

# The cricket *Ornebius aperta* (Orthoptera: Gryllidae) established in New Zealand

G. W. RAMSAY

DSIR Plant Protection, Private Bag, Auckland, New Zealand

## ABSTRACT

The mogoplistine cricket *Ornebius aperta* Otte & Alexander 1983 is established in the Auckland region. It may be recognised by its characteristic song but as it is ventriloquistic and retiring only 1 specimen has as yet been collected. A similar if not identical species was collected at Paihia, Northland, in 1977. The Auckland population is either an extension of the range of this species or newly-immigrated.

**Keywords:** Gryllidae, Mogoplistinae, *Ornebius*, new record.

## INTRODUCTION

The discovery of a population of a mogoplistine cricket at Auckland is interesting as it is only the third time such a cricket has been reported as occurring in New Zealand. Its song is very different from those of other New Zealand crickets and it was by this that its presence was first realised. However, the species is highly ventriloquistic and difficult to locate by its song, apart from being inconspicuous ;and inhabiting shrubbery, so it was 13 months from the time it was first heard before a specimen was captured and identified as *Ornebius aperta* Otte & Alexander 1983 (Ramsay 1990).

The genus occurs in Australia where 29 species classified in 3 species groups are present, distributed mainly along the eastern seaboard, especially that of Queensland (Otte & Alexander 1983). It is also present in the Cook Islands, Samoa, Tonga and Fiji. The body length varies from approximately 6 mm up to 1 centimetre. All species are flightless,

females being apterous and males lacking hindwings. The forewings cover only the anterior half of the abdomen. The pronotum is expanded posteriorly and the body is densely covered by scales.

The establishment of yet another insect species in New Zealand is part of the continual gradual homogenisation of the faunas of the World despite quarantine barriers. Such examples are frequently cases of anthropogenisation.

### PREVIOUS RECORDS

*Ornebius* was first recorded in New Zealand by Caudell (1927) who reported that a specimen had been collected at Rotorua on 20 July 1922 by members of the 1922 Fiji-New Zealand Expedition of the University of Iowa. The record is based on a single male specimen identified as *Ornebius novarae* (Saussure 1877), and is the basis of its being listed as a New Zealand species by Wise (1977). This discovery of an *Ornebius* in a settled area, one which had been at least superficially investigated entomologically, was surprising. Further, the species has not been recollected there, or anywhere else in New Zealand, despite the presence of several entomologists involved in forest biological survey over a period of years at the Forest Research Institute, Rotorua. The record of *O. novarae* at Rotorua should therefore be regarded, at best, as being dubious. This suggestion is supported by the fact that another insect collected at Rotorua by the same expedition, the earwig *Euborellia annulipes* (a large cosmopolitan species which prefers coastal areas (Hudson 1973)), has also not been recollected there. Perhaps specimens of both species were mis-labelled. Interestingly enough these 2 were the only species found by the expedition to be common to both Fiji and New Zealand.

The second record is unpublished. Four specimens of an *Ornebius* species were collected at Paihia, Northland, by Dr R. D. Archibald, then of the MAF Auckland Plant Health and Diagnostic Station at Mt Albert. These were sent overseas for specific identification but a reply has not been received. This population probably still persists but has been neither monitored, nor recollected.

### DISCOVERY

The realisation that another cricket species was present in the Auckland area first came about when a strange cricket song was heard at Royal Oak during April 1989. It was not heard again until the following year when it was noted at Titirangi in February, Avondale in March, and the Auckland University grounds in April. I also heard it at Tairua, Coromandel Peninsula during April 1990. In no case was it possible for me to locate the singer. However, on 20 May 1990, Mrs G. Sharp of 7 La Veta Avenue, Mt Albert, Auckland, captured an adult male, which had possibly been attracted by light, on the back door of her home. She had noticed the song on several occasions and attempted, unsuccessfully, to locate the insect responsible. This is the only Auckland specimen known to have been captured (Ramsay 1990).

### IDENTITY

The unique Auckland specimen, which fortunately is a male, has been identified as *Ornebius aperta* belonging to the "wandella" species group. This is characterised by having the face and first 2 pairs of legs only, weakly marked (the integument is more or less uniformly coloured, markings being formed by darkly pigmented scales); by the presence of up to 3 dark markings along the posterior border of the forewings of the male, and indistinct dark markings scattered over the remainder of the surface, and by the form of the 10th abdominal tergite which usually has a pair of tufts of setae or spines near the mid-line.

In the Australian male *O. aperta* described by Otte & Alexander (1983) the face and legs are weakly marked; the posterior margin of the forewing is completely dark, the darkening of the posterior mirror vein being separate, the medial mirror vein is dark, and the unions of mirror veins are dark also. The overall result is a pair of anterior and a pair of posterior dark spots, and the dark posterior border. The stridulatory file has 166 teeth. Femur I with 3-4 indistinct dark bands, femur II with 1 distinct band, tibiae

I & II darker and indistinctly banded, femur III reddish brown distally, tibia III darker with proximal and distal dark bands. Dorsum and venter of abdomen and pronotum similar in colour; abdominal sternites with a transverse row of several dark brown spots symmetrically placed. In the illustration the 10th abdominal tergite has strong shoulders at the sides, posterior border not differentiated medially, setae present only on the shoulders, and suranal plate differentiated at the posterior only. The genital processes are slightly club-shaped and dark at the base (Otte & Alexander 1983).

#### AUCKLAND SPECIMEN

The Mt Albert specimen (Fig. 1) generally conforms in detail with the above description but there are some differences mentioned below, especially with the wing markings and 10th abdominal tergite. It is rusty brown in colour and 8 mm long. From above, the pronotum tapers toward the anterior, and the abdomen tapers toward the posterior, so that the outline is somewhat cigar-shaped. It is a soft, delicate, rather flat insect with long fine antennae and abdominal cerci. Scales completely cover the body except for the wings, and venter of the head (including mouth-parts) and thorax. The scales are considerably less dense on the sides and top of the legs than they are on the body, and they are absent on the underside of the legs. There is a dense fringe of strong scales along the posterior rim of the pronotum.

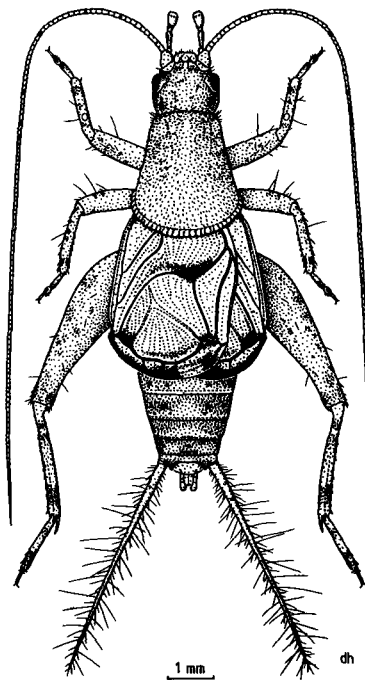
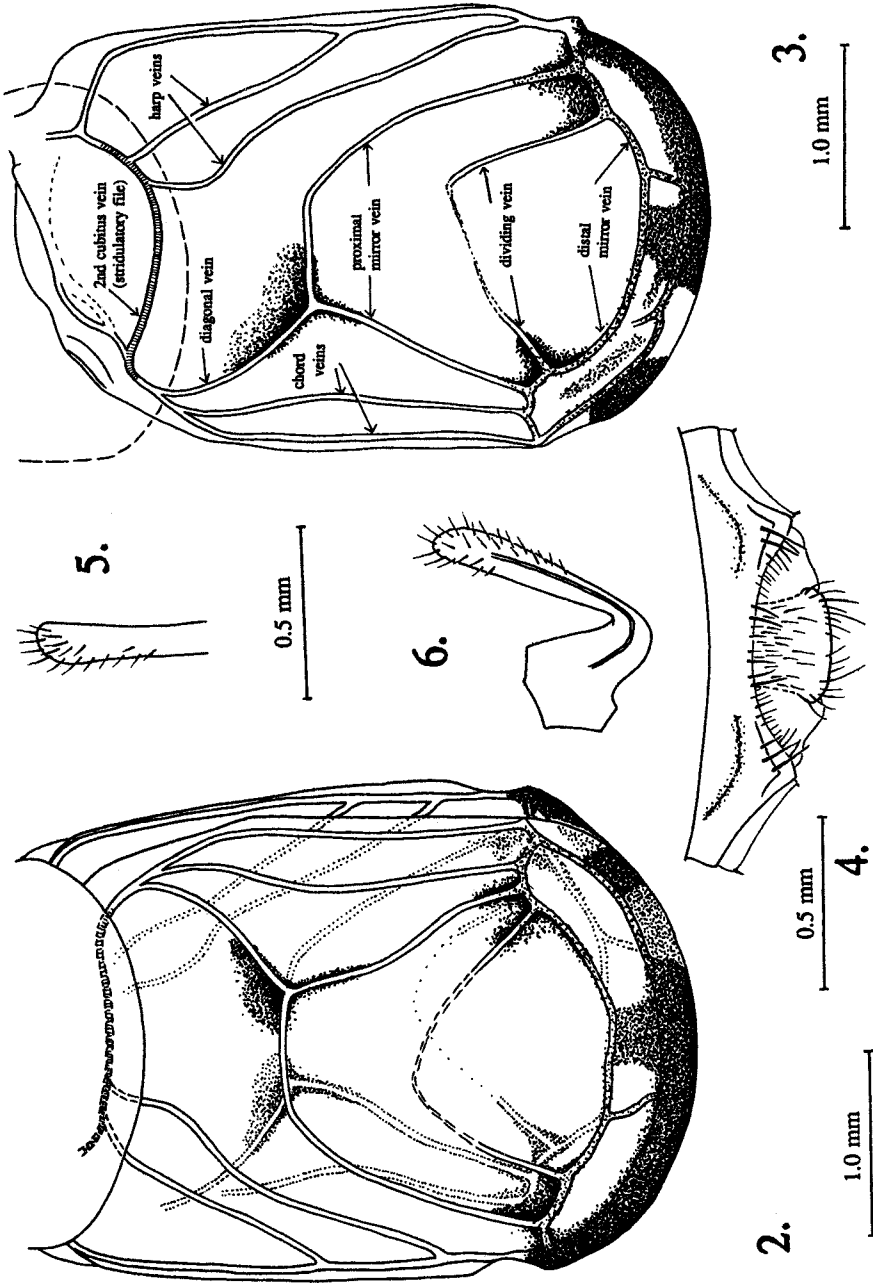


Fig. 1 *Ornebius aperta* Otte & Alexander 1983. Dorsal view of adult male from Mt Albert, Auckland. The forewings are slightly spread in this specimen. The distal  $\frac{1}{2}$ - $\frac{2}{3}$  of the antennae and the left cercus are missing from the unique specimen.

When the forewings are coincident (Fig. 2) their posterior border appears completely darkened, and the darkened markings and veins more or less identical with those described and illustrated for the Australian *O. aperta* specimens. However, when the wings are examined individually, this is not so (Fig. 3). The dark band along the posterior border is seen to be incomplete with a clear gap at approximately  $\frac{2}{3}$  of the distance across from the fold of the leading edge. Further, medially, this band is continuous with the darkened



**Figs 2-6:** In Figures 2 and 3 the lateral field (leading edge) of the wing is not shown as it is folded down the side at right angles to the upper surface. It contains the subcostal, radial, and medial veins. Figure 2, forewings fully coincident with left overlying the right; the coincident dark markings are shown. Figure 3, right forewing showing markings, venation and the reduced basal/anal area. The stridulatory file on the second cubitus vein lies beneath the pronotal expansion. Figure 4, dorsal aspect of the 10th abdominal tergite. Figure 5, right genital process or paraproct, dorsal view. Figure 6, same, outer lateral view.

posterior mirror vein for a short distance. Dark patches are present at both distal mirror vein unions, 1 on each side, and there is a single anterior marking at the union of the proximal mirror and diagonal veins. Thus, when the forewings are coincident, each of the 2 posterior markings is composite, that of the right consisting of the patch at the anterior union of the proximal and distal mirror veins and that of the dividing vein of the left forewing, overlying the dark patch area at the posterior union of the same veins of the right forewing. Similarly the left marking is made up of the patch at the posterior union of the dividing, and proximal and distal mirror veins of the right forewing, underlying that at the anterior union of the same veins of the left forewing. The pair of more medial proximal/anterior markings is not composite; each forms at the junction of the diagonal and mirror veins, that on the right being on the left forewing and that on the left being on the right forewing and therefore beneath the left forewing which is transparent here, enabling the mark to be seen through it. Because of this the anterior medial marking does not appear to be paired when the wings are spread (Fig. 3).

Whether the left forewing overlies the right or vice versa is variable and random in *Ornebius*. The illustrations of Otte & Alexander (1983) show 14 examples of right over left and 6 of left over right. Whether or not this variation is intra- or inter-specific is unknown. Masaki *et al.* (1987) state that crickets usually fold their tegmina in the right over left position but that the mogoplistine *Ornebius* is exceptional in showing random overlapping of right and left tegmina.

In *Ornebius*, as exemplified by *O. aperta*, the apical and basal areas of the forewing are considerably reduced, the latter or proximal area being foreshortened (Fig. 3). There is one rather weak anal vein and indications of another. The second cubitus vein is strong, transverse, and carries 172 stridulatory file ridges, and is the most proximal or anterior vein of the wing. Because of the basal or proximal wing reduction the second cubitus vein and its transverse stridulatory file comes to lie beneath the posterior expansion of the pronotum.

The 10th abdominal tergite (Fig. 4) has strongly developed submarginal angular lateral shoulders each with 2 larger pigmented setae, and a fringe of translucent setae along its concave posterior border. Two medial groups of 2-3 larger inconspicuous setae may represent the pair of medial tufts of setae or spines that are present in other members of this species group. The suranal plate is tongue-like, rounded, and distally broadened. Proximally it merges with the 10th tergite and laterally it is encompassed by pale-coloured membranes.

The genital processes or paraprocts(?) are straight and weakly clubbed. In dorsal view (Fig. 5) each is parallel-sided, only slightly swollen distally, and with setae on its terminal and upper and lower surfaces. The outer edge is a thin flat longitudinal blade or flange which is present for most of the length of the process. In lateral view (Fig. 6) the process is tapered proximally, straight dorsally, and curved ventrally. The flange shows as a sharp ridge. Proximally the process is darkly pigmented and curves strongly upward to form a basal plate.

It is probable that the points of variance with the description of the Australian specimens (detail of wing markings, form of the 10th abdominal tergite, number of stridulatory file ridges) will be resolved with further study of that material. Unfortunately so few specimens are available for examination that the range of variation cannot be defined. However, the extent of the overall agreement of the details of the New Zealand specimen with those of the Australian is so great in comparison with the points of distinction between the Australian species, that there can be little doubt that the identity of the former can only be *O. aperta*.

## STRIDULATION

The song of *O. aperta* is soft and unobtrusive, even though penetrating, and is easily missed unless being purposely listened for. Its initial discovery generated some disbelief as the sound seemed almost unreal and acceptance that a strange new orthopteran was present required confirmation. The song consists of several long, low, steady chirps with regular breaks in between, and then a pause before it is recommenced. It is usually heard

during the evening, always arising amongst shrubbery, about a metre above the ground. On 1 occasion only it was heard during the daytime. Listening for the song is the best way of discovering the presence of this cricket. The fact that the stridulatory file lies beneath the posterior expansion of the pronotum may have some influence on sound quality in this species.

### RECOGNITION

The species is easily distinguishable from the 5 other named crickets recorded from New Zealand. Its soft and unobtrusive though penetrating song is very different from the more strident sounds produced by the other species in that it is slow and has no pitch, whereas that of the others is a rapid chirping note with pitch; it occurs amongst foliage and shrubs rather than on the ground in lawns, pasture, grassland and open spaces; it is a dull rusty brown colour and is densely covered by scales—the other species are mostly shiny black or dark coloured with paler markings. Its body is slightly flattened and cigar-shaped when viewed from above—the other species are rounded and more or less parallel-sided. It is the only brachypterous species in which the forewings are not uniformly coloured, having dark markings and a transverse dark band across the posterior border. It is the only species in which the female is quite wingless.

### ORIGIN

There is no doubt that the species must have come from Australia as there is no other known source, but how did it come? There are 2 possibilities—it could be an extension of the *Ornebius* population at Paihia, which may prove to be conspecific, or it could be a new immigrant that succeeded in evading quarantine detection. In Australia it is known from 3 specimens only (2 male) collected in the southeast corner of Queensland on Mt Tambourine. The specimens occurred in tangles of vine and underbrush in rain forest (Otte & Alexander 1983). It is likely that its area of distribution is wider than this, but as there is no other information and no data on its biology and life history, any consideration of its mode of dispersal must be speculative. Perhaps eggs or living crickets were carried here with bananas or pineapples (grown in the southeast corner of Queensland and marketed in New Zealand) and slipped through the quarantine inspection (R. Kleinpaste pers. comm.). Whatever the mode of dispersal and entry *O. aperta* must certainly have originated in Australia and is probably now well established in the Auckland area and possibly in regions beyond.

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