E-ISSN: 2663-1067
P-ISSN: 2663-1075
https://www.hortijournal.com
IJHFS 2023; 5(2): 45-47
Received: 02-09-2023
Accepted: 11-10-2023

Rahmonov Ahliddin Xabibullayevich
Assistant, Department of Plant Protection, Tashkent State Agrarian University, Tashkent-100140, University str., 3, Uzbekistan

Corresponding Author:
Rahmonov Ahliddin Xabibullayevich
Assistant, Department of Plant Protection, Tashkent State Agrarian University, Tashkent-100140, University str., 3, Uzbekistan

Apple orchards infected by *Tetranychus urticae* (Acari: tetranychidae) are being monitored for acaricide resistance

Rahmonov Ahliddin Xabibullayevich

DOI: https://doi.org/10.33545/26631067.2023.v5.i2a.177

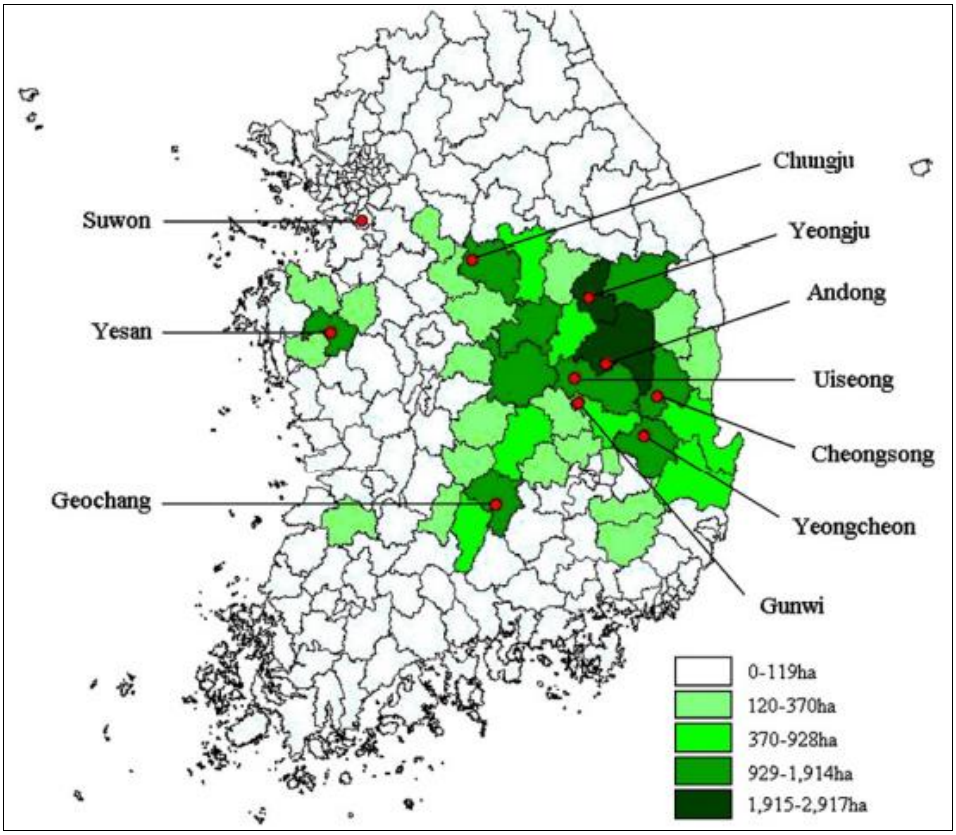
Abstract
Spider mites are significant crop pests in various crops, often becoming a management concern when pesticides are used to eradicate other pests. They disrupt biological control due to non-target effects on natural enemies, particularly phytoseiid mites. Some studies suggest that pesticides can stimulate reproduction in spider mites at levels below fatal dosages, leading to increased population growth and fecundity. Spider mites are more prone to becoming resistant to pesticides due to their haplodiploid reproduction, which has reduced food resource constraints and high polyphagy. *Tetranychus urticae* Koch, a two-spotted spider mite, is a significant pest of over 150 fruit, ornamental, vegetable, and agricultural crops worldwide. It causes reduced plant growth, yield, leaf bronzing, necrosis, deformation, and plant mortality. This damage can also result in aesthetic damages, such as scars on clementine mandarin fruits and gold flecking on tomatoes, which impair the marketability and commercial worth of fruit. Apples are severely harmed by *Tetranychus urticae* Koch, and acaricides are frequently used to manage them. However, the presence of resistant populations limits the consequences. The shelf life of acaricides is getting shorter, and monitoring local population resistance is crucial for efficient management. A deeper understanding of resistance development is needed to limit the evolution of resistance and postpone the dissemination of resistant populations.

Keywords: *Tetranychus urticae*, apple orchards monitored, resistance, acaricide

Introduction
Spider mites are significant crop pests in many different crops. Spider mites are secondary pests in many cropping systems, such as those that produce tree fruits, and only become a management concern when pesticides are used to eradicate other pests. This is often linked to the disruption of biological control caused by many pesticides' non-target effects on spider mite natural enemies, particularly phytoseiid mites. However, some studies have suggested that pesticides can also stimulate reproduction in spider mites at levels below fatal dosages (A process known as hormoligosis), leading to an increase in the pest's population growth and fecundity. It is crucial to ascertain how regularly used pesticides affect both spider mites and their predatory animals. A substance is likely to impair biological control if it is more destructive to the predatory mites than the pests. Spider mites are more prone than phytoseiids to become resistant to a pesticide even if they are originally vulnerable to it. Due of the haplodiploid reproduction, this has occurred. This is related to some species of spider mites (*Tetranychus urticae* Koch) having haplodiploid reproduction, which has a reduced food resource constraint and a high degree of polyphagy.
Tetranychus urticae Koch (Acari: Tetranychidae), a two-spotted spider mite, is a significant pest of more than 150 fruit, ornamental, vegetable, and agricultural crops worldwide. Larvae, protonymphs, and deutonymphs are active early life stages that feed by inserting their stylet into mesophyll and epidermal cells. As a result of this feeding activity, the amount of chlorophyll is effectively diminished, and the epidermal and stomatal guard cells' functions are changed. This causes a drop in photosynthesis and transpiration rates as well as an increase in water stress.
Reduced plant growth and yield, leaf bronzing, necrosis, and deformation, and in rare cases plant mortality are all possible effects of *T. urticae* damage.

Additionally, this may result in aesthetic damages that impair the marketability and commercial worth of fruit, flowers, or leaves. For instance, aesthetic damage manifests as scars on clementine mandarin fruits (Citrus clementina Hort. ex. Tan.) and gold flecking on tomatoes (*Solanum lycopersicum* L.), making such fruit unsuitable for fresh market retail. Fruit with visual flaws is degraded or culled by producers and merchants because they have a low tolerance for it, which causes growers to suffer large financial losses (Julian R 2020) [6].

Apples are severely harmed by *Tetranychus urticae* Koch around the world. Acaricides are frequently used by farmers to manage *T. urticae* in apple orchards. However, the presence of resistant populations limits the consequences. Due to its short life cycle, strong reproductive capacity, and haplo-diploid parthenogenesis, *T. urticae* has a relatively high risk of developing pesticide resistance.



Picture 1: Location map of collection sites of *T. urticae* populations from major apple growing regions (Sang-Hyun Koh 2009) [3]

There are several reports on the emergence of *T. urticae* strains that are resistant to acaricides as well as the failure of these compounds to control *T. urticae*. The shelf life of acaricides is getting shorter. The monitoring of local population resistance is the first step in the efficient management of *T. urticae*. To limit the evolution of resistance in *T. urticae* and postpone the dissemination of resistant populations, a deeper comprehension of resistance development is needed. There isn't many research in Korea that look at *T. urticae*' s acaricide resistance, and there aren't any that track it all. The resistance levels of *T. urticae* populations that were gathered from significant apple producing regions, as well as the cross-resistance and multiple-resistance of *T. urticae* to acaricides in Korea, are described in this research (Sang-Hyun Koh 2009) [3].

From the main apple-producing regions in Korea, ten sample locations were chosen (Fig. 1). From each region, one commercial apple orchard was selected. From June through October of 2002, *T. urticae* were gathered from the apple tree canopy at a height of 1.5 to 3.0 m. From each orchard, at least 40 leaves that were *T. urticae*-infested were taken and transported to the lab. Under a microscope, mature female *T. urticae* were applied with a fine brush to kidney bean plants that were two weeks old.

In order to control *T. urticae* resistance in apple orchards, the first step is to monitor local populations for acaricide susceptibility. We discovered in this investigation that the majority of the local mite populations had minimal resistance to the majority of the widely used acaricides. This is remarkably different from earlier results that claimed *T. urticae* in apple orchards had moderate to high levels of resistance to dicofol, fenpyroximate, pyridaben, and fenbutatin-oxides. The use of conventional pesticides, particularly acaricides, has decreased in Korea during the past ten years while apple IPM has grown. IPM-managed orchards had larger densities of predatory mites than conventionally-managed orchards.

References

1. Schmidt-Jeffris RA, Beers EH. Potential impacts of orchard pesticides on *Tetranychus urticae*: A predator-prey perspective. Crop Protection. 2018;103:56-64.
2. Golec JR, Hoge B, Walgenbach JF. Effect of biopesticides on different *Tetranychus urticae* Koch (Acari: Tetranychidae) life stages. Crop Protection. 2020;128:105015.
3. Koh SH, Ahn J, Im JS, Jung C, Lee SH, Lee JH. Monitoring of acaricide resistance of *Tetranychus urticae* (Acari: Tetranychidae) from Korean apple orchards. Journal of Asia-Pacific Entomology.

2009;12(1):15-21.
4. Van Leeuwen T, Vontas J, Tsagkarakou A, Dermauw W, Tirry L. Acaricide resistance mechanisms in the two-spotted spider mite *Tetranychus urticae* and other important Acari: A review. Insect biochemistry and molecular biology. 2010;40(8):563-572.
5. Devine GJ, Barber M, Denholm I. Incidence and inheritance of resistance to METI-acaricides in European strains of the two-spotted spider mite (*Tetranychus urticae*) (Acari: Tetranychidae). Pest Management Science: formerly Pesticide Science. 2001;57(5):443-448.
6. Julian R, Swanson B, Sukhatme GS, Levine S, Finn C, Hausman K. Never stop learning: The effectiveness of fine-tuning in robotic reinforcement learning. arXiv preprint arXiv:2004.10190. 2020 Apr 21.