California red scale outbreak in Florida

By Phil Stansly

California red scale (CRS), Aonidiella aurantii, had been previously reported in Florida from citrus and some ornamental crops, but not even old timers remember it ever being a problem on Florida citrus. However, during the 1998 growing season, I received reports of outbreaks of armored scale on some mandarin varieties as well as orange and grapefruit in southwest Florida. An unusual aspect of these reports was the prevalence of CRS. CRS is round and resembles yellow scale A. citrina except for the difference in color. It can be distinguished from the very dark Florida red scale (Chrysomphalus aonidum) by its lighter red-orange color and flatter profile. I saw CRS most commonly on Murcott mandarins but also on the orange varieties Valencia, pineapple and navel. CRS colonizes fruit as well as leaves and stems of citrus. It does not greatly inhibit degreening like chaff scale (Parlatoria pergandii), but is hard to remove in the packinghouse except by high pressure wash. CRS can be debilitating to the tree like purple scale (Lepidosaphes beckii).

CRS is arguably the worst pest of citrus in Mediterranean climates: typically cool and rainy in winter and dry and hot in summer. El Nino essentially converted Florida to a Mediterranean climate for the first half of 1998, which could explain why we saw so much CRS that year. That was also the first year Nexter 75WP (pyridaben), a BASF product, was labeled for mite control on Florida citrus.

In California, a thriving industry has sprung up to supply the parasitic wasp, Aphytis melinus, that attacks CRS, and satisfactory biological control is usually achieved in coastal regions. However, there is often a need for chemical control in the drier central valleys, where high rates of Lorsban (chlorpyrifos) have been the treatment of choice.

Nexter at 0.5 and 1.0 lb (ai)/acre (1.07 and 2.13 oz) was tested by researchers of the University of California, Riverside as a possible alternative against CRS with surprising results: Instead of going down, populations zoomed five to eight times above the untreated check! However, in a subsequent trial the following year, no increase of CRS was seen with the recommended 6.6 oz (0.31 lb ai/ac) rate.

In response to grower reports and my observations of high CRS populations in some groves during the 1998 season, we conducted a survey of scale incidence and pesticide use in Florida citrus. Seventy-three responses were received from growers in the Southwest, Indian River and Ridge regions. Nine growers reported recent problems with CRS and all had used Nexter. All but two of an additional 11 who had used Nexter saw higher than normal armored scale populations, albeit of different species. In contrast, only nine of 55 growers who had not used Nexter reported unusually heavy armored scale infestations.

In view of these and other reports, BASF stepped up to the plate and agreed to fund a full-scale trial in southwest Florida to test possible effects of Nexter on CRS under field conditions. An 18-acre block

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of Murcott with a one-year history of Nexter use and CRS problems was chosen. Four treatments were assigned to each of 11 four-row beds in a randomized complete block design: (1) Nexter sprayed June 9 only.  
(2) Nexter Sept. 24 only.  
(3) Nexter June and September, and  
(4) no Nexter.  

Nexter 75 WP was applied at the highest labeled rate of 10.7 oz/acre (0.5 lb a.i/oz). All but treatment No. 2 was replicated three times. Plots designated as “Control” or “September only” were sprayed on June 9 with AgriMek @ 8 oz/acre + 6 % v/v FL 435-66 spray oil. All applications on that date included zinc and manganese at 1 lb/acre and copper at 4 lb/acre as a tank mix. Treatments were applied with an airblast sprayer at 125 gpa.

Early on we saw much more CRS on fruit from trees sprayed with Nexter compared to those treated with AgriMek and oil. Indeed, by August it looked as if packout from sprayed blocks might be reduced due to scale. However, in November and January, only trees sprayed on both dates had heavier infestations than the control or any other treatment. Furthermore, packout was excellent, according to the grower. No differences among treatments were seen in the following year’s crop sampled on May 30.

What scenario could explain the considerable, though short-lived, increase in CRS populations we observed? Suppression of parasitic wasps from the June spray could have allowed scales to multiply rapidly at first. More scales would have attracted more wasps, reducing CRS on trees sprayed in June only. However, trees sprayed again in September did not recover as quickly due to further suppression of parasitism.

Indeed, we did observe on Nov. 13 that parasitism as judged by wasp emergence was highest on trees sprayed with Nexter in June and lowest on trees sprayed in September. Nevertheless, scale populations apparently did not have time to rebound on trees sprayed only in September. Broad-spectrum insecticides were not used in the grove, so parasitic wasps were probably able to reestablish by the following spring, negating any further effect of Nexter.

Given these results, it is clear that the 10.7-oz rate of Nexter could cause CRS populations to increase in Florida if sprayed early in the year, especially when followed by a second spray. The more usual 6.6-oz rate might not have caused scale to flare-up. Although the additional spray in September prolonged the outbreak, a single spray at that time had no effect on scale populations.

Perhaps we will not see CRS problems of similar magnitude until the next El Nino. Nevertheless, we recommend that, especially where armored scale is a concern, this excellent miticide should be sprayed at no more than the 6.6 oz/acre rate, preferably late season.

Stansby is professor of entomology at the University of Florida/IFAS Southwest Florida Research and Education Center at Immokalee.  

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