Dicamba drift cutting Mid-South soybean yields

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Several thousand acres of Mid-South soybeans have been affected by either drift, volatility, temperature inversions or tank contamination from dicamba herbicide applications.

Photo: Tom Barber/University of Arkansas

Driving around the Mid-South, especially in the Missouri Bootheel, west Tennessee and some areas of northeast Arkansas, it is not hard to find soybean fields that have been affected by either drift, volatility, temperature inversions or tank contamination from dicamba herbicide applications.

No matter how many times we have mentioned the potential off-target issues with this herbicide, it seems to have fallen on deaf ears. Many producers planted Xtend cotton and soybean cultivars which are tolerant to dicamba herbicide this season; however, no federal label currently exists for any dicamba formulations to be applied at planting or over the top of this technology.

Coincidentally this has been one of the worst pigweed years in recent memory, with the onset of PPO-resistant Palmer pigweed, especially in these regions mentioned.

Many growers, I am sure, felt that they did not have a choice — either spray dicamba or lose the crop. Based on the number of acres affected, it appears that many fields of cotton and soybeans containing this technology have been sprayed with an off-labeled application of dicamba — either pre-emergence or postemergence or likely, both.

In addition, the improved formulations of dicamba that reduce volatility are not available, so any **dicamba formulations that have been sprayed to these fields are ones that tend to be more volatile, which increases the potential for off-target movement.**

The result of these applications is **damage on neighboring susceptible soybean and cotton fields that are not Xtend or tolerant to dicamba herbicide.** Over the last two weeks we have received more phone calls than we can count wondering what to do and what to expect once this injury occurs.

Fortunately we have had a graduate student working for the last two years on a project to answer a lot of these questions. We knew going into this project that soybeans are very sensitive to dicamba herbicide, but I don't think we really knew how sensitive.

TWO MAIN FACTORS

Based on the data, the severity of yield loss from drift or off-target movement of dicamba is dependent on two main factors: **(1) the rate of dicamba** active that injured the beans, and **(2) the growth stage** when the beans were affected.

One important thing to keep in mind while looking at this damage in the field is that the full extent of dicamba injury may not be revealed until after three weeks from when the drift occurred.

So fields will need to be monitored for at least three weeks after the first symptoms are revealed to evaluate the full injury potential.

Yield loss is obviously the main concern when dealing with off-target movement of any herbicide. In terms of dicamba, it does not take very much at the right growth stage to cause potential yield loss in soybeans.

According to our research R1 is one of the most sensitive stages to lose yield from dicamba drift.

Figure 1 shows percent soybean yield loss from dicamba rates ranging from 1X (0.5 lb ai/A) or 16 oz/A Clarity all the way down to 1/1024X of the labeled rate. We have observed a 10 percent yield loss from dicamba at rates as low as 1/1024X in soybeans sprayed at R1.

There is no really good way to tell what rate of dicamba drifted or moved off-target by looking at the damage to the field because soybeans are so sensitive. What we have observed in the field, however, is that soybean stunting from dicamba can be highly correlated to some yield loss.

The data in Figure 1 represents numerous indeterminate soybean cultivars under varying environmental conditions.

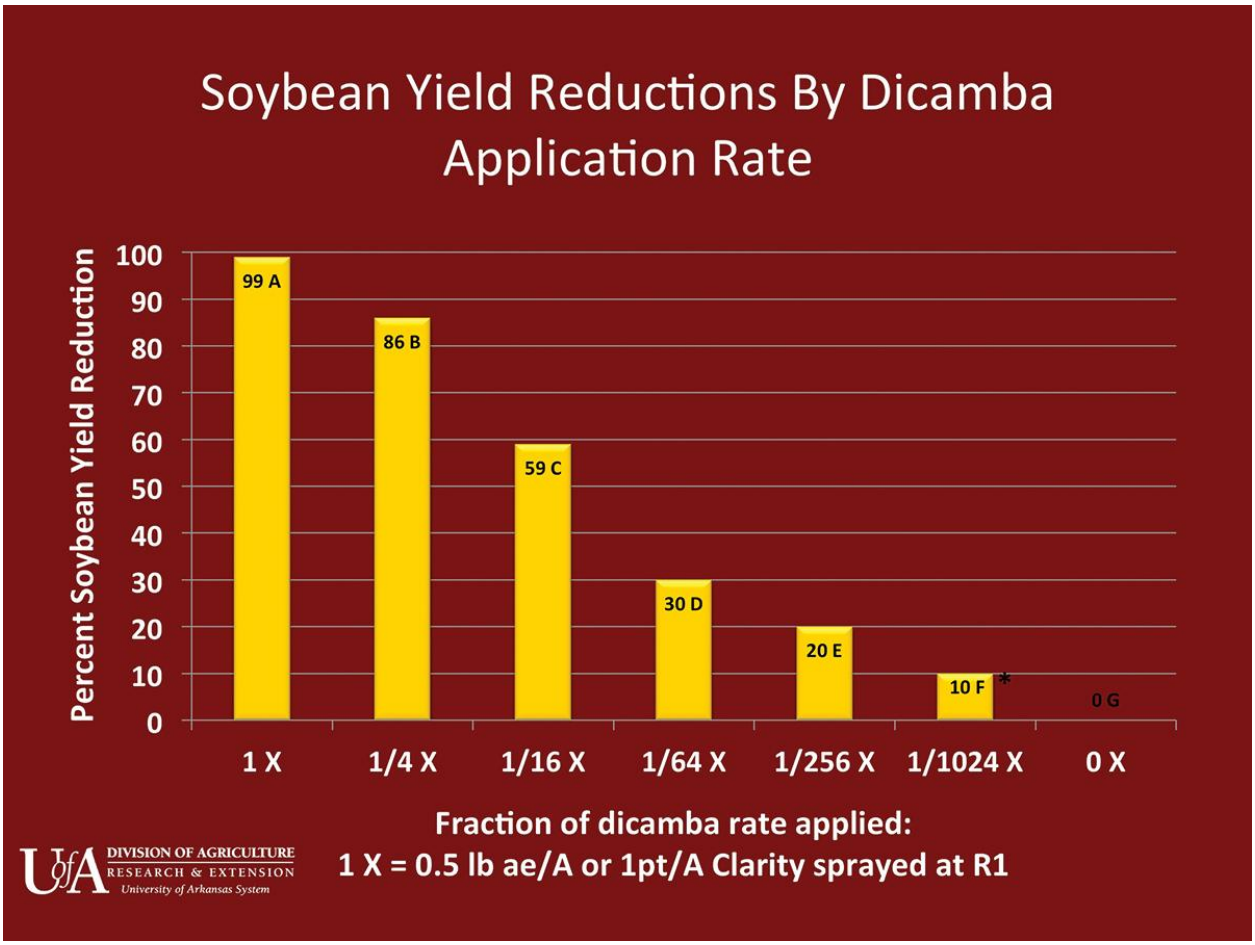

Figure 1

Because all cultivars may handle injury from dicamba differently, we wanted to try and determine if there were any differences in an indeterminate or determinate growth habit in regards to the plant's ability to recover from dicamba injury.

Figures 2 and 3 represent percent soybean yield reduction when 1/64X and 1/256X rates were applied at various growth stages.

The data for figures 2 and 3 were replicated at four different locations across multiple years.

It is obvious in both, regardless of soybean cultivar, the higher rate of 1/64X caused greater yield loss, especially during reproductive stages.

What is interesting is the fact that the indeterminate cultivar (Figure 2) was more sensitive in the reproductive stages while the determinate cultivar (Figure 3) was more sensitive to yield loss from early vegetative applications.

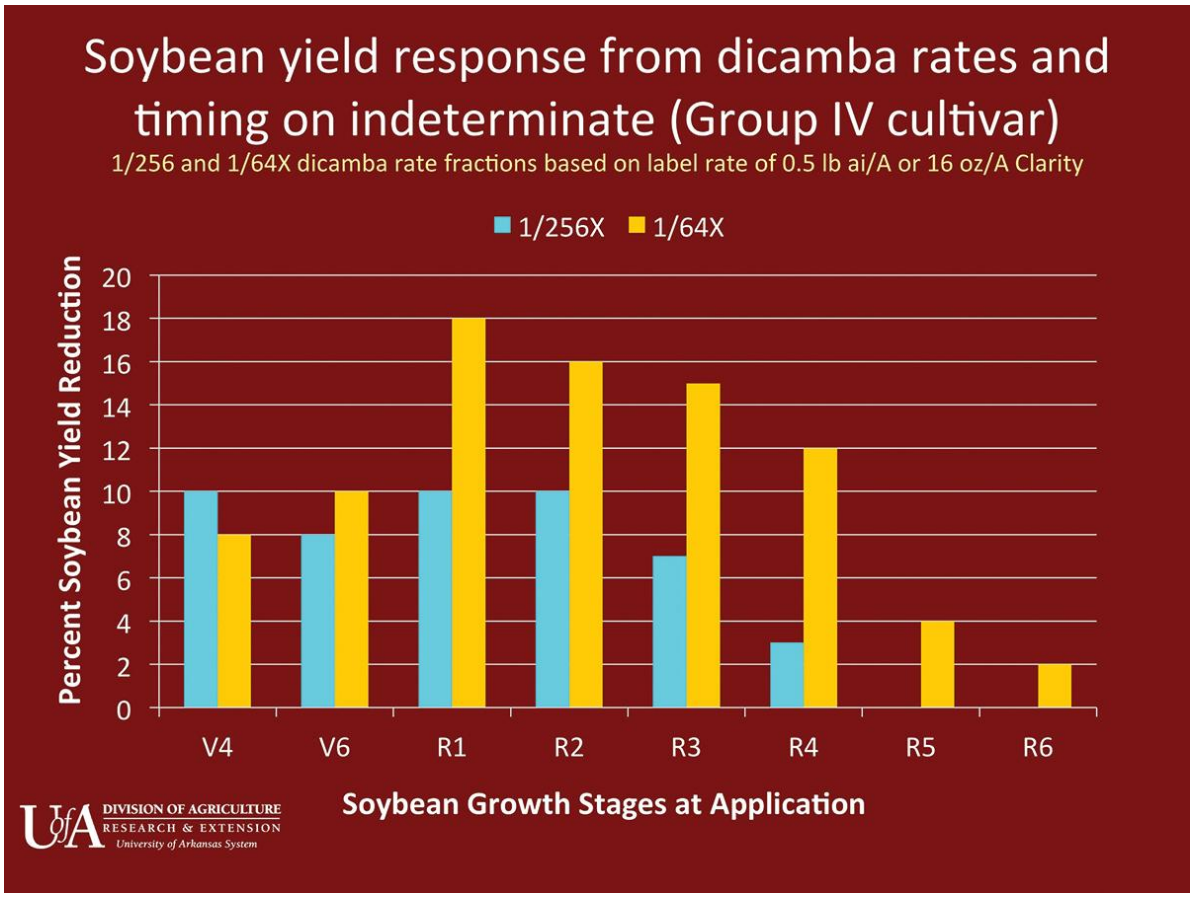

Figure 2

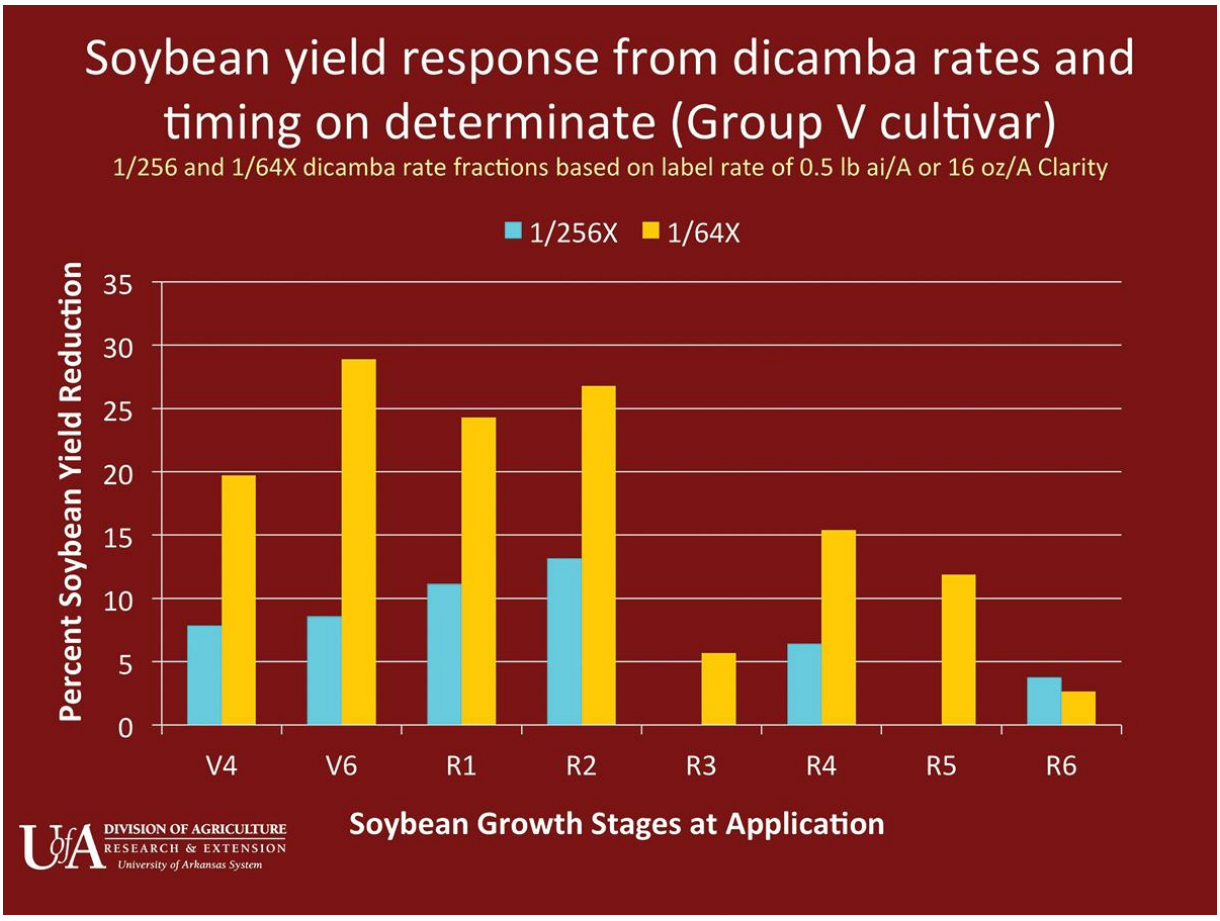

Figure 3

In general it looks like soybean cultivars that are more determinate in growth habit may be more sensitive to dicamba and susceptible to higher yield loss from off-target movement or tank contamination.

In either case, it is fairly safe to say that a yield loss of at least 10 percent can be expected under most scenarios.

In addition to yield reduction, low rates of dicamba that come into contact with susceptible soybeans at later growth stages such as R3-R5 can result in dicamba carryover in the soybean seed or progeny.

Based on our research it is evident that progeny from soybean plants treated with these low rates of dicamba such as 1/64X and 1/256X at later reproductive stages, especially R4, will have lower seed germination, significantly decreased seedling vigor and seedlings that emerge from the soil with dicamba-like symptomology.

Off-target movement at later reproductive periods may have serious implications for producers growing seed beans that are not tolerant to dicamba herbicide.

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