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ORIGINAL ARTICLE

Biological Control with Natural Enemies, Parasitoids; *Ceranisus menes and Thripobius semiluteus* against Chilli Thrips, *Scirtothrips dorsalis* Under Net House Conditions During the Year 2014-2015

Manika Gupta
Department of Zoology, D.S. College, Aligarh
Email: manika.gupta1992@gmail.com

ABSTRACT

Experiment was conducted (2014-2015) on chili crop production to evaluate the biological potential of thrips parasitoids, Thripobius semiluteus and Ceranisus menes against Chilli thrips, Scirtothrips dorsalis. Biological control with both parasitoids was significantly effective against chilli thrips. Result revealed stastically that the percentage gain in Scirtothrips dorsalis reduction is affected by the release of both the parasitoids; Thripobius semiluteus and Ceranisus menes during two successive releases.

Key words: *Ceranisus menes, Thripobius semiluteus, Scirtothrips dorsalis, Biological control, T- test.*

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INTRODUCTION

Generally, pests are organisms that compete with humans for food sources and space. A major constraint in successful chilli production is damage caused by insect pest's right from emergence to harvest (*Stern, et al. 1959*). Among these chilli thrips, *Scirtothrips dorsalis* is notorious and most destructive pest. Chilli thrips damage the chilli crop by sucking the cell sap, there by arresting the growth of crop. Chilli thrips, *S. dorsalis* does not feed on mature host tissues; it feeds on young fruit calyx and leaves. Thrips feeding on delicate plant organs can create silvery scarring on leaves. This early damage to plant growth can lead to malformation of the fruits. It is the result of feeding injury caused by *S. dorsalis* on the host plant that the photosynthetic activity is also affected. The growing importance of chilli thrips compels the academic world to carry more and more researches in this field so that the major problems posed by thrips may be countered and effective solutions may be traced. Biological control with natural enemies is recommended to combat thrips infestation (Sivinski 2013), which cause deleterious effects on the ecosystem. The present investigation is now gaining prominence among agricultural scientists and was undertaken to suggest the safer and compatible alternative method for pest control utilizing natural enemies (Tachikawa 1986). Biological control of pest is a safe alternative. This method may replace pesticides and can bring good results both ways- at economic threshold and on environmental issues.

MATERIAL AND METHODS

Experiment was conducted in the net house for one year at the experimental site of Department of Zoology, D.S. (P.G.) College, Aligarh, during favourable season of chilli crop,

2014-2015. Three replication of each treatment was undertaken (Table). The healthy chilli seeds were by hand dibbling uniformly at systematic linear fashion. Some plants of chilli are transplanted on first week of January 2014 and first week of July in all micro-plots of the net house respectively. Each plant was separated from the other at the distance of about 40-50 centimetres. The distance was maintained from row-to-row and plant-to-plant. The biological treatment was done with the selected natural enemies.

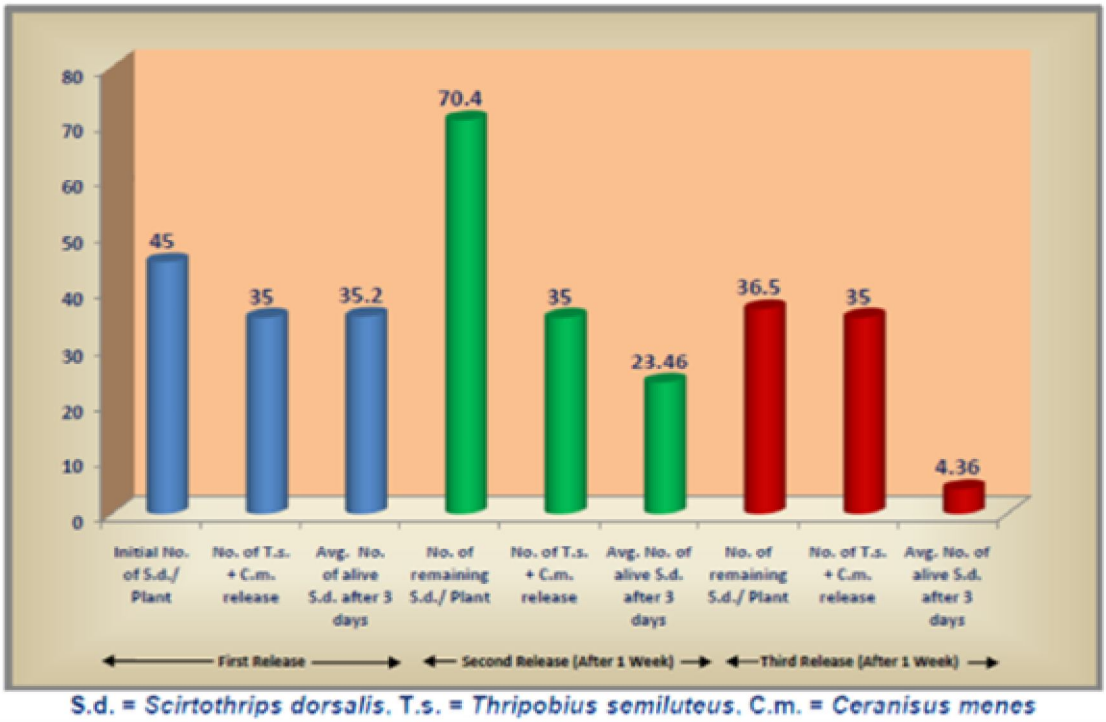
Table 1: Effect of Parasitoids; *Thripobius semiluteus* and *Ceranisus menes* on the population of Scirtothrips dorsalis in Chilli Field Net house during the year 2014-2015

Experimental Microplot	First Release				Second Release (After 1 Week)				Third Release (After 1 Week)			
	Initial No. of S.d.*/ Plant	No. of T.s. + C.m. release**	Avg. No. of alive S.d. after 3 days	% reduction	No. of remai-ning S.d.*/ Plant	No. of T.s. + C.m. release**	Avg. No. of alive S.d. after 3 days	% reduction	No. of remai-ning S.d.*/ Plant	No. of T.s. + C.m. release**	Avg. No. of alive S.d. after 3 days	% reduction
I	45	15+20	35.20	21.7	70.4	15+20	23.46	66.6	36.5	15+20	4.36	88.05
II	45	20+25	30.10	33.11	63.5	20+25	10.30	83.7	--	--	--	--
III	45	25+30	25.30	43.7	57.6	25+30	7.10	87.6	--	--	--	--

* Mean Value, ** All the number of parasitoids were releases in each micro-plot

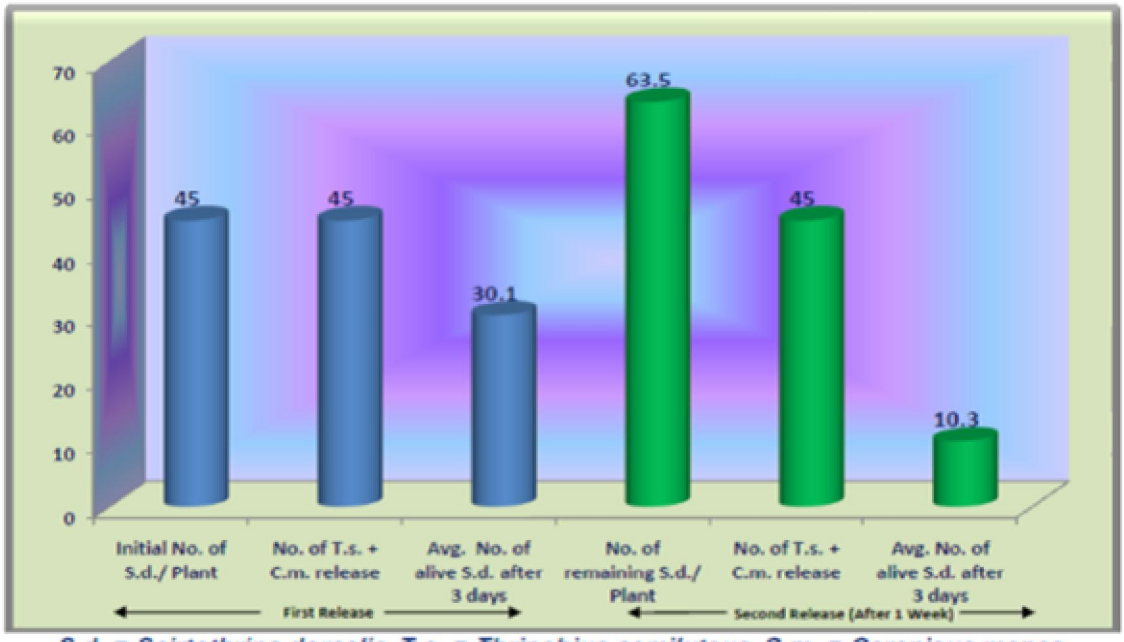
S.d. = *Scirtothrips dorsalis*, T.s. = *Thripobius semiluteus*, C.m. = *Ceranisus menes*

Graph 1: Effect of Parasitoids; *Thripobius semiluteus* and *Ceranisus menes* on the population of Scirtothrips dorsalis in Chilli Field net house during the year 2014-2015 (First Microplot)



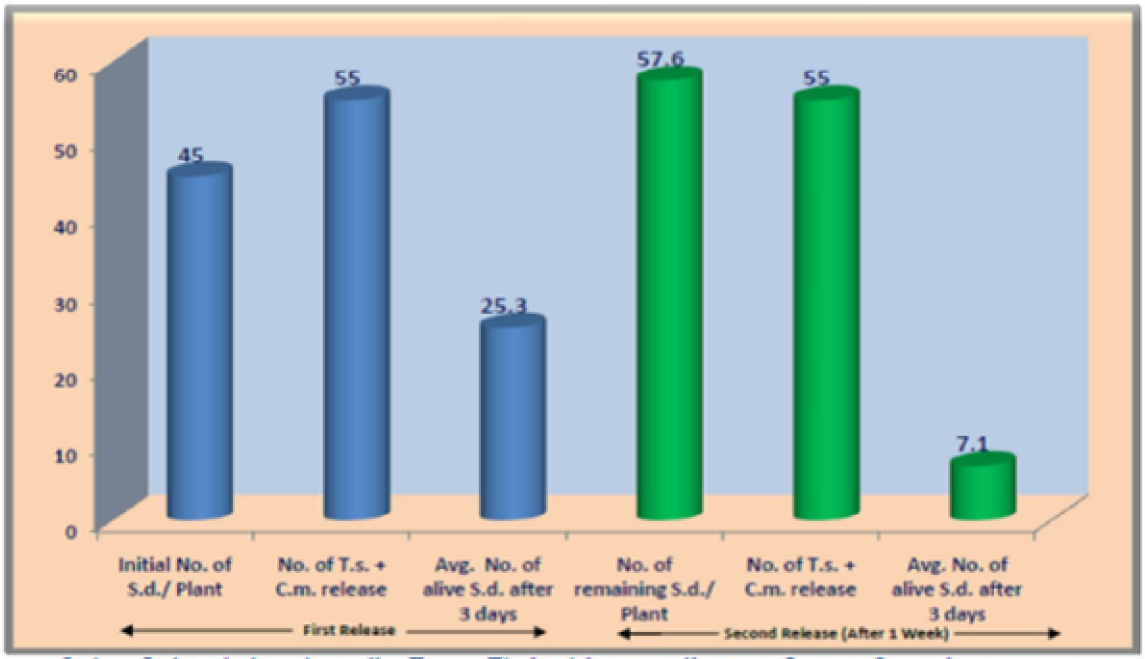
S.d. = *Scirtothrips dorsalis*. T.s. = *Thripobius semiluteus*. C.m. = *Ceranisus menes*

Graph 2: Effect of Parasitoids; *Thripobius semiluteus* and *ceranisus menes* on the population of Scirtothrips dorsalis in Chilli Field net house during the year 2014-2015 (Second Microplot)



S.d. = *Scirtothrips dorsalis*, T.s. = *Thripobius semiluteus*, C.m. = *Ceranisus menes*

Graph 3: Effect of Parasitoids; *Thripobius semiluteus* and *Ceranisus menes* on the population of Scirtothrips dorsalis in Chilli Field net house during the year 2014-2015 (Third Microplot)



S.d. = *Scirtothrips dorsalis*, T.s. = *Thripobius semiluteus*, C.m. = *Ceranisus menes*

The observations on the incidence of chilli thrips at 3 days (first release of first, second and third microplots) and a week after, at 3 days (second release of first, second and third microplots) and the two weeks after from the first release, at 3days (third release of the first, second and third microplots) intervals was recorded on randomly selected five plants In this manner, we calculated the mortality in the experimental units. Each

experiment was performed till the population of thrips reached at Economic Threshold Level (ETL). The data obtained were transformed pooled and subjected to statistical analysis.

STATISTICAL ANALYSIS

Sample 1:

Gain in percentage reduction of alive number of *Scirtothrips dorsalis* during first release and second release.

x_i = 44.9, 50.59, 43.9

Sample 2:

Gain in percentage reduction of alive number of *Scirtothrips dorsalis* during second release and third release.

y_i = 21.4

$\bar{X}$**(Mean of 1st Sample)** = 46.46

$\bar{Y}$**(Mean of 2nd Sample)** = 21.45

The Sum of Square Deviation

$\sum (x_i - \bar{X})^2$ = 26.04

$\sum (y_i - \bar{Y})^2$ = 0.0

S = Standard Deviation

S = 2.61

d.f = 2

Null Hypothesis (H_0):

Assume that difference between gain in percentage reduction of alive *Scirtothrips dorsalis* during two successive releases is not significantly different.

$|t|$ = 6.007

RESULT AND DISCUSSION

The pooled data on the incidence of thrips revealed much incidence on 3 days after the first release (third microplot), after the second release (third microplot) and after the third release (first microplot) day after emergence. In the experimental net house both types of parasitoids; *Thripobius semiluteus* and *Ceranisus menes* were released simultaneously. The initial number of *Scirtothrips dorsalis* in the first microplot was 45. The parasitoids i.e. 15+20 for T.s. & C.m. were released. After three days the average number of alive *Scirtothrips dorsalis* was recorded at 35.20 per plant. So, the reduction in the thrips population was at 21.7%. One week after, the second release of the parasitoids was made in the same number, as, it was done at the time of first release (15+20). At that time the remaining number of *Scirtothrips dorsalis* was recorded 70.4. Proper examination was made after three days interval, and, it was found that the average number of alive *Scirtothrips dorsalis* was 23.46 and thus, the rate of reduction in thrips population was recorded at 66.6%. In this manner, at the time of third release of the parasitoids in equal number (15+20), the number of remaining *Scirtothrips dorsalis* was recorded 36.5. Three days after the average number of alive *Scirtothrips dorsalis* was found 4.36 and the reduction rate in thrips population was calculated at 88.05%.

In the second microplot of this experiment, the initial number of *Scirtothrips dorsalis* was the same as in the first, microplot i.e. 45. But increasing number of parasitoids (20+25) for T.s. and C.m. was released, in order to see the impact of biological controlled parameters over thrips population. Three days after the average number of alive *Scirtothrips dorsalis* was reduced to 30.10 and in this manner, the reduction rate was 33.11%. A week after, another group of the same parasitoids with equal numbers (20+25) was released. At that time the remaining number of *Scirtothrips dorsalis* in the experimental microplot was 63.5. Three days after, the data was claculated and found the average number of alive *Scirtothrips dorsalis* was 10.30. The reduction rate in thrips

population was calculated at 83.7%. Since, the significant level of percentage reduction in the population of thrips, *Scirtothrips dorsalis* was obtained in the second release of the second microplot. So, the third release of the parasitoids was not needed.

In the third experimental microplot, the initial number of *Scirtothrips dorsalis* was the same as previous experiments. i.e. 45. But, the number of selected parasitoids was increased. It was made (25+30). On examination after three days, it was found that the number of the alive *Scirtothrips dorsalis* was 25.30 and thus, the percentage reduction was recordd at 43.7%. At the time of the second release of the same group of parasitoids in the same number; (25+30), at that time, the remaining number of *Scirtothrips dorsalis* was 57.6. Three days after on the basis of observation, it was recorded that the average number of alive *Scirtothrips dorsalis* was 7.10. In this manner, the reduced percentage in thrips population was recorded at 87.6%. Since, at the time of third release the level of significant in thrips population was obtained in the second release. Therefore, at this time the third release of the parasitoids was not necessitated. Thus, it appeared to be the most effective.

CONCLUSION

But tabulated $| t |_{0.05}$ for Degree of Freedom 2 is 4.30 which is smaller than the calculated value 6.007. Hence, Null Hypothesis (H_0) is accepted at 5% level of significance. The gain in % reduction of the two samples is not significantly different and it is accepted at 5% level. Thus, we conclude statistically that the percentage gain in *Scirtothrips dorsalis* reduction is affected by the release of both the parasitoids; *Thripobius semiluteus* and *Ceranisus menes* during two successive releases.

REFERENCES

1. Sivinski John (2013): Augmentative Biological Control: Research and Methods to help make it work. *CAB International*, 8: 1-11.
2. Stern V.M., Smith R.F., Bosch R., Van Den and Hogen K.S. (1959): The Integrated Control Concept, Hilgardia, 29: 81-101.
3. Tachikawa T. (1986): A note on *Ceranisus brui* (Vuillet) in Japan (Hymenoptera: Chalcidoidea, Eulophidae). Trans. Shikoku Entomol. Soc., 17(4): 267-269.