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Imidacloprid: Response to EPA Proposed Interim Decision for Arizona and the Desert Southwest

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

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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 insecticide imidacloprid, on behalf of stakeholders. In doing so, we wish to incorporate by reference three previously submitted EPA comments from 2016 and 2017, identified by docket ID numbers below. Herein, we summarize key points from these documents and add new information. The entirety of our comments combine stakeholder input received from University of Arizona Extension Specialists, surveys and telephone interviews with licensed pest management professionals from Arizona and New Mexico, and reported use data for imidacloprid from the Arizona Pest Management Center Pesticide Use Database.

Prior Comments, incorporated by reference:

- Imidacloprid Use in Arizona Citrus. University of Arizona, Arizona Pest Management Center. April 14 2016. Docket ID: **EPA-HQ-OPP-2008-0844-0891**.
- Neonicotinoid Insecticide Use and Pollinator Protection in Several Crops and Recreational Turf in Arizona and New Mexico. University of Arizona, Arizona Pest Management Center. Jul 24 2017. Docket ID: **EPA-HQ-OPP-2011-0920-0100**.
- Imidacloprid. University of Arizona, Arizona Pest Management Center. Nov 13 2017. EPA Docket ID: **EPA-HQ-OPP-2008-0844-1255**.

Imidacloprid Use in Southwest Agriculture and Recreational Turf

Imidacloprid insecticides are reportedly used on over 50 different crops and in recreational turf in Arizona and throughout the southwestern states. The most significant crop uses of imidacloprid in Arizona, according the Arizona Pest Management Center (APMC) pesticide use database, include lettuces, cole crops, melons, cotton, spinach, celery, potatoes, pecans and citrus. Over the past 8 years, imidacloprid applications have accounted for about 40% of all reported neonicotinoid use in Arizona agriculture (Fournier et al. 2017). The largest portion of imidacloprid use is on lettuces, melons and cole crops. Imidacloprid also has significant uses in recreational turf (golf courses) and residential turf. Like other neonicotinoids, imidacloprid products provide very effective alternatives to broad-spectrum insecticides and help to preserve natural enemies for biological control of insect pests in many crops, making them a valuable component of IPM programs. While much of the information we provide is derived from Arizona stakeholders and pesticide use data, many described use patterns are broadly representative of imidacloprid use and importance throughout the desert Southwest.

Lettuce / Brassica / Cole Crops

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 $891 million in 2018. Arizona produces fresh market broccoli, cauliflower and cabbage. In 2018, over 20,300 combined acres harvested were valued at over $172 million (USDA-NASS 2019).

Imidacloprid is the number one neonicotinoid used on Arizona lettuce and the third-most used insecticide overall, with 25,250 acres (77%) of head lettuce treated in Fall 2018 and 23,466 acres (72%) in Spring 2019, based on pest control advisor responses to Lettuce Pest Losses surveys (Palumbo 2019, WIPMC 2018).

According to Dr. John Palumbo, Extension Entomologist and Research Scientist with University of Arizona, the EPA's proposed label changes for reduced foliar uses of imidacloprid "will have a negligible impact on leafy vegetables and brassica/Cole crops grown in the desert southwest" (Palumbo 2020). Foliar uses of imidacloprid are not common on leafy vegetables, and the proposed reduction from 0.23 to 0.20 lbs. ai / acre should not be problematic. Effective alternative products are available. The EPA's Proposed Interim Decision does not impact at-planting soil systemic applications of imidacloprid, which are critical and are applied to 85% of desert lettuce acres annually (Palumbo 2020) and most brassica and cole crops.

Melons

Arizona produces fresh market cantaloupe, watermelons and honeydew. In 2017, 19,400 combined harvested acres produced fruit valued at nearly $128 million (USDA-NASS 2018). With limited agricultural land available in Arizona, and limited water, the majority of Arizona producers, including all large melon growers, rely on subsurface drip irrigation systems and re-plant melons in the same fields, often double-cropping.

Imidacloprid is inexpensive and provides control from aphid-borne potyviruses. It also provides 30-45 days control of whitefly nymphs in early spring melons (planted Jan-Feb), and helps in delaying whitefly infestations in late planted melons (planted Mar-Apr) (Palumbo 2020). Some large growers in Arizona rely on imidacloprid for whitefly control, with applications up to 21 days before harvest of spring melons. Under the EPA's Proposed Interim Decision, these applications would be prohibited, because they occur after emergence of the first true leaf, after vining, and while bees may be actively visiting flowers.

In the Proposed Interim Decision (p.49), EPA concludes that, "a restriction from vining to harvest is likely to not significantly impact current usage," based on benefits information suggesting a majority of imidacloprid use occurs prior to crop emergence. This fails to account for post-emergence soil applications made by many of our growers to control whiteflies.

According to a pest control advisor (PCA) who works with large Arizona melon growers, imidacloprid is applied by sub-surface drip irrigation 30-days before harvest. It is efficacious, inexpensive, and controls wireworms in addition to whiteflies. Alternative neonicotinoids, dinotefuron and thiamethoxam, are more expensive and not known to be efficacious against wireworms. Imidacloprid is the only neonicotinoid this PCA uses in melons, so this application offers the added benefit of rotating insecticidal modes of action for resistance management.

Given concerns the EPA has identified regarding risks to pollinators, we wish point out that the majority of Arizona melon growers, including all large growers, apply all in-season imidacloprid uses via sub-surface drip irrigation. We are not sure whether these qualify as "soil drench" applications as defined by the EPA. Chemical is delivered below the soil surface, so bees are not expected to come in contact with imidacloprid residues via contact with surface soil or foliage. However, we recognize the possibility of exposure of foraging bees to imidacloprid residues via pollen or nectar, if chemical systemically taken up is expressed in these floral products.

Some Arizona melon growers have already discontinued use of imidacloprid, based on research by Dr. John Palumbo that has shown that the systemic activity of imidacloprid will not effectively control whitefly adults enough to suppress Cucurbit Yellows Stunting Disorder Virus (CYSDV) infections on young plants (Palumbo 2020). Some growers are using pyrifluquinazon (PQZ) and afidopyropen (Sefina) as viable alternatives for whitefly control.

EPA should note, there are apparent contradictions in proposed wording within the imidicloprid PID with respect to crop stage-based application restrictions. The wording provided in table 2 on page 48 and in the text that follows on page 49, describing the crop stage-based application restrictions for cucurbits is not consistent with the language in Appendix B, page 64 for "all outdoor foliar spray uses."

The language in Appendix B states, "For foliar spray application to crops not under contract pollinator services: Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen off unless the application is made in response to a public health emergency declared by appropriate State or Federal authorities." **These proposed changes would impact current language in the 'Bee Box' for all outdoor foliar spray uses of these products**. These changes were not discussed in the body of the PIDs,

and are only present in the appendices of the PIDs for imidacloprid, clothianidin & thiamethoxam, and dinotefuran. The changes would broadly eliminate needed bloom applications for crops where previous exemptions were made. We hope that this language in the PID Appendix tables was mistakenly included, but ask that EPA clarify.

Cotton

Arizona often leads the world in cotton yield per acre (>1550 lbs.), nearly twice the U.S. average, contributing 9,000 jobs and $700 million to Arizona's economy in 2011 (anonymous 2012). In 2017, Arizona cotton had a value exceeding $200 million for cotton and cotton seed production combined (USDA-NASS 2019).

Imidacloprid is rarely used in cotton as a foliage spray, usually targeting Bemisia whiteflies. It is not the primary neonicotinoid used. Reported treated acres vary, but in most recent years have not exceeded 1,000 acres, some of these as a constituent of a mixture product. Based on reported use rates (Fournier 2017), one to several applications of imidacloprid could still be used, if needed, after implementation of proposed Maximum Annual Application Rates for Imidacloprid for cotton of 0.37 lbs. AI/A. This proposed change is not expected to impact growers.

Chile Peppers

In 2018, Arizona produced 1,100ac of chile peppers valued at over $2.6 million (USDA-NASS 2019). In 2019, New Mexico produced 8,700ac valued at over $50 million. Chile peppers are the third most valuable crop in New Mexico, following pecans and hay (USDA-NASS 2020)

Neonicotinoid insecticides are used to protect young seedling peppers from damaging flea beetles, and for early season control of aphids and thrips. Some Arizona growers use imidacloprid seed treatments, while other growers use in-furrow treatments of imidacloprid at planting at full label rates. Additional foliar applications of neonicotinoids are used, if needed, later in the season, including products like Assail (acetamiprid). The APMC Pesticide use database includes reports of dinotefuran and thiamethoxam as well as imidacloprid use in peppers (Fournier et al. 2017).

Imidacloprid and thiamethoxam are both critical chemistries for the control of the sugar beet leafhopper (SBLH) in New Mexico pepper production. The SBLH transmits curly top virus, which, if not effectively managed, can have dramatic impacts on yield. Yield losses of up to 30% have been observed, leading to estimated economic losses of $2,300 per acre, according to industry sources. The virus is widespread in arid and semi-arid production regions. Aggressive control of the insect vector (once it is detected, based on scouting) is the best practice for minimizing curly top virus infection rates. Once disease symptoms are apparent in the plants, it is too late for effective control. Resistant varieties are not available for peppers or tomato. Control of nearby host weeds and the vector insect are the primary control measures, and are most effective when implemented on an areawide basis (Goldberg 2001, Koike et al. 2009).

Effective management of sugar beet leafhopper in spring peppers is highly dependent on the systemic action of imidacloprid and thiamethoxam. When leafhoppers feed on infected plants,

they will quickly spread the disease as they move from plant to plant through the field. Knock-down materials are ineffective at limiting transmission, because infected hoppers quickly move in from adjacent sites. The systemic action of these neonicotinoid insecticides is highly effective. As hoppers feed on treated plants, they die quickly, preventing further transmission of the virus.

An experienced crop consultant who works with the pepper industry expressed **concern about the Proposed Crop Stage-based application Restrictions for Imidacloprid, which propose to restrict applications after 5 days post-planting or transplanting, regardless of application method.** Currently, growers require 2 applications of either imidacloprid (Admire) or thiamethoxam (Platinum) at full rates to effectively control the vector and limit the spread of curly top virus. Either of these active ingredients is applied at planting as an in-furrow application, and then again sometime between the 2-leaf and 8-leaf stages (6 to 8 weeks), depending on sugar beet leafhopper population levels. **EPA's proposed stage-based restrictions would eliminate this second application, leaving growers with no effective defense against curlytop virus**. Although other insecticides are available which may be efficacious against the vector, they are not systemic, and so, are not effective at curtailing the transmission of the disease sufficiently to avoid significant yield losses. We hope EPA will look carefully at this concern as they proceed with registration review.

Other proposed changes impacting peppers are seen as having less concerning impacts, and are workable within the New Mexico production system, according to an industry consultant.

Pecans

In 2018, Arizona growers harvested 17,000 acres of pecans valued at over $51 million (USDA-NASS 2019). Pecans are the number two economic crop of New Mexico, following hay, with 46,000 acres harvested in 2019 valued at over $170 million (USDA-NASS 2020).

Imidacloprid is applied in both pecans and pistachios, as a soil application or through injection. A single application provides aphid control without harming beneficial insects. It is effective and affordable for growers. The maximum single application rates reported in the APMC Pesticide Use Database are below the proposed Maximum Annual Application Rates for Imidacloprid on tree nuts. According to a pest control advisor in Southeastern Arizona, soil applications of imidacloprid at full label rate (Wrangler, 16 oz./acre = 0.50 lbs. ai/acre) are used to control aphids. Full label rate for these applications are required to get good control of aphids. The EPA's proposed annual use rate reduction would make these imidacloprid applications ineffective. Although there are alternatives to neonicotinoids for aphid control in pecans, including flonicamid and sulfoxaflor, which also help to preserve beneficial insects, PCAs do have concerns losing another mode of action which will limit the rotation of insecticides for resistance management.

Citrus

As previously communicated to the EPA in comments submitted in 2016 (Docket ID: EPA-HQ-OPP-2008-0844-0891), imidacloprid is used in Arizona citrus for the control of two key citrus pests: citrus nematode and the Asian citrus psyllid (ACP), vector of Huanglongbing (HLB) or

yellow dragon disease, which causes citrus greening. According to the Area Wide Control of Asian Citrus Psyllid *(Diaphorina citri)* Technical Working Group Report, imidacloprid is recommended as an effective systemic treatment against ACP to help limit the spread of HLB (USDA APHIS PPQ 2009). The APMC Pesticide Use Database shows a five to ten fold increase in citrus acres treated with imidacloprid in 2017 and 2018 compared to prior years (Fournier et al. 2017). We are glad that the EPA's Proposed Interim Decision will not impact these uses beyond the new requirement for gloves to reduce applicator exposure for liquid/ foliar handgun applications.

Turf Uses

The Arizona golf industry is a strong contributor to the state economy with a total economic contribution of $3.9 billion in sales in 2014, including golf facility operations, golf tourism, and golf-related businesses (Duval et al. 2016).

According to Kai Umeda, University of Arizona Area Extension Agent for Turfgrass Science, imidacloprid, thiamethoxam, and clothianidin are used to control beetle grubs and billbugs in recreational turf (golf courses). These insect infestations attract javelina, skunks and racoons, that dig up the turf in search of food. Damage can be severe, and control of the insect pests is the only mode of treatment. Beetle populations are monitored with traps that inform effective timing of applications.

A single application of imidacloprid (or other neonicotinoid) 3 to 4 weeks after peak flights is recommended. Maximum single application rates are typically used, which vary somewhat by product. Based on reported use, a **high proportion of single-use applications in Arizona are at or above the EPA's proposed 0.30 lbs. ai/acre maximum annual application rates for imidacloprid**. Contacts in the industry see the reduction in annual use rates to 0.30 lbs. ai/acre as problematic, since lower rates are known to reduce efficacy against target pests.

We understand that the proposed cancellation of residential spray applications is to address human health risks of concern which the EPA identified in risk assessments. While imidacloprid is commonly used in residential turf for insect control in the desert Southwest (both professional and homeowner applications), alternative products are available for consumers and professionals.

<u>Who We Are</u>

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 works with the Western IPM Center, representing stakeholders in the desert Southwest states in EPA registration reviews. Dr. Peter Ellsworth is Director of the APMC, State IPM 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. John Palumbo is a Research Scientist in Entomology and an Extension Specialist working with the Arizona vegetable industry. 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, 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 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 (WIPMC 2018), partially funded through 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 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 California, with typical responses representing up to 65% of acres planted in Arizona. These data provide detailed information on shifting pest trends, chemical use and costs, and often compliment and augment information from the APMC Pesticide Use Database, particularly for pesticide uses for which the state does not mandate reporting.

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