National Cotton Council of America

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January 11, 2021

Ana Pinto
Environmental Protection Agency Docket Center (EPA/DC)
(28221T)
1200 Pennsylvania Ave. NW
Washington, DC 20460-0001

RE: EPA-HQ-OPP-2011-0855-0208

Dear Ana Pinto:

The National Cotton Council (NCC) appreciates the opportunity to comment on the Environmental Protection Agency's (EPA's) Proposed Interim Decision (PID) for Paraquat.

The NCC is the central organization of the United States cotton industry. Its members include producers, ginners, cottonseed processors and merchandizers, merchants, cooperatives, warehousers and textile manufacturers. A majority of the industry is concentrated in 17 cotton-producing states stretching from California to Virginia. U.S. cotton producers cultivate between 10 and 14 million acres of cotton with production averaging 12 to 20 million 480-lb bales annually. The downstream manufacturers of cotton apparel and home furnishings are located in virtually every state. Farms and businesses directly involved in the production, distribution and processing of cotton employ more than 125,000 workers and produce direct business revenue of more than $21 billion. Annual cotton production is valued at more than $5.5 billion at the farm gate, the point at which the producer markets the crop. Accounting for the ripple effect of cotton through the broader economy, direct and indirect employment surpasses 280,000 workers with economic activity of almost $75 billion. In addition to the cotton fiber, cottonseed products are used for livestock feed and cottonseed oil is used as an ingredient in food products as well as being a premium cooking oil.

The NCC respects the diligent efforts of the EPA to carefully review scientific information relevant to the benefits and risks of applying pesticides. Carefully balancing pesticide benefits and risks is imperative to preserve human and environmental safety while increasing production quantity and quality to meet the increasing demand of the global human population requiring affordable food and fiber.

The NCC is concerned with the EPA's PID as we believe it diminishes the critical value of aerial application for paraquat and sets an unfounded precedent for restrictions impacting future aerial application registration reviews without considering more flexible mitigation measures. The NCC also believes that the EPA, when making this decision, should consider the entire crop production system as compared to only considering a single pesticide application at one point in time during the crop season. Best management practices (BMPs), weed resistance management

(WRM) programs, and farm sustainability would all be negatively altered by the proposed PID. The NCC will expand our concerns on each of these topics in order to provide EPA critical clarity of the importance of aerial applications of paraquat and alternative mitigations that would not place an unwarranted burden on the agricultural aviation industry.

Fallibility of Ground Application Reliance

Weed control in agronomic crops requires extensive monitoring, identification of weeds, appropriate selection of control measures, and implementation of control measures with extreme precision in regard to timeliness. Over the past two decades, herbicide resistance has profoundly changed our agricultural landscape and the need for integrated and diversified programs is paramount. Removal of the practical use of an extremely effective herbicide, such as paraquat, threatens effective WRM programs, as the loss of any herbicide chemistry has potentially dire consequences (Jason K. Norsworthy, Sarah M. Ward, David R. Shaw, Rick S. Llewellyn, Robert L. Nichols, Theodore M. Webster,, 2012).

For an effective BMP or WRM program to be successful, fields must be free of weeds at planting. While agronomic producers have the incentive to utilize ground applications ensuring that weed-free planting window, and thereby maximizing returns on equipment investment, the agricultural aviation industry remains a vital component of today's agricultural pest management system. Each year across the country, weather conditions prevent growers from making timely pesticide applications in their fields for extended periods of time. When the soil is too wet for a grower to make an herbicide application, weeds can grow as much as much as 1 inch or more per day. Quickly, growers lose their ability to effectively control troublesome weeds potentially delaying planting and harvest, while decreasing yields and profits. As farmers become larger to try to remain competitive, a delay in managing weeds prior to planting only escalates as it is impossible for them to "catch-up" or cover the acreage needed with only their ground equipment. Thus, the availability of aerial applications is essential to assist our farmers in weed control prior to and just after planting.

Similarly, late-season variability in weather jeopardizes crop preparation for harvest. As a mature cotton crop loses its canopy closure, the soil seedbank is exposed to sunlight favorable for weed seed germination. Late-season weed infestations, especially climbing vine weed species, will reduce yield while potentially reducing fiber quality and damaging harvest equipment. Additionally, as WRM programs promote the benefits from depleting weed seed from the soil seed bank, one must consider the massive volume of seeds generated by late-season emerging weeds that rapidly produce seed due to a declining photoperiod if they are not controlled.

Planting Preparations

The goal, or BMP for weed control and WRM, is to plant to a weed free field (Jason K. Norsworthy, Sarah M. Ward, David R. Shaw, Rick S. Llewellyn, Robert L. Nichols, Theodore M. Webster,, 2012). While this goal may be critical and often achievable, it is not easily accomplished. The predominant production practice today relies on minimum disturbance of the soil (no-till or minimum-till). Without tillage, fields rely on chemical control to terminate vegetation in the field and allow sufficient time for partial deterioration of vegetation in order for planting equipment to effectively deliver the seed below the soil surface and effectively close the

planting furrow. Excessive debris can impede necessary penetration of the soil surface for seed delivery into the soil as well as limit the ability to seal seed furrows following seed delivery.

The lack of access to aerial application for rapid coverage of land will force many producers to return to tillage. Producers do not have the capability to rapidly treat large acreage in a timeframe consistent with planting operations. Additionally, ground equipment committed to preplant burndown will limit timely applications for at plant and pre-plant. Producers have shifted away from tillage and embraced no-till with many also embracing cover crops. The reality is tractors and tillage equipment are on hand and would be utilized to till fields in order to timely prepare for planting operations. Alternative herbicides to address the spectrum of weeds and recognition of weeds resistant to one or more MOA imposes limits for the complete herbicide program.

At Planting and Emergence

The vulnerability of cotton crops during the early stage of establishing a sufficient plant stand through initial fruiting (squaring) is widely known by scientists of multiple disciplines (J.C. Banks, Craig Bednarz, Rogers Leonard, Gus Lorenz, Joel Faircloth, Robert Lemon, William C. Robertson, and Alexander Stewart., 2007). Seedbed preparation to achieve an adequate plant stand (minimum of 30,000 plants per acre) recommends preplant burndown herbicide applications at least three weeks prior to the planting to ensure no green matter is on the seedbed.

During the first 40 days of cotton plant development, the plant grows slow and lacks the ability to compete with weeds for nutrients. To maximize yields and profits, it is critical to eliminate weed competition for six to nine weeks after planting. Additionally, the recommendation is to rotate chemistries and engage multiple MOAs, consider use of residual herbicides, and treat weeds less than four inches high (J.C. Banks, Craig Bednarz, Rogers Leonard, Gus Lorenz, Joel Faircloth, Robert Lemon, William C. Robertson, and Alexander Stewart., 2007).

With respect to these recommendations, a standard weed control program would anticipate the following.

1. Burndown 3 weeks prior to planting (-21 days):
2. Broadcast at planting, tank mixture with a residual product (0 day)
3. 2 weeks later, scout, treat over the top (14 days)
4. 2 weeks later, scout, treat over the top (28 days)
5. 2 weeks later, scout, treat over the top or layby directed, (42 days)

Crop Termination

Compared to other crops, cotton is extremely unique being a perennial plant managed as an annual plant. As cotton reaches maturity, the plant canopy begins to open as plant growth terminates. Fruit on the plant (bolls) begin to open as the onset of plant canopy decline occurs. As the plant canopy declines, it allows increased sunlight to the soil surface where weeds germinate and emerge. Unfortunately, the canopy of most row crops allows penetration of sunlight several weeks prior to the time crops have sufficiently dried for harvest.

The purpose of defoliation is to kill or desiccate weeds that can reduce harvest efficiency or contribute to the weed seed bank for the following season. The slight difference for cotton is to ensure the perennial crop is terminated, leaves are dropped quickly, and remaining bolls in the upper canopy desiccate to open the bolls and allow the lint to fluff and dry for harvest.

Herbicide Programs

The availability of herbicide MOAs for use on cotton is limited (Table 1). Numerous products may exist, but multiple products represent the same MOA thereby requiring them to be considered collectively as one MOA.

The review of the previous information captures the considerations and eliminations of alternative herbicides when planning a weed management program. The assignment of an herbicide MOA to one period should remove it as an option for the next to comply with WRM. Additionally, producers must consider the restrictions of annual use limitations per acre and carefully target those uses for the best treatment periods. The availability for the herbicide program becomes more complex as consideration is given to the various weed species present and variation of weed species resistant to one or more MOA (Table 2).

Table 1. Mechanism of action (MOA) of herbicides labeled for use in U.S. cotton production.

Mechanism of Action	WSSA* Group #	Active Ingredients
ACCase inhibitors	1	quizalofop, fluazifop, sethoxydim, clethodim
ALS Inhibitors	2	trifloxysulfuron, tribenuron, thifensulfuron-methyl + tribenuron-methyl, thifensulfuron, thifensulfuron-methyl + rimsulfuron, pyrithiobac, halosulfuron
Microtubule assembly inhibitors	3	pendimethalin, trifluralin
Synthetic Auxins	4	2,4 D, Dicamba
Photosystem II Inhibitors	5	prometryn
	7	fluometuron, diuron, diuron, linuron
EPSP Synthease inhibitor	9	glyphosate
Glutamine synthase inhibitor	10	gluphosinate
carotenoid biosynthesis inhibitors	12	Fluridone + fluometuron
	13	clomazone
PPG oxidase inhibitors	14	carfentrazone-ethyl, lactofen, Oxyfluorfen,

VLCFA inhibitors	15	S-metolachlor, acetocochlor, pyrozasulfone, dimethenamid-P
unknown	17	MSMA
Photosystem I Inhibitors	22	Paraquat

*WSSA is the Weed Science Society of America.
*The source for this table is Texas A&M AgriLife Extension, Weed Management in Texas Cotton, SCS-2016-16, page 4 modified to reflect chemical name rather than trade name.

Table 2. An Incomplete list of documented weeds resistant to a Mechanism of Action (MOA).

ACCase inhibitors	WSSA Group #	Palmer Amaranth	Common Cocklebur	Common Ragweed	Horseweed	Goosegrass	Johnsongrass	Ryegrass
ALS Inhibitors	1					Yes	Yes	Yes
Microtubule assembly inhibitors	2	Yes	Yes	Yes	Yes			Yes
Synthetic Auxins	3	Yes				Yes		
Photosystem II Inhibitors	4							
	5							
EPSP Synthease inhibitor	7							
Glutamine synthase inhibitor	9	Yes		Yes	Yes	Yes	Yes	Yes
carotenoid biosynthesis inhibitors	10							
	12							
PPG oxidase inhibitors	13							
VLCFA inhibitors	14							
unknown	15							
Photosystem I Inhibitors	17							

*The source of this table is bulletin drafted by 6 authors and reviewed by an expert panel 10 scientist. (Nilda Burgos, 2006) Cotton-Herbicide-Resistance.pdf (cottoninc.com)

Reflecting back to the five applications for cotton, the broad spectrum of weeds present, and the various weed species that have developed resistance to one or more MOA, the challenge intensifies to plan weed programs with tank mixtures to ensure no escapes are present while reserving critical, limited products that may be used over-the-top later in the season. Additional consideration must acknowledge products that mainly target monocot species (e.g. Group 1) and those mainly targeting diocot species (e.g. 2,4 D in 4).

When all is taken into consideration, one realizes the limited MOAs available to cotton producers and the critical benefit of unique MOAs such as paraquat. Additionally, the need to have the option to apply paraquat aerially in cases of either, wet spring planting periods, or near harvest, becomes essential for all producers.

Paraquat's unique mode of action is critical to all producers. The rapid activity of paraquat with minimum concern of rain wash-off provides benefits not available with other products. Without paraquat in rainy seasons, producers will encounter random rain events that will require repeated application thus further limiting the options to complete the seasonal herbicide program. The benefits of paraquat and aerial application are extremely high.

Suggested Considerations

The NCC urges EPA to consider alternate options to reduce/eliminate risks-of-concern (ROC). The NCC strongly supports the comments and recommendations of the National Agricultural Aviation Association's (NAAA) comments to the paraquat docket. The NCC is encouraged by the engagement of NAAA to identify restrictions that alter their normal operations but would mitigate ROC identified by EPA without eliminating aerial application ability. The NCC notes our previous concern eliminating aerial application, and further notes NAAA's acknowledgement that aerial application operations are small businesses. The NCC urges EPA to verify its consideration of the impact the PID would have on these small businesses and acknowledges the impact in the risk-benefit analysis.

NCC acknowledges NAAA's reference to Research from Purdue University and the University of Minnesota documenting limitations and negative impacts (i.e. costs) associated with reliance on ground rig applications. The NCC urges EPA to recognize and account for these impacts in the risk-benefit analysis.

The NCC appreciates the expertise of NAAA and is concerned with NAAA's lack of confidence in the AgDRIFT model. The NCC understands EPA reviews all models through scientific panels comprised of numerous experts. However, the rapid change in technology over the past 10 years has altered numerous agricultural practices in ways that altered exposure routes and application technology reducing drift. The NCC intends to work with NAAA to further understand the specifics of the operations changes and support additional research documentation. The NCC urges EPA to carefully review NAAA comments and consider impacts to the AgDRIFT Model's reliability.

The NCC appreciates NAAA's suggestions of label requirements to include closed-system loading systems and full PPE including elastomeric half facepiece cartridge respirators when mixing and loading paraquat. Additionally, the NCC supports the label clarification prohibiting

"flaggers", an antiquated practice no longer in existence. The NCC appreciates the NAAA's support for medium to course droplet size. The NCC supports NAAA's proposed label restriction for boom length not to exceed 50% of the wingspan of fixed wing aircraft and 60% of the rotor diameter for helicopters. The NCC is aware of similar label adoptions that have proven highly effective.

Aerial application exists due to a market driven need. That need is closely associated with the need to cover vast areas in a timely manner for necessary pest control. Prohibiting aerial application through regulations has dire consequences on all production systems.

Paraquat is a pesticide that must be respected for its potential harm. EPA has sufficiently labeled paraquat with appropriate restrictions for many years. Incidents related to paraquat have been relatively low and these incidents have shown the individuals involved were violating the label restrictions. The NCC fully supports compliance with pesticide labels and continues to stress label compliance with membership. The NCC notes the unfortunate incidents were already label violations. Additional label restrictions have already been implemented by EPA. However, the NCC urges EPA to understand the additional burdens are being placed on those who are and have been safely using paraquat in compliance with the protective requirements of the label.

The NCC appreciates the opportunity to provide these comments to EPA's PID for paraquat. The NCC appreciates the historical safe use of paraquat in compliance with EPA label restrictions and acknowledges the critical value of paraquat for weed control in cotton as well as the critical values and service of the agricultural aviation industry to all U.S. crop production systems.

Sincerely,

Steve Hensley
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National Cotton Council