

Venturi Nozzles ~ Successful Farming

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Air-induction nozzles produce fewer driftable fines while maintaining efficacy

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Spraying Roundup Ready soybeans right next to seed corn production rows accentuates the importance of drift control. Van Barroquillo, sprayer operator for Lords Seeds, Inc., says he wouldn't be without the venturi-style TurboDrop nozzles he's used since the mid-1990s.

The Greenleaf TurboDrop was about the only venturi-style nozzle on the market when Lords bought their tips. As recently as 1999, there were only five different models being sold in the U.S.

The chart below shows 15 different tips being marketed in the US now. There have even been some new versions introduced since this article was researched.

In addition to the sheer number of the tips available today, the biggest change since 1999 is in the pressure range that will produce an acceptable spray pattern. Many of the newer tips are classified as low to medium pressure, which means that they will maintain a good spray pattern using much lower pressure than the earlier venturi-style tips.

Venturi-style nozzles all use the same basic design principle. They have two orifices. The first meters the flow of the chemical and faces the most pressure. The second orifice creates the spray pattern and is usually at least twice as large as the metering orifice (if you're using an 02 metering orifice, the pattern orifice would be at least an 04).

Between the two orifices, there's a mixing chamber with an air intake (venturi). Since the pattern orifice is larger than the metering orifice, there is a significant pressure drop between the two that draws air in through the Venturi and mixes it with the spray. As a result, the venturi-style tips produce larger spray droplets and fewer driftable fines than equivalent-size conventional nozzles at the same pressure.

That's about where the similarity ends. You can choose from ceramic, stainless steel, and polyacetal orifices.

Material Differences

Ceramic tips cost more initially but will last longer than poly or stainless steel. A ceramic tip will last 10 times as long as a stainless steel tip, according to Norm Burgeson, sales

manager for Lechler, a German nozzle manufacturer. Barroquillo says he is still using the set of ceramic tips the Lord operation bought in the mid-1990s.

"The poly tips are lasting so long that most guys are going with poly unless they're custom applicators," says Will Smart, Greenleaf Technologies. "The ceramics will last longer, but if you're spraying 2,000 acres a year, you're never going to wear out a ceramic nozzle. So why spend the money on it?"

Venturi-style polyacetal tips are even lasting twice as long as conventional stainless steel tips, Smart says. One reason is that the polyacetal is extremely wear-resistant. But the design of the tips themselves contributes to the longer life. The metering orifice faces most of the pressure, and it is a round hole that wears more evenly than a tapered fan orifice.

Hypro, TeeJet, and TurboDrop sell nozzles that incorporate the cap and tip into one piece. However, you may have fewer size choices.

Most of the other tips are one-piece designs that fit into a standard cap. The PneuJet tip has an insert that can be removed for cleaning. The TurboDrop and TurboDrop XL both allow you to exchange the pattern tip if you choose.

Other points of difference include the length, availability, and cost. The Air Bubble Jet, Albuz AVI, and PneuJet are not as widely distributed in the U.S. as the other models shown above.

Sizing Matters

Proper nozzle sizing depends on the type of sprayer you're running and the true operating range, Smart says. "With the TurboDrop, we suggest picking the size that will give you the application rate you want at approximately 60 psi. That way you've got plenty of room to slow down and still be in the operating range of the nozzle. With the Airmix, we tell them to target 40 psi so they still have room to slow down," Smart says.

"For the self-propelled sprayers that tend to have much wider speed variations, we always try to get them to use the TurboDrop because it has a wider overall range. If it's a pull-type or tractor-mounted sprayer where they're not changing speed as much, then the Airmix is OK. The more pressure they use, the better they can penetrate the canopy," Smart adds.