

Wireworm control experiment in potatoes in Abingdon, VA in 2011

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Wireworms (Fig. 1) are the soil-dwelling larvae of click beetles. They can cause serious damage to potato crops by tunneling into tubers (Fig. 2), which reduces yield quality and creates entry points for certain plant pathogens that can rot the tuber. In 2010, potatoes that were planted at the Southwest Virginia 4-H Center in Abingdon, VA suffered tremendous wireworm damage. In 2011, we conducted an experiment in this same field to evaluate the efficacy of various insecticide treatments that might reduce damage by this pest.



Fig. 1. Cornfield wireworm, *Melanotus* spp. (Coleoptera: Elateridae)

Materials & Methods

On May 6, 2011, furrows were plowed and ‘Kennebec’ seed potatoes were hand-planted approximately 12 inches apart within rows. Experimental design included 9 treatments (see below) arranged in a randomized complete block design with 4 reps. Individual plot sizes were one row x 20 ft. (3 ft. row centers) without guard rows. All plots were maintained according to standard commercial practices. Insecticide treatments were applied in-furrow over top of the seed, or post-emergence banded on the side of emerged plants, or a combination of both as described in Table 1. Insecticides included all products that are currently registered for use on potatoes in Virginia including: Admire Pro (imidacloprid); Capture LFR (bifenthrin); Brigadier (imidacloprid + bifenthrin); and Regent (fipronil). All in-furrow insecticide treatments were applied in 900 ml of water at 19.8 GPA on 6 May using a single nozzle boom equipped with an 8003 even flat spray tip powered by a CO₂ backpack sprayer at 30 psi. Immediately after the treatments were applied over top of seed-pieces, the seed was covered. Post-emergence banded treatments of insecticides were applied at drag-off on 30 May using the same spray boom and volume as described above. On 2 Sep, 50 tubers were dug per plot and examined for wireworm damage. The % tuber damage data were analyzed using analysis of variance procedures. Means were separated using Fisher’s LSD at the 0.05 level of significance. Data were sqrt transformed to normalize when necessary.



Fig. 2. Potato tubers damaged by wireworm.

Results

On May 31, 2011, we observed significant numbers of tobacco flea beetles (*Epitrix hirtipennis*) on the potato plants. Although this experiment focused on controlling wireworms below ground, there were noticeable differences among the treatments in the amount of leaf damage by this pest. Data were recorded, and significant differences were found in the % of leaves severely damaged by flea beetles (Fig. 3). All insecticide treatments that included Admire Pro and/or Brigadier had significantly less leaf damage than the untreated control or other insecticides (Table 1). This is not surprising because imidacloprid, the active ingredient in both Admire Pro and Brigadier, is systemic and effective against leaf-feeding beetles.



Fig. 3. Leaf damage by flea beetles.

Regarding wireworm control, there was a significant treatment effect. Although none of the insecticides eliminated wireworm damage completely, all treatments significantly reduced wireworm injury to tubers compared to the untreated control. A treatment of Brigadier @ 12 fl. oz/A + Admire Pro @ 3.48 fl. oz/A applied in-furrow then followed by a 2nd Brigadier post-emergence application @ 12 fl. oz/A provided the best protection against wireworm damage, although similar control was also achieved with Regent 4SC applied in-furrow or a combination of Capture LFR @ 25.5 fl. oz/A + Admire Pro @ 3.5 fl. oz/A. In conclusion, potato growers have several insecticide options that can help reduce wireworm injury to potatoes. Some of the products, including Brigadier and Admire Pro will also provide control of above-ground insect pests such as Colorado potato beetle, flea beetle, and potato leafhopper.

Table 1. Summary of insecticide efficacy experiment for control of wireworms in potatoes, Abingdon, VA 2011.

Treatment	Rate / acre	% of potato leaves severely injured by flea beetles 31 May	% wireworm damage
1. Untreated Control		86.0 a	41.0 a
2. Brigadier + Admire Pro (in-furrow) + Brigadier (post-emergence)	16 + 3.48 fl. oz 6.4 fl. oz	0.0 b	20.0 bcd
3. Brigadier + Admire Pro (in-furrow)	16 + 5.22 fl. oz	16.0 b	29.0 ab
4. Brigadier + Admire Pro (in-furrow) + Brigadier (post-emergence)	12 + 3.48 fl. oz 12 fl. oz	0.0 b	11.5 d
5. Brigadier (in-furrow) + Admire Pro + Brigadier (post-emergence)	12 fl. oz 3.48 + 12 fl. oz	10.0 b	24.0 bc
6. Brigadier (in-furrow)	25.5 fl. oz	20.0 b	20.0 bcd
7. Capture LFR + Admire Pro (in-furrow)	25.5 + 3.5 fl. oz	0.0 b	16.0 cd
8. Capture LFR (in-furrow) + Capture LFR + Admire Pro (post-emergence)	12 fl. oz 12 + 3.5 fl. oz	66.0 a	18.0 bcd
9. Regent 4SC (in-furrow)	3.2 fl. oz	70.0 a	15.5 cd
<i>P-Value from ANOVA</i>		0.0001	0.0022

* Numbers within a column followed by the same letter are not significantly different (P > 0.05).