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Response to EPA Proposed Interim Decision for Fenamidone

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Re: Fenamidone, Comments on EPA Proposed Interim Decision
Docket ID: EPA-HQ-OPP-2014-0048

To Whom It May Concern:

The Arizona Pest Management Center is host to the University of Arizona's expert IPM scientists including Ph.D. entomologists, weed scientists and plant pathologists with expertise in the strategic tactical use of pesticides within IPM programs that protect economic, environmental and human health interests of stakeholders and the society at large. In coordination with the Western Integrated Pest Management Center, we contribute to federal comments on issues of pest management importance to stakeholders throughout the desert southwest including Arizona, New Mexico, Nevada, Colorado and the southeast desert regions of California.

At this time, we wish to respond to the Agency's Proposed Interim Decision for the fungicide fenamidone, EPA Docket number EPA-HQ-OPP-2014-0048, on behalf of Arizona agricultural stakeholders. Our comments combine stakeholder input received from University of Arizona Extension Specialists, licensed pest management professionals from Arizona, and reported pesticide use data from the Arizona Pest Management Center Pesticide Use Database.

Fenamidone Use and the Importance of Downy Mildew in Arizona Vegetable Crops

In 2019, Arizona growers produced 71,000 combined acres of head lettuce, leaf lettuce and romaine value at over $1.6 billion, as well as 12,570 combined acres of cauliflower and broccoli valued at over $185 million (USDA-NASS 2020). Bok choy and Napa cabbage are also produced in Arizona, although economic numbers are not readily available.

According to pesticide use data submitted by growers to the Arizona Department of Agriculture and maintained in the Arizona Pest Management Center database (Fournier et al. 2017), fenamidone is used on a variety of vegetable crops, including lettuce, spinach, arugula, cabbage, broccoli, cauliflower, kale, celery, mustard greens and swiss chard, as well as onions. In most

cases, a relatively small portion of acres are treated annually. A more significant level of use is reported in lettuce and spinach than the other crops. Fenamidone is primarily used to control downy mildew in all these crops.

Downy mildew is a significant and regular "key pest" disease of spinach and lettuces in Arizona, and also causes damage across a number of other vegetable crops, including brassicas. The conditions conducive to pathogen development are present every year, and active controls and prevention tactics are deployed by growers to manage downy mildew. Symptoms are somewhat similar in lettuce and brassica crops (Koike & Subbarao 2017), although the specific pathogen is different (Matheron 2015). In young seedling lettuce, downy mildew symptoms appear as fluffy white growth on cotyledons and young leaves, resulting in stunting and plant death. On older lettuce plants, symptoms include yellow spots on upper sides of leaves, which later become necrotic brown or tan lesions. Under favorable conditions, fluffy white fungal growth occurs on the undersides of affected leaves. Systemic infections occur infrequently, but can cause browning of internal stem tissue (Matheron 2015, Koike & Turini 2017). Systemic infections in broccoli and cauliflower can result in necrotic streaks and patches on stems and floret branches. Downy mildew infections of cotyledons of young seedlings can lead to plant death (Koike & Subbarao 2017).

According to former University of Arizona Extension Plant Pathologist, Dr. Mike Matheron, "Optimal management of downy mildew is achieved by having a fungicide in place before disease symptoms become apparent. Less than optimal control will occur when fungicide applications are not started until downy mildew symptoms are visible on plants." (Matheron 2017a). Management of downy mildew can be difficult, because of the complexity of the pathogens involved. For example, the distinct pathogens which infect lettuce and spinach each consist of multiple races, with new races emerging as the pathogens evolve. For this reason, resistant cultivars, while very useful, are not a stand-alone long-term management strategy. Growers rely on fungicides for management of downy mildew, and resistance management practices are extremely important to decrease selection of fungicide-resistant components within pathogen populations (Matheron 2018, 2020).

The Fungicide Resistance Action Committee recommends a number of resistance management strategies, including: rotation of multiple modes of action in the treatment program; limiting the number of applications of any particular mode-of-action each season; applying fungicides at the full recommended rate; targeting fungicide applications for disease prevention, not eradication; integrating fungicide use with other tactics, including biological control, disease-resistant cultivars, crop rotation, and other beneficial cultural practices (Matheron 2014). In Arizona, rotation of different fungicidal modes of action is broadly adopted by growers. We do not yet have reliable downy mildew resistant varieties. Varieties selection is based on market demands and desirable traits in produce. Biologically-based fungicides which have been tested have not shown sufficient levels of efficacy against downy mildew under field conditions in Arizona (Matheron 2017b), but when combined with chemical fungicides can contribute to effective management programs.

Fenamidone is one of a number of fungicides shown to be effective in the management of Downy Mildew (Matheron 2017a). Fenamidone (Reason SC) is applied in rotation with other

effective chemistries, either as a preventative, or as soon as early symptoms of downy mildew are apparent. One PCA estimated that up to 25% of brassica crop acres are typically treated. Use of fenamidone is more prominent in brassica grown for seed, although brassica seed crops represent a small percentage of acres for these crops in Arizona. Fenamidone is also cost-effective, being cheaper than many alternatives.

Typically, a single foliar application of fenamidone at the full label rate is used. A second application is rarely needed in broccoli, though two applications is more common in lettuce (in rotation with other fungicides). Application timing can vary throughout the season. This makes it difficult to predict when field activities may need to occur in relation to sprays. Hand-labor activities in broccoli include thinning, weeding, cultivating, harvesting and irrigating. Irrigation is less of an issue in terms of potential worker exposure to pesticide residues, because in most instances, irrigation can be set from ditch banks at the edges of the field. The brassicas tend to be less labor-intensive than lettuces, but still require hand labor activities at various times during the season.

Comments on EPA's Proposed Interim Decision

Proposed Increased REI for Brassica Vegetables & Chinese Cabbage

After review of EPA's proposed interim decision, our primary concern in terms of impacts on growers is with the proposed increase in Restricted-Entry Intervals (REIs) from 12 hours to 4 days in brassica head and stem vegetables and Chinese cabbage (Bok choy and Napa). Based on feedback from several of pest control advisors (PCAs), there is a consensus that 4-day REIs would be unworkable for our vegetable growers. The vegetable industry in Arizona relies heavily on hand labor, including hoeing, weeding, field sanitation, irrigation, cultivation and harvesting at various times during the field season. Treatment with fenamidone to control downy mildew can occur after the first indication of symptoms, or in rotation with other fungicides in disease prevention programs (recommended). In either case, applications of fenamidone may be needed at various times during the growing season, making it difficult to predict application timing in relation to the timing of other field activities. For this reason, materials with longer REIs are avoided by vegetable producers. With a 4-day REI, "we would never be able to use it [in these crops]," one PCA stated.

According to the PID, "the agency assumes that the efficacy of the available alternatives is equal to that of fenamidone." Field research at University of Arizona appears to support this statement (e.g., Matheron 2017). However, more than one experienced pest control advisor placed fenamidone among the most effective available materials for downy mildew management, regardless of cost. Because relatively few modes of action are reliably effective against downy mildew, it is important to maintain several viable options for rotation, to ensure effective resistance management of downy mildew (Matheron 2014).

Use of fenamidone in brassica crops and Chinese cabbages is much lower than in lettuces and spinach. Because downy mildew primarily affects the leaves, crops grown for stem and head, such as cauliflower and broccoli, less frequently require treatment. One PCA estimated he

typically uses fenamidone on 25% of his brassica acres, a single full rate application. Pesticide use data (Fournier et al. 2017) for these crops suggests that statewide use levels may be even lower than 25%. However, because not all applications require reporting to the state, it is difficult to provide a more precise estimate.

We hope the EPA will take these factors into consideration in their risk estimates and in the final interim decision for fenamidone.

Thank you for the opportunity to comment.

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Who We Are

Dr. Alfred Fournier is Associate Director of the APMC / Associate Specialist in Entomology, and has expertise in evaluating adoption and impact of integrated pest management and associated technologies. He serves as a Southwest Region IPM Network Coordinator for the Western IPM Center, representing stakeholders in the desert Southwest states. Dr. Bindu Poudel is Extension Plant Pathologist and Plant Disease Diagnostician with University of Arizona, based at Yuma Agricultural Center. She works with vegetable producers and conducts annual fungicide efficacy trials on vegetable crops. She also manages the Yuma Plant Health Clinic, focused on disease diagnostics. Dr. Peter Ellsworth is Director of the APMC, State IPM and Pesticide Coordinator for Arizona and Professor of Entomology / Extension IPM Specialist with expertise in developing IPM systems in cotton and other crops and measuring implementation and impact of IPM and pest management practices. Mr. Wayne Dixon holds a B.S. in Computer Information Systems and develops tools and data used in IPM research, education and evaluation, including management of the APMC Pesticide Use Database.

These comments are the independent assessment of the authors and the Arizona Pest Management Center as part of our role to contribute federal comments on issues of pest management importance and do not imply endorsement by the University of Arizona or USDA of any products, services, or organizations mentioned, shown, or indirectly implied in this document.

Our Data and Expert Information

Through cooperative agreements with Arizona Department of Agriculture, the Arizona Pest Management Center obtains use of, improves upon, and conducts studies with ADA's Form L-1080 data. Growers, pest control advisors and applicators complete and submit these forms to the

state when required by statute as a record of pesticide use. These data contain information on 100% of custom-applied (i.e., for hire) pesticides in the state of Arizona. Grower self-applied pesticide applications may be under-represented in these data. In addition, the Arizona Pest Management Center is host to scientists in the discipline of IPM including experts in the usage of this compound in our agricultural systems. We actively solicit input from stakeholders in Arizona including those in the regulated user community, particularly to better understand use patterns, use benefits, and availability and efficacy of alternatives. The comments within are based on the extensive data contained in the Arizona Pest Management Center Pesticide Use Database, collected summary input from stakeholders and the expertise of APMC member faculty.

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