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Occurrence of Insect Pests on Guava *(Psidium guajava)* Tree

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Abstract.- A research programme was started on pests of guava fruit targeted in the area of Arifwala municipality on farmer's fields, where marketable varieties were grown. Insect pests populations on guava tree were counted every 15 days period before and after flowering and fruiting stages. The programme included monitoring, identification and finally suggestions for control operations. The most significant finding in this study was the higher level of fruit fly damage that was severe in all selected sites tracked by mealy bugs, mites, stinkbug, red-banded thrips, guava moth, guava whitefly and scale in that order. This study suggested that the occurrence of significant population of fruit fly (10.33 flies/tree) might be an indicator of potential source of infestations and these informations endowed with, can give effective control using different techniques to reduce insect's nuisance.

Key words: Guava, infestation, insect fauna, fruit fly.

INTRODUCTION

Continuous monitoring of larvae and adults insect pests population numbers are essential to assess the necessity and success of the any control programme. Guava is a climacteric fruit, during 2003-2004, the area under guava in Pakistan was declined to 61608 hectares with an average yield of 549599 tons (Anonymous, 2003-2004). Out of many causes for decline in its yield, insect pests contribute to the maximum strength. There are many fruit insect pests in almost all guava fruit growing areas of the world and their economic importance can be summarized as; they attack commercially produced fruits, some species have become pests in regions far removed from their native range, in such cases quarantine restrictions have to be imposed to limit further spread of fruit pests. Quarantine regulations imposed by an importing country can either deny the produce of producing country, or force the producer to carry out expensive disinfestations treatment. Therefore, the diagnostic purpose of this paper was to assist in confirming identification, damage and management informations to farmers, gardeners, and extension agents about distinct insects species of this fruit.

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MATERIALS AND METHODS

Survey of insect pests was carried out from 1993-94, prior to the beginning of the research programme sequence, the guava trees were selected around the Arifwala city (Punjab) that served target of research at fortnightly intervals. The main experimental methods used were; detection of plant parts, collection of fruit samples to determine fruit infestation and collection of adult and immature insect pests from 3 randomly selected trees for population studies. The simplest but most productive method of monitoring was visual inspection of leaves and fruits, because these can yield informations about the eggs laid, larvae developed, and adults hatched. Assessment of infestation was made by observing the attacked fruits usually showing signs of oviposition punctures or ovipositor "stings", holes and blemish on the fruit, fruits with exude of liquid that usually solidifies adjacent to the oviposition site and mechanical damage caused by insects. Insect pests infestation was detected as eggs, larvae and adults or as attacked growing fruits. Fruits associated insects were collected by rearing them from infested fruits. Field samples collected were brought to the laboratory in paper bags.

Upon return to laboratory, collected fruits were placed in container that had muslin top and a dry saw dust at its base, in which emerging larvae could pupate. Fruit holding containers were also

provided with an ant barrier. Samples were checked after every 2 days and fruits from which larvae emerged were discarded. A sugar solution (5%) as a food for the emerging adult, and to keep the adults alive for at least 4 days after emergence was also placed in the container, so that the flies can develop their full body colouration and normal shape, otherwise failure to feed, flies could result in specimens that may have shriveled abdomens and dull colours. Specimens to be dried mounted were killed with ethyl acetate vapour, taking care not to allow the specimens to come in contact with any form of moisture, as this will damage the body parts. Dry mounted specimens were pinned through the side of the thorax with a micropin. Identification of adult and immature specimens was done by going through keys available in the literature. For mites' collection, suspected leaves were taped over white paper to see them and then stored in vials. Some other devices useful in certain situations for collecting some other types of insects were aspirator, sifter, traps and hand nets or directly by hand picking. The insect's counting data was subjected to statistical analysis using Duncan's Multiple Range Test.

RESULTS AND DISCUSSION

The principal and key insect species identified for guava include fruit fly, mealy bugs, mites, stinkbug, red-banded thrips, guava moth, guava whitefly and scale in that order having 10.33, 8.33, 7.33, 6.33, 5.33, 5.00, 3.33 and 3.00 mean populations per tree, respectively (Table I). Red-banded Thrips *(Selenothrips rubrocinctus)* was slightly greater than 1 mm in length, and had a dark brown to black body underlined by red pigment, chiefly in the first three abdominal segments. The larvae were light yellow to orange, with the first three and last segments of the abdomen bright red. Red-banded thrips preferred young foliage, which led to leaf drop, at times totally denuding trees. Infested leaves were spotted on the upper surface with fecal deposits that turned reddish brown to black. The russetting from thrips feeding resulted in fruit, which was out-of -grade. Guava Fruit Moths *(Argyresthia eugeniella)* larvae were whitish in colour with a black head. They become pink as they approached maturity and attained a length of nearly ¼ inch. The larvae of the fruit moth caused the damage to guava by tunneling through the fruit. Guava Whitefly *(Metaleurodicus cardini)* adults were greenish yellow with a fine dusting of white wax, wings dusky with a conspicuous dark spot near the center of each wing. As females deposited eggs, a fine trail of fluffy white wax was rubbed from a tuft of wax on the ventral side of the abdomen. The scale species *(Coccus viridis)* were damaging not only because they fed on sap, but also because of the toxicity of their saliva. Scales were found on the upper or lower surfaces of leaves and also on fruits. Scale insects were also intermittently infesting guava plantings. The fruit tree was a problem at the peduncle junction, these weakened guava plants by puncturing the tissues and consuming sap, but the major damage was caused by the production of large amounts of honeydew upon which saprophytic fungi developed. The resultant thick black layer of sooty mould caused a drastic reduction in photosynthetic efficiency, resulting in premature leaf drop. False spider mite *(Brevipalpus phoenicis)* and stinkbugs were noted to damage the peel. The mite, as a tiny member of the arachnid family, damaged plants during hot and dry conditions, identified by leaf veins turning yellow or red-brown, then fine dusty looking webbing could be seen between leaves. Mite sucked the chlorophyll out of plant tissue leaving dried out leaves with yellow or red spots and blotches sometimes with tiny white dots. Stink Bug (*Acrostemum hilare)* generally green to brown, oval to elliptical, recognized most readily by the large triangular scutellum (plate that fits behind pronotum and between the forewings), because of their feeding behavior, left the superficial scars in fruits. Mealy bugs *Pseudococcus* sp. fed on leaves and fruits, weakened plants by puncturing the tissues and consuming sap, production of large amounts of honeydew upon which sooty mould developed, resulting reduction in photosynthetic efficiency and in premature leaf drop.

Oriental Fruit Fly, *Bactrocera dorsalis* was statistically the most important and destructive pest problem associated with guava in that area. The adult was noticeably larger than a housefly, but there was prominent yellow and dark brown to black

Table I.- Species composition of insect pests taxa on guava *(P. guajava)* tree.

Taxon		Order	Number captured/tree
Common Name	**Scientific Name**		
Oriental fruit fly	*Bactrocera dorsalis*	Diptera	10.33 A
Mealy bug	*Pseudococcus* sp.	Homoptera	8.33 B
False spider mite	*Brevipalpus phoenicis*	Acarina	7.33 BC
Green stink bug	*Acrostemum hilare*	Homoptera	6.33 CD
Red banded thrips	*Selenothrips rubrocinctus*	Thysanoptera	5.33 D
Guava fruit moths	*Argyresthia eugeniella*	Lepidoptera	5.00 D
Guava whitefly	*Metaleurodicus cardini*	Homoptera	3.33 E
Scale species	*Coccus viridis*	Homoptera	3.00 E
L.S.D. value		1.476	

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

markings on the thorax. Adult's wings mostly hyaline, wing pattern had 2 solid black lines stemming from the point of attachment, without a black spot at the tip. Abdomen gold to brown with gold to brown horizontal band and prominent black "T" shaped pattern. The abdomen had two horizontal black stripes and a longitudinal median stripe extending from the base of the third segment to the apex of the abdomen. Eggs white, elongate and elliptical and had a chorion without sculpturing. Larva, which had typical maggot appearance, was creamy white. The only band of spinules encircling the body was found on the first segment. The matured larva emerged from the fruit, dropping to the ground, and forming a tan to dark brown puparium. Pupation normally occurred 2.5-5 cm inches under the soil. Fruit fly adult's damage was most oftenly noted by their eggs in the fresh flesh of fruits. These eggs hatched into maggots that most often fed on the inside of the fruit, resulting in a soft, mushy mess. To look for wiggling white larvae, a very ripe guava fruit can be picked.

The production of quality products is probably as dependent on adequate and proper pest control as on any other single factor. The basis of good pest control programme is prevention than cure. Healthy plants, soils, and ecosystems are the foundation of plant defenses. Planning cropping system to maximize populations of beneficial organisms and minimize potential pests, monitoring pests, removing ripe fruits from area (sanitation), harvesting early, preventing fruit fly damage by enclosure, and burying infested fruits deep or put in air- tight container for four days are imperative. Fruit flies if be present at low levels without causing significant economic problems, their control may not be necessary. If high fly populations are causing severe fruit damage, management practices may need to be implemented. There is a large body of literature covering the subject of control; the main techniques available are the combination of bait spraying and male annihilation (Bateman, 1982). Similarly, it is current policy to use a combination of bait spraying and Sterile Insect Technique (Mitchell and Saul, 1990). Qureshi and Hussain (1993) recommended the use of product Clensel (liquid soap containing ammonia) and Traps baited with lure toxicant mixture (85% methyl eugenol + 10% sugar solution + 5% naled) for effective fruit fly control. Management depends on bait sprays, trapping of adult flies, harvest timing, fruit sanitation after harvest, and biological control (Van Steenwyk *et al.,* 2003). Some insecticides have been registered to control insect pests on guava like imidacloprid, buprofezin, chlorpyrifos, cyhalothrin, fenpropathrin, thiomethoxam, acetamiprid and endosulphan which can give promising results. Implementation of IPM strategies and tactics can be

a big step for growers, biological control along with host plant resistance, and cultural and management practices are the cornerstones of IPM.

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