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Mefenoxam, Cymoxanil and Dimethomorph Use in Arizona, New Mexico and Southeastern California

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Comments submitted by the Arizona Pest Management Center, University of Arizona

EPA Docket ID#s:
Mefenoxam: EPA-HQ-OPP-2009-0863-0022
Cymoxanil: EPA-HQ-OPP-2012-0148-0013
Dimethomorph: EPA-HQ-OPP-2013-0045-0016

Summary

- Three active ingredients that currently have draft risk assessments at EPA, mefenoxam, cymoxanil and dimethomorph, are important in the management of several diseases in crops of the desert southwest.
- All three AIs are used and are highly effective for the management of downy mildew in winter lettuce production in southeastern Arizona and the adjacent Colorado River production region of California.
- Mefenoxam and dimethomorph are important in onion and onion seed production in Arizona, where they are used for management of downy mildew as well as purple blotch.
- Mefenoxam is used for Pythium control in Arizona cantaloupes and watermelons, and is one of the only efficacious products available to growers for Pythium.
- Mefenoxam is a critically important fungicide for management of powdery mildew, bacterial leaf spot and Phytophthora in New Mexico Chile pepper production.
- In all these cropping systems, these active ingredients are either mixed and/or rotated with chemistries that have different modes of action to help reduce risks of developing resistant populations of these pathogens.

Who We Are

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.

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. Dr. Al Fournier is Associate Director of the APMC / Adjunct Associate Specialist in Entomology, holds a Ph.D. in Entomology, and has expertise in evaluating adoption and impact of integrated pest management and associated technologies. He serves as a Comment Coordinator for the Western IPM Center, representing stakeholders in the desert Southwest states. Dr. Mike Matheron is the University of Arizona Extension Plant Pathologist with many years of experience working on disease management for vegetable crops in the Yuma County production region of Arizona, particularly leafy greens. 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 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 these compounds 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.

Use in Arizona & Southeastern California

University of Arizona Extension Plant Pathologist, Dr. Michael Matheron, works extensively in the vegetable production systems of Yuma County, Arizona and regularly conducts research trials on fungicides in these cropping systems. According to Matheron, **Mefenoxam** is an important active ingredient used to help manage several important diseases in lettuces, spinach, cole crops, onions (including onion seed) and melons in Arizona. It is effectively used in the control of Pythium, Phytophthora and downy mildew. Pythium is active on a broad range of plants, as are the pathogens that cause downy mildew. Both of these are important diseases that impact produce production and profitability in Arizona. Phytophthora is not a concern for the produce industry, but it can be an important disease affecting citrus and Chile pepper production in Arizona and New Mexico. **Dimethomorph** is an important active ingredient that is primarily used for control of downy mildew in lettuces, spinach and onions. This is the most used fungicide active ingredient in Arizona produce. It has a short REI and PHI and it is highly

efficacious. It is mainly used as a stand-alone product (Forum), but is also available in a premix with ametoctradin (Zampro), which is also used. **Cymoxanil** is used primarily to control downy mildew in produce and onions. It was originally a stand-alone (Curzate) product. Tanos is a pre-mix with famoxadone.

Produce

Arizona growers are one of the leading producers of fresh-market vegetables in the U.S., producing vegetables and melons at an estimated total economic contribution of over $2.5 billion in 2015 (Kerna et al. 2016). This includes over 90% of all fresh lettuce consumed in the U.S. in the winter, valued at over $920 million in the 2015–2016 season (USDA-NASS 2017a). The large majority of production is in Yuma County, Arizona and the adjacent regions of California. Downy mildew has become a major problem in recent years for the produce industry in lettuce and in spinach. Produce crops are now impacted by the disease every year. One Yuma area licensed pest control advisor (PCA) indicated that 4 out of the past 5 years have been "very bad years" for downy mildew in produce, and he estimates crop losses up to 30% have occurred in some cases, even where fungicides were used. Because of a zero-tolerance policy of growers and shippers against any aesthetic defects on harvested fresh lettuce, produce visibly damaged by downy mildew is left behind in the field at harvest time. In lettuce and spinach, all three active ingredients (dimethomorph, mefanoxam and cymoxanil), as well as other fungicides, are used to manage downy mildew from November into early spring. Products are typically applied preventatively in affected fields once conditions are favorable for development of the disease. From this point, applications are made on a seven-day schedule and products with different modes of action are applied as mixtures or rotated for resistance management. Products are generally used at the full label rate.

Based on information from the Arizona Pest Management Center Pesticide Use Database, dimethomorph is the most the used of these three AIs, with over 12,000ac and 10,000ac of head and leaf lettuce treated in 2016, respectively. By comparison, in 2016, cymoxanil was used on 8,600ac and 8,200ac of head and leaf lettuce respectively; and mefenoxam on 4,600ac and 3,100ac, respectively. One produce PCA said, while it is more expensive, mefenoxam is "the best preventative we have" for downy mildew in produce. Two Arizona PCAs we spoke with emphasized the need for having multiple modes of action available to combat downy mildew, and to ensure proper rotations (or mixtures) to help prevent development of resistance in the pathogen. "Every active ingredient we have for disease management in lettuce is important, because the frequency of application demands that we rotate different modes of action" to avoid resistance development. To date, all three active ingredients reportedly remain efficacious or highly efficacious against downy mildew in Arizona and southeastern CA.

Onions

Arizona produces dry onions and very high-quality onion seed for export. Downy mildew has become a major problem in recent years in onions produced for consumption and for seed. Production is impacted every year with significant yield losses possible. In addition, purple blotch is an important disease in Arizona onions that is often associated with downy mildew. Downy mildew is treated with applications of fungicides on a seven-day schedule at the first sign

of the disease. Mefenoxam and dimethomorph are both used in rotation with other fungicide active ingredients as needed to manage downy mildew as well as purple blotch. Cymoxanil is used to a lesser extent. According to a Yuma-area PCA who works with onion growers, the past few years they have seen an increase in downy mildew and purple blotch, with the 2016-2017 season "the worst year for purple blotch yet." As in produce, access to multiple active ingredients across modes of action is important to avoid resistance issues.

Melons

Arizona produces fresh market cantaloupe and watermelons. In 2016, over 20,000 combined acres harvested were valued at over $98mil (USDA-NASS 2017a). Mefenoxam is used primarily for Pythium control in both cantaloupes and watermelons. It is mainly a problem in the spring crop, less so in the fall. A PCA who works extensively with melon growers in central Arizona indicated that Ridomil (mefenoxam) is one of the only products that works well for Pythium control. It is applied as a preventative when conditions favor development of the disease and in fields that have a history of infestation. In watermelons, the same products are also used to manage Rhizoctonia.

Mefenoxam use in Arizona & New Mexico

Mefenoxam use in Chile Peppers

In 2016, Arizona produced 1,600ac of Chile peppers valued at over $4.4mil and New Mexico produced 8,700ac valued at over $50.5mil (USDA-NASS 2017b). According to a pest management advisor who works with the NM Chile industry, mefenoxam is a critically important fungicide for management of powdery mildew, bacterial leaf spot and Phytophthora. Most use occurs late in the Chile pepper season. Phytophthora is the most significant disease issue in NM Chile peppers and can attack the roots or the fruit. Phytophthora flourishes under high heat and wet conditions, especially during the monsoon season. In hot rainy conditions, the fruit becomes susceptible to attack. The pathogen, *Phytophthora capsici,* is splashed by rain events from the soil to the fruit and infection occurs when the fungus directly penetrates the skin, leading to lesions and unmarketable fruits (Goldberg 2001). Mefenoxam is a key component of their Phytophthora control program. Mefenoxam is generally used for preventative control under favorable disease conditions or, at times, as a rescue treatment for Phytophthora. After a hail event, mefenoxam and/or other fungicides are applied preventatively. It has good efficacy and is used in rotation with other fungicides for resistance management. Apart from Chile peppers, jalapenos also are susceptible to Phytophthora and the treatment regime is the same. Because peppers are a small acre specialty crop, there are relatively limited effective options available to them for labelled fungicides. Mefenoxam is among the most important of these.

References

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