

Notes: Basis for a Mid-April Suspension of In-Crop Dicamba Applications to Dicamba-resistant Agronomic Crops in Arkansas

1. *The Plant Board spent a large amount of time and resources deliberating the potential introduction of dicamba-resistant cotton and soybean cultivars and related over-the-top dicamba herbicide formulations for the past five or more years.*

- a. The Pesticide Committee met approximately 30 times, heard testimony, and deliberated over voluminous written and oral information provided by registrants, growers, consultants, public and private researchers, and members of the public.
- b. The entire Plant Board considered recommendations and additional information in at least 22 meetings during this period.
- c. Throughout, board members considered all the information made available, striving for a science-based decision to manage risks posed by this chemistry, well-known for its volatile nature and broad host range for more than 60 years.
- d. It should be noted that this is not the first time that the agricultural industry in Arkansas, including the Plant Board, has faced the introduction of products featuring high risk for off-target movement under the application conditions of eastern Arkansas.
- e. In the past, problems with 2,4-D volatile ester forms, clomazone EC forms, and quinclorac formulations among others posed special risk to off-target plant species. The Plant Board has maintained a logical and consistent position that pesticides should stay on-target, and that off-target movement is not legal, desirable or acceptable. For the most part, the agriculture industry has agreed with this principle.
- f. With all this said, the introduction of this pesticide technology followed a somewhat unusual pattern in that very limited field research was conducted and made available, especially field testing with relevance to Arkansas conditions – conditions that are widely known to present special challenges.
- g. Prior to use in 2017, the Board approved the use of Engenia herbicide, a new BAPMA salt of dicamba that appeared to be more stable than other forms based on limited (but some) field information from multiple sources.
- h. The Board considered this approval something of a compromise to industry requests for “a path forward for the technology” and it was hoped that this new formulation, combined with extensive training by BASF as well as the Cooperative Extension Service prior to use would result in minimal off-target movement during 2017.

2. *During the winter months of early 2017, plans were also made for collaborative field research of Xtendimax, the formulation of dicamba featuring VaporGrip technology, developed by Monsanto.*

- a. This work was planned and conducted by several public researchers in multiple states during 2017 to assess the off-target movement potential of new dicamba herbicide formulations under field conditions in Arkansas, Tennessee, Missouri, Mississippi and other states.

3. *The commercial introduction of Engenia herbicide in Arkansas during 2017 was to some degree a “giant field experiment” to test the ability of applicators to manage off-target movement – a major concern of the Plant Board, based on information and concerns presented at the many meetings over five years.*

- a. Unfortunately, the result of the experiment was widespread off-target movement and plant injury symptoms across an estimated 800,000 acres in 26 Arkansas counties.
- b. Similar experiences were reported in Tennessee, Mississippi, Missouri and many other states where all three new formulations of dicamba were permitted.
- c. The entire plant landscape in many areas of use was affected - an off-target event of massive scale, beyond the experience of practicing weed scientists, agronomists and industry personnel.
- d. Plants affected included horticulture crops, non-dicamba resistant soybeans, cotton, trees, peanuts, ornamentals, gardens and many natural plants thought to be important to pollinators.
- e. The heaviest off-target movement areas were also the areas with the heaviest dicamba-use, and off-target movement from legal, labeled use was reported at distances greater than one mile.
- f. In addition, the pattern of off-target injury to the landscape often did not follow expected physical drift patterns, but rather patterns associated with movement from volatility or possibly inversions according to experts who walked many complaints.
- g. Frequently, experts could not determine the source of any off-target movement, noting that symptoms occur 7 – 21 days after exposure and there were many applications made in the same area and same time frame, resulting in suspected “atmospheric loading”.
- h. In Arkansas, off-target injury was first noticed in late May and by mid-June had exploded into daily official complaints rapidly increasing to the Plant Board. This resulted in an emergency ban in early July to prevent further off-target injury to the environment.
- i. By the end of the summer, almost 1000 official complaints to the State Plant Board as well as thousands of unofficial complaints and concerns. This number of complaints was unheard of with any previous technology introduction and illustrated the critical need to adequately research products under conditions relevant to a planned and massive release into a given area.

4. *In the meantime, and despite widespread off-target injury to planned soybean research plots in Arkansas, replanted field studies were conducted during 2017 in the state, and other states.*

- a. In general, these studies established that volatility of the new formulations of dicamba herbicide occurred over at least a 2-3-day period following application.
- b. Air temperatures ranged from 79 F to 94 F at time of application in four of these studies, resulting in off-target movement from at least 120 ft. to well over 300 feet, sometimes in an unanticipated direction.
- c. All applications followed label directions and recommended conditions.

5. *In response to these developments during the spring and early summer of 2017, the Governor and the Arkansas Agriculture Department established The Arkansas Dicamba Task Force, with members representing all areas of plant agriculture in the state.*

- a. The Task Force deliberated during two separate day-length meetings, listening to public researchers, private experts and company representatives.
- b. They concluded that due to the demonstrated volatility of new dicamba formulations, the only available management option to minimize off-target movement risk in the future was an early season suspension of product use, the majority agreeing on April 15, the same cut-off date option used successfully over the years to manage volatile forms of 2,4-D in the state.
- c. Certain Task Force members indicated that the earlier cut-off date would more likely minimize risk to sensitive off-target plant species and crops than later dates, when temperatures were increasing along with number of applications in an area.

6. *Previous scientific reports suggest that dicamba volatility increases from at least 68F upward, with more active release from 77 F upward.*

- a. However, it has been noted that other factors such as humidity, amount and type of formulation, and even type of surface applied to influence volatility, and that additional research on mechanisms that influence volatility in the environment was needed.
- b. Climate data in Arkansas supports April as having less risky temperatures and other conditions for volatility than May or June when temperatures are higher.
- c. Again, experience in managing 2,4-D ester (volatile) forms in the state using an April 15 cut-off date provides additional confidence that a mid-April suspension would offer reduced risk for off-target movement than later dates.
- d. Given the problems observed in 2017, the Plant Board remained interested in additional field research on cut-off dates at multiple locations as to effect on off-target movement.

7. *The chemical nature of dicamba and salt formulations was discussed at the November 8 Plant Board hearing, and the nature of this chemical suggested that all current and new formulations of dicamba can dissociate in the environment over time, with the resulting acid form volatilizing into the atmosphere.*

- a. While the different formulations may dissociate at different rates, field observations in 2017 suggest that new formulations can contribute enough volatile dicamba to the landscape to result in off-target movement and injury to plants, as well as potentially expose humans and animals.
- b. It was also noted in the discussion that only about half of the applied dicamba to plant surfaces is absorbed, allowing the remainder to be available to potentially volatilize.
- c. Since the total application rate equals 1 lb. of active dicamba per acre, this means that about ½ lb. could be left over per acre. For one million acres that receive two applications at the .5 lb. ai rate, this means that 500,000 lbs. of active dicamba could still be available on applied surfaces for some time.

- d. It is highly recommended that additional research on volatility of new formulations of dicamba be conducted, at a level adequate to provide confidence in the application of this technology to the scale of planting intended across hundreds of local environments.
- e. These factors - added to the research findings and experience from 2017 - strengthened concerns of the Plant Board as to the ability to effectively manage off-target movement of these products during the growing season and argued for a logical April cut-off.

8. *As noted, off-target injury and thus risk to crops and sensitive plant species other than soybeans or other row crops was widely noted in 2017.*

- a. Besides complaints and documented off-target injury to horticulture crops, native trees and the landscape in general, there was also a comprehensive complaint from a large beekeeping company.
- b. The owner observed a decline in hive health and honey production during July that resulted in an estimated \$500,000 loss for hives placed in the most heavily used dicamba area.
- c. Hives in other areas, where dicamba was not used, had normal yields and no losses were suffered.
- d. Further observations in the affected region suggested widespread interruption of flowering of natural plant species important to foraging bees and other pollinators during a critical time of plant growth and development, resulting in apparently less pollen and nectar for bees.
- e. This phenomenon as well as other potential impact of off-target movement to the environment should be effectively researched.
- f. In the meantime, these concerns support an April cut-off to minimize potential risk from large scale dicamba use in Arkansas prior to critical vegetative (leafing out and growth) and reproductive (flowering) development of many plant species in the state.
- g. It is still true that April showers bring May flowers, regarding development of many spring plants in the state.

9. *Vegetable and fruit producers also expressed concern that their crops, when exposed to off-target movement to dicamba, would thus be unsaleable.*

- a. This was documented and reported to be the case for two commercial producers in Mississippi County.

10. *Soybean growers noted widespread leaf symptomology but most reported recovery of these fields during the near-ideal growing conditions of 2017 with yields like historical field yields.*

- a. However, some growers measured significant yield losses and noted increased weed control costs in fields that had delayed canopy closure from off-target dicamba exposure.
- b. Certain growers also reported that insurance companies denied damage claims since the insured applicator followed the label correctly, therefore off-target injury was not the insured applicator's responsibility.

11. As noted in reports from field experts, off-target movement and resulting plant injury due to dicamba were often not traceable during 2017 in Arkansas.

- a. This is scientifically understandable where volatility is involved, since the chemical moves as a gaseous form sometime after application and may condense uniformly over an affected area, leaving no discernible pattern of movement.
- b. In addition, numerous applications in an area within a limited time frame may also result in multiple drift events, making source of the off-target movement undetermined.
- c. Finally, spraying into an inversion can result in unusual movement and patterns of injury, making source difficult to determine in a multi-application environment.
- d. Without the source of injury being traceable, then liability cannot be assessed and enforcement measures against an applicator cannot be applied.
- e. This supports an early suspension of use to protect the environment, producers and many facets of plant agriculture until effective measures to manage off-target movement become available.

12. Given the volatile nature of the new dicamba herbicide formulations under Arkansas field conditions, the Plant Board concluded that correcting application mistakes or additional education could not fully address the significant risk to the environment from unpredictable volatility.

- a. While preventing illegal uses, greater penalties, and additional training would all be positive steps to address part of the off-target movement issue, the scientific evidence from multiple states strongly suggest these would not be adequate, in the face of the continued volatile nature of dicamba when applied on a massive scale.
- b. No expert from public or private sources was able to present another option to the Board to prevent another 2017, other than an early use suspension.
- c. Therefore, the Board agreed with the State Task Force on Dicamba and recommended an April 16 cut-off.
- d. Until there is additional relevant, and adequate, scientific information to manage the risk posed by volatility of dicamba in large scale use under Arkansas conditions, this was the most scientifically based and effective option available to minimize risk to all citizens and production systems in the state.

20-20-204. Penalties.

- (a)(1) Any commercial or noncommercial applicator, dealer, or pilot who violates any provision of this subchapter or the regulations adopted thereunder shall be guilty of a misdemeanor and upon conviction shall be punishable for the first offense by a fine of not less than one hundred dollars (\$100) and not more than one thousand dollars (\$1,000), for the second and any additional offense by a fine of not less than five hundred dollars (\$500) and not more than two thousand dollars (\$2,000).
- (2) Any private applicator who violates any provision of this subchapter or the regulations adopted thereunder subsequent to receiving a written warning from the State Plant Board for a prior violation shall be guilty of a misdemeanor and upon conviction shall be punishable by a fine of not less than one hundred dollars (\$100) and not more than five hundred dollars (\$500) for each offense. An offense committed more than three (3) years after a previous conviction or written warning shall be considered as a first offense.
- (b) No state court shall allow the recovery of damages from administrative action taken if the court finds that there was probable cause for such action.

20-20-205. Administration of subchapter by State Plant Board.


- (a) This subchapter shall be administered by the State Plant Board.
- (b) The functions vested in the State Plant Board by this subchapter shall be considered to be delegated to the employees of the State Plant Board or its authorized representatives.

20-20-206. State Plant Board Powers and duties.

- (a) The State Plant Board shall administer and enforce the provisions of this subchapter and shall have authority to issue regulations after a public hearing following due notice to all interested persons to carry out the provisions of this subchapter.

- (1) Where the State Plant Board finds it necessary to carry out the purpose and intent of this subchapter, regulations may relate to the time, place, manner, amount, concentration, or other conditions under which pesticides may be distributed or applied and may restrict or prohibit use of pesticides in designated areas during specified periods of time to prevent unreasonable adverse effects by drift or misapplication to:

- (A) Plants, including forage plants, or adjacent or nearby lands;
- (B) Wildlife in the adjoining or nearby areas;
- (C) Fish and other aquatic life in waters in reasonable proximity to the area to be treated; and
- (D) Humans, animals, or beneficial insects.

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- (2) In issuing regulations, the State Plant Board shall give consideration to pertinent research findings and recommendations of other agencies of this state, the federal government, or other reliable sources. The State Plant Board may by regulation require that notice of a proposed application of a pesticide be given to owners or persons in control of lands adjoining the property to be treated or in the immediate vicinity thereof if it finds that the notice is necessary to carry out the purpose of this subchapter.

- (b) For the purpose of uniformity and in order to enter into cooperative agreements, the State Plant Board shall consider as restricted-use pesticides those uses or pesticides classified as such by EPA.

- (1) In addition, the State Plant Board may declare certain pesticides or pesticide uses as state restricted-use pesticides when after investigation it finds and determines the pesticides or pesticide uses to be injurious to persons, animals, or vegetation other than the pest or vegetation which it is intended to destroy, or otherwise

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