December 3, 2025

U.S. Environmental Protection Agency
EPA Docket Center
Proposed Decision to Approve Registration for Epyrifenacil
Mail Code 28221T
1200 Pennsylvania Ave, NW
Washington, DC 20460

RE: EPA's Proposed Decision to Approve Registration for the New Active Ingredient Epyrifenacil; Docket ID: EPA-HQ-OPP-2022-0354.

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

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 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.

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

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

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 CO_2 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

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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

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.

NAAA has 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 supports the registration of the new active ingredient epyrifenacil and EPA's decision to allow aerial applications of the new herbicide. NAAA agrees with most of the required mitigations for aerial application including droplet size, boom length restrictions, maximum wind speed, swath displacements, wind measurement, release height, buffer zones for unmanaged areas, and the use of EPA's online mitigation menu to reduce buffer distance.

One mitigation NAAA objects to is the statement "When applying to crops via aerial application equipment, the spray boom must be mounted on the aircraft to minimize drift caused by wing tip or rotor blade vortices." To be clear, NAAA fully supports the concept of reducing the risk of drift caused by spray being entrained in wing or rotor tip vortices; it is the vague language of the statement to which NAAA objects. The restrictions on boom length relative to wingspan or rotor diameter currently listed in the memorandum to approve the registration of epyrifenacil achieve the goal of minimizing drift caused by wing and rotor blade tip vortices. The additional statement provides no clarity or specifications on what EPA intends to be mitigations that can further reduce the risk of drift from wing or rotor tip vortices. NAAA welcomes a discussion with EPA to provide clarity to this statement.

While it is not listed in the memorandum supporting the proposed decision to register epyrifenacil, the proposed labels contain the restriction that the labeled formulations of epyrifenacil be applied at a minimum spray application rate of 7 gallons per acre (GPA). NAAA disagrees with the statement that higher gallonage is required to achieve better performance. Additionally, with aerial applications, a higher spray application rate can increase the risk of drift instead of reducing it when using straight stream nozzles. Of all the nozzle types available for aerial applications, straight stream nozzles provide the largest droplet sizes and would be the ideal choice for applications of epyrifenacil and other herbicides. 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[8].

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. 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 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[8,9].

Conclusion

NAAA supports the registration of epyrifenacil and that aerial application will be allowed. NAAA requests clarification on a vaguely written mitigation statement and lowering the minimum GPA for aerial applications of epyrifenacil.

Thank you for this opportunity to comment.

Sincerely,

Andrew D. Moore
Chief Executive Officer

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[8] 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

[9] 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