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OBSERVATIONS ON POPULATIONS OF *BEMISIA TABACI* GENNADIUS (HOMOPTERA: ALEYRODIDAE) ON COTTON ADJACENT TO SUNFLOWER AND POTATO IN ISRAEL*

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ABSTRACT

During the last few years an increase was observed In the populations of the tobacco white- fly (*Bemisia tabaci* Gennadius) on cotton In Israel.

Sunflowers and potatoes, which are sown In Israel earlier than cotton, are hosts of *B. tabaci.* A survey of adult and larval populations Indicated that when a high population of the tobacco whltefly builds up In these crops, the adults migrate to adjacent cotton fields and may cause economic damage.

INTRODUCTION

The tobacco whitefly, *Bemisia tabaci* Gennadius (Homoptera: Aleyrodidae), Is a pest of cotton in Egypt (Abul-Nasr and El Nahal, 1969), Sudan (Mound, 1965; El-Khidier, 1965), Turkey (Sengonca, 1975), Central America (Kraemer, 1966), Mexico (de Leon and Sifuentes, 1973) and many other countries.

The presence of *B. tabaci* on cotton has long been observed in Israel (Rivnay, 1962), but damages have not been of economic importance. During the last few years an unusual increase in white-

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fly populations has been observed, and at some localities the cotton was heavily damaged (Melamed-Madjar *et al.*, 1978).

The tobacco whitefly is a polyphagous pest, which is found in Israel on numerous host plants of different families (Avidov and Harpaz, 1969).

Preliminary observations in Israel showed the presence of high population of *B. tabaci* in sunflower and potato fields which are sown in the spring, earlier than cotton. A survey was, therefore, carried out in the spring and summer of 1978 to determine whether migration of the pest occurs from these crops to adjacent cotton.

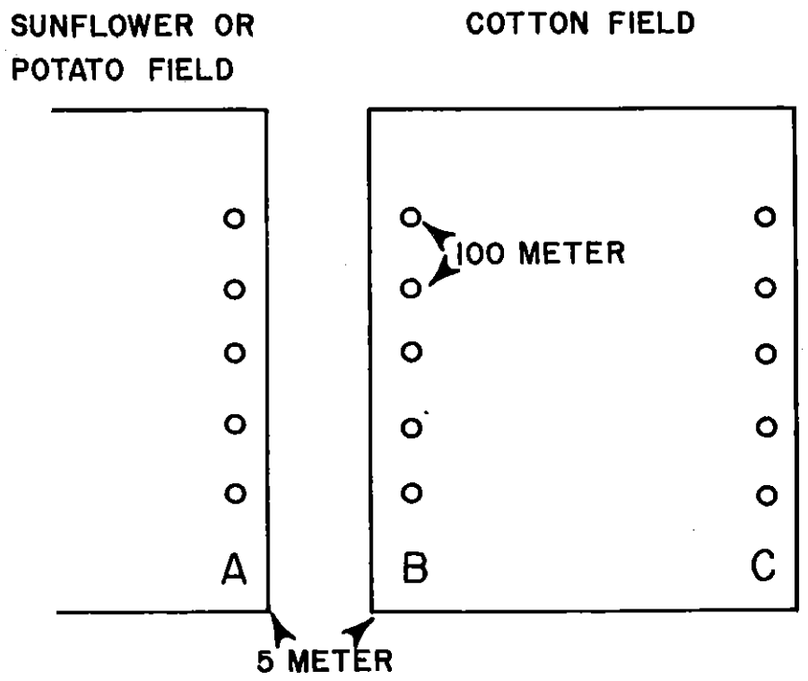

Fig. 1. Scheme of trap location in the observation fields.

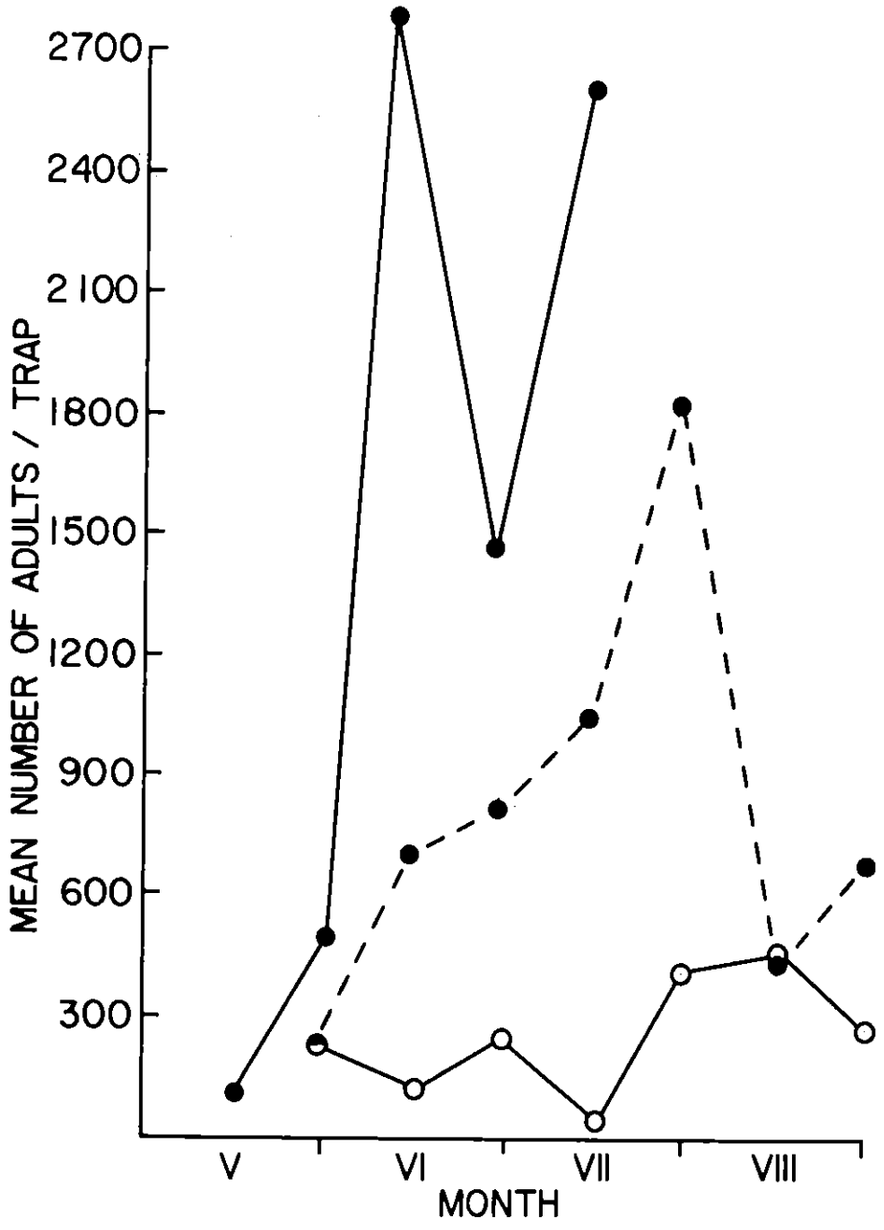

Fig. 2. Number of *B. tabaci* adults trapped on sticky yellow traps in sunflowers (———), in cotton adjacent to sunflowers (-----), and in cotton farthest away from sunflowers (o----o) (Zor'a, 1978).

METHODS

This survey was based on observations which took place in a cotton field adjacent to a sunflower field at Zor'a (in the foothills of the Judean Mountains) and in a cotton field adjacent to a potato field at Beror Hayil (in the South coastal plain).

The adult whitefly population was assessed with the aid of sticky yellow traps, which attract adult *B. tabaci* (Melamed-Madjar *et al.*, 1978). Five traps were placed at the edge of the sunflower or potato field, 100 meters apart from each other (Fig. 1A). Parallel to these, a similar row of traps was placed at the edge of the Cotton field, 5 m from the sunflowers or the potatoes (Fig. 1B). Another row of traps was placed at the edge of the cotton field farthest away from the crop checked, approximately 450 m from the sunflower field and 150 m from the potato field (Fig. 1C). All the traps were changed weekly and the adult *B. tabaci* were counted.

Concomitant with checking of the sticky traps, samples of leaves were collected from around the traps to examine the larval population present, and the larvae were counted under magnification.

RESULTS

The number of *B. tabaci* adults caught in neighbouring sunflower and cotton fields is presented in Fig. 2. In the sunflower field the adult whitefly population built up very rapidly, and in late May and early June very high numbers were trapped. The sunflower plants dried up at the end of June, and at this time the whitefly population in the cotton field started to build up (Fig. 2). This was especially noticeable in the row of traps nearest to the sunflower field which caught five times more adults than the traps farthest away from the sunflower field.

Fig. 3 shows the *B. tabaci* larval population in both sunflower and cotton fields. There seems to be a correlation between the adult and larval populations. The leaves collected in the cotton field adjacent to the sunflower plants were heavily infested with *B. tabaci* Larvae, while leaves from the opposite edge of the cotton field, 450 m away from the sunflower plants, carried a very light larval population.

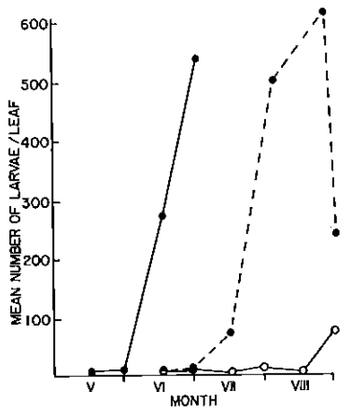

Fig. 3. Number of *B. tabaci* larvae on leaves of sunflowers (——), of cotton adjacent to sunflowers (-----), and of cotton farthest away from the sunflowers (o----o) (Zor'a, 1978).

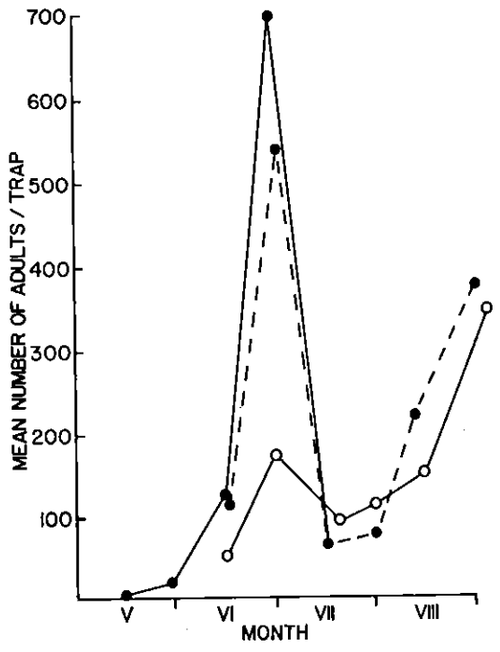

Fig. 4. Number of *B. tabaci* adults trapped on sticky yellow traps in potatoes (——), in cotton adjacent to potatoes (----), and in cotton farthest away from the potatoes (----o) (Beror Hayil, 1978).

The number of *B. tabaci* adults caught in neighbouring potato and cotton fields is prsented in Fig. 4. In the adjacent potato and cotton fields the adult population increased in mid-June, at a time when large whitefly populations on cotton are quite unusual. At a distance of 150 m from the potatoes, the increase in catch during June-July was not so high. In mid-August the catches were high in all traps, regardless of their location.

The larval population (Fig. 5) on potatoes reaches its peak in mid-June. On cotton it peaked in mid-August and was approximately four times as high on leaves adjacent to potato plants than on those farthest away from the potato plants. This indicates an invasion of the cotton field in June by a large number of whiteflies, a fact which enabled the establishment of the large population found in August.

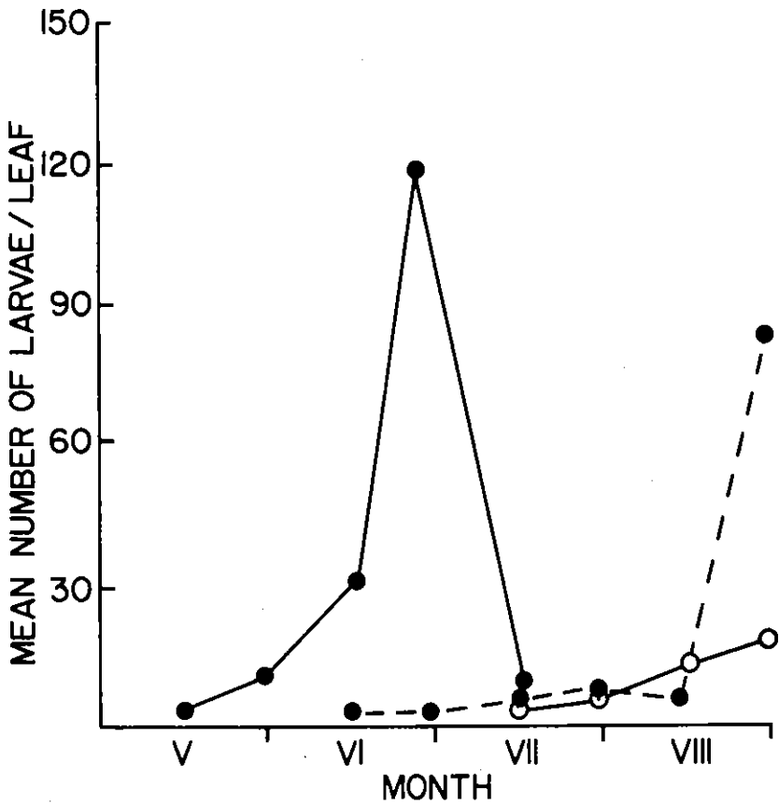

Fig. 5. Number of *B. tabaci* larvae on leaves of potatoes (——), of cotton adjacent to potatoes (----), and of cotton farthest away from the potatoes (o----o) (Beror Hayil, 1978).

DISCUSSION

Sunflowers and potatoes are hosts of the tobacco whitefly in Israel and they contribute to the build up of a large population in early spring. These crops are sown prior to cotton and they start to dry up when cotton fields are still fresh and green.

The present observations show that when a large whitefly population builds up in sunflower or potato fields adjacent to cotton fields, the adults may migrate en masse to the cotton fields, and thus lead to the establishment of a large population which may cause economic damage in August-September.

Similar observations have been recorded from other countries. In Iran (Habibi, 1975), melon is the preferred host plant of the tobacco whitefly and when melon leaves wilt at the end of Augst, *B tabaci* migrates to the cotton fields where large populations build up rapidly. In Turkey, Sengonca (1975) observed that eggs and larvae of *B. tabaci* overwinter on green parts of vegetable plants and their proximity to cotton fields was thought to be one of the factors leading to the outbreak of the tobacco whitefly population. In Sudan (El-Khidir, 1965) vegetable crops cultivated throughout the year, such as eggplant, tomato cucurbits and some autumn weeds, were potential sources from which infestations spread to cotton.

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