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Research Article

Surveillance and Documentation of Fruit Flies Parasitoids from Infested Fruits Collected from District Larkana and Hyderabad

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Abstract: Fruit flies belong to family (Tephritidae-Diptera) are the most injurious fruit pests of the fruits and vegetables. Biological control is an environmental friendly control method that has been used against pest fruit flies. Parasitoids have been one of the most widely used groups of natural enemies. In present studies we have surveyed the biological control agents from two different zones of Sindh. The field locations were Hyderabad and Larkana districts from where infested fruits were collected from guava and mango orchards. The results revealed that significantly ($P<0.05$) higher number of larval cum pupal parasitoid *Trybliographa daci* were (62.2 ± 3.03, 50.20 ± 4.45) recorded in guava from both districts. Furthermore, Maximum number of *Bactrocera zonata* infestation was recorded (395.6 ± 4.50, 288.00 ± 11.57) from guava orchards of both districts. This study established that Larval/pupal parasitoid *Trybliographa daci* proved most promising biocontrol-agent in limiting the population of fruit flies in guava and guava observed most susceptible host for fruit flies in terms of infestation.

Keywords: *Trybliographa daci,* Guava, Bio-control agents, Fruit flies.

1. INTRODUCTION

Tephritid fruit flies are the most significant fruit pests throughout the cosmos. In Pakistan, there are two species of economic and quarantine importance: the Peach fruit fly, *Bactrocera zonata,* and the Oriental fruit fly *Bactrocera dorsalis*. These dipteran pests has shown greater adaptability, being distributed in almost over a wide range of climates [1]. Both fruit fly species spell a wide range of commercial crops such as mango, guava, citrus etc. [2]. Annual losses from direct damage are estimated to be 15-20% of fruit production [3]. The occurrence of even a single individual of these species can prevent the exportation of fresh fruit to countries free of these pests due to stern quarantine regulations [4]. Biological control is an environmental friendly control method that has been used against these pests. Parasitoids have been one of the most widely used groups of natural enemies in classical and augmentative biological control strategies employed against fruit fly species [5 , 6]. Among fruit fly parasitoids two important species are the larval cum pupal parasitoids *Diachasmimorpha longicaudata* (Ashmead) and *Trybliographa daci* (Weld.) are presently mass-reared using various fruit fly species as hosts [7]. These parasitoids are easy to manipulate and rear on different fruit fly species and successfully used to control tephritid pests [8]. *D. longicaudata* and *T. daci* are being mass-reared at Fruit Flies and their parasitoids lab Plant Protection division Nuclear Institute of Agriculture (NIA), Tando Jam. Controlled releases of parasitoids were performed during different periods and the effectiveness of the programme is being evaluated unfortunately work from Sindh has not been published yet. [9] Our aim of this study was to survey population of the both parasitoids of fruit flies larvae in order to document their availability from different orchard agro-ecosystem of Sindh for the management of tephritid fruit flies.

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2. MATERIALS AND METHODS

The infested fruits from mango and guava orchards of Hyderabad and Larkana region were collected and brought to Fruit Flies and their parasitoids laboratory, NIA, Tando Jam. The infected fruits were placed on sterilized sand in wooden trays covered with fine wire mesh for pupation under controlled laboratory conditions. The observations were made on number of adult fruit flies emerged from unparasitized pupae and number of larval/ pupal parasitoids emerged from parasitized larvae. The adult flies and parasitoids were placed in separate cages (45×40×40) and provided with artificial diet.

2.1 Artificial diet ingredients

Sugar, Casein Protein, Honey, and Water soaked cotton were used as artificial diet ingredient.

2.2 Statistical Analysis

All statistical analyses were done with the help of Statistix® Version 8.1, Analytical Software, Inc., and Tallahassee, FL, USA. Statistical analysis was calculated using two-ways analysis of variance ANOVA for different parameters Followed by Tukey's Post Hoc LSD Test for the significance of data.

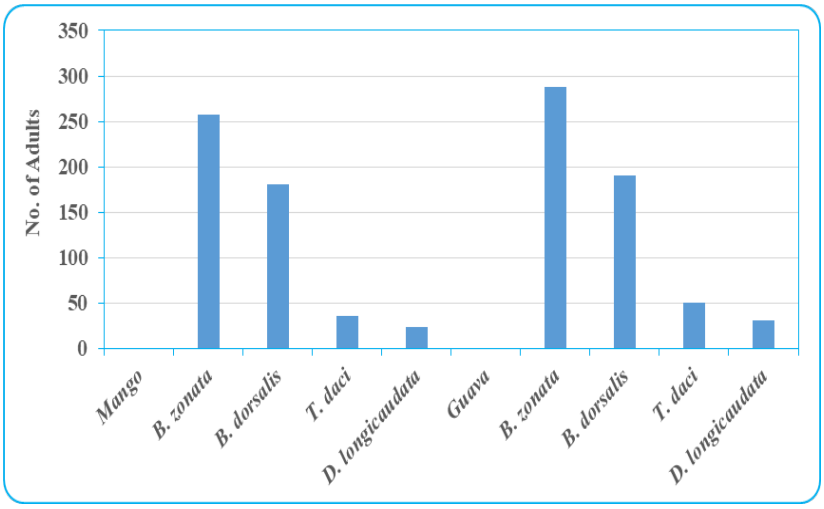

Fig. 1. Number of adult fruit flies and their parasitoids obtained from infested fruits collected from Mango and Guava orchards of district Larkana.

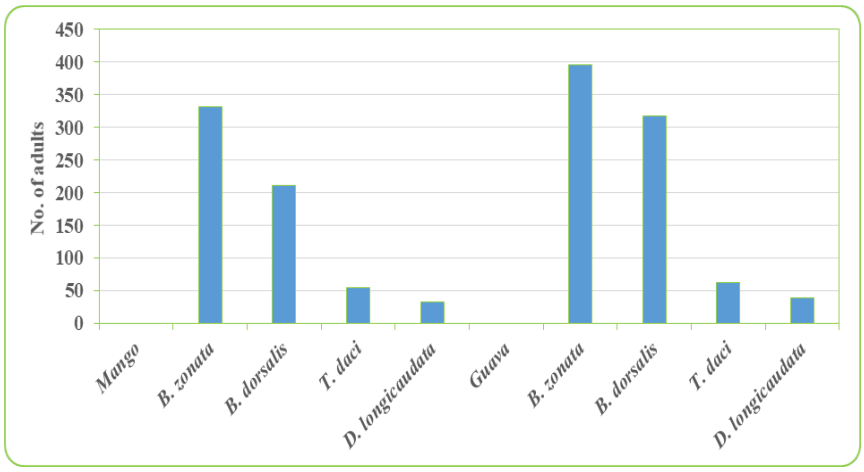

Fig. 2. Number of adult fruit flies and their parasitoids obtained from infested fruits collected from Mango and Guava orchards of district Hyderabad.

Table 1. Showing (Mean ± SE) Number of adult fruit flies and their parasitoids obtained from infested fruits collected from Mango and Guava orchards of different climatic zones of Sindh.

Location and Fruit	Number of Adult Fruit Flies and their parasitoids			
	B. zonata	*B. dorsalis*	*T. daci*	*D. longicaudata*
Larkana Guava	288.00 ± 11.57 a	190.60 ± 12.04 b	50.20 ± 4.45 c	30.80 ± 1.49 c
Larkana Mango	258.0 ± 8.60 a	180.2 ± 12.27 b	35.2 ± 3.08 c	24.2 ± 2.22 c
Hyderabad Guava	395.6 ± 4.50 a	317.8 ± 5.58 b	62.2 ± 3.03 c	38.6 ± 1.48 d
Hyderabad Mango	331.2 ± 5.82 a	211.6 ± 6.04 b	54.2 ± 2.59 c	32.2 ± 3.56 d

Values with the same letters are not significantly different according to Fisher's Least Significant Difference (LSD) test at ($P < 0.05$).

3. RESULTS AND DISCUSSION

Results revealed that maximum number of larval cum pupal parasitoid *Trybliographa daci* were obtained from the pupae yielded from infested guava fruits collected from Hyderabad region followed by Larkana (62.2 ± 3.03, 50.20 ± 4.45). Whereas, low number of *Diachasmimorpha longicaudata* was obtained by infested mango of Larkana and Hyderabad zones; (24.2 ± 2.22, 32.2 ± 3.56) respectively.

The significantly higher ($P < 0.05$) number *Bactrocera zonata* were emerged from infested fruits of guava (288.00 ± 11.57, 395.6 ± 4.50) orchards of Larkana and Hyderabad regions as compared to *Bactrocera dorsalis.*

In the present studies the surveillance of larval cum pupal parasitoids *(D. longicaudata* and *T. daci)* from guava and mango orchards of Hyderabad and Larkana region were undertaken where no prominent work has been done and published yet on these biocontrol agents. However other authors [10,11] from Huawei recorded the *D. longicaudata* population in higher number during field survey as compared *T. daci* on contrary we found maximum number of *T. daci* followed by *D. longicaudata* in guava and mango orchards of both climatic regions during field visit. Moreover, reduction in the population of oriental fruit fly was found from infested fruits these results are in lined with our results. Interestingly, both larval cum pupal parasitoids emerged from infested fruits were found similar as in our study. During fruit flies and parasitoids associations we obtained similar numbers as described by [12].

4. CONCLUSIONS

In present studies guava was observed most susceptible host for *B. zonata* and *B. dorsalis* in terms of infestation. Whereas, larval/pupal parasitoid *Trybliographa daci* was recorded most promising bio-agent in limiting the population of fruit flies in guava as compared with mango fields in district Hyderabad and Larkana.

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