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Resistance in Musk-melon (*Cucumis melo* L.) Against Melon Fruit Fly *Bactocera cucurbitae* Coq) and its Chemical Control in Dera Ismail Khan.

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Abstract

Experiments were conducted to determine the varietal resistance of muskmelon (*Cucumis melo* L.) against *Bactocera cucurbitae* Coq and to evaluate the comparative efficacy of Dipterex and Malathion alone as well as in combination with molasses against fruitfly. The results of varietal resistance trial reveal that 'Sarda' variety with 16.33 percent infestation was found the least susceptible to the attack of *B. cucurbitae*, followed by Mankera (23.33 %) and Bonanza (31.67 %). Local variety Bukhara was most susceptible (having 64.00 % infestation) to the attack of the pest. In the chemical control trial the muskmelon crop was sprayed with Dipterex alone, Dipterex + Molasses, Malathion alone and Malathion + Molasses for two times. The first spray was done after fruit setting and second spray was done 15 days after first spray. The results show that all the treatments were significantly better than control. Dipterex + Molasses was found the best of all, followed by Malathion + Molasses, Dipterex alone and Malathion alone.

Introduction

Musk-melon (*Cucumis melo* L.) has nutritional value of considerable importance. It contains reasonable quantity of minerals and is also a rich source of vitamin "A", "B" and "C". Its rind is used as an important animal feed. Kernel of seed is used as medicine for kidney disease and as brain tonic. It is also grown as an important cash crop in many parts of Pakistan.

In N.W.F.P the area under muskmelon crop during 1986-87 was 12346 hectare with a production of 164611 tones. In Dera Ismail Khan Division alone the area was 11491 hectares with a production of 156694 tones during 1986-87 (Anonymous, 1987). Its production was declined to 138457 tones in D.I.Khan Division and 138629 tones throughout the Province in the year 1991-92 (Anonymous, 1992). This decreasing tendency in the production is mainly attributed to the insect pests namely, fruitfly, red pumpkin beetle, field crickets and aphids etc. Out of all these pests, melon fruit fly [*Bactocera (=Dacus)* spp] is the serious menace and regular threat to discourage the growers.

Shan and Chughtai (1978) evaluated fruitfly resistant varieties of muskmelon in the agro-climatic condition of D.I.khan. They worked on 10 varieties. According to the results Danish variety was found the most resistant one, having 17.92 percent infestation followed by Talbi samsori (Afghani) having 30.50 percent infestation. Bukhara variety was found most susceptible having 72.21 percent infestation of fruit fly. They further stated that the fruitflies do not oviposit in Danish, Talbi Samsori and Afghani varieties due to their very hard rind.

Agarwal *et al.* (1987) conducted an experimental trial for the varietal resistance of musk-melon against *B. cucurbitae* in D.I.Khan. In their experiment they worked on 6 musk-melon varieties viz, Mari, Kulachi wal, Tal wal, Bukhara, early white and Kashmir wal. According to them Tal wal variety of muskmelon *Cucumis melo* L was the most resistant one as it had very low percent infestation

compared to other five varieties. The percent infestation was 20.06, 26.13, 15.46, 30.13, 29.04 and 25.95 in respect to the above mentioned varieties.

Keiser (1968) evaluated the insecticide in Hawaii between 1952 and 1960 as foliar sprays for control of melonfly *B.cucurbitae*. Comparisons for the mortalities obtained with 37 insecticides after 1,2,4,8 and 16 days on musk melon. Results showed that Fenthion, Parathion, Dieldrin, Dimethoate, Azinphosmethyl, Malathion, D.D.T., Ethion, Isodrin and Methoxychlor at appropriate rates were most effective.

Harris *et al.* (1971) applied Malathion and Naled against melon fruitfly. They reported that Naled caused more immediate mortality, while Malathion has longer residual effect against melon fruit fly.

Nawaz (1976) conducted a control trial against melon fruitfly at Dera Ismail Khan and found that three sprays of Dipterex (Trichlorfon) at the rate of 6 percent (a.i), first after fruit setting and then subsequently at ten days interval, significantly reduced the pest infestation.

Bhatti (1981) used Dipterex, Hostathion and Anthio on apricot against fruitflies at 0.1 percent concentration in seven different combinations of 1, 2, or 3 sprays at time intervals of 36, 24 and 12 days before maturity of the crop. Dipterex was found better as compared to other insecticides.

Agarwal *et al.* (1987) stated that the control of melon fruitfly can be achieved by spraying plants with 500 g Molasses, mixed with 50 g Malathion in 50 liters of water at 7-days intervals.

Chughtai and Baloch (1988) reported that the production of muskmelon is dependent on availability of soil moisture and out break of melon fruit fly. They further stated that out of eight insecticides tested, Carbicron and Dipterex gave significantly better control of melon fruitfly larvae under D.I.khan conditions.

Materials and Methods

The research trials were carried out at the Farm of Agricultural Faculty, Gomal University, Dera Ismail Khan during 1993 on the varietal resistance of musk melon to fruitfly (*B. cucurbitae* Coq.) and its chemical control. Two fields were prepared for the studies on the above two aspects. Experiments were laid out in randomized complete block design (RCBD) with three replications. In both fields musk-melon was sown on March 3, 1993. Plant to plant and row to row distances were kept 60 cm and 183 cm respectively. The sub-plot size was 4 x 5 m².

Varietal Resistance: Four varieties namely, Bonanza, Bukhara, Sarda and Mankera were sown randomly in four plots in each replication. Two seeds/hill were sown just after irrigation. Thinning was done to leave one seedling per hill after germination. At seedling stage the crop was saved from the attack of red pumpkin beetle *Raphidopalpa foveicollis* by dusting a mixture of Sevin dust 5 percent and ash at a ratio of 1:20. The crop was also sprayed with Bevestin fungicide 50 g/100 liters of water to save the crop from the attack of fungal disease. All of the fruits of the treated and untreated plots were dissected and the infestation was determined on the basis of presence of fruitfly maggots in the pulp.

Chemical Control: Two Insecticides, Dipterex and Malathion and their two combinations with molasses (Table 1) were sprayed with the help of Solo knapsack sprayer, for the control of melon fruitfly in Bukhara variety of muskmelon. First spray was applied on April 12, 1993 after fruit setting. Second spray was done on April 27, 1993 (after 15 days of the first spray) when the fruits reached a diameter of 2 inches. The data of fruit infestation were recorded at the picking /harvesting time. For this purpose all the fruits of the treated and untreated plots were dissected and the infestation was determined on the basis of presence of fruit-fly maggots in the pulp.

The data was subjected to statistical analysis, and significant difference among the means was worked out by D.M.R. Test at 1 percent level of probability.

Table 1: Different treatments and their combinations with molasses.

S.no.	Treatment/insecticide	doses/acre
1.	Malathion 57 EC	350 ml
2.	Dipterex s _p 80	500 g
3.	Malathion 57 EC. + Molasses	350 ml + 1 Litre
4.	Dipterex s _p 80 + Molasses	500 g + 1 Litre

Results and Discussions

Varietal trial: The results (Table-2) show that lowest percent infestation (16.33) of Melon fruitfly maggots was recorded in 'SARDA' variety. The percent infestation of *B. cucurbitae* in 'MANKERA' variety (23.33) was statistically indifferent from that of 'SARDA' and it was also found

better than the rest of two varieties because of some what resistance to the attack of Melon fruitfly.

Table-2. Mean values of percent infestation of Musk-melon by melon fruitfly on different Melon varieties.

Treatments	Replications			Average
	R ₁	R ₂	R ₃	
T ₁ Bukhara	60	50	80	63.33
T ₂ Mankera	18	23	29	23.33
T ₃ Bonanza	27	54	44	41.67
T ₄ Sarda	17	13	19	16.33

The means followed by same letters do not differ significantly from each other at 5 percent level of significance.

'BONANZA' variety with 41.67 percent infestation was found susceptible to the attack of Melon fruit fly. Local variety 'BUKHARA' with 63.33 % infestation was found very susceptible to the attack of melon fruitfly. Our results agree to those of Khan and Chughtai, (1978) and Marvi *et al.* (1987). They also found BUKHARA variety susceptible to the attack of Melon fruitfly.

Chemical control: The results (Table. 3) of chemical control trial conducted against fruitfly *B. cucurbitae* show that the insecticides as well as their combinations with Molasses effectively controlled the infestation of fruitfly muskmelon compared to check pots. Statistical analysis of the data reveals that Dipterex plus Molasses and Malathion plus Molasses were non-significantly different from each other at 1 percent level of probability and were found effective in the control of melon fruitfly. These were followed by Dipterex alone and Malathion alone. However, the best results were obtained with Dipterex plus molasses followed by Malathion plus molasses, Dipterex alone and Malathion alone in the control of this pest.

Table 3: Percent infestation of muskmelon by melon fruitfly in the chemical control trial.

Treatments	Replications			Average
	R ₁	R ₂	R ₃	
T ₁ Dipterex + Molasses	11	16	17	14.67
T ₂ Malathion	21	23	22	22.00
T ₃ Dipterex	17	18	19	18.00
T ₄ Malathion + Molasses	16	17	17	16.67
T ₅ Control.	138	140	136	138.00

Means followed by same letters do not differ significantly from each other at 1 percent level of significance.

These results agree with those of Nawaz (1976), Harris and Khan (1980), Chughtai *et al* (1984), Mian *et al.* (1984), Chughtai and Baloch (1988), who also recorded Dipterex 80 SP as the best poison in the control of melon fruitfly *B. cucurbitae*. Harris *et al.* (1971) Hussain and

1980) and Keiser (1968) obtained good control of this pest with application of Malathion. Our findings are also in accordance with those of Agarwal *et al.* (1987) who used Molasses in combination with Malathion.

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