



July 7, 2025

Office of Pesticide Programs Docket
Environmental Protection Agency Docket Center (EPA/DC), (28221T)
1200 Pennsylvania Ave. NW
Washington, DC 20460-0001

**RE: EPA's Proposed Decision to Approve Registration for the New Active Ingredient
Diflufenican; Docket ID: EPA-HQ-OPP-2021-0435.**

The National Agricultural Aviation Association (NAAA) appreciates the opportunity to comment on EPA's proposed decision to approve the registration for diflufenican.

U.S. Aerial Application Industry Background: 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 rangeland 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 application¹. 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.

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

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

standing crop results in a significant yield loss. Research from Purdue University² 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 study³ and the 2019 NAAA industry survey⁴ 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 billion⁵.

Research summarized by the University of Minnesota⁶ 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 applications⁷ 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&M⁴ 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 annually⁵. 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 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

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>

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.

Comments

NAAA strongly opposes the decision to prohibit aerial applications of diflufenican. NAAA fully acknowledges that because it is a preplant and preemergence herbicide, aerial applications would be very uncommon. Growers will normally apply it themselves or have it applied by a retailer, in both cases using a ground rig. However, there may be years when aerial application can help ensure a timely application, which is critical for controlling resistant weeds, an important role for diflufenican.

Aerial applications on corn and soybean are very common. The following table provides estimates, based on NAAA's 2019 industry survey data, of the acres of corn and soybean treated by aerial application for 10 of the top states for corn and soybean production. Also given is the percentage of the USDA 2024 acres harvested for both crops that was estimated to have been treated by aerial application.

State	Corn acres treated by aerial	% corn aerial	Soybean acres treated by aerial	% soy aerial
Iowa	5,893,702	48%	2,512,194	25%
Illinois	5,035,236	47%	2,678,379	25%
Nebraska	4,296,582	44%	1,430,154	27%
Minnesota	3,540,199	46%	2,055,883	28%
Indiana	2,455,211	49%	1,510,230	26%
South Dakota	2,396,739	46%	1,421,952	26%
Kansas	2,377,701	41%	1,292,820	29%
Missouri	1,529,311	47%	1,481,779	25%
Ohio	1,493,326	47%	1,285,303	26%
North Dakota	1,488,938	41%	1,789,070	27%

NAAA acknowledges that most of these acres treated by aerial application are primarily fungicide and insecticide applications and that preplant and preemergence herbicide application by air on corn and soybeans are not common. However, the aircraft and infrastructure are in place to serve corn and soybean growers for any and all application needs, and growers know they can utilize aerial when needed. While it might be uncommon for aerial applications of preplant and preemergence herbicides, they do occur – atrazine is one example. While growers may go years without utilizing aerial applications for these types of applications, if an excessively wet spring occurs when soils remain to wet for a ground rig, growers know they can use aerial application to get the work done. To deny them the ability to use aerial application in these situations could lead to a failure to effectively apply diflufenican, which in turn could lead to the survival and growth of resistant waterhemp, Palmer amaranth, and other pigweed species.

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, particularly if the ground is wet. 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.

Conclusion

NAAA opposes the prohibition of aerial applications of diflufenican. While aerial applications of preplant and preemergence herbicides are not common, growers need to have that option should weather conditions limit the ability to make applications with ground sprayers.

Thank you for this opportunity to comment.

Sincerely,



Andrew D. Moore
 Chief Executive Officer