

Impact of Proposed EPA Label Changes on Neonicotinoid Uses on Produce and Melon Crops in the Desert Southwest

John C. Palumbo, Department of Entomology

The USEPA recently released their Proposed Interim Registration Review Decisions for four neonicotinoids (*dinotefuran*, *imidacloprid*, *thiamethoxam* and *clothianidin*) commonly used on desert crops. Another neonicotinoid, *acetamiprid*, was not part of this reregistration process. The label changes they propose are an attempt to reduce risks to pollinators and aquatic invertebrates, as well as occupational risks to applicators. Below is a summary of how these proposed changes may affect insect pest management on desert leafy vegetable and melon crops.

Leafy Vegetables/Brassica/Cole crops The proposed label changes for reduced foliar uses of imidacloprid and dinotefuran will have a negligible impact on leafy vegetables and brassica/Cole crops grown in the desert southwest. There are no proposed changes for clothianidin and thiamethoxam foliar or soil uses on leafy vegetables or brassicas.

Imidacloprid-foliar uses only

- The proposed label changes would reduce the maximum annual amount of active ingredient allowed from 0.23 lbs. ai./A per year to 0.20 lbs. ai./A per year.
- This would reduce the number of foliar applications of imidacloprid (i.e., Admire Pro at 1.3 oz/ac) allowed from 5 to 4 applications per year.
- Imidacloprid foliar sprays are not common in desert leafy vegetable. Use data from 2019 Lettuce Insect Losses surveys show that neonicotinoids are applied no more than once per crop season on less than 15% of lettuce acres. Most neonicotinoid usage on lettuce is from acetamiprid (Assail) and thiamethoxam (Actara and Endigo).
<https://cals.arizona.edu/crops/vegetables/advisories/docs/190626-insecticide-usage-summary-in-lettuce-2018-19.pdf>
- In contrast, imidacloprid is used primarily as an at-planting, soil systemic application and is annually applied to ~85% of the lettuce acreage in the desert. It does not provide season-long control and requires additional foliar sprays to produce marketable crops. There are no proposed changes to this use pattern.
- There are several foliar alternatives (non-neonicotinoids with different MOA) that are as, or more, effective than imidacloprid for foliar insect management in leafy vegetables:

Aphids: *spirotetramat* (Movento), *sulfoxaflor* (Sequoia), *flupyradifurone* (Sivanto), *flonicamid* (Beleaf), *pyrifluquinazon* (PQZ), *afidopyropen* (Versys)

Whiteflies: *spirotetramat* (Movento), *flupyradifurone* (Sivanto), *pyrifluquinazon* (PQZ), *cyantraniliprole* (Exirel, Minecto Pro), *afidopyropen* (Versys)

- When used in rotation following UA guidelines, the above alternatives will prevent excessive selection pressure on the neonicotinoids.
- EPA proposes no changes for imidacloprid soil usage on leafy vegetables and brassica/Cole crops.

Dinotefuran-foliar uses only

- The proposed label changes would reduce the maximum annual amount of dinotefuran (Venom/Scorpion) allowed from 0.268 lbs. ai./A per year to 0.23 lbs. ai./A per year.
- In leafy vegetables, the proposed label would reduce the maximum number of 3 oz/ac foliar applications of Venom from 2 to 1 application per crop season. In Brassica/Cole crops, a single 4 oz application would still be allowed. Application of Venom at rates below 3 oz/ac are not recommended for control of whiteflies.
- Dinotefuran foliar sprays on leafy vegetables are not common in the desert southwest. Venom/Scorpion were applied to less than 1% of lettuce acres last year (*i.e.* 2019 LIL survey).
- Dinotefuran has shown inconsistent activity against aphid species that attack leafy vegetable/brassica crops in the desert and is not recommended by UA Cooperative Extension.
- Dinotefuran has excellent activity against whiteflies (adults and nymphs) on leafy vegetables and are occasionally sprayed more than once on lettuce.
- Effective foliar alternatives are available to offset the loss of the 2nd application - this also fits our Insecticide Resistance Management (IRM) guidelines.
- There are several foliar alternatives ((non-neonicotinoids with different MOA)) that are as, or more, effective than dinotefuran for foliar insect management in leafy vegetables: (Listed in order of use)
 - Aphids**: *spirotetramat* (Movento), *sulfoxaflor* (Sequoia), *flupyradifurone* (Sivanto), *flonicamid* (Beleaf), *pyrifluquinazon* (PQZ), *afidopyropen* (Versys)
 - Whiteflies**: *spirotetramat* (Movento), *flupyradifurone* (Sivanto), *pyrifluquinazon*, *cyantraniliprole* (Exirel, Minecto Pro)
- EPA proposes no changes for dinotefuran soil usage on leafy vegetables and brassica/Cole crops.

Thiamethoxam (Actara/Platinum/Durivo/Endigo)

- No proposed changes to foliar or soil labels on leafy vegetables or brassica/Cole crops.

Clothianidin (Belay/Nipsit seed treatment)

- No proposed changes to foliar or soil labels on leafy vegetables or brassica/Cole crops.

Melons/Cucurbits: The proposed changes for these neonicotinoids may impact spring melon production for some growers but should have little impact on fall melons. EPA is recommending a growth stage restriction from vining (first true leaf) to harvest for some soil and foliar applications. For direct seeded melons, at-plant soil applications would still be allowed. For transplanted melons and watermelons, only soil application of dinotefuran and thiamethoxam would be allowed. Foliar uses would only be allowed for dinotefuran on melons.

Imidacloprid-soil and foliar uses

- The EPA is proposing a crop stage restriction for both **foliar and soil** uses of imidacloprid that would prohibit its use after the emergence of the first true (non-cotyledon) leaf.
- Growers can still apply an at-planting, soil injection application of imidacloprid in direct seeded melons. This is the standard for spring melons in the desert. Drip chemigation applications prior to emergence of first true leaf would be allowed
- 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).
- In fall melons, the loss of imidacloprid soil applications is negligible. Our research 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.
- Growers have been successfully controlling whiteflies and suppressing virus on fall melons using at-plant, soil-systemic applications of *dinotefuran* (Venom) and/or *flupyradifurone* (Sivanto) for systemic uptake by the plant at stand establishment.
- Side-dress or drip chemigation applications of imidacloprid after the emergence of the first true would be prohibited. This would prevent growers from applying imidacloprid up to 21-days before harvest in spring melons. Growers would be forced to use an alternative neonicotinoid for post-emergence applications.
- Alternatives to imidacloprid for side dress and drip chemigation would be *dinotefuran* (Venom/Scorpion) and *thiamethoxam* (Durivo/Platinum). These are as, or more, effective as imidacloprid, but more expensive.
- For transplanted melons and watermelons, application of imidacloprid through drip chemigation during or after transplanting would be prohibited because transplants have 1 or more true leaves when planted.
- Alternatives to imidacloprid soil usage for melon or watermelon transplants include: *dinotefuran* (Venom/Scorpion), *thiamethoxam* (Durivo/Platinum), *flupyradifurone* (Sivanto). Effective, but expensive relative to imidacloprid. Sivanto will cause unacceptable crop injury to to netted melons (i.e., cantaloupes) when applied as a transplant drench.

- The loss of **foliar** imidacloprid uses in melons is not critical since there are several foliar alternatives that provide significantly better adult and immature control of whiteflies including: *Pyriproxyfen* (Knack), *buprofezin* (Courier), and *spiromesifen* (Oberon). The neonicotinoids *dinotefuran* and *acetamiprid* (Assail) would also be available as foliar sprays and are more efficacious than imidacloprid.

Thiamethoxam -soil and foliar uses

- The EPA is proposing a crop stage restriction for **foliar** use only that would prohibit the use of Actara and Endigo after the emergence of the first true (non-cotyledon) leaf.
- Endigo (*lambda-cyhalothrin + thiamethoxam*) can still be used as a sprinkler chemigation treatment during stand establishment to prevent flea beetle, cricket and other seedling pests from damaging cotyledons if chemigated before emergence of 1st true leaf.
- The loss of **foliar** thiamethoxam (Endigo, Actara) applications in melons is not critical since there are several foliar alternatives that provide as good or better adult and immature control of whiteflies including: *Pyriproxyfen* (Knack), *buprofezin* (Courier), and *spiromesifen* (Oberon).
- The neonicotinoids *dinotefuran* and *acetamiprid* (Assail) would also be available and research has shown they are more efficacious than thiamethoxam foliar sprays.
- There are no proposed restrictions of **soil** applications of thiamethoxam in direct seeded or transplanted melons. Thiamethoxam (Durivo/Platinum) can be applied at-planting and would provide an efficacious alternative to imidacloprid for post-emergence side-dress or drip chemigation applications for whiteflies on spring melons.

Clothianidin -soil and foliar uses

- The EPA is proposing a crop stage restriction for **both foliar and soil uses** of imidacloprid that would prohibit its use after the emergence of the first true (non-cotyledon) leaf.
- Since very little clothianidin (Belay) is used in desert melons, and effective alternatives are available for both soil and foliar applications in control of whiteflies (see above), the proposed changes should have little to no impact on desert melon production.

Dinotefuran -soil and foliar uses

- No proposed changes to **foliar or soil** use on melon crops.

Additional Changes for all Neonicotinoids

PPE Requirements

- EPA is proposing that handlers use additional PPE such as respirator and gloves for certain uses of clothianidin and thiamethoxam and should have little an impact for leafy vegetable and melon in the desert.

Reducing Spray Drift and Runoff

- EPA is proposing to establish mandatory spray drift and runoff mitigation language that is similar across all pesticide classes including the neonicotinoids.
- The proposed language states “Applicators are required to use a medium or coarser droplet size” as defined by ASABE.S572.1.
- To produce lager spray droplets, applicators will have to increase spray volume, use lower spray pressure, or use different spray nozzles. This could increase the application costs.
- EPA states that using larger droplet sizes is beneficial to reduce drift and advises the applicator to use the largest droplet size possible that still provides efficacy.
- Unfortunately, we don’t know what that droplet size is. Will large droplet sizes (i.e., Medium to Coarse) significantly reduce neonicotinoid activity on melons and brassica crops? Presumably not, but we won’t know until we investigate under field conditions.
- This nozzle requirement could potentially be problematic.

Pesticides Resistance Management

- The EPA is proposing resistance-management labeling for neonicotinoids in order to provide PCAs and growers with access to important information to help maintain the effectiveness of useful pesticides.
- The UA has been a leader in Insecticide Resistance Management and provides information in the UA Vegetable IPM updates and has specifically focused on Neonicotinoids in Cross-commodity communities.
<https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1319.pdf>

Bottom line:

The proposed changes to neonicotinoid labels through the recent EPA review process should have minimal impact on production of leafy vegetable and melon crops in the desert southwest. Melon growers may have to absorb additional expenses in managing whiteflies on spring melons. The impact of requiring applicators to use larger droplet sizes when applying neonicotinoids is unknown.