

The Imago

The earliest observed emergence is that of the laboratory specimen mentioned above on March 16. When newly emerged it was pale brown with the extremities of the appendages dark brown and the unexposed areas under the elytra creamy. It assumed the normal colouring after two weeks, without coming to the surface during that time. In Canterbury the adults burrow deeper after emergence, and have been found from July 7 to late September at depths of two to four feet, in an inactive state. Of twelve collected during July, seven were male and five female, but they were not associated in pairs. Adults were first observed near the surface on September 5, which is also the date of the first observed copulation.

The pair were found under an inch of sand near the seaward foot of the dunes. They lie at right angles to one another, the posterior ends abutting with the ventral surface of the male adjacent to the dorsal surface of the female. The genital armature of the female is exerted and completely envelops the protrusible part of the male organ. Disengagement is achieved by the male twisting through 180° and dragging clear by the action of the front and intermediate legs on the sand assisted by the hind legs pushing against the partner's abdomen. Copulation was also observed on October 10.

The first eggs were found on October 14, when thirty-seven were collected. The female taken on September 5 died on October 29 without producing any eggs. The last newly deposited eggs were collected on November 15.

The beetles fly during September and October in Canterbury, but may do so earlier in the North Island. Most flying takes place in October in both islands, and the phenomenon of massed flights has been reported from Tauranga and Opotiki on October 13 (Mr E. E. Turbott, correspondence) and at Waiterere, near Foxton, on October 16. There is some evidence that males fly during the early part of the evening and females from about 9.30 p.m. to midnight, and that flights are confined to the evening and the few hours before dawn. Flights have been observed only on fairly calm nights when the surface sand is not compacted by recent rain. Their function appears to be purely distributive and has not shown any connection with pairing, in the observations made to date. That flight is not a necessary prelude to mating has been shown by a pair kept in a jar of sand from July to October, when ten fertile eggs were produced.

Live females are rare in the field after mid-November, but skeletons are common at depths of twelve to eighteen inches, which suggests that they die after depositing their eggs without returning to the surface. This is the explanation of the apparent disparity of the sexes observed among the dead specimens so common on the surface in late December and January (Broun, 1879) for the males, which normally survive among the eggs and young larvae until early December, usually die on the surface, where their skeletons are often aggregated by the wind.

Neither observations of adult habits nor examination of the alimentary canal has yielded any indication that the adults feed.

SECTION II.—DESCRIPTION

DESCRIPTION OF THE FINAL INSTAR LARVA

The larvae of the three species so far studied (*P. truncatus*, *P. punctatus*, and an unnamed species), are, apart from the greater dimensions of *P. truncatus*, extremely similar in form, and Broun's (1879) and Hudson's (1934) descriptions are quite unable to separate them. The new description of the larva which