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Spinosyn Use and Importance in Arizona Agriculture
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Comments submitted in response to Docket # EPA-HQ-OPP-2011-0667-0025
by the Arizona Pest Management Center, University of Arizona

Summary

U.S. EPA has requested public comment on draft human health and ecological risk assessments for the registration review of several compounds (docket number EPA-HQ-OPP-2011-0667-0025), including spinosad and spinetoram, two active ingredients in the spinosyn chemical class, IRAC Mode of Action #5, nicotinic acetylcholine receptor allosteric modulators. EPA's Preliminary Environmental Fate and Ecological Risk Assessment for the Registration Review of Spinosad (EPA-HQ-OPP-2011-0667-0026) identifies potential risks from spray applications of spinosad to birds, mammals and invertebrates. According to the draft assessment, all foliar uses of spinosad also present a risk of concern at the Teir I level to pollinating bees. Because of this concern, and the known importance and utility of the spinosyns for several crops in the arid southwest, we believe it valuable at this time to provide public comment on how spinosad and spinetoram are used in Arizona, with specific attention to potential concerns about pollinator exposure.

In Arizona, the spinosyns are important reduced risk chemistries that control a variety of pests in organic (spinosad) and conventional (spinetoram) crops, including lettuces, spinach, cole crops, celery, arugula, other vegetable crops and citrus, with the most extensive use pattern in lettuces.

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. John Palumbo is an Extension Specialist, Vegetable Crops, Department of Entomology, University of Arizona.

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 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. Through our Crop Pest Losses and Impact Assessment Signature Program, funded through USDA-NIFA and the Western IPM Center, we collect detailed information on pest management practices, pest impacts, yield and economic losses due to pests of head lettuce and cotton. The comments and data within and referred to in this report include information from the Arizona Pest Management Center Pesticide Use Database, Crop Pest Losses survey data, and expert opinion of APMC member faculty.

Spinosyn Use in Arizona Crops:

Lettuce

Arizona growers are one of the leading producers of fresh-market vegetables in the U.S. This includes over 90% of all fresh lettuce consumed in the U.S. in the winter, valued at over $705M in the 2015 season (USDA NASS 2016). Table 1 shows combined acres treated with spinosad and spinetoram for major use crops in Arizona in 2015, from the Arizona Pest Management Center Pesticide Use Database. Crops with large scale use included lettuces, spinach, cole crops, celery, arugula and other vegetable crops, and citrus, with the most extensive use in lettuce.

Dr. John Palumbo has conducted an extensive annual Lettuce Pest Losses survey of licensed pest control advisors (PCAs) since 2014 (APMC 2015), with responses typically representing upwards of 60% of head lettuce acres in Yuma County, the primary lettuce production area of

the state. The following is extracted from Dr. Palumbo's report on the 2016 results of the survey:

> A total of 22 surveys were completed in the 2016 workshop, representing an estimated total of 28,650 fall acres and 29,920 spring lettuce acres from Yuma and neighboring Imperial County (Bard/ Winterhaven). In general, the most commonly used insecticides in fall and spring lettuce correspond directly to the key pests that typically occur during these growing periods. The spinosyns remain the second most commonly used class of insecticides [after pyrethroids], where greater than 95% of the lettuce acreage was treated with Radiant (spinetoram) or Success (spinosad) in 2015-16. Their use against both lepidopterous larvae (Figure 1) and thrips (Figure 2) has remained steady over the past 12 years, averaging over 2 sprays per treated acre (Palumbo 2016).

The spinosyns remain the most used of several classes of reduced risk chemistries for insect control on lettuce, based on acres treated in the 2015 – 2016 season (Figure 3).

Other crops

The spinosyns are important to conventional (spinetoram) and organic (spinosad) production systems for leafy vegetables, including cole crops, spinach and celery in Arizona. In these crops, main target pests are several important Lepidoptera species (beet armyworm, cabbage looper, corn earworm, diamondback moth) and leafminers, *Liriomyza sativa and trifolii*. For these leafy vegetable crops, which do not flower during the production season, pollinator exposure should not be a concern. (The spinosyns are not used in vegetable seed crops.) An average of 3 applications per season is used in most of these crops. Potential alternative insecticides for leafy vegetable crops include the diamides (chlorantraniliprole and cyazypyr), emamectin benzoate, methoxyfenozide, indoxacarb, methomyl, chlorpyrifos and abamectin.

In melons (watermelons and cantaloupes), spinosyns are used primarily to control beet armyworm and cabbage looper, and occasionally for leafminer, if they flare up (this is rare but does occur). Use in melons is primarily done at pre-harvest to prevent cosmetic damage to melons from Lepidoptera larvae, and typically one application is used (potentially two under heavy pressure late in the season). Applications are made in accordance with the label instructions, which is not to apply "to blooming, pollen-shedding or nectar-producing parts of plants if bees may forage on the plants during this time period." Because cucurbits are continuously flowering plants, this generally means night time applications. Potential alternative insecticides in melons include methoxyfenozide, diamides (chlorantraniliprole and cyazypyr), indoxacarb and methomyl.

Spinosyns are used in citrus (including organges and lemons) in Arizona for control of citrus thrips, which cause damage to the citrus rind. They are generally applied after petal fall for protection of the developing fruit. Potential alternative insecticides for citrus include Danitol, dimethoate, spirotetramat, abamectin and Carzol.

Table 1: Reported combined acres treated with spinosad and spinetoram for major use crops in Arizona in 2015. *Source: Arizona Pest Management Center Pesticide Use Database.*

Crop Name	Reported Acres Treated
LEAFY GREENS	
LETTUCE, HEAD	85,199
LETTUCE, LEAF	74,793
LETTUCE, ROMAINE	20,018
SPINACH	30,903
COLE CROPS	
CAULIFLOWER	5,759
BROCCOLI	5,487
OTHER VEGETABLES	
CELERY	4,384
CABBAGE, UNSPECIFIED	3,435
ARRUGULA	2,461
KALE	1,750
GREEN, MUSTARD	1,252
SWISS CHARD	1,208
ONION, DRY	1,139
CITRUS	
LEMON	8,002
CITRUS, UNSPECIFIED	1,107
ORANGE	1,071

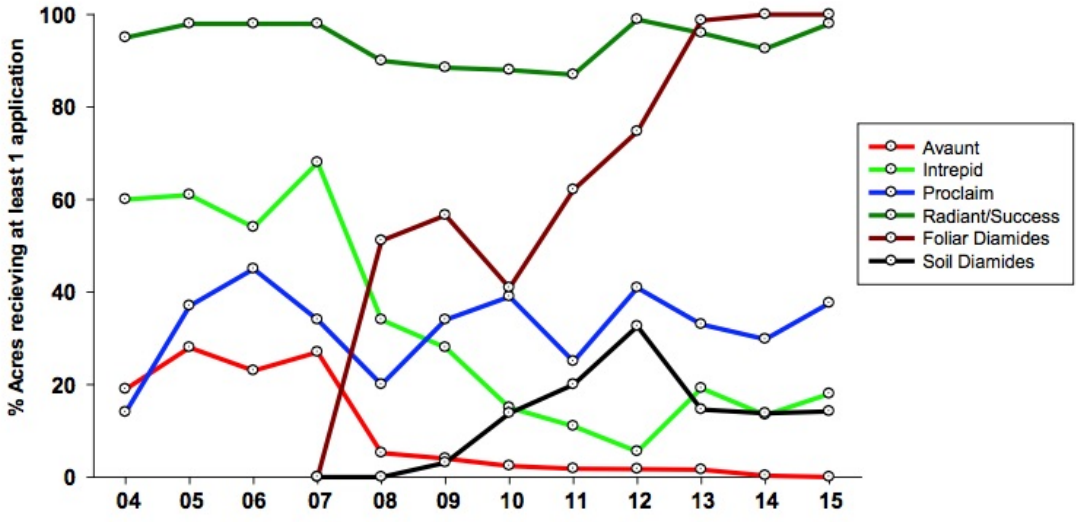

Figure 1. Trends in insecticide use for control of Lepidopterous larvae in fall lettuce, 2004 – 2015. (Palumbo 2016).

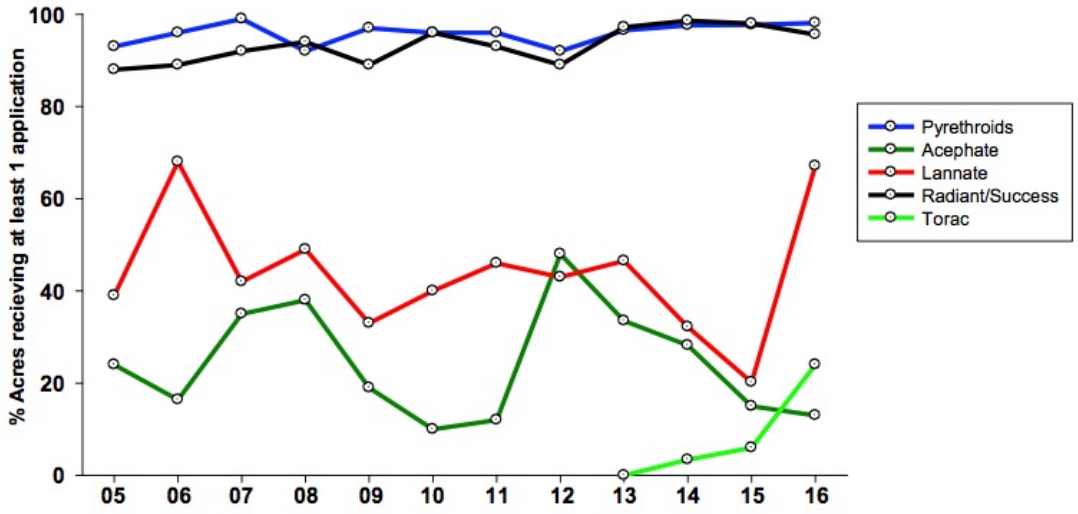

Figure 2. Trends in insecticide use for control of western flower thrips in spring lettuce, 2005 – 2016 (Palumbo 2016).

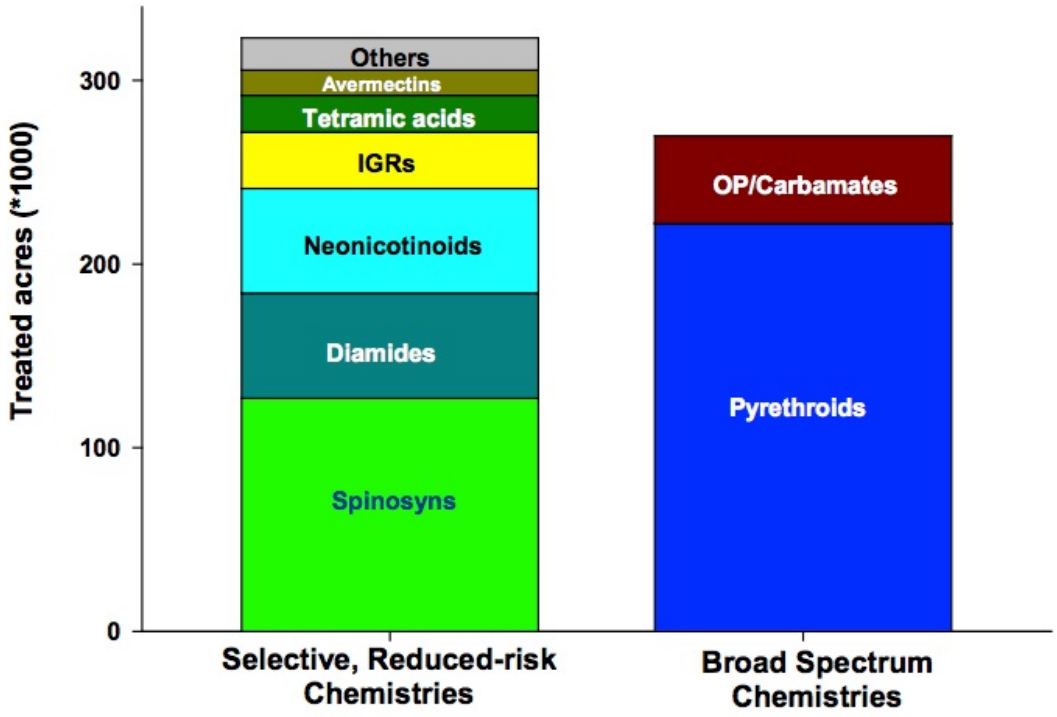

Figure 3. Estimates of total insecticide use for insect control on lettuce, 2015-2016.

References Cited

APMC 2015. Vegetable Pest Losses, Arizona Crop Information Site (ACIS). Arizona Pest Management Center, University of Arizona Cooperative Extension. http://cals.arizona.edu/crops/vegetables/insects/vegiloss.html

Palumbo J.C. 2016. Insecticide Usage on Desert Lettuce 201516. Veg IPM Update. University of Arizona Cooperative Extension. Vol. 7 No. 12 http://cals.arizona.edu/crops/vegetables/advisories/docs/060816%20Insecticide%20Usage%20Summary%20in%20Lettuce%202016%20New.pdf

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