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SPIDER MITES

OF BEANS AND CORN AND THEIR CONTROL



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SPIDER MITES

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The spider mites economically important to Idaho bean and corn producers are commonly called red spider mites, or preferably two-spotted spider mites. There are 6 or 8 species, similar in appearance and difficult to tell apart. All are tiny and often difficult to see without a magnifying glass. In color, they range from shades of green to yellow, orange and red. They can be almost black depending upon season, sex and host plant. They have two black blotches or spots on their backs, one on either side just back of their red eyespots.

These mites are known to live on approximately 200 different species of plants. They often seriously damage field and forage crops, vegetables, flowers, evergreens and grasses. They normally live on lower surfaces of plant leaves and feed by sucking the juices from the cells. Spider mite feeding causes the plants to lose vigor. Heavily infested plants may dry up and die.

Adult mites spin fine, dense webs over infested leaf surfaces and stems of plants, giving them an unsightly "cobwebby" appearance. This webbing serves as a protective covering for the mites.

Stages and Life Cycle

Life cycles of the two-spotted spider mites include stages as adults, eggs, larvae, protonymphs and deutonymphs. Adult females are oblong in shape, about 1/50th of an inch long and half as wide. Adult males (figure 1) are smaller and more active than females and have a distinctly pointed abdomen. Eggs are extremely small. Newly laid eggs are generally translucent or slightly reddish in color, becoming darker as incubation progresses. Just before hatching, the bright red eyespots of the embryo are visible. Newly hatched larvae are round, about the size of the egg, and have 6 legs. They are colorless except for the red eyespots. After molting they develop into 8-legged nymphs that resemble adults except for size.

This publication was prepared by J. R. Douglass, retired Entomologist; R. W. Portman, Extension Entomologist, and H. C. Manis, Head, Department of Entomology, University of Idaho.

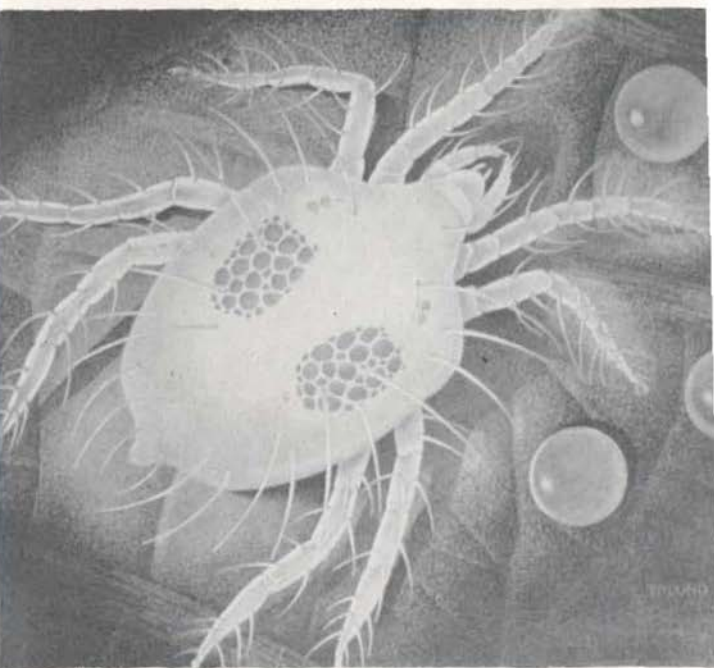


Figure 1—Adult two-spotted spider mite and three eggs (greatly enlarged).

Life History in Idaho

In Idaho, life histories of the two-spotted spider mites are quite similar although their development may vary because of climatic conditions. The adults hibernate in winter on overwintering plants, among leaves and debris or in the soil. As warm weather approaches in the spring, they leave hibernation quarters to find plants on which to lay their eggs. The eggs hatch in 3 to 5 days, and the young mites require another 8 or 9 days of hot, dry weather to mature. During this time, the webs protect the eggs and young mites from wind, rain and the larger predators, but not from the smaller predators — small black lady beetles, minute pirate bugs and predatory mites.

The adult male generally matures a few hours before the female. As soon as the female matures, mating is accomplished. Although mating is not necessary for reproduction, unmated females produce only male offspring. Mated females produce eggs that develop into either males or females.

The female feeds for approximately 1 day after maturing before beginning to lay. Egg laying may then continue for 1 to 1½ months. A female may deposit up to 300 eggs, singly or in masses, during her lifetime. During the peak of laying, she may lay 20 eggs in one day.

Nature and Extent of Damage

Since two-spotted spider mites normally feed on the lower surfaces of plant leaves, they often are not noticed until damage to the leaves is visible. When mites are abundant, however, they may be found feeding all over the plants.

When feeding, mites puncture the leaf tissue with their mouthparts and extract the plant juices. Loss of chlorophyll and other cell contents produces a characteristic blotching or stippling of the plant leaves, causing them to become grayish or brownish in color. Severely damaged plants may be killed by dessication. Figure 2 shows the results of a heavy spider mite infestation.

Dispersion

When field crops are harvested in the fall, spider mites are forced either to hibernate or to seek other green food. Many locate on weeds and plants growing along ditch banks, fence rows and other waste areas around the fields. In the spring, the mites become active before most annual field crops are up so they again live on weeds, clover and other plants. As the season progresses, they migrate by walking and by floating on air currents and on surface water. Adult females can travel over smooth surfaces at the rate of about 5 inches per minute, or 600 feet in 24 hours. Infestations may be spread locally by man, animals, birds, insects, machinery, or directly from plant to plant by interweaving branches. Probably the most common method of dispersion is by "ballooning." The mites crawl to the edges of leaves or grass blades and "put out" a single strand of web. From there, they are picked up and transported on air currents to other hosts. Should the air current become too strong, the mite is capable of withdrawing the web until favorable conditions exist.

Factors Affecting Population Increases

Climatic conditions and suitable host plants on which to reproduce influence the development of spider mite populations. When mites emerge from hibernation in the spring, temperatures are relatively low and rainfall and humidity relatively high. As a result, the first generation deposits few eggs. Hot, dry weather hastens development. A female which lays about 6 eggs on a cool day will increase the number to 15 or 20 on a hot day. On cool, rainy days, she may deposit none. At Twin Falls, Idaho, average normal precipitation for May, June, July, August and September is 1.00, 0.79, 0.24, 0.17 and 0.49 inches. The mite population is normally low in the higher rainfall months of May and June, then becomes high in July and August.



Figure 2—Compare the defoliation of beans in the foreground with normal foliage in the background. A small irrigation ditch separated this bean field from clover and sugar beet fields to the right. The clover field adjoined the lower part of this field, beets the upper part. Mite spread from the clover field to the beans was helped by prevailing winds. (Photo courtesy of USDA)

Widespread use of insecticides may also stimulate spider mite activity. This may happen in several ways. Many insecticides destroy spider mite predators and other beneficial insects without controlling the mites. Free of their natural enemies, the mites then can multiply to damaging population levels. An insecticide may also bring about a stress condition that causes a female to lay 5 times more eggs than one not affected by the insecticide.

Preventive Measures

Two-spotted spider mites are difficult to control with ordinary contact dusts and sprays. Mite colonies are protected by their location on the underside of the leaf, and by their fine web covering. Only a third of an insecticidal dust applied to corn penetrates the plant canopy to reach the lower leaves. Only about one-fifth of this amount reaches the undersides of the leaves. Bean plant foliage is even more protective. In addition, mites in the quiescent stages are highly resistant to most miticides.

Therefore, thorough preventive measures should be used rather than relying entirely on contact chemicals to solve the spider mite problem.

Early in the season, destroy weeds and other plants around edges of the field by burning or with herbicides. About 2 weeks before the first

alfalfa or clover hay crop will be cut or when corn is waist high, dust ditchbanks, fence rows and field margins with dusting sulfur at a rate of 25 to 35 pounds per acre.

When an organo-phosphorus compound is used for spider mites, two applications are required within an interval of 9 days. The first application will kill the mites that are in active stages of life. Eggs will not be damaged, so a second application is necessary within 9 days to kill the new hatch before they mature to lay more eggs.

When treating beans and corn, select only miticides that list these crops on the container label and which also give the dosage rates for spider mite control.

Contamination of bordering crops results from drift. Apply only materials that will not contaminate neighboring crops and in a way that will keep drift to a minimum.