MINN-DAK FARMERS COOPERATIVE

BEET TOPics

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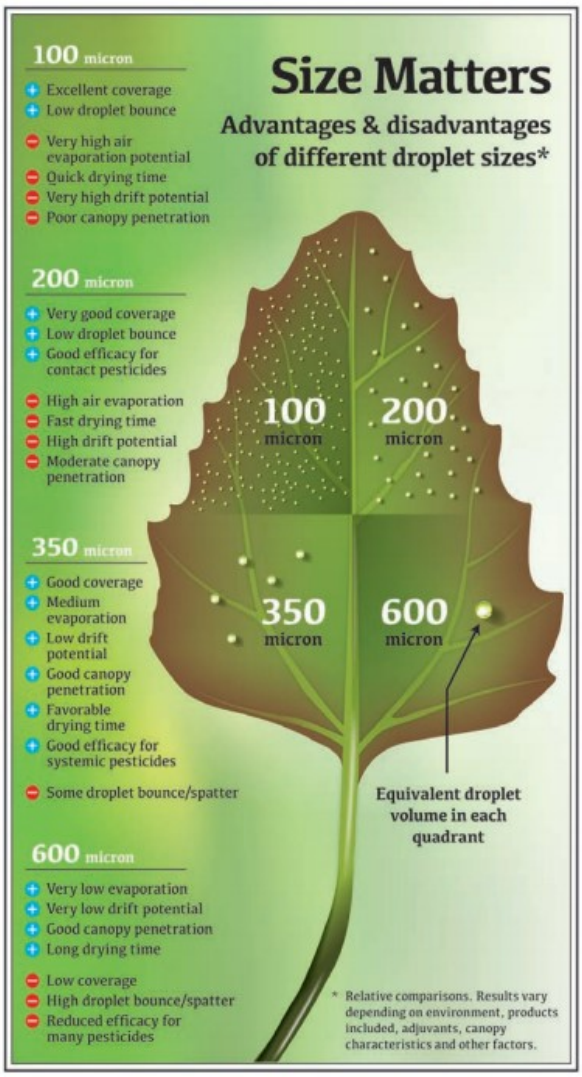
Spray Nozzle Selection for CLS Control…

When it comes to Cercospora fungicide applications, everyone has heard the 'Three R's cliché' - that disease control comes from using the RIGHT product at the RIGHT rate at the RIGHT time. This statement has consistently held true through the years and has proven itself time and time again. Keep in mind that by following the 2019 MDFC Fungicide program, you will hit all three of these key areas of CLS control. Based upon the most current research and with resistance management in mind, we are recommending that specific fungicides be tank-mixed and applied together (RIGHT product) at full-labeled rates (RIGHT rate) on 10-12 day intervals (RIGHT time). I would argue that the amendment of a 'Fourth R' could be added to help make the original three even more effective, and that's to apply the spray solution in the RIGHT manner.

One of the most important (and often overlooked) components of making sure the spray solution is applied in the RIGHT manner is the spray nozzles. Nozzles are typically the least expensive items on a sprayer but play a key role in the final outcome of a fungicide application. It is important to remember that once the spray solution leaves the nozzle, you no longer have control of the spray droplet from that point on. Even if you have done everything 'upstream' of the nozzle to textbook standards, if the solution leaves the sprayer through the wrong nozzle (or the right nozzle used incorrectly), CLS control will be compromised.

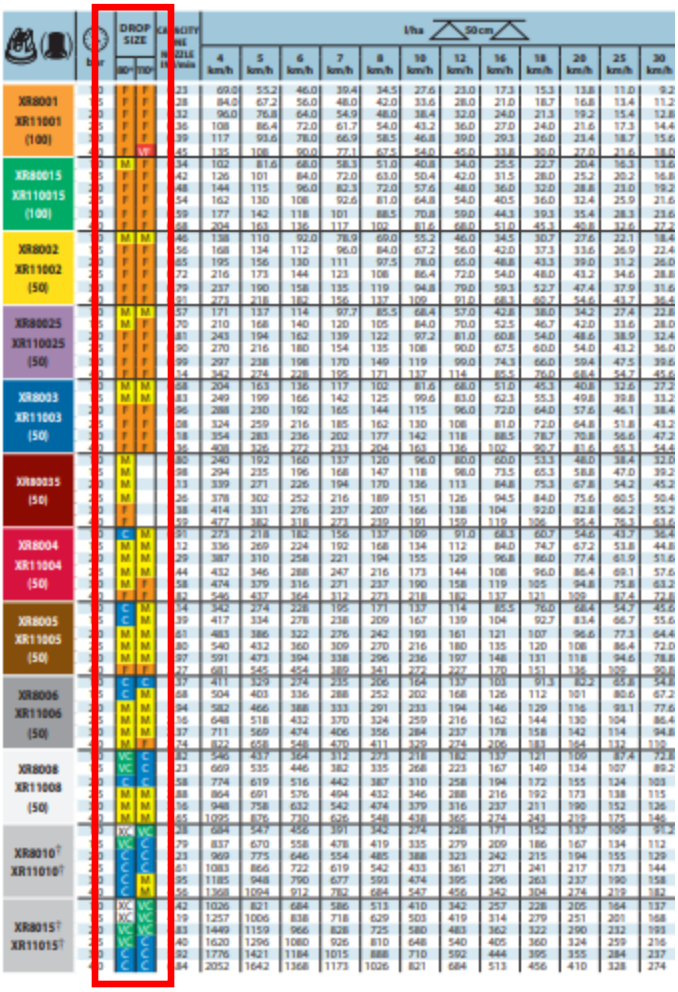
So Which Nozzle Should I Use?

When it comes to CLS applications, the most important part of selecting the spray nozzle is the droplet size that it will produce. You want to be using nozzles that will produce medium-fine to fine droplet size. This is in the range of 145 to 325 microns (for reference the diameter of a human hair is roughly 100 microns and a toothbrush bristle 300 microns). Calculated with both the protectant and systemic-type products we are using, this range ensures that the spray droplets are not too small - decreasing canopy penetration and increasing the potential for the droplet to move off target and/or evaporate too quickly. The range also safeguards from droplets being too large, which have the tendency to bounce and/or run off the beet leaf. The illustration to the right was developed by Purdue Extension and summarizes the advantages/disadvantages of each micron range, as well as the effect of droplet size in relation to individual leaf coverage.



Where Do I Find The Droplet Size Each Type of Nozzle Produces?

Most all of the spray catalogs have tables for each nozzle, similar to the one shown to the right. Using the most recent TeeJet catalog, note that the table for XR Flat Fans indicates the spray droplet size (fine, medium, coarse, etc.) produced at different pressure settings under the 'Drop Size' heading (red box).



Is There A Specific Brand Of Nozzle I Should Be Using?

Nope – Just like many of you prefer to drive a Chevy pickup over a Ford (or vise-versa), all of the major nozzle brands have products that will produce a droplet size in the recommended micron range for Cercospora Leaf Spot applications.

How About Nozzle Tip Material?

The nozzles that you will find at an ag retailer will likely be made of either brass, plastic, stainless steel or ceramic. As a rule of thumb, brass is the least durable nozzle material and will wear faster than the other materials. In comparison, plastic nozzle tips last two to four times longer, stainless steel four to six times longer and ceramic 20 to 50 times longer than brass. However, research conducted at the University of Nebraska has shown that the most accurate and consistent spray patterns come from brass and stainless steel nozzle tips. This is because these tips are machined as opposed to being cast (like plastic and ceramic tips). Although the differences are minute, after any casted material cools it shrinks, altering the spray pattern slightly.

Dual nozzles provide increased canopy coverage, but increase the distance the spray droplet must travel from spray tip to canopy

Which Nozzle Pattern Will Work the Best For CLS Applications?

It was stated earlier that once the spray solution leaves the nozzle, you no longer have control of the spray droplet from that point on. With this in mind, your goal should be to get the droplet from Point A (nozzle tip) to Point B (leaf surface) as quickly as possible to avoid other factors (wind, dust, etc.) having a negative impact on the spray droplet. Since the shortest distance between any two points is a straight line, a flat-fan nozzle mounted perpendicular to the sugarbeet canopy will be your best bet (as long as the droplets are medium-fine to fine in size).

Double nozzles, especially the asymmetric types, are becoming more popular with fungicide applications. While they will work for CLS, they were originally designed for diseases where an exposed vertical part of the plant is the primary spray target (i.e. spraying wheat for Head Scab). A flat-fan nozzle set up with two spray patterns (forward/back) will help you increase coverage, but will also increase the distance from nozzle tip to the sugarbeet canopy (think of it like a right triangle, you are spraying in the direction of the hypotenuse instead of the vertical leg) making the refinement of other manageable factors (spray angle, water volume, sprayer speed, etc.) critical to achieve disease control.