A Biological Study of Green Pea) Aphid Acyrthosiphon Pisum (Harris) (on Alfalfa in Mazandaran)

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Abstract: **In recent years, green pea aphid acyrthosiphon pisum (Harris) has been identified as one of the important post of alfalfa, and it is active in most parts of Iran in alfalfa farms and causes damage to them including Mazandaran, Fars, Isfahan, Kermanshah, and Eastern Azarbaijan. This aphid is active in two a live winged and alive wingless farms within all farming year. According to studies conducted on this pest biologically, it's maximum activity has been occurred in May and at beginning of July when monthly maximum heat has been in a range from 28 to 30 C and relative humanity in range from 60% to 65%. For this reason maximum damage to the alfalfa product caused by this aphid is accomplished within this time. On the basis of the conduct studies, sexual and adulation steps in this aphid has not been observed in the climatic conditions of Mazandaran. This aphid passes the winter in alive wingless females form. In spring they begin to be active upon favorableness of climatic conditions and generate wangled and wingless individuals by the Parthenogenes thelytoqie /parthenogenesis in spring and are active and reproduce via this method throughout the year in case of existence of the host. In the performed studies, it has been shown that each viviparous female aphid has reproduced 26 to 71 youngs. The young ones have been maturated following 6 to 8 days and their life span has been in a range from 11 to 12 days since birth time.**

Key words**: Green pea, alfalfa, aphids, young.**

1. Introduction

Among the pests of alfalfa aphids although they seen small-body insect but it can be said that they are counted as important pests of alfalfa and cause a noticeable losses to alfalfa due to feeding on the vegetative extract. Meanwhile, green pea aphids, while feeding leads to stoppage of growth and transfers from viral diseases and cause damages through this way as well. Also when feeding it excretes a lot of extract leading to viscosity of alfalfas and, thus, the product harvest often accomplishes with difficulty and trouble. Marble reported that the green pea aphid causes stoppage of the plant entanglement and burning of the leaves and decreases of the products at the remarkable rate. Mittler and Sylvester realized that in some parts of the farms where the mentioned aphid excreted a lot of honey has been led to dryness of alfalfa bush because in the alfalfas covered from honey photo synthesis operations become disrupted and the plant loses his own growth. According to Heimer the mentioned aphid in terms of dissemination is active on the pea Fava bean and alfalfa in majority of middle east countries including Iraq, Israel, Lebanon, Turkey and Iran as well as Japan, U.S.A, Canada and Europe. Farahbakh has reported existence of this aphid on the fava been pea lentil alfalfa and clover in Iran. Habibi has collected these aphids on the alfalfa around Mazandaran.(1) Kaiser and Shalk have reported activity of the green pea's aphid on the grains and transfer of the viral disease of leaf entanglement in the pea in Mazandaran and Shiraz . Monajjemi and Esmaeeli have not mentioned activity of this insect on the alfalfa . In terms of morphology and biology this insect is existed in two viviparous winged and wingless females from which are active in two above forms within all farming seasons. Fastop has reported that this aphid reproduces through parthenogenesis and vivi parity forms in some parts with very cold winter throughout the year while it creates a sexual generation in the cold region within autumn in which male and female individuals mate and lay eggs. The eggs pass the winter in the same manner and are delivered the young and generate the fond a trice individuals. In this article it has been tried that in term of winter passage, length of life span, strength of son birthing and maximum activity of this insect within various seasons, biology of this insect is studied in west of Mazandaran region.

2. Materials and Methods

In order to determine length of life span, from the first-age young to death of complete insect, and, also number of young achieved by each aphid, the cylindrical screening chambers(with the height of 11 cm and diameter of 2 cm) were used. It is in such a way that an alfalfa stalk was passes through each cylindrical pipe and its lowered part was blocked by the cotton, then, after putting two aphids(the last age young) in to the pipe, its upper part was blocked by the cotton as well.(Figure 1). Following the maturity of the aphids, number of the resulted young maximum time span of young ling up to puberty and maximum life span of the complete insect were determined.(life span of aphid from birth to death in the second generation was conducted inside the cage. It was in such a way that following the maturity of the first generation youngs due of the second generation youngs was recorded and their biological activities were pursued.)

This experiment was carried out twice in 200 hector farm of Agriculture College in May. In each turn of experiment five cylindrical screens were used each of which was installed on an alfalfa bush and at intervals of five meters from each other. In order to study status of aphids in terms of passing the winter, 100 alfalfa bushes along with root (within three years) were transferred from farm to laboratory every week, and they were studied in term of existence or inexistence of egg and determination of the various statues of growth. In order to study changes of the aphid's population in the green pea, two 200 hector and 140 hector farms were sampled from beginning of activity of the aphids to termination of their activity every week. The 200 3
hector farm locates in the west of Mazandaran and in a distance of 5 kilometers far away from agriculture faculty with an approximate area of 90 hector in which alfalfa has been planted. Although 150 hector farm located in west of Mazandaran, but in distance of 11 kilometers far away from agriculture faculty and its 50 hectors were under cultivation of alfalfa. Sampling was conducted by method of counting the aphids from the stalks as following.

2.1 Counting of aphids from stalks

In this method a piece of 30 x30 cm white colored cardboard was placed alongside the alfalfa bushes and ground surface a d shaken on it gently, and following full of the aphids on the cardboards, their number was counted. In each sampling, 20 stalks, in 10 repetitions (200 stalks totally) were selected from various parts of farm randomly and number of the aphids was counted. Sampling from two 200 hector and 140 hector farms began from March, 20 and continued until beginning of the winter. All samplings were carried out weekly within four years. Their average number has been calculated monthly and inserted in the related columns. In order to study the relationship of the non-alive factors(heat and humidity) with green a phids statistics of meteorology related to the country's meteorology organization situated in 200 hector farm of the farming college was used. It is in such a way that average of maximum heat and maximum humidity has been calculated and reflected and studied in the related columns.

3. Results and Discussion

In the table one it is noted that majority of the aphids appear in the wingless individuals from (figure 2) which after a little time of reproduction via parthenogenesis methods their population is increased and winged individuals are created. In climatic conditions of Mazandaran appearance of the winged individual is usually preformed in the second half of the April. At this time the winged individuals fly to various parts of the alfalfa farm.(In the farms where spraying insecside and etc performs in the beginning of the April against the proboscis head of the alfalfa leaf the aphils are eliminated and recontamination of these farms is to be occurred by these the same individuals). Both winged and wingless aphids reproduce through pothelytoqie method and this reproduction method and young birthing will be continued in the same manner during spring, summer, fall, and even winter.(in the case of existence of the host)[table 1and 2]. According to the studies conducted in climatic conditions of Mazandaran, sexual steps and ovulation have not been observed or at trace this insect's egg has not been seen in samplings carried out in y=the winter during three years.(table 3). As noted in table1, maximum population of this aphid is in May.(Average heat/monthly maximum is in a range from 28 to 30 C and average relative humidity/monthly/maximum is in range from 60% to 65%.).

4. Conclusion

Result of this experiment show significant effect of the priming treatment on the majority of yield components in the pea grain, including average number of pod, pod fresh weight, number of grains per plant, average grain weight per plant, germination percentage, the lowest pod distance from land, the biggest pod size, pod total weight, number of pod, and grain fresh weight, and they indicate an insignificant effect of priming treatments on the attributes such as pod dry weight, grain dry weight, protein percentage/content, the highest pod distance from land and the smallest pod size. The maximum average number of pod, grain fresh weight, pod number and pod total weight have been observed in control treatment; the maximum pod fresh weight and number of grains per plant have been observed in a calcium chloride treatment, the maximum average grains weight per plant has been observed in potassium chloride treatment; the maximum germination percentage has been observed in the zinc sulfate treatment and the biggest pod size has been observed in the distilled water treatment.

Table 1: average number of green pea aphid percentage of alfalfa stalk average maximum heat and monthly maximum humanity.

Months	Number of the aphids in hundred alfalfa stalks(average in 4 weeks)	Average of the monthly maximum heat	Average of the monthly maximum humidity
March	100	19	66
April	163	22	65
May	578	28	65
Jun	18	34	56
July	9	35	56
August	18	33.5	49
September	14	28	62
October	31	20	69

November	16	14	72
December	7	8	74

Table 2: Number of the Youngs achieved from each green pea aphid life span and the time from youngling to puberty/maturity. Chalous 200 hector farm of agriculture colledge,2016, May.

Repetition	Average Number of the youngs achieved by one aphids	Maximum life span per puberty/ maturity per a day	Maximum range from young ling to puberty/ Maturity per day
1	**54**	**12**	**7**
2	**26**	**12**	**7**
3	**32**	**11**	**6**
4	**71**	**12**	**7**
5	**58**	**12**	**8**

1. Yazdi Variety:
2. Above test has begun since half of May and ended in the late of May. Average of maximum heat has been in a range from 27.8 to 30.7C during two weeks and relative humidity has been in a range from 57 to 58% during two weeks.
3. Each repetition consist of a cylindrical screen or sieve which two last age youngs were placed in to each one them which following the completion of the aphids, number of achieved youngs, life span and youngling time until maturity were determined.

Table 3-A study of state of winter-passing of the green pea aphid.200 hector farm of Chalous agriculture faculty.

	Mature Applied		young	
	December	**January**	**December**	**January**
The first year	5	3	2	1
The second year	4	3	2	1
The third year	3	2	1	0

1. In each turn 100 alfalfas were taken out with soil from soil out of various parts of the farm randomly and transferred to a laboratory. Then they were examined from viewpoint of inflection with aphid and aphid egg.(Two-year alfalfa) gradually following May and beginning of June activity of these aphids slows down and their population decreases but they can continue their own life and reproduce. In July their growth decreases again and in August their activity and growth performs in a better manner via approaching of autumn (In comparison with July), but their population never reaches at rate of late spring (table 1). In table 2, it is observed that each aphid has given birth 26 to 71 Youngs. After 6 to 8 days the young have been matured. (It is described that a low number of the Youngs have been matured and the rest Youngs have been reached maturity limit after 7 days and in some cases after 8 days since birth time.) From birth time to death life span of the aphids has been in a range from 11 to 12 days.

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