SATSA Mukhapatra - Annual Technical Issue **30** : 2026 ISSN 0971-975X

Tetranychus Macfarlanei Baker and Pritchard (Tetranychidae) a New Pest of Sarpagandha Plant, *Rauvolfia Serpentina* L. (Fam: Apocynaceae) in West Bengal and Its Control with Green Pesticides

Kinkar Saha[1] and S.K. Gupta[2]*

(Received : December 17, 2025; Revised : January 07, 2026; Accepted : January 23, 2026)

ABSTRACT

The present paper deals with control of a spider mite, *Tetranychus macfarlanei,* which was found seriously attacking *Rauvolfia serpentine* an important medicinal plant in the Medicinal Plant Garden of Ramkrishna Mission, Narendrapur, West Bengal, India. Among the treatments of herbal pesticides, Nishinda (*Vitex negundo*) leaf extract and chilli paste were found very promising where leaf extracts of Ram Tulsi (*Ocimum gratissimum*) and Neem (*Azadirachta indica*) were relatively poor. This study reports *T. macfarlanei* as a new pest of *R. serpentina* in India and suggests eco-friendly management options using locally available plant-based pesticides.

Keywords : *Tetranychus macfarlanei, Rauvolfia serpentina*, Spider mite, Green pesticides, Nishinda

Introduction

Rauvolfia Serpentina is one of the most important medicinal plants having wide therapeutic values like hypertension, reducing blood pressure, sedative etc. along with an antidote against snake bites. The Ramakrishna Mission, Narendrapur, maintains several plots of this plant, where a severe infestation of a spider mite was observed on the lower surface of the leaves. Infested leaves showed symptoms such as chlorosis, defoliation, stunted growth and reduced plant vitality (Nandini and Srinivasa, 2018). As many as 55–70 mites of different life stages were observed on a single leaf. The occurrence of this mite as a pest on *R. serpentina* had not been reported earlier and no information was available regarding its control. Keeping this in view, a laboratory experiment was conducted using some green pesticides, and the results of the study are presented in this paper.

Material and Methods

The plants which were selected for preparation of leaf extract/pastes were: Nishinda (*Vitex negundo*), Marigold (*Tagetes erecta*), Ram Tulsi (*Ocimum gratissimum*), Neem (*Azadirachta indica*), Chilli paste and all were used at 2.5% concentration.

[1]Entomologist, Alipore Range, O/o Deputy Director of Agriculture, Barasat, West Bengal, India
[2]Medicinal Plant Research Centre, Ramakrishna Mission, Narendrapur, Kolkata-700103.
[*]Corresponding Author E-mail: sahakinkar@gmail.com

Leaf extracts were prepared following the techniques described by Sarmah *et al.* (2007) and Attiah *et al.* (2012). Test mites were obtained from a laboratory culture. The experiment was conducted using the leaf-disc technique, wherein excised leaves were placed on wet cotton pads in Petri dishes (10 cm diameter). For each treatment, three replications were maintained along with a water-sprayed control. Ten mites of the same age were released on each excised leaf. Plant extracts were applied topically on the mites. Chilli paste was prepared by crushing fresh green chilli fruits, mixing with water and spraying was done using a hand sprayer. (Gopal, 2000; Mitra *et al.*, 2015).

Observations on mite mortality were recorded after 24, 48, 72, 96, and 120 hrs using a stereo-binocular microscope. Mean mortality was calculated and percentage mortality was determined using the following formula (MacGregor, 1970):

$$\% \text{ Mortality} = \frac{\text{No. of dead mites}}{\text{Total No. of mites}} \times 100$$

Results and Discussion

The mortality data achieved at different intervals have been presented in Table 1. A perusal to that reveals the following :-

At 24 Hrs. Interval : At 24 hrs interval the mortality percentage can be arranged in the following descending order: Nishinda (34.01%)> Chilli paste (26.91%) > Neem (24.12%) > Marigold (23.91%) >RamTulsi (19.25%). No mortality was recorded in control treatment. Nishinda was significantly superior to all other treatments and no significant difference was noticed between Neem and Marigold. Ram Tulsi was poorest among all.

At 48 Hrs. Interval : At this interval the percentage mortality can be arranged in the following descending order: Chilli paste (39.92%) = Nishinda (39.21%) > Marigold (34.11%) > Neem (28.41%) >Ram Tulsi (22.51%). There was no significant difference between Chilli paste and Nishinda and these two were superior to other treatments. Again Ram Tulsi was poorest among all.

At 72 Hrs. Interval : The efficacy of different treatments may be arranged in the following descending order: Chilli paste (53.29%) = Nishinda (53.24%) > Marigold (44.72%) > Ram Tulsi (41.12%) > Neem (35.10%). No mortality was in control. Chilli paste and Nishinda were at par and were superior to other treatments. Likewise, Marigold and Ram Tulsi were also at par. Neem was poorest among all.

At 96 Hrs. Interval : The efficacy of different treatments may be arranged in the following descending order: Nishinda (71.90%) > Chilli paste (62.35%) > Marigold (61.21%) > Neem (53.22%) > Ram Tulsi (52.56%). Nishinda was superior to all other treatments. While Marigold and Chilli paste were at par. Neem was poorest among all. No mortality was seen in control.

At 120 Hrs. Interval : The efficacy of different treatments may be arranged in descending order as follows: Nishinda (89.50%) > Chilli paste (72.50%) = Marigold (72.12%) > Neem (70.56%) > Ram Tulsi (63.43%). Nishinda was superior to all treatments. While Neem and Chilli paste were at par and Ram Tulsi was poorest among all.

Mean Mortality

The percentage of mean mortality may be arranged in descending order as follows:

Nishinda (57.57%) > Chilli paste (50.99%) > Marigold (47.21%) > Neem (42.28%)> Ram Tulsi (39.77%). Nishinda was superior to all other treatments followed by Neem and Chilli paste while Ram Tulsi was poorest of all.

All plant extracts exhibited acaricidal activity against *T. macfarlanei,* though the level of effectiveness varied among treatments and time intervals. Nishinda leaf extract consistently resulted in the highest mortality at all observation periods, reaching 89.50% at 120 hours. Chilli paste and marigold extract were moderately effective while Neem and Ram Tulsi showed comparatively lower mortality, (Keerti and Padma, 2012; Srinivasa and Gopal, 2001).

The progressive increase in mortality over time indicated the cumulative toxic effect of the botanical treatments. No mortality was observed in the control. The effectiveness of Nishinda may be attributed to the presence of bioactive compounds with known insecticidal and acaricidal properties. The findings are in agreement with earlier reports on the efficacy of plant extracts against tetranychid mites. (Banerjee, *et al.,* 2021; Meena, *et al.,* 2010)

Table 1. Effect of different plant extracts at different time intervals

Treatments	Initial Population	% Mortality at different intervals					
		24 hrs	48 hrs	72 hrs	96 hrs	120 hrs	Mean
Marigold 2.5%	10	23.91	34.11	44.72	61.21	72.12	47.21
Nishinda 2.5%	10	34.01	39.21	53.24	71.90	89.50	57.57
Ram Tulsi2.5%	10	19.25	22.51	41.12	52.56	63.43	39.77
Neem 2.5%	10	24.12	28.41	35.10	53.22	70.56	42.28
Chilli paste 2.5%	10	26.91	39.92	53.29	62.35	72.50	50.99
Control	10	0	0	0	0	0	0
CD at 5%	-	4.66	6.92	5.91	7.11	7.30	6.38

Conclusion

The present study establishes *Tetranychus macfarlanei* as a new pest of Sarpagandha (*Rauvolfia serpentina*) in West Bengal, India. Among the botanical pesticides evaluated, Nishinda leaf extract proved to be the most effective followed by chilli paste and marigold leaf extract. Considering their low cost, easy availability and eco-friendly nature, Nishinda leaf extract and chilli paste may be recommended for the management of this mite pest in medicinal plant cultivation.

Acknowledgement

The first author is grateful to the Secretary Moharaj, Ramkrishna Mission,

Narendrapur, West Bengal, India for funding and providing the necessary facilities to carry out this research. The author also acknowledges the Director of Agriculture and Ex-officio Secretary, Department of Agriculture, Government of West Bengal, for granting permission to conduct the study.

References

Attiah, S., Grissa, K.L., Ghzabi, Z.D., Malleux, A., Logany, G. and Hance, T. 2012. Acaricidal activity of 31 essential oils extracted from plants collected in Tunisia. *Journal of Essential Oil Research* **24**(3): 279-288.

Banerjee, P., Laha, A., Samaddar, I., Biswas, H., Sarkar, D., Roy, S., Saha, G.K. and Podder, S. 2021. Acaricidal activity of nishinda (*Vitex negundo*) leaf and garlic (*Allium sativum*) bulb extract against red spider mite, *Oligonychus coûeae* (Acari: Tetranychidae) in tea plantations of Darjeeling hill, West Bengal, India. *Acta Biological Szegediensis* **65**(1): 59-64.

Gopal, T.S. 2000. Evaluation of certain botanicals against spider mite *Tetranychus urticae* Koch and *Oligonychus indicus* Hirst (Acari: Tetranychidae) and their effects on mite predator, *Amblyseius longispinosus* (Acari: Phytoseiidae). M. Sc. (Agri.) thesis. University of Agricultural Sciences Bengaluru. pp. 100.

Keerti ,G. and Padma, K. 2012. Evaluation of phytochemical and antimicrobial study of extracts of *Vitex negundo* Linn. *Drug Development and Research* **4**(4):192- 199.

MacGregor, j.G., Breen, J.E. and Pfrang, E.O. 1970. Design of slender columns. *ACI Structural Journal* **67**: 6-28.

Meena, A. K., Singh, U., Yadav, A. K., Singh, B. and Rao M.M. 2010. Pharmacological and phytochemical evidences for the extracts from plants of the genus *Vitex*: *A Review*. *International Journal of Pharmaceutical and Clinical Research* **2**(1): 1-9.

Sarmah, M., Rahman, A., Phukan, A.K. and Gurusubramanian, G. 2007. Effects of aqueous plant extracts on Tea red spider mite, *Oligonychus coffeae*, Nietner (Tetranychidae: Acarina) and *Stethorus gilvifrons* Mulsant. *African Journal of Biotechnology* **8**(3): 417-423.

Mitra, S., Gupta, S. K. and Ghosh, S. 2015. Bio-efficacy of some green pesticides towards mortality and repellency against *Petrobiaharti* Ewing (Acari: Tetranychidae) infesting Medicinalweed, *Oxalis corniculata* L. (Oxalidaceae). *International Journal of Applied Research* **1**(11): 739-742.

Nandini, K.N. and Srinivasa, N. 2018. Direct and indirect effects of leaf extracts of *Vitex* spp. on okra red spider mite *Tetranychus macfarlanei* Baker and Pritchard (Acari: Tetranychidae). *Journal of Entomology and Zoology Studies* **6**(4): 465-46

Srinivasa, N. and Gopal, T. S. 2001. Evaluation of certain botanicals on phytoseiid mite predator *Amblyseius longispinosus* (Evans) (Acari: Phytoseiidae) (Abstract). Proceedings of Symposium on biocontrol based pest management for quality crop protection in the current millennium, Ludhiana, 2001.