September 6, 2025

U.S. Environmental Protection Agency
EPA Docket Center
New Use of Dicamba on DT Cotton and DT Soybean
Mail Code 28221T
1200 Pennsylvania Ave, NW
Washington, DC 20460

RE: EPA's Proposed Decision to Approve Registration for the Uses of Dicamba on Dicamba-Tolerant Cotton and Dicamba-Tolerant Soybean; Docket ID: EPA-HQ-OPP-2024-0154.

The National Agricultural Aviation Association (NAAA) appreciates the opportunity to comment on EPA's proposed decision to approve registration for dicamba on dicamba-tolerant cotton and soybean.

<u>U.S. Aerial Application Industry Background:</u> NAAA represents the interests of the 1,560 aerial application industry owner/operators and 2,028 non-operator agricultural pilots throughout the United States licensed as commercial applicators that use aircraft to enhance the production of food, fiber and bio-energy; protect forestry; protect waterways and ranchland from invasive species; and provide services to agencies and homeowner groups for the control of mosquitoes and other health-threatening pests.

Within agriculture and other pest control situations, manned aerial application is an important method for applying pesticides, for it permits large areas to be covered rapidly—by far the fastest application method of crop inputs—when it matters most. It takes advantage, more than any other form of application, of the often too-brief periods of acceptable weather for spraying and allows timely treatment of pests while they are in critical developmental stages, often over terrain that is too wet or otherwise inaccessible for terrestrial applications. It also treats above the crop canopy, thereby not disrupting the crop and damaging it. Aerial application has greater productivity, accuracy, speed, and is unobtrusive to the crop compared to ground application[1]. Although the average aerial application company is comprised of but six employees and two aircraft, as an industry these small businesses treat nearly 127 million acres of U.S. cropland each season, which is about 28% of all cropland used for crop production in the U.S. In addition to the cropland acres, aerial applicators annually apply to 5.1 million acres of forest land, 7.9 million acres of pasture and rangeland, and 4.8 million acres for mosquito control and other public health concerns.

[1] Kováčik, L., and A. Novák, 2020. "Comparison of Aerial Application vs. Ground Application." *Transportation Research Procedia* 44 (2020) 264–270.

While there are alternatives to making aerial applications of pesticides, aerial application has several advantages. In addition to the speed and timeliness advantage aerial application has over other forms of application, there is also a yield difference. Driving a ground sprayer through a standing crop results in a significant yield loss. Research from Purdue University[2] found that yield loss from ground sprayer wheel tracks varied from 1.3% to 4.9% depending on boom width. While this study was conducted in soybeans, similar results could be expected in other crops as well. Data from a Texas A&M University economics study[3] and the 2019 NAAA industry survey[4] were used to calculate that the aerial application industry is directly responsible for the production of 1.69 billion bushels of corn, 199 million bushels of wheat, 548 million pounds of cotton, 295 million bushels of soybeans, and 3.33 billion pounds of rice annually that would be lost every year without the aerial application of pesticides. The value in additional crop yield that the aerial application industry brings to farmers, input suppliers, processors, and agricultural transportation and storage industries for corn, wheat, cotton, soybean, and rice production in the U.S. is estimated to be about $37 billion[5].

Research summarized by the University of Minnesota[6] describes how soil compaction from ground rigs can negatively affect crop yields due to nitrogen loss, reduced potassium availability, inhibition of root respiration due to reduced soil aeration, decreased water infiltration and storage, and decreased root growth. Aerial application offers the only means of applying a crop protection product when the ground is wet and when time is crucial during a pest outbreak. A study on the application efficacy of fungicides on corn applied by ground, aerial, and chemigation applications[7] further demonstrates that aerial application exceeds ground and chemigation application methods in terms of yield response. The aerial application of crop protection products results in greater harvest yields of crops. This in turn results in less land being used for agricultural production, preserving more wetlands for natural water filtration, forest ecosystems for carbon sequestration and habitat for threatened and endangered species.

The Texas A&M[4] study revealed that the total area of cropland needed to replace the yield lost if aerial application was not available for corn, wheat, soybean, cotton, and rice production is 27.4 million acres, an area roughly the size of Tennessee. Aerial applicators seed 3.8 million acres of cover crops annually[5]. This means that aerial applicators are responsible for helping to sequester 1.9 million metric tons of $CO2$ equivalent annually, which according to the EPA would be the equivalent of removing approximately 412,000 cars with carbon-combustion engines from the roads each year.

The aerial application industry is also actively involved in education and research efforts to improve the accuracy and safety of aerial applications. The National Agricultural Aviation

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[2] Hanna, S., S. Conley, J. Santini, and G. Shaner. 2007. “Managing Fungicide Applications in Soybean.” Purdue University Extension Soybean Production Systems SPS-103-W. https://www.extension.purdue.edu/extmedia/sps/sps-103-w.pdf
[3] Dharmasena, S. 2020. “How Much is the Aerial Application Industry Worth in the United States?” Research presented at the 2020 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/2020aatresearchpapers
[4] National Agricultural Aviation Association. May 2019. “2019 NAAA Aerial Application Industry Survey: Operators.” https://www.agaviation.org//Files/Comments/NAAA%202019%20Operator%20Survey.pdf
[5] Dharmasena, S. 2021. “Value of the Agricultural Aerial Application Industry in the United States” Research presented at the 2021 Ag Aviation Expo, Savannah, GA. https://www.agaviation.org/2021aatresearchpapers
[6] University of Minnesota. “Soil Compaction.” Accessed April 29, 2021. https://extension.umn.edu/soil-management-and-health/soil-compaction
[7] Thomas, D. 2009. Unpublished research results submitted to EPA. https://www.agaviation.org//Files/Comments/Fungicide%20efficacy%20results.pdf

Research and Education Foundation (NAAREF) is a non-profit organization dedicated to promoting research, technology transfer and advanced education among aerial applicators, allied industries, government agencies and academic institutions. NAAREF's Professional Aerial Applicators' Support System (PAASS) program is a four-hour course offered annually at all state and regional agricultural aviation association conventions. The curriculum is brand new every year and a minimum of one hour of PAASS is focused on environmental professionalism. This ensures aerial applicators are kept up to date on the latest information related to making accurate applications and drift mitigation. Nozzle selection, buffer zones, inversions, precision application technology, dissection of real-life drift incidents, and proper spray boom setup are some of the environmental professionalism topics that have been covered in PAASS.

Five years after PAASS became part of the aerial application annual curriculum in 1999, there was a 26% drop in drift incidents according to Association of American Pest Control Officials drift surveys. In addition, ag aircraft accidents have also significantly declined. From 1999 to 2010, the accident rate per 100,000 hours flown dropped by 21.6% compared to pre-PAASS accident rates. From 2011 to 2019, the accident rate dropped even more—30.8%—compared to pre-PAASS accident rates. Each year we continue to see a drop in our accident rate since pre-PAASS days, but now it declines more incrementally. While aviation safety is the domain of the FAA and not the EPA, the reduction in accidents proves PAASS has had, and continues to have, a significant positive impact on the aerial application industry.

Another NAAREF program is Operation S.A.F.E. (Self-regulating Application & Flight Efficiency). The primary component of Operation S.A.F.E. is a fly-in clinic. At a S.A.F.E. fly-in, aerial applicators can have their aircraft calibrated and application patterns (both liquid and dry) measured and evaluated for accuracy and uniformity. Spray droplet size is also measured at a fly-in to ensure the agricultural aircraft is creating the droplet size required by the labels for products to be applied by the aircraft. Many of the concepts used mitigate the risk of drift from agricultural aircraft have originated from ideas first tested at Operation S.A.F.E. fly-ins.

Just last year, NAAA created a professional certification program for the aerial application industry named C-PAASS for Certified Professional Aerial Application Safety Steward. To be certified under C-PAASS aerial applicators must take the PAASS program annually and Operation S.A.F.E. biennially, in addition to belonging as a member to their state/regional agricultural aviation association and the NAAA. C-PAASS professionals are also required to take and be tested on additional aviation safety and environmental stewardship curriculum offered on-line through a learning management system software NAAA installed. The purpose of C-PAASS is to enhance professionalism in the aerial application industry as our statistics show that those that participate in our educational programs are safer from both an aviation and environmental perspective.

<u>Comments</u>

NAAA disagrees with EPA's proposal to prohibit aerial applications of the three end use dicamba products for weed control in dicamba tolerant (DT) cotton and DT soybean. Aerial application is critical for ensuring growers can make timely and effective applications of pesticides. Only aerial application is capable of treating a large number of acres in a shorter period of time. This is particularly important if the ground is wet or if weather conditions—especially high wind speeds, high temperatures, and inversions—limit the hours per day that are available to make applications of dicamba according to label requirements.

EPA's memorandum of support for dicamba applications on DT crops mentions how even two days of delay in application timing can make it difficult to control pigweed species with dicamba. As an example, the ideal size for control of palmer amaranth with a post emergence herbicide is 2-4 inches in height at the time of application, with plants taller than 6 inches being only partially controlled or not controlled at all[8]. Palmer amaranth grows 2-3 inches per day[9]. Assuming a grower in the southern United States notices an infestation of palmer amaranth the day after emergence at 2 inches in height, a delay of spraying with a ground rig of seven days caused by a substantial spring rain event[10] could allow the palmer amaranth to grow to a minimum height of 16 inches. This is well beyond the point where control is possible.

To compare the productivity between aerial application and ground application in a row crop agricultural setting, an aerial applicator and ground applicator from Mississippi were asked to provide details about the productivity of their application equipment. The aircraft was an Air Tractor AT-502B with a 60-foot swath width and the ground rig was a John Deere R4030 with a 90-foot boom. In both cases a 12-hour day of spraying was assumed, which is appropriate during the height of the spraying season. In an average 12-hour day, the aircraft treats 1,800 acres while the ground rig treats 450 acres, meaning aerial application is roughly four times as productive as ground application in this region. Using this information, it's estimated the agricultural aircraft is treating about 150 acres per hour while the ground rig is only treating about 38 acres per hour.

For any given period of time when the weather conditions permit applications, aerial applicators can treat far more acres. Matthews et al.[11] notes that application timing is a key for Integrated Pest Management (IPM) and that aerial application has an advantage over ground application when and where large areas need to be treated quickly. The option of aerial application is also crucial during this time of weed resistance that is afflicting crop growth and yields. NAAA also believes this productivity reduces drift incidents because growers who utilize aerial application to make herbicide applications in a timely manner do not feel pressured to spray with a ground rig under high-wind weather conditions in order to get the application made. While acknowledging no data to prove it, NAAA hypothesizes that many of the drift incidents that have occurred with the newer formulations of herbicides intended for resistant crops are due to applications in unfavorable weather conditions. Growers are forced to apply in unfavorable weather in order to get all their fields treated within the narrow time period they're allowed to use these herbicides during the growing season.

As previously mentioned, the proposed decision to approve registration for the three dicamba products on DT crops has numerous restrictions on weather conditions for making applications, including temperature, wind speed, and the presence of an inversion. While NAAA understands the reasoning for these restrictions, they do significantly reduce the time available during the day to make dicamba applications, making it impossible to adequately cover the needed acreage by ground applications alone.

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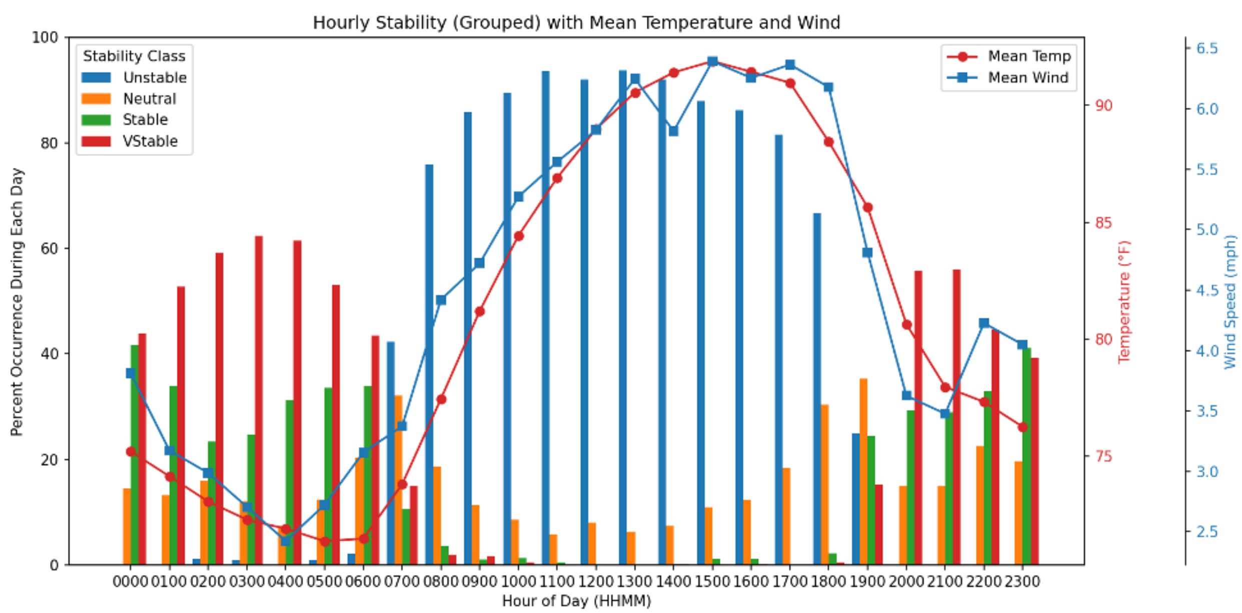
[8] Legleiter, T. 2020. "Palmer Amaranth and Waterhemp Control in Corn and Soybean." http://www2.ca.uky.edu/agcomm/pubs/AGR/AGR260/AGR260.pdf. Assessed March 14, 2024.
[9] USDA NRCS. 2017 "Palmer Amaranth". https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdafiles/FactSheets/archived-fact-sheets/palmer_amaranth_nrcs_national_factsheet.pdf. Accessed March 14, 2024
[10] Holloway, G. Operator and Chief Pilot of G3 Flying, LLC; 2024 NAAA Vice President. Personal Conversation March 14, 2024.
[11] Matthews, G.A., R. Bateman, and P. Miller. 2014. *Pesticide Application Methods*. Fourth Edition. John Wiley & Sons, Ltd.

To investigate how the weather restrictions will impact the daily time available for making applications, NAAA used data from a study investigating the temporal distribution of low-level temperature inversions and atmospheric stability[12] provided by the main author, Dr. Bradley Fritz with the USDA-ARS. Dr. Fritz provided average atmospheric stability, temperature, and wind speed data from the College Station, TX location for the month of June 2003. The example that follows is not expected to be unique to just College Station, TX. It applies to locations across the country that need applications of DT crops. In many parts of the country, it is expected that wind speeds above 10 mph will further restrict the available application window.

A summary of this data is shown in the figure below. Temperature inversions are typically associated with stable and very stable atmospheric conditions[12]. On an average June day in College Station Texas, this would mean not spraying before 7:00 AM or after 6:00 PM. Ideally, spraying would not be conducted under even neutral conditions, further limiting the application timing to between 8:00 AM and 6:00 PM. The temperature rises above 85°F between 10:00 AM and 11:00 AM and doesn't drop below 85°F until after 7:00 PM. While applications of dicamba would be permitted during this time, applicators would be restricted to only treating 60% of the target area or using no tank mix partners. Either of those options dramatically increases the risks of weed control failure. When wind speed is examined, the hours between 12:00 and 5:00 AM are eliminated because the wind speed drops below 3 mph. On average, the wind speed does not exceed the 10-mph maximum wind speed limit for dicamba applications at this location in June.



Summarizing the impact of the hourly weather data at this location during June, weather conditions that both avoid inversions and don't restrict either the application area or products used only occur between 8:00 AM and 10:30 AM. This is an incredibly short period each day in which growers have to treat their DT crops with dicamba. If allowed, aerial application could provide at least a four times increase in the acres treated during this short time period. This

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[12] Fritz, B.K., W.C. Hoffmann, Y. Lan, S.J. Thomson, and Y. Huang. 2008. Low-Level Atmospheric Temperature Inversions and Atmospheric Stability: Characteristics and Impacts on Agricultural Applications. Agricultural Engineering International: the CIGR Ejournal. Manuscript PM 08 001. Vol. X.

would dramatically improve growers' success at using dicamba to control resistant weeds before they grow to a size at which control becomes impossible to eradicate, resulting in a marked yield reduction and theft of moisture and key soil nutrients.

According to the USDA 2024 state overview for Texas[13] the average farm size in Texas is 541 acres. If we assume a cotton grower has 500 acres of cotton that needs to be treated with dicamba, and they can only apply for 2.5 hours a day at a rate of 38 acres per hour using a ground rig (see previous example), they will need over five days to treat all of their cotton. By contrast, an aerial applicator applying at a rate of 150 acres per hour (see previous example) would be able to get all 500 acres treated within two days.

NAAA supports the herbicide strategy and the drift mitigation requirements proposed for applying the three dicamba products to DT crops as detailed in the memorandum of support. To allow for aerial applications of dicamba to DT cotton and soybean, NAAA suggests the following label restrictions in addition to the requirements detailed in the memorandum of support:

- Spray droplet size class of very coarse or larger
- Maximum boom length of 50% of wingspan or rotor diameter
- Minimum GPA of 5 GPA
- 400-foot downwind buffer (maximum aerial buffer distance from Ecological Mitigation Support Document to Support Endangered Species Strategies Version 2.0)
- Mitigation measures for % reduction in buffer distance:
    - Downwind windbreak/hedgerow/riparian/forest/woodlots/shrubland
        - 50% for basic
        - 75% for advanced
        - 100% for appropriate vegetation ≥60 ft width
    - 10% for relative humidity ≥60%
    - No reductions for droplet size increases (unless EPA adds extremely coarse to the acceptable mitigation measures list in the ecological mitigation document)
    - No reductions for drift reducing adjuvants (already required)
    - No reductions for reduced proportion of field treated
- ¾ swath displacement upwind at the downwind edge of the field
- Maximum 10-foot release height unless a greater application height is required for pilot safety
- Volatility reducing agent (VRA) rates adjusted for aerial applications at 5 GPA based on the percent concentration from the ground rig rates.
    - VRA @ <75° F = 7 fl oz/A
    - VRA @ ≥75° F = 14 fl oz/A
- Drift reducing agent (DRA) selection based on availability of data from trials for aerial applications (NAAA was unable to view the current lists of approved DRAs as all three registrants currently have websites listing DRAs turned off)

NAAA recognizes that 5 GPA is considerably less than the 15 GPA required by the proposed registration of the dicamba products for ground applications. However, the relationship between GPA and drift potential for aerial applications is different than it is with ground applications. For aerial applications, a higher spray application rate can increase the risk of drift instead of

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[13] https://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=TEXAS

reducing it when using straight stream nozzles. Of all the nozzle types available for aerial applications, straight stream provide the largest droplet sizes and would be the ideal choice for applications of dicamba. Applying at higher GPA's requires a higher flow rate, which in turn requires a larger orifice. For straight stream nozzles on high-speed fixed-wing agricultural aircraft, increasing the orifice size decreases the droplet size[11].

As an example, an aerial applicator with an AT-502 aircraft has 50 nozzles on the boom for a setup with boom length at 50% of the wingspan. The aircraft will be operated at 140 mph with an effective swath width of 50 feet. All nozzles would be setup with 0-degrees deflection. Using a standard pump and nozzle options for which the USDA has modeled and classified droplet size (those capable of 3.0 gallons per minute flow rate and below), a AT-502 cannot be set up to apply at 15 GPA, so for this example we will use 10 GPA for the highest spray application rate. If the application is to be made at 10 GPA with straight stream nozzles, the applicator would need to select 0025 nozzles and operate them at 51 psi. The resulting droplet spectrum class would be coarse, with a VMD of 429 microns and a %V<200µm of 16.04%. If the spray application rate was reduced to 5 GPA the applicator could choose 0012 nozzles operated at 55 psi. This would create a very coarse droplet spectrum with a VMD of 498 microns and a %V<200µm of 11.29%. If the GPA was again halved to 2.5 GPA (included only as an example to explain the relationship between GPA, orifice size, and droplet size), a 0006 nozzle could be used at 59 psi, resulting in an extremely coarse droplet size with a VMD of 536 microns and a %V<200µm of 8.58%. This example demonstrates that with straight stream nozzles, smaller orifices used for lower GPAs increase droplet size and reduce the risk of drift. Current research is documenting that large droplets from straight stream nozzles can provide similar or better efficacy than smaller droplets[14,15].

The ecological risk assessment for the proposed registration of dicamba for use on DT tolerant crops used the Tier 1 model in AgDRIFT to estimate the risk of drift. While NAAA realizes this was for ground applications only since aerial was not proposed, NAAA recommends EPA use the Tier 3 model in AGDRIFT as detailed in EPA's ecological mitigation support document version 2.0 (released with the final insecticide strategy) to evaluate the risk of drift from aerial applications. Prior to the ecological mitigations support document, former OCSPP secretary Jake Li publicly stated EPA intended to update their atmospheric modeling, referencing NAAA's suggested use of Tier 3 of the AgDRIFT model. Tier 3 can show the impact that decreasing boom length and increasing droplet size have on reducing the risk of drift from aerial applications, as documented in NAAA's June of 2023[16] letter to EPA. When the Tier 3 AgDRIFT model is run with NAAA's parameter settings using a very coarse droplet size and a 50% boom length, the fraction of applied materials estimated at 200 feet downwind is 0.0035. This is an 92% reduction in drift compared to the Tier 1 aerial AgDRIFT model. The Tier 1 ground model in AgDRIFT with droplet size set at medium to coarse estimates the fraction of applied materials at 200 feet downwind is 0.0026, just slightly lower than the amount estimated from the aerial application with a 50% boom and very coarse droplet size.

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[14] Fritz, B.K. 2022. Straight Stream Nozzle Models to Support Aerial Applications. Presentation at 2022 Ag Aviation Expo. https://education.agaviation.org/aat-expo-presentations
[15] Martin, D.E. 2022. Effect of Application Rate on Fungicide Efficacy from an Aerial Application for Control of Sheath Blight in Rice. Presentation at 2022 Ag Aviation Expo. https://education.agaviation.org/aat-expo-presentations
[16] NAAA letter to EPA, June 27, 2023. https://www.agaviation.org/wp-content/uploads/2023/08/202306-epa-letter-drift-mitigation.pdf

As a final point, NAAA would like to point out that dicamba is aerially applied on other crops in the same areas where DT cotton and soybean are grown. Former NAAA President and current test pilot for Air Tractor Scott Schertz is experienced with making aerial applications of dicamba in both central Illinois and the panhandle of Texas[17]. Soybean is one of the two major crops grown in central Illinois, while cotton is a major crop in the Texas panhandle. Aerial applications of dicamba in these areas occur among fields of non-DT soybean or cotton, other sensitive crops, and other non-target areas. These applications are successfully and safely made using a combination of shortened booms, straight stream nozzles, and strict attention to weather conditions.

<u>Conclusion</u>

NAAA opposes prohibiting aerial applications of dicamba on DT crops. The weather restrictions for these applications makes the ability for growers to utilize aerial applications critical to successfully controlling resistant weeds. The restrictions on aerial applications proposed by NAAA in these comments will allow dicamba to be applied successfully and safely by agricultural aircraft.

Thank you for this opportunity to comment.

Sincerely,

Andrew D. Moore
Chief Executive Officer

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[17] Schertz, S, Test Pilot for Air Tractor; 2005 NAAA President. Personal Conversation 8-12-25.