

Flight Activity of Tobacco Whitefly *Bemisia Tabaci* in Jordan.

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ABSTRACT :

Suction trap samples collected weekly between 1985 and 1989 revealed that the period of flight activity of the tobacco whitefly *Bemisia tabaci* Genn, extends from August through December. The first peak of activity occurred in autumn with maximum abundance in October. The second peak of activity was distinctly smaller than the first peak and occurred in May and June. The captured population was very low in late winter and early spring. Migration of this pest to the adjacent fields and uplands was discussed in detail.

Key words : Whitefly, *Bemisia tabaci*, flight activity, viruses, vegetable crops.

INTRODUCTION

A large cultivated area of the Jordan Valley is grown with vegetable crops. These crops are tomatoes, cucumbers, squashes, eggplants and others. The crops are attacked through the year by the tobacco whitefly, *Bemisia tabaci* Genn. (Alyrodidae : Homoptera), the main vector of Tomato Yellow Leaf Curl Virus (TYLCV) and Cucumber Vein Yellowing Virus (CVYV). These viruses are major problems to tomato and cucurbit plantings causing 50-100% reduction in the yield (Al-Musa *et al.* 1982).

Several studies were conducted to investigate the biology, ecology, population dynamics, disease transmission and control of this insect pest (Sharaf and Allawi 1981, Al-Musa *et al.* 1982, Nazer and Sharaf 1982). The density of the immature population of the whitefly reached its maximum in

November and declined to the lowest level in late winter (Sharaf and Allawi 1981). Sharaf (1982) used yellow sticky traps to study density and dispersal of the whitefly in the University Farm between winter 1979 and spring 1980. No study was made on the migration of this pest or its flight activity.

The aim of this study is to monitor the seasonal flight activity of this whitefly, to understand the migration, and to predict initial occurrence to help in controlling this pest.

MATERIALS AND METHODS

A large tall suction trap (Fig. 1) was placed in the University Farm in the Jordan Valley for a weekly monitoring population of the tobacco whitefly adults from August 1985 up to January 1989.

The trap consisted of a wooden box (a) 3.4m high, standing on a concrete plate form. A tube (b) of 9.14m long and 23.75cm in diameter was placed on its top. The air inside the box was vacuumed by an electrical centrifuged fan with 2880 r.p.m. The vacuumed air from 12.8 m height containing the insect sample rushed down the tube and slowed a conical expansion chamber. The insects were then collected in a bottle containing a preservative fluid. The fluid consisted of 45 parts 95% methyl alcohol, 22 parts glycerol and 33 parts of distilled water (Johnson and Tayler 1955). Samples were collected weekly, examined under a dissecting binocular microscope and whitefly adults were recorded.

RESULTS AND DISCUSSION

The number of the weekly caught adult whiteflies during four years are represented in Figs. 1-4. The catch was generally low except in autumn when it reached its maximum. In October, high adult density was observed on vegetables particularly, tomatoes, cucumbers, eggplants and others.

In 1985 the maximum catch was in October, it was 388 adults in one week. The catch was quite low in August and December, it reached the zero level in many weeks (Fig. 2).

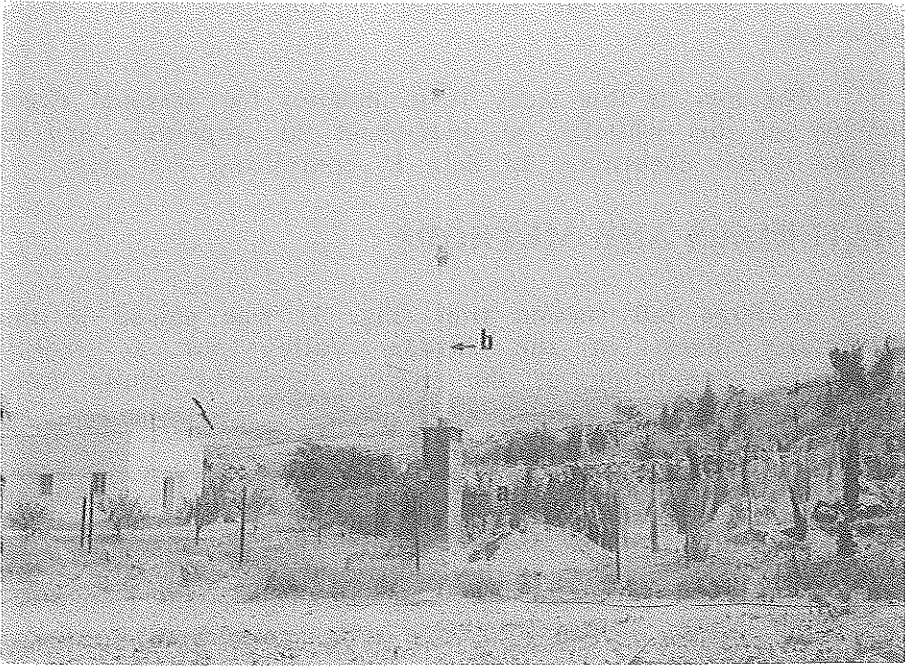


Fig. 1 Insect suction trap :
a. Wooden box
b. Long tube

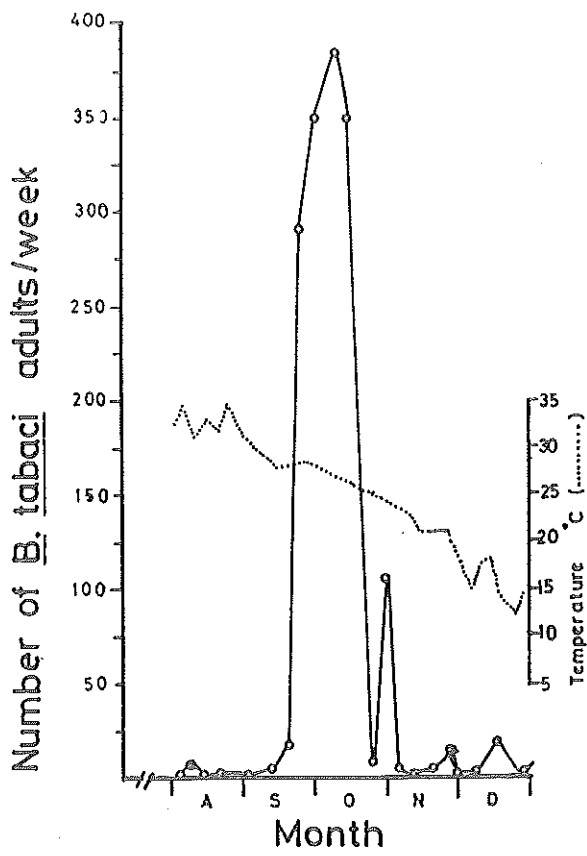


Fig. 2 Total number of *B. tabaci* found weekly in the suction trap in 1985.

In 1986, the maximum catch was around mid of October and it was 305 adults in a week. The recorded catch was either low or even zero in many cases in January, February and March. The number increased to a small peak in late April, then declined in May and continued low until the late of September (Fig. 3).

In 1987 the weekly catch shows that the maximum number was around mid October and was 125 adults. It was low during January, June, July and August. Few numbers were caught in November and December (Fig. 4).

In 1988 the weekly catch shows that the maximum number was caught in early October and was 239 adults (Fig. 5). The lowest was caught in January, February and March while few numbers were caught in April, May, July. Considerable numbers were caught in August, September, November and December.

Bemisia tabaci Genn. is an insect pest that has been known as serious vector transmitting the Tomato Yellow Leaf Curl Virus (TYLCV). This viral disease is wide spread in the tropical and subtropical areas including Jordan and the neighbouring countries. The field population dynamics of this white fly has been studied intensively in the Jordan Valley (Sharaf and Allawi, 1981).

The data from the suction trap showed two peaks of flight activity in each year during the four successive years. The first peak was small appearing in April, May and June. This flight adult peak preceded the immature population peak on tomato in the field. Ohnesorge et al. (1981) found that the density of immature population of whitefly in the spring tomato crop from mid-May throughout June remained on a moderate level until the end of the season but significantly lower than in the autumn crop. The second peak was large occurring in October and preceding about one month ahead the peak of immature population on tomato as monitored by Ohnesorge of et al. (1981). Many host plants of the tobacco whitefly are grown in the University Farm in each year of 1985, 1986, 1987 and 1988 such as tomatoes, squashes, eggplants, cucumbers, beans, peas, peppers, potatoes.. etc. This whitefly can overwinter as eggs and pupae on some of

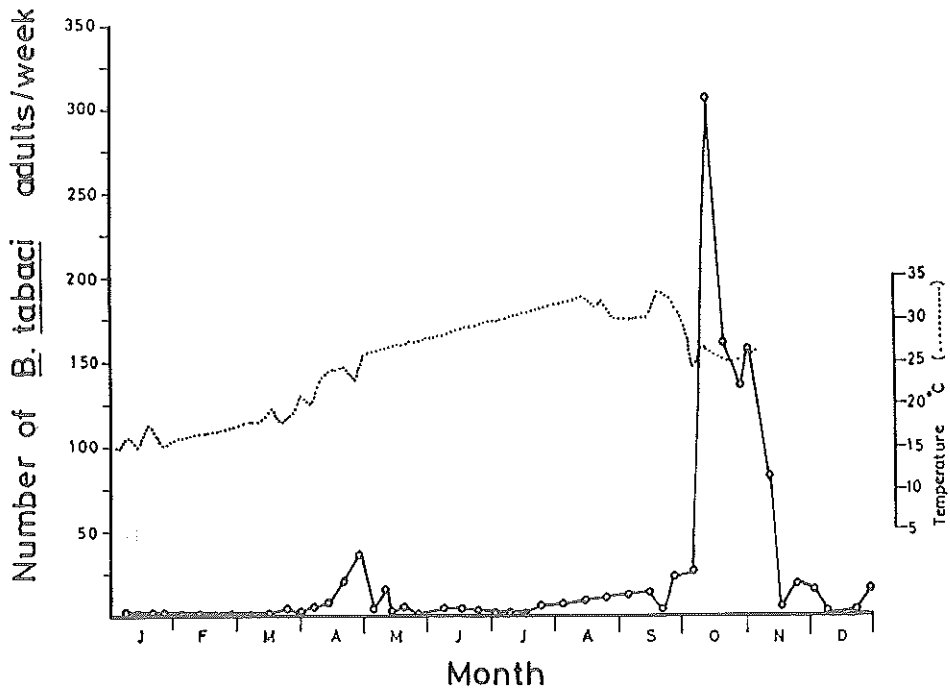


Fig. 3 Total number of *B. tabaci* found weekly in the suction trap in 1986.

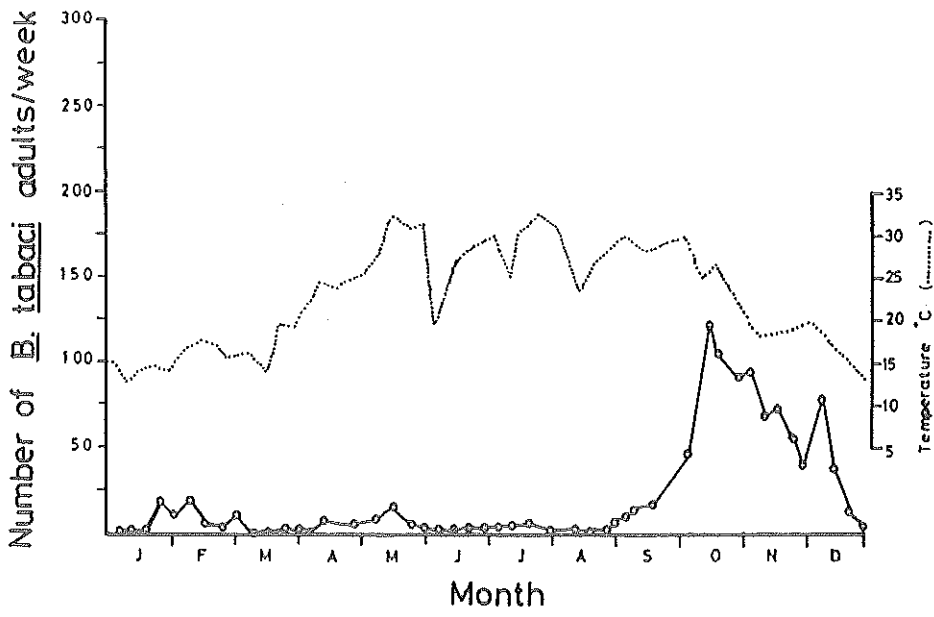


Fig. 4 Total number of *B. tabaci* found weekly in the suction trap in 1987.

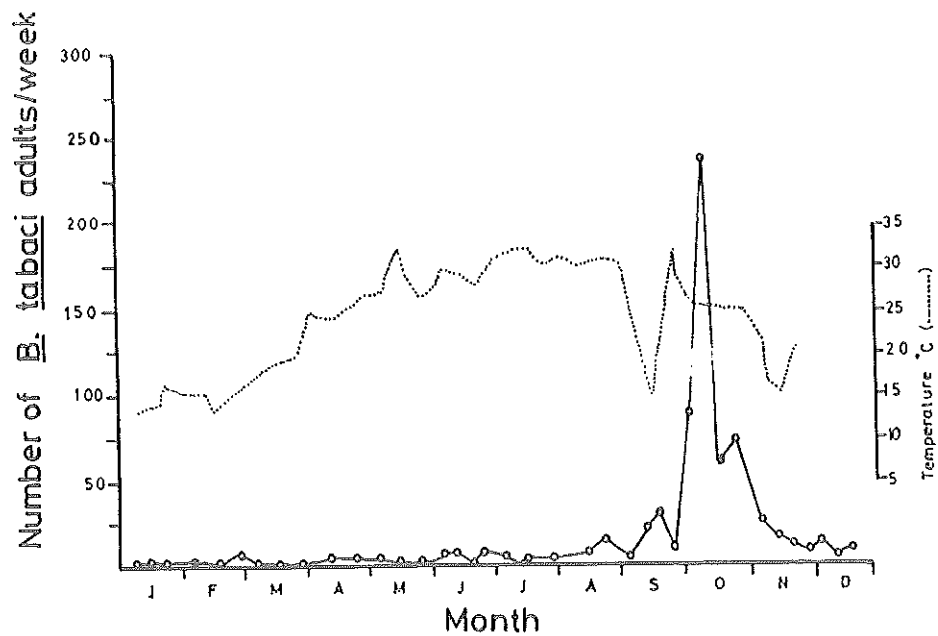


Fig. 5 Total number of *B. tabaci* found weekly in the suction trap in 1988.

these hosts during January, February and March. At the beginning of April, the population of the whitefly increased to small level, and these flies began to migrate to adjacent fields and the uplands as the temperature went up in the Jordan Valley. This whitefly migration might probably achieved by the assistance of the wind and khamasin spells. Those migrants that go up, and will be established on favourable hosts and increase in population to a high level by the end of July to suitable weather conditions. At this time, the summer planting season in the Jordan Valley is very restricted to small area due to high temperature but many of summer crops are planted in the uplands. After August, the temperature in the uplands begin to go down while the temperature in Jordan Valley also goes down but still higher than that in the uplands. So that considerable migration of this whitefly might occur from uplands to Jordan Valley assisted by the wind movement in August. From August up to the end of Autumn, Jordan Valley is intensively planted with host plants of this pest such as solanaceous and cucurbit crops in addition to wild perennial weeds. The whitefly feeds upon these hosts approaching a high population level in October and then decreasing to a low level in winter. This work is supported by several investigations. Of these, seven yellow water traps placed in the same area of the suction trap between early February and late May 1987 showed that no whiteflies were captured in February, March and April while 5-15 adults per trap were captured weekly in May. Joyce (1973) considered that dispersal of whitefly is very important in determining the fate of its population in Sudan. Sharaf, (1982) stated that low vegetation density and adverse weather conditions might stimulate migration from the unfavourable zone in Jordan Valley to the more favourable zone in the uplands but without determining the time of migration.

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ملخص :

جمعت العينات بواسطة مصيدة شفط كهربائية إسبوعيا ما بين عامي ١٩٨٥ - ١٩٨٩ وقد بينت النتائج على أن فترة الطيران النشط للذبابة الدخان البيضاء تبدأ من أغسطس وتمتد حتى شهر ديسمبر وكان أول نشاط واضح في الحريف وقد وصل الى قمته في شهر أكتوبر . أما فترة النشاط الثانية وهي أقل كثيرا من الأولى فقد حدثت في مايو ويونيو . وكان العدد منخفضا جدا في نهاية الشتاء وبداية الربيع . هذا وقد نوقشت هجرة هذه الآفة الحشرية الى الحقول المجاورة في غور الأردن والأراضي المرتفعة من الأردن بالتفصيل .