New Spider Mite
California's Sola

E. R. OATMAN • C

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toes, potatoes, and eggpla
serves as a useful indicator

Photo 1, left above, lily-of-the-valley vine defoliated by Tetranychus marianae. Photo 2, left below, webbing produced by Tetranychus marianae on defoliated lily-of-the-valley vine, showing masses of mites clustered on terminals of the host plant. Photo 3, below, close-up of cluster formed by myriads of Tetranychus marianae on terminal of lily-of-the-valley vine.

A NEW, HIGHLY destructive spider mite, *Tetranychus marianae* McGregor, was discovered on nightshade, *Solanum* sp., near East Highland in San Bernardino County in August 1965. By June 1966, the species had also been found in Orange, Los Angeles, and Riverside counties, feeding on both wild and cultivated solanaceous plants. In Riverside, the spider mite was first discovered feeding on lily-of-the-valley vine, *Salpichora rhomboidea* Miers (photos 1, 2, and 3). Subsequently, the mite was found on native *Solanum* sp., various species of cultivated exotic Solanaceae, and on an experimental planting of tomato genetic varieties (photo 4).

Preliminary laboratory studies show that *T. marianae* has an unusually high rate of egg production. Five field-collected females averaged 16 eggs per day per female during a five-day period. A generation from egg to egg was completed in eight days when reared on Irish potato plants at 82° F and 50% relative humidity.

Host range studies conducted under greenhouse conditions revealed that tomato, Irish potato, eggplant, silverleaf solanum (*Solanum elaeagnifolium*), and lily-of-the-valley vine were killed within three to five weeks after being artificially infested by 20 *T. marianae* females per plant, whereas similarly infested bell pepper, cotton, and castor bean (*Ricinus communis*) plants were only lightly injured (photos 5 and 6). When the studies were conducted outdoors, similar results were obtained except that the mite populations and resulting damage to the plants developed more slowly. Observations to date indicate that solanaceous plants are the preferred hosts as well as the most seriously damaged.

Tetranychus marianae has been reported primarily from tropical and subtropical areas, including the Bahamas, West Indies, Central America, and the Marshall and Mariana Islands in the southwest Pacific. Within the United States the species had been reported only

Poses Threat to laceous Crops

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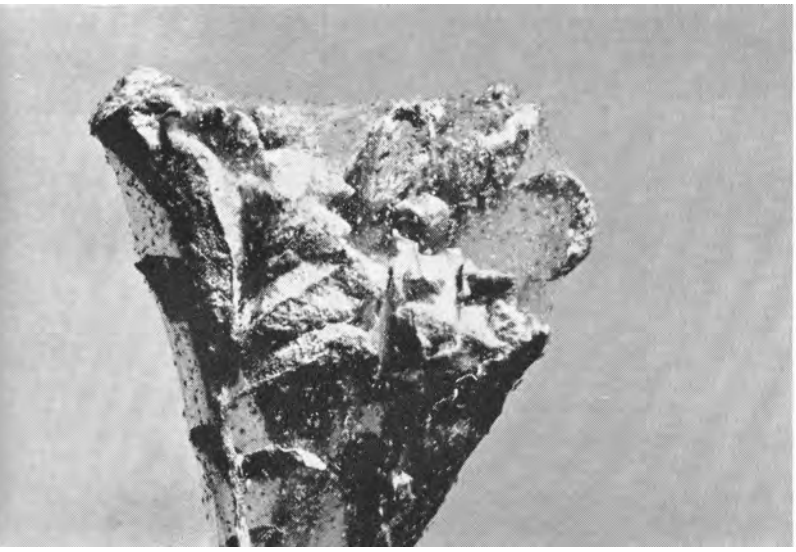
uthern California poses a threat to solanaceous ;ate that the species is highly destructive to toma- Black nightshade is a preferred native host and int for determining distribution of the mite pest.



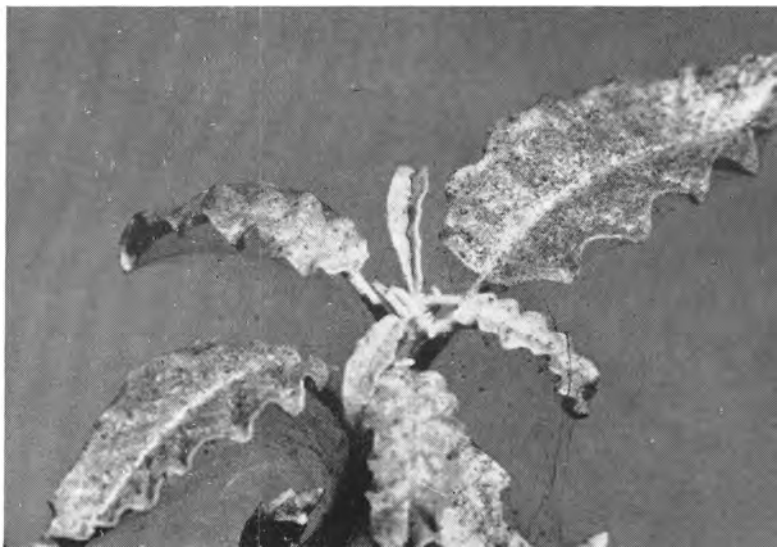


Photo 4, below, terminal of Irish potato plant heavily infested with Tetranychus marianae. Photo 5, right above, terminal of tomato plant killed by Tetranychus marianae in the field. Photo 6, right center, terminal of eggplant severely injured by Tetranychus marianae. Photo 7, right below, black nightshade severely injured by high populations of Tetranychus marianae.

from Florida and Texas prior to its discovery in southern California. In Texas it is annually a serious pest of tomatoes and eggplant in the lower Rio Grande Valley, requiring repeated applications of acaricides for its control since its discovery there in 1956. Although *T. marianae* was reported on cotton in Nicaragua, it has not been found infesting this crop in the United States, and preliminary studies indicate that cotton is not a preferred host. This does not, however, preclude the possibility that irrigated cotton in arid areas of southern California might be acceptable to the species.

Tomato, potato, and eggplant are important vegetable crops in southern Cali-

fornia with the first two crops ranking first and second in importance in the state's vegetable crop production. In 1965, 147,600 acres of tomatoes were valued at $164,000,000 and 106,900 acres of potatoes were worth $127,000,000. Although *Tetranychus marianae* has not been found in commercial fields, its presence nearby poses a direct threat to both crops with potential serious economic loss to California growers.

Observations in the field thus far indicate that native predators of mites are practically nonexistent on solanaceous plants heavily infested with *T. marianae* even though they are sometimes abundant on nearby plants infested with native species of spider mites. It is not known whether this scarcity of predators is due to the unacceptability of the prey or the host plant. The problem is under investigation. Preliminary experiments with biological control of *T. marianae* have been initiated, using the predaceous mite *Phytoseiulus persimilis* Athias-Henriot.

The presence of *T. marianae* in Central America and its apparent preference for and destructiveness to solanaceous plants which supposedly originated in Central and South America made these areas initial targets for exploration for natural enemies. However, foreign exploration trips to Central America and Mexico this year were unsuccessful in locating either the spider mite or its predators. It is hoped that further explorations will produce predators that may be introduced before the pest becomes widely established in commercial plantings of tomatoes and potatoes.

Black nightshade, *Solanum nigrum* L., has been found to be a good indicator plant (photo 7) for detecting the presence of *T. marianae*. The reddish-orange spider mite can be readily detected in the field due to its habit of developing dense webbing and clusters of living mites on the tips of heavily infested plants (photos 2 and 3). Positive identification of the species requires careful examination of male specimens by mite taxonomy specialists.

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HORN FLY AND GRUB CONTROL ON BEEF CATTLE

. . . testing several new insecticides

W. H. JOHNSON · E. C. LOOMIS

A 75% reduction in horn fly populations lasted from two to four weeks following trial spray applications of insecticides in June, for two to six weeks following August treatments, and for the remainder of the fly season with most of the September grub control treatments. During the entire trial, most treatments kept horn fly populations below 100 flies per animal for five to six weeks after treatment. Grub control was excellent with all treatments, ranging from 96% to 99% control. Both common and northern grub infestations were effectively reduced. The split dose of Ruelene 8R provided excellent grub control as well as satisfactory horn fly control from August to the end of the fly season. There were no adverse effects observed on any animals treated during this study.

THE HORN FLY, *Haematobia irritans*, and cattle grubs, *Hypoderma lineatum* (common type) and *H. bovis* (northern type), continue to create external parasite problems on beef cattle grazed in open rangeland. The effectiveness of various insecticides for control of these pests was tested in Shasta County during 1966–67. Treated animals included weaner bull and heifer calves, and yearling heifers, all of the Hereford breed. The test was conducted on the Crowe Hereford Ranch in the foothill area 17 miles east of Redding.

Each of four groups of bulls (averaging 498 lbs) and four groups of heifers (averaging 475 lbs), received a different treatment. The yearling heifers were given a grub treatment only, and were kept in a field apart from the calves. The bull calves were sorted into two pastures two miles apart, with some of each treatment in each pasture, while the heifer calves ran in the same field with their dams for the first 12 weeks of the trial (June 21 to September 14), and then were moved away from the cows to another field.

The chemical programs for the groups treated are shown in table 1. All treatments except Neguvon and methoxychlor dust followed the recommendations contained in AXT 172, "Control of External Parasites of Livestock" or AXT 253, "Factors Affecting the Cowman's Income"—both University Agricultural Extension Service publications.

Spray applications were made using a power sprayer with mechanical agitator, operated at 200 psi and one half-gallon dosage was applied to each animal. Pour-on applications were made using a standard six-ounce capacity metal dipper.

Weekly horn fly counts were made by recording the number of flies observed resting on one entire side and on the withers area of at least 50% of the bulls and 30% of the weaner heifers in each group. The animals were examined in the morning hours either from a vehicle driven through the pastures, or while walking through the herds. Investigators