A Systematic Classification of Pseudococcus and Some Related Genera—Part I.

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THE literature dealing with the systematic classification of the Coccidae, with few exceptions, is extremely unsatisfactory; particularly is this so in New Zealand, where practically nothing has been done to remedy it. G. F. Ferris (1918), when reporting on some mealy bugs found in California, made the following statement, which is as true to-day as it was then:—". . . Of the nearly 100 mealy bugs thus far described from North America, including some 35 from California, not more than three or four are recognisable at all on the basis of the published descriptions if taken apart from their typical host and type locality." This is a challenging statement, and calls for consideration by all students of the group, who must in the future do their best to remedy such a defect. Several have already attempted to solve it with but partial success. Berlese (1893) has described some of the structures that could be made use of in identification, and Marchal (1908) seems to have been the first to make use of them. Smith (1911) investigated the value of characters ordinarily used, and later (1913) discussed the possible value of others. In spite of this, however, very little progress appears to have been made.

It was in the early days of my studies that the difficulty of identifying already-named species made itself so apparent, and but for the courtesy of the Government Entomologist at that time, in allowing me to examine the type slides of the Maskell collection, and also for the assistance rendered by Mr E. E. Green, who had received specimens from Mr Maskell, I would have been forced to give up. Thus at the outset I decided that as soon as my collection approached anything near a reasonable number, I would endeavour to take each genus separately and try to bring order out of chaos. The work, of course, has been very slow, and was made more so by the large number of new species discovered, and still being discovered, and also by the fact that many of my earlier preparations were found to be unsatisfactory and had to be re-mounted; again, the loss of specimens when transferring from one place to another added to my difficulties. Further trouble was also experienced through not being able to find workable descriptions of the different genera concerned, since every author appeared to have his own opinion as to what should be considered generic characters. However, thanks to scientific friends, the difficulty has been overcome as far as the group of genera here mentioned is concerned, and I trust that this will be only the first of a series of papers containing descriptions of all new species, and re-descriptions of all species

already named, which occur in New Zealand. Myers (1922), in his reference list of the N.Z. Coccidae, refers to 22 named species of the Pseudococcinae, of which one species, *P. comstocki* Kuwana, was wrongly identified, and the type slide of another, *P. arecae* Mask., contains only a small portion of the insect, and consequently is quite useless for the purpose of identification. To Myers's list it is now necessary to add another 30 distinct species which belong to the following three genera: *Trionymus* 20; *Pseudococcus* 9; *Ripersiella* 1; making a grand total of at least 50 distinct species of Pseudococcinae in New Zealand.

Morphological Characters.

Before dealing with the taxonomic value of the morphological characters, it will not be amiss to explain how classification was carried out in the past. Costa was supposed to have erected the first genus, *Dactylopius,* on the basis of an eight-jointed antenna. As collections progressed, specimens were found with both fewer and more joints than eight, though otherwise apparently related. Westwood separated those with nine-jointed antennae under the name of *Pseudococcus,* and Signoret those with six joints under the name of *Ripersia.* Later, Signoret again separated another portion on the basis of greater body length, to form the genus *Westwoodia,* which genus, after much alteration, now appears under the name of *Trionymus* Berg. Due to the investigations of Marie E. Fernald into the literature of the Coccidae, several changes in nomenclature had to be made, as the name *Dactylopius* had to be transferred to quite a distinct subfamily, and *Pseudococcus,* next in priority, was substituted for it, while the name *Phenacoccus* was substituted for that of *Pseudococcus.* It will be seen therefore, that the number of antennal joints was the main basis for the separation of the genera, and as it has since been shown that this is probably the most variable organ of the body, it is little wonder that so much confusion resulted.

Although it was only recently that I became aware of the lines along which other students of the group were working, I had long been studying the problem, and had drawn up a list of all characters likely to be of taxonomic value, and had applied them to my own collection. The result as far as the New Zealand species of these genera are concerned appears to be quite satisfactory.

Adult female.

Antenna.—Very little reliance should be placed on the antennal characters, owing to their great variability. They have their uses in dividing a genus, however, into two or more groups according to the number of joints, but a large allowance must be made for error, as in a number of species it will be found to vary from six to seven or seven to eight joints. It is also useful to know which is the shortest joint usually found in a species, as this character appears to remain fairly constant.

Legs.—Considerable attention was paid to the legs to see if they possessed any characters of taxonomic value. The most reliable constant characters found were the groups of minute pores which may be observed on one or more joints of the hind legs of different species. These proved very useful in further separating the groups of species into still smaller groups, thus aiding identification. It was also useful to make a comparison of the length of the tibia with the tarsus, as this character, though not so constant, has some value. Any denticle on the claw should be noted, as all species with dorsal ostioles found to possess such a denticle will probably belong to the genus *Phenacoccus* irrespective of the number of joints in the antenna.

Mouth parts.—The only character of taxonomic value found was a comparison of the length with the breadth of the so-called mentum, or beak. I have never found this to vary in any species, or variety of a species.

Dorsal Ostioles.—These are really of group importance, and apply to the mealy bugs only. They are never found in the Eriococcinae groups. There are usually two pairs of these present, one pair being on the frons, and another pair about the third segment of the abdomen.

Cerarii.—A typical cerarius consists of a pair or more of spines set close together near the margin of the body, and usually accompanied by a more or less closely set group of triangular pores, and sometimes by two or more accessory setae. They are undoubtedly of great importance in the identification of the species, and may also be used in the separation of the genera. One of the weak points of the cerarii is, that though fairly constant as regards the species, they have a way of gradually fading out that makes it sometimes hard to decide where they end, consequently, unless a hard and fast rule is laid down as to what constitutes a cerarius, no two students are likely to agree as to how many a certain species may have. A good instance of this is to be found in the species *P. aurilanatus* Mask., which, according to Ferris (1918), possesses five or six pairs of cerarii. According to my way of thinking there is only a single pair of cerarii, and each cerarius contains two spines, a few grouped triangular pores, and two or three accessory setae. Ferris, in his description of the species, states as follows:—". . . cerarii present on the last five or six abdominal segments only, each with two cerarian spines, those in the anteriormost are so small and so widely separated as to be scarcely recognisable . . . remaining cerarii with neither grouped pores nor auxiliary setae." There is very little doubt, however, that if a hard and fast rule is laid down as to what shall constitute a cerarius, this difficulty can be overcome, in which case the following diagnosis of a cerarius may probably meet with some approval: A cerarius to consist of one or more spines surrounded by a definite cluster of small triangular pores, with or without accessory setae; in the absence of definitely clustered pores, then a cerarius to consist of two closely-contiguous spines,

easily recognisable by their shape or size from other derm spines or setae, and situated in the proper position for a cerarius.

Anal lobes.—Owing to the anal lobes being in an undeveloped state, they are very little use for taxonomic purposes. In some species there may be a chitinous area on the dorsal or ventral surface of the rudimentary lobes that is worth recording, but otherwise they appear to be of no value.

Derm pores.—These are usually of two types: small triangular, and large disc. The former are similar to those found in the cerarii, have a trilocular centre, and are generally evenly spaced over the dorsal surface of the body, though they may also be found on the ventral surface. The large disc pores are of the multilocular type, and are usually in transverse segmental bands on the ventral surface of the abdomen only; in some species, however, they may be found on the thoracic portion of the body, and also on the dorsum. As regards the taxonomic value of the derm pores, very little use can be made of the triangular pores except to note their relative numbers, as there is no doubt that they are more plentiful in some species than in others, therefore this fact should be noted. The large multilocular disc pores, on the other hand, are certainly of value, there being usually three to five more or less irregular transverse bands on the abdomen, and in one species, *T. obtectus* Mask., in definite single rows. It will be noted that in some species the ends of these bands reach the margin of the body when spread out flat on the slide, while in other species they do not reach more than half way to the margin. This fact is worth noting, as well as the number of the bands—not always an easy matter to observe. The arrangement of these bands appears to be very constant. There is yet one other type of pore found in several of the New Zealand species that may probably necessitate the erection of a new genus. It is of the small circular or roughly triangular, multilocular type, and replaces the triangular trilocular type in at least four species, three of which are subterranean in habits. This type of pore may or may not be accompanied by large disc pores, and apart from their generic value, are likely to be of little use.

Tubular ducts.—There are two types of these ducts to be met with: large and small. What I call the large ducts have a wide, short tube and opening, and in some exotic species the openings are situated within a chitinous area. They are usually sparse, and appear to be more prevalent at the apical extremity of the body, or one or more may be found in close proximity to each of the cerarii. In the majority of the New Zealand species these large ducts are absent. The small tubular ducts have openings about the size of the triangular pores, and the tube is equally narrow. They are to be found in the majority of the endemic species, and are usually aggregated into clusters near the margin of the abdomen, though occasionally they are found in transverse bands. Owing to their small size they are very often hard to detect, and this detracts very much from their value. Both types of ducts should be looked for, and their presence or absence noted.

Derm setae.—These are usually present, and vary to a certain extent, but unless unusually numerous or large, are of very little taxonomic value. Their presence or absence, however, should always be noted.

Derm spines.—In at least one endemic species these take the place of the derm setae, and thus have a specific value. Their presence should always be noted.

Anal ring.—As far as this is concerned there appears to be no distinguishing fact in the endemic species. Some authors have placed reliance on the length and number of the setae on the anal ring, but these are found to vary considerably in specimens belonging to the same species. There is sometimes a slight difference in the arrangement of the pores composing the anal ring of different species.

Spiracles.—These appear to be of very little importance for the identification of the species.

Larva.

As far as the New Zealand species of the above genera are concerned, there appears to be very few distinguishing characters in the larva. The antenna have fewer joints, usually six, sometimes seven joints, but apart from this, there appears to be very few characters that can be made use of for taxonomic purposes.

Male.

Owing to their scarcity, and also to the great similarity noticed among the males of all species so far found, they appear to have no taxonomic value.

Secretions.

In the past too much reliance has been placed on the nature and disposition of the secretions of the living insects, and one consequence of this has been to increase the list of synonyms. As far as the New Zealand species of the genera are concerned, the secretions may be of two kinds: mealy or cottony, with the exception that *T. alpinus* Mask., which has a felted test similar to that of an *Eriococcus*. Again, too much reliance should not be placed on the colour of the secretion, as I have noticed in one subterranean species, for example, that the colour of the secretion in the young stage is white, while that of the adult is orange. The pencils of secretion—such as are found in *P. longispinus* Targioni—have in the past often been used as a means of identification; but it must be borne in mind that there are several other New Zealand species with very similar pencils, consequently wrong identification is likely to occur.

Colour.

Very little reliance should be placed on the actual colour of the insect. The majority of the endemic species are of a pinkish colour, with a few species green, but this cannot be relied on, as I have found one species in which some of the specimens are green and

others red; moreover, it could not be said that the red specimens were a variety of the green, or vice-versa, as both colours have been found in the brood of a single female. It is therefore evident that the only really safe course to adopt when identifying later collections is to examine the prepared insect.

Systematic Treatment.

As pointed out by Ferris (1918), a doubt exists as to the proper scientific term that should be applied to this group of insects, to which the vernacular term "mealy bugs" is commonly given. After a fairly close study of the endemic species, I have no hesitation in affirming that Ferris was correct in saying that the species in the genera under discussion form a natural group quite distinct from the remainder of the Coccidae, especially from such genera as *Eriococcus* and *Rhizococcus,* both of which are strongly represented in this country; but it is open to question as to whether this group should be placed as a tribe of the subfamily Dactylopinae, as a subfamily, or as a family. As has been pointed out by others, all the members of the group have at least one pair of dorsal ostioles, which are not present in any other members of the family, and in the presence of cerarii, which, with few exceptions, are general within the group; moreover, the tubular ducts are different in shape from those found in the *Eriococcus.* For these reasons, and for the sake of clearness, I will hereafter in this paper refer to the group as a subfamily, Pseudococcinae, thus separating them from such other groups as will come under the Subfamily Eriococcinae.

The extent of the group thus defined is somewhat problematical, and need not concern us here except as regards the New Zealand members of the subfamily; and, judging from the material already collected, these, in all probability, can be included within the following six genera: *Antonina, Phenacoccus, Pseudococcus, Ripersia, Ripersiella,* and *Trionymus.*

Generic Concepts.

As stated previously, the present generic concepts of this group are based almost wholly on the number of joints in the antenna. In the early days of the study of the Coccidae this may have appeared quite satisfactory for this group; but with the large number of species now being found throughout the world, and owing to the great variability that has since been found to take place in the antenna of the species belonging to the group, the uselessness of continuing this method of identification is obvious. It has therefore become necessary that other characters should be found to take the place of the antennal characters in identification, not only for generic, but for specific purposes also, and for this the cerarii will undoubtedly be found the most suitable. As far as the endemic species are concerned, the cerarii appear to be very constant within the species, and as long as a hard and fast rule is laid down as to what will constitute a cerarius, very little trouble should occur as far as the two main genera are concerned. For the further separation of the

genera, the absence of cerarii, and a different type of derm pore in place of the small triangular pore with a trilocular centre, would be of great assistance in separating off several species in this country, as was done by Ferris (1918) in California, when he erected a new genus on the basis of a quinquelocular derm pore. Whether or not the denticle on the claw could be used for the separation of species belonging to the genus *Phenacoccus,* I am unable to say, as this genus is not well represented in this country. However, as no other representative of the other genera in this group, as far as I am aware, possesses a denticle on the claw, this fact should be sufficient for separating off such species from the genus *Pseudococcus.*

Ferris (1918), in his diagnosis of the genus *Pseudococcus,* made the following statement: ". . . with not more than 17 pairs of cerarii and sometimes with not more than five distinct pairs. . . ." This was an oversight, and, I understand, was corrected later.

One peculiarity noticeable among the endemic species is, that while those species usually having a six-jointed antenna have less than ten pairs of cerarii and therefore belong to the genus *Trionymus,* those usually with a seven-jointed antenna have a full complement of from 16 to 18 pairs, and must be placed in the genus *Pseudococcus.*

As regards the separation of the different genera here set out, it will be noticed that I have not entirely abandoned the antennae, owing to the fact that to a certain extent they can be of use for further separation of the genera into groups, while at the same time using other and more important factors for the separation of the genera. I do not claim for the system here adopted that it will prove equally successful in other countries, but it is tentative as regards the species found in this country, and until the group can be examined as a whole.

For the information of those who make use of the key for identification, it should be borne in mind that it is to be used as an aid, and not as a final means of identification. By means of the key, a glance at the antenna will show in which primary division the specimen will be found if already named, and a further examination of the hind legs will at once place it in a certain group of that division; the number of cerarii, and spines in the ultimate cerarius, will show to which species in that particular group the specimen under consideration most nearly resembles, and any further reference required should be restricted to the text of those species. In very few instances will a comparison have to be made with more than one species.

In conclusion, I would like to thank all those who have assisted me in my studies. To Mr E. E. Green I am especially indebted for much advice and many specimens of foreign species. To Messrs Muggeridge and Cottier, of the Government Research Station, I am indebted for many specimens and much information, and also for the loan of any slides in the Maskell Type Collection that I required. I must also acknowledge the great assistance I have received from the Entomological staff of the Cawthron Institute, including the Assistant Director, Dr D. Miller. To these and to many others I tender my most sincere thanks.

Key for the Identification of the Species of the Genus Trionymus Found in New Zealand.

A. Antenna usually of 6 joints.

(a) Pores on Hind Legs Absent:

Cerarii.	Cerarian Spines: abdom.	Frons.	Tubular ducts: Large.	Small.	Chitinized cerarii.	Name.
1	3	–	–	–	–	*montanus* sp. nov.
2	?	–	?	?	–	*fagi* Mask.
3	2	–	P	–	3	*raouliae* sp. nov.
4	2	–	P	–	–	*occultus* Brit.
4	2	–	P	P	1	*assimilis* sp nov.
4	2	–	–	P	1	*dendrobii* sp. nov.
5–6	4	–	P	–	1	*otagoensis* sp. nov.

B. Antenna usually of 8 joints.

(a) Pores on Hind Legs Absent:

1	2	–	–	P	–	*aurilanatus* Mask.
1	2	–	–	–	–	*drimydis* sp. nov.
2	3	–	–	P	–	*obtectus* Mask.
3	2	3–4	–	P	1	*morrisoni* sp. nov.
4	2	–	P	–	1	*oamaruensis* Brit.
4	2	–	–	P	1	*cottieri* sp. nov.
4	6	–	–	P	–	*alpinus* Mask.
4	7	–	–	P	1	*chiltoni* sp. nov.
6	2	–	P	P	–	*insolitus* sp. nov.

(b) Pores on Hind Coxa only:

1	2	–	–	P	–	*dissimilis* sp. nov.
2	2	–	–	P	–	*danthoniae* Morr.
2	2	–	–	P	–	*diminutus* Leon.
3	2	–	–	P	–	*diminutus-cordylinidis* subsp. nov.
4	2	–	–	P	1	*canalis* sp. nov.
4	6	–	–	–	–	*sexaspinus* Brit.
4	11	–	P	–	1	*iceryoides* Mask.
7	2	–	P	P	–	*leucopogi* sp. nov.

(c) Pores on Hind Coxa and Tibia:

3	2	–	P	P	–	*coriariae* sp. nov.
6	2	–	P	P	–	*zealandicus* sp. nov.

(d) Pores on Hind Femora and Tibia:

4	2	–	P	P	–	*mammillariae* Bouche

(e) Pores on Hind Tibia only:

1	2	–	P	P	–	*podocarpi* sp. nov.
5	4	3	–	P	2	*ambiguus* Morr.

Abbreviation—P = present.

Genus Trionymus Berg.

Genotype: *Westwoodia perrissii* Signoret.

Pseudococcinae forms with at least one pair of dorsal ostioles. Antenna of six to nine joints. With not more than ten distinct pairs of cerarii present, each cerarius to consist of one or more spines surrounded by a more or less definite cluster of triangular pores, and with or without accessory setae. In the absence of definitely clustered pores, then a cerarius to consist of at least two closely-contiguous spines easily recognised by their shape and size

from other derm spines or setae, and situated in the proper position for a cerarius. Small triangular pores with trilocular centres present. Large circular disc pores present or absent. Large and small tubular ducts present or absent. Derm setae usually present, but may be replaced by derm spines.

Trionymus montanus sp. nov.

Adult female situated within a small gall formed on the fan-shaped phylloclads of the plant, ovate. Antenna of six joints, last joint longest, formula: 6,3(1,2)(4,5). Rostrum normal, mentum as broad as long. Legs short and thick, tibia slightly longer than tarsus; pores on hind legs absent. With only one distinct pair of cerarii, each with three small spines, a few loosely-clustered triangular pores, without accessory setae. Derm pores of two types: small triangular with trilocular centres, sparse; and a few large disc pores close to anal ring. Large and small tubular ducts not observed. Derm setae not observed. Length about 1·70 mm.; width 1·14 mm.

Hab.—In small gall on *Phyllocladus* sp., Otira, 28/12/15.

Type slides in own collection.

The unusual habitat of this species rather puzzled me at first, but apart from the somewhat shortened legs, and the absence of setae, there is nothing else which would warrant the erection of a new genus, as the antenna and cerarii are quite normal.

Trionymus fagi Maskell.

1890. *Ripersia fagi* Mask., *Trans. N.Z. Inst.*, vol. xxiii, p. 24.

Adult female elongate-ovate. Antenna of six joints, last joint longest, formula: 6,3,1,2,5,4. Rostrum normal, mentum broader than long. Legs rather short and thick, tibia not quite twice length of tarsus; pores on hind coxa only observed. Two definite pairs of cerarii only observed; ultimate pair each with probably five to seven long thin spines and a close cluster of pores; penultimate pair each with four or five somewhat smaller spines and a close cluster of pores. Accessory setae not observed. Derm pores of two types: small triangular very plentiful, and large disc in about four single rows which do not reach the margin of the body. Large tubular ducts not observed; small tubular ducts not observed. Derm setae present, sparse. Length about 1·86 mm.; width about 1·32 mm.

Hab.—On *Nothofagus menziesii*, Reefton.

Type slide in Maskell Collection.

Described from one slide in the Maskell Collection dated 1890. There is also another slide labelled "early second stage," of the same date, but the only fact I was able to make out was that there were six spines on the ultimate cerarius. Both slides are unstained, and many characteristics cannot be fully made out, but there can be no doubt that the species is rightly included in this genus. Apart from the six-jointed antenna, this species does not agree with any other endemic species of which I have knowledge.

Trionymus raouliae sp. nov.

Insects covered with a thin yellow mealy secretion, subterranean. Adult female dark purple, ovate. Antenna of six joints, last joint longest, formula: 6(1,3)2(4,5), all joints with the usual long setae. Rostrum normal, mentum longer than broad. Legs normal, tibia not quite twice length of tarsus; all joints with very long, stout setae; pores on hind legs absent. With three distinct pairs of cerarii, each surrounded by a small chitinized area, that on the ultimate cerarius being the largest: ultimate pair each with two stout spines, four accessory setae, and a loose group of pores; remaining cerarii each with two stout spines, two accessory setae, and a small cluster of pores; the spines on all the cerarii approximately equal in size. Derm pores of two types: small triangular evenly spaced, and large disc in about one irregular band. Large tubular ducts only observed. Derm setae fairly plentiful, rather large. Length about 2·58 mm.; width about 1·77 mm.

Hab.—On Raoulia sp., on riverbed, Maruia Springs, 3/11/35.

Type slides in own collection, No. 262.

This species may very easily be mistaken for *R. globatus* Brit., when mounted, but differs in the number of cerarii and in the absence of pores on the hind coxa. When in the natural state it differs in the colour of the secretion.

Trionymus occultus Brittin.

1914. *Ripersia occultum* Brit., *Trans. N.Z. Inst.*, vol. xlvii, p. 155.

Adult female elongate-ovate, colour dark-purple, covered with a thick yellow mealy secretion. Antenna of six joints, last joint longest, formula: 6,1,3(2,5)4. Rostrum normal, mentum longer than broad. Legs stout, tibia nearly twice length of tarsus, pores on hind legs absent. With four distinct pairs of cerarii, each with two stout spines, two or three accessory setae, and a loose cluster of triangular pores. Derm pores of two types: small triangular evenly spaced, and large disc in several transverse bands on the abdomen. Large tubular ducts only observed. Derm setae present, long and stout, most numerous on frons. Length about 1·53 mm.; width about 0·92 mm.

Hab.—On roots of grass, Oamaru, 14/7/13.

Type slide in own collection, No. 12.

Differs from *T. raouliae* n.sp. in its more elongate form, its smaller size, an additional pair of cerarii, and with smaller spines on all the cerarii anterior to the ultimate pair.

Trionymus assimilis sp. nov

Adult female elongate-ovate, covered with a white mealy secretion. Antenna of six joints, last joint longest, formula: 6(2,3)1,5,4. Rostrum normal, mentum longer than broad. Legs stout, tibia twice length of tarsus, pores on hind legs absent. With four distinct pairs of cerarii, each with two stout spines, about four accessory setae, and a loose cluster of triangular pores; the ultimate pair of cerarii

slightly chitinized. Derm pores of two types: small triangular evenly spaced, and large disc in transverse bands on abdomen. Large tubular ducts present, sparse; small tubular ducts present, sparse. Derm setae present, long and stout. Length about 2·40 mm.; width about 1·45 mm.

Hab.—On *Poa,* Christchurch, 15/6/16.

Type slides in own collection, No. 27.

This species differs from the last-named in its larger size, the differently coloured secretion, in the ultimate pair of cerarii being slightly chitinized, and in the presence of both large and small tubular ducts.

Trionymus dendrobii sp. nov.

Adult female ovate, secretion orange-yellow. Antenna of six joints, last joint longest, formula 6,3,1,2,5,4. Rostrum normal, mentum not observed. Legs long and stout, tibia nearly twice length of tarsus, claw thin and narrow at base, pores on hind legs absent. With four distinct pairs of cerarii: the ultimate pair slightly chitinized, with two stout spines, about four accessory setae, and a loose cluster of pores; remaining cerarii not chitinized, with two similar spines, a small cluster of pores, but without recognisable setae. Derm pores of one type only observed, small triangular, very plentiful. Derm setae present, very plentiful, long and stout. Small tubular ducts only observed. Length about 2·0 mm.; width about 1·50 mm.

Hab.—On roots of *Dendrobium,* under moss, Westport, 11/10/35.

Type slide in own collection, No. 265.

Somewhat resembles *T. raouliae* n.sp., but differs in having an additional pair of cerarii of which only the ultimate pair is chitinized, by the presence of large tubular ducts, and the absence of large disc pores.

Trionymus otagoensis sp. nov.

Adult female ovate, subterranean. Antenna of six joints, last joint longest, formula: 6,3,1,2,5,4. Rostrum normal, mentum longer than broad. Legs stout, rather large, tibia nearly twice length of tarsus; pores on hind legs absent. With five to six definite pairs of cerarii: ultimate pair each with two large and three small spines, about two accessory setae, and a loose cluster of pores; remaning cerarii each with two stout spines and a few grouped triangular pores, but with accessory setae. Ultimate pair of cerarii lightly chitinized. Derm pores of two types: small triangular evenly spaced and large disc in irregular transverse bands at abdomen. Large tubular ducts present; small tubular ducts not observed. Derm spines present, rather numerous, of various sizes. Derm setae present, sparse. Length about 2·52 mm.; width about 2·0 mm.

Hab.—On *Poa,* Oamaru, 3/10/13.

Type slides in own collection, No. 309.

Very close to *T. assimilis,* but differs in having large tubular ducts only, and also in the presence of derm spines.

Trionymus aurilanatus Maskell.

1890. *Dactylopius aurilanatus* Mas., *Trans. N.Z. Inst.*, vol. xxii, p. 151.
1918. *Pseudococcus aurilanatus* (Mas.), Ferris, *Stanford Univ. Ser.* p. 38.

Adult female elongate-ovate, dark-red, covered with a yellow, waxy secretion arranged in tuffs on the dorsum and along the margin. Antenna of eight joints, last joint longest, formula: 8,3,1,7(5,6)4. Rostrum normal, mentum longer than broad. Legs normal, tibia nearly twice length of tarsus, pores on hind legs absent. With only one definite pair of cerarii, each with two narrow spines, three accessory setae, and a few loosely clustered pores. Derm pores of two types: small triangular fairly numerous, and large disc in about six irregular transverse bands at abdomen. Derm setae present, sparse. Derm spines present on dorsum, small, most numerous at cephalic extremity. Large tubular ducts not observed; small tubular ducts present, not numerous, scattered. Length about 2·0 mm.; width about 1·26 mm.

Hab.—On *Araucaria bidwelli,* ex Maskell collection.

Type slide in Maskell Collection.

Very close to *T. drimydis* Mask., from which it can be separated by the presence of derm spines. Ferris (1918) placed this species in the genus *Pseudococcus,* but stated that it was nearer *Erium* or *Trionymus* than *Pseudococcus.* He also mentioned that it had five or six pairs of cerarii, but that the spines in the anteriormost pairs were so widely separated as to be scarcely recognisable.

Trionymus drimydis sp. nov.

Adult female elongate, dark-red. Antenna of eight joints, last joint longest, formula: 8(2,3)1,4,7(5,6). Rostrum normal, mentum slightly longer than broad. Legs normal, stout, tibia two and a-half times length of tarsus; pores on hind legs absent. Only one definite pair of cerarii: each with two stout spines, two accessory setae, and a loose cluster of triangular pores. Derm pores of two types: small triangular evenly spaced, and large disc in irregular transverse bands on abdomen, they appear to be confined to the median area, and do not reach the margin of the body. Large and small tubular ducts not observed. Derm setae present, medium length, and apparently in bands on abdomen. Length about 3·30 mm.; width about 1·80 mm.

Hab.—On *Drimys colorata,* Christchurch, 2/12/16.

Type slide in own collection, No. 104.

As regards the number of cerarii this species resembles *T. aurilanatus* Mask., but differs in the colour and nature of the secretion, and also in the absence of derm spines.

Trionymus obtectus Maskell.

1890. *Dactylopius obtectus* Mask., *Trans. N.Z. Inst.*, vol. xxii, p. 152.

1922. *Pseudococcus obtectus* (Mask.), Myers, *Jour. Sci. and Tech.*, vol. v, No. 4, p. 198.

Adult female concealed beneath the bud-scale of the plant, elongated, almost pyriform in shape, with anal lobes more prominent than is usual in the genus. Antenna of eight joints, last joint longest, formula: 8(1,2)(3,7)6,5,4 and 8(1,2)7(3,6)5,4. Rostrum normal, mentum longer than broad. Legs normal, tibia nearly twice length of tarsus, pores on hind legs not observed. Two distinct pairs of cerarii: ultimate pair each with five somewhat small spines, about three accessory setae and a loose cluster of seven or eight triangular pores; penultimate pair each with two similar spines and a few loosely-clustered pores. The body of the insect narrows towards the abdominal lobes, which are more prominent than is usual in the genus. Derm pores of two types: small triangular, sparse; and large disc in about four transverse rows, disc pores in each row equidistant. Large tubular ducts not observed, small tubular ducts numerous over whole body. Derm setae present, sparse, rather long and fine. Length about 1·11 mm.; width across cephalothoracic portion 0·72 mm.

Hab.—On *Nothofagus fusca,* ex Maskell Collection. On *Nothofagus fusca,* Motueka, in own collection.

Cotype slide in Maskell Collection.

The somewhat pyriform shape with its narrow abdomen and prominent lobes, also the single rows of large disc pores, sufficiently distinguish this species from any other endemic species of the genus. As the Maskell slide was not to be found in the Maskell Collection, through the courtesy of the Government Entomologist I was allowed to mount a slide from the scanty spare material that was discovered, and this slide is now in the collection. Since then I have rediscovered the species on some Beech trees at Motueka.

Trionymus oamaruensis Brittin.

1915. *Pseudococcus oamaruensis* Brit., *Trans. N.Z. Inst.*, vol. xlvii, p. 153.

1893. *Dactylopius arecae* Mask. (in part), *Trans. N.Z. Inst.*, vol. xxv, p. 231.

1922. *Pseudococcus oamaruensis* (Brit.): Myers, *N.Z. Jour. Sci. and Tech.*, p. 198.

Adult female elongate, convex above, flat beneath, colour brick-red, covered with a thin yellow meal. Antenna of eight joints, last joint longest, formula: 8,2,1(3,5)(6,7)4. Rostrum normal, mentum longer than broad. Legs normal, tibia nearly twice length of tarsus, pores on hind legs absent. With four definite pairs of cerarii, the ultimate pair being lightly chitinized, with two somewhat lanceolate spines, about four accessory setae, and a loose cluster of triangular pores; the next two pairs with two spines, and the foremost each with one spine, each cerarius with a few clustered pores. Derm pores of two types: small triangular evenly spaced, and large disc in apparently a single transverse band about anal orifice. Derm

setae present, long, most numerous at cephalic extremity. A few large tubular ducts present; small tubular ducts not observed. Length about 2·52 mm.; width about 1·72 mm.

Female of second instar similar to adult. Antenna of six joints, last joint longest. Rostrum normal, mentum longer than broad. Legs normal, tibia and tarsus about equal. With only three definite pairs of cerarii, each with two spines but without any definitely clustered pores. Derm pores apparently of two types: small triangular widely spaced and what appear to be a few disc pores just above anal ring. Derm setae present, similar to that of adult. Tubular ducts not observed. Length about 2·0 mm.; width about 1·12 mm.

Hab.—Subterranean, on roots of various plants in garden, Oamaru.

Type slide in own collection, No. 11.

This species is present in the Maskell Collection under the name *Dactylopius arecae.* There are four slides under this name in the collection, three of which (one of adult female dated 1892; one preadult female 1892; one portion of female 1893) undoubtedly belong to this species. One other slide under the name of *Dactylopius arecae* dated 1893 shows the anterior half of the body, and, as there are a number of cerarii showing, it is obvious that the insect belong to the genus *Pseudococcus,* with a complete series of cerarii, moreover, the small triangular pores are very numerous on this specimen, whereas in *T. oamaruensis* they are widely spaced. Maskell first reported *D. arecae* Mask. in 1889 on the roots of Nikau palm at Wellington, it is therefore evident that none of the slides mentioned here could have been types. He afterwards reported the species as on the roots of various cultivated plants at Ashburton in 1893, and it is probable that the slides now in the collection were taken from the later finding. As Maskell's original description is quite useless for the purpose of identification, and seeing that there are now several species with the same coloured secretion, I have thought best to retain my original name for the three slides above mentioned, leaving the fourth slide provisionally under the name *P. arecae* Mask. until this species is rediscovered in its original habitat.

[Note.—Disc pores are not usually found in second instar. The supposed second instar may prove to be a distinct species.]

Trionymus morrisoni sp. nov.

Adult female elongate, green, covered with a thin white meal. Antenna of eight joints, last joint longest, formula: 8(1,3)2(5,7)6,4, all joints with very long setae. Rostrum normal, mentum longer than broad. Legs normal, stout, tibia more than twice length of tarsus, pores on hind legs not observed. With three distinct pairs of cerarii, two of which are on frons between antennae: abdominal pair each with two long stout spines, about four accessory setae, and a large loose cluster of pores; cerarii on frons with three to four small spines and a few loosely clustered pores without accessory setae. The abdominal pair of cerarii appear to be lightly chitinized. Derm

pores of two types: small triangular most plentiful at either extremity and large disc in about four single rows on abdomen, the ends of which do not reach the margin of the body. Large tubular ducts not observed, small tubular ducts present, sparse. Derm setae present. Length about 3·20 mm.; width about 1·52 mm.

Hab.—On *Alectryon excelsum,* Motueka, 9/11/37.

Type slides in own collection.

A rather unusual species, and with the exception of one other species, *T. ambiguus* Morr., the only member of the genus in New Zealand with cerarii on the cephalic portion of the body. It differs from the latter species in having fewer cerarii, in having only one pair on the abdomen, while there are two pairs between the antennae; it also differs from *T. ambiguus* in being of a green colour in its tremity, and large disc in about four single rows on abdomen, the natural state. I have much pleasure in naming this species after Mr Harold Morrison of the Biological Department, U.S.A., from whom I have received much assistance.

Trionymus cottieri sp. nov.

Adult female elongate-ovate, very active, colour dirty white, covered with a thick white cottony secretion in which the insects in the early stages appear to form tunnels, and from which they emerge soon after the leaf has been picked. The secretion is always deposited on the under surface of the leaf. Antenna of eight joints, last joint longest, formula: 8(1,2,5,7)3(4,6). Rostrum normal, mentum longer than broad. Legs normal, tibia about twice length of tarsus, claw with a thin, narrow base; pores on hind legs not observed. With four definite pairs of cerarii: ultimate pair each with two long narrow spines, about three accessory setae, and a loose cluster of pores; the remaining cerarii each with two thin spines and two or three pores, but without accessory setae. Derm pores of two types: small triangular, sparse, and large disc, very numerous and scattered over whole body. Large tubular ducts not observed; small tubular ducts numerous, and found scattered over whole body. Derm setae present: sparse on abdomen, long and plentiful on frons. Length about 1·55 mm.; width about 0·85 mm.

Hab.—On Nothofagus Menziesii, Wanganui, Motueka, Maruia.

Type slide in own collection.

I have much pleasure in naming this species after Mr W. Cottier of the Plant Research Station, from whom I first received living specimens. I had first noticed the secretion of this species on *Nothofagus* on the Takaka Hills, and with a weak magnifying glass had been able to see that there were insects underneath the secretion. However, when examining the secretion again with the intention of preparing specimens for mounting, I could not find any. As regards the large number of disc pores scattered all over the body, this species somewhat resembles *T. diminutus* Leon., but differs in not having pores on the hind legs.

Trionymus alpinus Maskell.

1884. *Dactylopius alpinus* Mask., *Trans. N.Z. Inst.*, vol. xvi, p. 138.

Adult female enclosed within a closely-felted sac similar to that of an *Eriococcus,* old dried examples dark-red, almost black, very convex on dorsum, flat beneath, the insect when mounted on a slide appearing almost circular. Antenna of eight joints, last joint longest, formula: 8(1,2)(3,6,7)5,4. Rostrum normal, mentum broader than long. Legs normal, tibia twice length of tarsus, pores on hind legs not observed. With four definite pairs of cerarii, the two posterior pairs being slightly chitinized: ultimate pair each with three large and three small spines, two or three accessory setae, and a loose cluster of triangular pores; the penultimate pair each with two large and three small spines and a loose cluster of pores, but without accessory setae; the remaining two pairs of cerarii each with two large spines and a few clustered pores. The last three abdominal segments each with a transverse row of large stout spines similar to those on the cerarii. Derm pores of two types: small triangular evenly spaced, and large disc in about four transverse bands on abdomen. Large tubular ducts not observed; small tubular ducts present. Length about 3·06 mm.; width about 3·04 mm.

Hab.—On *Veronica* sp., ex Maskell Collection.

Described from two co-type slides in the Maskell Collection.

The closely-felted sac of the adult female, together with the transverse rows of stout spines, clearly distinguishes this species from any other endemic species.

Trionymus chiltoni sp. nov.

Adult female elongate-ovate, dark-red. Antenna of eight joints, last joint longest, formula: 8,2,1(3,7)(5,6)4. Rostrum normal, mentum as broad as long. Legs normal, tibia one-third longer than tarsus; pores on hind legs not observed. With four definite pairs of cerarii: ultimate pair each with three very large and four small spines and a few loosely-clustered pores; remaining cerarii each with two large and one smaller spine and a few clustered pores; no accessory setae observed. Derm pores of two types: small triangular widely spaced, and large disc in about six short double transverse rows which do not reach the margin of the body. A few large tubular ducts observed at cephalic extremity; small tubular ducts numerous over whole body. Derm spines present; there being three transverse segmental rows at abdomen, with numerous small spines scattered on remainder of body. Derm setae not observed. Length about 2·60 mm.; width about 1·82 mm.

Hab.—On *Leucopogon* sp., Cass, Canterbury.

Type slides in own collection.

I have much pleasure in naming this species after its discoverer, the late Dr Charles Chilton, who was kind enough to send me the specimens discovered during one of his trips to the Cass. It is a very distinct species, and in some respects resembles *T. alpinus* Mask.,

which was also discovered in the same district. It differs from that species in the number of spines in the cerarii, by the absence of derm setae, and by the presence of large tubular ducts at the cephalic extremity.

Trionymus insolitus sp. nov.

Adult female elongate-ovate, dark-red, covered with a thin white meal. Antenna of eight joints, last joint longest, formula: 8(1,2,3)(5,6,7)4. Rostrum normal, mentum longer than broad. Legs normal, tibia two and a-half times length of tarsus; pores on hind legs not observed. With six definite pairs of cerarii: the ultimate pair slightly chitinized, and each with two stout spines, about seven accessory setae, and a loose cluster of triangular pores; the remaining cerarii each with two stout spines and a few clustered pores, without accessory setae. Derm pores of two types: small triangular, very plentiful, and larges disc in about five transverse segmental bands, the ends of which do not reach the margin of the body. Large tubular ducts present, there being one opposite each of the cerarii, small tubular ducts present on abdomen near margin. Derm setae present in various sizes over whole body. Length about 2·30 mm.; width about 1·12 mm.

Hab.—On unknown plant, Maruia Hot Springs.

Type slide in own collection, No. 258.

A very distinct species that can hardly be mistaken for any other endemic species.

Trionymus dissimilis sp. nov.

Adult female very elongate, apparently naked, colour light green, turns red in boiling caustic potash. Antenna of eight joints, last joint longest, formula: 8,1,2(5,7)(3,6)4. Rostrum normal, mentum slightly broader than long. Legs normal, stout, tibia twice length of tarsus; pores on hind coxa only. With one definite pair of cerarii, each with two stout spines and a few loosely-clustered pores, but without any recognisable accessory setae. Derm pores of two types: small triangular evenly spaced, and large disc in about four narrow transverse segmental bands reaching the margin of the body. Large tubular ducts not observed; small tubular ducts present. Derm setae present, short and fine on dorsum, longer on ventral surface. Length about 5·62 mm.; width about 2·0 mm.

Hab.—On dead leaves on ground, Oamaru; on *Coprosma* sp., Riwaka, Nelson.

Type slides in own collection, No. 10.

In colour this species greatly resembles *P. glaucus* Mask., for which I at first mistook it until I had examined the Maskell types; it differs, however, in having only a single pair of cerarii, each with two spines, and also in the presence of pores on the hind coxa.

Trionymus danthoniae Morrison.

1925. *Trionymus danthoniae* Morr., *Jour. Agric. Res.*, vol. xxxi, No. 5, Sept., p. 494.

1884. *Dactylopius calceolariae* Mask. (in part), *Trans. N.Z. Inst.*, vol. xvi, p. 100.

Adult female with antenna of eight joints, second joint longest, formula: 2,8,1,5,(3,4)7,6. Rostrum normal, mentum as broad as long. Legs normal, stout, tibia twice length of tarsus; with a large group of pores on hind coxa. With two definite pairs of cerarii, each with two stout spines, about four accessory setae, and a few loosely-clustered pores. Derm pores of two types: small triangular, very plentiful, and large disc in about three transverse band on abdomen with others scattered over body up to a level with the rostrum. Large tubular ducts not observed; small tubular ducts present, most noticeable at margin of body. Derm setae present, most numerous at cephalic extremity. Length about 5·64 mm.; width about 2·40 mm.

Hab.—On *Danthonia* sp., Stewart Island.

Type slide in Maskell Collection.

Described from one slide in the Maskell Collection labelled *Dactylopius calceolariae,* dated September, 1880.

Although this species was described by Morrison from two specimens in the Maskell Collection, it is very doubtful if it is sufficiently distinct from *T. diminutus* Leon. to constitute a new species. From discoveries that have been made during the last few years, it is now very evident that there are several varieties of *T. diminutus,* one of which is found on *Cordyline,* and another on the common rush. In all the varieties the large disc pores are found scattered over the body, although to a slightly different extent according to the plants on which the insects are found. In each case the small triangular pores are numerous, but also varying slightly according to the plant habitat; and in each instance the mentum is as broad as long. Practically the only distinctive point in *T. danthoniae* is found in the second joint of the antenna, which is longer than the eighth joint.

Trionymus diminutus Leonardi.

1884. *Dactylopius calceolariae* Mask. (in part), *Trans. N.Z. Inst.*, vol. xvi, p. 138.

1925. *Trionymus diminutus* (Leon.) Morr., *Jour. Agric. Res.*, vol. xxxi, No. 5, p. 495.

Adult female elongate-ovate, pink, rather flat, covered with a thin white mealy secretion. Antenna of eight joints, last joint longest, formula: 8,2,1(3,5)(4,7)6. Rostrum normal, mentum as broad as long. Legs normal, stout, tibia more than twice length of tarsus; large group of pores on hind coxa. With two definite pairs of cerarii: ultimate pair each with two stout spines, about four accessory setae, and some very loosely clustered pores; penultimate pair each with two similar spines and a few loosely clustered pores. Derm pores of two types: small triangular, very numerous; and large disc also very numerous and found scattered all over the

body, there being some found between the antennae and on both dorsal and ventral surfaces. Large tubular ducts apparently absent; small tubular ducts present. Derm setae present, of two sizes, most numerous at cephalic extremity. Length about 4·90 mm.; width about 2·25 mm.

Hab.—On *Phormium tenax,* Oamaru, Christchurch, Nelson.

There are at least two other forms of this species, one of which is found on *Cordyline australis,* and differs from that found on *Phormium* in always possessing three pairs of cerarii; it is also, on the average, slightly smaller than those found on *Phormium,* and the large disc pores do not seem to be quite so plentiful, but are still found between the antennae. Although the average size on *Cordyline* is smaller, the antennae average longer. These differences justify systematic recognition, so the name *Trionymus diminutus cordylinidis* subsp., nov. is proposed.

The variety found on rushes is the smallest, averaging about half that found on *Phormium,* and the antennae are equally short. There are only two pairs of cerarii, exactly similar to those of the variety found on *Phormium.* The large disc pores are more numerous than on either of the other two varieties, but are not to be found above the level of the rostrum, and in this last fact it resembles *T. danthoniae* Morr., although the adult female averages smaller than that species. In all these varieties there is a large group of pores on the hind coxa, and the mentum is as broad as long.

Trionymus canalis sp. nov.

Adult female short ovate, dark-red, turning purple on maceration in caustic potash. Antenna variable, of eight joints, last joint longest, formula: 8,2,3(1,5)7,4,6. Rostrum normal, mentum longer than broad. Legs normal, stout, tibia two and a-half times length of tarsus; pores on hind coxa only observed. With four definite pairs of cerarii: ultimate pair lightly chitinized, and each with two stout spines, a large group of triangular pores and several accessory setae; remaining cerarii each with two small spines and a small group of pores without accessory setae. Derm pores of two types: small triangular, numerous, and large disc very numerous over whole body. Large tubular ducts not observed; small tubular ducts numerous. Derm setae present, long and fine. Length about 3·40 mm.; width about 2·15 mm.

Hab.—On *Discaria,* under moss, in tunnels made by ants, Mauria Hot Springs.

Type slides in own collection, No. 264.

Very close to *T. insolitus* n.sp., but differs in having fewer cerarii, in the smaller cerarian spines, in the large number of disc pores, and in the presence of pores on the hind coxa. From *T. diminutus* and varieties, it differs in having the mentum longer than broad, and in the larger number of cerarii.

Trionymus sexaspinus Brittin.

1915. *Pseudococcus sexaspinus* Brit., *Trans. N.Z. Inst.*, vol. xlvii, p. 154.

Adult female elongate-ovate, pale pink, covered with a white cottony secretion, subterranean. Antenna of eight joints, last joint longest, formula: 8,1,2(5,7)6(3,4). Rostrum normal, mentum as broad as long. Legs normal, stout, tibia twice length of tarsus; pores on hind coxa only observed. With four definite pairs of cerarii: ultimate pair each with six stout spines, about three accessory setae, and a loose cluster of pores; penultimate pair each with two—sometimes three—stout spines and one or two pores, but no recognisable accessory setae; the remaining two pairs each with a single stout spine, but no recognisable setae or clustered pores. Derm pores of two types: small triangular or subtriangular, evenly spaced, and large disc in about five broad bands on abdomen, and also with a few scattered on frons. Large tubular ducts not observed; small tubular ducts present. Derm setae present, long and fine. Length about 3·50 mm.; width about 2·20 mm.

Hab.—On roots of sedge, Reefton, N.Z.

Type slides in own collection, No. 35.

A very distinct species as far as the number of spines in the cerarii are concerned. I have, in this species, somewhat departed from my rule as regards the cerarii, inasmuch as I have reported a single spine without grouped pores as a cerarius. My reason for this is that the spine is very large—in fact as large as any found in the ultimate cerarius, and each spine is in the proper place for a cerarius.

Trionymus iceryoides Maskell.

1892. *Dactylopius iceryoides* Mask., *Trans. N.Z., Inst.*, vol. xxiv, p. 33.

1922. *Pseudococcus iceryoides* (Mask.): Myers, *N.Z. Jour. Sci. and Tech.*, vol. v, No. 4, p. 198.

Antenna of eight joints, last joint longest, formula: 8,1,2(3,7)6,5,4. Rostrum normal, mentum slightly longer than broad. Legs rather small and thick, tibia about one and a-half times length of tarsus; hind coxa with a large group of pores. With four definite pairs of cerarii: ultimate pair on a slightly chitinized oval plate, each with three large and about eight small spines, but without any definite clustered pores or accessory setae; the remaining three pairs of cerarii each with two spines without setae or clustered pores. Derm pores of two types: small triangular very numerous, in bands at abdomen, and continued along margin of body, and large disc in about five transverse bands on abdomen. Large tubular ducts present; small tubular ducts not observed. Derm setae present at both extremities, long and fine. Scattered derm spines present. Length about 4·0 mm.; width about 3·0 mm.

Hab.—On *Nothofagus fusca,* Reefton.

Type slides in Maskell Collection.

Preadult female very similar to adult. Antenna of seven joints, formula: 7,1(2,3,4,6)5. Rostrum and mentum normal. Legs short and thick, tibia and tarsus about equal. With four pairs of cerarii exactly similar to those of adult. Derm pores of one type only observed, small triangular. Derm spines present, sparse.

Decribed from one slide of adult female in the Maskell Collection dated 1891, and one slide of preadult female dated 1891, and compared with slides in own collection, No. 44.

Trionymus leucopogi sp. nov.

Adult female elongate-ovate, covered with a fairly thick white secretion. Antenna of eight joints, last joint longest, formula: 8,1,2,3(4,7)5,6. Rostrum normal, mentum longer than broad. Legs normal, stout, tibia more than twice length of tarsus; pores on hind coxa only observed. About seven definite pairs of cerarii: ultimate pair each with two long narrow spines, about three accessory setae, and a loose cluster of triangular pores; remaining cerarii each with two close-set fine spines and a few pores, but without accessory setae. Derm pores of two types: small triangular, evenly spaced, and large disc in about five transverse segmental rows on abdomen. Large tubular ducts present, small tubular ducts present, very numerous on abdomen, being in broad transverse segmental bands. Derm setae present, of various sizes. Length about 2·30 mm.; width about 1·24 mm.

Hab.—*Leucopogon fasciculata,* East Coast, Waihi.

Type slides in own collection, No, 246.

A very distinct species and not easily mistaken for any other endemic species.

Trionymus coriariae sp. nov.

Adult female elongate-ovate when mounted, colour and secretion not known. Antenna of eight joints, last joint longest, formula: 8,2(1,3)(5,7)(4,6). In all specimens examined the antenna remained very constant. Rostrum normal, mentum nearly twice as long as broad. Legs normal, stout, tibia nearly three times length of tarsus; pores on hind coxa and tibia observed—the group of pores on the coxa is very large, covering nearly the whole joint. With three definite pairs of cerarii: ultimate pair each with three long stout spines, about four accessory setae, and a loose cluster of pores; penultimate pair each with two small spines and about nine triangular pores, but without accessory setae; the remaining pair with two very long thin spines and about seven triangular pores. Derm pores of two types: small triangular, evenly spaced, and large disc in broad transverse bands on abdomen. A few large tubular ducts present; small tubular ducts present in transverse bands on abdomen. Derm setae present, sparse. Length about 3·72 mm.; width about 2·0 mm.

Hab.—On roots of *Coriaria* sp., Aramoho, N.Z.

Type slides in possession or Dr D: Miller.

Described from four mounted specimens in the collection of Dr D. Miller. It is apparently closely related to *T. zealandicus* n.sp., from which it can be separated by the much larger group of pores on the hind coxa, the number and nature of the cerarii, and the difference in habitat (subterranean).

Trionymus zealandicus sp. nov.

Adult female short ovate, very convex on dorsum. Antenna of eight joints, last joint longest, formula: 8,3,2,1,5(4,7)6. Rostrum normal, mentum nearly twice as long as broad. Legs normal, stout, tibia more than twice length of tarsus; pores on hind coxa and tibia observed. With six definite pairs of cerarii: ultimate pair each with two large stout spines, about six accessory setae, and a large loose cluster of pores; remaining cerarii each with two small spines and a small cluster of pores, but without accessory setae. Derm pores of two types: small triangular, evenly spaced; and large disc, very numerous at abdominal extremity, with a few more found scattered over the ventral surface as far as the antennae. Large tubular ducts present, sparse; small tubular ducts present, numerous, in transverse bands at abdomen. Derm setae present, long and fine. Length about 3·70 mm.; width about 2·40 mm.

Hab.—On unknown plant, Otira, N.Z. On *Podocarpus ferruginea,* Ngatea, N.Z.

Type slides in own collection, No. 99.

Differs from *T. coriariae* n.sp. in the larger number of cerarii, in the more numerous large disc pores, and in the smaller group of pores on the hind coxa.

Trionymus mammillariae Bouchè.

Adult female elongate-ovate, colour pink, covered with a thin white secretion. Antenna of eight joints, last joint longest, formula: 8,1(2,3)(4,5,7)6. Rostrum normal, mentum longer than broad. Legs normal, stout, tibia nearly two and a-half times length of tarsus; with a large group of pores on hind coxa and a small compact group of pores on hind tibia about two-thirds down. With four definite pairs of cerarii: ultimate pair each with two long narrow spines, three accessory setae, and a loose cluster of pores; remaining cerarii each with two small narrow spines and about six clustered pores, but without accessory setae. Derm pores of two types: small triangular, evenly spaced, and large disc in about five irregular transverse rows on abdomen. Large tubular ducts present; small tubular ducts present, very numerous, in bands on ventral surface of abdomen. Derm setae present, long and fine. Length about 2·25 mm.; width about 1·30 mm.

Hab.—On cactus, Nelson.

I have been unable to get the synonmy of this species, and had to depend on Green's somewhat meagre description—afterwards supplemented by correspondence—for its identification. Green mentions that Bouchè wrote the specific name *mamillariae* with only

two " m's," although the correct name of the host is *Mammillaria.* This species is easily recognised by the large group of pores on the hind coxa and the very small compact group on the hind tibia, which latter group is quite unlike that of any other species.

Trionymus podocarpi sp. nov.

Adult female elongate-ovate, dark-red. Antenna of eight joints, last joint longest, formula: 8,3,2,1(5,7)4,6. Rostrum normal, mentum as broad as long. Legs normal, stout, tibia twice length of tarsus; micropores on hind tibia only observed. With only one definite pair of cerarii, each with two long narrow spines and a few loosely-clustered pores. Large tubular ducts present, about five on each side of body, in old specimens they appear to open within a slightly chitinized area; small tubular ducts present, fairly numerous at abdomen. Derm pores of two types: small triangular, widely spaced, and large disc in about three narrow transverse bands at abdomen. Derm setae present, long and fine, in bands at abdomen. Length about 2·20 mm.; width about 1·34 mm.

Hab.—On *Podocarpus dacridioides,* Motueka, Palmerston North.

Type slides in own collection, No. 135.

A very distinct species, and the only one so far reported from the above-mentioned habitat. The elongated ovisac is very prominent, and sometimes averages about half an inch in length. The insect is usually hard to find, owing to the habit of dropping off as soon as the ovisac is completed. Mr E. E. Green (1929) first mentioned this species when reporting on some Coccidae collected by Dr. J. G. Myers, but was not able to name it as the specimens were too much damaged for description.

Trionymus ambiguus Morrison.

1925. *Pseudococcus ambiguus* Morr., *Jour. Agric. Res.,* vol. xxxi, No. 5 (Sept.).

Adult female elongate-ovate, covered with a thin grey meal, with four long pencils of secretion at abdominal extremity and two short ones on frons between antennae. Antenna of eight joints, last joint longest, formula: 8(2,3)1(4,5)6,7 or 8(2,3)4(1,5)6,7. Rostrum normal, mentum longer than broad. Legs normal, stout, tibia about three times length of tarsus; an elongated group of micropores on hind tibia observed. With five definite pairs of cerarii, four of which are on abdomen and one on frons between antennae: ultimate pair each with four stout spines, a very close circular cluster of pores, and about two accessory setae; penultimate pair each with three stout and three to five smaller spines, a very close circular cluster of pores, and about two accessory setae; remaining cerarii on abdomen with two or three small spines and a few clustered pores; cerarii on frons each with three small spines and a large close cluster of pores. Derm pores of two types: small triangular, evenly spaced, and large disc in about four transverse segmental bands on abdomen. Large tubular ducts not observed; small tubular ducts present in about four transverse segmental bands on abdomen, the bands widening as

they approach the margin of the body. Derm setae present, short and fine at abdomen, long and stout at cephalic extremity. Length about 3·94 mm.; width about 1·92 mm.

Hab.—On *Coprosma* sp., *Fagus* sp., *Leptospermum* sp., Motueka.

A very distinct though variable species that cannot be mistaken when prepared for microscopical examination for any other endemic species, owing to the very distinctive cerarii. Morrison first came across this species when examining the Maskell Collecton, where it was included as a pinned specimen among the unmounted material of *Pseudococcus calceolariae.*

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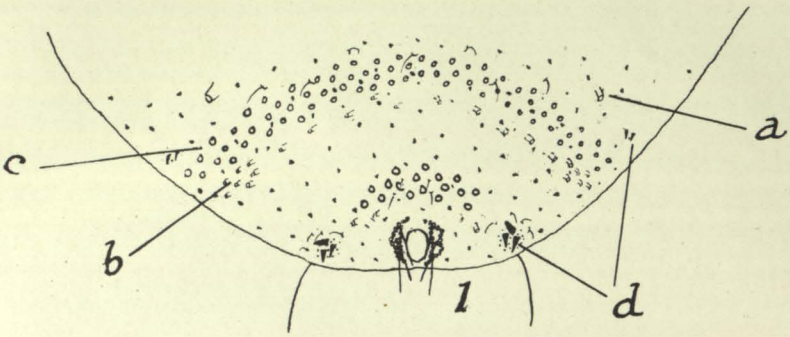

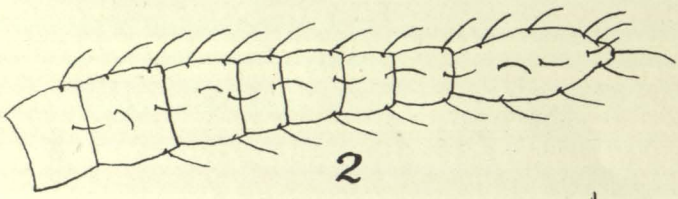

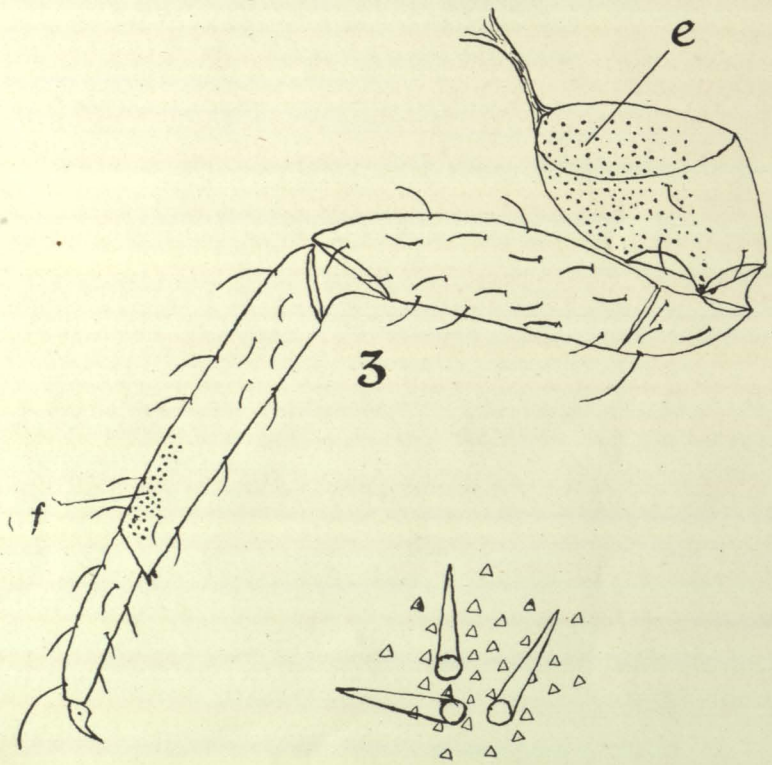

FIG. 1. Margin of pygidium of *Trionymus coriariae*. (a) Large tubular duct. (b) Small tubular ducts. (c) Large disc pores. (d) Cerarii.

FIG. 2. Antenna.

FIG. 3. Hind leg with (e) pores on coxa; (f) pores on tibia.

FIG. 4. Ultimate cerarius showing details.

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