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Organic Control of Colorado Potato Beetles in Potato Production

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Organic Control of Colorado Potato Beetles in Potato Production

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Abstract

Organic controls of the Colorado potato beetle *(Leptinotarsa decemlineala)* were tested in 2006 at Mount Saint Benedict Gardens in Crookston, MN. The control methods tested were PyGanic, diatomaceous earth, and two companion plantings. Potato varieties used were Russet Norkotah, Pontiac, Yukon gold, and Kennebec. The diatomaceous earth and the PyGanic exhibited control over the pest.

Materials & Methods

A study was conducted to investigate the use of four organic methods of control for Colorado potato beetles (*Leptinotarsa decemlineala*). The study was composed of plots consisting of four potato varieties; four of these plots use different organic means to control the pest; two companion plantings, an organic pesticide, diatomaceous earth and a control, the other being the control plot. Each plot was four feet by four feet

The potatoes were planted on May 24, 2006. The conditions during the growing season were quite dry; however, the plots were irrigated on a regular basis. The garden consisted of two different areas where potatoes were planted. One being the treatment plots and the other location was planted for the produce. The garden with the produce potatoes was approximately a half mile west of the treatment potatoes and those that were further west were infested with potato beetles almost a month prior to those plants in the treatment plots. The plots consist of the following varieties: Russet Norkotah, Pontiac, Yukon gold, and Kennebec.

The Russet Norkotah has a maturity of 95-110 days. These potatoes have poor drought tolerance due to a small root system. They also have the potential to yield over 400 cwt/acre under good conditions (Univ., 2006).

Red Pontiac is a late season variety potato, consisting of round to oblong tubers. This potato has a dark skin with white flesh and a low specific gravity. These potatoes also have a high yield potential. The plants of this variety are large with thick stems, and have some drought tolerance (Wing, 2006).

Yukon Gold has medium – early maturity. The skin and flesh are both light gold in color. They also have a medium-high specific gravity with some susceptibility to ozone damage (Univ. 2, 2006).

The Kennebec is a mid to late season variety. The plants are large and dark green in color. They are typically a large yielding, fast growing variety. The tubers have a thin smooth white skin. They also have a medium high specific gravity. (Canada, 2006)

The first treatment tested PyGanic for control of Colorado potato beetles. PyGanic contains a pyrethrum which is a botanical insecticide derived from chrysanthemums. Pyrethrums also have a low toxicity people as well as vertebrates, it is a non – carcinogenic, and it is also non-mutagenic. PyGanic contains 5% of the active ingredient pyrethrum and is manufactured by the McLaughlin Gormley King Company. The PyGanic trial was sprayed on July 10, 19, and August 2. Using ½ oz of PyGanic with 1 ½ gallons of water (McLaughlin, 2006).

The second treatment tested the use of diatomaceous earth to control potato beetles. Diatomaceous earth is composed of the fossilized remains of diatoms. The shells of diatoms contain sharp spines which aid in the control of pests. The spines

actually pierce the soft body tissues of larval stage insects as well as adults by damaging soft tissue between their hard exoskeletal plates. These wounds cause the insect to become dehydrated and eventually die. This trial was sprayed on July 10, 19, and August 2, using 1/8 C of diatomaceous earth with 1 gallon of water. After spraying the plants with the mixture the plants were then dusted with the diatomaceous earth, while the leaves were still wet (Korunic, 1998).

The third treatment was the control plot which received no treatment.

The fourth treatment was a companion planting trial. This was done using Red Beauty pepper plants and planting side by side potatoes with peppers. Both the larvae and adults are known to feed on pepper plants, since they are from the same family as potatoes (solanaceae). The pepper plants were planted in the rows with the potatoes to deter the beetle from the potato plants (Ragsdale,2001).

The fifth treatment was another companion planting trial using eggplants. The theory behind this trial is similar to that of the pepper companion planting trial with potatoes. The eggplants are used as a trap for the potato beetles, to hopefully reduce the infestation in the potatoes (McClure, 1994). In conclusion, in both of these companion planting trials I found no physical evidence that led me to believe that the Colorado potato beetles were more attracted to the trap plants rather than the potatoes.

Results

Variety	Trial	No. of Plants	No. of Potatoes	Lbs. of Potatoes	Ave. No./ Plant	Ave. Potato Weight
Norkotah	PyGanic	12	36	5.8125	0.484	0.161
Norkotah	Diatomaceous Earth	12	39	4.8125	0.401	0.107
Norkotah	Control	11	24	5.0625	0.46	0.211
Norkotah	Pepper Companion	10	24	5.45	0.545	0.227
Norkotah	Eggplant Companion	10	27	6.94	0.694	0.257
Pontiac	PyGanic	14	23	5.3125	0.379	0.231
Pontiac	Diatomaceous Earth	14	28	5.25	0.375	0.188
Pontiac	Control	17	18	3.69	0.217	0.205
Pontiac	Pepper Companion	15	29	4.75	0.317	0.164
Pontiac	Eggplant Companion	13	29	6.81	0.524	0.235
Yukon	PyGanic	12	15	3.75	0.321	0.25
Yukon	Diatomaceous Earth	12	20	4	0.333	0.2
Yukon	Control	14	19	4.8125	0.289	0.253
Yukon	Pepper Companion	13	17	3.69	0.248	0.217
Yukon	Eggplant Companion	10	22	5.125	0.513	0.233
Kennebec	PyGanic	19	34	5.0625	0.266	0.149
Kennebec	Diatomaceous Earth	12	25	4.25	0.354	0.17
Kennebec	Control	14	35	4.5	0.321	0.129
Kennebec	Pepper Companion	11	21	4.25	0.386	0.202
Kennebec	Eggplant Companion	6	32	6	1	0.187

Conclusion

When analyzing the data there are a number of things to look at for it depends on which factor of production the producer is looking to improve. One example is the size of the potato per plant versus the total yield of the potato plant. According to the data the Yukon variety and control yielded the largest potatoes and the largest number of potatoes per plant was the Norkotah trial using control of companion planting with eggplants.

I feel that these trials are a good start at researching the effects that the organic treatments have on potato beetles. This study should be replicated on a much larger scale to ensure that the results are accurate. More questions that should be considered is the soil fertility as well as weather conditions.

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