Evaluation of Control Strategies for Determining When to Apply Insecticides for Management of Potato Psyllid Infestations and Zebra Chip Incidence. Primary Focus Area – Pest Management

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Research Location: Texas AgriLife Research facility - Bushland

Need:
Potato producers are trying to manage “Zebra Chip” infection and psyllid yellows with a strategy of spraying multiple insecticide applications for season long control of potato psyllid and rotating insecticides among different chemical classes for insect resistance management. This strategy has been referred to as an “IPM program”. But, this approach is very costly, as insecticide costs alone can be over $300.00 per acre. Although chemicals are being rotated, potato psyllids are exposed to extensive amounts of insecticides. These season long applications disrupts the ability of natural enemies of psyllids from assisting in the control of psyllid populations. This type of management strategy is strictly preventative without accounting for non-damaging or non-Liberibacter infected psyllid populations when making control application decisions. In 2010, we were the first to initiate a project to evaluate different control strategies for applying insecticide applications based on an adult psyllid trapping density or the presence of psyllid adults testing positive for Liberibacter. The development of a control strategy based on these criteria or on other adult and nymphal density samples have the potential of becoming an action threshold for making spray application decisions. This type of decision making tool has the potential of reducing insecticide usage while reducing ZC infections and keeping psyllid populations to non-damaging levels.

Objectives:
To evaluate different control strategies, based on psyllid adults, nymphs, or Liberibacter infected psyllid adults, as a tool for deciding when to spray insecticides during the potato growing season.

Approach:
A randomized complete block experiment will be conducted to evaluate different control strategies (treatments) under field conditions. The proposed treatments are 1) season long weekly foliar applications (farmer control), 2) applications when ≥ 3 psyllid adults are caught on yellow sticky traps each week, 3) applications when ≥ 6 psyllid adults are caught per 10 sweep net sample each week, 4) applications when any of the weekly trapped psyllid adults test positive for carrying Liberibacter, 5) applications when there are ≥ 5 psyllid nymphs per leaf, and 6) an untreated control. Five yellow sticky traps will be placed along the field margin and changed weekly. Weekly sweep net samples will be collected from treatment 3 plots. Five leaf samples per plot will be collected from all treatments weekly and the number of eggs and nymphs will be counted with a dissecting microscope. Insecticide applications of Ag-Mek with Fulfill will be applied according to the different treatment criteria. Field ratings of ZC diseased plants will be taken throughout the growing season. Yield samples (no. tubers, tuber wt., tuber size) will be dug and processed. Tubers will be inspected and fried for incidence of ZC and real time qPCR will be used to detect and quantify Liberibacter in psyllids and symptomatic plants.

Expected Outcome:
The ultimate goal is to identify management action thresholds for making application decisions for protection against damaging potato psyllid infestations and ZC infections. Producers and crop consultants will have a tool for making control decisions that will be cost effective and environmentally compatible.

Budget: $20,000.00