United States Department of Agriculture

May 4, 2020

Elissa Reaves, Ph.D., Acting Director
Pesticide Re-Evaluation Division (7508P)
Office of Pesticide Programs, Environmental Protection Agency
1200 Pennsylvania Ave., N.W.
Washington, DC 20460-0001

Re: USDA Comments on the Proposed Interim Decision documents for Imidacloprid, Thiamethoxam, Clothianidin, Dinotefuran, and Acetamiprid for Registration Review; EPA-HQ-OPP-2008-0844, EPA-HQ-OPP-2011-0581, EPA-HQ-OPP-2011-0865, EPA-HQ-OPP-2011-0920, and EPA-HQ-OPP-2012-0329, respectively.

Dear Dr. Reaves:

Thank you for the opportunity to comment on EPA's proposed interim decision (PID) documents for the neonicotinoid insecticides imidacloprid, thiamethoxam, clothianidin, dinotefuran, and acetamiprid, posted on February 3, 2020 in the *Federal Register*. Imidacloprid, thiamethoxam, clothianidin, and dinotefuran are systemic N-nitroguanidine neonicotinoid insecticides that act on the nicotinic acetylcholine receptors of the insect central nervous system. Acetamiprid is a cyano-substituted neonicotinoid insecticide that acts similarly to nitroguanidines but has far less toxicity to bees.

All of these active ingredients are classified by the Insecticide Resistance Action Committee (IRAC) as class 4A nicotinic acetylcholine receptor competitive modulators (IRAC, 2019). These active ingredients are widely used and critically important in agriculture. Over the past 20-25 years, neonicotinoids have served as replacement options for numerous broad-spectrum organophosphate and carbamate insecticides across numerous crop groups and use patterns. The efficacy, utility, and affordability of neonicotinoid insecticides makes them linchpin tools in modern integrated pest management (IPM) programs.

Neonicotinoids have large and diverse use patterns, including applications as foliar sprays, soil drenches, and seed treatments to control a variety of chewing and sucking insects on a multitude of agricultural crops, including root and tuber vegetables, bulb vegetables, leafy vegetables, Brassicas, cucurbits, fruiting vegetables, pome and stone fruit, citrus, berries, grapes, tree nuts, cotton, cereal grains, oilseeds, herbs, and spices, as well as having important uses in commercial seed production, commercial ornamental production, forestry, quarantine treatments, and animal agriculture, including poultry house treatments.

We are pleased to comment on these PIDs and applaud EPA's careful and thoughtful assessments of the agricultural benefits of this important insecticide group. We appreciate that EPA's overall approach to risk management retains a good measure of utility and flexibility for most growers. EPA has clearly worked hard to balance the needs of growers along with the complexity of EPA's risk assessments and the associated public scrutiny around this important class of insecticides.

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USDA strongly supports efforts to ensure pesticide handler safety. We generally find EPA's proposals to require additional personal protective equipment (PPE) (e.g., double layer clothing, gloves, respirators) to be reasonable measures for reducing occupational exposure and do not expect these requirements to impose undue hardship on producers. USDA also welcomes EPA's proposal to update and standardize existing label language for chemical-resistant gloves and engineering controls (e.g., water soluble packaging). We believe these updates will provide greater clarity to handlers, further ensuring occupational safety and the use of best management practices.

We note that for many crops and crop groups, EPA's proposals are not likely to negatively impact producers on a widespread basis. We particularly appreciate that EPA proposes to maintain widespread grower access to acetamiprid, which is relatively less toxic to bees than nitroguanidine active ingredients (AIs). For some pests, acetamiprid will likely serve as a critically important substitution option for a number of use patterns where nitroguanidine uses are being proposed for restrictions, particularly for important pest management needs on blooming crops.

However, USDA is very concerned about EPA's proposed pollinator statement for non-contract pollinated crops for nitroguanidine AIs, which we believe is in direct conflict with other proposed mitigations, and with EPA's previously published final policy for protecting pollinators from acutely toxic pesticides. We support EPA's existing "bee box" and the pollinator protection language that was applied to neonicotinoid labels in 2013, and we also support EPA's published policy for mitigation of acute risks to pollinators, but we believe the current proposed statement for non-contract pollinated crops is in problematic conflict with both of these. We also are very concerned with application timing restrictions proposed for fruiting vegetables and cucurbit vegetables. We feel that adequate control of pepper weevils (on peppers) and whiteflies (on all of these crops) may be irreparably harmed by EPA's current proposal. For whiteflies especially, the importance of effective control is made more acute due to vectoring of viral diseases that can completely wipe out production on a widespread basis. While we believe that EPA's benefit/impact assessments have identified many of these concerns accurately and clearly, EPA's PIDs have inadequately addressed these massive potential impacts on growers.

We also have concerns about other crop-specific proposals (e.g., cotton and cucurbit vegetables), where likely impacts are more regionally or use-pattern specific. For such situations, we will request that EPA consider regional or niche flexibility to allow for continued use of neonicotinoid insecticides to address critical IPM needs. For example, one common thread in stakeholder feedback across multiple crops is that proposed reductions in seasonal maximum soil application rates can be more problematic than some of the proposals for foliar reductions. This is particularly true for root vegetables (especially sweet potatoes), cucurbits, berries, and Southeastern cotton, where the full seasonal maximum soil application rate is often applied as one application early in the season and where efficacy necessitates the maximum rates.

USDA's detailed comments are attached for your review. Our comments span a number of topics including:

1. <u>Starting on Page 4</u>: Concerns about EPA's proposed pollinator language (as listed in Appendix B of EPA's respective nitroguanidine PID documents);

2. Starting on Page 6: Several crop-specific or use-pattern-specific concerns and additional information on agricultural benefits;
3. Starting on Page 20: Concerns related to EPA's proposed drift mitigation language;
4. Starting on Page 22: Tolerance actions and international harmonization;
5. Starting on Page 24: Comments from USDA's Animal and Plant Health Inspection Service (APHIS) regarding neonicotinoid benefits for plant protection and quarantine (PPQ) programmatic needs;
6. Starting on Page 32: Appendix A: Review and discussion of common diseases transmitted by insect vectors in fruiting vegetables and cucurbits; and
7. Starting on Page 40: Appendix B: Tabular overview of tolerance/international harmonization issues of interest.

USDA stands ready to provide EPA with additional information on the benefits of neonicotinoid insecticides as well as additional characterization information to help address and/or refine EPA's risk estimates, if needed. Please let me know if you would like to discuss further. We thank you for your consideration of our comments.

Sincerely,

Sheryl H. Kunickis

Sheryl H. Kunickis, Ph.D.
Director

USDA-OPMP Comments on Proposed Mitigations

Proposed Pollinator Protection Language for Imidacloprid, Thiamethoxam, Clothianidin, and Dinotefuran

USDA notes that EPA has proposed pollinator protection language that only somewhat aligns with EPA's previously published Policy to Mitigate the Acute Risks to Bees from Pesticide Products (USEPA, 2017a) and previously applied (2013) pollinator protection language for neonicotinoid pesticides. For applications to crops under contract pollination services, the PID proposals for the nitroguanidine neonicotinoid AIs require growers to contact beekeepers within 48 hours prior to application. USDA is not overly concerned with this particular requirement, given that growers utilizing contract pollinator services would likely already be doing this as a matter of practice, both for good relations with their contract pollination services provider and for protecting the significant benefits received from bees placed on site. It is in no grower's interest to harm bees placed on site for pollination services, and we therefore generally agree with EPA that such label language makes sense for situations where bees are placed on site under contract.

However, USDA is very concerned about the second paragraph of this section for the nitroguanidine PIDs that refers to crops not under contracts for pollination services:

> *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."*

This statement, as proposed, would essentially be a de facto ban on foliar use of these materials during bloom periods, for numerous indeterminately blooming crops such as citrus, grapes, cotton, strawberries, and fruiting vegetables. As such, USDA wonders if this particular inclusion may have been unintentional. We note that EPA's previously approved mitigation verbiage for non-contract scenarios, approved in coordination with their publicly vetted acute toxicity mitigation policy (USEPA, 2017a) and EPA's prior mitigation actions on neonicotinoids from 2013, included additional flexibility for applicators for crops that are not under contract for pollination services. The verbiage that was previously approved included exceptions for applications made at night-time, for applications made under a specific temperature, and for applications made in accordance with state approved managed pollinator protection plans and/or beekeeper registries. The prior statement also specifically referenced "food/feed crops and commercially grown ornamentals."

As proposed currently, however, this restriction eliminates all but the "public health emergency" allowance. It also would be applied to all outdoor foliar uses (as opposed to only "food/feed crops and commercially grown ornamentals") which could pose additional new burdens on cotton producers, compared to the prior version. As proposed currently, the statement also appears to be in direct conflict with the risk management rationale provided elsewhere in these PIDs, which clearly indicated that bloom restrictions were not warranted for many of these crops (excluding fruiting vegetables) due to high benefits. It is unclear to USDA why PIDs would indicate elsewhere that no mitigations were being applied to grapes or citrus, for example, due to high benefits, without accounting for the massive negative impact that would result from an open-ended bloom restriction that could last for months during the growing season. It is further unclear to USDA why no reference was made to this statement in the sections of the PIDs outlining the risk mitigation rationale, and it is only listed in Appendix B of the respective PIDs, where the lists of proposed label language are located. As currently proposed, there appears to be no direct accounting for the impacts that would result from this statement.

This statement, as proposed, also back-tracks on EPA's overall pollinator protection strategy going back several years with extensive deliberations over EPA's previously applied pollinator mitigation for neonicotinoid insecticides, EPA's acute mitigation policy (USEPA, 2017a), and numerous discussions with stakeholders and neonicotinoid registrants. During the development of EPA's acute mitigation policy, it was determined that a broad and all-encompassing bloom restriction on non-contract pollinated crops would impose an unfair and highly impactful burden on growers who do not always have control over the presence of bees near their operations. In particular, growers of citrus and cotton often interact with beekeepers who seek access to crops for honey production, but for whom no contract or direct payment is involved, since the grower is not receiving a pollination benefit from the presence of bees. In other instances, growers are sometimes not even aware of the placement of bees for honey production.

Given these conflicts, to maintain consistency and to reduce uncertainty to growers, we strongly urge EPA to consider revising the second paragraph of this pollinator statement in Appendix B of the respective nitroguanidine neonicotinoid insecticides, pertaining to crops not under contract pollinator services. Retaining the proposed restriction as currently listed in the PIDs would have massive (and likely unintended) impacts on many crop producers in the United States. Instead, we strongly urge EPA to consider applying some version (with minor modifications as needed for consistency) of the existing pollinator protection verbiage for blooming crops already applied to neonicotinoid insecticide labels. This verbiage was carefully developed after weighing public comments and input from numerous stakeholders and reflects a practical and workable set of use directions that meets EPA's protection goals and is familiar to industry. The current verbiage already applied to neonicotinoid insecticide labels is as follows:

FOR FOOD/FEED CROPS AND COMMERCIALLY GROWN ORNAMENTALS NOT UNDER CONTRACT FOR POLLINATION SERVICES BUT ARE ATTRACTIVE TO POLLINATORS
Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen unless one of the following conditions is met:

- *The application is made to the target site after sunset*
- *The application is made to the target site when temperatures are below 55°F*
- *The application is made in accordance with a government-initiated public health response*
- *The application is made in accordance with an active state-administered apiary registry program where beekeepers are notified no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying*

- *The application is made due to an imminent threat of significant crop loss, and a documented determination consistent with an IPM plan or predetermined economic threshold is met. Every effort should be made to notify beekeepers no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying.*

Fruiting Vegetables (Peppers, Tomatoes, Eggplants, Okra, etc.)

USDA has major concerns with EPA's proposed restriction of foliar and soil applications of neonicotinoid insecticides "from the appearance of initial flower buds until flowering is complete and all petals have fallen off" for fruiting vegetables. More specifically, for tomatoes, peppers, chili peppers and okra, EPA's proposed restriction would be from "5 days after planting or transplanting" regardless of application method. Given the indeterminate blooming and fruiting nature of these crops, this restriction essentially constitutes a complete prohibition of in-season neonicotinoid use on fruiting vegetables after 5 days post-planting. For areas of the country where whitefly pressure is problematic, this would have disastrous impacts and pose an existential threat to production of these crops. USDA notes that EPA's benefit and impact analysis (USEPA, 2019a) broadly and accurately discusses these significant impacts, particularly for peppers and tomatoes. In particular, EPA's analysis correctly identified whiteflies (and especially the viral pathogens they vector), stink bugs, and pepper weevils as the primary pests driving the need for foliar neonicotinoid applications in fruiting vegetables throughout the growing season. Pepper weevil control, in particular, relies heavily on thiamethoxam according to EPA's cited usage data (USEPA, 2019a) and available production guides cited by EPA.

USDA has received feedback indicating a broad and strong national consensus from extension experts and stakeholders confirming that EPA's current proposal would be disastrous for growers of tomatoes, peppers, and other fruiting vegetables. While alternative insecticides exist for control of whiteflies, many areas of the country where fruiting vegetables are grown experience immense population pressure from this pest, necessitating the use of multiple and varied tools to control outbreaks during the growing season. This is a particularly critical need in areas where whiteflies vector numerous viral pathogens, some of which by EPA's own estimation can cause 100% crop losses (EPA, 2019a). Further, experts from the University of Georgia (Riley and Sparks, 2020) indicated that if the restrictions functionally eliminate neonicotinoids from any whitefly susceptible crops, this will place extreme resistance pressure on the IRAC Group 28 (diamide) insecticides. While multiple modes of action are labeled for whiteflies, practically speaking only the neonicotinoids and diamides provide the level of control needed for the pest pressure observed in the Southern United States. To quote UGA experts, *"Loss of one group would undoubtedly result in resistance in the other and collapse of control and loss of fall production"* (Riley and Sparks, 2020).

USDA has also included in this comment document, for EPA's reference, a broad overview of insect-vectored plant pathogens for fruiting vegetables and cucurbits (see Appendix A). We particularly note that for many of the viruses and other diseases vectored by whiteflies, vector insect control, often with neonicotinoids, is one of the primary mechanisms cited to preventing spread of these damaging pathogens.

Respondents from the University of Georgia (Riley and Sparks, 2020) indicated that if EPA's proposal were to be imposed, major crop losses would occur in peppers in the fall growing season due to whiteflies (both imidacloprid and dinotefuran are being used for this), and year-round due to pepper weevil. In particular, thiamethoxam is *"absolutely critical"* for pepper weevil control since there are so few effective insecticides available. With the pepper weevil, insecticide applications must begin at the very first bloom and continue through harvest, which is continual and indeterminate in most production systems (Riley and Sparks, 2020) for the fresh market. Thiamethoxam has been identified here and elsewhere in the United States as a linchpin tool for economical control of pepper weevils, in line with EPA's own published conclusions (USEPA, 2019a).

Input from the Florida Fruit and Vegetable Association (FFVA) to USDA was in wholesale alignment with the feedback from Georgia, noting that the in-season loss of neonicotinoid insecticides would be devastating for fruiting vegetable producers in Florida (Aerts, 2020). EPA's own analysis (USEPA, 2019a) indicated very high benefits from neonicotinoid usage for Florida tomato growers, given the problems of high whitefly pressure and the associated viral diseases they vector. It was also noted to USDA by the FFVA (Aerts, 2020) that while many of the available alternatives for whiteflies used on tomatoes, such as pyriproxyfen, pymetrozine, buprofezin, and spirotetramat, have good efficacy against nymphs, neonicotinoid insecticides offer better efficacy against adults as well. Foliar and soil applications of neonicotinoid insecticides are crucial for in-season management of whiteflies to minimize transmission of viral diseases. Further, in Florida as in other regions of the United States, control of pepper weevil is heavily dependent on the use of thiamethoxam via foliar applications in season, as applications must target the bloom of the plant for efficacy and applications are needed through harvest (Aerts, 2020).

Feedback from the California Specialty Crops Council (CSCC) (Van Sickle, 2020) was also in broad concurrence with the responses from the Southeastern United States. While alternative options exist for aphids, thrips, and leafhoppers on tomatoes and peppers, the efficacy of neonicotinoid insecticides offers crucial benefits for fruiting vegetable producers for control of whiteflies and pepper weevils. Specifically, it was stated by the CSCC that *"without access to thiamethoxam, pepper growers in California would be forced to abandon peppers and [grow] other crops, some of which may not be as profitable as peppers. There really are not very effective alternatives. The weevil used to be considered a regional problem, now it is becoming a statewide problem in CA. Without control, pepper weevils will cause the grower to lose the crop"* (Van Sickle, 2020). Stakeholders from Georgia (Riley and Sparks, 2020) and Florida (Aerts, 2020) agreed with this specific statement and echoed it for producers in the Southeastern United States.

While whitefly and pepper weevil pressure are not universally present everywhere in the United States, other regionally important pests also drive the need for in-season access to neonicotinoids for fruiting vegetables. Feedback from North Carolina State University (Walgenbach, 2020) indicated to USDA that both imidacloprid and dinotefuran are linchpin tools for control of stink bugs. The only viable alternatives for stink bug control on fruiting vegetables in North Carolina and the mid-Atlantic region are pyrethroids, which are disruptive to IPM due to toxicity to mite predators. Because of this adverse effect on beneficial insects, extension experts have worked hard to move vegetable growers away from pyrethroids toward increased adoption of neonicotinoids, to preclude the need for additional acaricide applications, which would certainly be necessary in the absence of imidacloprid and dinotefuran (Walgenbach, 2020). It is also widely known that pyrethroid insecticides pose obvious acute toxicity risks to pollinators. It was stated that while soil applications of neonicotinoids may be workable for control of thrips, aphids, and whiteflies in this region (due to relatively low pest pressure), foliar applications are still critically important for control of stink bugs (Walgenbach, 2020).

While respondents from the upper Midwest, including the University of Wisconsin (Groves, 2020) and Michigan State (Szendrei, 2020), indicated that EPA's proposed restrictions were workable for now, this was because whitefly and stink bug pressure is relatively low in this region and pepper weevil is not a significant concern at this time. Further, relatively limited acreage of fruiting vegetables is grown in this region, compared to California and the Southeastern United States. However, if any or all of these pests were to become problematic in the future, neonicotinoid tools would be critically important for control. Also, feedback from Michigan State University indicates that foliar neonicotinoid applications are important for control of Colorado potato beetle on eggplants (Szendrei, 2020).

Given EPA's substantive and well-reasoned assessment of benefits and impacts (USEPA, 2019a), it is unclear to USDA why EPA would still propose to impose such a burden on growers for a set of crops that are never commercially pollinated by honeybees outdoors (USDA, 2017). While USDA lists tomatoes as requiring commercial pollination, the notes for this entry in Table 1 of the document clearly state that bumble bees would only be used commercially for indoor production (USDA, 2017). Further, stakeholders have confirmed to USDA that commercial bees are not used for outdoor production of any of these crops to any significant extent in the United States.

While USDA acknowledges that wild and native pollinators can be attracted to the flowers of these fruiting vegetable crops (USDA, 2017), we suggest that this exposure pathway and relative risk likelihood is disproportionate to the massive impacts that this proposed restriction would impose on growers, and that this sort of proposal breaks with recent EPA precedent. For example, in numerous recently released PIDs for insecticides that are known to pose significant acute toxicity risks to pollinators and other non-target insects (for example abamectin, spinosyns, and some pyrethroids), no similar restrictions are proposed for fruiting vegetables or even for crops that utilize commercial pollination services.

Given that pyrethroids, organophosphates, and carbamates are all widely known to be acutely toxic to bees, and given that these chemical classes are identified by EPA as the most likely to be adopted as substitution options in the absence of neonicotinoids, it is unclear to USDA what real-world pollinator protection benefit is served by EPA's proposal. In practicality, we suggest that EPA's proposal could have the unintended consequence of actually increasing overall acute toxicity risks to pollinators by driving increased usage of chemicals that are more disruptive to IPM than neonicotinoids. Further, given the widespread existential threat that whiteflies, pepper weevils, and their associated vectored pathogens would pose to profitable production across the country, this proposal could also potentially drive major areas of production for fruiting vegetables out of the United States altogether. We strongly urge EPA to reconsider the proposed timing and rate restrictions for fruiting vegetables in light of the comparative risks of alternatives, the real-world risk likelihood, the relative importance of the protection goal, and the existential threat that these restrictions would pose to sustainable production of fruiting vegetables in the United States.

Cucurbit Vegetables (Squash, Melons, Cucumbers, Pumpkins, etc.)

USDA is very concerned about EPA's proposed bloom restrictions for foliar and soil applications to cucurbit vegetables, but these concerns are mainly focused on cucurbit production in the Southeastern United States. Similar to what was discussed for peppers and tomatoes above, the concerns for whitefly infestation pressure and the associated viruses that are vectored by whiteflies also apply to cucurbits. Stakeholders from the University of Georgia (Riley and Sparks, 2020) and from the FFVA (Aerts, 2020) again emphasized that immense whitefly pressure in this region necessitates the application of multiple insecticides throughout the growing season to mitigate damage. EPA's proposal as currently described, which would ban foliar neonicotinoid applications from "vining to harvest," would be disastrous for growers of squash, melons, cucumbers, and other cucurbit vegetables in areas where whitefly pressure is high. As EPA discussed in its benefits and impacts assessment (USEPA, 2019a), some viruses vectored by whiteflies on cucurbit vegetables are capable of inflicting total crop losses.

Feedback from other areas of the country indicates that EPA's proposal may be more workable for some production regions, particularly the desert Southwest and the Midwestern United States. Input from the University of Arizona (Palumbo, 2020a) to USDA indicates that in the Western United States, acetamiprid is the only neonicotinoid that is recommended for use on melon and cucurbit production during bloom, mainly for whitefly control. This situation is in contrast with the conditions in the Southeastern United States, where adequate foliar control is not achieved with all neonicotinoid alternatives. Appendix A of this document provides additional information about insect vectored plant pathogens in cucurbit vegetables, for EPA's reference.

It was still was emphasized, however, that much like the Southeastern United States, soil applications at transplanting remain critically important for pest control, and rate reductions for these applications would be detrimental to control and resistance management in the desert Southwest (Palumbo, 2020a). Melon growers in Arizona and California require aggressive in-season pest control interventions due to a newly introduced virus, Cucurbit Yellows Stunting Disorder Virus (CYSDV). *"The industry quickly realized that without effective management of the vector, CYSDV could cause yield losses in excess of 70%. CYSDV is a semi-persistent crinivirus which requires a latent feeding period before efficient transmission or acquisition of the virus occurs. Thus, virus transmission and subsequent spread can be suppressed in fields by preventing adult whiteflies from feeding on melon plants for extended periods of time. To achieve economic suppression of CYSDV, melon growers commonly make multiple foliar spray applications throughout the season (including bloom and fruit set), in addition to soil applications of systemic insecticides during stand establishment"* (Palumbo, 2020a).

USDA notes that cucurbit producers in the Midwestern United States may experience relatively lighter infestation pressure from whiteflies, and seasonal production can be shorter for cucumbers grown for processing (with synchronized harvest) in contrast to indeterminately flowering and fruiting fields of cucumbers grown for the fresh market in other regions of the United States. However, cucumber beetle infestations do sometimes necessitate interventions with neonicotinoid insecticides. Feedback from Michigan State University to USDA indicated that there is still a need for neonicotinoid availability in this region: *"If (neonicotinoids) were lost, I believe it'd actually lead to more negative impacts on pollinators as growers would have to spray broad-spectrum insecticides for cucumber beetle. Now it's an isolated issue"* (Szendrei, 2020).

USDA suggests to EPA that from a practical standpoint, the proposed bloom restriction for foliar applications on crops under contracts for on-site honeybee pollination services may already adequately address many of EPA's risk concerns for bee exposure on cucurbit vegetables. Given that cucurbits depend heavily upon contract pollination services, and given that many cucurbit growers have long-established relationships with beekeepers going back many years, the requirement to contact beekeepers within 48 hours of a foliar applications seems to USDA to be an adequate measure to protect bees placed on or near cucurbit vegetable fields. We suggest to EPA that extending this requirement to soil-applied neonicotinoid applications during bloom on cucurbits would be a reasonable extension of the same protective idea. USDA believes that this solution would be practical for producers while still addressing EPA's risk concerns. Most importantly, we believe it would also provide growers with the flexibility to make crucial pest management interventions using existing bee-protective best management practices that have been workable with commercial beekeeper partners for many years prior.

Bulb Vegetables

USDA notes that EPA has proposed cancellation of all neonicotinoid active ingredients except acetamiprid for foliar use on onions and garlic. It is USDA's understanding that EPA intends to retain use of neonicotinoid seed treatments on bulb vegetables, which are of critical importance to growers. USDA appreciates EPA's recognition of seed treatment benefits and we offer more specific comments on EPA's overall approach to seed treatments in another section below. While foliar usage of imidacloprid is relatively low on onions, we note that it offers a rotational option for resistance management in IPM programs targeting thrips.

We would further suggest that the actual footprint of EPA's modeled risks of concern from this use is relatively limited, given the low overall foliar usage of neonicotinoids on onions. However, we do generally agree with EPA's published benefit assessment that overall benefits of imidacloprid are low for thrips control on onions and garlic. Stakeholder feedback from the University of Georgia (Riley and Sparks, 2020) to USDA indicates that the loss of imidacloprid for foliar use on onions would not be a major problem for most growers.

Leafy Greens and Brassica Vegetables

In general, USDA does not object to EPA's proposed reduction in the seasonal maximum foliar rates for imidacloprid applications to leafy greens and Brassica vegetables. However, we are concerned about the possible impact of the proposed dinotefuran restrictions for Brassica vegetable growers in the desert Southwest.

Extension experts from California and Georgia have communicated to USDA that imidacloprid is most critically important for soil applications, and that foliar applications are not generally observed at levels approaching the current label maximum seasonal rates. Both of these areas have significant aphid and whitefly concerns, with whiteflies as the predominant driver pest. Input from the California Central Coast (Van Sickle and Clark, 2020), the desert Southwest (Palumbo, 2020a), and the Southeast (Riley and Sparks, 2020) reflects a broad consensus that imidacloprid usage is most important for soil applications and that EPA's proposed reduction in the foliar seasonal maximum rate is not expected to be problematic for growers of leafy greens and Brassica vegetables.

While feedback from these stakeholders indicates that proposed dinotefuran restrictions would also not be widely problematic, it was noted that two applications of dinotefuran are sometimes needed in the desert Southwest to control invasive Bagrada bugs, *Bagrada hilaris*, on Brassica vegetables (Palumbo, 2020a). While two dinotefuran applications are not frequently recommended, there are instances where pest pressure from Bagrada bugs (combined with the benefit of added whitefly efficacy) drives pest control advisors to recommend a second dinotefuran application to Brassicas. As currently proposed, EPA's seasonal maximum rate reduction for dinotefuran would preclude this second application at an effective rate, and the most likely alternatives would include pyrethroids, organophosphates, and methomyl (Palumbo, 2016; Palumbo, 2020a). Given the comparatively favorable risk profile of dinotefuran and the future uncertainty of methomyl availability, USDA requests that EPA consider retaining the current seasonal maximum dinotefuran rate for Brassica vegetables in the desert Southwest (Arizona, California, Nevada, New Mexico, and Utah), where Bagrada bug management is a significant concern.

Root/Tuber Vegetables (excluding Potatoes) and Legumes (excluding Soybeans and Peanuts)

While EPA's proposed reductions in foliar seasonal maximum application rates are not expected to be widely problematic, USDA is concerned about the proposed reductions for soil-applied seasonal maximum rates for root/tuber vegetables, particularly for sweet potatoes and California carrots. We note that EPA's benefits and impact analyses did not include any usage data for sweet potatoes, as this crop is not surveyed by EPA's proprietary data provider. USDA therefore did outreach regarding neonicotinoid usage and importance on sweet potatoes to further inform EPA's benefits consideration.

Sweet potato extension experts from Louisiana State University (Smith, 2020), North Carolina State University (Huseth, 2020), and Mississippi State University (Burdine, 2020) all indicated that the full 0.38 lb ai/A soil rate of imidacloprid is widely recommended at planting for control of whiteflies, as well as other soil pests. In Louisiana, additional control of sugarcane beetles and cucumber beetles with imidacloprid is observed (Smith, 2020). All stakeholders indicated that lower soil application rates have not been evaluated for efficacy, so it is possible that some lost efficacy could be observed with this rate reduction. While the availability of clothianidin (which is not proposed for similar rate reductions on root vegetables) would offset the potential impact of an imidacloprid rate cut for some pests, stakeholders emphasized that imidacloprid is the primary soil-applied insecticide tool available that they recommend for whiteflies, and that at-plant soil applications are needed at the current maximum rate of 0.38 lb ai/A (Burdine, 2020).

Foliar neonicotinoid applications are not a widely recommended option for whitefly control in North Carolina sweet potatoes, given the availability of superior alternatives, so minimal impact would be expected from the restriction on imidacloprid in regions without heavy whitefly pressure (Huseth, 2020). However, for areas in the Southern United States with heavy whitefly pressure, limitations on foliar neonicotinoid availability could be expected to impact any crop that whiteflies attack, including sweet potatoes and legumes where resistance management and insecticide rotation is important. USDA appreciates that EPA's proposal is only to reduce the maximum seasonal foliar rate and does not propose a use cancellation.

Similarly for carrots, some stakeholders have expressed concerns that reductions in maximum soil seasonal application rates will result in a reduction in their single application rate flexibility for pests such as flea beetles. Input from the country's largest carrot producer, headquartered in California (Dowling, 2020), aligns with the prior concerns discussed around the proposed reductions in seasonal maximum rates for imidacloprid, which is critical for flea beetle control and is applied via chemigation. While alternative options are available, imidacloprid is rated as the most effective insecticide for flea beetle control by California pest control advisors. Similar to the responses for sweet potatoes, there is scant data available to support the efficacy of imidacloprid at the lower soil application rate proposed by EPA (Dowling, 2020).

In contrast, feedback from the Pacific Northwest indicates that neonicotinoids are less commonly used in this region, with the exception of seed treatments (Rondon, 2020). For root vegetables grown in Washington, including carrots, garden beets, turnips, radishes, and rutabagas, stakeholders indicated to USDA that while imidacloprid availability is very important, EPA's proposed seasonal rate reductions are not expected to be widely problematic for this region (Gerdeman, 2020). We note that clothianidin, dinotefuran, and acetamiprid are not available for use on root vegetables and thiamethoxam is not available for use on garden beets (Gerdeman, 2020), making imidacloprid a primary option for these growers.

While specific impacts on legumes are less certain, USDA notes that the same concerns regarding whitefly pressure that have been discussed for fruiting vegetables would likely apply to fresh legume crops grown in the Southern United States. For legumes and carrots grown in the upper Midwestern United States, extension experts from the University of Wisconsin (Groves, 2020) and Michigan State University (Szendrei, 2020) have indicated to USDA that the proposed reductions in imidacloprid applications would not be expected to have negative impacts in their region. However, both emphasized the importance of continued neonicotinoid seed treatment availability, which EPA is not proposing to restrict further for vegetables.

Cotton

USDA appreciates EPA's assessment and consideration of the benefits of neonicotinoid insecticides for cotton. However, we reiterate our concerns regarding EPA's proposed general pollinator protection language for crops not using contract pollinator services, which would have highly detrimental impacts on cotton production in the United States if retained as currently proposed.

In general, USDA finds EPA's proposals for cotton to be reasonable and of likely limited impact to most growers. However, we note that the Midsouth (or "Delta") region of cotton production has major challenges due to high population pressure from *Lygus* plant bugs that often necessitate intensive and aggressive chemical control tactics with neonicotinoid insecticides. Cotton extension experts from the University of Tennessee (Stewart, 2020), Mississippi State University (Catchot, 2020), University of Arkansas (Lorenz, 2020), and Louisiana State University (Brown, 2020) have provided consensus feedback to USDA on the *Lygus* situation in the Delta. This feedback largely aligns with previous feedback that stakeholders from this region have offered to USDA and EPA on multiple occasions via the National Cotton Council of America, which has hosted EPA and USDA for numerous information sessions and briefings on this topic since 2010. Generally speaking, growers need to utilize multiple tools, including sulfoxaflor, neonicotinoids, pyrethroids, and organophosphates, in careful rotations that manage insecticide resistance, to battle a very challenging situation in this region. In some instances, 10-12 insecticide applications are needed during the peak of the cotton growing season to prevent fields from being overwhelmed by *Lygus*. We also note that experts from the Delta, as well as other regions, all expressed shared concerns about the proposed droplet size restrictions addressing drift, for which USDA offers more detailed comments further below.

A particular concern for the Delta/Midsouth region is that EPA's total seasonal rate restrictions could reduce foliar availability of neonicotinoids to control *Lygus*, especially when growers utilize the full rate(s) of soil applications early in the season. While new alternatives such as flupyradifurone and acetamiprid have good foliar efficacy against aphids and thrips, they do not offer good efficacy for *Lygus* under the high population pressure present in this region (Stewart, 2020). Given the region-specific needs and the intense pest pressure that is observed in this region (which has necessitated numerous Section 18 emergency exemption applications over the past decade), USDA requests that EPA consider retaining the full availability of neonicotinoids for cotton growers in the Midsouth region (including Missouri, Tennessee, Mississippi, Arkansas, and Louisiana) as is currently labeled.

While extension experts from the Southeastern United States indicated that EPA's proposal should not be problematic for most growers in their region, feedback from the University of Georgia (Roberts, 2020) indicated that in-furrow soil applications of imidacloprid are currently recommended at the highest labeled rate, which would preclude maximum foliar rate applications of imidacloprid later in the season. In general, the adoption of soil-applied neonicotinoid usage is important for this region and serves as a primary control option for pests such as thrips. Given that use of sub-optimal foliar rates could exacerbate resistance concerns, USDA requests that EPA consider modifying the seasonal imidacloprid rate limitation to allow at least one foliar application at the full rate in addition to the soil application at the full rate for this active ingredient. We do note that thiamethoxam would still be available at rates recommended for Georgia (Roberts, 2020).

Outside of this concern for imidacloprid, experts from Virginia Tech (Taylor, 2020), North Carolina State University (Reisig, 2020), Clemson (Green, 2020), and the University of Georgia

(Roberts, 2020) shared a view that EPA's cotton proposals were otherwise workable for most growers in the Southeast region. Aphids are an occasional problem for Southeastern cotton growers, but outbreaks don't always necessitate treatment and available alternatives are likely to be adequate. There is some concern about aphid-mediated spread of cotton leaf roll dwarf virus in this region, and the possibility that aphid control could be warranted for that reason (Green, 2020; Roberts, 2020). However, for aphid control, imidacloprid is not a primary choice for this region (Reisig, 2020). While plant bug pressure is somewhat lower in this region than in the Delta, there was broad consensus that acetamiprid is not a reliable alternative for plant bugs and is only useful for aphids and whiteflies.

For other regions of cotton production, EPA's proposed reductions should be workable for the majority of growers. Feedback from the University of Arizona (Ellsworth, 2020) informed USDA that for the most part, cotton producers in the desert Southwest do not rely heavily on nitroguanidine neonicotinoids for their pest control needs. Acetamiprid is by far the most important tool used in Arizona, mainly for whitefly control (Ellsworth, 2020). Available alternatives are generally adequate for control of other pests, which occur with lower overall population pressure than is observed in the Delta. Feedback from Texas A&M University (Vyavhare, 2020) was aligned similarly and indicated that growers in most of Texas rarely utilize multiple neonicotinoid foliar applications for control of *Lygus*. While control of aphids and fleahoppers is a critical need for Texas producers, EPA's current proposal would not be problematic for this region, as pest pressure in Texas, particularly in the 4 million acres of production in the "High Plains" region, is generally low. Growers in Texas are more often using acetamiprid for control of aphids, and for relatively low pressure *Lygus* situations (Vyavhare, 2020). As seed treatments are a critical need here and in all regions for control of thrips, USDA appreciates that EPA's PID does not propose additional restrictions on this use pattern.

USDA also wishes to note that across almost all regions, experts were in agreement that the tenability of their current IPM programs is heavily reliant on the continued availability of organophosphate options such as dicrotophos and acephate. In the Delta, these active ingredients are critical tools for *Lygus* control (Stewart, 2020; Catchot, 2020). In the Delta and the Southeast, acephate applications also take on increased early-season importance as regional neonicotinoid resistance problems emerge for tobacco thrips (Roberts, 2020), and acephate is also still a critical need for *Lygus* (Reisig, 2020). USDA commends EPA on its careful consideration of cotton benefits in the development of these PIDs. Both EPA and USDA have benefited from the proactive outreach activities coordinated by the National Cotton Council of America on behalf of cotton producers. We urge EPA to continue coordinating with these stakeholders and to consider that future restrictions on alternative active ingredients such as dicrotophos and acephate could drastically change pest management paradigms for cotton producers and alter the degree to which neonicotinoids are successfully used in cotton IPM.

Seed Treatments

USDA appreciates EPA's recognition of the benefits of neonicotinoid seed treatments to U.S. agriculture and we note that across numerous crops, these uses allow for highly beneficial preventative pest management options that can preclude the need for using more broad-spectrum soil-applied insecticides. We commend EPA's assessment of the agricultural benefits of seed treatments on small grains and vegetables, and we particularly appreciate the discussion of impacts and costs associated with pelletizing small seeds. We also appreciate EPA's publication of a revised assessment and response to comments document on the benefits for soybean seed treatments (USEPA, 2017b). This revision included prior input from USDA and more explicitly accounted for regional seed treatment benefits driven by high soil pest pressure, particularly in the Southern United States.

USDA notes that EPA has proposed a closed-system requirement for commercial seed treatment of corn with thiamethoxam, while on-farm treatment is not restricted. Conversely for imidacloprid, on-farm seed treatment is proposed for prohibition for canola, millet, and wheat, while commercial seed treatment is not impacted. Neonicotinoid insecticide seed treatments are critically important for control of soil-dwelling pests on cereal grains and for control of flea beetles on canola. Generally, USDA is concerned when farmers are restricted in their ability to treat seeds on farm. On farm treatment typically allows for greater flexibility in application rates, differential treatment of seed by planting site, and grower convenience. However, we do note that clothianidin seed treatments remain available for all three of these commodities, with on farm seed treatment options available for wheat and millet. In seeking information about the impact of the imidacloprid on farm seed treatment prohibition for canola growers, we received feedback from the Northern Canola Growers Association (Coleman, 2020) and the Minnesota Canola Council (Nelson, 2020) indicating that few if any canola growers in the United States treat their seeds on farm. Because treated canola seed is almost always purchased with seed treatments already applied at commercial facilities, USDA does not expect any widespread negative impacts on canola growers from these proposed restrictions.

We strongly support EPA's proposals to mandate clear and consistent seed treatment advisory language for the proper handling of seeds, prevention/clean-up of spills, and best management practices. USDA believes this will provide additional clarity to growers using treated seeds and help to reduce the likelihood of unintentional ecological exposure without imposing undue hardship on growers. USDA requests that EPA clarify whether advisory statements for seed treatment uses will be placed on end-use seed treatment product labels, or if they will be placed on seed bag tags. The acetamiprid PID does not specify a location for these statements, while the imidacloprid, clothianidin, and thiamethoxam PIDs specify that the statements are to be added to the seed bag tag. Since these advisory statements are directed toward users/planters of treated seed, USDA suggests that it may be most appropriate to place the statements on the seed bag tags for commercial seed treatments.

Tree Fruits

USDA appreciates EPA's assessment and consideration of the benefits of neonicotinoid insecticides for citrus, and we appreciate that no additional label restrictions are proposed for this critically important use pattern. USDA strongly supports the continued availability of neonicotinoid insecticides to manage Asian Citrus Psyllid (ACP), which vectors the Huanglongbing greening disease in citrus crops. The spread of this disease represents an ongoing existential threat to citrus production in the United States and citrus growers are in desperate need of a wide variety of insecticidal tools to manage the disease vector throughout the growing season. We compliment EPA's thorough assessment of neonicotinoid benefits and potential mitigation impacts for citrus and appreciate EPA's recognition of the importance of neonicotinoid insecticides to citrus IPM. However, we again reiterate our concerns regarding EPA's proposed general pollinator protection language listed for crops not using contract pollinator services, which could have highly detrimental impacts on citrus production in the United States if retained as proposed.

For deciduous tree fruits (pome fruits and stone fruits), USDA generally supports EPA's proposed restrictions on the total seasonal maximum rates for imidacloprid, clothianidin, and thiamethoxam. We also support EPA's proposed post-bloom restrictions for applications of thiamethoxam (pome and stone fruits) and dinotefuran (stone fruits only). We note that for a number of key pests of pome and stone fruits, the continued availability of acetamiprid is critically important as a substitution option for nitroguanidine neonicotinoids. This is particularly true for control of plum curculio, which is a key direct pest in the Eastern United States. While thiamethoxam applications are sometimes made near bloom to address this pest, the prohibition of thiamethoxam applications prior to petal fall is not expected to be impactful, due to the retained availability of acetamiprid. USDA also notes that in the Pacific Northwest, control of mealybugs on apples and cherries is critical to prevent vectoring of Little Cherry Virus, and neonicotinoid insecticides are a critical tool for this situation. However, the Northwest Horticultural Council (NHC) has provided input to USDA from numerous industry stakeholders who all agreed that EPA's proposed restrictions are not problematic for managing this pest (Epstein, 2020). Limitations on the number of applications of imidacloprid are not expected to impact the availability for mealybug control, as acetamiprid remains available as a highly effective tool.

While clothianidin and thiamethoxam can occasionally be used for pear psylla control, multiple pest control advisors and other industry stakeholders have indicated to USDA through NHC (Epstein, 2020) that the proposed prohibition of applications prior to petal fall will not be problematic, due to the number of available alternatives and the retention of both thiamethoxam and clothianidin for applications later in the growing season. Stakeholder feedback from NHC (Epstein, 2020), Michigan State University (Wise, 2020), Penn State University (Krawczyk, 2020), Cornell University (Agnello, 2020), and Virginia Tech (Bergh, 2020) reflects a broad national consensus that EPA's seasonal rate reductions and timing restrictions for pome and stone fruits are workable for existing IPM programs. Other than concerns about proposed drift language as it relates to air blast sprayers (discussed further below) EPA's proposal is not expected to cause any problematic impacts for tree fruit growers.

Tree Nuts

USDA appreciates that timing restrictions are not proposed for imidacloprid or clothianidin. EPA's usage analysis also indicates that the seasonal rate reductions proposed for neonicotinoids do not appear to be problematic for most growers of tree nuts (USEPA, 2019a). However, we note that EPA's tree nut rate analysis aggregated across all tree nut crops. We request that EPA confirm that proposed seasonal rate reductions for imidacloprid and clothianidin do not disproportionately impact any specific tree nut crop over another. For instances where neonicotinoid applications target aphids, particularly in pre-bloom periods, USDA notes that a major alternative is chlorpyrifos.

We note that timing restrictions around bloom have been proposed for thiamethoxam, but that usage is only reported on pecans and pistachios. USDA notes that of all the tree nuts mentioned in EPA's PID, only almonds are commercially pollinated by bees. We agree with EPA that pre-bloom and bloom application restriction of neonicotinoids are sensible for almond productions, given the annual and intentional pollinator interface and the crop's overall dependence on commercial honey bees for production. However, walnuts, pecans, pistachios, and hazelnuts are all wind pollinated. In terms of bee attraction, only walnuts and hazelnuts show even marginal honeybee attractiveness and even then, only to pollen (USDA, 2017). Since neither pecans nor pistachios are rated as bee attractive, it is unclear to USDA what protection goal is served by the proposed bloom restrictions of thiamethoxam on these crops.

Tropical/Sub-Tropical Fruits

USDA appreciates that no timing or seasonal rate restrictions have been proposed for pomegranates, where growers rely upon neonicotinoids significantly. While we agree with EPA's analysis that proposed timing restrictions for olives, avocados, bananas, and dates are not likely to be broadly impactful to growers, we note that of these crops, only avocados are rated as attractive to bees and are commercially pollinated (USDA, 2017). Because avocado bloom is indeterminate, the proposed timing restrictions amount to a de facto cancellation of neonicotinoid use on this crop. While USDA acknowledges that reported neonicotinoid usage on avocados is very low (USEPA, 2019a), we note that because avocados are commercially pollinated, EPA's proposed bloom time application restriction requiring beekeeper notification would apply. USDA believes that this existing mitigation option would offer practical flexibility for avocado growers to retain access to neonicotinoid options for sporadic and exigent IPM needs, while still addressing EPA's risk concerns for bees.

Berries and Grapes

USDA appreciates EPA's assessment and consideration of the benefits of neonicotinoid insecticides for grapes, and we appreciate that no additional label restrictions are proposed for this key use pattern. However, we again reiterate our concerns regarding EPA's proposed general pollinator protection language listed for crops not using contract pollinator services, which would have highly detrimental impacts on grape and berry production (particularly strawberries, given indeterminate blooming) if it is retained as proposed.

In general, USDA does not expect that EPA's proposal would impose widespread negative impacts on berry growers; but there are some exceptions. Feedback from the Cranberry Institute (Wilson, 2020) to USDA indicates that soil applications of imidacloprid at the maximum rate are needed for control of soil insects such as grubs and cranberry rootworms. Reducing this rate could compromise efficacy in a situation where no viable alternatives are available. USDA notes that aquatic exposure concerns associated with cranberry uses may be significantly over-estimated by EPA's PFAM model, which models in-field concentrations only and does not quantitatively account for down-stream dilution where ecological protection goals are more clear and problematic exposure is more likely. Further, the benefits of retaining effective control of soil insects for cranberries is significant. The Cranberry Institute (Wilson, 2020) also noted that the rate reduction for thiamethoxam could have some impact on control of cranberry weevils, which are beginning to show resistance to indoxacarb. While EPA's proposed reduction would still allow for two foliar thiamethoxam applications at the maximum rate, it would preclude a third application for scenarios where pest pressure and resistance necessitate it. The Cranberry Institute's internal usage survey data indicate that approximately 80% of cranberry growers in Massachusetts are expected to apply thiamethoxam in 2020.

Strawberry stakeholders from Cal Poly, San Luis Obispo (Shearer, 2020), the Florida Fruit and Vegetable Association (Aerts, 2020), and North Carolina State University (Burrack, 2020) largely agreed that EPA's proposals for strawberries are not likely to be problematic for most growers, aside from the aforementioned concern with EPA's non-contract pollinator bloom restriction proposal. In general, neonicotinoid applications at planting are of most critical importance for strawberry growers, and existing preharvest interval restrictions preclude much in-season foliar usage of neonicotinoids, especially for ever-bearing varieties. While early-season foliar applications are sometimes done to control aphid and whitefly outbreaks, this would not be precluded by EPA's proposal. It was noted that for California, acetamiprid is an adequate aphid control alternative, but is not effective on whiteflies (Shearer, 2020).

USDA has not received specific concerns from industry stakeholders related to EPA's proposals for blueberries or caneberries. However, we note and agree with EPA's conclusion that in many cases, soil application seasonal maximum rates reflect single application rates for many situations, including blueberries and caneberries (USEPA, 2019c). Feedback from North Carolina State University (Burrack, 2020) indicates that of the proposed restrictions, the most concern is for the seasonal rate reduction for soil applications of imidacloprid. While this use is not widespread, it was stated that soil applications are gaining popularity in the Southeastern United States for blueberries in response to infestations of root-boring beetles (Burrack, 2020). We also note EPA's conclusion (USEPA, 2019c) that many of the most likely alternatives for neonicotinoid applications include organophosphates and synthetic pyrethroids.

Poultry Houses

USDA notes that for EPA's exposure estimates for neonicotinoids from poultry house treatments targeting darkling beetles, the modeling of treated poultry litter applied to agricultural fields was mostly based on an upper-bound (i.e., screening-level) rate calculation. Even assuming the unlikely utilization of upper-bound usage rates as discussed in a prior EPA memorandum (USEPA, 2017c), poultry litter applied to fields is generally incorporated into soil for row crops, and therefore would be unlikely to pose risks near those modeled by EPA. USDA further notes that the above memorandum (USEPA, 2017c) used to calculate a final field application rate of 0.011 lb ai/A (vs. 0.49 lb ai/A) is likely to be more reflective of real-world usage under most conditions.

However, USDA notes that the restrictions proposed for imidacloprid and clothianidin limit use of each active ingredient to one whole-house application per year. Currently labeled uses for spot and perimeter treatments with thiamethoxam remain unchanged. Prior extension and stakeholder input to USDA through the U.S. Poultry and Egg Association (Bredwell, 2017) indicated that most insecticide treatments of poultry houses are targeted at structural perimeter applications and areas near feed lines where beetles are most likely to congregate. Whole-house treatments tend to be cost-prohibitive and are done infrequently. Based on the continued availability of single whole-house applications for both imidacloprid and clothianidin, and with the additional perimeter/structural treatments retained for all three active ingredients, EPA's proposed mitigation is not expected to negatively impact poultry producers seeking control of darkling beetles.

Commercial Ornamental Production (Outdoor)

In general, stakeholder feedback to USDA indicated that EPA's proposal to lower the seasonal maximum application rates of several neonicotinoids is expected to have limited impact on producers of commercial ornamentals and nursery plants (Calabro, 2020). While the lowering of seasonal maximum limits is not expected to be widely problematic, stakeholders noted that some pests can occasionally require aggressive control approaches at rates at or near current label maximum rates, and that acetamiprid does not offer the same level of control for all target pests (Calabro, 2020).

Regarding quarantine uses, USDA notes that commercial nurseries are often the most important site of applications for APHIS-PPQ programmatic needs. Stakeholders seek to ensure that uses that have been exempted from major mitigations are not limited to federal lands, and they also request clarification on which particular quarantine pests are included in this exemption. USDA-APHIS comments around this issue and clarification needs are found later in this document. Stakeholders noted that imidacloprid and dinotefuran are particularly important tools for these uses due to their efficacy, systemic activity, and residual control (Calabro, 2020). USDA appreciates that no additional restrictions are proposed for indoor/greenhouse production of commercial ornamentals.

Residential Ornamentals and Landscapes

USDA notes that neonicotinoid product labels already contain the 'bee box' and other mitigation language applied by EPA in 2013, and that this well-vetted and considered measure already provides good clarity to users around bee protection. While USDA generally supports EPA's proposal to apply additional advisory language and facilitate stewardship activities by registrants to ensure responsible use of neonicotinoid products by homeowners, we have concerns with EPA's proposed statement that these products are "intended for use by professional applicators." This statement does little to achieve the intended purpose of promoting pollinator protection and may actually be confusing to users since no context is provided. We request that EPA consider a statement that more explicitly addresses the actual concern. One possible example of a statement that alludes to pollinators and then clearly directs users to take appropriate protective action is as follows:

> *"To protect pollinators, use caution when using this product on or near blooming plants. Consult your local State Agricultural Experiment Station, or Extension Service Specialists for specific information or guidance on pest management practices for pollinator-attractive plants."*

While EPA's Label Review Manual indicates that the statement "intended for use by professional applicators" is advisory, USDA is concerned that this proposed statement would be confusing to homeowners and could conflict with the benefits that these products are intended to provide. Legal and judicious use of these types of products by homeowners is critical in limiting and managing outbreaks of invasive species that threaten agricultural production. For example, in California, treatment of backyard residential citrus trees for Asian Citrus Psyllid (ACP) is an important component of area-wide prevention of ACP infestation for commercial citrus groves. Similarly, programs in the mid-Atlantic are in progress to encourage homeowners to identify and manage the invasive spotted lanternfly (SLF), including specific recommendations for use of available insecticides that include dinotefuran and imidacloprid (Penn State University, 2020). While we appreciate EPA's goal of reducing risks to pollinators, we believe that an alternative advisory to the "professional applicators" verbiage, such as that proposed above, could more effectively achieve the intended goal while avoiding confusion to users and preserving important benefits to agriculture.

We further note that in terms of real-world pollinator risks, uses in residential landscape settings tend to be spot treatments that do not result in wide-acreage exposure risks, and that many ready-to-use products are highly diluted. We encourage EPA to choose label verbiage that would not in any way discourage consumers from managing important invasive pests. USDA-APHIS offers additional comments below regarding quarantine needs for ACP, SLF, and other pests.

Finally, we note that EPA's proposal to cancel liquid spray applications of imidacloprid to residential lawns could result in cost impacts to users seeking effective control of grubs and other turf pests (Calabro, 2020). We request that EPA consider the impacts on efficacy and comparative exposure from use of granular-only formulations and the potential impacts of substitution costs for use of alternative active ingredients.

Drift Mitigation Proposal

While USDA generally supports EPA's approach to drift mitigation for ecological risk concerns, which focuses on mandating maximum application heights, wind speed restrictions under 15 mph, and droplet sizes, we have some concerns with the applicability of droplet size restrictions as currently proposed. As written, specific droplet size requirements are impractical for air blast sprayers, due to the inevitable effects of wind shear on droplet size spectra for this use pattern. USDA notes that for pyrethroid insecticides, proposed droplet size restrictions were, appropriately, proposed only for aerial and ground boom applications (USEPA, 2019b).

USDA suggests that language mandating actual droplet size may not be feasible and would be highly difficult to enforce, given the inherent variability around control inputs that impact droplet sizes on myriad and varied spray application equipment that is available for applying neonicotinoid insecticides. Given that nozzles are often marketed with specifications directly applicable to droplet size control, USDA requests that EPA consider the following alternative language that has been proposed more recently for numerous other PIDs:

> *"Applicators are required to select nozzles and pressure that deliver medium or coarser droplets as indicated in manufacturers' catalogues and in accordance*

with American Society of Agricultural & Biological Engineers Standard 572.1 (ASABE §572.1).”

We also note that there are many situations where droplets smaller than “medium” are necessary for efficacy of neonicotinoid insecticides. This would be especially true for applications that target insect pests via contact efficacy, rather than systemic efficacy--for example, *Lygus* on cotton or stink bugs on rice (USEPA, 2019d). This is also particularly important for pests that occur on the under-sides of leaves in dense crop canopies, for example. USDA received specific feedback from Texas A&M University (Vyvahare, 2020) regarding the need for droplet size flexibility that is in broad agreement with other stakeholder inputs on droplet size needs for cotton. To quote the university’s extension expert, *“... finer droplets are critical for adequate insecticide coverage especially in the tall rank cotton. Coarser or medium droplets may not provide desired level of coverage and control against target pests such as cotton aphids which colonize and feed from the underside of leaves and cotton bollworms which can dig deeper into the lower canopy of plants. Restrictions of medium and coarser size droplets will compromise insect control and will eventually result in need for additional insecticide applications”* (Vyvahare, 2020). Coverage is also a common concern for crop foliage with trichomes or heavy waxy cuticles (such as Brassica vegetables), where larger droplets can bead up and run off of the leaf prior to drying if the spray droplets are too large.

For niche situations where droplet sizes might impact efficacy, particularly for crops where the target pests are hemipteran pests killed by contact rather than systemic efficacy, the current proposal could have the unintended consequence of driving growers to use higher per-acre application rates of neonicotinoids to compensate for lost efficacy, which would run counter to EPA’s overall risk reduction goals. We also agree with EPA’s conclusions, stated in several benefits/impact analyses, that stringent droplet size requirements could negatively impact growers and drive users to comparatively riskier and more problematic alternatives.

USDA suggests that consideration of additional nuance (by use pattern), and some associated compromises might help to address these concerns. For example, for in-furrow or banded applications to soil (especially where the pesticide is incorporated, buried, or further watered-in after application), USDA suggests that a more stringent requirement of nozzles delivering coarse or ultra-coarse droplets would provide a substantial reduction in the likelihood of drift without negatively impacting efficacy. Conversely, for foliar applications, USDA suggests that EPA’s requirement for medium and coarser droplets might be modified in ways that preserve user flexibility and maintain efficacy for instances where adequate foliar coverage would be negatively impacted. Some possible examples include:

1. A general exception allowing for fine droplets in “situations where adequate foliar coverage is difficult.”
2. Allowing “fine and coarser” droplets as a default for all foliar applications, as this could still provide a meaningful reduction in drift likelihood relative to being silent or advisory-only on the issue of droplet sizes.
3. Alternatively, EPA could consider allowing a fine droplet size only when wind speeds are below 10 mph, rather than 15 mph, while retaining the proposed 15 mph wind restriction for all ground boom and aerial applications where medium or coarser droplets are used.

Tolerance Actions and International Harmonization

USDA recognizes the increasing importance of international maximum residue limit (MRL) harmonization and appreciates that EPA considered Codex MRLs (as well as MRLs in Canada and Mexico) in its reviews of the existing U.S. tolerances for acetamiprid, dinotefuran, imidacloprid, clothianidin, and thiamethoxam. In general, we encourage EPA to consider a more comprehensive approach to MRL harmonization by evaluating not only existing U.S. tolerances but also cases where Codex has established an MRL and EPA has no corresponding tolerance. Specific opportunities for further harmonization with Codex are outlined below and in the attached Appendix B. Given that dietary risk estimates are below levels of concern for each of these chemicals, even under conservative exposure assumptions (e.g., tolerance-level or field trial residues, 100 percent crop treated), USDA suggests that further action to harmonize with Codex is unlikely to impact EPA's dietary or aggregate safety findings.

Acetamiprid

In its draft human health risk assessment for acetamiprid (DP441937, December 15, 2017), EPA noted that harmonization with Codex MRLs is a priority and identified several cases where U.S. tolerances could potentially be raised to harmonize with Codex MRLs for the same commodities (green onion and small fruit and berry subgroups 13-07A, 13-07B, and 1307F). In the PID for acetamiprid, however, EPA does not propose to take any action to harmonize U.S. tolerances with Codex MRLs. USDA requests that EPA either reconsider the proposed tolerance actions outlined in the PID or provide an explanation for not harmonizing with Codex. USDA also notes several commodities with Codex MRLs for which EPA has not established tolerances and does not appear to have considered harmonization, including cardamom; pepper, black, white; peppers chili, dried; and sweet corn fodder (Codex Alimentarius, 2016a). USDA encourages EPA to consider the potential for Codex-aligned import tolerances for these commodities. See Appendix B, Table B1.

Dinotefuran

In the PID for dinotefuran, EPA proposes to raise several U.S. tolerances to harmonize with Codex MRLs for the same commodities (grape, raisin; kohlrabi; vegetable, head and stem Brassica, group 5-16). USDA also identified several commodities with Codex MRLs for which EPA has not established tolerances and does not appear to have considered harmonization, including peppers chili, dried; poultry meat; and rice straw and fodder, dry (Codex Alimentarius, 2013). USDA encourages EPA to consider the potential for Codex-aligned import tolerances for these commodities. See Appendix B, Table B2.

Imidacloprid

In the PID for imidacloprid, EPA proposes to raise the U.S. tolerances for citrus fruits and coffee to harmonize with Codex MRLs for the same commodities. EPA notes that other tolerances and MRLs cannot be harmonized because U.S. use patterns necessitate higher tolerances than those set by Codex. USDA identified several commodities where this does not appear to be the case (i.e., the Codex MRLs are higher than U.S. tolerances), including almond hulls; basil; blueberry;

caneberry subgroup 13-A; citrus, dried pulp; currant; elderberry; gooseberry; hop, dried cones; huckleberry; Juneberry; kale; lingonberry; peanut; pear; pomegranate; salal; soya bean fodder; and vegetables, root and tuber. While USDA recognizes that the misalignment of U.S. and Codex crop groupings and commodity definitions may create challenges for harmonization in some cases, we request that EPA either reconsider harmonization for these commodities or provide a more comprehensive explanation of the reasons for not harmonizing with Codex. USDA also notes several commodities with Codex MRLs for which EPA has not established tolerances and does not appear to have considered harmonization, including olives for oil production; peanut fodder; peppers chili, dried; prunes, dried; and tea, green, black (fermented and dried) (Codex Alimentarius, 2016b). USDA encourages EPA to consider the potential for Codex-aligned import tolerances for these commodities. See Appendix B, Table B3.

USDA also seeks clarification of the information in Appendix E of the PID for vegetable, Brassica leafy, group 5. The PID comments state that this tolerance will be updated to the Brassica head and stem vegetable, group 5-16, but it appears to USDA that several of the commodities in group 5 would be covered under the leafy greens group 4-16. (USDA also notes that 4-16 is a group, not a subgroup as listed in Appendix E.) Finally, USDA notes that although Table C.1 of EPA's draft human health risk assessment for imidacloprid (DP437947, June 22, 2017) lists a U.S. tolerance for tea, no such tolerance exists in 40 CFR §180.472. USDA suggests that the listing in Table C.1 may be a typographical error, as it appears that this value would be correctly placed in the column for Canada.

Clothianidin and Thiamethoxam

For clothianidin, EPA proposes in the PID to raise several U.S. tolerances to harmonize with Codex MRLs for the same commodities (low-growing berries, subgroup 13-07H, except strawberry; grain, cereal, group 15, except rice; and grain, cereal, forage, fodder, and straw, group 16, except rice, straw). USDA appreciates EPA's proposal but notes that the Codex MRL for berries and other small fruits includes strawberry, and that Codex has established a separate MRL for rice. USDA therefore encourages EPA to reconsider the exclusions of strawberries and rice from the proposed U.S. tolerances. USDA also notes that EPA has established a time-limited Section 18 tolerance for clothianidin in/on rice and consequently believes that the exclusion of rice from the group 15 tolerance may be unnecessary. USDA further notes that there are several commodities with Codex MRLs for which EPA has not established tolerances and does not appear to have considered harmonization, including cacao beans; eggs; poultry meat and byproducts; pea hay or pea fodder (dry); peppers chili, dried; pineapple; prunes, dried; and sugar cane (Codex Alimentarius, 2015a). USDA encourages EPA to consider the potential for Codex-aligned import tolerances for these commodities. See Appendix B, Table B4.

There are several other commodities with Codex MRLs for which EPA has not established clothianidin tolerances. USDA notes that, based on the tolerance expression in 40 CFR §180.565 for thiamethoxam, certain U.S. tolerances established for thiamethoxam may account for residues of clothianidin (calculated as the stoichiometric equivalent of thiamethoxam). The commodities for which Codex has established clothianidin MRLs and EPA has established thiamethoxam tolerances include artichoke, globe; avocado; banana; beans, except broad bean and soya bean; coffee beans; dried grapes (raisins); hops, dry; legume vegetables; edible offal (mammalian); mango; mints; oilseeds; papaya; and sweet corn (corn-on-the-cob). For these commodities, USDA encourages EPA to ensure that the U.S. tolerance levels established for clothianidin residues—whether they result from direct application of clothianidin or application of thiamethoxam—are aligned with the MRLs established by Codex to the extent possible. See Appendix B, Table B4.

For thiamethoxam, EPA proposes in the PID to raise certain U.S. tolerances to harmonize with Codex MRLs for the same commodities (caneberry, subgroup 13-07A). USDA notes several other commodities for which minor increases to current U.S. tolerances would achieve harmonization with Codex MRLs, including artichoke, globe; avocado; berry, low-growing, subgroup 13-07G, except cranberry; Brassica, head and stem, subgroup 5A; bushberry, subgroup 13-07B except lingonberry and blueberry, lowbush; cranberry; fruit, citrus, group 10; fruit, pome, group 11; fruit, stone, group 12, fruit, small vine climbing, except fuzzy kiwifruit, subgroup 13-07F; milk; potato; vegetable, cucurbit, group 9; vegetable, fruiting, group 8; vegetable, legume, group 6; vegetable, root, subgroup 1A; vegetable, tuberous and corm, except potato, subgroup 1D; and wheat, straw. While USDA recognizes that the misalignment of U.S. and Codex crop groupings and commodity definitions may create challenges for harmonization in some cases, we request that EPA either reconsider harmonization for these commodities or provide a more comprehensive explanation of the reasons for not harmonizing with Codex. USDA also notes several commodities with Codex MRLs for which EPA has not established thiamethoxam tolerances and does not appear to have considered harmonization, including cacao beans; eggs; oilseeds; pea hay or pea fodder; peppers chili, dried; pineapple; and poultry meat and byproducts (Codex Alimentarius, 2015b). USDA encourages EPA to consider the potential for Codex-aligned import tolerances for these commodities. See Appendix B, Table B4.

Animal and Plant Health Inspection Service (APHIS) Plant Protection and Quarantine (PPQ) Comment on the U.S. EPA Office of Pesticide Programs (OPP) Neonicotinoid (imidacloprid, dinotefuran, clothianidin, and thiamethoxam) Registration Review Proposed Interim Decisions

The abbreviated comments below follow detailed APHIS comments, dated April 20, 2018, submitted in response to the neonicotinoid registration review risk assessment public comment period. Updates on quarantine and treatment programs in place that use neonicotinoids to control invasive pests, as well as specific comments on the EPA proposed label changes for these chemicals, are below.

Proposed Interim Decision Label Table

APHIS appreciates the proposed quarantine-use exception to the EPA proposed rate reduction for "Production/Commercial Ornamentals, which includes ornamental trees, forestry, ornamental woody shrubs and vines, and outdoor greenhouse/nursery" not to exceed maximum annual application rate of 0.40 lbs ai/A/yr for both foliar spray and soil drench. APHIS wanted to clarify the exception statement that says, 'Does not include indoor commercial nursery, Christmas trees, greenhouse uses, or forestry use on public land and quarantine application by USDA,' to a suggested:

'Does not include indoor commercial nursery, Christmas trees, greenhouse uses, forestry use on public land, or applications made for USDA quarantine requirements or treatment programs.'

This is to clarify that applications for quarantine are not just done on federal or public land, if that is implied in the current exception. APHIS applications, or applications done to comply with APHIS quarantines, are more often done on land the government does not own, like residential, commercial, or otherwise private land. In addition, USDA is not conducting the applications in many cases, and instead contracts with certified applicators to apply pesticides for treatment programs. Private entities such as nurseries are also conducting applications or hiring certified applicators to comply with quarantines imposed by APHIS.

Updates and Additional Information –APHIS Programs that use Neonicotinoids

Spotted Lanternfly

The spotted lanternfly (SLF) is a new pest with confirmed live detections in Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia. Since the April 2018 APHIS comment was submitted, the SLF has continued to spread, and now the quarantine includes thirteen counties in eastern Pennsylvania, in addition to Philadelphia. SLF egg masses can easily be transported long distances on a wide variety of surfaces such as rock, concrete, tile, and wood. SLF can walk, jump, or fly short distances, and its long-distance spread is facilitated by the human assisted movement of infested material or items containing egg masses. Spreading SLF populations make it harder to eradicate this pest, which could seriously harm grape, apple, peach, stone fruit, and logging industries throughout the country. Dinotefuran and imidacloprid are used to control the insects, which congregate to feed on the host Tree of Heaven (*Ailanthus altissima*), itself an invasive species. Most *Ailanthus* are removed on infested properties, but a few 'trap trees' are left behind and then treated with a basal trunk spray or injection to target the instars and adult insects feeding on those trees.

Asian Longhorned Beetle

The Asian Longhorned Beetle (*Anoplophora glabripennis*, ALB), native to Asia, is a pest of a wide variety of hardwood tree species that provide urban and suburban shade, recreational uses, and forestry uses including timber and maple syrup production. ALB was probably introduced in woodpacking material or infested wood pallets in cargo shipments. The ALB Eradication Program is a cooperative effort between Federal and State agencies to identify and eradicate ALB infestations in the United States to protect forest trees. To date, there have been ALB outbreaks in Illinois, Massachusetts, New Jersey, New York, and Ohio. APHIS continues to work toward eradication of ALB in Massachusetts, as well as New York and Ohio.

ALB bores through the tissues of the tree that carry water and nutrients. The tree then shows symptoms of infestation in 3 to 4 years and is more vulnerable to secondary attack by disease and other insects. Infested trees do not recover, or regenerate and trees typically die 10 to 15 years after ALB initial infestation. APHIS and the states establish quarantine boundaries 1.5

miles from a tree with ALB-exit holes, and 0.5 miles from a tree with egg sites only. Movement of regulated articles is restricted outside of the quarantine area, examples of which include firewood from all hardwood species, green lumber, and other living, dead, cut, or fallen material from ALB-host trees. APHIS regulates 12 genera of host trees where ALB can feed and complete its life cycle, but maple (*Acer)* is the most commonly infested tree genus in the United States, followed by elm (*Ulmus)* and willow (*Salix)*.

As part of its integrated approach to eradication, the Program removes infested host trees as well as high risk host trees within a ½ mile of infested host trees. The decision to treat or remove high risk host trees is based on levels of infestation in the area, host tree density and distribution, potential environmental impacts, and logistical resources. Because there is a risk that nearby host trees are also infested, these trees are treated once a year with imidacloprid to protect them from the beetle. The treatment is part of an integrated approach that also includes implementation of quarantines. Identification of ALB pheromones is an ongoing area of research but these chemistries are currently not available.

Citrus Psyllid

Imidacloprid and dinotefuran are required for use in the Asian citrus psyllid on citrus nursery stock in the APHIS Treatment Manual and Citrus Nursery Stock Protocol for use as soil drench or in-ground granular treatments prior to shipment. The Asian citrus psyllid spreads the introduced Huanglongbing (HLB) or citrus greening disease, about which EPA is well aware. HLB is devastating to the citrus industry and is now established throughout most citrus-producing counties in Florida; the entire State is under Federal quarantine for citrus greening and Asian citrus psyllid. APHIS quarantine regulations restrict the movement of live citrus plants, plant parts, budwood, or cuttings outside of Florida. Citrus nursery stock and related hosts must be treated for the psyllid before it can be moved out of quarantine areas to prevent its spread. Alternatives to neonicotinoids include organophosphates like chlorpyrifos, and the pyrethroids.

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Appendix A

USDA Review and Discussion of Common Diseases Transmitted by Insect Vectors in Fruiting Vegetables and Cucurbits

Common Diseases Transmitted by Tomatoes and Peppers

Control of viral diseases is a challenge to growers and can only be managed, at best, to minimize losses. Generally, the most effective management strategy is to deploy resistant cultivars. However, the emergence of resistance in plant-virus-insect interactions has become a common threat to the long-term survival of cultivars. Zitter (2014) indicated that the application of insecticides has not been completely successful in treating viral diseases for the following reasons: insects frequently develop resistance to insecticides (common for whitefly-transmitted viruses); insects are often able to transmit viruses in a very short time frame (common for aphid-transmitted viruses in a nonpersistent manner); and the incidence or severity of virus diseases varies from season to season because of the complex interrelationships among the virus pathogen, crop, insect vector, virus source, and the environment.

Management of insect-transmitted viruses - whether in the field or the greenhouse, organic or conventional farming - is most effective when virus reservoirs and insect vectors can be eliminated. The most effective strategy is an integrated approach with deployment of virus-free planting material, adequate testing of planting material exhibiting viral disease symptoms, elimination of weeds and other sources of virus near susceptible crops, and reduction of vector populations through biological or chemical methods (Adkins et al., 2012).

University of Georgia entomologists (Riley, 2020)highlighted that neonicotinoids have been one of the principal group of insecticides for insect vector control since the 1990s, notably whitefly and geminivirus control in tomato and thrips vector control in tomato. Imidacloprid reduces settling and feeding for some species of thrips. In the last decade, the diamides have become viable alternatives to the neonicotinoids for whitefly/tomato yellow leaf curl virus (TYLCV) in tomato and thrips/tomato spotted wilt virus (TSWV) in tomato. Furthermore, they noted that the dominant impact of insecticides for virus vector control is by reducing secondary spread. In addition, insecticide resistance has been prevalent in whiteflies and other vectors, requiring rotations of insecticide modes of action, and multiple modes of actions in registered crops. In spite of the prevalent use of insecticides for vector control, University of Georgia believes that "most field biologists would agree that host plant resistance to the virus is the first and best tactic for mitigating damage due to plant viruses, e.g. thrips transmitted TSWV in tomato and pepper, whitefly transmitted TYLCV in tomato and aphid transmitted mosaic viruses in cucurbits. However, whitefly transmitted virus resistance is not commercially available in cucurbits.

A. Aphid-Transmitted Viruses

Only a fair efficacy rating of aphid-transmitted viruses has been demonstrated with the Southeastern Vegetable Extension Workers on alternative management practices in peppers such as the change in planting date within a growing season; prompt destruction of crop residue;

application of horticultural oils; use of reflective mulch; and weed management (Southeastern U.S. Vegetable Crop Handbook, 2020).

1. Alfalfa Mosaic Virus
   Alfalfa mosaic virus (AMV) becomes economically important when tomato crops are situated near established alfalfa fields or permanent pastures. Greater losses to tomato have occurred in the Imperial Valley of California, where losses of 10-15% have been reported with a more uniform spread of AMV throughout the tomato fields. In other parts of California, damage from AMV infection has been limited to those areas of tomato fields that are adjacent to alfalfa fields (Zitter, 2014).

   Because of the nonpersistent manner of virus spread, spraying to control aphids will not control the primary spread of AMV. Other interventions to address AMV infections include avoidance of infection by not planting tomato near fields of alfalfa or red clover as well as future breeding to incorporate germplasm from a wild relative of tomato, *Lycopersicon hirsutum*, as a source of resistance to strains of AMV. However, no resistant or tolerant tomato cultivars are currently available (Zitter, 2014).

2. Potato Virus Y
   Potato virus Y (PVY) occurs worldwide with a narrow host range causing important diseases in solanaceous crops and may be co-infected with other aphid-transmitted viruses (e.g., tobacco etch virus, cucumber mosaic virus, tomato mosaic virus). Plants that are doubly infected with another virus at an early plant stage rarely yield marketable fruit. In southern Florida, mixed and overlapping plantings of tomato and pepper crops undoubtedly contribute to the development of a large aphid population and may contribute to the spread of PVY (Zitter, 2014).

   Managing spread of PVY through vector intervention has proven unsuccessful, and destruction of oversummering/overwintering virus reservoirs is not practical because of their widespread occurrence in major tomato production areas. Thus, tomato growers have resorted to management strategies that delay the entry of primary inoculum into the crop such as (1) isolating tomato plantings from areas used to produce earlier tomato and pepper crops, (2) planting in areas that are less likely to support aphid populations and virus reservoirs, and (3) spraying with mineral oil to reduce the frequency of transmission when primary inoculum is kept low. To reduce the risk of PVY transmission in glasshouse operations, pruning tools are dipped in a 10% solution of sodium hypochlorite. Resistance to PVY and to tobacco etch virus has been identified in the wild relative, *L. hirsutum* PI 247087 (Zitter, 2014).

3. Tobacco Etch Virus
   The occurrence of tobacco etch virus (TEV) in commercial tomato farms is closely associated with infection of other solanaceous crops (especially pepper) and natural weed species that serve as virus reservoirs such as horsenettle, thistle, lambsquarters, sicklepod, jimsonweed, black nightshade, Brazilian nightshade, groundcherry, and toadflax (Zitter, 2014).

No commercial tomato cultivars have resistance to TEV, but two tomato accessions have been identified as tolerant to the virus: *Solanum pennellii* LA 716 and *S. pimpinelli-folium* LA 1478. Given the lack of resistant tomato cultivars, other practices must be used to manage TEV. Entry of the virus into the tomato crop can be delayed by isolating the crop from areas in which peppers are grown, since the pepper crop is a major source of inoculum and aphids. Applying mineral oils weekly can also greatly reduce the rate of virus spread, thereby delaying infection. To eliminate the transmission of TEV in glasshouse operations, pruning tools should be dipped in a solution of sodium hypochlorite (Zitter, 2014).

B. Leafhopper-Transmitted Viruses

1. Beet Curly Top Virus

   Beet curly top virus (BCTV) (or curly top disease of tomato) infects more than 300 plant species and can cause heavy losses in staked tomatoes, for which the plants are more widely spaced. BCTV can also be a serious problem for processing tomatoes in California's San Joaquin Valley in a crop season with early and high populations of the vector, beet leafhopper (Zitter and Wintermantel, 2014).

   Several management strategies to reduce the occurrence of BCTV include the application of insecticides on alternate hosts of tomato and pepper such as the Russian thistle and wild mustard which are the primary hosts of the vector in the summer. In addition, tomato and pepper crops should not be planted near overwintered sugarbeets which are a significant winter virus reservoir. Plowing down reservoir crops prior to planting fruiting vegetables avoids movement of leafhoppers from the reservoir crop into the vegetable fields at plow-down. Double-row planting of processing tomato fields appears to reduce losses from BCTV while some released cultivars have shown increased levels of tolerance to virus infection and leafhopper preference (Zitter and Wintermantel, 2014).

C. Whitefly-Transmitted Viruses

1. Tomato Infectious Chlorosis Virus

   Management of tomato infectious chlorosis virus (TICV) can be very difficult especially when potentially high populations of whitefly vectors is reached, the ease of transmission by vectors, and the wide host ranges of both whitefly vectors and viruses. No TICV-resistant tomato cultivars are commercially available. Management is achieved primarily through the control of vector populations with chemical and cultural practices. Removal of weed and ornamental hosts from tomato fields and areas adjacent to tomato production that can serve as source of infection for transmission of TICV by whitefly vectors has been found to be effective (Polston and Wintermantel, 2014).

   In addition, testing of nursery stock and ornamental host plants for the presence of TICV can reduce movement of TICV to new areas. Since the minimum latent period between infection and development of visual symptoms is 3 weeks, symptomless plants must be tested to identify seedlings in the early stage of infection (Polston and Wintermantel, 2014).

2. Tomato Yellow Leaf Curl Virus

   Despite regular application of insecticides, a tomato crop can be severely affected by tomato yellow leaf curl virus (TYLCV) and yield losses of 100% have been recorded with high population of the whitefly vector. A broad geographic expansion of the disease has been attributed to the movement of TYLCV-infected transplants and fruit. Commercial cluster tomatoes (i.e., fruit plus vine) harvested from TYLCV-infected plants have been shown to be a source of TYLCV for whiteflies, and the shipment of such fruit has been implicated as a means of spreading the disease. The movement of infected and asymptomatic tomato transplants for both the retail and commercial sectors was significant in the rapid distribution of TYLCV throughout Florida (Polston, 2014).

   Furthermore, Polston (2014) stressed that "TYLCV can be managed (although not always successfully) through the simultaneous application of multiple approaches. The most economical control of TYLCV for both protected and open field production can be achieved with the use of resistant cultivars. But cultivars are limited and not available for all production conditions, climates, and market preferences. Further, resistance in these cultivars can be overcome by early and high inoculation pressures, so growers need to use additional management strategies even with the use of resistance cultivars".

   In addition, Polston (2014) detailed that "in protected production, growers should rely mainly on exclusion through the use of whitefly-proof screening and ultraviolet (UV)-absorbing plastic screens and covers. In open field production, growers should rely heavily on a rotation of pesticides to reduce whitefly populations, frequently using a neonicotinoid (i.e., systemic insecticide) that kills all life stages of whiteflies. However, the development of pesticide resistance and the loss of natural predators and parasites after repeated insecticide applications have contributed to control problems and environmental concerns. Additional open field practices include roguing, timing of planting to avoid high whitefly populations, allowing crop-free periods, using reflective plastic mulches, and sanitation".

   In discussions with an extension plant pathologist from Texas A&M University (Isakeit, 2020), it was emphasized that in field situations, host plant resistance is still the best approach for virus disease control, but it might not always be available for a particular crop. Other management approaches are found to be impractical or insufficient (e.g. reflective mulches, oil sprays, row covers). In a study conducted by Anco et al. (2020), current management tactics focus on farm-centric strategies that rely mainly on the strategic application of insecticides for vector control, the use of TYLCV-resistant cultivars, rogueing infected plants, and various cultural controls, including metallic reflective mulch, staggered planting dates, and the prompt destruction or burn-down of fields after harvest to eliminate virus reservoirs. But these interventions are limited in their effectiveness in terms of managing either the whitefly vector or TYLCV. And this can be attributed to the absence of a coordinated effort to implement management strategies on an area scale (multiple farms) than a field scale approach. Because farm managers often do not consult with one another when making pest-management decisions, asynchronous execution of control strategies among neighboring farms (e.g., insecticide application) is commonplace. Hence, an areawide pest management (AWPM) is a practical and viable alternative strategy that manages whitefly populations and the associated TYLCV below damage and economic thresholds.

D. Thrips-Transmitted Viruses

1. Tomato Spotted Wilt Virus
   Tomato spotted wilt virus (TSWV) commonly occurs in the tropics and subtropics as well as in temperate zones. Severe losses have been reported in Hawaii and in selected counties of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee (Zitter and Momol, 2014).

   Because of the broad host range of TSWV including perennial ornamentals and weed species, managing the disease is very challenging. TSWV overwinters in a relatively few abundant winter annual weed species, and dispersal of viruliferous thrips from these alternate host plants to susceptible crops occurs during a brief period in the spring. To reduce the level of virus infection, this information should be used in decision making about cultivar selection and planting date of the crop. Application of insecticides has been used to reduce development of immature thrips and thus limit secondary virus spread. The use of ultraviolet (UV) reflective mulches, a plant activator (acibenzolar-S-methyl), and insecticides have provided viable alternative management of TSWV in commercial tomato fields. Resistant cultivars with single dominant gene resistance (Sw-5) are currently being used to reduce losses to TSWV, however, symptoms appear more visible on fruit (immature and ripening) than on foliage, thus limiting the commercial marketability of these cultivars. Unfortunately, resistance-breaking isolates of TSWV can breakdown both conventional and transgenic resistance (Zitter and Momol, 2014).

   The Southeastern Vegetable Extension Workers have demonstrated that variable control of TSWV in peppers was obtained by changing the planting date within a growing season while poor control resulted with weed management. However, good control was achieved with the use of reflective mulch and the use of resistant cultivars (Southeastern U.S. Vegetable Crop Handbook, 2020).

Common Diseases Transmitted by Insect Vectors in Cucurbit Vegetables

1. Bacterial Wilt
   The striped cucumber beetle (*Acalymma vittatum*) and the spotted cucumber beetle (*Diabrotica undecimpunctata howardi*) transmit the pathogen of bacterial wilt caused by *Erwinia tracheiphila*. Bacterial wilt is a serious and major threat to commercial muskmelon and cucumber production in the midwestern and eastern United States including parts of southeastern Canada. These beetles acquire the bacterial cells as they chew on infected tissue and infect healthy plants when they visit and feed upon. Also, these vectors ingest bacterial cells that could transmit the disease by defecating bacterial particles on fresh wounds of plant parts. Suppression of bacterial wilt relies primarily on the application of systemic transplant or soil-applied neonicotinoids to control cucumber beetles especially on the first few weeks after transplant or seedling emergence. Few

resistant cultivars are available for cucumber and none for muskmelon (Gleason and Saalau-Rojas, 2017).

In addition to transmission of bacterial wilt, the banded cucumber beetle (*Diabrotica balteata*), spotted cucumber beetle, and western striped cucumber beetle (*A. trivittatum*) are vectors of viral pathogens such as squash mosaic virus and melon necrotic spot virus. Host resistance to the striped cucumber beetle has been found in some squash and cucumber cultivars and is associated with lower levels of cucurbitacin, a feeding stimulant. Other control options investigated include trapping or baiting beetles with synthetic odors as well as using natural enemies such as parasitic tachinid fly and entomopathogenic species of nematodes to reduce larval populations (Elsey, 2017).

2. Viral Diseases

Palumbo (2020b) noted that the impact of the proposed changes on neonicotinoid usage will be negligible on the transmission of viruses on melon crops grown in the desert southwest. On virus disease management, *Bemisia* whiteflies (as virus vectors) drive pest management programs on fall melons. Historically, growers have relied on neonicotinoids to control whiteflies from their feeding damage and the proposed changes to the neonicotinoids would only be a minor inconvenience for spring melon production. Even though growers battle an important virus on fall melons, the overall proposed changes will have little to no impact on pest management or production.

University of Arizona entomologists (Palumbo, 2020c) indicate that, in the past 12 years, melon growers in the southwestern United States have become heavily dependent on the availability of effective insecticides (including neonicotinoids) necessary for the control of adult whiteflies. Beginning in 2007, a new whitefly-vectored virus, Cucurbit Yellows Stunting Disorder Virus (CYSDV) became established throughout Arizona and Southern California. Without effective management of the vector, CYSDV could cause yield losses in excess of 70%.

CYSDV is a semi-persistent crinivirus which requires a latent feeding period before efficient transmission or acquisition of the virus occurs. Thus, virus transmission and subsequent spread can be suppressed in fields by preventing adult whiteflies from feeding on melon plants for extended periods of time. To achieve economic suppression of CYSDV, melon growers apply systemic insecticides to the soil at-planting, followed by multiple foliar spray applications throughout the season (including bloom and fruit set). Cultural practices (e.g., crop isolation) can minimize the transmission of CYSDV when used strategically but it is difficult to isolate melons during the fall away from important virus/vector crop sources such as cotton, alfalfa and spring melon crops. Furthermore, the University of Arizona (Palumbo, 2020c) noted:

"use of at-planting soil systemic insecticides allows for protection of emerging seedlings and is the primary means of reducing virus infection from viruliferous adult whiteflies as they migrate into fields. Melon growers presently rely on dinotefuran (no changes in EPA proposed mitigation plans) and flupyradifurone as the soil systemic treatments for reducing primary infection. Research and commercial field experiences have shown these

to be the best soil insecticides for battling primary CYSDV infection on fall melons. Soil application of imidacloprid, thiamethoxam and clothianidin were not effective in preventing transmission of CYSDV. Once plants have emerged, foliar insecticides are applied at frequent intervals (~ 6 d intervals depending on migration) throughout the season, to reduce the secondary spread of CYSDV. The foliar insecticide alternatives currently available for controlling whitefly adults/CYSDV include cyantraniliprole, acetamiprid, pyrifluquinazon, and afidopyropen. These compounds provide excellent adult efficacy, rapid cessation of adult feeding/transmission, and are considered bee safe (except cyantraniliprole which is not used during pollination). Dinotefuran is effective against adults as a foliar spray but is prohibited from foliar use if previously applied to the soil. None of the other neonicotinoids (imidacloprid, thiamethoxam and clothianidin) provide comparable adult activity as foliar sprays. The loss of soil and foliar uses of imidacloprid, clothianidin and thiamethoxam would have a negligible impact on their current CYSDV/whitefly management program. In regard to effective alternatives that address viral infections outside of controlling the insect vectors, they have nothing solid yet, but melon varieties with resistance/tolerance to the virus are being developed. To date, several seed companies and USDA-ARS breeders (Jim McCreight's lab) have been active in this pursuit. Their observations in the field have been that some of the newer harper varieties currently grown by melon producers tend to delay the expression of the interveinal chlorosis (yellowing) from the virus compared with the western shipper varieties".

Table A1 shows a list of insect-vectored viruses including new and emerging viruses that are considered economically important in cucurbit production of the United States and worldwide. With the global movement and trade of agricultural products, awareness as well as preparedness in the management of common viruses including those not yet introduced in the United States would be significant. Viruses in cucurbits are difficult to control due to the different modes of transmission (e.g., mechanical, seed) not only by insects but also through soil- or waterborne organisms in addition to the wide array of symptoms expressed by the host plants (Wintermantel, 2017).

Table A1. Viruses and viroids that infect cucurbit vegetable crops grouped according to vector.

Vector Virus or Viroid (Acronym)	Genus	Family	Virus Section[b]	Primary Symptom Type[c]	Other Modes of Transmission[d]
Aphid					
Cucumber mosaic virus (CMV)	*Cucumovirus*	*Bromoviridae*	Mosaic	Mos, LC, LD, St, F	M
Cucurbit aphid-borne yellows virus (CABYV)	*Polerovirus*	*Luteoviridae*	Yellowing	Y, Chl, Mo	...[e]
Algerian watermelon mosaic virus (AWMV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	Mos[f]	M
Clover yellow vein virus (ClYVV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	CS	M
Melon vein-banding mosaic virus (MVbMV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	Mos, VB, St	M
Moroccan watermelon mosaic virus (MWMV)	*Potyvirus*	*Potyviridae*	Mosaic	Mos, B, LD, Fil, F	M
Papaya ringspot virus-W (PRSV)	*Potyvirus*	*Potyviridae*	Mosaic	LD, B, Mo, Mos, St, F	M
Telfairia mosaic virus (TeMV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	LD, Mos	M, S
Watermelon mosaic virus (WMV)	*Potyvirus*	*Potyviridae*	Mosaic	Mos, VB, Fil, LD	M
Zucchini tigre mosaic virus (ZTMV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	VB, Mos	M
Zucchini yellow fleck virus (ZYFV)	*Potyvirus*	*Potyviridae*	Uncommon and Regional	CS, Mos, VB, F	M
Zucchini yellow mosaic virus (ZYMV)	*Potyvirus*	*Potyviridae*	Mosaic	Mos, Y, LD, F, VC	M, S
Muskmelon vein necrosis virus (MuVNV)	*Carlavirus*	*Betaflexiviridae*	Uncommon and Regional	CS, NS, VC, N	M
Beetle					
Squash mosaic virus (SqMV)	*Comovirus*	*Secoviridae*	Mosaic	VB, N, Mo, Mos, B	M, S
Melon rugose mosaic virus (MRMV)	*Tymovirus*	*Tymoviridae*	Uncommon and Regional	Mos, Bl	M
Wild cucumber mosaic virus (WCMV)	*Tymovirus*	*Tymoviridae*	Uncommon and Regional	VC, Bl, Mo	M, S
Chytrid fungus					
Cucumber leaf spot virus (CLSV)	*Aureusvirus*	*Tombusviridae*	Other Virus Diseases	CS, Mo, NS	M, S
Cucumber necrosis virus (CNV)	*Tombusvirus*	*Tombusviridae*	Uncommon and Regional	NS, N, En	M
Melon necrotic spot virus (MNSV)	*Carmovirus*	*Tombusviridae*	Other Virus Diseases	NS, N, F	M, S
Leafhopper					
Beet curly top virus (BCTV)	*Curtovirus*	*Geminiviridae*	Other Virus Diseases	LC, Mo, Chl, N, St	...
Nematode					
Tobacco ringspot virus (TRSV)	*Nepovirus*	*Secoviridae*	Other Virus Diseases	Mos, Mo, RS, LD, N, En	M, S
Tomato ringspot virus (ToRSV)	*Nepovirus*	*Secoviridae*	Other Virus Diseases	Mos, Mo, Chl, RS, F	M
No known vector					
Cucumber fruit mottle mosaic virus (CFMMV)	*Tobamovirus*	*Virgaviridae*	Mosaic	Mo, Mos, LD, LCr, F	M, S
Cucumber green mottle mosaic virus (CGMMV)	*Tobamovirus*	*Virgaviridae*	Mosaic	Mo, Mos, LD, LCr, F	M, S
Kyuri green mottle mosaic virus (KGMMV)	*Tobamovirus*	*Virgaviridae*	Mosaic	Mo, Mos, LD, LCr, F	M, S
Zucchini green mottle mosaic virus (ZGMMV)	*Tobamovirus*	*Virgaviridae*	Mosaic	Mo, Mos, LD, LCr, F	M, S
Hop stunt viroid (HSVd)	*Hostuviroid*	*Pospiviridae*	Other Virus Diseases	St, LD, CS, VB, VC, F	M
Ourmia melon virus (OuMV)	*Ourmiavirus*	*Ourmiaviridae*	Uncommon and Regional	CS, Mos, Y, RS	M
Thrips					
Melon yellow spot virus (MYSV)	*Tospovirus*	*Bunyaviridae*	Other Virus Diseases	CS, Mos, NS, N	M
Watermelon bud necrosis virus (WBMV)	*Tospovirus*	*Bunyaviridae*	Uncommon and Regional	Mo, Y, CS, NS	M
Watermelon silver mottle virus (WSMoV)	*Tospovirus*	*Bunyaviridae*	Other Virus Diseases	Mo, Chl, LCr, CS, F	M
Zucchini lethal chlorosis virus (ZLCV)	*Tospovirus*	*Bunyaviridae*	Uncommon and Regional	Chl, Br, LC, N	M
Whitefly					
Cucurbit leaf crumple virus (CuLCrV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	LC, LCr, Y, Mo, F	...
Melon chlorotic leaf curl virus (MCLCuV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	LC, Chl, CS, St	...
Melon chlorotic mosaic virus (MeChMV)	*Begomovirus*	*Geminiviridae*	Uncommon and Regional	St, LC, Mos, Chl	...
Squash mild leaf curl virus (SMLCV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	LC	...
Squash leaf curl China virus (SLCCNV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	VC, Y, Mos	...
Squash leaf curl Philippines virus (SLCPHV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	VC, Y, Mos	...
Squash leaf curl virus (SLCV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	LC, Mo, Chl, En, F	...
Squash leaf curl Yunnan virus (SLCYV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	LC, Mos	...
Squash yellow mild mottle virus (SYMMoV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	Y, Mo, LC, CS, LCr	...
Tomato leaf curl New Delhi virus (ToLCNDV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	Mos, LC, Y, LD	...
Watermelon chlorotic stunt (WmCSV)	*Begomovirus*	*Geminiviridae*	Begomoviruses	VC, Mo, Mos, Y, LC, St	...
Melon yellowing-associated virus (MYaV)	*Carlavirus*	*Betaflexiviridae*	Yellowing	Y, Chl, Mo	...
Beet pseudoyellows virus (BPYV)	*Crinivirus*	*Closteroviridae*	Yellowing	Y, Chl, Mo	...
Cucurbit chlorotic yellows virus (CCYV)	*Crinivirus*	*Closteroviridae*	Yellowing	Y, Chl, Mo	...
Cucurbit yellow stunting disorder virus (CYSDV)	*Crinivirus*	*Closteroviridae*	Yellowing	Y, Chl, Mo	...
Lettuce infectious yellows virus (LIYV)	*Crinivirus*	*Closteroviridae*	Yellowing	Y, Chl, Mo	...
Cucumber vein yellowing virus (CVYV)	*Ipomovirus*	*Potyviridae*	Other Virus Diseases	VC, Chl, N, St, F	M
Squash vein yellowing virus (SqVYV)	*Ipomovirus*	*Potyviridae*	Other Virus Diseases	VC, Chl, LC, N, F	M

[a] Prepared by W. M. Wintermantel.
[b] Section of this compendium in which the description of the virus is located.
[c] B = blister; Br = brittle leaf; Chl = chlorosis; CS = chlorotic spots; En = enations; F = fruit symptoms; Fil = filiformity; LC = leaf curl; LCr = leaf crumple; LD = leaf distortion; Mo = mottle; Mos = mosaic; N = necrosis; NS = necrotic spots; RS = ring spots; St = stunting; VB = vein banding; VC = vein clearing; and Y = yellowing. Some symptoms listed may be specific to individual cucurbit host species.
[d] M = mechanical transmission, and S = seed transmission.
[e] No mode of transmission other than the insect vector.
[f] Limited information available.

Appendix B

Table B1: U.S. Tolerances and Codex MRLs of Interest for Acetamiprid			
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment**
Cardamom	--	0.1	Request that EPA consider potential for a Codex-aligned import tolerance.
Onion, Green	4.5 (Subgroup 3-07B)	5 (Spring Onion)	Request that EPA raise the existing tolerance to harmonize with Codex.
Pepper, Black, White	--	0.1	Request that EPA consider potential for a Codex-aligned import tolerance.
Peppers Chili, Dried	--	2	Request that EPA consider potential for a Codex-aligned import tolerance.
Caneberry Subgroup 13-07A	1.6	2 (Berries and other small fruits except strawberries and grapes)	Request that EPA raise the existing tolerance to harmonize with Codex.
Bushberry Subgroup 13-07B	1.6	2 (Berries and other small fruits except strawberries and grapes)	Request that EPA raise the existing tolerance to harmonize with Codex.
Small Vine Climbing Fruit Subgroup 13-07F, Except Fuzzy Kiwi	0.35	2 (Berries and other small fruits except strawberries and grapes) 0.5 (Grape)	Request that EPA raise the existing tolerance for subgroup 13-07F, excluding grape, and set a separate tolerance for grape to harmonize with Codex.
Sweet Corn Fodder	--	40	Request that EPA consider potential for a Codex-aligned import tolerance.

Table B2: U.S. Tolerances and Codex MRLs of Interest for Dinotefuran			
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment**
Peppers Chili, Dried	--	5	Request that EPA consider potential for a Codex-aligned import tolerance.
Poultry, Meat	--	0.02	Request that EPA consider potential for a Codex-aligned import tolerance.
Rice Straw and Fodder, Dry	--	6	Request that EPA consider potential for a Codex-aligned import tolerance.

Table B3: U.S. Tolerances and Codex MRLs of Interest for Imidacloprid			
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment**
Almond Hulls	4	5	Request that EPA raise the existing tolerance to harmonize with Codex.
Basil	48 (Herbs subgroup 19A, dried herbs) 8 (Herbs subgroup 19A, fresh herbs)	20 (Basil)	Request that EPA raise the existing tolerance for fresh herbs or consider establishing a separate tolerance for fresh basil to harmonize with Codex.
Blueberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Caneberry, Subgroup 13-A	2.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex.
Citrus, Dried Pulp	5	10	Request that EPA raise the existing tolerance to harmonize with Codex.
Currant	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Elderberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Gooseberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Hop, Dried Cones	6	10 (Hops, dry)	Request that EPA raise the existing tolerance to harmonize with Codex.
Huckleberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Juneberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Kale	3.5 (Vegetable, *Brassica* leafy, Group 5)	5 (Kale (including collards, curly, Scotch and thousand-headed kale; not including Marrow-stem kale))	USDA notes that kale will be covered under the proposed tolerance for leafy greens, group 4-16. Request that EPA raise the tolerance or consider establishing a separate tolerance for kale to harmonize with Codex.
Lingonberry	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Olives for Oil Production	--	2	Request that EPA consider potential for a Codex-aligned import tolerance.

Table B3: U.S. Tolerances and Codex MRLs of Interest for Imidacloprid			
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment**
Peanut	0.45	1	Request that EPA raise the existing tolerance to harmonize with Codex.
Peanut Fodder	--	30	Request that EPA consider potential for a Codex-aligned import tolerance.
Pear	0.6 (Fruit, pome, group 11)	1	Request that EPA raise the existing tolerance or consider establishing a separate tolerance for pear to harmonize with Codex.
Peppers Chili, Dried	--	10	Request that EPA consider potential for a Codex-aligned import tolerance.
Pomegranate	0.9	1	Request that EPA raise the existing tolerance to harmonize with Codex.
Prunes, Dried	--	5	Request that EPA consider potential for a Codex-aligned import tolerance.
Salal	3.5	5 (Berries and other small fruits except cranberries, grapes, and strawberries)	Request that EPA raise the existing tolerance to harmonize with Codex and consider establishing a subgroup 13-07B tolerance.
Soya Bean Fodder	35 (Soybean, hay)	50	Request that EPA raise the existing tolerance to harmonize with Codex.
Tea, Green, Black (Black, Fermented and Dried)	--	50	Request that EPA consider potential for a Codex-aligned import tolerance.
Vegetables, Root and Tuber	0.4 (Vegetable, Root and Tuber, Group 1, Except Sugar Beet) 0.05 (Beet, sugar, roots)	0.5 (Root and tuber vegetables)	Request that EPA raise the existing Group 1 tolerance and remove the exclusion for sugar beet to harmonize with Codex. (This action would allow EPA to revoke the separate tolerance for beet, sugar, roots.)

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
Commodity	**Clothianidin**		**Thiamethoxam**		**USDA Comment/Request**
	U.S. Tolerance (mg/kg)	**Codex MRL (mg/kg)**	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	
Artichoke, globe	--	0.05	0.45	0.5	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Avocado	--	0.03	0.4	0.5	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Banana	--	0.02	0.03	0.02	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Beans, Except Broad Bean and Soya Bean	--	0.2	0.02 (Bean, succulent) 0.02 (Vegetable, legume, group 6)	0.3	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Berry, Low-Growing, Subgroup 13-07G, Except Cranberry	--	0.07 (Berries and other small fruits)	0.3	0.5 (Berries and other small fruits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Berry, Low-Growing, Subgroup 13-07H, Except Strawberry	0.01	0.07 (Berries and other small fruits)	--	0.5 (Berries and other small fruits)	Request that EPA raise the existing clothianidin tolerance to harmonize with Codex and consider potential for a Codex-aligned thiamethoxam import tolerance.
Bushberry, Subgroup 13-07B, Except Lingonberry and Blueberry, Lowbush	--	0.07 (Berries and other small fruits)	0.2	0.5 (Berries and other small fruits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
	Clothianidin		**Thiamethoxam**		
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment/Request**
Brassica, Head and Stem, Subgroup 5A	--	0.2 (*Brassica* (cole or cabbage) vegetables, head cabbage, flowerhead *Brassicas)*	4.5	5 (*Brassica* (cole or cabbage) vegetables, head cabbage, flowerhead *Brassicas)*	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Cacao Beans	--	0.02	--	0.02	Request that EPA consider potential for Codex-aligned clothianidin and thiamethoxam import tolerances.
Coffee Beans	--	0.05	0.2 (Coffee, green, bean)	0.2	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Cranberry	--	0.07 (Berries and other small fruits)	0.02	0.5 (Berries and other small fruits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Eggs	--	0.01	--	0.01	Request that EPA consider potential for Codex-aligned clothianidin and thiamethoxam import tolerances.
Fruit, Citrus, Group 10	0.07 (Fruit, Citrus, Group 10-10 Sec. 18, Expires 12/31/20)	0.07	0.4	0.5	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider removing the time limitation on the clothianidin tolerance to harmonize with Codex.
Fruit, Pome, Group 11	1.0	0.4	0.2	0.3	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex.
Fruit, Stone, Group 12	0.8 (Peach)	0.2	0.5	1	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
	Clothianidin		Thiamethoxam		
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment/Request**
Fruit, Small Vine Climbing, Except Fuzzy Kiwifruit, Subgroup 13-07F	--	0.07 (Berries and other small fruits)	0.2	0.5 (Berries and other small fruits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Grain, Cereal, Group 15	0.01 (Grain, Cereal, Group 15, Except Rice)	0.04 (Barley) 0.02 (Maize) 0.5 (Rice) 0.02 (Wheat)	0.02 (Grain, Cereal, Group 15, Except Barley)	0.05 (Maize) 0.05 (Wheat)	Request that EPA raise the existing clothianidin and thiamethoxam tolerances to harmonize with Codex. For clothianidin, Codex MRLs for barley, maize, rice, and wheat are higher than the U.S. group 15 tolerance. For thiamethoxam, Codex MRLs for maize and wheat are higher than the U.S. group 15 tolerance.
Grain, Cereal, Forage, Fodder, and Straw, Group 16, Except Rice	0.35 (Group 16 forage, except rice) 0.07 (Group 16 hay, except rice) 0.05 (Group 16 straw, except rice)	0.2 (Barley straw and fodder, dry) 0.2 (Wheat straw and fodder, dry)	0.4 (Barley, hay, straw) 0.5 (Wheat, forage) 0.02 (Wheat, hay, straw)	2 (Barley straw and fodder, dry) 2 (Wheat straw and fodder, dry)	Request that EPA raise the existing clothianidin and thiamethoxam tolerances to harmonize with Codex. For clothianidin, Codex MRLs for barley and wheat straw are higher than the U.S. group 16 tolerances for straw and hay. For thiamethoxam, Codex MRLs for barley and wheat straw and fodder are higher than the U.S. tolerances for these same commodities.
Grape, Dried (Raisin)	0.6 (Grape)	1 (Dried grapes (currants, raisins, and sultanas))	0.3 (Grape, raisin)	--	Request that EPA raise the existing clothianidin grape (RAC) tolerance to harmonize with Codex and cover raisin or, alternatively, set a separate tolerance for the processed commodity (raisin).
Hops, Dried Cones	--	0.07 (Hops, dry)	0.1	0.09 (Hops, dry)	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
	Clothianidin		Thiamethoxam		
Commodity	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	USDA Comment/Request
Mango	--	0.04	0.4	0.2	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Meat and Meat Byproducts (Mammalian)	--	0.02 (Meat from mammals) 0.02 (Mammalian fats)	0.02 (Cattle, Goat Horse, Hog, Sheep, Meat) 0.04 (Cattle, Goat Horse, Sheep, Meat Byproducts) 0.02 (Hog, Meat Byproducts)	0.02 (Meat from mammals)	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Milk	0.01	0.02	0.02	0.05	Request that EPA raise the existing clothianidin and thiamethoxam tolerances to harmonize with Codex.
Mints	--	0.3	1.5 (Peppermint, tops)	1.5	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Oilseeds	0.01 (Canola, seed; mustard, seed) 0.2 (Cotton, undelinted seed; soybean, seed)	0.02 (Note: Codex oilseed group includes a wide variety of seeds and nuts, as well as oleaginous fruits, such as but not limited to colza; kapok; moringa; Niger seed; olives; palm nut; sesame; shea nut; etc.)	0.02 (Borage, seed; canola, seed; crambe, seed; flax, seed; mustard, seed; peanut; rapeseed, seed; safflower, seed; sunflower)	0.02 (Note: Codex oilseed group includes a wide variety of seeds and nuts, as well as oleaginous fruits, such as but not limited to colza; kapok; moringa; Niger seed; olives; palm nut; sesame; shea nut; etc.)	Request that EPA raise the existing clothianidin tolerances for canola and mustard to harmonize with Codex. Additionally, request that EPA consider potential for Codex-aligned clothianidin and thiamethoxam import tolerances for other commodities covered by the Codex oilseed group for which EPA has not established tolerances, including the potential for a crop group 20 tolerance.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
Commodity	Clothianidin		Thiamethoxam		USDA Comment/Request
	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	
Papaya	--	0.01	0.4	0.01	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Pea Hay or Pea Fodder (Dry)	--	0.2	--	0.3	Request that EPA consider potential for a Codex-aligned clothianidin and thiamethoxam import tolerances.
Peppers Chili, Dried	--	0.5	--	7	Request that EPA consider potential for a Codex-aligned clothianidin and thiamethoxam import tolerances.
Pineapple	--	0.01	--	0.01	Request that EPA consider potential for a Codex-aligned clothianidin and thiamethoxam import tolerances.
Potato	0.3 (Vegetable, tuberous and corm, Subgroup 1C)	0.2 (Root and tuber vegetables)	--	0.3 (Root and tuber vegetables)	Request that EPA consider potential for a Codex-aligned thiamethoxam import tolerance.
Poultry Meat and Byproducts	--	0.01 (Poultry fats) 0.01 (Poultry meat) 0.1 (Poultry, edible offal)	--	0.01 (Poultry meat) 0.01 (Poultry, edible offal)	Request that EPA consider potential for a Codex-aligned clothianidin and thiamethoxam import tolerances.
Prunes, Dried	--	0.2	0.5 (Fruit, stone, group 12)	--	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Radish, Tops	--	2 (Leafy vegetables)	0.8	3 (Leafy vegetables)	Note that the tolerance for radish, tops appears to be covered by the proposed conversion to group 4-16. Therefore, it may be appropriate to revoke this tolerance.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
	Clothianidin		Thiamethoxam		
Commodity	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	U.S. Tolerance (mg/kg)	Codex MRL (mg/kg)	USDA Comment/Request
Rice	0.5 (Rice, grain Sec. 18, Expires 12/31/24)	0.5	0.02 (Grain, Cereal, Group 15, Except Barley) 6 (Rice, grain Sec. 18, Expires 12/31/24) 2 (Rice, straw Sec. 18, Expires 12/31/24)	--	Request that EPA consider removing the time limitation on the clothianidin tolerance to harmonize with Codex.
Sugar Cane	--	0.4	--	--	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Sweet Corn (Corn-on-the-Cob)	--	0.01	0.02 (Corn, sweet, kernel plus cob with husks removed)	0.01	Request that EPA consider potential for a Codex-aligned clothianidin import tolerance.
Vegetable, Cucurbit, Group 9	0.06	0.02 (Fruiting vegetables, cucurbits)	0.2	0.5 (Fruiting vegetables, cucurbits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex.
Vegetable, Fruiting, Group 8	0.2 (Vegetable, fruiting, group 8, except pepper) 0.8 (Pepper)	0.05 (Fruiting vegetables other than cucurbits)	0.25	0.4 (Fruiting vegetables other than cucurbits)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex.

Table B4: U.S. Tolerances and Codex MRLs of Interest for Clothianidin and Thiamethoxam					
	Clothianidin		**Thiamethoxam**		
Commodity	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**U.S. Tolerance (mg/kg)**	**Codex MRL (mg/kg)**	**USDA Comment/Request**
Vegetable, Legume, Group 6	--	0.01 (Legume vegetables)	0.02	0.01 (Legume vegetables) 0.04 (Pulses)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Vegetable, Root, Subgroup 1A	--	0.2 (Root and tuber vegetables)	0.05	0.3 (Root and tuber vegetables)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Vegetable, Tuberous and Corm, Except Potato, Subgroup 1D	--	0.2 (Root and tuber vegetables)	0.02	0.3 (Root and tuber vegetables)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.
Wheat, Straw	--	0.2 (Wheat straw and fodder, dry)	0.02	2 (Wheat straw and fodder, dry)	Request that EPA raise the existing thiamethoxam tolerance to harmonize with Codex and consider potential for a Codex-aligned clothianidin import tolerance.