Ford Baldwin's perspective on Dicamba Delivered to Legislative Ag Committee 7/7/17

Introduction

I did not volunteer for this task as there are many other places I would rather be. I was asked by Representative Jett and Chairman Douglas to appear and after some arm twisting here I am. I will give one weed scientists point of view on the science surrounding the dicamba issue.

Current Status of Herbicide Technology

Last new herbicide Mode of Action is over 30 years old

The short term survival of chemical weed control as we have known it now depends upon 4 postemergence herbicides all tied up in competing seed trait technologies.

Roundup Ready failed on driver weeds like Palmer amaranth 10 years ago.

Now the herbicides we backed it up with called the PPO inhibitors are failing.

Liberty Link technology is forced to be overused and we cannot afford to lose it.

Therefore I fully understand the need for new technologies, and weed scientists have worked hard to find a path forward for Xtend technology.

I fully understand that growers planting Xtend crops are happy with the weed control and I know the agronomic genetics are good. In the proper programs, weed control in Xtend crops has been very good in research as it has been in several other current and developing technologies.

This weed scientist believes herbicides are a wonderful thing if they do their intended job AND they can be used without causing harm to others. In this case the second part is not happening and that is why we are here.

There is an equally large segment that are happy with their Roundup Ready's and do not wish to pay an increased trait fee; there are those happy with Liberty Link soybeans and wish to continue to use it as a diversity tool; some want to grow Non-GMO soybeans for specialty markets for a premium; some want to grow food beans for a specialty market and so on.

A wedge has been driven between these groups just as I predicted 4 to 5 years ago and tensions and tempers are running extremely high in the field.

I am aware of a fight that occurred yesterday.

Brief Background on dicamba

Developed in the 1960's as a corn herbicide.

In Arkansas it has primarily been used as a pasture herbicide and for vegetation burn down prior to planting in soybean, cotton and other crops.

It is a synthetic auxin herbicide which produces auxin- like or hormone-like symptoms in susceptible plants. These can include cupping, twisting, stunting, yield loss, and carryover into seed that can then produce symptoms in the progeny if planted. As a side note Arkansas has had "Hormone Herbicide" regulations since before I came to the U of A in 1974. Most had to do with 2,4-D on cotton.

Dicamba has a volatility component, which means it can change from a liquid or solid to a vapor after spraying, that can move off target in addition to the physical drift of spray particles moving.

Since its development there has been research on both volatility and efficacy of different formulations.

Common formulations you hear about are the DMA salts like Banvel, DGA salts like Clarity, and now Engenia. DMA salts are the most volatile, DGA are less volatile and Engenia the least volatile. Note however Engenia is not NON VOLATILE.

There have been non volatile salts such as Calcium and Aluminum salts developed in the past and these are referenced in the literature. It is my understanding that it is impossible to completely remove volatility and still control weeds. Has this been thoroughly researched?

Previous uses of dicamba have been earlier in the season when temperatures are cooler, susceptible crops were not emerged, and perennial vegetation not leafed out.

The use in the Xtend crops is the first broad scale use of dicamba in summer temperatures with crops and vegetation emerged.

What is Happening in the Field?

Susie Nichols has made some symptomology photographs available to you.

I have a few on slides to show in attempt to orient you as to what you would see if you went to the heavily hit areas.

When dicamba symptoms first appear and you go to investigate, these fields will have textbook drift patterns in them and often times the source of the drift is obvious. It lulls you into thinking maybe things will be alright.

In the lower use areas this pretty much remains the case. A lot of these fields get hit once and recovery can occur. This is why you may hear “we aren’t having much problem in this county or this state.”

However in the higher use areas this year such as Mississippi, Crittenden, Craighead, east Poinsett, Lee, Phillips and Monroe counties, around 2 to 3 weeks after the drift symptoms show up the bomb goes off!

COUPLE OF STORIES

Now every field of non Xtend soybeans in these areas are affected, those at similar growth stages affected to the same degree, every field showing perfectly uniform symptoms and some of these are miles from a nearest Xtend field. There is no way I can describe it to you and you be able to fathom it unless you go see it, and I will not engage with those who wish to downplay the magnitude unless they have been to look.

It is impossible for this pattern to be caused by physical drift, and little of it is being caused by accumulation of physical spray particles in a stable atmosphere or temperature inversion as some contend. If you have questions about this I can attempt to answer later.

What is happening though is volatiles of dicamba are accumulating as vapors in stable atmosphere or inversions and blanket-covering large areas. Again if you have questions I will take them later. I have provided you a hand out on this topic that is an easy read.

This volatility component of the current dicamba formulations is the part that cannot be fixed. You can have all the committee meetings and convene as many task forces as you wish and still wind right back up in the same place. That is also why simple sounding things like only allowing spraying to occur at certain hours or requiring hooded sprayers are not going to fix anything.

We knew the problems in 2016 were caused by higher volatility formulations being used illegally. For 2017, those of us involved hung our hat on the newer, lower volatility formulations along with ultra coarse sprays and required training to hopefully the problem. The answer to that now is obvious. Has there been off label applications and even some use of illegal formulations this year- I am sure. Do I believe this is the reason for continued problems absolutely not? Do I believe it is a few outlaws causing most of the problem absolutely not?

I now wish to address a few questions and comments commonly received

1. “If the ASPB approved it earlier why do they now wish to stop it in midstream?” I am actually the one that spoke up for Engenia at a meeting last fall when there was a motion on the floor to include it in the April 15 cut off. In hindsight perhaps that was a mistake. Again we were simply trying to see if there could be a path forward for a technology we need. At this point stopping the use takes away a tool from those who bought the Xtend technology in good faith. This late in the season, that will have minimum impact. However if you are in the minority at this stage who have late planted soybeans I am sure you disagree. The flip side is stopping the use now gives a lot of affected acres a fighting chance to make some recovery. Weed guys have actually been thrown under the bus for holding up the technology and now being backed over for allowing it to go forward.

2. “Cupping of leaves is easily confused with other things so we don’t know for sure this is dicamba.” Make no mistake what we are looking at is dicamba pure and simple.
3. “This is no different than when Roundup Ready was introduced and we just have to ramp up the learning curve and everything will be fine.” This is nothing like when Roundup Ready was introduced and here is why. Weed control, drift and plant sensitivity.
4. “Why is Arkansas the only state having issues of this magnitude?”
5. MS estimated 350,000 acres of soybeans alone. Other vegetation as well.
6. TN estimated 400,000 acres of soybeans alone. Other crops and vegetation also affected. As a result of the largest vineyard in the state being hit, they are proceeding with a stop use proposal- no application in cotton after first bloom which is now.
7. MO numbers all over the board depending upon who you talk to. A colleague is now telling me he is getting more calls north of I-

70 than from the bootheel. Other crops and vegetation as well.

8. KS- 30 complaints and counting. Calling inquiring about the proposed actions here
9. Midwest- It is happening and won't know where they stand for remainder of July.
10. What is the real effect of the near 600 complaints now in AR? Exact figures can be difficult but some of the math is pretty simple. You can take the number of soybean acres in the hardest hit counties and essentially subtract Monsanto's estimate of 34% Xtend and go. In those areas the only 2 types of soybeans are dicamba or Xtend beans and those that have been affected by dicamba beans. I used a figure on 1 million potentially affected acres and figured a 25 to 50% yield loss. If you figure an average yield of 60 Bu/A and $10 soybeans you hit figures of $150 to 300 million. The university numbers had much more thought put into them and are more conservative. Any way you slice it … you get

big numbers. Is this the soybean industry you want?

Xtend is an all or nothing technology. I have written that and stated that every time I have been asked to speak on the subject.

There are really only 2 choices as I see it. You stop the use of dicamba at a certain date OR you allow the current marketing model to force 100% of the acres to dicamba. The latter would provide a short term soybean solution for those that want to use it.

Here is the down side. First you eliminate the ability of growers to plant the other types of soybeans discussed at the beginning. Second it eliminates diversity because other technologies cannot be grown without injury; third it will fail quickly from a resistance standpoint- we already know PPO resistant Palmer is more tolerant to dicamba than susceptible populations and University

of Arkansas Weed Scientists have shown dicamba resistance can develop within 3 years. We must get smarter than a weed with no brain and quit using up technologies one at a time; fourth, it eliminates the development of newer technologies that actually have better herbicide packages in them compared to dicamba. Every public and private soybean breeding location in the midsouth has been hit, as well as variety trials, and seed production fields. According to a press release yesterday, the University of Wisconsin has had their soybean variety trials destroyed by dicamba drift. The researcher speculates the drift came from miles away. Again is this the soybean industry you want?

Then you move on to crops like peanuts, horticulture crops, gardens, trees, landscape plants and the like. This takes the issue to the next level and gets it outside agriculture. There are no established tolerances for dicamba in most of these crops and in theory these should be crop destruct. If I bring you a bucket of tomatoes that have dicamba damage on

them do you want to eat them? Who is going to pay?

Tree Picture LADY STORY

In Summary

In my 43 years as a weed scientist there are 4 things I never dreamed I would see and I feel I am watching agriculture be destroyed before my eyes.

1. Farmers indiscriminately threatening each others livelihoods with chemical trespass.
2. Companies that would put forth a technology that would drive a wedge between farmers and also agriculture and non agriculture and

then refuse to take ownership of the fallout that is occurring.

3. That a federal regulatory agency (EPA) would allow a herbicide registration when they knew these risks were great. They did it and they are the ones that need to fix it. However they are worried about endangered species and not crop damage and leave the crop damage part up to the states. Our state has taken their role in trying to deal with it seriously.
4. That herbicide science and behavior could get so embroiled in politics. You have the best weed science faculty in the nation at the University of Arkansas. Go a step further and take in Jason Bond in MS, Larry Steckel in TN and Kevin Bradley on MO and you have the very best collective group you could assemble in the world. They can guide you if this is a science issue. If it is going to be purely a political issue all the scientists in the world can't help you. I can tell you that this weed scientist would make a poor politician. I am afraid you may find out politicians make poor

weed scientists. Weeds and Herbicides do not understand politics!

QUESTIONS