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

DEC 16 2009

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: BEAD Responses to Selected Glyphosate Comments (DP#369997)

FROM: Derek Berwald, Ph.D., Economist
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THRU: Timothy Kiely, Chief
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TO: Jude Andreasen, Chemical Review Manager
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Pesticide Re-Evaluation Division

PRODUCT REVIEW PANEL: December 9, 2009

BACKGROUND

Environmental Protection Agency has received comments in response to the opening of the docket for registration review of glyphosate. The Biological and Economic Analysis Division (BEAD) has reviewed selected submissions.

For five of these comments, a BEAD response is appropriate because they discuss use data, the alternatives, and the benefits of glyphosate to agriculture. The work plan laid out a schedule for registration review process, a human health assessment scoping document, a problem statement for ecological risks, and a screening level usage analysis (SLUA). BEAD anticipates work on benefits assessments for glyphosate to be part of the registration review process, and the comments will help inform those assessments

Glyphosate is a broad spectrum herbicide registered in both food and non-food cropping systems, as well as for home use. Glyphosate is one of the most commonly used pesticides, and use has increased dramatically in response to the development of crops genetically modified to be resistant to the herbicide. Glyphosate use has more than doubled since 2000, and current use of glyphosate is in excess of 200 million pounds per year (EPA proprietary data).

(A) a + que doublé son utilisation depuis 2000 (nous sommes en 2009 rédaction du document, 9 années) et l'utilisation courante du G ~~excède~~ est en augmentation + de 200 millions de Livres/an. (donnée communiquée par EPA), 90.000.000 (90 000 T/an)

COMMENTS AND RESPONSES

Comment EPA-HQ-OPP-2009-0361-0018.1

Comment Summary : The National Cotton Council provided comments that highlighted the importance of glyphosate to cotton production in the United States. The comment reports background information on the size and economic impact of cotton, and the importance of weed management for maintaining cotton quality and yield. The comment also highlights the high levels of use of glyphosate on cotton, and provides estimates of the share of cotton that uses glyphosate by state for 2009. The comment concludes with information on the environmental impact of glyphosate, which allows reduced use of other herbicides, reduces the amount of fuel used in the field, and allows conservation tillage practices.

Response: The information in this comment will be important when BEAD evaluates the benefits of glyphosate as part of registration review. Although a benefits assessment was not included in the preliminary work plan, it is a likely task once the risks have been assessed. In all of our benefits assessments, BEAD attempts to determine unique advantages of the chemistry in question, as well as evaluate the impacts of using alternatives.

Comment EPA-HQ-OPP-2009-0361-0020.1

Comment Summary: The American Sugarbeet Growers Association submitted a comment on the importance of glyphosate in sugarbeet production. Their comment began with a discussion of the importance of sugarbeet sugar production to the nation, and challenges facing the industry. One of the most important challenges facing sugarbeet producers is weed control. Recent introduction of genetically modified glyphosate-tolerant sugarbeets has proven to be popular with growers. Up to 95% of sugarbeet acreage has been planted to the glyphosate-tolerant varieties in 2009, the second year of availability. The advantages of glyphosate in the glyphosate-tolerant varieties are reduced use of multiple other herbicides, fewer trips through the field, more flexibility in application times, reduced tillage, elimination of hand labor and reduced herbicide phytotoxicity from glyphosate relative to alternatives.

Response: Recent legal action threatens the availability of glyphosate-tolerant sugarbeet seeds in the future. However, the quick adoption of glyphosate-tolerant sugarbeets indicates the value that this crop in combination with glyphosate has for sugarbeet growers, and the comment helps to explain why this is so. The comment highlights the advantages of the glyphosate-tolerant varieties to growers, and this information is a useful reminder to EPA for our future benefits assessments, if necessary.

Comment EPA-HQ-OPP-2009-0361-0021.1

Comment Summary: The Georgia Cotton Commission submitted a comment on the importance of glyphosate to cotton production in Georgia. After a brief summary of the importance of cotton to the Georgia economy, the comment discusses the ways in which glyphosate is an important tool for Georgia cotton growers. Glyphosate is used on about 97% of cotton acres in Georgia, and is an important tool for weed control, which is important to produce high quality cotton. Glyphosate can also be used in place of other herbicides, and allows reduced tillage, which has environmental benefits.

Response: The issues raised in this comment will be important if a benefits assessment is required as part of the registration review process. The high adoption rate by Georgia growers provides an important indication of how valuable growers find glyphosate when used in conjunction with herbicide tolerant cotton varieties.

Comment EPA-HQ-OPP-2009-0361-0037.1

Comment Summary: Alexander and Baldwin, Inc., provided comments about the importance of glyphosate in three different areas of their operation: sugarcane production on Maui, coffee production on Kauai, and an irrigation company on Maui. These firms use glyphosate to maintain roadways and ditchbanks. In addition, the comment states that glyphosate is important for sugar production for several reasons. As a ripener, it is applied to almost all of their sugar acreage to increase yields. Also, glyphosate is the only option for post emergence control of perennial weeds in sugar. In coffee, glyphosate is used for control of vines.

Response: EPA thanks Alexander and Baldwin for this comment. It provides very useful information about glyphposate use in sugar and coffee. For smaller crops like these, independent information is particularly important.

Comment EPA-HQ-OPP-2009-0361-0033.1

Comment Summary: The Center for Food Safety (CFS) provided very detailed comments, including an appendix on glyphosate resistant weeds that was submitted to USDA as part of their regulatory process for genetically modified crops. The comments to EPA focused on three main areas: usage trends for glyphosate, the ecological effects of glyphosate use, and the human health effects of glyphosate use. The appendix focuses primarily on glyphosate and glyphosate resistance among weedy plants. This summary will not address the ecological and health effects of the comment, as those are more properly dealt with by other divisions in the Office of Pesticide Programs.

The comment highlights the changes in glyphosate use, and CFS contends that EPA's preliminary registration review documents do not mention changes in the amount of glyphosate used, as well as changes in use patterns. The comment goes on to address factors contributing to

the growth of glyphosate use in the past, as well as reasons that glyphosate might be expected to used even more commonly in the future. The past:

- Adoption of reduced tillage practices, for which glyphosate is used to kill vegetation in the field, in place of tillage
- Crops have been genetically modified to be resistant to glyphosate, so that it can be used during the growing season to control weeds. Glyphosate resistant varieties have been very widely planted in soybeans and cotton, and to a lesser extent in corn. As a consequence, use of glyphosate has increased tremendously, becoming the most widely used pesticide in the country.
- Adoption rates of glyphosate resistant corn varieties have lagged behind adoption rates in corn and soybeans, but adoption is increasing, and glyphosate use on corn is increasing faster than adoption of glyphosate resistant varieties.
- EPA has systematically underestimated the use of glyphosate, due to shortcomings in the data, and the methods used in Screening Level Usage Analysis (SLUA). The SLUA is likely to underestimate use of glyphosate on corn. CFS estimates of glyphosate use on corn are roughly twice the estimates in EPA's SLUA.
- The increasing use of glyphosate promotes the emergence and success of glyphosate tolerant weeds. The increase in glyphosate tolerant weeds results in the use of increasing rates of glyphosate.

After discussing past trends in glyphosate use, the CFS comments focus on possible future patterns of glyphosate use. CFS sees a future where glyphosate use increases because:

- For crops where there are already glyphosate tolerant crops, such as soybeans, cotton, and corn and presumably canola, the share of acreage planted to glyphosate tolerant varieties may increase.
- The possible introduction of new glyphosate tolerant crops, such as alfalfa, wheat, and bentgrass for turf.
- The increasing linking of glyphosate resistant traits with other desirable genetic traits in crops, both stacked with other genetic modifications, or conventionally bred agronomic properties.
- Increasing resistance of weedy species to control by glyphosate, which can lead to increased use rates.
- New genetic means to incorporate resistance to glyphosate in crop plants, so they can tolerate higher application rates.
- CFS estimates that roughly half of the herbicide resistant traits for which USDA APHIS has granted permits for field trials are glyphosate resistant traits.

The appendix was originally submitted to USDA APHIS and it discusses regulation genetically modified crops in general, and herbicide tolerant crops in particular. The appendix discusses the growth in the number of herbicide resistant weeds, with a particular emphasis on glyphosate resistant weeds.

Response: The comment from CFS is very detailed, and the summary provided above may over-simplify some parts of the comment. The full comment can be found using the docket ID above,

or at the following web address:
http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480a28746.

The data provided in the SLUA is for screening level analysis only, and the estimates will be updated during the registration review process. More serious is the charge that EPA misinterprets USDA NASS pesticide use data, which is part of the data used for the SLUA. Specifically, CFS states that because NASS does not survey every state, the NASS estimates of the total amount of pesticide used should be inflated to reflect acreage in the states that were not surveyed. For many crops, such an adjustment is probably unnecessary, because USDA NASS surveys the states that are important producers of the crop. In the case of corn, which the comment focuses on and which is widely grown, an adjustment may be required. However, the SLUA is not based solely on NASS data, which is used in combination with other sources of data. A SLUA is not intended to be a forecast of future use, since it is an average of use patterns from recent years. Generally the past is a reasonable predictor of the future, but this is probably not the case with glyphosate. The potential for growth can make past use patterns a poor predictor of future use, and the average itself is misleading if use is rapidly growing. This has clearly been the case with glyphosate. Although the comment states that application rates are increasing, EPA initial assessments of worker and ecological risks are based on maximum label rates.

EPA is aware of the tremendous growth in the use of glyphosate since it was reregistered, and its relationship with the development of herbicide tolerant crops and reduced tillage practices. Accurate estimates of current use patterns will indeed be important for evaluating the human health and environmental effects of glyphosate. EPA is also aware of and concerned about glyphosate resistant weeds, and the impact they can have in farming systems. Forecasting the future of glyphosate is difficult, because it is, in effect, a forecast of market acceptance of new genetically modified crops, as well as forecasting future deregulatory actions by USDA. It is essential, however, that any decisions made in registration review of glyphosate ensure that it is used safely in the future.

Comment EPA-HQ-OPP-2009-0361-0036.1

Comment Summary: This comment is by a Purdue University emeritus professor of plant pathology, Dr. Don M. Huber. The comment states that there are serious concerns about the short and long term effects of glyphosate use, primarily through changes in the availability of nutrients in the soil. The concerns resulting from glyphosate use are

- The over-all negative effects of glyphosate on target and non-target organisms, as well as soil microbes.
- Harmful residual effects of glyphosate in the cropping system
- Misleading marketing information about the residual effects of glyphosate
- The loss of choice in agricultural production, because of the dominance of glyphosate-tolerant crops.

The comment discusses these issues in some detail and provides citations to published research. The general points made in the comment are: glyphosate is a strong metal chelator that makes

metal nutrients unavailable to the plant, which can reduce yields or require the application of additional nutrients to the soil; because of glyphosate toxicity to beneficial micro-organisms in the soil, negative effects of glyphosate can be observed in non-glyphosate tolerant crops if glyphosate has been applied to the field with earlier crops; glyphosate use can lead to increased incidence of plant disease.

Response: EPA thanks Dr. Huber for this information. In many cases the issues raised in the comment are important to users of glyphosate. For example, the comment states the benefits of nutrient remediation. EPA is focused on protecting human health and the environment. These issues are issues that growers need to confront, and are really the purview of the public and private agricultural industry. For the purposes of registration review they may play a role in benefit assessments for glyphosate, as they would reduce the benefits relative to other weed control strategies. Like the prior comment, many of the concerns with glyphosate result from the greatly increased use in conjunction with genetically modified crops, and this change in cropping patterns is indeed important for analyses as part of this registration review.