

Supplement to New Zealand Crambinae (Lepidoptera: Pyralidae) — corrections, description of females of two species, and notes on structure, biology, and distribution

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Supplement to New Zealand Crambinae (Lepidoptera: Pyralidae) — corrections, description of females of two species, and notes on structure, biology, and distribution

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Abstract The females of *Orocrambus crenaeus* (Meyrick) and *O. scutatus* (Philpott) are described for the first time; data on early stages of 13 species of *Orocrambus* Purdie are provided, as are additional distributional records for *Orocrambus* (28 species), *Kupea* Philpott (1 species), *Maoricrambus* Gaskin (1 species), *Gadira* Walker (3 species), *Tawhitia* Philpott (1 species), and *Tauroscopa* Meyrick (1 species).

Keywords Lepidoptera; Pyralidae; Crambinae; taxonomy; insect morphology

INTRODUCTION

The taxonomy and systematics of New Zealand Crambinae were discussed by the author in a series of earlier papers (Gaskin 1971, 1973, 1975a,c) and some data on the biology of *Orocrambus* Purdie in another article (Gaskin 1975b). The purpose of the present paper is to summarise additional information obtained since that time.

In particular, the females of *Orocrambus crenaeus* (Meyrick) and *O. scutatus* (Philpott) are described for the first time; some data on the early stages of 13 more species of *Orocrambus* are provided and distributional data from 25 species of *Orocrambus*, 1 of *Maoricrambus* Gaskin, 1 of *Kupea* Philpott, 3 of *Gadira* Walker, 1 of *Tawhitia* Philpott, and 1 of *Tauroscopa* Meyrick, gathered in 1976–77 are presented. In some cases, these data represent the first records of a species for many years; *Kupea electilis* for example, had not been reported since 1930, *Orocrambus fugitivellus* since 1939, and *Gadira petraula* since 1933. The observed distribution of each of these three species was so

limited, and the habitats of *electilis* and *petraula* so specific, that the possibility of providing some protection should be given serious consideration.

I also take this opportunity to correct some errors in Gaskin (1975a) which went unnoticed until recently. First, the drawings of male genitalia for *O. apicellus* and *O. angustipennis* were inadvertently reversed during re-plating for publication; the correct designations are Fig. 3c for the former and 3d for the latter. The same error was made for *O. scutatus* (correct designation Fig. 9c) and *O. siriellus* (correct designation Fig. 9a). In the case of both pairs the females are correctly figured. In the second case the problem was introduced at an earlier stage and compounded; the error also occurs in the male genitalia key and the species descriptions. In the key, for line 21(20) read *siriellus*, for line 23(17) read *scutatus*. The descriptions for the male genitalia on p. 33 and 335 should be reversed. Another minor error occurs in the generic citation for *Kupea* Philpott (p. 345), where the date should be 1930; it is given correctly in the specific citation lower down on the same page.

MATERIALS AND METHODS

Collections were made in New Zealand between December 1976 and April 1977 as follows; two trips into the Mt. Arthur Range — Lake Sylvester region, two to the Lewis Pass, three to Arthur's Pass and adjacent ranges, one to the Ashley Gorge, four to the Mackenzie Plain, three to the Porter River — Castle Hill region, one to coastal Southland, three to Banks Peninsula-Kaitorete Spit, one to Kaitioura, and one (light-trapping for one night only) to Mt. Egmont with the late Dr K. J. Fox. Local collections were made intermittently in the general Christchurch area throughout the period.

Females were induced to oviposit by retaining them in the dark in small boxes or vials (Gaskin 1975b). When eggs were laid the initial colour and colour after 24–36 h were recorded, the basic morphology and morphometrics noted, and the ranges of incubation period observed. After hatching, young larvae were offered a variety of likely food plants (usually grasses) from the collection site. A few eggs and larvae were preserved in 70% alcohol.

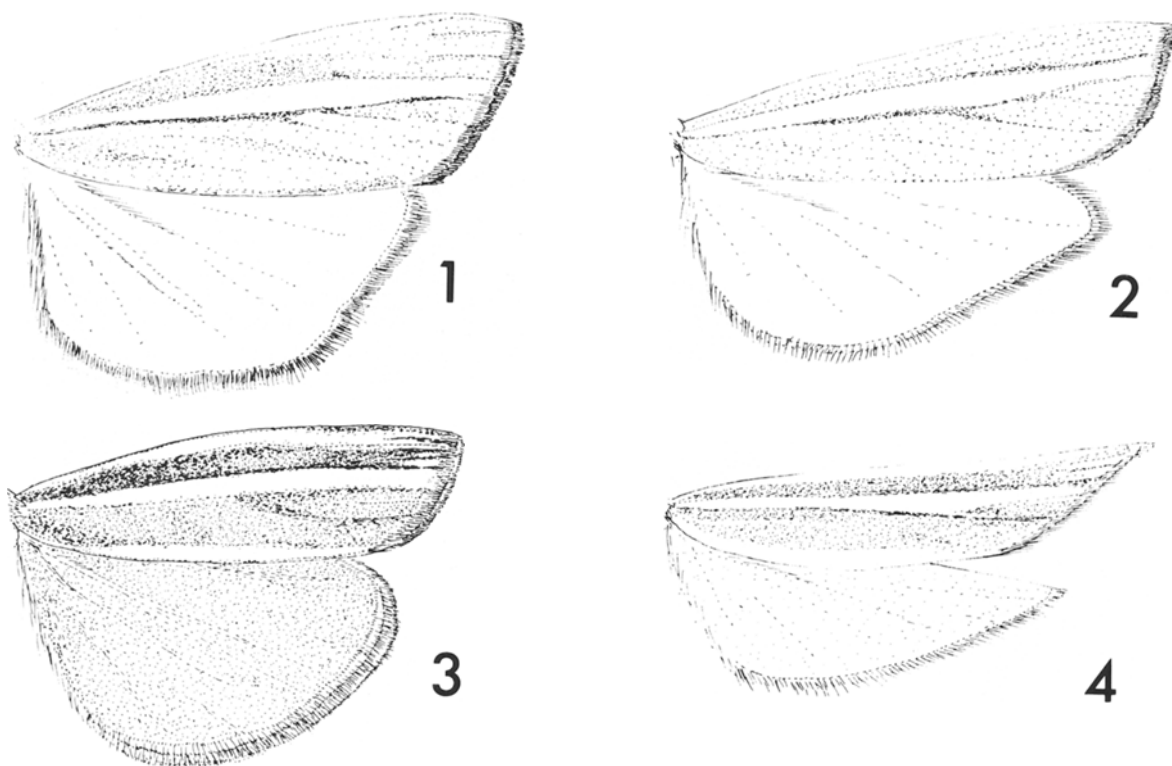


Fig. 1–4 *Orocrambus crenaeus* male, (1); *O. crenaeus* female, (2); *O. scutatus* male, (3); *O. scutatus* female, (4).

Time and other constraints prevented any species being reared beyond the third instar; some larvae simply would not feed, probably because the correct foodplant had not been supplied. For examination of setal patterns, larvae were cleared in 5–10% hot KOH for 10–20 mins, and mounted in glycerine.

RESULTS

Orocrambus crenaeus (Meyrick, 1885)

Description of female. External features (Fig. 1, 2): Alar expanse 32 mm, head, thorax, and abdomen as described by Meyrick for male, forewings well-developed but only about two thirds as wide as those of the male (Fig. 2), pattern otherwise identical.

Genitalia. (Fig. 5). Anal papillae free, triangular, posterior apophyses short, barely length of papilla body; 8th sternite a weak patch in 7–8th intersegmental midline; 8th tergite narrower than length of anal papillae, slightly broader in midline, fusing dorso-laterally with antrum in a very distinctive fashion, the extremities being attached to the dor-

sal wall of the antrum like a pair of “glued tabs”. No distinct lamella postvaginalis, but strong lamella antevaginalis with introrsely directed flanges, only weakly connected to postvaginalis in lateral midlines. Ductus bursae in total (including antrum) about 5–5.5× length of anal papillae, junction with ducts seminalis at about 0.6 from ostium, corpus bursae with one moderate-size, strong signum and a second minute one.

Comments. The female genitalia of *O. crenaeus* indicate a relationship close to *O. abditus* Philpott as indicated by running the characters through the key provided by the author (Gaskin 1975a, pp. 284–285); this is in accord with the previous conclusions about relationships based on male genitalic characters. It is necessary to examine the genitalia under high magnification at the right angle to see that the relict 8th sternite is a narrow crescentic or lunate weak plate, with two sclerotised spots within it.

The flight of this female was quite weak; it was captured at dusk on the edge of Burke’s Pass on 26.ii.1977 in the company of six or seven males. All the specimens were walking on the stalks of a large clump of *Chionochloa? rubra*, two males within a few centimetres of the female. When disturbed it

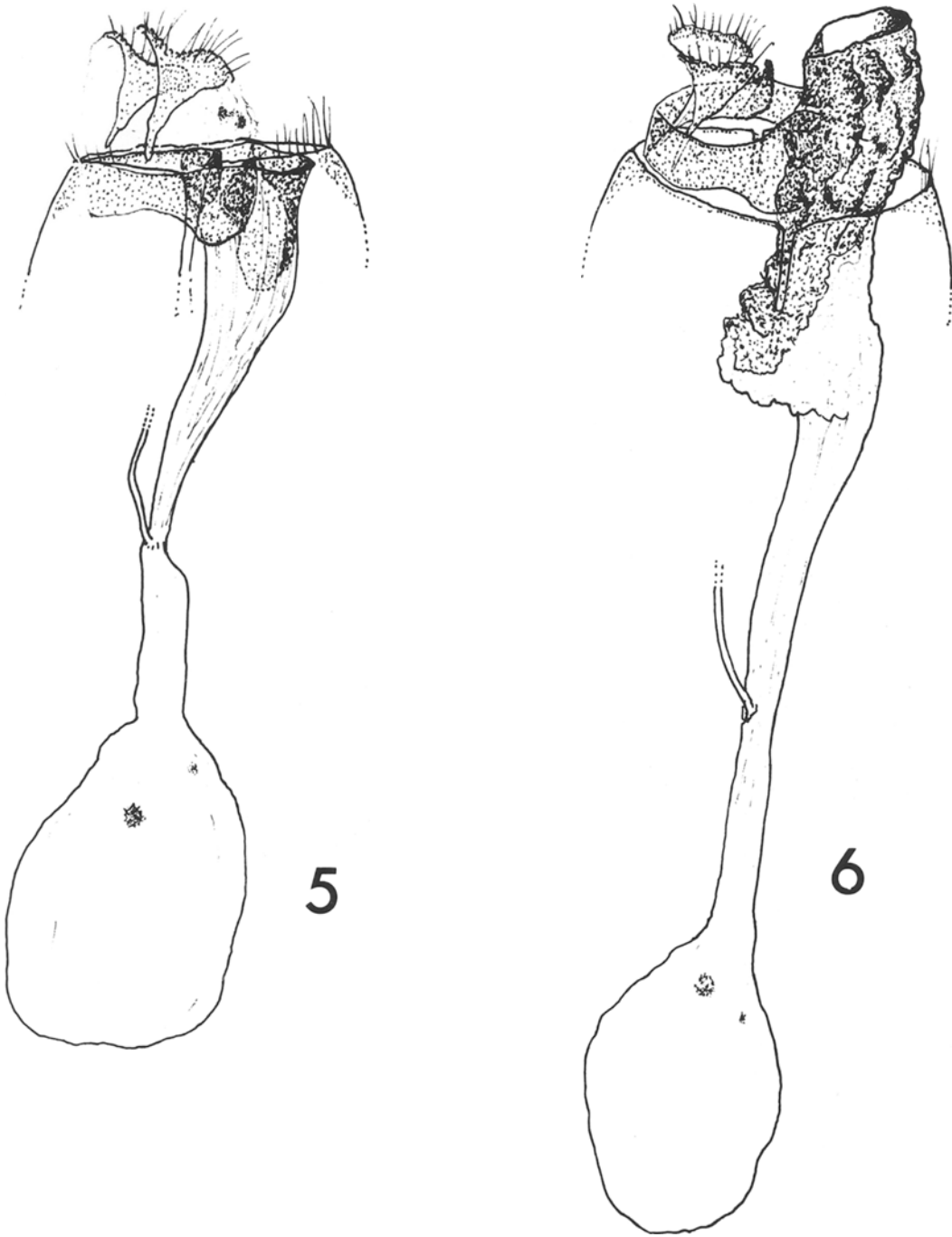
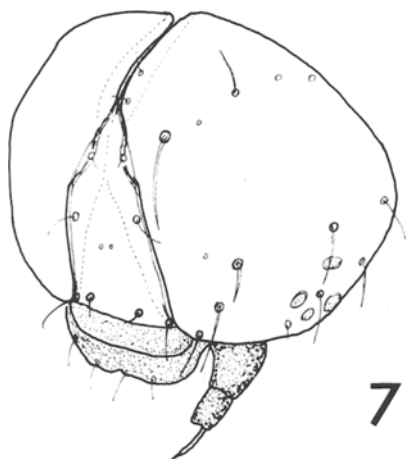
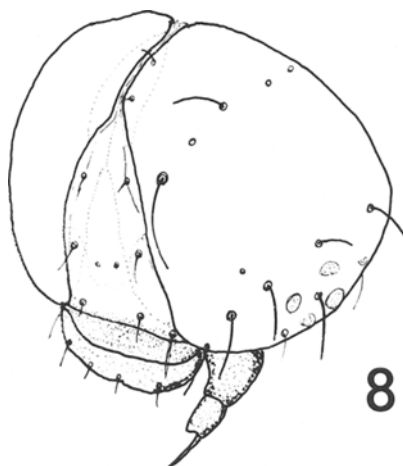


Fig. 5, 6 *Orocrambus crenaeus* female genitalia, (5); *O. scutatus* female genitalia, (6).



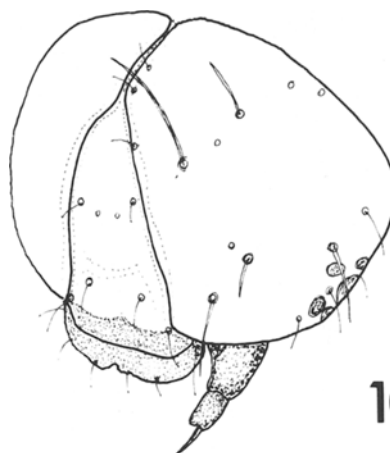
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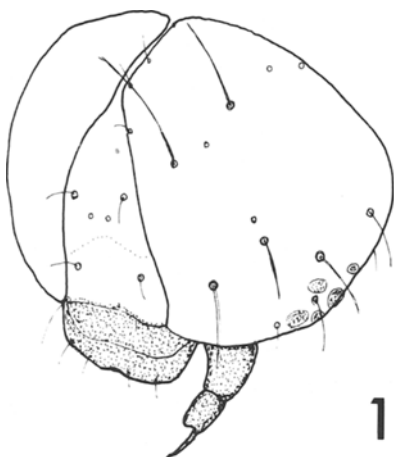
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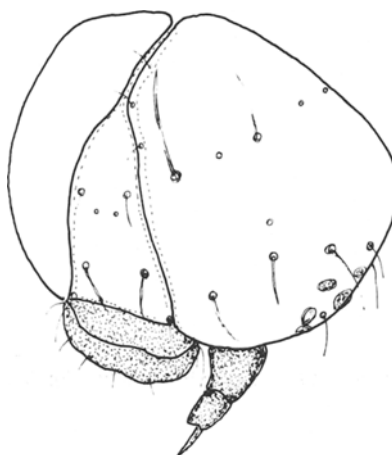
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12

Fig. 7-12 Head capsule setae arrangement in *Orocrambus callirrhous* (7); *O. ephorus* (8); *O. lewisi* (9); *O. philpotti* (10); *O. siriellus* (11); *O. xanthogrammus* (12).

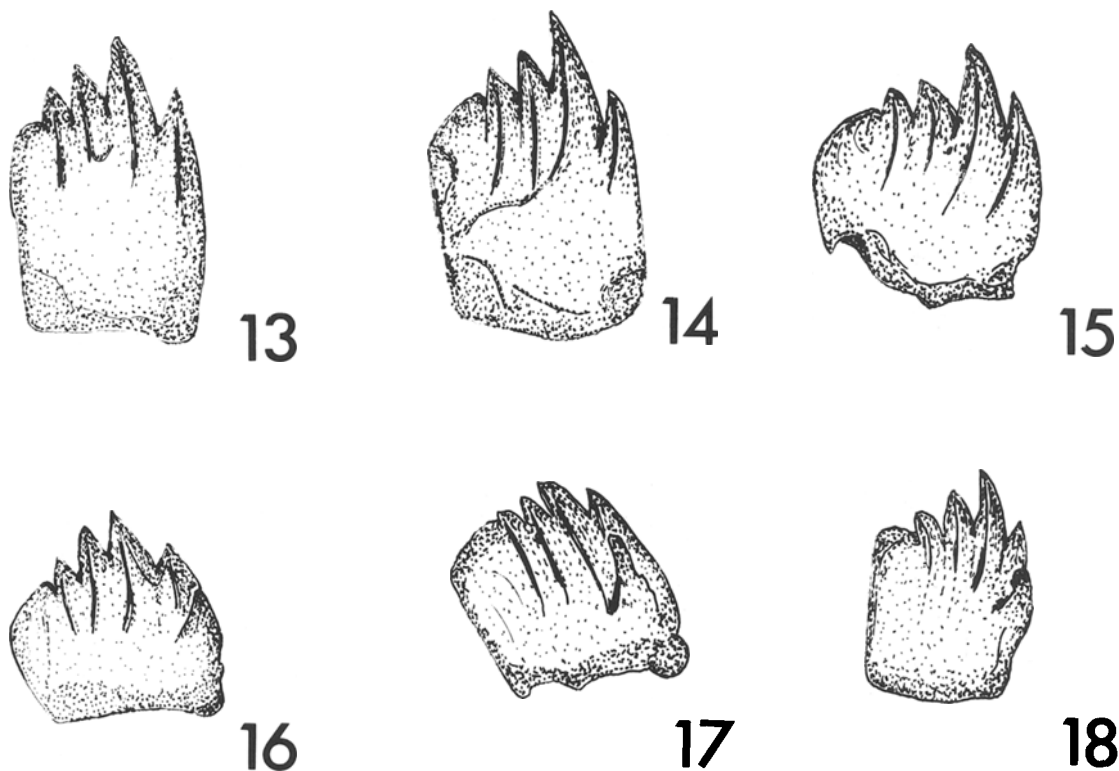


Fig. 13–18 Mesal surface of left mandibles of larvae of *Orocrambus callirrhous* (13); *O. ephorus* (14); *O. lewisi* (15); *O. philpotti* (16); *O. siriellus* (17); and *O. xanthogrammus* (18).

flew, with a markedly fluttering flight unlike that of the male *crenaeus*, to the base of the next tussock a few metres. away, one of the males following it. The specimen did not attempt to fly again and was easily induced to walk into a collecting box. The corpus bursae contained two spermatophores.

Orocrambus scutatus (Philpott, 1917)

Description of female. External features (Fig. 3, 4): Alar expanse 27 mm, head, thorax, and abdomen as described by Philpott (1917) for the male; forewings basically the same reddish brown with a white stripe but considerably paler and much narrower with acutely pointed apices. The hindwings also have pointed apices, and are dull whitish instead of greyish khaki as in the male.

Genitalia. (Fig. 6). Anal papillae free, posterior apophyses about as long as body of papilla; 8th sternite a distinct crescentic sclerite in the intersegmental membrane; 8th tergite only about 0.5× as long as anal papillae, strap-like, firmly fused to

wall of antrum just ventrad of lateral midlines. Antrum large, protruding, strongly sclerotised and folded, narrowing slightly in subantral region, in which only dorsal sclerotisation is present. In this zone there is a transparent intensely convoluted “cerebellar”-looking expansion. Total length of ductus bursae (including antrum) about 7× length of anal papillae, junction with ductus seminalis at about 0.7, corpus bursae with two sclerotised signa, one quite small but clearly visible under low power, and other a microscopic spot under low power.

Remarks. The female was taken not far from Lumsden in company with a series of males of the same species; all were disturbed on an overcast afternoon from red tussock. The flight of the female was even weaker than that of *crenaeus*; it fluttered down less than 1 m from the site of takeoff and attempted to crawl among the basal stalks of a tussock. In the key previously prepared by the author (Gaskin 1975a) this female locates with *O. tuhualis* (Felder & Rogenhofer), consistent with the systematic position predicted on the basis of male genitalia (Gaskin 1975a, Fig. 2).

Table 1 Dimensions, characteristics and duration of egg stage of 13 species of New Zealand *Orocrambus* (Crambinae).

Species	Shape and colour at oviposition	Colour after 48 h	Max and min dimensions (mm)	No. and type of vertical ribs	Duration of egg stage (days)	Clutch sizes recorded	Locality obtained
<i>aethonellus</i>	Oblate, creamy yellow	Vermillion	0.58 × 0.38 to 0.52 × 0.34	17–22 Weak, irregular	19–20 days (Jan)	8–26	Porter's Pass Canterbury
<i>callirrhous</i>	Oblate, pale cream	Vermillion	0.66 × 0.42 to 0.64 × 0.40	28–32 Strong	15–16 days (Feb) 20–21 days (Mar)	10–34 5–41	Birdlings Flat, Canterbury
<i>catacaustus</i>	Globose, greenish white	Pale orange	0.64 × 0.50 to 0.58 × 0.46	26–28 Weak	Did not hatch, larvae dead inside	6–12	Arthur's Pass, Canterbury
<i>crenaeus</i>	Oblate, pale pinkish brown	Dull red	0.64 × 0.48 to 0.60 × 0.44	16–18 Strong	Did not hatch, larvae dead inside	9	Porter's Pass, Canterbury
<i>ephorus</i>	Subcylindrical greenish white	Pinkish orange	0.84 × 0.48 to 0.80 × 0.44	21–23 Strong	13–18 days (Feb)	9–15	Peel Range, Nelson
<i>haplotomus</i>	Elongate-oblate, creamy yellow	Reddish brown	0.60 × 0.38 to 0.59 × 0.36	19–22 Strong	Did not hatch, larvae dead inside	32	Porter River, Canterbury
<i>lectus</i>	Oblate, whitish	Orange	0.54 × 0.38 to 0.50 × 0.34	18–20 Strong	15–17 days (Jan, Feb) Large clutch died after about 36 h	3–10	Porter River, Canterbury
<i>lewisi</i>	Sub-globose, creamy yellow	Orange	0.80 × 0.66 to 0.72 × 0.64	30–32 Weak	16–18 days (Jan, Feb)	9–48	Mackenzie Plain, Canterbury
<i>ordishi</i>	Sub-cylindrical, creamy white	Bright orange	0.56 × 0.32 to 0.52 × 0.28	22–25 Strong	18 days (Jan–Feb), died within 24 h	27	Lewis Pass, Canterbury
<i>philpotti</i>	Oblate, lemon yellow	Apricot	0.54 × 0.40 to 0.52 × 0.36	22–25 Weak	16–17 days (Jan)	13–50	Porter's Pass, Canterbury
<i>siriellus</i>	Truncate, pale yellow	Light orange	0.60 × 0.42 to 0.58 × 0.40	22–24 Strong	20–21 days (Jan)	18–45	Lewis Pass, Canterbury
<i>vulgaris</i>	Oblate, creamy yellow	Pinkish brown	0.54 × 0.40 to 0.52 × 0.36	14–15 Weak	Did not hatch, larvae dead inside	23	Christchurch, Canterbury
<i>xanthogrammus</i>	Melon-shaped yellow-ochreous	Dull red	0.66 × 0.36 to 0.60 × 0.32	40–44 Fine but strong	15–16 days (Jan–Feb)	19	Porter River, Canterbury

Notes on egg structure of *Orocrambus* species

Gaskin (1975b) described the size, shape, colour, number of surface ribs, and the duration of the egg stage in 10 species of *Orocrambus* from New Zealand. In Table 1 comparable data are presented for 13 more species; *O. aethonellus* (Meyrick), *callirrhous* (Meyrick), *catacaustus* (Meyrick), *crenaeus* (Meyrick), *ephorus* (Meyrick), *haplotomus* (Meyrick), *lectus* (Philpott), *lewisi* Gaskin, *ordishi* Gaskin, *philpotti* Gaskin, *siriellus* (Meyrick), *vulgaris* (Butler), and *xanthogrammus* (Meyrick).

Notes on larval structure and colour pattern of *Orocrambus* species

Gaskin (1975a) described the colour, chaetotaxy, and head capsule patterns of eight species of this genus but gave the following caution in the paper dealing with life cycles and biology (1975b, p. 369): "Specific differences are slight and regional variation far from fully explored, such that the constancy of seemingly useful diagnostic features is at present uncertain". This caution applies once more to the notes given below, if anything more so, since larvae in this case were all 1st–3rd instars only. Seven species could not be described because the larvae died in the eggs or soon after hatching. Even a period of 12–24 h was sufficient to leave them in such a state that description of features or chaetotaxy was useless. Exact balance of humidity seems essential in some species of *Orocrambus*; in others such as *vittellus* and *flexuosellus* tolerance of variable conditions prior to hatching is considerable.

I could not find any differences in the patterns of segmental setae in these young larvae which I did not suspect were the result of distortions during fixation, storage, or clearing and mounting. Some differences were noted in the patterns of setae on the head capsules (Fig. 7–12) especially in the spatial relationship between P1 and P2, and A1, A2, and A3. Sample sizes were small however, and there is individual variation with a presently unknown range.

More promising results for larval identification were obtained from the mandibles of the six species available for study. The mesal surfaces of the left mandibles are shown in Fig. 13–18; they all exhibit distinct characters which seem to be consistent within the available samples. Those of *callirrhous* and *ephorus* have only four serrations and are rather truncate but the latter has a long, curved second tooth and a markedly truncate medial angle.

The mandible of *lewisi* also has four serrations but is curved on the medial margin. *O. philpotti*, *siriellus*, and *xanthogrammus* all have five serrations,

the fifth in the form of a distal 'thumb' which is triangularly pointed in *philpotti*, inset and narrowed in *siriellus*, and marginal but with a blunt and slightly expanded apex in *xanthogrammus*. The mandibles, on the basis of present material, would seem to hold out considerable promise of a means of easy identification of larvae of *Orocrambus* and merit much further study.

Distribution record summary with some notes on collecting sites of Crambinae collected in 1976–77

Locality codes as in Crosby et al., 1976

- Orocrambus abditus* (Philip.). NC: Arthur's Pass 850 m, Jan 77; Porter's Pass 1050 m, Jan 77; Kowai River, Jan 77; SC: Opuha 250 m, Jan 77; MC: Gapes Valley 200 m, Jan 77.
- O. aethonellus* (Meyr.). MC: Porter's Pass 900–1100 m, Jan 77.
- O. angustipennis* (Zell.). OL: Burwood 500 m, Jan 77.
- O. apicellus* (Zell.). NN: Cobb Reservoir 900 m, Jan 77.
- O. callirrhous* (Meyr.). NC: Arthur's Pass 900 m, Jan 77. MC: Craigieburn 650 m (in shingle of river bed), Feb 77; Kaitorete Spit, sea level (in short dry, over-grazed pasture), Mar 77; Porter River 700 m (among boulders and shingle), Feb 77. DN: Shag Point, sea level (in dune grasses) Otago, Jan 77.
- O. catacaustus* (Meyr.). NC: Arthur's Pass 900 m (in sundew-sphagnum bog), Feb 77.
- O. crenaeus* (Meyr.). NN: Mt Peel 1630 m (in dense tussock), Feb 77, Sylvester Ridge 1300 m, Jan 77; NC: Arthur's Pass 1600 m (in dense tussock) Feb 77. MC: Porter River 750 m, Feb 77. SC/MK: Burke's Pass 600 m (in scattered brown tussock) Cant., Feb 77. MK/CO Lindis Pass 1000 m, Jan 77.
- O. cyclopicus* (Meyr.). MC: Craigieburn 1200 m (among rocks with sparse grass), Mar 77; Kaitorete Spit sea level (in silt pans behind dunes, very abundant), Mar 77; Kowai River 800 m, Mar 77. MK/CO Lindis Pass 100 m, Jan 77. MK: Tekapo Canal region, Mackenzie Plains 650 m (in short, dry over-grazed pasture), Feb 77.
- O. enchophorus* (Meyr.). MC: Craigieburn 1300 m, Mar 77. MK: Old Haldon Road area, East Mackenzie Plains 580 m, Feb 77.
- O. ephorus* (Meyr.). NN: Mt Peel 1600 m (in dense snowgrass) Feb 77. NC: Arthur's Pass 1200 m (in speargrass-filled gully) Feb 77.
- O. flexuosellus* (Doubl.). NN: Cobb Reservoir 900 m, Jan 77. MC: Christchurch, Dec 76–Apr 77; Kowai River 700 m, Jan 77. SC: Opuha 250 m, Jan 77.

- O. fugitivellus* (Huds.). MK: Old Haldon Road area, East Mackenzie Plains 580 m (in short reddish unidentified grasses, Gray's River Flats), Feb 77.
- O. haplotomus* (Meyr.). BR: Lewis Pass 1000 m, Jan 77. MC: Broken River 700 m, Jan 77; Porter River 800 m, Feb 77.
- O. heliotes* (Meyr.). NN: Sylvester Ridge 1300 m, Jan 77. BR: Lewis Pass 1000 m, Jan 77.
- O. isochytus* (Meyr.). NN: Mt Peel 1600 m (edge of dense stand of snowgrass), Feb 77.
- O. lectus* (Philp.). MC: Broken River 700 m, Jan, Feb 77; Porter River 800 m, Jan, Feb 77.
- O. lewisi* (Gask.). MC: Cashmere Hills 400 m, Cant., Jan 77; Porter River 700 m, Feb 77. MK: Lake Ohau, Cant., Jan 77.
- O. mylites* (Meyr.). NN: Sylvester Ridge 1350 m (settling in lichen pans among *Chionochloa australis*), Jan 77.
- O. ordishi* (Gask.). NC: Arthurs Pass 800 m, Jan 77. MC: Cashmere Hills 400 m, Jan 77; Kaitorete Spit sea level, Mar 77; Porter River, 600 m, Jan 77. MK: Lake Ohau 700 m, Jan 77; Tekapo Canal Region, Mackenzie Plain 650 m, Feb 77. MK/CO: Lindis Pass 1000 m, Jan 77.
- O. paraxenus* (Meyr.). MK: Tekapo Canal region, Mackenzie Plain 600 m (in dry, over-grazed pasture), Feb 77.
- O. philpotti* (Gask.). BR: Lewis Pass 1000 m, Jan 77. NC: Arthur's Pass 850 m (in hard tussock), Jan, Feb 77, also at 1600 m in Feb 77. MC: Broken River 700 m, Jan 77; Cass 800 m, Jan 77; Broken River 700 m, Jan 77; Porter's Pass 900–1150 m, Jan, Feb 77; Kowai River 700 m, Jan, Mar (worn) 77.
- O. ramosellus* (Doubl.). BR: Lewis Pass 1000 m, Jan 77. MC: Christchurch, Dec 76–Feb 77; Kowai River 700 m, Jan 77; Springfield 250 m, Jan 77. SC: Opuha 300 m, Jan 77. SC/MK: Burke's Pass 600 m, Jan 77. MK: Tekapo Canal region, Mackenzie Plains, 700 m, Feb 77. OL: Keys 500 m, Otago, Jan 77.
- O. scutatus* (Philp.). OL: Centre Hill, Mossburn 500 m, Otago (in mixed tussock stands but specifically red tussock), Jan 77.
- O. simplex* (Butl.). NN: Hope Saddle 600 m, Nel., Jan 77. BR: Maruia River 600 m, Nel., Jan 77. NC: Arthur's Pass 850 m, Jan 77. MC: Christchurch, Mar 77.
- O. siriellus* (Meyr.). BR: Lewis Pass 1000 m (in red tussock), Jan, Feb 77. NC: Arthur's Pass 700 m (in red tussock), Jan 77.
- O. vittellus* (Doubl.). NN: Sylvester Ridge 900 m, Jan, Feb 77. BR: Maruia River 600 m, Jan 77. NC: Arthur's Pass 700 m, Jan, Feb 77. MC: Broken River 750 m, Jan 77; Christchurch, Dec 76–Mar 77; Craigieburn 650 m, Feb 77; Kaitorete Spit, Mar 77; Kowai River 700 m, Jan 77. MK/CO: Lindis Pass 1000 m, Jan 77.
- O. vulgaris* (Butl.). NC: Arthur's Pass 850 m, Jan 77. MC: Christchurch, Mar 77; Craigieburn 1300 m, Mar 77; Kowai River 700 m, Jan 77. MK: Mt Cook Nat. Park 500 m, Feb 77; Tekapo Canal region, Mackenzie Plains 700 m, (in dry pasture), Feb 77. MK/CO: Lindis Pass 1000 m, Jan 77. OL/SL: Keys 500 m, Jan 77.
- O. xanthogrammus* (Meyr.). MC: Porter River 600 m (among shingle and boulders in river bed), Feb 77.
- Maoricrambus oncobolus* (Meyr.). MC: Porter River 800 m (among boulders and lichens at margin of river bed), Feb 77.
- Kupea electilis* (Philp.). MC: Kaitorete Spit, sea level (in silt pans among cushion plants behind dunes), Apr 77.
- Tawhitia pentadactyla* (Zell.). MK: Tekapo Canal Region, Mackenzie Plains (settling on bare ground in dry, brittle over-grazed pasture; very abundant), Feb 77.
- Gadira acerella* (Walk.). MK: East Mackenzie Plain, Old Haldon Road area (in moist patches with *Juncus* and *Carex* spp.), Feb 77.
- G. leucophthalma* (Meyr.). MC: Kaitorete Spit sea level (settling on lichens in silt pans among cushion plants behind dunes), Apr 77.
- G. petraula* (Meyr.). MC: Cashmere Hills 500 m (on exposed lichen-covered outcrops), Jan 77.
- Tauroscopa notabilis* (Philp.). NN: Mt Peel 1300 m (in carpet grass), Feb 77; Sylvester Ridge 1350 m (open patches of ground between carpet grass clumps), Jan 77.

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