

Management of Key Cotton Arthropod Pests with Insecticides and Acaricides

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INTRODUCTION

Integrated pest management of California cotton insect and mite pests is based on a long record of successful research and implementation. Maintaining cost-effective and efficacious insecticides and miticides is a constant, evolving process. As the pest biology, cropping patterns, cotton varieties, production techniques, and other factors change in the cotton agroecosystem, pest management needs change. The development of resistance in pests and regulatory actions are two of the key actions that influence the availability of crop protection tools. Fortunately, new materials are developed to facilitate control and to compensate for these losses. Regulatory actions with pesticides are ongoing and appear inevitable in California. Most recently, volatile organic compound (VOCs) issues have surfaced and regulations to restrict many emulsifiable concentrate pesticide formulations are being formulated. The fuming action of these products is important for managing pests in cotton, which creates a challenge. Through this project I strive to monitor and study insecticide/miticide issues relative to cotton and to address research needs and to further IPM programs on cotton.

The specific studies summarized in this report on the management of whiteflies and cotton aphids were conducted at the Shafter REC in 2005 and 2006. Results are primarily from 2005 as the 2006 studies are ongoing.

SUMMARY

Cotton aphids were a persistent problem in the SJV in 2005. Mid-season populations above threshold levels were rare, but in most situations low to moderate populations were continual and of concern to PCAs. Late-season populations were present and required treatments. Whitefly populations, another culprit for sticky cotton, were generally low. Three efficacy studies were done at the Shafter Research and Extension Center to examine insecticide efficacy on cotton aphids occurring during 1.) the mid-season period and 2.) the late-season period. One of the priorities was to examine alternative formulations of chlorpyrifos (to Lorsban 4E) as well as the efficacy of experimental materials. The treatments were applied with ground equipment at 20 GPA on 25 July and 14 Sept.

2005 Mid-Season Aphids (Fig. 1): Cotton aphid populations started to expand in mid-July and pretreatment numbers were 35.9 aphids per leaf. At 3 days after treatment (DAT), all the chemical treatments provided significant control. The Assail treatments, 70WP at 0.6 oz. and 30SG, provided over 90% aphid control. Several other treatments including Provado, Assail 70WP (1.1 oz.), Furadan, Thiodan, and Lock-on showed 85%+ control on this date. Aphid populations declined substantially over the next 4 days with the untreated plots averaging 9.7

aphids per leaf. All the treatments except Vydate significantly reduced the aphid levels at 7 DAT. Lorsban 4E, Assail (0.6 oz.), and Furadan provided 90% or more control. At 14 DAT, Lorsban 4E, Assail 30 SG and Assail (1.1 oz.) still provided over 85% aphid control. Similar trends were seen at 21 DAT, albeit with low aphid pressure.

2005 Late-Season Aphids – Acala (Fig. 2): Pre-treatment cotton aphid populations averaged 27 per leaf which is much higher than threshold levels. Aphid levels at 1 DAT were assessed to examine knock-down of aphid populations. At 1 DAT, populations in the untreated plots were 8.1 aphids per leaf. Aphid numbers in the Assail 30SG plots were the lowest (~75% control) with eight of the twelve treatments providing no control. At 5 DAT, aphid numbers in the Lock-on treatment were highest and the lowest levels were seen in the Provado and Assail (both formulations) plots. The best control seen was 77% at 5 DAT; the highest level of control in the study was seen at 7 DAT with Provado, Assail 30SG, and Furadan at 85%+ control. At 14 DAT, the aphid populations expanded greatly in most treatments. Numerically, the best control was provided by Provado, Assail 70WP, and Furadan. Seven of the treatments provided some level of control compared with the untreated.

2005 Late-Season Aphids - Pima: Similar studies were conducted in pima cotton against late-season aphids. Aphid populations in the untreated ranged from 4 to 6 per leaf during the study. At 8 DAT, Assail (both formulations) provided over 90% control and Provado, Carbine and endosulfan over 75% control.

2006 Mid-Season Aphids: Studies are ongoing for the 2006 year. Treatments (25 different ones in total) against mid-season aphids were made on 18 July. Populations in the untreated averaged 106.5 aphids per leaf. At 7 days after treatment,

- 90%+ control – Assail 70WP, Assail 30WG,
- 80-90% – Lorsban 4E, Trimax Pro, Vydate C-LV,
- 70-80% – Carbine 50DF,
- 60-70% – Lock-on, Fulfill 50DF, Ecosmart,
- 50-60% -- Provado, Lorsban 75WDG, endosulfan,
- 40-50% -- Curacron, Centric

In summary, Assail (both formulations), Provado, Lorsban 4E, and Furadan were efficacious for managing infestations of cotton aphids. Carbine was also effective to a slightly lesser extent. The 30SG formulation of Assail appeared to have quicker knockdown of aphids than the 70WP. Mid-season aphids were clearly easier to control than aphids occurring late-season on senescing cotton. The WDG and Lock-on formulations of chlorpyrifos were only slightly less effective than the 4E formulation for mid-season aphid control but were inferior on late-season aphids. The cotton species (acala vs. pima) did not have a significant effect on late-season aphid control efficacy.

Acknowledgements

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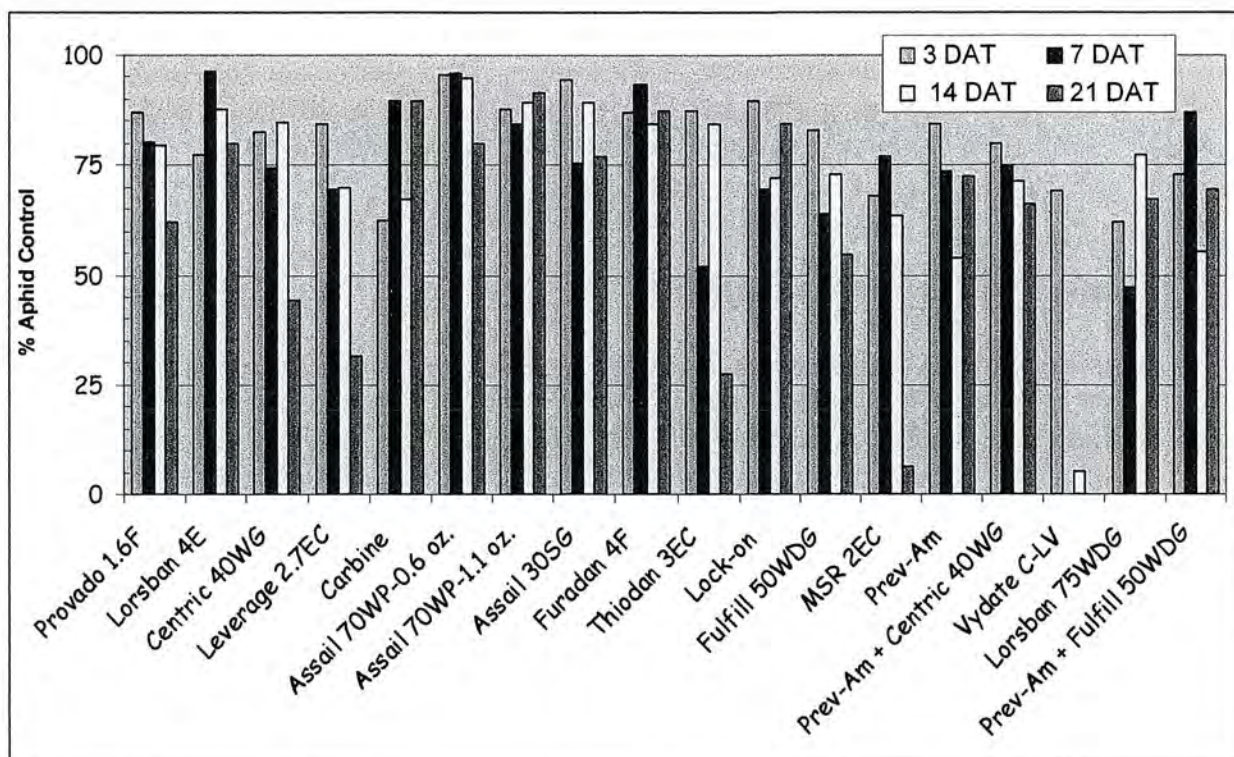


Figure 1. Mid-season cotton aphid control - 2005.

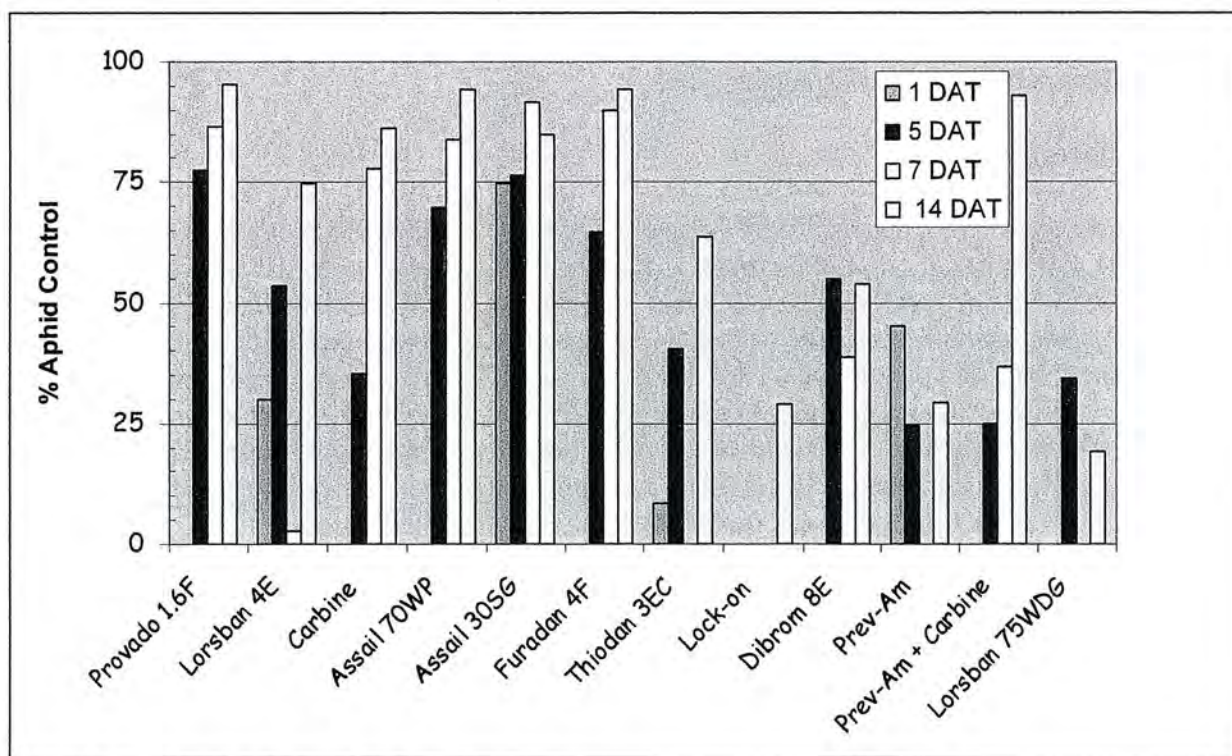


Figure 2. Late-season cotton aphid control - 2005.