



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

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RE: SFIREG Issue Paper – Cover Crop Issues and Plant-Back Restrictions (submitted to EPA July 2019)

Thank you for your submission of the SFIREG Issue Paper titled “Cover Crop Issues and Plant-Back Restrictions.” The issue paper discusses stakeholder challenges with following pesticide label directions for cover crops. EPA has explored the concerns raised by the issue paper and herein responds to some of the issues described in the paper. EPA has focused this response on the issues that are most pertinent, relevant, and within the scope of EPA’s influence. EPA is committed to assisting SFIREG and our co-regulators to address these issues.

The issue paper describes the following challenges and suggested EPA remedies:

1. Confusion about the definition of a cover crop and whether these crops can be used for food/feed or whether they are only for non-food/non-feed use.
2. Confusion about the applicability, enforceability, and readability of label language regarding plant-back intervals and rotational crop instructions on pesticide labels; requests for EPA to update PR Notice 2000-5 regarding mandatory and advisory label language and to add a new section to the Label Review Manual to include cover crop language.
3. Concern about cover crop damage from uptake of residual pesticides in soil and the lack of phytotoxicity statements on labels, and request for EPA to support residue studies and bioassays to help growers identify carry-over effects.
4. Request for EPA to organize cropping systems within growing regions and incorporate this information on labels.
5. Concern about poor directions for cover crops on pesticide labels and potential inconsistency with USDA-NRCS Conservation Cover Crop Termination Guidelines, and request for increased coordination among federal agencies.

To address SFIREG's concerns, EPA formed a work group of staff across various divisions within the Office of Chemical Safety and Pollution Prevention (OCSPP)'s Office of Pesticide Programs (OPP) and Office of Program Support (OPS). The work group includes staff from OPP's Registration Division (RD), Pesticide Re-Evaluation Division (PRD), Health Effects Division (HED), Biological and Economic Analysis Division (BEAD), and OPS's Intergovernmental and Community Relations Branch (ICRB). EPA's responses to specific topics raised in the issue paper are provided in the following sections.

EPA Response:

1. Determine whether cover crops can be used for food/feed

SFIREG requests that the Agency determine whether cover crops can be used for food or feed.

The Agency acknowledges that the meaning of a cover crop varies across government agencies, states, extension, growers, and registrants. EPA's pesticide regulations do not define cover crop and certain other terms used in this response. For the purpose of this response, a working definition for a cover crop, as developed by the workgroup, is *a crop planted to improve soil quality, reduce soil erosion, reduce water quality degradation, and to manage weeds, insect pests, and/or plant diseases. A cover crop can be used for food and/or feed purposes if labeled rotational crop plant-back intervals are followed.* A working definition for a rotational crop is *a crop planted following application to a treated crop and used for food and/or feed. Rotational crops may include cover crops if the cover crop is used for food and/or feed and labeled plant-back intervals are followed.* For additional working definitions developed by the workgroup for the purpose of this response, please see *Appendix 1: Working Definitions.*

EPA's focus in setting rotational crop plant-back intervals is to prevent tolerance-related issues in plant and livestock commodities and to include all residue sources when assessing human dietary exposure. Therefore, cover crops that are used for food/feed purposes must follow the labeled plant-back intervals. To clarify terminology, the term "plant-back interval" can be used interchangeably with "plant-back restriction," "rotational crop interval," or "rotational crop restriction."

Sometimes, registrants can choose to add more restrictive rotation instructions and/or phytotoxicity statements on labels; however, these statements must meet the minimum residue-based plant-back intervals set by EPA. Since label restrictions based on phytotoxicity are typically determined by the registrant, it is possible that labels may be silent on phytotoxicity to rotational crops if the residue-based plant-back intervals are greater than those based on phytotoxicity. Registrants should be the primary source for advice on phytotoxicity. However, growers/land managers have the option to conduct bioassays to determine if there are phytotoxicity concerns with non-feed/non-food cover crops. When growers/land managers need assistance, they should consult the registrant for more information on how to conduct a bioassay.

Unless there are other grazing restrictions on the label, land managers also have discretion to graze non-food animals such as llamas, sheep raised for wool, and pets earlier than the time

period for the plant-back interval since those animals will not be entering interstate commerce as food.

2. *Improve plant-back interval language consistency across labels as confusion can lead to potential tolerance exceedances; update PRN 2000-5 and the Label Review Manual*

SFIREG notes that label language about plant-back intervals is inconsistent, and in some cases, contradictory across product labels and may lead to potential residues and tolerance exceedances in food and/or feed. Additionally, SFIREG requests that EPA standardize pesticide label language across products and crops and display rotational information in the same section across labels, ensure that plant-back interval language is clear and consistent across all product labels, clearly differentiate plant-back intervals for commercial crops and cover crops used for soil conservation purposes, and update PR Notice 2000-5 and the Label Review Manual to include mandatory and advisory label language for cover crops.

To determine the appropriate plant-back intervals to prevent illegal tolerance-related residues, EPA requires registrants to conduct and submit specific residue chemistry guideline studies. These are OCSPP Guideline 860.1850 Confined Accumulation in Rotational Crops and OCSPP Guideline 860.1900 Field Accumulation in Rotational Crops. See 40 CFR Part 158, Subpart O.

As mentioned above, labeled plant-back intervals are based on the available rotational crop residue data. Labels may not specify plant-back intervals for certain crops if the available data does not support rotation to those crops. The Agency assumes that the registrant will provide sufficient rotational crop data to make the product desirable to growers and does not generally require the submission of data to support rotation to certain cover crops or intervals. The inconsistency in plant-back intervals across product labels may arise as labels are reviewed as part of registration requests. Data permitting rotation to a certain crop may not have been available as part of an earlier registration action and, therefore, labels associated with the earlier registration may list more restrictive plant-back intervals. Also, the residue-based plant-back intervals determined by EPA are the minimum intervals needed to ensure that no illegal pesticide residues will appear in rotated crops, whereas registrants may establish longer plant-back intervals if they feel it is necessary, for example, due to phytotoxicity concerns.

Please see *Appendix 2: Applying Cover Crop Label Language* for further educational information on how label instructions can be used by State Lead Agencies to determine plant-back intervals. Appendix 2 provides an illustrative example.

Regarding the location of plant-back interval instructions on pesticide labels, the Agency acknowledges that placement of these instructions differ across labels. Concerning PR Notice 2000-5, the process by which changes are made to a PR Notice is time and labor intensive, often taking years to complete. Therefore, at this time, the Agency is unable to commit to amending PR Notice 2000-5. Rather, the Agency will work to address this concern via updates to the Label Review Manual, which is revised on a routine basis, and will strive to ensure clear and concise label language in the future.

3. Support residue studies and bioassays

SFIREG requests that the Agency encourage growers to conduct bioassays to determine if pesticide residues are present in the soil and at concentrations high enough to adversely impact cover crops.

As the issue paper points out, a cover crop could potentially experience phytotoxicity or germination effects depending on the pesticide(s) used previously and how much time has elapsed.

The chemical-physical properties, persistence of each pesticide, and environmental conditions will determine how long pesticidal activity remains in the field. Some registrants do encourage bioassays and include bioassay instructions on labels. In cases where labels do not discuss conducting a bioassay, the Agency encourages growers to consult with the registrant for information on phytotoxicity concerns or how to conduct bioassays to test for potential phytotoxicity prior to planting a cover crop to reduce the likelihood of damage occurring.

It is important to note that, while the bulk of the concerns for residue testing appear to revolve around herbicides and phytotoxicity, plant-back intervals are equally important for insecticides, fungicides, plant growth regulators, and other pesticides to prevent illegal residues and associated human health exposure concerns.

4. Organize cropping systems within growing regions

SFIREG requests that the EPA collaborate with USDA's Natural Resources Conservation Service (NRCS), and Cooperative Extension to organize cropping systems within growing regions (e.g., what crops are grown in rotation with each other), incorporate this information on labels and NRCS 340, and apply this information to address crop rotation issues.

EPA will engage with USDA to inform them of this issue. The Agency cannot commit to adding cropping system information on pesticide labels at this time. The inclusion of this type of information would significantly increase the length and complexity of pesticide labels and make it harder for the user to interpret the label. Instead, cropping system information may be communicated through educational materials for growers and land managers. Some educational materials on cropping systems may already exist and EPA will discuss with USDA the best way to disseminate any existing resources to the grower community.

5. Improve coordination among federal agencies

EPA is working with USDA NRCS to increase collaboration and coordination in our existing federal programs. The Agency is discussing the USDA-NRCS Code 340 Cover Crop fact sheet that was referenced in the issue paper in follow-up conversations with USDA.

Conclusions:

EPA acknowledges that AAPCO/SFIREG have identified an important and unresolved labeling issue and is prepared to work together to determine the best short- and long-term courses of action. As stated above, for purposes of this response, the workgroup has developed a working

definition of a cover crop as *a crop planted to improve soil quality, reduce soil erosion, reduce water quality degradation, and to manage weeds, insect pests, and/or plant diseases. A cover crop can be used for food and/or feed purposes if labeled plant-back intervals are followed.* If a cover crop will not be used for food or feed and no plant-back intervals addressing phytotoxicity are provided on the label, the Agency recommends that growers and land managers consult with the registrant to prevent damage to their cover crops. The Agency encourages stakeholders to share the results of their work within the grower community.

The Agency recognizes that label instructions and recommendations can be confusing to understand and interpret. The Agency is open to working with AAPCO/SFIREG to improve education and outreach efforts with pesticide users, regulators, and registrants in order to increase label comprehension. To this end, we encourage SFIREG to share both Appendix 1: *Working Definitions* and the example shown in Appendix 2: *Example: Applying Cover Crop Label Language* with State Lead Agencies, extension, and the pesticide user community to raise awareness on this topic.

EPA will work to better ensure clear label language in the future and will reevaluate current label language guidance in the course of routine updates to the Label Review Manual. The Agency understands that this response may only partially resolve the issues raised and is committed to continuing this dialogue with AAPCO/SFIREG and other partners to address concerns surrounding cover crops and pesticide label clarity.

EPA would like to thank AAPCO/SFIREG for raising these concerns and for the opportunity to brief state members at the April 2021 SFIREG Joint Working Committee meeting. We look forward to continuing our work with AAPCO/SFIREG, state, and federal partners on these and other important pesticide issues.

Sincerely,

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APPENDICES

Appendix 1: Working Definitions.....	7
Appendix 2: Example: Applying Cover Crop Label Language.....	8

APPENDIX 1:

Working Definitions

For the purposes of this response, working definitions developed by the workgroup are provided for the following terms:

Cover Crop: A crop planted to improve soil quality, reduce soil erosion, reduce water quality degradation, and to manage weeds, insect pests, and/or plant diseases. A cover crop can be used for food and/or feed purposes if labeled plant-back intervals are followed.

Rotational Crop: A crop planted following application to a treated crop and used for food and/or feed. Rotational crops may include cover crops if the cover crop is used for food and/or feed and labeled plant-back intervals are followed.

Plant-back Interval: Interval from last pesticide application to planting a rotational crop. A plant-back interval may be also termed plant-back restriction, rotational crop interval, or rotational crop restriction.

Food Crop: Crop ingested by humans.

Feed Crop: Crop ingested by livestock which are raised for purposes of human consumption.

Forage/Fodder: Plant material or a crop which is grown as an animal feed, e.g., dried grass or clover.

APPENDIX 2:

Example: Applying Cover Crop Label Language

Ultimately, whether or not a cover crop can be planted into a treated field depends on several primary factors: 1) the type of cover crop; 2) will the cover crop be used for feed or food purposes; and 3) when was the pesticide application made to the previous crop, relative to planting. The following is intended to walk the reader through how growers can determine if a cover crop can be planted into a treated field.

The example below is based on an herbicide for use in cotton. However, similar considerations apply to all pesticides because the plant-back intervals refer to residue concerns related to tolerance enforcement and potential exposure from humans consuming food or meat from livestock fed vegetation that was planted after a previous crop received an application of the pesticide in question.

According to the example label, the herbicide has 4 different plant-back intervals: 3 months/90 days for wheat; 8 months/240 days for field/sweet corn and peanuts; 9 months/270 days for rice, grain, sorghum and soybean; or 12 months/365 days for all others not listed (Figure 1). The application timing ranges from 75 days before planting up to 60 days before harvest. Cotton requires 150 to 180 days from planting to harvest¹.

Plantback intervals for the following crops

- 3 months for wheat
- 8 months for field corn, sweet corn, and peanuts
- 9 months for rice, grain, sorghum and soybeans
- 12 months for all other crops not listed above

Figure 1. Plant-back intervals identified on the example label.

As mentioned, when the application occurred is important in determining how long a grower must wait to plant a cover crop after applying an herbicide to cotton. Below are example calculations for determining when a plant-back interval has been met using the label requirements.

Example A. Grower wants to rotate to wheat which has a 90-day plant-back interval (above)

Application: herbicide applied 75 days before planting cotton

- 255 days have elapsed between application and cotton harvest*
- Wheat can be planted since 90 days have elapsed since application

Example B. Grower wants to rotate to tomato, which has a 365-day plant-back interval (above)

¹ National Cotton Council. Undated. Cotton: from field to fiber. Available at: <https://www.cotton.org/pubs/cottoncounts/fieldtofabric/crops.cfm>

Application: herbicide applied 75 days before planting cotton

- 255 days have elapsed between application and cotton harvest*
- Tomato can be planted 110 days after cotton is harvested (365-day plant-back interval – 255 days for cotton crop = 110 days)

** cotton takes 150-180 days from planting to harvest. For the example, 180 days is used --- 75 days before planting + 180 days for cotton to be harvested = 255 days.*

Another consideration that is of interest is how the phytotoxicity or “crop safety” fits into the decision on what cover crops can be planted. The example label does not have information about crop safety; therefore, hypothetical durations were developed for the purposes of discussion. It is assumed that when labels do not have this information, growers would conduct germination tests to see if the desired plants would be injured after a given number of days following a pesticide application. For this hypothetical discussion, the days required for “crop safety” range from 90 to 120. Similar calculations would be conducted as above, but the number of days used for plant-back intervals would be replaced with number of days needed for crop safety. It is worth noting that the Agency does not review information on crop safety, so any labels that have this information would have been added at the discretion of the registrant.

Table 1 describes the interaction of the cover crop planted, plant-back interval and phytotoxicity concerns for the cover crop plant. Using the crop maturity profile of cotton (180 days) to provide estimates and when the application of the herbicide occurred, there could be as few as 60 days between application and harvest/planting or as many as 255 days. The plant-back restrictions range from 90 to 365 days and the hypothetical number of days required to ensure crop safety range from 90 to 120. The table also assumes planting of the cover crop would occur the day of harvest, so additional time could be added to the “interval between application and harvest” when considering field work required for preparing the field for planting.

With this information, one can estimate a range of times describing the period between the application and harvest. Depending on when the application occurred, nearly all non-food/non-feed cover crops are acceptable regardless if the plant-back interval is greater than the interval between application and harvest/planting. However, there were exceptions for a cover crop of either wheat or “grains” after a late application because only 60 days would have lapsed, and there are “hypothetical” phytotoxicity concerns until 120 days after application. Therefore, a grower would need to wait another 60 days before there are no phytotoxicity concerns.

Application timing is a large factor in determining when and what type of cover crop can be planted following a pesticide application in the previous crop. The earlier an application is made, the more likely that crop safety and plant-back issues are not problematic because the pesticide has more time to breakdown. Conversely, the later the application, the less time there is for the pesticide to breakdown and the more likely an application may result in an issue with plant-back intervals and/or crop safety. There may be some species of cover crop that may have crop safety concerns that may not have plant-back restriction concerns and the registrant may extend the EPA-required plant-back interval or leave that particular crop off the listed crops so that it falls under the “other crops” category that require a 365-day plant-back interval, the maximum interval based on required residue data. The Agency only requires plant-back intervals for purposes of tolerance enforcement and to be protective for human dietary risk.

Table 1. Cotton herbicide example using plant-back intervals from label.

Rotated Cover Crop (CC)	Plant-Back Interval (PBI) (days)	Hypothetical Phytotoxicity / (germination tests) (days)	Interval Between Application and Harvest/ Planting (days)	Can CC be planted after the phytotoxicity data indicates it is "safe"?	
				Non-Food/Non-Feed	Food/Feed
Earliest possible application - 75 days before planting					
wheat	90	120	255 ¹	Yes - because it is non-food/non-feed use, residues are not a concern	Yes - there would be 255 days that passed since the application and only 90 were needed to ensure there are no residues of concern
"grains"	270	120	255	Yes - because it is non-food/feed use, residues are not a concern	No - even though phytotoxicity tests indicate it is "safe" for the desired cover crop, residue data indicate 270 days are required but only 255 days lapsed. However, accounting for time to prepare the field - it is reasonable that a grower could wait 15 days to adhere to the PBI.
clover (or "all other crops")	365	90	255	Yes - because it is non-food/non-feed use, residues are not a concern	No - even though phytotoxicity tests indicate it is "safe" for the desired cover crop, residue data indicate 365 days are required but only 255 days lapsed.
Latest possible application - 60 days before harvest					
wheat	90	120	60	No – only 60 days lapsed and there needs to be 120 days lapse before there are no crop safety issues. Registrants would provide this information on the label, but the Agency would not require this.	No - residue data indicate 90 days are required but only 60 days lapsed
"grains"	270	120	60	No – only 60 days lapsed and there needs to be 120 days lapse before there are no crop safety issues. Registrants would provide this	No - residue data indicate 270 days are required but only 60 days lapsed

Rotated Cover Crop (CC)	Plant-Back Interval (PBI) (days)	Hypothetical Phytotoxicity / (germination tests) (days)	Interval Between Application and Harvest/ Planting (days)	Can CC be planted after the phytotoxicity data indicates it is "safe"?	
				Non-Food/Non-Feed	Food/Feed
				information on the label, but the Agency would not require this.	
clover (or "all other crops")	365	60	60	Yes - because it is non-food/non-feed use, residues are not a concern	No - even though phytotoxicity tests indicate it is "safe" for the desired cover crop, residue data indicate 365 days are required but only 60 days lapsed.

1 - 75 [days before planting based on the label] + 180 [days between planting and harvest].