

Virginia Soybean Update

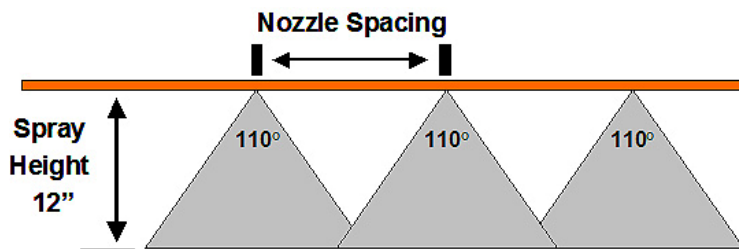
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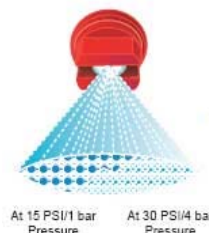
Nozzle and Sprayer Strategies

Bobby Grisso, Extension Ag Engineer



Researchers recently announced several conclusions from studies conducted during 2005 and 2006 to determine what spray equipment will work best in a battle against Asian soybean rust (ASR). The Ohio State University (OSU) studied the performance of nozzles and spray equipment for both spray deposits and coverage. The six main conclusions from the spray studies are:

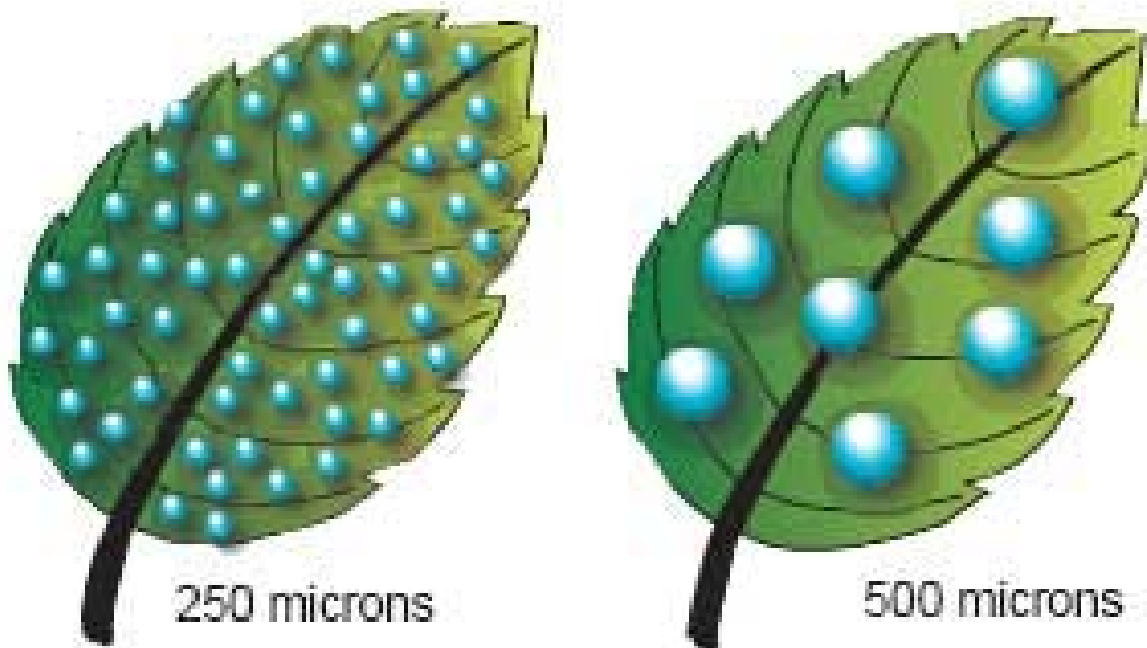
- ◆ A “medium” spray quality (rather than “fine” or “coarse”) provides better droplet penetration into the plant canopy and better spray coverage when using conventional boom sprayers.
- ◆ Air-assisted delivery equipment provides better overall penetration into the plant canopy than conventional spray boom equipment.
- ◆ A flat-fan spray pattern performs better than a hollow cone spray pattern when using conventional boom sprayers. However, in air-assisted applications, cone and flat-fan nozzles performed equally.
- ◆ A short, low-density plant canopy helps to improve both spray coverage and spray deposits on lower and middle leaves, no matter which equipment delivers the spray.
- ◆ A single flat-fan provides better spray coverage and spray deposition than cone or dual-fan nozzles in tall, dense plant canopies. With less dense canopies (double-crop), dual nozzles worked equally well.
- ◆ A mechanical canopy opener, or a rigid bar that bends the top of the plant canopy over ahead of boom, helps improve spray penetration when using sprayers without air assistance.



Air-assisted technologies consistently performed best among tested products in delivering fungicide below the middle and lower-leaf canopy, where rust is most likely to develop. The choice of spray equipment is crucial to soybean rust control, especially if the soybean canopy is dense and tall.

Nozzle selection was also important when using a conventional boom sprayer. Research conducted clearly showed that a twin-flow pattern nozzle, such as the conventional TwinJet nozzle, did not perform as well as a single flat-fan nozzle in dense canopy. When using a conventional boom sprayer, a flat-fan nozzle provides a single-spray flow pattern that will likely work better than a cone nozzle or a twin-pattern flat-fan nozzle.

The studies also showed that droplet size is equally important for both conventional boom sprayers and air-assisted systems. Most product labels for soybean rust control recommend droplets in the “fine” to “medium” size, or in the 200-350 micron range. However, based on these studies, nozzles producing 250-micron size droplets should be selected.



Research data from Brazil, indicate that the most successful fungicide treatments are the ones that reach the plant's lower parts. It is the older, lower leaves that are the most prone to rust infection. A successful spray application will not only include selecting the right fungicide product, but also the right spray equipment.

(Modified from John Pocock in The Corn and Soybean Digest Apr 1, 2007)

For additional information, see publication VCE 450-306, Asian Soybean Rust – Frequently Asked Questions VI: Sprayer Nozzle and Technology. This publication can be found on the web at www.ext.vt.edu/pubs/soybean/450-306/450-306.html.

Nozzles and the corresponding pressure and travel speed ranges to achieve “medium droplets with a 20” nozzle spacing and 15 GPA. To download a copy of this spreadsheet visit the Virginia Soybean Rust web site www.ppws.vt.edu/ipm/soybeanrust/index.htm. Click on Disease management, then click on Proper Equipment and Application Techniques to Ensure Adequate Fungicide Coverage.

Spacing= GPA=	20 15	Pressure		Speed Range for MEDIUM Droplet			
		Range (psi)		Speed (mph)			
	GPM	Low	High	Low	High	input	psi
XR8003	0.3	15	55	3.6	7.0	7.0	55.5
XR11003	0.3	15	25	3.6	4.7	6.0	40.8
TP8003	0.3	30	55	5.1	7.0	7.0	55.5
DG8003	0.3	38	60	5.8	7.3	7.0	55.5
DG11003	0.3	38	60	5.8	7.3	7.0	55.5
TT11003	0.3	45	90	6.3	8.9	8.0	72.6
TJ60-6503	0.3	30	35	5.1	5.6	5.0	28.3
DGTJ60-11003	0.3	32	60	5.3	7.3	7.0	55.5
TTJ60-11003	0.3	75	90	8.1	8.9	8.0	72.6
XR8004	0.4	25	60	6.3	9.7	9.0	51.7
XR11004	0.4	15	45	4.8	8.4	8.0	40.8
TP8004	0.4	30	60	6.9	9.7	9.0	51.7
TP11004	0.4	30	45	6.9	8.4	8.0	40.8
DG8004	0.4	45	60	8.4	9.7	9.0	51.7
DG11004	0.4	38	60	7.7	9.7	9.0	51.7
TT11004	0.4	70	90	10.5	11.9	11.0	77.2
TJ60-6504	0.4	30	50	6.9	8.9	8.0	40.8
TJ60-8004	0.4	30	38	6.9	7.7	7.0	31.2
DGTJ60-11004	0.4	55	60	9.3	9.7	9.0	51.7
TTJ60-11004	0.4	85	90	11.5	11.9	11.0	77.2
XR8005	0.5	35	60	9.3	12.1	12.0	58.8
XR11005	0.5	15	55	6.1	11.6	11.0	49.4
TP8005	0.5	32	60	8.9	12.1	12.0	58.8
TP11005	0.5	30	55	8.6	11.6	11.0	49.4
DG8005	0.5	45	60	10.5	12.1	12.0	58.8
DG11005	0.5	45	60	10.5	12.1	12.0	58.8
TJ60-8005	0.5	30	45	8.6	10.5	10.0	40.8
TJ60-11005	0.5	30	45	8.6	10.5	10.0	40.8
TT11005	0.5	80	90	14.0	14.9	14.0	80.0
XR11006	0.6	25	60	9.4	14.5	14.0	55.5
TP11006	0.6	30	60	10.3	14.5	14.0	55.5
TT11006	0.6	85	90	17.3	17.8	15.0	63.8
TJ60-6506	0.6	30	60	10.3	14.5	14.0	55.5
TJ60-8006	0.6	30	60	10.3	14.5	14.0	55.5
TJ60-11006	0.6	30	45	10.3	12.6	12.0	40.8
XR11008	0.8	45	60	16.8	19.4	17.0	46.1
TP11008	0.8	45	60	16.8	19.4	18.0	51.7
TT11008	0.8	85	90	23.1	23.8	23.0	84.3
TJ60-6508	0.8	50	60	17.7	19.4	18.0	51.7
TJ60-8008	0.8	35	60	14.8	19.4	15.0	35.9
TJ60-11008	0.8	30	60	13.7	19.4	14.0	31.2
TJ60-8010	1	45	60	21.0	24.2	21.0	45.0
TJ60-11010	1	30	60	17.1	24.2	17.0	29.5

