

Long-term Effects of Chloronicotinyls on Citrus IPM

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Our goal is to assess the impact of Assail on citrus IPM when applied in April-May as a glassy-winged sharpshooter (GWSS) treatment, June as a red scale treatment, or August as a citricola scale treatment. We are also evaluating Admire in April or May as a GWSS treatment. In each block, there were three 6-acre treated replicates and three 6 acre untreated replicates arranged in a checkerboard fashion in four Paramount citrus orchards in Kern County.

Treatments: (1) Assail glassy-winged sharpshooter treatment (2-2.9 oz in 200 gpa): Assail 70 WP was applied as 2.9 oz on May 20, 2003 and as 2.0 oz on April 22, 2004. (2) Assail California red scale treatment (5.7 oz in 900 gpa): Assail 70 WP was applied on June 6, 2003 and on June 22, 2004. (3) Assail citricola scale treatment (5.7 oz in 500 gpa): Assail 70 WP was applied on August 6, 2003, Aug 22, 2004 and Aug 29-30, 2005. (4) Admire GWSS treatment (32 oz through the irrigation): Admire was applied on May 7, 2004 and April 1, 2005.

Summary of results: Assail applied at 2 oz/acre had little or no effect on pests (thrips, mites, scales) and most natural enemies (predatory mites and *Comperiella*). The exception was a 50% reduction in survival of *Aphytis* that emerged from Assail-treated lemons exposed in the field.

When Assail was applied at higher rates (5.7 oz in 500-900 gpa), it exhibited both benefits and problems. With regard to citrus red mite, it was found to reduce predatory mites and flare red mites if applied when they were active. It had no effect on mites at other times of the year or the year after. The 5.7 oz rate of Assail reduced red scale on fruit, but it did not control the red scale on leaves or twigs. The red scale control only lasted one season. The 5.7 oz rate of Assail was also fairly toxic (60-80% mortality) to emerging *Aphytis*. Thus, the red scale control achieved was short-term at best, and the scale population increased as soon as the treatments were stopped. On the positive side, citricola scale was controlled (reduced well-below the economic threshold) for a single season by this rate of Assail.

A 32 oz Admire treatment in May reduced red scale on the fruit but, similar to Assail, it was not very effective against scale infesting leaves. The *Aphytis* were less compromised by Admire than by Assail, thus the red scale control achieved was longer-term. Similar to Assail, Admire treatments controlled citricola scale, but the effect was only for a single year.

The general conclusion for the neonicotinoids Assail and Admire is that they are effective for GWSS programs, but the length of control of scale insects is only a single season, and they are fairly broad spectrum, disrupting natural enemies. Thus, they should be used only when needed for GWSS control and are not a good fit for long-term integrated pest management of citrus.



Aphytis-parasitized scale-infested lemon evaluates effects of neonicotinoids on parasites.