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Study of pests attacking guava in Jordan

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Abstract

The study was conducted in 2009-2011 to survey pests which attack guava trees in Jordan through weekly visits to various guava growing areas, in order to register pests and diseases which present on guava. The pests are: Aphid *Aphis gossypii* Hemiptera: Aphididae, Glover, Medfly *Ceratitidis capitata* Wied. Diptera: Tephritidae), Hibiscus mealy bug (*Maconellicoccus hirsutus*) Green Hemiptera: Pseudococcidae, olive black scale *Saissetia olea* Olivier. Homoptera: Coccidae, beetle *Maladera (Cephaloserica) insanabilis*. Brenke. Coleoptera: Melolonthinae, thrips *Thrips tabaci* Lindeman. (Thysanoptera; Thripidae) and Red scale insect (*Aonidiella aurantii*) Maskell. Homoptera: Diaspididae. Survey showed. wilting disease caused by *Fusarium oxysporum* spp. and Cercospora leaf spot (*Cercospora psidii*). Natural enemies present are, *Anagyrus* sp, Lace wing *Chrysoperla carena* and lady bird, *Coccinella* sp.

Keywords: guava, insects, diseases, Jordan

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1.0 Introduction

Guava *Psidium guajava* L. originated in tropical America, and now widely grown all over the tropics and subtropics regions of the world [1,2] . In Jordan guava is grown commercially in Jordan Valley and highland (Irbid governorate / Wadi Khaled /, Madaba governorate /Eyon Al-Deeb, Taphella governorate/ Borbetah).The total area planted with guava trees was 2,194.2 hictars, in Jordan valley and highlands, producing 16,349 thousand tons [3] . It is expected that commercial and backyard planting of guava trees will continue to increase. The existence of adults and immature stages on the leaves , branches and fruits leads to damage the fruits and poor quality marketing, in addition to the growth of black sooty mold on the leaves. This leads to yellowing of leaves and wilting due to sucking the plant sap and reduces the metabolism of chlorophyll. Guava tree is one of the relatively modern plants in Jordan. Nowadays Jordanian farmers facing several problems specially insect and fungi which affect the quality and quantity of. Little

information is available on pests infesting guava in Jordan [4]. This work aims to survey of pests on guava trees in Jordan for the first time, their damage and management strategies to help farmers, gardeners and extension agents diagnosing the pests and how to deal with it.

2.0 Materials and methods

Survey of guava pests was carried out in Jordan through biweekly visit to the areas planted with guava trees for three years, 2009-2011. The sites cultivated by guava, Irbid/ Sahem Kfarat (Wadi Khaled) North of the kingdom, Tafila (Borbetah) Southern of Kingdom, middle of Kingdom Madaba (Eyyon Al-Deeb, Zrga Ma'in) and Jordan valley were surveyed. The main experimental methods used were; detection of plant parts, collection of fruit samples to determine fruit infestation. The simplest but most productive method of monitoring was visual inspection of leaves and fruits, because these can yield information's about the eggs laid, larvae developed, and adults hatched [5].

| Pest | Site | | | | Months |
|---|-------------------------|-------------------------|-------------------|------------------|--------|
| | North Wadi Khaled | Middle Eyyon Al-deeb | South Borbetah | Jordan Valley | |
| Aphid(<i>Aphis gossypi</i>) | ✓ | ✓ | ✓ | ✓ | 2-9 |
| Fruit fly (<i>Ceratitits capitata</i> Wied.) | ✓ | ✓ | | ✓ | 9-12 |
| Hibiscus mealy bug (<i>Maconellicoccus hirsutus</i>) | ✓ | ✓ | | ✓ | 1-12 |
| Maladera(Cephaloserica) insanabilis | | ✓ | | | 5-9 |
| Coleoptera(scarabaeidae) | | | | | |
| Red scale insect(<i>Aonidiella aurantii</i>) | | | ✓ | ✓ | 6-8 |
| Black scale insect (<i>Saissetia olea</i>) | | | ✓ | | 6-8 |
| Thrips (<i>thrips tabaci</i>) | | ✓ | ✓ | ✓ | 2-8 |
| Broad mite | ✓ | | ✓ | | 7-8 |

Table-1: Showed different site of guava cultivation with the pests

The infestation by insect was detected by presence of eggs, larvae and adults and various signs by attack on pests on fruit. Fruits associated insects were collected by

rearing them from infested fruits. Samples (infected leaves, fruits or any other parts) collected from field were brought to the laboratory in paper bags .Collected plant

parts were placed separately in wood cages covered by muslin cloth (1x1x1m) with sand or trays at its base, in which emerging larvae could pupate. Samples were checked after 2-4 days, then identification of adult and immature specimens was done by going through keys available in the literature. Other types of insect were collected by using aspirator, traps or directly by hand picking. The diseases infected guava (wilting) was identified by brought a piece of infected root (0.5mm) and placed on potato dextrose agar (PDA) and incubated for 5 days at 28°C, while other diseases (Foliar) were directly isolated from infected tissues.

3.0 Results and discussion

Results showed that pest species attacked guava were aphids, medfly, mealy bugs, beetle, scale insect, thrips and broad mite (Table-1). Aphid *Aphis gossypi* Homoptera: Aphidae is one of the most important insects that attacked guava in Jordan (Table-1), aphid attacked guava in February because temperatures are suitable for its development specially in Jordan valley, where aphid numbers increased during the summer months and gave up to 30 generations per year. In Jordan, farmers usually controlled aphids by using insecticides, however, a number of effective natural enemies found in Jordan environment but most of these enemies are killed or disappeared due to using of pesticides to control different pests.



Figure-1: Maladera adult damage, branches without leaves .

From these natural enemies which present are lace wing, Lady bird. *Aphidius* spp. The result showed that Fruit fly (*Ceratitis capitata* Wied. Diptera: Tephritidae) appeared in April and May (Table-1), while in Jordan Valley it was present all over the year because many hosts were present around year [6,7]. Fruit fly attacked guava fruits in September near the maturation of fruits because mature and soft fruits allow the fly to lay eggs better than immature and ridged fruits [8,9]. Medfly was controlled by different ways in Jordan, first insect monitored by using Pheromone traps to determine fly appearance and the best time to control, then Jackson trap (TML2gms) holding for males attraction, (McPhail trap baited with Biolures FA-3 (Ammonium acetate, putrescine and trimethylamine) + water or DDVP (Dichloro divinyl phosphite) to attract both sexes females and males. Partial spray had been taken with insecticide like spinosad Fruit Fly Bait (Spin-tor). Some farmers used cultural practices like removing the infested fruits from farms to prevent re-infection.

The study showed that insect Hibiscus mealy bug or pink grape (*Maconellicoccus hirsutus*) is one of the most important pests which attacked guava in Jordan (Table-1). It attacks the leaves, branches and fruits, and weakened plants by puncturing the tissues and consuming sap, production of large amounts of honeydew upon which sooty mould developed, resulting in reduction of photosynthetic efficiency and in premature leaf drop.

The importance of hibiscus mealy bug appears from the difficulty in control because the presence of waxy (cottony) material surrounding the insect which prevent insecticide to reach and kill it, in addition to the speed of insect reproduction within time. Jordan farmers control this insect by using many chemical pesticides such as commando, Confidor 200SL, Comando SL20 (Imidacloprid) in the beginning of March. Survey showed appearance of the parasitoid *Anagyrus* spp with large numbers in first of February and reached 16 parasitoid/branch. Results also showed that the appearance of the beetle *Maladera* (*Cephaloserica*) *insanabilis* Coleoptera (scarabaeidae) (Table-1) in Eyyon al-deeb /Madba governorate in May as adult near the root zone where they laid eggs favorite wet soil, and eggs hatched to larvae. The larvae feed on the organic matter present in both the soil and plant roots, while adult feed on leaves at night by cutting leaves, severe symptoms showed the branches without leaves (**Figure-1**).



Figure-2: Guava fruit deformation

Control insect was done by sprayed insecticides such supertac (Alpha Cypermethrin as). Figure-1 : *Maladera* adult damage, branches without leaves. Scale insects other pests recorded (Table-1). The following scale insects: Red scale insect (*Aonidiella aurantii*) Homoptera: Diaspididae, Black scale insect (*Saissetia olea*) homoptera: coccidae were appeared on guava at the end of May in

borbetah / tafila governorate and the Jordan Valley, insect attack leaves, branches, fruits and guava plantings (seedlings), sucking the plant sap and reduced the quality of the product 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 on fruits.



Figure-3 : Fusarium wilt disease in Guava

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. Scale insects controlled in Jordan by spraying insecticides, mineral oils to reduce infestation. Thrips *Thrips tabaci* Lindeman.(Thysanoptera; Thripidae) was appeared with low numbers However, it was considered a secondary pest in terms of its effect on the trees. Low thrips numbers were due to using pesticide to control other pests (Table-1).The study recorded a case on guava fruits (fruit deformations(Figure-2).

The symptoms could be referred to broad mite *Polyphagotarsonemus latus* Banks (Acarina: Tarsonemidae injury or, nutritional (boron) deficiencies or physiological disorders . in Wadi Khaled a mineral test had been done and the analysis showed boron deficiency. Another reason may form fruit deformation, Farmers in Jordan propagated guava by seed and no varieties known, this result in some segregation in the plant. For example, during late winter production, with cool temperatures and high humidity, some leaf curling and twisting, seen on New Guinea impatiens, is a physiological disorder and not broad mite injury [10].

Table-2: Showed different Site of guava cultivation with the diseases.

| Site | | Jordan Valley | South Taphellah Borbetah | Middle Eyyon Al-deeb | Appearance |
|---|--|---------------|--------------------------|----------------------|-----------------|
| Wilting(<i>Fusarium</i> spp. <i>oxysporume</i>) | | ✓ | ✓ | ✓ | Around the year |
| Cercospora leaf spot (<i>Cercospora psidii</i>) | | ✓ | ✓ | ✓ | Around the year |
| fruits Deformation or element deficiency | | ✓ | ✓ | ✓ | 6-10 |

The survey showed that guava infected by diseases Table-2. Wilt disease (Figure-3) which caused by the fungus *Fusarium oxysporum* spp. was the most important disease of guava in Jordan. Affected plants show yellow coloration with slight leaf curling at the terminal branches, becoming reddish at the later stage and subsequently shedding of leaves take place. Twigs become bare and fail to bring forth new leaves or flowers and eventually dry up. Fruits of all the affected branches remain underdeveloped, become hard, black and stony.



Figure-4: Leaf spot *Cercospora Psidii*.

The entire plant becomes defoliated and eventually dies. When making longitudinal cross section in the root zone, Brown discoloration had been noticed in wooden vessels. The spread of the disease increased in land planted with guavas where farmers planted vegetables between guavas trees. Farmers advised to control this disease by irrigated soil by fungicides like Tashagareen(Hymexazol), Benlate(Benomyl).Another disease which was recorded in infected guava leaves was caused by fungus *Cercospora Psidii* (Figure-4). Symptoms were appeared as round spots and irregular reddish-brown and becomes gradually to white status. Disease controlled by Jordanian farmers by sprayed a copper fungicide.

4.0 Conclusion

In conclusion, this study records the pests that attacked guavas in Jordan and mentioned some ways of control. The most important insect was Mealy bug, and wilting disease. Therefore, it is hoped that new work has a potential in studying the insect situation life cycle, appearance incidence and control program.

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