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EPA Amended Proposed Interim Decision for Pronamide (Propyzamide): Comments on Arizona & Southeastern California Lettuce Use Practices And Response to Proposed Changes

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Re: Pronamide, Comments on EPA Proposed Interim Decision
Docket ID: EPA-HQ-OPP-2009-0326

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 herbicide pronamide (propyzamide), EPA Docket number EPA-HQ-OPP-2009-0326, on behalf of Arizona agricultural stakeholders. Our comments combine stakeholder input received from University of Arizona Extension professionals and researchers, licensed pest management professionals and growers from Arizona, and reported pesticide use data from the Arizona Pest Management Center Pesticide Use Database.

We also support comments submitted by Arizona Farm Bureau Federation. The data analysis we present herein has been shared with USDA's Office of Pest Management Policy, the Western IPM Center, the Arizona Farm Bureau, and the Arizona Crop Protection Association.

Pronamide Use and Importance for Weed Management in Lettuce Production in Arizona and Adjacent Region of Southeastern California.

Arizona supplies over 90% of winter lettuce to the United States (Anonymous 2014). In 2020, Arizona growers produced 67,000 combined acres of head lettuce, leaf lettuce and romaine valued at over $725 million (USDA-NASS 2021). Southwest production of "winter lettuce" is primarily based in the Yuma Valley of Arizona and in adjacent areas of California along the Colorado River, and occurs mainly between September and May. Most lettuce production shifts to the Salinas Valley of California in the warmer months.

Pronamide is an essential component of production practices that make it possible to grow lettuce profitably in the desert southwest. Field research originally conducted by Barry Tickes, University of Arizona County Agent, helped growers determine that pronamide provides the broadest range of weed species control in lettuce with fewer negative effects than alternative herbicides. Kerb (pronamide) controls all major weeds except for sowthistle and prickly lettuce, with good safety when used properly. Balan (benfluralin) only reliably controls grasses, and often causes crop injury. Prefar (bensulide) controls grasses, pigweed and purslane, but misses most other weeds.

The nuances of preemergent weed control in lettuce are explained in an Extension publication by Tickes (2013). This highlights the reason that different rates or pronamide are used based on the application method. The recommended rates for chemigation of pronamide are 0.50 – 1.0 lbs ai/acre (table 1).

> "It is important that all of the three preemergent herbicides used in lettuce be at the right place at the right time to be effective. The right place is around the germinating weed seeds and the right time is when they are germinating. Unlike Prefar (bensulide) or Balan (Benefin), Kerb (pronamide) moves readily with high amounts of irrigation water. Prefar and Balan adhere more strongly to the soil. When lettuce is germinated with furrow irrigation and Kerb is applied after planting and before the first irrigation, the water moves laterally and upward (subbed) and dissolves but does not move the herbicide downward. Higher rates are required for effective weed control because much of the herbicide stays on the surface. When the herbicide is applied after planting, before the first irrigation and sprinkler irrigation is used, the kerb is moved with the overhead water further into the soil. Less herbicide is needed and rates drop by about one third. Depending upon the weed species and time of the season, some of the herbicide may have moved deeply into the soil and be below the germinating weed seeds. This is why delayed applications by chemigation are often used with Kerb. Chemigation is the most efficient means of concentrating Kerb where and when you need it. The rates are therefore, half of the recommended rates for furrow irrigated lettuce. Unfortunately, the most effective techniques used to concentrate kerb around the weed seeds also concentrates it around the lettuce seed. For that reason we don't want to use any higher rates than are necessary for good weed control."

Table 1. Recommended use rates for pronamide application based on irrigation techniques in Arizona lettuce. (Tickes 2013).

Irrigation Technique	Rate (Pt. of product/A)	Rate (active ingredient/A)
Furrow	3.5 to 5	1.4 to 2
Sprinkler	2.5 to 3.5	1.0 to 1.4
Chemigation	1.25 to 2.5	0.5 to 1.0

Until about 15 years ago, pronamide was mostly applied using furrow irrigation after planting and before lettuce was germinated. Overhead sprinkler irrigation has steadily replaced furrow irrigation to germinate lettuce in order to improve water conservation and application efficiency, and to keep soils cool to promote good germination of lettuce. As irrigation practices shifted, pronamide efficacy decreased. Research identified the reason was that pronamide leaches below the weed seeds with overhead sprinkler irrigation, before the seeds have germinated. To overcome this, Pronamide applications are now delayed until just before the weed seeds germinate. This is between 1 and 7 days from the start of irrigation, depending on the time of year. The careful timing and use of chemigation have greatly improved pronamide efficacy.

It is not possible to apply pronamide with ground driven equipment after the sprinklers have started, because the fields are wet. Aerial applications are not uniform enough to provide consistent control, but are used to a small extent. Chemigation works well and has been nearly universally adopted by our growers as the standard practice. Based on recent input from growers and professional pest control advisors (PCAs) who make pest management decisions on these farms, pronamide is used on about 90% of lettuce grown in the Yuma region (including adjacent areas of California), and about 90% of those applications are chemigated. This is consistent with Arizona pesticide use reporting data, which indicates that 92% of reported applications are chemigated.

PCAs interviewed commented on how critical pronamide chemigation is to local lettuce production. Among pre-emergent herbicides, pronamide is efficacious against the broadest range of common weeds, particularly troublesome winter weeds. Ground applications simply won't work, because the timing of effective applications immediate follows irrigation. Aerial applications provide inferior coverage and control, and there are concerns with drift. Labor for hand-weeding is extremely costly, due to labor limitations. One PCA stated, "It would be a weedy mess without pronamide." Another PCA commented that in the earliest fall plantings (September) some growers use Prefar (bensulide) in place of Kerb (pronamide). However, a few weeks into the season, they need to switch to Kerb because Prefar is not effective against the late fall / winter weeds that dominate during the bulk of the lettuce season.

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), an average of over 41,000 acres of lettuce (head lettuce, leaf lettuce, romaine) were treated with pronamide annually between 2016 and 2020. Reported acres treated in 2021 represents about 59% of acres harvested that year (USDA-NASS 2021). These numbers greatly underestimate actual use, because Arizona reporting requirements are mainly focused on commercial (custom)

applications, and a sizable portion of grower self-applied herbicides go unreported to the state. Based on input from growers and PCAs, we estimate that about one third of lettuce growers hire a custom applicator company (distributor) to manage their pronamide chemigations. These applications require reporting in Arizona, and are expected to be included in the data analyses that follow. Approximately 39% of chemigations included in our analyses did not include a custom applicator license number and are presumed to be private grower applications. These likely represent only a portion of all grower chemigations of pronamide.

Application rates

We examined Arizona Pesticide Use Reporting data to determine rates used for pronamide chemigations in lettuce. We ran a distribution analysis of lbs. a.i./A for all reported pronamide applications in 2019 and 2020 (pooled). Application reports consisted of two formulations of pronamide: 4,175 applications (96.7%) of the 3.3. SC formulation, and 343 applications (3.3%) of the 50 WSP formulation. Mean application rate across all formulations was 0.617 lbs. a.i./A, with a standard deviation of 0.141. The median application was 0.619 lbs. a.i./A. maximum application rate was 1.031. See figure 1.

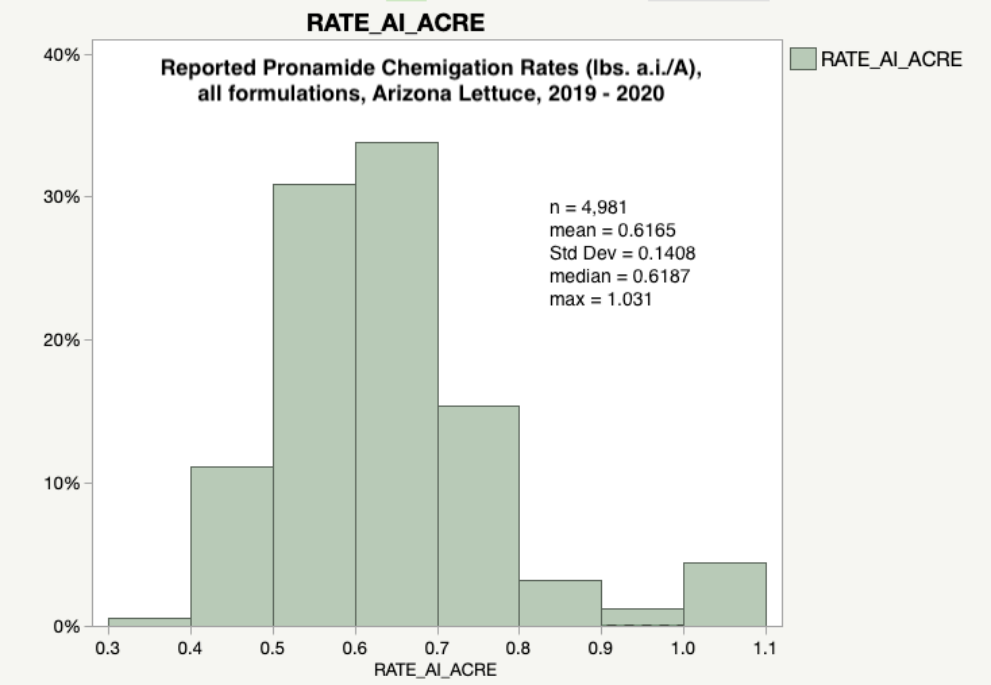

Figure 1. Reported use rates for pronamide chemigations on Arizona lettuce, 2019-2020 expressed as lbs. a.i./acre.

Comments on EPA's Amended Proposed Interim Decision

The assumptions underlying EPA's human health and occupational risk assessments are inconsistent with lettuce production practices and chemigation practices in Arizona and adjacent production regions of Southeastern California.

Use Rates

EPA's analysis is based on a 2 lb ai/acre (5 pints product/acre) application rate for chemigations in lettuce. The maximum label rate for lettuce chemigation in Arizona and California, according to the Kerb SC label, is 1 lb ai/acre (2.5 pints product/acre). As our rate analysis shows, even lower rates are typically used in Arizona lettuce production, averaging about 0.62 lb ai/acre over the past two years (Figure 1). We request that EPA refine human health and occupational risk assessments using exposure scenarios more typical of lettuce production practices.

Acres treated per worker per day

EPA's analysis assumes that a single worker is handling enough pronamide in one day to treat 350 acres of lettuce. According to information provided by Corteva, this acreage amount is based on 3 crop circles of 100-120 acres each. Lettuce is not grown in crop circles, and the average field size in Arizona is about 20 acres, with a range from 5 to 40 acres per field. (In Imperial Valley of California, fields average closer to 30 acres.) More to the point, as explained in the discussion to follow, we estimate that a single worker might irrigate 40 to 80 acres in a single day, although our analysis shows an average of acres treated by either commercial applicators or private growers to be in the range of 31 acres/day (Table 2).

There is no peak planting time for lettuce in the Yuma Valley. It is planted continuously starting in early September, in order to support continuous harvests starting in December and continuing until early May. The need for a steady supply of produce, combined with labor limitations to support hand-harvesting, limited cold-storage facilities and shipping capacity, result in a situation where only a limited proportion of lettuce in the field at any time is at the germination / early growth stage when pronamide is applied.

In Arizona, many lettuce growers have large operations and employ their own personnel to apply many of the pesticides that go on by ground or through chemigation. Many of these types of applications do not require reporting to the state, and so grower-applied pesticides are often under-represented in our database. After conversations with growers and licensed Pest Control Advisors (PCAs), who make pest management decisions on these farms, Tickes estimates that about one third of lettuce growers hire a custom applicator company (distributor) to manage their pronamide chemigations. These applications require reporting in Arizona, and are expected to be included in our data. Approximately 39% of chemigations included in our analyses did not include a custom applicator license number and are presumed to be private grower applications. These likely represent only a portion of all grower chemigations of pronamide, since these uses do not require reporting to the state.

Some larger growers lease land in multiple locations throughout Yuma Valley and work with more than one PCA to make pesticide recommendations, and perhaps more than one custom applicator company to provide chemigation services. A typical custom applicator company may have two or more individuals responsible for setting up and deploying chemigations for hire.

It is important to understand that the application practices themselves limit the potential for exposure of a single mixer/loader to no more than about 80 acres of applications per day, though much less is typical. Lettuce is grown in small fields and continually planted to support continual harvesting. Pronamide chemigations occur early after planting. If a custom applicator is used, it takes about 90 minutes for them to set up the pronamide chemigation rig in the field. Typically,

10 to 20 acres are chemigated at a time, but according to PCAs, up to 40 acres may treated in a single chemigation event. Tickes' field research has indicated that 90 minutes is the ideal timeframe over which pronamide should be applied for optimal results. Whether or not these recommendations are followed precisely, it takes 1 to 2 hours to apply the chemical once the chemigation process begins. Then it takes roughly one hour for the worker to pack up the chemigation rig. The entire process, we estimate, takes about 3.5-4 hours. A single mixer/loader employed by a custom applicator company might service up to two 40-acre fields in an 8-hour work day.

Acres per day analysis

We examined Arizona Pesticide Use Reporting data to determine acres treated by day by grower. We focused on current practices, pooling and examining data from 2019 and 2020. Data consisted of all reported pronamide chemigation uses for those two years.

For the "acres per day" analysis, we summarized acres treated by each unique combination of application date / grower / PCA / custom applicator. This grouping gets us close to level of acres treated by an individual in a day, but it is not perfect. It does not account for custom applicator companies with multiple employees handing chemigations for the same grower, for example, but we believe it works well for typical grower operations. Also, we should note that the pesticide use reporting forms (form L-1080) can span more than a single day's worth of applications. In our analysis, 52 out of 5,014 "acres treated" results were for applications spanning over more than a single day. These multiday applications contributed to outliers.

An average of 30.84 acres were treated per day, with a standard deviation of 24.9. The median was 24.4 acres per day. The minimum and maximum, excluding outliers, were 0.9A/day and 77A/day, respectively. Outliers, ranging from 77.3A/day to 197A/day, represent less than 5% of the data, and result because the structure of the available data preclude a direct analysis of mixer/loader daily behaviors. Based on our earlier description of custom applicator chemigation practices, it is unlikely that a single worker is chemigating more than about 80 acres of lettuce with pronamide in a single day.

Approximately 39% of applications included in our analyses did not include a custom applicator license number, and are presumed to be private grower applications. A separate examination of records with and without custom applicator license numbers was conducted to determine whether differences between number of acres treated directly by private growers was different from that of growers employing custom applicators (Table 2). Although differences between private growers and custom applicators are minor in this analysis, it is important to note that the majority of private grower applications go unreported, so it is difficult to say with confidence whether this trend would hold up in a more complete dataset.

Table 2. A comparison of custom applicator and private growers pronamide chemigations estimating acres treated per day by a single worker.

Pronamide Chemigations	Custom Applicators	Private Growers
Percent of records	61%	39%
Mean acres treated	30.95	31.58
Median acres treated	23.2	25.4

Engineering Controls for Chemigation

In the Amended Proposed Interim Decision, EPA proposes a requirement for engineering controls (i.e., closed loading systems) for mixing and loading for both aerial and chemigation applications (all crops). While only a very small percentage of pronamide applications are made by air, our applicator companies are generally well-equipped and this would not be a concern for aerial applicators. However, closed systems for chemigation are not broadly used in the Arizona lettuce industry. Based on research conducted by Arizona Farm Bureau, the cost for these systems ranges from $750 to $2,000 per unit. Because many of lettuce growers have large operations spread out in different areas, some growers would need to purchase more than one system. Based on Arizona Farm Bureau research, several types of closed systems are available. Additional clarification will be needed from EPA to explain the specific requirements of closed loading systems for chemigation, to ensure that exposure concerns addressed, if such systems are still determined to be a requirement following any refinement to occupational health risk assessments EPA may make based on accurate use rates and acres treated per day information provided to them during this comment period.

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

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. Mr. Barry Tickes is University of Arizona Area Agriculture Agent for Yuma and LaPaz Counties. He works with vegetable producers to research and extend weed management practices appropriate to Southwest desert production systems. 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.

References

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