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Fluctuation of sucking pest populations (*Aphis gossypii* (Glove.) and *Bemisia tabaci* (Gen.) in the Ultra narrow row the cotton fields of Golestan province of Iran.

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ABSTRACT: In this method, planting is used instead of the distance of open rows at distances below 40 cm. This planting method saves water consumption, reduces the cost of weeding, increases production and premature in cotton. In order to compare the populations of important sucker pests such as green aphid(*Aphis gossypii*) and white fly (*Bemisia tabaci*)on three cultivars new of Golestan, sahel and Sepid, in two narrow cultivars 20 × 25 and 20 × 80 cm, a factorial experiment was conducted in a randomized complete block design with three replications. Sampling was done weekly and randomly on plants. In each plot, 15 leaves were cut in a circle of 5 plants and different stages of sucking pests (nymph and adults) were counted on them and recorded in special tables. The data was analysis by MSTAT Mean comparison revealed, sucking-pest population density is very narrow gap in agriculture, the yield rate of the tested intervals Golestan cultivar distance of 80 cm with an average yield of 4422.87gr/plots maximum yield and Sepid with a distance of 25 cm with an average yield of 3108.33gr/plots had the lowest yield. Infection levels of cultivars of cotton aphid population, Golestan and sepid with a distance of 80cm, respectively, with a density of 53.42,49.18 and 41.35 aphids per leaf has the highest infection, Sepid and Sahel varieties 25cm,respectively, with a density of 9.26 and 7.11 aphids per leaf had the lowest infection. Population bemisia levels of cotton cultivars in Golestan, Sahel and Sepid 25cm respectively with densities of 27.63,24.31 and 20.86 bemisia on leaf number, maximum infection and Sepid varety with a distance of 80cm with a density of 6.15 bemisia number of leaves have the least pollution. Therefore Golestan cultivar with an average yield important sucking pests such as population infection, aphids and whitefly the lowest cotton cultivation in agriculture ultra-narrow row 80 and 25 centimeters had in the cotton fields.

***Keywords*:** Ultra narrow row (UNR), Cotton genotype, *Aphis gossypii* and *Bemisia tabaci* and cotton.

INTRODUCTION

In the planting system, very narrow row spacing with spacing of rows between 20 and 40 cm is considered (Kirby *et al.,* 1990). Compared to the more spaced row spacing system, there will be evident changes in the number of bolls per plant and the state of the canopy. In this system, the number of bolls per plant and plant height and length of branches and decreases (Galanopoulous,*et al.,*1980). Reducing cotton production costs, especially through early maturity, reducing pesticide use by interrupting the critical cycle of pests, reducing irrigation water consumption is one of the benefits of dense planting and in different ways, including planting narrow and very narrow intervals, plating a clump. also, with the advent of mechanized, early harvesting of cotton has become very important. Agronomic and environmental factors that have a great effect on the precociousness of the product, we can plant density, Plant pest control, nitrogen fertilizer management and proper irrigation periods. More densities

generally increase aging, but management of such farms is very important. In this type of farming, due to increased competition, the loss of buds increases, which in each plant leads to a decrease in yields (Kucheki, 1985).
The this study was to determine the effect of plant density on three cotton cultivars,The cultivar Sai okra 324 had more yield and yield than the number of bolls per plant. This figure is more than 400 to 600 kilograms in comparison to the sahel variety and produces more than 200-500 kilograms from Zeta-2 variety. In all cultivars, the highest yield was obtained at high plant densities, so that the highest yield in sahel cultivar was observed at plant densities of 125,000 plants per hectare, In the cultivar Saiokra 324 at a plant density of 125000 and 62500 plants and In Zeta-2 cultivar, 125000 plants were also reported. There are different opinions about the effect of row spacing on performance in different studies. Cotton farming is expanding in ultra-Narrow Row in cotton growing countries (Ghajari and Ghadrei,F.2006). Advantages of this method of planting include the increase of early maturity and yield of the plant under dry conditions (Philip, 2000, 2001). Early premature plant increases the use of pesticides and reducing pollution from the environment. Early premature plant is done by reducing the number of bolls per plant (Bin Mohammad,1982). At the same time, reaching the bolls or quickening them will result in more efficient use of hormones, insecticides, and increased yields (Bin Mohammad,1982). Increasing the yield of the product by increasing the density in the above mentioned method, regardless of weather conditions, is also reported in some reports (Jesus Rossi, *et al.,* 2004). In the closure of a faster or shadow surface, the area of life for weeds is severely reduced (Phlip,2002). On the other hand, this reduces water evaporation after irrigation and saves it (Jesus Rossi, *et al.,* 2004) It also increases the absorption of light by increasing the number of leaves (Bin Mohammad,1982). Determining the responses of different genotypes to different densities is one of the fundamental plans in the reports. The necessity of this issue is due to the importance of introducing cultivars in very high densities. The phenotypic variations of the varieties were reported in terms of height reduction, shortening of length and number of branching branches, shortening of reproductive branches and increasing distance between the first branch of dreams and germs from the soil surface (Donyavian, 1999 and Stella;Sfican , 1980). The results of studies by Wright *et al*., (2011) showed that fiber yield decreased by 9 plants per row compared to 1 and 5 plants. The yield of fiber of early cultivar and limited growth was not influenced by density, but in the case of complete clay and unlimited growth, with increasing density, the yield decreased. Philip (2001) examined three densities by spacing between planting lines (25, 50, 100 centimeters) and stated that Plant density will greatly affect morphological traits and yield components. More densities decrease vegetative growth and produce crops. Cultivation of cotton in narrow strips can have a significant impact on insect management; however, little information is available to insect control strategies for insect control. The damage to pests such as aphids, white flies, and spider mites reduces row crops. Almost all cotton pests can be indirectly controlled by a very narrow cultivation system (Jesus Rossi, *et al.,*2004). Increasing the number of cotton plants from 50 thousand to 125 thousand bee hectares the populations of important sucking pests such as thrips, aphids and white fly were easily controlled due to increased natural enemies in the cotton field (Wright, *et al.,*2015). In studies conducted on the rate of contamination of successful cotton lines to major pest killers of the Tbl-180, N2G80, Skt-133 and Skt-134 lines in comparison with the common cultivar of Golestan province, the most common pests have the lowest amount of contamination. In researches on the amount of contamination of the population of sucking pests in Golestan province, the Skt-134, Tbl-80 and N2G80 hybrids has the least infection with the major suckling pests such as thrips, aphids, white fly and cotton grasshoppers (Darvish, Mojeni, 2012,2013). The aim of this study was to investigate the effects of very low distance farming (UNR) on the populations of sucking pests in arable crops in Golestan province for the first time.

Material and Methods:

This research was carried out at Hashem Abad Cotton Research Station in Gorgan during 2015-2016.
Treatments were three cotton cultivars (Golestan, sahel and Sepid) and two narrow spacing of 20 × 25 and 80 × 20 cm were evaluated in a factorial experiment in a randomized complete block design with three replications. Each plot contained 10 12-meter plantations. After emergence of pests in the field, to study the changes in the population of important sucking pests (thrips, aphids and white fly) sampling was carried out on a regular basis on a weekly and random basis on plants. In each plot, 15 leaves were discarded in circular form of 5 plants different stages of sucking pests (nymph and adults) were counted and recorded in special tables (Jesus Rossi, *et al.,*2004 and Darvish, Mojeni, 2012). The performance of each experimental plot after the removal of two lateral lines and one meter margin from the beginning and the end of each row were measured all records were taken from the middle rows. The data were obtained as a factorial experiment in a randomized complete block design Data were analyzed using MSTAT software and the mean of data was compared with Duncan's multiple range test.

Results:

According to the studies carried out, the data obtained from or transduction of different traits showed the results of the analysis of the combined mean of the test data the treatments of cultivars have a significant difference in cultivars in very narrow rows. Golestan cultivar with 80 cm spacing with 4423 kg and 25 cm golestan with 3946 kg/ ha had the highest yield of group A and sahel and Sefid cultivars were 25 cm with 3165 and 3108 kg respectively in group C With the lowest yield in the level of 5% ($p = 0.004$, $f = 7.33$, and $df = 2$, respectively) (Table 1, fig3). There was no significant difference between the effects of the traits in the experiment and the results were not presented. In terms of population density, there was no significant difference between sucking pests among cultivars. Therefore, the study of changes in the population of sucking pests on experimental cultivars showed a very narrow cultivar that Golestan cultivar had higher yield and less population density than sucking pest compared to other cultivars.

The population changes in aphid population at Golestan cultivar with a distance of 80 cm from the end of July to mid-July, with the highest population density. At a cultivation interval of 25 cm, a lower population was observed in August (Fig. 1). In terms of infection the population of green aphid of cotton in the tested treatments by performing combined analysis of varieties on the cultivars tested in UNR system cultivation Sahel, Golestan and Sepid cultivars with a distance of 80 cm with density 11.6, 92.9 and 5.55 aphids in leaf, had the highest infection in group A and sepid and sahel cultivars of 25 cm with a density of 5.92 and 0.90 aphids in leaf in group B at the 5% level ($p = 0.323$, $f = 1.19$, $df = 2$), they did not show significant differences (table 1). Fluctuation of white fly population on Golestan cultivar was 80 cm from Golestan cultivar from mid-August to the end of September. While the white fly population showed a lower density on the Golestan cultivar at a distance of 25 cm (Fig. 2). In terms of average infection rate, the white fly population in the tested treatments by performing compound analysis of variance in very narrow cultivation Golestan, sahel and Sepid cultivars with a distance of 25 cm with density of 2.99, 2.96 and 2.15 of white fly in leaf In group A and sepid variety with a distance of 80 cm with a density of 1. 28 of white fly in leaf in group B at 5% level ($p = 0.091$, $f = 2.71 = 2$, $df = 2$), there was a significant difference have not given (table 1).

Conclusion:

This has been done by investigating that a very narrow row of cotton production can have a significant impact on insect management. Pests such as aphids and white fly with a very narrow culture system can be directly controlled (Jesus Rossi, *etal.,*2004) which is consistent with the studies in this research.

The aphid activity in cotton fields generally begins with the appearance of buds and flowers on cotton plants and its peak in late May is observed in Gorgan cotton fields(Darvish, Mojeni,2012,2013). Pest activity in the year 2012 was due to warmer climates. So that Golestan cultivar with a distance of 80 cm showed a maximum of 1.3 of aphids in leaf and sepid with 80 cm 0.8 of aphids in leaf had the lowest density.

In the year 2013, the population of aphid population was observed among treatments due to the favorable weather conditions of cloudy and humid populations of aphid. So that the Golestan cultivar is 25 cm spacing, 6.5 of aphid and sepid with a spacing of 80 cm. 6.1 in the leaf with the highest density and Golestan cultivar with a distance of 80 cm, had the least amount of 5.2 times aphid in leaf. So, the longer the cultivar is, the greater the amount of high light the aphid density of the cotton is reduced (Fig. 1). According to the research done (Jessus Razie *et al*., 2004) In India, the effects of very narrow crop cultivation on cotton crops on important pests such as aphids, white fly and spider mites, with regard to the width of the row, is reduced. Almost all cotton pests can be controlled indirectly with a very narrow cultivation system. Also, the increase in the number of cotton plants from 50 thousand hectares per hectare to 125 thousand hectares was very difficult to control. The populations of important sucking pests such as thrips, aphids and white whales were easily controlled due to the increase of their natural enemies in the cotton field (Wright *et al.,* 2015).

This research conducted in cotton farming on the population of important sucking pests such as aphids and white fly with the lowest infection in Golestan cultivar with a distance of 80 cm in Gorgan has similar results and important sucking pests are easily controllable.

White fly is active in cotton fields of the Gorgan region from late July to mid-September. In the 2013, white fly was more densely tested than in the year 2014. It's been hot and dry in the summer. Therefore, in all treatments, almost identical population was recorded and no significant difference was observed among the treatments. The sahel cultivar is 25 cm, with 2.9 white fly and the highest density is 80 cm, with a minimum of 2.6 white fly leaf per leaf. In summer 2014 in the Gorgan region, there was a decrease in the weather conditions of the cloudy and humid white fly population. Pest density did not show significant differences among treatments Golestan cultivar was 80 centimeters with 1.6 white fly with the highest density and white fly in 25 centimeters with 1.3 with the lowest density. Therefore, the higher the plant density, the lower the white fly population density due to the shading

surface (Fig. 2). The results were the same with other studies in other countries. The narrow row of cotton production can have a significant impact on the management of these insects, however, little information is available to insect control strategies for insect control. Important cotton pests, such as aphids, white fly and spider mites, are reduced by reducing the width of the crop. Almost all cotton pests can be indirectly controlled by a very narrow culture system (Wright *et al.,* 2011). The study of the increase in the number of cotton plants ranging from 50,000 per hectare to 125 thousand. The population of important sucking pests such as aphids and white fly were easily controlled due to the increase of their natural enemies in the cotton field (Wright et al., 2015).

In terms of yield per hectare, in the year 90, Golestan had the highest yield of 25 centimeters with 4433 kg/ ha. The sahel with a distance of 25 cm with 2169 kg /ha had the lowest yield (Table 1). The results of the research are based on research conducted in India on the effects of very narrow crop cultivation on cotton crops on important pests such as aphids, white fly, and spider mites, the row width decreases. Almost all cotton pests can be controlled indirectly with a very narrow cultivation system. This research with cotton cultivars has the same results on the populations of important suckers, such as aphids and whitefly cotton, with the lowest density in Golestan cultivar with an average yield of 3946-4423 kg/ ha in Gorgan region(table1). Early premature in cotton cultivation is achieved without decreasing yield by increasing the number of plants per hectare (Kirby *et al.,* 1990).

Moderate plant density in improved cultivars for very thin crops is more rapid and more efficient compared with other densities (Galanopoulos, 1980). According to the table, the final conclusion of the test should be that the number of plants per hectare should increase. Because the level of shading of the plant increases and decreases the amount of light among the cotton plants, for this reason, there is a significant difference among the available cultivars in terms of population density of thrips and cotton aphid. On the three cultivars tested, it was significant in terms of yield and Golestan cultivar with a distance of 80 and 25 cm had the most suitable yield (4423-3946 kg/ ha), in terms of the population of the most important pests, the sucking pest had the least infection.
Therefore, Golestan cultivar is recommended for very narrow row cultivation and can have a significant impact on the integrated management practices of pests in Gorgan region.

Table 1**.** Comparison of the mean of different traits in very narrow agriculture on the population of important sucking pests

White fly(N.leaf)	Aphis(N. leaf)	Yield (kg/ha)	Treatment / cultivar
27.63±1.86a	12.01±2.1b	3946±473ab	Golestan 25 cm
24.31±1.12a	9.26±1.26 c	3165± 379 c	Sahel 25 cm
20.86±0.89a	7.11±0.86c	3108±372 c	Sepid 25 cm
8.15±1.02ab	53.42±2.75a	3780±453b	Sahel 80 cm
7.36±1.46b	49.18±3.81a	4422±530a	Golestan 80 cm
6.15±0.65b	41.35±4.11ab	3331±398bc	Sepid 80 cm
6.31 %	16.25 %	12.44 %	CV %
0.755	2.47	858.94	Stde

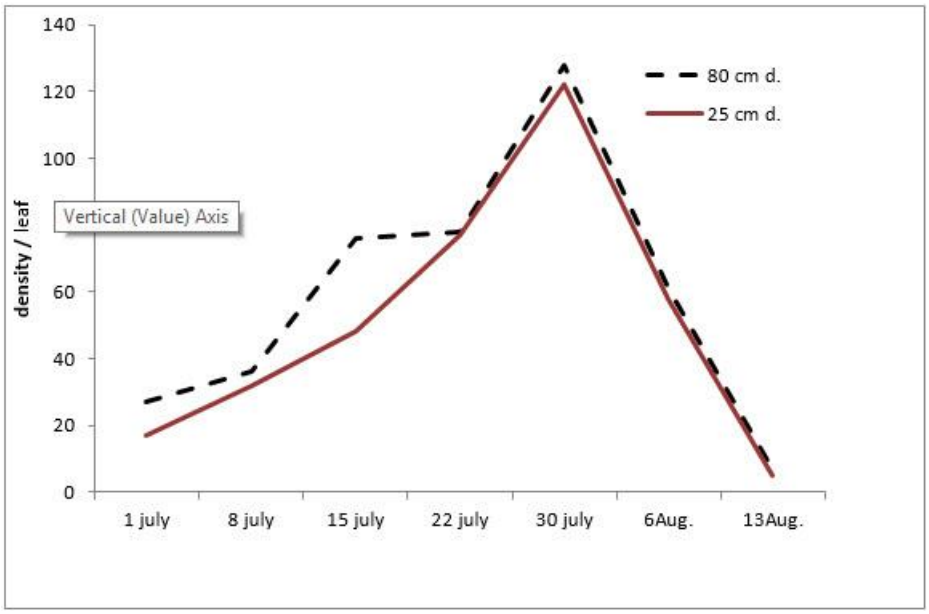

Figure 1. poplation daynamic of *Aphis gossypii* on golestan cultivar

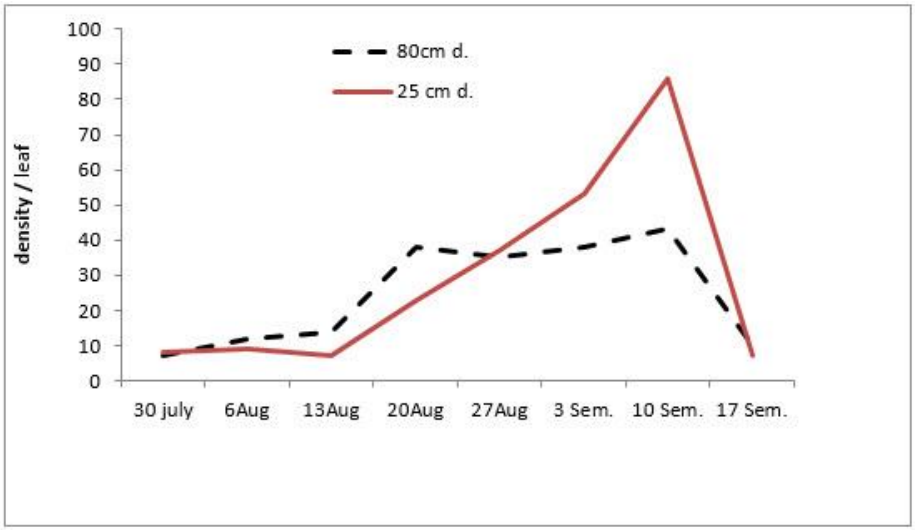

Figure 2. poplation daynamic of *Bemisia tabaci* on golestan cultivar

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