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Research Article

Incidence of Mealy Bug *Dismycoccus brevipes* (Cockrell) on Pineapple

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Abstract: The pineapple mealy bug (*Dismycoccus brevipes*) infestation is reported for the first time from Pakistan, Ratoon, crownlet, slip and sucker plants were found infested by this bug. A total of 3464 bugs were collected from these plants with a mean value of 43.3 bugs/plant. Two-third (2291) of the bug population was found on the roots while one-third (1173) were recovered from the leaf base of the pineapple.

Key Words: *Dismycoccus brevipes,* pineapple.

Pamuklu Bit'in (*Dismycoccus brevipes*) Ananas Bitkilerinde Görülmesi

Özet: Ananas pamuklu biti (*Dismycoccus brevipes*) istilası Pakistan'dan ilk kez olarak bildirilmektedir. Taç, göz ve piç kısımlarından yetiştirilen bitkilerin bu böcek tarafından istila edildikleri belirlenmiştir. Ortalama bitki başına 43,3 böcek olmak üzere toplam 3464 böcek bu bitkilerden toplanmıştır. Böcek sayısının üçte ikisi (2291) ananasların kökünde, üçte biri ise (1173) yaprak dibinde bulunmuştur.

Anahtar Sözcükler: *Dismycoccus brevipes*, ananas.

Introduction

Pineapple (*Ananas comosus* L) is one of the many fruit crops grown in the world due to its excellent flavour, colour, taste with plenty of commercial as well as household uses as dessert (fresh and preserved). It is a rich source of vitamins like A, B, C and contains minerals such as potassium, calcium, magnesium, iron and proteoloytic digestive enzyme bromelain (1). The pineapple is a plant with a slow rate of multiplication and this problem is felt more seriously when a cultivar needs to be propogated (2). Tay and Wee (2) reported that the yield of crown was the best among these plants. Pineapple is a herbacious perennial crop grown commercially in tropical and subtropical countries. This plant is subjected to the attack of mealy bug (*Dismycoccus brevipes*). The bug is a polyphagous pest found mainly on roots. Ayyar (3), Carter (4), Beardsley (5) and Feakin (6) reported that this bug is a serious pineapple pest in India. Abrahao *et.al* (7) stated that it causes severe losses to pineapple in Brazil. Singh *et. al.* (8), Mani and Thontadarya (9) and Dhileepan (10) reported its occurrence on groundnut, grapevine, oil palm bunch and pineapple plants respectively. The bug has also been described as toxicogenic insect causing mealy bug wilt disease which occur due to the feeding of the mealy bug on roots and leaf bases of pineapple plant (11).

Materials and Methods

The pineapple variety Queen was planted at the Plant Introduction Centre of Pakistan Agricultural Research Council, Karachi. The experiment was laid down in 12 year old coconut tall plantation with pineapple as an intercrop having Randomized Split Plot Design (RSPD) adopting two row system of planting. The plants were transplanted with the spacing of 40 cm between plants and 50 cm between rows.

The crowns were longitudinally divided into 5 to 8 pieces depending upon the size and volume of the crown in order to increase the planting materials. Each crownlet was planted in perforated polyethylene bags of 5x7 inches size. Each bag was having a mixture of river bed silt, farmyard manurend agrograde

gypsum in equal quantities to make the soil pH 6.0 - 6.5. The other planting materials such as slips and suckers were planted directly in beds, while the ratoons were cultivated in the field and as well as in earthern pots in the same ratio of soil mixture. Weekly irrigation and other horticultural practices such as weeding, interculturing and mulching etc. were carried out regularly. The pineapple mealybug, *Dismycoccus brevipes* infestation was seen on leaf bases showing curly downward leaf.

Ten plants of each category was sampled for insect infestation. The insects were collected from the plants roots by removing the whole plant from the soil and dipping this base in insecticidal emulsion, the insects thus freed swim for sometimes before death. The dead insects were finally counted. Collection of insects from the leaf bases were undertaken by brushing. Mean insects per plants was calculated. Student's t-test was applied to calculate the difference of mealy bug infestation among different plant category.

Relative humidity and temperature was noted daily from local newspaper throughout the experimental period.

Results and Discussion

The mealy bug, *Dismycoccus brevipes* (Cockrell) is recorded for the first time in Pakistan at the Plant Introduction Centre, Karachi on pineapple plants infesting roots and leaf bases. This bug lives underground in colonies with only a small population on leaves. The aerial individuals were found mostly at the bases of leaves which may have to be spread in order to make the bugs evident.

The infestation symptom (formation of curly leaves) were observed among 63 ratoon, 692 crown, 122 slip and 377 sucker plants.

Out of these plants the symptoms were identified in 38 (60.3%), 274(39.6%), 36(29.5%) and 55 (14.7%) ratoon, crown, slip and sucker plants respectively (Table 1). From this infested stock the insects were counted from 40 plants (10 each of the four category). A total of 3464 insects were counted from these plants (Table 2). The most infested plants (67.75) were of ratoons followed by chopped crowns (44.60), slips (33.15) and suckers (27.70).

Overall, 2291 (2/3 of the total population) insects were collected from the roots of these plants. The highest number of insects (892) were collected from roots of ratoons while the lowest (370) from suckers plants (Table 3).

In comparison 1173 (1/3 of the total population) were collected from the leaf bases (Table 4). The most infested plants were also ratoons (46.3) and least from the suckers (18.4).

Comparison of *Dismycoccus brevipes* infestation from roots and leaf bases of the four plant categories

Table 1. Number of different plant categories observed for pineapple mealy bug infestation.

Plant category	No.of plants observed	No.of plants infested	percentage infestation
Ratoon	63	38	60.3
Crownlet	692	274	39.6
Slip	122	36	29.5
Sucker	377	55	14.7

Table 2. Incidence of Dismycoccus brevipes infestation on different loci of pineapple palnt.

Sr. No.	Plant category	No.of plants observed roots/leaf bases	Total No. insect collected	Mean	SD	SE	Range
1.	Ratoon	10/10	1355	67.75	31.02	6.93	19-138
2.	Crownlet	10/10	892	44.60	21.79	4.87	11-86
3.	Slip	10/10	663	33.15	17.92	4.01	4-66
4.	Sucker	10/10	554	27.70	12.72	2.84	12-54
Total		40/40	3464	43.30	26.31	2.94	4-138

Table 3. Incidence of Dismycoccus brevipes infestation on ROOTS of the pineapple plants.

Sr. No.	Plant category	No.of plants observed	Total No. insect collected	Mean	SD	SE	Range
1.	Ratoon	10	892	89.2	28.15	8.90	41-138
2.	Crownlet	10	602	60.2	18.17	5.75	27-86
3.	Slip	10	427	42.7	18.20	5.76	13-66
4.	Sucker	10	370	37.0	10.66	3.37	19-54
Total		40	2291	57.27	27.67	4.37	13-138

Table 4. Incidence of Dismycoccus brevipes infestation on LEAF BASES of the pineapple plants.

Sr. No.	Plant category	No.of plants observed	Total No. insect collected	Mean	SD	SE	Range
1.	Ratoon	10	463	46.3	14.72	4.66	19-66
2.	Crownlet	10	290	29.0	11.49	3.63	11-48
3.	Slip	10	236	23.6	12.01	3.80	04-43
4.	Sucker	10	184	18.4	5.98	1.89	08-27
Total		40	1173	29.3	15.13	2.39	04-66

Sr. No.	Plant category	Infestation site	N	Mean	Range	tc	df	P
1.	Ratoon	roots	10	89.2	41-138	0.13	18	P<0.005
		leaf bases	10	46.3	19-66			
2.	Crownlet	roots	10	60.2	27-86	0.65	18	P<0.005
		leaf bases	10	29.0	11-48			
3.	Slips	roots	10	42.7	13-66	0.41	18	P<0.005
		leaf bases	10	23.6	04-43			
4.	Sucker	roots	10	37.0	19-54	0.98	18	P<0.005
		leaf bases	10	18.4	08-27			

Table 5. Comparison of Dismycoccus brevipes infestation on ROOTS and LEAF BASES of the pineapple plants.

showed a significant difference (Table 5) in population of the pest on the loci of the plants (P<0.005). Similarly, Abrahao *et.al.* (7) observed severe infestation of *Dismycocuss brevipes* on pineapple in Brazil, where these bugs damaged 50% of the plants. The results of the present studies coincides with that of Chiu and Cheng (12) who also recovered 2/3 and 1/3 bug population from roots and leaf bases from pineapple fields of Taiwan. Recently Dhileepan (10) also observed this mealy bug on the oil palm in India where the insects were found on the fruit bunches and infest 3.2 - 100% of the plants.

It was also observed that the high bug population was associated with less relative humidity (26%) and high temperature exceeding 38°C. The same observations were presented by Santacecilia *et. al.* (13).

In Pakistan this newly identified pest of pineapple must be monitored regularly and a control methodology must be designed in order to gear up the high population of the pest and thus to minimize the economic losses.

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