
FIGURE 2

Stop Those Pesky Spider Mites

Because spider mites do not fly, early detection is only possible by checking all plants in all rows at least weekly. Enlist the assistance of workers carrying out various tasks within the crop daily, and are in close contact with the plants. BY DR. M. ISHTIAQ RAO


FIGURE 1

At this time of year, the two-spotted spider mite makes its very predictable appearance in greenhouse crops. Despite our familiarity with this pest, it continues to challenge us.

Spider mites observed now, in mid-winter, would most likely be those coming out of diapause. The diapause stage allows spider mites to survive low temperatures; during this stage, they feed minimally and do not reproduce.

Diapausing spider mites appear reddish-orange and are all mated females **(Figure 6).** This latter fact partly explains their ability to quickly establish new infestations in spring crops. It should also be noted that starving females may be brick-red in colour and therefore can resemble the orange-red diapausing forms although they are not in diapause. Such forms may be observed later in spring and summer. This phenomenon can be caused by poor quality food from senescing leaves or feeding damage caused by the mites themselves.

Spider mites enter the diapause stage during late summer or fall months of the preceding year. The same factors that brought on the diapause state, also affect their emergence from it. The major factors include daylength, temperature, quantity and quality of food supply. Shortening daylengths, decreasing temperatures, and lack of

FIGURE 1:
Spider mite webbing on cucumber is an advanced stage of infestation.
FIGURE 2:
Advanced spider mite damage on cucumbers.

or poor quality food supply all favour the diapause state.

By the same token, during the early months of the year when days are getting longer, greenhouses are warm and full of young, succulent growth. The mites, now no longer in diapause but still orange-coloured, crawl out of their hiding places to start feeding and reproducing.

Because spider mites do not venture too far from the last feeding areas just prior to entering diapause in the previous fall, they tend to emerge from the same areas in the new spring crop. It is important to note that spider mites in this stage tend to be more resistant to pesticides than regular, non-diapausing mites, and are reluctantly fed upon by *Phytoseiulus persimili* **(Figure 7),** one of the most commonly used biocontrol agents for spider mites. *P. persimilis* is a highly specialized predator of spider mite, and it's a useful biocontrol agent because it consumes spider mites of all life stages**.**

Spider mites are notorious for causing economic crop damage (such as in **Figures 1- 3),** and we need to adopt a multi-pronged approach when managing this chronic pest. Some tips to bear in mind for controlling spider mites are as follows:

Check records of the previous crop for spider mite infestations – Successful suppression of spider mite populations requires early detection of infestations. Do not wait to see webbing **(Figure 1)** on your crops, because at that point the spider mites have gotten out of control. Having good visual records of the previous year's "hot spots" provides valuable clues as to where the mites might first appear in the new crop.

Monitor crop thoroughly and diligently – For early detection of spider mites, there can be no shortcuts. Because spider mites do not fly, early detection is only possible by checking all plants in all rows at least weekly. For such a task, it is advisable to enlist the assistance of workers who are carrying out various tasks within the crop daily, and are in close contact with the plants regularly.

Train your crop workers to recognize spider mite damage both on upper and lower surfaces of the leaves **(Figures 4 and 5).** Early detection is key to save money on spider mite control.

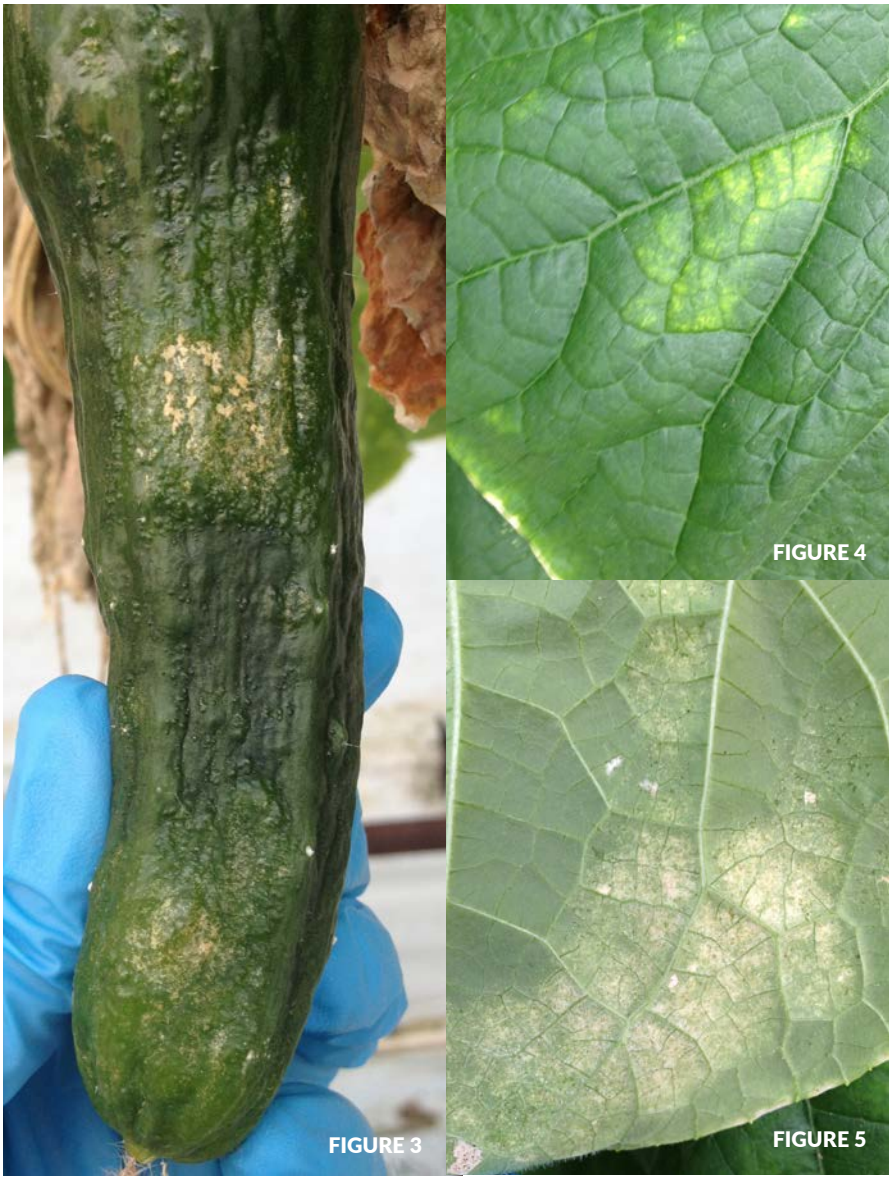

FIGURE 3:
Spider mite feeding damage on a cucumber fruit.
FIGURE 4 & 5:
Earlier stages of spider mite damage on upper and underside of cucumber leaf.

Use a combination of biocontrols – Usually, it's best to use a combination of predators because the different characteristics of the various species, released strategically, can enhance the success of a biocontrol program for spider mites.

Fortunately, several biocontrol agents are commercially available for managing spider mites. These include *Phytoseiulus persimilis, Stethorus punctillum, Feltiella acarisuga, Amblyseius andersoni,* and *Amblyseius* or *Neoseiulus californicus.*

Another predatory mite, *A. swirskii,* though not recommended specifically for spider mites, can assist in suppressing their populations. Competition can occur among the different biocontrols, but research suggests that this usually happens only after there's a crash in the prey or pest population, which is the desired outcome anyway.

Be informed on negative potential impact of all pesticides used – Pest control products and their residues can adversely affect the activity and survival of biocontrol agents. Residues of some products can remain toxic for at least a few weeks to the predatory mites. Although some pesticides may not cause immediate death of the predators, they can significantly affect their reproduction and survival, especially when higher rates are used.

FIGURE 6: **Diapaused spider mites on a tomato leaf, note the orange-red colour.**
FIGURE 7: ***Persimilis* sucking out the contents of a spider mite egg.**

Ensure compatibility of biocontrols and host plant – Host plants can influence the effectiveness of biocontrols in several ways such as via their surface characteristics. For example, biocontrol of spider mites is comparably easier on peppers than on tomatoes. This is because peppers have relatively smooth leaf surfaces that allow for free movement and predatory activity. By contrast, the presence of sticky hairs on tomato plants can hinder the activity of the predator, thereby reducing its efficiency.

Note impact of greenhouse microclimate – Activity and efficiency of biocontrols are affected by the greenhouse environment. For instance, under optimum conditions of about 20 to 25 C, *P. persimilis* can increase its numbers at about twice the rate as those of the spider mite. However, within a cucumber crop, temperatures in the upper leaf canopy often exceed 30 C, and humidities are often under 60 per cent during late spring and summer. Above 30 C, *P. persimilis* does not thrive, whereas its prey, the spider mite, reproduces rapidly. Below 60 per cent RH, egg-laying and life-span of *P. persimilis* are sharply reduced whereas such dry conditions favour the spider mite.

In managing the two-spotted spider mite, we always need to be mindful of its biology and that of its biocontrols, and the many accompanying influencing factors encountered in the production of greenhouse crops. If, in addition, we are diligent and timely about implementing the strategies necessary for suppressing their populations, our chances of successfully managing them will be greatly increased.

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