



March 14, 2023

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Office of Program Support
Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460-0001

RE: Comments to the U.S. EPA Regarding the Agency's White Paper Describing Benefits of Structured and Digital Content Labels for Pesticide Products. Docket No. [EPA-HQ-OPP-2023-0562](https://www.epa.gov/pesticide-registration/epa-hq-opp-2023-0562)

Dear Misters Bongard and Savage,

Thank you for the opportunity to comment on the U.S. Environmental Protection Agency (hereafter the EPA) White Paper Describing Benefits of Structured and Digital Content Labels for Pesticide Products ([EPA-HQ-OPP-2023-0562](https://www.epa.gov/pesticide-registration/epa-hq-opp-2023-0562)).

The Weed Science Society of America (WSSA), along with the Aquatic Plant Management Society (APMS), North Central Weed Science Society (NCWSS), Northeastern Weed Science Society (NEWSS), Southern Weed Science Society (SWSS) and Western Society of Weed Science (WSWS) (hereafter "Weed Science Societies") represent over 3000 weed scientists from around the world. Members include academic, governmental, and private industry research scientists, university, extension professionals, educators, land managers, and crop consultants.

The Weed Science Societies respect the challenges the agency faces under the current registration and re-registration environment. Ample non-scientific court decisions coupled with the loss of personnel is a monumental task to overcome, but one that can be addressed through partnering with science-based organizations such as the WSSA. The Weed Science Societies are

committed to working with EPA to 1) generate dependable, accurate, and usable science-based data, thereby improving the regulatory process and 2) provide a direct connection to research and extension experts working with herbicides across environments in real-world situations. Furthermore, the WSSA is requesting the agency consider the many benefits of developing WSSA-EPA working groups to cooperatively and more effectively address the Endangered Species Act.

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EXECUTIVE SUMMARY

Many pesticide labels are difficult to read, understand, or use. WSSA organized a panel of 14 Weed Science extension experts (hereafter “Weed Science Label Review Panel”) from across the country to solicit their input on how to improve pesticide labels. These Weed Science extension experts (Appendix C) review hundreds of herbicide labels each year helping them write their state pest management guides and handbooks. These widely-used pest management guides are designed to help growers, pesticide applicators, extension agents, and crop consultants identify and implement effective and legal weed management strategies.

The Weed Science Label Review Panel has identified three main problems with herbicide labels that contribute to many difficulties when trying to interpret herbicide label requirements. The Weed Science Label Review Panel provides the following recommendations:

Format: Labels lack a clear and uniform format making it difficult to efficiently locate critical information across labels causing frustration and potentially contributing to

improper use of herbicides. Consequently, we propose that all labels include the following:

- 1) a standardized Table of Contents,
- 2) a uniform format,
- 3) information communicated primarily in tables and not in text, and
- 4) the addition of a table with key user information positioned near the front of the label.

Organization: Labels, across pest management disciplines, are not organized in a clear, consistent, or effective approach making information difficult to locate. Labels need to be more effective at presenting critical details for effective and environmentally safe application of pesticides. A few examples for improvement include the following:

- 1) a conversion table sharing the amount of product per acre relative to pounds active ingredient per acre compared to just sharing pounds active ingredient per acre thereby ensuring users will not apply more than the yearly maximum allowed rate,
- 2) a list of individual crops, NOT crop groups (which users do not understand, cannot easily find, and the groups often change),
- 3) pest lists with effective rates for control (especially for pre-mixes),
- 4) tank-mix instructions described in a more defined and clear approach,
- 5) the Mode of Action box should be color coded, differently among pesticide types, so the user knows they are looking at an herbicide to help avoid potentially devastating mistakes,
- 6) consistent buffer language.

Clarity: Many labels are unclear with poor use descriptions or restrictions, such as references to cropping practices no longer used or crop varieties that are no longer grown. Most importantly, different labels attempt to communicate the same point through different terminology causing unnecessary confusion. To address this concern, the EPA Label Review Manual should be mandatory and not recommended (without a clear requirement to follow a format the current label problems will not change) and should include an Appendix showing the actual required Structured Index. Additional steps to improve label clarity include:

- 1) The challenge of each reviewer inserting their individual opinions of key descriptions or instructions must be replaced with a standard element that is provided explicitly in the EPA Label Review Manual facilitating an actual standard and repeatable structured label,
- 2) resistance management language,
- 3) a technical editor reviewer, and
- 4) labels should be designed to clearly describe to users how endangered species can be protected.

Recommendation for the EPA Office of Pesticide Programs (OPP):

- Use of the Label Review Manual should be made “**mandatory**” not “recommended”. EPA OPP should insert an example of a structured index in the Label Review Manual that allows reviewers to be consistent over time. All labels should contain information to reduce pesticide resistance.

DISCUSSION

Many pesticide labels are difficult to read, understand, or use when making pest management decisions. The lack of consistency among labels adds to this confusion. The Weed Science Label Review Panel has identified three main reasons for these challenges and provide easy to implement suggestions to address each of them. Labels need a uniform format, be organized so that key information is easy to find and understand, and need greater clarity and uniformity in the language used. The Weed Science Label Review Panel recommends that electronic labels should be a goal for all pesticides and that uniform format, organization, and clarity are necessary prerequisites to create user friendly and easily updated electronic labels.

The Weed Science Label Review panel, part of the WSSA Endangered Species Act Committee, is comprised of 14 weed scientists (Appendix C) from multiple states who review hundreds of herbicides labels every year to help write their state pest management guides/handbooks. These guides are designed to help growers, pesticide applicators, extension agents, retailers, and crop consultants identify and implement effective herbicides to control their problem weeds and describe some of the key limitations and warnings for each of those products. The Weed Science Label Review Panel identified difficulties across herbicide labels with inconsistent format, organization, and clarity making them difficult to read, hard to find critical usage directions, and are often excessively long (some labels are over 100 pages in length). These challenges make it difficult to develop and communicate effective pest control decisions that are at the correct: rate, timing, and application method and are protective of bystanders, workers, the environment and threatened and endangered species and their habitat.

Due to the challenges with label format, organization, and clarity, the Weed Science Label Review Panel makes the following recommendations:

- **FORMAT:** Labels often lack a uniform format which can make it very difficult to find information. Refer to Appendix A for examples.
 - **Table of Contents:** Every label should have an in-depth logical table of contents with the categories provided in the same order across all herbicide labels. Unique details that need to be added for a specific product should go after the core table of contents entries.
 - **Format:** Every label should have a similar general format/layout to provide uniformity and make it easier for the user to find information regardless of manufacturer.
 - **Tables:** Putting information into tables is strongly preferred over text as it is easier to find critical information. Tables should be designed to provide all pertinent information.
 - Many labels put information into sentences when a table would make it easier to find and interpret important information.

- Related information should be in chronological order on a table or placed in adjacent tables making it easier to find information.
 - If information is in tables, the user can determine which table to check. If the information is not there, then they will know that the issue has not been addressed on the label (e.g., soil or rainfall restrictions).
 - In many cases, the user can only find part of the information they need to make a decision. In those cases, they may give up abandoning the search for the other important information. Thus, a table approach following a uniform structure across labels will alleviate this burden.
 - If data are omitted from the table then details defining the omission should be provided (e.g., not listed, not applicable, or not provided) or that section will be left out but the numbering outlined in this table should be preserved to maintain consistency across labels.
 - Information should be organized to avoid redundancy with detailed information on a topic in a single section.

- **Label Highlights Table of Key User Information:** See Appendix B for example tables.
 - A table should be placed near the beginning of the label that includes key information for the user in one place.
 - Information should include:
 - ✦ Trade name
 - ✦ Common name - If the chemical name is used the common name should follow at the end in parenthesis. Diglycolamine salt of 3, 6-dichloro-o-anisic acid (dicamba). Even weed scientists have not memorized the chemical names and need the common name.
 - ✦ Labeled crops - if there are too many labeled crops to list in the label highlight section then a statement will guide the reader to the exact location of where this information is provided in the label. The Table of Contents should also direct the user where to find the list.
 - ✦ Restricted Entry Interval (REI)
 - ✦ EPA Registration Number
 - ✦ Date of approval - so you don't read an out-of-date label
 - ✦ Formulation type - stated immediately after the concentration statement on all herbicide labels. The formulation is critical because it can impact the level of weed control, crop injury, mixing order, and compatibility.
 - ✦ Registrant's name

- **ORGANIZATION:** Labels often do not have a clear organization when providing information making it difficult to locate and interpret critical details when recommending or using pesticides.
 - **Conversion Table:** Labels should provide a conversion chart to convert the amount of formulated product per acre to pounds of active ingredient per acre (and acid

- equivalent if relevant) for each active ingredient in the product. This information is critical as many new labels have a yearly maximum rate that can be applied; this conversion table will assist in quantifying and ensuring the amount is not exceeded. These details are also vital in determining appropriate plant back intervals especially when multiple formulations are being applied. Tables should include information relevant to each application method (e.g., if backpack sprayer applications are allowed then ounces (oz) or milliliters (ml) converted to pounds should be described).
- **Crops Not Crop Groups:** Individual crops should be listed, not crop groups. While crop groups may be helpful to OPP and registrants, most growers, extension agents, retailers, and consultants do not fully understand crop groups and often cannot find the complete list of crops. Additionally, crop groupings can change without any notification to pesticide users. Confusion may also occur if a crop falls into multiple crop groups (e.g., edamame).
 - **Pest List:** List of weeds controlled should be in a table which will facilitate ease of understanding. The table should include information on effective rates for each species. This information is especially important with pre-mixed formulations where the effective rate is not equivalent to rates for the single active ingredient products.
 - **Tank-mixing instructions:** There should be a standard way to describe this critical process. Tank-mixing information should be located at one place on the label or within specific individual crop instructions.
 - **Mode of Action (MOA) box:** Color coding the MOA box by pesticide type (herbicide, insecticide, fungicide, etc.) will distinguish the type of pesticide being applied thereby assisting in eliminating applicator error. Using the current MOA box to accomplish this is ideal. For example, making the box blue for all herbicides would help applicators avoid grabbing the incorrect container – color selection should avoid red/green colorblind concerns). OPP uses MOA while the WSSA uses the term Site of Action (SOA) to describe the different sites of action.
 - **Buffer Language:** Application buffers to protect against spray drift, erosion or runoff are very difficult to understand, are poorly defined and should direct users to Bulletin Live Two! For more extensive definitions and to expand clarity, a logically designed table should be designed making it easier for users to understand and comply.
 - **Cross-References:** When a topic is discussed in more than one section then that section should cross-reference other sections that contain that information.
 - **Supplemental and Section 24(c) labels are difficult to find:** EPA OPP should encourage registrants to place all labels (including supplemental labels and state labels) on readily accessible websites such as CDMS (<https://www.cdms.net/Label-Database>).
- **CLARITY:** Many labels are unclear with poor descriptions regarding optimal use conditions (e.g., of crop growth stages, adjuvant use), refer to cropping practices that are no longer used, and to crop varieties that are no longer grown. Refer to Appendix B for examples.

- Having tables that are consistent across labels will directly improve a reader’s ability to interpret and follow label guidelines. Addressing and eliminating confusion, a leading cause in the misuse of pesticides, is a priority for the Weed Science Label Review Panel.
 - **Technical Editor:** Labels should be reviewed by a technical editor because they can be confusing, contradictory, and use terms not often understood by applicators. This is especially important when an outside expert needs to clarify different descriptions proposed by a registrant and a regulator. We list two professional organizations whose members could conduct these reviews. In addition, if the EPA and registrant cannot agree on clear language a technical editor can be used to “break the tie.”
 - ✦ There are organizations devoted to this, two are listed below:
 - (<https://www.scienceje.com/>; <https://www.nasw.org/>) are general science journal organizations, a more ag-specific organization would be the North American Ag Journalists and Ag Communicators Network (<https://www.naaj.net/> and <https://agcommnetwork.com/>).
 - **Changes from Previous Label Version:** Some registrants include a list of changes from the previous product label, which greatly improves clarity for the user. The Food and Drug Administration requires this for drug product labels.
- **RECOMMENDATION FOR EPA OPP:** The Weed Science Label Review Panel suggests that EPA OPP adopt the following changes:
 - 1) The Weed Science Label Review Panel realizes that the changes being proposed may require implementation through the Federal Rulemaking process, but the Weed Science Societies believe the potential improvement in labels would justify the work at EPA OPP through improved pesticide stewardship. In addition, herbicides with formatted and organized labels would encourage users to read and follow the label.
 - 2) **EPA Label Review Manual:** The Label Review Manual, where the EPA describes existing label policies, should be made “mandatory” and not “guidance” to create uniform organized labels. Without a clear requirement to follow a uniform format the current problems with labels will not change.
 - 3) **Structured Table of Contents:** EPA OPP should require all new registrations to include a structured table of contents in their label and they should insert an example of a Structured Index (see Appendix A) into the end of the Label Review Manual. The core table of contents should exist with the exact same layout (numbering) on **ALL labels**; unique details that need to be added for a specific product go after the core table of contents.
 - 4) **Resistance Management Language:** The Weed Science Societies strongly support the placement of pesticide resistance management language on all labels. This language should be consistent across all registrant labels. Currently, resistance management language is not found on all labels and over time has been modified from the original Pesticide Registration Notice so that the message is not consistent across all labels. A simple consistent message should be on all labels.

- **WEED SCIENCE LABEL REVIEW PANEL PROPOSAL TO LAUNCH STANDARD LABEL FORMAT:** The Weed Science Societies strongly support the Weed Science Label Review Panel’s proposal to help improve registrant and user acceptance of a uniform label format and organization.
 - The Weed Science Label Review Panel is willing to work with a registrant to be a champion for further developing our suggestions for format, organization, and clarity on an existing herbicide label moving through the re-registration process.
 - The Weed Science Label Review Panel will give a short presentation of its recommendations to members of the EPA OPP Pesticide Re-Evaluation Division (PRD) and Registration Division (RD) so that reviewers will have an initial understanding of the process and goals.
 - As the process goes forward, the Weed Science Label Review Panel will give a series of presentations to pesticide users to help them understand the proposed changes and their value to the user community.
 - Extension Weed Scientists from the Weed Science Societies around the country will serve as the educational voice of a unified label structure which will help applicators interpret the new and improved approach.

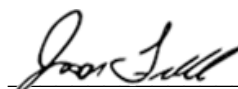
CONCLUSION

Herbicides are important tools in agriculture to help feed the world and their product labels provide critical information about how to safely and legally use them. Improvements in herbicide label format, structure, and clarity are critically needed to help applicators better comprehend product labels of increasing complexity. **The Weed Science Societies’ willingness to cooperate in this process is strong.** Please do not hesitate to reach out to any of our members.

Sincerely,



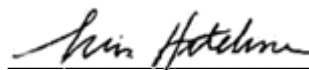
Dr. Gregory K. Dahi
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APPENDIX A. Suggested format for a Table of Contents to place in the Label Review Manual

Description: Every label should have an in-depth logical table of contents with the category and order the same on all labels. The Committee has provided an example to help with discussions between OPP, registrants, and users.

TABLE OF CONTENTS

Precautionary Statements

Label Highlights Table (place on page 1 or after hazard information).....Page # or Section #

1.0 First Aid.....Page # or Section #

2.0 Hazards to Humans and Domestic Animals.....Page # or Section #

3.0 User Safety – Agricultural Use Requirements.....Page # or Section #

 3.1 Worker Protection Standards (WPS).....Page # or Section #

 3.2 Personal Protective Equipment (PPE)Page # or Section #

 3.3 PPE RemovalPage # or Section #

 3.4 Cleaning of Clothing, PPE, and Skin.....Page # or Section #

4.0 Environmental Hazards.....Page # or Section #

 4.1 Groundwater Advisory.....Page # or Section #

 4.2 Surface Water AdvisoryPage # or Section #

 4.3 Non-Target Organisms AdvisoryPage # or Section #

 4.4 Mixing and Loading AdvisoryPage # or Section #

 4.5 Reporting Environmental IncidentsPage # or Section #

5.0 Physical or chemical hazards.....Page # or Section #

Directions for Use

6.0 Product Information.....Page # or Section #

7.0 Active Ingredient Conversion Chart.....Page # or Section #

8.0 Crops LabeledPage # or Section #

9.0 Crop Rotations.....Page # or Section #

10.0 Weed Resistance & Integrated Programs... ..Page # or Section #

11.0 Application Directions and ESA Requirements... ..Page # or Section #

 11.1 Method of applicationPage # or Section #

 11.2 Boom height.....Page # or Section #

 11.3 Droplet sizePage # or Section #

 11.4 Water volumePage # or Section #

11.5 Wind speed	Page # or Section #
11.6 Sprayer speed	Page # or Section #
11.7 Temperature and humidity	Page # or Section #
11.8 Temperature inversions	Page # or Section #
11.9 Activating rainfall	Page # or Section #
11.10 ESA spray drift.....	Page # or Section #
11.11 ESA runoff/erosion.....	Page # or Section #
12. Bulletins Live Two!	Page # or Section #
(provide details for applicator to obtain information from site)	
13. Adjuvant Recommendations.....	Page # or Section #
14. Directions for Use, Mixing, and Restrictions (4 example crops)	Page # or Section #
14.0 Proper Mixing Order.....	Page # or Section #
14.1 Cucumber.....	Page # or Section #
14.2 Squash.....	Page # or Section #
14.3 Watermelon	Page # or Section #
14.4 Tomato	Page # or Section #
15. Equipment Clean Up.....	Page # or Section #
16. Weeds Controlled or Suppressed.....	Page # or Section #
17. Storage and Disposal.....	Page # or Section #
18. Conditions of Sale.....	Page # or Section #
19. Changes From Previous Label.....	Page # or Section #
<i>Additional Instructions Specific to Product</i>	
20. Planting Cover Crops.....	Page # or Section #
21. Rinse the Tank After Each Days Use.....	Page # or Section #
22. Homeowner use.....	Page # or Section #

APPENDIX B. Example Tables.

Description: Labels should incorporate information into tables instead of text. The Committee has provided example tables to help with discussions between OPP, registrants, and users.

Mode of Action Table

Color Code the Mode of Action Table at the top of each label. Each type of pesticide should be color coded with blue used for herbicides with different colors used for fungicides and insecticides.

Herbicide 101	Group	57	Herbicide
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Label Highlights Table (Place on page 1)

- **Labeled crops:** A postemergence herbicide for use in cucumber, squash, tomato, and watermelon. *If the crop list is too large to fit in the label highlight section, then indicate the page or section number where the list is located.*
- **Restricted Entry Interval (REI):** 12 hours
- **Rain-free Period:** 3 hours
- **Restricted Use Pesticide:** No
- **Formulation:** Liquid Flowable *(if encapsulated include those details here)*
- **Sale, use, and distribution of this product** is available in all U.S. States except Hawaii. Or direct to a website for current information.
- **Label approved:** March 14, 2024
- **EPA Registration #:** 222-222

1.0 First Aid Table

FIRST AID	
If swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the poison control center or doctor. • Do not give anything by mouth to an unconscious person.
If on skin or clothing	<ul style="list-style-type: none"> • Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center or doctor for treatment advice.

If in eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
If inhaled	<ul style="list-style-type: none"> • Move person to fresh air. • If person is not breathing, call 911 or an ambulance, and then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
Have the product container or label with you when calling a poison control center or doctor, or going for treatment.	
HOTLINE NUMBER For 24-Hour Medical Emergency Assistance (Human or Animal), or Chemical Emergency Assistance (Spill, Leak, Fire, or Accident) Call XXXXXXXXXXXX	

4.0 Environmental Hazards – EXAMPLE TABLE FORMAT	
4.0 Environmental Hazards	For terrestrial uses only, XXXXX
4.1 Groundwater Advisory	The active ingredient Herbicide 101 is known to leach XXXX
4.2 Surface Water Advisory	This herbicide may impact surface water quality due to runoff or spray drift. XXXXX
4.3 Non-Target Advisory	This herbicide is toxic to plants and may adversely impact the forage habitat of non-target organisms XXXXX
4.4 Mixing and Loading Restrictions	Avoid mixing/loading or using within 50 ft of any well XXXXXX
4.5 Reporting Environmental Incidents	To report incidents including injury or mortality to plants and animals call 1-800-XXXXXXXX

6.0 PRODUCT INFORMATION, EXAMPLE ASKING FOR MORE DETAIL:

Herbicide 101 is a systemic, postemergence herbicide for the control of sensitive weeds smaller than 4 inches. Additionally, if 0.5” or more of rainfall or irrigation is received after application the herbicide will offer residual weed suppression. *Include pertinent details AND make sure the following are addressed 1) water solubility and/or mobility, 2) soil half-life, 3) potential volatility, 4) how the herbicide works such as absorbed through the leaf and stem tissue, etc. and 5) expected symptomology and time interval for weed death.*

8.0 Crops Labeled: individually and alphabetically – no crop groups here
Cucumber
Squash
Tomato
Watermelon

9.0 Crop Rotations – All Other Crops Category Must Be Addressed		
PRODUCT RATE	CROPS	ROTATION INTERVALS
X oz/A	Soybean, Peanut, Sugarcane	None
	Cotton, Field Corn, Rice, Sorghum, Sunflower, Tobacco, Wheat	1 Month
	Barley, Dry and Snap Beans, Peas, Rye, Sweet Corn	3 Months
	All other crops not listed	4 months if soil is tilled prior to planting 8 months if no tillage is performed
2X oz/A	Soybean, Peanut, Sugarcane	None
	Cotton, Field Corn, Rice, Sorghum, Sunflower, Tobacco, Wheat	2 Months
	Barley, Dry and Snap Beans, Peas, Rye, Sweet Corn	4 Months
	All other crops not listed	5 months if soil is tilled prior to planting 10 months if no tillage is performed

11.0 Ground Application Directions – Example of Details Requested	
11.1 Method of Application	Ground Application
11.2 Boom height above target	24 inches
11.3 Droplet size	Use spray nozzles that provide a coarse to ultra coarse droplet
11.4 Water volume	Apply in 10 to 15 gallons of water per acre
11.5 Wind speed	Apply when winds are between 3 and 10 mph
11.6 Sprayer speed	Apply with ground speeds not to exceed 10 mph
11.7 Temperature and humidity	When making conditions in hot and dry conditions.....
11.8 Temperature inversions	Avoid applications during inversions as the potential for drift is extreme. Temperature inversions are characterized
11.9 Activating rainfall	Although Herbicide 101 is a postemergence herbicide it may provide residual suppression of sensitive weeds if 0.5 inch or more of rainfall or irrigation is received within 4 days of application.

Table 11.10 Endangered Species Spray Drift Buffer Distance Requirement (feet), Rate, Droplet Size, and Boom Height*							
CROP	Single Max. App. Rate (oz/A)	Droplet Size / Boom Height					
		Very Fine/ Fine	Very Fine/ Fine	Fine/Medium	Fine/Medium	Coarse/Very Coarse	Coarse/Very Coarse
		Height 24"	Height 48"	Height 24"	Height 48"	Height 24"	Height 48"
Cucumber and Squash	1.0	100	200	50	75	40	50
	0.8	75	150	25	50	20	25
	0.6	75	100	20	50	20	20
Tomato	0.8	75	150	25	50	20	25
	0.6	75	100	20	50	10	20
Watermelon	0.6	75	100	20	40	10	0
	0.4	50	50	10	20	0	0

*Buffer distance (feet) between application and terrestrial or aquatic habitat in feet. Downwind windbreak/hedgerow or hooded spray = 50 reduction in buffer distance required.

11.11 Endangered Species Requirements for Runoff/Erosion		
CROP	Mitigation Points Needed	Mitigation Options and Points Allowed
Cucumber		
Squash		
Tomato		
Watermelon		

11.0 APPLICATION DIRECTIONS - example for AERIAL APPLICATION	
11.1 Method of Application	Aerial application only
11.2 Boom height above target	10 feet unless a higher distance is needed for safety
11.3 Droplet size	Use spray nozzles that provide a coarse to ultra coarse droplet
11.4 Water volume	Apply in 4 to 5 gallons of spray solution per acre
11.5 Wind speed	Apply when winds are below 10 mph.
11.6 Temperature and Humidity	When making applications in hot and dry conditions ...
11.7 Temperature inversions	Avoid applications during inversions as the potential for drift is extreme. Temperature inversions are characterized by ...
11.8 Activating rainfall	Although Herbicide 101 is a postemergence herbicide it may provide residual suppression of sensitive weeds if activated by 0.5 inch of rainfall or irrigation within 4 days of application.
11.9 Boom width	Fixed wing aircraft boom width should not exceed 75% of wingspan.
11.10 ESA spray drift	Endangered Species Spray Drift Buffer Requirements – Rate, Droplet size, and Boom Height
11.11 ESA runoff/erosion	Endangered Species Requirements for Runoff/Erosion

Note. Similar tables would be provided for other application methods as appropriate: aerial, air blast, chemigation, drone, rotary wing aircraft, hand, see & spray, etc. If a different application method has other application conditions, they should be added at the bottom of the table so that the order remains as consistent as possible.

14.0 Proper Mixing Order

Proper Mixing Order

1. Fill tank 1/3 full with clean water and agitate.
2. Add spray-grade ammonium sulfate (AMS).
3. Add nonionic surfactant (NIS).
4. Add Herbicide 101.
5. Add dry formulations (DF, WDG), then liquid formulations (L, EC).
6. Fill tank with water to desired level.

Directions for Use on Cucumber

14.1: Cucumber						
Product Rate (fl oz/A)	Application Timing		Use Directions			
12 to 16	Preemergence		Apply within 24 hours of seeding and follow with 0.5 inch of irrigation before crop emergence.			
12 to 24	Postemergence		Apply after cucumber reaches the 3-leaf stage but before bloom; include adjuvant as noted in Section 14.0			
Tank Mixtures						
Required	Product Z is required to be applied in mixture with postemergence applications to reduce injury potential.					
Approved	Herbicide 101 plus product Z may be mixed individually with product A, B, C, D, E, or F.					
Prohibited	Herbicide 101 may not be mixed with product X or liquid fertilizers.					
Use Restrictions						
<i>Application Rate Restrictions Per Acre</i>						
Preemergence Maximum Rate	Postemergence Maximum Rate	Seasonal Maximum Rate	Yearly Maximum Rate	Maximum Number of Applications	Minimum Application Interval	Fall Application Allowed
16 fl oz	24 fl oz	48 fl oz	96 fl oz	2	14 days	Yes
<i>Preharvest Interval (PHI)</i>						
Do not apply less than 30 days before harvest						
<i>Last Application Growth Stage</i>						
Applications may be until the first flowers appear on the crop.						
<i>Geographic Restrictions</i>						
Do not apply in Hawaii						
<i>Soil Restrictions – (texture, organic matter, pH, etc.)</i>						
Do not apply on soils with less than 0.5% organic matter.						
<i>Calendar Date Restrictions</i>						
None						
<i>Additional Restrictions</i>						
Avoid applications if an organophosphate insecticide was applied in-furrow during planting.						
Grazing Restrictions						
Grain	Do not graze					
Forage	Do not graze for 21 days					
Hay	Do not cut for hay less than 15 days after application					
Silage	Do not harvest for 21 days					
Pastures	Lactating livestock	Do not graze for 21 days				
	Non-Lactating livestock	Do not graze for 15 days				
Additional as needed						

APPENDIX C. Weed Scientists on Weed Science Label Review Panel

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