

A NATURAL ENEMY OF THE COMMON GRASS GRUB, *Costelytra zealandica* White

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ABSTRACT

A native tachinid parasite, *Proscissio cana* Hutton is recorded for the first time, from the larvae of *Costelytra zealandica* White. Some ecological considerations are given.

INTRODUCTION

Members of the dipterous family Tachinidae are well known for the role they play, as biological agents, in the control of insect pests. Several species of tachinids have previously been reared from members of the Melolonthinae, the sub-family to which *Costelytra zealandica* belongs (Given, 1945) but none, until the present, have been recorded from this common grass grub.

Kelsey (1951) states that grass grubs were responsible for losses to farmers and forestry concerns of approximately £2,000,000 during 1950. He lists several natural controlling factors present in New Zealand: a bacterium causing "milky disease", a nematode (*Mermis* species), larvae of ground beetles (Carabidae) and robber flies (Asilidae). Some of these are said to exercise a significant degree of control in localised areas. In an earlier paper (Kelsey and Hoy 1950), the overall effects of the native and introduced parasite species were considered ineffective in preventing the dangerous build-up of grass grub populations. No reference to tachinids is made in these papers.

SPECIES DETERMINATION

Proscissio cana is widespread throughout New Zealand. It and a closely related species, *P. valida* were first described by Hutton (1901). Malloch (1938), after examining the respective types reduced, with some reservations, *P. valida* to a variety of *P. cana*.

Given (1945) described the larva of a tachinid reared from *Chlorochiton* sp. as that of *Proscissio cana*. The structure of the bucco-pharangeal skeleton, which he figures, differs considerably from the tachinid here considered as *P. cana*, reared from *Costelytra zealandica* (fig. 1).

Adults of the tachinid reared from *Chlorochiton* are larger than those reared from *Costelytra zealandica* and the two differ in the distribution of the setae. J. S. Dugdale, who has kindly looked at the adult specimens, considers that the tachinids reared by Given, from *Chlorochiton* sp., are nearest to *P. cana* var. *valida* (Hutton 1901, Malloch 1938), while those reared by the author from *Costelytra zealandica*, conform to *P. cana* var. *cana* (Malloch 1938).

FIELD OBSERVATIONS

During the late spring of 1960, when extensive collections of *C. zealandica* larvae were being made on a property in Pretty Bridge Valley, Nelson, a number of larvae from one small area, were each found to contain a mature larva or puparium of *P. cana* (Plates 1 & 2). The area in which the collection was made is approximately 1000 feet above sea level and is adjacent to a river bed which has patches of scrub along its banks. The soil in the area is comprised of a friable silt loam with good drainage. At the time the collection was made, the pasture in the area had been seriously depleted through the depredations of the grass grub. The more numerous plants which remained included weed grasses, such as sweet vernal, brown top and Yorkshire Fog and the broad-leaved weeds, dandelion, plantain and others, intermingled with a small proportion of ryegrass and cocksfoot.

The incidence of parasitism by the tachinid in the only large scale collection made by the author, was 2.62 per cent. (17 out of 650 larvae). Actual parasitism is probably higher, as it is difficult to recognise host specimens containing the early juvenile stages of the parasite. This incidence of parasitism contrasted markedly with that in an area of open, closely grazed pasture on the same property, where no tachinids were recorded from numerous (more than one thousand) *Costelytra zealandica* larvae. It appears, therefore, that the tachinid prefers the more sheltered areas of pastures where at times the vegetation becomes rank, but this point requires further investigation.

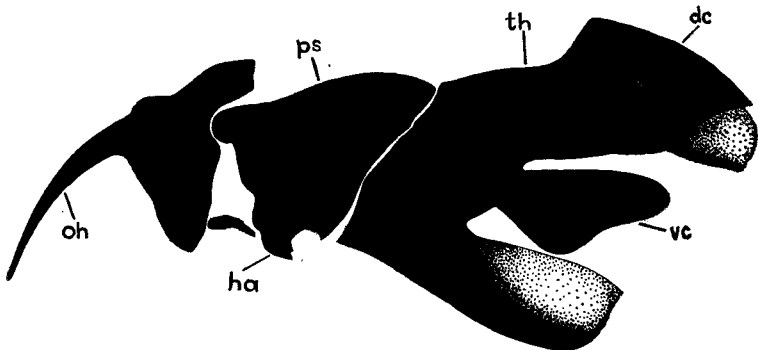


Fig. 1—*Proscissio cana* Hutton, bucco-pharyngeal skeleton of larva reared from *Costelytra zealandica* White.

dc.—dorsal cornu of theca.
ha.—hypopharyngeal arch.
oh.—oral hook.

ps.—parastomal sclerite.
th.—theca.
vc.—ventral cornu of theca.

The host larvae at the time of collection were in the final instar. The parasite larva assumed an inverted position in the anterior region of the host, extending from behind the head into the anterior abdominal region (plate 1). In the majority of examples the parasite pupated in this position within the host. The pupal period of the parasite occupied three to four weeks under laboratory conditions and the adults emerged during early November. Females outnumbered males by approximately 2:1.

In the field, the adult flies emerge during November and early December. They tend to rest in the vegetation during the early part of the day, but on warm sunny afternoons numerous individuals were observed resting on river stones in the vicinity and many were still present there after sunset. J. Brown, who has recently (October 1962) reared *P. cana* from *Costelytra zealandica* larvae from Dry Creek, Canterbury, has also noted aggregation of the adults in riverbeds (p. comm.).

DISCUSSION

The differences already noted between the larvae and adult tachinids reared from *Chlorochiton* and *Costelytra zealandica* and the reservations Malloch gave with his opinion point to a future re-acceptance of *P. cana* and *P. valida* as separate species as originally proposed by Hutton. *P. cana*, although widespread throughout New Zealand appears to have little effect in controlling *Costelytra zealandica* in open pasture land. Its habits and ecological preferences may act in limiting its multiplication and effectiveness, but further studies are necessary to understand its ecological requirements and control potential.

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