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Reassessment of *Ctenopseustis* Meyrick and *Planotortrix* Dugdale with descriptions of two new genera (Lepidoptera: Tortricidae)

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Abstract Current pheromonal, behavioural, and adult morphological studies force a reassessment of the genera *Ctenopseustis* Meyrick and *Planotortrix* Dugdale, which include endemic primary orchard leafroller horticultural pests. *Ctenopseustis* includes five species: *obliquana* (Walker) restricted [with *spurcatana* (Walker) *transtrigana* (Walker), *turbulentana* (Walker), *ropeana* (Felder & Rogenhofer), *charactana* (Meyrick) as synonyms]; *herana* (Felder & Rogenhofer), [with *inana* (Butler) as synonym]; *servana* (Walker) (synonymy as in Green & Dugdale 1982); *fraterna* Philpott; and *filicis* new species. The existence of a North Island entity morphologically similar but pheromonally distinct from sympatric *obliquana*, and morphologically distinct but pheromonally indistinguishable from allopatric *herana* is reported. *Planotortrix* is restricted to *excessana* (Walker) [with synonym *biguttana* Walker], *octo* new species, *octoides* new species, *avicenniae* new species, *puffini* new species, *flammea* (Salmon), and *notophaea* (Turner).

Two new genera are described: *Apoctena*, new genus for *conditana* Walker, *n. comb*, type species; *flavescens* Butler *n. comb; clarkei* Philpott *n. comb; orthocopa* Meyrick *n. comb*; *orthropis* Meyrick *n. comb; persecta* Meyrick *n. comb; spatiosa* Philpott *n. comb; syntona* Meyrick *n. comb; tigris* Philpott *n. comb*; and *Leucotenes* new genus, for the species *coprosmae* Dugdale (with *Tortrix charactana* auct., nec Meyrick, 1881, as synonym) *n. comb.*

Keywords Lepidoptera; Tortricidae; Archipini; *Ctenopseustis*; *Planotortrix*; *Apoctena* n.g.; *Leucotenes* n.g.; pheromones; systematics

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INTRODUCTION

Archipini in New Zealand (and Australia) are divisible into two distinct groups differing in male genital valval structure (Dugdale 1966b, 1971; Horak 1984). One group has the valva more or less triangular and lacking a costa, with the inner face "plicate" (Horak 1984), whereas the other group has the valva more or less oblong and with a strong costa, with the inner face not plicate or folded (a "simple" valva, Horak 1984). In New Zealand, the first group – the "true Archipini" – is represented by less than 20 species in 5 genera, including the adventive *Epiphyas postvittana* (Walker) from Tasmania and south-east Australia. The second group is dominant (Dugdale 1966b, 1988) and includes the 4 genera discussed in this paper, as well as 17 other genera, including *Catamacta* Meyrick, *Ecclitica* Meyrick, *Epichorista* auct., *Gelophaula* Meyrick, *Harmologa* Meyrick, and *Pyrgotis* Meyrick, and over 130 species.

Before 1984, the New Zealand orchard-infesting *Ctenopseustis* species or brown-headed leafroller (BHLR), and *Planotortrix* species or green-headed leafroller (GHLR) (both Lepidoptera: Tortricidae) were thought to be two species only, *Ctenopseustis obliquana* (Walker) sensu Green & Dugdale 1984, and *Planotortrix excessana* (Walker), sensu Dugdale 1966a. These endemic leafrollers were classed as primary orchard pests (Wearing et al. 1990 in press) affecting horticultural and, to a lesser extent, silvicultural management in New Zealand.

Intensive studies on the female-produced sex pheromones of these species from many localities, since 1984 (Galbreath et al. 1985; Young et al. 1985; Foster et al. 1986; Foster & Dugdale 1988; Foster et al. 1989) have shown that the entities BHLR and GHLR each include sibling or cryptic species. The studies were extended whenever opportunity arose to include other species morphologically classed as either *Planotortrix* or *Ctenopseustis*, and to include populations from the Chathams Islands, some 800 km east of the South Island. Isozyme analyses and morphological comparisons gave results congruent with the pheromone results (C. White, pers. comm.).

Besides the economic importance of the BHLR and GHLR species complexes, the two genera are of interest: (1) because their sex pheromones are unusual in Tortricinae, being probably derived via Δ9 or Δ10 desaturation (as summarised by Foster & Dugdale 1988), rather than via Δ11 desaturation as found in the majority of Tortricinae examined to date (Roelofs & Brown 1982; Arn et al. 1986); (2) their morphologies are "rich in plesiomorphies" (Horak 1984: 20); and (3) as became evident in the course of the studies since 1983, we were accumulating behavioural, biochemical, and morphological data on what appears to be the complete extant range of two presumed monophyletic groups (i.e., groups morphologically definable on postulated synapomorphies). Such studies based on monophyletic groups of species rather than on single species from diverse groups may be more useful for comparative evolutionary studies.

The purpose of this paper is to formalise nomenclature, assign synonyms, and give taxonomic diagnoses of the entities now recognised as a result of the studies carried out by members of Entomology Division, DSIR (now DSIR Plant Protection) on the *Ctenopseustis* and *Planotortrix* complex since 1983.

The genera *Ctenopseustis* and *Planotortrix* are here redefined, and two new genera are proposed: *Apoctena nov.*, and *Leucotenes nov.* The four genera together form a distinctive morphological and colour pattern set within the New Zealand tribe Archipini (sensu Horak 1984: 8–9), subfamily Tortricinae.

The necessity to define the use of the term "species" in a study (as stressed by Mishler & Donoghue 1982; Ackery & Vane-Wright 1984) is recognised here. The characters used for elucidating and describing the species recognised in this study are in two groups:

(a) A communication system that allows sexual commnication between the members of a population and which is not recognised in full by members of other populations.
(b) Unique patterns of morphological or genetic markers and frequencies of genetic characters.

In Tortricidae, the female-produced sex pheromone elicits relatively long-distance activation of the male; in response, the male flies upwind to the pheromone source, i.e., the female (Roelofs & Carde 1974). In this way the two sexes are brought together and copulation generally results. Characterisation of the sex pheromone can therefore be a valuable aid in the differentiation and classification of species where no morphological differences are discernible in structures used in mating behaviour (see, for example, Roelofs & Carde 1974: 97).

States of the first group of characters form an important determinant of mating fidelity between members of a presumed species, and would exclude interspecific matings in the wild. For the second group, the states are the results of such fidelity. Morphological characters were found to be consistent in laboratory-reared pure lines, in specimens collected in sticky traps baited with relevant compounds, and in field-collected specimens accumulated over the last 136 years.

In the following descriptions, the area code of Crosby et al. (1976), e.g., Moutere Hills (NN) is used here. Sex pheromone components acronyms are as follows: Z5–14:OAc for (Z)–5–tetradecenyl acetate; Z7–14:OAc for (Z)–7–tetradecenyl acetate; Z8–14:OAc for (Z)–8–tetradecenyl acetate; Z10–16:OAc for (Z)–10–hexadecenyl acetate; and Z11–14–OAc for (Z)–11–tetradecenyl acetate.

The study is based on approximately 3900 specimens in NZAC.

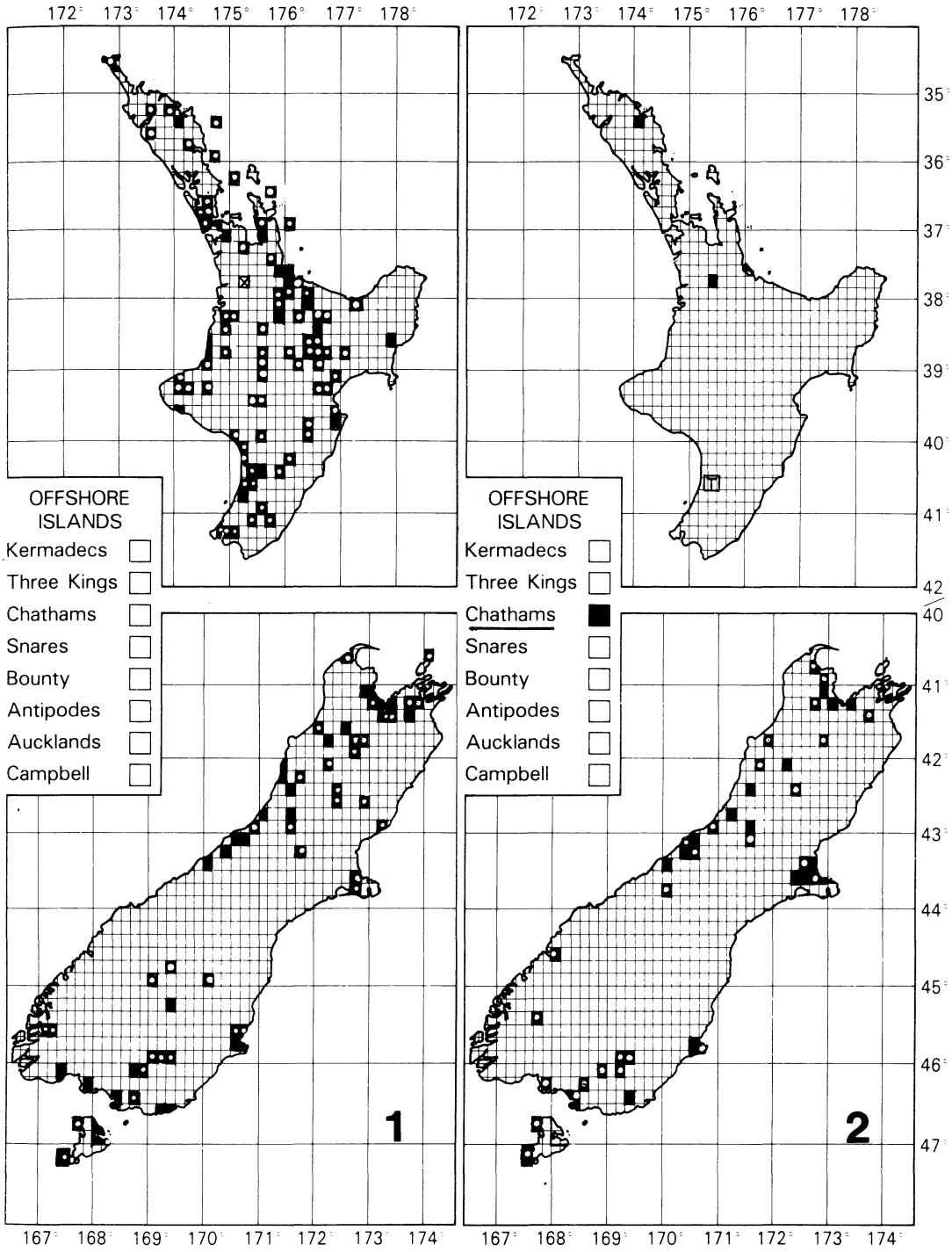
DESCRIPTIONS

The *Ctenopseustis – Planotortrix* subgroup of genera.

This subgroup is distinguishable from most other members of the "oblong-valva" group in Archipini by the following character states in combination:

(1) labial palpi porrect and beak-like, sometimes very long (range: 2.0–4.0× horizontal diameter of the compound eye). There are two exceptions: *Apoctena orthropis* Meyrick, and *A. pictoriana* F & R.
(2) thorax and tegulae smooth-scaled (i.e., not crested, nor with erect scales)

Fig. 1–8 (this and following 3 pages) Distribution maps (solid symbol – records based on female sex pheromone analysis and/or capture of males in sex pheromone baited sticky traps; hollow symbol record based on adult morphology only); **1** *Ctenopseustis obliquana* (Walker) Note: North Island morphological records may include *Ct.* "Type II North I.";**2** *Ct. herana* (Felder & Rogenhofer), South Island; and *Ct.* "Type II North I.", North Island based on pheromone analyses, (solid symbols), and male trapping (T); **3** *Ct. fraterna* Philpott, North Island; *Ct. filicis* n. sp., South and Stewart Islands; **4** *Ct. servana* (Walker); **5** *Planotortrix excessana* (Walker); **6** *P. octo* n. sp.; **7** *P. avicenniae* n. sp., North Island; *P. puffini* n. sp., South and Stewart Islands; **8** *P. flammea* (Salmon).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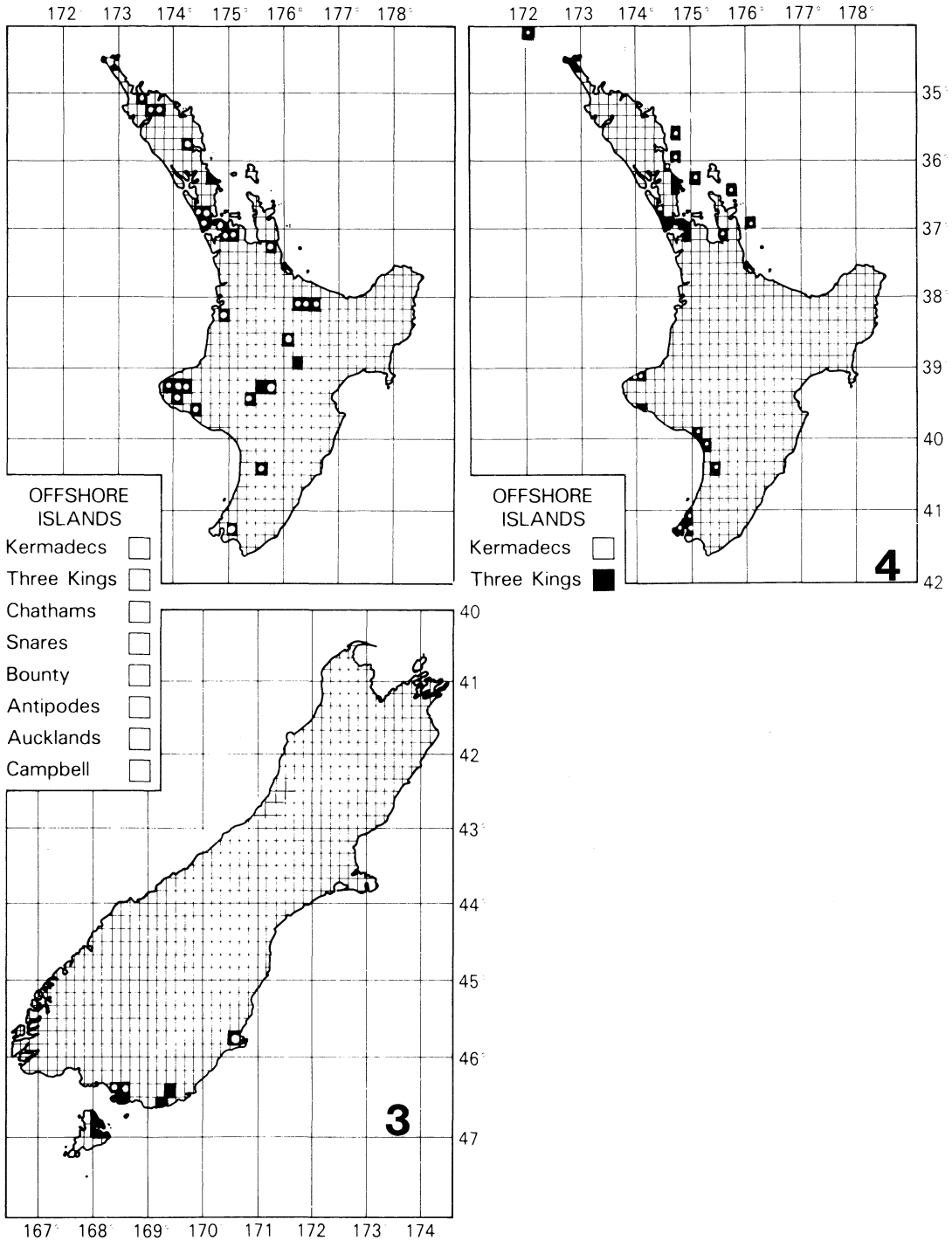
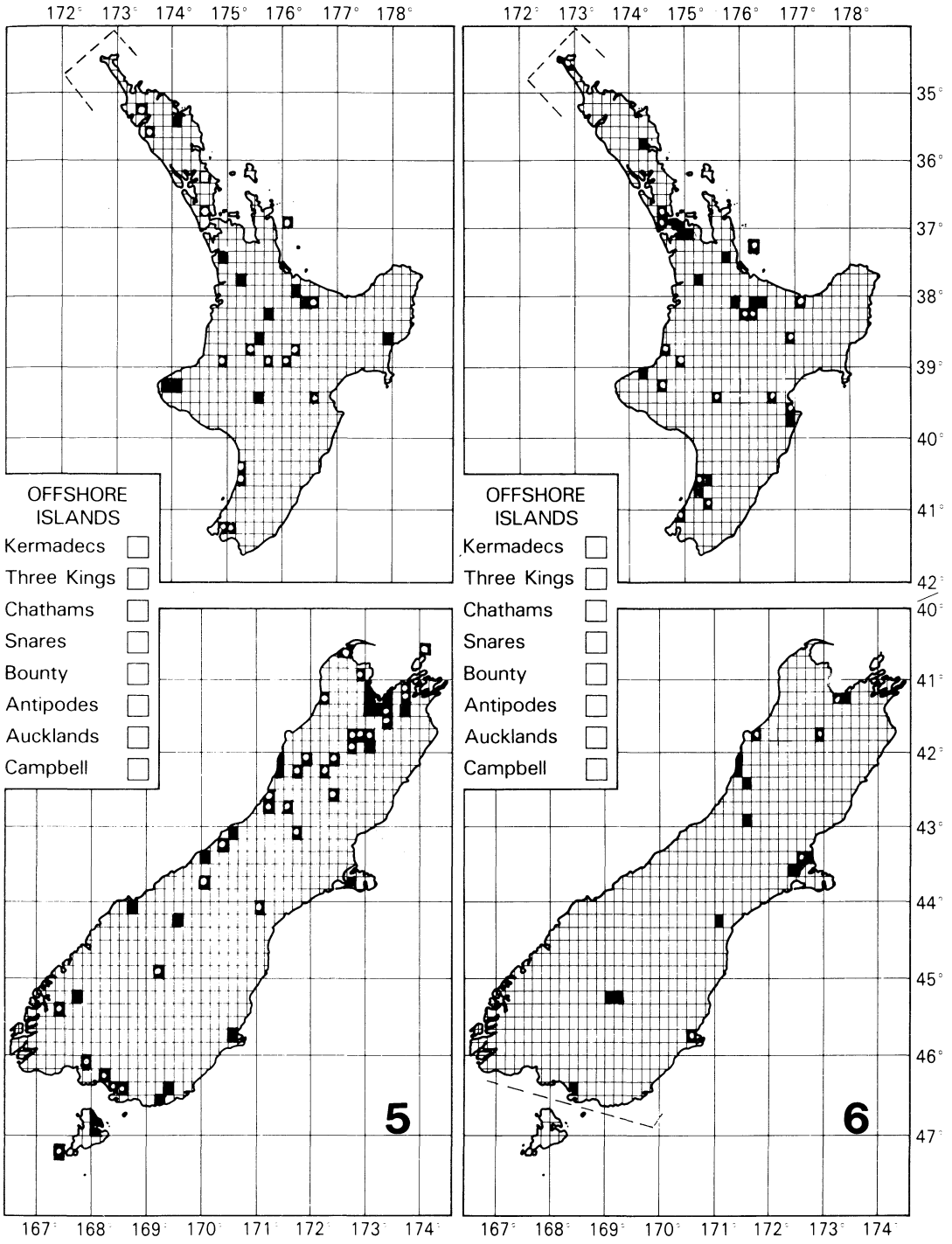


Fig. 1–8 (*continued*)



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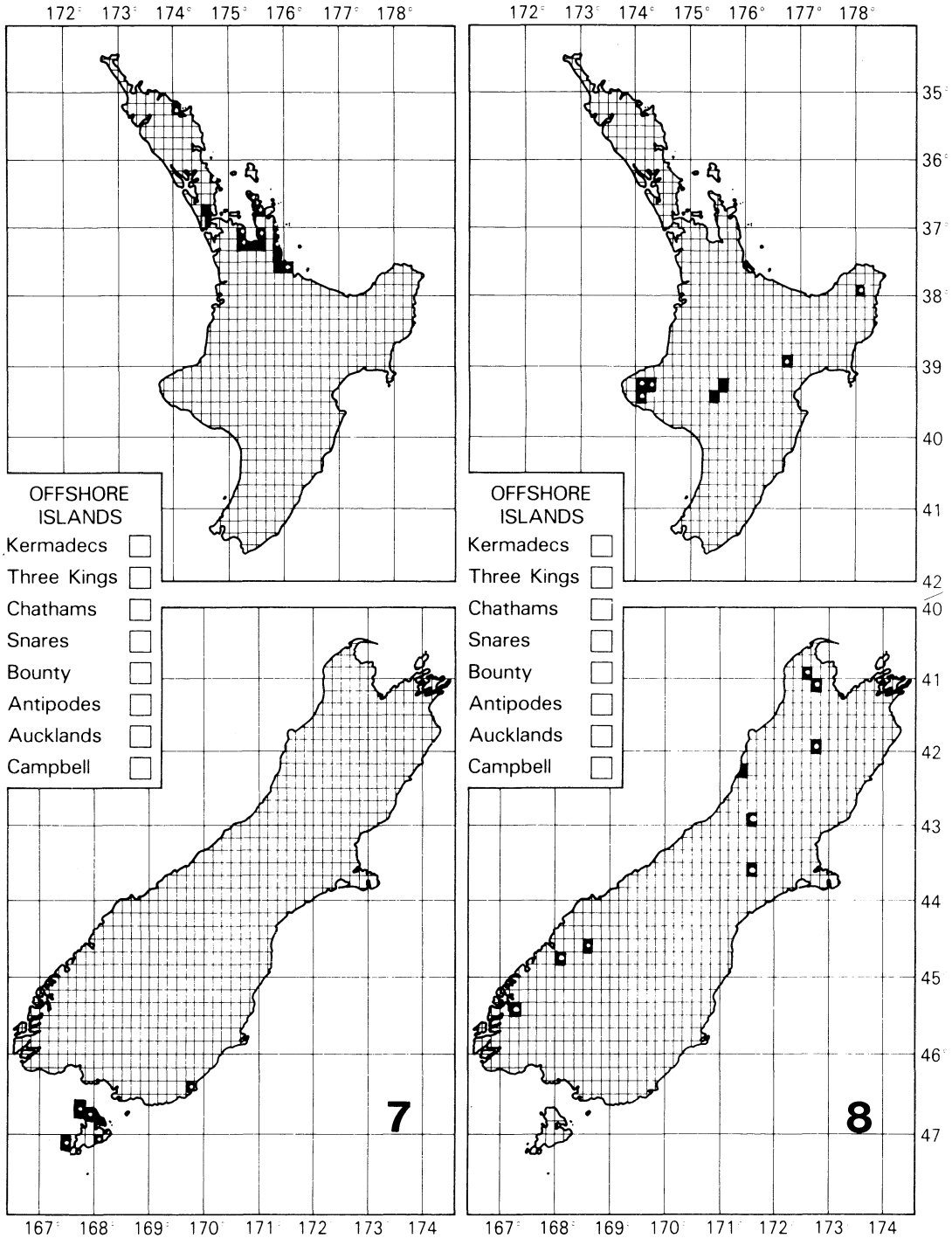


Fig. 1–8 (*continued*)

(3) wings held flat in repose.
(4) forewing termen sinuous, i.e., emarginate at apices of veins M1, M2. There are two exceptions, both with narrow pointed wings: *A. persecta* Meyrick, and *A. syntona* Meyrick.
(5) forewings with veins R4, R5 (Rs3, Rs4) separate.

The *Ctenopseustis & Planotortrix* subgroup is most closely approached in facies by the alpine genus *Gelophaula* (which has thickened male antennae, and an entire forewing termen) and by *Catamacta* (which has forewing veins R4, R5 stalked). Otherwise, the relatively large size, the flat resting posture, and the beak-like labial palpi superficially distinguish the subgroup.

Each genus, although definable, has species which have one or two character states always present in the other three genera. For instance, the capitulum of the corpus bursae signum is always skewed in *Planotortrix* (in the restricted sense), and is upright (peg-like) in *Ctenopseustis* (e.g., Fig. 56), except for *Ct. servana* (Fig. 69), which has a skewed, "*Planotortrix*-type" capitulum.

In the course of examining tortricid genera, both Dr M. Horak (pers. comm.) and I independently observed that the ovipore chamber contains eversible lobes (Fig. 61, 62). In the *Ctenopseustis–Planotortrix* group, and in *Epiphyas* Turner there are five lobes: paired large dorsal lobes directed obliquely latero-ventrally, apically truncate; short small sublateral lobes; and a single, apically emarginate ventral lobe. In "*Cnephasia*" *jactatana* (Walker), "*Cn*". *incessana* (Walker), and species *Sparganothis pilleriana* Denis & Schiff. and *Xenothictis* Meyrick from New Caledonia, the five lobes are differently directed (dorsal lobes directed laterally) and the ventral lobe is large, and apically simple or with a membranous process. The function of these structures has not been demonstrated.

Relatively full generic descriptions have been given for *Ctenopseustis* (Green & Dugdale 1982: 427–428) and for *Planotortrix* s.l. (Dugdale 1966a). The descriptions given below concentrate on the defining characters. As information on larval and pupal structure is at present inadequate, little is said about them in the diagnoses, except where there is clear information.

Key to genera in the *"Ctenopseustis Planotortrix"* subgroup

1 Hindwing with a cubital pecten (Fig. 9–12); hindwing axillary cord and epaulette tufts equally large; male forewing costal fold (Fig. 23–27) half or nearly half forewing length (and forewing with a basal transverse line of raised scales); aedeagus with orifice dorso-dextral or dextral (Fig. 28–32), 3 or more cornuti of equal length, vesica with a basal finger-like simple lobe (e.g., Fig. 28, 29); female cestum longitudinally and sinuously split, basally (i.e., at corpus bursae) expanded, twisted and inrolled (e.g., Fig. 56) ..... *Ctenopseustis* Meyrick
—Hindwing lacking a cubital pecten; male forewing costal fold one-third or less forewing length, or absent (and males with no oblique basal crest on forewing); aedeagus (Fig. 37–44) orifice dextral, dorsal or sinistral; vesica with 1 cornutus, or if with 2 or 4 cornuti, these unequal; if vesica basal lobe present, this scobinate; female cestum not split, nor basally inrolled or twisted 2

2 Male hindwing costal margin with a pseudo-frenular tuft of long, decumbent scales hidden by a row of semi-erect pointed scales (e.g., Fig. 18, 19); female ductus bursae cestum cylindrical (not expanded basally), either collar-like and short (Fig. 77), or long and smooth, or as a sclerotised longitudinal trough (Fig. 78, 80); hindwing axillary cord and epaulette tufts equally (*A. orthropis*) or unequally developed ..... *Apoctena* new genus
—Male hindwing costal margin unmodified (e.g., Fig. 11); female ductus bursae cestum either a flattened long tube ending well before the ductus-corpus bursae junction (Fig. 69), or a sclerotised tube with a longitudinal groove tapering from base (Fig. 64) 3

3 Ground colour of both sexes milky or creamy white; male forewing lacking a costal fold; axillary cord and epaulette tufts sparse, weakly developed; male aedeagus apex (Fig. 45c, lower) acuminate, orifice dorsal, vesica (Fig. 33) lacking a basal process; female cestum tubular, sclerotised, with a longitudinal invagination (groove), and evenly expanded to ductus-corpus bursae junction (Fig. 65, 67); signum with capitulum reduced ..... *Leucotenes* new genus
—Ground colour of both sexes not milky or creamy white; male forewing with a costal fold; axillary cord and epaulette tufts strongly developed; male aedeagus (Fig. 37–40) apex rounded or oblique, orifice dorso-sinistral, vesica with a basal apically scobinate process, or scobinate patch (absent in *P. puffini*); female cestum (Fig. 66, 69, 72–76) a long, often arcuate, flattened tube, signum with a well-developed, skewed capitulum ..... *Planotortrix* Dugdale

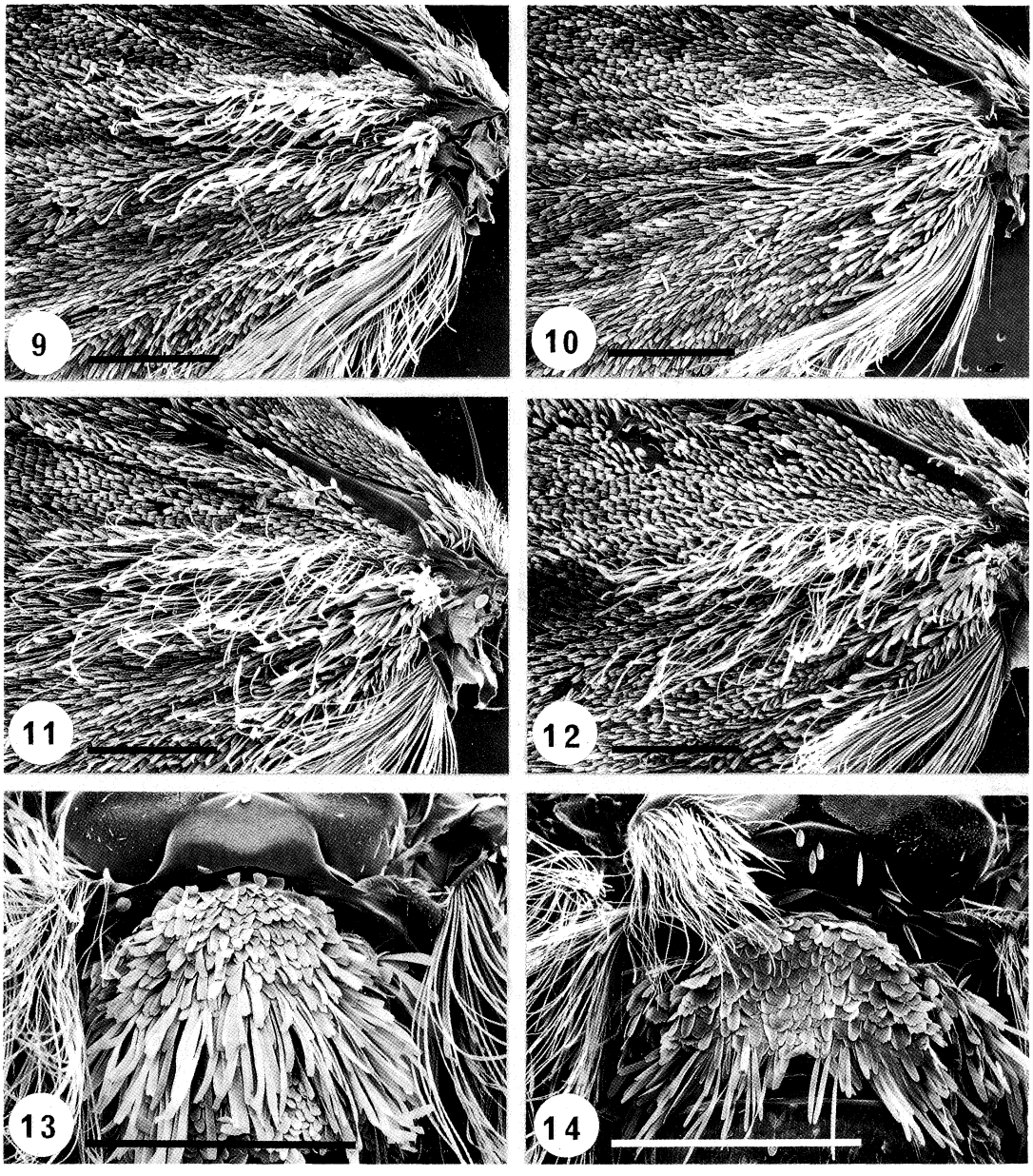


Fig. 9–14 *Ctenopseustis* species male hindwing cubital pecten detail; *Planotortrix* and *Ctenopseustis* abdomen base scaling. Scale interval = 1 mm. **9,** *Ctenopseustis obliquana*, Auckland AK, male hindwing with cubital pecten (SEM prop. JSD 39); **10,** *Ct. obliquana*, Nelson NN, ditto (SEM prep. JSD 40); **11,** *Ct. herana*, Canaan NN, ditto (SEM prep. JSD 41); **12,** *Ct. "Type II North Id"* Rukuhia WO, ditto (SEM prep. JSD 46); **13,** *Ct. obliquana*, Appleby NN, abdomen base scaling (SEM prep. JSD 43); **14,** *Pl. excessana* Nelson NN, ditto (SEM prep. JSD).

DIAGNOSES OF *CTENOPSEUSTIS* AND INCLUDED SPECIES

Ctenopseustis Meyrick, 1885

—Meyrick, 1885: 348; Green & Dugdale 1982: 427.

Type species. *Teras obliquana* Walker, 1863, by original monotypy.

Diagnosis. Head with the vertex scales upright, overhanging the frons, exceeding the scape; male forewing with oblique, transverse crest of scales on basal quarter, and with the costal fold (Fig. 23–27) between 0.4×–0.5× forewing length, eversible and both floor and ceiling of the enclosed chamber covered by short tongue-like scales (Fig. 20) and with well-developed campaniform sensilla (Fig. 21); hindwing with cubital pecten (Fig. 9–12) in both sexes, costa arched; male with equally strong axillary cord and epaulette tufts, the axillary cord tufts expandable (scale sockets 8-shaped, Fig. 15), and extending almost to the hindwing anal angle; basal abdominal tergite with a long scale fringe (Fig. 13). Male genitalia: uncus trowel-shaped, socii very large and sclerotised on outer margin; aedeagus orifice (Fig. 28–32) dorsodextral, apex acute, with 4–6 appressed spines, cornuti many (3–22), equal, needle-like; vesica basal lobe (Fig. 29, 30) slender, finger-like, unornamented, or thumb-like, obscurely spinulose (*Ct. servana* Fig. 32).
Female genitalia: colliculum ventrally split, ductus bursae smooth, tapering from bursa to three-quarters of length, thence membranous to sterigma; cestum a twisted split tube (Fig. 55–60, 63), greatly expanded and inrolled towards the ductus-corpus bursae junction; capitulum upright (skewed in *Ct. servana*), signum with 3 arms: an invaginated dagger, a short posterior sclerotised strip, and a long slender anterior strip internally spinulose (Fig. 56, 57, 60, 63).

Remarks. *Ctenopseustis* differs from *Planotortrix* and *Apoctena nov.* in its dextral aedeagal orifice, possession of a hindwing cubital pecten, and an inrolled cestum: *Leucotenes nov.* differs from *Ctenopseustis* in its lack of a cubital pecten, lack of a male forewing costal fold, and weakly developed axillary cord/epaulette tufts, but closely resembles *Ctenopseustis* in the tapering dorso-dextral aedeagus orifice.

From *Epalxiphora* Meyrick (both sexes of which also have a cubital pecten), *Ctenopseustis* differs in wing shape, unmodified patagia, resting posture, and lack of a subcostal field of orange, modified scales on the male hindwing, and on other characters, notably uncus and socii structure.

Included species:
Ct. obliquana (Walker); *Ct. herana* (Felder & Rogenhofer) revised status; *Ct. fraterna* Philpott; *Ct. servana* (Walker); *Ct. filicis* new species. A North Island entity, possibly of specific status, is discussed under *Ct. herana.*

KEY TO ADULTS OF *CTENOPSEUSTIS* SPECIES

Note: The North Island pheromonally-definable entity cannot be distinguished morphologically with confidence from sympatric (North Island) *Ct. obliquana*, and is not keyed.

1 Labial palpi usually over 3× compound eyewidth; male uncus apex broadly rounded (Green & Dugdale 1982, fig. 4); female with capitulum reduced and skewed (Fig. 70 and Green & Dugdale 1982, fig. 7); male sandy in colour, aedeagus (Fig. 32) orifice dorsal, vesica basal lobe thumb-like, weakly spinulose; female abdomen with sternite 7 conspicuously dark brown scaled (Three Kings Is, Coastal North Island and off-shore islands) ..... *Ct. servana* (Walker)
—Labial palpi usually 3× or less compound eye width; male uncus apex acute (Green & Dugdale 1982, fig. 6) vesica basal lobe finger-like (Fig. 28–30); female with capitulum peg-like (Fig. 56, 57, 60, 63); male and female colour pattern variable, but female abdomen without contrastingly coloured sternite 7 scales 2

2 Male costal fold: forewing length ratio 1:2.2–2.4 (Fig. 26, 27); female cestum sclerotised for less than one third total ductus bursae length (Fig. 57, 58), (South, Stewart, Chatham Islands) ..... *Ct. herana* (F&R)
—Male costal fold: forewing length ratio 1:1.9–2.1 (Fig. 23–25); female cestum sclerotised for over one-third total ductus bursae length or, if cestum reduced, colour pattern yellowish or orange fawn 3

3 Colour pattern distinctively yellowish or orange-fawn with red-brown markings, underside pale fawn with rust-red markings; male with segment 8 constricted dorso-basally; female with cestum reduced, less than one-fifth length of ductus bursae (Fig. 63) (Dunedin, Catlins, Bluff Hill, Stewart Island, on *Cyathea, Dicksonia*) ..... *Ct. filicis new species*
—Ground colour not conspicuously yellowish-orange fawn, and either whitish fawn, or grey, or purple grey ventrally; male with tergite 8 not constricted basally; female with cestum approximately half ductus bursae length 4

4 Ground colour dark chocolate or purplish-brown, the transverse fascia often broken in the male forewing into distinct, angular marks or (rarely) divided by a pale longitudinal band, and in the female often sharply pointed and outlined in whitish scales; male antenna lacking black scales on basal 10 segments (North Island, on *Cyathea, Dicksonia, Sticherus*) ..... *Ct. fraterna* Philpott
—Ground colour not dark chocolate or purple brown; wing pattern highly variable; male antenna with black scales on basal 10 segments (North, South Islands, polyphagous) ..... *Ct. obliquana* (Walker)

Note: The morphological concept of North Island *Ct. obliquana* cannot differentiate *obliquana* from "Ct. Type II North Island" in the female, but there is a tendency for there to be long, hair-like scales (cf. Fig. 9, 10, 12) in the male hindwing cubital pecten in the latter entity.

Ctenopseustis obliquana* (Walker), *restricted
(Fig. 1, 9, 10, 13, 15, 20, 21, 23, 24, 28–31, 55, 56, 60)

obliquana Walker, 1863: 302 (*Teras*) Holotype ♀ Auckland AK, A. Bolton, BMNH, abdomen missing.

spurcatana Walker, 1863: 305 (*Teras*). Holotype ♂ Nelson NN, T. R. Oxley, BMNH.

transtrigana Walker, 1863: 305 (*Teras*). Holotype ♂ Nelson NN, T. R. Oxley, BMNH, abdomen missing.

turbulentana Walker, 1863: 355 (*Sciaphila*) Holotype ♂ Nelson NN, T. R. Oxley, BMNH, abdomen missing.

ropeana Felder & Rogenhofer, 1875: pl. CXXXVII, fig. 45 (*Tortrix*) Holotype ♀ Nelson NN, T. R. Oxley, BMNH.

charactana Meyrick, 1881: 492 (*Cacoecia*) Holotype ♂ Auckland AK, E. Meyrick, BMNH, abdomen missing.

[*obliquana* Types I, III of Foster et al. 1986: 156. *obliquana* Type I of Foster & Dugdale 1988: 229]

Diagnosis. As in Green & Dugdale 1982: 430–431, fig. 3, 6, 8, 9, 12, 13 (North Island specimens) and male forewing costal fold half length of forewing (costal fold ratio 1:1.9–2.1, Fig. 23, 24); male hindwing cubital pecten (Fig. 9, 10) composed of long, sinuous capitate or strap-like scales, apically strongly decurved and appearing "curly"; anal pecten with a broad-scaled basal tuft, and long "curly" capitate scales in a strip.

Female genitalia with cestum variable (especially in South Island specimens) but usually over one-third ductus bursae length, and posterior arm of signum longer than capitulum height (Fig. 55, 56).

♀ **Sex pheromone main components**: Z8–14:OAc, Z5–14:OAc; North Island (Type I) ratio 80:20 (Z8:Z5, range 76: 24–84:16), South Island (Type III) ratio 90:10 (range 90:10–97:3) (Young et al. 1985; Foster et al. 1986: 156–157).

Note. Further analyses have shown that there is overlap in the ranges of ratios of pheromone components between Types I and III (Drs J. R. Clearwater, S. P. Foster, pers. comm.).

Distribution. (Fig. 1): North, South, Stewart Islands (absent from Three Kings and Chatham Islands) sea level to timberline.

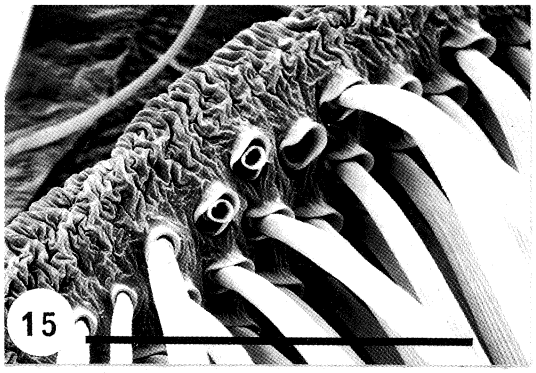
Hosts. polyphagous.

Material examined. Holotype ♂ ♂ *obliquana, spurcatana, transtrigana, turbulentana, ropeana,* Holotype ♀ *charactana* (BMNH), and 1504 additional specimens (NZAC).

Remarks. As there is no evidence of a *Ctenopseustis* species producing solely Z5–14:OAc at Auckland, I assume that the females collected by Bolton in 1854 and Meyrick in 1881 are conspecific with the 1980+ populations on which Green & Dugdale (1982) and which Foster et al. (1986) and Foster & Dugdale (1988) based their descriptions and pheromone analyses, respectively.

The synonymy involving *spurcatana, transtrigana, turbulentana,* and *ropeana* is based on costal fold/forewing length ratios of the four holotype males. All fall within the range of ratios 1:1.9–2.1, and all have the cubital pecten curly. Because of the

Fig. 15–22 Wing structures, *Apoctena* n. gen., *Ctenopseustis*, and *Planotortrix* species. Fig. 20, 22 by kind permission of J. R. Clearwater. Scale interval = 1 mm, except where stated otherwise; **15,** *Ct. obliquana*, Appleby NN, axillary cord scale sockets (SEM prep. JSD 43). Scale interval = 0.1 mm; **16,** *P. excessana*, Nelson NN, ditto (SEM prep. JSD 44) Scale interval = 10 μm; **17,** *Apoctena orthropis* (Meyrick), Titirangi AK ditto, (SEM prep. JSD 47). Scale interval = 10 μm; **18,** *A. orthropis*, Titirangi AK, pseudofrenular scaling; **19,** *A. conditana*, Nelson NN, pseudofrenular scaling; **20,** *Ct. obliquana*, male costal fold opened out; note the diverse scale types, and relatively dense scaling; **21,** *Ct. obliquana*, male costal fold, vein Sc campaniform sensillum, ×1500 magnification. Scale interval = 10 μm; **22,** *P. excessana*, male costal fold opened out; note sparse scaling.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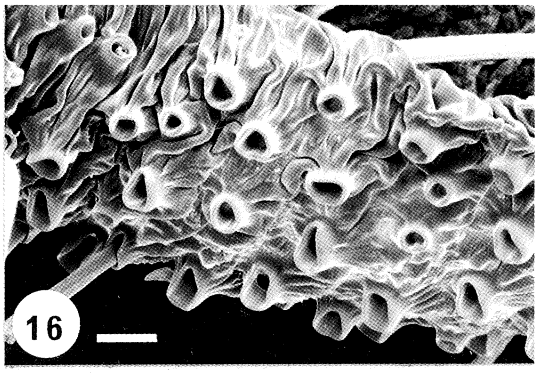
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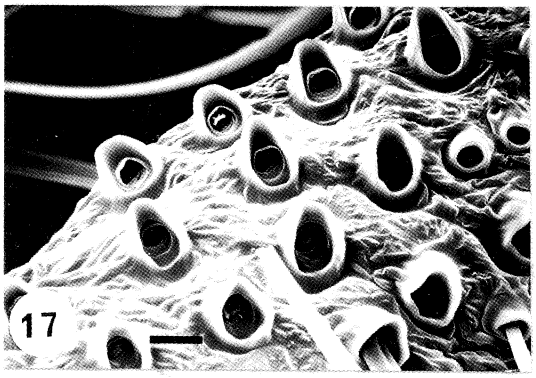
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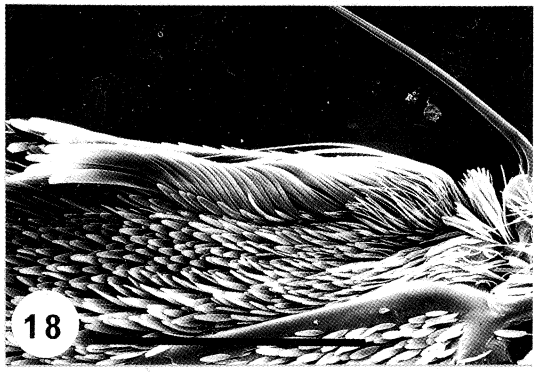
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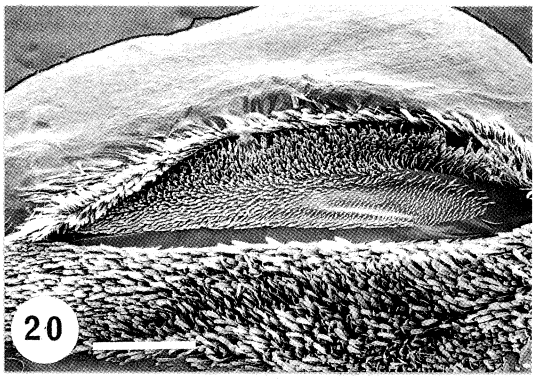
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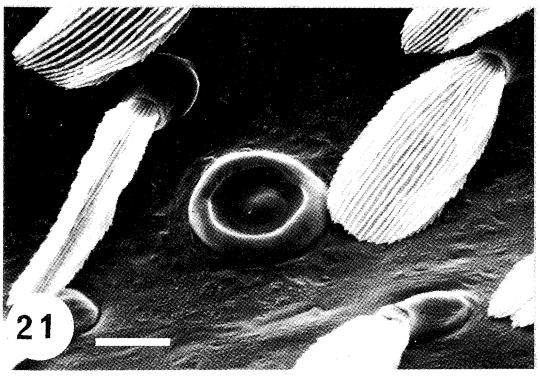
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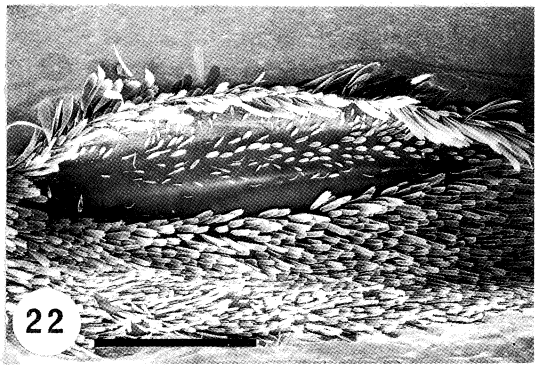
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discovery of an entity in the North Island with pheromone and isozyme characteristics of *Ct. herana* and the morphology of *Ct. obliquana*, Fig. 1 combines distribution records of specimens that combine *Ct. obliquana* morphology. Fig. 2 shows the distribution of known populations of the *Ct.* "Type II North Island" entity, based on analyses of females or on the capture of males in Z5–14:OAc baited traps. This entity is discussed further under *Ct. herana*.

***Ctenopseustis herana* (Felder & Rogenhofer)**
Reinstated species
(Fig. 2, 11, 26, 27, 57, 58)

herana Felder & Rogenhofer, 1975: pl. CXXXVII, fig. 52 (*Tortrix*) Holotype ♂ Nelson NN, T. R. Oxley, BMNH, abdomen missing.
inana Butler, 1877: 403, (pl. 43, fig. 13 (*Cacoecia*) Holotype ♀ "Canterbury" J. D. Enys, BMNH, genitalia slide no. 10609.
[obliquana Type II of Foster et al. 1986: 1565, Foster & Dugdale 1988].

Diagnosis. Male with forewing costal fold less than half as long as forewing (ratio 1:2.2–2.4, Fig. 26, 27), male hindwing cubital pecten composed of slender, more or less straight, uniform or strap-like scales, and the pecten extending beyond halfway towards the base of vein CuA1 (Fig. 11).

Female with cestum variable (Fig. 57, 58), but usually less than one-third ductus bursae length, and posterior arm of signum (Fig. 57) not longer (often shorter) than capitulum height.

♀ **Sex pheromone main component**: Z5–14:OAc (Foster et al. 1986: 156; Foster & Dugdale 1988: 229).

Distribution: (Fig. 2): South, Stewart, and Chatham Is (excluding Rangatira Island), sea level to timberline.

Hosts. polyphagous.

Material examined: Holotype ♂ *herana* (BMNH), Holotype ♀ *inana* (BMNH), and 503 specimens (NZAC).

Remarks. The holotype male of *Tortrix herana* has a costal fold:forewing length ratio of 1:2.26, and the hindwing cubital pecten is composed of more or less straight hair-like scales. Females from the Dun Mountain Track by Nelson City, and from Appleby research orchard at the seaward foot of the Moutere Hills (NN), which on analysis of pheromone content yielded only Z5–14–OAc agreed in cestum and signum characters with Z5–14:OAc producing

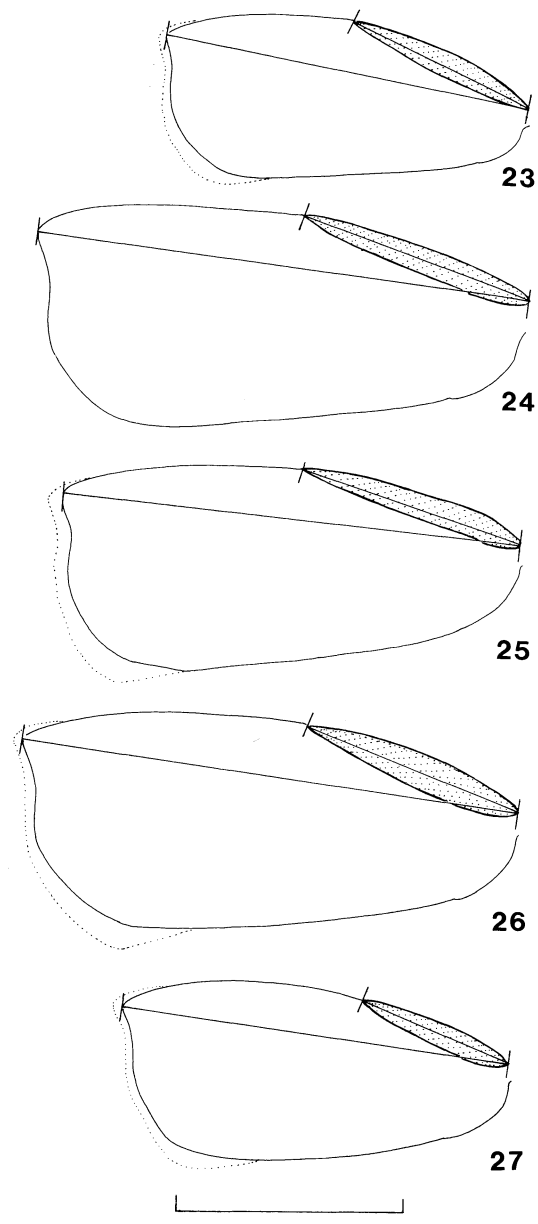


Fig. 23–27 *Ctenopseustis* species, male costal fold: forewing length ratio measurement sites, and wing shape; **23**, *Ct. obliquana*, Auckland AK; **24**, *Ct. obliquana*, Oban SI; **25**, *Ct.* "Type II North I", Rukuhia WO; **26**, *Ct. herana*, Canaan N.N; **27** *Ct. herana*, Tai Tapu MC.

females from Christchurch and nearby Taitapu (MC), the presumed area where J. D. Enys *may* have collected the female described by Butler as *Cacoecia inana*. The holotype female of *C. inana* also agrees

in cestum sclerotisation length and the posterior arm of the signum in *Ct. herana*, i.e., the combination "long cestum and long posterior signum arm" was not observed.

This concept of *Ct. herana* has not been recorded from the North Island. It is largely sympatric with *Ct. obliquana* in the South and Stewart Islands, except for the Canterbury Plains around Christchurch in which only *Ct. herana* is known (but both species are present on the contiguous Banks Peninsula) and the Clutha-Kawarau-lower Manuherikia valley floors (the "Central Otago orchard area") from which only *Ct. obliquana* is known.

Ctenopseustis "Type II North Island"
(Fig. 2, 12, 25, 59)

Material examined. 23 ♂ ♂ 12 ♀ ♀ (NZAC)

In terms of female-produced long-range sex pheromone components, selected isozymes, and, under confined conditions, captures of (South Island) *Ct. herana* males in sticky traps baited with Ct "Type II North Island" females in a field cage, Ct. "Type II North Island" must be included in the species *Ct. herana*. Although the amount of Z5–14:OAc in pheromone glands of North Island females was observed to be less, on average, than in South Island females, the ranges of quantities observed overlapped (S.P. Foster, pers. comm.).

In terms of morphology – male costal fold length relative to forewing length (Fig. 25) and male hindwing pecten scaling (Fig. 12), *Ct.* "Type II North Island" is not consistently distinguishable from *Ct. obliquana*, with which it is known to be sympatric at Kerikeri ND, and Rukuhia (WO).

Fig. 2 gives the known distribution (two localities based on analysis of females, one on incidence of males in traps baited with Z5–14:OAc. As *Ct. obliquana* and Ct. "Type II North Island" are not consistently morphologically distinguishable, the distribution shown for *Ct. obliquana* (Fig. 1) may well include specimens morphologically *obliquana* but exhibiting pheromone and isozyme characters of *herana*.

Interpretation of the status of the entity *Ct.* "Type II North Island" cannot progress without more rigorous comparative studies on, for example, incidence of intersexes and developmental synchrony between male and female progeny of reciprocal crosses with *Ct. herana* (South Island), (b) mitochondrial DNA studies, (c) a wider spectrum of enzymes, with these analyses covering more populations.

Until such information is available, the entity *Ct.* "Type II North Island" is here objectively regarded as an example of parallelism, this being the least restrictive assumption, in the sense of Throckmorton (1965: 228). This entity displaying the morphology of one species with which it is sympatric, and the chemical sexual communication system (at least in large part) and part of the isozyme pattern of another allopatric species, may well be of interest in speciation studies.

Ctenopseustis fraterna Philpott
(Fig. 3)

fraterna Philpott, 1930: 7. Holotype ♂ (designated by Philpott) Whangarei ND, C. E. Clarke, AMNZ.
————, Green & Dugdale 1982: 428, 435, fig. 5 (♂ genitalia), 11 (♂), 15(♀), 19(♂ hindwing pecten) (redescription).

Diagnosis. As in Green & Dugdale 1982: 435, fig. 5, 11, 15, 19, and male forewing costal fold: forewing length ratio 1:1.8–2.0. Hindwing cubital pecten composed of loosely curled strap-like scales. Lowland specimens (localities below 300 m) as in Green & Dugdale 1982, upland specimens (localities over 300 m) more transversely marked, transverse markings strongly toothed, and often outlined in silver-grey scales. Female cestum over one-third ductus bursae length (0.5×–0.6× bursa length, Green ♀ Dugdale 1982).

♀ **Sex pheromone main components**: not identified; possibly consisting of various tetradecadienyl acetates. (Dr S. P. Foster, pers. comm.)

Distribution (Fig. 3). North Island only.

Hosts. Pteridophyta: *Cyathea dealbata, C. smithii; Dicksonia fibrosa, D. squarrosa; Sticherus cunninghamii* (to 1100 m).

Material examined. Holotype ♂ *fraterna* (AMNZ); and 126 additional specimens (NZAC).

Remarks. The dark chocolate or purplish, or contrastingly chocolate/orange brown/ash colour patterns are distinctive; at rest *Ct. fraterna* blends with the dead fronds of its hosts, all of which are ferns. One male reared from *Sticherus* has the proximal half of the forewing disc pallid, forming a pale saddle-shaped mark also seen in some males of *Ct. obliquana* and *Ct. herana*. The long costal fold in the male, and the relatively long female cestum may point to closer affinity with *Ct. obliquana* than with *Ct. herana*.

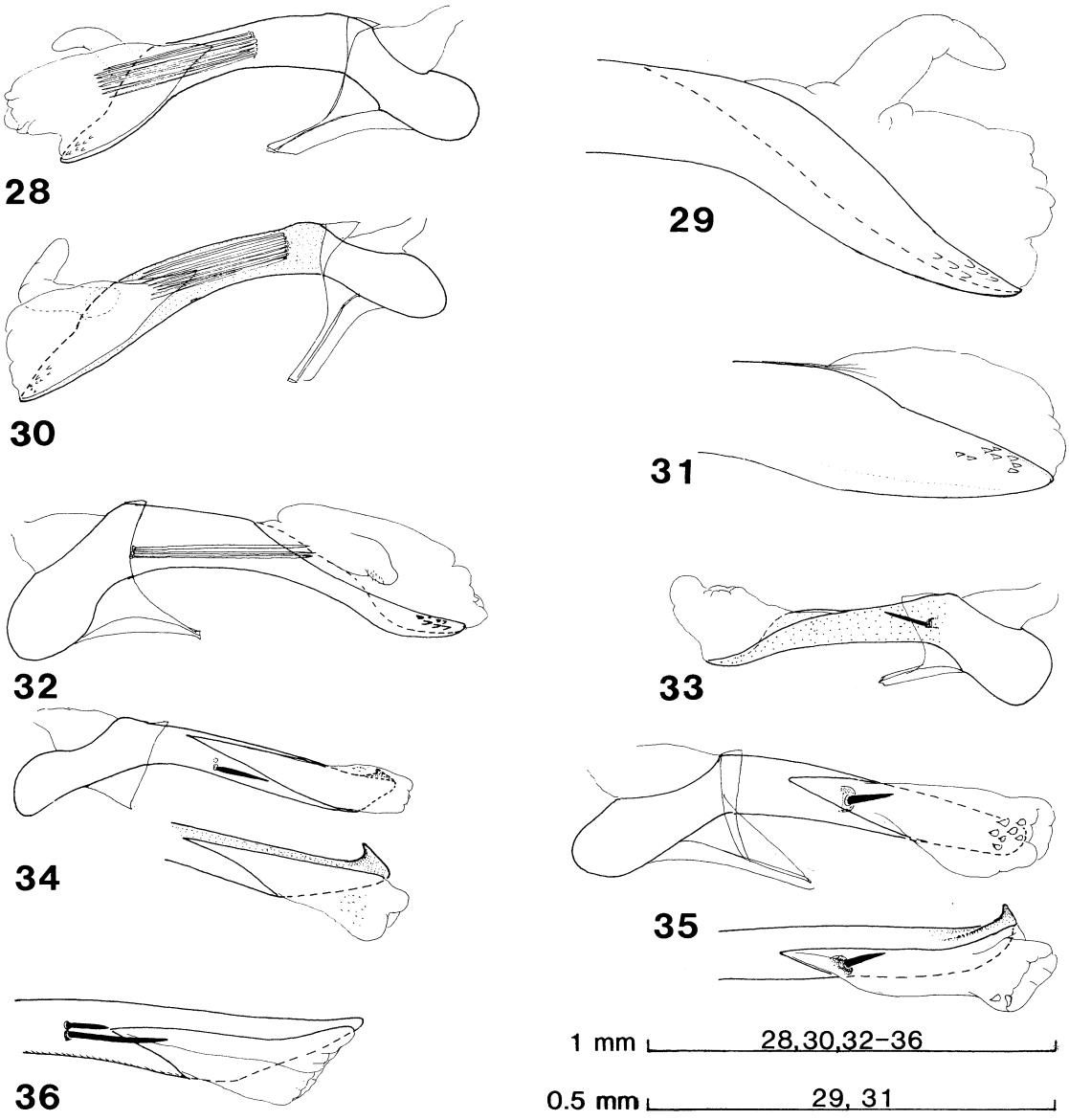


Fig. 28–36 *Ctenopseustis, Leucotenes, Planotortrix* species, aedeagal structure; **28,** *Ct. obliquana*, Auckland AK, right aspect; **29,** ditto, vesica and aedeagus apex, left aspect; **30,** *Ct. obliquana*, Appleby NN, right aspect; **31,** ditto, desica and aedeagus apex, left aspect; **32,** *Ct. servana*, Mangawhai Heads ND, left aspect; **33,** *Leucotenes coprosmae*, Tararua Range WN, right aspect; note single cornutus (cf. Fig. 45); **34,** *Planotortrix flammea*, Homer Tunnel FD, left aspect; insert, aedeagus apex dorsal view; **35** *P. notophaea*, Manurewa AK, left aspect; insert, aedeagus apex, dorsal view; **36,** *P. puffini*, Lee Bay SI, aedeagus apex, dorsal aspect.

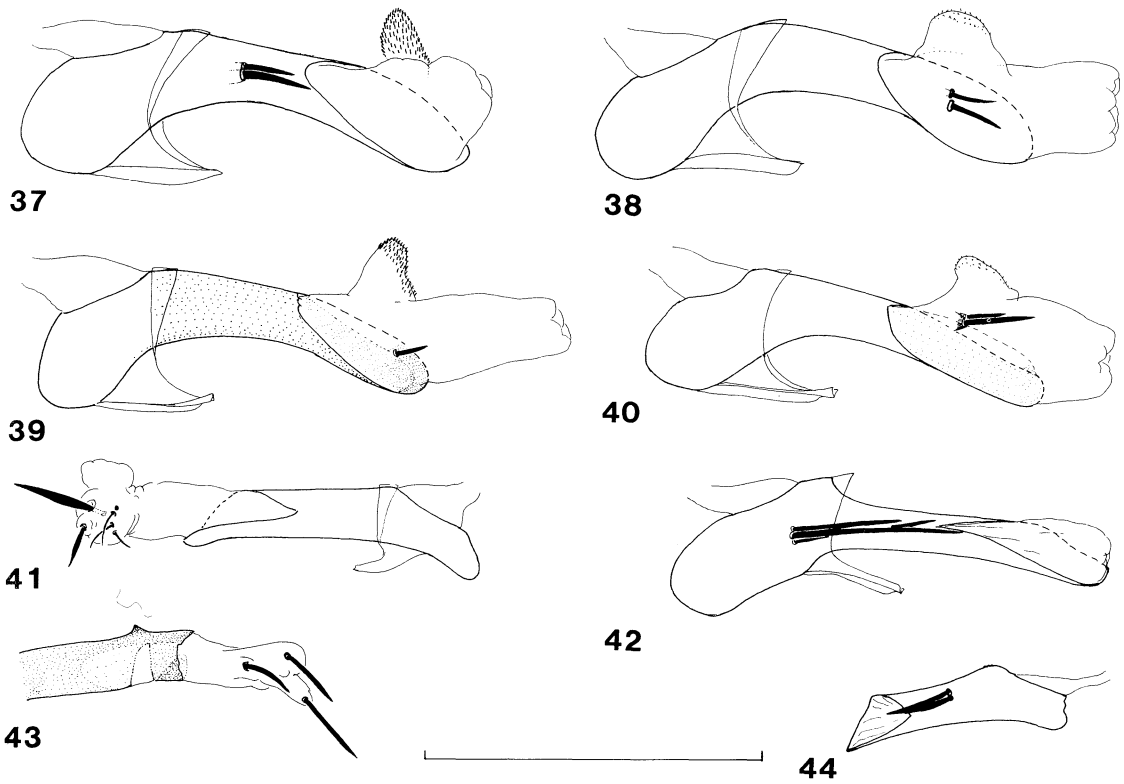


Fig. 37–44 *Planotortrix* and *Apoctena* species, aedeagal structures.; **37**, *P. excessana*, Dun Mountain, Nelson NN, left aspect; **38**, *P. avicenniae*, Kopu WO/CL, left aspect; **39**, *P. octo*, Auckland (laboratory colony), left aspect; **40**, *P. pseudocto*, Rangatira I, Chatham Is, left aspect; **41**, *Apoctena conditana*, Opouri Valley SD, right aspect; **42**, *A. orthropis*, Tararua Range WN, left aspect; **43**, *A. pictoriana*, Craigieburn Forest Park, MC, left aspect; **44**, *A. flavescens*, Beaumont Forest SL, right aspect.

***Ctenopseustis filicis* Dugdale, new species**
(Fig. 3, 63, 71)

[*Ctenopseustis* Type IV of Foster et al. 1986, Foster & Dugdale 1988.]

Description. Colour pattern variable, largely reddish brown on a yellow-fawn or warm ochreous ground; underside of body and hindwings pallid, sometimes cream-coloured, particularly in females. Wingspan: 19–24 mm (♂ ♂), 22–28 mm (♀♀). Males with costal fold: forewing length ratio as for *Ct. obliquana* (1:1.9–2.1; and abdomen with segment 8 constricted dorso-basally, and tergite 8 expanded apically, forming a hood; Fig. 71). Female with cestum very reduced, less than one-quarter total ductus bursae length, and posterior arm of signum not longer than capitulum height (Fig. 63).

♀ **Sex pheromone main components:** Z10–16:OAc, Z8–14:OAc (Foster & Dugdale 1988: 229).

Hosts. Pteridophyta: *Dicksonia squarrosa* (favoured in SL, SI sites); *Cyathea smithii* (favoured in DN sites; on both young (soft) and older (hardened) fronds.

Holotype ♂ New Zealand SL Bluff Hill Glory Track, larva coll. 8 March 1986 J. S. Dugdale & J. R. Clearwater "ex Dicksonia, em. 30.6.86" NZAC, wing span 19 mm.

Material examined. Holotype ♂, allotype ♀ same data as Holotype except "em. 15.6.86", and 84 additional specimens, NZAC.

Distribution (Fig. 3). DN: Leith Saddle (reared ex *Cyathea*); SL: Rankleburn State Forest (to light); Chaslands, Tautuku State Forest (reared ex *Dicksonia*), Tisbury, West Plains, Bluff (to light, A. Philpott), Bluff Hill (reared); SI: Oban area, (to light; reared ex *Dicksonia*, *Cyathea*; in baited sticky traps) at Raroa Track, Horseshoe Bay, Lee Bay, Observation Rock.

Remarks. This conspicuous orange-brown species with its rust-red or red-brown markings and pale, cream, or buff venter and hindwings was first

recognised as a species by analyses of pheromone components. *Ct. filicis* is the most geographically restricted *Ctenopseustis* species, and unlike *Ct. fraterna*, it has not been reared from host ferns other than the two listed species. In facies (broad wings, long costal fold, colour pattern elements) it is very similar to *Ct. obliquana*, but the female genitalia resemble those of *Ct. herana* (reduced cestum and posterior arm of signum). The female-produced sex pheromone components suggest an affinity with *Ct. obliquana* as there is no trace of Z5–14:OAc and the preponderant Z10–16:OAc is probably produced along a similar biosynthetic pathway as shown for Z8=14:OAc (Foster & Roelofs 1988: fig. 3).

The name *filicis* is the genitive singular of the noun felix = fern (Latin), and refers to the larval hostplant.

Ctenopseustis servana (Walker)
(Fig. 4, 32, 61, 64, 70)

servana Walker, 1863 (*Teras*) Holotype ♂ Auckland AK, A. Bolton, BMNH, abdomen missing.
Synonymy as in Green & Dugdale 1982: 431; Dugdale 1988: 121.

Diagnosis. As in Green & Dugdale 1982: 428, 431, fig. 4, 7, 10, 14, 18. Male costal fold: forewing length ratio 1:2.2–2.3; male hindwing cubital pecten composed of hair-like scales, and fringe of abdominal tergite 1 weakly developed (strongly so in other *Ctenopseustis* species); uncus apex rounded-truncate; adeagus orifice dorsal, basal lobe on vesica short, weakly spinulose apically (Fig. 32). Female with capitulum of signum skewed (obliquely bent), anterior and posterior signum arms equal in length (Fig. 64, 70).

♀ **Sex pheromone main components:** Z5–14:OAc, ratio range 32:68–35:65 (Foster & Dugdale 1988: 229).

Distribution (Fig. 4). North Island: off-shore islands, Three Kings Islands, coastal ND, AK, CL, WO, TK, WI-WN; absent from coastal BP, GB, HB, and WA.

Hosts. polyphagous on woody coastal angiosperms.

Material examined. HT ♂ *servana* and 144 additional specimens (NZAC).

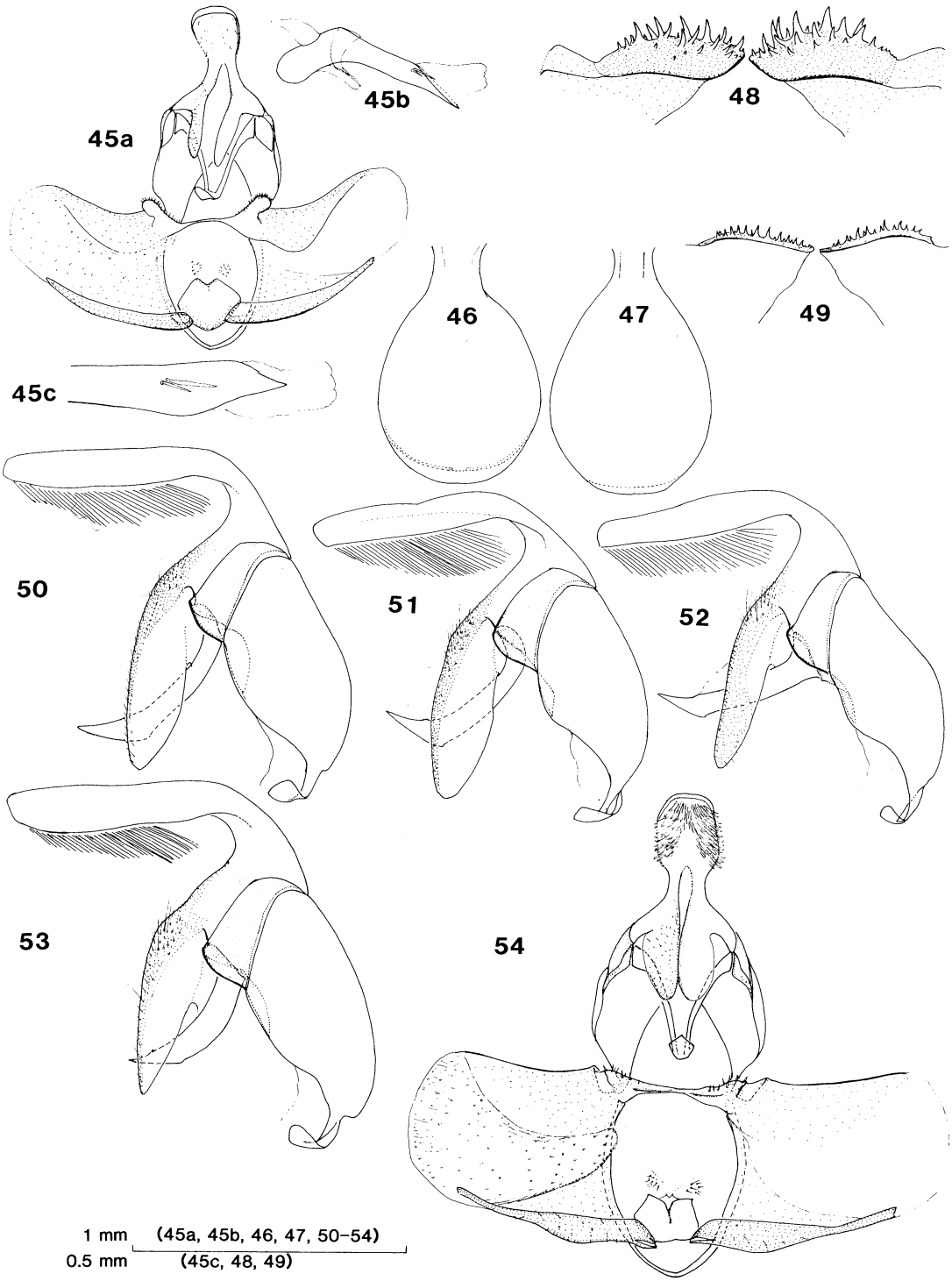
Remarks. *Ct. servana* is the only *Ctenopseustis* species recorded on the Three Kings Islands. It has not yet been found more than 2 km inland in the North Island. The very long palpi, the skewed capitulum, the rounded uncus apex, the thumblike, scobinate vesica process, and the combination of Z5–14:OAc and Z7–14–OAc in the female-produced sex pheromone are character states more commonly found in *Planotortrix*. Some *Ctenopseustis* character states are reduced: the line of raised scales on the forewing, the conspicuous fringe on abdominal tergite 1, the cubital pecten. The aedeagus, however, has a dorso-dextral orifice (Fig. 32), and the cestum is expanded and inrolled at the ductus-corpus bursae junction (Fig. 64, 70).

Leucotenes Dugdale, new genus

Type species. *Planotortrix coprosmae* Dugdale, 1988.

Description. Labial palpi porrect, over twice compound eye width, vertex scales exceeding scape height, vertex scale tufts not divergent, mesoscutellum lacking a crest, forewing termen emarginate at veins M1, M2, male forewing lacking a costal fold, and without a line of raised scales on basal third, hindwing costa unmodified, cubital pecten absent, axillary cord and epaulette tufts weakly scaled; abdominal tergite 1 lacking a long scale fringe; male genitalia (Fig. 33, 45) with socii shorter than gnathos arms, transtilla with teeth congested, and not in a single row; aedeagus expanded subapically, tapering to an acuminate apex, vesica dorso-apical, with one cornutus or two unequal cornuti. Female genitalia (Fig. 62, 65, 67) with cestum evenly sclerotised with a very long groove or trough, and widened to junction with corpus bursae, capitulum (Fig. 65) reduced, anterior and posterior signum arms reduced, dagger present, either stout and short (Fig. 65) or long (Fig. 67).

Fig. 45–54 *Leucotenes*, *Planotortrix*, *Apoctena* species, male genitalia; **45**, (a) *Leucotenes coprosmae*, Prices Valley Bush MC, male genitalia; (b) (top insert), aedeagus, left view; (c) (bottom insert), aedeagus apex, ventral; note presence of 2 cornuti (cf. Fig. 33); **46**, *Planotortrix excessana* Dun Mtn NN, uncus dorsal view; **47**, *P. octo*, Tai Tapu MC, uncus, dorsal view; **48**, *P. octoides*, Pitt Island, Chathams, transtilla, posterior view; **49**, *P. avicenniae*, Kopu WO/CL, transtilla, posterior view; **50**, *P. excessana*, Dun Mth NN, tegumen, uncus, gnathos, socius, lateral view; **51**, *P. octo*, Tai Tapu MC, ditto; **52**, *P. octoides*, Pitt Island, Chathams, ditto; **53**, *P. avicenniae*, Kopu WO/CL, ditto; **54**, *Apoctena conditana*, Opouri Valley SD, male genitalia, posterior view. ➤


45a
45b
48
46
47
49
45c
50
51
52
53
54
1 mm (45a, 45b, 46, 47, 50–54)
0.5 mm (45c, 48, 49)

Remarks. *Leucotenes* is distinguished from *Planotortrix* (cf. Dugdale 1966a: 396, as *Planotortrix charactana*; Dugdale 1988: 125 as *Planotortrix coprosmae*) by the lack of strongly-scaled axillary cord and epaulette tufts, the reduced socii, the spear-like aedeagus apex, and the form of the cestum. From *Ctenopseustis* (which it resembles in colour pattern and facies) *Leucotenes* is distinguished by the absence of a hindwing cubital pecten and the forewing costal fold, the reduced socii, lack of spines on aedeagus apex, one or two stout cornuti, rather than several fine cornuti, lack of a basal lobe on the vesica, the reduced signum, the straight cestum invagination, and cestum extending to four-fifths ductus bursae length. This last character, and the absence of a pseudo-frenulum on the male hindwing, distinguish *Leucotenes* from *Apoctena* described below.

The combination of facies, colour pattern, and aedeagus shape suggest a relationship with *Ctenopseustis*.

Leucotenes is monobasic and restricted to New Zealand, where the only species is widely distributed, with members of the shrub genus *Coprosma* (Rubiaceae) as hosts.

Etymology. The name is derived from the the Greek *leukos* = white, and *tenes*, a conventional suffix for tortricids, feminine.

Leucotenes coprosmae Dugdale
(Fig. 33, 45, 62, 65, 67)

coprosmae Dugdale, 1988: 125 (*Planotortrix*; as new name for *Tortrix*)

charactana nec Meyrick, 1881: 492. Holotype ♂, Christchurch MC, E. Meyrick, BMNH, BM, genitalia slide no. 8914 ♂.

charactana, Meyrick 1883: 50–51 (*Tortrix*); ———, Hudson 1928: 227, pliXXIV fig. 33–35 (description and colour illustration) ———, Philpott 1928: 450–451, p. 465 fig. 60 (male genitalia) ———, Dugdale 1966a: 396 (in *Planotortrix*).

Diagnosis. As illustrated by Hudson 1928, pl. XXIV, fig. 33–35; wing span variable, 14–18 mm (AK), or 18–20 mm (SL) to 24–26 mm (subalpine WN, NN). Ground colour of head, thorax, forewings, and abdomen creamy or milky white; forewing invariably (137 specimens) with a short oblique black, chocolate, or dark red bar on the costa at just under half costal length, rest of the "tortricoid" wing pattern faintly (lowland specimens) to strongly (upland and timberline specimens) developed. Aedeagus (Fig. 33, 45) sharp pointed, the longer cornutus less than one-quarter length of the aedeagus, the other, when present, half the length of the first. Female genitalia (Fig. 62, 65, 67) as for generic description; signum dagger short and stout or long and slender.

♀ **Sex pheromone main components:** Calling pheromone: Z11–14:OAc (S. P. Foster, pers. comm.)

Distribution. North, South, and Stewart Islands, throughout; sea level to timberline.

Hosts. small-leaved species of *Coprosma* (Rubiaceae).

Larva. Body distinctively green, with a red dorsal stripe more or less as figured by Hudson 1928, pl. iii fig. 17.

Material examined. Holotype ♂ *coprosmae* (BMNH); and 136 specimens (NZAC).

Remarks. Differences in cornutus-number (Fig. 33, 45) and cestum base shape (Fig. 65, 67) suggest that there may be more than one entity lumped under *charactana*.

Planotortrix Dugdale, restricted

Planotortrix Dugdale, 1968: 292
["Planotortrix I" of Foster & Dugdale 1988: 229]

Type species. *Teras excessana* Walker, 1963 by original designation.

Diagnosis. Head with vertex scales proclinate short and exposing the frons. Male forewing with costal fold 0.4× or less forewing length, and floor and ceiling of the chamber enclosed by the fold with a sparse field of short broad scales (Fig. 20). Male forewing smooth-scaled. Both sexes with labial palpi elongate triangular. Hindwings lacking a cubital pecten; anal pecten in both sexes with hair-like scales, axillary cord and epaulette with hair-like scales extending to three-quarters or less the distance to the hindwing anal angle, axillary cord scale sockets either not 8-shaped (*flammea*, *excessana* groups), (Fig. 16) or 8-shaped (*notophaea* group). First abdominal tergite (Fig. 14) weakly fringed. Male genitalia with aedeagus orifice dorso-sinistral, 1 or 2 cornuti, short, unequal, apex rounded; vesica often with thumb-like, scobinate basal lobe. Female genitalia with the cestum a long, flattened tube, sometimes with the strongest sclerotisation restricted to one side, and signum with capitulum decumbent and smooth, anterior signum arm weakly developed, with few, weak spinules.

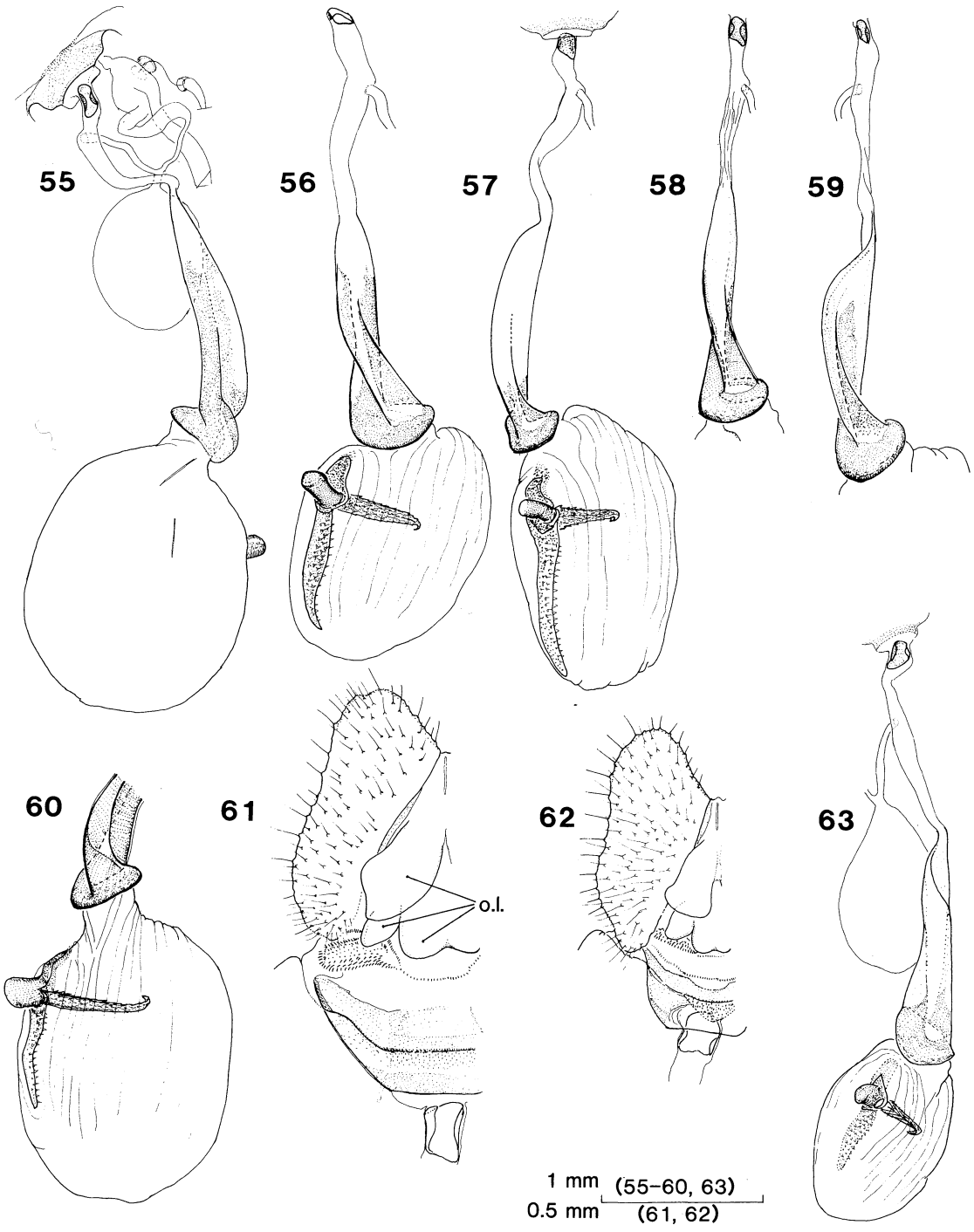


Fig. 55–63 *Ctenopseustis* and *Leucotenes* species, female genitalia; **55,** *Ctenopseustis obliquana*, Waitakere Ranges, AK; **56,** *Ct. obliquana*, Manurewa AK ("♀ "341, single tip analysis); **57,** *Ct. herana*, Dun Mtn NN ("♀ "WCC 19 single tip analysis); **58,** *Ct. herana*, Appleby NN ("♀ "81, single tip analysis), ductus bursae; **59,** *Ct.* "Type II North I." Rukuhia WO, ductus bursae; **60,** *Ct. obliquana*, Waitakere Ranges AK, ductus bursae base, bursa, and signum; **61,** *Ct. servana*, Manaia TK, sterigma, papillae anales, and oviporal eversible lobes (OL); **62,** *Leucotenes coprosmae*, Lake Rotoiti BR, ditto; **63,** *Ct. filicis*, Lee Bay SI, corpus and ductus bursae.

Remarks. *Planotortrix* differs from *Ctenopseustis* in lacking a cubital pecten, the male costal fold covering a sparsely scaled chamber often with reduced campaniform sensilla; and, in both sexes, by the short, proclinate vertex scales which do not overhang the frons. The female genitalia have a flattened cestum, quite unlike the in-rolled, split, twisted cestum characteristic of *Ctenopseustis*, or the grooved tube of *Leucotenes*. From *Apoctena*, *Planotortrix* is distinguished by the unmodified hindwing costal margin and its flattened, rather than tubular, cestum. The long porrect palpi and broad forewings give *Planotortrix* a distinctive facies; from the superficially similar *Catamacta* the genus is distinguished by the forewing veins R4 and R5 (RS3 and RS4) arising separately from the discal cell, and the larger overall size (*Planotortrix* species wingspan is usually over 18 mm, generally over 24 mm; *Catamacta* species rarely exceed 16 mm).

Included species:

P. excessana (Walker); *P. avicenniae* new species; *P. flammea* (Salmon); *P. notophaea* (Turner); *P. octo* new species, *P. octoides* new species; *P. puffini* new species.

KEY TO ADULTS OF *PLANOTORTRIX* SPECIES

1 Male costal fold with a field of scattered broad scales on the "ceiling"; uncus beak trowel-shaped (apically blunt); no basal process on the vesica; aedeagus apex acute or with a lateral process or thorn; female cestum sclerotised laterally only (*notophaea* complex) **2**
—Male costal fold lacking broad scales on the "ceiling" (Fig. 20); uncus beak paddle-shaped (apically broadly rounded, Fig. 46, 47); vesica with a thumb-like process, aedeagus apex broadly rounded; female cestum broadly sclerotised (*excessana* complex) **4**

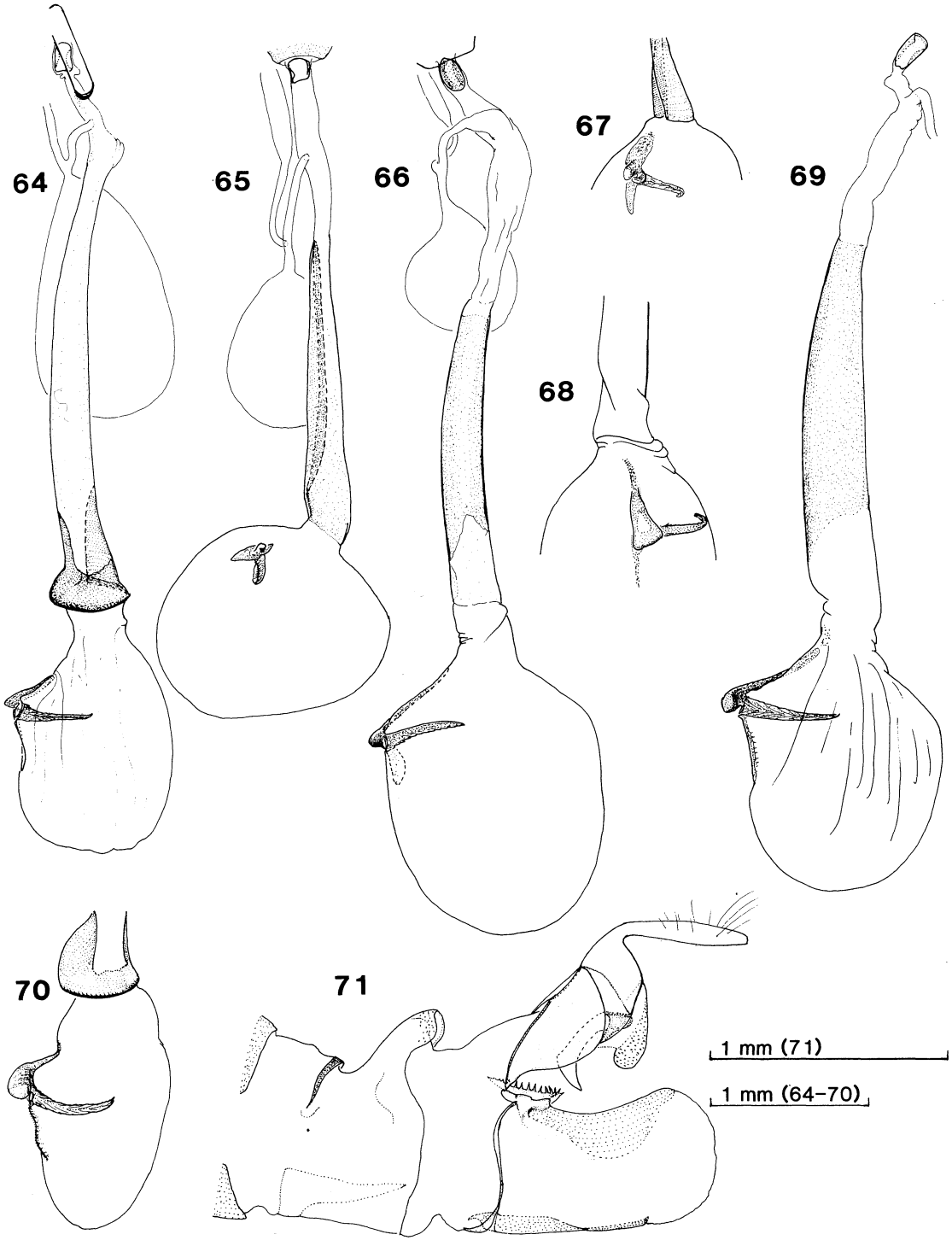
2 Purple-brown or orange-brown moths with whitish hindwings and abdomen, hindwings with a conspicuous purple fringe; male costal fold: forewing length ratio 1:3.2–3.6, hindwing axillary cord tuft extending only halfway to anal angle of hindwing; aedeagus with apical thorn, vesica lacking strong spinules (Fig. 34); female cestum curved with two lateral sclerotised strips (Fig. 73) (larva on *Hebe* spp., GB-FD) .... *P. flammea* (Salmon)
—Hindwings, if whitish, without a contrasting purple fringe; male costal fold:forewing length ratio 1:2.5–2.7; abdomen in both sexes often with a black lateral stripe; male axillary cord tuft strong and extending close to hindwing anal angle; aedeagus apex acuminate, directed diagonally or at right angles to long axis (Fig. 35, 36); female cestum sclerotised along one lateral margin (Fig. 74, 75) **3**

3 Robust moths, wingspan generally exceeding 22 mm, often over 30 mm (especially females); male hindwing anal pecten with hair-like scales; vesica with 2 cornuti (Fig. 36), vesica lacking basal spinules; female cestum widest posteriorly (Fig. 75) (larva on large-leaved Asteraceae, FD, SL coastal, SI coastal, and subalpine .... *P. puffini* new species
—More streamlined moths, wingspan not exceeding 20 mm, usually 15–18 mm; male hindwing anal pecten of stiff, narrow strap-like scales with bifid apices; abdomen in both sexes with a black lateral stripe; vesica with 1 stout cornutus, vesica base with a patch of 3–10 broad sclerotised spinules (Fig. 35); female cestum widest at half length (Fig. 74) (larva polyphagous, Three Kings ND-SI, coastal to montane) .... *P. notophaea* (Turner)

4 Male socii in lateral view narrow and pointed (Fig. 52, 53); basal lobe of vesica obscurely scobinate (at ×32 magnification) (Fig. 38, 40): larvae brown-headed (head capsule sclerotised and patterned, prothoracic and anal shields sclerotised, body grey-green with contrasting pale setal pinaculae) **5**
—Male socii in lateral view broad, apically rounded (Fig. 50, 51); basal lobe of vesica strongly scobinate (at ×532 magnification); larvae green-headed (head capsule greenish, prothoracic and anal shields concolorous with body, integument usually with a whitish "bloom" **6**

5 Female cestum scarcely sclerotised and then only on the middle third of the expanded portion

Fig. 64–71 *Ctenopseustis*, *Leucotenes*, and *Planotortrix* species, female genitalia, *Ctenopseustis filicis* male genitalia; **64,** *Ctenopseustis servana*, Great I, Three Kings Is; **65,** *Leucotenes coprosmae*, Lake Rotoiti BR; **66,** *Planotortrix avicenniae*, Matakana I. BP; **67,** *L. coprosmae*, Lake Rotoiti BR, corpus/ductus bursae junction, signum; **68,** *P. avicenniae*, Matakana I. BP, corpus/ductus bursae junction, signum; **69,** *P. excessana*, Appleby NN (♀ 48 single tip analysis); **70,** *Ct. servana*, Manaia TK, ductus corpus bursae apex, corpus bursae; **71,** *Ct. filicis*, Oban SI, male postabdomen, lateral view showing dorsally constricted segment 8. ➤


64
65
66
67
68
69
70
71
1 mm (71)
1 mm (64–70)

of the ductus bursae, capitulum peg-like, rounded (Fig. 76); male transtilla teeth on a stout ridge, congested and irregularly triseriate, aedeagus orifice with dextral margin unsclerotised (Fig. 40); male costal fold: forewing length ratio 1:2.9–3.5; colour pattern of both sexes variable; larva polyphagous (Chatham Is) .... *P. octoides* new species

—Female cestum sclerotised over most of the expanded portion of the ductus bursae, capitulum flattened or depressed (Fig. 66); male transtilla teeth on a narrow ridge, largely uniseriate (Fig. 49), aedeagus orifice dextral margin sclerotised (Fig. 38); male costal fold: forewing length ratio 1:2.5–2.7; colour pattern of both sexes usually charcoal or dull brown, pattern elements often picked out with ash or cream scales; larva on *Avicennia*, ND, AK–BP, estuarine .... *P. avicenniae* new species

6 Male costal fold: forewing length ratio 1:2.9–3.3; expanded portion of uncus almost as wide as long (Fig. 46), aedeagus orifice dextral margin sclerotised. (Fig. 37); female cestum sclerotised over three-quarters of its length, no lateral, longitudinal shallow groove (Fig. 69); larva polyphagous, ND-SI .....*P. excessana* (Walker)

—Male costal fold: forewing length ratio 1:2.6–2.7; expanded portion of uncus clearly longer than wide (Fig. 47), aedeagus orifice dextral margin unsclerotised (Fig. 39); female cestum usually sclerotised over entire length, and often with a shallow groove along one side, widest posteriorly (Fig. 72); larva polyphagous, ND-SL ..... *P. octo* new species.

Note: The morphological and colour pattern overlap between adults of all members of the *excessana* complex (key couplets 4–6) makes identification of wild-caught adults—especially females—uncertain. One species can be distinguished geographically (*P. octoides*, the only known Chatham species in the complex) and another species can be distinguished by the range of its host plant, (*P. avicenniae* on mangrove). Both of these have "brown-headed" larvae. Females of the two species that have "green-headed" larvae cannot always be confidently distinguished; males can be distinguished on costal fold: forewing length ratios, and, less easily, on uncus shape and aedeagus apex sclerotisation. Each species in the *excessana* complex has a distinctive female-produced sex pheromone.

Planotortrix excessana (Walker)

(Fig. 5, 14, 16, 22, 37, 46, 50, 69)

excessana Walker, 1863: 303 (*Teras*). Lectotype ♂, Nelson, NN, T. R. Oxley, BMNH.

biguttana Walker, 1863: 305 (*Teras*) Lectotype ♂ Nelson, NN, T. R. Oxley, BMNH

["Planotortrix Type B" of Foster et al. 1986: 156. "*Planotortrix* Types B & C" of Foster & Dugdale 1988: 229. "*Planotortrix excessana*" of Foster et al. 1989: 457–465].

Diagnosis. Wingspan ranging from 19–28 mm (males) and 22–34 mm (females).

Male costal fold: forewing length ratio 1:2.9–3.3; male uncus paddle-shaped, expanded area almost as wide as long (Fig. 46), socii in lateral view 2× wider than gnathos arms, and sclerotised in a strip along the caudal margin (Fig. 50); vesica with 2 cornuti, scobinations on the vesica basal lobe easily visible at ×32 magnification (Fig. 37). Female ductus bursae with cestum broadly and strongly sclerotised on all but the basal quarter, and widened from posterior to anterior (Fig. 69).

♀ **calling pheromone main components**: Z5–14:OAc, ratios ranging from 3:97–71:29, (Z5:Z7), and Z9–14:OAc (Foster & Dugdale 1988; Foster et al. 1989).

Distribution (Fig. 5). ND-SI, locally absent on Canterbury Plains around Christchurch, and part of Central Otago; sea level to montane forest.

Hosts. Polyphagous (excluding ferns, and small-leaved angiosperms/conifers).

Material examined. Lectotype ♂ ♂ *excessana*, *biguttana* (BMNH), and 498 additional specimens (NZAC).

Remarks. The Lectotype ♂ ♂ of *Teras excessana* and *T. biguttana* have costal fold: forewing length ratios falling within the range of males associated with females known to produce Z5–14:OAc and Z7–14:OAc, but not Z8–14:OAc. *P. excessana* adults are usually warmly-coloured (and sometimes strikingly patterned) in contrast to the more sombre *P. avicenniae* and *P. octo*. The "biguttana" pattern (a diamond shaped white or cream patch in the forewing discal cell) is present in some individuals of all *Planotortrix* species.

Planotortrix avicenniae Dugdale, new species

(Fig. 7, 38, 49, 53, 66, 68)

["*Planotortrix* Type M" of Foster et al. 1986: 156. "*Planotortrix* 1" "M" of Foster & Dugdale 1988: 229.]

Description. Adult colour pattern usually sombre, charcoal-brown with obscure pattern, sometimes with pattern elements in ash or ochreous scales. Male costal fold: forewing length ratio 1:2.5–2.7, uncus with expanded area longer than wide; socii in lateral view less than 1.5× as wide as gnathos arms (Fig. 53), vesica with 2 cornuti and basal lobe with scobinations indistinct at ×32 magnification (Fig. 38). Female cestum (Fig. 66) as in *P. excessana*.
♀ **calling pheromone major component**: Z5–14:OAc (Foster et al. 1986).

Larva. Head capsule, prothoracic shield, anal shield sclerotised, contrasting with the grey-green faintly striped body and pallid setal pinnacula, forelegs darkened.
Holotype ♂ : [BP] Matakana I Monro Block ex *Avicennia officinalis* em. 11.5.61 [A. E. Marsack], in Type Collection NZAC.

Distribution. (Fig. 7). ND: Kerikeri Inlet (larvae); AK: Puhoi Estuary, Waitemata Harbour; WO: Piako estuary; CL: Firth of Thames, Kopu; Coromandel Harbour, Whangamata, Tairua estuary; BP: Tauranga Harbour, Matakana I.

Host. *Avicennia resinifera* (Verbenaceae)

Material examined. Holotype ♂ , Allotype ♀ , 2 ♂ ♂ 2 ♂ ♂ paratypes (same data as Holotype), 69 other specimens in NZAC.

Remarks. *P. avicenniae* males differ from those of other *excessana* complex species in the North Island in their (unusually) narrow socii and indistinctly scobinate basal lobe on the vesica. The costal fold: forewing length ratio overlaps with that of *P. octo*, and females are not consistently morphologically distinguishable from those of *excessana* and *octo*.

Although most members of an *avicenniae* population are typically charcoal or dull brown, others—particularly females—cannot be distinguished from sombre-coloured females of the other two species, both of which are parapatric as larvae, but are sympatric in flight range as adults with those of *avicenniae*.

The larva of *P. avicenniae* is distinctive, and with its brownish headcapsule, prothoracic and anal shield, darkened forelegs, and grey-green, faintly striped integument is quite dissimilar from the green-headed, green bodied larvae of *P. octo* and *P. excessana*.

The name is the genitive singular of *Avicennia*, the larval host.

Planotortrix flammea (Salmon)
(Fig. 8, 34, 73)

flammea Salmon, 1956: 575 (*Bactra*). Holotype ♂ Homer Forks FD, J. T. Salmon, NMNZ.

Diagnosis. Adult colour pattern purple-brown or orange-brown, hindwings and abdomen whitish ochreous, hindwings almost immaculate, and with a distinct purple or orange fringe. Male costal fold reduced (costal fold: forewing length 1:3.2–3.6); hindwing axillary cord tuft reduced, extending only halfway to hindwing anal angle; female cestum sclerotised laterally on each margin (Fig. 73).
♀ **sex pheromone major components**: Z5–14:OAc, Z7–14:OAc (ratio 50:50) S. P. Foster (pers. comm.).

Distribution (Fig. 8). GB, TO, TK, NN, BR, NC, MC, MK, FD, coastal to alpine.

Material examined. Holotype ♂ *flammea* NMNZ and 30 additional specimens (NZAC).

Host. *Leonohebe odora* complex, *Hebe salicifolia*, *H. stricta*, *H. subalpina* (Scrophulariaceae).

Remarks. *P. flammea* is now known from coastal *Hebe salicifolia* (Truman Track, Bullock Creek, BR), and from subalpine, frost flat, and alpine *Hebe* communities from Mt Hikurangi (GB) southwards. The type population (from Homer Basin, Upper Hollyford Valley FD) is more orange in overall colour, but no consistent morphological differences were seen. *P. flammea* adults resemble in general facies those of *P. notophaea* being somewhat slender, and males of both have conspicuously pallid antennae. The larvae are rarely found abundantly, in contrast to larvae of other *Leonohebe* and *Hebe*-feeding tortricines such as *Harmologa speciosa* Philpott, *H. sanguinea* Philpott, or *Pyrgotis consentiens* Meyrick.

Planotortrix notophaea (Turner)
(Fig. 35, 74)

notophaea Turner, 1926: 135 (*Tortrix*) Holotype ♂ Epping New South Wales (Australia), reared by A. Philpott, NZAC (ex ANIC).
distincta Salmon, 1948: 310 (*Ctenopseustis*, as subspecies of *obliquana*) Holotype ♂ Great Island, Three Kings Islands, AMNZ.

Diagnosis. Adults small (15–18 mm wingspan), often with forewing colour pattern arranged so that a diamond-shaped patch is present in the discal cell; male with a long costal fold (costal fold = forewing length ratio 1: 2.5–2.7), costal fold with "ceiling" sparsely clad in broad upright scales; hindwing anal pecten with stiff, strap-like, apically bifid scales; axillary cord tuft long, extending to hindwing anal

angle. Abdomen of both sexes with a lateral black stripe. Male uncus trowel-shaped, aedeagus with recurved apex, vesica with apical patch of broad spinules (Fig. 35) female cestum sclerotised along one margin only (Fig. 74).

♀ **sex pheromone main component**: Z7–14:OAc (Foster & Dugdale 1988: 229).

Larva. head capsule green with narrow brown or blackish stripes; body green (sometimes bright green), and with a more or less distinct white or cream lateral stripe; forelegs blackened.

Distribution. Three Kings Islands, ND-SI, coastal to montane forest.

Hosts. Polyphagous, more usually found on small-leaved, "hard-leaved" gymnosperms and dicotyledonous angiosperms.

Material examined. Holotype ♂ ♂ *notophaea* (NZAC ex ANIC), *distincta* (AMNZ), and 63 additional specimens (NZAC).

Remarks. *P. notophaea* is a rather slender, streamlined *Planotortrix*. Like *P. puffini*, and *Ctenopseustis* species, the axillary cord and epaulette tufts are composed of stiff long hair scales. Females of *P. notophaea* are distinctive in having the abdomen with a black lateral stripe (absent in sympatric *P. octo* and *P. excessana*). The larva is distinctive; no other known tortricine in New Zealand is bright green with black forelegs and a pallid to cream lateral stripe along the body.

In the absence of further records from Australia, I assume that the (adventive) type population at Epping, near Sydney, is now extinct.

Planotortrix octo Dugdale, new species
(Fig. 6, 39, 47, 51, 72)

["*Planotortrix excessana* Type A" of Foster et al. 1986: 156, Foster & Dugdale 1988: 229; Foster & Roelofs 1988: 1–9.]

Description. Male costal fold:forewing length ratio 1:2.6–2.7, costal fold lacking broad scales on "ceiling". Male uncus (Fig. 47) with expanded portion distinctly longer than wide; socii as in Fig. 51, broad; vesica with basal lobe distinctly scobinate (viewed at ×32 magnification), and 2 cornuti (northern populations) or 1 cornutus (southern populations), (Fig. 39).

Female genitalia. Cestum (Fig. 72) sclerotised over entire length, dextral margin with a shallow groove, widest posteriorly, in some specimens.

♀ **sex pheromone major components**: Z8–14:OAc, 14:OAc, (Galbreath et al. 1985; Foster et al. 1986: 156; Foster & Roelofs 1988: 7 in ratio 98:2; Foster & Dugdale 1988: 229).

Type material. Holotype ♂ "New Zealand MC Taitapu ex ivy, larvae coll. Sept. 1987 G. Burnip & J. S. Dugdale" NZAC.

Distribution (Fig. 6). ND-SL, coastal to timberline.

Hosts. polyphagous.

Material examined. Allotype ♀, 28 paratypes, same data as Holotype and 335 additional specimens.

Remarks. The name *octo* (8) refers to the major component of the female calling pheromone (Z8–14:OAc). *P. octo* is distinguished from *P. excessana* on male structures, and the different calling pheromone components. Galbreath et al. (1985) demonstrated the absence of cross-attraction between *P. octo* and *P. excessana*. Eggmasses of *P. octo*, unlike those of *P. excessana*, are covered with a copiously applied whitish coating extending beyond the eggmass. Such whitish-coated egg masses have been observed in the field (W. P. Thomas, pers. comm.) and in laboratory colonies (D. Rodger, pers. comm.).

In *P. octo* the number of cornuti on the vesica is variable. In northern and western localities (ND-WN, NN-BR-WD in part) males usually have two cornuti on the vesica; in the southern group (NC, MC, CO), there is usually one cornutus.

Planotortrix octoides Dugdale, new species
(Fig. 40, 48, 52, 56, 76)

Description. Medium-sized *Planotortrix*, wingspan 18–26 mm (both sexes); male forewing costal fold: forewing length ratio 1:2.9–3.5 (i.e., comparable with *P. excessana*). Socii width less than 1.5× width of gnathos arms (Fig. 52); male uncus expanded portion longer than wide, transtillar teeth congested (Fig. 48), more or less triseriate towards outer apex of each transtilla plate; aedeagal vesica basal lobe obscurely scobinate (at ×32 magnification) (Fig. 40); female cestum (Fig. 76) expanded centrally, scarcely sclerotised and then only on the expanded portion.

♀ **sex pheromone major component**: Z8–14:OAc (Dr S. P. Foster, pers. comm.).

Larva. head capsule, prothoracic and anal shields sclerotised, ("brown-headed"); rest of body pale grey-green.

Type Material. Holotype ♂: "Chatham Islands NZ: Rangatira I. (South East I) 1–14 Dec. 1987 J. S.

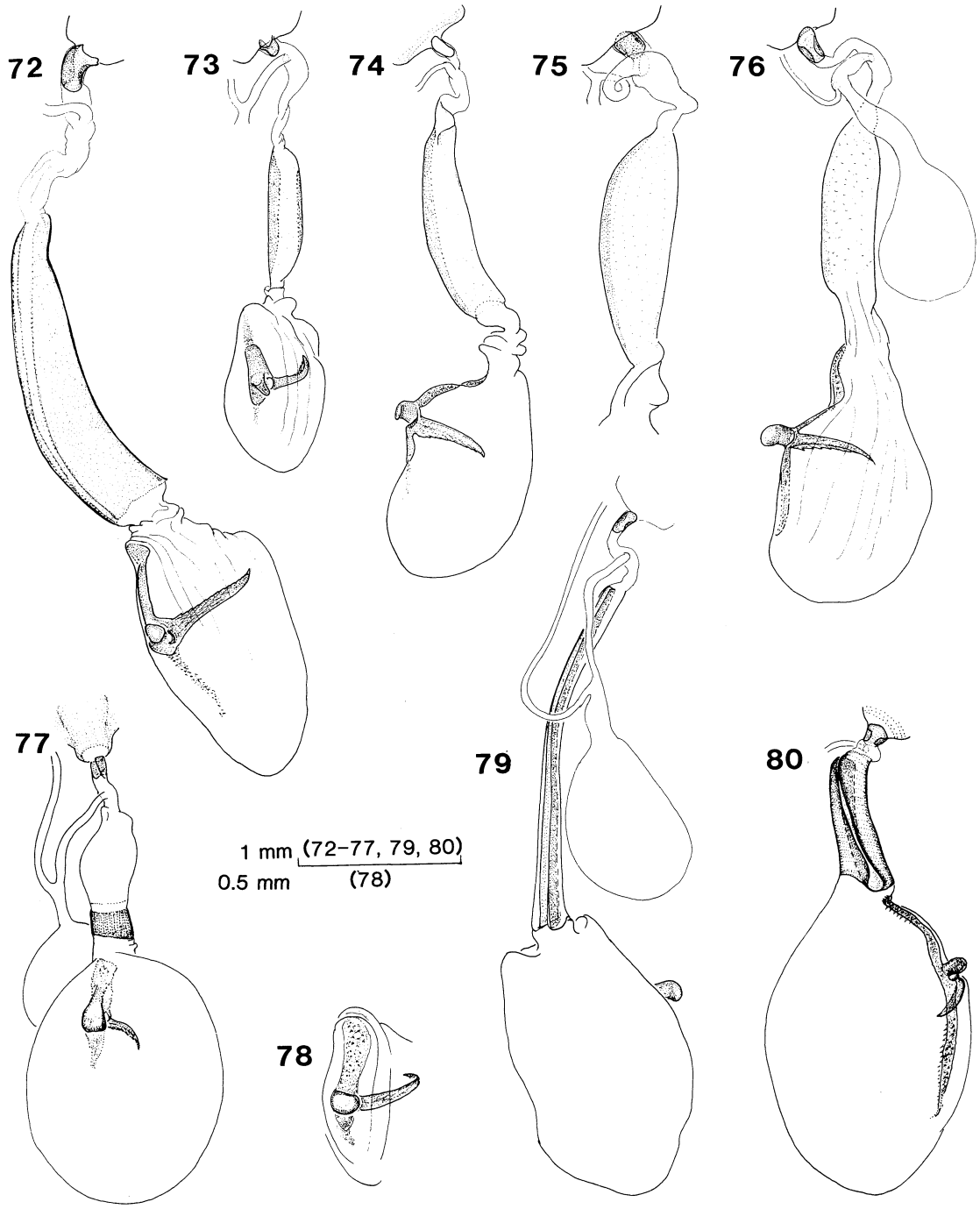


Fig. 72–80 *Planotortrix* and *Apoctena* species, female genitalia; **72**, *Planotortrix octo*, Tai Tapu MC; **73**, *P. flammea*, Ohakune Mountain Road TO; **74**, *P. notophaea*, Golden Downs NN; **75**, *P. puffini*, Lee Bay SI (corpus bursae omitted); **76**, *P. octoides*, Rangatira I, Chatham I (male 1 single tip analysis); **77–80**, *Apoctena* species, female genitalia; **77**, *Apoctena conditana*, Nelson NN; **78**, *A. orthropis*, ditto, signum; **79**, *A. orthropis*, ditto, female genitalia; **80**, *A. pictoriana*, Hanmer NC.

Dugdale". "L[eaf]R[oller] coll. NM, ex *Myrsine* em[erged] 6–8 Feb. 1988" NZAC.

Distribution. Chatham Islands: Chatham, Pitt, Rangatira (South East) Islands.

Hosts. polyphagous.

Material examined. "Allotype ♀ em. 14 Jan. 1988, STA [single tip analysis]", otherwise same data as Holotype, and 42 Paratypes, same data as Holotype and 26 additional specimens, variably patterned.

Remarks. The name *octoides* (similar to number 8, Latin) reflects the major component of the female calling pheromone, along with the morphological dissimilarity between this species and true *octo*.

As with *P. avicenniae, P. octoides* males have slender socii lobes (Fig. 52) and reduced scobinations on the basal lobe of the vesica (Fig. 40). The scarcely sclerotised ductus bursae (and then only on the middle third of the expanded portion of the ductus, (Fig. 76) distinguishes this species from *avicenniae* and the other members of the *excessana* complex.

P. octoides is an allopatric member of the *excessana* complex, and is endemic to the Chatham Islands, where it is the only *Planotortrix* species known. The host range includes both indigenous and introduced angiosperm trees and shrubs, including horticultural cultivars.

Planotortrix puffini Dugdale, new species
(Fig. 7, 36, 75)

[*Planotortrix* Type MBS of Foster et al. 1986: 156. *Planotortrix* I "MBS" of Foster & Dugdale 1988: 229.]

Description. Medium sized to very large *Planotortrix*, wingspan 24–30 mm (males) and 26–40 mm (females). Male costal fold:forewing length ratio 1:2.5–2.7, costal fold "ceiling" with upright broad scales (as in *P. notophaea*); hindwing axillary cord tuft long and extending to hindwing anal margin, hindwing anal pecten composed of hair-like scales. Male uncus trowel-shaped (apically bluntly pointed), aedeagus apex acuminate, vesica lacking scobinations (Fig. 36). Female cestum expanded, widest posteriorly, sclerotised along one side of the expanded zone, as a single lateral strip (Fig. 75); some females with a more or less distinct, but broken blackened lateral stripe on abdomen.

♀ sex pheromone major components: Z5–14OAc, Z7–14:OAc in proportions (Z5:Z7:Z9) 3:97:2 (Foster & Dugdale 1988: 229).

Larva. Head, prothoracic and anal shields sclerotised, brown; rest of body grey or grey-green, forelegs often darkened.

Type Material. Holotype ♂ : "NZSI Lee Bay, coastal. L[eaf] R[oller] HI March 1987. J. S. Dugdale and S. J. Muggleston. Reared ex *Brachyglottis reinoldii* em[erged] 30 April 1987", NZAC.

Distribution (Fig. 7). FD: Breaksea I; SL: Nugget Point; SI: Mt Anglem, summit scrub; Lee Bay, Oban area, Ocean Beach, Port Adventure, Mason Bay (south end); Codfish I; Big South Cape I; coastal and subalpine.

Hosts. *Brachyglottis reinoldii; Celmisia lindsayi, Olearia colensoi colensoi, O. colensoi grandis, O. oporina* (Asteraceae).

Material examined. Allotype ♀ same data as Holotype, 63 Paratypes same data, and 76 additional specimens.

Remarks. *P. puffini* is a robust, usually large species with the slender (or "long-winged") facies of *P. notophaea*, which it closely resembles morphologically. Males may be distinguished from those of *P. notophaea* by the hair-like, rather than flattened, sword-like anal pecten scales, and females by the absence of, or weak development of a black lateral abdominal stripe (strongly evident in *P. notophaea*), as well as the broader forewings and more robust build. From the *excessana* complex, the long hindwing axillary cord tuft, the presence of broad scales on the costal fold "ceiling", the trowel-shaped uncus, and the narrowly laterally sclerotised cestum, serve to distinguish both *P. puffini* and *P. notophaea*.

P. puffini is so far known only from Nugget Point SL (on *Celmisia*), Breaksea Island FD, and Stewart Island and adjacent islands (on *Brachyglottis* and *Olearia*). Mr B. H. Patrick has reared it from summit *Olearia colensoi* on Mt Anglem, Stewart Island. I was unable to find *P. puffini*, or evidence of attack, on Chatham Islands, even though *Olearia oporina* var *chathamica* is present in extensive communities on the southern peaks of Rangatira Island.

The name *puffini* is the genitive singular (Latin) of *Puffinus* (the genus to which the muttonbird belongs. *P. puffini* is associated with "muttonbird scrub" (coastal *Olearia, Brachyglottis* species) over much of its range.

Apoctena Dugdale, new genus

["*Planotortrix* II" Foster & Dugdale 1988: 229, 231]

Type species. *Teras conditana* Walker, 1863.

Diagnosis. Medium to large, usually broadwinged tortricines; labial palpi porrect, usually over 1.8× compound eye width. Male with a reduced costal fold (ratio c. 1:4.0); costal fold lacking broad scales on "ceiling", "floor" nude. Male hindwing (Fig. 18, 19) with a long, usually yellowish tuft of scales on the costal edge just beyond the frenulum, concealed by a series of acuminate scales either above or below, or both. Male genitalia (Fig. 41–44, 54): socii large (e.g., *flavescens*, Philpott 1928, fig. 68) or moderate (*conditana*, Fig. 54) or less than half gnathos arm length; uncus with a distinct neck, expanded apical part oblong, or oval, or trowel shaped, or apically or laterally emarginate; aedeagus orifice dorsodextral (Fig. 41), dorso sinistral (Fig. 42) or apical (Fig. 43), vesica lacking a basal lobe and with 2–6 cornuti, usually stout, sometimes ensiform (Fig. 41).

Female genitalia (Fig. 77–80: cestum usually shorter than corpus bursae (longer in *orthropis*), either sclerotised as a collar (most species, Fig. 77) or as a tube with a lateral longitudinal furrow along its entire length (*orthropis* (Fig. 79), *pictoriana* (Fig. 80), signum complete (Fig. 78).

Common female sex pheromone components: E11–14:OAc, Z11–14:OAc, and some species also with Z9–14:OAc. (Foster & Dugdale 1988: 229).

Included species (other nomenclatural details in Dugdale 1988: 123, 125–126):

Apoctena conditana (Walker, 1863)	n. comb.
Apoctena clarkei (Philpott, 1930)	n. comb.
Apoctena fastigata (Philpott, 1916)	n. comb.
Apoctena flavescens (Butler, 1877)	n. comb.
Apoctena orthocopa (Meyrick, 1924)	n. comb.
Apoctena orthropis (Meyrick, 1901)	n. comb.
Apoctena persecta (Meyrick, 1941)	n. comb.
Apoctena pictoriana (Felder & Rogenhofer, 1875)	n. comb.
Apoctena spatiosa (Philpott, 1923)	n. comb.
Apoctena syntona syntona (Meyrick, 1909)	n. comb.
Apoctena syntona laqueorum (Dugdale, 1971)	n. comb.
Apoctena taipana (Felder & Rogenhofer, 1876)	n. comb.
Apoctena tigris (Philpott, 1914)	n. comb.

and one undescribed species known from males only, Lochnagar Ridge, Paparoa Range BR.

Remarks. This endemic New Zealand genus is distinguished by the presence of a tuft of modified hair-scales (Fig. 18, 19) on the costal edge of the male hindwing, near the frenulum.

Apoctena is not as homogeneous as *Planotortrix* or *Ctenopseustis*. The aedeagus is variable in structure particularly for orifice position (Fig. 41–44). The female cestum states indicate three groups: *conditana* et al. (Fig. 77), *orthropis* (Fig. 79), and *pictoriana* (Fig. 80). This grouping coincides with male hindwing "pseudofrenular" states – the *conditana* et al. state (Fig. 19), the *orthropis* state (Fig. 18), and the *pictoriana* state (the brush very long, extending to at least one-third wing length, and exposed dorsally). The present grouping under *Apoctena* may be paraphyletic and needs closer analysis.

Apoctena species are largely broad-winged, *Planotortrix*-like moths with the wings held flat-folded in repose. The two narrow-winged species are both characteristic of exposed (windswept) plant communities – *A. persecta* (previously in *Epichorista*, Dugdale 1988: 123) on *Coprosma* species, and *A. syntona syntona* on the Auckland Islands largely on *Pleurophyllum* (Asteraceae).

Not all the *Apoctena* species have been analysed for female sex pheromones; of the five species analysed, *A. orthropis* is unusual (a) in having Z9–14OAc in the pheromone (Foster & Dugdale 1988) and (b) combining some *Ctenopseustis* and *Planotortrix notophaea* morphological group characters. The male of *A. orthropis* has a well-developed axillary cord tuft resembling that of *Ctenopseustis* species, the scale sockets (Fig. 17) having the same 8-shape configuration as the sockets of the expandable *Ctenopseustis* axillary tuft (Fig. 15).

All *Apoctena* species have arboreal, or at least above-ground feeding larvae. Some species are polyphagous, (e.g., *A. conditana, A. syntona, A. flavescens*), but six species (at least) are restricted to a genus or family of host plants: *A. clarkei* on *Sticherus*; *A. orthocopa* on *Cyathea*; *A. persecta* on *Coprosma*; *A. pictoriana* on *Nothofagus*; *A. spatiosa* on *Griselinia*. Larvae of *A. conditana, A. pictoriana,* and *A. persecta* have a colour pattern, usually consisting of a dark subdorsal stripe, and the dorsum and lateral areas differentially tinted.

Six species are found in both North and South Islands; two are restricted to the North Island (*A. orthocopa* and *A. clarkei*, both on ferns), three are known only from the South Island (*A. fastigata, A. persecta*, and *A. taipana*). *A syntona* is composed of two polyphagous allopatric subantarctic populations: *A. s. syntona* on Auckland Island and *A. s. laqueorum* on the Snares.

Further work is needed on the suspected synonymy of *spatiosa* with *taipana*, and on the status of the synonyms of *conditana* as listed in Dugdale

(1988: 125). The morphological examination of *conditana* specimens for this paper included the Holotype (from Nelson), and Nelson-Marlborough Sounds specimens agreeing with the Holotype in colour pattern and structure. The name is derived from the Greek *apo* = away and *kteis, ktenos* = a comb; gender feminine, and draws attention to the apomorphous hindwing character.

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