

ONTARIO TOMATO RESEARCH INSTITUTE

RESEARCH RESULTS

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PROJECT TITLE: THE DEVELOPMENT OF PEST MANAGEMENT STRATEGIES FOR INSECTS AND PLANT DISEASES IN PROCESSING TOMATOES - 1999

OBJECTIVES and RESULTS

1. To report and investigate the registration status of fungicides and copper used for processing tomatoes both in the field and for plug production in the greenhouse.

I have developed a listing of the current registration status for the fungicides and copper compounds used in the greenhouse and field tomatoes in Canada. A full report is available in my Insect and Disease Management booklet. I have been in contact with PMRA/Health Canada officers and chemical company representatives to determine the most efficient method of extending selected registrations.

HIGHLIGHTS

KOCIDE 101 is NOT registered for use in vegetable seedling greenhouse applications

There are no copper fungicides registered for use on greenhouse peppers.

If a product is registered on a crop in the greenhouse it can be used on both full term and seedling transplants.

Fungicides registered individually on a crop can be tank mixed. Growers assume all risks and responsibilities for tank mixtures.

If greenhouse use is not mentioned on the label or if the label is unspecified then field use only is implied. A product must have greenhouse indicated on its label to be applied in the greenhouse.

Pesticides applied to US destined crops must have a Canadian registration if applied in Canadian greenhouses or fields.

The industry must rely on URMULE - User Requested Minor Use Label Expansion Registrations, to update labels for effective utilization of several products with currently limited label recommendations.

Due Diligence - growers and processors are responsible.

2. Cultural practices to enhance earliness in processing tomatoes

An article in the September, 1999, Greenhouse Canad issue, outlines the collaborative work being conducted to determine the benefits of Paclobutrazol for earliness in tomatoes. Vincent Souza-Machado was quoted as saying, “the application of Paclobutrazol (as a foliar spray onto seedling tomatoes in the greenhouse) makes for a hardier tomato transplant which promotes earlier planting and earlier harvesting. An earlier harvest means the grower’s schedule fits better with the tomato processor’s schedule, and allows for more favourable weather conditions for growers to harvest in”. Details of this study are found in my Insect and Disease Management booklet.

3. & 4. To develop control strategies for foliar fungal and bacterial diseases in field tomatoes.

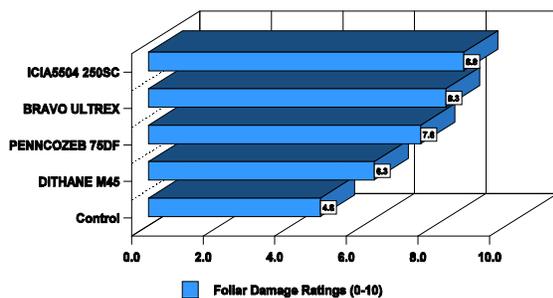
The following research trial titles and conclusions were conducted to address control strategies for both foliar fungal and bacterial diseases in field tomatoes.

FUNGAL DISEASE CONTROL IN TOMATOES

Under conditions of minimal disease pressure due to the dry weather, until late into the season, ICIA5504 250SC proved to reduce the incidence of foliar tomato diseases when applied alone or alternating with either BRAVO ULTREX or with PENNCOZEB 75DF or following applications of BRAVO ULTREX. DITHANE M45 was the least effective of the fungicides evaluated. Even during the early and summer dry periods the effectiveness of the first two fungicide applications proved significant. If either BRAVO ULTREX or ICIA5504 250SC were applied once or two times during this early apparently dry period the end of season control of tomato foliar diseases was improved. All the fungicide treatments provided control of tomato fruit anthracnose.

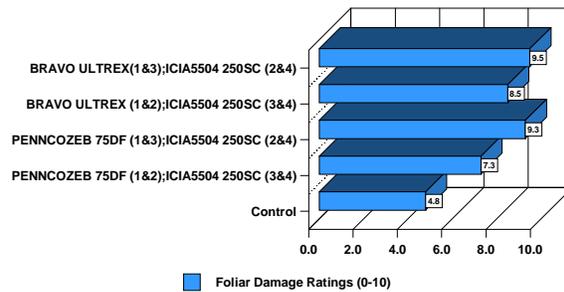
FOLIAR FUNGAL DISEASE CONTROL IN FIELD TOMATOES

FOLIAR DAMAGE RATINGS (0-10) 10= Excellent Control



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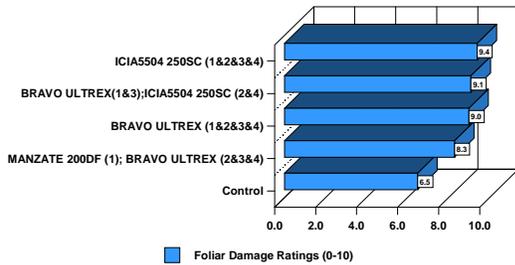


FUNGAL DISEASE CONTROL IN TOMATOES USING ICIA5504 SC

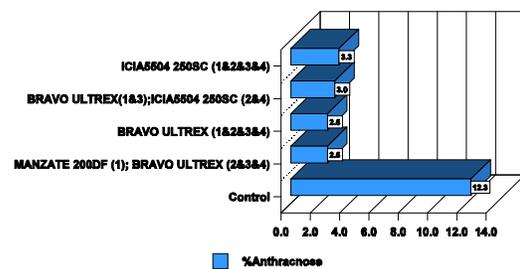
Under conditions of minimal disease pressure due to the dry weather, until late into the season, ICIA5504 250SC and BRAVO ULTREX proved to reduce the incidence of tomato foliar diseases and fruit anthracnose when applied alone or in an alternating spray program. Tomato disease control was maintained throughout the season. Initiating a spray program with MANZATE 200DF, then followed by BRAVO ULTREX provided equal tomato disease control. The lowest rate of 0.3L product/ha of ICIA5504SC provided excellent tomato disease control throughout the growing season. It was only late into the season, after most tomatoes had been harvested, that reduced control was noticed equal to the late season control provided by MANZATE 200DF.

FOLIAR FUNGAL DISEASE CONTROL IN FIELD TOMATOES USING ICIA5504SC

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FRUIT ANTHRACNOSE CONTROL IN FIELD TOMATOES USING ICIA5504SC

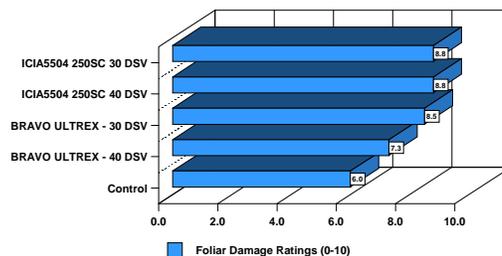


TOM-CAST SPRAYING USING NEW TOMATO FUNGICIDES

Under conditions of minimal disease pressure due to the dry weather, until late into the season, ICIA5504 250SC and BRAVO ULTREX proved effective in reducing the incidence of tomato foliar diseases and fruit anthracnose. The TOM-CAST model recommended 5 foliar fungicide applications based on spraying every 20 DSV, 4 for 30 DSV and 3 for 40 DSV . The two new fungicides/formulations were evaluated as to their ability for extending the spraying intervals to 30 and 40 DSV. The standard spray interval has been set at 20 DSV. The actual spray dates corresponding to either a 30 DSV or a 40 DSV interval are listed in Table 1 in the trial booklet. The foliar disease ratings indicated that spraying tomatoes under this year’s weather conditions, at either the 30 or 40 DSV spray intervals, significantly reduced the amount of foliar disease by September 15. It was noted that at a spray interval of 40 DSV, the fungicide ICIA5504 provided greater foliar disease control as well as reduced anthracnose counts than BRAVO ULTREX at that 40 DSV spray interval. This suggests that the spray intervals can be extended over a longer time period when using the new fungicide ICIA5504 250SC.

TOM-CAST SPRAYING USING NEW TOMATO FUNGICIDES

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USE OF SURFACTANTS TO IMPROVE THE EFFECTIVENESS OF COPPER FOR THE CONTROL OF FOLIAR DISEASES IN TOMATOES

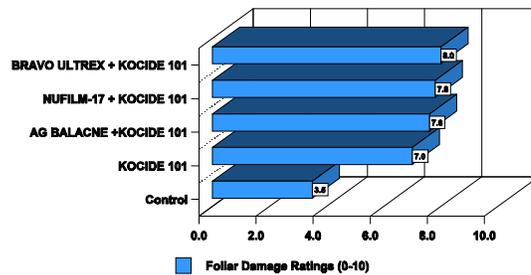
Since the tomato transplants were obtained from a greenhouse where considerable bacterial spot was observed the initial intent was to evaluate the following treatments on their effectiveness to control bacterial spot. The bacterial disease did not spread and reinfest the tomatoes once in the field due to the dry weather conditions this past summer. Foliar fungal diseases were evaluated instead.

The addition of NUFILM-17 at the 0.1% v/v rate significantly improved the effectiveness of KOCIDE 101 in its ability to control foliar fungal diseases in tomatoes. Fungal disease control could also be improved with the addition of BRAVO ULTREX presumably aided by the surfactant incorporated in the BRAVO formulation. The surfactant AG BALANCE only slightly improved the activity of KOCIDE 101.

As mentioned earlier, the intent of this experiment was to determine if surfactants could improve bacterial disease control in field tomatoes. The results suggest further investigations with NUFILM-17.

USE OF SURFACTANTS TO IMPROVE THE EFFECTIVENESS OF COPPER FOR THE CONTROL OF FOLIAR DISEASES IN TOMATOES

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FUNGAL DISEASE CONTROL USING COPPER COMPOUNDS IN FIELD TOMATOES

Since the tomato transplants were obtained from a greenhouse where considerable bacterial spot was observed the initial intent was to evaluate the following treatments on their effectiveness to control bacterial spot. The bacterial disease did not appear to spread and reinfest the tomatoes once in the field due to the dry weather conditions this past summer. Foliar fungal diseases were evaluated instead.

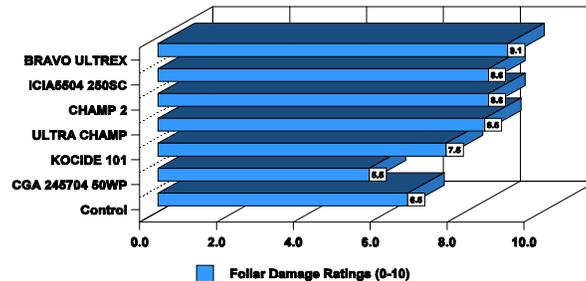
Comparing the products when used alone at the September rating, BRAVO ULTREX, ICIA5504 250 SC, CHAMP 2 and ULTRA CHAMP provided excellent control of the damage caused by the various tomato foliar diseases. KOCIDE 101 was less effective and CGA 245704 50WP was ineffective. By October the deterioration of the foliage was noted with considerable variation in the plot with little significant differences between treatments and the untreated control. The numerical data found that the two fungicides BRAVO ULTREX and ICIA5504 250 SC showed considerable weakness by October, not able to control the foliar diseases at that time, while the three copper products CHAMP 2 and ULTRA CHAMP followed by KOCIDE 101 retained their effectiveness in controlling the foliar disease in this trial.

Tomato foliar disease control was maintained when KOCIDE 101 and ULTRA CHAMP were tank mixed with BRAVO ULTREX but significant loss in disease control was noted when CHAMP 2 was tank mixed with BRAVO ULTREX. Further investigations are needed to determine whether there is a potential incompatibility between these two products when tank mixed.

All three copper materials KOCIDE 101, ULTRA CHAMP and CHAMP 2 were compatible with ICIA5504 250SC in maintaining tomato disease control.

FUNGAL DISEASE CONTROL USING COPPER COMPOUNDS IN FIELD TOMATOES

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5. Development of resistance management strategies for controlling Colorado potato beetles.

This year's Colorado Potato Beetle trials in tomatoes have identified two products of interest to the tomato industry, ACTARA 25WG and EXP61486A 70WP. Both of these products were extremely effective in their control as foliar applied insecticides. A third product was tested called Garlic Barrier but was ineffective in controlling beetle populations.

Since the introduction of the insecticide ADMIRE 240FS, Colorado Potato Beetles, no longer poses an immediate threat to the tomato processing industry. The industry of course knows that this respite from the devastation from this pest is only momentary and that we must both continue to support the data required by Health Canada to continue the registration of ADMIRE but we must also be aware of an expected reduction in its control - someday. In this we must continue to develop new alternatives to extend the value that ADMIRE has offered the tomato industry.

GARLIC BARRIER FOR THE CONTROL OF COLORADO POTATO BEETLES IN FIELD TOMATOES

Garlic Barrier was ineffective in controlling Colorado potato beetles.

INSECT CONTROL USING ACTARA 25WG

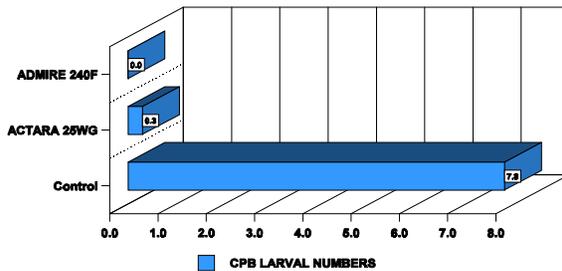
ACTARA 25WG provided immediate and effective control of both large and small Colorado potato beetle larvae attacking field tomatoes.

INSECT CONTROL IN FIELD TOMATOES USING

EXP61486A 70WP provided immediate and effective control of both large and small Colorado potato beetle larvae attacking field tomatoes.

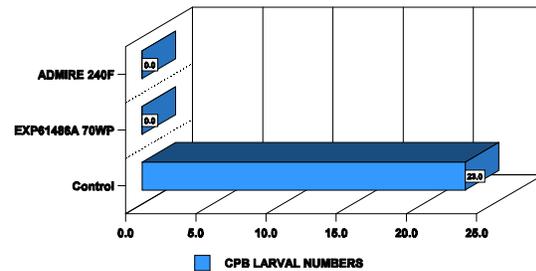
INSECT CONTROL USING ACTARA 25WG

COLORADO POTATO BEETLE CONTROL IN TOMATOES - FOLIAR APPLICATIONS



INSECT CONTROL USING EXP61486A 70WP

COLORADO POTATO BEETLE CONTROL IN TOMATOES - FOLIAR APPLICATIONS



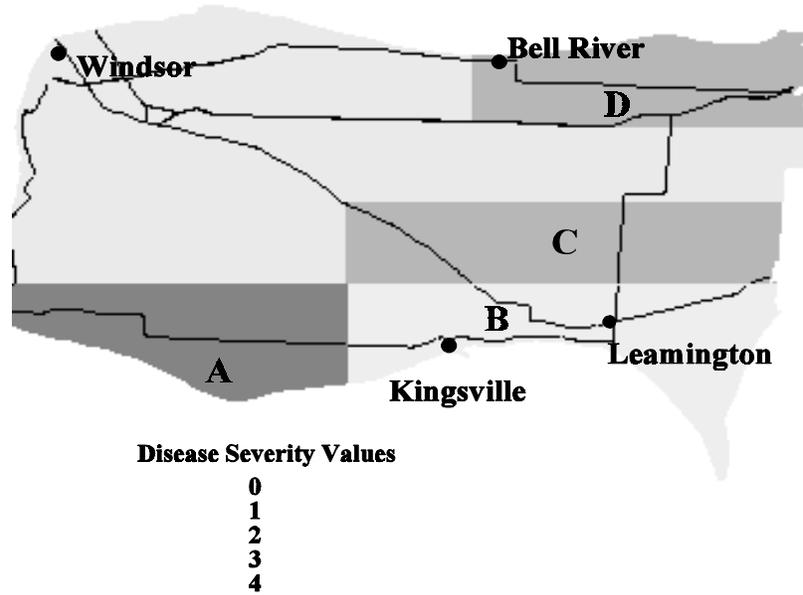
6. Nematode suppression through cultural management

Effort was directed towards determining the value of applying the soil fumigant VAPAM to fields having had numerous plantings of tomatoes compared to fields where tomatoes had not been planted in the past. The trial was a collaborative effort including soil and pest management expertise from both Ridgetown College University of Guelph and the local OMAFRA personnel. The results will be summarized and submitted independent of this document.

7. Applications using environmental database GIS technologies.

The technologies of GIS are now being investigated to develop site specific information for the tomato grower in Ontario. Presently the efforts are being directed towards fine tuning TOM-CAST. TOM-CAST has been a program to help growers determine when to apply foliar fungicides for the control of foliar and fruit anthracnose fungal diseases. Four and five zones in Essex and Kent counties respectively were created from which daily disease severity values (DSV) were calculated and made available to growers. Growers would identify which zone their particular fields were in using those specific zone DSV numbers to make spraying decisions. The use of GIS and further computer manipulation has made it possible to more accurately identify the unique DSV given the longitude and latitude or geo referenced locations of any field within the Essex and Kent counties. You will note on the following maps the zone configuration presently used vs the greater precision now available through these new technologies. The development of this technology will allow for further developments for the control of other diseases such as bacterial diseases as we learn more about the epidemiology of these diseases.

A. Present TOM-CAST fixed geographical zones. Growers currently use the Disease Severity Values reported for the zone for their individual fields within that zone



B. Future calculated zones reflecting the dynamics of the real-time data available. This will lead to greater precision, and more cost effective disease management.

