Seasonal Occurrence of Insect Pests on Mango *Mangifera indica* L. cv Sein-ta-lone in Meiktila Environs

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Abstract

Seasonal occurrence of insect pests on mango ***Mangifera indica* L. cv Sein-ta-lone** was recorded during the study period from July 2012 to June 2013. A total of 17 species insect pests under 15 genera belonging to 12 families, and three orders was recorded in *Mangifera indica* L. at two orchards in Meiktila Environs. In Site A, 16 species and in Site B, 14 species were collected. The 17 species included *Leptocentrus taurus*, *Idioscopus clypealis* and *I. nitidulus*, *Dictyophara pannonica*, *Lawana conspersa*, *Ricania* sp., *Scolypopa australis*, *Aphis gossypii*, *Myzus persicae*, *Icerya aegyptica* and *I. seychellarum*, *Aulacaspis tubercularis*, *Pseudococcus longispinus*, *Batocera rufomaculata*, *Hypomeces squamosus*, *Sternochetus mangiferae* and *Bactrocera dorsalis.* The most species were Order Homoptera, the least species were Diptera. Larva stage was encountered in only *Batocera rufomaculata. A. gossypii*, *A. tubercularis* and *B. dorsalis* throughout the year while *Dictyophara pannonica* occurred only in November.

Key words : mango, pests, damaging parts

Introduction

Myanmar people have a saying concerned with taste of food "mango in fruits, pork in meat, and tea in leaves". According to this saying, tea is the most delicious in all leaves, pork is the most delicious in all meat, and mango is the most delicious in all fruits.

Mangoes (*Mangifera indica* L.) belong to the genus *Mangifera* of family Annacardiaceae. *M. indica* (mango) has its origins in India and Myanmar. Today, mangoes are recognized and eaten throughout the world (Bissdorf, 2005). Mango is one of the most economically important agricultural products in Myanmar. Myanmar mangoes have been exported overseas since 1985-86. The biggest importers of Myanmar mango are China, Singapore and recently some European countries (Hirano *et al*., 2008). More than one hundred varieties of mango exist in Myanmar. Among these, Sein-ta-lone is the most important fruits for local consumption as well as for export market, because it has high sweetness level and unique taste, fibre free and aroma. Moreover, Sein-ta-lone is regarded as the highest price in the market (Khin Khin Sann, 2008).

factors contributing to the production and quality losses in mango. Mango is attacked by a variety of insect pests, these insect pests attack roots, stems, leaves, flowers and fruits there by, causing a decline in quantity or quality of potentially harvestable and unmarketable. Mango fruit reduction is caused by the insect pests. Insects belong to the largest phylum Arthropoda. As measured by distribution and abundance, insects are generally considered to be the most successful group of living organisms on earth (Brower, 1997).

More than 492 species of insects, have been reported to be infesting mango trees. Almost a dozen of them have been found damaging the crop to a considerable extent causing severe losses and, therefore, may be termed as major pests of mango. The insects other than those indicated above are considered as less injurious to mango crop and are placed in the category of minor pests (TFNET, 2013). At present, as there is a great demand for mango (Sein-ta-lone variety) in foreign market, there is a need to assess the infestation of insect pests which might lead to economic loss to the mango cultivators.

By taking above the consideration, the present study was conducted with the following objectives;

- to identify and record as much as possible the pests that infest the plantations of mango *Mangifera indica* L.
- to investigate plant part attacked, type of damage and collection stage of pests
- to study monthly occurrence of pests in two study sites.

Materials and methods

Study area and study sites

Pyithayar, Meiktila Township, Mandalay Region was chosen as study site. It is situated between 20° 54' and 20° 55' N and between 95° 49' and 95° 54' 2" E (Plate 1).

Site A, Agricultural Garden and has an area of 4.29 km^2 mango plantation and consists of 1190 trees. Site B, Win Win Mango Garden, has an area of 6.88 km^2 consisting of 207 mango trees. The varieties in these two orchards are Sein-ta-lone (Plate 1 . A, B).

Study period

Study period lasted from July 2012 to June 2013.

Sample collection

Insect pests were collected two times a month. Survey was carried out during 8: 00 am to 11: 00 am randomly.

Leaves, flowers, twigs, fruits and stem of mango were thoroughly searched for pest. Infestation on the leaves, twigs and stems was examined throughout the year while flowers and fruits, only during their blooming and fruiting seasons. Then all available stages of insect were collected. Some pests were collected by hand and some were collected by insect net. Collected samples were brought to the laboratory, Department of Zoology, Meiktila University, for further identification. Studies were made using dissecting microscope and compound microscope.

Identification

Identification and classification were followed by Borror *et al*., (1992), Hill (1983).

Site (A) (Agricultural Garden) Site (B) (Win Win Mango Garden)

Plate 1. Map of study area and study sites

Results

A total of 17 species insect pests under 15 genera belonging to 12 families, and three orders was recorded in *Mangifera indica* L. at two orchards in Meiktila Environs (Table 1). The most percentages of species occurred in Order Homoptera (Figure 1). The most common percentages of families were Cicadellidae, Aphididae Margarodidae, Ricaniidae and Curculionidae (Figure 2).

Descriptive account of insect pests

Leptocentrus taurus (Fabiricius, 1775)
Common name-Treehopper
These insects are black and distinguished from other bugs by the shape of their pronotum, which makes them difficult for a predator to eat. The dorsal surface of the conical body is black; the sides of body
have white spots (Plate 2. A).
Damage: Treehoppers suck plant sap from the leaves, causes stagnation of growth of leaves.
Idioscopus clypealis (Lethierry, 1889)
Common name - Mango Leafhopper
Idioscopus clypealis is the smallest of the three species of mango hopper with two spots on the scutellum dark spots on the vertex, light brown in colour. They are abundance in the period of flowering and fruiting (Plate 2. B).
Damage: They destroy the inflorescences and excrete massive quantities of honeydew which imparts sugary shine to leaves and fruits and other plant parts and encourages growth of fungi, giving rise to growth of sooty mould.
Idioscopus nitidulus (Walker, 1870)
Common name - Mango Leafhopper
Mango leafhoppers are small insects. Adults have brown body with pale yellow on the top of the head. The head bears small black eyes. They are also abundance in the period of flowering and fruiting (Plate 2. C).
Damage: Mango leafhoppers can cause serious damage by feeding on flowers and leaves, reducing fruit set and production.
Dictyophara pannonica (Germar 1830)
Common name - Planthopper
Apex is black color, in the end of rostrum, rounded in shape. Legs slender, fore wing: membranous, large, extending behind abdomen. Hind wing: membranous, shorter than fore wing, with apex broader than the rest of wing (Plate 2. D).
Damage: Attack leaf.
Lawana conspersa (Walker, 1851)
Common name - Planthopper
It is the white moth cicada. Forewings are white colour with black patch of scales. The anterior end of forewing is narrow but the posterior end of forewing is broad. The margin of forewing has numerous bands. Hind wings appeared to fold longitudinally (Plate 2. E).
Damage: feed on plant sap, causing dehydration of plant parts.
Aphis gossypii Glover, 1877
Common nam - Cotton Aphid
This aphid varies greatly in colour, usually from light green or dark green to almost black. The nymph is found undersides of leaves. The body is dull in colour because it is dusted with wax secretions (Plate 2. F).
Damage: Aphids feed by sucking sap from their hosts. Infested leaves often become cupped downwards and may appear wrinkled. Heavy infestations on hosts may result in wilting young plant and which may have reduced or stunted growth.
Myzus persicae Sulzer, 1776
Common name - Green Peach Aphid
It is polyphagous insect. Aphids are small, pear-shaped, delicate insects with soft, fragile bodies. Adult aphids may be winged or wingless. Usually it is green with a darker thorax; Legs are long (Plate 2.G).
Damage: They attack leaves. Leaves infested with aphids become curled or twisted, and when aphid populations are large, entire plants become wilted, distorted or yellowish.

Icerya aegyptica (Douglas, 1890)

Common name - Egyptian Fluted Scale

Its body is orange red, covered by thick layer of white wax, and its marginal areas with fringe of wax processes, it differs from other species which have brown setae on body margin forming inconspicuous clusters of 3 to 4 setae (Plate 2. H).

Damage: They suck the sap from the stems, shoots and leaves. The damage is usually slight, just a little loss of sap.

Icerya seychellarum (Westwood, 1855)

Common name - Seychelles Fluted Scale

They are small and oval-shaped scales. Body orange to brick red, legs and antennae black, covered by layer of white to often yellow wax; median area with longitudinal series of tufts, it is unique by having open center pores (Plate 2. I).

Damage: Fluted scales suck sap from the stems, shoots, and leaves. Usually slight damage, but a conspicuous insect; leaving fruits covered with waxy exudates.

Aulacaspis tubercularis (Newstead, 1906)

Common name - Mango White Scale

Armored scales are small, white, sides nearly paralleled. The head locates at the anterior end and the colour is blackish, occurred in both upper and lower surface of leaves. Mango white scale is present all year (Plate 2. J).

Damage : They attack leaves and fruits. The infested leaves become gradually yellow.

Seudococcus longispinus Linnaeus, 1767

Common name - Long-tailed Mealybug

The yellowish-grey body is largely obscured by the powdery white wax with which the mealybug covers itself, except for a slightly darker stripe running up the middle of the back. Posterior two filaments are exceptionally long, giving this mealybug its common name (Plate 2. K).

Damage: Leaves are distorted (rolled or folded), stunted, and yellow. Like the other sap-feeding insects, mealybugs excrete large quantities of honeydews, which promote sooty mold that caused blackened malformed leaves, stems, and fruits. Infested fruits are unmarketable.

Ricania sp.

Common name - Ricaniid planthopper

The adult of Ricania species is dark brown with pale bands. Each side of the forewings has a notch and the rest of margin appear with many bands. The antennae are tiny and inconspicuous (Plate 2. L).

Damage : They suck the sap from the leaves

Scolypopa australis (Walker, 1851)

Common name - Planthopper

Commonly known as the Passionvine hopper is a species of planthopper insect.The head is black and the colour of forewings is deep yellow with dark brown patches at the base and margin.Black spots are present at each side of posterior margin in the forewings (Plate 2. M).

Damage : They suck the sap from leaves.

Batocera rufomaculata De Geer, 1775

Common name - Mango Stem Borer

A very large species, the larval tunnel, it has 10 segments. The adult beetles emerge in the spring. They are especially large and with very long antennae (Plate 2. N).

Damage : The larvae tunnel through the sapwood and, because of their size, they make large tunnels, which interfere with sap flow and affect foliage and fruit production. Heavily attacked trees may die.

Hypomeces squamosus Fabricius, 1792

Common name - Gold-dust Weevil

The adult is a broad-nosed weevil of about 10.15 mm body length, grayish in colour and with the body surface covered with a fine golden green dust (Plate 2. O).

Damage : They destroy on the foliage of their host-plants by eating notches out of the edge of the leaf lamina.

Sternochetus mangiferae Fabricius, 1775

Common name - Mango Seed Weevil

The adult weevil is short, compact. The legs can be compressed to the body and the snout fits into a ventral groove, elbowed antennae. The colour pattern varies with age from grey to dark-brown (Plate 2. P).

Damage : The only damage is to the seed.

Bactrocera dorsalis (Hendel, 1912)

Common name - Oriental Fruit Fly

They are regarded as the principal pests of mango. The adult flies are dark brown with bright yellow and a dark. T- shaped marking on the abdomen. The wings are transparent. The upper margin of hyaline wings is blackish. These markings are quite specific. The female has a pointed slender ovipositor use to deposit eggs under the skin of host fruit (Plate 2. Q, R).

Damage: They attack the fruits. The females puncture the fruits leaving scars and holes on the fruit surface.

Seasonal occurrence of some insect pests

In the present study, *A. gossypii, A. tubercularis* and *B. dorsalis* were found throughout the study period. *I. clypealis, I. nitidulus, I. agyptica, I. seychellarum* and *P. longispinus* occurred in hot, rainy and cold season. *L. taurus, Ricania* sp., *S. australis* and *S. mangiferae,* were observed in hot and cold season. *B. rufomaculata* and *Hypomeces squamosus* occurred in rainy and cold season. *Myzus persicae* occurred in flowering season (hot season). *Lawana conspersa* and *Dictyophara pannonica* occurred in cold season (Table 3). Adult stages were found at most (Table 2).

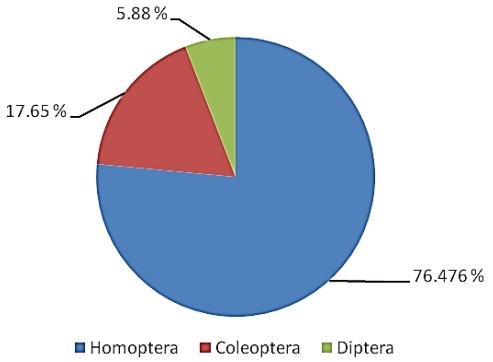


Figure 1. Orderwise composition of recorded species (July 2012- June 2013)

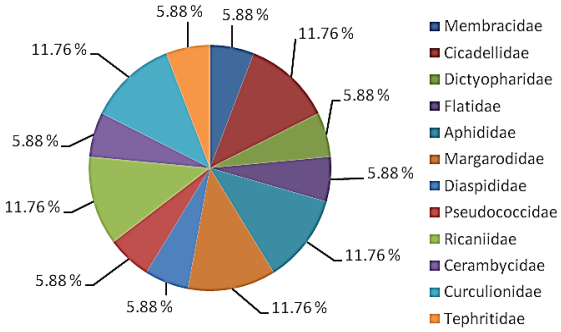
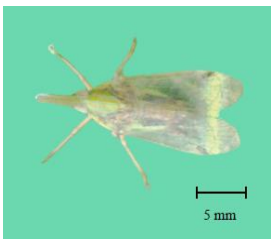


Figure 2. Familywise composition of recorded species (July 2012- June 2013)

(A) *Leptocentrus taurus*

(B) *Idioscopus clypealis*

(C)*Idioscopus nitidulus*



(D) *Dictyophara pannonica*

Table 1. List of recorded pest species on mango tree at two study sites during the study period

Order	Family	Scientific name	Common name
Homoptera	Membracidae	*Leptocentrus taurus*	Treehopper
	Cicadellidae	*Idioscopus clypealis*	Mango Leafhopper
		Idioscopus nitidulus	Mango Leafhopper
	Dictyopharidae	*Dictyophara pannonica*	Planthopper
	Flatidae	*Lawana conspersa*	Planthopper
	Aphididae	*Aphis gossypii*	Cotton Aphid
		Myzus persicae	Green Peach Aphid
	Margarodidae	*Icerya aegyptica*	Egyptian Fluted Scale
		Icerya seychellarum	Seychelles Fluted Scale
	Diaspididae	*Aulacaspis tubercularis*	Mango White Scale insect
	Pseudococcidae	*Pseudococcus longispinus*	Long-tailed Mealybug
	Ricaniidae	*Ricania* sp.	Ricaniid planthopper
		Scolypopa australis	Planthopper
Coleoptera	Cerambycidae	*Batocera rufomaculata*	Mango Stem Borer
	Curculionidae	*Hypomeces squamosus*	Gold-dust Weevil
		Stermochetus mangiferae	Mango Seed Weevil
Diptera	Tephritidae	*Bactrocera dorsalis*	Oriental Fruit Fly

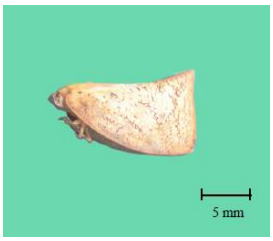
Table 2. Pest species, plant parts attacked, type of damage and collected stages

No.	Scientific name	Plant part	type of damage	Stage
1	*Leptocentrus taurus*	Leaf	Sucking	Adult
2	*Idioscopus clypealis*	Flower	Sucking	Adult
3	*Idioscopus nitidulus*	Flower	Sucking	Adult
4	*Dictyophara pannonica*	Leaf	Sucking	Adult
5	*Lawana conspersa*	Twig	Sucking	Adult
6	*Aphis gossypii*	Leaf & young shoot	Sucking	Nymph
7	*Myzus persicae*	Leaf & young shoot	Sucking	Adult
8	*Icerya aegyptica*	Stem, shoot & leaf	Sucking	Adult
9	*Icerya seychellarum*	Stem, shoot & leaf	Sucking	Adult
10	*Aulacaspis tubercularis*	Leaf & fruit	Sucking	Adult
11	*Pseudococcus longispinus*	Leaf & fruit	Sucking	Adult
12	*Ricania* sp	Leaf	Sucking	Adult
13	*Scolypopa australis*	Leaf	Sucking	Adult
14	*Batocera rufomaculata*	Stem, branch	Boring	Larva
15	*Hypomeces squamosus*	Leaf	Biting	Adult
16	*Sternochetus mangiferae*	Seed	Boring	Adult
17	*Bactrocera dorsalis*	Fruit	Boring	Adult

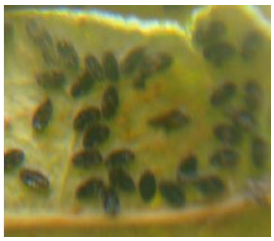
Table 3. Monthly occurrence of pests in two study sites from July 2012 to June

No.	Species	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
1	*Leptocentrus taurus*	-	-	-	+	-	-	-	+	+	-	-	-
2	*Idioscopus clypealis*	+	+	+	+	-	-	-	-	+	+	+	-
3	*Idioscopus nitidulus*	+	+	+	+	-	-	-	+	+	+	+	+
4	*Dictyophara pannonica*	-	-	-	-	+	-	-	-	-	-	-	-
5	*Lawana conspersa*	-	-	-	-	+	+	-	-	-	-	-	-
6	*Aphis gossypii*	+	+	+	+	+	+	+	+	+	+	+	+
7	*Myzus persicae*	-	-	-	-	-	-	+	+	+	-	-	-
8	*Icerya aegyptica*	+	+	+	+	+	-	-	+	+	-	+	-
9	*Icerya seychellarum*	+	+	+	+	+	-	-	+	+	+	+	-
10	*Aulacaspis tubercularis*	+	+	+	+	+	+	+	+	+	+	+	+
11	*Pseudococcus longispinus*	+	+	-	-	+	+	-	+	+	+	+	+
12	*Ricania* sp	-	-	-	+	+	+	-	-	-	-	-	-
13	*Scolypopa australis*	-	-	-	-	+	+	-	-	-	-	-	-
14	*Batocera rufomaculata*	+	+	+	+	+	+	+	-	-	-	-	-
15	*Hypomeces squamosus*	+	-	+	+	+	+	+	-	-	-	-	-
16	*Sternochetus mangiferae*	-	-	-	-	+	+	+	-	-	+	+	+
17	*Bactrocera dorsalis*	+	+	+	+	+	+	+	+	+	+	+	+

+ = occurred
- = not occurred



(E) *Lawana conspersa*



(F) *Aphis gossypii*

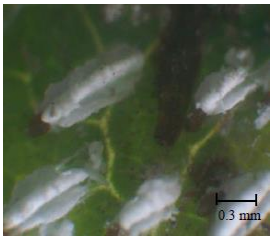
(Q) *Bactrocera dorsalis* (Male)

(R) *B. dorsalis* (Female)

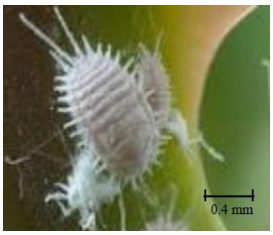
(G) *Myzus persicae*

(H) *Icerya aegyptica*

(I) *Icerya seychellarum*

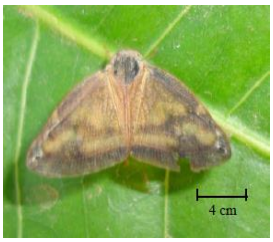


(J) *Aulacaspis tubercularis*



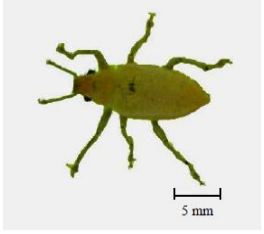
(K) *Pseudococcus longispinus*

(L) *Ricania* sp.



(M) *Scolypopa australis*

(N) *Batocera rufomaculata*



(O) *Hypomeces squamosus*

(P) *Sternochetud mangiferae*

Plate 2. Pests of Order Homoptera, Coleoptera and Diptera on Mango

Discussion

Seasonal occurrence of insect pests on mango *Mangifera indica* L. was studied during the period of July 2012 to June 2013 at two orchards in Meiktila Environs.

In this study, 17 species of insect pests under 15 genera, 12 families and three orders of insect pests were collected. Among the 17 pest species, *L. taurus, D. pannonica, L. consperasa,* and *B. rufomaculata* were found at study site A while the remaining species were found in both study sites.

In the present study, *A.* gossypii, *A. tubercularis* and *B.dorsalis* occurred in all year round. Minimum occurrence of insect pests was *B. rufomaculata* in the present study and occurred only at Site A. *B.dorsalis* incidence was throughout the year by pheromone entrapment. They occurred mostly in harvesting period. *A. gossypii* and *A. tubercularis* are dominant at two study sites in the present study. Chin *et al.*, (2010) described that *A. tubercularis* occurred throughout the year. So the present study agrees with above authors.

Hill (1983) reported that *A. gossypii* was observed as a minor pest on Manila hemp. However, Rahman and Kuldeep (2007) studied the Bioecology of mango hopper and they described three species *Amriotodus atkisoni, Idioscopus clypealis, I. niveosparsus* were serious pest of mango all over India. They stated as most serious pests during flowering and fruiting stages.

In the present study, mango hopper *I. clypealis* and *I. nitidulus* found in flowering and fruiting stages as serious pests. Therefore, the finding of present study is same with Rahman and Kuldeep.

Moreover, Kaushik *et al.*, (2012) recorded *A. atkinsoni* and *I. clypealis* on mango in Chhattisgarh, India. They recorded these two species occurred during flushing, flowering and fruiting stages. This data also agrees with the present study since mango leaf hoppers were recorded during flushing, flowering and fruiting stages in this study.

Tin Tin Aye and Myint Thaung (2002) studied the occurrence of fruit fly in Yezin Area. In their studies, four different fruit flies *Bactrocera* sp. were recorded from seven different hosts in Yezin area especially

during the fruiting season. Among them, *B. dorsalis* is is the most common pest in the Yezin area and infests mango, guava, banana and plum. Infested fruits are unmarketable and sometimes it causes total losses if it is not controlled by suitable insecticide or the fruits are not bagged.

In the present study, the maximum number of occurrence of *B. dorsalis* was the fruiting season. Chin *et al.* (2010) reported that the fruit fly *Bactrocer*a species occurred from June to December. Therefore, the finding of present study is similar to the above authors.

On the whole the results of the present study is hoped to be of some value to mango cultivators, by getting the awareness on what sort of insect pests infest the mango tree and their prevalence on the specific parts of the tree, so that in future necessary measures would be taken to maintain the productivity of their crop.

Acknowledgements

I am very grateful to Dr Khin Mya Mya, Professor and Head of Zoology Department (Retired), University of Mandalay for her close supervision. I would like to express my gratitude to Rector Dr. Ba Han and Pro-Rector Dr. Tin Tun Aung, Meiktila University for their permission to perform this research in Meiktila Research Journal. I wish to give sincere thanks to Dr. Thet Thet Tun (Professor and Head) and Dr. Khin Aye Aye Tun (Professor), Department of Zoology, Meiktila University for their permission to conduct this paper.

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