Egypt. J. Agric. Res., 79 (1), 2001.

SILVER LEAFING, ESTERASE AND RAPD-PCR ANALYSIS OF A FIELD POPULATION OF *BEMISIA TABACI* (HOMOPTERA: ALEYRODIDAE) FROM EGYPT

SHAABAN ABD-RABOU[1], GINA K. BANKS[2] AND PETER G. MARKHAM[2]

1 Plant Protection Research Institute, Agricultural Research Centre, Dokki, Giza, Egypt.

2 Departement of Virus Research, John Innes Institute, John Innes Centre for Plant Science Research, Colney Lane, Norwich NR4 7UH (United Kingdom).

(Manuscript received November 1999)

Abstract

The present work deals with identification of whitefly *Bemisia tabaci* (Genn.) strains in Egypt using the ability to induce silver leafing on squash leaves, easterase analysis by native polyacrylamide gel electrophoresis and DNA analysis by was of RAPD-PCR. This work was aimed to determine if *B. tabaci* biotype B is present in Egypt. Results indicated that *B. tabaci* Biotype B among samples collected from Qalubiya on *Lantana camara*.

INTRODUCTION

The whitefly, *Bemisia tabaci* biotype B (*Bemisia argentifolii* Bellows & Berring) is an important agricultural pest world wide (Byrne and Bellows, 1991; De Barro, 1995). The insect is a vector for numerous infectious plant viruses that damage a variety of crop species (Cock, 1993; Brown, 1994). It exhibits significantly higher levels of insecticides resistance (Liu *et al.* 1992).

The present work was carried out to identify whether *B. tabaci* B found among samples collected from Egypt.

MATERIALS AND METHODS

Samples of *Bemisia tabaci* (Genn.) on *Lantana camara* collected from Qalyubiya during 1996 were shipped to John Innes Center, U.K. to maintain a colony of *B. tabaci.*

Three methods were conducted to identify the presence or absence of biotype B of this pest in Egypt to realize the facts. These are:

1. The ability to induce silver leafing on squash leaves was tested by placing single seedlings of squash in the insect stock cages. The potential for silvering of the

upper leaf surfaces was noted approximately 10 days following initial exposure of whiteflies to the bioassay plants (Bedford *et al.* 1993).

2. Esterase analysis by native polyacrylamide gel electrophoresis. Samples were analysed by polyacrylamide gel electrophoresis on 7.5% vertical native gels (0.75 mm thick) with a 3% stacking gel and using a Tris-glycine (PH 8.3) running buffer. Gels were stained for the presence of esterases in 0.1 M phospaht buffer PH 6.5 using alpha and beta-naphthyl acetate as substrates and fast blue RR stain (Byrne and Devonshire, 1991).

3. DNA analysis by was of RAPD-PCR. Sixty primers from Operon kits, A. F. and H. were screened against the population of were selected and tested against the population. Amplification products were separated electrophoretically using 1.5% agarose run at 8.0 V/cm for 2 h. Both gel and running buffer solutions contained ethidium bromide. B and S were made visible using UV light. Gels were photographed and then scanned into corel photopaint^{Tm} where the images were inverted to make the bands more distinct (Gawal and Barlett, 1993)

RESULTS AND DISCUSSION

A colony of *Bemisia tabaci* was collected in the field from *Lantana camara* and maintained as a colony on cotton at the John Innes Center, Norwich, U. K. The colony was examined using three different criteria to characterize the population or biotype. These were: the ability to induce silver leafing on squash leaves, the definitive test for the B biotype; esterase analysis by native polyacrylamide gel electrophoresis using a known B biotype as a standard and DNA analysis by way of RAPD-PCR comparing the banding patterns produced by random primers (on ethidium bromide-stained agarose gels), from individual insects of the Egyptian population to that of that of a B biotype. The Egyptian colony was able to produce a silver leafing effect on squash plants. Analysis of non-specific esterase patterns from the Egyptian insects, revealed native enzyme profiles identical to that of the standard *B biotype* colony from Israel, Fig. 1. The DNA banding patterns produced by RAPD-PCR using Operon primer F2, gave an approximately 500 bp band in both the Egyptian and the Israeli colonies, Fig. 2. In *B. tabaci* biotypes examined so far, this 500 bp fragment only appears in B biotype colonies. The combined results of the three different methods of analysis in this study show that the B type of *Bemisia tabaci*, or *B. argentifolii,* as it is also known, is present in Egypt.

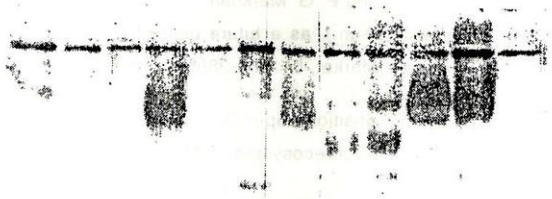

Fig. 1. Native enzyme profiles of whitefly individuals from the Egyptian B biotype.

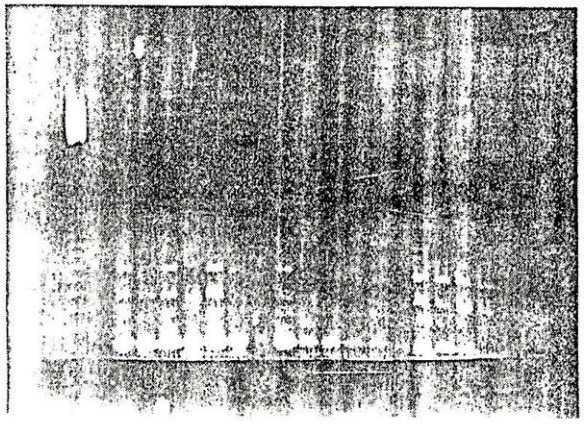

Fig. 2. DNA banding patterns produced by RAPD-PCR using Operon primer F2.

REFERENCES

1. Bedford, I. D., R. W. Briddon and P. G. Markham. 1993. A new species of Bemisia of Biotype of *Bemisia* tabaci (Genn.), as a future pest of European agriculture. Plant Health and European Single Market, 54: 381-386.

2. Brwon, J. K. 1994. A global position paper. The status of *Bemisia tabaci* as a plant pest and virus vector in world agroecosystem, FAO Plant Prot. Bull., 42: 3-32.

3. Byrne, D. N. and T. S. Bellows. 1991. *In vivo* inhibition of esterase and acetylcholinesterase activities by profenofos treatments in the tobacco whitefly *Bemisia tabaci* (Genn.): implications for routine biochemical monitoring of these enzymes. Pest Biochem & Physiol., 40: 198-204.

4. Cock, M. J. 1993. *Bemisia tabaci,* an update, 1986-1992. CAB, International Institute of Biological Control, Ascot, 78 pp.

5. De Barro, P. J. 1995. *Bemisia tabaci* biotype B : a review of its biology, distribution and control. CSIRO Div. Entomol. Tech. Paper 36.

6. Gawel, N. C. and A. C. Bartlett. 1993. Characeterization of differences between whiteflies using RAPD-PCR. Insect Molecular Biology, 2: 33-38.

7. Liu, H. Y., S. Cohen and J. E. Duffus. 1992. The used of isozyme patterns to distinguish sweetpotato whitefly (*Bemisia tabaci*) biotype, Phytoparasitica, 20: 189.

تفضض الورقة والتحليل الأنزيمي وتحليل تفاعل السلاسل متعددة الأنماط لجاميع حقلية من ذبابة القطن والطماطم البيضاء في مصر

شعبان عبد ربه[1]، جينا بانكس[2]، بيتر ماركم[2]

١ معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقي – الجيزة – مصر.
٢ قسم بحوث الفيروس – جون انز سنتر – نورش – المملكة المتحدة.

هذا العمل تضمن تعريف السلالة البيولوجية B لذبابة القطن والطماطم البيضاء باستخدام قدرة الآفة على أحداث اللون الفضي لنبات القرع والتحليل الأنزيمي وتفاعل السلاسل المتعددة الأنماط في مصر. النتائج أشارت إلى وجود السلالة البيولوجية B لذبابة القطن والطماطم البيضاء *Bemisia tabaci* وذلك من خلال عينات اللانتانا كمارا التي جمعت من محافظة القليوبية.