INSECTICIDE CONTROL OF A WHITE GRUB,
MALADERA MATRIDA, ON SWEET POTATO

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In an effort to control the damage caused by the beetle Maladera matrida Argaman (Coleoptera: Scarabaeidae) to sweet potatoes, Ipomoea batatas (L.) Lam., experiments comparing heptachlor with other insecticides were conducted in the Besor region in the southern part of Israel in 1987. Taking the percentage of clean tubers at the final harvest as the criterion of insecticidal efficacy, the best results were achieved with heptachlor (97.3% clean tubers) and with the synthetic pyrethroid Talstar (biphenthrin) (91.1% clean tubers), while the percentage of clean tubers obtained in two untreated control plots was 52.5% and 65.9%. The effect of heptachlor and Talstar was not significantly different from that of Oftanol (isofenphos) plus Becis (decamethrin), but was significantly better than that of Dizictol (diazinon), Becis, Dizictol plus Becis, Oftanal, and the untreated controls. The average tuber weights from the treatments with heptachlor, Talstar and Becis were significantly higher than those of the untreated control plots and from the treatments with Dizictol, Oftanol, and Oftanol plus Becis.

KEY WORDS: Maladera matrida Arg.; Scarabaeidae; Coleoptera; beetle; white grub; chemical control; Dizictol (diazinon); Becis (decamethrin); heptachlor; Talstar (biphenthrin); Oftanol (isofenphos); sweet potato; Ipomoea batatas (L.) Lam.

INTRODUCTION

A new species of the beetle Maladera (Coleoptera: Scarabaeidae), causing damage to ornamental plants in the central region of Israel, was recorded in 1983 (12). It was described by Argaman (2) and given the name of Maladera matrida Argaman. Since

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1983, *M. matrida* has spread to new regions, *e.g.* the Eshkol region in southern Israel, and to additional crops. Heavy injury, caused by adults feeding on foliage, was recorded on citrus, avocado, macadamia and cherry trees in commercial orchards and nurseries. The grubs of the pest caused serious losses by feeding on living roots of several agricultural crops: sweet potato, peanut and strawberry plants (8). Thus, like other representatives of the family Scarabaeidae (15) and *Maladera* species in many countries of the world, *e.g.* in India (13,14,18), China (10), Japan (4) and the U.S.A. (19), *M. matrida* has become a serious pest of various field crops and ornamentals in Israel.

Sweet potato, *Ipomoea batatas* (L.) Lam., is heavily damaged by *Maladera* white grubs, and the infestation prevents the export and marketing of the yield (6). It is known that insecticidal control of soil-inhabiting insects in sweet potato is difficult (3,11,16,17). With the ban on the effective chlorinated hydrocarbons such as chlordane and heptachlor, several species of white grubs (Japanese beetle, *Popillia japonica* Newman; European chafer, *Rhizotrogus* (*Amphimallon*) *majalis* (Razoumowsky); Asiatic garden beetle, *Maladera castanea* (Arrow); and oriental beetle, *Anomala orientalis* Waterhouse) have become important soil insect pests of nursery crops, turf and agriculture in the U.S.A. (11,21,25) and other countries (4,13,14).

Research in finding effective control methods for white grubs is conducted in several directions: new insecticides (16,21,22,23,24), insect-resistant plants (11,17) and entomogenous nematodes (5,25). The aim of the present research was to find effective insecticidal control methods — both soil and foliage spray treatments — for the prevention of injury to sweet potato caused by the white grubs of *M. matrida*.

**MATERIALS AND METHODS**

*Field design*

The plots chosen for the field experiments were at the Besor Experiment Station (Negev) in a field in which sweet potatoes had been cultivated during the previous season (1986) and had suffered severely from *Maladera* attack (79% infested roots). The area was not disinfected by soil fumigation in order to assure infestation during the year of the trial (1987), and adult beetles were found among weed roots in the field, especially in *Chenopodium murale* (L.), *Amaranthus* sp. and *Portulaca oleracea* (L.), before the experiment began.

The trial was carried out in six replicates in randomized blocks. Each block included seven chemical treatment plots and two untreated plots which served as the control; the two untreated plots were included in the experimental design in anticipation of a lack of uniformity in the expected infestation. The area of each treatment replicate was 46.8 m² (13 m × 3.60 m).