Cercospora Management for 2022...

Whether you are ready for it or not, Cercospora Leaf Spot (CLS) spraying is just around the corner. This past spring has certainly been a challenge (to say the least) and has the 2022 Minn-Dak sugarbeet crop spread out over a wide range of planting dates. As such, the current growth stages of the crop vary greatly across each of the Agriculturist districts, between growers, and in many cases, even on the same farm. CLS has always been and still remains to be the most crippling foliar disease of sugarbeet within our growing region. We all have firsthand experience witnessing just how quickly the disease can spiral out of control, and the devasting financial impacts of such - for both the grower and the Cooperative. Regardless of your crop's growth stage, all fields will need multiple applications of fungicides this season to keep this pathogen's inoculum load down and your on-farm profits up...It's all just a matter of application timing...

Spraying Without Spots

Spraying for a disease without physically seeing symptoms present on the plant is a difficult concept for many growers to 'wrap their head around' because it directly challenges what has long been considered the norm when it comes to CLS control. The dogma of 'you do not start spraying for CLS until you see spots' has held sway across the MDFC growing area since the early 1980s. In reality, this is an incredibly antiquated approach to disease control and continuing to put this advice into practice will hurt your bottom line...

One of the most valuable observations we have witnessed in the MDFC Research Trials is that early applications of a CLS fungicide make a HUGE difference in the level of disease severity experienced throughout the entire growing season. In other words, you need to start spraying BEFORE you physically see spots on the plant. The advantages of this simple alteration in fungicide timing have been further proven in commercial fields over the past two growing seasons where there was a noticeable difference in CLS control between fields that received an early application of fungicide and those that had a fungicide program that was delayed. In both cases (research trials and grower fields), every single quality attribute that we measured (percent sugar, percent purity, RST, RSA, etc.) increased as the level of CLS severity decreased. To put it in plain terms...**Spraying early = Greater financial returns per acre.**

CLS is Already Out There

The MDFC Research Staff has partnered with both NDSU and the USDA-ARS (Fargo, ND) to conduct studies to determine when the onset of CLS infection actually takes place in our growing area. We know that as part of it's life cycle, spores from leaves previously infected with CLS are released into the air the following spring and that the latent onset and development of CLS lesions can take anywhere from 5 to 21 days depending upon the environmental conditions present. As such, the MDFC Ag Staff has been collecting asymptomatic leaves from 2022 sugarbeet fields that share a border with last year's beet ground and sending them to Drs. Secor (NDSU), Bolton, and Wyatt (USDA-ARS) for molecular analysis. Of the 84 fields analyzed over the past two weeks, 17 of them (~20%) have been identified as having CLS already present within the young plants! This is the very premise of the need to start your fungicide applications early so that you do not play 'catch-up' for the remainder of the season.

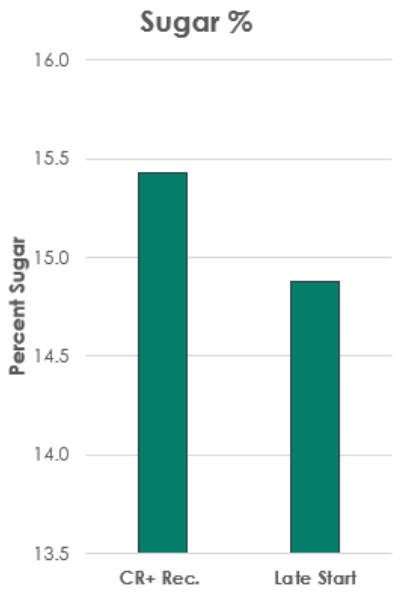
So When Should I Start Spraying?

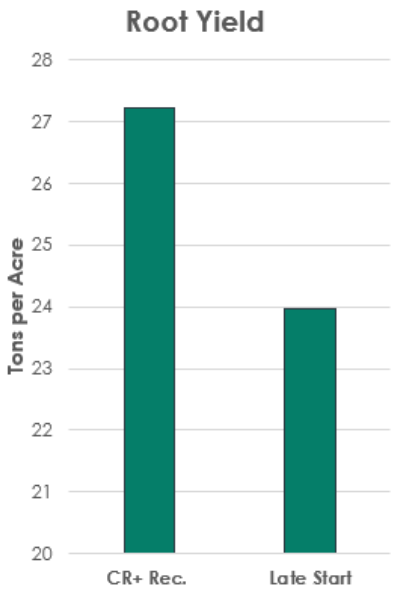
A general rule of thumb is to target the distance between the rows as your 'application trigger.' Using the picture to the right as a reference, plan on your first application starting when the leaves between each row are roughly 3 to 4 inches apart. Keep in mind that this is the time of the year where your Agriculturist will become your best friend as they are the absolute best source for information regarding CLS. Be sure to keep in close contact with them regarding products, rates & fungicide application onset/timing.

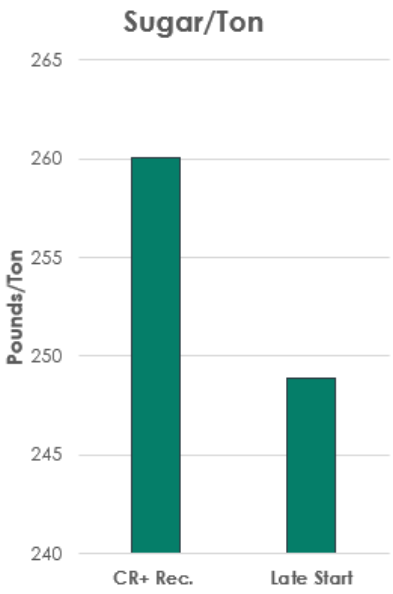
Can I Delay Spraying With CR+ Varieties?

<u>This answer to this questions is easy - NO!!!</u> Keep in mind that even though the genetic protection expressed by the CR+ varieties offers an enhanced level of tolerance to CLS, it does NOT offer immunity to it. The pathogen is still able to infect the plant and cause disease, but it is just not able to 'take hold and thrive' like it can on traditional-type varieties. Since their preliminary arrival in 2019, research has been conducted at MDFC to evaluate various fungicide applications with the primary focus being the correct timing and sequence of fungicides applied to these new genetics. The bars charts below provide a brief summary to one of the 2021 CLS fungicide trials.

The highest sugar content, root yield, and recoverable sugar per ton in last year's inoculated Minn-Dak field trials came from using CR+ genetics in combination with the MDFC recommended CLS program (tagline of 'One, Two, Skip a Few'). This program included an early application of EBDC followed by a Proline/EBDC tank-mix. It was only after these two initial applications were made in sequence that the intervals between fungicides were stretched. Based upon this dataset and our current payment, **<u>following the MDFC program showed just shy of a $173 per acre advantage</u>** over delaying the start of CLS applications. The results of this trial also provided us with a 'golden nugget' for the future - just like the traditional genetics, CR+ cannot play catch up when it comes to this aggressive pathogen.







Should I Be Paying Attention to the CLS Rating of the Varieties I Planted This Year?

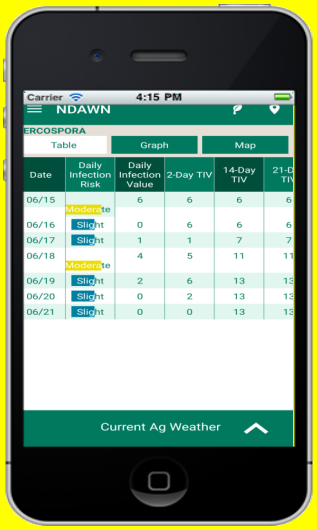
Absolutely – Varieties approved for sale at Minn-Dak can greatly differ in their susceptibility to CLS. Listed to the right are the 2-yr CLS ratings for the five most popular varieties planted at Minn-Dak for the 2022 season. Remember, the lower the number, the more tolerant the variety is to CLS.

MDFC Variety	CLS Rating
Betaseed 7029	1.55
ACH 973	1.78
ACH 082	1.95
Betaseed 7068	2.07
ACH 011	2.29

Not All Varieties Are Created Equal - Make Sure You Know The Difference Between Them...

Keep A Close Eye On CLS Development By Utilizing DIVs In The MDFC Mobile App

Users can select weather, growing degree day, sugarbeet root maggot and CLS data from the three NDAWN stations within the Minn-Dak growing area - Campbell and Sabin, MN, and Wahpeton, ND. The app also features real-time weather conditions from each station for decision making and record-keeping during spraying season.



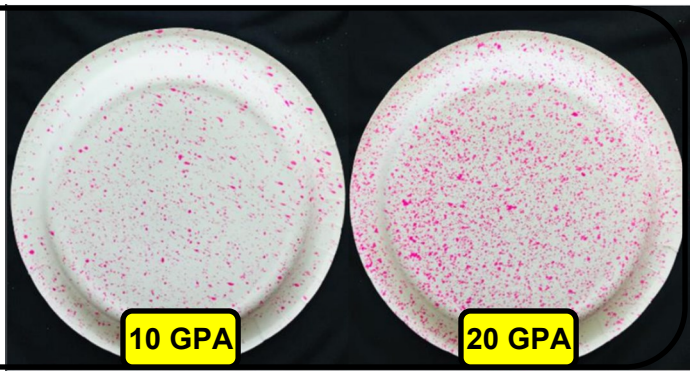
Specifically for CLS, the Daily Infection Values (DIVs) can be displayed in both table and graphical formats as well as providing a map with 'infection zones' by station.

Water Is The Cheapest Thing You Put Into Your Spray Tank - Use It To Your Advantage

Water Volume + Fungicides	Recoverable Sugar per Acre
20 GPA	8,032 lbs.
15 GPA	7,878 lbs.
10 GPA	7,803 lbs.
7 GPA	7,623 lbs.
Check Trt.	7,289 lbs.

No 'miracle' adjuvant can replace the effectiveness that water volume has on your CLS fungicide program. Regardless of which fungicide combination you have in the tank, every single product relies on thorough leaf coverage to be effective - there is just no way around it. The data to the left was complied by Dr. Mohamed Khan (NDSU) from a trial near Glyndon, MN. Just as one would expect, higher per acre water volumes resulted in higher levels of disease control (and the greater revenue per acre). Water is the cheapest thing that you put into the spray tank - **it doesn't make much sense to try to 'cheat' the performance of your CLS fungicides at the expense of something as simple as water...**

The picture to the right demonstrates the clear difference between spray water volumes on a per acre basis. A spray solution consisting of water and a pink dye was 'captured' on the back of paper plates. The same solution was applied with TeeJet XR8002 flat fan nozzles - the only difference was the spray volume. There is absolutely no difference between the surface of the plates or the surface of a sugarbeet leaf. **Remember: Coverage = Control**



2022 MDFC Fungicide Program

For CR+ Varieties: *"One, two, skip a few…"*

1. Early EBDC
2. Proline + EBDC
3. *skip*
4. TPTH + EBDC
5. *skip*
6. Provysol or Inspire + Copper or EBDC

Keep all fungicide applications to a 10-12 day spray interval or tighter if rainfall and/or DIVs require

TPTH	Rate/Acre	Pre-Harvest Interval	Reentry Interval
Liquid	8 oz	21 Days MN / 7 Days ND	48 Hours

Agri Tin Flowable / Super Tin 4L

Copper	Rate/Acre	Pre-Harvest Interval	Reentry Interval
Dry	2 lbs.	0 Days	48 Hours
Liquid	2 pts.	0 Days	48 Hours

Badge SC / X2, Champ 2 Flowable / Kocide / Cuprofix Ultra / MasterCop

EBDC	Rate/Acre	Pre-Harvest Interval	Reentry Interval
Dry	2 lbs.	14 Days	24 Hours
Liquid	1.6 qts.	14 Days	24 Hours

Dithane DF / F-45 / M-45, Koverall, Manex II, Manzate Max / Pro-Stick, Penncozeb 75DF / 80WP

Triazoles	Rate/Acre	Pre-Harvest Interval	Reentry Interval
Provysol	4 oz	7 Days	12 Hours
Inspire XT	7 oz	21 Days	12 Hours
Proline	5.7 oz	7 Days	12 Hours
Eminent / Minerva	13 oz	14 Days	12 Hours
Minerva Duo	16 oz	14 Days	48 Hours

The product label trumps this information at all times - Always read & follow label instructions

Odds & Ends to Make Your CLS Program More Effective…

- **Start your program on time** and stay on schedule.
- **Keep your spray intervals tight** - everything in this year's program should be kept to a 10-12 day interval. Utilize the reminder feature in your smartphone - it's a handy tool to help stay on schedule!
- **Use the MDFC recommended tank-mix partners.** Given the high level of CLS resistance present in our growing area, strobilurin products (Headline, Priaxor, etc.) and benzimidazole products (Topsin) are NOT effective tank-mix partners.
- **Watch the NDAWN Daily Infection Values (DIVs)**. These color-coded ratings can be found on the MDFC website or within the MDFC mobile app.
- **Use the correct nozzles**. The same nozzles you utilize for glyphosate applications are generally not the best for fungicide use (small vs large droplet size). Generally speaking, your target for fungicide applications should be around a medium droplet size (250 to 350 microns).
- **High water volumes**. Many of the tank-mix partners are protectants and as such, require a little more water than you'd normally like to use. Like I mentioned earlier, water is the cheapest thing you put into your spray tank; there should be no reason to cut back on it. Ground applications should target 20 GPA and aerial applications no less than 5 GPA.
- **Do not mix fungicides with glyphosate**. The main reason is the amount of water required with each application. CLS fungicide performance is best when applied with medium droplets at high water volumes (20 GPA). Glyphosate is just the opposite as it has better performance when applied in larger droplets (pile effect) and lower water volumes (5-15 GPA). They are two completely different approaches to maximize the control offered by each type of product. You are money ahead making separate applications to achieve the needed weed and CLS control rather than making one single application and getting mediocre control of each.
- **Be wary of 'miracle-type' adjuvants**. Please keep in mind that if there was a 'silver bullet' that could be added to the tank to significantly increase CLS control we would be recommending it. We test LOTS of these products every year and publish the results on our website. Invest your money where you know it will return dividends - increased water volumes, tighter spray intervals, full rates, etc.
- **Use an aerial applicator if needed**. If rain/wet ground is prohibiting you from staying on your spray schedule, call in the 'Air Force.' You are money ahead by staying on schedule - once you get behind the eight-ball of CLS pressure, it's almost impossible to catch up.
- **Don't give up on the dry formulations**. They will give you little to no trouble if handled & mixed correctly. When in doubt, follow the A.P.P.L.E.S. recommended by NDSU Weed Science:
  - ⇒ **A**gitate
  - ⇒ **P**owders soluble (SG, SP)
  - ⇒ **P**owders dry (DF, WDG, WP)
  - ⇒ **L**iquid flowables & suspensions (ASC, F, ME, SC, SE)
  - ⇒ **E**mulsifiable concentrates (EC, EW, OD)
  - ⇒ **S**olutions (S, SL)

  Make sure that each product is uniformly mixed in the tank before adding another...

  Warm water will also help dissolve each product into solution. Leaving dark-colored bulk tanks filled with water out in the sun a few days before spraying will make a world of difference.
- **There is a pecking order when it comes to the Copper fungicides**. Cu-Hydroxide and Cu-Oxychloride formulations are most effective (i.e. Badge, Kocide, Champ, etc.), whereas products containing Cu-Sulfate (Cuprofix Ultra, MasterCop, etc.) do not perform as well in our research trials.
- **Pay attention to Pre-Harvest Intervals.** Pay close attention to the PHI of each product you pour into the spray tank - it will likely have an impact if we have an August start.
- **Listen to your Agriculturist**. They are the best source for information regarding CLS - keep in close contact with them regarding products, rates & timing.