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Relative Resistance of Cotton Varieties Against Sucking Pests

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Abstract: Field studies were carried out to investigate the relative resistance of twenty cotton varieties against sucking pests, that is Jassid, *Amrasca devastans* Dist., Thrips, *Thrips tabaci* Lind., Whitefly, *Bemisia tabaci* (Genn.) and mite, *Tetranychus* spp. The results indicated that the highest *A. devastans* population of 2.72 insect leaf^{-1} was observed on Greg-25V variety, while the lowest population was found on variety Rajhans (2.06 insect leaf^{-1}), while the highest and the lowest thrip population of 4.28 and 2.21 insects leaf^{-1} were observed on Empire WRD and Rode okra respectively. Similarly, the highest and lowest population of *B. tabaci* were found on Rehmani and Greg-25V as 1.99 and 1.73 insects leaf^{-1} respectively. Whereas in case of *Tetranychus* spp. the highest and lowest population noted as 3.23 and 1.71 on Rajhan and Coker-8316, BW-673, Rode okra, Genetic male sterile, Russian red leaf, Rehmani, TH-1100 and TH-1174, varieties.

Key words: Cotton, resistant varieties, sucking pests

Introduction

Cotton is one of the important commercial crops of Pakistan. It occupies a very prominent position in the economy of the country because it provides livelihood to millions of people and is also one of the major foreign earner of the country. Cotton is a very delicate crop, about 150 species of insects and mites have been reported attacking cotton (Huque, 1972), causing an estimated losses of 20-40% in yield every year in Pakistan (Ahmed, 1980; Ali, 1983). Among serious pests, sucking pests like jassid, *Amrasca devastans* (Dist.), whitefly, *Bemisia tabaci* (Genn.), Thrips, *Thrips tabaci* Lind. and mites, *Tetranychus* spp. are important (Ahmed, 1991).

Plant protection plays a very crucial role in the successful production of cotton crop and saves it from the devastation of pets. In Pakistan, the major emphasis is on the use of chemical pesticides, as the use of insecticides is increasing every year. The indiscriminate use of insecticides for the control of insect pests creates problems of environmental pollution, worker exposure to toxic effects of pesticides and development of insecticide resistance insect populations. To reduce the problems associated with abuse of pesticides in agriculture, different alternate methods of pest suppression are being tested in different parts of world, use of resistant varieties is one of the important alternatives. In the present study, 20 cotton cultivars were evaluated for their resistance against sucking pests of cotton, that is, jassid, *Amrasca devastana*, Whitefly, *Bemisia tabaci*, Thrip, *Thrips tabaci* and mite, *Tetranychus* spp. under field conditions.

Materials and Methods

The present investigation on the relative resistance of cotton varieties against sucking pests that is, Jassid, *Amrasca devastans* Dist., Thrips, *Thrips tabaci* Lind., Whitefly, *Bemisia tabaci* (Genn.) and mites, *Tetranychus* spp. Was conducted at the Experimental Farm, Sindh Agriculture University, Tandojam, Pakistan, during cropping season 1998.

Table 1: Mean sucking pet population per leaf on different varieties of cotton

Cotton varieties	Whitefly	Jassid+	Trhip	Mite
Suker okra (Nectariless)	1.85a	2.46	3.60b	1.98a
Nectariless	1.79a	2.28	3.66b	2.35b
Rajhans (hairy)	1.98b	2.06	3.00a	3.23c
Coker-8316 (Glandless)	1.95b	2.65	3.08b	1.71a
BW-673 (High gossypol)	1.92b	2.12	2.61a	1.71a
Rex sooth leaf (Glabrous)	1.89a	2.38	3.70b	1.88a
Frego bracts (Frego)	1.94b	2.53	3.76b	1.78a
Rode okra (okra)	1.81a	2.40	2.21a	1.71a
Acala cluster (Cluster Mutant)	1.82a	2.09	3.03a	1.77a
Goa-6 (Early)	1.83a	2.31	2.82a	1.80a
Deltapine-70 (Heat tolerant)	1.92b	2.57	2.54a	1.86a
Genetic male sterile	1.85a	2.69	2.35a	1.71a
Versant yellow	1.76a	2.35	3.47b	1.77a
Russina red leaf	1.74a	2.46	3.09b	1.71a
Greg-25 V (gossypol free)	1.83a	2.72	3.20b	1.77a
Rehmani	1.73a	2.44	2.96a	1.71a
TH-1100	1.89a	2.50	3.10b	1.71a
Empire WRD (Hairy)	1.99a	2.51	4.28c	1.73a
TH-1174	1.77a	2.60	2.42a	1.71a
Qalandri (Hairy)	1.88a	2.37	3.78b	1.81a

Means in the same column followed by the same letter are not significantly different. + = Non significant

The seeds of 20 varieties of cotton (Table 1) obtained from the Pakistan Central Cotton Research Institute, Sakrand, Sindh were sown on May 10, 1998. Each treatment comprised a 20 meter long single row of every

variety replicated four times in a randomized complete block design. The distance between plant to plant and row to row was kept at 30 and 75 cm respectively.

The observations were taken at weekly intervals, 15 days after germination of the plants and continued till complete disappearance of the pest species from the crop. The data was recorded from five plants selected at random per treatment per replicate. Six leaves, two each from bottom, middle and top portions of plant were observed for pest species activity during every observation.

The data collected were subjected to square root transformation after LeClerg *et al.* (1962), then analysis of variance and LSD range test were carried out.

Results and Discussion

Whitefly: *B. tabaci* population on different varieties of cotton varied significantly. The minimum and maximum population of 1.73 and 1.99 insects leaf^{-1} were recorded on varieties Rehmani and Empire WRD respectively (Table 1). Comparatively higher infestation of *B. tabaci* on Rajhans variety might be due to its heariness as it has been shown that higher hair density increases the *B. tabaci* population on cotton (Khan *et al.*, 1993; Ahmed *et al.*, 1987). Similarly, Butter (1986) observed morphological basis of resistance to *B. tabaci* and found hair density and leaf thickness positively correlated with population of *B. tabaci*. Butler *et al.* (1986) found more adults and eggs of *B. tabaci* on cotton on cotton cultivar leave with hairs compared with smooth leaf isolines.

Jassid: *A. devastans* population on 20 cotton varieties did not differ significantly. However, the lowest population of 2.06 jassids leaf^{-1} was recorded on variety Rajhans which is a hairy variety, while the highest population of 2.72 insects per plant were observed on Greg-25V, a gossypol free variety. The jassid, *A. devastans* is the most serious pest among the sucking group and its heavy infestation may cause premature shedding of leaves, flower buds and bolls (Mahmood, *et al.*, 1998). Leaf hairy density and gossypol glands play important role in varietal resistance in cotton against *A. devastans*. In their study Ahmed, *et al.* (1987) concluded that greater hairy density and gossypol glands contributed towards jassid resistance in cotton. Similarly, Khan *et al.* (1993) found highly significant correlation in between hair density and jassid infestation and gossypol glands and jassid attack.

Thrips: *T. tabaci* infestation on different cotton varieties varied significantly. The highest and the lowest thrip population of 4.28 and 2.21 insects per leaf were recorded on Empire WRD, a hairy variety and rode okra respectively. Rummel and Quisenberry (1979) studied the influence of thrips on leaf development and yield of various cotton genotypes found the morphological characters such as okra leaf, red colour, glandless, nectariliness or smooth leaf did not provide the plant with resistance, while pilose was associated with high level of resistance to thrips. Whereas, Ahmed *et al.* (1987) and Khan *et al.* (1993) reported that varieties resistant to thrips were less hairy. The findings of the present study seem to agree with that of Ahmed *et al.* (1987) and Khan *et al.* (1993).

Mites: *Tetranychus* spp. different significantly on different varieties of cotton (Table 1). Significantly higher population was recorded on Rajhans, a hairy variety compared to other varieties.

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