 μm long.

MALE. Present.

TYPE DATA. From *Hoheria sexstylosa* (Malvaceae), Marokopa, near Te Kuiti, 18 February 1973, B. M. May (holotype slide and 1 paratype slide, NZAC; 12 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series, plus non-type examples from *Hoheria sexstylosa*, Esk State Forest, 10 Mar 1976.

WO, HB / - .

Forming a reddish erineum on leaf undersurfaces.

REMARKS. *Eriophyes sexstylosae* is very

similar to *E. hoheriae*, from which it can be distinguished by the length of the first ventral seta (23-29 μm , as against 43-52 μm) and by the type of damage to the host plant - *hoheriae* causes stem galls, and *sexstylosae* causes a leaf crinum.

***Eriophyes totarae* new species**

Figures 460-467

FEMALE (description from 7 specimens). Length 138-166 μm , width 49-54 μm , depth 45-55 μm . Fusiform. Rostrum 21-23 μm long, curved down; antapical seta 6-8 μm long. Dorsal shield subsemicircular, 25-29 μm long, 33-41 μm wide; ornamentation consisting principally of thick, almost dash-like longitudinal lines, as follows: median line absent; admedians running almost full length of shield; 2 submedians, the inner one running only about one-third length of shield, the outer almost reaching shield setae; usually a short line starting anterior to shield seta and running diagonally towards lateral shield margin; some slight lateral granulation; dorsal tubercles ahead of rear shield margin, 18-19 μm apart; dorsal setae 5-6 μm long, directed medially.

Foreleg 23-25 μm long; femoral seta absent; tibia 5 μm long, with a seta 6-8 μm long at about one-third; tarsus 5-6 μm long; claw 5-6 μm long; featherclaw 6-rayed. Hind leg 20-23 μm long; tibia 5 μm long; tarsus 5-6 μm long; claw 6-7 μm long. Coxae granulose; 1st coxal seta 6-8 μm long, ahead of anterior coxal approximation; 1st setiferous coxal tubercles much further apart than the 2nd, which are well ahead of a line through the 3rd tubercles. Sternal line forked posteriorly.

Abdomen with about 62-70 rings, all microtuberculate except about the last 7 and the dorsal half of the 3 preceding them; microtubercles oval, on rear ring margin. Lateral seta on about ring 9, 28-31 μm long. Ventral setae: 1st on about ring 22, 32-40 μm long; 2nd on about ring 41, 21-38 μm long; 3rd on about 6th ring from rear, 16-21 μm long. Accessory caudal seta 2-3 μm long. Genitalia 20-21 μm wide, 13-15 μm long. Coverflap with granules anteriorly, longitudinal markings posteriorly; genital seta 6-9 μm long.

MALE. Not seen.

TYPE DATA. From (?) *Podocarpus totara* (totara; Podocarpaceae), Baigent Park, Wakefield, 1 October 1964, G. Kuschel (holotype slide and 2 paratype slides, NZAC; 7 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

- / NN.

Associated with cones.

REMARKS. The lack of a forefemoral seta and the six-rayed featherclaw should together distinguish *Eriophyes totarae*.

Ramaculus new genus

TYPE-SPECIES *Ramaculus mahoe* new species.

(The name *Ramaculus* is informally derived from the name of the host plant of the type-species and an existing genus-group name in the Eriophyidae; gender masculine.)

Body fusiform; rings subequal dorsoventrally. Rostrum short. Dorsal shield without an anterior lobe; dorsal tubercles at rear shield margin, directing setae posteriorly. Legs with normal segmentation; foretibial seta absent; featherclaw simple. First coxal tubercles and setae absent. Abdomen with 2nd ventral seta absent. Female genitalia: internal apodeme of normal length.

REMARKS. The main distinguishing features of this genus are all deficiencies - the absence of the foretibial seta, the first coxal tubercles and setae, and the second ventral seta.

Ramaculus mahoe new species

Figures 468-475

FEMALE (description from 7 specimens). Length 123-195 μm , width 46-52 μm , depth 45-57 μm . Fusiform; whitish. Rostrum 14-15 μm long, curved down; antapical seta 1-3 μm long. Dorsal shield subsemicircular, 20-25 μm long, 42-46 μm wide; central shield area unornamented, clearly outlined, the outline forming horn-like projections at posterolateral corners; an irregular line joining

dorsal tubercles; granulose areas at anterolateral shield margins; dorsal tubercles prominent, on rear shield margin, 21-24 μm apart; dorsal setae 22-26 μm long, directed posteriorly.

Foreleg 18-21 μm long; tibia 2-4 μm long, without a seta; tarsus 4-5 μm long; claw 4-5 μm long; featherclaw 4-rayed or 5-rayed. Hind leg 17-19 μm long; tibia 2-3 μm long; tarsus 3-5 μm long; claw 8-11 μm long. Coxae granulose; 1st coxal seta absent; 2nd setiferous coxal tubercles ahead of a line through the 3rd tubercles. Sternal line absent.

Abdomen with about 54-57 microtuberculate rings, the microtubercles fading dorsally over about the last 17 rings and completely absent on about the last 6-9; microtubercles oval, on rear ring margin. Lateral seta on about ring 8, 20-29 μm long. Ventral setae: 1st on about ring 18, 50-55 μm long; 2nd absent; 3rd on about 7th ring from rear, 13-18 μm long. Accessory caudal seta 1-2 μm long. Genitalia 18-20 μm wide, 8-10 μm long. Coverflap with a few light crescentic markings posteriorly, otherwise unornamented; area anterior to coverflap granulose; genital seta 6-9 μm long.

MALE. Present.

TYPE DATA. From *Melicytus ramiflorus* (mahoe or whitewood; Violaceae): Twin Peaks track, Huia, 8 December 1972, B. M. May (holotype slide and 5 paratype slides, NZAC; 9 paratype slides, PLNZ); Rangitoto Island, 25 June 1950, E. Bray (5 paratype slides, PLNZ); Waitakere Range, 28 December 1958, J. A. Hunter (4 paratype slides, PLNZ).

MATERIAL EXAMINED. Type series only.

AK / - .

Causing flower galls and galling and malformation of the leaf buds.

REMARKS. Distinctive characters are the absence of the first coxal seta, foretibial seta, and second ventral seta, the great length of the hind claw, and the gradual fading out of the abdominal microtubercles on the posterodorsal area.

The holotype slide of *Aceria melicyti* has four specimens of *Ramaculus mahoe*, and the paratype slides contain almost entirely this species - only two *A. melicyti* are present.

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APPENDIX 1(a)

A comparison of three body characters in New Zealand specimens of *Eriophyes pyri* and *E. mali*.

CHARACTER	<i>E. pyri</i>	<i>E. mali</i>
2nd ventral seta, length (µm)	10.31	3.46
Standard deviation	±2.10	±1.65
No. of specimens	8	13
Lateral seta, length (µm)	28.00	14.88
Standard deviation	±5.45	±2.00
No. of specimens	8	17
Body rings, number	97	69
Standard deviation	±13.20	±4.77
No. of specimens	8	16

APPENDIX 1(b)

A comparison of several body characters in *E. mali* from the U.S.A. and New Zealand

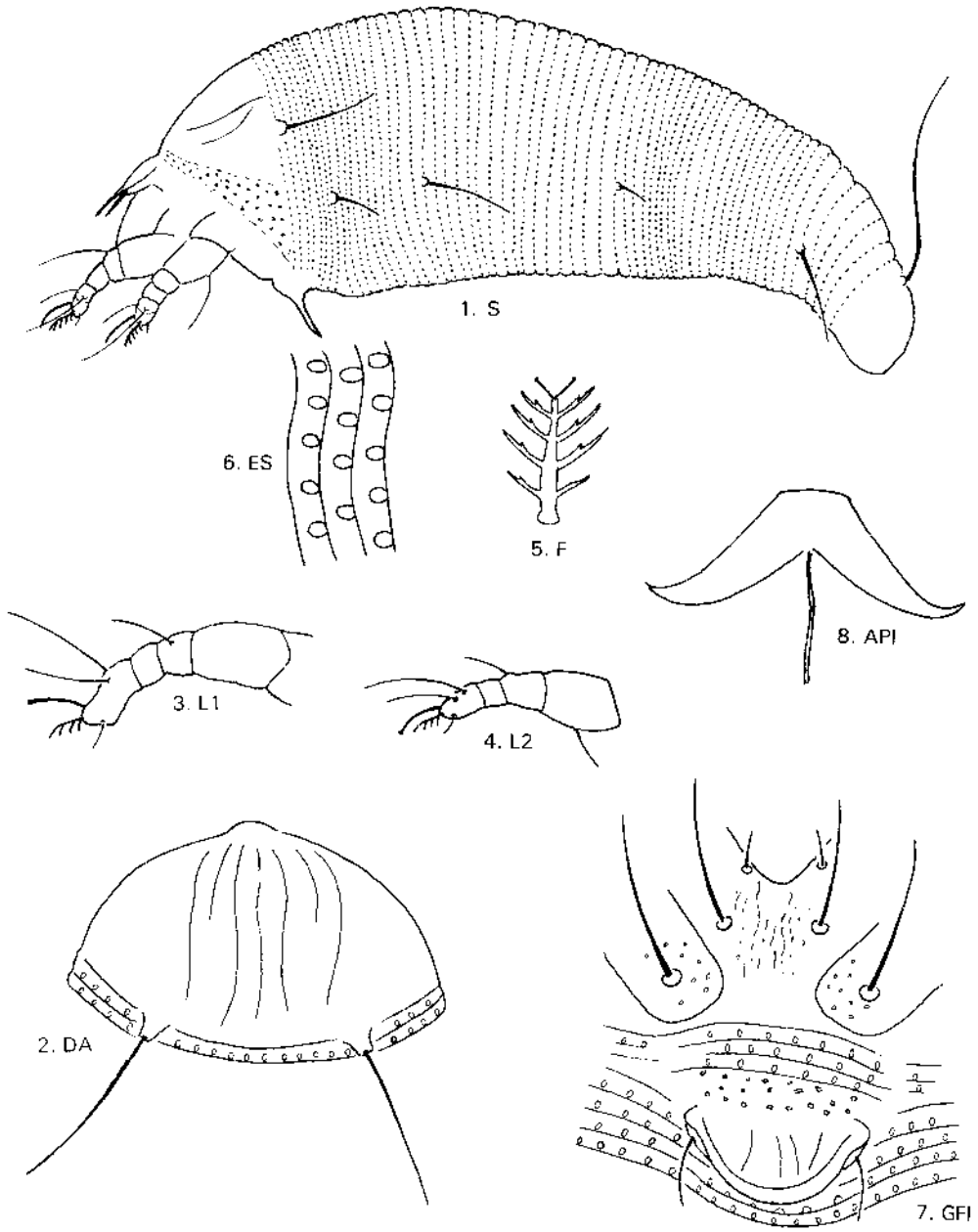
CHARACTER	U.S.A.	N.Z.
1st ventral seta, length (µm)	24.48	23.53
Standard deviation	±3.91	±3.81
No. of specimens	20	17
2nd ventral seta, length (µm)	8.53	3.46
Standard deviation	±1.53	±1.65
No. of specimens	20	13
Lateral seta, length (µm)	18.64	14.88
Standard deviation	±2.21	±2.00
No. of specimens	19	17
Genital seta, length (µm)	7.95	4.68
Standard deviation	±1.17	±2.59
No. of specimens	26	16
Body, length (µm)	159.3	152.4
Standard deviation	±10.45	±13.16
No. of specimens	20	17
Body rings, number	81	69
Standard deviation	±10.10	±4.77
No. of specimens	18	16

ILLUSTRATIONS

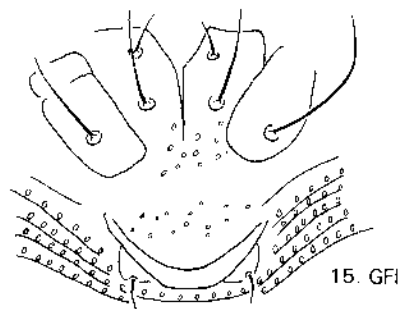
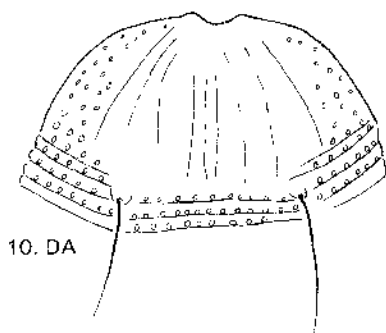
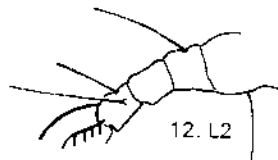
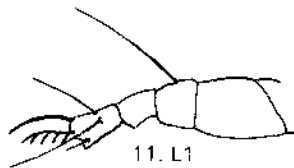
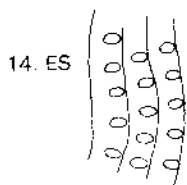
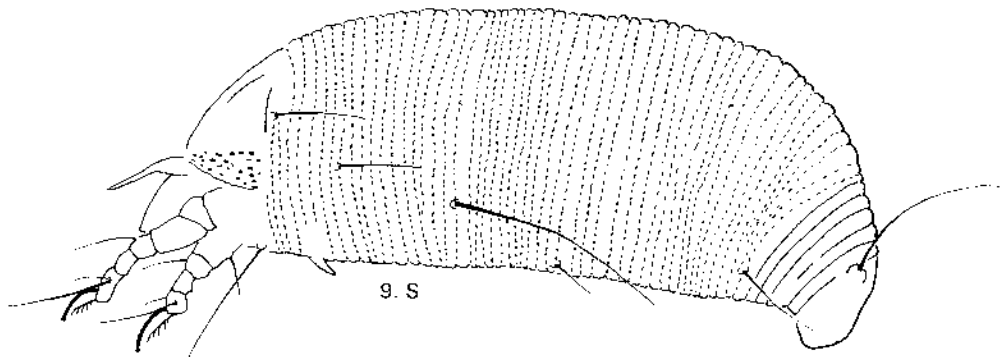
Figures 1-475 Habitus drawings of New Zealand species of Eriophyinae, and enlargements of features that aid identification.

Key. **API**, internal genitalia of female, showing form of apodeme; **D**, habitus, dorsal aspect; **DA**, dorsal shield; **ES**, body rings and tubercles; **F**, featherclaw; **GFI**, genital field of female, including coxal region; **L1, 2**, foreleg and hind leg; **S**, habitus, lateral aspect. **SA**, anterior end, lateral aspect.

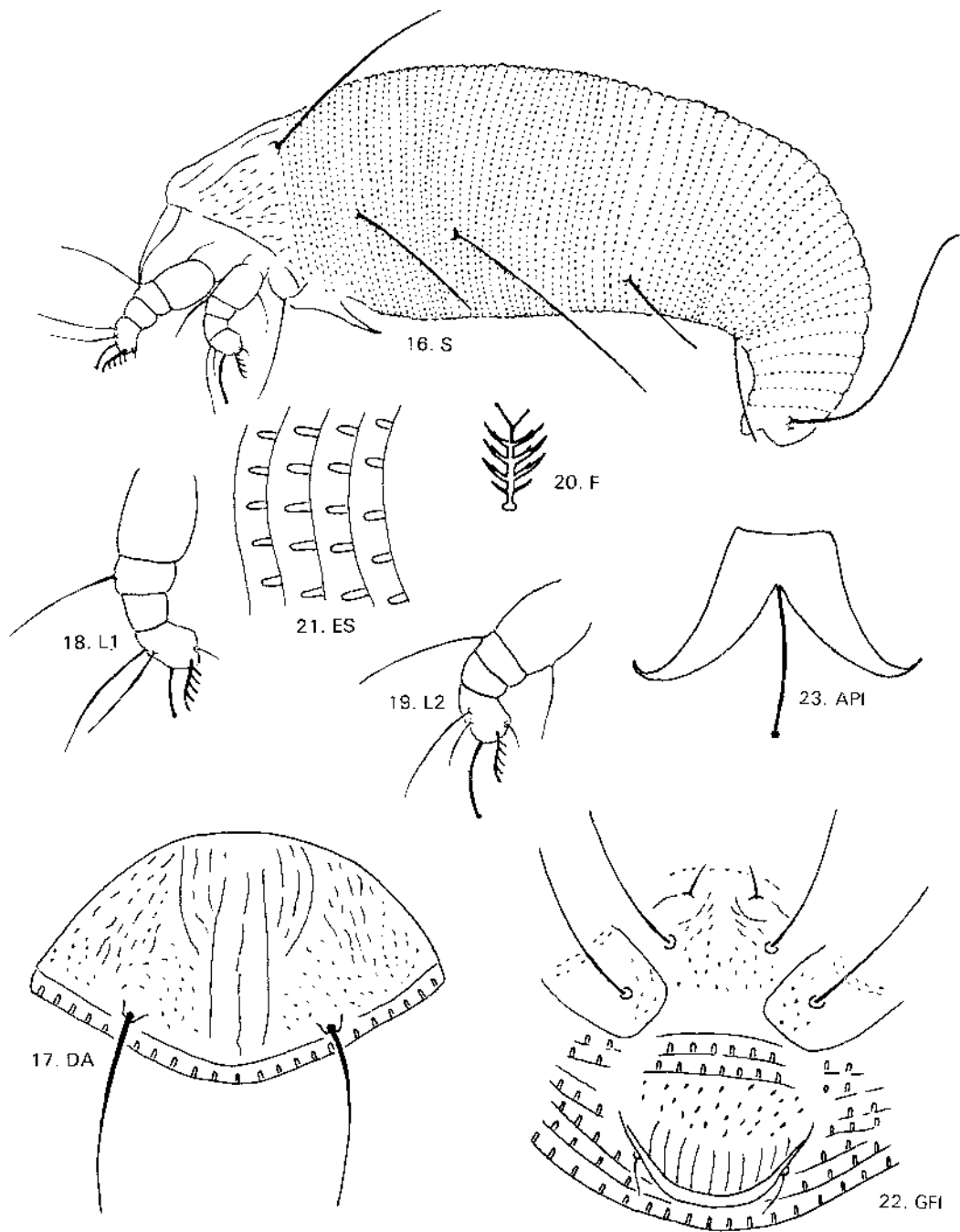
For names of structures, see figures 1-16 in *FNZ 4*.



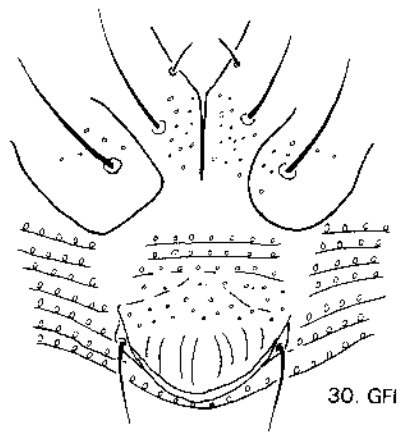
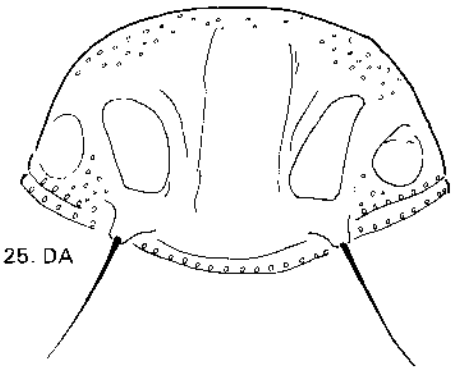
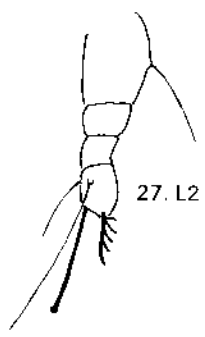
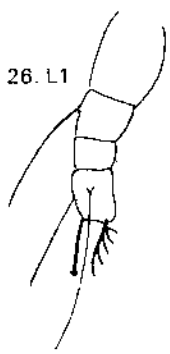
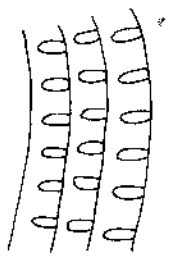
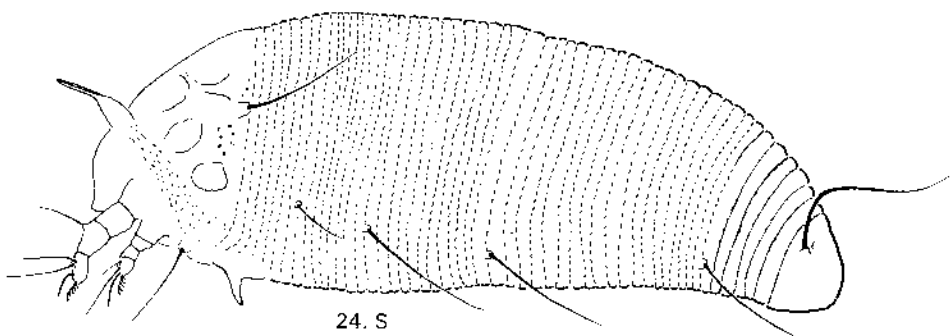
1-8. *Acalitus australis*



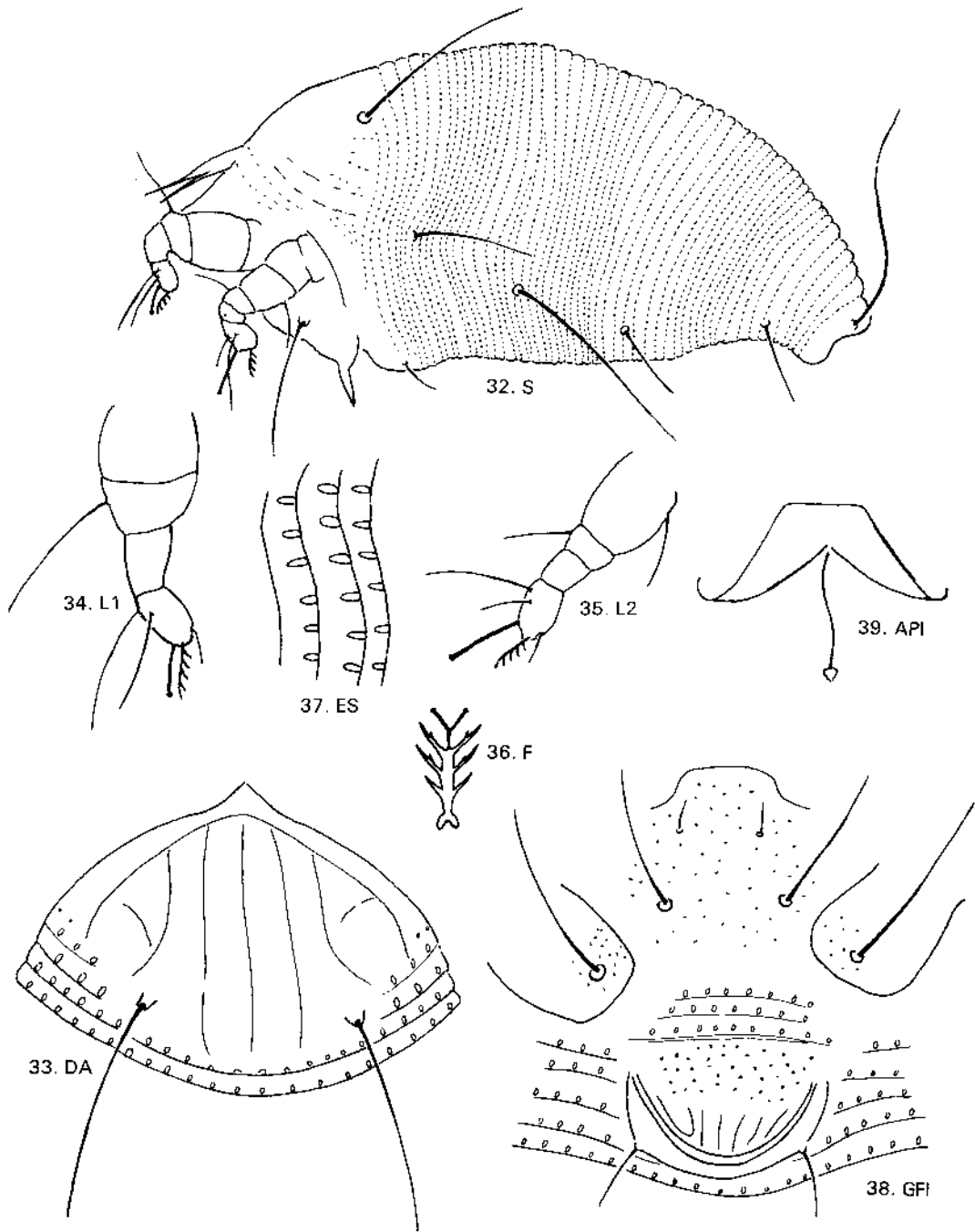
9-15. *Acalitus avicenniae*



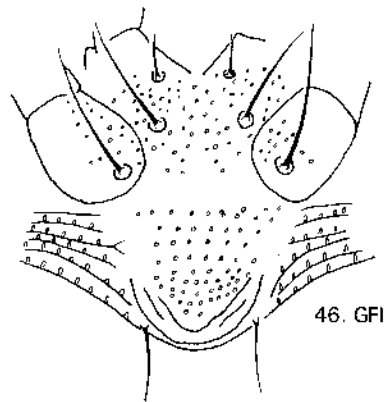
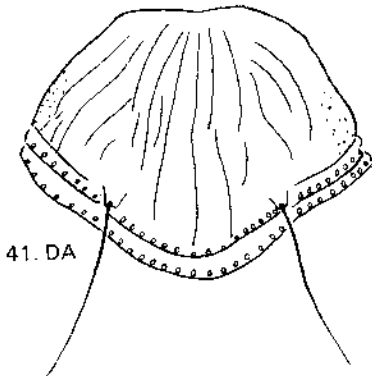
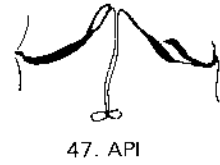
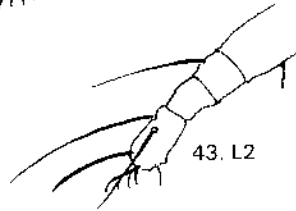
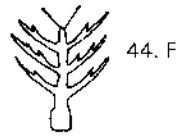
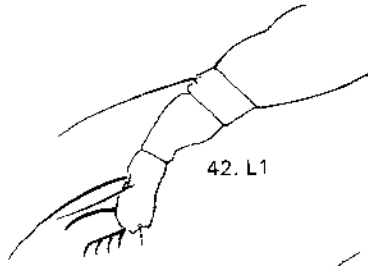
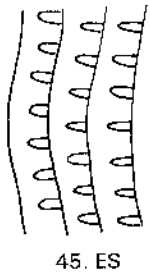
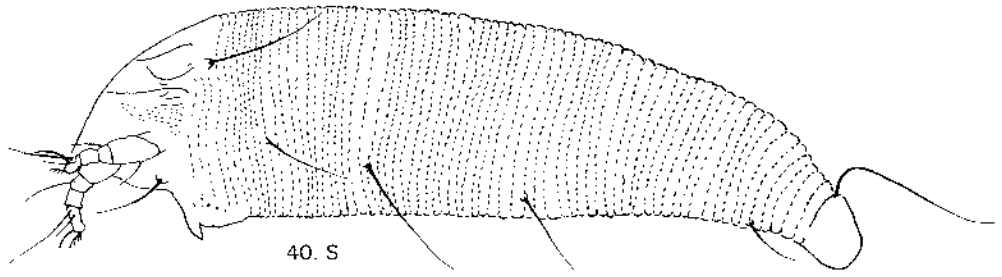
16-23. *Acalitus carpatus*



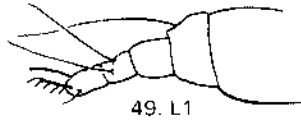
24-31. *Acalitus cottieri*



32-39. *Acalitus dissimus*



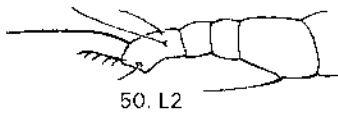
40-47. *Acalitus essigi*



49. L1



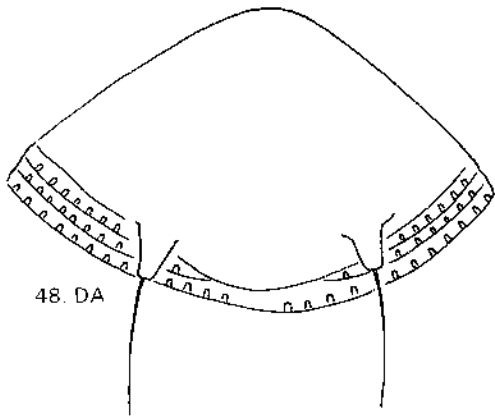
51. F



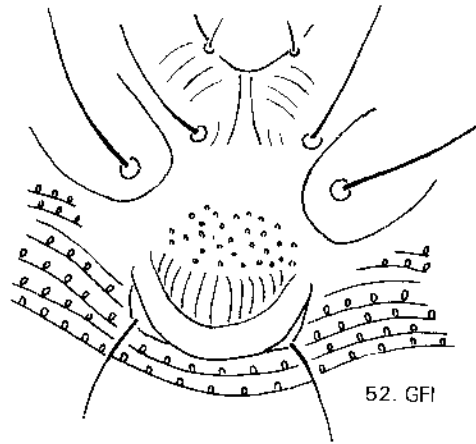
50. L2



53. API

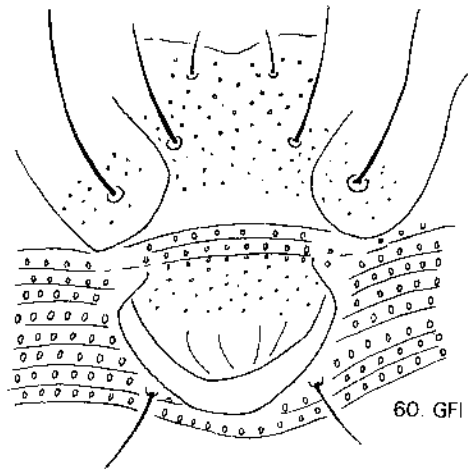
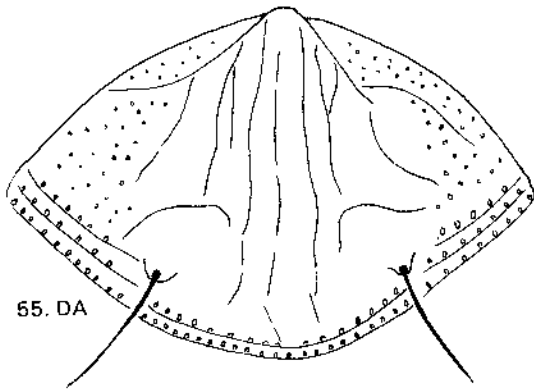
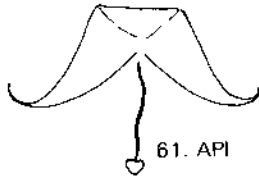
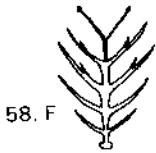
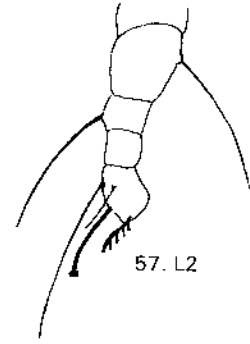
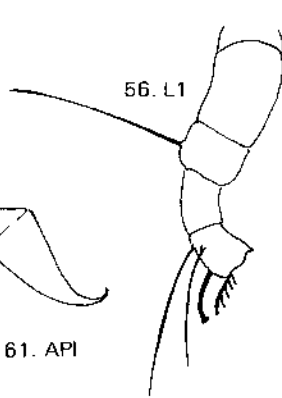
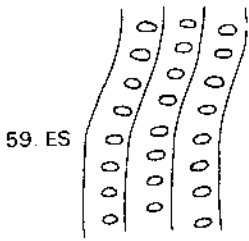
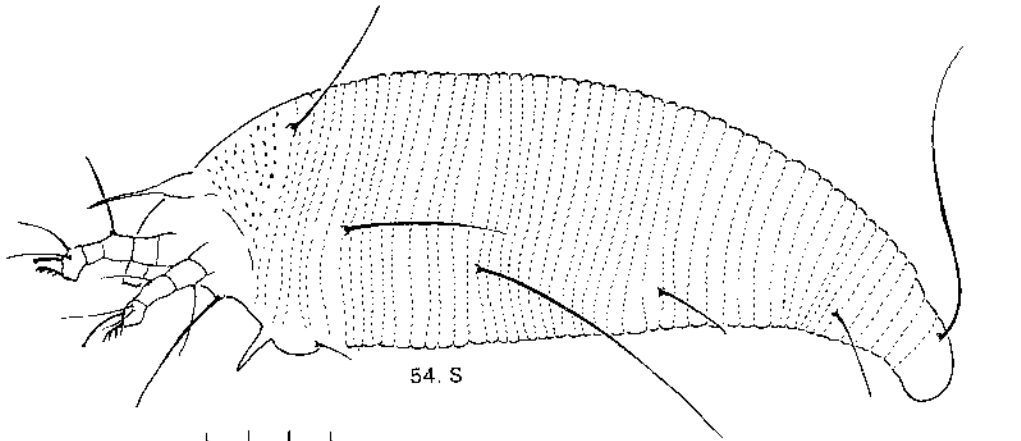


48. DA

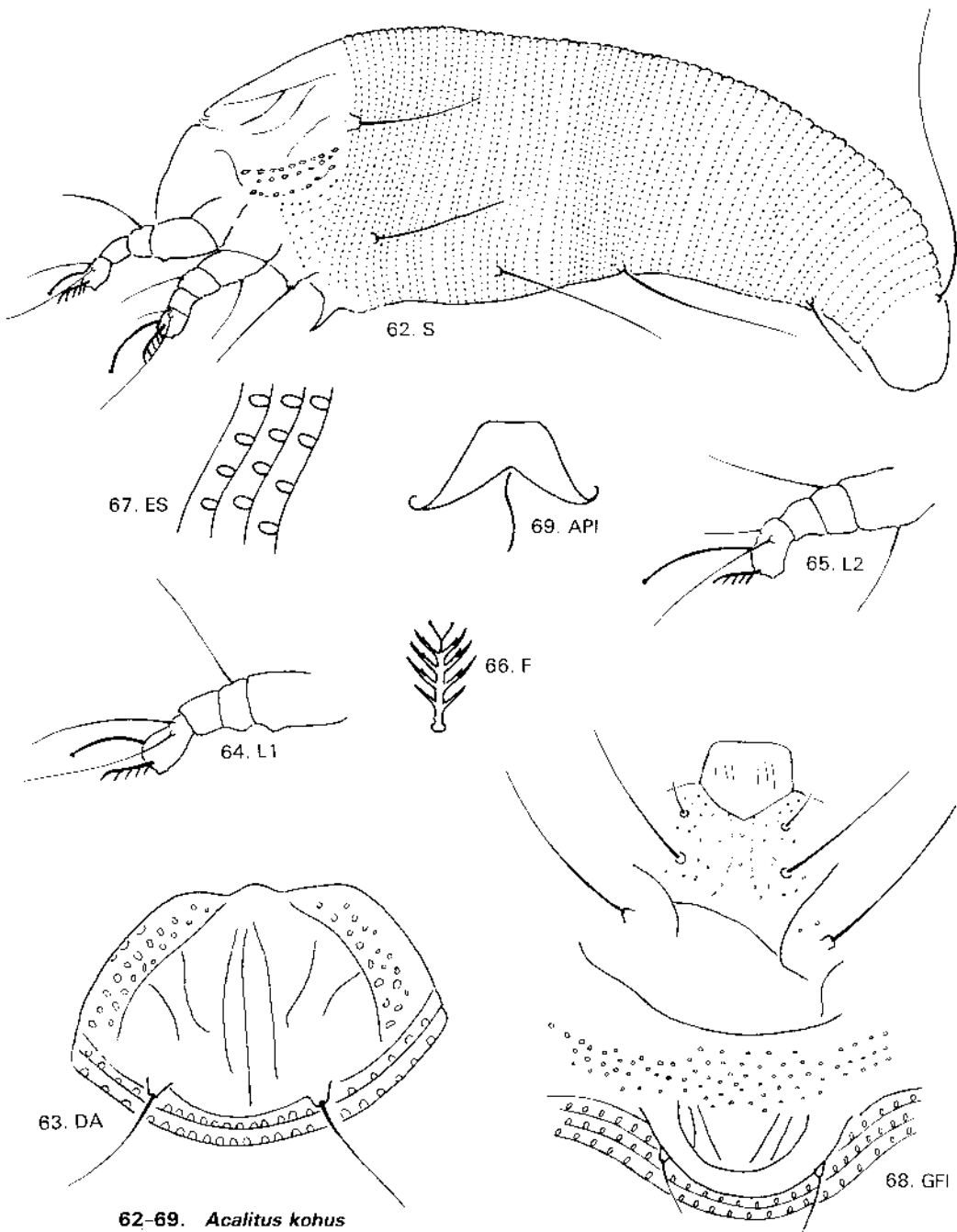


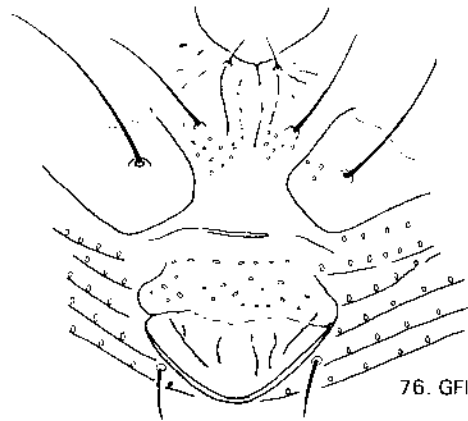
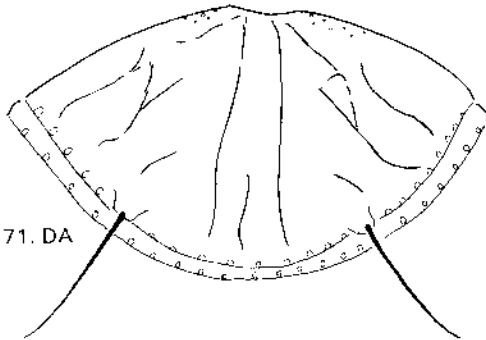
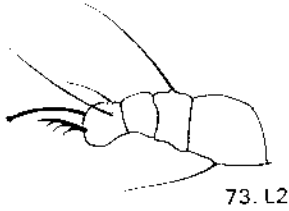
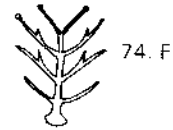
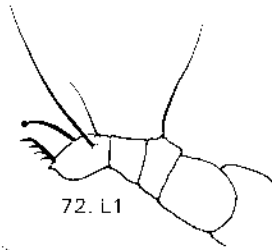
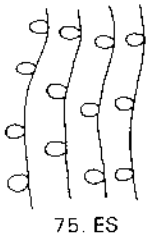
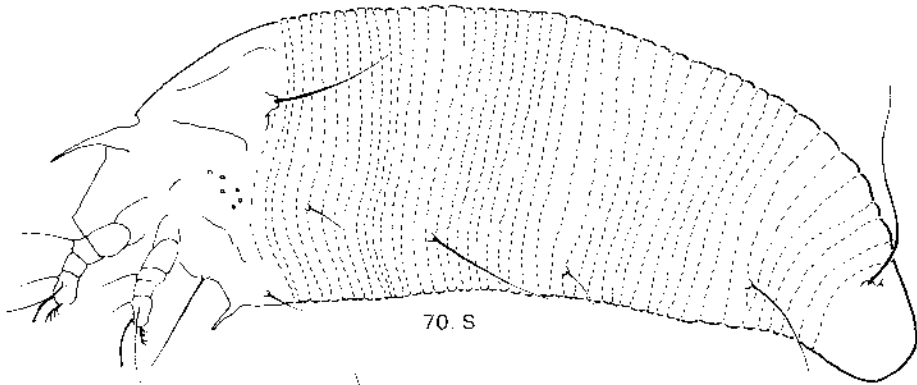
52. GI

48-53. *Acalitus excelsus*

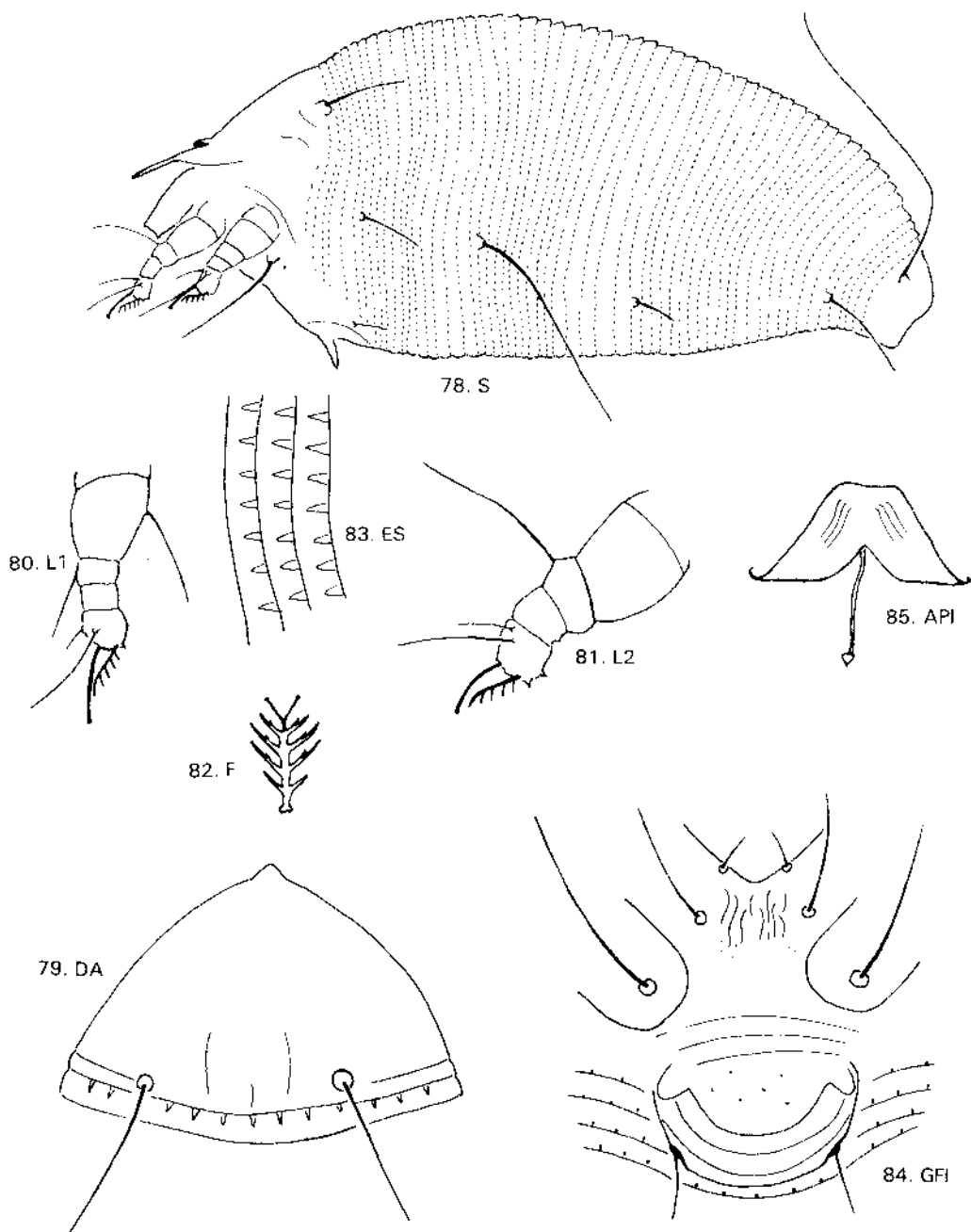


54-61. *Acalitus intertextus*

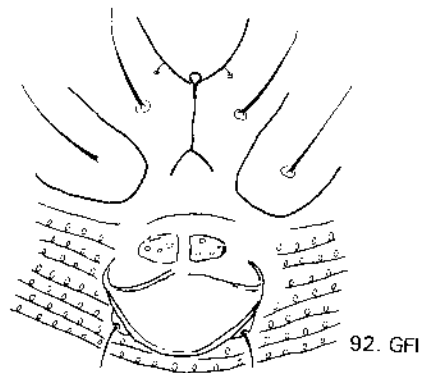
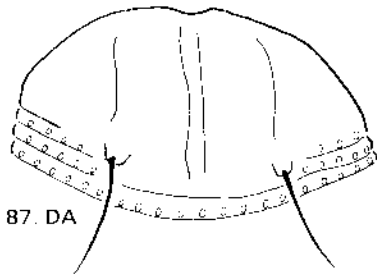
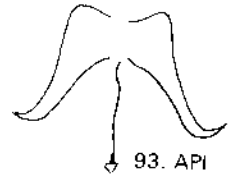
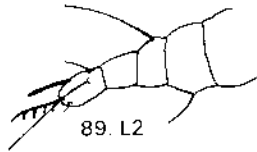
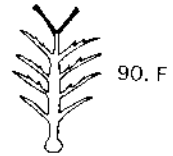
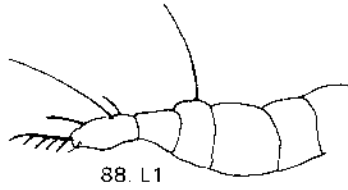
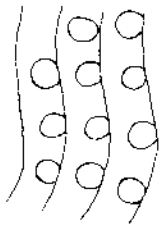
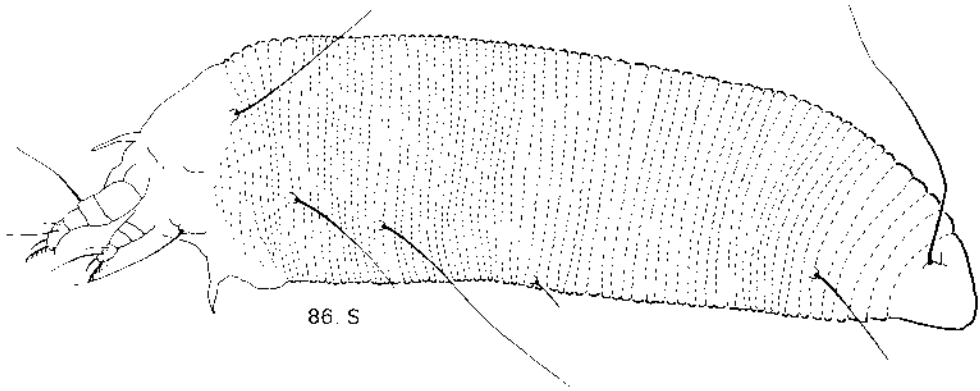




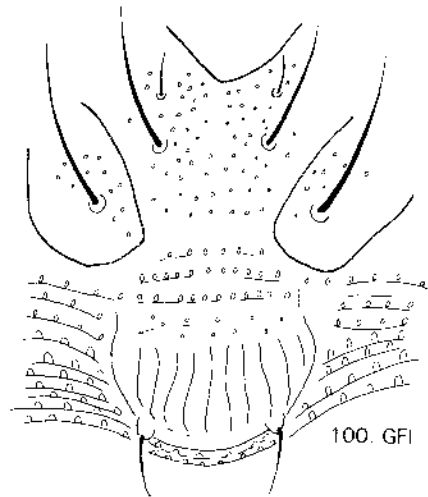
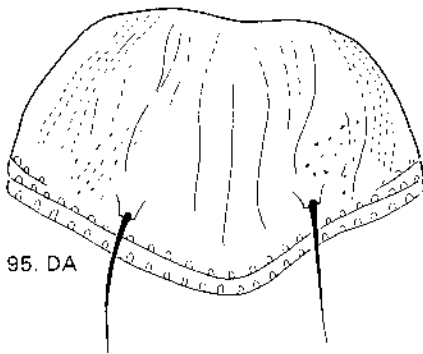
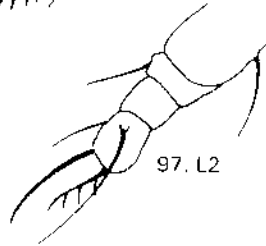
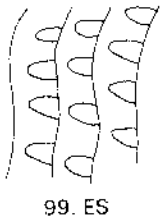
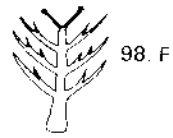
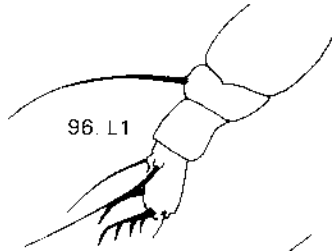
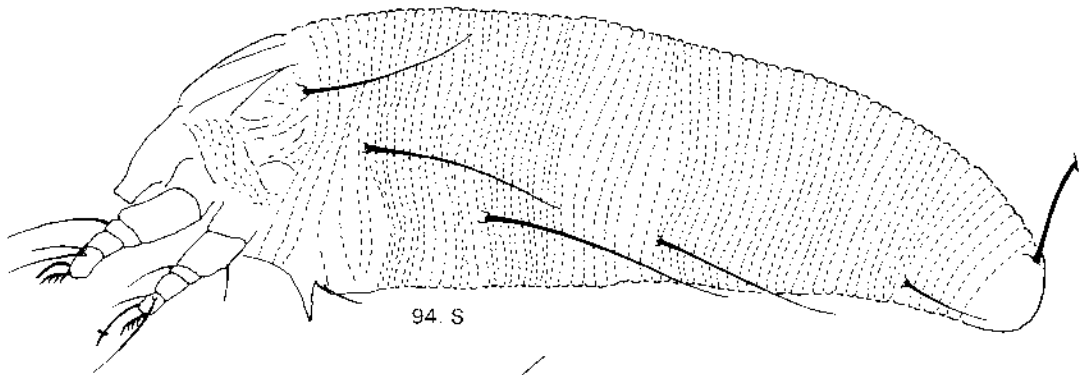
70-77. *Acalitus lowei*



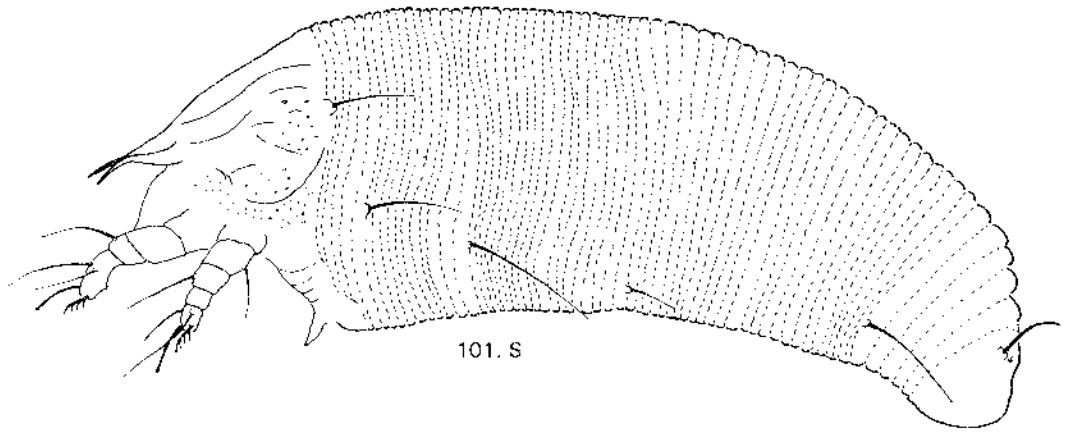
78-85. *Acalitus lowei* (variant)



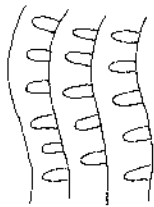
86-93. *Acalitus morrisoni*



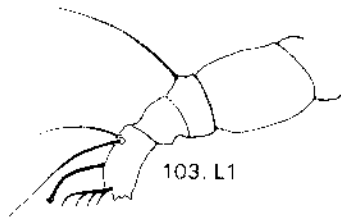
94-100. *Acalitus orthomerus*



101. S



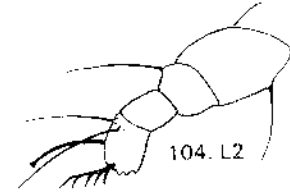
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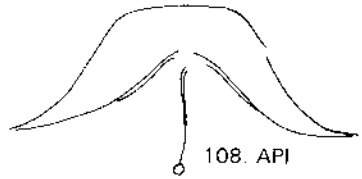
103. L1



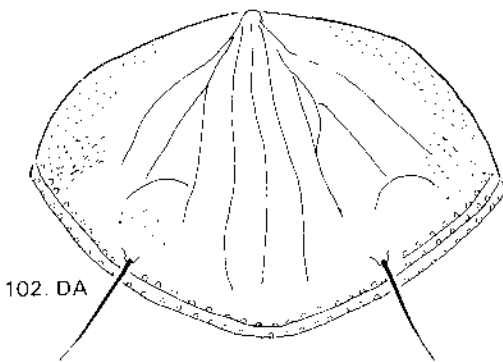
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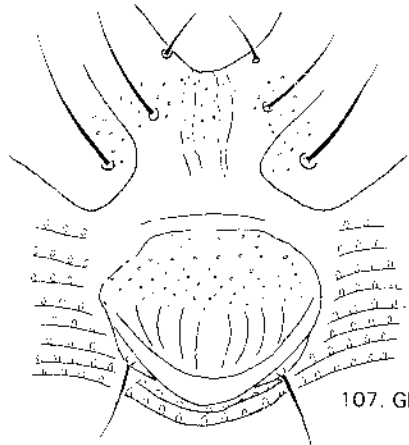
104. L2



108. API

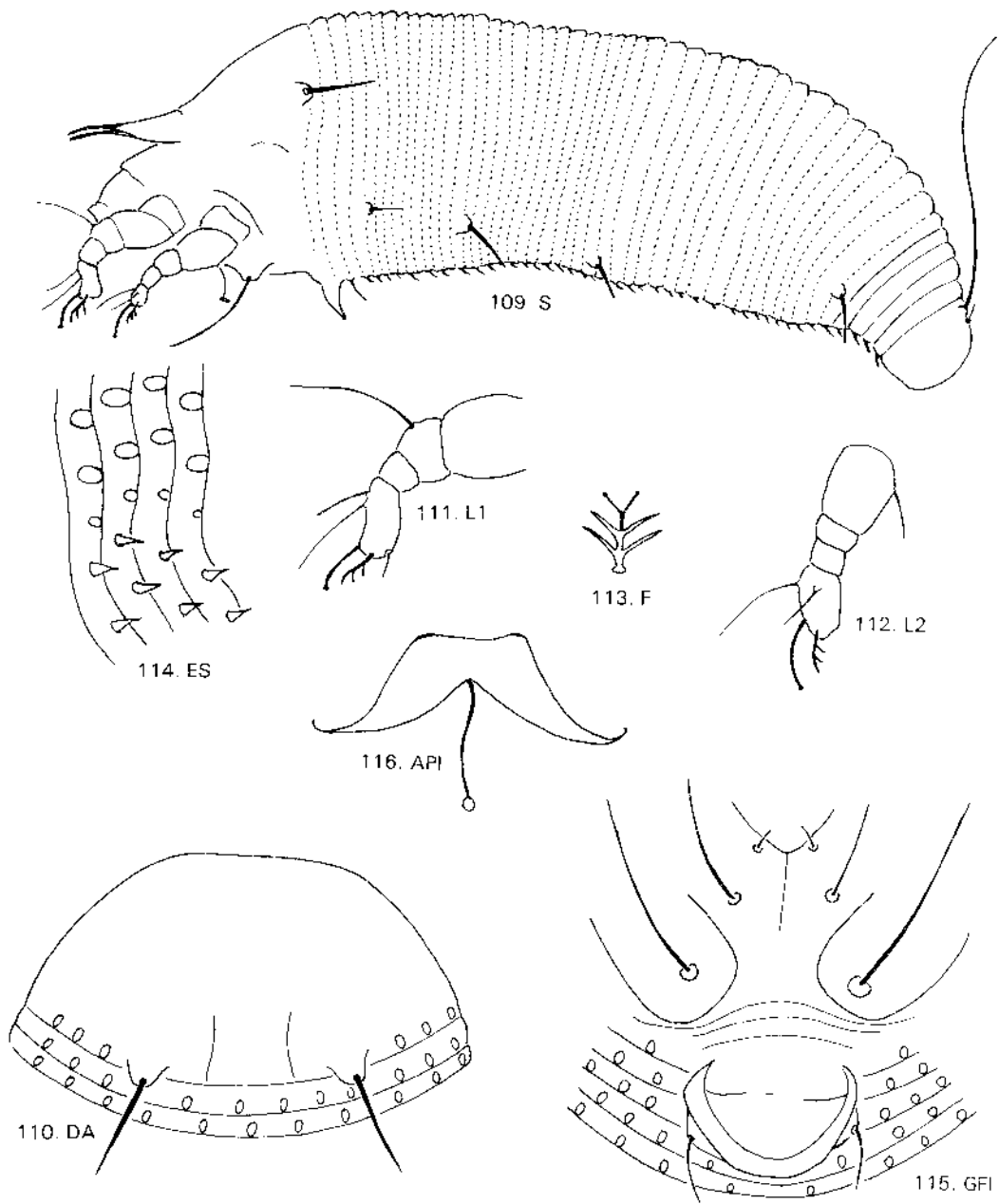


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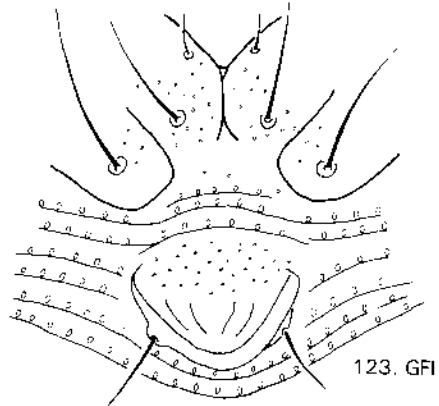
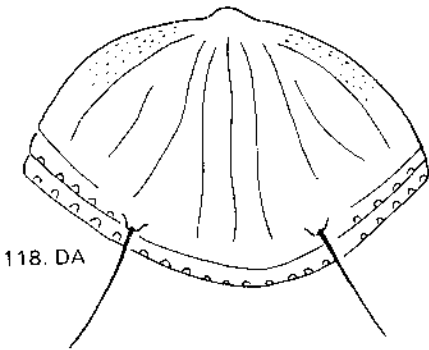
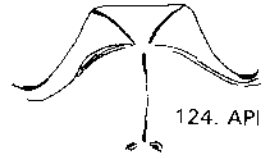
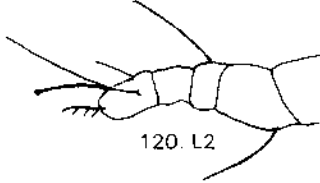
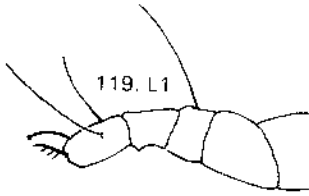
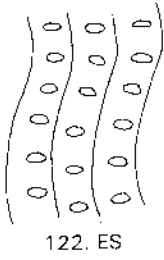
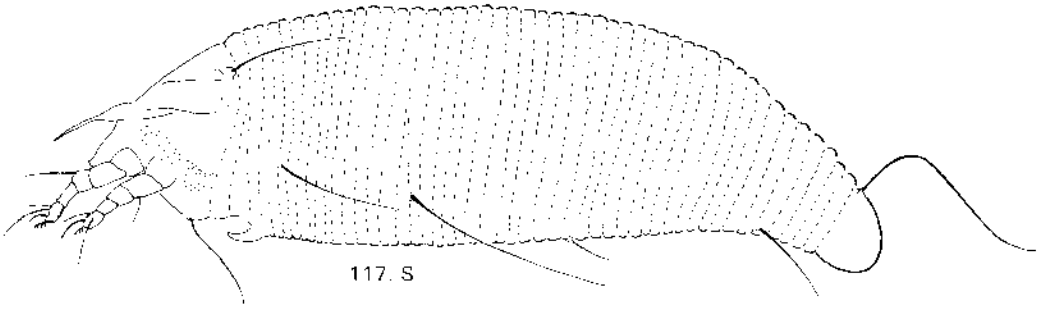


107. GFI

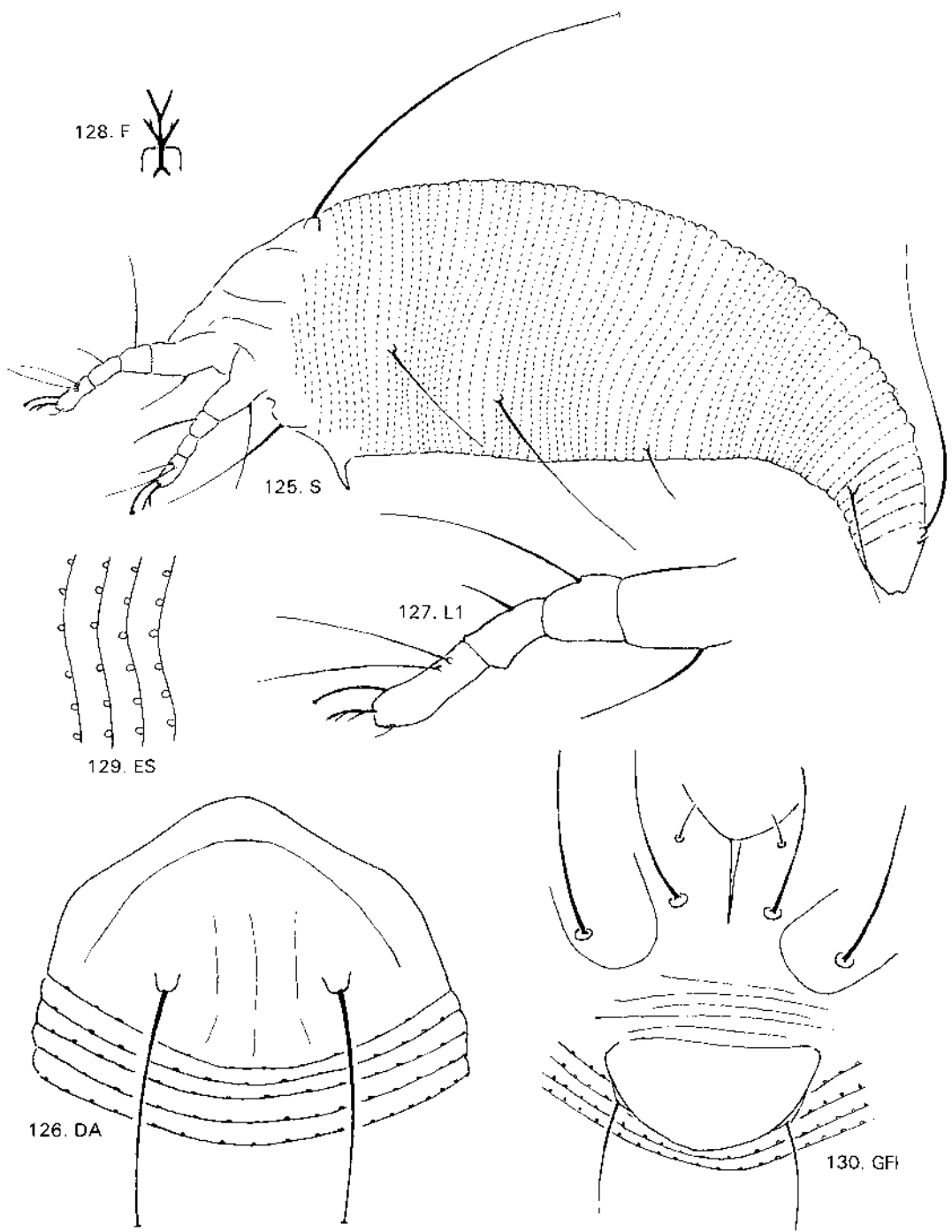
101-108. *Acalitus rubensis*



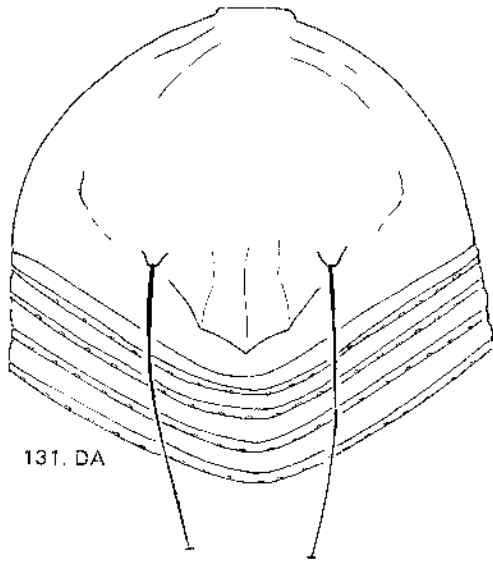
109-116. *Acalitus spinus*



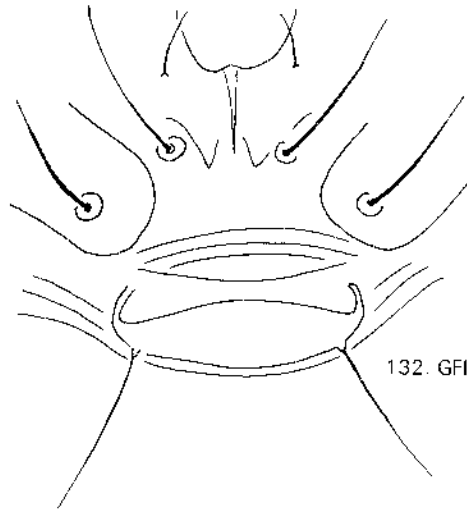
117-124. *Acalitus taurangensis*



125-130. *Aceria bipedis* (protogyne)

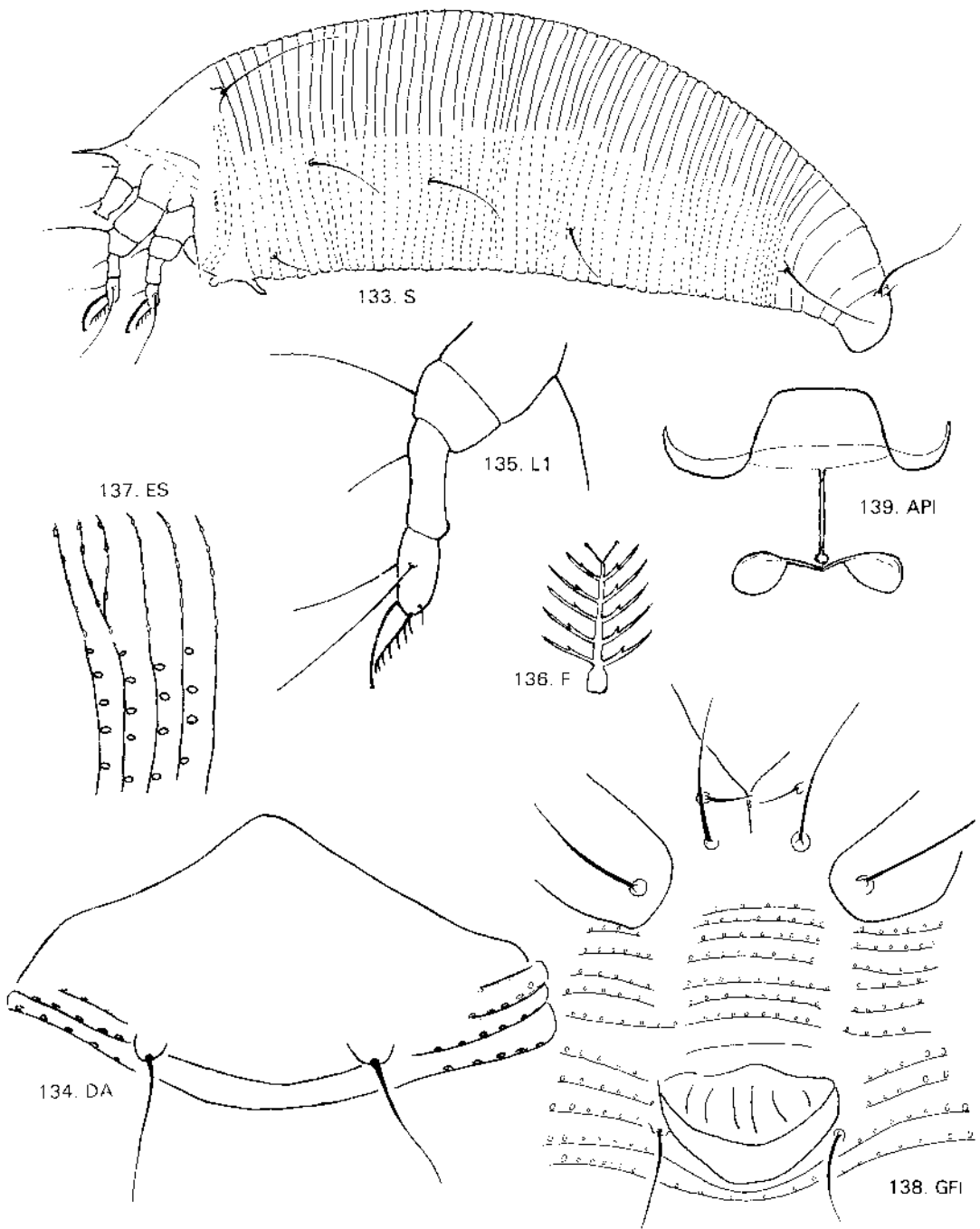


131. DA

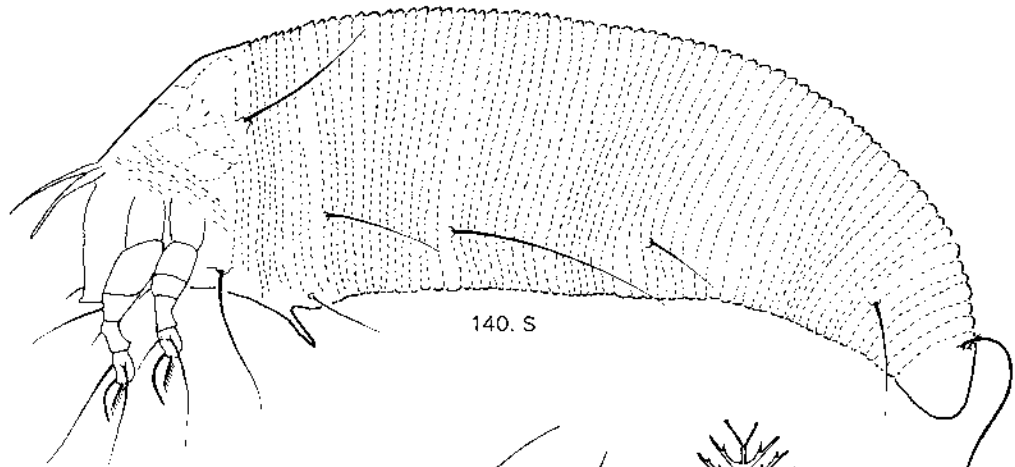


132. GFI

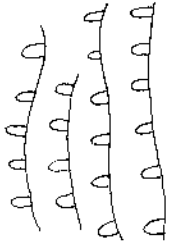
131, 132. *Aceria bipedis* (deutogyne)



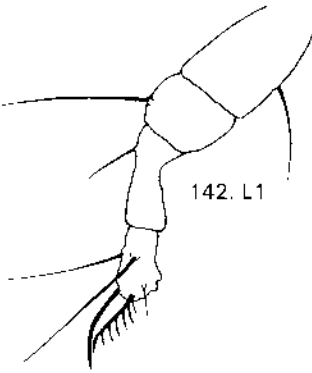
133-139. *Aceria calystegiae*



140. S



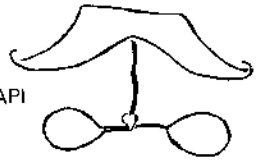
144. ES



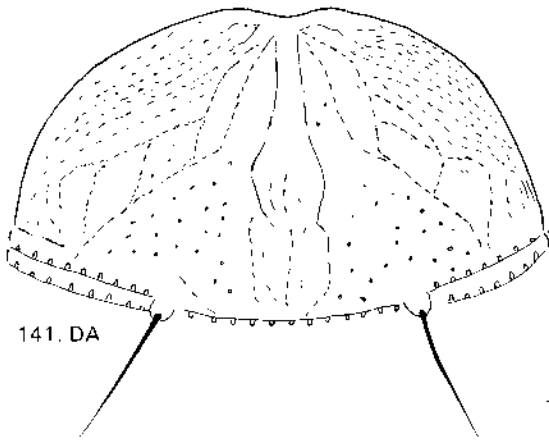
142. L1



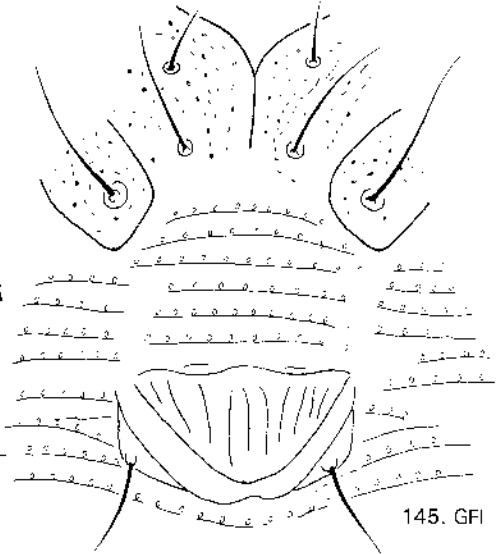
143. F



146. API

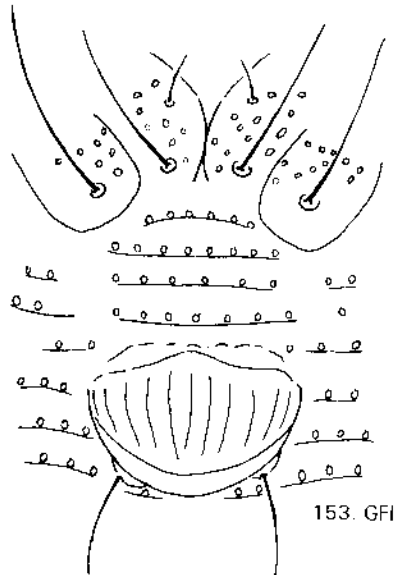
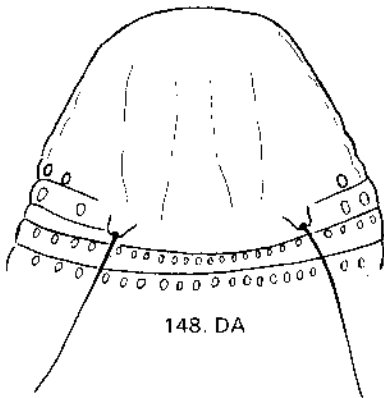
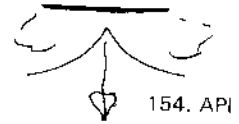
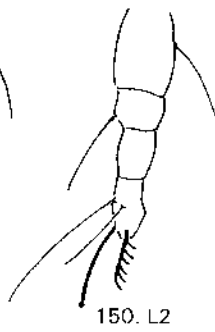
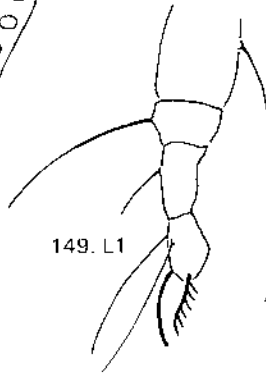
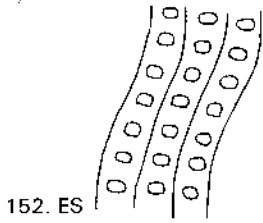
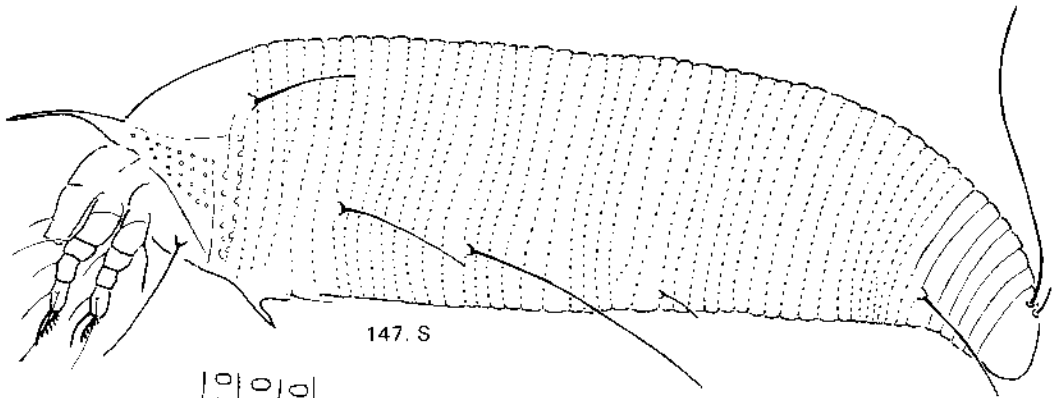


141. DA

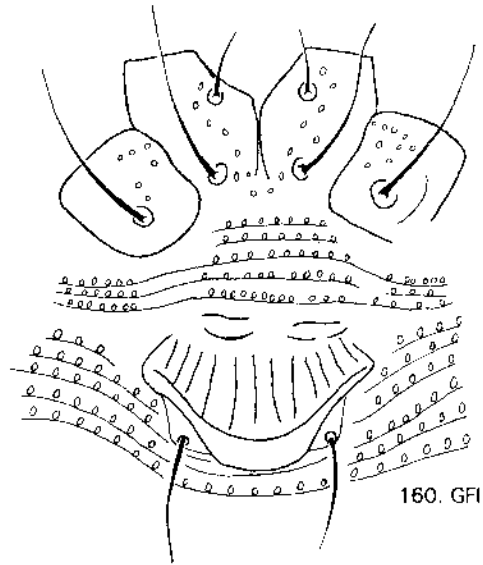
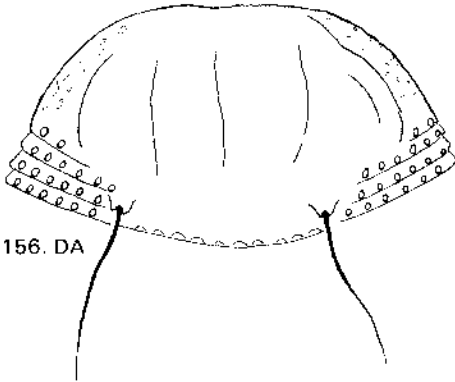
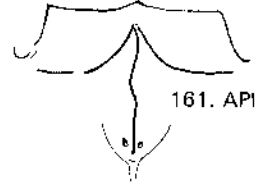
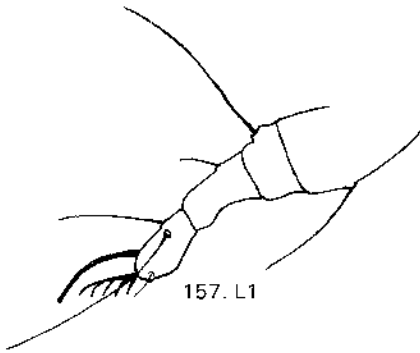
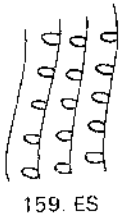
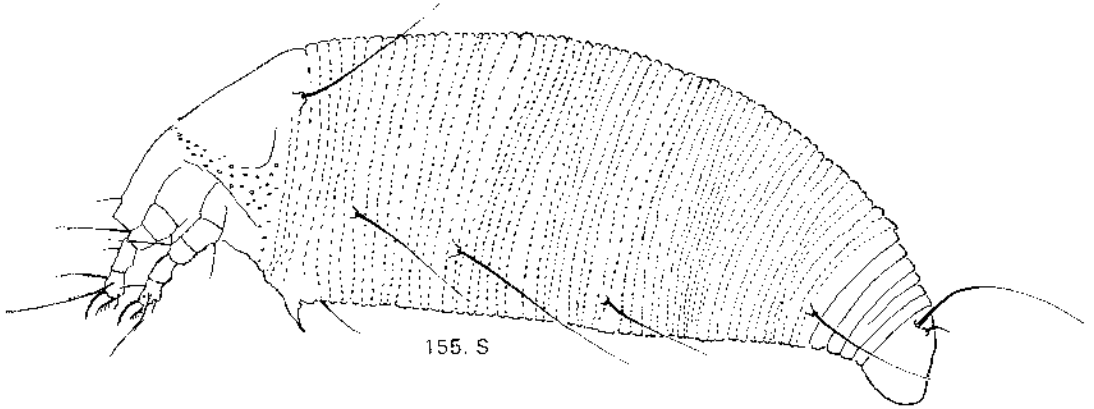


145. GFI

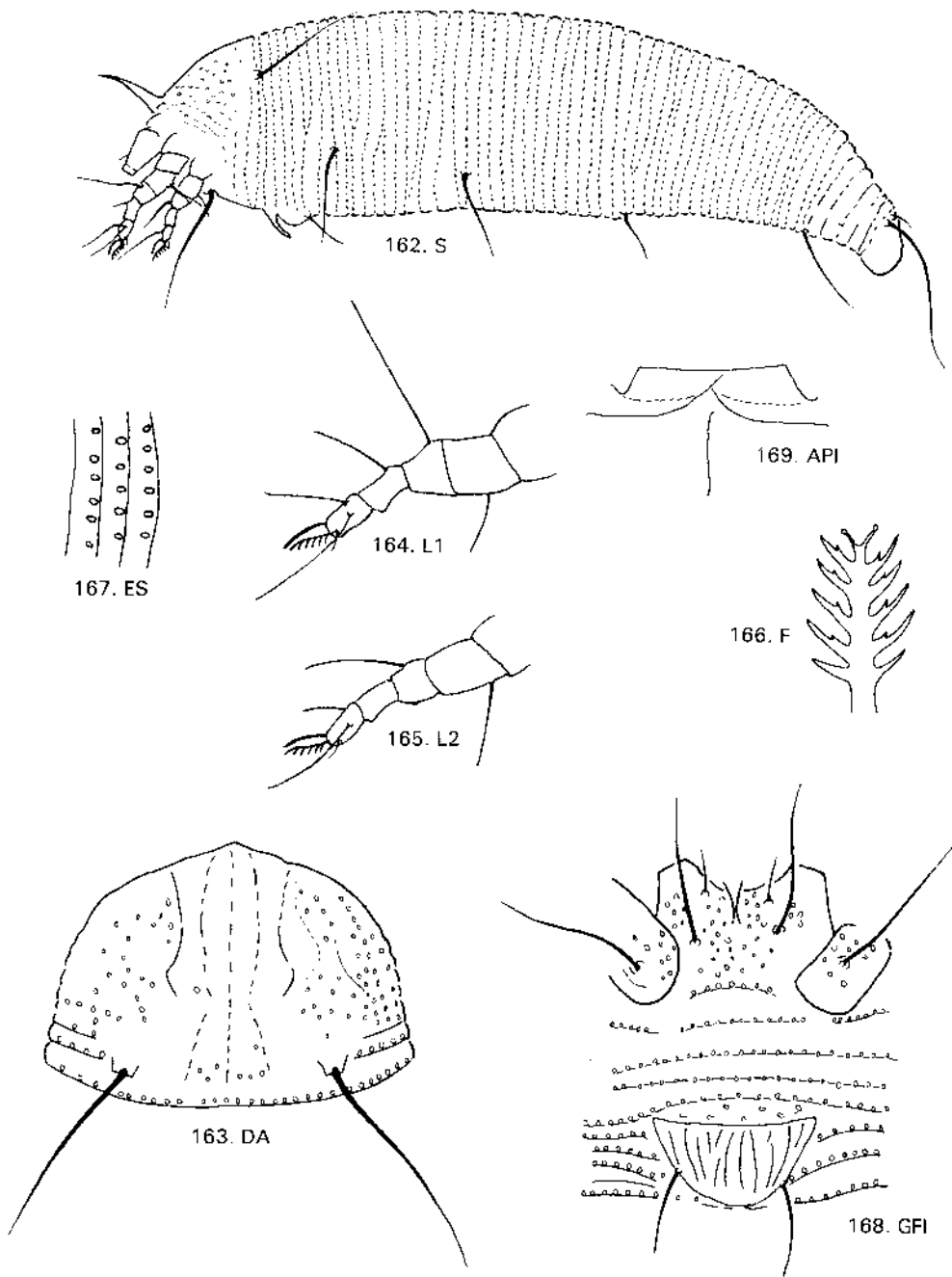
140-146. *Aceria capreae*



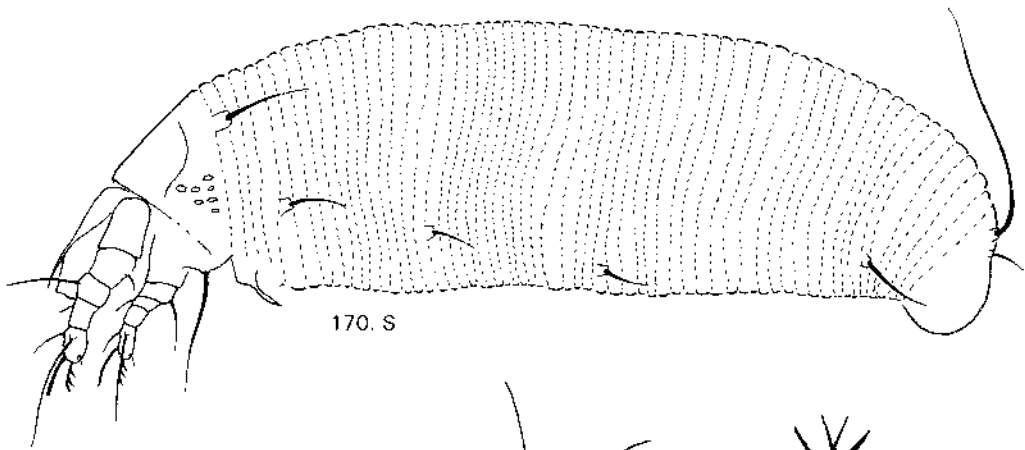
147-154. *Aceria carmichaeliae*



155-161. *Aceria cianthi*



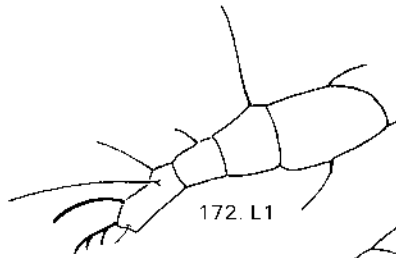
162-169. *Aceria depressae*



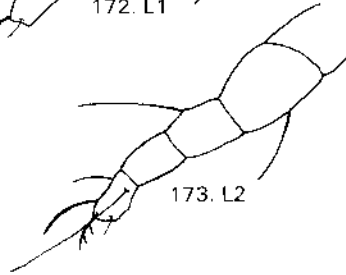
170. S



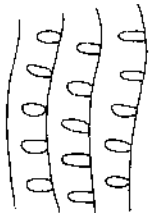
174. F



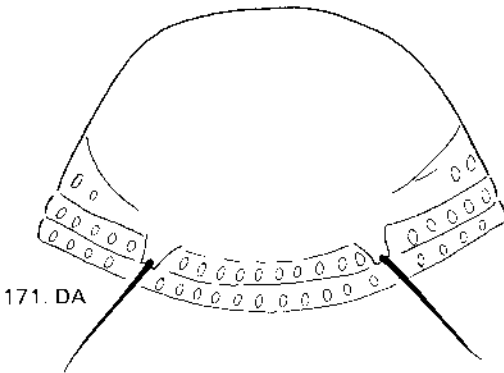
172. L1



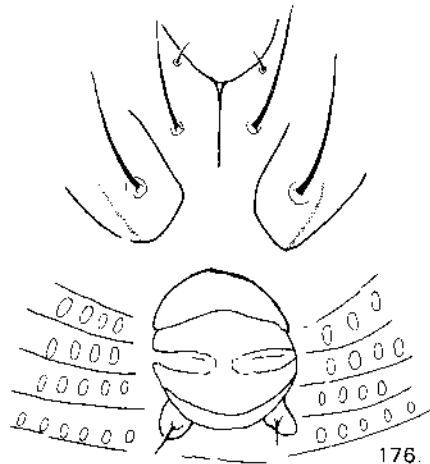
173. L2



175. ES

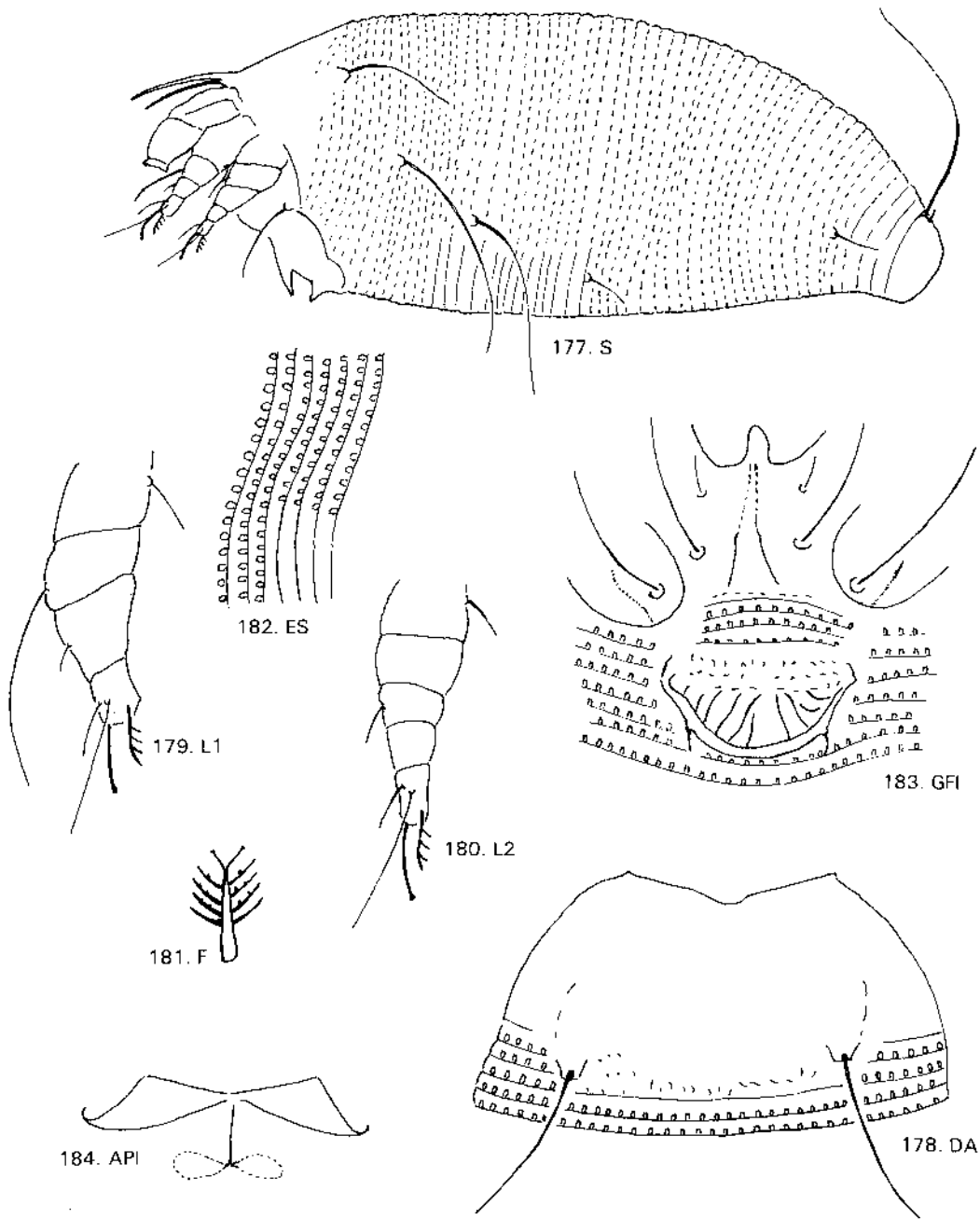


171. DA

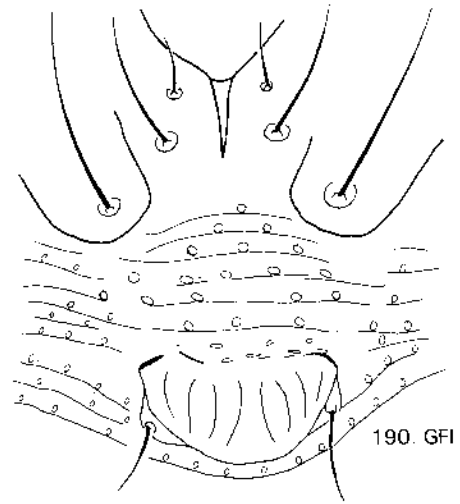
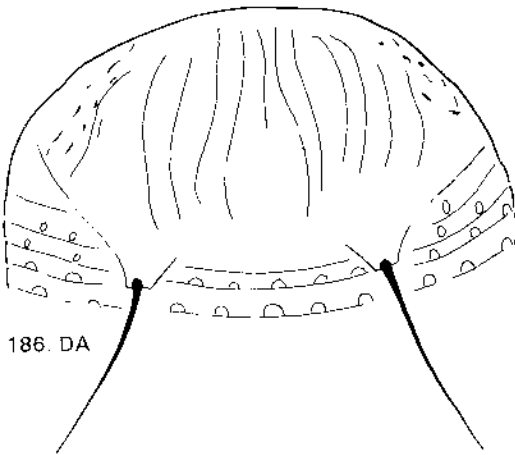
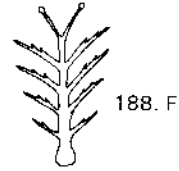
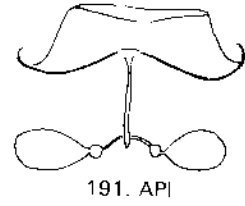
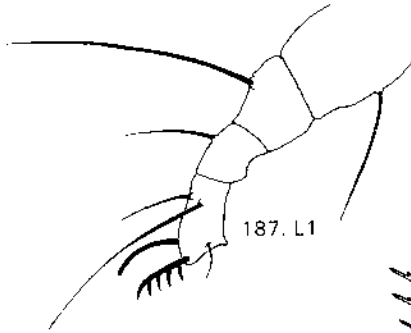
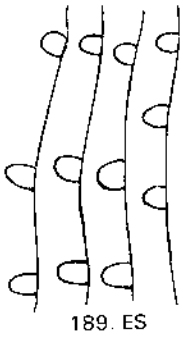
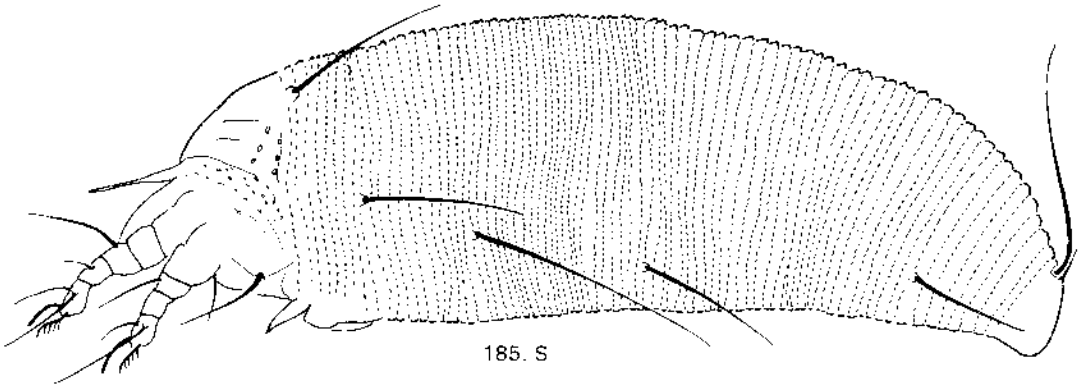


176. GFI

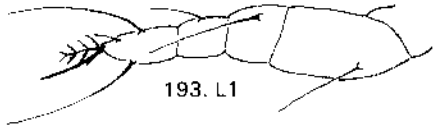
170-176. *Aceria erineae*



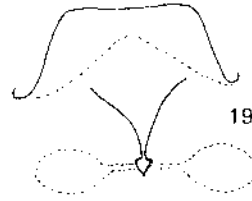
177-184. *Aceria gersoni*



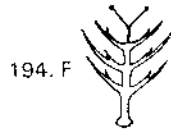
185-191. *Aceria gleicheniae*



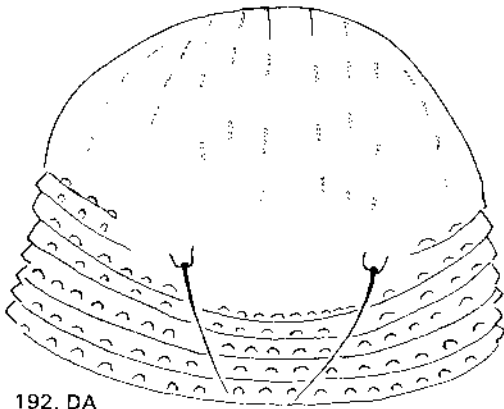
193. L1



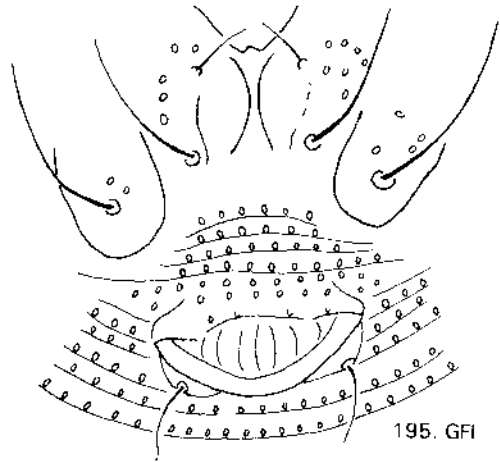
196. API



194. F

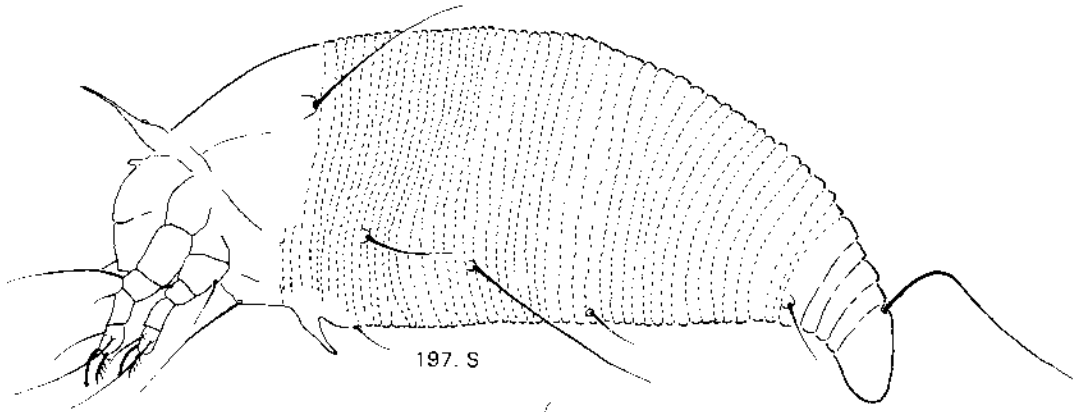


192. DA

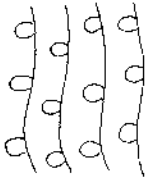


195. GFI

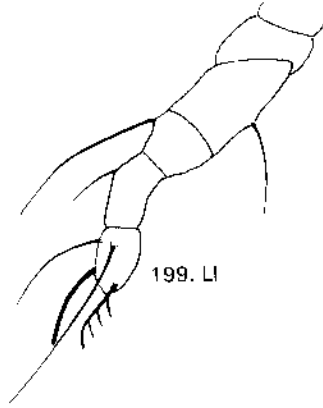
192-196. *Aceria hagleyensis*



197. S



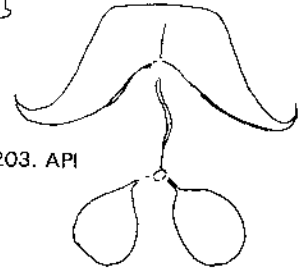
201. ES



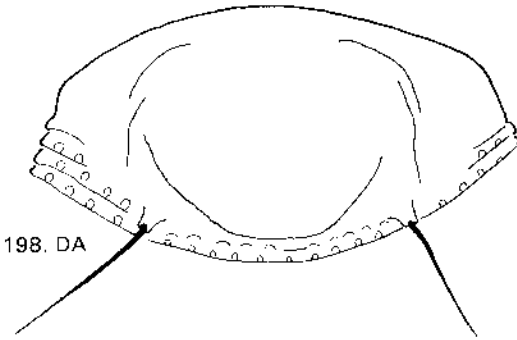
199. LI



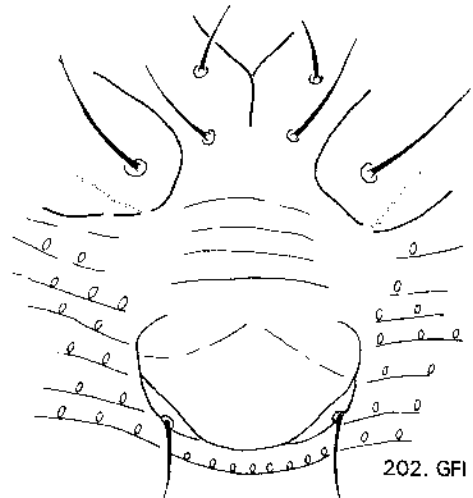
200. F



203. API

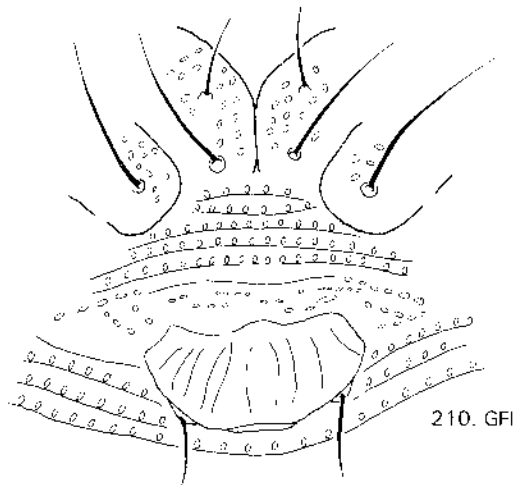
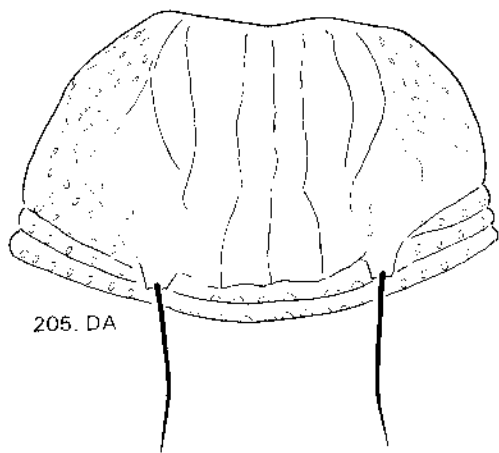
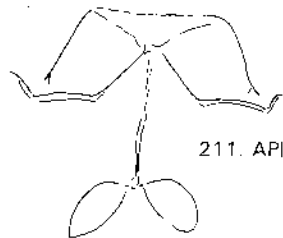
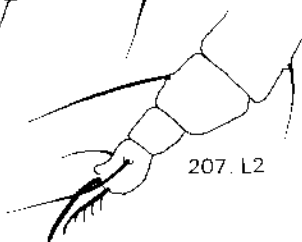
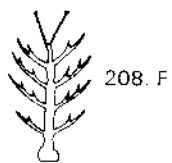
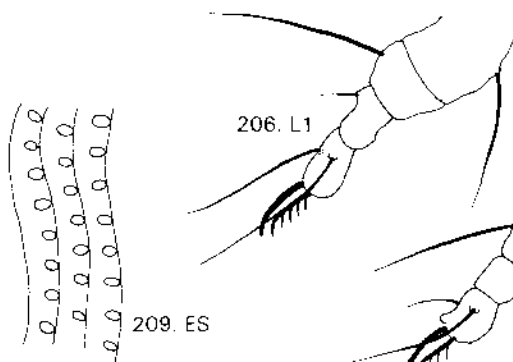
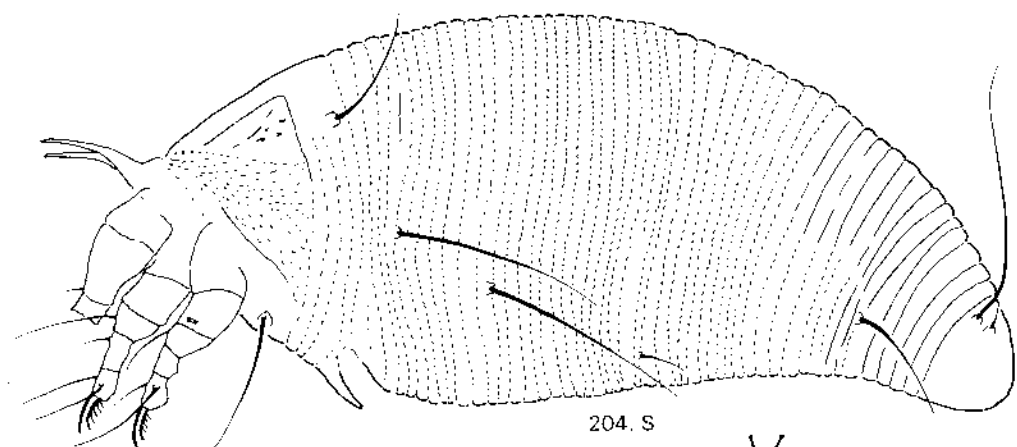


198. DA

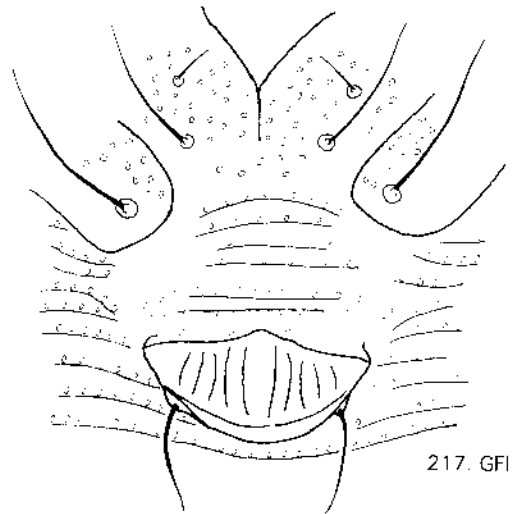
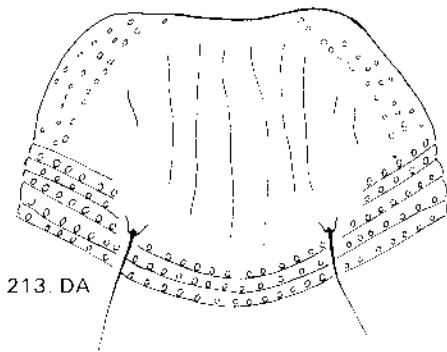
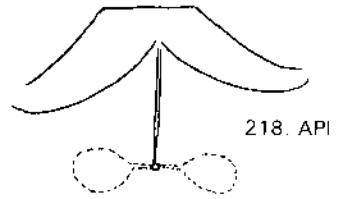
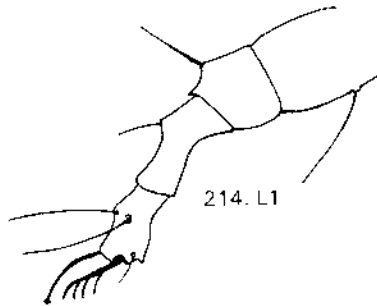
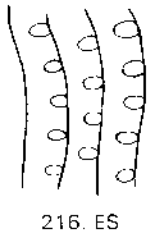
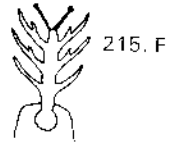
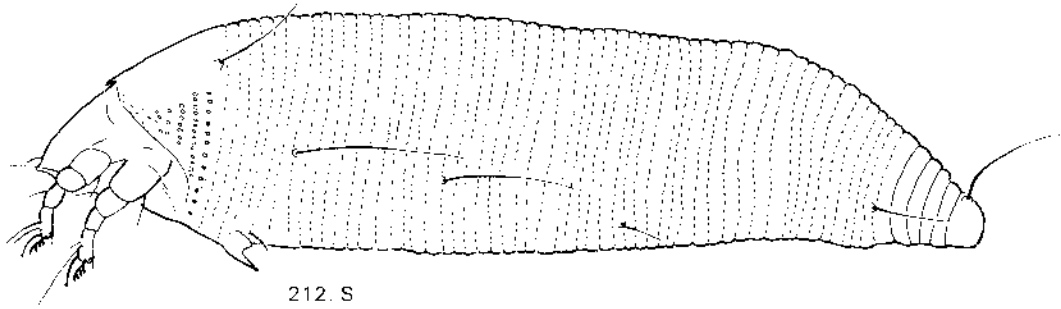


202. GFI

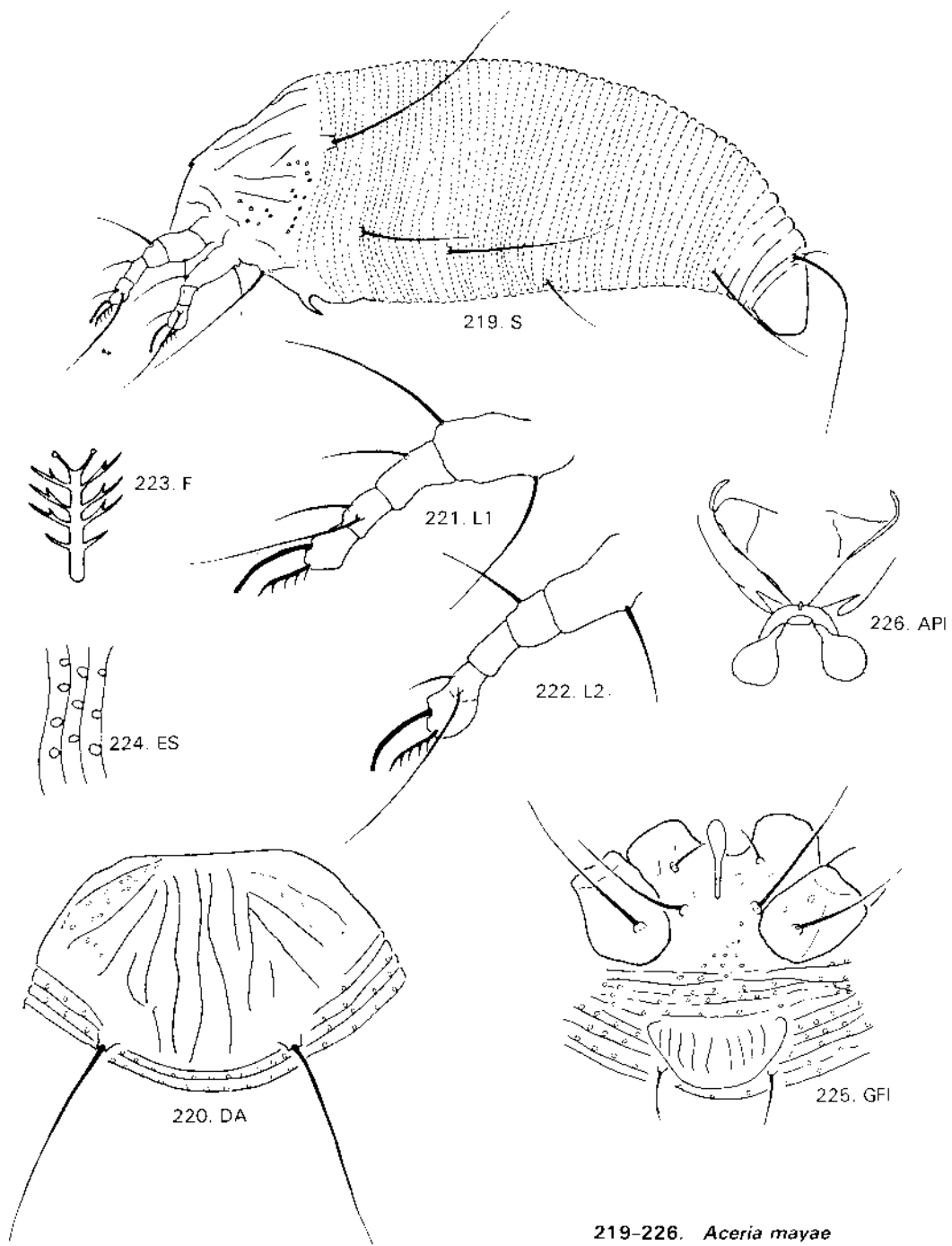
197-203. *Aceria healyi*

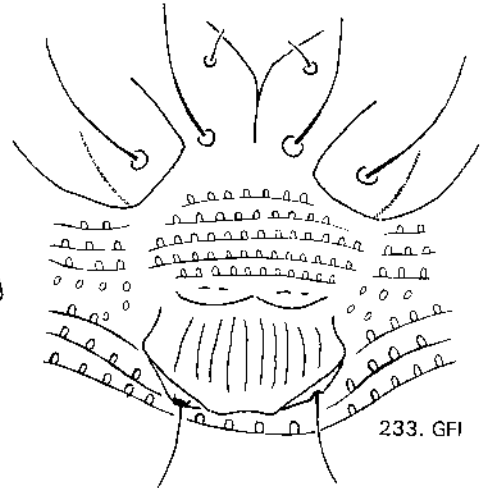
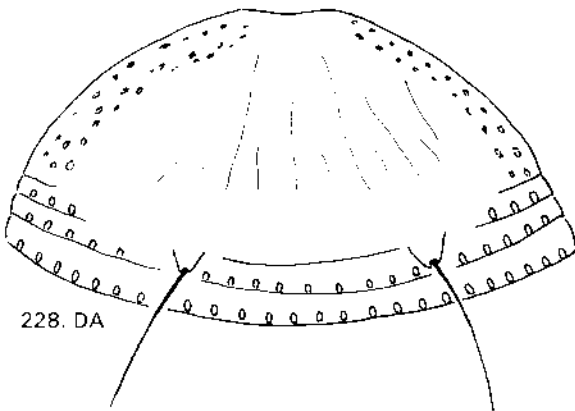
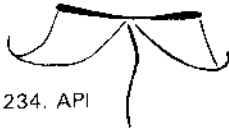
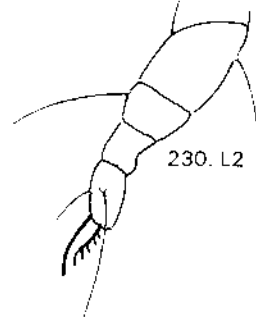
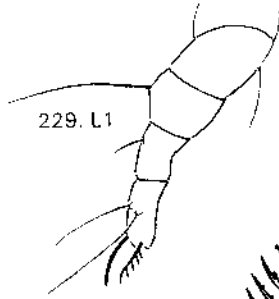
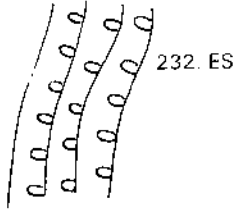
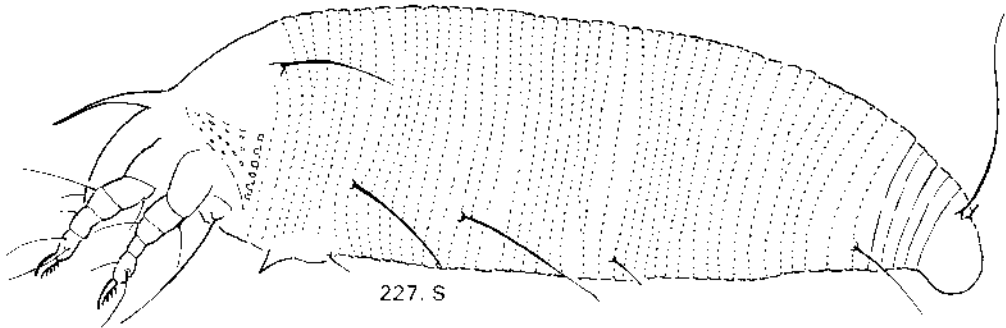


204-211. *Aceria korelli*

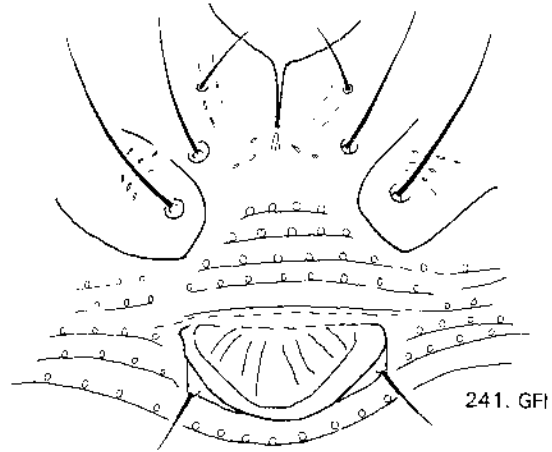
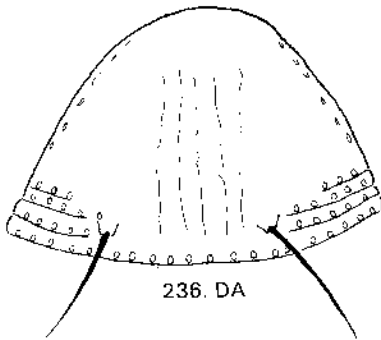
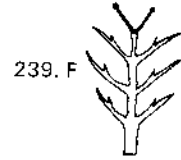
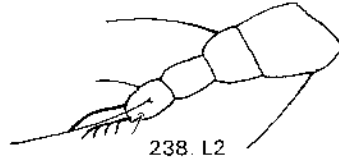
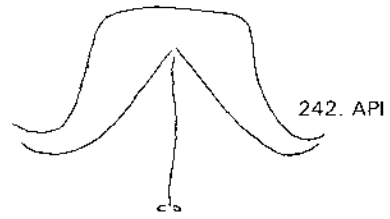
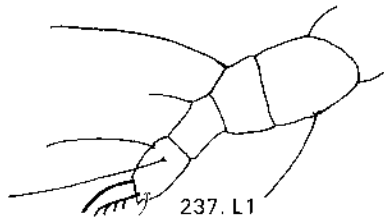
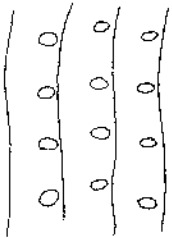
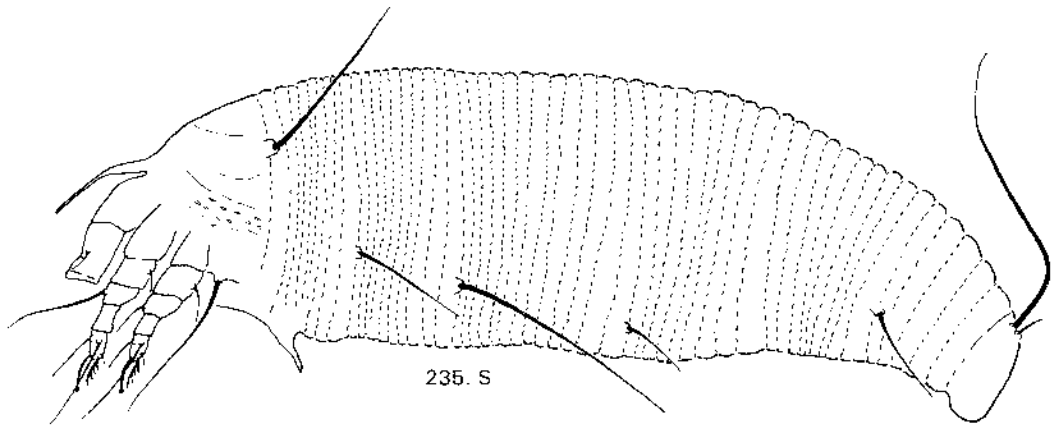


212-218. *Aceria manukae*

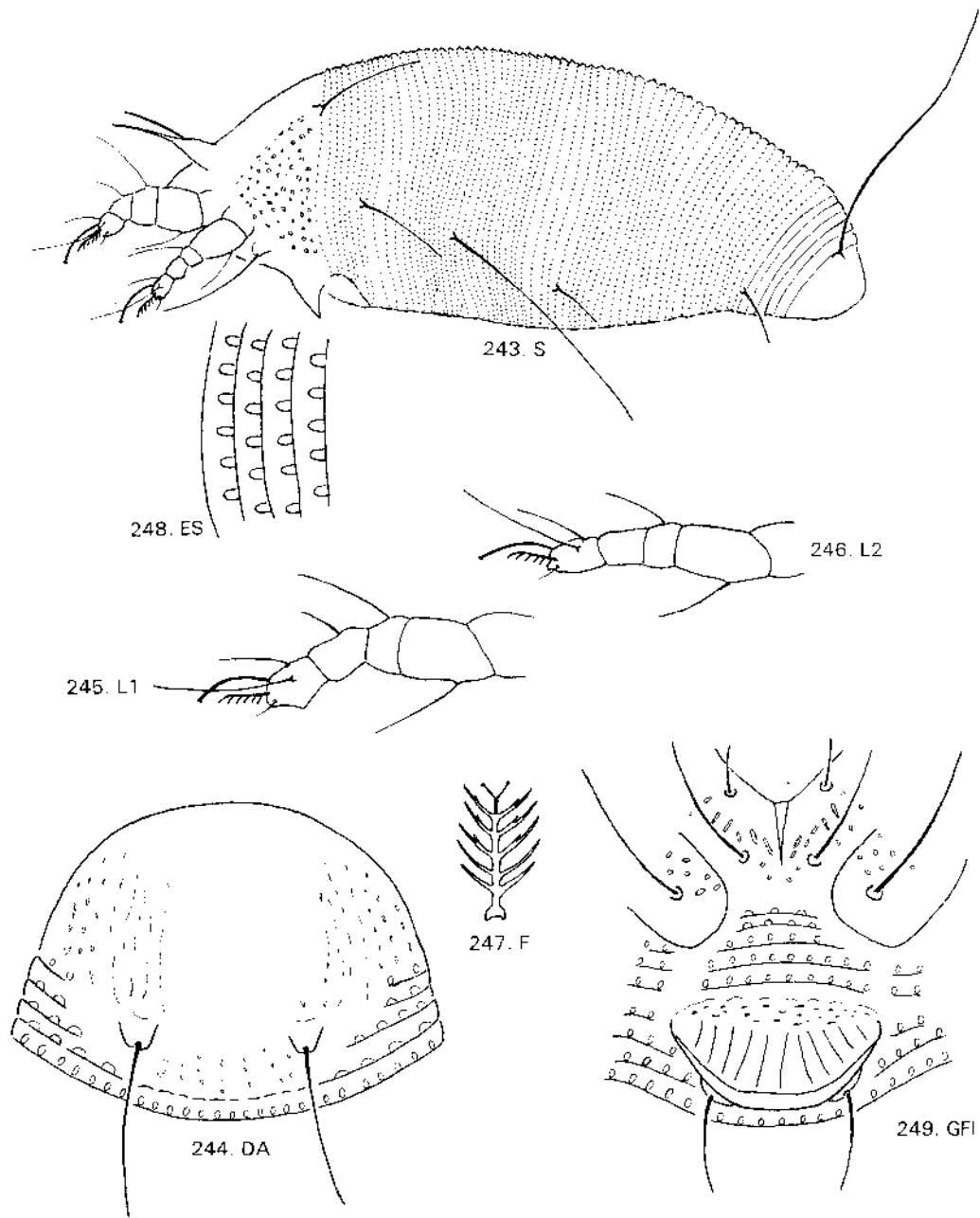




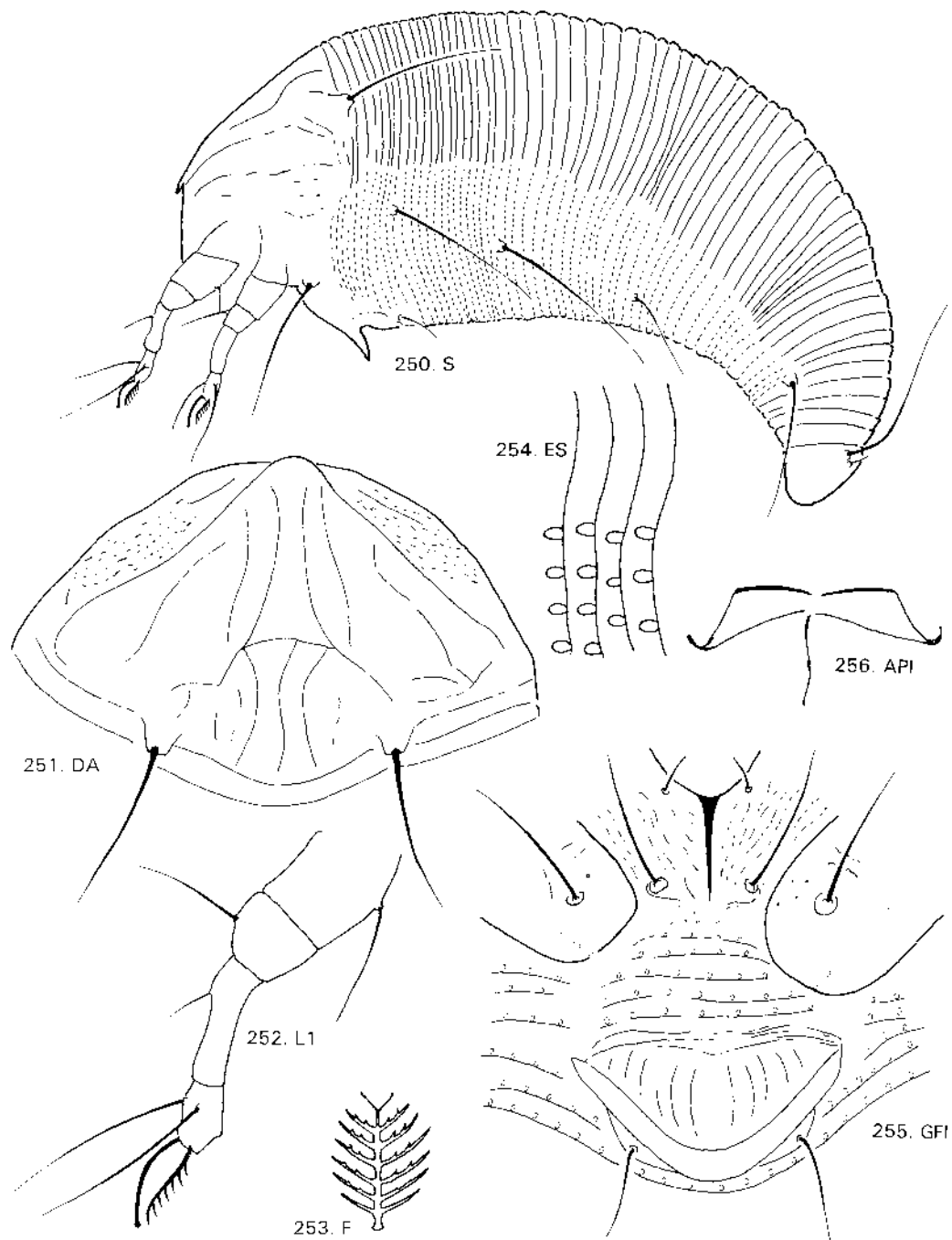
227-234. *Aceria melicopis*



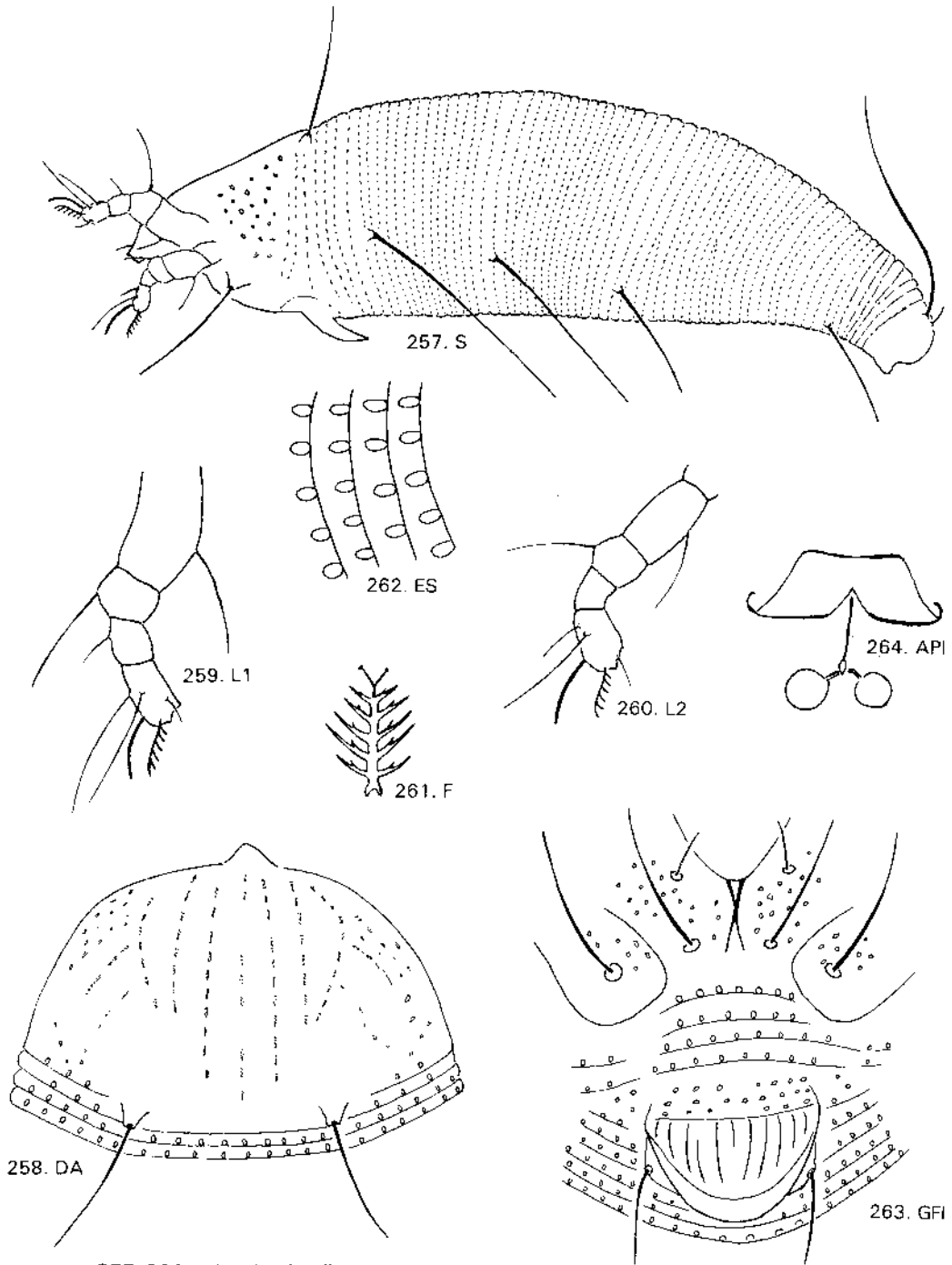
235-242. *Aceria melicyti*



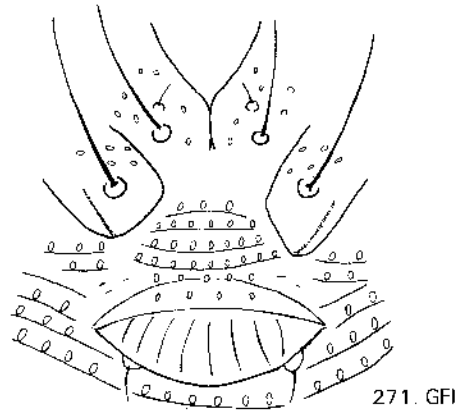
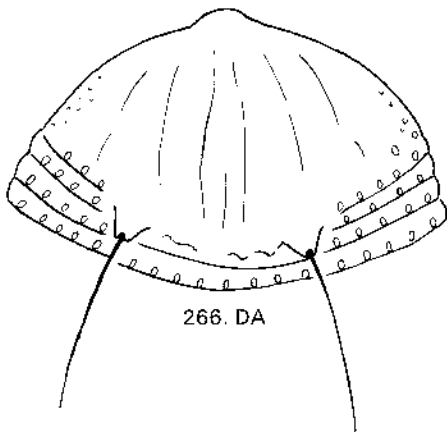
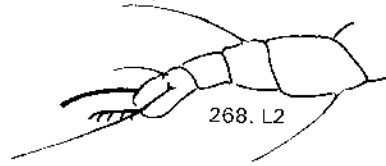
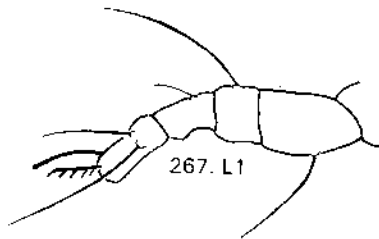
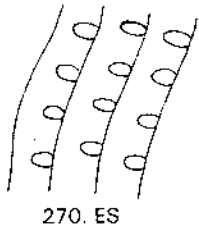
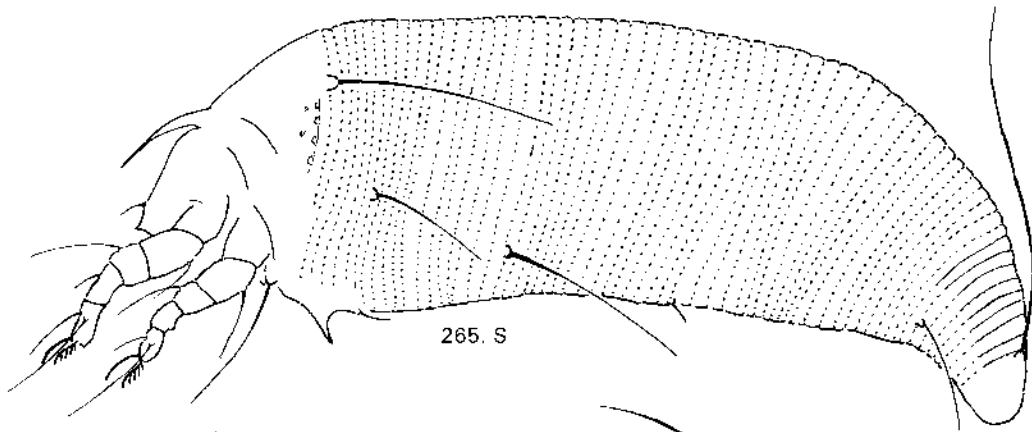
243-249. *Aceria microphyllae*



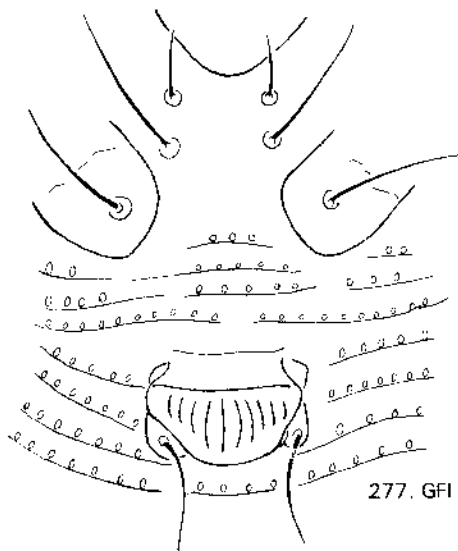
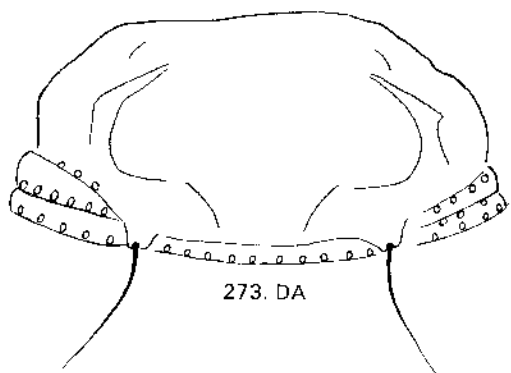
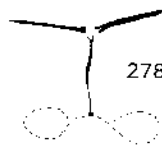
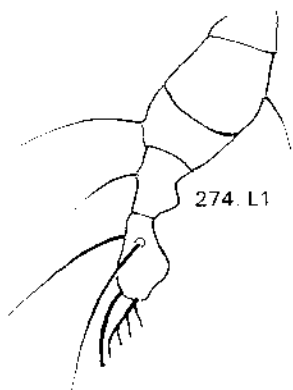
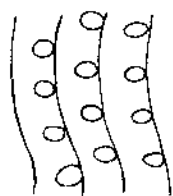
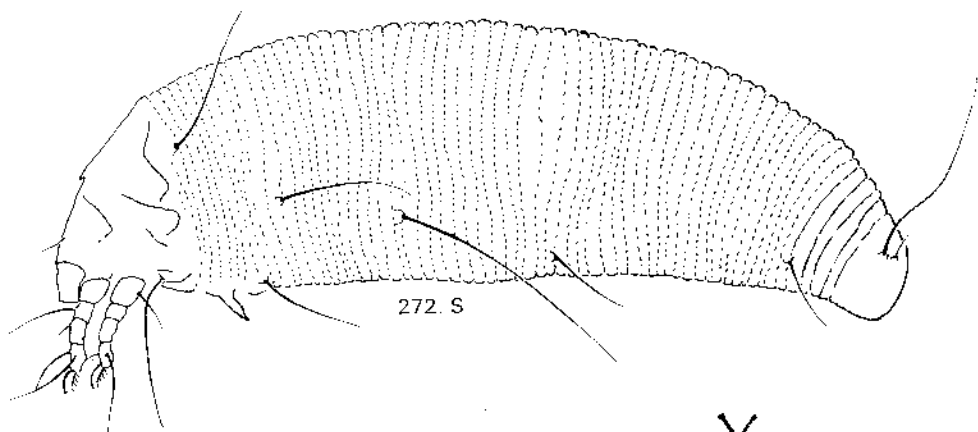
250-256. *Aceria parvensis*



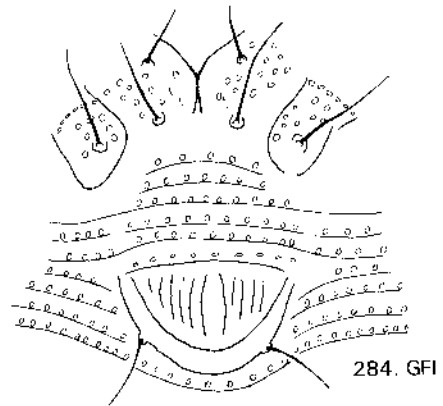
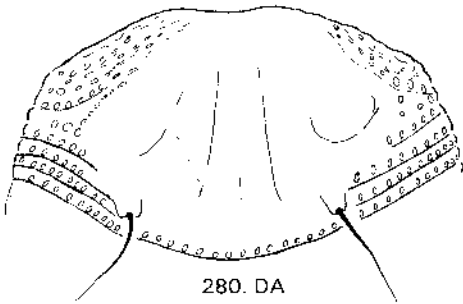
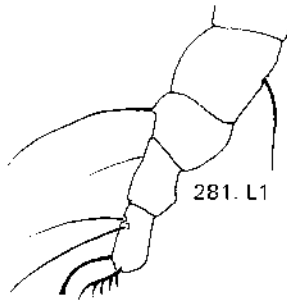
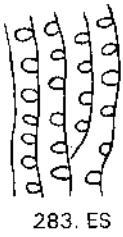
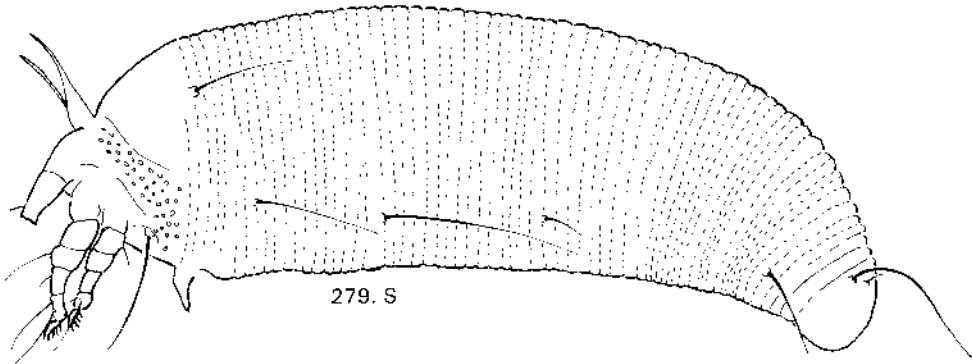
257-264. *Aceria pimeliae*



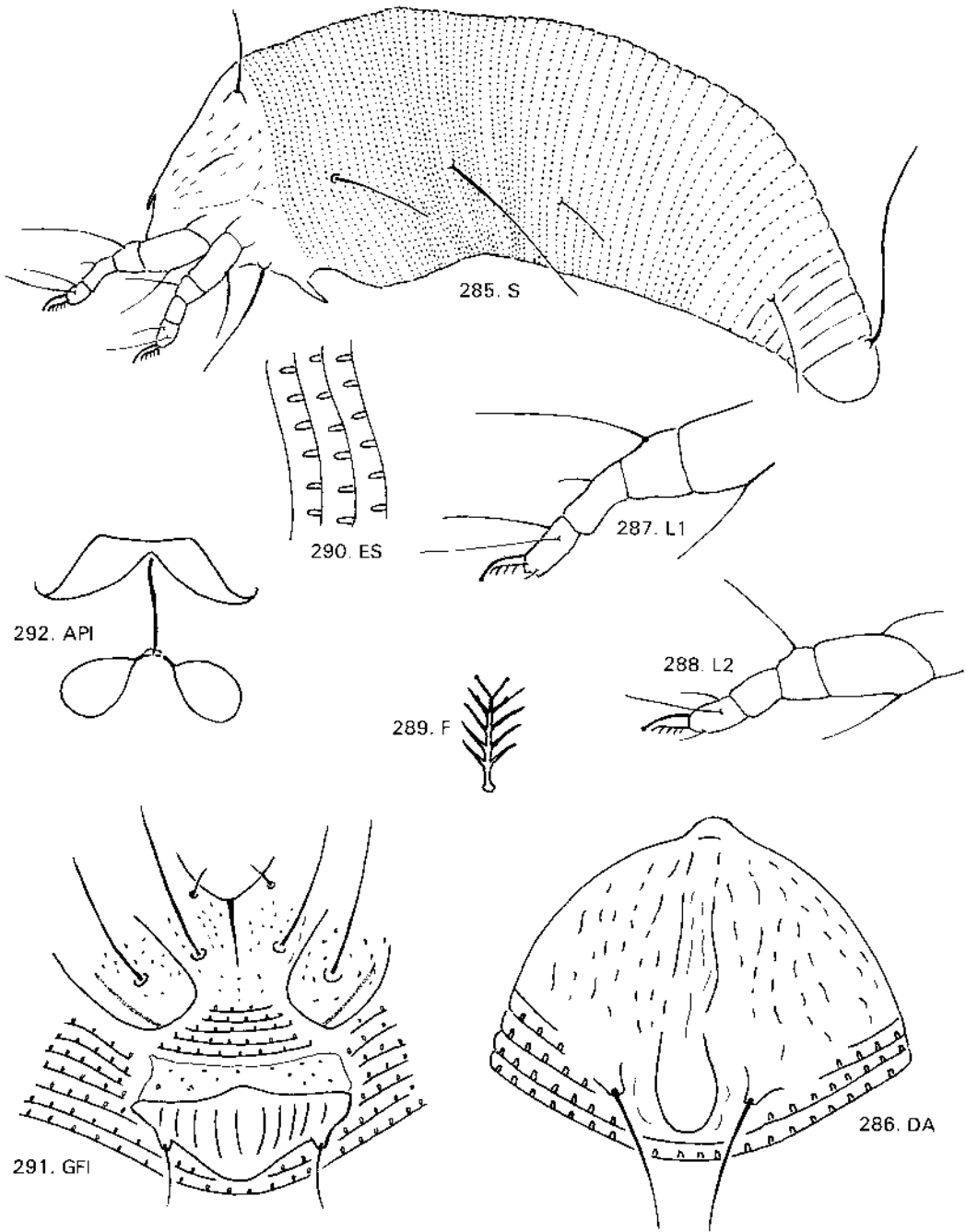
265-271. *Aceria plagianthi*



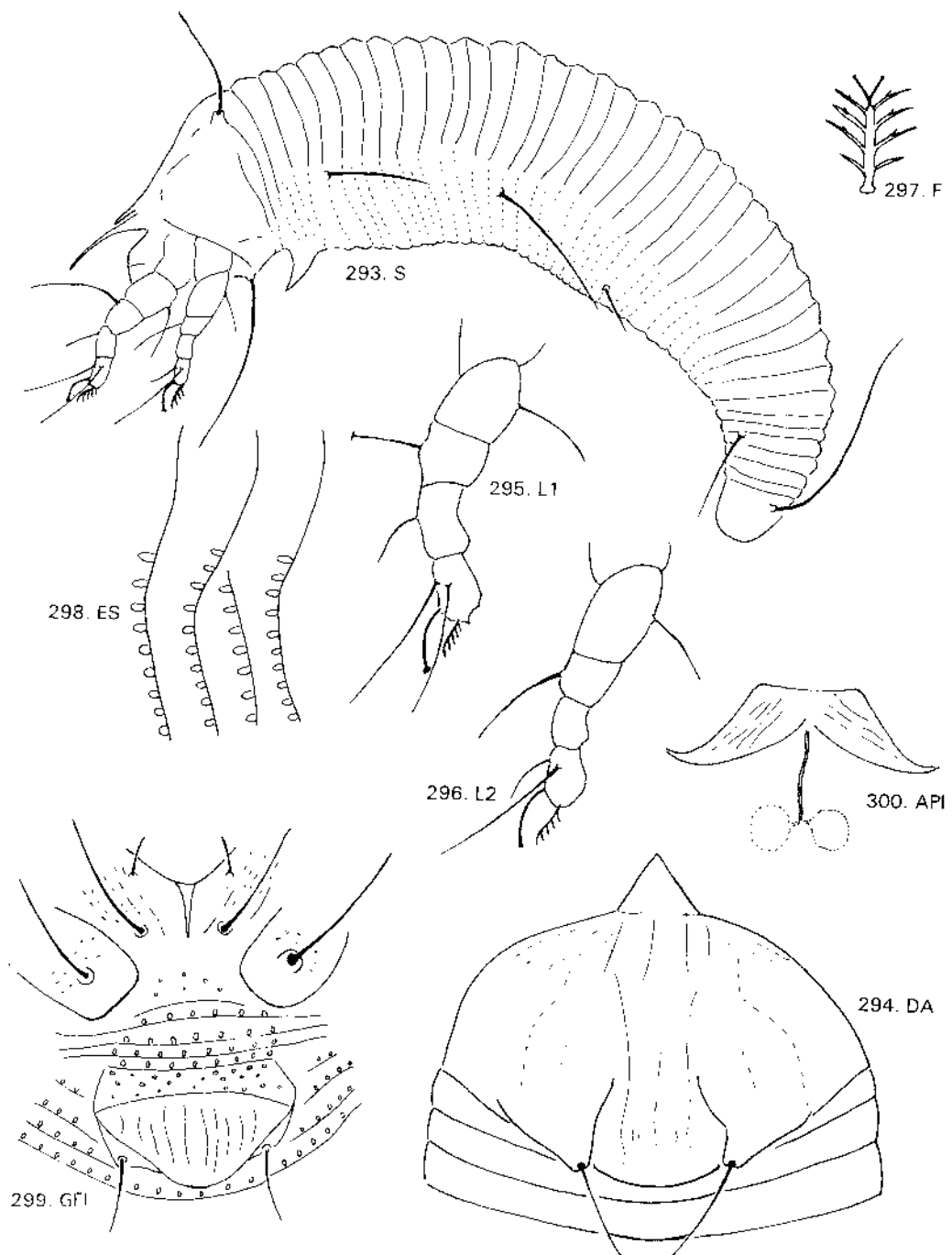
272-278. *Aceria rubifaciens*



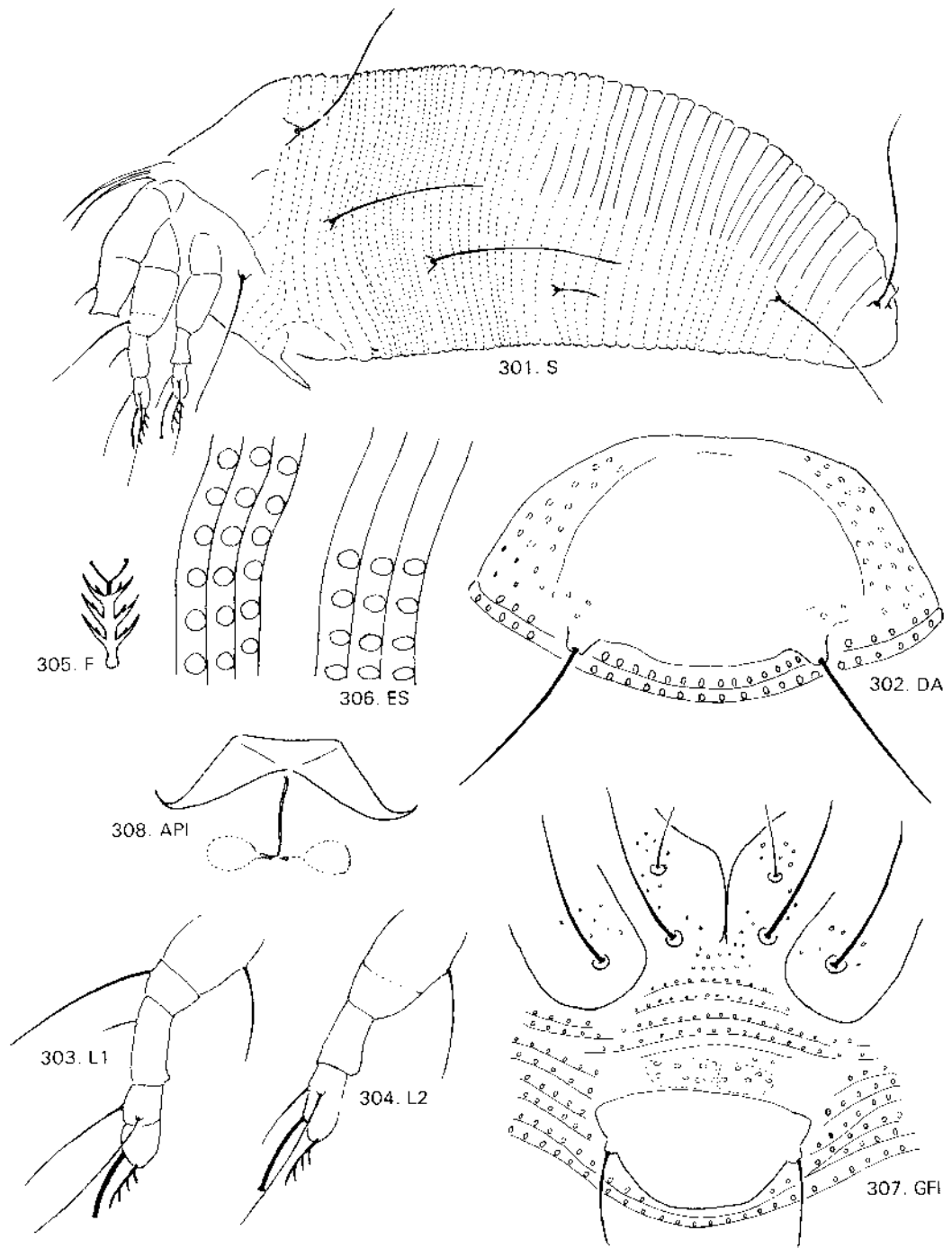
279-284. *Aceria sheldoni*



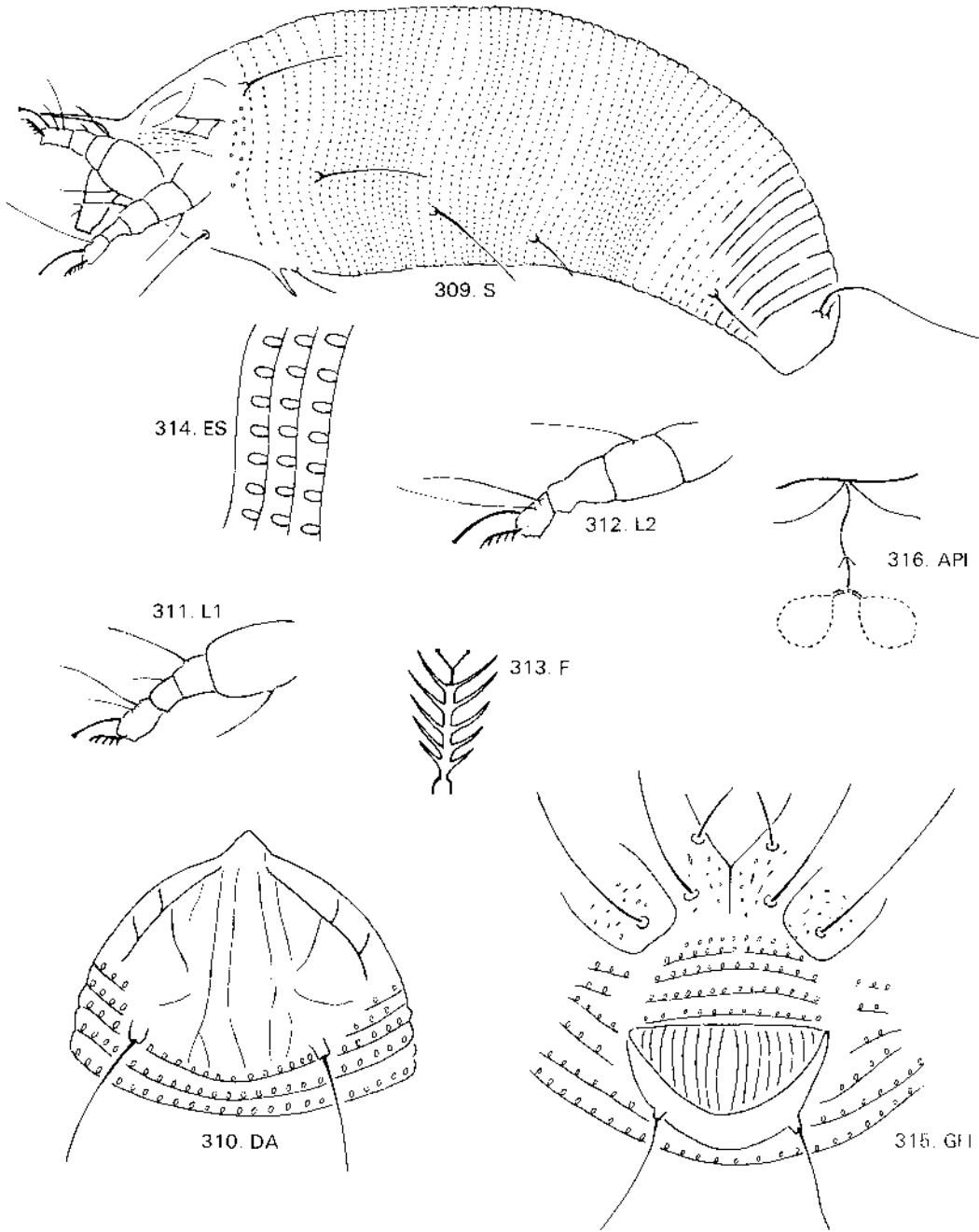
285-292. *Aceria simonensis* (protogyne)



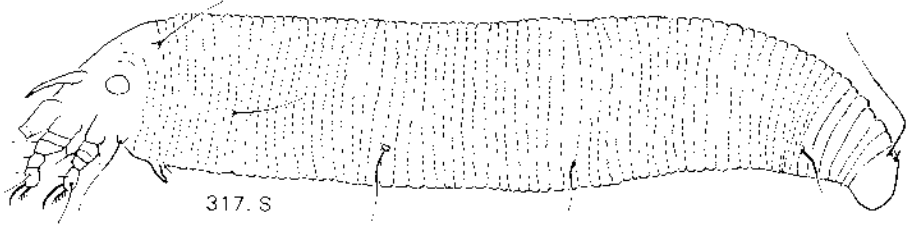
293-300. *Aceria simonensis* (deutogyne)



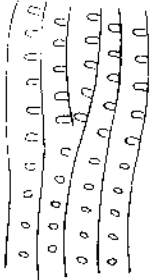
301-308. *Aceria strictae*



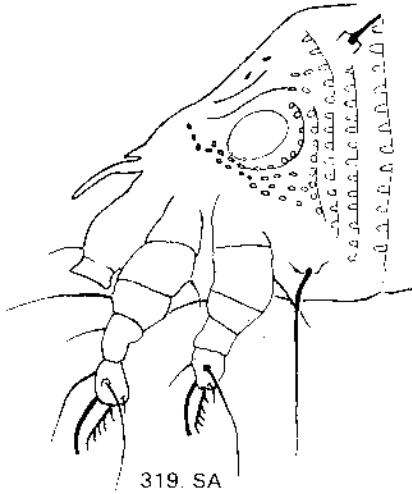
309-316. *Aceria tenuifolii*



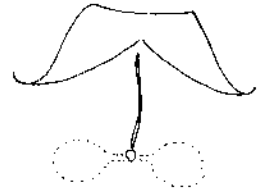
317. S



321. ES



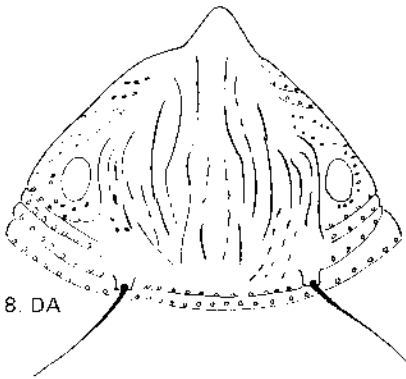
319. SA



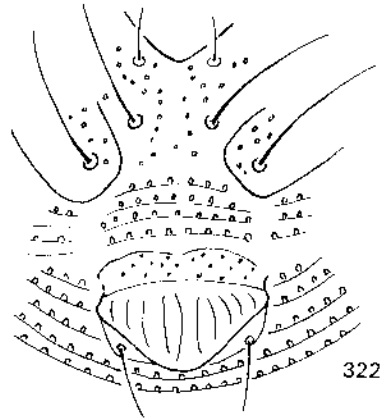
323. API



320. F

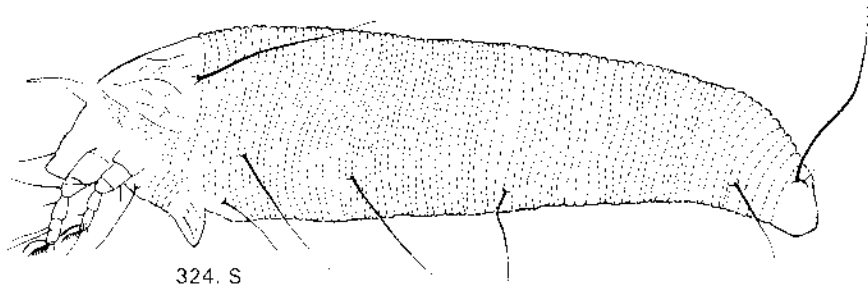


318. DA

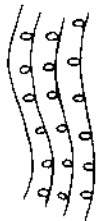


322. GFI

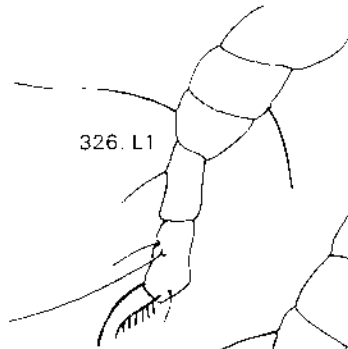
317-323. *Aceria titirangiensis*



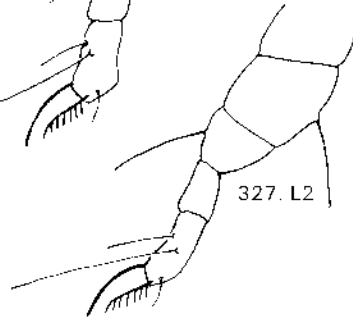
324. S



329. ES



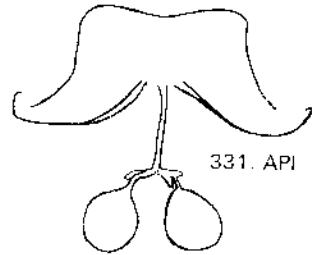
326. L1



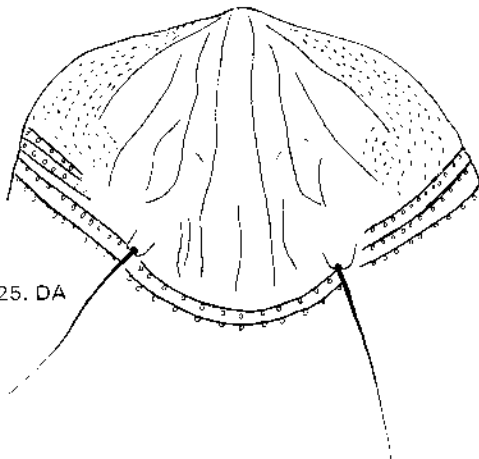
327. L2



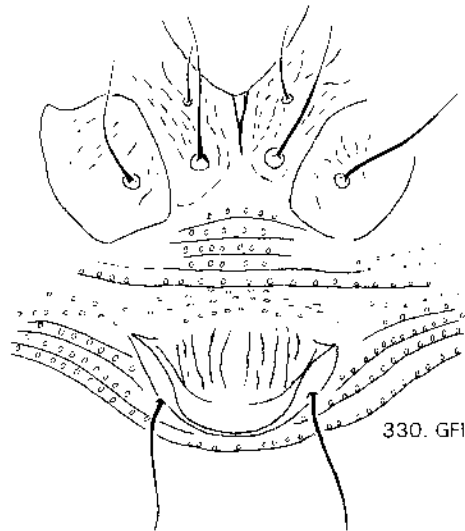
328. F



331. API

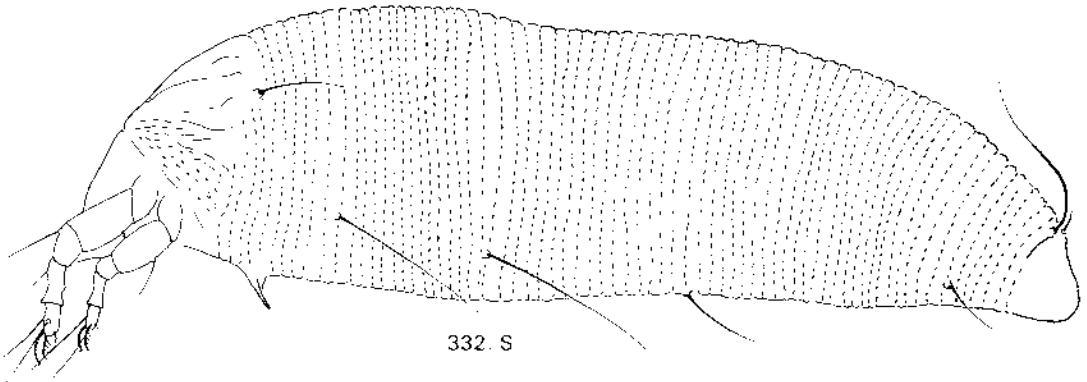


325. DA

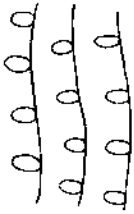


330. GFI

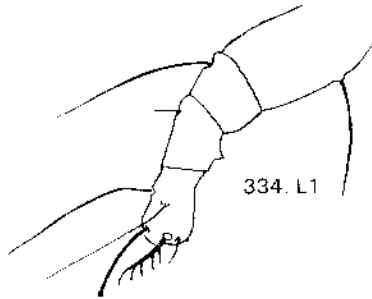
324-331. *Aceria tulipae*



332. S



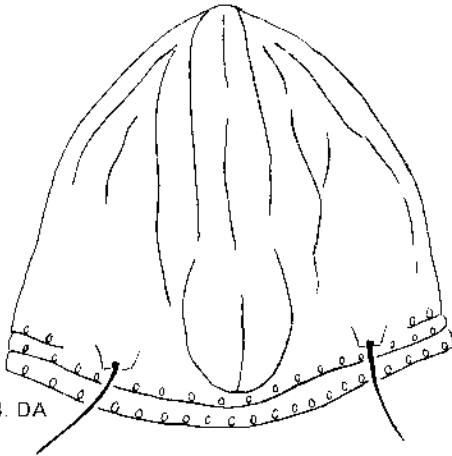
336. ES



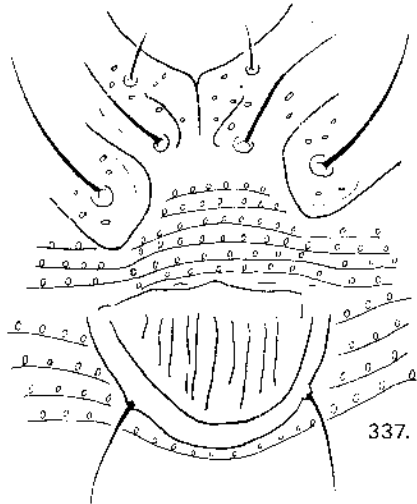
334. L1



335. F

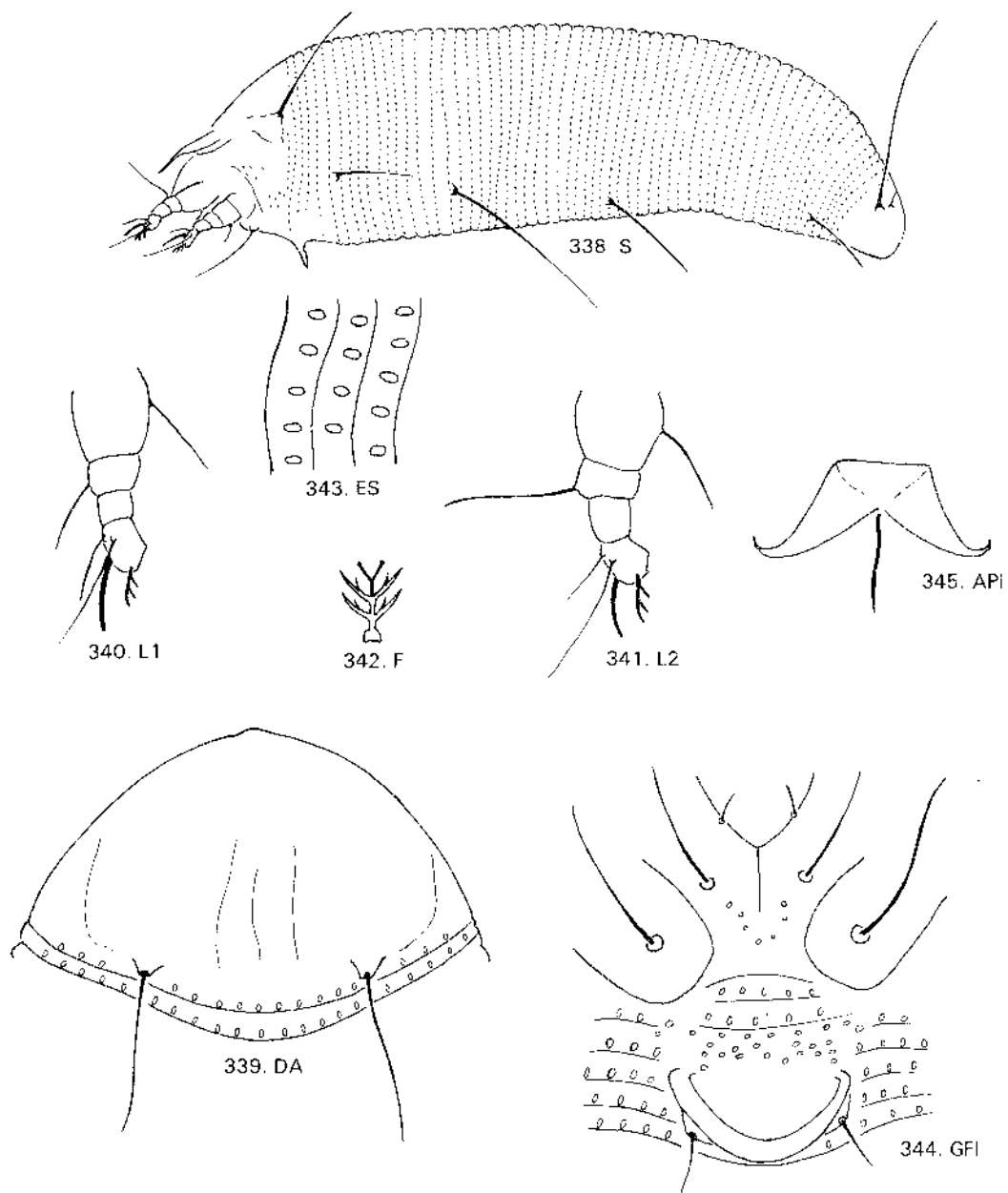


333. DA

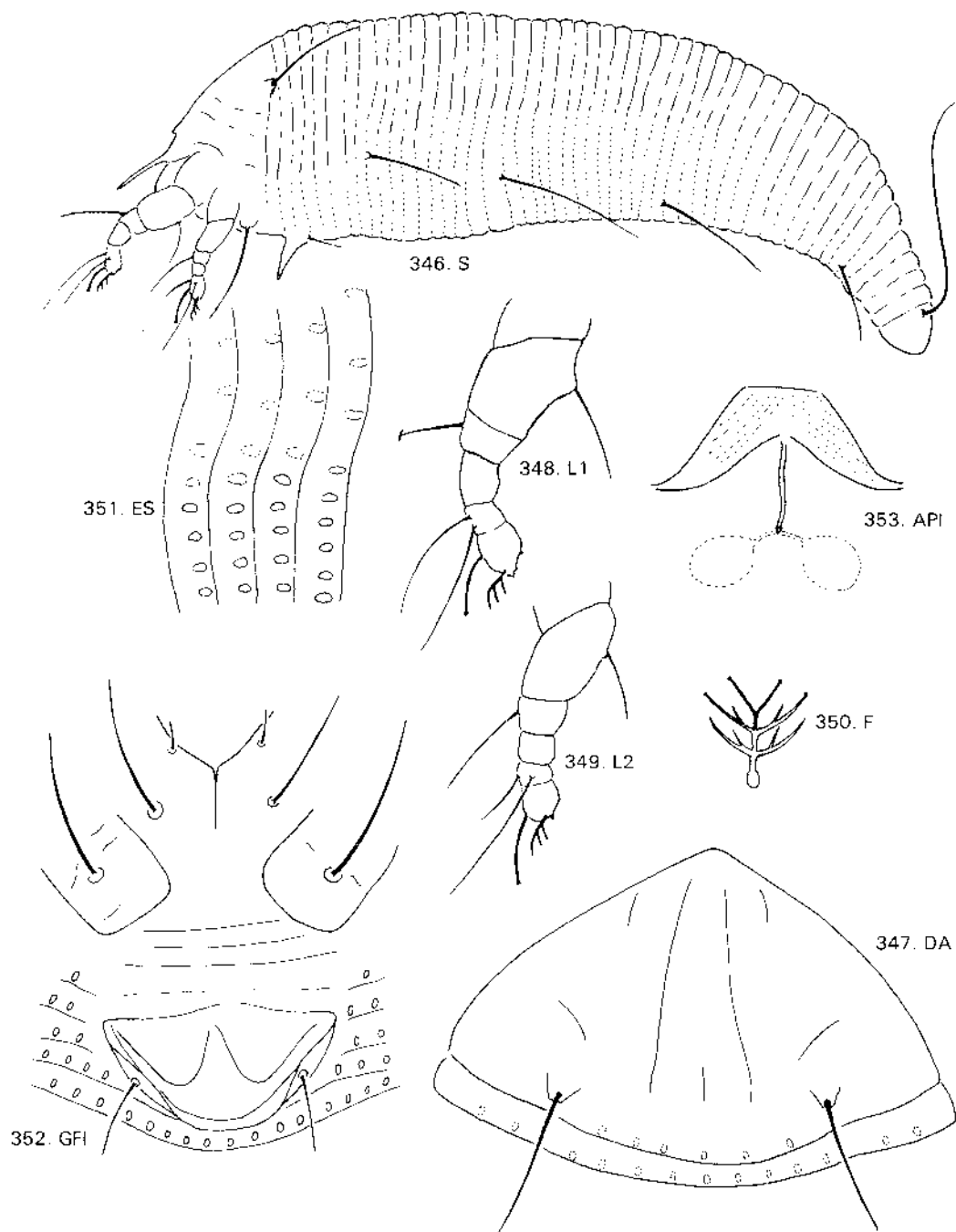


337. GFI

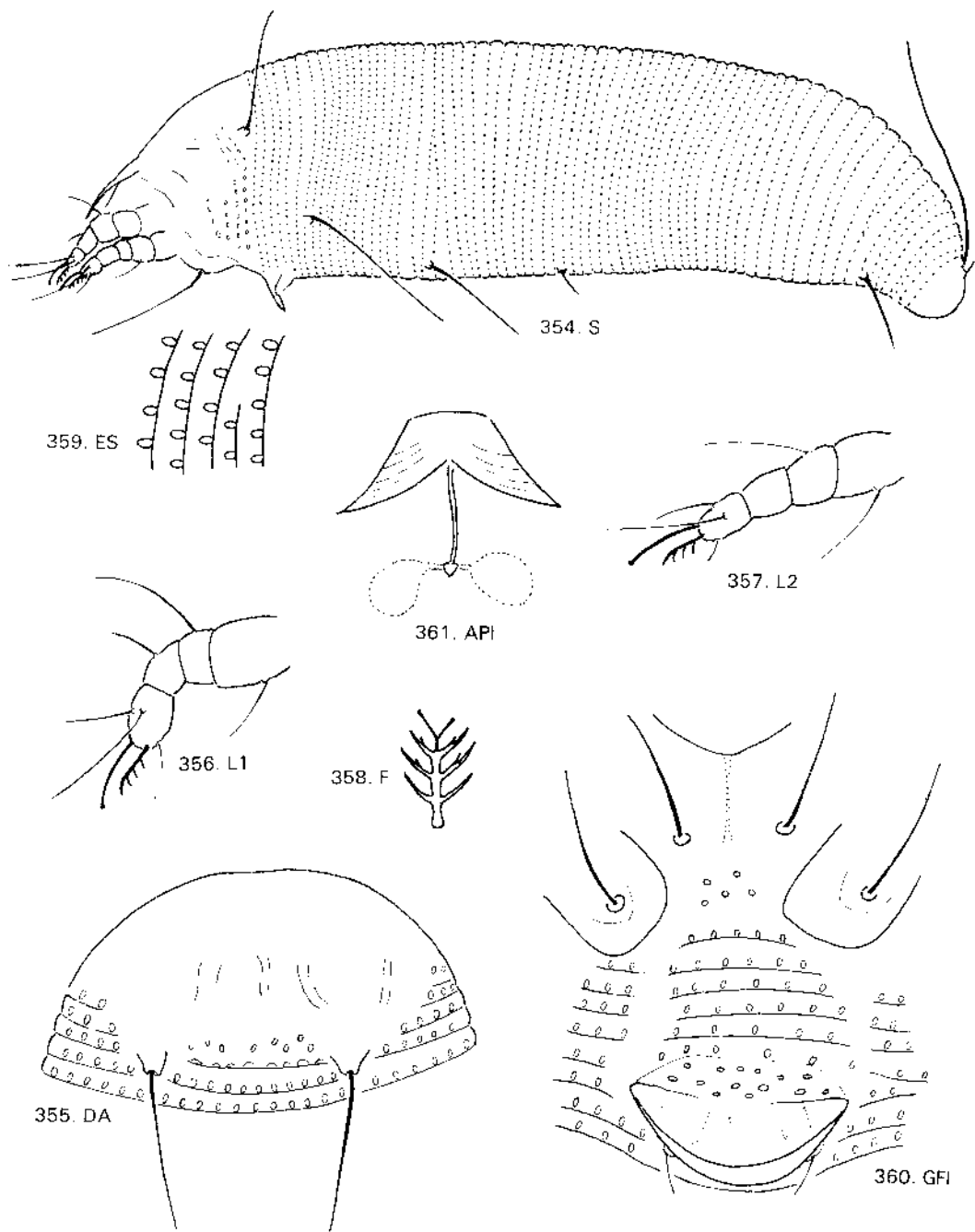
332-337. *Aceria victoriae*



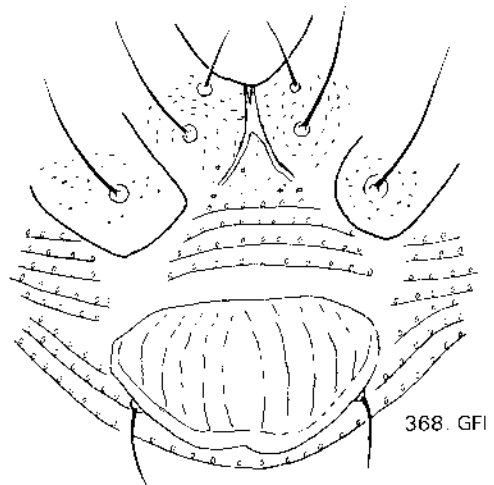
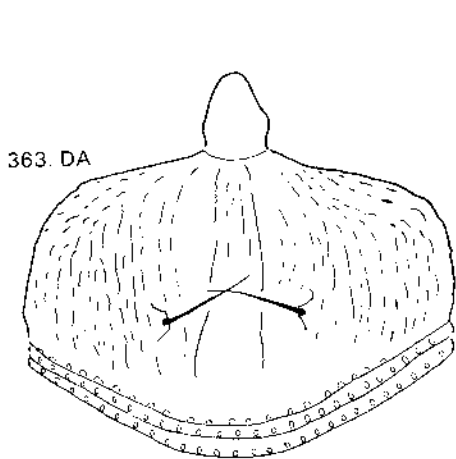
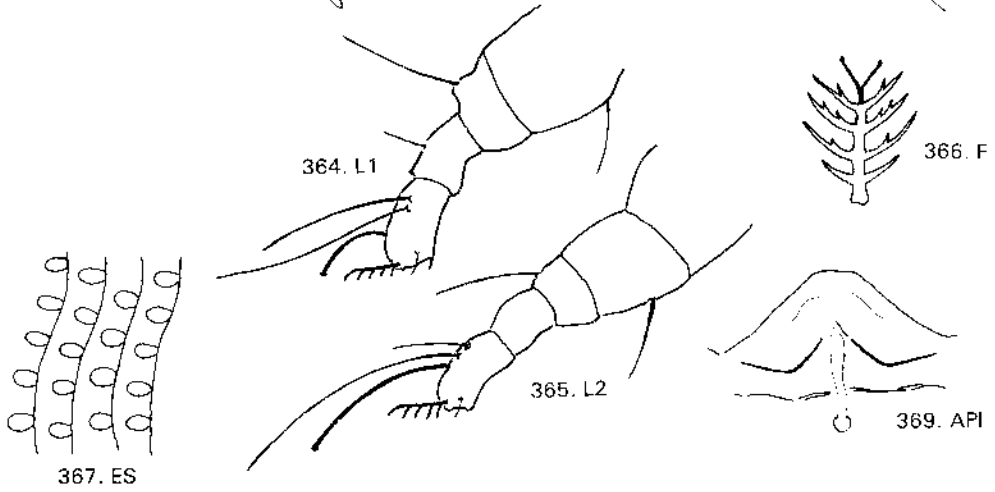
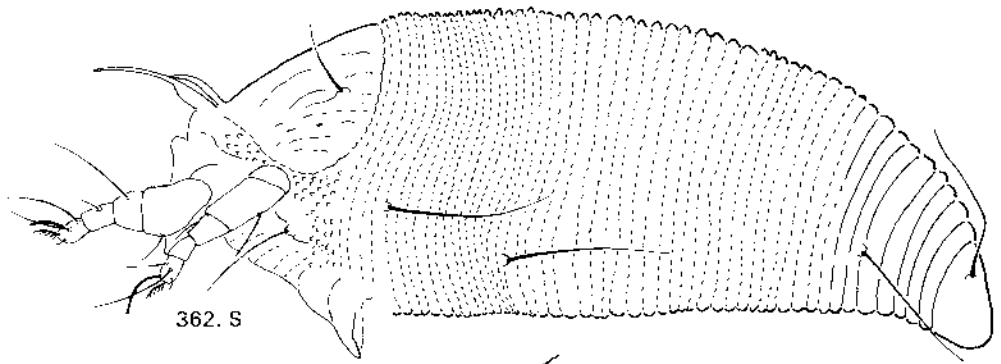
338-345. *Aceria waltheri* (protogyne)



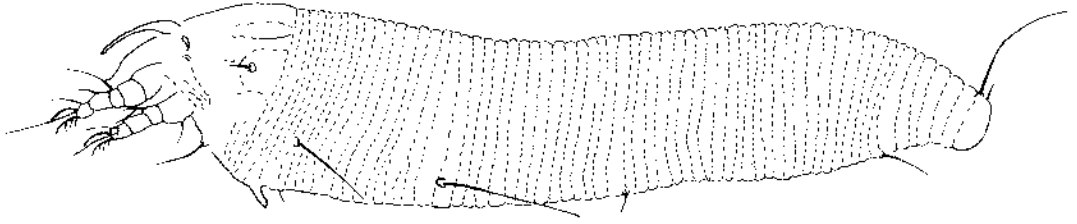
346-353. *Aceria waltheri* (deutogyne)



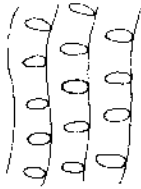
354-361. *Acerimina pyrosiae*



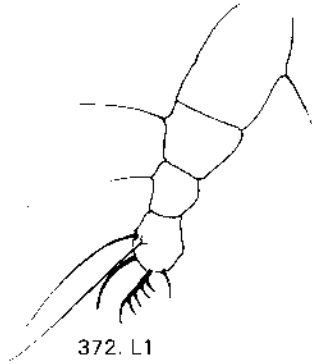
362-369. *Asetilobus hodgkinsi*



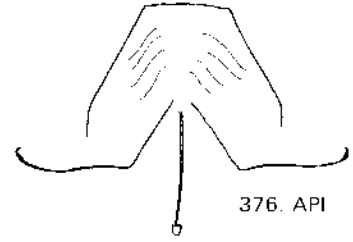
370. S



374. ES



372. L1

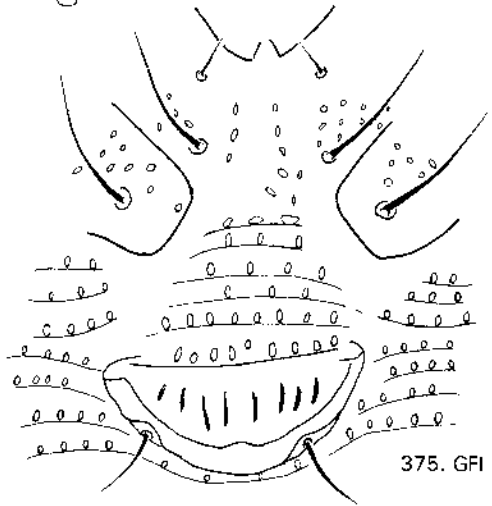
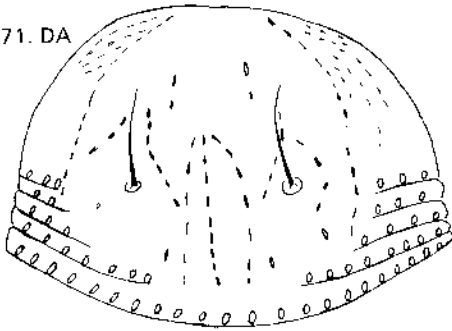


376. API



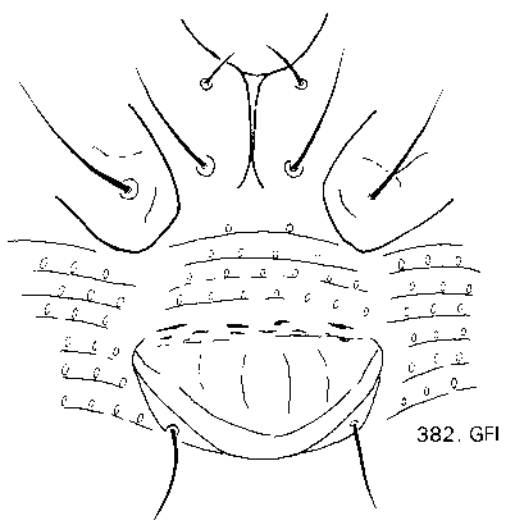
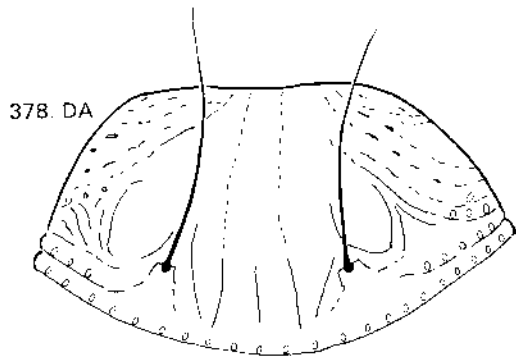
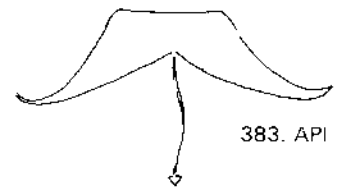
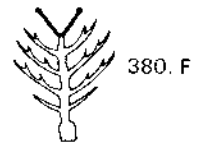
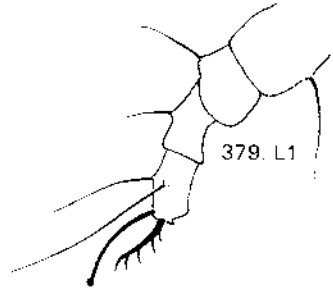
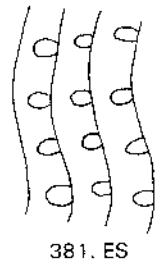
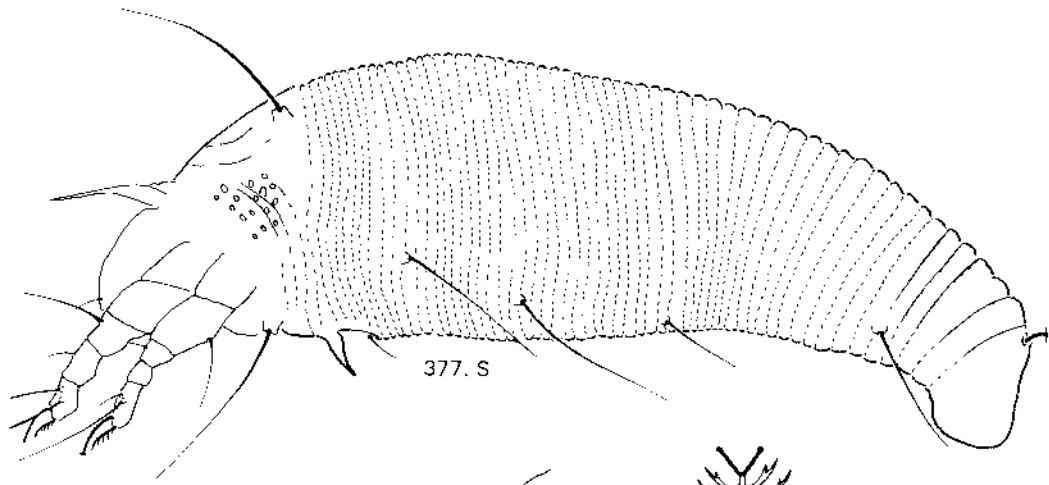
373. F

371. DA

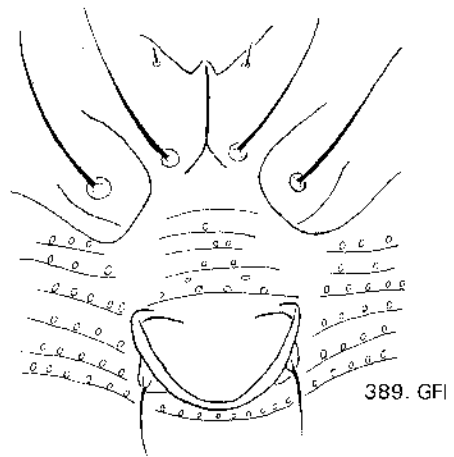
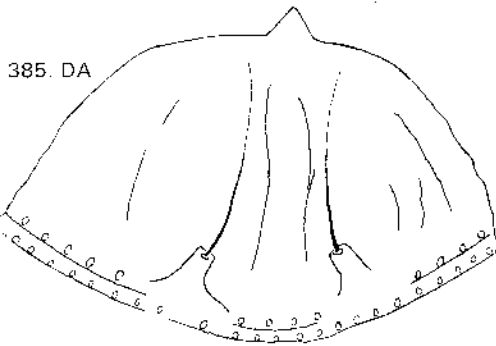
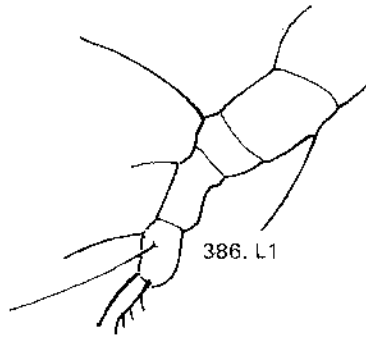
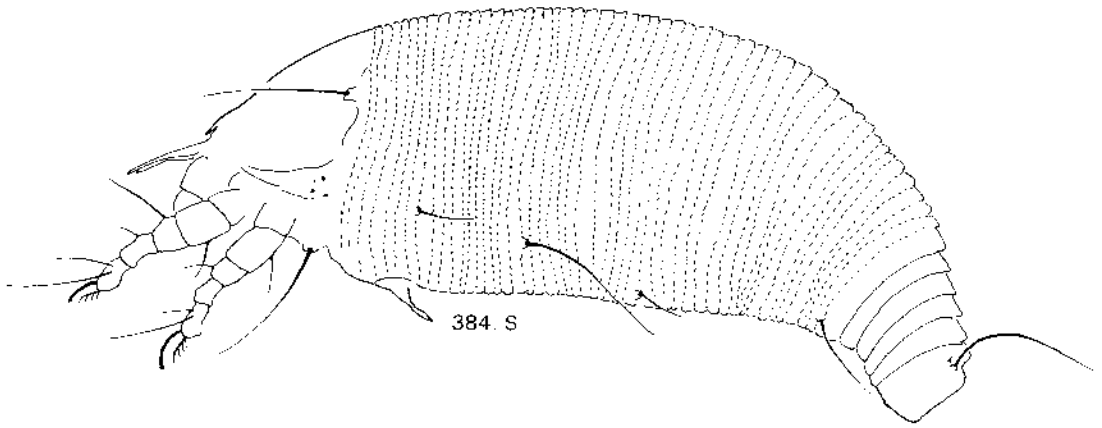


375. GFI

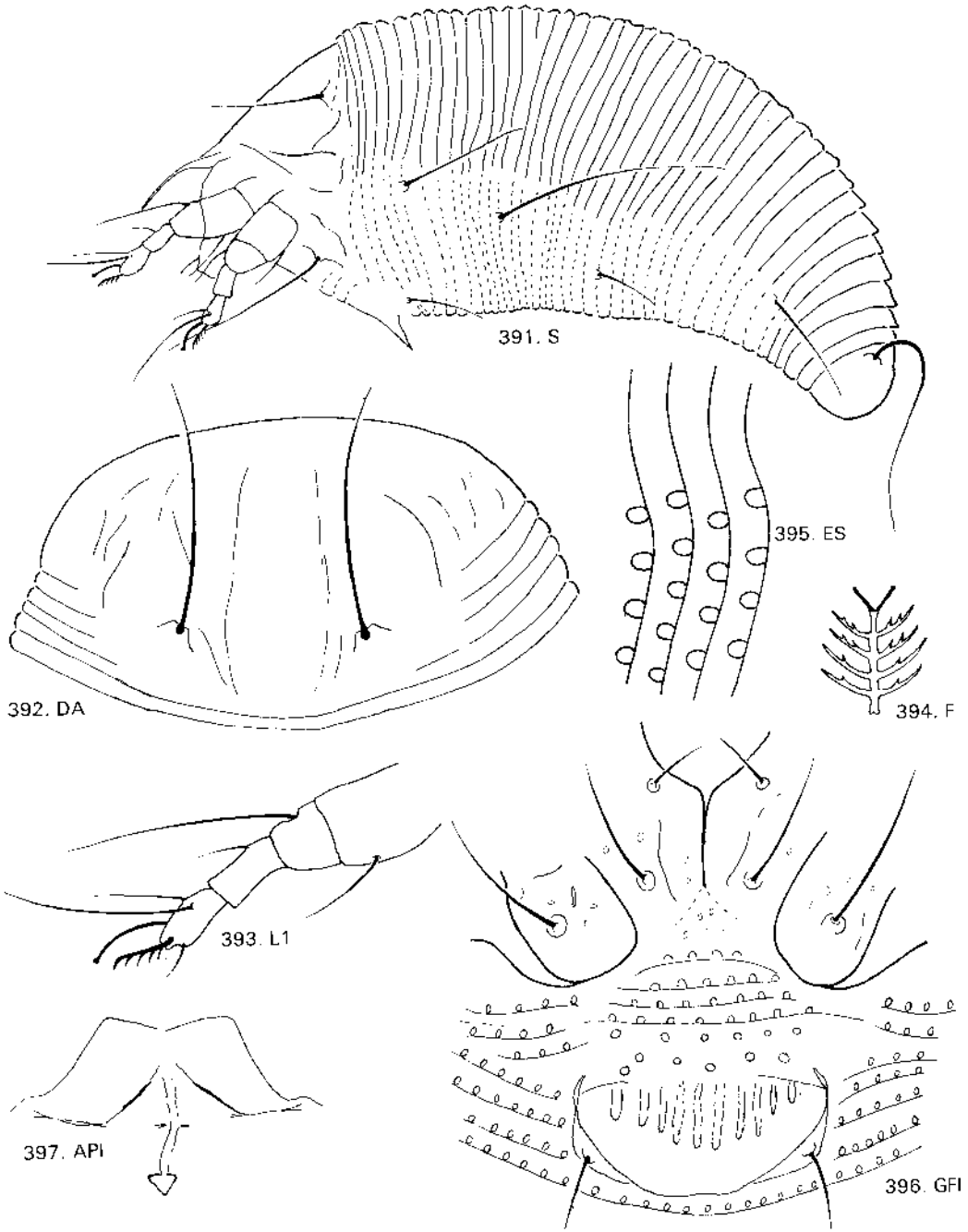
370-376. *Ericiphyes dracophylli*



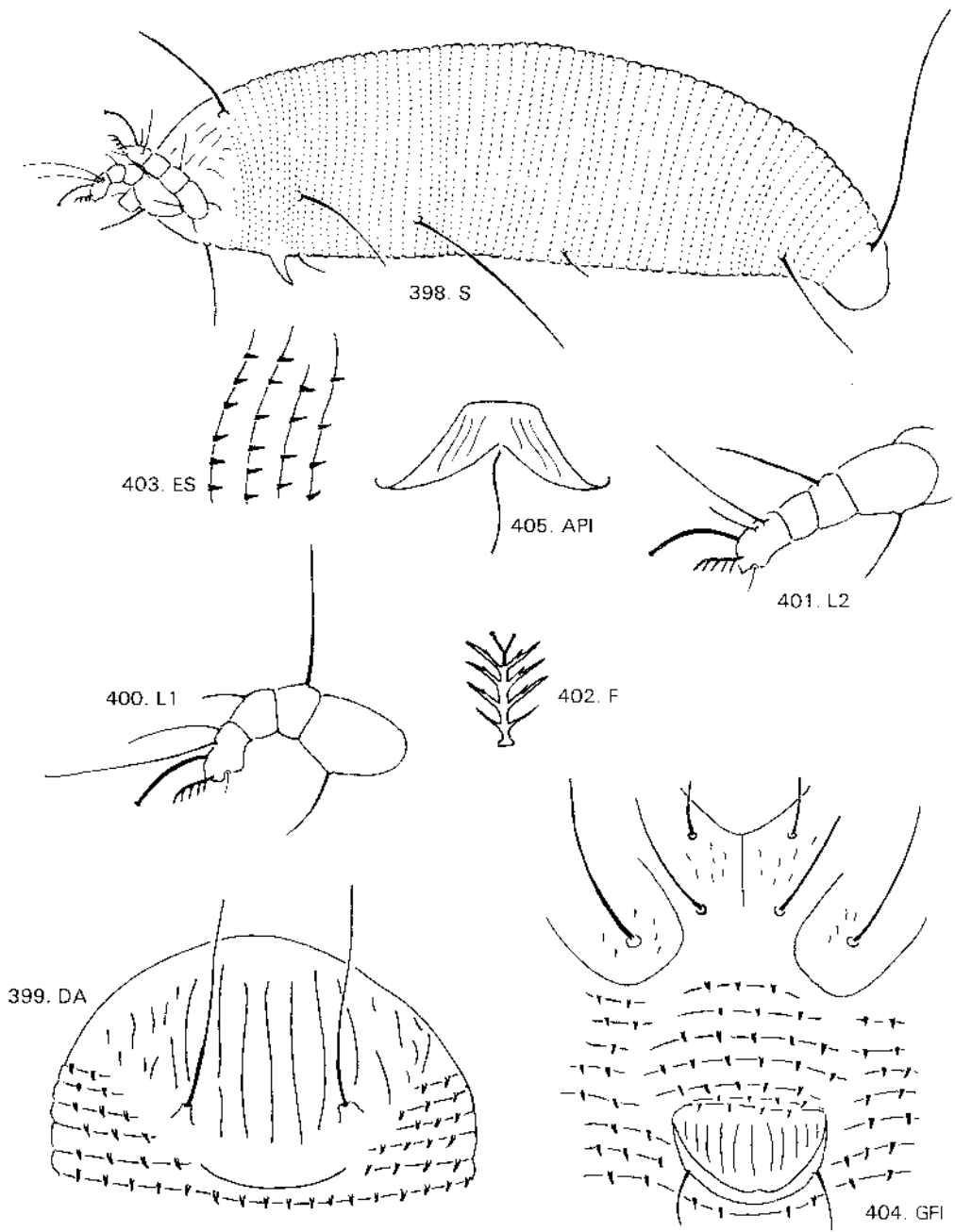
377-383. *Eriophyes duguidae*



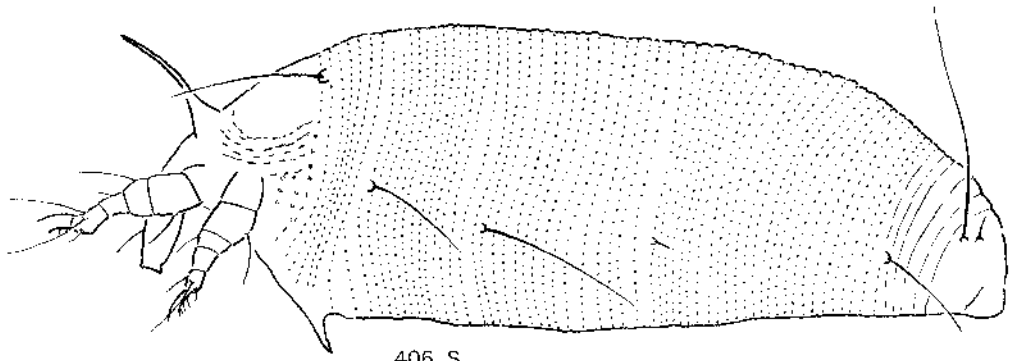
384-390. *Eriophyes hoheriae*



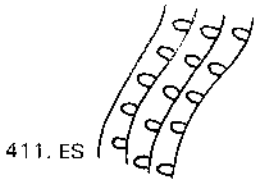
391-397. *Eriophyes lambi*



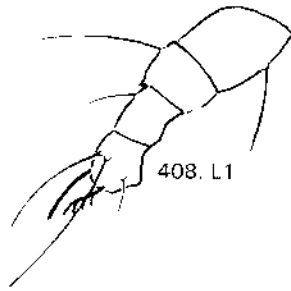
398-405. *Eriophyes leptophyllae*



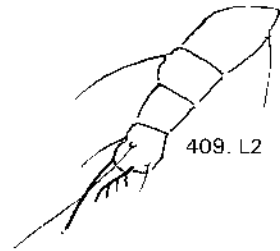
406. S



411. ES



408. L1



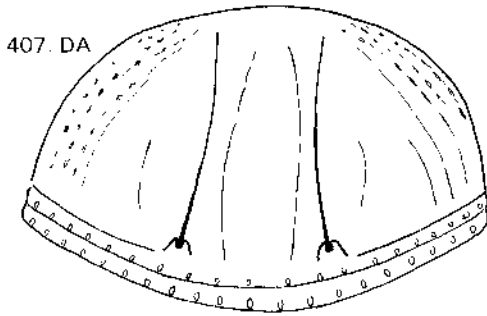
409. L2



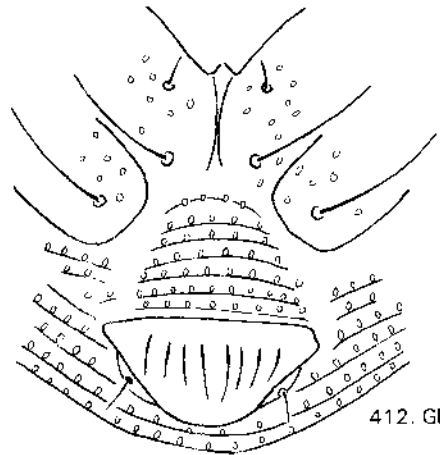
413. API



410. F

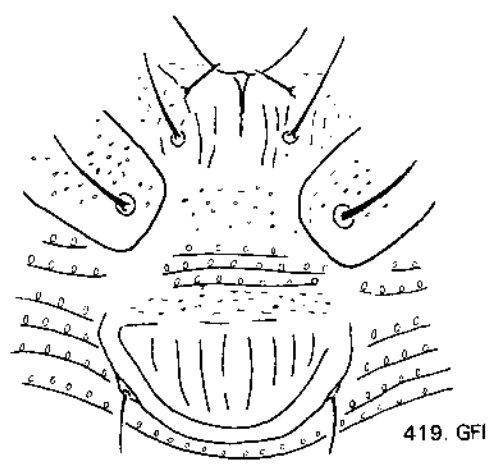
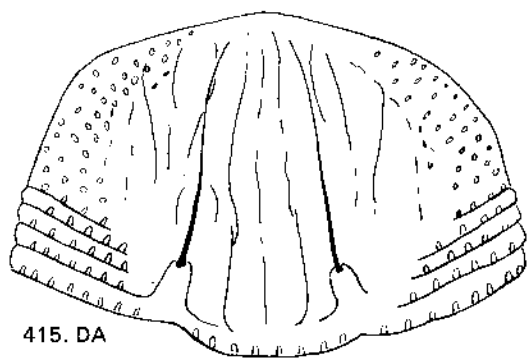
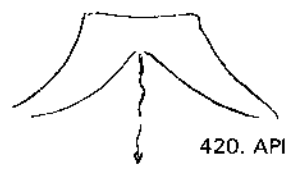
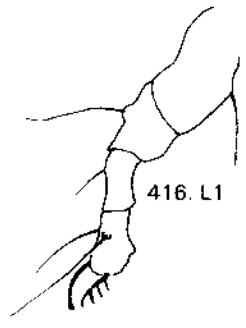
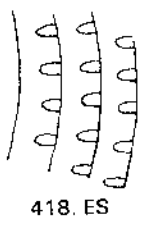
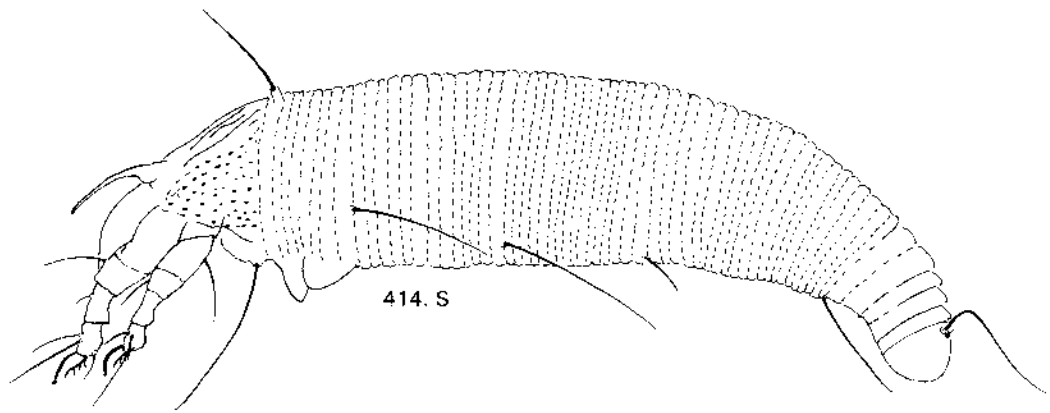


407. DA

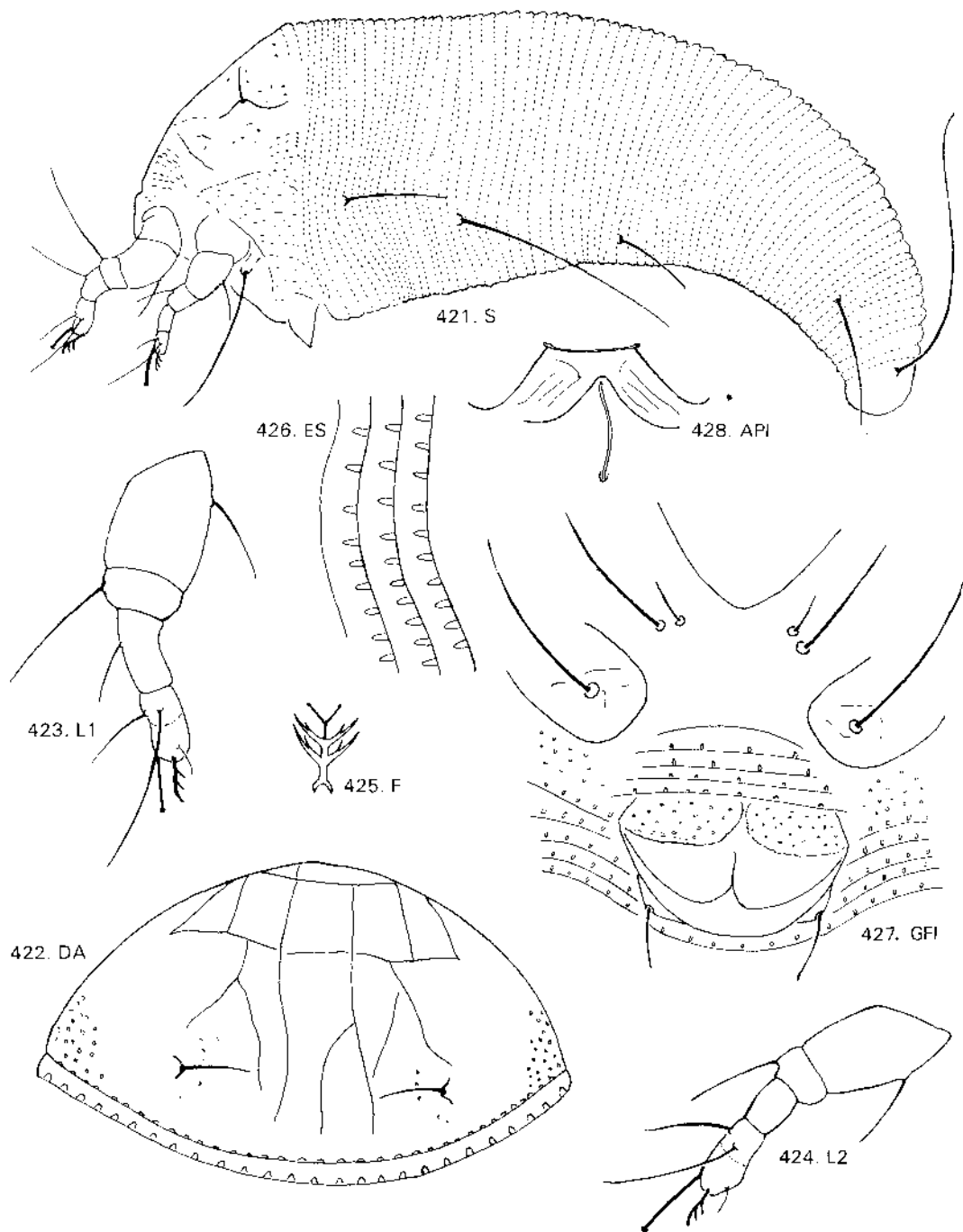


412. GFI

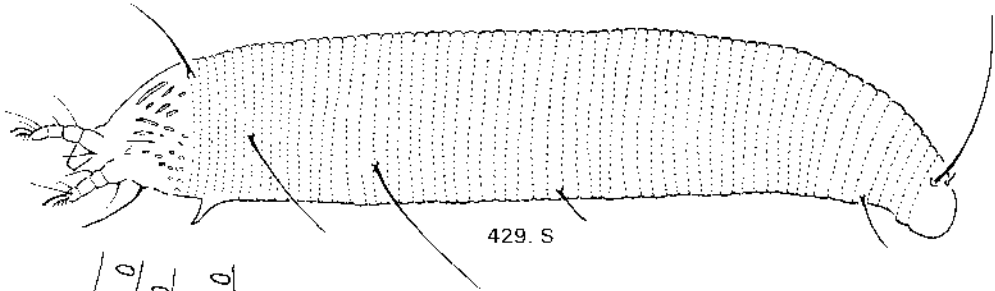
406-413. *Eriophyes mali*



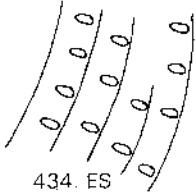
414-420. *Eriophyes paratrophis*



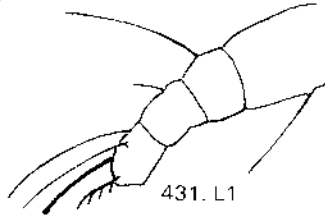
421-428. *Eriophyes parsonsiae*



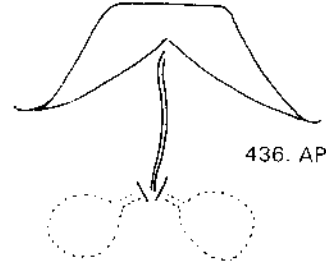
429. S



434. ES



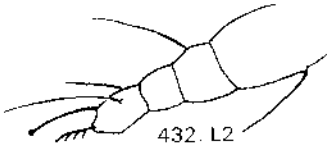
431. L1



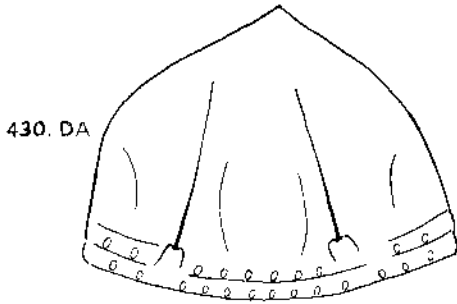
436. API



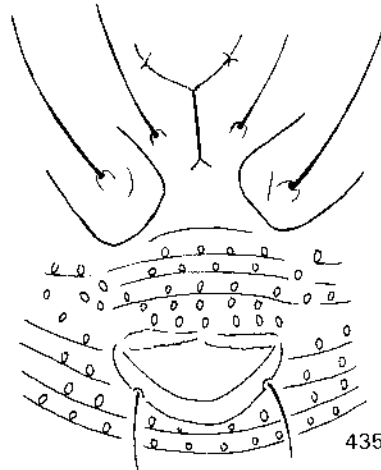
433. F



432. L2

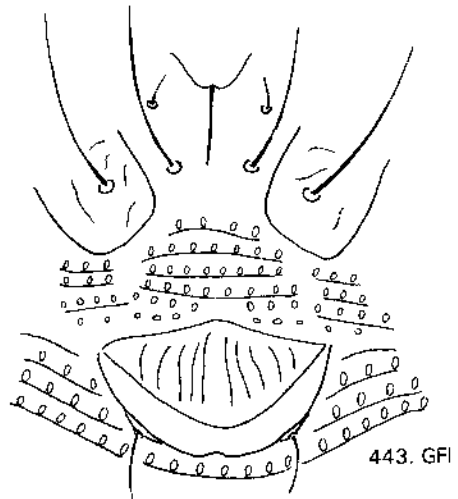
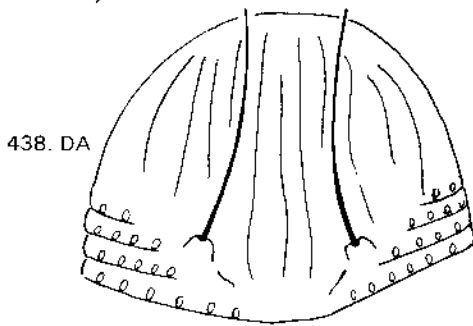
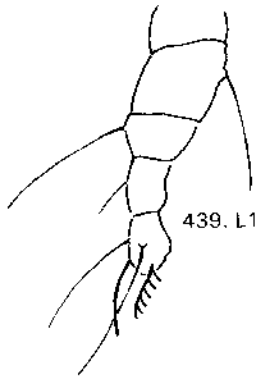
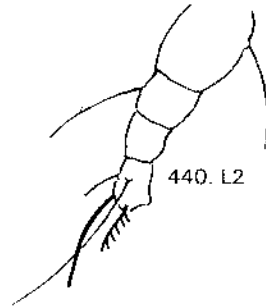
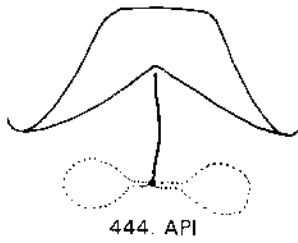
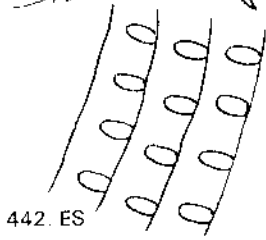
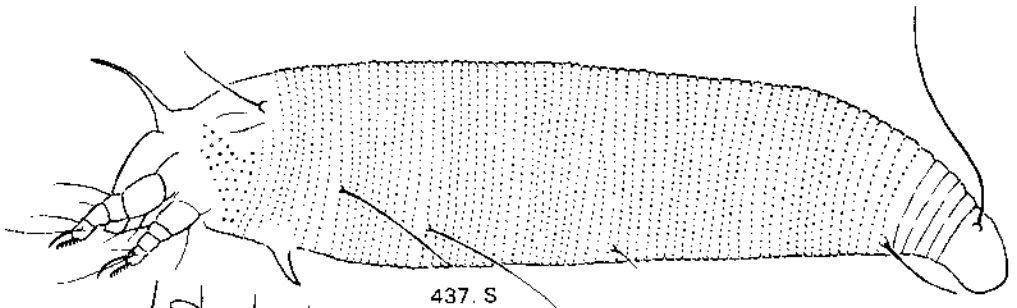


430. DA

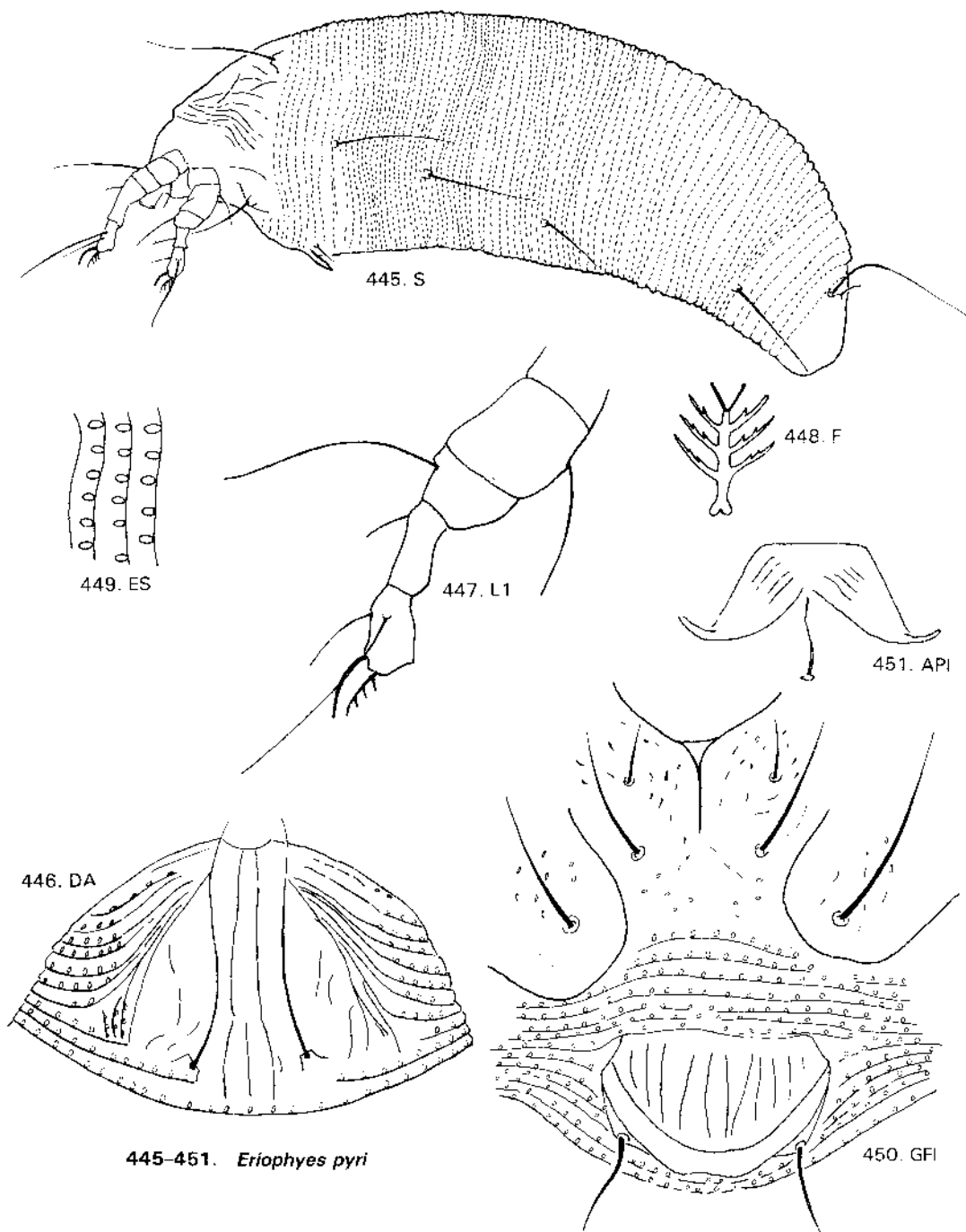


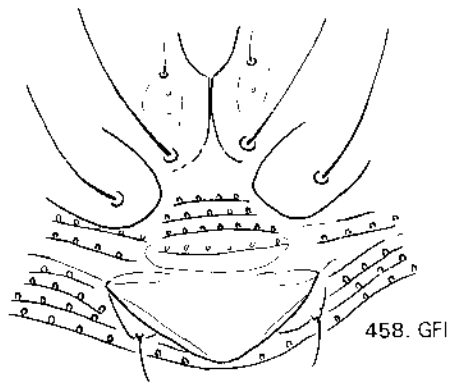
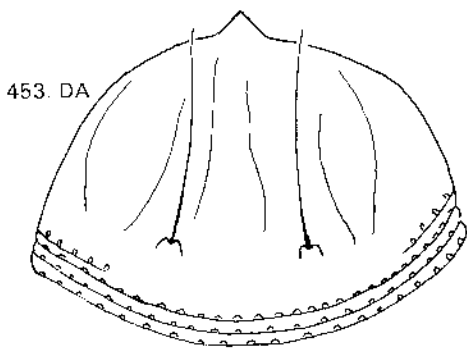
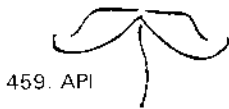
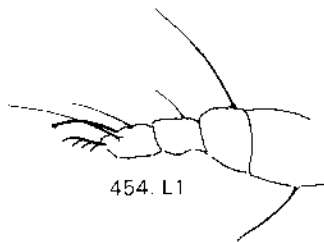
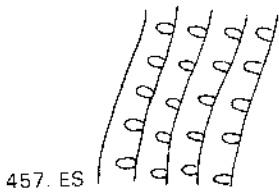
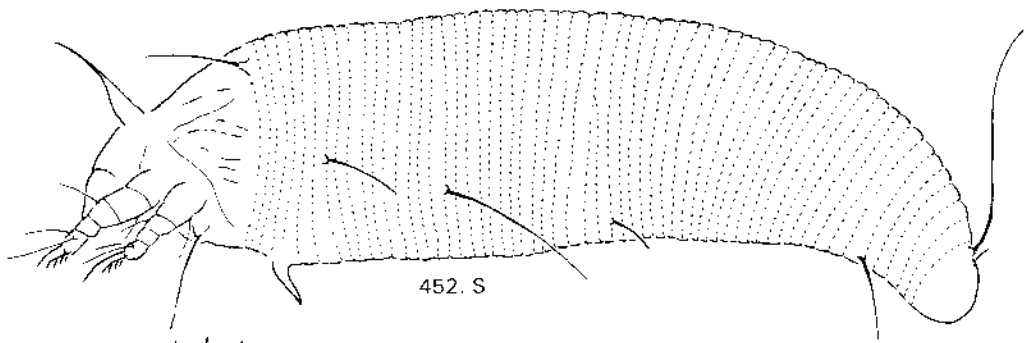
435. GFI

429-436. *Eriophyes plaginus*

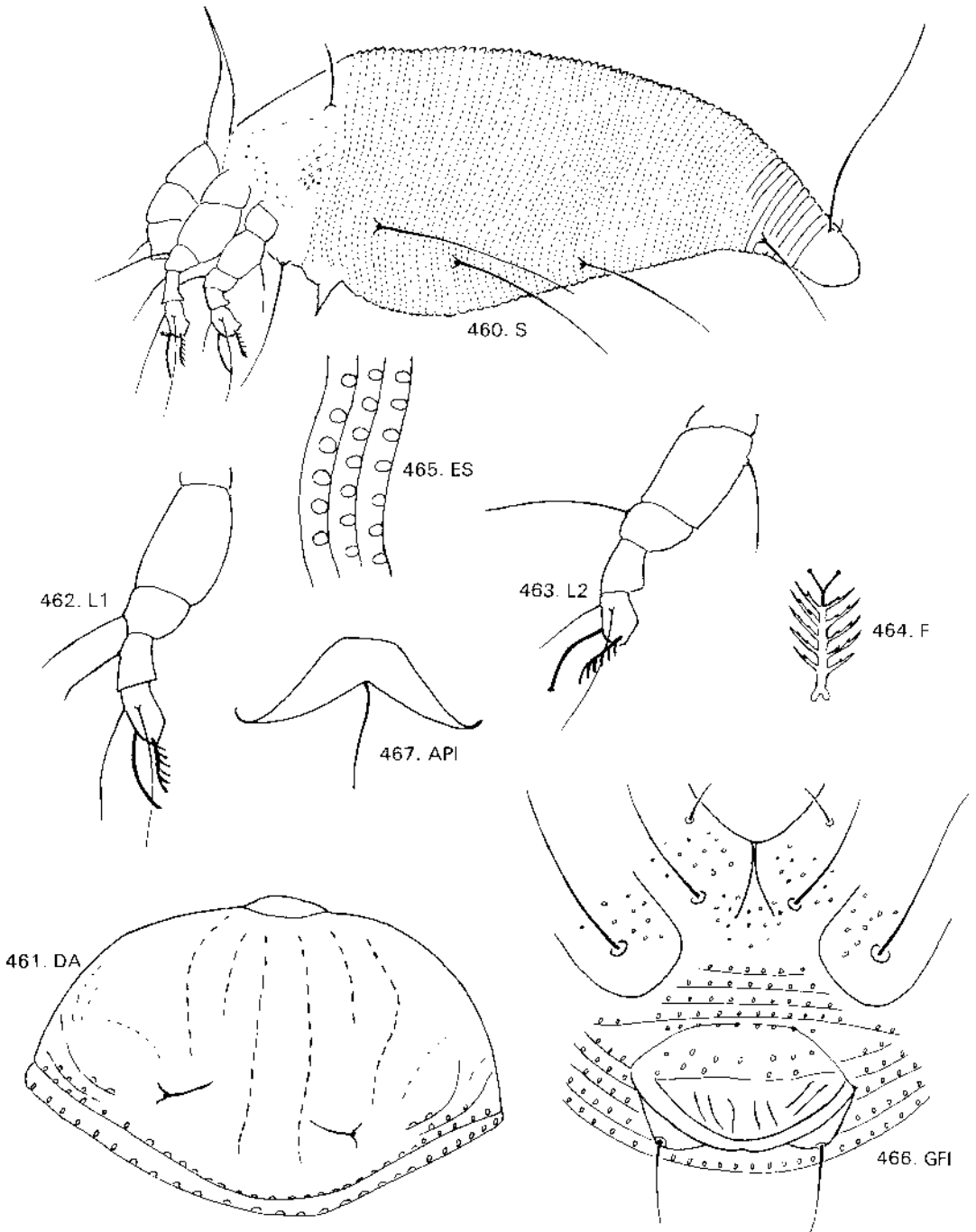


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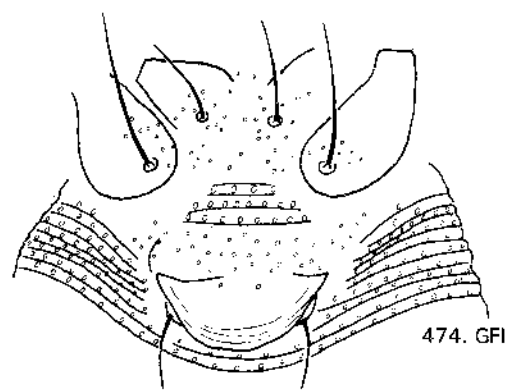
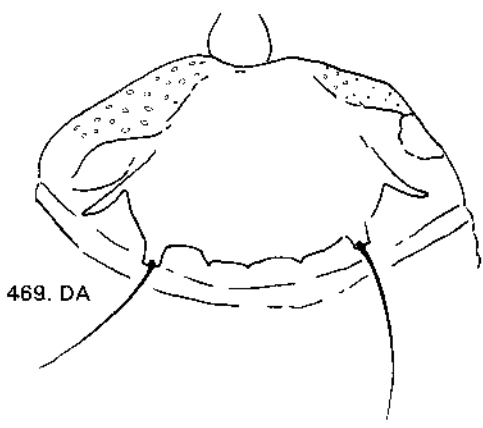
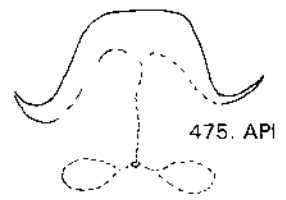
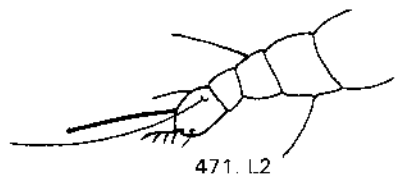
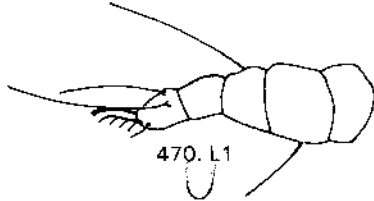
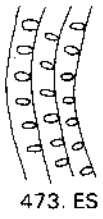
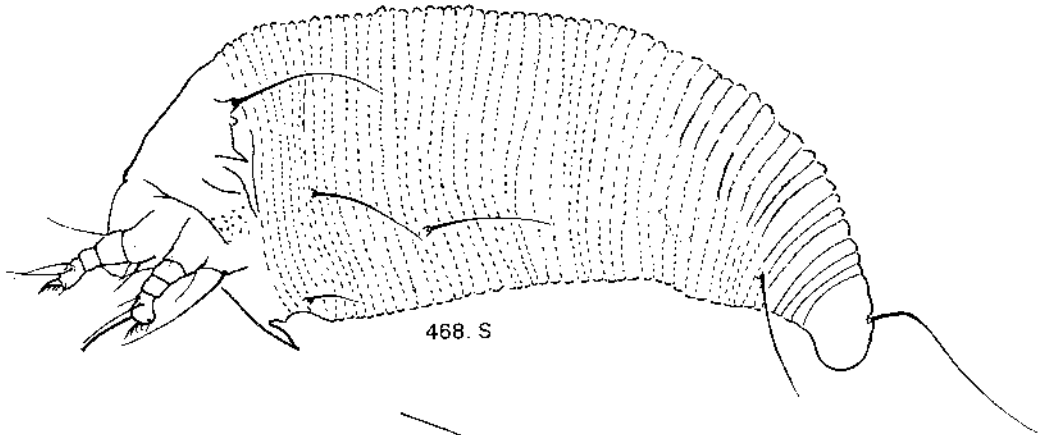




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TAXONOMIC INDEX

This index covers all taxa (i.e., including some not recorded in New Zealand) that are mentioned in *Fauna of New Zealand* numbers 4 and 5. Underlined entries are opening page numbers of descriptions followed (for species only) by page numbers on which illustrations appear.

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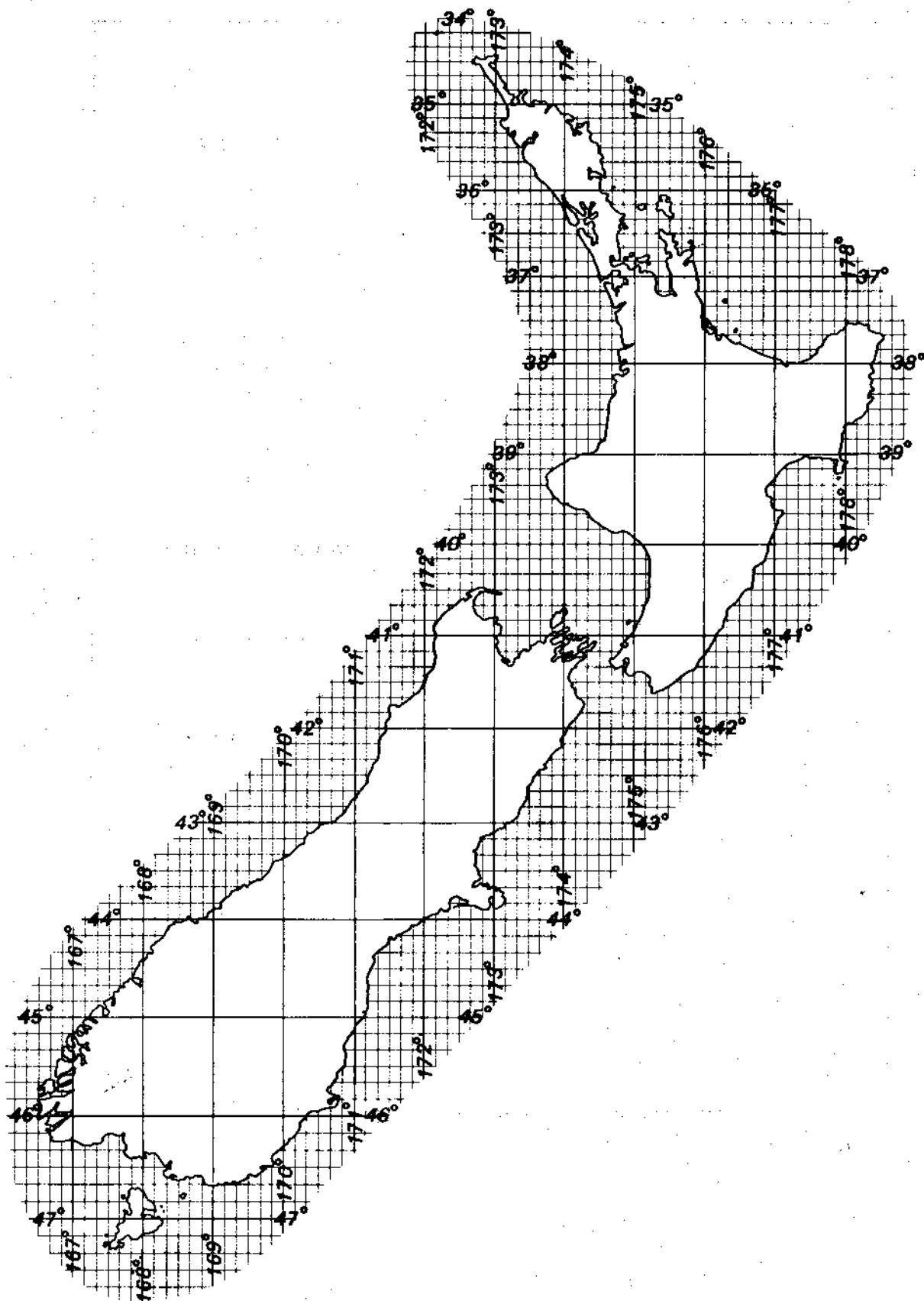
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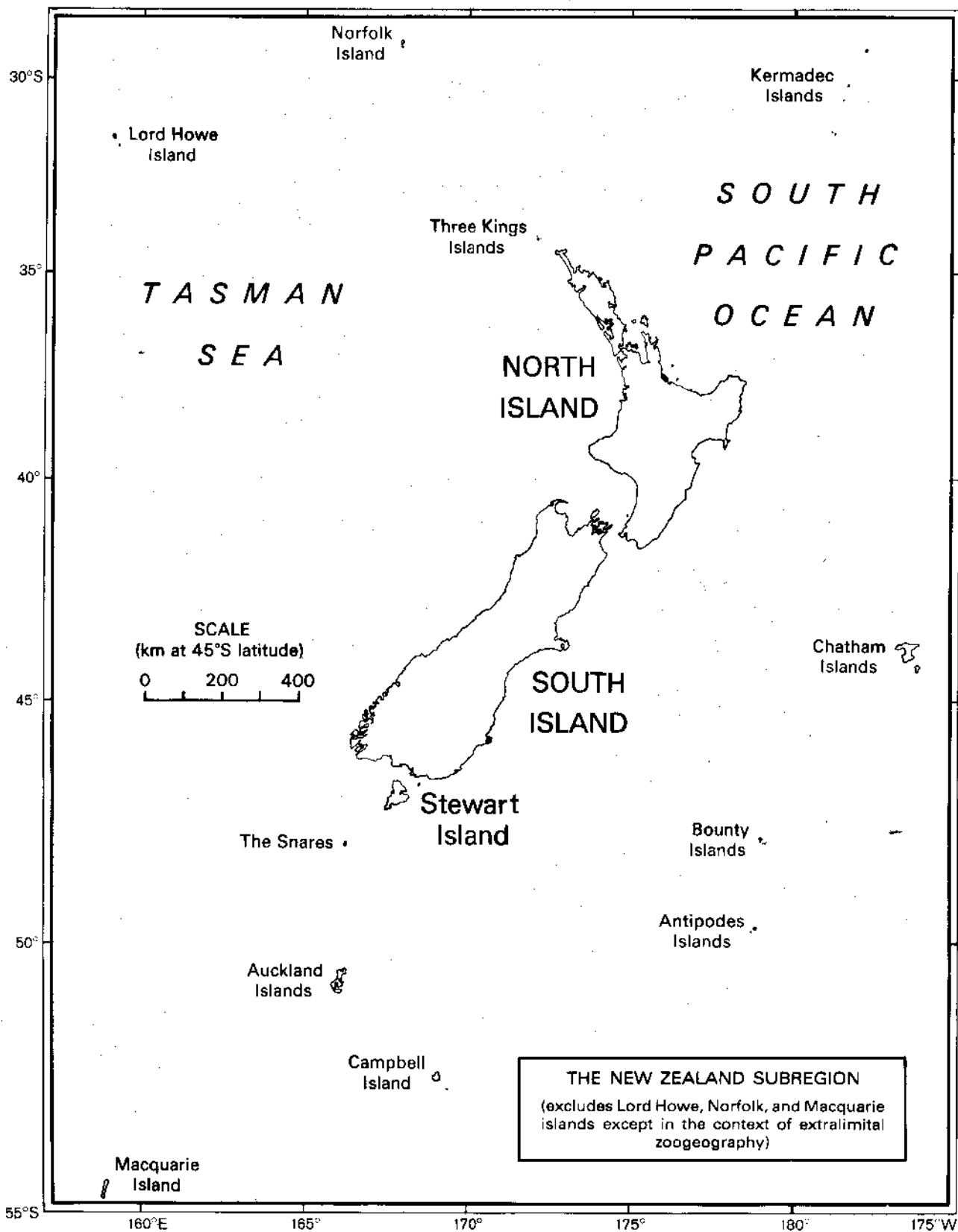


Number 5

Eriophyinae

(Arachnida: Acari:
Eriophyoidea)

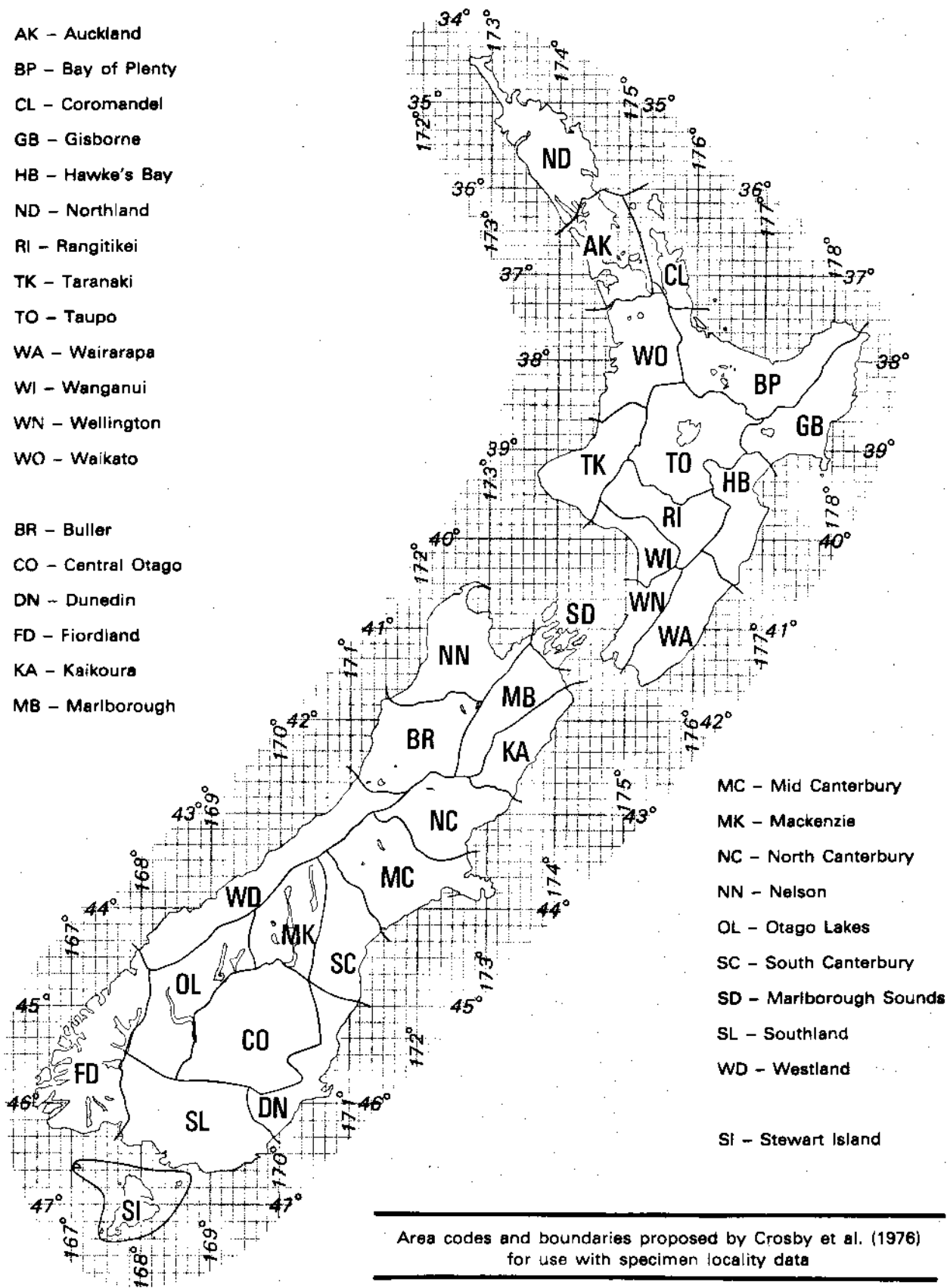
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Arachnida: Acari — Ixodidae, by G. W. Ramsay; Cryptostigmata review, by M. Luxton.

Crustacea: Copepoda — Harpacticoida, by M. H. Lewis. Amphipoda — Talitridae, by K. W. Duncan.

Insecta: Coleoptera — Introduced Curculionioidea, by G. Kuschel; Key to families, by J. C. Watt. Diptera — Calliphoridae, by J. P. Dear. Hemiptera — Pseudococcidae, by J. Cox; Psyllidae, by P. Dale. Hymenoptera — Ambositrinae, by I. Naumann; Apoidea, by B. J. Donovan; Chalcidoidea (in several parts), by J. S. Noyes and E. W. Valentine; Key to families, by E. W. Valentine; Pompilidae, by A. C. Harris. Lepidoptera — Catalogue of types, by J. S. Dugdale. Protura, by S. L. Tuxen. Thysanoptera — Tubulifera, by L. A. Mound & A. K. Walker.

A further twenty-plus contributions had been promised up to the time this number went to press.

Mollusca: Gastropoda — Punctidae, by F. M. Climo; Introduced Pulmonata, by G. M. Barker.

CHECKLIST OF TAXA

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DESCRIPTIONS

ILLUSTRATIONS

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