

Study on the overwintering stage(s) of Panonychus ulmi (Red Spider Mite) of mulberry in Kashmir

Omesa Hamid^{1,2}, Dr. Ranju Gupta¹ and Dr. Vishal Mittal²

¹(Dept. of Life Science, Dr. C.V. Raman University, C.G., India-495001)

²(Entomology & Pathology Section, CSR&TI, Pampore, J&K, India-192121)

Abstract: A preliminary study has been undertaken at CSR&TI Pampore from February-April, 2015 to observe the diversity of *Panonychus ulmi* overwintering stage(s) on different maintained varieties of mulberry (Goshoerami, KNG, Tr-10, Ichinose and Chinese White). *Panonychus ulmi* enters into diapause in the wintering months to overcome the unfavorable conditions. The mite egg infestation was observed in all the varieties. Investigation revealed highest egg population among the Bush type varieties followed by Dwarf and least in the Tree type varieties. Goshoerami recorded highest egg population followed by KNG, Ichinose, Tr-10 and least in Chinese White. The egg population with respect to branch position also varies.

Keywords: Mulberry plant, Overwintering stages, egg density, *Panonychus ulmi*, Bush type.

I. Introduction

Mulberry, *Morus* spp. (Urticales:Moraceae) is the only plant which provides the major kind of silk (Mulberry silk), 81.59% of total raw silk production of the world, as it is the sole food plant of silkworm, *Bombyx mori* (Lepidoptera:Bombycidae). The agro climatic conditions of J&K state are most ideal for the development of sericulture and for producing high grade raw silk of international standards, the soil being very fertile for mulberry plants. Mulberry is exposed to the ravages of different pests and diseases due to its luxuriant foliage. A number of pests and diseases have been reported on mulberry (Sharma & Sharma, 1989; Teotia & Sen, 1994). Mites (non insect pests) belonging to families Tetranychidae & Eriophyidae have reported to cause mulberry leaf damage upto 5-10% in India (Narayanaswamy et al., 1996). A recent study in Kashmir valley on mulberry mites revealed a threat from two phytophagous mite species viz., *Tetranychus* and *Panonychus* and two predacious mite species, *Agistemus* and *Euseius*, which are impairing the quality of mulberry leaves and adversely affecting the silkworm fed with these mite infested leaves (Dar et al., 2011a and 2011b; Ramegowda et al., 2012). Generally in Kashmir valley the information on mulberry mites is meager. In this background, a preliminary study has been undertaken at CSR&TI Pampore, Kashmir, 2015 to provide basic information of the overwintering stage(s) of *Panonychus ulmi* (Red Spider Mite) of mulberry and their diversity on the economically important mulberry varieties.

II. Materials And Methods

2.1.Site of study. The study was conducted at Central Sericultural Research & Training Institute located at Gallandar, Pampore at an altitude of 1574m above msl. A legal permit was requested to carry out the study in the institute.

2.2.Mulberry variety. Commercially important mulberry varieties Goshoerami, KNG, Tr-10, Ichinose and Chinese White of Tree, Dwarf and Bush type have been taken for the proposed study.

2.3.Observation on the overwintering stage(s) of Panonychus ulmi. Sampling was done randomly by selecting five plants from each mulberry variety of each plant type. Among the five plants one plant was selected from each corner and one from the center of Randomized Complete Block Design (RCBD) as described by Kant and Bhat (2010). Five branches of each plant were selected randomly and cut using Secateurs and each branch was cut after measuring with scale for observing the mite egg density of the Top, Middle and Bottom portions of each branch. Observation was done under the Transmitted Light Stereo-Zoom Microscope.

III. Results

3.1.Prevalence of Panonychus ulmi overwintering stage(s) on mulberry varieties. Present investigation revealed that *Panonychus ulmi* has entered the diapause to overcome the drastic winters. All the commercial mulberry varieties are infested by mite eggs. Eggs have been laid on the surface of buds, crevices and lenticels in groups or singly.

Among the five selected varieties highest mite egg population was recorded in Goshoerami with 91.3 mean no. of eggs per branch followed by KNG and Tr-10 with 55.9 and 46.6 mean no. of eggs per branch

respectively, in the bush type. The least egg count was found in Ichinose and C.W. with 45.9 and 30.9 mean no. of eggs per branch in bush type. Among the dwarf varieties Goshorami recorded highest with 46.6 and Tr-10 lowest with 26.1 average eggs per branch. In the tree type also Goshorami recorded highest with 31.8 and Tr-10 lowest with 13.2 average eggs per branch (Fig 1). By calculating the overall mite egg population in all the bush, dwarf and tree types, Goshorami recorded highest followed by KNG, Ichinose and Tr-10. Chinese white recorded the lowest mite egg population during the winter period of temperate region of Kashmir.

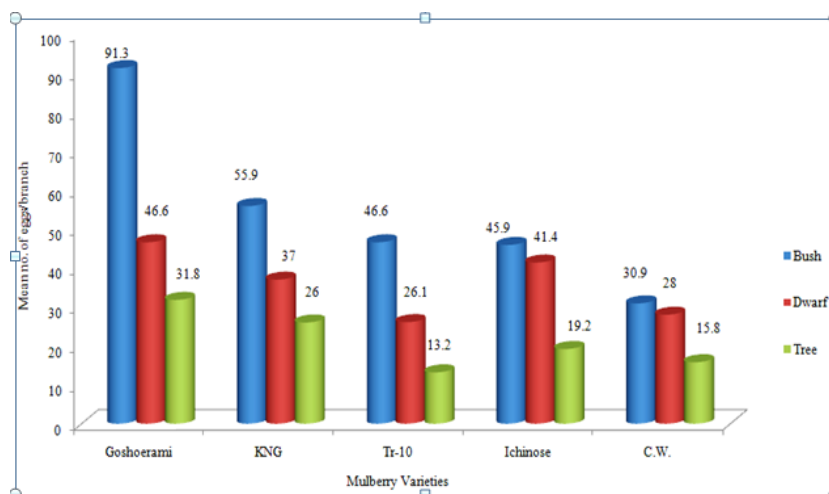


Figure 1. Overwintering egg population of *Panonychus ulmi* on different mulberry varieties at CSR&TI Pampore, 2015.

3.2. Population dynamics of *Panonychus ulmi* eggs at different branch positions on mulberry plants. Mite egg population with respect to branch position varies among different varieties and types of mulberry.

3.2.1. Bush type. Goshorami and Tr-10 recorded the highest mite egg population at top position followed by middle and bottom. KNG recorded highest at middle followed by top and then bottom. Ichinose and Chinese White follow the trend of highest at bottom, then middle and then top (Fig 2), the varieties being defrosted on top.

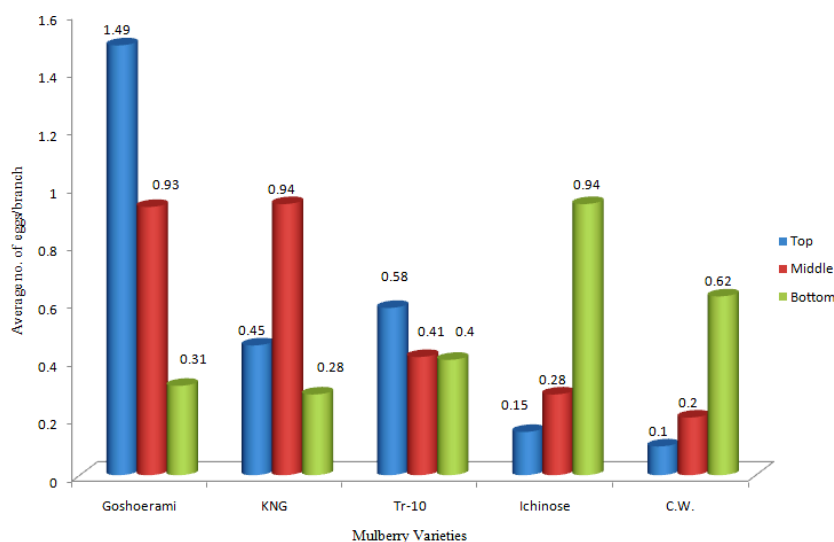


Figure 2: Egg population of *Panonychus ulmi* with respect to branch position of Bush type varieties of mulberry at CSR&TI Pampore, 2015.

3.2.2. Dwarf type. Goshorami and Tr-10 follow the same trend of highest at top, then middle and then bottom as in the bush type. Ichinose and Chinese White also follow the same trend as in the bush type. KNG recorded highest at middle, then bottom and least at the top position (Fig 3).

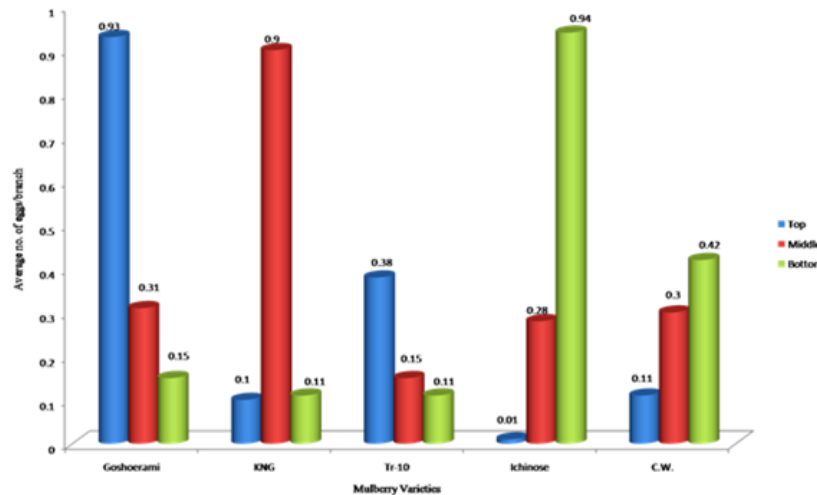


Figure 3. Egg population of *Panonychus ulmi* with respect to branch position of Dwarf type varieties of mulberry at CSR&TI Pampore, 2015.

3.2.3 Tree type. Goshoerami recorded highest egg population at top position followed by middle and then bottom. KING and Ichinose show the trend of highest at middle and least at top. Tr-10 shows highest at bottom and least at middle position. Chinese White shows highest at bottom and least at top position (Fig 4).

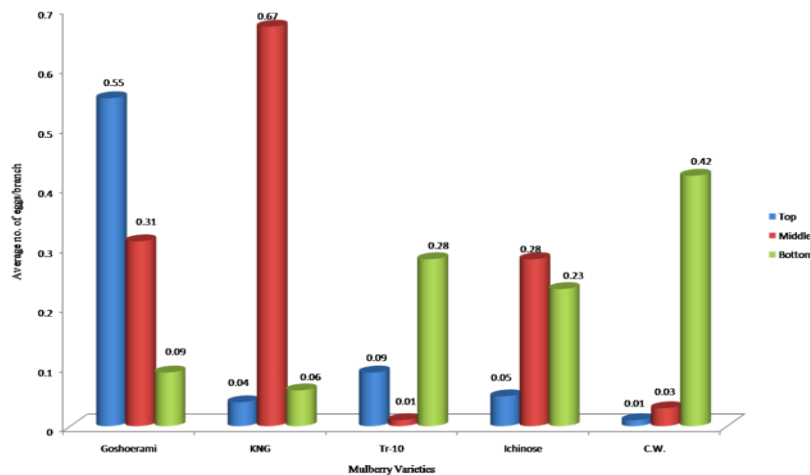


Figure 4: Egg population of *Panonychus ulmi* with respect branch position of Tree type varieties of mulberry at CSR&TI Pampore, 2015.

IV. Conclusion

The present investigation on overwintering stage(s) of *Panonychus ulmi* revealed that *Panonychus ulmi* live on mulberry plants during their dormancy periods as overwintering propagules for the development of adult mite in the temperate region of Kashmir. Eggs are usually laid on or near buds, on or near lenticels and in the crevices of braches. The mite egg infestation on the branches significantly increase the mite infestation on the future crop. The pest management strategies should be followed for the control of *Panonychus ulmi* infestation on mulberry and thus a check is done on the egg laying on mulberry plants. The information generated from the study is preliminary and needs further improvement in the course of future studies. An integrated approach should be followed to control the infestation of mite pests on mulberry plantation for sustainable sericultural development in future.

References

- [1]. Sharma, B. and Sharma, S., Entomological investigations done in India along with a check list of insect pests attacking mulberry plants in the world. In: The University Review (Science), University of Jammu, 1989, 183-193.
- [2]. Teotia, R.S. and Sen, S.K., Mulberry diseases in India and their control, *Sericologia.*, 34(1), 1994, 01-08.
- [3]. Narayanaswamy, K.C., Geethabai, M. and Raghuraman, R., 1996, Mite pests of mulberry-A Review, *Indian Journal of Sericulture*, 35(01), 01-08.

- [4]. Dar, M.Y., Illahi, I., Agarwala, O.P., Mittal, V. and Ramegowda, G.K. 2011 a, Impact of mite infestation on mulberry leaf biochemical composition and silk worm, *Bombyx mori* L., *Indian Journal of Entomology*, 73(4), 2011, 378-381.
- [5]. Dar, M.Y., Illahi, I., Agarwala, O.P., Mittal, V. and Ramegowda, G.K. 2011 b, Preliminary studies on the mulberry mite diversity and dynamics in Kashmir, India, *Indian Journal of Entomology*, 74(1), 2011, 01-08.
- [6]. Ramegowda, G.K., Dar, M.Y., Mittal, V., Ahmad, S.N., Guruswamy, D., Illahi, I., Agarwala, O.P. and Dhar, A., 2012, Preliminary studies on the effect of mite damaged mulberry leaves on performance of silk worm, *Bombyx mori* L., *Munis Entomology and Zoology*, 7(2), 2012, 01-05.
- [7]. Kant, R. and Bhat, M.M. 2010, Mulberry foliar, fungal diseases and insect pest calendar in Uttarakhand, *Indian silk*, 48(10), 10-13