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Cycloate Use and Benefits in Arizona & Southeastern California Agriculture

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The EPA is seeking public comments in response to published human health and ecological risk assessments for the herbicide cycloate. EPA has identified risks of concern from chronic dietary exposures, and from occupational handler short- and intermediate-term dermal and inhalation exposures (baseline attire with PPE, and environmental controls). The Human Health Draft Risk Assessment for Registration Review includes specific label recommendations from the Health Effects Division of EPA (HED) which would significantly extend pre-harvest intervals (PHI) for garden beets, sugar beets and spinach (US EPA 2020).

Our goal at this time is to inform the EPA about specific use patterns of cycloate on crops in Arizona and the southeastern desert regions of California, and to provide stakeholder feedback on how HED's recommended changes could negatively impact these industries. We hope that a more refined understanding of our use patterns might impact risk modeling, leading to shorter PHIs that would still reduce risks of concern for workers. We inquired of stakeholders regarding percent of crop treated, product use rates and alternative herbicide options, which are severely limited for the affected crops.

Summary

- The Arizona Pest Management is Center is responding on behalf of agricultural stakeholders in Arizona and Southeastern California to EPA's call for comments on draft risk assessments for the herbicide cycloate.
- Cycloate is one of only two effective herbicides critical for weed control in spinach and beets produced in our region.
- Spinach has a very short growing season in the Desert Southwest, generally from 25 to 50 days from planting to harvest, depending on the type of spinach and temperatures during the growing season.
- Beets are generally harvested appro 60 days after planting, depending weather.
- Pre-Harvest Intervals (PHIs) recommended by EPA Health Effects Division in the Draft Human Health Risk Assessment of 60 days for spinach and garden beets and 120 days for

sugar beets would not be workable for our growers. This is a challenging situation, because so few herbicides are available in these crops.

- The median product use rate for Ro-Neet (cycloate) in both spinach and beets is 32 fl. oz/acre, under half of the maximum label rate.
- An estimated 20-30% of Arizona conventional spinach acres are treated with cycloate.
- An estimated 100% of Arizona conventional beets are treated with cycloate.

Cycloate Use in Arizona and Southeastern California Crops

According to the Arizona Pest Management Center Pesticide Use Database (Fournier 2017), cycloate has significant annual reported uses in spinach and beets, two valuable specialty crops in our region.

Spinach

In 2018 (most recent statistics available), Arizona growers produced 11,000 acres of spinach value at $83.8 million (USDA-NASS 2019). In 2019, the state of California produced over 50,000 acres of spinach valued at over $388 million (USDA-NASS 2020).

According to a licensed pest control advisor (PCA) responsible for a large number of spinach acres in Arizona and California, cycloate (Ro-Neet) is used mainly in production of baby spinach in Arizona. Baby spinach is harvested young. Depending on the time of year, temperature and growth rate, days from planting to harvest span from 25 to about 50 days. For some spinach types, under the coldest conditions, harvest can occur as late as 65 days after planting, but this is not the norm for the majority of southwest desert production. Barry Tickes and two PCAs knowledgeable about spinach production practices and herbicide use in Arizona and California indicated that **a 60-day PHI would be unworkable for desert spinach production, given our extremely short growing season here**.

Currently, only two herbicides are available for use on spinach in Arizona. In addition to Ro-Neet (cycloate), Dual Magnum (S-Metolachlor) is registered for use on spinach under a Special Local Needs (SLN, 24-c) label, and has a 40-day PHI. Both herbicides are effective, and PCAs indicate that both herbicides are needed by growers. They are used in rotation when spinach is planted back to back, for resistance management.

Cycloate is applied once per season, pre-plant or at-planting. According to the Arizona Pest Management Center Pesticide Use Database, (32 fl. oz/acre the median rate. 73% of all reported applications are at or below the rate of 40 fl. oz/acre (Fournier 2017). The 40 fl. oz/acre rate is less than half the maximum label rate for spinach. Lower rates of cycloate are used by our growers to avoid plant damage. At low rates, this herbicide offers decent but not outstanding weed control, while minimizing the potential for crop damage. The crop is harvested between 25 and 50 days after planting. Currently, there is no PHI requirement for Ro-Neet in spinach.

Not all Arizona acres of spinach are treated with cycloate. One pest control advisor estimated that about 20% of Arizona conventional spinach acres are typically treated with cycloate each season. The balance of acres is treated with S-Metolachlor.

Another PCA who scouts spinach in Arizona and California only uses cycloate on spinach in California, not in Arizona. In his experience, S-Metolachlor (Dual Magnum) is the more effective herbicide of the two, and has lower potential for crop damage. Arizona's Special Local Needs (SLN, 24-c) label for Dual Magnum, with a 40-day PHI, makes it workable for him in spinach. The California label for Dual Magnum requires a 50-day PHI, which is too long.

Conventional spinach crops in Arizona and California are generally all machine-harvested, which minimizes the time workers spend in the field. Crews are need to pre-scout fields prior to machine harvesting. They may flag off or cut out areas with where plants are infested with mildew, and also scout for food safety issues. Compared with hand-harvesting, contact between workers and treated plants time in the field is much less.

Beets

In 2019, the state of California produced over 50,000 acres of spinach valued at over $388 million and 24,500 acres of sugar beets, valued unspecified (USDA-NASS 2020). Beet acreage in Arizona is small and not well documented, primarily centered in Yuma County, with perhaps 120 acres in Maricopa County. Current USDA statistics on crop value are unavailable. Both sugar beets and garden beets are grown in both states.

Cycloate is applied pre-plant or at-planting for weed control in beets. According to one PCA, 100% of conventional beet acres are treated with cycloate. Arizona Pest Management Center Pesticide Use Database (Fournier 2017) indicates a median use rate for Ro-Neet of 32 fl. oz/acre. 88% of all reported applications are at or below the rate of 40 fl. oz/acre. Even the 40 fl. oz/acre rate is less than half the maximum label rate for beets. Beets are generally harvested roughly 60 days after planting, depending weather.

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. Al Fournier is Associate Director of the APMC / 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 an Integrated Pest Management Network Coordinator through the Western IPM Center Signature Program, representing stakeholders in the desert Southwest states in EPA registration reviews. 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

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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 Form1080 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 and other compounds in our agricultural systems. We actively solicit input from stakeholders in Arizona and other Southwest states (Nevada, Colorado, New Mexico and Southeastern California), 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.

References

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