

DISTRIBUTION AND KEY OF GENUS *BEMISIA* QUAINANCE & BAKER IN EGYPT WITH AN UPDATED LIST OF WHITEFLIES IN EGYPT

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Abstract

The members of Genus *Bemisia* Quaintance & Baker (Hemiptera: Aleyrodidae) is the most important pests in different parts of the world .

It comprises in Egypt by three species. These are *Bemisia afer* (Priesner & Hosny), *Bemisia formosana* Takahashi and *Bemisia tabaci* (Gennadius) (Biotypes B &Q). The results of the present work indicated that *B. afer* distributed in 21 governorates , *B. formosana* in 3 governorates and *B. tabaci* in 27 governorates. Diagnosis , maps and key of *Bemisia* spp. as well as updating list of whiteflies in Egypt also provided.

INTRODUCTION

Genus *Bemisia* Quaintance & Baker (Hemiptera: Aleyrodidae) comprises to 46 species (Evans, 2008). Three of them recorded in Egypt (Abd-Rabou,2008). These are *Bemisia afer* (Priesner & Hosny) , *Bemisia formosana* Takahashi and *Bemisia tabaci* (Gennadius) (Biotypes B &Q). *Bemisia* spp. are the key pests of vegetables , horticultural crops and ornamental plants in much of the tropics and subtropics sector. They are the most important agricultural pests due to their wide distribution. Also, They cause both direct and indirect damage through feeding on plant sap. Direct feeding damage is shown by leaf chlorosis, a mottled appearance, reduction in plant vigour, general plant stunting, and induction of various phytotoxic disorders in several plants. Indirect damage is mainly through transmission of plant viruses, and to a lesser extent through encouraging development of sooty mould. Jones (2003) recorded more than 110 plant viruses. Whiteflies are still control by pesticides considering market restrictions on the presence of pesticide residues on fruits. Incorrect use of pesticides frequently causes the development of pest resistance, reflecting that chemical control proved to be more difficult or even ineffective. Integrated Pest Management (IPM) strategies combining biological control and synthetic pesticides are used by many greenhouse growers in the world (Heinz *et al.*, 2004). In Egypt, Abd-Rabou (1999 and 2001) recorded more than 150 host plants infested *Bemisia* species in Egypt. Biotypes of *B. tabaci* in Egypt comprises to two biotypes B&Q (Abd-Rabou *et al.* 2001) and De Barro *et al.*2000). Recently (Abd-

Rabou, 2006) recorded *Citrus* sp. a new record of host plant infested *Bemisia afer*. Later (Abd-Rabou and Evans (2009) recorded *B. formosana* as a new aleyrodid infested sugar cane .

The aim of the present work is to study the distribution and key of the members of genus *Bemesia* in Egypt as well as updating list of whiteflies in Egypt.

MATERIALS AND METHODS

A survey was carried out all over Egypt during 2008-2010. Infested host plants with the whitefly, *Bemisia* spp. were examined in the field, using a pocket lens. Leaves from different host plants were collected and placed separately in paper bags for further examination in the laboratory. Identification of *Bemisia* spp. was done by examining its pupal case and mounted adult in Canada balsam according to Bink-Moenen (1983).

RESULTS AND DISCUSSION

I. Genus *Bemisia* Quaintance & Baker in Egypt

1. *Bemisia afer* (Priesner & Hosny)

Diagnosis: The puparia are broadly oval-shaped .Caudal setae always stout and usually as long or longer than vasiform orifice. Little variation between individuals. Vasiform orifice slightly longer than the length of the caudal furrow, with straight sides. Lingula shorter and slightly wider, Dorsal surface distinct stippling absent, small tubercles and papillae may be present. Dorsal setae up to seven pairs of enlarged, well developed setae present, longer on plants with hirsute leaves. Dorsal pore/porette pairs Single pair between median line and first abdominal setae.

Distribution

WORLD: Brazil, France, Iran, Israel, Italy, Sicily, Spain, Cameroon, Chad, Congo, Guinea, Ivory Coast, Kenya, Madagascar, Mulawi, Niger, Nigeria, Sierre Leon, South Africa, Sudan, Uganda, Zaire, China, Korea, 6: India, Pakistan, Australia, New Guinea.

EGYPT: Alexandria, Asyut, Aswan, Behira, Beni-Suif, Daqhilya, Demyata, El-Minia, Gharbiya, Giza, Ismailia, Kafer El-Shikh, Matruh, Menofia, Port –Said, Qalyubiya, Qena, Red Sea, Sharqiya, Sohag, Southern Sinai, Sueze

Abd-Rabou (1996, 1997& 1999) studied the distribution of this species in Egypt.

2. *Bemisia formosana* Takahashi

Diagnosis: The puparia are very long and slender (elliptical). The puparium is 2x or less as long as wide and only has 1 pair of relatively short marginal setae on the head.

Distribution

WORLD: Taiwan and India.

EGYPT: Aswan, Giza, Qena, and Sohag.

Abd-Rabou and Evans (2009) stated that since this is the first report of this species occurring on sugarcane, an economic crop, and the first distribution record of it occurring in Egypt and the Mediterranean region.

3. *Bemisia tabaci* (Gennadius)

Diagnosis: The puparia broadly oval-shaped. Caudal setae usually less than half the length of the vasiform orifice and often minute, highly variable between individuals. Vasiform orifice usually shorter than length of the caudal furrow, with sides often distinctly concave. Lingula highly variable, generally longer and narrower. Dorsal surface Occasionally with distinct stippling and well developed tubercles and papillae. Dorsal setae highly variable, often minute and difficult to detect but may be well developed. Dorsal pore/ porette pairs most puparia with two pairs between median line and first abdominal setae, they are often difficult to detect.

WORLD Distribution

Argentina, Barbados, Brazil, Chile, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, French Guiana, Guadeloupe, Haiti, Honduras, Grenada, Guatemala, Jamaica, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Trinidad & Tobago, Venezuela, Virgin Islands, 3: Afghanistan, Algeria, Canary Island, Cyprus, England, France, Greece, Iran, Iraq, Israel, Italy, Jordan, Lebanon, Libya, Netherlands, Portugal, Romania, Saudi Arabia, Spain, Syria, Turkey, Yemen, Cameroon, Central African Republic, Chad, Congo, Ethiopia, Gabon, Gambia, Ghana, Guyana, Ivory Coast, Kenya, Liberia, Madagascar, Mauritius, Mozambique, Nigeria, Sierra Leone, South Africa, Sudan, Uganda, United Kingdom, Zaire, Zimbabwe, 5: China, Hong Kong, Japan, Korea, Taiwan, Andaman and Nicobar Islands, India, Malaysia, Pakistan, Philippines, Senegal, Seychelles, Singapore, Sri Lanka, Thailand, 7: Australia, New Guinea, Sumatra, 8: Caroline Islands, Fiji, Guam, Mariana, Islands, Saipan, Tahiti, Hawaii.USA.

EGYPT: Alexandria, Asyut, Aswan, Behira, Beni-Suif, Cairo, Daqhilya, Demyata, El-Dakhala, El-Kharga, El-Minia, Faiyum, Gharbiya, Giza, Ismailia, Kafer El-Shikh, Matruh, Menofia, Northern Sinai, Port –Said, Qalyubiya, Qena, Red Sea, Sharqiya, Sohag, Southern Sinai, Suez.

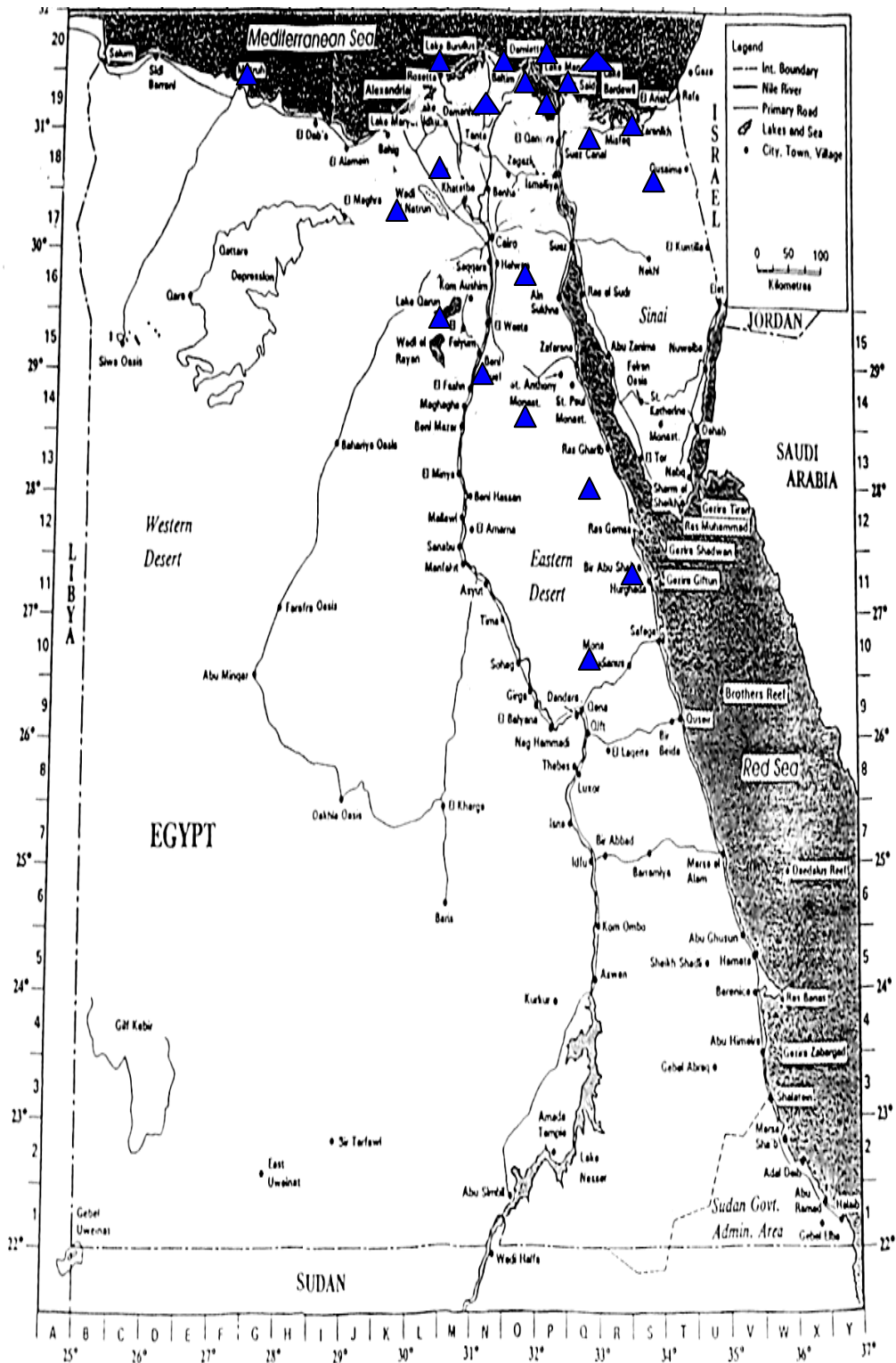
The distribution of *B. tabaci* in Egypt studied by Doss (1968) Shaheen (1983), Nada *et. al.* (1991) , Abd-Rabou (1997) and Hussin (1997) .

II. Key to species of *Bemisia* spp. In Egypt**Key to species**

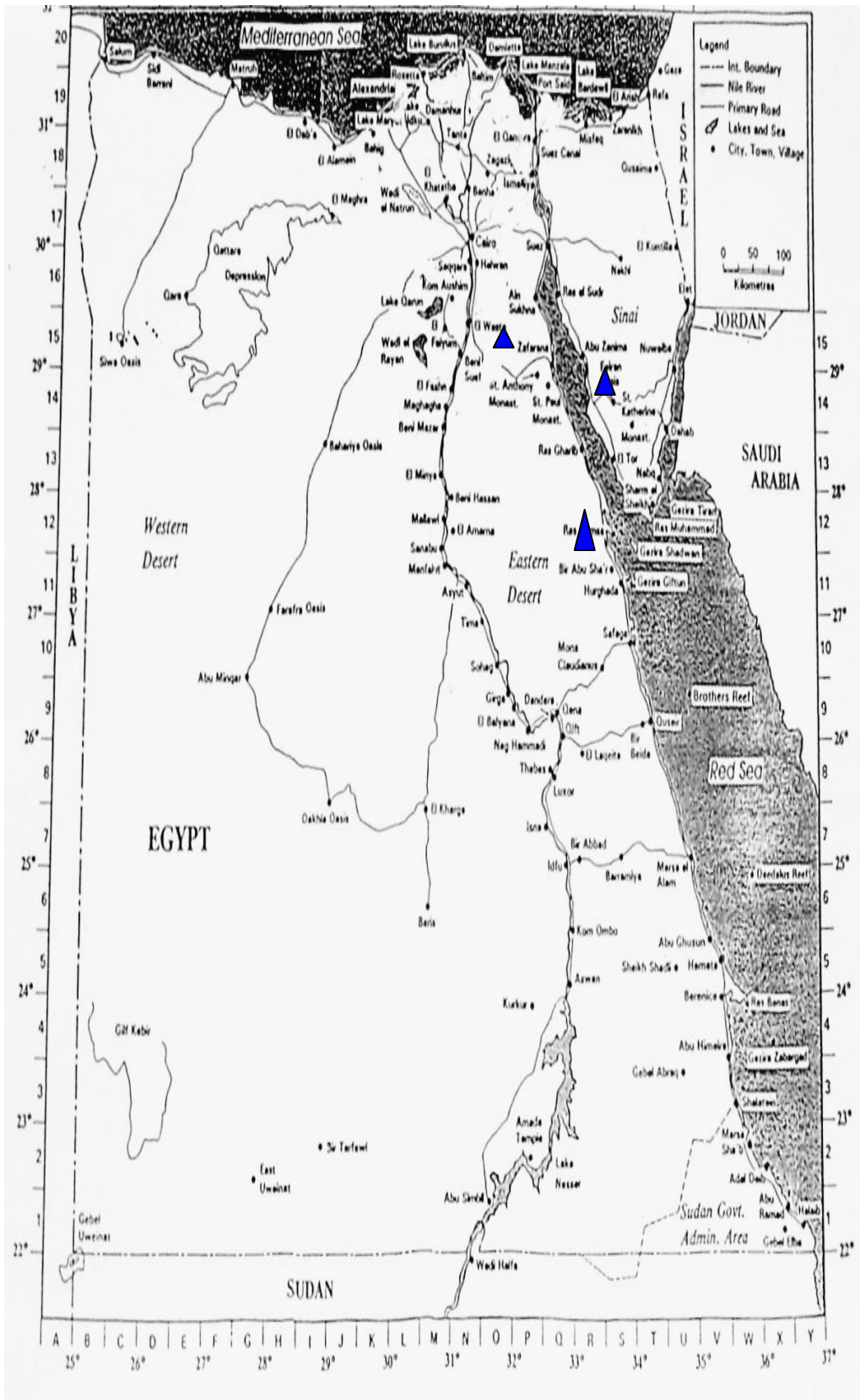
1. The puparia broadly oval-shaped.....2
-The puparia very long and slender (elliptical). the puparium is 2x or less as long as wide and only has 1 pair of relatively short marginal setae on the head..... ***Bemisia formosana* Takahashi**
2. Vasiform orifice Slightly longer than the length of the caudal furrow, with straight sides. ***Bemisia tabaci* (Gennadius)**
- Vasiform orifice Usually shorter than length of the caudal furrow, with sides often distinctly concave..... ***Bemisia afer* (Priesner and Hosny)**

III. Updating list of whiteflies in Egypt:

1. *Acaudaleyrodes rachipora* (Singh)
2. *Aleuroclava jasmini* (Takahashi)
3. *Aleuroclava porosus* (Priesner & Hosny)
4. *Aleurocanthus ziziphi* Priesner & Hosny
5. *Aleuromarginatus tephrosiae* Corbett
6. *Aleurolobus marlatti* (Quaintance)
7. *Aleurolobus olivinus* (Silvestri)
8. *Aleuroplatus acaciae* Bink-Moenen
9. *Aleuroplatus cadabae* Priesner & Hosny
10. *Aleuroviggius adrianae* Iaccarino
11. *Aleyrodes proletella* (Linnaeus)
12. *Bemisia afer* Priesner & Hosny
13. *Bemisia formosana* Takahashi
14. *Bemisia tabaci* (Gennadius)
15. *Dialeurodes citri* (Ashmead)
16. *Dialeurodes kirkaldyi* (Kotinsky)
17. *Parabemisia myricae* (Kuwana)
18. *Ramsesseus follioti* Zahradnik
19. *Singhiella elbaensis* (Priesner and Hosny)
20. *Siphoninus phillyreae* (Haliday)
21. *Tetraleyrodes leguminicola* Bink-Moenen
22. *Trialeurodes ricini* (Misra)



Map 1. Distribution of the whitefly, *Bemisia afer* in different localities in Egypt.



Map 2. Distribution of the whitefly, *Bemisia formosana* in Egypt.

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التوزيع الجغرافى و مفتاح تصنيفى لجنس بيميزيا فى مصر مع تحديث لقائمة الذباب الأبيض فى مصر

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الأنواع التى تنتمى الى جنس بيميزيا من الآفات الهامة التى تسبب ضررا شديدا للمحاصيل الهامة فى مصر و العالم. يتميز هذا الجنس فى مصر بثلاثة أنواع و هى ذبابة القطن والطماطم البيضاء و ذبابة الجميز البيضاء و ذبابة القصب البيضاء. أشارت النتائج أن ذبابة القطن والطماطم البيضاء و ذبابة الجميز البيضاء و ذبابة القصب البيضاء سجلت فى 27 و 21 و 3 محافظة على الترتيب. و تضمن العمل أيضا خرائط للتوزيع الجغرافى للأنواع الثلاثة و الصفات التصنيفية و مفتاح تصنيفى للأنواع الثلاثة الى جانب تحديث لقائمة الذباب الأبيض فى مصر.