MPIC-05-10

Michigan Potato Industry Commission Competitive Grants Proposal (FY-10)

Project Title: **Late Season Weed Control in Low Vine Vigor Varieties**
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Background:

Potato varieties are known to have growth habits which can affect late season management. Weed control in potato is most effective when implemented as a preventative system as few herbicides are available for postemergence weed control. The greatest weed problems often are late in the season in varieties with low vine vigor, and after postemergence herbicides have been applied. Grass weeds such as large crabgrass, giant foxtail, and barnyardgrass and broadleaf weeds including nightshade, common purslane, and common lambsquarters often germinate in July and compete with potatoes for nutrient resources during the critical bulking period in late July to early September. Presence of weeds also creates management concerns as they can act as alternate hosts for diseases or insect pests. Also, weeds have the negative physical effect of intercepting fungicide and insecticide deposition, providing "non-treated" areas for insects and diseases to persist.

The presence of these weeds presents several management questions, specifically: How do potato varieties compete with late season weeds? Will the use of additional herbicide applications control late season weeds? What are the best combinations of management practices to control late season weeds in potato?

Objectives:

1) Determine the effect of vine vigor on competition with late season weeds.
2) Evaluate if an early postemergence application aids in late season weed control.
3) Investigate the impact of multiple herbicide applications on potato growth and yield.
4) Determine the economic impact of additional herbicide applications and vine vigor on potato production.

Materials and Methods:

Tubers will be planted in early May at the Montcalm Research Farm at a 10-inch spacing in rows 34-inches apart. Treatments will be replicated four times; and arranged in a split-plot factorial design with main plots of potato variety (Snowden and FL 1922) and sub-plots of herbicide timing (early postemergence and postemergence applications). Preemergence herbicides will be applied to all plots and consist of Dual Magnum at 1.33 pt/A plus Lorox at 1.5 qt/A; early postemergence options will include Prowl at 1.8 pt/A, Boundary at 1.5 pt/A, V10142 at 8.5 oz/A, and No Early Postemergence; postemergence options will consist of Matrix at 1 oz/A, Sencor at 0.33 lb/A, V10142 at 8.5 oz/A, Matrix plus Sencor, and No Postemergence for a total of 40 treatments.

Potato tolerance and weed control will be evaluated by visually assessing plots every 2 weeks for 8 weeks after the postemergence treatment. Potato tubers will be harvested and graded; and internal defects will be estimated. Tuber numbers for each group and weights (CWT) will be taken. Data will be presented as total yield and marketable yield per unit planted. Data will be analyzed using ANOVA and treatments separated using mean separation with Fisher's Protected

LSD. We would like to conduct this research for two years, in order to evaluate treatments under two different environmental conditions.

Outcomes:

Results of this research will improve weed management programs for producers in the Michigan potato industry. From this research weed control recommendations can be made to growers that will improve late season weed control and reduce competition and interference due to weeds. This information will be reported to the Michigan Potato Industry Commission, county Extension agents, private agricultural consultants, and to the academic community.

Budget (see attached):

Materials Needed: We are asking that the seed industry supply Snowden and FL 1922 seed for the study.

Budget Justification:

Undergraduate Students: Based at $12.00/hr.

Materials and Supplies: Supplies needed to conduct the research.

Travel: Several trips will be needed to and from the Montcalm Research Farm to conduct this research.

Publication (Year 2 only): We would like to publish the results of this trial in a peer-reviewed scientific journal.

PROJECT BUDGET

Budget Item	FY-10	FY-11
(A.) Personal Wages		
(A1.) Research Associates		
(A2.) Graduate Students	5,000	5,000
(A3.) Technical, Shop & Other		
(A4.) Secretarial & Clerical		
(A5.) Undergraduate Students	2,000	2,000
(B.) Total Personal Costs	7,000	7,000
(C.) Equipment Cost (Attach Explanation)		
(D.) Materials & Supplies	1,000	1,000
(E.) Travel	2,500	2,000
(F.) Publication		500
H. Other Costs (Attach explanation, list of items and individual costs.)		
TOTAL:	10,500	10,500