ONTARIO SUGARBEET GROWERS’ ASSOCIATION

RESEARCH RESULTS - 2000
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CONTROL OF EARLY SEASON RHIZOCTONIA CROWN ROT IN SUGARBEETS - SEED MIXTURES

The emergence and stand counts between either of the two sugar beet cultivars 1353 and 319 were similar. There was not sufficient Rhizoctonia root rot present in the plot area to allow for a comparison between the cultivars alone or in the various seed mixtures. There was an apparent difference in the susceptibility to Cercospora Leafspot with 1353 being more tolerant to the foliar fungal disease. This also showed in the disease severity ratings with the amount of Cercospora less with increasing amounts of the more tolerant cultivar 1353. Alternatively the disease damage ratings increased with increasing concentrations of the more susceptible sugar beet cultivar 319.

TRIAL A: CONTROL OF EARLY SEASON RHIZOCTONIA CROWN ROT IN SUGAR BEETS - SEED TREATMENT

TRIAL B: CONTROL OF EARLY SEASON RHIZOCTONIA CROWN ROT IN SUGAR BEETS - EMERGENCE SPRAYS

There were no significant differences in emergence and stand counts using either the seed treatments or the directed fungicide sprays. Also there were not sufficient infections caused by Rhizoctonia root rot to make comparisons amongst the various treatments.

CULTIVAR RESISTANCE AND ITS EFFECT ON A SPRAY PROGRAM FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGAR BEETS

The levels of genetic resistance between the susceptible sugar beet cultivar E17 towards Cercospora leafspot and the more tolerant sugar beet cultivar 319 was in evidence in this trial. The disease ratings were significantly different supporting earlier evidence of these differences. The use of a fungicide spray program was shown to be of benefit raising the susceptible sugar beet cultivar E17 foliage ratings equal to the resistance levels in the cultivar 319.

REGISTERED FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGAR BEETS - Brian Fox - 2000

Sugarbeets were sprayed 5 times, 3 times in August and 2 times in September. SENATOR 70WP applied alone or tank mixed with DITHANE DG 75% NT for pesticide resistance management reasons provided the highest level of control throughout the entire season well into September, 4 weeks after the last spray application. DITHANE DG 75% NT, KOCIDE 101 and PENNCOZEB 80WP gave excellent results early in the season until the last application on August 24 but control faded the rest of the season with only DITHANE DG 75% NT providing control into early September. DITHANE M-45, MANZATE 200 DF where not as effective as DITHANE DG 75% NT. It was interesting that the KOCIDE 101 alone was more efficacious than when mixed with the surfactant SIL WETT. In previous years, SIL WETT improved the level of control when combined with KOCIDE 101 even though the surfactant had caused a
moderate amount of foliar damage. In this year’s trial the 5 applications of SIL WETT caused considerably more phytotoxicity, resulting in tattered, shredded, torn leaves that would not be acceptable to commercial sugarbeet growers and apparently resulted in more Cercospora Leafspot disease with a lower foliar disease rating.

USE OF SURFACTANTS TO IMPROVE THE EFFECTIVENESS OF COPPER FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Brian Fox - 2000

KOCIDE 101 provided adequate Cercospora Leafspot control however disease control and yield were improved using specific surfactants. The most effective surfactant was ASSIST with significantly better RWSA than that of the unsprayed control. AGRAL 90 provided improved leafspot control early in the season but resulted in lower processing sugar qualities at harvest. The other surfactants including NU-FILM, AG-BALANCE and SIL WETT did not improve disease control when mixed with KOCIDE 101. The surfactant SIL WETT caused unacceptable injury to the sugarbeet foliar resulting in leaf shredding and a lower disease control rating. The addition of DITHANE DG 75% NT greatly improved the level of Cercospora leafspot control when mixed with KOCIDE 101 than when KOCIDE 101 was used alone. Further additions of the surfactants SIL WETT and AGRAL 90 to DITHANE DG 75% NT did not improve the level of Cercospora control and may even have slightly reduced its effectiveness and sugarbeet quality.

EVALUATION OF CANDIDATE FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Brian Fox - 2000

A number of new candidate fungicides are showing great promise for the control of Cercospora Leafspot in sugarbeets. The most effective were EMINENT 125 SL and BAS 500 250EC providing equal control to the commercial standard SENATOR 70WP. EMINENT 125 SL showed significant improvements in sugarbeet quality in particular the RWSA and high ratings in the other quality parameters. BAS 500 250EC and SENATOR 70WP placed consistently high in beet quality as well. DITHANE DF 75% NT, BRAVO 500F, PENNCOZEB 75 DF and ICIA5504 250 SC gave good control during the period when repeat fungicide applications were made however control was less after the last application on August 23 with disease rated in September. The addition of THIS COPPER or THIS ZINC did not improved the level of Cercospora leafspot control when tankmixed with BRAVO 500F.

PROGRAM SPRAY SCHEDULES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Brian Fox - 2000

Season long control was observed with several different fungicide combinations. The addition of DITHANE DF 75% NT, PENNCOZEB 75 DF or 80 WP formulations with SENATOR 70 WP provided outstanding Cercospora Leafspot control in sugarbeets. Foliar control was less when KOCIDE 101 alone or with the surfactant SIL WETT was tank mixed with either SENATOR 70 WP or PENNCOZEB 75 DF. Outstanding control was achieved whenever EMINENT 125 SL or BAS 500 250EC was alternated with each other, BRAVO 500 or a combination of SENATOR 70 WP and DITHANE DG 75% NT. The highest sugarbeet quality assessment was observed when EMINENT 125 SL was alternated with a tank mixture of SENATOR 70 WP and DITHANE DG 75% NT.
THE EVALUATION OF BAS 500 F 250EC FOR THE CONTROL OF CERCOSPORA
LEAFSPOT IN SUGARBEETS -Brian Fox - 2000

The fungicide BAS 500 250 EC with or without the surfactant ASSIST provided excellent Cercospora Leafspot control equal to the combination of SENATOR 70 WP tank mixed with DITHANE DG 75% NT. High levels of Cercospora Leafspot control could be attained using the lowest rate tested in this trial of BAS 500 F 250 EC at 0.22 L product/ha using a 5 spray application program. There was no visual signs of plant injury even with the highest BAS 500 F 250 EC treatment of 1.28 L product/ha with ASSIST. All of the treatments tested provided significantly higher sugarbeet yield and quality assessments than the non sprayed control.

There appears a white flecking on the sugarbeet foliage where the Cercospora leafspot lesions had been suggesting a type of kickback activity using BAS 500 F 250 EC. This observation needs to be repeated to be understood and verified.

INITIAL SPRAY APPLICATION TIMING FOR CERCOSPORA LEAFSPOT CONTROL IN
SUGARBEETS-Brian Fox - 2000

The highest level of Cercospora leafspot control observed on the foliage was to initiate the fungicide spray program at first sight of disease or between July 1 and 15 or between 55-70 DSV calculated using the TOMCAST model. The most cost effective spray program having the highest level of Cercospora Leafspot control with the fewest number of fungicide sprays was the initiation of the program when the DSV were between 55 and 70. If the initial spray was delayed or fewer early sprays applied, late season control was significantly reduced. In this years trials delaying the initial spray application to July 18 (102 DSV) and beyond resulted in significantly more foliar damage due to Cercospora Leafspot. Using a product with higher levels of Cercospora Leafspot control may be necessary to show significant differences in yield and sugarbeet quality.

The first symptoms of Cercospora Leafspot were note on July 4 which corresponded to a cumulative disease severity value of 70 using the TOMCAST model.

TIMING OF SUBSEQUENT SPRAY APPLICATIONS FOR CERCOSPORA LEAFSPOT
CONTROL IN SUGARBEETS - Brian Fox - 2000

Since the last fungicide spray was applied early in August, August 8 for all but treatment #1 which was last sprayed on August 16, the disease assessments were reflective of the July and early August spray programs.

Excellent control of Cercospora leafspot resulting in high RWST and % sugar, was observed using the 3 spray regime of treatment 3. This treatment used the tank mix of EMINENT 125 SL and BAS 500, followed by DITHANE DF 75NT with the last of the three spray regime to include again the tank mixture of EMINENT 125 SL and BAS 500. The program was initiated on July 6 (71DSV) and was repeated every 36 DSV.

The next best spray program was treatment #2 with excellent control throughout the summer and into the fall but after the September 2 evaluation the treatment effect was lost and Cercospora Leafspot observations significantly increased resulting in less sugar content. This program was timed exactly the
same as treatment #3. Although the fungicide SENATOR 70WP appeared to provide the necessary control as observed on both the August 24 and September rating days the number of times DITHANE DF 75%NT was used compared to treatment 3 resulted in a shorted control period.

When DITHANE DF 75%NT is used alone a shorter interval requiring more spray applications would be necessary to achieve the high level of control as when either SENATOR 70WP, EMINENT 125 SL and/or BAS 500 are used.

EFFECT OF EARLY, MID vs LATE SEASON SPRAY PROGRAMS FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS - Brian Fox - 2000

The early season fungicide spray applications were essential for the control of Cercospora Leafspot observations in late August. Ending the program early resulted in an increase in foliar diseases later in the season. Only one application was made in the Late Season Sprays treatments as by September the foliage was severely damaged and continued applications were deemed not worthwhile.

Control of Cercospora Leafspot could be controlled with multiple applications of fungicides.

Higher levels of control using other fungicides may have shown more significance in the sugarbeet quality assessments.

COMMERCIAL EVALUATION OF A SPRAY PROGRAM FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGAR BEETS - Brian Fox - 2000

Due to the cool temperatures in June and July there was very little Cercospora leaf spot noticed in sugarbeet fields until July 29, resulting in most growers delaying their first fungicide application. However by late August the disease had progressed sufficiently to cause significant foliage damage. In other trials at this location, yields were marginally reduced due to the incidence of this fungal disease however it is anticipated that sugar content will be affected due to this level of foliage damage. Sample results have not yet been received from the laboratory.

In this trial Cercospora leafspot was significantly reduced with either of the two fungicide application treatments. It would appear that the August spray timing was the more critical of the applications.

REGISTERED FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGAR BEETS - Bob Harvey - 2000

Three applications of fungicides were applied with the last on August 4. Assessments were taken at intervals after the last fungicide application. On August 24, 20 days after the last fungicide application the incidence of Cercospora Leaf Spot was significant however all but DITHANE M-45 proved effective. Assessments were made a week and 4 weeks later with no additional spray applications. Products which provided the greatest residual Cercospora Leafspot control were in order of effectiveness, SENATOR 70 WP + DITHANE DG 75% NT, SENATOR 70WP used alone and then DITHANE DG 75% NT when used alone. The next group showing degrees of effectiveness were KOCIDE 101 + SIL WETT and KOCIDE 101 when used alone. PENNCOZEB 75 DF and PENNCOZEB 80WP provided a high level of Cercospora Leafspot control early but without repeated applications, their effectiveness become significantly less later in the season. Similarly MANZATE 200DF and especially DITHANE M-45 were the least effective fungicides evaluated in this trial. The surfactant SIL WETT caused unacceptable leaf
burn however it appeared to improve the effectiveness of KOCIDE 101. Possibly another less phytotoxic surfactant would prove beneficial.

USE OF SURFACTANTS TO IMPROVE THE EFFECTIVENESS OF COPPER FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Bob Harvey - 2000

Twenty days after the last of the 3 fungicide spray application program, the KOCIDE 101 fungicide provided excellent Cercospora Leafspot control with or without the addition of a surfactant. Disease progressed very rapidly after this date providing a clear differentiation between the surfactants. The most effective surfactant when added to KOCIDE was ASSIST providing equal disease control to that of the combinations of KOCIDE 101 plus DITHANE DG 75% NT with or without the SIL WETT and AGRAL 90 surfactants.

The fungicidal effect of KOCIDE 101 was improved with the use of the surfactant ASSIST.

AGRAL 90, AG-BALANCE and NU-FILM did not provide any additional benefits when tank mixed with KOCIDE 101. The addition of the surfactant SIL WETT caused minor damage to the sugarbeet foliage.

DITHANE DG 75% NT provided higher levels of Cercospora control than KOCIDE 10. Further additions of surfactants to DITHANE DG 75% NT did not improve the level of Cercospora control.

EVALUATION OF CANDIDATE FUNGICIDES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Bob Harvey - 2000

Effective Cercospora Leafspot control was observed 4 weeks after the last of a three spray program using the following fungicides, BAS 500 250 EC, EMINENT 125 SL and SENATOR 70 WP. In addition, BAS 500 250 EC provided outstanding control even beyond that period providing acceptable control into late September, on September, 27 almost 7 weeks after the last application.

By August 24, 20 days after the last of three spray applications, DITHANE DF 75% NT, combinations of BRAVO 500F with THIS COPPER and THIS ZINC were still providing a level of control, statistically at least, equal to SENATOR 70WP, however the level of leafspot control became less by the September 2nd foliar disease ratings.

Significantly less leafspot control was achieved both in the August and September ratings with PENNCOZEB 75 DF, ICIA5504 250 SC and BRAVO 500F when used alone.

PROGRAM SPRAY SCHEDULES FOR THE CONTROL OF CERCOSPORA LEAFSPOT IN SUGARBEETS -Bob Harvey - 2000

The combination spray programs used in this trial provided outstanding Cercospora Leafspot control almost 4 weeks after the last of the three spray application program. Several combinations provided further control late in September. The most effective treatments were EMINENT 125 SL; SENATOR 70 WP +DITHANE DG 75% NT; // EMINENT 125 SL;BRAVO 500 F; then SENATOR 70 WP +PENNCOZEB 75 DF // PENNCOZEB 75 DF; PENNCOZEB 75 DF + SENATOR 70 WP; PENNCOZEB 75 DF. There appeared to be a significant difference between the PENNCOZEB
formulations with the 75 DF providing longer lasting Cercospora Leafspot control than the 80 WP formulation.

The deletion of the third spray in treatments #9 and #2 may have resulted in less control noted by September 27.

INITIAL SPRAY APPLICATION TIMING FOR CERCOSPORA LEAFSPOT CONTROL IN SUGARBEETS - Bob Harvey - 2000

The excessive rainfall created conditions preventing further spray applications into August and September. Early in the season the weather conditions were unusually cool delaying the disease development of Cercospora Leafspot. The first symptoms of Cercospora Leafspot were noted on July 19 with a cumulative disease severity value of 74 using the TOMCAST model. It is of interest that in another trial several miles west of this location the first disease symptoms were noted considerably earlier on July 4, however using the disease forecasting model TOMCAST the cumulative disease severity value was 70, very close to what was observed at this site.

Control of leafspot was observed on August 24 from spray applications made during the early to mid July periods, treatments 1, 2, 5, and 6. Due to the cessation of spraying due to the moisture conditions in the field the September disease ratings indicated poor levels of control other than for treatment 5 where 3 + 1 = 4 applications were made interestingly all in July.

TIMING OF SUBSEQUENT SPRAY APPLICATIONS FOR CERCOSPORA LEAFSPOT CONTROL IN SUGARBEETS - Bob Harvey - 2000

Under conditions of severe Cercospora Leafspot disease pressure the most effective treatments where to apply subsequent sprays every 20 DSV if using DITHANE DF 75%NT. Equal or improved disease control can however be achieved with fewer spray applications if SENATOR 70WP, EMINENT 125 SL or BAS 500 fungicides were incorporated into the sequence of spraying. The intervals can be extended from 20 to 35 DSV with combinations of these new fungicide products.

It should be noted that disease symptoms did not appear until late July at this site. The TOMCAST disease forecasting model did not cumulate as high an index early in the season due to the unusually cool weather conditions which apparently are not conducive to encouraging the infection cycle of Cercospora. The cumulative disease severity value on July 13, the date of the first spray application was in contrast to a similar fungicide trial run several miles west of this site where much earlier on July 6 the cumulative DSV’s had increased to 71. This demonstrates the site specific nature of this disease requiring a method such as a weather disease forecasting model such as TOMCAST to assist a grower in deciding when to initiate a fungicide spray program.

EFFECT OF EARLY, MID vs LATE SEASON CONTROL OF CERCOSPORA IN SUGARBEETS - Bob Harvey - 2000

Due to the excessive rainfall the mid and late season fungicide sprays were not applied. The trial does demonstrate however the value in early season spray applications. Only two fungicide sprays of KOCIDE 101 + DITHANE DG 75%NT + AGRAL 90 were applied with the last on July 11, however its beneficial
effect was noticed throughout the remaining days of July, the entire month of August and into early September.

SUGARBEET CULTIVARS - RESISTANCE TO CERCOSPORA LEAFSPOT - MICHIGAN TOUR - September 11, 2000

A list of 66 sugarbeet cultivars, many still in the experimental trials are ranked in order of their resistance to Cercospora leafspot. In addition to trials that were rated on this tour in Michigan, I have ratings for the sugarbeet cultivars included at the two locations in Ontario in cooperation with John Zandstra at this college.