NOTES

PRELIMINARY NOTES ON THE PHENOLOGY AND BIOLOGY OF
Batrachedra amydraula Meyrick (Lepidoptera: Cosmopterigidae), A NEW PEST OF DATE PALMS IN ISRAEL

By

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Batrachedra amydraula Meyrick was detected for the first time in Israel in 1970. Injury inflicted to date plantations by this pest resulted in considerable fruit drop and serious losses in yield. The appearance of the pest in the plantation is limited to a period from late March to early July. In their last stage of development, the larvae undergo diapause, which is affected by changes in daylength during early spring and late summer.

KEY WORDS: Batrachedra amydraula: phenology; biology, date palms; diapause.

Batrachedra amydraula Meyrick (the lesser date moth) is known as a pest of date palms in India, Egypt, Libya, Iraq and Iran (1, 2, 3, 4); it is also a storage pest (2). During 1965-1966 the insect was recorded by Michael (5) in the Sinai desert, where it caused very marked damage to date fruits. In 1970, B. amydraula was detected for the first time in the Arava region (southern part of Israel) and in the following year, extreme damage was caused in that area. Larvae and injury were also found on date palms at Neviyot, Dahab and A-Tor, along the shores of the Red Sea.

The larva chews a hole adjacent to the stem end, through which it penetrates the fruit and damages the flesh and the soft seed. Injury inflicted to the trees by this pest results in considerable fruit drop and serious losses in yield (Fig. 1). Of 111 damaged fruits of the Khadrawi variety examined at Eilot (in the Arava desert region) on April 24, 1972, 18.1% were less than 0.6 cm in diameter, 81% were between 0.6 and 1.0 cm, and 0.9% were between 1.0 and 1.5 cm. It appears therefore that most fruits are attacked when they are between 0.6 and 1.0 cm in diameter (the ripe fruit has a diameter of 2.0-2.5 cm).

The following varieties have been found to be attacked by the pest in Israel: Khadrawi, Zahidi, Deglet Noor, Halawi, Barhee, Hayany and Medjool.

Young larvae of B. amydraula were found in date palm plantations towards the middle or end of March 1972. During April, their numbers increased considerably and damage began to be visible. The larva is capable of moving from one fruit to another within the bunch, thus increasing the damage and causing the fruits to drop. During June, the larval population decreased considerably and at the begin-
Fig. 1. Date bunches of the Khadrawi variety before picking time: (A) damaged by *Batrachedra amydraula*; (B) undamaged.

ning of July the incidence of attack by larvae likewise dropped. From the end of July no larvae or further damage was detected, nor were larvae found on bunches or on decaying fruit during autumn or winter. The appearance of larvae and the damage inflicted to the trees were then restricted to a relatively short period (late March – early July).

Observations made during summer and autumn of 1972 in a date plantation at Eilot, showed that *B. amydraula* diapaused in the larval stage. The larvae of the last generation completed their development but did not pupate. They constructed elongated white cocoons which were well hidden inside the fibers at the bases of the palm fronds. As claimed by Michael and Habib (6), these larvae apparently remain in this condition until the beginning of the following spring. However, contrary to the findings of those authors, the larvae are not in need of further nutrition at the end of the diapause in the spring, but pupate without causing any further damage, and give rise in the following spring to the first generation adults, the larvae of which are the ones that attack the newly set date fruits.

On September 24, 1973, 52 cocoons of *B. amydraula* from the laboratory breeding (23 ± 2°C; 60-70% R.H., natural daylength) were examined. It was found that 48.1% of the larvae developed into adults which emerged within a short time, 44.2% continued to diapause and emerged only after 2-3 months, and 7.7% of the larvae died.

An experiment aimed at clarifying the factors inducing or terminating diapause was conducted. Cocoons, from the regular laboratory breeding, were taken at the beginning of October and divided into two groups. Both groups were placed in an incubator at 28°C, but one was given a photoperiod regimen of 10 h photophase and 14 h scotophase, while the other was kept in a diurnal regimen of 14 h photophase and 10 h scotophase. The light