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RESEARCH ARTICLE

IDENTIFICATION OF PEACH FRUIT FLY, *BACTROCERA ZONATA* (SAUNDERS) IN IRAQ

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ABSTRACT

Results of field study was carried out in citrus and fruit orchards in AL- Gheraiat region/ Baghdad during season 2016 showed the first appearance of peach fruit fly *Bactrocera zonata* (Saunders) in addition to the presence of Mediterranean fruit fly, *Ceratitis capitata* according to the results of the pheromone traps. The diagnostic characteristics that were adopted for the diagnose of the peach fruit fly *B. zonata*, as follows: (a) the presence of a small dark spot near the wing tip, (b) with has a black scutum and a black 'T' pattern on abdominal terga III-V. Infestation with this pest recorded on different host plant, the highest rate of infestation was (22) on the pear fruits and the lowest rate of infestation was (zero) on the sweet orange. This rate of infestation represents mixed infestation with both species of fruit fly, peach fruit fly *B. zonata* and Mediterranean fruit fly, *C. capitata*.

INTRODUCTION

Fruit flies of the family Tephritidae constitute a group of agricultural pests of worldwide importance that attack a wide range of fruits and vegetables (White and Elson-Harris 1992). The genus *Bactrocera* Macquart comprises 651 described species and consider the most economically significant fruit fly genus with at least 50 species (White & Elson-Harris, 1992 and Dacine Fruit Flies of the Asia-Pacific, 2015). *Bactrocera zonata* originates from South and South-East Asia (India, Indonesia, Laos, Sri Lanka, Thailand, and Vietnam) and has been introduced into Bangladesh, Myanmar, Nepal, Pakistan, Saudi Arabia, Oman, Mauritius and Reunion Island (EPPO/CABI, 1997). In Egypt peach fruit fly *Bactrocera zonata* was recorded in 1990 and it is now present throughout Egypt, up to the borders of the Palestinian Territories (Gaza Strip) and Israel, and has also been recorded recently in southern Iran and Lebanon (Iwahashi and Routhier, 2001). Recorded hosts (over 50 species) include common guava (*Psidium guajava*), mango (*Mangifera indica*), peach (*Prunus persica*), sugar apple (*Annona squamosa*), apple (*Malus domestica*), bitter melon (*Momordica charantia*), date palm (*Phoenix dactylifera*), okra (*Abelmoschus esculentus*), papaya (*Carica papaya*), paradise apple (*Malus pumila*), pomegranate (*Punica granatus*), quince (*Cydonia oblonga*), sweet orange

(*Citrus sinensis*), and tropical almond (*Terminalia cattapa*) (OEPP/EPPO, 2010). In Iraq Mediterranean fruit fly, *Ceratitis capitata* was identified during 2006, since then it spread to all citrus and other stone fruits orchards in the central and southern regions of Iraq (Alrubeai and Khlaywi, 2007). This investigation depicted the identification of the peach fruit fly *Bactrocera zonata* for the first time in Iraq infesting different host plants.

MATERIALS AND METHODS

Sample fruits were collected randomly from sweet orange, pomegranate, pear, pummelo fruit orchard in the region of AL-Gheraiat, northeast of Baghdad (longitude: 44.348259 and latitude: 33.405002) during 2016 growing seasons, and examined for fruit fly infestations. The collected fruits were stored separately in the laboratory in plastic jar which were covered with organza clothes, to prevent entry of other flies and ants and incubated at 27± 2°C, 60- 70% RH and 14:10 light: dark until the adult flies emerged. The emerged adults were preserved and identified according to the key found in the Plant Health Australia (2016), Drew and Romig (2013) and White & Elson-Harris (1994). Identification process and photography were done using dissecting microscope with camera, Dino-Lite, Digital Microscope (Big C Dino-Lite). Rate of infestation was recorded by examining 100 fruits taken randomly from each host species.

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RESULTS AND DISCUSSION

The diagnostic characteristics applied for the identification of adults peach fruit fly *B. zonata* emerged from infested fruits were:

- The costal cells colorless and lacking microtrichia (Fig.1, no.1).
- Narrow costal band ending at apex of R_{2+3} (Fig.1, no. 2).
- Small spot at apex of wing (Fig.1, no. 3).

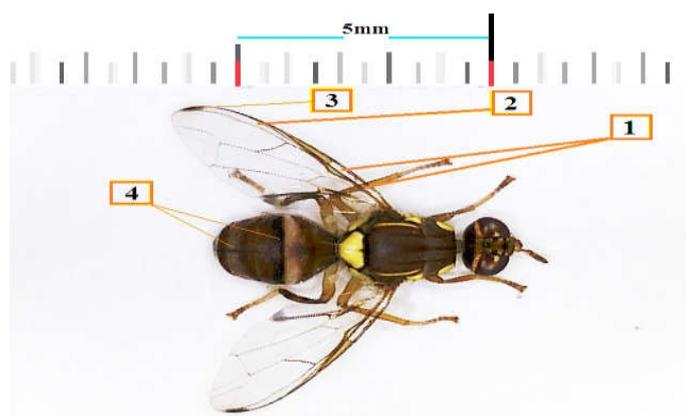


Figure 1. Identification characteristics of *B. zonata* collected from infested fruit in Iraq. Numbers refer to the diagnostic characteristics mentioned in the text

- The black scutum and the black ‘T’ pattern on abdominal terga III-V (Fig 1, no.4).
- The adult peach fruit fly *Bactrocera zonata* is about the size of a housefly, 5 to 6 mm in length.
- The thorax and abdomen pale orange-brown to red-brown.

Applying the above identification characteristics upon all (265) adults fruit fly emerged from the collected fruit samples, indicated the presence of (106) adults peach fruit fly *B. zonata*. These results depicted for the first time the presence of peach fruit fly, *B. zonata* in fruit orchards in the middle of Iraq. It was expected that this species will invade different fruits orchards and crops, since high quantities of different host fruits were imported from countries having high level of infestation with peach fruit fly, such as Lebanon, Egypt and Iran, along with weak phytosanitary measures. Experience in Egypt shows that *B. zonata* has already adapted to climatic conditions different to those in its area of origin (Iwahashi and Routhier, 2001).

Table 1. Mean percentage of fruit flies infestations on different host fruits collected from AL- Gheraiat orchards

Host fruits	Sampling date	Mean % infestation
Sweet lemon, <i>Citrus limetta</i>	3/ 10/ 2016	12
Pomegranate, <i>Punica granatus</i>	3/ 10/ 2016	18
Pear, <i>Pyrus communis</i>	10/11/ 2016	22
Pummelo, <i>Citrus maxima</i>	3/ 10- 10/11/ 2016	15
Sweet orange, <i>Citrus sinensis</i>	1/ 9 – 10/11/ 2016	zero

The result of Table (1) showed that the highest mean percentage of *B. zonata* infestation was observed on pear at the time of sampling, it was reached 22% and the lowest was on

sweet orange (zero). The five host species mentioned in (Table 1) are all listed in the host plant of *B. zonata* marked by FAO/ IAEA (2000). It is noteworthy to mention that infestation with *B. zonata* on pear fruits was found to be mixed with Mediterranean fruit fly, *Ceratitis capitata*. First captured peach fruit fly *B. zonata* in AL- Gheraiat orchard (13 male/ trap) during November/ 2016, right after pheromone traps of peach fruit fly were placed in the region (Table 2). Concerning Mediterranean fruit fly *C. capitata* the trap capture indicated the presence of males during early Aug. 2016, and continues throughout the season.

Table 2. Mean No. of fruit flies captured (adult/ trap) in citrus fruit orchard

date	Highest Density (trap/ month)	
	<i>C. capitata</i>	<i>B. zonata</i>
1/6/ 2016	46	-
1/ 7/ 2016	17	-
2/ 8/ 2016	22	-
1/ 9/ 2016	53	-
2/ 10/ 2016	58	-
2/ 11/ 2016	34	13
31/ 12/ 2016	1	1

These results are in harmony with that mentioned by Elenagar *et al* (2010), which depicted the presence of both types of fruit flies *B. zonata* and *Ceratitis capitata* in citrus and fruits orchard in Egypt. Just recently, the Iraqi Directorate of Plant Protection recorded the presence of *B. zonata* in some provinces using male pheromone of this pest (ANEPPNEL, 2016). Finally, it's worth mentioning that research program was established and initiated including surveillance and proposed control systems for fruit flies pest species depend upon pheromone mass trapping and entomopathogenic fungi to control pupae in soil.

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