

Biology and pest management of spider mites - ENT4

Lanni Zhang Diagnostic Services

Background

Mites are microscopic arthropods that are classified in the order Acarina. They are not insects but are related to ticks and spiders. There are over 40,000 described species of mites in the world. Some of them live freely in soil or water; some are found on plants and some are associated with other animals. Due to their small size most of them are difficult to see with the naked eye.

Mites that are plant pests include spider mites (family Tetranychidae), false spider mites (family Tenuipalpidae), tarsonemid mites (family Tarsonemidae) and the rust or gall mites (family Eriophyidae). These mites cause damage by piercing plant cells and sucking out their contents. In heavy infestations mites may even kill the host plant.



Two spotted mite adult and egg



Oriental red mite adult and egg

Spider mites are given their name as they often spin characteristic protective silk webs. This family has more than 1000 species, which include some species of quarantine importance, and many species that may cause heavy losses to major food crops and ornamental plants. These include the infamous two-spotted mites *Tetranychus urticae*, and other major economic spider mite pests, which have been recorded in the Northern Territory e.g. oriental red mite, *Eutetranychus orientalis* - primarily a pest of citrus; vegetable spider mite, *Tetranychus neocaledonicus*; and avocado brown mite, *Oligonychus punicae*. These species attack a wide range of horticultural crops. Mites may cause serious damage to plants but since they are microscopic they are usually not noticed until damage symptoms appear on the plant.

Appearance

Spider mites are very tiny; the adult females are only 0.3 - 0.5 mm long and the males are even smaller. They are often red, brown, green or yellow in colour and they can be seen clearly with the aid of a lens. The immature stages resemble the adults except in size and they have three pairs of legs at larval stage and four pairs of legs at pre-mature and adult stage.

Two-spotted mite females are oval in shape and yellowish to greenish in colour and have two dark spots on their shoulders. Their eggs are translucent, about 0.1 mm in diameter, pale yellow or green in colour and have distinctive red eye spots before hatching.

Oriental red mite females are ovoid and brown-green to dark green with light coloured legs. The smaller male mite has legs up to three times the length of the body.

Life cycle and biology

There are five stages in the life cycle of spider mites: egg, larva, protonymph, deutonymph and adult. Most species of spider mites prefer to colonize and lay eggs on the underside of leaves, such as the two spotted mite, but some spider mites, such as the oriental red mites, are often found on the upper side of the leaf. The eggs of spider mites are deposited singly, directly on the host leaf surfaces. Female adults can lay more than 100 eggs during their 30 day life cycle. Development from egg to adult takes about one week in the tropics, so there may be many overlapping generations in a single season. Their populations can increase rapidly and cause extensive plant damage in a very short time when conditions (temperature, humidity and food) are suitable.

Two-spotted mites have been recorded on more than 900 species of known hosts, including more than 150 hosts of some economic value, which includes most of the important agricultural crops and ornamental plants. In the Darwin area, two-spotted mite is one of the most serious pests in the dry season. Two-spotted mites have been recorded on vegetables such as snake beans, eggplant, cucurbits such as watermelon, fruit trees such as carambola and pawpaw and ornamentals such as palms, heliconia, gerberas as well as many other native and horticultural plants.

Symptoms and damage

Spider mites have needle-like mouthparts and feed by piercing the leaves of host plants and sucking out the fluids from plant cells. Feeding causes yellow spots on the leaves and in heavy infestations, foliage has a yellowing or bronzing appearance and may suffer from premature leaf drop. In situations where there is severe damage this may lead to plant death. Mites prefer the young leaves, however in heavy infestations, the older leaves are also affected and sometimes webbing may be seen all over the plant.

Oriental red mite, *Eutetranychus orientalis*, is primarily a pest of *Citrus*, however, the mite has several alternative host species such as cotton, squash, frangipani and grapevines. Oriental red mite damage is similar to that caused by two-spotted mite, infested leaves have a chlorotic appearance and may become weak and finally drop.



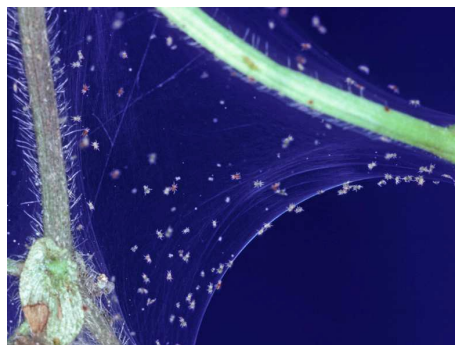
Spider mite damage to watermelon leaf



Oriental red mite damage to Kaffir lime leaves



Spider mite damage to taro leaf



Spider mites and webbing on bean plant

Pest management

Timely inspection of susceptible plants is important in preventing serious damage. As spider mites often re-infest the same plants year after year, it is important to regularly monitor plants that have a history of mite problems. A hand lens (with X10 or 20 magnification) is essential for adequate viewing of the mites.

The best method of monitoring mites is to walk through the crop randomly checking the underside of new and medium aged leaves on a weekly basis. Look out for yellow or distorted leaves as these may be symptoms of mite infestation.

The regular use of miticides may kill predatory mites or create problems with pesticide resistance in the plant feeding mites. Soft chemical sprays such as petroleum oil and potassium soap are effective in controlling certain species of mites in crops. When using potassium soap 2mls per L of spray oil is usually added to the spray. Good spray coverage is essential when applying pesticides. When applying pesticides ensure that you read product labels and only use as directed.

Biological control of spider mites has been successful in some countries. In Australia, for example, the predatory mites, *Phytoseiulus persimilis* Athias-Henriot and *Typhlodromus occidentalis* Nesbitt have been produced commercially for the purpose of controlling some important spider mites, such as *Tetranychus* spp. on vegetables, ornamental plants and fruit trees.

i

References

Jeppson, L.R., Keifer, H.H. and Baker, E.W. 1975. *Mites Injurious to Economic Plants*. University of California Press, Berkeley, California. 614 pp

Bolland, H.R., Gutierrez, J. and Flechtmann, C.H.W. 1998. *World Catalogue of the Spider Mite Family (Acari: Tetranychidae)*. Leiden, Brill. 392 pp

Young, G. and Zhang, L. 1998. The IPM of snake bean, *Vigna unguiculata* ssp. *sesquipedalis*, in the Top End of the Northern Territory. Proceedings of the sixth workshop for tropical agricultural entomologists, Darwin. DPI&F Technical Bulletin No. 288, 95-100

Acknowledgments

The author would like to acknowledge Deanna Chin and Haidee Brown for assisting with the preparation of the factsheet

For further information on this factsheet contact Entomology at insectinfo.dpifm@nt.gov.au. Agnotes or factsheets on other pests are available from www.entomology.nt.gov.au or www.primaryindustry.nt.gov.au

Department of Primary Industry and Resources

© Northern Territory Government

Disclaimer: While all care has been taken to ensure that information contained in this Factsheet is true and correct at the time of publication, the Northern Territory of Australia gives no warranty or assurance, and makes no representation as to the accuracy of any information or advice contained in this publication, or that it is suitable for your intended use. No serious, business or investment decisions should be made in reliance on this information without obtaining independent/or professional advice in relation to your particular situation.