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Comparison of tolerance of new cotton crosses to bollworm population (*Helicoverpa armigera* (Hub.) in Golestan province

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ABSTRACT: Cotton is as important and strategic crops with serious problems of pests, so far any varieties has not introduced tolerant to pests. Cotton bollworm (*Helicoverpa armigera*) ,a major pest of cotton in Iran and world which cause economic damage to cotton crop. An experiment was conducted as randomized complete block with three replications and 13 hybrids(16-84,113,114-2,19-84,100,104,3-84,6-84,1084,102,108,106 and sahel variety) immobilized in each plot with 6 line including 8-meter by cropping pattern 80×20 on 2014-2015. .In order to investigation changes in different growth stages of the cotton bollworm samples were regularly collected weekly from 5 plants per plot and middle stages of the pest was also recorded in special tables. Composited analysis showed that treatments of, 114-2, 19-84 and 102had the highest yield at the rates of 918, 817 and 837kg/ha respectively in 5 % level. I view of hybrids treatments of 19-84, 104 and 3-84 had the highest earliness percentage at the rate of, 94.23, 92.42 and 91.36, respectively. The infection rate of bollworm treatments hybrids 6-84,102, 113 and 3-84 by 0.363, 0.363, 0.330 and 0.243, had the lowest density of plant pest infestation.

***Keywords*:** Tolerance, New crosses of cotton, Helicoverpa armigera and Golestan province.

INTRODUCTION

Cotton of important strategic and serious problems of pests that have a specific figure was not as tolerant to pests introduced. Resistances to pests have been studied over the years from two aspects:1- The resistance of pests to pesticides is a problem for agriculture 2-Production of crops resistant to pests. One of the most important goals should be to try to prevent the spread of resistance to pesticides. Strongest resistance to pesticides limiting pest control options and increased costs of control. The second aspect is the use of plant varieties resistant to pests, biological control is one of the appropriate methods Which are inherently equipped with defensive factors, biochemical or morphological, As these factors, or to keep the plant from pest attack or pest attack can be triggered as a defense and can even kill them. His type of resistance can also be synthetically and by stimulating the release of biochemical substances produced. Even if in some insect resistant varieties of plants shortages of food needed to be there, it will have effect as if they contain biochemical plant is toxic and in fact, due to the emergence of similar effects, the mechanism of resistance is antibiosis. For example, growth trichomes habit insect's factors that cause a lack of willingness to feed and lay eggs on the plant(Bultler, *etal.,*1991). Some cases, these trichomes secrete toxins as a chemical weapons plant defense against insect attack acts(Mazaheri, 1993 and Berlinger,1986). Various pest management strategies that significantly reduce the use of pesticides. Among these strategies, the use of resistant cultivars. In this study, selection and evaluation of the top 40 new cotton lines took up the bollworm pest tolerance should be specified. Cotton boll Worm of the most important pests of cotton in the country and in most parts of the world, causing economic losses each year, and for the control of various chemicals in large volumes are, Unfortunately, not only did not solve the pest problem, but also increase the incidence of new problems, such as the resistance. Because finding crop varieties tolerant to pests and transfer resistance genes has gained the necessary culture of tolerance, and reduce environmental damage have intact. A variety of strategies that can be used in

integrated pest management and the use of insecticides significantly reduced. Some of these strategies include the use of resistant varieties named (Butler, *etal.,*1991).Use tolerant varieties can be an important way to limit the damage honeydew. Some researchers fewer honeydew on the leaves to the smooth lines and varieties of cotton that lack this feature(Mazaheri, 1993).Super okra and okra leaf plants may show more resistance to cotton honeydew, although it seems that this is likely to have a genetic background of interaction(Mazaheri,1993and Janes, *etal.,* 1996).Cotton pests during the growing season annual survey in Australia showed that the pest *Helicoverpa armigera* and *Helicoverpa punctigera* is included. Tests on the pest at the end of the season indicated that with a population of 0, 2, 4, 6 and 8 larvae of this pest in square meters, is not significant yield loss(Jones, *etal.,* 1996).Another study in Australia showed that cotton can withstand damage during the growing season to reduce the area under economic losses(Butler, *etal.,* 1991).Wanchao *et al* in 1996, Bt. gene were synthesized protein with insecticidal properties that it had entered into a number of upland cotton produced in the transgenic plants, good resistance to cotton boll worms observed. The first generation plants, 5 the high toxicity against larvae and boll worm showed larval mortality rate, 91.6, 93.8, 92.3, 85.7 and 75%, respectively. A cotton without nectar of upland cotton germplasm occra leaf type (WC-12NL) of red worms showed resistance cotton, was registered in 1987(Wanchao, *etal.,*1996).Factors such as physical and morphological characteristics of plant selection by insect herbivores and natural enemies of pests by eating, especially at higher levels of efficiency of parasitoids are effective in attracting (Berlinger, 1986 and Butler , *etal.,* 1991).Sumera a in 1998, a number of varieties and lines of cotton in Sindh province of Pakistan in terms of morphological characteristics associated with resistance to pests studied and concluded that early on variety causes the end of the season whitefly attack and escape boll worm. The early varieties are more tolerant cotton red worms and boll rot resistant than more. Morphological characteristics including without nectar, plant color red bracts of the oven and eaten in resistance to whitefly and increase the performance of their role. Super okra and okra leaves and because a more open canopy of vegetation, about 40 percent less foliage than conventional varieties at maturity and allow more than 70 percent of sunlight to penetrate the canopy. He showed that all tested strains of okra leaves, better than the control. The strains were 4% lower boll rot. In addition, all strains of Accra leaves of thrips, leafhoppers and less infested with whitefly populations were less than the control varieties check. Boll weevil plant color red is preferred cause. It is suggested that plants have light-green color red plant, the degree of absence of whitefly have preferred that more studies are needed. trichomes morphological factors that caused the reluctance of insects to feed plants or lay eggs on the plant. Susa, *et al* in 1997 in the Research Institute of the Philippines (CRDI) on 30 cotton genotypes for varieties resistant to phylloxera-resistant varieties of cotton, and 5, respectively. of the remaining 17, the figures showed little resistance, and the remaining 6 were susceptible to damage sensitive showed aphids (Mazaheri,1991). Studies showed that the canopy open and cotton varieties barbadense with small leaves, less sensitive to a closed canopy and honeydew are varieties with large leaves(Mazaheri,1999).

Material and Methods:

1. To carry out the study, including 13 treated (stabilized hybrid cotton) in 3 replications, experimental complete block design in two separate pieces, sprayed and non-sprayed Gorgan Research Station Hashem Abad was planted, according to local custom. Each plot consisted of 6 to 8 meters with a 20 × 80 cm planting pattern.
2. Sampling of bollworm during the season, after the advent of the boll worm, regular weekly and 5 plants in the middle of each plot completely random selection of eggs, larvae counted and recorded in tables was also recorded. The data were analyzed using the computer program MSTATC and the means by Duncan's multiple range tests were grouped. View treatments:16-84,113,114-2,19-84,100,104,3-84,6-84,10-84,102,108,106 and Sahel Varity.

Results and Discussion:

Based on studies conducted during two years of testing and statistical analysis, data conversion and analysis of variance showed that: The average weight of 30 bolls in treatments using analysis of variance in hybrids 106 treated with 178.93 g highest boll weight in the group **a**, and hybrid 2-114 with 123.75gr minimum weight boll in the group **b** in Level 5 have shown significant (Table 1).

The average yield, the method achieved in treatments using analysis of variance in the treatment of hybrid 2-114 with 918 kg per hectare highest yield in the group **a**, And 84-16 hybrid treatment with 377 kg/ ha, has the lowest yield at 5% have shown significant differences(Table 2).

In terms of boll opening in treatments using analysis of variance in the treatment of hybrids 84-19 and 106 with 94.23 and 92.47, the highest early boll opening respectively, in the group **a**, and hybrids 84-6 and 108,with 83.89 and 77.93 percent respectively, had the lowest early boll opening in group **bc** and **c** show a significant difference at 5% (Table 3).

The rate of infection in the population of cotton bollworm treatments using analysis of variance on the Sahel and hybrid hybrids tested treatments 84-108,10, 100 and 104 respectively, with a density of 0.607, 0.607, 0.532, 0.497 and 0.468 with the highest population in a number of plant pests **a** and **ab**, hybrid treatments 84-6, 102, 113 and 84-3 with the lowest population in level of 5 percent compared to the control group **bc** and **c** have shown significant difference (Table, 4). Wanchao *et al* in 1996, Bt. gene were synthesized protein with insecticidal properties that it had entered into a number of upland cotton produced in the transgenic plants, good resistance to cotton boll worms observed. Super okra and okra leaf plants may show more resistance to cotton honeydew, although it seems that this is likely to have a genetic background of interaction (Mazaheri, 1993and Janes, *etal.,* 1996).

CONCLUSIONS:

According to statistical analysis and analysis of variance two years of testing in terms of performance, the lint obtained Hybrid treatments 2-114, 84-19 and 102, respectively 918, 817 and 837 kg per hectare, the highest yield in the group **a** and **ab** at 5 percent.

In terms early boll opening treatments 84-19, 104 and 84-3, respectively, 94.23, 92.47 and 91.36 percent, the highest early boll opening in the group **a** was at 5%.

In terms of the population of cotton bollworm infestation treatments hybrids 84-6, 102, 113 and 84-3, with respectively, 0.363, 0.362, 0.330 and 243/0 has the lowest density of population of cotton bollworm in th e group **bc** and **c** are shown at 5% level.

Therefore, hybrids 84-6, 102, 113 and 84-3 as the least infestation to have bollworm population in the future so it can be used in breeding programs or hybrid genotypes under study and the release of cultivars use them.

Table 1. Compare the average boll weight 30 according to Duncan test

Treat.	Ave.(gr)
106	178.983 a
108	152.800 ab
10-84	152.617 ab
102	150.817 ab
16-84	145.867 b
19-84	145.200 b
100	144.567 b
6-84	144.250 b
3-84	139.600 b
104	133.767 b
113	132.200 b
Sahel	129.400 b
114-2	123.750 b

Table 2. Compare the average yield on Duncan

Treat.	Ave. of yield (kg/ha)
114-2	918 a
1984	817 ab
102	837 ab
100	766 abc
3-84	754 abc
113	728 abc
10-84	669 abc
104	623 abcd
106	573 bcd
6-84	512 cd
108	440 cd
Sahel	394 d
16-84	377 e

Table 3. Compare the average early boll opening according to Duncan test

Treat.	Ave.(%)
19-84	94.232 a
104	92.470 a
3-84	91.358 ab
106	89.552 ab
114-2	89.623 ab
16-84	88.890 ab
102	88.311 ab
Sahel	86.296 abc
10-84	85.659 abc
100	85.200 abc
113	84.637a bc
6-84	83.897 bc
108	77.932 c

Table 4. Compare the average population density of cotton bollworm on Duncan

Treat.	Ave.(density)
Sahel	0.607 a
10-84	0.607 a
108	0.532 a
100	0.498 a
104	0.468 ab
19-84	0.453 ab
106	0.452 ab
114-2	0.438 ab
16-84	0.408 ab
6-84	0.363 bc
102	0.362 bc
113	0.330 bc
3-84	0.243 c

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