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Survey and Surveillance of ber Fruit Fly, *Carpomyia vesuviana* Costa in Semi-arid Region of Rajasthan

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ABSTRACT: Investigation on 'Survey and surveillance of ber fruit fly, *Carpomyia vesuviana* Costa in semi-arid region of Rajasthan were carried out at farmers fields in five tehsils of Chomu, Amer, Kotputali, Shahpura and Jobner of Jaipur district during November and February month of the year 2021-2022 and 2022-23. The results showed that the average percentage of fruit fly infestation in different areas of Jaipur district varied from 21.24 to 25.57 during both the years of investigations. The perusal of the data exhibited the maximum per cent infestation 25.30 and 25.83 was recorded in Chomu tehsil during 2021-22 and 2022-23, respectively. Albeit, the minimum per cent infestation *i.e.,* 20.80 and 21.68 was recorded in Amer tehsil during study 2021-22 and 2022-23.

Keywords: Ber Fruit Fly, Maximum and Minimum Damage percent.

INTRODUCTION

The ber (*Ziziphus mauritiana* Lamk) is an important fruit crop in arid and semi-arid region. It belongs to the family Rhamnaceae. The ber also called as desert apple, jujube, Chinese apple, Badari (Sanskrit), ber (Hindi), Dongs, boroi, bor, beri, Indian plum and permseret (Anguilla) (Balikai, 2013). It is mainly grown in India and other country in central Asia, China and Taiwan. It is more associated with Indian culture since ancient times. Rajasthan, Haryana, U.P., Gujarat, M.P., Bihar, Maharashtra, A.P. and T.N. are the major growing stataes in India. The major growing districts in Rajasthan are Jaipur, Ajmer, Sikar, Jodhpur, Pali, Sirohi, Bharatpur, Chittor. India ranks second in ber crop with an area of 0.54 Lakh hectares and production of 596 MMT (Anonymous, 2021-22). Rajasthan holds a key position with an area of 1158 hectares and with a production of 9869 Million tonnes (Anonymous, 2022 - 23)

Over 100 species of insect-pests are reported as pest of ber (Lakra and Singh, 1985) which include fruit fly, *Carpomyia vesuviana* Costa; fruit borer, *Meridarchis scyrodes* Meyrick; bark eating caterpillar, *Indarbela quadrinotata* Wlk*;* mealy bug, *Perisso pneumon tamarindus Green*; fruit weevil, *Aubeus himalayanus* Voss; Thrps, *Scirtothrips dorsalis* Hood; Grey weevil, *Myllocerus dentifer* Boheman; butterfly, *Tarucus Theophrastus* Fabricius and Hairy caterpillar, *Thiacidas postica* Walker; Among them ber fruit fly, *Carpomyia vesuviana* costa is most serious one (Sharma *et al.,*1998; Lal *et al*., 1993) and found everywhere in India where ber is grown. It is the monophagous pest of ber. The pest contributes towards low yield and poor quality of fruits. Incidence of *C. vesuviana* reduce the yield from 13 to 20 per cent per plant (Bagle, 1992) but severe condition it may damage up to 90 to 100 per cent (Joshi and Shinde 1971). The survey of insect pest is important, because control measures became uneconomical, environmentally harmful residues increased into the soil and causing pesticide resistance if pest population not taking into consideration. The objective of the study was to identify the status of various insect pest of ber crop in Rajasthan. Hence the present studies were undertaken to record the pests associated with ber fruits.

MATERIAL AND METHOD

The research study was carried out during the two year of ber season at the Department of Entomology SKNAU, Jobner (Rajasthan). Field surveys were carried out in two consecutive years (2021-22 and 2022-23) in ber growing areas of Jaipur districts. During survey five orchards were selected for recording the observation of fruit fly. Ten plants per orchard was selected at random, tagged for counting the pests population and their infestation and observation were taken in zigzag rows (Raja *et al*., 2014). For fruit fly exit hole or deformation of fruit was taken as identification mark of infestation. Fifty fruits from each tree were randomly observed to ascertain. The fruit damage per cent based on number basis (Preetha and Nadarajan 2006)

Percentage of fruit damage (no. basis)

$$= \frac{\text{Number of damaged fruit}}{\text{Total number of fruits}} \times 100$$

RESULT AND DISCUSSION

The fruit fly damage percent in2021-22 showed that maximum 11.40 and 39.20 per cent fruit damage was recorded in ber at Chomu in November and February, respectively whereas, minimum 9.00 and 32.60 per cent fruit damage was recorded in ber at Amer in November and February, respectively. The average fruit fly infestation in ber at different locations of Jaipur district was varied 9.92 per cent damage in November and 36.32 per cent in February. The maximum fruit fly infestation of 25.30 per cent was recorded in Chomu tehsil followed by Shahpura (23.70 %), Kotputali (23.50 %) and Jobner (22.30 %) and minimum was in Amer (20.80 %). The data recorded confirms that the overall mean incidence of fruit fly infestation of ber in Jaipur district was 23.12 per cent (Fig. 1).

In 2022-23 showed that the maximum fruit fly infestation of 11.85 and 39.80 per cent was recorded at Chomu in November and February, respectively. The minimum fruit fly infestation of 9.51 and 33.58 per cent was recorded at Jobner in November and Amer in February respectively. The average fruit fly infestation in ber at different locations of Jaipur district was varied 10.17 per cent damage in November and 36.77 per cent in February. The maximum fruit fly infestation of 25.83 per cent was recorded in Chomu tehsil followed by Kotputali (23.74%), Jobner (23.55 %) and Shahpura (22.57%) and minimum was in Amer (21.68 %). The data recorded confirms that the overall mean incidence of fruit fly infestation of ber in Jaipur district was 23.47 per cent (Fig. 2).

In the pooled mean of two consecutive years (2021-22 and 2022-23), the per cent damage of fruit fly in the November and February ranged from 9.39-11.64 and 33.09-39.50 per cent, respectively on different locations of Jaipur district. The maximum fruit fly infestation of 11.64 and 39.50 per cent was recorded at Chomu in November and February, respectively. The minimum fruit fly infestation of 9.39 and 33.09 per cent was recorded at Amer in November and February, respectively. The average fruit fly infestation in ber at different locations of Jaipur district was varied 10.05 per cent damage in November and 36.55 per cent in February. The maximum fruit fly infestation of 25.57 per cent was recorded in Chomu tehsil followed by Kotputali (23.62%), Shahpura (23.14%) and Jobner (22.93 %) and minimum was in Amer (21.24 %). The data recorded confirms that the overall mean incidence of fruit fly infestation of ber in Jaipur district was 23.30 per cent (Fig. 3). A commendable work on survey the infestation on fruit fly has been conducted by Lakra and Singh (1984) who observed that the extent of damage due to ber fruit fly (*C. vesuviana*) in off season on wild trees/bushes (*Zizyphus mummularia/Zizyphus rotundifolia*) at Hissar by surveying various orchards and uncultivated localities and reported on an average 31.2 per cent loss by the fruit fly. Present results of the study are in close agreement with the findings of Farrar *et al.* (2004) surveyed ten different regions in Samal and Easvand and obtained the *C. vesuviana* infestation rates of trees in the East, South, North and West parts were 23, 17, 15 and 15 per cent, respectively. Balikai (2009) reported that *C. vesuviana* Costa as major pest on this crop with infestation varying from high to very high degree, support the present findings. The present results are also in agreement with those of Karuppaiah *et al.* (2010) who found that minimum fruit fly, *C. vesuviana* infestation in November and maximum in February. Sarwar *et al.* (2014) observed that fruit fly infestation between 7.45-9.05 per cent in June, July and August, respectively in mango orchards. Bughti *et al.* (2015) reported that 8.02 per cent infestation by the *C. vesuviana* throughout the season, a bit lower in present study in November. Similar observations were also recorded by Haldhar (2016) who observed that ber fruit fly (*C. vesuviana* Costa) infesting on ber from hot arid region of Rajasthan with high infestation rate. Irsad and Haseeb (2019) collected a number of infested guava fruits from different places was proportionately in the range of 21.00-69.85, 21.06-49.80 and 20.12-43.65 per cent for *B. zonata, B. dorsalis* and *B. correcta*, respectively. Gaur *et al.* (2020) surveyed in different districts of south west Haryana revealed that cumulative infestation of *C. vesuviana* Costa varied from 5.0 to 36.0 per cent, also supports the present findings. These findings partially corroborated with the present results. Since this work of survey programme in ber field against fruit fly infestation in the semi- arid region of Rajasthan was conducted only by very few workers, so the present results particularly regarding survey work could be discussed and compared with the findings of other workers of other locations of Rajasthan and India in different crops for corroborate the present findings.

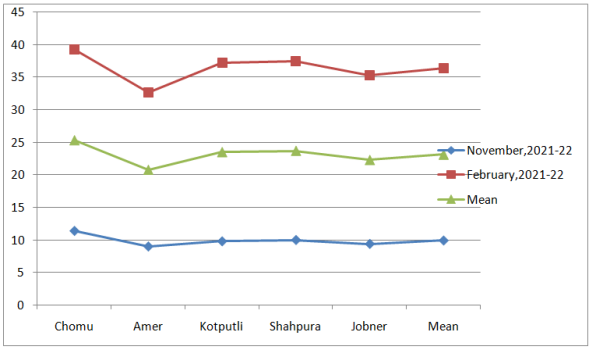

Fig. 1. Survey the infestation (number basis) of fruit fly, *C. vesuviana* in ber in Jaipur district of Rajasthan during *Rabi,* 2021-22.

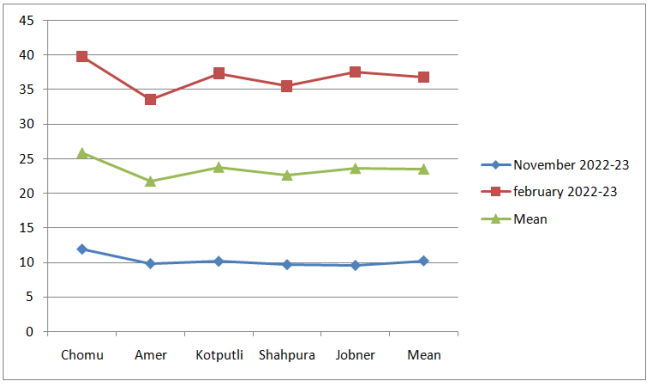

Fig. 2. Survey the infestation (number basis) of fruit fly, *C. vesuviana* in ber in Jaipur district of Rajasthan during *Rabi,* 2022-23.

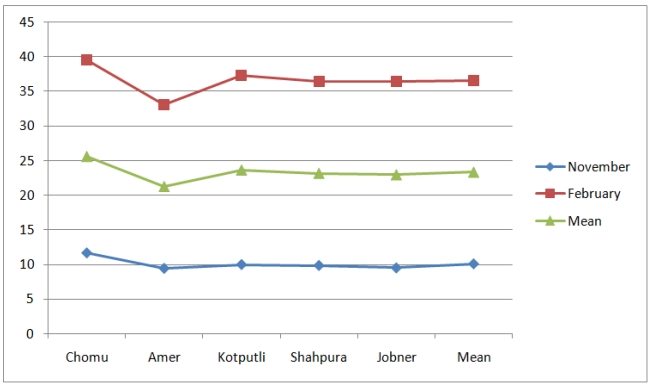

Fig. 3. Survey the infestation (number basis) of fruit fly, *C. vesuviana* in ber in Jaipur district of Rajasthan (Pooled, 2021-22 & 2022-23).

Fig. 4. Adult Ber fruit fly, (*Carpomyia vesuviana* Costa).

CONCLUSIONS

The purpose of the surveys and surveillance were to collect information about the pests in the area to prepare a recommended schedule of control measures for farmers and to determine the spatial and temporal pattern and intensity of ber pests in Jaipur areas. In a study conducted in Jaipur district of Rajasthan state, the maximum fruit fly infestation of 25.57 per cent in ber orchard was recorded in Chomu tehsil while, the minimum 21.24 per cent was in Amer tehsil during both the years.

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