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

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OFFICE OF
PREVENTION, PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Evaluation of Public Interest Documentation for the Conditional Registration of Pyrasulfotole on Wheat, Barley, Oats, and Triticale (D340011; D340014)

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PEER REVIEW PANEL: June 27, 2007

SUMMARY

Pyrasulfotole is a 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitor, which is a new mode of action for small grains. HPPD-inhibitors are currently available for use in other crops but not in small grains. BEAD has reviewed the efficacy information which indicates that pyrasulfotole will provide control of redroot pigweed, common lambsquarters, wild buckwheat and volunteer canola. To control a broader spectrum of weeds, a combination product with bromoxynil is proposed for use in the United States.

BEAD reviewed the documentation submitted by the registrant to determine whether one of two criteria have been met: there is a need for the new pesticide that is not being met by currently registered pesticides or the benefits from the new pesticide are greater than those from currently registered pesticides or non-chemical control measures.

Although the information submitted focused on the pyrasulfotole + bromoxynil product, BEAD focused its review on the benefits of pyrasulfotole since bromoxynil is currently registered. BEAD believes that by providing a new mode of action for control of certain weeds,

pyrasulfotole meets a need that is not being met by currently registered pesticides. BEAD believes that the availability of a new mode of action will serve as a resistance management tool.

AGENCY PUBLIC INTEREST FINDING POLICY

The registration of a new pesticide ingredient is presumed to be in the public interest if one or more of the following criteria are applicable: 1) it involves a replacement for another pesticide that is of continuing concern to the Agency; 2) it involves a use for which a Section 18 emergency exemption has been granted, if the basis for the exemption was the lack of a suitable alternative; or 3) it involves a use against a pest of public health significance.

For pesticides which do not meet any of the criteria listed above for the presumption of public interest, one of the following three criteria must be met: 1) there is a need for the new pesticide that is not being met by currently registered pesticides; 2) the new pesticide is less risky than currently registered pesticides; or 3) the benefits from the new pesticide are greater than those from currently registered pesticides or non-chemical control measures. This review focuses on items 1 and 3 (needs and benefits).

GENERAL INFORMATION ABOUT PYRASULFOTOLE

Pyrasulfotole (AE 0317309) is a 4-hydroxyphenylpyruvate dioxygenase (HPPD) inhibitor herbicide. HPPD-inhibitors are currently available for use in other crops but not in small grains. Pyrasulfotole provides post-emergence control of broadleaf weeds, including lambsquarters, redroot pigweed, and wild buckwheat. The weed spectrum controlled is broader when used in combination with bromoxynil: kochia, mustards, wild buckwheat, pigweeds, Russian thistle, lambsquarters, sunflower, henbit, and prickly lettuce. However, within the scope of this analysis BEAD focused its review on the benefits of pyrasulfotole since bromoxynil is currently registered.

The proposed label use rate of pyrasulfotole + bromoxynil is 11 oz product/acre, up to 15 oz product/acre (0.027 to 0.037 lb ai/acre pyrasulfotole and 0.15 to 0.205 lb ai/acre bromoxynil). Pyrasulfotole + bromoxynil may be applied by ground, through sprinkler irrigation systems, and by air.

ANALYSIS OF REGISTRANT'S CLAIMS FOR PUBLIC INTEREST

The registrant claims that pyrasulfotole 1) offers a new mode of action for cereal crops, 2) is a resistance management tool, 3) provides an effective herbicide with crop tolerance, 4) that its use results in a reduced need for tank mixes for broadleaf weed control, 5) is a compatible tank mix partner for grass herbicides, 6) is a low risk herbicide, and 7) is compatible with integrated pest management. The registrant focused on wheat and barley in the public interest document submitted to the Agency. However, the pyrasulfotole + bromoxynil label will also include the crops triticale, oats, and rye.

The registrant claims that pyrasulfotole will control lambsquarters, redroot pigweed, and wild buckwheat. Additional broadleaf weeds are controlled when used in combination with

bromoxynil.

New Mode of Action for Cereal Crops

As described above, pyrasulfotole is an HPPD inhibitor herbicide (WSSA Group 28). HPPD-inhibitors are currently available for use in other crops but not in small grains. BEAD searched CDMS for herbicides registered for use on wheat and no other WSSA Group 28 chemicals were labeled. Based on this information, BEAD is not aware of another HPPD inhibitor herbicide labeled for use on small grains.

Emergency Exemptions (Section 18s)

BEAD did not find relevant section 18 requests for triticale and oats. For barley and wheat, several states requested fluorxypyr to control kochia in the 1990s. BEAD found the situation to be routine and fluroxypyr was eventually registered for this use.

Efficacy

Although only the product containing pyrasulfotole + bromoxynil is expected to be marketed in the U.S., a pyrasulfotole product label exists. This label indicates that pyrasulfotole will control wild buckwheat, common lambsquarters, redroot pigweed, and volunteer canola. Many other weed species are listed on the pyrasulfotole + bromoxynil label, but it is not clear if there is a synergistic effect between pyrasulfotole and bromoxynil or if bromoxynil alone provides control of these additional weeds.

Efficacy data for pyrasulfotole alone was not provided by the registrant. Comparative performance data with pyrasulfotole + bromoxynil was provided. Comparisons were made with bromoxynil + MCPA, although another bromoxynil treatment was not always available, making it difficult to determine the efficacy of pyrasulfotole. From the data provided, it appears that pyrasulfotole is efficacious on redroot pigweed. Bromoxynil has been described as weak on pigweed (Crop Profile for Wheat in MN, 2002).

The comparative performance data included comparisons of pyrasulfotole + bromoxynil with bromoxynil + MCPA, thifensulfuron + fluroxypyr, and/or clopyralid + fluroxypyr + MCPA. Pyrasulfotole + bromoxynil provided control comparable to the alternatives for wild buckwheat, common lambsquarters, and other broadleaf weeds.

Canada's Pest Management Regulatory Agency (PMRA) evaluated efficacy trials of pyrasulfotole and pyrasulfotole + bromoxynil. BEAD reviewed the efficacy reviews conducted by PMRA for pyrasulfotole without bromoxynil because the registrant did not submit efficacy or comparative performance trials of pyrasulfotole alone. PMRA reviewed 37 trials of pyrasulfotole + a safener, many of which included a comparison with thifensulfuron + tribenuron. PMRA determined that pyrasulfotole controls wild buckwheat, common lambsquarters, redroot pigweed, and volunteer canola at a rate of 50 g ai/ha (0.045 lb/acre) (Couture, 2006a).

PMRA also evaluated the damage to rotational crops. The rotation intervals for the pyrasulfotole product were different from those described for the U.S. (Couture, 2006b).

PMRA evaluated crop tolerance data, including comparisons to dicamba, bromoxynil + MCPA, and thifensulfuron + tribenuron. Spring wheat, durum wheat, winter wheat, spring barley, tame oats, triticale, and timothy seed production (not on U.S. label) were all found to be tolerant of pyrasulfotole (Couture, 2006c).

Resistance Management Tool

Although the registrant describes herbicide resistant weeds, such as kochia, in small grain fields, BEAD will focus the review of pyrasulfotole as a resistance management tool for redroot pigweed, common lambsquarters, wild buckwheat, and volunteer canola. Data demonstrating the efficacy of pyrasulfotole is available for these weeds. The registrant submitted comparative performance data for ALS-inhibitor resistant biotypes of kochia, Russian thistle, prickly lettuce, and henbit. However, this information was submitted for pyrasulfotole + bromoxynil, and BEAD does not have evidence indicating that pyrasulfotole has activity on these weeds.

Redroot pigweed has documented resistance to photosystem II inhibitors, ALS inhibitors, and biotypes with multiple resistance (photosystem II inhibitors + ALS inhibitors and photosystem II inhibitors + ureas) (Heap, 2007). It is not clear if these resistant biotypes are problematic in small grain production areas. Common lambsquarters has documented resistance to photosystem II inhibitors and ALS inhibitors but it is not clear if these resistant biotypes are problematic in small grain production areas (Heap, 2007). BEAD believes that the addition of a new mode of action may be useful for weed control in crop rotations, particularly if herbicide-resistant weeds are present, and to minimize the development of resistance.

Volunteer canola is a weed in small grains and may be herbicide tolerant (i.e., glyphosate-tolerant canola may have been planted previously). Herbicides available to control volunteer canola in small grains include glypohsate (pre-plant and if not glyphosate-tolerant), thifensulfuron + tribenuron and mesosulfuron (Zollinger, 2007).

BEAD has not found documentation of wild buckwheat resistance to herbicides (Zollinger et al., 2006; Heap, 2007). However, wild buckwheat is a common weed in small grain crops that causes yield losses and interferes with harvesting (Zollinger et al., 2006). ALS-inhibitor herbicides, dicamba, clopyralid + fluroxypyr, and bromoxynil + MCPA are available for use (Zollinger, 2007). Wild buckwheat is tolerant of MCPA and normal rates of 2,4-D and is somewhat tolerant of glyphosate (depending on a number of factors, including application rate) (Zollinger et al., 2006). Rotation with an herbicide with a new mode of action may help minimize the potential for the development of resistance.

Reduced Risk

The registrant claims that pyrasulfotole is comparable to or lower risk when compared to the alternatives due to the low use rate and low toxicity. For this claim, BEAD defers to RD.

Other Information

Wild buckwheat is described as a weed of concern in wheat fields (PMSP, 2003). ALS-resistant kochia is also described as problematic but BEAD does not have adequate information on pyrasulfotole efficacy on kochia to make a determination based on this weed (PMSP, 2003).

CONCLUSIONS AND RECOMMENDATIONS

Pyrasulfotole provides a new mode of action for use in small grains to control wild buckwheat, common lambsquarters, redroot pigweed, and volunteer canola. For a public interest finding, BEAD determines whether one of two criteria have been met: there is a need for the new pesticide that is not being met by currently registered pesticides or the benefits from the new pesticide are greater than those from currently registered pesticides or non-chemical control measures. HPPD-inhibitors are currently available for use in other crops but not in small grains. BEAD believes that an effective new mode of action in small grains is a need not being met by currently registered pesticides, particularly given the tendency of certain weeds (i.e., common lambsquarters and redroot pigweed) to develop resistance to herbicides.

REFERENCES

Crop Data Management System (CDMS) search, Web address: https://premier.cdms.net/webapls

Crop Profile for Wheat in Minnesota, 2002, Web address: http://www.ipmcenters.org/CropProfiles/docs/MNwheat.pdf

Couture, S., 2006a, Category A Review- Efficacy and Lowest Effective Rate (Pyrasulfotole), PMRA.

Couture, S., 2006b, Category A Submission - Damage to Rotational Crops (Pyrasulfotole), PMRA.

Couture, S., 2006c, Category A Submission - Non-Safety Adverse-Effects (Pyrasulfotole), PMRA.

Heap, I., The International Survey of Herbicide Resistant Weeds, Online, Internet, Accessed June 13, 2007, Web address: www.weedscience.com

Pest Management Strategic Plan (PMSP) for Northern Wheat, 2003, Web address: http://www.ipmcenters.org/pmsp/pdf/NorthernWheatPMSP.pdf

Zollinger, R.K., 2007, 2007 North Dakota Weed Control Guide, W-253, North Dakota State University, Web address: http://www.ag.ndsu.edu/weeds/w253/w253w.htm

Zollinger, R., D. Peterson, and M. Moechnig, 2006, Biology and Management of Wild Buckwheat, GWC-10, The Glyphosate, Weeds, and Crops Series, Purdue Extension, Web address: http://www.ces.purdue.edu/extmedia/GWC/GWC-10-W.pdf