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STUDY OF THE RESISTANCE OF NEW VARIETIES AND LINES OF COTTON TO SUCKING PESTS

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ABSTARCT:

Our research that carried out for a long time have convincingly shown the varietal differences in the plants susceptibility to harvest mites during the growing season. Long-term observations of the dynamics of the number of spider mites have shown that the degree of damage to the cotton variety and line ranges from 10 ~ to 100%.

KEYWORDS: variety, mite, aphid, susceptibility, resistance, tolerance, pests, cotton, infestation.

INTRODUCTION:

The selection of high-yielding, disease-resistant and pest-resistant cotton varieties is one of the main ways to increase the raw cotton yield. The selection success for immunity is largely determined by a source material presence with high resistance to diseases and pests and a set of economically useful traits. It is very important to have long-term observation data that characterize the material according to several characteristics, including resistance to pests and diseases and other indicators. [1, p. 92-94; 2, p. 11-12; 3, p. 169-171; 4, p. 69-70; 5, p. 15-19; 6, p. 61-62; 7, p. 114-116; 8, p. 13-15; 9, p. 176-178].

The studying issue of the cotton varieties resistance to harmful insects is currently insufficiently covered, in addition, there is no single methodology for assessing the sucking pest. In the recent creation view of a large number of new cotton varieties and lines, it became necessary to study their resistance degree to the main pests and diseases, to reveal the resistance causes and to provide guidance to breeders for working in this direction. [1, p. 92-94; 2, p. 11-12; 3, p. 169-171; 4, p. 69-70; 5, p. 15-19;6, p. 61-62; 7, p. 114-116; 8, p. 13-15].

MATERIALS AND METHODS:

To this purpose, in Andijan scientific experimental station, the research institute of seed breeding and Agro cotton growing technology (RISBACGT) was evaluated various varieties and lines during 2015-2019.

The experiment was based on a background where no chemical pest control measures were applied. Evaluation of varieties for resistance to pincers was carried out in natural conditions and with artificial plants infection in order to study the resistance degree and nature and to isolate the most valuable materials. This method has several advantages. It allows identifying field resistance as a sum of factors characterizing the relationship between the pest and the plant in agrobiocenosis. Fertilizers were applied in accordance with the norm adopted at the experimental station. Cotton care was common throughout the station. The test involved cotton varieties Andijan-35 (standard),

Andijan-35(standard, Andijan-36, Andijan-37,UzPITI-201,UzPITI-202,UzPITI-203,L-964,L-965, L-968,L-970,L-971,L-1, L-3,L-4,L-6,L-8,L-9, Khorazm-127,Khorazm-150,Bukhara-6,Bukhara-8,L-192,L-194,L-195,L-198,L-206,L-210,L-211,L-212,L-214, L-220,L-231, L-240,L-251,L-260,L-271.

RESULTS:

The resistance of cotton to spider mite was assessed by the plants infestation degree, leaves and the number on one leaf. Artificial cotton infection with spider mites was carried out over the years at the end of June. Long-term observations of the spider mites' number dynamics have shown that the damage degree to the cotton variety and line ranges from 10 ~ to 100%. The number of spider mites in some years on one infected leaf ranged from 2.0 to 100 pcs. and more. When counted on June 10, July 20, August 15, as can be seen from the table, the lowest percentage of infected plants for spider mites in relation to the standard was observed on the following varieties and lines: Andijan -36, UzPITI -201, UzPITI -202, L-968, L-971.

For 5 years, while future varieties are tested against entomological background of breeding material assessments in the field, it is possible to identify relatively resistant to aphids and spider mites. Our research has succeeded in isolating varieties and lines that are 9—13 times less affected by aphids and spider mites. Using such estimates, to some extent, it is possible to ensure the entomological control of the varieties bred by breeders, which in the future may sharply reduce the chemical treatments frequency in the cotton-growing regions of the republic. Aphids populate cotton crops every year. Their high number leads to partial crop losses. According to our data, the mass aphids' appearance is associated not only with the low temperature and high air humidity in May-June, but with the wide cotton varieties distribution that are not resistant to pests. In addition, research shows that increased aphid proliferation causes unbalanced fertilization.

Table-1. Spider mite population dynamics and the number of infected cotton leave (average over 3 years).

Variety, Line	Number of harvest mites per infection Leaves pcs.			Infected leaves,%			Infected plants,%			Number of boxes for 1.1x pcs.
	10.06	20.07.	15.08	10.06	20.07	15.08	10.06	20.07	15.08	
Andijan-35 (standard)	9,0	87,0	16,0	11,1	39,0	60,0	5,3	74,0	59,0	9,5
Andijan -36	0,0	10,0	3,0	0,0	19,1	35,4	0,0	39,0	44,0	10,8
Andijan -37	16,0	80,0	18,5	41,0	100,0	70,0	13,0	100,0	74,0	9,6
UzPITI -201	0,0	14,8	5,2	0,0	24,0	50,0	0,0	34,0	49,0	10,8
UzPITI -202	0,0	13,2	6,1	0,0	17,0	40,0	0,0	44,0	59,0	11,6
UzPITI -203	4,0	14,0	8,5	19,1	44,0	65,0	4,0	69,0	37,0	8,2
L-964	9,0	44,0	26,5	28,1	100,0	67,3	59,0	100,0	79,0	10,1
L-965	6,8	67,0	25,5	37,5	100,0	80,0	16,0	100,0	84,0	10,4
L-968	0,0	11,0	0,0	0,0	19,0	0,0	0,0	11,0	0,0	9,1
L-970	9,0	37,0	3,0	11,0	31,0	18,0	6,0	17,4	19,0	9,5
L-971	0,0	15,0	8,5	0,0	9,0	15,0	0,0	24,0	44,0	8,5
L-1	3,0	10,0	1,5	8,3	24,0	38,0	4,7	29,0	39,0	9,3
L-3	6,0	17,0	4,5	0,0	29,0	45,0	0,0	34,0	39,0	10,1
L-4	0,0	14,0	2,5	0,0	29,0	50,0	0,0	39,0	24,0	10,1
L-6	11,0	57,0	18,5	101,0	100,0	75,0	90,0	100,0	39,0	7,1
L-8	0,0	8,0	2,5	0,0	19,0	35,0	0,0	14,0	24,0	9,5
L-9	0,0	17,0	5,5	0,0	91,5	50,0	0,0	27,0	49,0	9,4

The use of resistant varieties is the most effective and most economical means of controlling cotton pests. The introduction of even relatively less susceptible varieties gives a certain economic effect, since the number of chemical treatments, the rate of consumption of drugs are reduced, which guarantees the protection of the environment from pollution, and preserves the activity of entomophages. In the long-term plan for the development of plant protection, the use of resistant varieties should become the basis for pest control.

The experiment on the resistance of various varieties of cotton to aphids was laid by us against a background where for several years no chemical pest control measures were applied. The evaluation of varieties for resistance to aphids was carried out under conditions of natural and artificial infection of plants. This method makes it possible to reveal the relationship between pests and plants in agrobiocenosis conditions. Fertilizers were applied in accordance with the norms adopted at Andijan scientific experimental station, the scientific research institute of seed breeding and agro cotton growing technology. (SESSRISBCGT) (250kg/ha nitrogen, 175 kg/ha phosphorus, 125 kg/ha potassium). Part of the annual rate of phosphorus, 60 kg, was introduced under the plow, and the rest of the amount of nitrogen, phosphorus and potassium was applied during feeding. Cotton planting was carried out in the phase of 3-4 true leaves, butanization and flowering. Cotton care was common throughout the station. Aphids are one of the most serious pests of cotton seedlings in Fergana Valley; therefore, the assessment of varieties and lines for resistance to it is of great interest. The study of a large number of varieties, carried out for the period 2015-2019, showed that among them there are relatively resistant to aphids. It should be noted that when there was a mass reproduction of aphids, all cotton material was subjected to the most severe test in natural conditions. In this situation, some materials in terms of productivity not only did not yield, but exceeded the standard variety.

The harmfulness degree, regardless of the materials, mainly depends on the seasonal timing of infection and the number of aphids on the plant. The pest in a short time colonizes young, not yet matured cotton plants, mainly the lower surface of the cotyledons and the apical point. Sometimes severely affected young plants stop growing, the apical point dies, and in some years a large percentage of plants form a "fork" on certain varieties of cotton.

With the appearance of real leaves, the aphids transfer to them and by sucking irritates plant tissues, causing an increased inflow of juices, as a result of which the leaf is twisted. Sometimes on individual leaves the percentage of deformed leaves reaches more than 30–40%.

Table-2 Dynamics of the aphids' number on different cotton varieties and lines (average over 3 years).

Variety, Line	Infected plants,%			Number of Lane 1 infection leave pcs.		Leaf deform, %
	25. 05.	28. 06.	15. 07.	25. 05.	28. 06.	10. 06.
Andijan-35 (standard)	36,0	44,6	100,0	2,4	19,8	18,5
Khorazm -127	0,0	100,0	100,0	0,0	40,0	38,9
Khorazm -150	21,0	100,0	100,0	4,6	42,3	30,0
Bukhara -6	0,0	100,0	100,0	0,0	46,0	43,3

Bukhara -8	11,0	100,0	100,0	6,8	55,8	34,5
L-192	11,0	100,0	100,0	10,1	59,0	46,5
L-194	0,0	18,0	49,0	0,0	9,0	5,7
L-195	12,8	15,8	49,0	2,1	7,0	4,5
L-198	31,0	19,8	34,0	2,1	8,0	6,7
L-206	13,0	17,1	100,0	1,1	10,0	5,1
L-210	9,0	24,0	79,0	1,1	11,0	5,3
L-211	11,0	89,0	27,0	1,1	31,0	34,8
L-212	11,0	74,0	100,0	1,1	36,0	26,1
L-214	0,0	24,1	54,0	0,0	9,0	6,5
L-220	11,0	22,0	79,0	1,6	3,8	1,9
L-231	11,0	20,4	29,0	1,1	8,5	7,3
L-240	11,0	39,0	49,0	1,1	11,8	6,0
L-251	21,0	29,0	39,0	1,1	8,0	4,6
L-260	41,0	24,0	49,0	5,1	6,0	3,0
L-271	21,0	17,0	39,0	1,1	36,0	1,7

Prolonged feeding of aphids on all varieties of cotton led to a slowdown in the growth and development of plants, as well as to the dropping of buds, as a result of which the rate of opening of bolls decreased compared to healthy specimens. In summer, with the onset of heat and coarsening of leaves, the number of aphids on all varieties of cotton decreases markedly. By autumn, when the air temperature drops, the pest becomes active again. At this time, in the opened boxes, raw cotton is contaminated with their excrement; the quality of the fiber deteriorates markedly. Determination of resistance was carried out on a 3-point scale: 1 point means single aphids (from 1 to 10) on separate leaves or small colonies; 2 points - colonies containing 11-50 aphids per leaf or occupying up to 25% of the leaf blade; 3 points - large colonies on at least five leaves (51-100 aphids per leaf) or colonies occupying 25-50% of the leaf blade.

Phenological observations were carried out over the plants throughout the growing season. Growth and development on all materials are in direct proportion to the time, degree and duration of plant infestation by aphids. The earlier and stronger the infection the more noticeable the lag in the plants' growth and development. The number of aphids, estimated at 1 point, cannot have a negative effect on productivity, since the infected plants do not show any signs of oppression. As can be seen from Table 2, the susceptibility of varieties L-210, L-198, L-195, L-194, L-214, L-220 was 1 point; 2 points for varieties Andijan-35, Khorazm-127, Khorazm-150, Bukhara-6, L-211, 3 points for varieties Bukhara-8, L-192, etc. An account of the dynamics of aphid population showed that all tested cotton varieties are significantly populated by sowers. Table 2 shows that the season average number of aphids on one infected leaf and the percentage of deformed leaves on varieties and lines give a difference in the dynamics of the number of pests. The deformed leaves percentage when counted in the first ten days of June showed that only 15% leaves were deformed on some cotton varieties, while on such varieties as Bukhara-8 (34.5%), L-192 (46.5%), Khorazm- 127 (37.9%), Khorazm-150 (30.0%), L-211 (34.8%). Depending on the cotton variety, every 8-10% of deformed leaves accounts for 0.8-1.0 lost bolls.When comparing the one capsule weight in healthy and aphid-infected plants, all varieties gave 0.1-0.5 g decrease in the capsules weight. In addition to the bolls loss and a decrease in their weight, even with minimal infection, losses are quite noticeable due to the lag in the bolls opening rate in

September and October (from 15 to 20%).

CONCLUSION:

The studies carried out by us for a long time have convincingly shown the varietal differences in the susceptibility of plants during the growing season. These differences are manifested in such indicators as the percentage of plants inhabited by the pest, the number of aphids on one infected leaf, the percentage of deformed leaves, the timing of the appearance and disappearance of aphids on plants. The varieties and lines that we have identified in the high tolerance group can be recommended for use in creating varieties that are resistant to sucking pests. Andijon-37, L-964, L-6 can be attributed to the average group in terms of the percentage of leaf infestation and the density of spider mites per leaf. L-968, L-8, L-970, L-971, L-9 lines are included in the group of the highest resistance against harvest mites. Thus, the experience of artificial infection with spider mites of different varieties of cotton revealed a significant difference between the test materials. Absolutely resistant, or immune, varieties and lines to spider mites were not observed among the subjects. The varieties and lines that we have identified in the high tolerance group can be recommended for use in creating varieties that are resistant to sucking pests.

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