

# ONTARIO PROCESSING VEGETABLE GROWERS RESEARCH SUMMARY RESULTS - 2002

## THE DEVELOPMENT OF PEST MANAGEMENT STRATEGIES FOR INSECTS AND PLANT DISEASES IN PROCESSING VEGETABLES.

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### CABBAGE

**BLACK ROT CONTROL IN CABBAGE USING BONZI + ACTIGARD - 2002.** The incidence of black rot was insignificant and levels of control could not therefore be assessed. BONZI 4 did indeed reduce the plant height of the transplants in the greenhouse prior to transplanting however within 4 weeks in the field the plants had grown out of the growth regulatory effects and in fact had caught up to the untreated plants with no apparent effect on yield or cabbage quality. The addition of ACTIGARD applied in the greenhouse or Alexin applied in the field did not have any measurable effect on the growth or vigour of the cabbage plants.

**CONTROL OF CABBAGE MAGGOTS USING A TRANSPLANT DRENCH TREATMENT IN SEEDLING TRAYS.** None of the insecticide treatments at either the low or high rates tested showed any signs of injury to the seedling cabbage transplants nor throughout the entire season.

**CONTROL OF CABBAGE FOLIAR INSECTS USING Btk PRODUCTS - 2002.** A seven-day foliar insecticide spray interval of either the M2 and M4 formulations of *Bacillus thuringiensis var. kurstaki* were equal to but no better than the commercial Btk formulation DIPEL 2XDF for controlling the Imported cabbageworm and diamondback moth larval populations in cabbage. The most effective material for insect control in cabbage was the synthetic pyrethroid DECIS 5.0EC. Further extending the spray schedule intervals to 14 days resulted in less insect control. The M2 and M4 materials proved effective in an earlier laboratory trials suggesting that the Btk materials when applied outdoors subjected to high temperatures and light intensity need to be supplemented with products such as molasses or other protectant materials to extend the effectiveness of the Btk products.

**THE EFFECT OF ALEXIN ON INSECT CONTROL IN CABBAGE - 2002.** Multiple applications of the Alexin with purported systemic acquired resistance (SAR) properties were not sufficiently potent to induce control of cabbageworms. Insect pressures were reduced only when DIPEL 2XDF was added to Alexin.

### PEPPERS

**TO ASSESS THE EFFICACY OF FOLIAR APPLICATIONS OF AMMONIUM LIGNOSULPHONATE FORMULATIONS FOR THE CONTROL OF BACTERIAL SPOT AND SPECK IN FIELD TOMATOES AND PEPPERS - 2002.** The powdered formulation of Ammonium lignosulphonate (ALS) significantly reduced the number of bacterial spot lesions on the foliage of peppers at the medium and high rates (4 and 8%). The liquid formulation of ALS was less effective than the powdered formulation showing only a slight lessening of the bacterial lesions when compared to the control. The most effective treatment was the standard KOCIDE DF + BRAVO 500 treatment in reducing bacterial spot lesions observed on pepper foliage. Pepper yields were not adversely affected with the addition of foliar applied ALS.

Under higher bacterial pressures, under irrigation neither of the ALS formulations reduced the number of bacterial spot lesions on the foliage of peppers. Bacterial spot lesion numbers however were significantly reduced using the commercial KOCIDE DF + BRAVO 500 combination. Spray applications especially KOCIDE DF + BRAVO 500 slightly lowered the number of pepper fruits harvested.

Under the moderate to high bacterial disease pressures created using the mist system devised, the ALS powder formulation proved slightly better in reducing bacterial speck foliar symptoms and the number of fruit lesions on tomato fruit than the liquid ALS formulation. Higher and more significant control of bacterial spot was observed using ALS however the differences between the powder and liquid formulations were not observed. Under this level

of bacterial pressure the commercial standard program using KOCIDE DF + BRAVO 500 provided significantly higher levels of bacterial speck and spot control than either of the ALS formulations. ALS formulations were not as effective in controlling the fungal diseases of Early Blight, Septoria and fruit anthracnose as the standard KOCIDE DF + BRAVO 500 applications.

In the non irrigated or misted tomato plot plots treated with ALS showed a browning tinge to the fruit although the residue was easily washed off. This tomato cultivar was a fresh market cultivar with the concern that the discolouration would be noticed in the marketplace. ALS did not show a consistent degree of bacterial spot control until just shortly after the rainfall prior to the August 17 evaluation. The level of control was marginal yet statistically significant when compared to the untreated control. The most consistent reduction of bacterial spot lesions on the tomato foliage was observed when KOCIDE DF + BRAVO 500 was used.

Under mild bacterial disease pressure marginal levels of control were observed when using ALS formulations to control bacterial speck on tomatoes. The highest reduction of foliar lesions was observed using KOCIDE DF + BRAVO 500.

**GROWTH CHARACTERISTICS IN VARIOUS PEPPER CULTIVARS TO APPLICATIONS OF BONZI AND ACTIGARD.** The application of Bonzi + Actigard sprayed onto peppers at the 2-leaf seedling stage in the greenhouse was evaluated to determine the growth regulator effect once established and grown in the field. It has been reported that Actigard, an inducer for the control of bacterial spot causes significant damage to pepper plants. It has been observed in tomatoes that the addition of Bonzi in this combination has reduced this damage.

The combination treatment Bonzi + Actigard had no significant effects in the number of leaves plants retained once transplanted in the field nor loss of flowers or fruit, but there was a disturbing trend that peppers were indeed damaged ever so slightly with this treatment. Although not significantly different, 56% of the pepper cultivars had 1 or more fewer leaves per plant when treated and 81 % of the pepper cultivars had fewer flowers or fruits when treated with Bonzi + Actigard in the greenhouse. It appeared that the greatest losses in fruit production were pepper cultivars' Red Knight, Sir Galahad, Hot Spot, Large Red Hot Cherry and Boynton Bell. Fruit production however was noted in other pepper cultivars such as in Red Start, Inferno and Lexington. It must be noted however that the only treatment affects that were statistically significant were readings of plant vigour where over half of the pepper cultivars showed an increase in plant vigour with non of the cultivar tested showed any adverse visual effects once planted in the field after being treated with Bonzi + Actigard in the greenhouse. Pepper yields were not taken so the increased vigour resulting from the Bonzi+Actigard treatments that may cause an initial slowing of fruit set, may subsequently catch up later on in the growing season.

**EFFECT OF THE METABOLIC PRIMER AUXIGRO ON THE PRODUCTION OF FIELD PEPPERS AND TOMATOES- 2002.** The application of the metabolic primer Auxigro with or without the assistance of the surfactant Sylgard did not appear to provide any significant growth promoting activity in either peppers or tomatoes. The season was considered dry.

**INFECTIVITY OF MYCORRHIZAL FUNGI IN PEPPERS.** The addition of the mycorrhizal inoculum to the roots of peppers did not improve plant vigour nor yield. Although not statistically significant there was a slight loss of early plant vigour with a numerical reduction in both pepper numbers counted at harvest and total fruit weight when the mycorrhizal inoculum had been applied. Root and soil samples were sent to the CFIA laboratory in Ottawa to determine the rate of colonization of the mycorrhizal organism in both the pepper roots and in the surrounding soil.

#### **SWEET CORN**

##### **EFFECTIVENESS OF AERIAL VS. GROUND APPLICATIONS OF WARRIOR 122 SC AND MATADOR 120 EC FOR THE CONTROL OF EUROPEAN CORN BORER IN SWEET CORN - 2002.**

There were no significant differences between the effectiveness of WARRIOR 122 SC and MATADOR 120 EC in controlling European Corn Borers in sweet corn. There was a significant difference however in the method of applying the insecticides especially at the Strathroy field site where the insect pressures were greater. Significantly more corn borers were controlled when MATADOR 120 EC was applied by ground application than by air with a similar trend favouring ground application for WARRIOR 122 SC.

**EVALUATION OF HEADLINE 250EC FOR THE CONTROL OF SWEET CORN FOLIAR DISEASES - 2002.** Under very light rust disease pressures due to the extensive dry summer, HEADLINE 250EC reduced the amount of rust observed in the trial. HEADLINE 250EC proved more effective than the BRAVO 500F treatment and as effective as TILT 250. Although not statistically significant rust lesions were visible on the lower rate treatments but were completely absent in the middle to higher rates of HEADLINE 250EC tested.

**TIMING OF FOLIAR FUNGICIDES FOR THE CONTROL OF RUST IN SWEET CORN - 2002.** Due to the extremely dry summer weather corn leaf rust did not develop sufficiently to allow for treatment comparisons.

**USE OF SEED TREATMENTS FOR THE CONTROL OF THRIPS, FLEA BEETLES AND STEWART'S WILT - RIDGETOWN - 2002.** Sweet corn emergence was improved only when one of the insecticide seed treatments was used. All of the insecticides including AMS 600FL, GAUCHO 480 and D&L worked equally well improving seedling emergence. There was considerable flea beetle scaring by July 27, but none of the seed treatment insecticides apparently persisted long enough to provide insect control. The level of Stewart's Wilt was relatively low reflecting possibly the late arrival of the flea beetles after the corn had grown and the seed treatment materials had possibly dissipated. Populations of thrips were low in this trial compared to the past two years and treatments could not be differentiated based on this low insect pressure. Plant vigour and feeding damage both reflected the benefits of the insecticides added compared to just adding the fungicide MAXIUM XL. The insecticides' AMS 600FL and GAUCHO 480 at either of the rates tested provided considerably higher levels of insect feeding damage control than did the seed treatment containing D&L.

**USE OF SEED TREATMENTS AND GRANULAR AT PLANTING APPLICATIONS IN SWEET CORN FOR THE CONTROL OF WIREWORM AND SEED CORN MAGGOTS - 2002.** The addition of the seed treatment MAXIUM XL, with fungicidal activity, significantly improved the emergence of sweet corn. The two at planting insecticides, COUNTER 15G and FORCE 1.5G, applied without the aid of a fungicide did not control or provide any additional benefit compared to the untreated control. However it was noted that seedling emergence was additionally improved beyond the benefits gained using the fungicide, in treatments using at least the higher rate of GAUCHO 480 and D&L (diazinon and lindane). The additional seedling emergence occurred beyond the fungal disease control suggesting control of root feeding insects possibly wireworm and/or seed corn maggots were reduced with the GAUCHO 480 and D&L treatments. Thrips populations were very much reduced this year. However, COUNTER 15G appeared to be the most effective product tested along with the higher rate of GAUCHO 480. The effect of seed treatments was observed well into the growing season with all of the MAXIUM XL treated plots having the highest plant vigour ratings.

#### **SNAP BEANS**

**USE OF SEED TREATMENTS AND GRANULAR AT PLANTING APPLICATIONS IN SNAP BEANS FOR THE CONTROL OF WIREWORM AND SEED CORN MAGGOTS - 2002.** Seed treatments containing the insecticides GAUCHO 480 and the at planting granular treatment COUNTER 15G provided the highest level of insect control resulting in significantly high plant vigour ratings and snap bean yields. None of the treatments caused any plant emergence problems. Early flea beetle control was achieved by all of the treatments containing insecticides although D&L and the lower rate of GAUCHO 480 were the least effective. Snap beans were attacked by leafhoppers which caused a yellowing of the foliage and a reduction in plant vigour ratings. The most effective treatments were the granular at planting treatment COUNTER 15G and the seed treatments containing GAUCHO 480 which reflected in the highest snap bean pod yields. The insecticide D&L was no more effective in controlling leafhopper damage than when the fungicide MAXIUM XL was used alone. The insecticide FORCE 1.5G was only moderately effective in controlling leafhopper damage in snap beans.

#### **SQUASH**

**CONTROL OF POWDERY MILDEW IN SQUASH USING CABRIO 20WG.** Powdery mildew control was observed early in the season, however by the end of August differences in efficacy were noted amongst the treatments. The highest level of powdery mildew control was achieved by any of the rates tested for BAS 51602F 38%WG. Equal control however was achieved by BRAVO 500 followed by BAS 51002F 70%WG and then BAS 51700F 300SC. CABRIO EG 20%WG was ineffective in controlling powdery mildew on squash.

### **CARBONATITE**

**EVALUATION OF CARBONATITE AND TURKEY/PEAT COMBINATIONS WITH CARBONATITE IN PROCESSING VEGETABLE CROPS - 2002.** Carbonatite alone or in combination with turkey manure and deep dug black peat did not show any beneficial influence on any of the processing vegetable crops including peppers, potatoes, sugarbeets, sweet corn and tomatoes in this first year of soil amendments. Apparently the applications of these materials were not applied in sufficient quantities to affect the growth and yield in year one of applications. It is often noted with soil amendments that multiple year applications must be made before any significant effects are observed.

### **MYCONATE**

**EVALUATION OF MYCONATE IN PEPPERS, POTATOES, TOMATOES AND CUCUMBERS - 2002.** MYCONATE treated vegetable plants showed an increase in weight per fruit and ultimately total yields. There were very few consistently noteworthy plant growth responses throughout the growing season. In peppers there was a statistically significant increase in both fruit numbers and total pepper yields. Although not statistically significant, plant vigour ratings increased, relative to the check plots, later on in the season resulting apparently from more of the bottom pepper foliage remaining in the MYCONATE treated plots. In potatoes, yields were increased especially in the cultivar Russet Burbank where the MYCONATE appeared to increase the number of stems, but showed little differences in plant vigour ratings. MYCONATE treated plots did not reduce the incidence of potato leafhoppers in either of the potato cultivars. In tomatoes, yields were not statistically different however as in all the trials yield numbers were higher in the MYCONATE treated plots. There was however a significant difference in the number of tomato plants that remained healthy in the plots, with fewer missing plants noted at location #1. In cucumbers MYCONATE treated plants showed a numerical increase in the average weight of harvest able cucumbers even though the number of fruits seemed to be reduced. There were a significant number of cucumber plants that remained greener in the MYCONATE treated plants. In general there was a positive effect in the growth and yield of MYCONATE treated vegetable plants. Further replications or larger plots would possibly show greater statistical significance between treatments.

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