

# Incidence of Insect Pests on Ber (*Zizyphus jujube*) Tree

MUHAMMAD SARWAR

Nuclear Institute of Agriculture, Tando Jam-70060, Pakistan

**Abstract.** - This study was undertaken to document the prevalent insect pests fauna on some ber trees causing considerable damage to matured plants. Field trials were established in farmer's fields where commercial ber varieties were grown. Insect population counts were taken every 15 days before and after flowering and fruiting stages in each unit. The results showed highest fruit fly population and infestation in that area. Amongst other insect species attacking ber tree were certain caterpillars, weevils, beetles, and mite. The fallout from this study emphasized the importance of field scouting to determine pest populations and their well timed control.

**Key words:** Ber, *Zizyphus jujube*, pest infestation, insect fauna.

## INTRODUCTION

**B**er or jujube, a common fruit grown in the warm subtropical regions of Pakistan, belongs to the genus *Zizyphus* of family Rhamnaceae. It is grown as windbreak or borders tree; while, in the warm area of Punjab and Northern Sindh some orchards are planted with an area of 2927 hectares having 16744 tons average yield in Pakistan (Anonymous 2003-2004). Several seedlings and grafted varieties are available in the country, more than a few species of *Zizyphus* bear edible fruit, but two *Zizyphus jujube* and *Zizyphus mauritiana* are commercially important. The intention of this paper was to provide identification and information to gardeners and extension representatives about the distinct species of insect pests crowding on ber fruit. Introduction to managing insects can point out simple but essential management tools that each ber grower should consider whenever planting this crop that hosts many pests in Pakistan.

## MATERIALS AND METHODS

Prior to the commencement of the research programme series, the ber trees were selected in the vicinity of Arifwala that served goal of research, monitored at fortnightly intervals. Some seedlings and grafted varieties available in the area were Umran No.9, Umran No. 13, Kernal Local and Gohar. For monitoring the pests, the focal methods used were the collection of adult insects from 3

randomly selected trees for population studies and gathering of fruit samples to find out fruit infestation. The simplest but most fruitful method of monitoring was visual check up of fruit to yield informations about the ovipositor stings holes, blemish on the fruit, eggs laid, larvae developed, adults that hatched and physical insect damage. Estimation of infestation was made by observing the attacked fruits usually showing signs of oviposition punctures or fruit that give off a fluid, which generally solidified adjoining to the oviposition spot.

To learn about these insects the best approach was to observe them on tree, their assortment, handling and preparing collection for study. The specimens were seen alive to gain an insight on their morphological characters, habits, habitat and behaviour informations. As the study was focused on insects feeding upon plant, hence plants were one of the best places for collection. For general collection there were different items in a sort of handbag, such as insect net, killing jar, pillboxes containing cleansing tissue paper, envelopes, vials of preservative, forceps, hand lens for examining insects, aspirator, sifter, traps and a knife for prying up bark, cutting open galls or digging into various materials. Insects were picked, shaken, or swept off the plant with a net. Every part of the plant like foliage, flowers, stem, bark, wood, fruit and roots were examined. The adults of few insects were obtained by collecting the immature stages and rearing them under laboratory conditions. This involved collecting larvae or nymphs, and maintaining them in container until the adults appeared. Collected specimens were preserved and mounted in various ways; most specimens were

**Table I.- Species composition of insect pests taxa on Ber (*Zizyphus jujube*) tree**

Common name	Scientific name	Order	Number captured/tree
Fruit flies	<i>Bactrocera zonata</i> , <i>B. Dorsalis</i> , <i>Carpomyia</i> sp.	Diptera	9.66 A
Ber beetle	<i>Adoretus pallens</i> , <i>A. nitius</i>	Coleoptera	4.66 B
Gray-hairy caterpillar	<i>Thiacidas postica</i> , <i>Euproctis fraternal</i>	Lepidoptera	2.66 BC
Leaf-eating caterpillar	<i>Porthmologa paraclina</i>	Lepidoptera	3.00 BC
Weevils	<i>Amblyrrhinus poricollis</i> , <i>Mylocerus</i> sp.	Coleoptera	2.00 C
Ber mite	<i>Larvacarus transitans</i>	Acarina	8.33 A
L.S.D. value			2.065

Different capital letters denote statistical significance in column and row values at alpha 0.050.

pinned, samples too small were mounted on microscopic slides and soft-bodied forms (nymphs, larvae and adults) were preserved in fluids for the purpose of taxonomic studies. The insects data, thus, obtained from 3 replicates were subjected to statistical analysis for the test of significance by adopting Duncan's Multiple Range Test. To eradicate the insect injury and to prevent any further spread of pests, recommendations were made to manage insect injury as based upon the current situations of the country.

## RESULTS AND DISCUSSION

During the existing studies, it was observed that ber tree suffered severely from the attack of different insect pests (fruit flies, ber beetle, gray-hairy caterpillar, leaf-eating caterpillar, weevils and ber mite encompassing 9.66, 4.66, 2.66, 3.00, 2.00 and 8.33 mean populations per tree, respectively) on or after flowering to fruit maturity (Table I). The major problem with different cultivars of *jujube* was the insects attack on early stages of fruit formation. Among the insect species attacking ber *Zizyphus jujube*, caterpillars of the *Thiacidas postica*, *Euproctis fraterna* and *Porthmologa paraclina*, and weevils, *Amblyrrhinus poricollis* and *Mylocerus* sp. fed on leaves and inflorescence. Other pest species identified included Ber beetle, *Adoretus pallens* and *A. nitidus*, it fed on leaves, cutting round holes in them. In severe infestation a few trees were observed completely defoliated. Such trees were unable to set fruit due to the cessation of photosynthesis. The first manifestation of attack by Ber mite *Larvacarus transitans*, was the appearance

of scale-like minute galls on the twigs. These grown and harden with time, attaining a size of about 9 x 4.5 mm. Each gall housed a mite, which damaged by sucking sap from the host with its chelicerae, retarding growth and reducing the fruit crop.

The most common insect which frequently attacked and severely damaged *jujube* fruits was fruit flies species such as *Bactrocera zonata*, *Bactrocera dorsalis* and *Carpomyia* species which were the greatest enemies of the produce, but these can attack other fruits as well *Bactrocera zonata* had a similar size to the one of a domestic fly, but with a reddish brown colour. Its wings distinguish it clearly, since the wings of this species have no spots and drawings at the bases of the veins. However, *Bactrocera zonata* presents/displays a longitudinal yellow band to each side of the thorax. Of fruit flies as based on the above mentioned findings, more than 50% of the fruits were damaged by *B. dorsalis* and *B. zonata*. Some cultivars were more susceptible than others; the flies preferred the largest, sweetest fruits, 100% of which were attacked; while on neighbouring trees, bearing a smaller, less-sweet type, only 2% of the crop was damaged. These flies infested the fruits at pea stage, so at this time it is very essential to spray a systemic chemicals with short residual effects. Qureshi *et al.*, (1991) reported *B. zonata* as a significant pest in India and Pakistan. Publications from Pakistan showed that it is possibly more important in these countries than *B. dorsalis*. Waterhouse (1993) identified *Bactrocera zonata* as one of the five most important pests of agriculture in South East Asia.

Lesser pests included a few small caterpillars that bored into the fruit; those were the gray-hairy

caterpillar, *Thiacidas postica* and also *Euproctis fraterna*. A leaf-eating caterpillar, *Porthmologa paraclina*, attacked the foliage. All moths and beetles can be attracted by light and might drown then in kerosenized water.

The most conclusive results from this study depict the importance of field pests scouting and monitoring to determine economical threshold levels prior to an insecticide application. Fruit fly activity can be monitored by fruit fly traps hung beneath the tree canopy. Methyl eugenol is considered the most powerful male lure for oriental fruit flies. It has been used successfully for control and eradication of *B. dorsalis* and infestations can be brought to sub-economic levels. Chemical treatments are utilized to initially reduce fruit fly population levels when technically practical and environmentally feasible. For controlling fruit fly infestations over a large area, the implementation of Bait Application Technique (BAT), followed by Male Annihilation Technique (MAT) is recommended. The first phase (BAT) would bring down the fruit fly populations to very low levels and the second phase (MAT) would maintain the populations at these low levels. These two methods could be selected because they are safe, cheap, and require very simple equipment for their application. A review of the biological aspects of male lures and their use is described more fully by Drew (1982). A trapping system used to monitor fruit flies has been described by Somerfield (1989). Sanitation is also quite important in the control of fruit fly. All dropped and prematurely ripe fruit, as well as infested young fruit, must be destroyed in order to

prevent the larvae from developing into adults. Aluja (1996) suggested that in the case of fruit flies, the assessment on vegetations adjacent to the infested orchards should be taken. And some of their management schemes should also be taken into account on the other host crops. Their larvae pupate in the soil and it has been found that treatment of the ground beneath the tree can help to reduce the problem. Control is possible with regular and effective spraying of insecticide. The spray can be repeated again after three weeks if infestation persists.

## REFERENCES

- ANONYMOUS, 2003-2004. *Fruit, vegetables and condiments statistics of Pakistan*. Govt. of Pakistan, Finance Division, Economic Adviser's wing, Islamabad, pp. 1-2.
- ALUJA, M. 1996. Future trends in fruit fly management. In: *Fruit fly pests: A world assessment of their biology and management* (eds. B. McPheron and G. Steck), pp. 309-320. St. Lucie Press, Delray Beach, FL, SA.
- DREW, R.A.I. 1982. *Fruit fly collecting*. In: *Economic fruit flies of the South Pacific Region*.
- QURESHI, Z.A., HUSSAIN, T. AND SIDDIQUI, Q.H., 1991. Relative preference of mango varieties by *Dacus zonatus* and *D. dorsalis*. *Pakistan J. Zool.*, **23**: 85-87.
- SOMERFIELD, K.G., 1989. Establishment of fruit fly surveillance trapping in New Zealand. *N. Z. Ent.*, **12**: 79-80.
- WATERHOUSE, D.F., 1993. *The major arthropod pests and weeds of agriculture in Southeast Asia: Distribution, importance and origin*. ACIAR, Canberra, Australia, 141 pp.

(Received 22 March 2005, revised 24 March 2006)