THE SPIDER MITE FAMILY TETRANYCHIDAE IN NEW ZEALAND
I. THE GENUS *BRYOBIA*

BY

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Summary.

A morphological study of the genus *Bryobia* (Acarina : Tetranychidae) in New Zealand has revealed the presence of six species and one sub species. They are : — *B. cristata* (Dugès), *B. repensi* n. sp., *B. rubrioculus* (Scheuten), *B. rubrioculus* f. *prunicola* Mathys, *B. watersi* n. sp., *B. variabilis* n. sp., *B. annatensis* n. sp. Detailed descriptions and illustrations of each species are provided.

This paper is intended to be the first of a series in the taxonomic study of the spider mite fauna of New Zealand.

Mites of the family Tetranychidae are known throughout the world and are regarded as a group of considerable economic importance, attacking almost any kind of plant and frequently causing damage severe enough to warrant the use of control measures.

Mites of the genus *Bryobia* are no exception. They occur throughout New Zealand and are known to be capable of causing serious damage to fruit trees, while in spring and autumn they frequently invade houses in such numbers as to be considered a nuisance.

A sound knowledge of the taxonomy of the different species is desirable both for the understanding of the group and for the use of the most effective control measures.

Historical review.

THOMSON (1922) makes a statement about the mite *Bryobia pratensis* Garm. as follows :

" In the report of the Agricultural Department for 1901 BLACKMORE reports a *Bryobia* as found under the leaves of fruit trees, to which it was causing great

damage. In the report for 1909 it is stated to be doing great damage to apple trees especially in the North Island. In 1905 it was reported from such widely separated localities as Ormond, Palmerston North and Lilburn Valley. It is generally distributed throughout New Zealand. "

From the above statement it can be seen that the genus *Byrobia* has been present in New Zealand for many years and was probably widespread throughout the country.

Bryobia pratensis is probably the species we now recognise as *Bryobia rubrioculus* (Scheuten).

COTTIER (1956), records *Bryobia praetiosa* as attacking a wide range of plants and says that as a pest it is comparable to the European red mite.

LAMB (1958) in a survey of red spider mites on apples stated " Clover mite infestation was not severe in any specimens examined though it is known from past experience that this species is sometimes a serious pest. " WOODHEAD (1958) indicated that *Bryobia* was troublesome in apple orchards chiefly at Nelson and Alexandra.

It would seem that the abundance of *Bryobia* mites on apple trees varies from season to season and from one locality to another.

HARRISON (1962) noted that the name of fruit tree form in New Zealand was *Bryobia rubrioculus* (Scheuten) = *Bryobia arborea* Morgan & Anderson.

COLLYER (1964) studied the biology of *B. rubrioculus* and noted the retention of the name *B. praetiosa* for the species that lives on herbaceous plants and often swarms over walls, houses and tree trunks.

Since 1955, overseas workers such as PRITCHARD and BAKER (1955), van EYNDHOVEN (1956, 1957, 1958), MATHYS (1957, 1961, 1962), MORGAN (1960), MORGAN and ANDERSON (1957), ANDERSON and MORGAN (1958), WAINSTEIN (1960) and others have carried out considerable investigation into this genus, and although their results are not in complete agreement they have indicated firstly, that many more species of *Bryobia* exist than was originally thought, and secondly, that the species known as *Bryobia praetiosa* consists of a complex of species or subspecies.

The work of the above authors forms a good foundation for the investigation of the New Zealand species, which up until now have been largely neglected. The following study deals not only with adult females but with the immature stages, particularly the larva which has been found to be of considerable significance in taxonomic work. Also the presence or absence of males is indicated and descriptions of those found included.

The classification followed is that of PRITCHARD and BAKER (1955) :

Family Tetranychidae Donnadieu,
Sub family Bryobiinae Berlese,
Tribe Bryobiini Reck,
Genus *Bryobia* Koch.

Characteristics of the genus.

Adult female (fig. 1).

Mites of the genus *Bryobia* are distinguished in the adult stage by possessing twelve pairs of dorsal hysterosomal setae and by the claw being hook like with one or more pairs of medio lateral tenent hairs. The body is usually oval in shape and at the anterior end are four forwardly projecting lobes known as the propodoso-

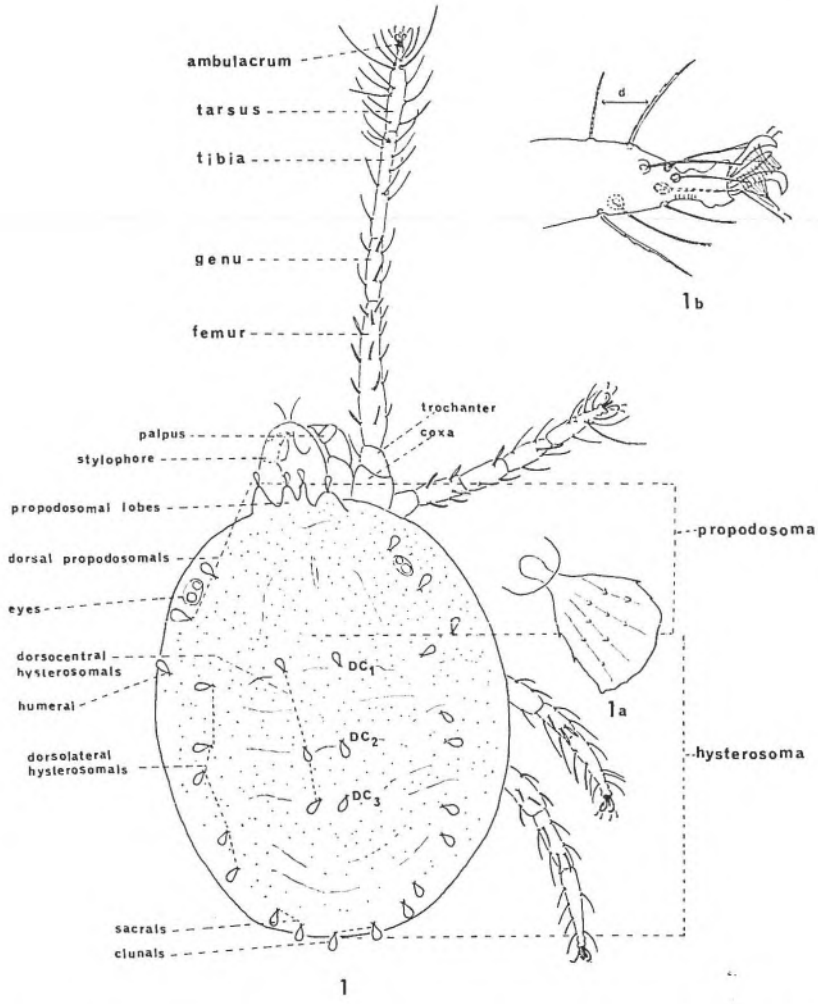

Fig. 1. — *Bryobia rubrioculus*. Dorsal view of adult female showing principal body parts. *a*) : enlarged view of dorsal body seta of adult female ; *b*) : enlarged view of distal extremity of tarsus IV of adult female showing spacing (d) of " duplex " setae.

mal lobes, each lobe bearing a seta at its distal extremity. The size and shape of these lobes is of taxonomic significance.

The propodosoma has four pairs of dorsal setae and a pair of lens like eyes on each side. The dorsal surface is frequently wrinkled and/or granulate. MORGAN (1960) drew attention to the presence or absence of a small swelling on each side near the anterior margin which he called the propodosomal anterior angulation (fig. 2).

The palpus is five segmented, terminating in a thumb-claw complex. Seven setae are borne distally, 4 being rod-like and sensory, the remaining 3 tactile (fig. 4).

The stylophore and associated chelicerae are always present, sometimes retracted within the body cavity. Some species have the stylophore notched on the anterior margin. The peritremes are elongated or globular structures arising from the anterior part of the propodosoma.

The propodosoma is divided from the hysterosoma by a transverse fold or wrinkling. The dorsal surface of the hysterosoma is usually somewhat wrinkled and granulate. The twelve pairs of setae consist of the following : one pair of humerals, three pairs of dorsocentrals, five pairs of dorsolaterals, two pairs of sacrals and one pair of clunals (terminology after PRITCHARD and BAKER (1955) and G. MATHYS (1957). The size and shape of these setae may be of taxonomic significance.

On the ventral surface (fig. 18) are four pairs of mid ventral setae. Two pairs of setae occur around the genital opening, three pairs around the anal opening and two pairs at the posterior extremity of the anus (fig. 40). All setae slender. Coxa I with two setae ; coaxe II, III and IV each with one seta. The setal arrangement appears to be constant for the genus.

Four pairs of legs are present, each 6 segmented and consisting of tarsus, tibia, genu, femur, trochanter and coxa. Three types of setae normally occur on the legs : (a) the tactile setae which are commonest vary in shape from being slender to broad and serrate ; those at the tarsal extremity are often forked at the tip ; (b) the sensory setae which are smooth and slender often appearing rod like and terminating bluntly ; transverse striations are sometimes evident. Sensory setae are commonest on tarsi I and II ; (c) the duplex setae which occur on tarsus I (two pairs) and tarsus II (one pair) each consist of a long sensory distal seta and a short proximal tactile seta (see fig. 32).

On tarsi III and IV are also frequently found two intimately associated setae which are sometimes called duplex setae (fig. 35). However the tactile seta is frequently almost as long or longer than the sensory member, and in this respect they differ markedly from those on tarsi I and II.

The length of leg I in relation to the body length is of taxonomic significance as are the lengths of individual segments and the number of setae present. Leg I is usually much longer than the other legs. At the distal end of the tarsus is the ambulacrum which includes the paired claws and central empodium. Tenent

hairs arise from both structures and their number and arrangement are often to taxonomic significance.

Besides the adult, four other stages occur in the life cycle — egg, larva, protonymph and deutonymph.

Egg.

Eggs are usually circular, bright red, and laid singly on plants or inanimate objects.

Larva.

Larvae are usually red, and can be distinguished in only possessing three pairs of legs and in that tarsus I bears only 8 setae. Propodosomal lobes are absent. Eyes are present. The shape of the dorsal body setae is usually distinct from that of the adult, and this stage is one of the most important taxonomically.

Ventrally (fig. 8) there are two pairs of mid ventral setae and five pairs of genital setae. Coxa I has one seta ; coxae II, III and IV without setae.

Protonymph.

Four pairs of legs are present. Propodosomal lobes are usually apparent. Dorsal body setae may show changes in thickness and length. Tarsus I usually bears 12 setae and femur I 3 setae.

Ventrally (fig. 10), there are 3 pairs of mid ventral setae and 5 pairs of genital setae (fig. 39). Coxa I has 2 setae ; coxae II and III each with one seta.

Deutonymph.

Propodosomal lobes are strongly developed and the shape of the dorsal body setae approaches that of the adult. Tarsus I normally bears 17 setae and femur I has more than 3 setae. The deutonymph is larger than any of the preceding forms not only in body length and width but in leg lengths and number of setae on individual leg segments.

Ventrally (fig. 19) there are 4 pairs of mid ventral setae and 6 pairs of genital setae. Coxa I has 2 setae and coxa II, III and IV each have one seta.

Male.

Males are normally smaller than females and the ratio of length of leg I to body length is much smaller than in the case of the females. Males possess the same number and arrangement of setae on both dorsal and ventral surfaces, with the exception of the genital area (fig. 96). The number of setae on individual segments of leg I, particularly the tarsus seem to be of significance in determining the different species.

Measurements and leg setal counts.

In the following descriptions the body length for each species is measured from the anterior margin of the propodosomal lobes (excluding setae) to the posterior body margin. In the larva, the anterior measurement is the anterior margin of the propodosoma.

Leg lengths are measured from the base of the trochanter to the distal extremity of the tarsus, excluding claws and empodium.

In the counting of individual setae on each leg segment no distinction is made between tactile and sensory setae. The duplex setae of tarsus I and tarsus II are included in the setal counts and each duplex seta is regarded as one seta only. Setal counts are frequently expressed as follows for tarsus, tibia, genu and femur : leg. I *22*-23 : 12-13 : 6-8 : 11-13.

The figure underlined represents the normal number of setae for any particular leg segment so that in this example tarsus I bears from 22-23 setae, 22 being the normally occurring number.

A key to the species of *Bryobia* occurring in New Zealand.

1a. Propodosomal lobes well developed. Empodium I of adult female with 1 pair of tenent hairs..... *praetiosa* complex, 2

1b. Propodosoma lobes poorly developed. Empodium I of adult female with 2 rows of ventrally directed tenent hairs..... *sarothamni* group, 6

2a. Outer propodosomal lobes of adult female large and teat like ; femur I usually bearing 24-26 setae..... *B. repensi* n. sp.

2b. Outer propodosomal lobes of adult female not teat like ; femur I usually bearing 16-21 setae..... 3

3a. Length of body of adult female less than 750 μ. Adventitious growths usually present on propodosomal lobes..... 4

3b. Length of body of adult female greater than 750 μ. Adventitious growths absent. 5

4a. Dorsal body setae of larva narrow (4-5 μ) ; normally occurring on apple and pear trees..... *B. rubrioculus*

4b. Dorsal body setae of larva broader (7-11 μ) ; normally occurring on peach and apricot trees..... *B. rubrioculus* f. *prunicola*

5a. Males present ; ratio of length of leg I to body length usually about 1 : 1.3 ; dorsal body setae of larvae spatulate..... *B. watersi* n. sp.

5b. Males not so far found ; ratio of length of leg I to body length usually less than 1 : 1.3 ; dorsal body setae of larvae slender and needle like..... *B. cristata*

6a. Usually found on broom (*Cytisus* sp.) ; males common. body shape of adult female oval..... *B. variabilis* n. sp.

6b. Found in grass ; body of adult female broadest at anterior 1/4. *B. annatensis* n. sp.

Bryobia cristata (Dugès), 1834.
(Figs 2-40).

Acarus graminum Schrank 1781, Beytr. Natur., p. 8.
Tetranychus cristatus Dugès 1834, Ann. Sci. Nat. Paris (sér. 2), 1 : 15, 28.
Bryobia praetiosa Koch. Morgan & Anderson, 1957 : Canadian Ent., LXXXIX : 11 : 485-490.

This species is readily identifiable in the larval stage by the slender dorsal body setae. Also, the inner sacral setae have moved anteriorly to give the appearance of a fourth pair of dorsocentrals. The distance apart of the DC1 setae is about twice that of the DC2 setae.

In the adult, the shape of the outer propodosomal lobes is distinctive, these usually being triangular with a bulge or swelling on the inner margin. The number of setae on the femur (18 — 21) and the length of the femur (263 ± 46 μ) readily distinguish it from the allied species *B. repensi* n. sp., in which the femur bears 24 — 26 setae and is 316 ± 25 μ long.

Larva (figs 7-9, 11-12, 24-26).

Examination of 18 slide mounted specimens.

Length of body 281 ± 47 μ ; greatest width of body 244 ± 39 μ. Anterior propodosomal setae short, slender, 8 μ long, Remaining dorsal body setae slender, serrate 29 — 41 μ long. The inner sacrals have moved into a slightly anterior position so that there appears to be four pairs of dorsocentrals. Dorsal body surface sparsely granulate and wrinkled. Mediodistal margin of stylophore smoothly rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 92 ± 27 μ : DC_2 43 ± 11 μ : DC_3 29 ± 5 μ.

Length of leg I 237 ± 30 μ. Lengths of individual segments of leg I : trochanter 25 ± 4 μ ; femur 67 ± 8 μ ; genu 41 ± 4 μ ; tibia 45 ± 4 μ ; tarsus 64 ± 7 μ. Length of leg II 173 ± 9 μ ; length of leg III 183 ± 15 μ.

Number of setae on each of leg segments tarsus, tibia, genu and femur as follows : — leg I 8:6:4:3 ; leg II 8:5:4:3 ; leg III 6:5:2:2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 3 roots.

Empodium I short, pad like with about 3 pairs of tenent hairs. Empodium II somewhat longer with about 5 pairs of tenent hairs. Empodium III about half as long as claw with at least 5 pairs of tenent hairs.

Protonymph (figs 10, 13-14, 20-23, 38-39).

Examination of 12 slide mounted specimens.

Length of body 441 ± 60 μ ; greatest width of body 355 ± 48 μ. Propodosomal lobes present. Anterior propodosomal setae short, broad, about 13 μ long.

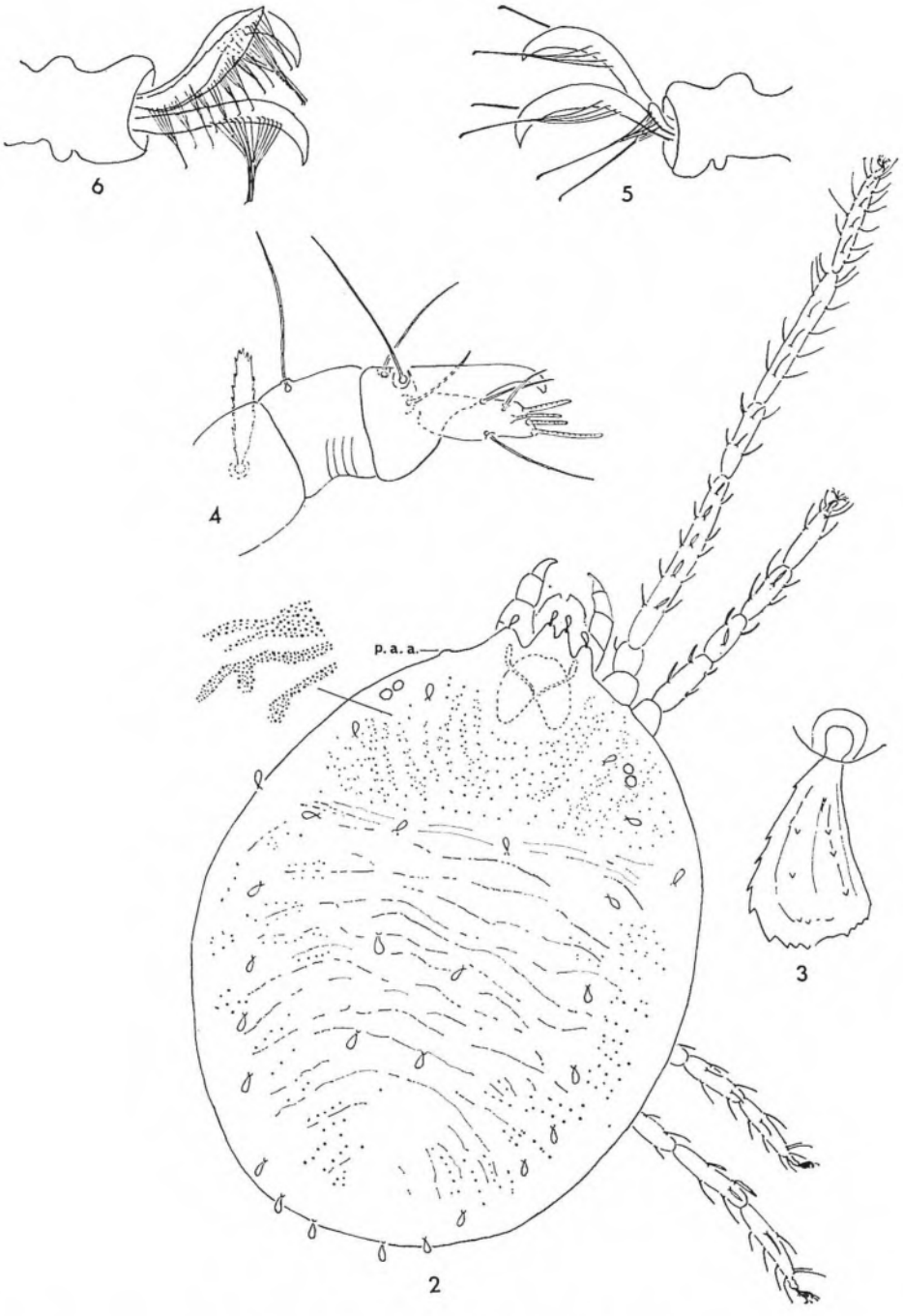

FIG. 2-6. — *Bryobia cristata*, adult female.

2. Dorsal view (p.a.a. — propodosomal anterior angulation) ; 3. Enlarged dorsal body seta ; 4. Palp tarsus ; 5. Claws and empodium of leg I ; 6. Claws and empodium of leg II.

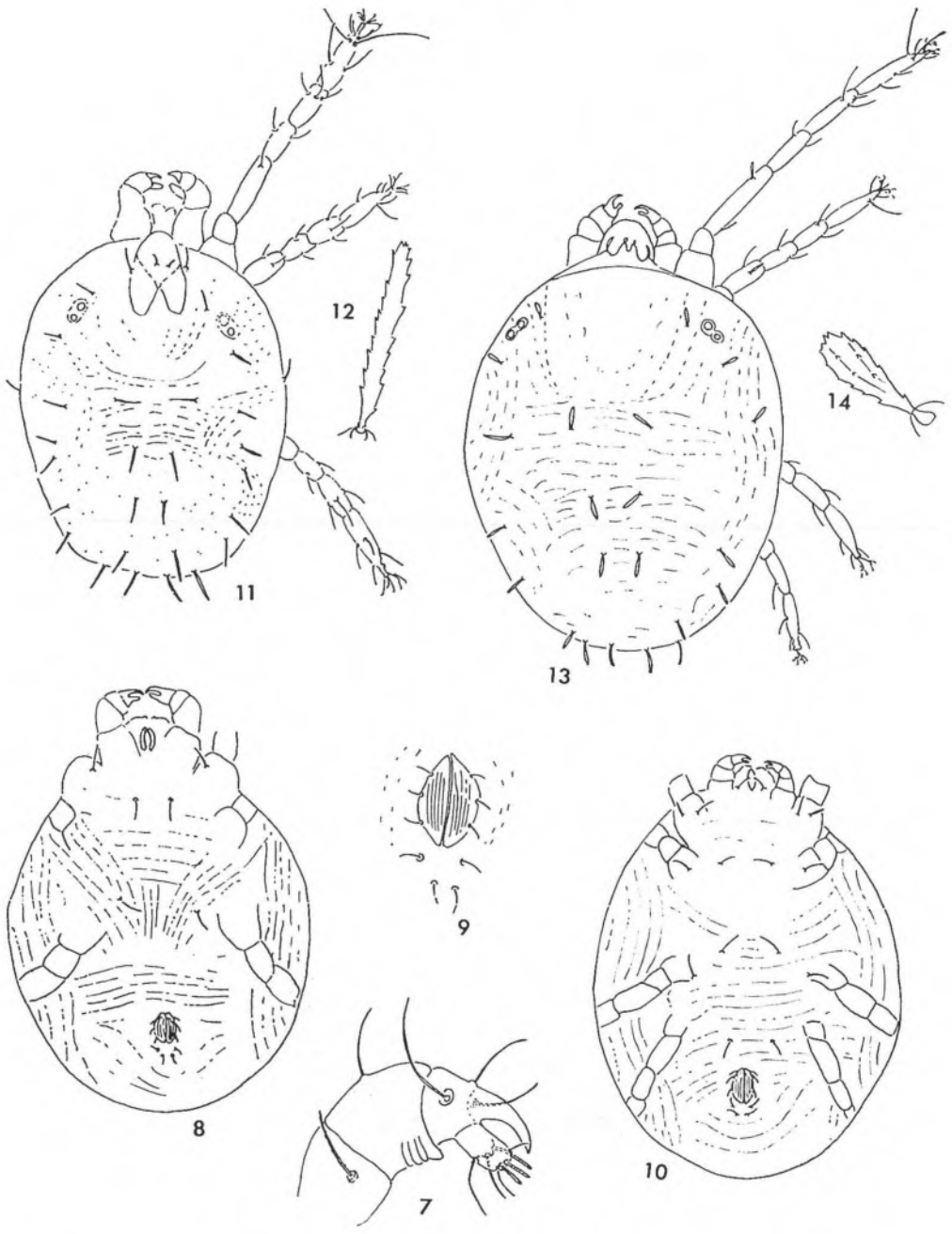

FIG. 7-14. — *Bryobia cristata.*

7. Palp tarsus of larva ; 8. Ventral view idem ; 9. Enlarged view of genital area idem ; 10. Ventral view of protonymph ; 11. Dorsal view of larva ; 12. Enlarged view of dorsal body seta of larva ; 13. Dorsal view of protonymph ; 14. Enlarged view of dorsal body seta of protonymph.

Remainder of dorsal body setae slightly thicker than those of the larva, about 23 — 34 μ long. Dorsal body surface sparsely granulate ; hysterosoma transversely wrinkled. Medio distal margin of stylophore rounded with a slight apical notch.

Distances between paired dorsocentral hysterosomal setae DC_1 83 ± 5 μ ; DC_2 60 ± 8 μ ; DC_3 39 ± 5 μ.

Length of leg I 314 ± 22 μ. Lengths of individual segments of leg I : trochanter 32 ± 3 μ ; femur 92 ± 6 μ, genu 52 ± 6 μ ; tibia 64 ± 5 μ ; tarsus 78 ± 7 μ. Length of leg II 212 ± 15 μ ; length of leg III 214 ± 17 μ ; length of leg IV 220 ± 19 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 12:6:4:3 ; leg II 10:5:4:3 ; leg III 8:5:2:2 ; leg IV 6:5:2:2.

A pair of tenent hairs arises from each claw, each tenent hair with at least four roots.

Empodium I short, with 2-3 pairs tenent hairs. Empodia II, III and IV almost as long as claw with two rows of ventrally directed tenent hairs.

Deutonymph (figs 15-17, 19, 27-30, 37).

Examination of 9 slide mounted specimens.

Length of body 618 ± 43 μ ; greatest width of body 503 ± 41 μ. Propodosomal lobes prominent. Anterior propodosomal setae about 17 μ long, 11 μ wide Remaining dorsal body setae 27 — 38 μ long and about 13 μ wide. Sculpturing of dorsal body surface similar to larva and protonymph although somewhat more granulate. Mediodistal margin of stylophore with slight depression. Distances between paired dorsocentral hysterosomal setae : DC_1 108 ± 13 μ ; DC_2 78 ± 7 μ ; DC_3 58 ± 7 μ.

Length of leg I 492 ± 17 μ. Lengths of individual segments of leg I : trochanter 43 ± 2 μ ; femur 158 ± 10 μ ; genu 70 ± 4 μ ; tibia 114 ± 9 μ ; tarsus 110 ± 3 μ. Length of leg II 296 ± 13 μ ; length of leg III 302 ± 11 μ ; length of leg IV 342 ± 8 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 17:*10*:4:9-10-11 ; leg II 12:5:4:5-*6* ; leg III 11:5:3:4 ; leg IV 10:5:2:2.

A pair of tenent hairs arises from each claw. Empodium I short, about 1/3 length of claw, with about 3 pairs of tenent hairs. Empodia II, III and IV almost as long as claw, each with 2 rows of ventrally directed tenent hairs.

Adult female (figs 2-6, 18, 31-36, 40).

Examination of 16 slide mounted specimens.

Length of body 891 ± 90 μ ; greatest width of body 672 ± 73 μ. Propodosomal lobes with a basal width of 151 ± 25 μ ; height of outer lobes 46 ± 10 μ ; height of median lobes 73 ± 16 μ. The outer lobes tend to be triangular in shape often with an enlargement or swelling on the inner side. Dorsal body setae spatulate

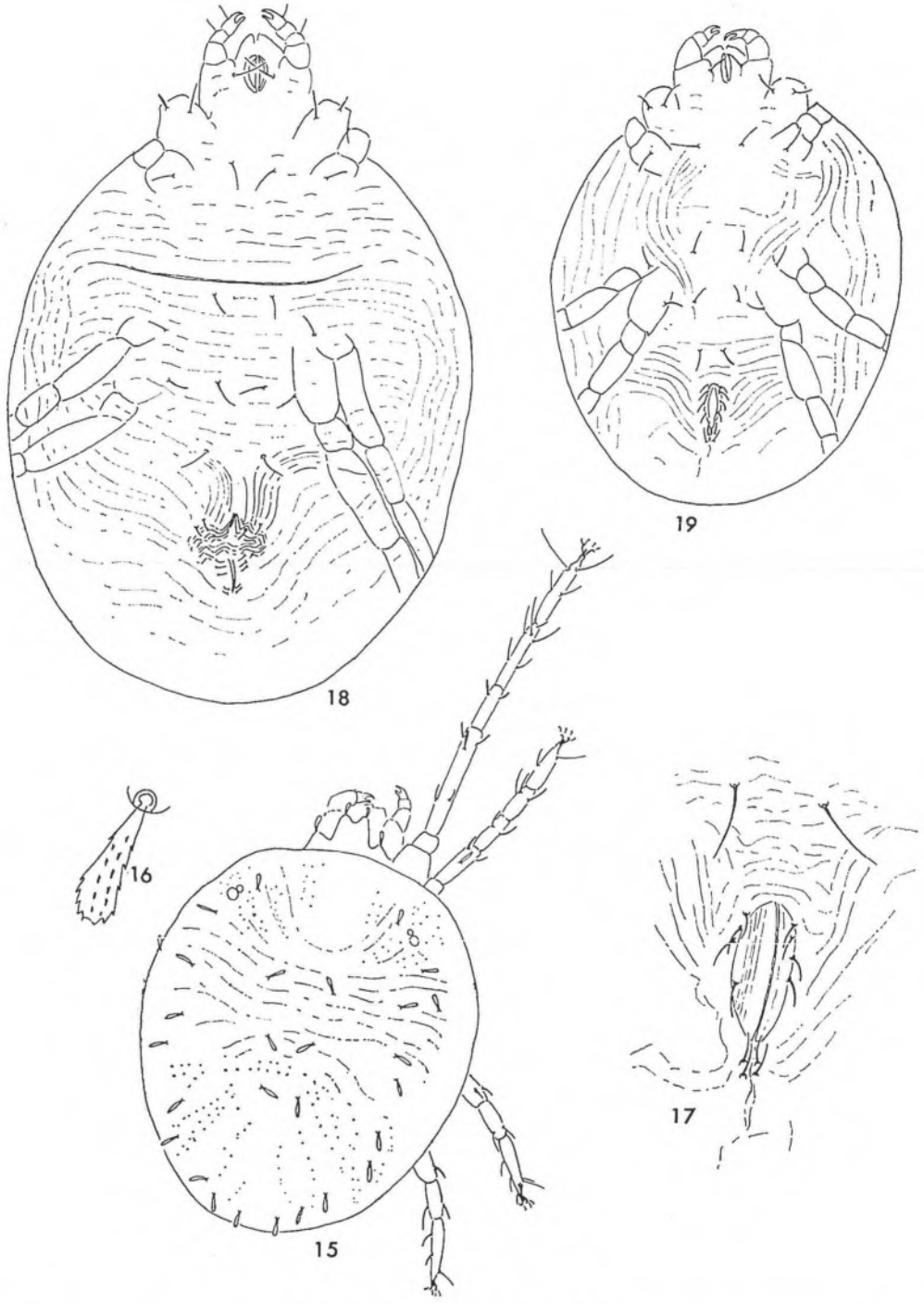

FIG. 15-19. — *Bryobia cristata.*

15. Dorsal view of deutonymph ; 16. Enlarged view of dorsal body seta of deutonymph ; 17. Enlarged view of genital area idem ; 18. Ventral view of adult female ; 19. Ventral view of deutonymph.

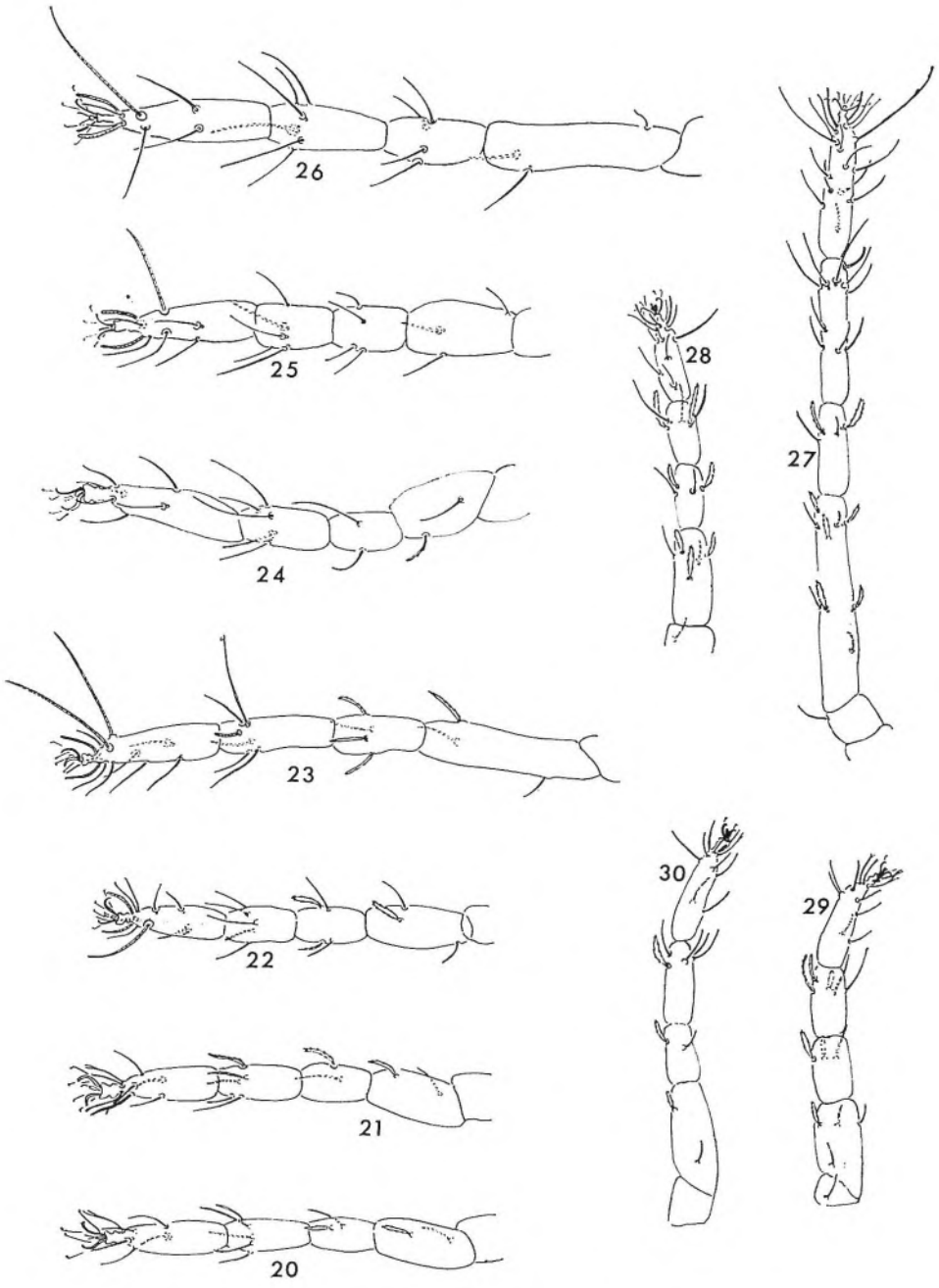

FIG. 20-30. — *Bryobia cristata.*

20. Leg IV of protonymph ; 21. Leg III idem ; 22. Leg II idem ; 23. Leg I ibid. ; 24. Leg III of larva ; 25. Leg II idem ; 26. Leg I idem ; 27. Leg I deutonymph ; 28. Leg II idem ; 29. Leg III idem ; 30. Leg IV ibid.

about 23 — 25 μ long and 15 — 19 μ wide. Dorsal surface of propodosoma finely granulate, that of hysterosoma with transverse wrinklings and granulations. Mediodistal margin of stylophore with a slight notch. Distances between paired dorsocentral hysterosomal setae DC_1 130 ± 30 μ; DC_2 114 ± 40 μ; DC_3 86 ± 23 μ.

Length of leg I 773 ± 109 μ. Ratio of length of leg I to body length : 1 : 1.1 (9 specs), 1 : 1.2 (5 specs), 1 : 1.3 (1 spec.). Length of individual segments of leg I : trochanter 51 ± 11 μ, femur 263 ± 46 μ, genu 111 ± 16 μ, tibia 218 ± 36 μ, tarsus 148 ± 17 μ. Length of leg II 442 ± 37 μ, length of leg III 444 ± 50 μ; length of leg IV 539 ± 53 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 26-28 : 16-18 : 7-*8* : 17-22 ; leg II 17-18 : 9 : 5-6 : 8-11 ; leg III 15 : 9 : 6 : 5-6 ; leg IV 15 : 9 : 5-*6* : 4-5.

Proximal member of " duplex " setae on tarsus IV about 2/3 as long as distal member.

A pair of tenent hairs arises from each claw. Empodium I short, pad-like with 1 pair of tenent hairs. Empodia II, III and IV each about as long as claw with two rows of ventrally directed tenent hairs.

Collection details.

On apple wood, Hamilton, 8-X-63 (A. T. J. WATTS) ; from grass, clover and weeds, Hastings, 23-IX-64 (A. WARD) ; on clover, Hastings, -X-64 (A. WARD) ; on ragwort, Wairakei, 21-V-64 (D. C. M. MANSON) ; invading house, Palmerston North, 5-V-64 (J. C. MUIRHEAD) ; on grass, Levin, 24-X-63 (D. C. M. MANSON) ; from dwelling, Burwood, Christchurch, 8-XII-60 ; from cracks in concrete, Christchurch, -VII-60 (A. D. LOWE) ; from Botany herbarium, Christchurch, 18-X-62 (B. SIMPSON) ; from Eureka St., Wainoni, Christchurch, 26-VII-61 ; invading house, Wainoni, Christchurch, 23-III-61 ; -X-61 ; 21-VI-65 (P. C. READ) ; invading house, Aldershot, Wainoni, Christchurch, 4-VI-65 ; on polyanthus, Christchurch, 17-VIII-64, and 11-XI-64 (A. D. LOWE) ; on pot plant of *Tradescantia* sp. and invading house, Christchurch, 18-IX-64 (J. E. MOSELEY) ; from grass and weeds by roadside, St. Albans, Christchurh, 10-II-65 (D. C. M. MANSON) ; from roadside, Annat, 7-IX-64 (T. JESSEP) ; from roadside, Darfield, 7-IX-64 (T. JESSEP) ; under bark of fruit tree, Dunedin, 10-X-58 ; on bark of Blenheim orange apple, Roxburgh, 16-VIII-63 (D. W. WILSON) ; on bark of sturmer apple, Roxburgh, 17-IX-63 (D. W. WILSON) ; on vetch, Roxburgh, 11-XII-63 (D. C. M. MANSON) ; on bark of European plum, Ettrick, 31-VII-63 (D. W. WILSON) ; on bark of pear, Coal Creek, 12-VIII-63, (D. W. WILSON) ; on Montgomery clover, Dumbarton, 24-IV-62 (D. W. WILSON) ; on either hydrangea or Azalea, Gore, 18-II-64 (F. WILKIN).

Discussion.

This species appears to be identical with that described by MORGAN and ANDERSON (1957) as *B. praetiosa* and has also probably been recognised in New Zealand under this name.

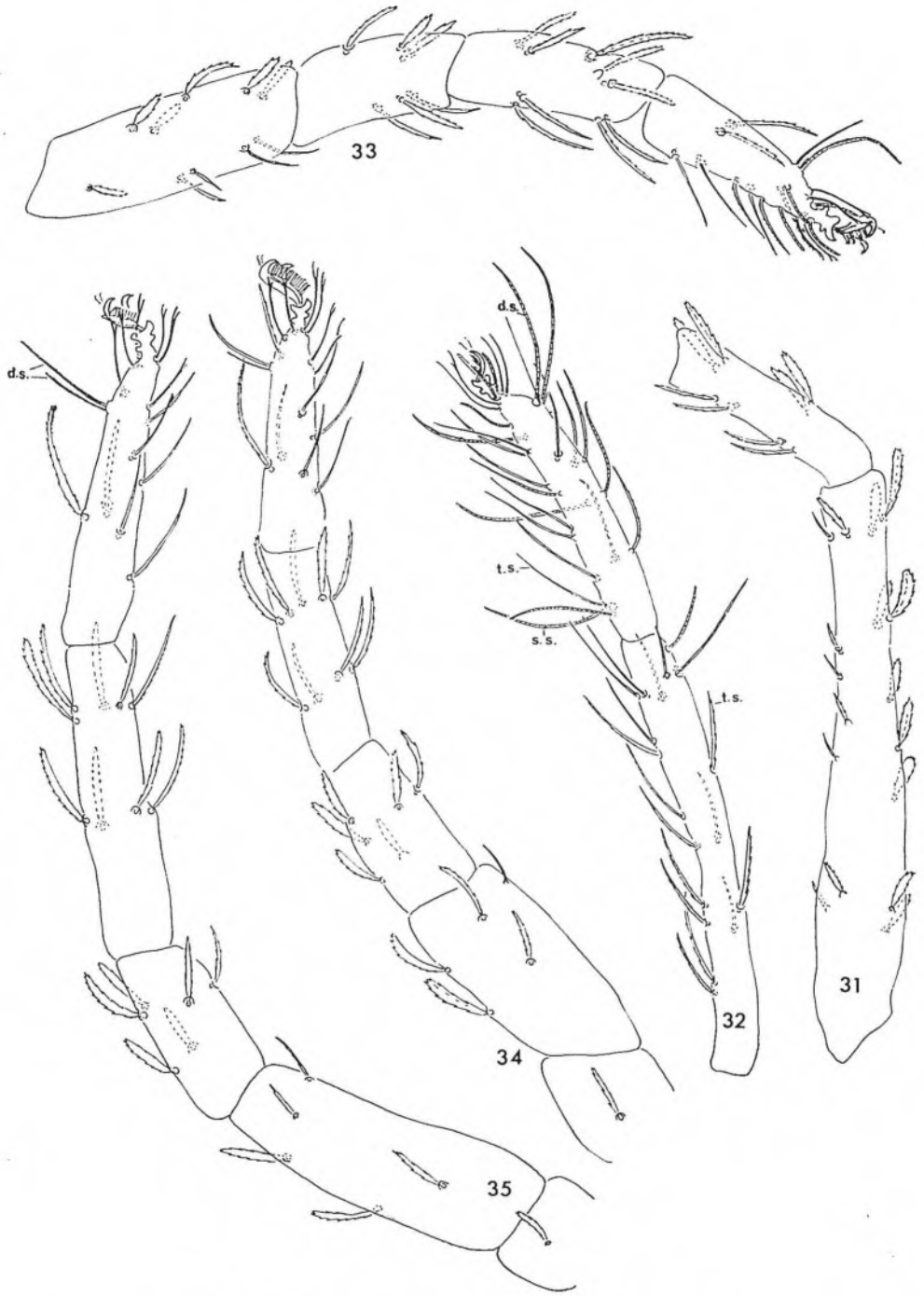

FIG. 31-35. — *Bryobia cristata*, adult female.

31. Femur and genu I ; 32. Tarsus and tibia I (t.s. : tactile setae ; d.s. : duplex setae ; s.s. : sensory setae) ; 33. Leg II ; 34. Leg III ; 35. Leg IV (d.s. : duplex setae).

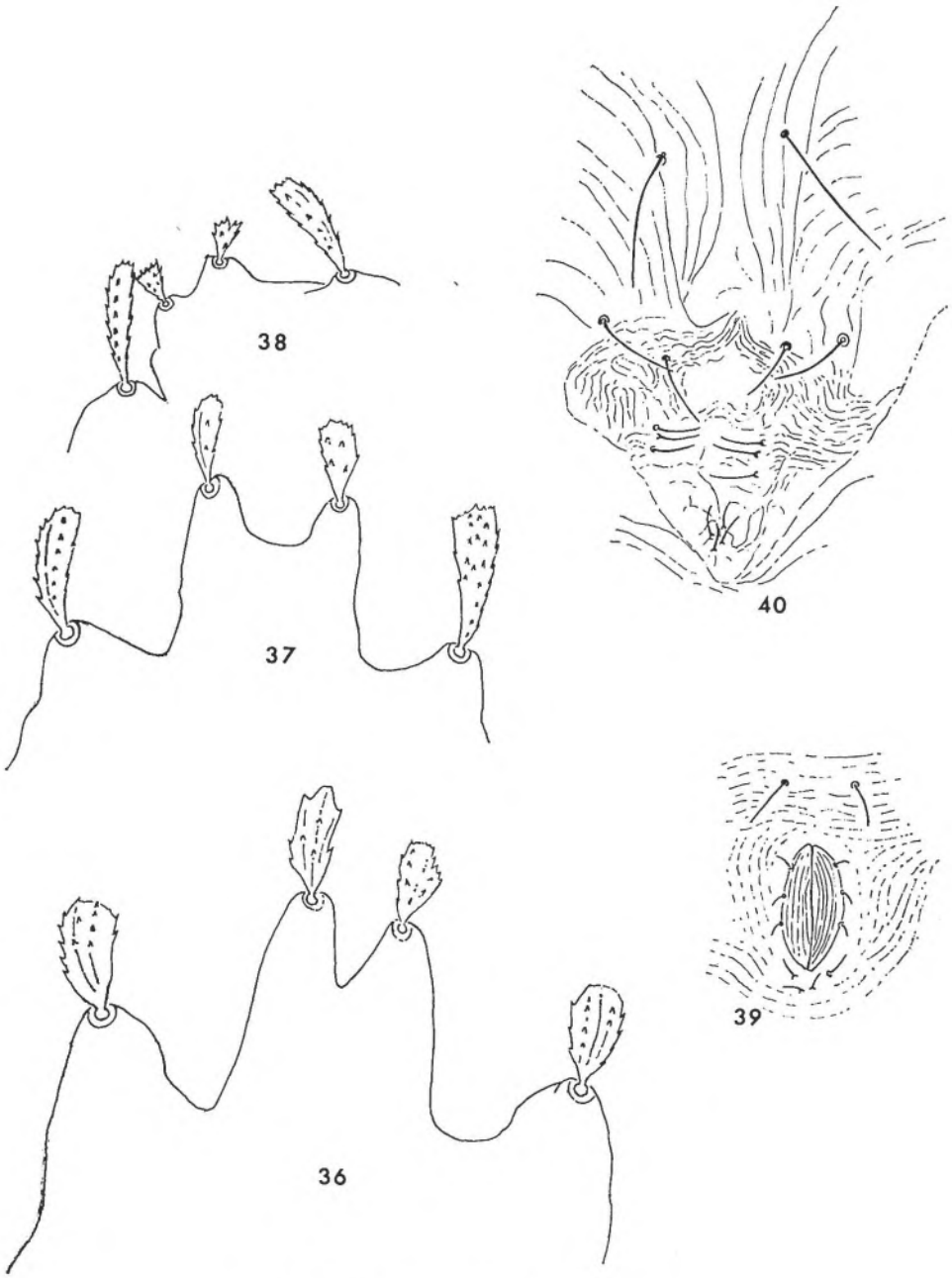

FIG. 36-40. — *Bryobia cristata.*

36. Propodosomal lobes of adult female ; 37. Propodosomal lobes of deutonymph ; 38. Propodosomal lobes of protonymph ; 39. Enlarged view of genital region of protonymph ; 40. Enlarged view of genital region of adult female.

However, MATHYS (1961), described the larva of *B. praetiosa* and the shape of the dorsal body setae of the larva tend to be claviform rather than lanceolate as in *B. cristata*. MATHYS indicated that MORGAN & ANDERSON'S species is actually *B. cristata* and this view is followed here so that the New Zealand species is also named *B. cristata*.

B. cristata was originally taken from Paris, France where it occurred in the vicinity of trees, stores and houses. Males were common and it was known to invade houses.

The species in New Zealand is also known to invade houses but so far no males have been found, neither did MORGAN and ANDERSON record males in spite of observing the life history of the species.

There is the possibility that males may yet be found — for instance, a male of *B. praetiosa* was recorded by MATHYS for the first time in 1959 — so for this reason it seems preferable to retain the name *B. cristata*, rather than create confusion by considering it as a new species.

Bryobia repensi n. sp.

(fig. 41-55).

In the larval stage this species can be recognised by the differing sizes of the dorsal body setae. The dorsocentral hysterosomals and the anterior member of the posterior dorsolaterals are distinctly smaller than most of the other dorsal setae.

In the adult the outer teat like propodosomal lobes are distinctive. Also, the length of the femur is greater than that of allied species — 310 ± 19 μ as compared to 263 ± 46 μ for *B. cristata* and 228 ± 27 μ for *B. watersi* ; there are also more setae on the femur — 24-26 as compared to 18-21 and 16-20 for *B. cristata* and *B. watersi* respectively.

The species bears some resemblance to *B. praetiosa f. longicornis* as described by MATHYS (1957), but differs in being larger with more setae on genu I.

	Body length	Body Width	No. setae on Genu I
B. praetiosa f. *longicornis*	749 μ	560	4 — 5
B. repensi	903 ± 69 μ	640 ± 49 μ	7

MATHYS did not study the larval stage of *B. praetiosa* f. *longicornis*, so comparisons between these cannot be drawn.

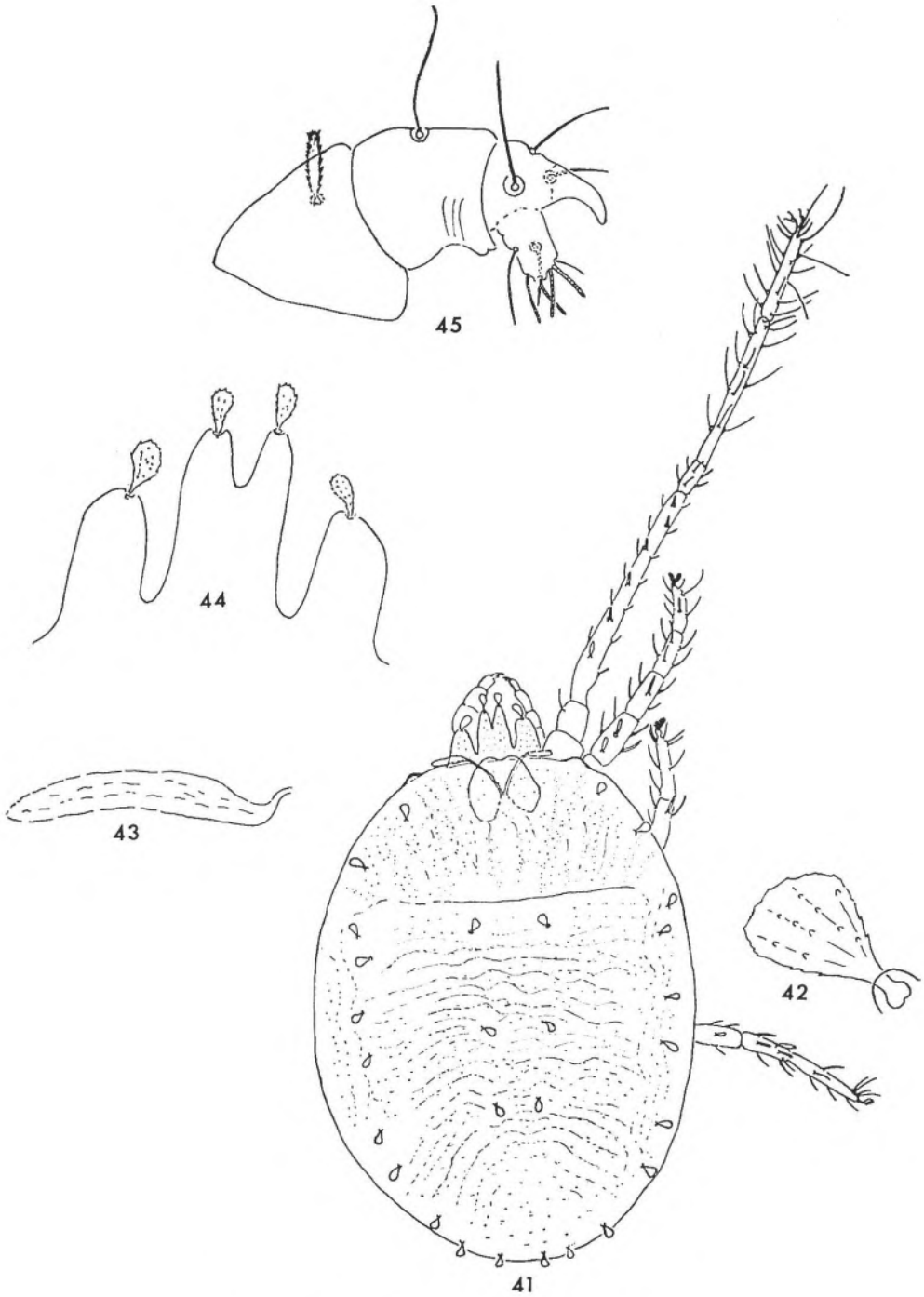

FIG. 41-45. — *Bryobia repensi*, adult female.

41. Dorsal view ; 42. Enlarged view of dorsal body seta ; 43. Enlarged view of peritreme ; 44. Enlarged view of propodosomal lobes ; 45. Enlarged view of palp tarsus.

Larva (fig. 47).

Examination of 13 slide mounted specimens.

Length of body 283 ± 33 μ ; greatest width of body 236 ± 19 μ. Anterior propodosomal setae short, slender, 11 μ long ; remaining dorsal body setae spatulate, 17-21 μ long, with the exception of the dorsocentrals, and 2nd and 4th dorsolaterals which are distinctly smaller (8-13 μ). One pair of sacrals has moved into an anterior position so that there appear to be four pairs of dorsocentrals. Median area of propodosoma slightly granulate. Remainder of dorsal body surface granulate and wrinkled. Mediodistal margin of stylophore flattened. Distances between paired dorsocentral hysterosomal setae : DC_1 71 ± 8 μ ; DC_2 28 ± 7 μ ; DC_3 23 ± 4 μ.

Length of leg I 204 ± 5 μ ; lengths of individual segments of leg I : trochanter 24 ± 1 μ ; femur 53 ± 2 μ ; genu 32 μ ; tibia 35 ± 3 μ. Length of leg II 145 ± 8 μ ; length of leg III 149 ± 6 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur : leg I 8:6:4:3 ; leg II 8:5:4:3 ; leg III 6:5:2:2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 3 roots.

Empodium I short, pad like with about 3 prs tenent hairs. Empodium II somewhat longer with about 5 prs tenent hairs. Empodium III about half as long as claw with at least 5 prs tenent hairs.

Protonymph (figs 48, 50).

Examination of 12 slide mounted specimens.

Length of body 412 ± 39 μ ; greatest width of body 316 ± 37 μ. Propodosomal lobes prominent. Anterior propodosomal setae spatulate, 8-10 μ long. Remainder of dorsal body setae spatulate, about 17 μ long, except dorsocentral setae and second and fourth dorsolaterals which are about 13 — 15 μ long. Median area of propodosoma granulate, remainder of dorsal body surface strongly wrinkled. The advanced sacrals have now moved into a more posterior position to be almost in line with the other posterior body setae. Medio distal margin of stylophore rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 71 ± 5 μ ; DC_2 36 ± 7 μ ; DC_3 25 ± 4 μ.

Length of leg I 279 ± 9 μ ; lengths of individual segments of leg I : trochanter 28 ± 1 μ ; femur 84 ± 4 μ ; genu 42 ± 2 μ ; tibia 55 ± 5 μ ; tarsus 69 ± 4 μ. Length of leg II 173 ± 9 μ ; length of leg III 178 ± 8 μ ; length of leg IV 180 ± 10 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 12:6:4:3 ; leg II 10:5:4:3 ; leg III 8:5:2:2 ; leg IV 6:5:2:2.

A pair of tenent hairs arises from each claw, each tenent hair with at least four roots.

Empodium I short, pad-like, with 2-3 prs tenent hairs. Empodia II, III and IV almost as long as claw with two rows of ventrally directed tenent hairs.

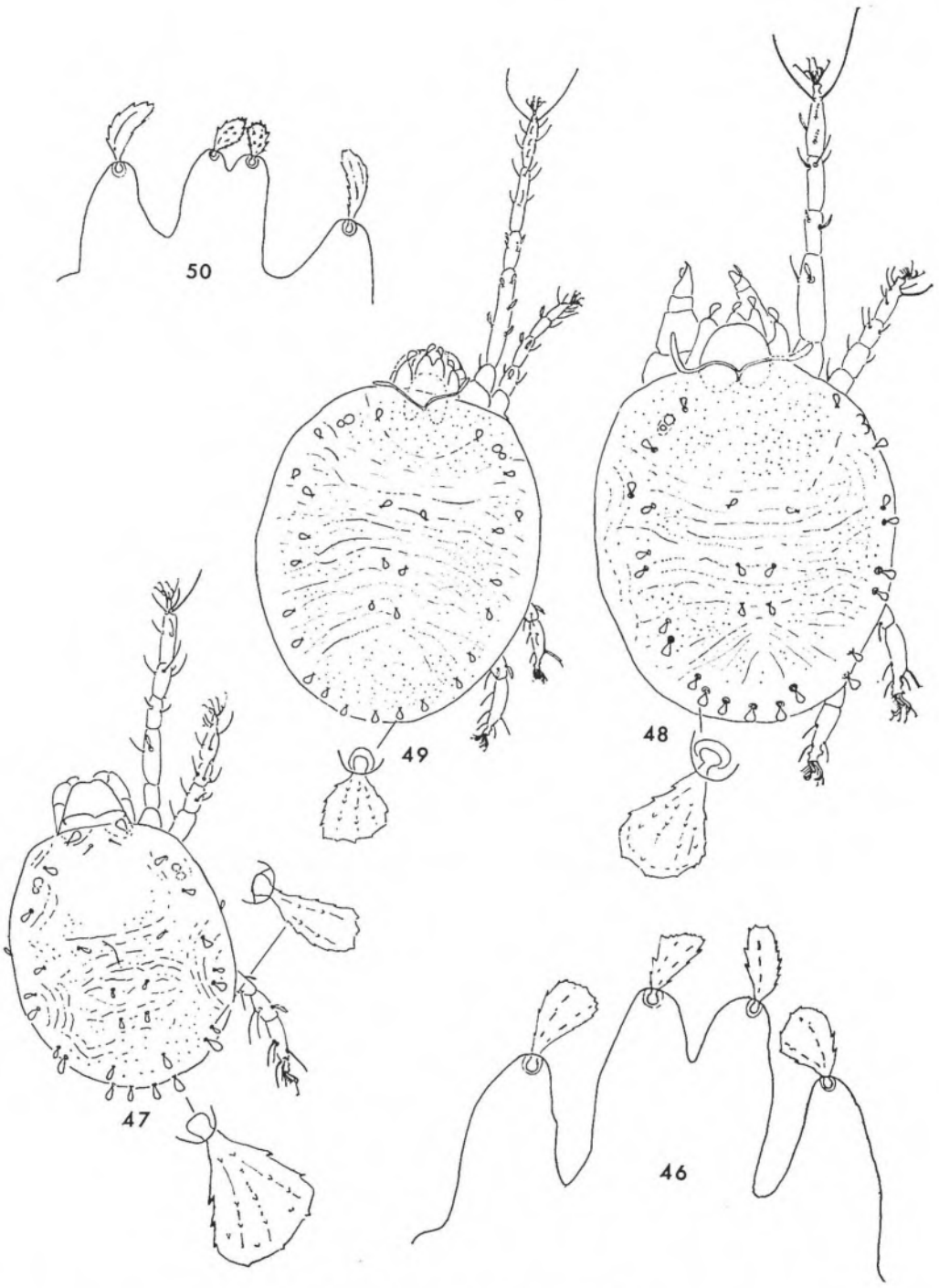

FIG. 46-50. — *Bryobia repensi.*

46. Propodosomal lobes of deutonymph ; 47. Dorsal view of larva ; 48. Dorsal view of protonymph ; 49. Dorsal view of deutonymph ; 50. Propodosomal lobes of protonymph.

Deutonymph (figs 46 ; 49).

Examination of 7 slide mounted specimens.

Length of body 596 ± 28 μ ; greatest width of body 446 ± 33 μ. Propodosomal lobes strongly developed (fig. 46). Setae on lobes spatulate, 19 — 21 μ long. All other dorsal body setae spatulate, 13-19 μ long. Posterior body setae usually slightly broader than dorsocentrals. Median area of propodosoma strongly granulate ; remainder of dorsal body surface granulate and strongly wrinkled. Medio distal margin of stylophore rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 87 ± 9 μ ; DC_2 45 ± 7 μ ; DC_3 40 ± 6 μ.

Length of leg I 429 ± 35 μ. Lengths of individual segments of leg I : trochanter 42 ± 6 μ ; femur 142 ± 14 μ ; genu 53 ± 6 μ ; tibia 95 ± 13 μ ; tarsus 93 ± 7 μ. Length of leg II 232 ± 19 μ ; length of leg III 241 ± 22 μ ; length of leg IV 263 ± 24 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I *17* — 18 : 10 : 4 : 10 — *11* ; leg II 12 : 5 : 4 : 4 — *6* ; leg III 10 — 11 : 5 : 2 — *3* : 2 — 4 ; leg IV 9 — *10* : 4 — *5* : 2 : 2.

A pair of tenent hairs arises from each claw. Empodium I short, pad-like with 2-3 prs tenent hairs. Empodia II, III and IV about 2/3 length of claw, each with 2 rows of ventrally directed tenent hairs.

Adult female (figs 41-45, 51-55).

Examination of 20 slide mounted specimens.

Length of body 903 ± 69 μ ; greatest width of body 640 ± 49 μ. Propodosomal lobes with a basal width of 148 ± 14 μ ; height of outer lobes 68 ± 9 μ ; height of median lobes 100 ± 16 μ ; outer lobes teat like, median lobes bottle shaped, tapering sharply at apical quarter. Setae on propodosomal lobes usually directed medially. Dorsal hysterosomal setae spatulate, 21-25 μ long, 13-19 wide. Propodosoma finely granulate, often with coarse dark blotching ; anterior angulations present ; hysterosoma granular with transverse wrinklings. Mediodistal margin of stylophore rounded with a slight apical notch. Distances between paired dorsocentral hysterosomal setae : DC_1 126 ± 17 μ ; DC_2 88 ± 22 μ ; DC_3 75 ± 12 μ.

Length of leg I : 867 ± 57 μ. Ratio of length of leg I to body length : 1:1.1 (15 specs), 1 : 1.0 (5 specs). Length of individual segments of leg I : trochanter 66 ± 9 μ, femur 316 ± 25 μ, genu 91 ± 7 μ, tibia 240 ± 19 μ, tarsus 152 ± 9 μ. Length of leg II 389 ± 24 μ ; length of leg III 393 ± 28 μ ; length of leg IV 462 ± 33 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 26-27 : 15-*16* : 7 : 24-26 ; leg II 16-17 : 9 : 6 : 8-10 ; leg III 14-15 : 8-9 : 6 : 5 ; leg IV 14-15 : 7-9 : 5-6 : 5.

Proximal member of " duplex " setae of leg IV almost as long as distal member (fig. 55).

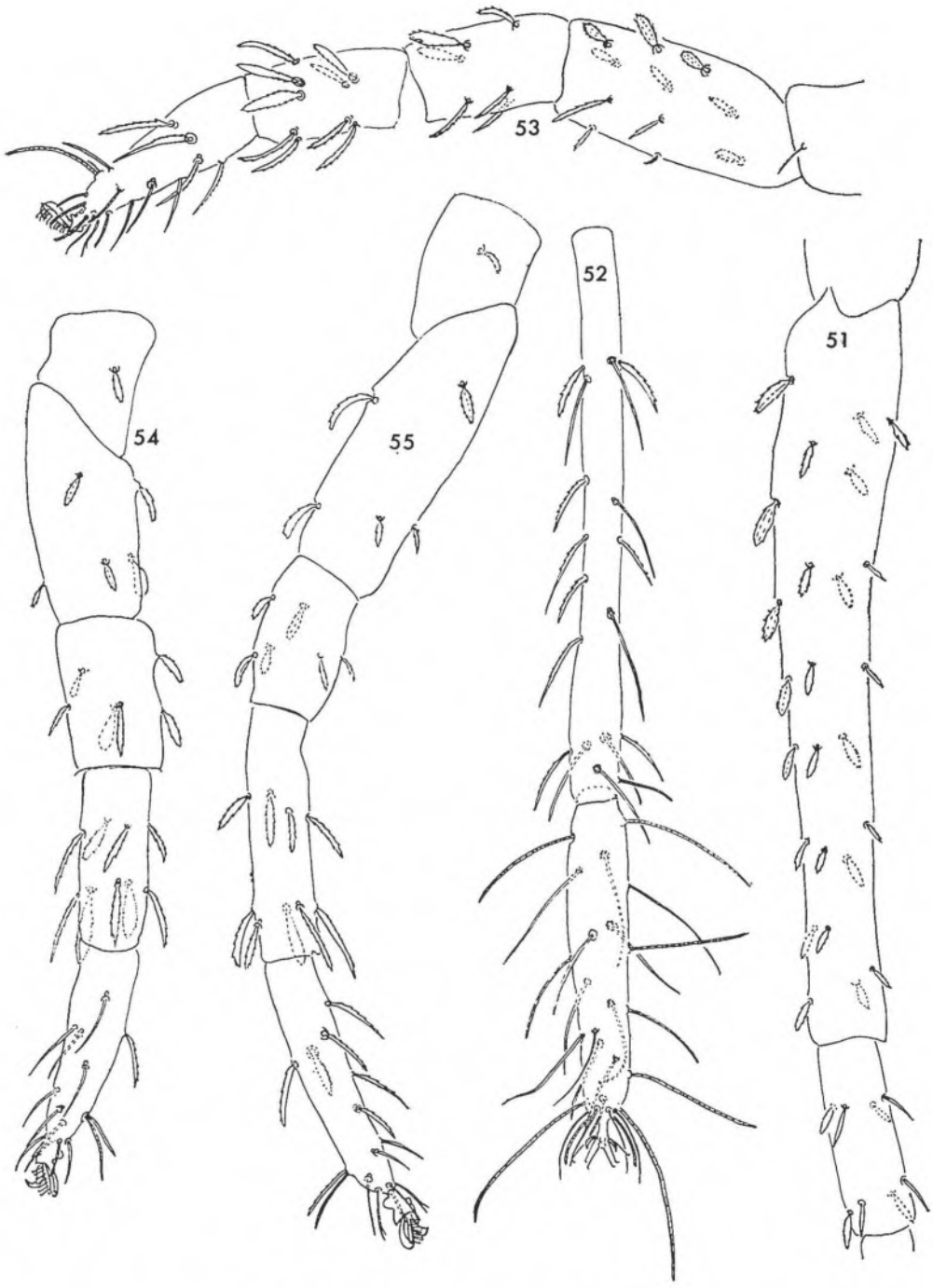

FIG. 51-55. — *Bryobia repensi*, adult female.
51. Femur and genu of leg I ; 52. Tibia and tarsus of leg I ; 53. Leg II ; 54. Leg III ; 55. Leg IV.

A pair of tenent hairs arises from each claw. Empodium I short, with one pair of tenent hairs. Empodia II, III and IV as long as claw with two rows of ventrally directed tenent hairs.

Collection details.

Holotype : female, on clover, Roxburgh, 11-XII-63 (D. C. M. MANSON). In collection of Department of Agriculture, Levin.

Paratypes : 14 females, 7 larvae, 10 protonymphs, 4 deutonymphs, with same data as holotype.

Specimens were also collected as follows : on clover, Plant Diseases Division, Auckland, 14-IV-64 (E. COLLYER) ; on grass and clover, Hastings, 24-IX-64 (A. WARD) ; on *Clianthus* sp. Feilding, 5-II-64 (L. MARTER) ; on clover, Levin, 1-VI-63, 27-IX-64 and 10-X-64 (D. C. M. MANSON) ; from roadside, Levin, 15-XI-64 and 19-XII-64 (D. C. M. MANSON) ; on *Passiflora mollissima*, Otaki, 26-I-64 (D. C. M. MANSON) ; on strawberry, Martinborough, 16-XI-62 (G. S. GRANDISON) ; on grass and weeds by roadside, Paekakariki, 28-XI-64 (D. C. M. MANSON) ; from roadside, Wallaceville, 25-XII-64 (D. C. M. MANSON) ; from roadside, Kaitoke, 26-XII-64 (D. C. M. MANSON) ; from roadside, Ohariu Valley, Wellington, 17-IV-65 (D. C. M. MANSON) ; from roadside, Porirua — Plimmerton, 20-IV-65 (D. C. M. MANSON) ; on clover, Khandallah, Wellington, 14-XI-64 and 27-XII-63 (D. C. M. MANSON) ; on clover beneath Delicious apple tree, Appleby, Nelson, 1-III-65 (E. COLLYER) ; from roadside, Christchurch, 10-II-65 (D. C. M. MANSON) ; on vetch and clover, Roxburgh, 11-XII-63 (D. C. M. MANSON).

Bryobia rubrioculus (Scheuten), 1857.

(figs 1, 56-65).

Sannio rubrioculus Scheuten 1857, Arch. Naturg. 23 : 104-112.
Bryobia rubrioculus (Scheuten) : van Eyndhoven 1956, Ent. Ber. 16, 45-46.
Bryobia arborea Morgan and Anderson 1957, Canad. Ent., LXXXIX : 11 : 485-490.

This species normally occurs on apple and pear trees, and is much smaller than other members of the *praetiosa* group. Not only is body length, width and leg measurments considerably smaller, but the distance apart of the DC_1 setae is only about half or slightly more than that of other species.

The propodosomal lobes are distinctive in normally possessing spine like outgrowths or swellings (adventitious growths).

A rather unusual feature of many specimens is the wide spacing of the " duplex " setae on tarsus IV (fig. 1 (b)).

Larva (figs 56-57).

Examination of 11 slide mounted specimens.

Length of body 243 ± 17 μ ; greatest width of body 214 ± 21 μ. Anterior propodosomal setae short, slender, 11-13 μ long. Remaining dorsal body setae spatulate, 19 — 27 μ long, 7-11 μ wide. Propodosoma coarsely granulate with a few wrinkles. Remainder of dorsal body surface granulate and wrinkled. Medio distal margin of stylophore rounded or slightly flattened. Distances between paired dorsocentral hysterosomal setae : DC_1 46 ± 4 μ ; DC_2 23 ± 4 μ ; DC_3 19 ± 4 μ.

Length of leg I 211 ± 24 μ. Lengths of individual segments of leg I : trochanter 23 ± 2 μ ; femur 51 ± 5 μ ; genu 30 ± 2 μ ; tibia 35 ± 1 μ ; tarsus 55 ± 3 μ. Length of leg II 136 ± 9 μ ; length of leg III 152 ± 4 μ.

Number of setae on each of leg segments tarsus, tibia, genu and femur as follows : leg I 8:6:4:3 ; leg II 8:5:4:3 ; leg III 6:5:2:2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 3 roots.

Empodium I short, pad-like, with about 3 prs tenent hairs. Empodia II and III somewhat longer, each with 4-5 prs tenent hairs.

Protonymph (figs 58-59, 62-65).

Examination of 14 slide mounted specimens.

Length of body 377 ± 41 μ ; greatest width of body 311 ± 44 μ. Propodosomal lobes present. Anterior propodosomal setae short, 8-11 μ long. Remainder of dorsal body setae spatulate, 19-25 μ long. Median area of propodosoma coarsely granulate. Remainder of dorsal body surface wrinkled and granulate. Medio-distal margin of stylophore rounded or slightly flattened. Distances between paired dorsocentral hysterosomal setae : DC_1 52 ± 10 μ ; DC_2 31 ± 11 μ ; DC_3 24 ± 7 μ.

Length of leg I 253 ± 24 μ. Lengths of individual segments of leg I : trochanter 25 ± 2 μ ; femur 73 ± 8 μ ; genu 42 ± 6 μ ; tibia 51 ± 7 μ ; tarsus 64 ± 5 μ. Length of leg II 173 ± 13 μ ; length of leg III 181 ± 17 μ ; length of leg IV 194 ± 22 μ.

Number of setae on each of leg segment tarsus, tibia, genu, femur as follows : leg I 12 : 6 : 4 : 3 ; leg II 10 : 5 : 4 : 3 ; leg III 8 : 5 : 2 : 2 ; leg IV 6 : 5 : 2 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 4 roots.

Empodium I short, with 3 prs tenent hairs. Empodia II, III and IV almost as long as claw with two rows of ventrally directed tenent hairs.

Deutonymph (figs 60-61).

Examination of 15 slide mounted specimens.

Length of body 430 ± 57 μ ; greatest width of body 347 ± 38 μ. Propodosomal lobes strongly developed. Anterior propodosomal setae 14 — 19 μ long.

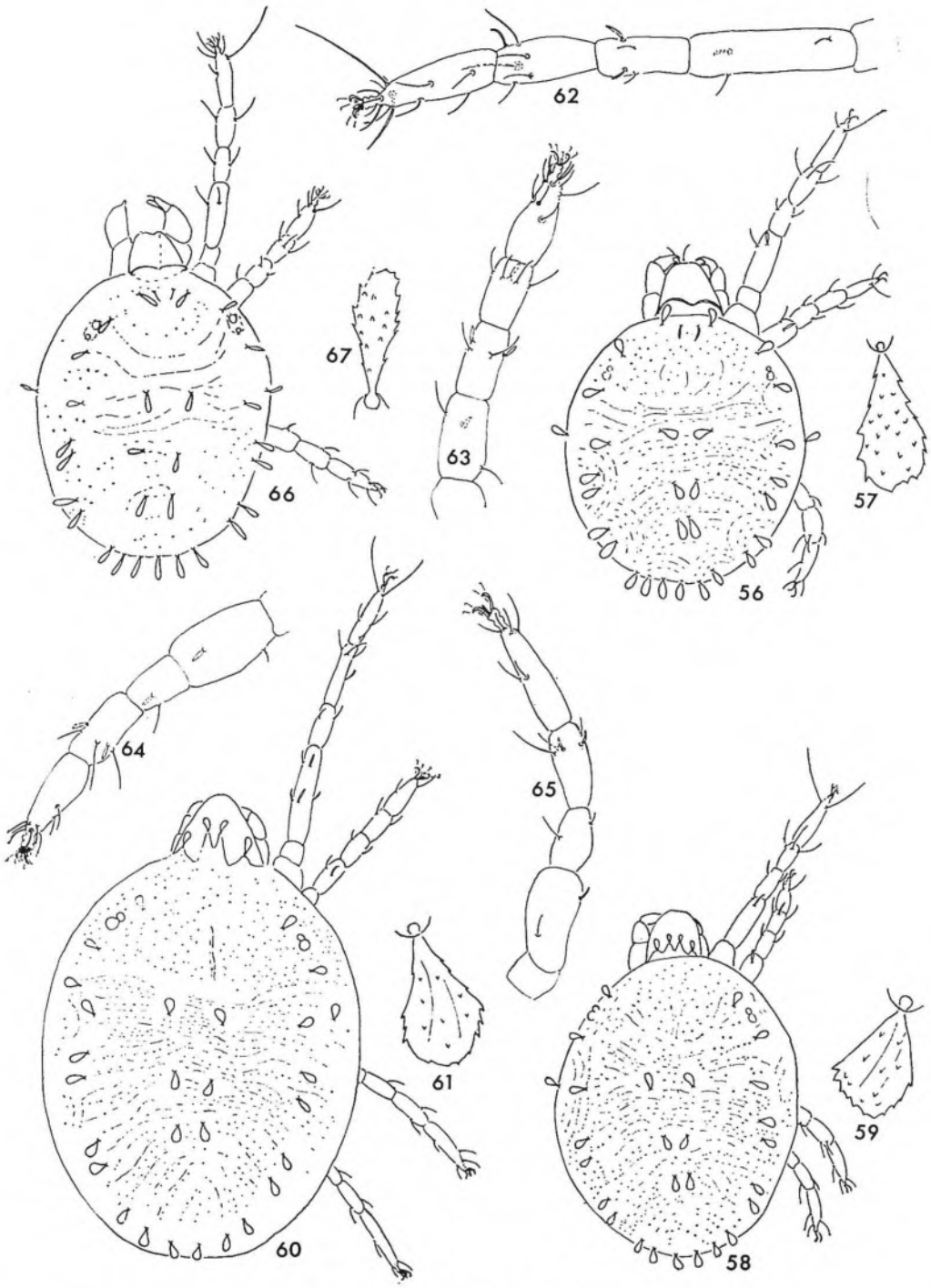

FIG. 56-65. — *Bryobia rubrioculus*.

56. Dorsal view of larva ; 57. Enlarged view of dorsal body seta, idem ; 58. Dorsal view of protonymph ; 59. Enlarged view of dorsal body seta, idem ; 60. Dorsal view of deutonymph ; 61. Enlarged view of dorsal body seta, idem ; 62. Leg I of protonymph ; 63. Leg II, idem ; 64. Leg III, idem ; 65. Leg IV, ibid.

FIG. 66-67. — *Bryobia rubrioculus* f. *prunicola*, larva.

66. Dorsal view ; 67. Enlarged view of dorsal body seta.

Remaining dorsal body setae spatulate, 19-25 μ long. Median area of propodosoma granulate ; remainder of dorsal body surface granulate and wrinkled. Mediodistal margin of stylophore flattened. Distances between paired dorsocentral hysterosomal setae : DC_1 52 ± 10 μ ; DC_2 31 ± 11 μ ; DC_3 24 ± 7 μ.

Length of leg I 334 ± 24 μ ; lengths of individual segments of leg I : trochanter 31 ± 4 μ ; femur 103 ± 8 μ ; genu 50 ± 4 μ ; tibia 74 ± 6 μ ; tarsus 79 ± 8 μ. Length of leg II 205 ± 16 μ ; length of leg III 212 ± 15 μ ; length of leg IV 230 ± 29 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I *17*-18 : 10 : 4 : 8-10 ; leg II 12 : 5 : 4 : 4-6 ; leg III 10-11 : 5 : *2-3* : *3*-4 ; leg IV 9-10 : 5 : 2-3 : 2.

A pair of tenent hairs arises from each claw. Empodium I short, with 3 prs tenent hairs. Empodia II, III and IV, almost as long as claw with 2 rows ventrally directed tenent hairs.

Adult female (fig. 1).

Examination of 12 slide mounted specimens.

Length of body 652 ± 77 μ ; greatest width of body 491 ± 45 μ. Propodosomal lobes with a basal width of 115 ± 14 μ ; height of outer lobes 40 ± 8 μ ; height of median lobds 54 ± 14 μ. A distinctive feature of the lobes is very frequently the presence of spine like outgrowths or swellings, first mentioned by MORGAN (1960) and called adventitious growths (fig. 78). Dorsal body surface granulate and wrinkled. Mediodistal margin of stylophore smoothly rounded or with a slight indentation. Distances between paired dorsocentral hysterosomal setae : DC_1 77 ± 10 μ ; DC_2 52 ± 8 μ ; DC_3 37 ± 10 μ.

Length of leg I 644 ± 80 μ ; ratio of length of leg I to body length : 1 : 1.1 (4 specs), 1 : 1.0 (7 specs.). Length of individual segments of leg I : trochanter 50 ± 4 μ, femur 212 ± 25 μ, genu 86 ± 10 μ, tibia 171 ± 37 μ, tarsus 123 ± 8 μ. Length of leg II 316 ± 29 μ ; length of leg III 312 ± 33 μ ; length of leg IV 377 ± 49 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 26 : 13-16 : *7-8* : 17-19 ; leg II 16-*17* : 8-9 :5 : 9-11 ; leg III 14-*15* : 8-9 : 5-6 : 5-6 ; leg IV 14-*15* : 9 : 5-6 : 5.

Proximal member of " duplex setae " on tarsus IV about 2/3 as long as distal member, and frequently each member of the pair is widely separated from the other (fig. 1 b).

A pair of tenent hairs arises from each claw.

Empodium I short, with 1 pr tenent hairs. Empodia II, III and IV almost as long as claw, each with two rows of ventrally directed tenent hairs.

Collection details.

On apple, Auckland, 8-II-65 (E. COLLYER) ; on pear, Auckland, -X-60 (E. COLLYER) ; on apple, Gisborne, 9-X-63 and 19-II-64 (J. OVERBYE) ; on apple, Otaki,

10-II-64 (R. A. S. WATERS) ; on apple, Lincoln, 7-III-61 ; on apple, Riccarton, Christchurch, 6-XI-63 (L. J. DUMBLETON) ; on apple, Christchurch, 17-I-65 (A. D. LOWE) ; on apple, Christchurch, 14-II-65 (D. C. M. MANSON).

Bryobia rubrioculus f. *prunicola* Mathys, 1957
(figs 66-82).

Bryobia rubrioculus f. *prunicola* Mathys, 1957 : Bull. Soc. Ent. Suisse 30 : 189-284.

This variety can be distinguished from *B. rubrioculus* in that the dorsal body setae of the larvae are much narrower (4 — 5 μ) as compared to those of *B. rubrioculus* (7-11 μ). The remaining stages appear to be identical.

Also, the host species for this variety is usually peach and apricot, as compared with apple and pear for *B. rubrioculus*.

Larva (figs 66-67).

Examination of 9 slide mounted specimens.

Length of body 265 ± 31 μ ; greatest width of body 238 ± 17 μ. Anterior propodosomal setae short, slender, 9-11 μ long. Remaining dorsal body setae spatulate, 19-25 μ long, 4-5 μ wide. Dorsal body surface granulate and wrinkled. Mediodistal margin of stylophore slightly rounded with a small apical notch. Distances between paired dorsocentral hysterosomal setae : DC_1 50 ± 6 μ ; DC_2 29 ± 4 μ ; DC_3 21 ± 2 μ.

Length of leg I 216 ± 7 μ ; lengths of individual segments of leg I : trochanter 23 ± 2 μ ; femur 58 ± 3 μ ; genu 34 ± 2 μ ; tibia 42 ± 3 μ ; tarsus 57 ± 4 μ. Length of leg II 155 ± 7 μ ; length of leg III 166 ± 6 μ.

Number of setae on each of leg segments tarsus, tibia, genu and femur as follows: Leg I 8 : 6 : 4 : 3 ; leg II 8 : 5 : 4 : 3 ; leg III 6 : 5 : 2 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 3 roots. Empodium I short, pad-like, with about 3 pairs tenent hairs. Empodia II and III somewhat longer, each with 4-5 pairs tenent hairs.

Protonymph (figs 74 ; 76).

Examination of 7 slide mounted specimens.

Length of body 384 ± 19 μ ; greatest width of body 300 ± 21 μ. Propodosomal lobes present. Anterior propodosomal setae short, spatulate about 9 μ long. Remainder of dorsal body setae spatulate, 17 — 23 μ long. Dorsal body surface granulate and wrinkled, mediodistal margin of stylophore flattened with a slight depression. Distances between paired dorsocentral hysterosomal setae : DC_1 56 ± 8 μ ; DC_2 39 ± 7 μ ; DC_3 27 ± 3 μ.

Length of leg I 251 ± 13 μ. Lengths of individual segments of leg I : trochan-

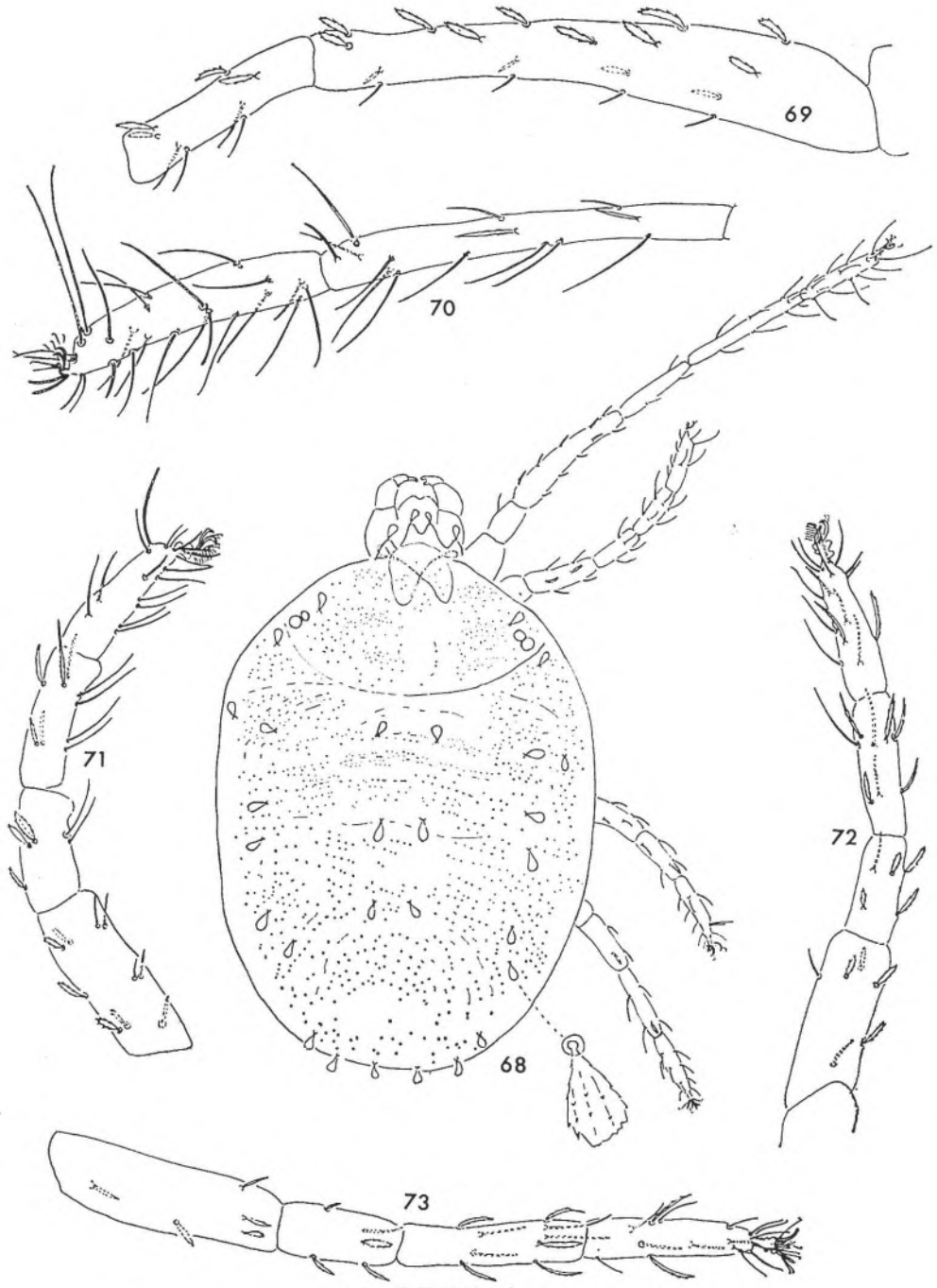

FIG. 68-73. — *Bryobia rubrioculus* f. *prunicola*, adult female.
68. Dorsal view ; 69. Femur and genu of leg I ; 70. Tarsus and tibia of leg I ; 71. Leg II ; 72. Leg III ; 73. Leg IV.

ter 25 ± 2 μ ; femur 70 ± 4 μ ; genu 42 ± 4 μ ; tibia 49 ± 3 μ ; tarsus 63 ± 4 μ. Length of leg II 168 ± 8 μ ; length of leg III 175 ± 11 μ ; length of leg IV 193 ± 4 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 12 : 6 : 4 : 3 ; leg II 10 : 5 : 4 : 3 ; leg III 8 : 5 : 2 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 4 roots.

Empodium I short, with 3 prs tenent hairs. Empodia II, III and IV almost as long as claw with two rows of ventrally directed tenent hairs.

Deutonymph (figs 75, 77, 79-82).

Examination of 3 slide mounted specimens.

Length of body 539 ± 12 μ ; greatest of body 417 ± 12 μ. Propodosomal lobes well developed. Anterior propodosomal setae 12-16 μ long ; remaining dorsal body seta spatulate, 21-23 μ long. Median area of propodosoma granulate ; remainder of dorsal body surface granulate and wrinkled. Mediodistal margin of stylophore rounded or with a slight indentation. Distances between paired dorsocentral hysterosomal setae : DC_1 61 ± 2 μ ; DC_2 45 ± 7 μ ; DC_3 41 ± 3 μ.

Length of leg I 353 ± 7 μ ; lengths of individual segments of leg I : trochanter 33 ± 1 μ ; femur 107 μ ; genu 55 ± 2 μ ; tibia 77 ± 1 μ ; tarsus 81 ± 3 μ. Length of leg II 220 ± 7 μ ; length of leg III 226 ± 9 μ ; length of leg IV 248 ± 14 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 17 : 10 : 4 : 8-9 ; leg II 12 : 5 : 4-5 : 4-5 ; leg III 11 : 5 : 3 : 3 ; leg IV 10 : 5 : 2-3 : 2.

A pair of tenent hairs arises from each claw.

Empodium I short, with 3 prs tenent hairs. Empodia II, III and IV almost as long as claw with 2 rows ventrally directed tenent hairs.

Adult female (figs 68-73, 78).

Examination of 8 slide mounted specimens.

Length of body 640 ± 57 μ ; greatest width of body 466 ± 29 μ. Propodosomal lobes with a basal width of 105 ± 11 μ ; height of outer lobes 40 ± 8 μ ; height of median lobes 52 ± 14 μ. Adventitious growths usually present on lobes. Propodosoma granulate. Hysterosoma mainly granulate with some wrinkling. Mediodistal margin of stylophore rounded or with a slight indentation. Distances between paired dorsocentral hysterosomal setae : DC_1 71 ± 4 μ ; DC_2 49 ± 7 μ ; DC_3 40 ± 4 μ.

Length of leg I 606 ± 34 μ ; ratio of length of leg I to body length : 1 : 1.1 (6 specs) ; 1 : 1.0 (2 specs). Length of individual segments of leg I : trochanter 51 ± 5 μ ; femur 195 ± 12 μ ; genu 86 ± 4 μ, tibia 163 ± 10 μ, tarsus 116 ± 8 μ. Length of leg II 306 ± 15 μ ; length of leg III 308 ± 21 μ ; length of leg IV 370 ± 26 μ.

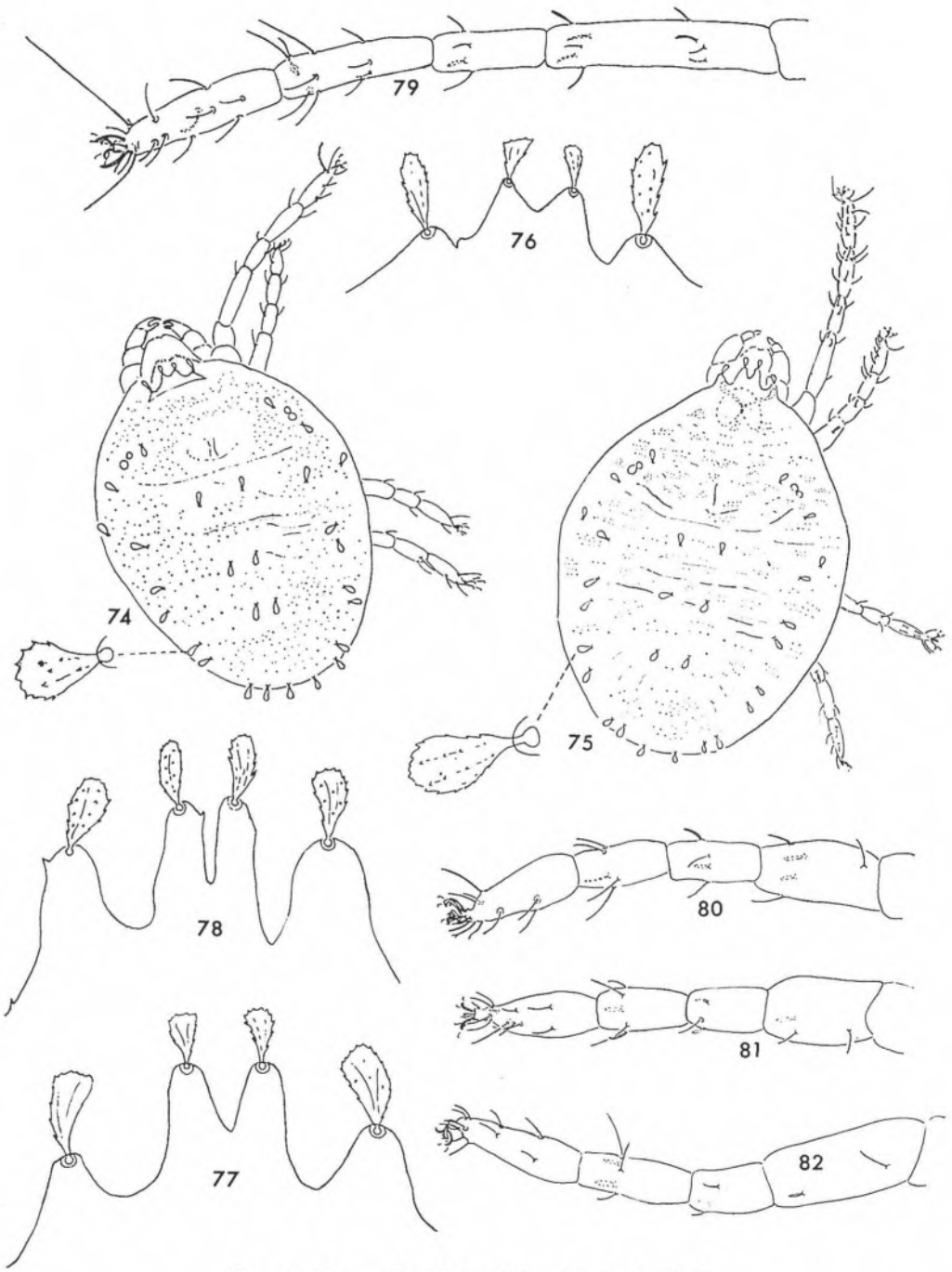

FIG. 74-82. — *Bryobia rubrioculus* f. *prunicola*.

74. Dorsal view of protonymph ; 75. Dorsal view of deutonymph ; 76. Propodosomal lobes of protonymph ; 77. Propodosomal lobes of deutonymph ; 78. Propodosomal lobes of adult female ; 79. Leg I of deutonymph ; 80. Leg II, idem ; 81. Leg III, idem ; 82. Leg IV, ibid.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I *26-27* : 13-16 : 8 : 17-19 ; leg II 17 : 8-9 : 5 : *10*-11 ; leg III 14-*15* : 8-9 : *5-6* : 5-6 ; leg IV 15 : 9 : 5-6 : 5.

Proximal member of " duplex " setae on tarsus IV about 2/3 as long as distal member each member usually being widely separated from the other.

A pair of tenent hairs arises from each claw.

Empodium I short, with 1 pr tenent hairs. Empodia II, III and IV almost as long as claw, each with two rows of ventrally directed tenent hairs.

Collection details.

On Golden Queen peach, Gisborne, 13-II-62, 7-X-63, and 2-III-64 (J. OVERBYE).

Bryobia watersi n. sp.

(figs 83-101).

A distinctive feature of this species is the presence of males which commonly occur with females in the same locality. Adult females are usually longer and broader than other females of the *praetiosa* group and have a notched stylophore. Also, the ratio of the length of leg I to body length is somewhat higher (1.3) than for other members of the *praetiosa* group.

The dorsal body setae of the larvae are broadly spatulate.

Larva (fig. 87).

Examination of 15 slide mounted specimens.

Length of body 267 ± 29 μ ; greatest width of body 238 ± 29 μ. Anterior propodosomal setae short, slender, 8-10 μ long ; remaining dorsal body setae spatulate, 15-21 μ long. Dorsal body surface lightly wrinkled with a few granulations. Mediodistal margin of stylophore smoothly rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 70 ± 15 μ ; DC_2 31 ± 6 μ ; DC_3 24 ± 5 μ.

Length of leg I 210 ± 13 μ ; lengths of individual segments of leg I : trochanter 25 ± 2 μ ; femur 52 ± 4 μ ; genu 32 ± 3 μ ; tibia 40 ± 2 μ ; tarsus 60 ± 5 μ. Lenght of leg II 154 ± 14 μ ; length of leg III 164 ± 13 μ.

Number of setae on each of leg segments tarsus, tibia, genu, and femur as follows : leg I 8 : 6 : 4 : 3 ; leg II 8 : 5 : 4 : 3 ; leg III 6 : 5 : 2 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with at least 3 roots.

Empodium I short, pad-like, with about 3 prs tenent hairs. Empodia II and III longer, each with 3-5 prs of tenent hairs.

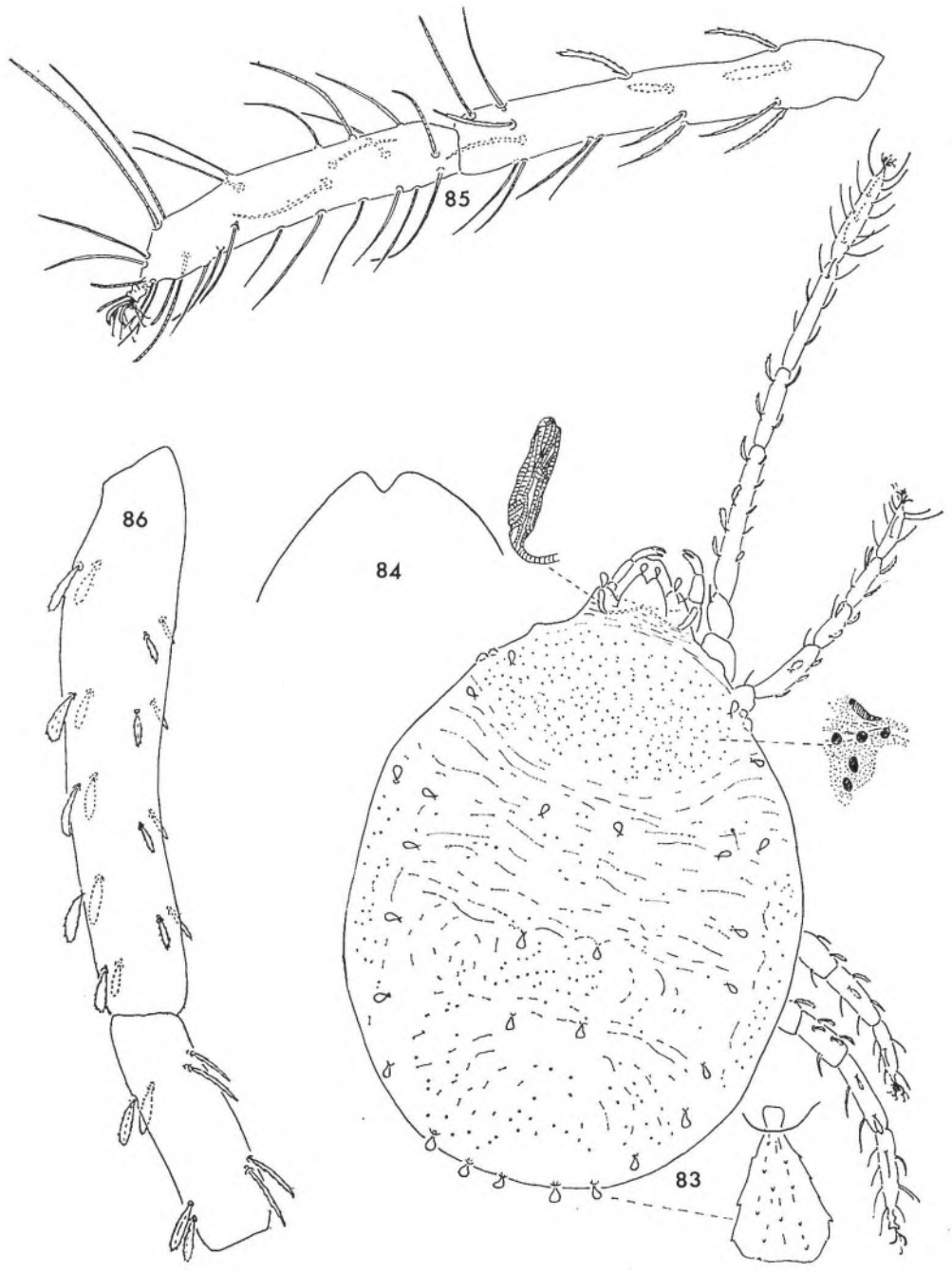

FIG. 83-86. — *Bryobia watersi*, adult female.

83. Dorsal view ; 84. Enlarged view of distal margin of stylophore ; 85. Tarsus and tibia of leg I ; 86. Femur and genu of leg I.

Protonymph (fig. 94).

Examination of 7 slide mounted specimens.

Length of body 412 ± 51 μ ; greatest width of body 346 ± 59 μ. Propodosomal lobes present and in some instances the median lobes appear to be almost fused together. Anterior propodosomal setae short, spatulate, about 11 μ long ; remaining dorsal body setae spatulate, 15-25 μ long. Median area of propodosomal lightly granulate ; remainder of dorsal body surface granulate andw rinkled. Mediodistal margin of stylophore either rounded or with a very small indentation. Distances between paired dorsocentral hysterosomal setae : DC_1 83 ± 13 μ, DC_2 47 ± 5 μ ; DC_3 40 ± 8 μ.

Length of leg I 253 ± 22 μ ; lengths of indivudal segments of leg I : trochanter 28 ± 5 μ ; femur 69 ± 6 μ ; genu 40 ± 2 μ ; tibia 48 ± 6 μ ; tarsus 70 ± 7 μ. Length of leg IV 195 ± 21 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 12 : 6 : 4 : 3 ; leg II 10 : 5 : 4 : 3 ; leg III 8 : 5 : 2 : 2 ; leg IV 6 : 5 : 2 : 2.

A pair of tenent hairs arises from each claw, each tenent hairs with at least 3-4 roots.

Empodium I short, with 2-3 prs tenent hairs. Empodia II, III and IV each with 3-4 prs tenent hairs.

Deutonymph (fig. 95).

Examination of 10 slide mounted specimens.

Length of body 540 ± 146 μ ; greatest width of body 495 ± 114 μ. Propodosomal lobes prominent. Anterior propodosomal setae spatulate, 10-19 μ long ; 4-9 μ wide ; remaining dorsal body setae spatulate, 19-25 μ long, 11-15 μ wide. Propodosoma granulate ; remainder of dorsal body surface wrinkled and granulate. Mediodistal margin of stylophore rounded or slightly flattened. Distances between paired dorsocentral hysterosomal setae : DC_1 96 ± 18 μ ; DC_2 70 ± 18 μ ; DC_3 55 ± 17 μ.

Length of leg I 398 ± 48 μ. Lengths of individual segments of leg I : trochanter 38 ± 4 μ, femur 119 ± 18 μ, genu 62 ± 7 μ, tibia 80 ± 12 μ, tarsus 98 ± 10 μ. Length of leg II 258 ± 41 μ ; length of leg III 285 ± 27 μ ; length of leg IV 301 ± 39 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 17-18 : 10 : 4 : 10 ; leg II *12*-13 : 5 : 4 : 6 ; leg III *11*-12 : 5 : 3 : 3-4 ; leg IV 10 : 4-5 : 2 : 2.

A pair of tenent hairs arises from each claw.

Empodium I short, pad-like, with 3 prs tenent hairs. Empodia II, III and IV each about 2/3 length of claw, with 2 rows of ventrally directed tenent hairs.

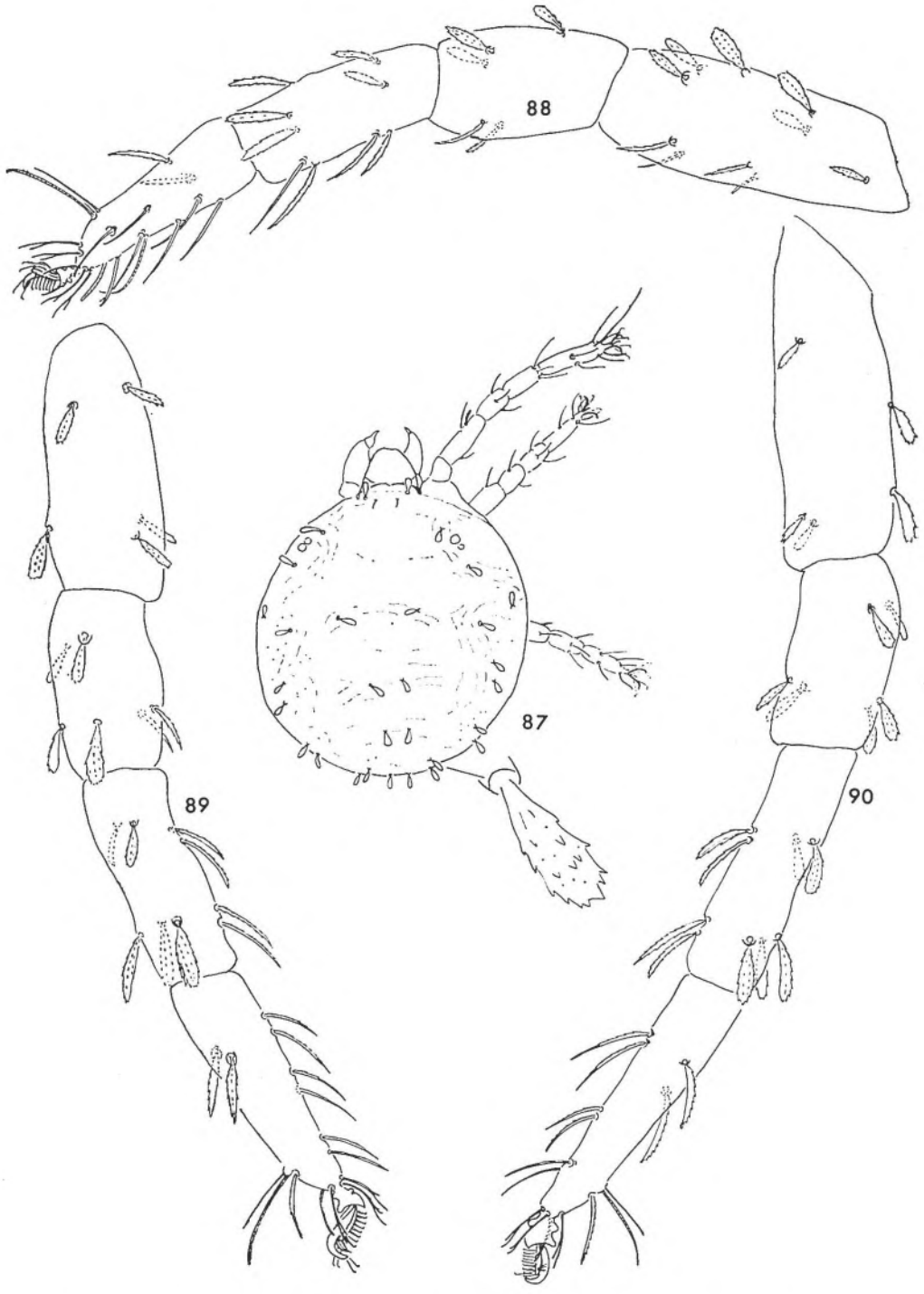

FIG. 87-90. — *Bryobia watersi.*
87. Dorsal view of larva ; 88. Leg II of adult female ; 89. Leg III, idem ; 90. Leg IV, idem.

Adult female (figs 83-86, 88-90, 99).

Examination of 16 slide mounted specimens.

Length of body 952 ± 110 μ ; greatest width of body 770 ± 81 μ. Propodosomal lobes with a basal width of 152 ± 13 μ ; height of outer lobes 50 ± 12 μ ; height of median lobes 74 ± 13 μ. Shape of propodosomal lobes as in fig. 99. Dorsal body setae spatulate, 23-24 μ long, 11-20 μ wide. Propodosoma granulate ; hysterosoma wrinkled and granulate. Anterior angulations present. Mediodistal margin of stylophore notched. Distances between paired dorsocentral hysterosomal setae : DC_1 151 ± 21 μ ; DC_2 128 ± 21 μ ; DC_3 106 ± 11 μ.

Length of leg I 693 ± 90 μ. Ratio of length of leg I to body length : 1 : 1.2 (3 specs), 1 : 1.3 (10 specs), 1 : 1.4 (1 spec.) ; 1 : 1.5 (2 specs). Length of individual segments of leg I : trochanter 62 ± 5 μ, femur 228 ± 27 μ, genu 107 ± 17 μ, tibia 154 ± 31 μ, tarsus 148 ± 21 μ. Length of leg II 430 ± 97 μ ; length of leg III 452 ± 67 μ ; length of leg IV 516 ± 84 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 27-28 : 14-*16* : 8 : 16-20 ; leg II 16-19 : 9 : 5 : 10-11 ; leg III 14-*15* : 9-10 : 6 : 4-5 ; leg IV 15 : 8-9 : 6 : 4-5.

Proximal member of " duplex " setae on tarsus IV about 2/3 as long as distal member.

A pair of tenent hairs arises from each claw.

Empodium I short, pad-like, with 1 pr. tenent hairs. Empodia II, III and IV almost as long as claw, each with two rows of ventrally directed tenent hairs.

Male (figs 91-93, 96-98, 100-101).

Examination of 4 slide mounted specimens.

Length of body 535 ± 25 μ ; greatest width of body 365 ± 9 μ. Propodosomal lobes with a basal width of 128 ± 6 μ ; height of outer lobes 41 ± 7 μ ; height of median lobes 44 ± 2 μ. The two median lobes have fused to form a single lobe ; all lobes evenly rounded. Anterior propodosomal setae short, about 11 μ long ; remainder of dorsal body setae spatulate, 19 — 25 μ long. Propodosoma and hysterosoma granulate with some coarse blotching. A transverse division at about half way on the dorsal body surface. Mediodistal margin of stylophore with a slight depression.

Length of leg I 785 ± 63 μ ; ratio of length of leg I to body length — 1 : 0.66 ; 1 : 0.61 ; 1 : 0.75 : 1 : 0.64. Length of individual segments of leg I : trochanter 51 ± 2 μ ; femur 259 ± 21 μ ; genu 126 ± 11 μ ; tibia 167 ± 27 μ ; tarsus 192 ± 18 μ. Length of leg II 430 ± 25 μ ; length of leg III 429 ± 8 μ ; length of leg IV 494 ± 18 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : Leg I 39-41 : 15-16 : 7-8 : 20-22 ; leg II 18-19 : 8-9 : 4-5 : 10-12 ; leg III 15 : 9 : 6 : 5-6 ; leg IV 14-15 : 8-9 : 6 : 6.

A pair of tenent hairs arises from each claw.

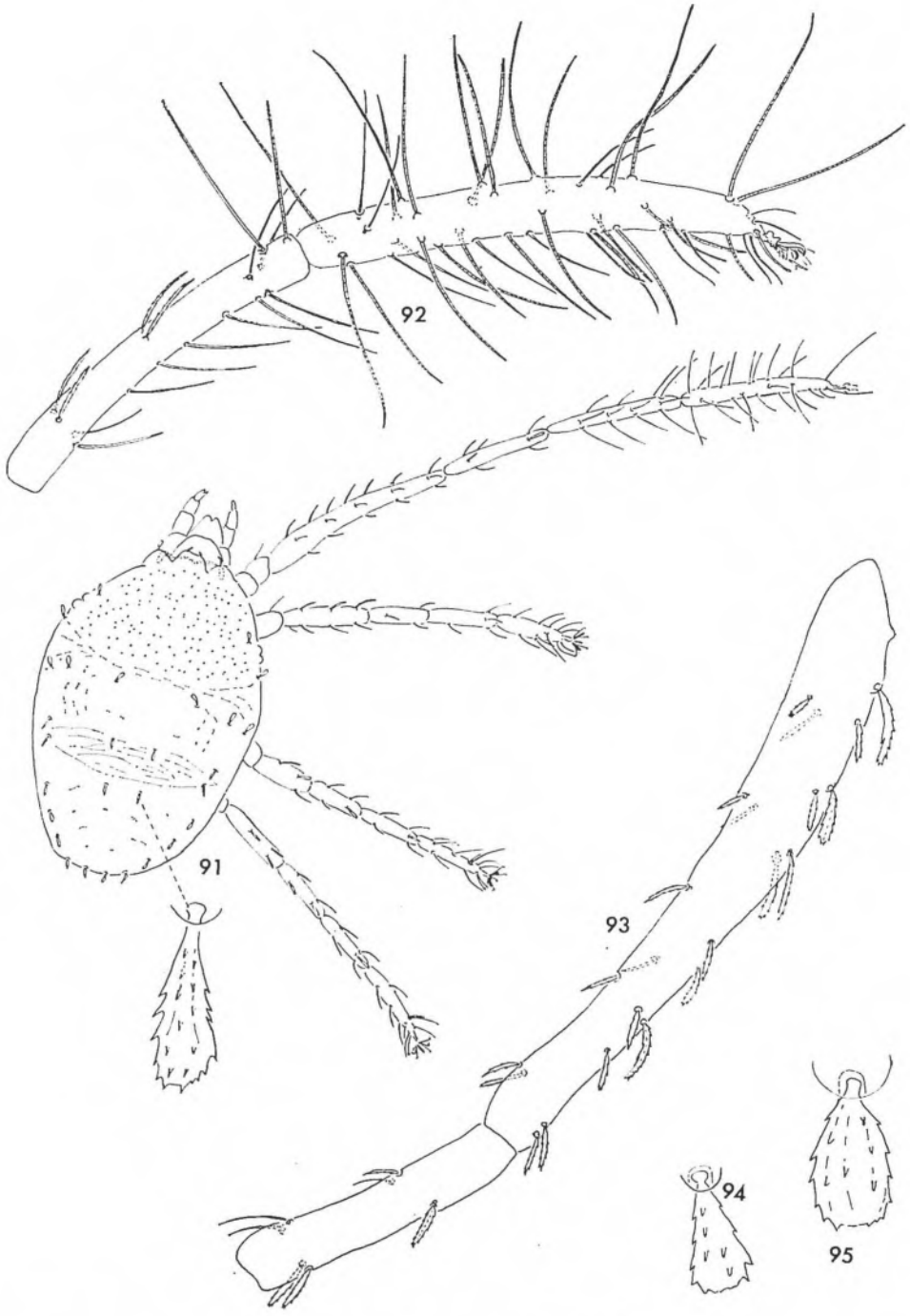

FIG. 91-95. — *Bryobia watersi.*

91. Dorsal view of male ; 92. Tarsus and tibia of leg I, idem. 93. Femur and genu of leg I, idem. 94. Enlarged view of dorsal body seta of protonymph ; 95. Enlarged view of dorsal body seta of deutonymph.

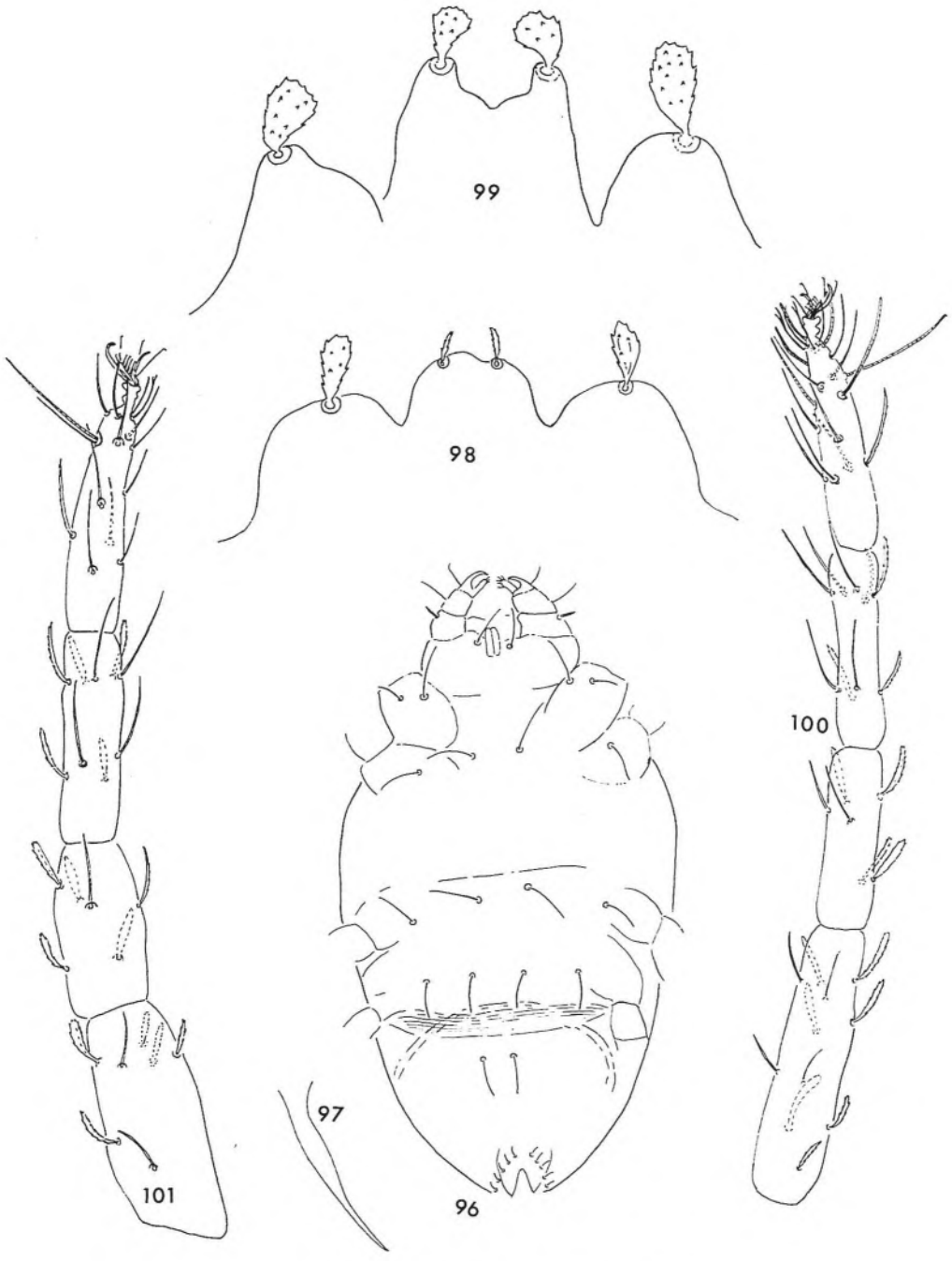

FIG. 96-101. — *Bryobia watersi*.

96. Ventral view of male ; 97. Aedeagus ; 98. Propodosomal lobes of male ;
99. Propodosomal lobes of adult female ; 100. Leg II of male ; 101. Leg III of male.

Empodium I about 1/3 length of claw, with 3 prs tenent hairs. Empodia II, III and IV almost as long as claw, each with two rows of ventrally directed tenent hairs.

Arrangement of ventral body setae as in fig. 96. Genital area at posterior body margin with 5 prs setae. Aedeagus as figured (fig. 97).

Collection details.

Holotype : female, on cucumber leaves, Levin, 6-XII-63, (R. A. S. WATERS). In collection of Department of Agriculture, Levin.

Paratypes : 17 females, 11 males, 18 larvae, 7 protonymphs, 9 deutonymphs, with same data as holotype.

Specimens were also collected as follows : on grass and weeds in orchard, Hastings, 22-X-64 (A. WARD) ; on kumara leaves, Levin, 3-V-64 (R. A. S. WATERS).

The species is named after the collector of the original specimens, Mr. R. A. S. WATERS.

Bryobia variabilis n. sp.

(figs 102-120).

This species has only been found on broom (*Cytisus* sp.). Males are common.

The larval stage can be distinguished in that the dorsal body setae are long, slender and serrate and the distance between the DC_2 setae is less than for the DC_1 and DC_3 setae.

Adults are oval in shape, the dorsal body setae being slender and serrate and varying considerably in length.

Overseas two other species of *Bryobia* are known to occur on broom : *B. sarothamni* in Europe and *B. spica* from California. *B. sarothamni* differs from *B. variabilis* in that the dorsal body setae are shorter and those of the male spatulate (GEIJSKES, 1939).

In *B. spica* the dorsal body setae are borne on small tubercles.

Larva (figs 109-110).

Examination of 7 slide mounted specimens.

Length of body 194 ± 18 μ ; greatest width of body 180 ± 16 μ. Anterior propodosomal setae short, slender, 6 μ long ; remaining dorsal body setae slender, pectinate, 34-44 μ long. Central area of propodosoma with a few wrinkles ; remainder of dorsal body surface lightly wrinkled. Mediodistal margin of stylophore smoothly rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 61 ± 6 μ ; DC_2 22 ± 3 μ ; DC_3 28 ± 5 μ.

Length of leg I 156 ± 13 μ. Lengths of individual segments of leg I : trochanter 20 ± 3 μ ; femur 33 ± 1 μ ; genu 27 ± 2 μ ; tibia 27 ± 2 μ ; tarsus 49 ± 5 μ. Length of leg II 128 ± 4 μ. Length of leg III 132 ± 8 μ.

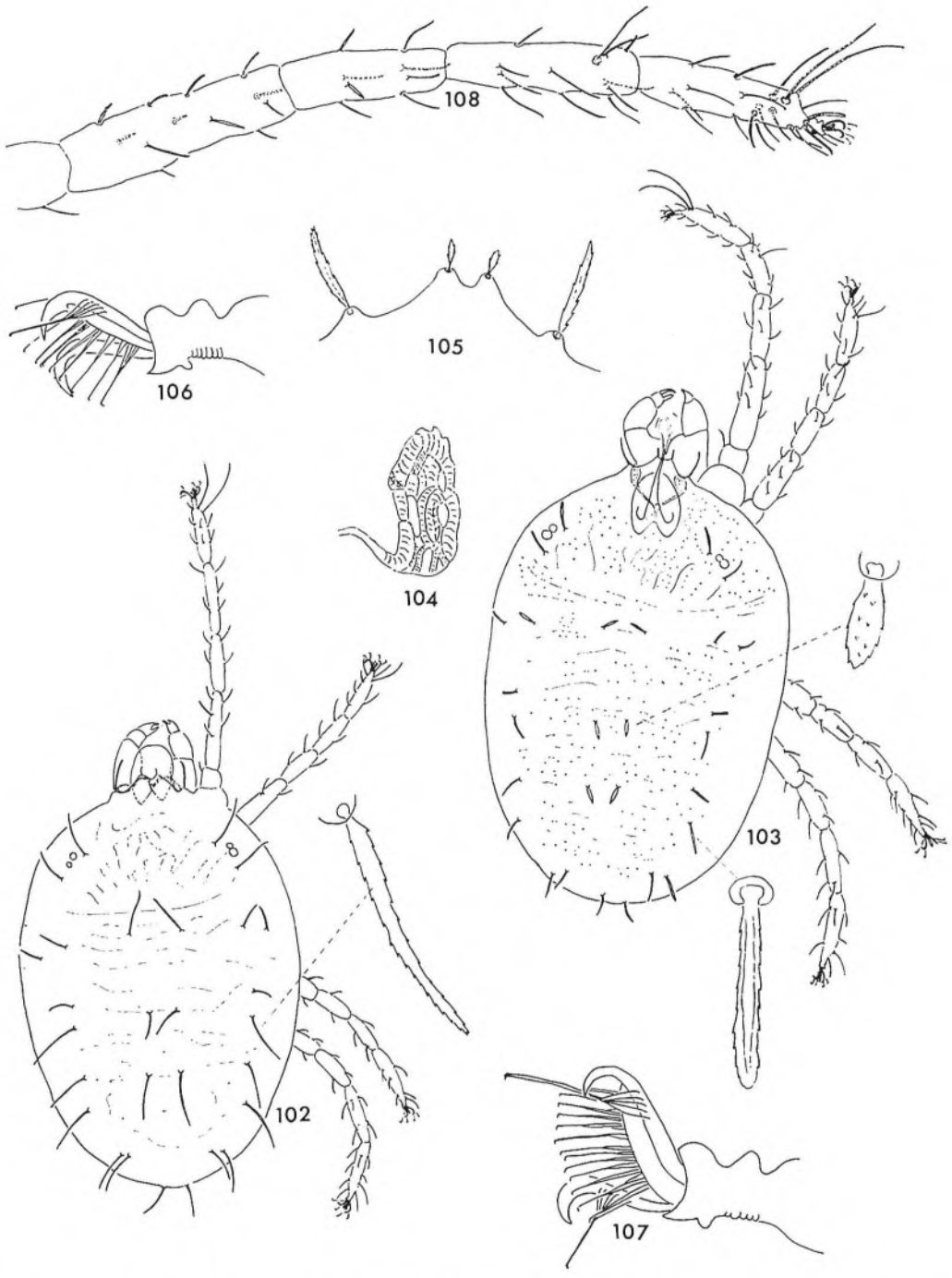

FIG. 102-108. — *Bryobia variabilis*, adult female.

102. Dorsal view (long setae) ; 103. Dorsal view (short setae) ; 104. Enlarged view of peritreme ; 105. Enlarged view of propodosomal lobes ; 106. Claws and empodium of leg I ; 107. Claws and empodium of leg II ; 108. Leg I.

Number of setae on each of leg segments tarsus, tibia, genu and femur as follows : leg I 8 : 6 : 4 : 3 ; leg II 8 : 3-*4* : 4 : 2-*3* ; leg III 6 : 3 : 1 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with about 3 roots.

Empodium I about 1/3 length of claw with at least 3 prs. tenent hairs. Empodia II and III each about 1/2 length of claw with 4-5 prs. tenent hairs.

Protonymph.

Examination of 8 slide mounted specimens.

Length of body 300 ± 33 μ ; greatest width of body 251 ± 21 μ. Propodosomal lobes not apparent. Anterior propodosomal setae short, slender, about 8 μ long ; remaining dorsal body setae slender, pectinate, 32-50 μ long. Dorsal body surface wrinkled ; conspicuous transverse fold separating propodosoma from hysterosoma. Mediodistal margin of stylophore either rounded or slightly flattened. Distances between paired dorso-central hysterosomal setae : DC_1 66 ± 5 μ ; DC_2 26 ± 3 μ ; DC_3 34 ± 7 μ.

Length of leg I 199 ± 18 μ. Lengths of individual segments of leg I : trochanter 24 ± 3 μ ; femur 47 ± 3 μ ; genu 37 ± 3 μ ; tibia 38 ± 4 μ ; tarsus 54 ± 6 μ. Length of leg II 156 ± 17 μ. Length of leg III 157 ± 12 μ. Length of leg IV 153 ± 16 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur, as follows : leg I 12 : 6 : 4 : 3 ; leg II 10 : 3-*4* : 4 : 3 ; leg III 8 : 3 : 1 : 2 ; leg IV 6 : 3 : 1 : 2.

A pair of tenent hairs arises from each claw, each tenent hair with 3-4 roots.

Empodium I about 1/2 length of claw with 4-5 prs. tenent hairs. Empodia II, III and IV each about 2/3 length of claw with 4-5 prs. tenent hairs.

Deutonymph.

Examination of 12 slide mounted specimens.

Length of body 434 ± 94 μ ; greatest width of body 324 ± 41 μ. Propodosomal lobes scarcely apparent. Anterior propodosomal setae about 6-7 μ long, arising from slight tubercles ; remaining dorsal body setae mainly slender and pectinate, varying in length from 22-55 μ. Dorsal body surface lightly wrinkled and granulate. Mediodistal margin of stylophore smoothly rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 76 ± 17 μ ; DC_2 31 ± 10 μ ; DC_3 39 ± 9 μ.

Lengths of leg I 286 ± 18 μ ; length of individual segments of leg I : trochanter 30 ± 5 μ ; femur 83 ± 12 μ ; genu 50 ± 3 μ ; tibia 56 ± 6 μ ; tarsus 71 ± 6 μ. Length of leg II 200 ± 34 μ. Length of leg III 219 ± 24 μ. Length of leg IV 245 ± 24 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I *17*-18 : 6-10 : 4 : 6-10 ; leg II 12 : 3-4 : 3-4 : 4-6 ; leg III 11 : 2-*3* : 2 : 3-4 ; leg IV 10 : 3 : 1 : 2.

A pair of tenent hairs arises from each claw.

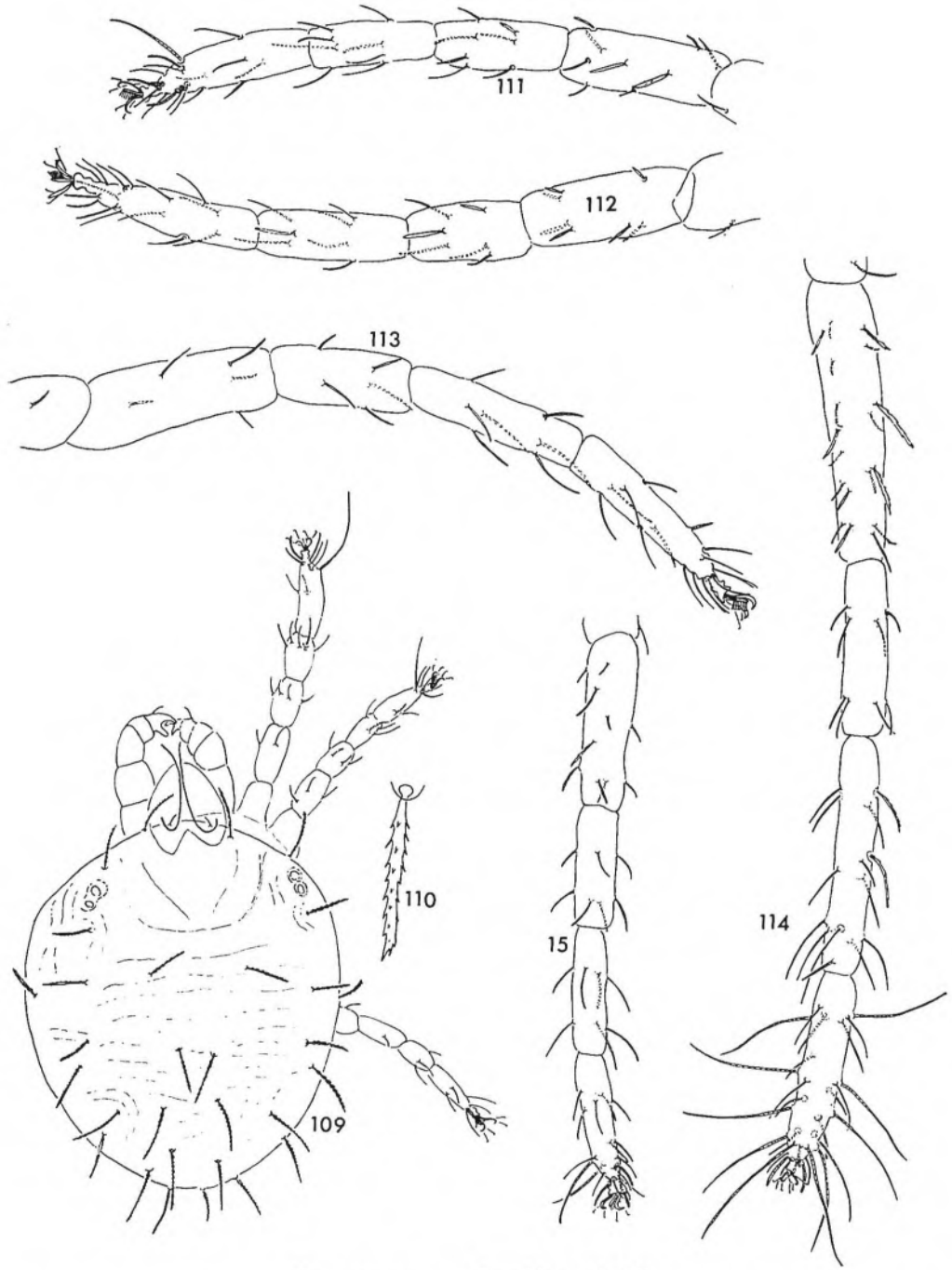

FIG. 109-115. — *Bryobia variabilis.*

109. Dorsal view of larva ; 110. Enlarged view of dorsal body seta of larva ; 111. Leg II of adult female ; 112. Leg III, idem ; 113. Leg IV, idem ; 114. Leg I of adult male ; 115. Leg II, idem.

Empodium I about 2/3 as long as claw, with about 4 prs. tenent hairs. Empodia II, III and IV almost as long as claw with two rows ventrally directed tenent hairs.

Adult female (figs 102-113).

Examination of 12 slide mounted specimens.

Length of body 664 ± 65 μ ; greatest width of body 462 ± 41 μ. Body shape almost oval. Propodosomal lobes weakly developed ; Median lobes more prominent than outer lobes which are scarcely developed. Anterior propodosomal setae 12-14 μ long, slightly thickened, pectinate ; remaining dorsal body setae varying considerably in length and thickness. For example, the dorsocentral hysterosomal setae may be short (13 μ) and broad, or alternatively long (78 μ) and slender. Dorsal body surface strongly wrinkled and granulate. Mediodistal margin of stylophore usually rounded, with a slight depression. Distances between paired dorsocentral hysterosomal setae : DC_1 94 ± 18 μ ; DC_2 45 ± 8 μ ; DC_3 54 ± 12 μ.

Length of leg I 473 ± 27 μ. Ratio of length of leg I to body length : 1 : 1.3 (5 spec.), 1 : 1.4 (4 spec.), 1 : 1.5 (1 spec.), 1 : 1.6 (1 spec.), 1 : 1.8 (1 spec.) Length of individual segments of leg I : trochanter 45 ± 5 μ, femur 129 ± 11 μ, genu 89 ± 7 μ, tibia 107 ± 6 μ, tarsus 103 ± 6 μ. Length of leg II 375 ± 25 μ ; length of leg III 359 ± 39 μ ; length of leg IV 412 ± 14 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur, as follows : leg I *20-23* : *12-13* : 6-8 : 11-13 ; leg II *17-18* : *7-8* : 9-11 ; leg III 14-*15* : *7* : 5-*6* : 6-*7* ; leg IV 13-*15* : 6-*7* : 4-*5* : 5.

The " duplex " setae of tarsus IV appear to consist of a long distal tactile seta and proximally at some distance is a short sensory seta, about 1/2 as long as the tactile member.

Male (figs 114-120).

Examination of 4 slide mounted specimens.

Length of body 399 ± 12 μ ; greatest width of body 252 ± 6 μ. Propodosomal lobes as figured (fig. 118). A very shallow or no depression between the median lobes. Anterior propodosomal setae slender, 8-15 μ long ; outer setae of propodosomal lobes serrate, thicker, 19-23 μ long ; remaining dorsal body setae slender, serrate 28-55 μ long. Dorsal body surface granulate, blotched, with an almost rugose appearance ; transverse division at about half way. Mediodistal margin of stylophore smoothly rounded or with a slight apical notch.

Length of leg I 638 ± 79 μ ; ratio of length of leg I to body length : 1 : 0.57 ; 1 : 0.69 ; 1 : 0.68 ; 1 : 0.67. Length of individual segments of leg I : trochanter 44 ± 5 μ ; femur 190 ± 29 μ ; genu 121 ± 16 μ ; tibia 156 ± 21 μ ; tarsus 126 ± 10 μ. Length of leg II 387 ± 38 μ ; length of leg III 375 ± 31 μ ; length of leg IV 436 ± 38 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows :

leg I : 27-29 : 12-15 : 8 : 15-18 ; leg II 17-18 : 6-8 : 7-8 : 10-*11* ; leg III : 13-15 : 5-7 : 6 : 6-7 ; leg IV 15 : 7 : 4-5 : 5.

A pair of tenent hairs arises from each claw.

Empodium I about 2/3 as long as claw with two rows of ventrally directed tenent hairs. Empodia II, III and IV, each almost as long as claw, with two rows of ventrally directed tenent hairs.

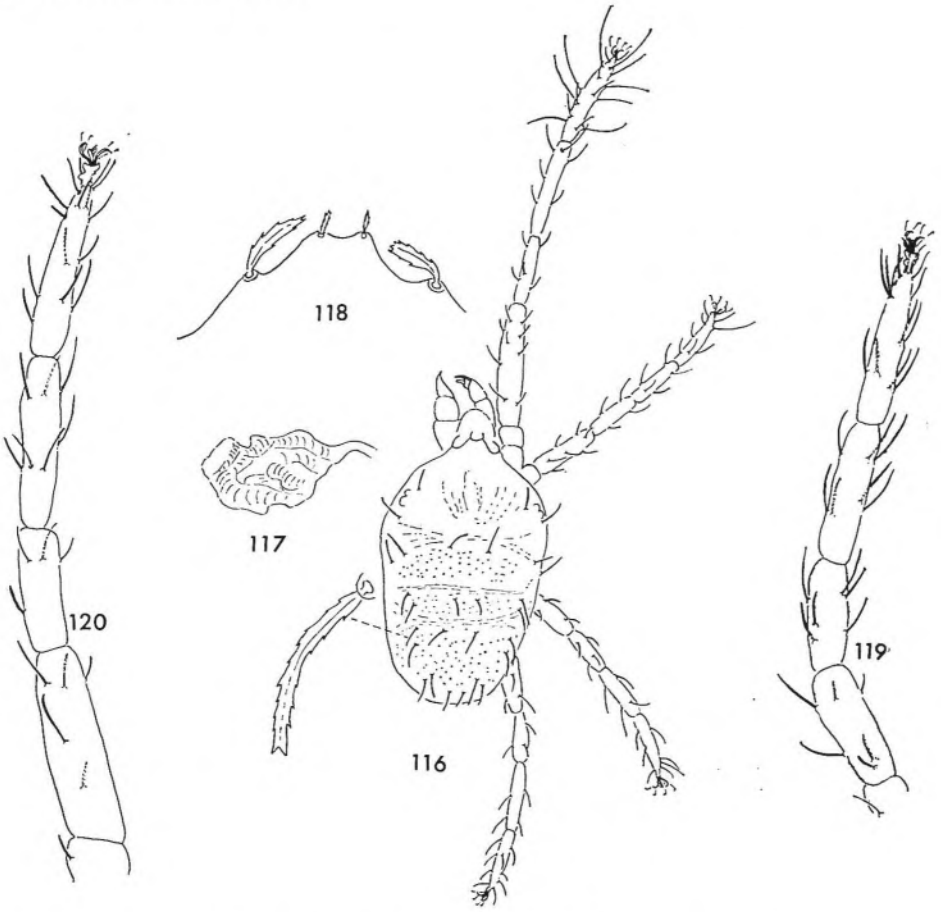

FIG. 116-120. — *Bryobia variabilis*, adult male.

116. Dorsal view ; 117. Enlarged view of peritreme ; 118. Enlarged view of propodosomal lobes ; 119. Leg III ; 120. Leg IV.

Collection details.

Holotype : female, on broom (*Cytisus* sp.), Christchurch, 14-II-65 (D. C. M. MANSON) ; in collection of Department of Agriculture, Levin.

Paratypes : 10 females, 10 males, 6 larvae, 7 protonymphs, 2 deutonymphs, with same data as holotype.

Specimens were also collected as follows : on broom, Raumati, 16-II-65 and 28-II-65 (D. C. M. MANSON) ; on broom, Styx Mill Road, Christchurch, 10-II-65 (D. C. M. MANSON) ; on broom, wairau valley, 30-IX-64 (E. COLLYER) ; on broom, Mapua orchard, 18-XI-64 and 23-II-65 (E. COLLYER) ; on broom roadside, Ngatimati, 25-II-65 (E. COLLYER).

Bryobia annatensis n. sp.

(figs 121-140)

The adult female of this species can be distinguished from that of *B. variabilis* in the differing body shape (widest at about the anterior 1/4) and the short slender dorsal body setae. The male also differs in shape from *B. variabilis* and is slightly longer with a greater ratio for length of leg I to body length (1:0.80 as compared to 1 : 0.57 — 0.69).

Deutonymph (figs. 135-140).

Examination of 1 slide mounted specimen.

Length of body 426 μ ; greatest width of body 324 μ, broadest at about anterior 1/4. Propodosomal lobes present as slight tubercles. Anterior propodosomal setae slender, 6 μ long ; remaining dorsal body setae slender, serrate, varying in length from 23-36 μ. Dorsal body surface granulate and wrinkled. A distinct transverse fold between propodosoma and hysterosoma. Mediodistal margin of stylophore smoothly rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 36 μ ; DC_2 24 μ ; DC_3 29 μ.

Length of leg I 265 μ. Lengths of individual segments of leg I : trochanter 25 μ, femur 70 μ, genu 48 μ, tibia 55 μ, tarsus 67 μ. Length of leg II 202 μ. Length of leg III 210 μ. Length of leg IV 241 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 16 : 8 : 4 : 5 ; leg II 12 : 4 : 4 : 4-5 ; leg III 11 : 3 : 2 : 2 ; leg IV 10 : 3 : 1 : 1.

A pair of tenent hairs arises from each claw. All empodia with two rows of ventrally directed tenent hairs.

Adult female (figs. 121-127, 130).

Examination of 1 slide mounted specimen.

Length of body 591 μ ; greatest width of body 455 μ ; body broadest at anterior 1/4. Propodosomal lobes weakly developed (fig. 123), similar to those of *B. variabilis*. Anterior propodosomal setae slender, 6 μ long ; remaining dorsal body setae slender, serrate, varying in length from 23-44 μ, the longest setae being situated near the posterior body margin, the dorsocentrals being amongst the shortest. Peritreme terminating as an enlarged, anastomosing, globular sac. Dorsal body surface lightly granulate and wrinkled, a transverse fold separating

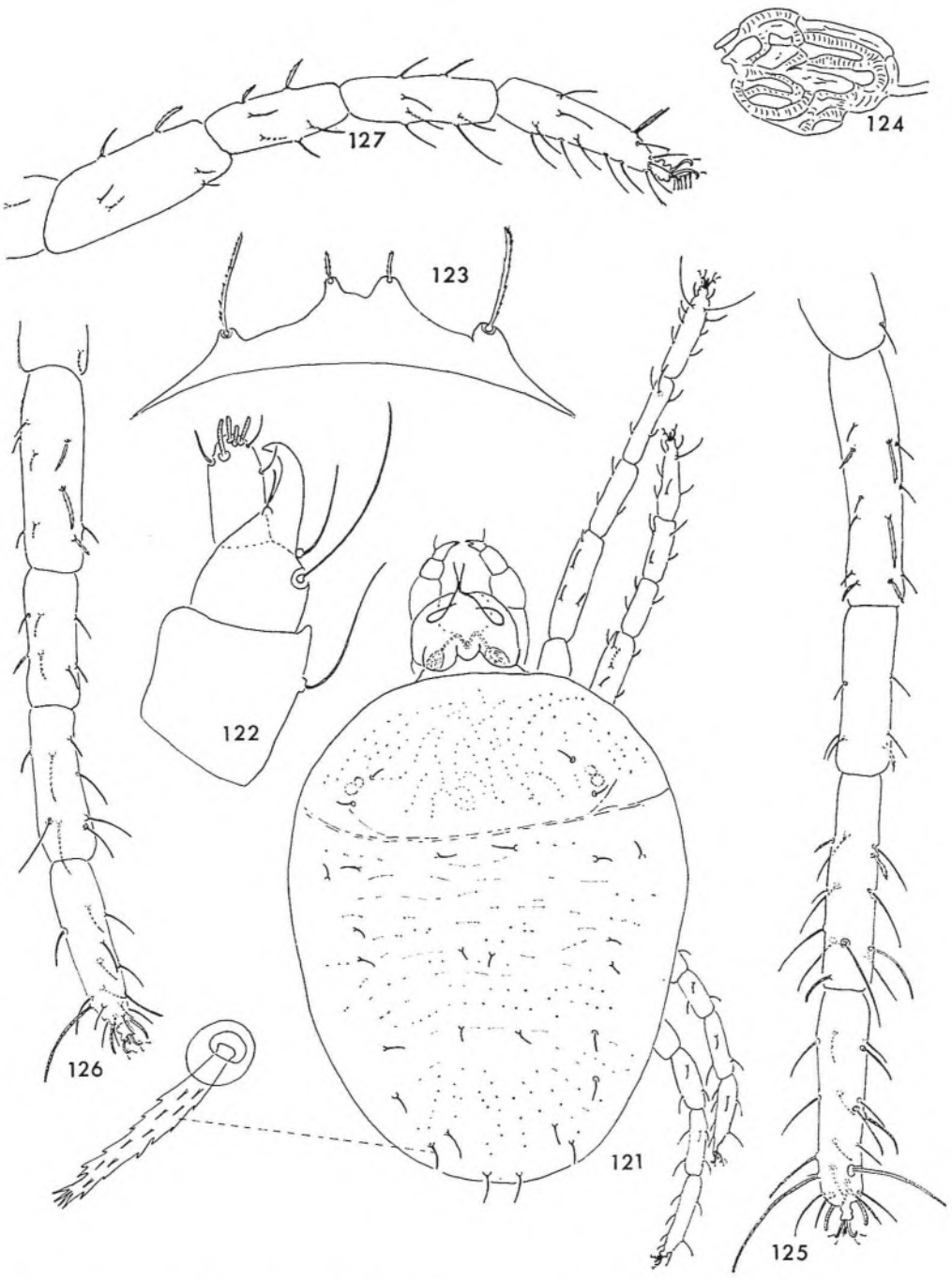

FIG. 121-127. — *Bryobia annatensis*, adult female.

121. Dorsal view. 122. Enlarged view of palp tarsus ; 123. Enlarged view of propodosomal lobes ; 124. Enlarged view of peritreme ; 125. Leg I ; 126. Leg II ; 127. Leg III.

FIG. 128-134. — *Bryobia annatensis.*

128. Dorsal view of adult male ; 129. Enlarged view of dorsal body seta, idem ; 130. Leg IV of adult female ; 131. Leg I of adult male ; 132. Leg II, idem ; 133. LegIII, idem ; 134. Leg IV, ibid.

the propodosoma from the hysterosoma. Mediodistal margin of stylophore rounded. Distances between paired dorsocentral hysterosomal setae : DC_1 95 μ ; DC_2 36 μ ; DC_3 63 μ.

Length of leg I 433 μ. Length of individual segments of leg I : trochanter 42 μ, femur 116 μ, genu 80 μ, tibia 93 μ, tarsus 102 μ. Length of leg II 320 μ. Length of leg III 328 μ. Length of leg IV 398 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur as follows : leg I 22 : 13 : 7 : 12 ; leg II 18 : 8 : 7 : 9 ; leg III 15 : 7 : 6 : 6 ; leg IV 15 : 7 : 4 : 4.

A pair of tenent hairs arises from each claw. Each empodium with 2 rows of ventrally directed tenent hairs.

Male (figs 128-129, 131-134).

Examination of 1 slide mounted specimen.

Length of body 445 μ, greatest width of body 260 μ. Propodosomal lobes weakly developed. Anterior propodosomal setae slender, 7 μ long ; outer setae of propodosomal lobes thicker, serrate, 19 μ long. Remaining dorsal body setae slender, serrate, 19-42 μ long, the longest setae being situated near the posterior body margin. Dorsal body surface lightly granulate and wrinkled. Mediodistal margin of stylophore rounded. Terminal portion of peritreme globular.

Length of leg I 552 μ ; ratio of length of leg I to body length : 1 : 0.80. Length of individual segments of leg I : trochanter 42 μ, femur 162 μ, genu 105 μ, tibia 130 μ, tarsus 113. Length of leg II 349 μ ; length of leg III 336 μ ; length of leg IV 398 μ.

Number of setae on each of leg segments tarsus, tibia, genu, femur, as follows : leg I : 27 : 14 : 8 : 18 ; leg II 18 : 7 : 6 : 11 ; leg III 14 : 7 : 6 : 6 ; leg IV 15 : 7 : 5 : 5.

A pair of tenent hairs arises from each claw.

Empodium I about 1/2 as long as claw. Empodia II, III and IV each almost as long as claw and with two rows of ventrally directed tenent hairs.

Collection details.

Holotype : female, netted from roadside, Annat, 17-VIII-64 (T. JESSEP). In collection of Department of Agriculture, Levin.

Paratypes : 1 male, netted from roadside, Annat, 31-VIII-64 (T. JESSEP), 1 deutonymph with same data as holotype.

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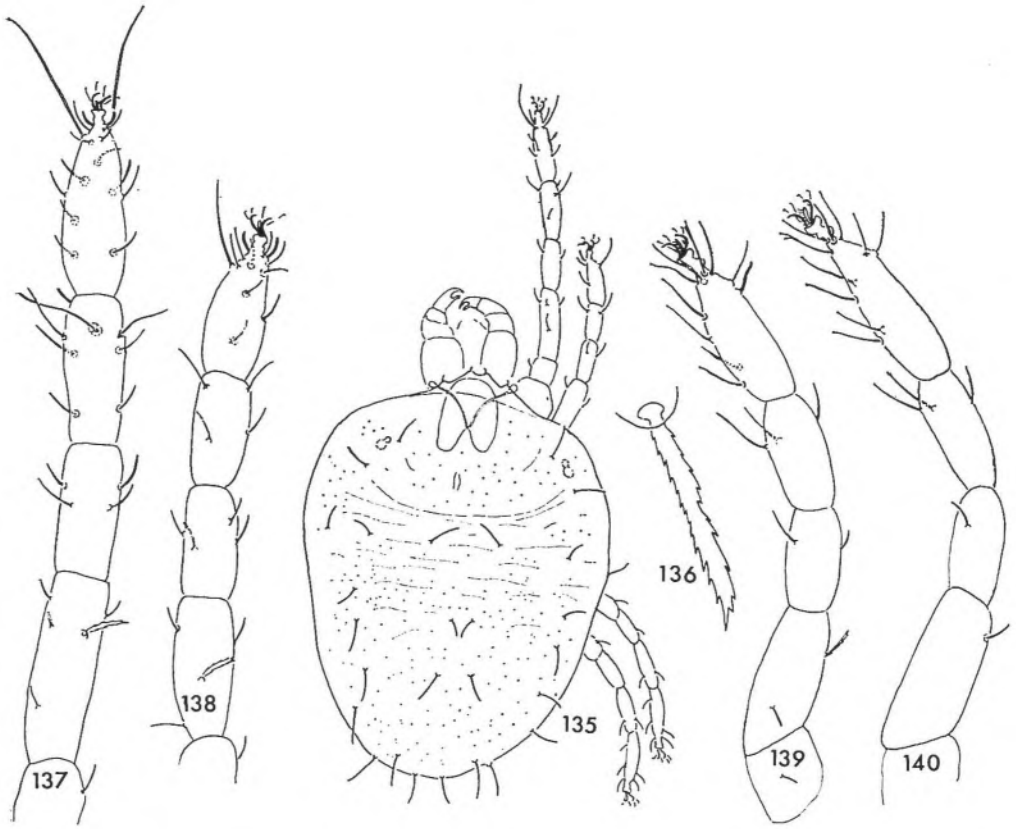

FIG. 135-140. — *Bryobia annatensis*, deutonymph.
135. Dorsal view ; 136. Enlarged view of dorsal body seta ; 137. Leg I ; 138. Leg II ; 139. Leg III ; 140. Leg IV.

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