

**OCCURRENCE OF PAPAYA MEALYBUG (*Paracoccus marginatus*
WILLIAMS AND GRANARA DE WILLINK, HEMIPTERA:
PSEUDOCOCCIDAE) IN UYO METROPOLIS, AKWA IBOM STATE**



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ABSTRACT

The occurrence of *Papaya* mealybug (*Paracoccus marginatus*) and its damages on Paw Paw plants cultured in Eniong Offot, Uyo were investigated between May and September, 2013. The result revealed 66.3 % infestation rate from 83 plants examined. Little or no difference was observed between the susceptibility of paw paw fruits (80%) and leaves (79.1%) to mealybug infection. The level of infection however varied with the location of farmland. On lightly infected leaves and fruits, mealybugs infestation appeared like small pieces of cotton attached to the fruits and leaves. The symptoms were more pronounced on the fruits and were characterized by its milky sap discharge. On heavily infested plants, the mealybug colonies formed cotton-like masses on the aerial parts. Other damages observed include chlorosis, distortion, stunting, early leaf and fruit fall, the production of honeydew, sooty mould and the death of infected plant. There is need however, to put in place an effective method for the control of this pest as it reduces the quality of the fruits.

INTRODUCTION

Mealubugs are small soft bodied insects, of the family Pseudococcidae that feed by sucking plant sap. The name ‘mealybug’ is derived from the mealy or waxy secretions that cover the bodies of the insect. The papaya mealybug *Paracoccus marginatus* is one of the mealybug species that attack pawpaw and other economically important fruits, vegetables and ornamentals. It has been reported in Costa Rica and Mexico (Williams and Granara de Willink 1992; Miller *et al.*, 1999); Caribbean region (Miller and Miller, 2002) Ghana (David-Chan *et al.*, 2011).

Infestation of the mealybug appears as clusters of cotton-like masses on the aerial portion of the plant particularly on the underside of leaves and fruits. The mealybug pierce and suck the sap of the leaf epidermis and inject toxic substances into the plant which results in chlorosis, distortion, stunting, early leaf and fruit fall, the production of honey dew, sooty mould and possible the death of the plant (Walker *et al* 2003).

The occurrence of severe infestation of some pawpaw plants by mealybug in Eniong Offt, Uyo Metropolis was investigated. The main objective of this work was to identify the mealybug infesting pawpaw *Papaya* plants in Uyo metropolis and evaluate the level of damages caused by the pest.

MATERIALS AND METHODS

Study Area

The study was carried out in Uyo Metropolis which is situated on latitude 5^o02’ 06^o72’ N and longitude 7^o57’ 28.76’ E. The study sites (Figure 1) randomly selected were Ewet Housing Estate, Osongama, Shelter Afrique and Urua Udofia all located in Eniong Offot clan of Uyo LGA (Fig.1). The study sites were sampled between May and June in the rainy season and November and December in the dry season.

Samples Collection

Pawpaw, plants, stem, leaves and fruits were carefully examined for symptoms of mealybug infestation. The Identity of the insect pest (mealybug) was confirmed by an entomologist based on its morphological and taxonomical characters (Miller and Miller, 2002).

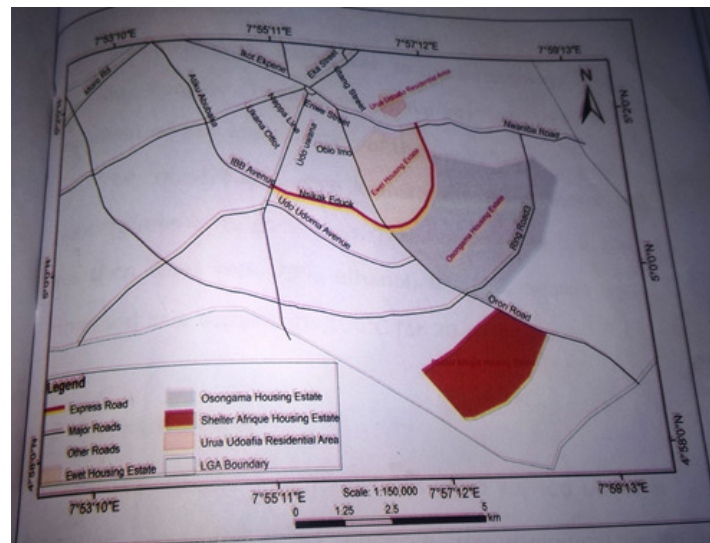


Figure 1: Study area showing the sample locations

Damage Assessment

The numbers of infested and healthy plant were recorded to ascertain the level of damage. The level of damage was determined using the formula:

$$\frac{x}{100} \times 100$$

Where x = No of leaves or fruits infested
 N = Total number of leaves or fruits on a pawpaw stand.

Data obtained were analyzed using sample percentage statistics.

RESULTS

The result in Table 1 indicates that out of a total of 80 *Carica papaya* plants examined, 53 (66.3%) were infested with papaya mealybug. The degree of infestation ranged from 35% in Osongama estate to 90% in Ewet housing estate.

Table 1: Prevalence of Papaya Mealybug in Uyo Metropolis

Site	No. of plants examined	No. of plants infested	% infested
Ewet Housing	20	18	90%
Urua Udofia	20	16	80%
Shelter Afrique	20	12	60%
Osongama	20	7	35%
Total	80	53	66.3%

Damage Assessment of Paw-paw Leaves and Fruits

Out of 436 pawpaw leaves (from 20 stands) examined, 223 (51.15%) were infested with papaya mealybug. Similarly, out of 179 fruits examined from the same 20 stands, 124 (69.27%) were infested with mealybug in Ewet Housing. The highest level of infestation of leaves per plant was 79.17% while that of infestation of fruit per plant was 80% (Table 2). At gardens located at Osong Ama Housing Estate, 383 pawpaw leaves (from 20 stands) were examined of which 9.14% were infested with papaya mealybug, while 16.44% of 146 fruits examined were

infested with papaya mealybug. The highest level of infestation of leaves per plant was 36.36% while that of fruit per plant was 41.66%, (Table 3).

Table 2: Damage Assessment of Pawpaw Leaves and Fruits in Ewet Housing Estate, Uyo

No. of leaves examined	No. of leaves infested	% infestation of leaves	No. of fruits examined	No. of fruits infested	% infestation of fruits
24	16	66.67	9	5	55.56
27	14	51.85	15	6	40.00
20	10	50.00	12	9	75.00
21	13	61.90	8	5	62.50
15	9	60.00	14	8	57.14
20	14	70.00	10	7	70.00
24	19	79.17	6	6	100.00
22	8	36.36	15	12	80.00
28	18	64.29	7	5	57.14
25	10	40.00	9	7	77.78
21	15	71.43	12	9	75.00
16	11	68.75	8	6	75.00
18	0	0.00	0	0	0.00
27	9	33.33	10	8	80.00
22	0	0.00	0	0	0.00
15	11	73.33	8	7	87.50
27	10	37.04	12	10	83.33
16	9	56.25	8	7	87.50
26	19	73.08	9	5	55.56
22	8	36.36	7	3	42.86
436	223	51.15	179	124	69.27

Table 3: Damage Assessment of Pawpaw Leaves and Fruits in Osongama Housing Estate, Uyo

No. of leaves examined	No. of leaves infested	% infestation of leaves	No. of fruits examined	No. of fruits infested	% infestation of fruits
22	8	36.36	12	5	41.66
19	0	0.00	8	0	0.00
15	0	0.00	3	0	0.00
23	4	17.39	7	3	42.86
20	3	15.00	10	3	30.00
24	6	25.00	12	4	33.33
27	0	0.00	6	0	0.00
12	0	0.00	10	0	0.00
28	0	0.00	0	0	0.00
9	2	22.22	8	0	0.00
22	0	0.00	7	2	0.00
18	0	0.00	12	0	16.67
23	0	0.00	0	0	0.00
11	0	0.00	3	0	0.00
20	0	0.00	5	3	0.00
12	7	58.33	7	0	42.86
15	0	0.00	0	0	0.00
27	0	0.00	15	0	0.00
20	5	25.00	12	4	33.33
16	0	0.00	9	0	0.00
383	35	9.14	146	24	16.44

At Shelter Afrique Gardens, 348 pawpaw leaves (from 20 stands) were examined and 20.11% were infested with papaya mealybug while 22.44% of of 156 fruits examined were infested with papaya mealybug. The highest level of infestation of leaves per plant was 37.04% while

that of infestation of fruit per plant was 66.67% (Table 4). At Urua Udofia, out of a total of 384 pawpaw leaves (from 20 stands), 42.97% were infested with papaya mealybug while 54.3% fruits infection was recorded for the 153 fruit sample examined (Table 5). The highest level of infestation of leaves per plant was 72.00% while that of infestation of fruit per plant was 76.92%

Table 4: Damage Assessment of Pawpaw Leaves and Fruits in Shelter Afrique Housing Estate

No. of leaves examined	No. of leaves infested	% infestation of leaves	No. of fruits examined	No. of fruits infested	% infestation of fruits
18	0	0.00	7	0	0.00
12	2	16.67	6	2	3.33
27	8	29.63	9	0	0.00
15	0	0.00	10	3	30.00
6	0	0.00	0	0	0.00
27	10	37.04	10	0	0.00
22	9	40.90	9	6	66.67
14	0	0.00	10	0	0.00
8	6	75.00	5	3	60.00
20	0	0.00	12	0	0.00
18	2	11.11	9	3	33.33
24	6	25.00	12	4	33.33
15	0	0.00	5	2	40.00
25	7	28.00	8	2	25.00
9	0	0.00	6	0	0.00
16	3	18.75	7	1	14.29
20	0	0.00	9	0	0.00
12	4	33.33	4	2	50.00
17	5	29.41	8	3	37.50
23	8	34.78	10	4	40.00
348	70	20.11	156	35	22.44

Table 5: Damage Assessment of Pawpaw Leaves and Fruits in Urua Udofia Residential

No. of leaves examined	No. of leaves infested	% infestation of leaves	No. of fruits examined	No. of fruits infested	% infestation of fruits
25	18	72.00	8	5	62.50
20	12	60.00	10	6	60.00
18	9	50.00	6	3	50.00
23	17	73.91	11	7	63.64
15	7	46.67	7	4	57.14
26	12	46.15	13	10	76.92
17	8	47.06	6	3	50.00
20	0	0.00	9	0	0.00
12	0	0.00	3	0	0.00
28	10	35.71	11	7	63.64
24	0	0.00	7	0	0.00
15	7	46.67	5	3	60.00
8	0	0.00	0	0	0.00
20	9	45.00	6	5	83.33
27	12	44.44	9	2	22.22
23	15	65.23	12	7	58.33
9	4	44.44	5	2	40.00
21	9	42.86	8	8	100.00
22	10	45.45	10	6	60.00
11	6	54.55	7	5	71.43
384	165	42.97	153	83	54.25

Symptoms of Infection

On lightly infested plant, papaya mealybugs formed cotton-like protrusions or masses on the fruits and leaves. In severe infections the insects were found on infected portions (Fig.2) while the leaves and fruits produces milky sap (Fig. 3). Heavily infested plants also had cotton-like masses on the aerial parts and several species of ants were found frequently in association with the mealybug on papaya plants as shown in Fig. 2

Some pawpaw leaves and fruits withered, decayed and some plant even died. Other damages include chlorosis, distortion, early leaf and fruit fall, the production of honey dew, sooty mould and death of the plant.



Figure 3: Mealybug induced fruits damage



Figure 2: Ants and mealybug on infected plant

DISCUSSION

In the study area, the total percentage of *Carica papaya* infested by the mealybug was 66.3% and this was lower than 85% reported by Rich (2008) in Asia. The rate of infestation varied with the sample locations. Gardens Ewet Housing Estate had the highest level (90%) infection rate while Osongma Estate had the least (35%) rate of infection. The difference could be ascribed to variation in the status of vegetation and other cultural conditions such as the availability and prevalence of insect pest. However the research findings have revealed a lower infestation rate when compared with the 85.9 % reported by Galanitre *et al* (2010) in Sri Lanka for pawpaw plant being infested in the mid of September. The difference here may have been due to the period of investigation. The mealybug is known to thrive more during early raining season. Furthermore, fruits (41.96%) had the highest level of infestation than the leaves (31.79%). This is in agreement with the result obtained by Mayerdrik *et al.*, (2011), Rich (2008) and Galanihe *et al.*, (2010) and may be ascribed to the feeding habit of mealybugs which prefer the succulent and juicy part of the plant (Tawar *et al.*, 2007 and Thangamalar *et al.*,2010).

CONCLUSION AND RECOMMENDATION

This study has shown that Papaya mealybug affects many paw paw fruits in Uyo. The infestation is more serious on the fruits than the leaves and stems. This may influence the quality and nutritional properties of pawpaw with consequent socioeconomic impact. Agric Extension services are required to educate gardeners on the damages caused by the pawpaw mealybug and ways of controlling it. Uses of predators such as larvae of lady bird beetles and parasitoid, physical control by directing a powerful set of water at infested plant parts have been recommended to reduce the activities of *Paracoccus marginatus* in the tropics.

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