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RESEARCH ARTICLE

USE SPIDERS IN THE CONTROL OF THE PEST *SPODOPTERA LITTORALIS* (BOISDUVAL) (LEPIDOPTERA: NOCTUIDAE) ON COTTON WHICH WAS SELECTED UNDER GREENHOUSE CONDITION DURING SEASON 2017 AD.

Ahmed R. Aly Taha¹, Mohamed H. El-Erksoy¹ and Wafai Z. A. Mikhail².

1. Plant Protection Research Institute, A.R.C., Dokki, Giza, Egypt.
2. Institute of African Research and Studies Cairo University.

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Abstract

Spiders succeeded in control of the pest *Spodoptera Littoralis*. Where the population densities of the pest decreased to zero in the third week after the release. Therefore the reduction percentage recorded 100%, while the averages of the population densities were decreased significantly at level (10) in the rest weeks. However the reduction percentages ranged between (35.88% - 84.16%) at level (5), while ranged (71.89% - 100%) at level (10).

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Introduction:-

The ecosystem were destroyed by chemical production meanwhile the researches must be in the direction of life restoring to it normal, the biological control divided into two parts, the first part is the classic biological control type therefore means inputting predators or parasites to ecosystem. While another type is maintain predators and parasites which already exist in ecosystem. The spiders are one from factors which playing an important role in biological control, Currently it included 46'906 from accepted species (World Spider Catalog Version 18.5 / <http://www.wsc.nmbe.ch/>), on the other hand the wide distribution qualifies them to be the key factor in the environmental balance to reduce pesticide impacts, also the cotton leaf worm considers from the dangerous pests in Egypt throughout the year, on several host, Younis (1992) so it was necessary use spiders in control this pest to save the ecosystem from the pesticides.

Materials and methods:-

The crop and land of experiment:-

The cotton of experiments cultured in Qaha station which follow plant protection research institute, in Qalubia governorate. The land were divided into 3 replicates, (two replicates for two levels of release, and one for land of the control), and plates were made of pipes covered with Guaze fabric, which was sowed in two layers to better withstand weather conditions. A zipper was added to the greenhouse.

The total of the examination were 5 times other than the pre-count, and 20 leaves were examined from each treatment.

Corresponding Author:-Ahmed R. Aly Taha.

Address:-Plant Protection Research Institute, A.R.C., Dokki, Giza, Egypt.

Spiders which were released in greenhouse:-

300 individuals from spiders were used in the release, they followed 3 families (Salticidae, Theridiidae and Thomisidae) collected from cotton crop fields, thus were defined by external morphological forms. Then saved in incubator in station of research in Qaha, prelude to release them on the pest *Spodoptera littoralis*.

Calculation of the reduction percentages:-

The reduction percentages were calculated by equation of Henderson and Tilton (1955).

Results:-

At beginning; the pre-count refers to the mean of the population density /20 leaves before the release. While level (5) refers to level of the release of spiders at rate 5 spiders for 1 bit. Meanwhile level (10) refers to level of the release of spiders at rate 10 spiders for 1 bit. And the (P.D.) means average of the population density /20 leaves of the pest.

As showed in table (1) and Fig (1); the pre-count of the population density (P.D.) of the cotton leaf worm larvae was 7.25 individuals /leaf for level (5) and 7.3 for level (10), while recorded 8.7 in the control piece

The infection symptoms permeated all pieces of the experiments where some leaves were damaged also there were some leaves were destroyed.

The first check-up after spiders release, was on 25/7; where the (P.D.) of the pest were decreased [at level (5) became 2.6, while at level (10) became 1.4 and it recorded 9.15 in the control]; therefore the reduction percentage recorded 66.7% and 83.5% for level (5) and level (10) respectively.

In the same context; the population densities of the pest, on 29/7 were (1.55, 0.25 and 5.96) for [level (5), level (10) and control] respectively; meanwhile the effect of spiders was high; where the reduction percentages recorded 69.46% in level (5) and reached 95.1% in level (10).

On 5/8 the (P.D.) numbers of the pest recorded 0.5 at level (5), while exactly disappeared at level (10) where recorded 0, meanwhile was 2.3 in the control, in the same way the reduction percentages reached an unprecedented level, where recorded 84.16% for level (5) and reached 100.00% at level (10).

In the fourth check-up after release; on 12/8, the (P.D.) were (3.5, 1.5 and 6.4) for levels (5, 10 and control); therefore the reduction percentages were [35.88% at level (5) and 72.71% at level (10)].

Finally in the last check-up on 19/8, the population densities of the pest were [1.25 at level (5), 0.7 at level (10) and 2.9 at the control], while the reduction percentages recorded [49.47% at level (5) and 71.89% at level (10)].

Table (1):- Population densities and reduction percentages of movable larvae of *S.littoralis* on cotton before and after spiders release under greenhouse condition during season 2017.

| The release level | Pre-count 22/7 | Population density and reduction of movable larvae of <i>S.littoralis</i> | | | | | | | | | |
|-------------------|-------------------|---|-------|------|--------|------|---------|------|--------|------|--------|
| | | 25/7 | | 29/7 | | 5/8 | | 12/8 | | 19/8 | |
| | P.D. | P.D. | R.% | P.D. | R.% | P.D. | R.% | P.D. | R.% | P.D. | R.% |
| Level (5) | 7.25 | 2.6 | 66.7% | 1.55 | 69.46% | 0.5 | 84.16% | 3.5 | 35.88% | 1.25 | 49.47% |
| Level (10) | 7.3 | 1.4 | 83.5% | 0.25 | 95.1% | 0.00 | 100.00% | 1.5 | 72.71% | 0.7 | 71.89% |
| Control | 8.5 | 9.15 | - | 5.96 | - | 2.3 | - | 6.4 | - | 2.9 | - |

Level (5) = level of release of spiders at rate 5 spider / (1) bit.

Level (10) = level of release of spiders at rate 10 spider / (1) bit.

P.D. = Average of population density /20 leaves.

R. % = Reduction percentage.

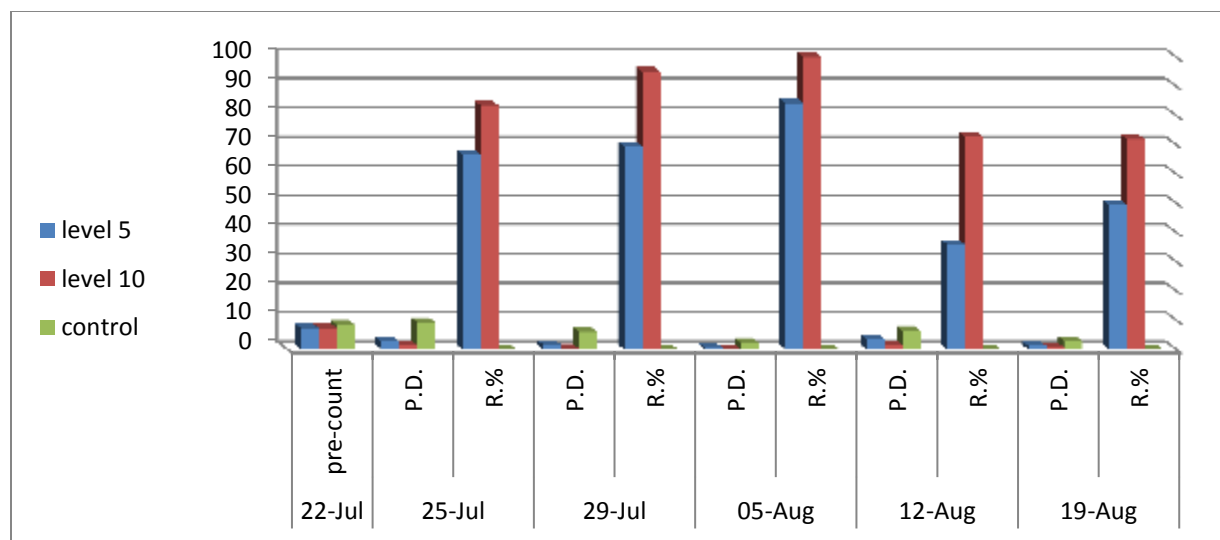


Fig.(1):- Population densities and reduction percentages of movable larvae of *S.littoralis* on cotton before and after spiders release under greenhouse condition during season 2017.

Dissection:-

It's for sure that the spiders strike the larvae, as shown in this study in table (1), where they seemed as they tracked the larvae until they almost finished in the third week. But it was not certainly that spiders were the only cause of the disappearance of larvae, where the infection appeared again in the fourth week and the adult of *S.littoralis* were seen on the walls of greenhouse.

The disappearance of larvae may be associated with the duration of the life cycle of the pest, which can be completed in about 25 days, and lasted the pupa stage in the soil (Espinosa, A. and A.C. Hodges, 2012). Additions that experiment were conducted during (22/7- 19/8).

When the larvae began to appear and population density became high again, the larvae - which were eaten - existed on the leaves (i.e., the spiders Suck the larvae and left them dead on the leaves). Then the larvae disappeared again.

Based on that; the fields which have no spiders were attacked by pests, contrary to the fields which spiders had been removed, they had higher pests more than those in which spiders remained (Riechert, S.E. and K. Lawrence., 1997)

Meanwhile it cannot be said that spiders alone were unique in restoring ecological balance. There are about 169 vital enemies that we can preserve. Jianjun, X. et al. (1999).

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