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Dicamba Use and Benefits in Arizona and the Southwest

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The EPA is seeking public comments in response to published draft ecological risk assessments and a second revision of the human health risk assessment for the herbicide dicamba. Dicamba is currently registered for use on a wide variety of agricultural crops (e.g., soybean, cotton, corn, grains, and sorghum) as well as non-agricultural uses (e.g., residential premises, rangeland, fallow fields, and turf). Our goal at this time is to inform the EPA about specific use patterns of dicamba in Arizona and throughout the Southwest, including agricultural uses, recreational and commercial turf uses, and important niche uses, including for management of noxious and invasive weeds in parks and natural areas.

Dicamba Use on Arizona Crops

According to the Arizona Pest Management Center Pesticide Use Database (Fournier 2017), dicamba is used primarily in cotton, corn, sorghum, wheat and other grain crops, Bermudagrass and Sudangrass, turfgrass, and on fallow land. One of the most significant uses is on cotton.

Cotton

In 2021, Arizona produced 129,000 acres of upland cotton with a value exceeding $142 million for cotton and cotton seed production combined (USDA- NASS 2022). Upland cotton in Arizona produces per acre yields larger than that of any other state or region of the world, while contributing over $700M annually to our state's economy (Ellsworth et al. 2016). Since the introduction of key technologies and Integrated Pest Management programs to support their use in 1996, we estimate that cotton growers in our state have cumulatively saved over $600 million (Ellsworth & Fournier 2022).

According to data from the Cotton Pest Losses and Impact Assessment surveys, between 2018 and 2021, an average of 74.1% of cotton acres reported by respondents were planted with varieties that included the dicamba-tolerant trait. As such, this is one of the most popular genetic technologies for weed control in Arizona. According to feedback from licensed Pest Control Advisors (PCAs), dicamba provides effective control of a wide range of broad-spectrum weeds, including glyphosate-resistant Palmer amaranth (pigweed), and other difficult to control weeds, such as careless weed and purslane. Dicamba reportedly has good residual activity, which can

reduce the need for follow-up sprays compared to other herbicides. Aerial applications are not permitted in cotton, so all applications are made by ground.

One grower in central Arizona who sprays dicamba over-the-top in tolerant cotton varieties noted a reduction in effectiveness this year, with more weed escapes (careless weed) that needed to be removed with costly manual labor. He will adjust his sprays to go on earlier next season. Agricultural contacts in other parts of the state did not express similar concerns with dicamba's effectiveness.

Wheat, Oats, Sorghum, Corn, Sudangrass and Bermudagrass

Dicamba (typically Clarity) is applied early in the weed life cycle, when it is most effective, in fields with a history of problematic weeds. In addition to standard weed control, dicamba also effectively controls volunteer crop plants following a rotation. For example, it is used to manage volunteer alfalfa plants when followed with wheat or sorghum. In grain or silage corn, dicamba is used (mixed with another herbicide) as a layby application late in the growing season. There are few other products growers can use at this stage in corn. PCAs noted that dicamba provides the most effective control of purslane and pigweed in Sudangrass and Bermudagrass, compared to other options. It is also cost-effective.

One PCA indicated he uses the 4 fl. oz rate of Clarity on wheat, applied by air. However, PCAs in other areas indicate that, despite an aerial label, most applications are made by ground in many of these crops. A review of the pesticide use data bears this out, especially for some crops like Sudangrass and Bermudagrass, where aerial uses represent a very small percentage of applications. Across most crop uses, low to moderate use rates prevail, with few applications near the top of the label rate.

Off-Crop Uses

Dicamba is commonly applied (e.g., Clarity or Detonate) to fallow fields, and around ditch banks and field edges to control weeds prior to seeding and to prevent their spread into adjacent cropland. Pest control advisors are well aware of drift concerns, and generally use spot sprays in areas where dicamba will not be prone to drift into a sensitive crop. Even without glyphosate resistance issues, one PCA commented he would prefer to use it because it is more effective and works faster than glyphosate.

Dicamba Use on Desert Turf

Based on the Arizona Pest Management Center Pesticide Use Database, there is reported use of dicamba on golf course turf (Fournier et al. 2017). Dicamba is usually applied in turf in a 3-way pre-mix product (for example, Trimec) with 2,4-D and mecoprop (MCPP) or other phenoxy herbicides related to the 2,4-D. SpeedZone Southern is a 4-way mix product that has gained popularity for the same purpose (2,4-D + MCPP mecoprop + Dicamba + Carfentrazone-ethyl). These types of products are registered for homeowner and professional uses. (Homeowner applications do not require reporting to the state Department of Agriculture and are absent from our database.)

According to recently retired Area Extension Agent in Turfgrass Science for University of Arizona, Kai Umeda, these types of premix herbicides provide flexible and effective control of broadleaf weeds. There are many combination products with different concentrations of dicamba and other active ingredients. This variety reduces the potential for any one chemistry to be overused, while providing flexibility in product selection for a specific situation. For example, certain challenging weeds might call for a higher concentration of dicamba and/or 2,4-D, whereas, in more sensitive areas, a lower percentage of dicamba would be preferred to minimize the potential for harm to native vegetation. Typically, weeds are not extensive in turf areas. Spot-treatments are generally used, minimizing the potential for significant drift. These materials are used to some extent throughout all areas of the golf course. In golf course roughs there may be heavier weed populations at times, due of lower maintenance. Such areas might receive a broadcast treatment if it is deemed necessary.

Dicamba Use in Natural Areas and Parks throughout the Southwest

Based on input from professionals with the National Parks Service and the nonprofit organization American Conservation Experience, dicamba is also an important tool for chemical control of noxious and invasive plants on rangelands, watersheds, and other natural areas throughout the Southwest. For example, according to Dan McLendon, Restoration Specialist with American Conservation Experience, dicamba is an excellent contact herbicide and provides good control of thistles, including Russian thistle, prior to flowering. It is often applied in combination with glyphosate, and sometimes 2,4-D. Spot treatments are used, and workers are cognizant to avoid potential damage to native vegetation.

Similarly, Curt Deuser, Supervisory Ecologist/Liaison with the Lake Mead Inter-Regional Invasive Plant Management Team, reports that dicamba is extensively used to control annual Forbes and Russian thistle on National Park lands in the Southwest. Russian thistle is a problematic weed throughout the American West. Because it accumulates toxic levels of nitrates that make it poisonous to grazing cattle, substantial efforts are made to reduce populations of this weed in rangeland areas. Russian thistle can also threaten native plant ecosystems. Russian thistle plants that accumulate along tree rows and fence lines can pose a serious fire hazard. It has been reported that prairie wildfires can spread rapidly when ignited balls of burning Russian thistle blow through grasslands. To prevent fire damage, often many hours of manual labor are required for physical removal of plants in areas where it is inadvisable to spray dicamba or other herbicides. Russian thistle can also be a major problem along the aqueducts where it can interfere with water delivery and pumping systems (Orloff et al. 2008).

According to a draft Navajo Nation Integrated Weed Management Plan recently circulated for public comment (BIA 2022), the Bureau of Indian Affairs Navajo Regional Office plans to significantly expand management of 45 noxious weed species on the Navajo Nation, including proposed chemical control methods on 30,000 acres. However, “the Bureau of Indian Affairs will not be considering the use of dicamba as an option for chemical treatment due to the June 8, 2020, Environmental Protection Agency (EPA) cancellation order for dicamba use” (BIA 2022, p. 200). According to Peter Lefebvre, Soil Scientist with the BIA Branch of Natural Resources, Navajo Regional Office, this prohibition is not expected to change.

Dicamba is also absent from the list of recommended herbicides in the Maricopa County Parks and Recreation Department Integrated Pest Management Plan (Armstrong et al. 2022). However, one person familiar with the plan indicated the possibility that this could change. There is some public pressure to eliminate the use of glyphosate in county parks. Should glyphosate use become prohibited, the management plan would need to be revised, and would most likely be re-written to accommodate the potential use of dicamba for control of broadleaf weeds. Similar issues may arise in other community parks and municipalities where the use of glyphosate is banned.

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. Dr. José Dias is Assistant Professor and Extension Weed Scientist in the School of Plant Sciences at University of Arizona, based at the Maricopa Agricultural Center. He works with producers throughout the state on weed management, resistance management, genetic technologies and other issues. Mr. Kai Umeda is a recently retired Area Extension Agent in Turfgrass Science for University of Arizona, previously stationed at Maricopa County Cooperative Extension. He works extensively in golf and recreational turf management, with particular expertise in weed management. 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 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, 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.

Through the Crop Pest Losses and Impact Assessment program, a Signature Program of the Western IPM Center, the Arizona Pest Management Center conducts annual surveys with state-licensed pest control advisors (PCAs), who are the primary pest management decision makers, in consultation with growers. The surveys, conducted at face-to-face and virtual meetings, provide detailed information on crop yield losses to specific insect pests, weeds and diseases, control costs, and pesticide use for the key crops, cotton and lettuce. Cotton data have been collected since 1991 and lettuce data since 2005. Data are collected for all of Arizona and neighboring production regions of southern California, with typical responses representing up to 65% of acres planted in Arizona. These data provide detailed information on shifting pest trends, chemical uses and costs, and often compliment and augment pesticide use information from the APMC Pesticide Use Database, particularly for pesticide uses for which the state does not mandate reporting (APMC 2020).

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