Int. J. Indust. Entomol. Vol. 17, No. 2, 2008, pp. 201~203

[Note]

International Journal of
Industrial Entomology

Simple Self Trap Cropping System to Control Tukra Mealy Bug (*Maconellicoccus hirsutus* Green) Incidence on Mulberry (*Morus* spp.).

K. Lavanya Latha, T. V. S. S. Rao[1], J. V. Krishna Rao[1], S. Jayaraj[2], N. Sivarami Reddy* and S. Sankar Naik

Dept. of Sericulture, Sri Krishnadevaraya University, Anantapur 515 003, India.
[1]Regional Sericultural Research Station, P. B. No. 50, Anantapur - 515 001, India.
[2]S. Jayaraj Research Foundation, Chennai, India.

(Received 06 July 2008; Accepted 10 December 2008)

A field study on self trap cropping system in controlling tukra mealy bug *Maconellicoccus hirsutus* Green) incidence on mulberry (*Morus* spp.; V-1 variety; 3' x 3' spacing) gardens was undertaken in selected sericulture farmers' mulberry gardens of Pydeti village (Parigi Mandal, Anantapur District, Andhra Pradesh, India). The study was conducted for three years (2004, 2005 and 2006). Four treatments (T0; control/no treatment, T1; self trap cropping rows with 10 row interval, T2; self trap cropping rows with 10 row interval and treating these rows only with 0.5% neem oil emulsion and T3; self trap cropping rows with 10 rows intervals and treating all the mulberry rows including self trap cropping rows with 0.5% neem oil emulsion) were considered. The results indicated that the incidence increased in T0 and T1 while the same suppressed in T2 and T3. The suppression (%) of tukra incidence between T2 and T3 was not significant. Hence, T2 only was recommended to farmers as its economical viable practice. The results are discussed based on the importance of tukra, its suppression and cost of treatment.

Key words: Self trap cropping system, Mealy bug, Mulberry, Tukra

Introduction

Sericulture is one of the major cropping systems in Hindupur (Anantapur District, Andhra Pradesh, India) area. Among various factors responsible for low productivity in mulberry and thereby silkworm cocoon crop, pest attack is very important one that needs much attention (Govindaiah, 2005). Protection of mulberry at a right time from the pest attack gives best result than controlling them (Benchamin *et al*., 1997). Mealy bug (*Maconellicoccus hirsutus* Green) is the most important pest that affects mulberry beyond economic threshold level. Various pest management methods, including use of chemical pesticide (Nuvan or DDVP) spray, is advocated to control mulberry tukra and thereby leaf yield loss (Govindaiah *et al*., 2005). It is well established that Nuvan is not only expensive but also affect the environment adversely. Nuvan, the organophosphorus pesticide is highly immobile in soils. Repeated usage of Nuvan will built up the toxic levels (Singaram, 2007). To avoid use of such dangerous pesticides, a simple self trap cropping system, after thorough discussion with the project farmers under farmers' participatory research, was developed and tested in mulberry gardens of Pydeti village (Parigi Mandal, Anantapur District of Andhra Pradesh). The encouraging results are reported in the present communication.

Materials and Methods

In the study of self trap cropping for controlling mealy bug, certain simple and naturally occurring factors were considered. Using the host plant (mulberry) itself for trapping the pest (mealy bug) seems to be a novel idea in the present study. Keeping a row of mulberry as border row, with certain height over the other plants avoids the wind flow that carries pests. In addition, allowing one mulberry row, after certain mulberry rows, helps in achieving the purpose of boarder rows effectively. For arranging such self trap cropping system in mulberry, the border rows and those rows after every 10 normal rows were pruned at

*To whom the correspondence addressed
Research Extension Centre, CSB, Haresamudram Post, Madakasira 515 301, India. E-mail: sivaramireddyneeli@yahoo.com

60 cm height on the 60th day of earlier pruning. The remaining rows were pruned at 20 cm height on 70th day of earlier pruning. To exploit the distinct behavioral character of sapsuckers, the rows pruned early at more height were allowed to grow fast with more succulent leaves, through providing more amounts of nitrogen and irrigation (frequency). Organizing such self trap cropping rows was aimed at attracting mealy bug crawlers and further settling themselves on the plants in these (self trap cropping) rows.

The study was conducted with 4 farmers, with 1 acre of mulberry plantation (*Morus* spp., V-1 variety, 3' x 3' spacing) for 3 years (2004, 2005 and 2006). Each farmer's mulberry garden (1 acre) was divided in to 4 equal parts (25 cents each). Four treatments *viz.,* T0; control (farmers practice with no self trap cropping system), T1; self trap cropping system at 10 row interval + 25% additional N application + irrigation once in 6 days, T2; self trap cropping system at 10 row interval + 25% additional N application + irrigation once in 6 days + 0.5% neem oil spray for self trap cropping row plants only (@ 20 litres of emulsion/acre) and T3; self trap cropping system at 10 rows intervals + 25% additional N application + irrigation once in 6 days for self trap cropping rows only + 0.5% neem oil spray (@ 200 litres of emulsion/acre) for all the plants, including self trap cropping row plants. Neem oil emulsion was sprayed for 2 times in each mulberry crop period, on 10th and 20th day of pruning. Data on tukra incidence (%) was recorded in two seasons (June/July and September/October) of 3 study years (2004, 2005 and 2006), as per Sharma and Gupta (2005). In each season, the data was collected 2 times from each crop, *i.e.,* on 10th (first count, just before the 1st spray of neem oil emulsion) and 30th day (2nd count, after 10 days of 2nd spray of neem oil emulsion) of pruning. The pooled data was analyzed statistically (ANOVA).

Results and Discussion

The data on the average mealy bug incidence (%) is depicted in Fig. 1. Pre-treatment tukra incidence (%) was identical in all treatments, ranging from 8% for T3 to 8.6% for T0. The differences in pre-treatment tukra incidence between treatments (T0 to T3) are non significant (Fig. 1). It is reminded that the operations between all the treatments (T0 to T3) are only pruning and irrigation schedule (for self trap cropping system rows in T1, T2 and T3) till the time of first count. Therefore, the identical expression of tukra incidence, in all these treatments (T0 to T3) could be well justified. The average incidence (%) of post-treatment, however, indicated interesting trends.

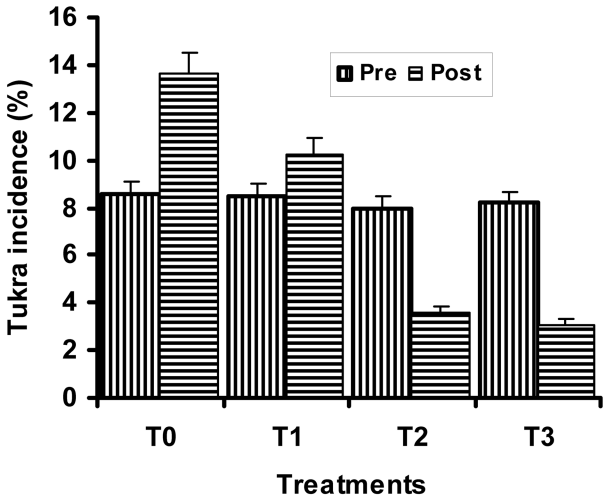

Fig. 1. Average incidence (%) of mealy bug (tukra) in pre (10th day of pruning) and post (30th day of pruning) treatment under four treatments; T0, T1, T2 and T3. Note increase in post treatment tukra incidence in T0 and T1 and decrease in T2 and T3 over pre treatment incidence.

Thus, the tukra incidence increased to 13.6% on 30th day from 8.6% on 10th day in T0, the increase being significant (1%). No treatment was imposed in T0 and therefore increase in the mealy bug incidence was as expected. In T1 also, the incidence increased from 8.5% to 10.2% (Fig. 1), the increase is significant at 5% level. T1 is different from control (T0) in pruning, irrigation and nitrogen schedule. Additional amount of nitrogen application and increased frequency of irrigation was emphasized for vigorous growth with more succulent leaves in the self trap cropping system. Therefore, the crawlers might have been trapped/attracted towards the self trap cropping system in

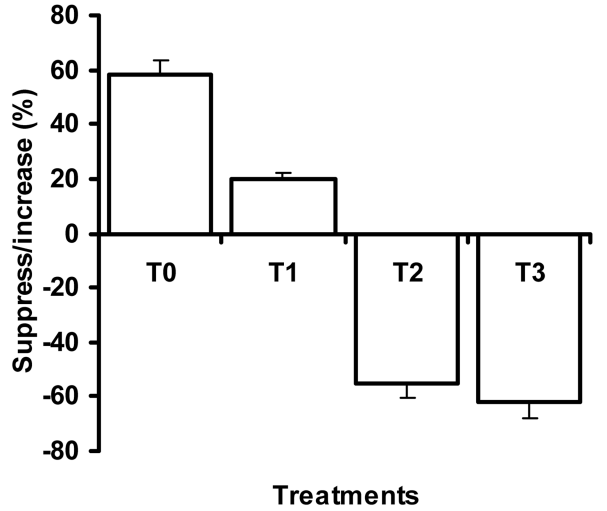

Fig. 2. Suppression/increase (%) in tukra incidence between pre and post treatment under four treatments; T0, T1, T2 and T3. Note increase in T0 and T1 and suppression in T2 and T3.

T1, resulting in less increase in tukra incidence compared to T0. The post-treatment data on tukra incidence with T2 and T3 treatments exhibited a complete reverse trend (Fig. 1). Thus, the post-treatment tukra incidence, in T2, reduced to 3.6% (30th day) from 8% (10th day). Similarly, the incidence reduced from 8.2% to 3.1% in T3. The differences in post-treatment incidence (%) in case of T2 and T3, however, are not significant. The trend must be due to imposing of 0.5% neem oil emulsion spray on self trap cropping system only in T2 and all rows in T3.

When the data of tukra incidence is converted into percentage of suppression/increase (%) over the pre treatment incidence, the trend appeared very distinct. Thus, there is increase in post treatment tukra incidence from pre treatment incidence in T0 and T1 while it decreased (suppression) in T2 and T3. The data on this aspect is depicted in Fig. 2. When the increase (%) alone is considered, the increase in tukra incidence in T0 and T1 are significant. The suppression (%) in T2 and T3 are significant (1%) compared to T0. However, the suppression (%) between T2 and T3 are not significant (Fig. 2). It is emphasized that the self trap cropping rows in T1 are provided with 25% more N and irrigation with which, the plants grow early, vigorously with more succulent leaves, resulting in trapping more number of crawlers by mulberry self trap cropping system. Thus, the less increase in tukra incidence in T1 compared to T0 is justified. However, the tukra incidences both in pre and post treatment seems to be on the higher side. Therefore, T1 can not be taken in to the farmers' consideration in effective control of tukra in mulberry.

In the other two treatments, T2 and T3, the post treatment tukra incidence suppressed over that of pre treatment (Fig. 2). It is reminded that 0.5% neem oil emulsion was sprayed in two doses (10th and 20th day of pruning) in T2 (only for self trap cropping system rows) and T3 (all rows, including self trap cropping system rows). Notably, the suppression (%) between T2 and T3 is not significant. The results on suppression of tukra between T2 and T3 offer farmers need not go for T3 with more expenditure on neem oil emulsion (@ 200 litres/acre) and labour/time for spray. It further offers that following treatment T2 (with less expenditure on neem oil emulsion (@ 20 litres/acre) and labour/time) could be more economical. Therefore, a simple self trap cropping system, consisting of treatments in T2 are suggested.

References

Benchamin, K. V., P. Venkataramana, S. Thimma Naik, and Y. N. Sanath Kumar (1997) Pest and disease occurrence in mulberry and silkworm: A survey. *Indian silk* **36**, 27-32.

Govindaiah (2005) Importance of plant protection in mulberry cultivation; in *A Text Book on Mulberry Crop protection.* Sampath, J. (ed.), pp 1-4, Central Silk Board, Bangalore, India.

Govindaiah, V. P. Gupta, D. D. Sharma, S. Rajadurai and V. Nishita Naik (2005) A Text Book on Mulberry Crop protection. Sampath, J. (ed.), Central Silk Board, Bangalore, India.

Sharma, D. D. and V. P. Gupta (2005) Methods and calculation for disease scoring in mulberry, in *A Text Book on Mulberry Crop Protection.* Sampath, J. (ed.), pp 23-36, Central Silk Board, Bangalore, India.

Singaram, P. (2007) Soil and Environmental Health: Challenges a head, *J. Indian Soc. Soil Sci.,* **55**, 404-410.