



First Record of the Carmine Spider Mite, *Tetranychus urticae*, Infesting *Withania somnifera* in India

Authors: Sharma, Ashutosh, and Kumar Pati, Pratap

Source: Journal of Insect Science, 12(50) : 1-4

Published By: Entomological Society of America

URL: <https://doi.org/10.1673/031.012.5001>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.



First record of the carmine spider mite, *Tetranychus urticae*, infesting *Withania somnifera* in India

Ashutosh Sharma^a and Pratap Kumar Pati^{b*}

Department of Biotechnology, Guru Nanak Dev University, Amritsar-143005, Punjab, India

Abstract

During April-June 2010, red two-spotted carmine spider mites *Tetranychus urticae* Koch (Trombidiformes: Tetranychidae) were found on aerial apical parts of Ashwagandha *Withania somnifera* (L.) Dunal (Solanales: Solanaceae) plants in the Amritsar District of Punjab Province in the North Indian plains. The mites fed on the leaves, making them shiny white in color, which gradually dried off and were later shed. The pest was identified as *T. urticae*. To best of our knowledge, this is the first record of this pest infesting *W. somnifera* in India.

Keywords: Ashwagandha, medicinal plant, pest management, Tetranychidae

Correspondence: ^a sharma_tosh_ashu@yahoo.co.in, ^b pkpati@yahoo.com, * Corresponding author

Editor: T.X. Liu was Editor of this paper.

Received: 20 May 2011, **Accepted:** 24 October 2011

Copyright : This is an open access paper. We use the Creative Commons Attribution 3.0 license that permits unrestricted use, provided that the paper is properly attributed.

ISSN: 1536-2442 | Vol. 12, Number 50

Cite this paper as:

Sharma A, Pati PK. 2012. First record of the carmine spider mite, *Tetranychus urticae*, infesting *Withania somnifera* in India. *Journal of Insect Science* 12:50 available online: insectscience.org/12.50

Introduction

Withania somnifera (L.) Dunal (Solanales: Solanaceae) is a traditional Indian medicinal plant of high repute, prone to a number of diseases and pests both under wild and cultivated conditions (Nagraj and Reddy 1985; Gupta et al. 1993; Pati et al. 2008; Sharma et al. 2011). Extracts from different plant parts including root, shoot, leaves, seed, and berry have been commonly used in various remedies. Recently, the leaf extracts of *Withania* have been explored for its strong anti-cancer activity and selective killing of cancer cells, which is attributed its constituent Withanone that activates the tumor suppressor protein p53 in cancer cells only (Widodo et al. 2010).

Materials and Methods

During the present investigation of pests infesting *W. somnifera* in Amritsar region of Punjab province, carmine spider mite *Tetranychus urticae* Koch (Trombidiformes: Tetranychidae) (Smith-Meyer 1974) was identified as one of the most potent pests harming the overall plant growth and vigor both in field grown and wild populations of *W. somnifera*. The plants were grown in Net-house at the Department of Biotechnology, Guru Nanak Dev University, Amritsar (74.82323-74.82332 °E, 31.63678-31.63688 °N, 221 MASL). The pests were collected from infested leaves and photographed using Sony Cyber-Shot DSC W350 (www.sony.com) and stereo-microscope (Olympus, www.olympus.com) coupled Magnus image capturing system.

Results

To the best of our knowledge, there has not been a record of *T. urticae* infesting *W. somnifera*. *Tetranychus urticae* feeds on the leaves of *W. somnifera* during the dry and hot periods of the year (April-June) when average maximum temperature rises to 35 °C or more. They infest the greenhouse plants in relatively cooler periods of the year. It generally feeds on the lower side of the leaves and forms spider web-like structures; the huge swarms of the mites on leaf tips are visible to naked eye. They generally feed on the plants growing in strong sunlight and are most virulent during hot and dry periods of the year (April-June). The pest leaves behind white and silvery spots on leaves after feeding on them. They penetrate the leaf tissues with the help of cheliceral-stylets and then suck in the liberated plant fluid; subsequent removal of chlorophyll and plant pigments usually lessens their green appearance, which is referred to as blotching of the leaves (Figure 1D). During severe attack, leaves gradually turn gray-white, sometimes light brown and ensuing sudden complete leaf fall. The mites spread in whole field and may lead to 90-100% defoliation of the leaves. Its nymphs are

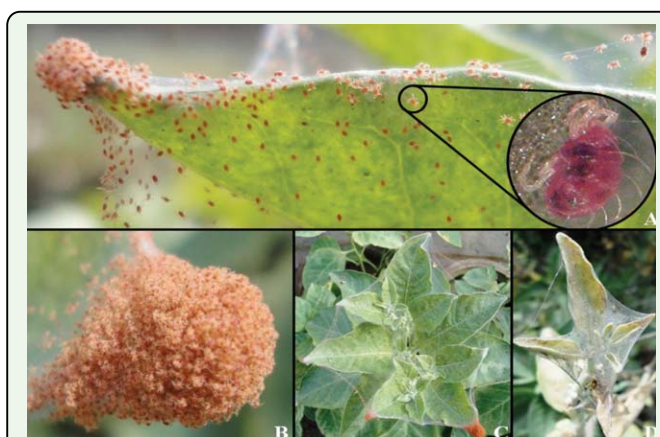


Figure 1. *Withania somnifera* plant infested by red spider mite *Tetranychus urticae*. (A) Heavily infested leaf with a single spider mite is zoomed out in spherical window. (B) Swarm of mites on a leaf tip. (C) Apical young leaves covered by web like structures. (D) Damaged apical part after heavy infestation. High quality figures are available online.

numerous, fast moving, pink–red colored, and can cover the entire top of the plant, especially the tips of young leaves (Figures 1B, 1C). Adults are relatively dark purple–red in color, with two dark spots on their body (Figure 1A). During heavy infestations, the mites produce a web all over the plant apex (Figure 1C, 1D). The mites develop very rapidly on its host plants causing distress and quick leaf fall, and ultimately leading to death of the plants. The pest is transmitted to adjacent uninfested plants by spider web/net–like structures created by the mites, connecting the leaves of adjacent plants.

Discussion

Tetranychus urticae is found on a wide range of hosts like groundnut, vegetable crops, and fruit trees (Nandagopal and Gedia 1995), but their attack is more common on eggplant and okra (Singh and Mukherjee 1991), the ensuing plant injuries causing a reduction in crop yield. Dhooria and Bindra (1980) recorded the percentage reduction of the *T. urticae* population after two, seven, 14, and 22 days of treatment on eggplant and found that spray containing 0.025% oxydemeton–methyl proved most effective, followed by 0.03% phosphamidon, 0.06% chlorobenzilate, 0.025% diazinon, 0.025% binapacryl, and 0.025% dicofol. They recommended oxydemeton–methyl for the control of *T. urticae* because of its high residual activity, quick knock–down effect, and availability. However, in another study dicofol 0.05% was found to be the most effective causing 70.56 to 91.85% reduction of mites in okra and 66.99 to 99.20% reduction in eggplant (Ramaraju 2004). The insecticides such as wettable sulphur, phosalone, and monocrotophos were next in order in controlling spider mite spread. The botanicals such as NOPO (Neem oil + Pungam oil),

NSKE (Neem seed kernel extract), and TNAU NO (Tamil Nadu Agricultural University Neem oil) were also found effective in descending order by the same group.

Acknowledgements

Financial assistance was provided by the Council for Scientific and Industrial Research (CSIR), Government of India, New Delhi, India.

References

- Dhooria MS, Bindra OS. 1980. Evaluation of different pesticides for the control of *Tetranychus urticae* (Boisd.) infesting brinjal in Punjab. *Indian Journal of Entomology* 42: 271-273.
- Gupta S, Kumar A, Thakur RN. 1993. Some problems in cultivation of *Withania somnifera* (L.) Dunal (Ashwagandha) in Jammu region of India. *Journal of Research and Education in Indian Medicine* 33: 234-235.
- Nagraj SD, Reddy SNR. 1985. Pests infesting *Withania somnifera* (L.) Dunal and biology of *Epilachna vigintioctopunctata*. *Indian Drugs* 22: 264.
- Nandagopal N, Gedia MV. 1995. Biology of the red spider mite *Tetranychus urticae* (Boisd.) a pest of groundnut. *Entomon* 20: 41-43.
- Pati PK, Sharma M, Salar RK, Sharma A, Gupta AP, Singh B. 2008. Studies on leaf spot disease of *Withania somnifera* and its impact on secondary metabolites. *Indian Journal of Microbiology* 48: 432-437.
- Ramaraju K. 2004. Evaluation of acaricides and TNAU neem oils against spider mite,

Tetranychus urticae (Koch) on bhendi and brinjal. *The Madras Agricultural Journal* 91: 425-429.

Sharma A, Pati PK. 2011. First report of *Withania somnifera* (L.) Dunal, as a New Host of Cowbug (*Oxyrachis tarandus*, Fab.) In Plains of Punjab, Northern India. *World Applied Sciences Journal* 14 (9): 1344-1346

Singh J, Mukherjee IN. 1991. Pest status of polyphagous mites in some Northern States of India. *Proceedings of the First Asia Pacific Conference of Entomology*: 192-203.

Smith-Meyer MKP. 1974. A revision of the Tetranychidae of Africa (Acari) with a key to the genera of the world. *Entomology Memoir, Department of Agricultural Technical Services, Republic of South Africa* 36: 1-291.

Widodo N, Priyandoko D, Shah N, Wadhwa R, Kaul SC. 2010. Selective killing of cancer cells by Ashwagandha leaf extract and its component Withanone involves ROS signaling. *PLoS ONE* 5(10): e13536. doi:10.1371/journal.pone.0013536