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

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

September 16, 2022

MEMORANDUM

SUBJECT: A Review of Valent's Petition for Extension of Exclusive Use for Ethaboxam (PC: 090205) (DP#465164)

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PRODUCT REVIEW PANEL DATE: July 27, 2022

SUMMARY

Valent (2022) has petitioned the Environmental Protection Agency (EPA), under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 3(c)(1)(F)(ii), to extend the exclusive use period for data supporting the fungicide ethaboxam for up to three years. Valent claims ethaboxam fills a void in current management programs and plays or will play a part in resistance management, criteria I and III as defined under FIFRA 3(c)(1)(F)(ii) in 12 use sites.

All 12 use sites claimed by Valent are supported by residue data and meet the criterion for minor use designation, i.e., less than 300,000 acres bearing or harvested. BEAD finds the registrant submitted sufficient evidence for 12 minor use sites to satisfy at least one criterion for extension of exclusive use for ethaboxam under FIFRA Section 3(c)(1)(F)(ii). BEAD finds that ethaboxam plays or will play a role in resistance management (Criterion III) in ginger, ginseng, lima beans,

bell pepper, non-bell pepper, summer squash, cucumber, cantaloupe, buckwheat, popcorn, rapeseed, and safflower.

BACKGROUND

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) provides certain data protection rights to data submitters for their registered pesticides. Section 3(c)(1)(F)(i) states that the original data submitter has a 10-year exclusive use period from the date of registration for the data submitted in support of the original registration. The period of exclusive use may be extended one year for each three minor uses registered, up to a total of 3 additional years, if, within 7 years of the commencement of the exclusive use period, the registrant demonstrates that:

(I) there are insufficient efficacious alternative registered pesticides available for the use;
(II) the alternatives to the minor use pesticide pose greater risks to the environment or human health;
(III) the minor use pesticide plays or will play a significant part in managing pest resistance; or
(IV) the minor use pesticide plays or will play a significant part in an integrated pest management program.

A minor use is defined in FIFRA Section 2(ll) as the use of a pesticide on an animal, on a commercial agricultural crop or site, or the protection of public health where "(1) the total U.S. acreage for the crop is less than 300,000 acres, as determined by the Secretary of Agriculture, or (2) the use does not provide sufficient economic incentive to support the initial registration or continuing registration of a pesticide for such use."

In the case of crop groupings, FIFRA 3(c)(1)(F)(ii) states that "the registration of a pesticide for a minor use on a crop grouping . . . shall be considered for one minor use for each representative crop for which data are provided." i.e., the maximum number of eligible distinct minor uses for a crop subgroup is equal to the number of representative crops for which residue data have been submitted. Greenhouse uses are considered separate use sites from field crops in cases where distinct residue data for field-grown crops are submitted to support the registration.

The Biological and Economic Analysis Division (BEAD) evaluates the use sites submitted in the registrant's petition to determine if each minor use meets the statutory requirements for extension of data exclusivity by verifying that (1) relevant data were submitted in support of an individual registered use site or required representative data in the case of a registered group of uses, (2) minor crop acreage or economic minor use criteria are met by the use, and (3) the claimed criterion/a with respect to need for the pesticide is established. The minor uses registered that meet the requirements for supporting extension of exclusive use are provided to inform the petition response. While evaluating the claimed criteria, BEAD reviews external sources, such as university extension and Resistance Action Committee recommendations, to assess and validate the petitioner's claims.

REGISTRANT SUBMISSION

The registrant claims that ethaboxam satisfies the FIFRA Section 3(c)(1)(F)(ii) requirements for the following 12 registered use sites: ginger, ginseng, lima beans, bell pepper, non-bell pepper, summer squash, cucumber, cantaloupe, buckwheat, popcorn, rapeseed, and safflower. The registrant claims all uses are individually associated with a residue trial and are grown on less than 300,000 acres. The registrant claims that there are insufficient registered alternative pesticides (criterion I) for safflower and that ethaboxam plays or will play a role in resistance management (criterion III) for each of the claimed minor use sites.

REQUIREMENTS TO QUALIFY FOR THE CLAIMED CRITERIA

Requirements for Criterion I, there are insufficient efficacious alternative registered pesticides for the use site. EPA considers Criterion I to be met in situations where the pesticide: 1) fills a void in the current program (e.g., unique timing window); 2) controls a broader spectrum of pests than currently registered alternatives; 3) controls a different life stage for the pest; or 4) provides a crucial timing advantage (e.g. shorter pre-harvest interval or restricted entry interval).

Requirements for Criterion III, the minor use pesticide plays or will play a significant part in managing pest resistance. EPA considers Criterion III to be met in situations where there is reliable information that the chemical being evaluated is used either to delay the development of pest resistance to other chemicals with different modes of action or where one or more of the target pests have already developed resistance in the U.S. to alternative chemicals.

BEAD ANALYSIS

BEAD first confirms that residue trial data are sufficient such that there is a one-for-one relationship for each use site. Then, BEAD confirms that each crop meets the definition of a minor crop per FIFRA Section 2(ll)(1), wherein each crop must be grown on less than 300,000 acres in the U.S. by consulting the most recent Census of Agriculture conducted by the United States Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). Finally, BEAD evaluates the evidence submitted by the registrant to determine if the claimed criteria are met. If BEAD finds nine qualifying use sites meet at least one claimed criterion, the evaluation is complete, as that is the requirement for the maximum three-year extension of data exclusivity.

Residue Trial Analysis

Of the 12 crops listed in the registrant submission, 12 are supported by residue data (Table 1). The registrant may claim up to 12 minor use sites if all use sites are cultivated on less than 300,000 acres and if minor use site criteria are met.

Table 1. Proposed crops and representative residue data by crop subgroup.

Minor Use site Claimed	Crop Group (Subgroup)	Crop Residue Data Submitted for Subgroup (Date; MRID)	Maximum Number of Use Sites Allowed
Ginger	Root Vegetables (1C)	Potato (8/3/17; 49489934)	1
Ginseng	Root Vegetables (1A)	Ginseng (8/3/17; 49489933)	1
Lima Beans	Legume Vegetables (6)	Soybean (3/4/2014; 48535676)	1
Bell pepper Non-bell pepper	Fruiting Vegetables (8-10B)	Bell pepper; Non-bell pepper (6/29/12; 49489930)	2
Summer squash Cucumber	Cucurbit Vegetables (9B)	Summer squash, cucumber (8/3/17; 49489929, 49489931)	2
Cantaloupe	Cucurbit Vegetables (9A)	Cantaloupe (8/3/17; 49489932)	1
Buckwheat Popcorn	Cereal Grains (15)	Corn; Wheat (3/4/14; 48535676)	2
Rapeseed	Oilseed (20A)	Canola (3/4/14; 48535676)	1
Safflower	Oilseed (20B)	Sunflower (6/23/16; 49490202)	1

Minor Use Analysis

The Environmental Protection Agency (EPA) relies on the United States Department of Agriculture (USDA) Census of Agriculture for data on crops grown in the United States (EPA 2018, USDA 2017). If a crop is not listed in the Census of Agriculture, per discussion with USDA, the acreage of the crop can be assumed to be less than 300,000. For the minor use qualification, fruit and tree nut crops are evaluated for bearing acreage, and other crops are evaluated for harvested acreage. For each of the 12 sites listed in Table 1, the total U.S. acreage is less than 300,000 acres, qualifying them as minor crops (Table 2).

Table 2. Acreage of crops and criteria considered for extension of exclusive use for ethaboxam.

Minor Use Site	Crop Acres Grown[a]	Criterion/a Claimed
Ginger	266	III
Ginseng	1,050	III
Lima beans	94,836	III
Bell pepper	48,801	III
Non-bell pepper	24,165	III
Summer squash	70,190	III
Cucumber	119,655	III
Cantaloupe	71,436	III
Buckwheat	27,762	III
Popcorn	221,264	III
Rapeseed	10,665	III
Safflower	144,027	I, III

[a]USDA NASS 2017.

BEAD Assessment of Claimed Criteria[1]

Applicability of Criterion III to ethaboxam. The registrant claims that ethaboxam plays or will play a significant part in managing pest resistance in ginger, ginseng, lima beans, bell pepper, non-bell pepper, summer squash, cucumber, cantaloupe, buckwheat, popcorn, rapeseed, and safflower. BEAD considers this criterion to be met in all sites and discusses below.

For ginger, ethaboxam is the only fungicide in the Fungicide Resistance Action Committee (FRAC) group 22 registered for soilborne oomycete disease control (e.g., *Pythium* spp. diseases). Soilborne and seed-borne diseases, including those caused by *Pythium* spp., can devastate ginger production (Ernst and Durbin, 2019). Other registered conventional pesticides for soilborne oomycete diseases in ginger include metalaxyl, mefenoxam (FRAC 4), azoxystrobin (FRAC 11), cyazofamid (FRAC 21), and oxathiapiprolin (FRAC 49). Isolates of *Pythium* spp. resistant to FRAC groups 4 and 11 have been documented in fields (FRAC, 2020). On the other hand, no known fungicide resistance exists for ethaboxam outside of lab-created mutations (Valent, 2022; FRAC, 2020). The FRAC indicates that resistance risk for these AIs are all high or medium to high and indicates the resistance risk for ethaboxam is low to medium (FRAC 2022). Because *Pythium* spp. are prone to developing fungicide resistance, it is important for growers to have access to multiple efficacious fungicides to implement a fungicide rotation program for resistance management (FRAC, 2010; FRAC, 2020). Given its unique mode of action and a generally lower risk of resistance than alternatives, ethaboxam satisfies criterion III for ginger and plays or will play a role in managing fungicide resistance in *Pythium* spp. diseases.

For ginseng, ethaboxam is the only fungicide in the FRAC group 22 registered for soilborne oomycete disease control (e.g., *Pythium* spp. diseases). These diseases are some of the most serious diseases in ginseng and can cause a significant reduction in plant stands if not treated with fungicides (Hausbeck, 2017). Other registered conventional pesticides for soilborne

[1] While the registrant claims that safflower meets Criterion I, this criterion was not assessed. Because Criterion III was claimed for all minor use sites, BEAD first assessed Criterion III because resistance management benefits are often similar for the same active ingredient across different use sites, as is the case here.

oomycete diseases in ginseng include captan (FRAC M04), metalaxyl, mefenoxam (FRAC 4), azoxystrobin, and fenamidone (FRAC 11). While captan has a nearly nonexistent risk of resistance, it is reportedly less efficacious than ethaboxam and may not be sufficient for every situation, e.g., in very wet soils (FRAC, 2022; Hausbeck, 2017). Because *Pythium* spp. are prone to developing fungicide resistance and have already developed resistance to FRAC groups 4 and 11, it is important for growers to have access to multiple efficacious fungicides to implement a fungicide rotation program for resistance management (FRAC, 2010; FRAC, 2020). Given its unique mode of action and a generally lower risk of resistance than alternatives, ethaboxam satisfies criterion III for ginseng and plays or will play a role in managing fungicide resistance in *Pythium* spp. diseases.

For lima beans, buckwheat, popcorn, rapeseed, and safflower, ethaboxam is the only fungicide in the FRAC group 22 registered for seed treatment for soilborne oomycete disease control (e.g., damping-off caused by *Pythium* spp.). Friskop et al. (2022) detail the importance of seed treatments for each of these crops for seedborne and soilborne pathogens, including *Pythium* spp. Friskop et al. (2022) also recommend ethaboxam as a preventive seed treatment for *Pythium* for several crops, including cereal grains (i.e., buckwheat and popcorn) and rapeseed. Other registered conventional pesticides for soilborne oomycete diseases in these use sites include metalaxyl, mefenoxam (FRAC 4) and azoxystrobin (FRAC 11; lima beans only). Because *Pythium* spp. are prone to developing fungicide resistance and have already developed resistance to FRAC groups 4 and 11, it is important for growers to have access to multiple efficacious fungicides to implement a fungicide rotation program for resistance management (FRAC, 2010; FRAC, 2020). Given its unique mode of action and a generally lower risk of resistance than alternatives, ethaboxam satisfies criterion III for and plays or will play a role in managing fungicide resistance in *Pythium* spp. seedling diseases in lima beans, buckwheat, popcorn, rapeseed, and safflower.

For bell peppers, non-bell peppers, summer squash, cucumber, and cantaloupe, ethaboxam is the only fungicide in the FRAC group 22 registered for control of the soilborne disease Phytophthora blight (*Phytophthora capsici*). Other registered conventional pesticides for control of this disease for all of the listed use sites include mancozeb (FRAC M03), metalaxyl, mefenoxam (FRAC 4; suppression only), cyazofamid (FRAC 21), fluazinam (FRAC 29), fluopicolide (FRAC 43) and oxathiapiprolin (FRAC 49). Isolates of *P. capsici* resistant to FRAC groups 4, 11, 21, and 40 have been documented in fields (FRAC, 2020). On the other hand, no known fungicide resistance exists for ethaboxam outside of lab-created mutations (Valent, 2022; FRAC, 2020). Mancozeb does not have good efficacy on *Phytophthora capsici* and is not recommended for management of this disease (Dutta et al., 2022). The FRAC indicates that resistance risk for most of the alternative AIs are all high or medium to high but indicates the resistance risk for ethaboxam is low to medium and the resistance risk for fluazinam is low (FRAC 2022). Because *Phytophthora capsici* is prone to developing fungicide resistance, it is important for growers to have access to multiple efficacious fungicides to implement a fungicide rotation program for resistance management (FRAC, 2010; FRAC, 2020). Given its unique mode of action and a lower risk of resistance than most single-site alternatives, ethaboxam satisfies criterion III and plays or will play a role in managing fungicide resistance in *Phytophthora capsici* in bell peppers, non-bell peppers, summer squash, cucumber, and cantaloupe.

CONCLUSION

BEAD finds the registrant has provided sufficient evidence that 12 minor use sites satisfy the criteria necessary for a 3-year extension of exclusive use for ethaboxam under FIFRA Section 3(c)(1)(F)(ii). BEAD finds that for the minor uses ginger, ginseng, lima beans, bell pepper, non-bell pepper, summer squash, cucumber, cantaloupe, buckwheat, popcorn, rapeseed, and safflower, ethaboxam plays or will play a role in resistance management for soilborne oomycete pests, e.g., *Pythium* spp. and *Phytophthora capsici*.

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