UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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OFFICE OF
PREVENTION,
PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Review of the PMRA Efficacy Review for BAS 670 H (D306548).

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PEER REVIEW PANEL: August 11, 2004

Summary and Conclusions

The herbicide BAS 670 H is undergoing a joint review with U.S. EPA and Canada's Pest Management Regulatory Agency (PMRA). Canada's PMRA conducted an efficacy review of BAS 670 H relative to the control of various weeds in field corn. BEAD was asked to review the PMRA review to determine if there are any differences between the proposed U.S. label and the uses accepted by PMRA and, especially, to evaluate the PMRA review of the proposed application rates.

There are several differences between the proposed U.S. label (draft from June 17, 2002) and the accepted uses from PMRA's review. First, the draft U.S. label proposes use on field corn, popcorn, seed corn, and sweet corn. Popcorn is a U.S. only use and seed corn was withdrawn from the Canadian label by the registrant. Canada's PMRA accepted use solely on field corn. They did not accept sweet corn use due a limited data package. Second, the U.S. label provides for a range of application rates, whereas Canada has approved uses at and below a rate that corresponds to the lowest U.S. rate. Finally, the U.S. label lists several crops as crop rotation options, whereas PMRA has only accepted soybeans because insufficient data were provided to support the others crops. These differences may impact the joint review process.

Without additional efficacy data, especially data specific to the U.S., BEAD can not provide further analysis. Higher rates may be justified in the U.S., due to a warmer climate and a broader spectrum of weeds, including some difficult to control perennial weeds. However, PMRA did not review rates above the lowest proposed U.S. application rate and the studies reviewed were conducted in Canada. It is not clear if higher rates will lead to an increased potential for crop injury, given the different growing conditions, crops, and varieties grown in the U.S.

Background

Three labels were provided to BEAD: a draft U.S. label, a draft Canadian label, and a draft joint label that incorporates the relevant information from both countries into one label. BEAD also was provided with PMRA reviews of crop tolerance data, efficacy data, and the rotational crop evaluation.

BAS 670 H is a systemic post-emergence herbicide for selective control of grasses and broadleaf weeds. Canada's Pest Management Regulatory Agency (PMRA) conducted an efficacy review of the use of BAS 670 H to control various weeds on field corn. These weeds are redroot pigweed, green pigweed, smooth crabgrass, common ragweed, Eastern black nightshade, wild mustard, green foxtail, yellow foxtail, large crabgrass, barnyard grass, fall panicum, common chickweed, common lambsquarters, velvetleaf, and lady's thumb. Additional weeds are on the proposed U.S. label (see BEAD review below).

The Canadian label has a proposed rate of 25 g ai/ha. The efficacy review provided by PMRA contained trials between the rates 12.5 g ai/ha and 25 g ai/ha. PMRA's review concluded that the proposed rate of 25 g ai/ha was justified but that the rate could be lowered to 12.5 g ai/ha for common ragweed, Eastern black nightshade, and wild mustard. The U.S. label contains rates ranging from 1 to 2 oz/acre (25 g ai/ha to 49 g ai/ha). However, data were not submitted for rates above 25 g ai/ha and Canada did not review rates above 25 g ai/ha.

BEAD Review

The following is a list of differences after comparing the proposed U.S. label (draft from June 17, 2002) and the accepted uses from PMRA's review.

1) Crops Labeled
The U.S. label proposes use on field corn, pop corn, seed corn, and sweet corn. Popcorn is a U.S. only use, and seed corn was withdrawn from the Canadian label by the registrant (no crop tolerance data was provided by the registrant for seed corn). Canada's PMRA did not accept the sweet corn use due to a limited data package (limited number of trials and inconsistent marketable yield results). Therefore, the only use accepted by Canada is field corn. Hence, the efficacy data will focus on the use of BAS 670 H in field corn.

2) Efficacy Review and Label Rates
Based on information provided in the PMRA review, the efficacy studies were conducted in Ontario and Quebec, Canada, and did not include studies conducted in the U.S. The studies

compared rates between 12.5 g ai/ha and 25 g ai/ha. The trials were conducted in a randomized complete block design with 4 replicates. Most of the trials were conducted under the supervision of BASF personnel, but some were conducted by university or government sponsored researchers. Visual assessments for percent weed control compared to the untreated control were made throughout the growing season. In the PMRA review and therefore in this review, early season is defined as < 26 days after treatment (DAT) and mid season is defined as > 26 DAT.

There were also efficacy studies conducted for BAS 670 H with and without the additives Assist adjuvant and liquid fertilizer at the rate of 37.5 g ai/ha (referred to in this document as the additives studies). It was determined that these additives are required with BAS 670H in Canada. On the proposed joint label, these additives are recommended for the U.S.

PMRA has accepted control at 25 g ai/ha for the following weeds: redroot pigweed, green pigweed and smooth crabgrass.

PMRA has accepted control at 12.5 g ai/ha for the following weeds: common ragweed, Eastern black nightshade and wild mustard. It should be noted that PMRA requested additional data for the 12.5 g ai/ha rate after their initial review of the application rates 12.5 g ai/ha to 25 g ai/ha. The data used in the initial review were from trials conducted in 2002. The registrant submitted data from the following year (2003), but PMRA did not analyze any data at the 25 g ai/ha rate, although these data may have been submitted. In several instances, the data in 2003 show better control than in 2002. Therefore, it is not known whether improved control was also seen at the 25 g ai/ha rate in 2003.

PMRA has accepted the suppression of the following weeds at 25 g ai/ha: green foxtail, yellow foxtail, large crabgrass, barnyard grass, fall panicum, common chickweed, common lambsquarters, velvetleaf, and lady's thumb.

PMRA also accepted tank mixes with certain atrazine and dimethenamid products. A review of the proposed joint label listed additional chemicals in the list of recommend tank mix options for the U.S.

The proposed U.S. label lists additional weeds not on the proposed Canadian label. These are: Palmer amaranth, carpetweed, common cocklebur, jimsonweed, kochia, venice mallow, morningglory sp., mustard sp., black nightshade, hairy nightshade, other pigweeds (prostrate, smooth, and tumble), giant ragweed, prickly sida, smartweed (ladysthumb and Pennsylvania), sunflower, Canada thistle, waterhemp (common and tall), woolly cupgrass, giant foxtail, goosegrass, Johnsongrass (seedling and rhizome), wild proso millet, field sandbur, shattercane, broadleaf signalgrass, and wild oat.

The use of a higher rate may be necessary to control these weeds, especially difficult to control perennial weeds like Canada thistle and Johnsongrass. In addition, the warmer U.S. climate may require higher rates for control. There was no review of efficacy data above 25 g ai/ha, and BEAD does not have efficacy data for weeds specific to the U.S. Additional efficacy data conducted in the U.S. on the proposed weed species is necessary to determine if the higher rates

of BAS 670 H are necessary for U.S. growing conditions. However, in the absence of efficacy data, BEAD believes that the proposed higher rates (25 g ai/ha to 49 g ai/ha) may be necessary to adequately control these additional weeds. Although PMRA has found field corn to be tolerant up 12x the 25 ai/ha rate, BEAD has

BEAD agrees with PMRA's review of the application rates. However, this review is limited to rates up to 25 g ai/ha. In some cases, the available data indicates that rates higher than 25 g ai/ha may provide better control. For example, for redroot pigweed, the higher control in the additives trials (with the rate 37 g ai/ha, with 91% early season and 96% mid season control) may be more effective than the rate 25 g ai/ha, with 87.7% early season and 83% mid season control. However, not enough information is available to make an adequate determination on this issue.

3) Rotational Crop Tolerance

PMRA has accepted soybeans as a rotational crop. However, the label states an interval of 9 months and PMRA has accepted the soybean rotation in the year after planting (10 to 12 months). The U.S. label also lists field corn, field corn grown for seed, sweet corn, popcorn, cereal crops (barley, oats, rye, and wheat), winter canola, alfalfa, cotton, canola, peanuts, sorghum, sunflower, edible beans and peas, and potato. PMRA did not accept these crops because insufficient data were provided (limited number of trials and/or inconsistent results).