

# ONTARIO TOMATO RESEARCH INSTITUTE

## RESEARCH SUMMARY RESULTS

### THE DEVELOPMENT OF PEST MANAGEMENT STRATEGIES FOR INSECTS AND PLANT DISEASES IN PROCESSING TOMATOES - 2001

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#### URMULE

The registration submission to PMRA for the use of KOCIDE 101 in the greenhouse for the control of bacterial diseases was finally granted.

#### FUNGAL DISEASES

##### **EVALUATION OF BRAVO ULTREX VS BRAVO 500F AND QUADRIS 250SC FOR THE CONTROL OF EARLY BLIGHT, SEPTORIA AND ANTHRACNOSE IN FIELD TOMATOES**

Weather conditions mid way through the season were extremely dry, delaying the development of tomato diseases until mid September. The number of fungicide spray applications were actually increased due to the trial protocol fixed scheduled spray program so that the treatment differences could be evaluated under conditions favourable for disease development.

BRAVO 500F alone or applied every other spray with QUADRIS 250SC provided outstanding control of foliar and fruit diseases affecting field tomatoes. BRAVO ULTREX 82.5DG was also an effective fungicide treatment for tomatoes but was not as effective as the BRAVO 500F formulation. All treatments controlled anthracnose with the higher rates of QUADRIS alternated with BRAVO 500F reducing the anthracnose numbers to the lowest counts.

##### **CONTROL OF FUNGAL DISEASES IN FIELD TOMATOES - Trial 1.**

The fungicide combination AMSF187 15WG + AMS21618 250SC provided outstanding control of the tomato foliar diseases. The addition of the surfactant AGRAL 90 did not improve this combination treatments overall disease control. FLINT 50WG was less effective in controlling foliar diseases as noted on September 15 although quite effective nevertheless. FLINT 50WG reduced the % anthracnose numbers lowest of all the treatments especially at the higher rate.

##### **CONTROL OF FUNGAL DISEASES IN FIELD TOMATOES - Trial 2.**

Although all of the treatments tested proved to be effective fungicides for disease control in field tomatoes the fungicide combination AMSF187 15WG + AMS21618 250SC provided the most consistent control throughout the season. The addition of the surfactant AGRAL 90 did not improve this combination treatments overall foliar disease control however the % Anthracnose counts were lower with the addition of AGRAL 90. Although not statistically different the lower rate of FLINT 50WG was numerically slightly less effective in controlling foliar diseases. The higher rate of FLINT 50WG reduced the % anthracnose numbers equal to BRAVO ULTREX 82.5WG and the combination fungicide treatment AMSF187 15WG + AMS21618 250SC including the surfactant AGRAL 90.

##### **EVALUATION OF TANOS AS A FUNGICIDE FOR USE IN FIELD TOMATOES**

Weather conditions mid way through the season were fairly dry, delaying disease development until late into August. The two chlorothalonil formulations, BRAVO ULTREX 82.5DG and BRAVO 500F effectively controlled the level of foliar fungal diseases throughout the entire season as well as reduced the fruit rot caused by anthracnose. MANZATE 200 DF was relatively ineffective in controlling both foliar fungal diseases, although clearly more effective than the non sprayed plot, as well as being ineffective in controlling fruit anthracnose late in the season. The addition of TANOS 50% WG, at either of the two rates tested following the initial two MANZATE 200 DF sprays, did not improve either the foliar fungal disease control or did it reduce the level of anthracnose control beyond the level controlled by MANZATE 200 DF applied alone.

#### **EFFECT OF HEADLINE 250EC AND CABRIO 20WG FOR THE CONTROL OF TOMATO FOLIAR AND FRUIT DISEASES**

Many growers are no longer following a 7-day fungicide spray program which significantly increases the number of sprays often extending the spray timing depending on the weather conditions. Many follow the spray guidelines of the weather timed spray program called TomCast.

A seven-day spray schedule of HEADLINE 250EC, BRAVO 500 and the combination BRAVO 500 + CABRIO 20WG were the most effective treatments for the control of foliar fungal diseases in field tomatoes. Control of these same diseases using CABRIO 20WG alone was slightly less, however still at a very high commercial level of disease control. Both HEADLINE 250EC and CABRIO 20WG effectively controlled the fruit disease anthracnose.

#### **EFFECT OF FOLIAR APPLICATIONS OF AMMONIUM LIGNOSULFONATE AND POTASSIUM PHOSPHATE FOR THE CONTROL OF FUNGAL DISEASES IN FIELD TOMATOES**

KOCIDE 101 provided the highest level of foliar fungal disease control however the combination of ALS + Acetic acid also proved to be as effective. ALS (ammonium lignosulfonate) and potassium phosphate provided moderate disease control while Actigard 50WG, Neem oil and fish emulsions were significantly less effective in controlling tomato foliage diseases. There was little difference between the treatments for the control of fruit anthracnose with KOCIDE 101 providing the least amount of anthracnose control.

#### **BACTERIAL AND FUNGICIDAL EVALUATION FOR THE CONTROL OF FOLIAR AND FRUIT DISEASES IN FIELD TOMATOES**

BRAVO ULTREX 82.5DG + KOCIDE 101, PENNCOZEB 75DG with or without Cuprofix 20% and DITHANE DF NT + KOCIDE 101 provided the highest level of fungal disease control. KOCIDE 101 was more effective in controlling fungal diseases than Cuprofix 20% while non of the Systemic Acquire Resistance products including Alexin, Messenger nor Resist were very effective in controlling fungal diseases in tomatoes. The weather conditions mid season was extremely dry, conditions that did not allow for the build up of bacterial diseases.

#### **BACTERIAL DISEASES**

##### **TIMING OF KOCIDE 101 APPLICATIONS IN TOMATO PLUG TRANSPLANTS**

KOCIDE 101 applied at the cotyledon and first true leaf stage of seedling plug plants had no significant adverse effects on tomato transplants even when sprayed up to 9 applications prior to transplanting. The multiple applications of KOCIDE 101 did increase the greenness of the seedling foliage.

##### **A SIMPLE TEST TO DETERMINE WHETHER OR NOT SEEDS HAVE BEEN TREATED**

The use of a simple test to identify whether or not tomato or pepper seeds were treated with either acid (HCL) or chlorine would be extremely useful for this industry. One hundred and thirty-five (135) seed samples, a combination of tomato and pepper seeds were collected from seedling greenhouses at the end of March 2001 to determine the effectiveness of these seed assay tests. The test for chlorine treated seeds was very good while the acid test appeared to give both false positives and negatives. The test required a judgment on the intensity of the colour change. Seeds with ratings above 3 would indicate a strong possibility of having been acid treated while seeds having a rating of 1 may be indicating the natural acids found on seeds. Also the low acid reading may be the result of being absorbed onto the seed pellet material which becomes problematic for this test. It was interesting that some seeds must have been both acid and chlorine treated while many others may not have been treated at all.

#### **PACLOBUTRAZOL**

##### **CONTROL OF BACTERIAL SPECK APPLIED TO SEEDLING TOMATO PLUG PLANTS USING ACTIGARD AND PACLOBUTRAZOL AND THE SUBSEQUENT EFFECTS IN THE FIELD**

Plant heights in the greenhouse were kept within a range of 1-2 cm through cultural activities so that each treatment could be transplanted in the field all at one time. There was a significant increase in plant weight when paclobutrazol was applied and a loss in plant weight when Actigard was applied. There appears to be a significant phytotoxic reaction when Actigard is applied to seedling tomatoes. The addition of paclobutrazol was able to make up for the phyto effect of the Actigard treatment. The application of paclobutrazol to seedling tomatoes increased the number of flowers observed earlier in the season. The slight phyto effect of Actigard remained after transplanting at least into June 20-25 as the plants taken from the field showed a lower fresh and dry weight than the

untreated control. Paclobutrazol on the other hand significantly increased the fresh and dry weight of all four tomato cultivars. A506 also had a safening effect of Actigard although not nearly to the degree that paclobutrazol provided. Actigard was not able to reduce either the fruit anthracnose fungal disease or the nutritional disorder blossom end rot. Plants treated with paclobutrazol appeared to have more blossom end rot a point suggesting that the plants were growing very fast during the period of drought observed in southwest Ontario this growing season. Actigard was able however to reduce the number of bacterial speck lesions on the foliage compared to the untreated control. The addition of A506 did not improve the level of control of bacterial speck however as mentioned A506 appears to safen the adverse phyto effect that Actigard has on tomato transplants. An interesting observation not anticipated was the remarkably high level of bacterial control when paclobutrazol was added to Actigard. Paclobutrazol applied alone had no substantial effect on reducing the number of bacterial speck populations or disease lesion however when combined with Actigard, it not only increased the safeness of Actigard reducing its apparent phyto effect on tomato plants but also improved the level of bacterial speck control in field tomatoes.

#### **EFFECT OF PACLOBUTRAZOL TREATED PLUG TRANSPLANTS ON THE ESTABLISHMENT AND YIELD OF FIELD TOMATOES**

There were no differences in plant establishment, i.e., plant stand counts however there was a significant difference in plant vigour between treatments. Paclobutrazol treated transplants applied at the two leaf stage in the greenhouse had a significant benefit improving the plant vigour in all three tomato cultivars N1069, CC337 and Peto 696 in the field throughout the summer. There were also significant differences observed, although not to the extent noted with paclobutrazol, with T22, the beneficial antagonistic fungi, Trichoderma, later in the season in tomato cultivar CC337 and with earlier benefits in Peto 696. The improved plant vigour ratings using paclobutrazol continued to show higher and earlier numbers of flowers, higher fresh and dry plant weights, significant advancement in fruit maturity and higher tomato yields. Although not statistically different there appeared to be a consistent trend across all three tomato cultivars with an increase in the number of fruit with blossom end rot when treated with paclobutrazol. This shows a significant difference in the rate of plant growth in a year that was extremely dry, conditions that favour blossom end rot in fast growing plants.

#### **COLORADO POTATO BEETLES**

##### **USE OF CALYPSO FOR THE CONTROL OF TOMATO INSECTS**

CALYPSO 480SC, at both rates tested, along with the commercial standard, ADMIRE 240F, effectively controlled the populations of Colorado potato beetles in field tomatoes. There were no significant differences in insect control amongst the sprayed treatments however all were significantly different in providing Colorado potato beetle control when compared to the non-sprayed control.

#### **SOIL AMENDMENTS**

##### **RESIDUAL BENEFITS OF A SINGLE YEAR'S APPLICATION OF SOIL AMENDMENTS (COMPOST) IN THE GROWTH AND PRODUCTIVITY OF PROCESSING TOMATOES**

Even after a year, the residual effect of applying spent mushroom compost to soil that was considered in "poor health" showed remarkable advantage in tomato growth. Unfortunately the summer of 2001 was extremely dry with the consequence that tomato yields were extremely low in this light soil. The increase in blossom end rot in the spent compost treatment is as much of a reflection of greater growth in those plots.

#### **ALEXIN & NUTRAPLUS**

##### **THE EFFECT OF ALEXIN ON THE GROWTH AND DISEASE SUPPRESSION IN FIELD TOMATOES**

Foliar applications of Alexin delayed the maturity of tomatoes resulting with fewer red fruits on the assessment day of August 29. It has been noted that many of the Systemic Acquired Resistant (SAR) products set back plant growth and are now being tested with fewer applications and in combination with products that promote plant growth.

##### **THE EFFECT OF NUTRAPLUS ON THE VIGOUR AND YIELD OF PROCESSING TOMATOES**

The benefits of foliar applications of NutraPlus could only be observed with multiple applications. Plant vigour was significantly improved.

My complete research abstracts are available through your board office or accessible through the Ridgetown College Web site: [www.ridgetownnc.on.ca](http://www.ridgetownnc.on.ca)