New Insecticides and Tank Mix Combinations for Worm Control in Lettuce

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Abstract

Proclaim and a normal use rate of 5 oz/ac of Success were highly effective against cabbage looper, Heliothis and beet armyworm. A low rate of 1.5 oz/ac of Success provided sufficient control of Heliothis and beet armyworm, but was weak against cabbage looper. While a low rate of 2.56 oz/ac of Warrior was not especially active against any of the target species. However, when this rate of Warrior was mixed with the low rate of Success, control across all the species was good, and was statistically similar to the higher rate of Success. Although Intrepid appeared slightly more active than its sister compound Confirm, it appears that it too will benefit from the addition of a pyrethroid for control of Heliothis and cabbage loopers on large lettuce plants.

Introduction

Lepidopterous pests continue to be the primary pests of concern in fall planted produce. There are several recent insecticide registrations that have proven to be extremely useful in combating this problem. Two of these new compounds, Success (spinosad) and Confirm (tebufenozide), have been extremely effective and valuable assets in managing these pests over the past few years. In addition to these compounds there are several others with pending registration in the near future. These include Proclaim (emamectin benzoate) and Intrepid (methoxyfenozide). Proclaim is in the same chemical family as Agri-Mek (abamectin), while Intrepid is similar to Confirm in mode of action. In this trial, we report the efficacy of Proclaim and Intrepid to Lepidopterous pests in lettuce. We also report information on using low rates of Success with a moderate rate of a pyrethroid in attempt to lower insecticide costs without sacrificing control.

Materials and Methods

Crisp head lettuce, 'Empire' was direct seeded into double rows on 42-in beds on 24 August 1998 at the Yuma Valley Agricultural Center, Yuma, AZ. Plots were 4 beds X 30 ft, bordered on each side by 2 blank beds and on each end by 5 ft alleys. The test was a randomized complete block design with 4 replicates. Treatments included two standards at normal use rates for Lepidopterous pests, Confirm 2F at 8 oz/ac and Success at 5 oz/ac. We evaluated a low rate of Success at 1.5 oz/ac alone, and in combination with Warrior at 2.56 oz/ac. We also looked at the same rate of Warrior alone for comparison. In addition to these treatments we evaluated several unregistered insecticides. Proclaim 5SG was evaluated at 0.15 and 0.2 lbs/ac, and Intrepid 80WP at 1.28 oz/ac. All applications included the non-ionic surfactant Kinetic at 0.05%v/v.

Treatments were sprayed using a tractor mounted sprayer. The boom covered 4 rows, with 3 hollow cone TXV-4

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nozzles per row, one centered over the bed and two on angled drops on each side of the bed. Foliar treatments were applied on 14 and 29 October, when the lettuce was 8-10 leaves and 16-18 leaves respectively.

Populations of cabbage loopers, beet armyworms and Heliothis were estimated by counting their number of small larvae (1st and 2nd instar) and large larvae (3rd - 5th instar) from 10 plants per plot at 5 to 7 days after treatment (DAT). Data were analyzed using ANOVA, and a F protected LSD ($P \leq 0.05$).

Results and Discussion

All the treatments contained significantly fewer large and total cabbage looper larvae than the untreated (Figure 1). Among the insecticides, Proclaim and Success at the high rates were especially efficacious followed closely by the low rate of Proclaim and Success + Warrior. Intrepid and Warrior were intermediate, while Confirm and the low rate of Success appeared were weak. Previous studies have also indicated that Confirm may be weak against loopers on larger lettuce plants and may benefit from the addition of a pyrethroid. Although the low rate of Success alone did not proved commercially acceptable looper control, it did when mixed with Warrior.

Confirm and Intrepid did not differ from the untreated in Heliothis control (Figure 2). Confirm is known to be weak against Heliothis, and although Intrepid is thought to be more active against this pest, it did not provide acceptable control at the rate we tested. Warrior's activity towards Heliothis was intermediate. It did not statistically differ from any of the insecticide evaluated. However, for tank mix comparison reasons, we were evaluating a low rate for Heliothis, 2.56 oz/ac, a normal rate for this target pest would be 3.84 oz/ac. The remaining insecticides and tank mixes provided good control of Heliothis.

All the insecticides and tank mixes evaluated contained fewer large beet armyworm larvae than the untreated (Figure 3). However, Warrior alone contained more large armyworms than the other insecticide treatments. This was not surprising since we used a low rate of Warrior and pyrethroids in general are weak on armyworms.

Overall, both rates of Proclaim and the high rate of Success were highly effective across all worm species encountered. The low rate of Success provided sufficient control of Heliothis and beet armyworm, but was weak against cabbage looper. While the low rate of Warrior we evaluated was not especially active against any of the target species, when mixed with the low rate of Success, it provided good control of all the species, and was statistically similar to the higher rate of Success. Although Intrepid appeared slightly more active than its sister compound Confirm, it appears that it too will benefit from the addition of a pyrethroid for control of Heliothis and cabbage loopers on large plants.

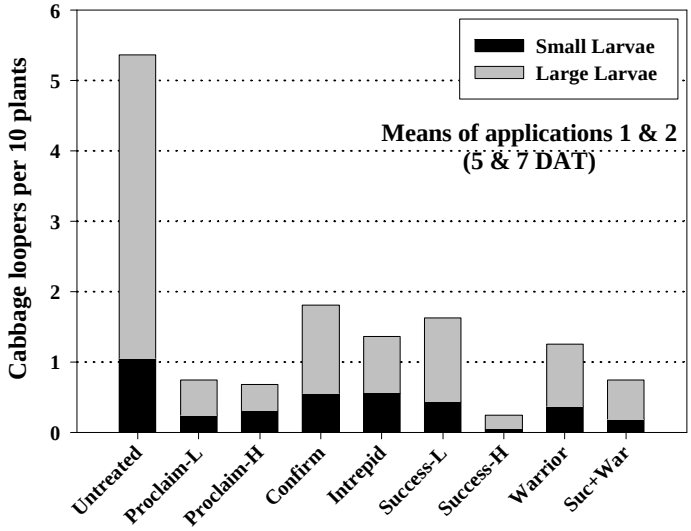

Figure 1 Efficacy of insecticides and insecticide mixtures to small (1st - 2nd instar) and large (3rd - 5th instar) cabbage looper larvae on head lettuce following two applications at 8-10 and 16-18 leaves respectively.

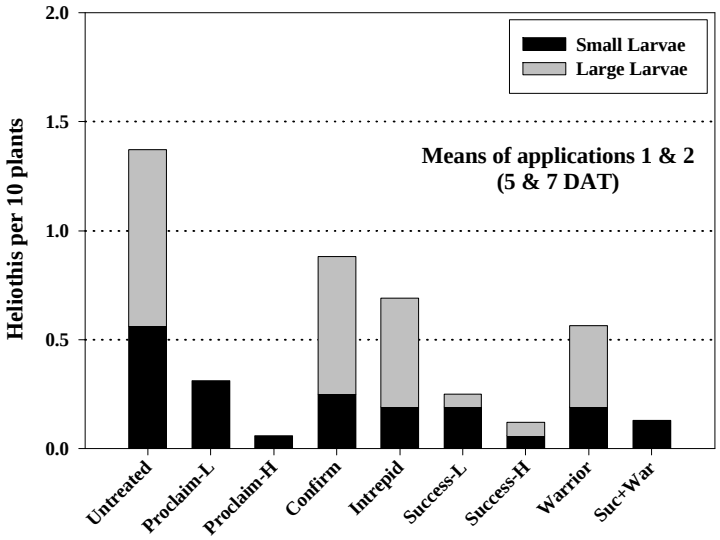

Figure 2 Efficacy of insecticides and insecticide mixtures to small (1st - 2nd instar) and large (3rd - 5th instar) Heliothis larvae on head lettuce following two applications at 8-10 and 16-18 leaves respectively.

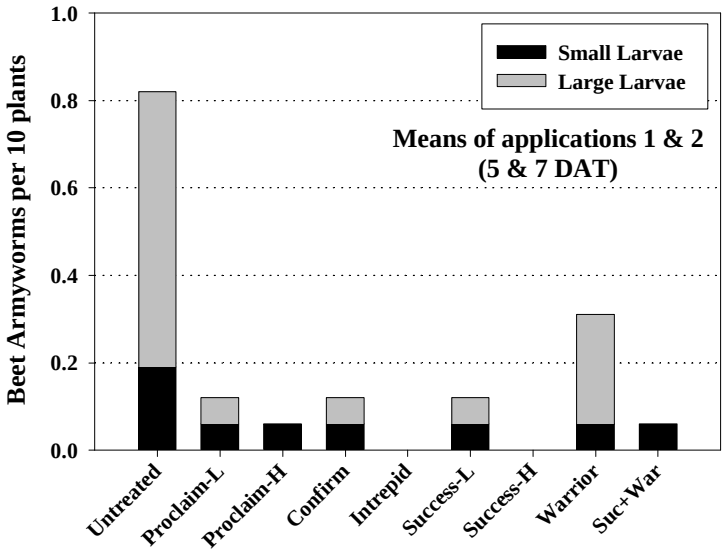

Figure 3 Efficacy of insecticides and insecticide mixtures to small (1st - 2nd instar) and large (3rd - 5th instar) beet armyworm larvae on head lettuce following two applications at 8-10 and 16-18 leaves respectively.