

## Record of an upland grassland moth in a coastal salt marsh in Otago, New Zealand

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The tortricid moth "*Eurythecta*" *leucothrinca* Meyrick is here recorded from coastal salt marsh for the first time. The species is known from a number of sites, from eastern Canterbury to northern Southland, all in montane to sub-alpine grasslands. The female is very short-winged (brachypterous), which indicates that the species has limited dispersal ability. The flight-period of the adult males is April to early June in montane to sub-alpine areas, but in the salt marsh on Rabbit Island, Blueskin Bay, it was found flying in late June. Both populations of adults are diurnal. Possible reasons for the presence of the moths in the salt marsh are suggested by reference to past tectonic events in eastern Otago. This observation emphasises the conservation value of the salt marsh on Rabbit Island.

*Keywords:* Tortricidae, *Eurythecta leucothrinca*, upland grassland, salt marsh, Rabbit Island, flight-period, immobility, tectonics, conservation

### INTRODUCTION

The presence of what are generally considered to be alpine or upland species of moths at discrete coastal sites is well known in New Zealand (Philpott, 1917; Hudson, 1928; Dugdale, 1975; Patrick, 1983) although from a biogeographic standpoint the subject has not been adequately addressed. Most of these coastal sites are in southern New Zealand, including Tiwai Peninsula, Seaward Moss, Fortrose Spit and Three Sisters sand dune. At most of these sites the normal coastal flora is supplemented with upland genera and species of both plants and insects, which together make an upland community. This paper records a normally alpine or upland moth species at a coastal site north of Dunedin, where alpine or upland vegetation is absent.

The diurnal "*Eurythecta*" *leucothrinca* Meyrick (Tortricidae: Archipini) (Fig. 1) has been recorded at a number of montane to sub-alpine grassland sites in the eastern South Island from Canterbury (Cass, Porter River, Lake Lyndon) to northern Southland, including the Danseys Pass (Patrick, 1982), Great Moss Swamp (Barratt and Patrick, 1987), Lammermoor Range, South Rough Ridge, Swampy Hill, and Upper Oreti Ashley Flats (B.H. Patrick, unpublished records). The species is the last to appear of the autumn-emerging Lepidoptera of these areas (Barratt and Patrick, 1987) with a known flight period of April to mid June. The female is brachypterous and has a tendency to hop. The species was not previously known from lowland sites such as salt marshes. The larval foodplant is not known, but it is likely that the larvae feed on leaf-litter or in short swards in the grassland/herbfield sites (J.S. Dugdale, pers. comm.).

### THE RABBIT ISLAND RECORDS

On 27 June 1989, I spent two hours on Rabbit Island, Blueskin Bay (45°44'S, 170°34'E), Waitati, Otago, examining the extensive salt marsh communities on its western shore. Seven males of a diurnal moth were collected and identified by myself as belonging to *Eurythecta*

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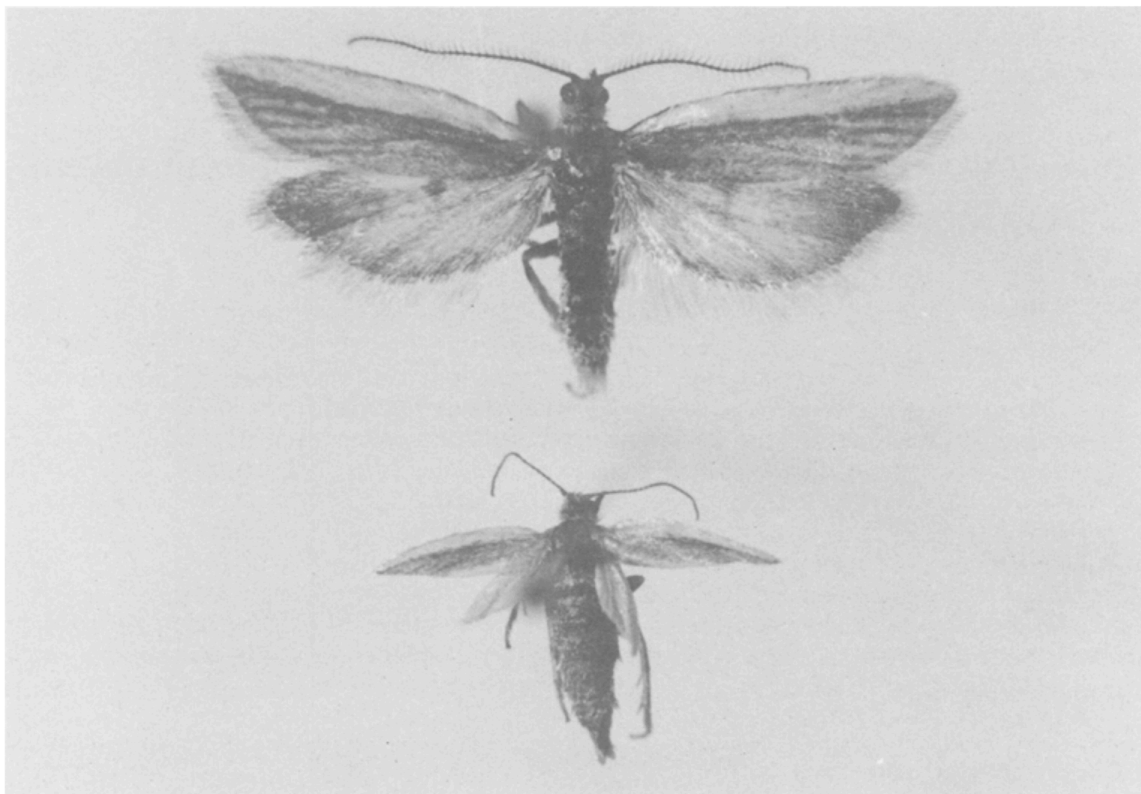


Fig. 1 – Above, an adult male of *Eurythecta leucothrinca* from Rabbit Island. Wingspan 17.5 mm. Below, a female from Bottle Rock, Lammerlaw Range, at 975 m, 4 May 1989.

*leucothrinca* Meyrick 1931b (Hudson, 1939). The seven adult males caught (out of approximately 15 seen) were flying in calm, warm, sunny conditions. The identification was confirmed by Mr J.S. Dugdale, Entomology Division, DSIR, Mt Albert, Auckland. Specimens are in the NZAC collection at DSIR, Mt Albert and the B.H. Patrick collection.

The vegetation of the site is dominated by *Sarcocornia quinqueflora* with some *Samolus repens* and *Selliera radicans*. Shrubs of the deciduous *Plagianthus divaricatus*, and tussocks of *Poa cita*, grow adjacent to the site.

I sampled four nearby mainland salt marshes soon after discovering *E. leucothrinca* on Rabbit Island, but without success. These localities were Aramoana, Waitati, Evansdale and Karitane salt marshes.

## DISCUSSION

*E. leucothrinca* is regarded as being effectively immobile, as it has a brachypterous female. The adults must have been present on Rabbit Island before I found them, which means that they emerge at about the same time of year on the coast as they do in upland areas. It is probable that this emergence pattern is controlled by day length.

In upland areas of east Otago it is not unusual to find the adult *E. leucothrinca* flying while snow is covering up to 40% of the ground. This is quite a different climatic regime to that encountered by an adult emerging in June on a comparatively sheltered coastal site.

*E. leucothrinca* is not an isolated case. An undescribed moth species of the genus *Reductoderces* (Psychidae) lives at Evansdale Glen, which is within 500 m of Blueskin Bay. This species has characteristic case-larvae feeding on algae on rock-faces, and the female is apterous. The conspicuous "long-tailed" cases are up to 15 mm long, and I have found them on The Remarkables, Garvie Mountains, Old Man Range, Mt Bengier, Great Moss Swamp and Silver Peaks at altitudes ranging from 750 to 2100 m (B.H. Patrick unpublished records). I suggest that the distributions of this species and *E. leucothrinca* provide us with

invertebrate evidence for a past (or continuing) geological event which links these shoreline communities with those of the inland mountains.

The presence of these moth species is difficult to explain without reference to the known geological history of eastern Otago. Benson (1941) shows clearly that the Miocene peneplain, which is still a feature of much of Central Otago, has been dislocated in many parts of eastern Otago affected by volcanic eruptions during the Pliocene. In some areas, Rabbit Island included, he has mapped the peneplain surface as now lying below sea level. In Rabbit Island's case, he believes the peneplain is about 125 metres down. He believes the deformation was caused by crustal instability, which in turn caused crustal movements and eruptions over a prolonged period of time from the late Miocene to the Pliocene. Therefore he suggests that synclines such as Blueskin Bay, of which Rabbit Island is a part, are essentially of tectonic origin.

I therefore suggest that the presence of *E. leucothrinca* at sea level is consistent with the available geological evidence of gradual but substantial deformation of the Miocene land surface. Apparently most of the flora and fauna did not survive this change, so we are fortunate to have two surviving species of moths that dramatically corroborate the geological evidence.

Additionally the presence of *E. leucothrinca* on Rabbit Island emphasises the high conservation value of the salt marsh community represented there. At present it has minimum protection, since it is designated only as recreation reserve. Because of the island's relative isolation, in comparison with nearby mainland salt marshes, it has been little modified by human activities over the past 150 years. As a consequence, its plant communities are largely intact, and preserve a sequence from mud flats to salt marsh ribbonwood that is among the best in eastern Otago. Further survey work is no doubt required, but observations to date indicate that the salt marsh on Rabbit Island is extremely important for conservation of the characteristic native plants, insects and birds of coastal eastern Otago. I recommend that the biological importance, based on the information presented above, of Rabbit Island be recognised and that its reserve status be upgraded. Additionally, a full biological inventory should be done, as I am confident that other species of high conservation value would be found.

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