

mainly males. However, they do give an indication of the numbers present at a given time. The present paper records the measurement of adult periodicity for a number of seasons at six light trapping stations throughout New Zealand.

METHODS

Philips H.P. 80 mercury vapour lamps emitting a wave length of 3,000 to 8,000 A° were used at six stations, the positions of which are shown in Figure 1. They were operated from dusk to midnight, and were cleared each day and the number of beetles taken recorded.

RESULTS OF LIGHT TRAPPING

The total weekly numbers of beetles trapped in the light traps for the seasons 1962-63, 1963-64, 1964-65, 1965-66 and 1966-67 are shown for each of the six stations in Figure 2. The numbers are plotted on the semi-logarithmic scale to give graphs of $\log(1 + \text{count})$ versus (linear) time. This enables the full range of counts to be shown and on a scale more naturally suited to population growth data. Flight occurs during the first few hours after dark on calm warm evenings. The adults feed until morning when they either re-enter the soil or hide under the vegetation until dusk.

Pastures on the lighter soils show the greatest damage by grubs, but infestation occurs throughout the country wherever the female is able to burrow. However, from Auckland northwards, grass grub is mostly replaced by black beetle, *Heteronychus arator* Blanch.

Figure 2 shows that the flight period is from October to January. In some areas this may even extend into February.

Flights begin at the northernmost stations of Manutuke, and Rukuhia in the Waikato about mid-October; one week later at Wairakei near Lake Taupo, and Tangoio in Northern Hawkes Bay and Winchmore in Canterbury; and two weeks later at Invermay in Otago in the South Island. Peak flights at Manutuke, Rukuhia, Wairakei, Tangoio and Winchmore are very much less in numbers than those at Invermay; here numbers very quickly rise to a large peak in the third and fourth week in November and then fall off nearly as rapidly, whereas at Manutuke, numbers rise steeply at first and remain on this level during November, December and January.

Beetle flights in 1965/66 and 1966/67 took place at all stations except Invermay at the same time as in preceding years. At Invermay, however, seasonal conditions delayed first emergence and peak flight a week to ten days. However, except for this, the general shape of the graph of periodicity corresponds very closely to those of other seasons. The total numbers trapped during the various seasons at each station remained approximately constant.

DISCUSSION

The study of light trap records at six stations has shown that the numbers of beetles trapped at each station over the period of observation has remained fairly constant, and that there was only approximately two weeks' difference in the time of emergence of beetles between the most northern and the most southern stations. This time of first emergence has so far been very constant with the exception of 1965/66 and 1966/67 seasons at Invermay. If this is found to hold for subsequent seasons, then it may be possible to predict when female activity is taking place in