Section IV
Potato Pests

CONTROL OF APHIDS AND COLORADO POTATO BEETLES IN POTATOES

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We report the results from two chemical trials conducted at the Oregon State University Hermiston Agricultural Research and Extension Center (HAREC) during the 2011 growing season. The main objective was to evaluate the efficacy of various seed and foliar treatments against aphids and Colorado Potato Beetle. The potato seed variety used was Russet Ranger; plot size: length 11.33 ft x width 30 ft. The experimental design was a randomized complete block with 4 replications per treatment. Field plots followed commercial standards and procedures. Potatoes were planted 19 April, and fertilizer was applied 30 March (pre-plant fertilizer), 14 June, 21 June, 30 June, 6 July, 13 July, 21 July, and 27 July (30 lbs N Solution 32). Herbicides were applied on 7 May (Glyphosate at 24 oz/acre) and 26 May (Matrix at 1 1/2 oz/acre, Dual at 16 oz/acre, and Senecor at 1/3 lb/acre). Fungicides were applied on 6 July (Dithane at 1.5 lbs/acre), 12 July (Bravo at 1.5pts/acre), 20 July, 27 July, 27 July, 2 August, 11 August, 16 August (Dithane at 1.5 lbs/acre). For the seed insecticides treatments tubers/seed pieces were treated on site just prior to planting. Slurry rates were adjusted to allow sufficient coverage of seed pieces.

Insect counts began on 1 June 2011 and continued weekly until 25 August 2011. Aphids were sampled using the "bucket method", a technique recommended for the region. Ten plants per plot were randomly selected from the two inner rows in each plot each week. A plastic bucket was placed below the stems of each potato plant, and the stems were shaken for 5 seconds to allow aphids to drop into the bucket. All aphids that dropped into the bucket were identified, counted and recorded. Colorado Potato Beetles were visually inspected. Number of eggs, larvae, and adults were counted from 5 individual plants per plot.

The response variables were aphid or Colorado potato beetles counts per plant. Insect counts were analyzed for each sampling date and fitted with a linear model: $y_{ij} = \mu + \alpha_i + \beta_j + \alpha_i \beta_j + \varepsilon_{ij}$, followed by means separation with least significant difference (LSD) tests. Since insect counts involved sub-sampling plots, we used the Type III mean square for the block*treatment interaction as an error term to test the hypotheses of no treatment effect. This error term was

also used for the LSD tests. Means were considered significantly different when *P* values were ≤ 0.05.

Results and Discussion

Seed treatment efficacy against aphid and Colorado potato beetle

Aphid population levels were low throughout the 2011 growing season. On only one occasion did aphid counts exceed one aphid per plant in control plots. Subsequent to 29 July, aphid levels dropped and remained low throughout 25 August when we terminated our sampling regime (Fig. 1). At 65 d, 72 d and 86 d post planting means separated indicating significantly lower aphid counts on plants where seeds potato received insecticide or fungicide/insecticide combinations treatments. Under low aphid pressure, seed treatments can provide more than 80 days of protection. Similar situation was observed for Colorado potato beetle.

Efficacy of Cyazypyr against aphids

An application of insecticides was made on 14 Jun after at least 10% of sampled plants had at least one aphid per plant. Plants were sampled weekly post application. The mean number (±SE) of aphids per plant by treatment for all trial samples dates from 1 June to 17 Aug. Despite application, aphid population levels remained above one aphid per plant in all trial plots through 29 June. A second application of insecticides was made to potato plants on 1 July. All treatments reported significantly lower aphid populations than control plots. Aphid populations remained very low in all trial plots throughout the duration of the trial. A certain level of significance was also observed in the control of the Colorado potato beetle.

Fig. 1 Effect of seed insecticides on populations of aphids, Hermiston, OR 2011. Maxim 4FS (Control).