



## **Memorandum Supporting Final Decision to Approve Registration for the New Active Ingredient of Isocycloseram**

Approved by: \_\_\_\_\_  
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## I. SUMMARY

This memorandum presents the rationale to support the final decision of the U.S. Environmental Protection Agency (EPA or the Agency) to unconditionally register under Section 3(c)(5) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), pesticide products containing the active ingredient isocycloseram.

Isocycloseram (4-[5-(3,5-dichloro-4-fluorophenyl)-5-(trifluoromethyl)-4,5-dihydro-1,2-oxazol-3-yl]-*N*-(2-ethyl-3-oxo-1,2-oxazolidin-4-yl)-2-methylbenzamide, containing 80–100% of the (5*S*,4*R*)-isomer) is a new broad-spectrum insecticide. It belongs to the isoxazolines chemical class, which have an insecticidal mode of action based on allosteric modulation of the gamma aminobutyric acid (GABA) receptor. As a new active ingredient, this is the first use of isocycloseram in the United States. Isocycloseram is classified by the Insecticide Resistance Action Committee (IRAC) as a Group 30 insecticide, which is a novel mode of action for multiple agricultural and non-agricultural uses.

Isocycloseram is formulated as a technical product and nine end-use products, including a ready-to-use (RTU) gel bait and various liquid concentrates (*i.e.*, dispersible, suspension, and flowable), with uses on treated seeds, agricultural field crops, indoor/outdoor residential areas, residential/commercial turf, greenhouse, commercial/industrial areas, industrial structures, and agricultural structures. Applications of the end-use products can be made by aerial, airblast, groundboom, chemigation, fogger (greenhouse only), electrostatic sprayer (greenhouse only), backpack sprayer, manually pressurized handwand, mechanically pressurized handgun, wood injection, crack and crevice treatment, spot treatment, residential/commercial perimeter treatment, and seed treatment equipment.

## II. REQUESTED ACTION

On June 24, 2021, EPA received an application from Syngenta Crop Protection, LLC (Syngenta) for registration of a new broad-spectrum insecticide, isocycloseram (CAS Number 2061933-85-3) for use on treated seeds, agricultural field crops, indoor/outdoor residential areas, residential/commercial turf, greenhouses, commercial/industrial areas, industrial structures, and agricultural structures. Syngenta also submitted this application to Health Canada's Pest Management Regulatory Agency (PMRA). EPA and PMRA agreed to conduct a work exchange for the review of isocycloseram. Each country's team of scientists and risk managers shared work and met periodically to discuss their respective assessments.

Under FIFRA Section 3(c)(4), EPA is required to notify the public when a request for registering a new active ingredient is made and to provide a 30-day comment period. The EPA published a notice of receipt on March 23, 2022, in the Federal Register for an application requesting the registration of isocycloseram. In addition, on March 22, 2022, the EPA published a notice of filing in the Federal Register announcing the receipt of the initial filing of the isocycloseram petition by Syngenta under section 408 of the Federal Food, Drug, and Cosmetic Act (FFDCA) requesting the establishment of tolerance regulations for residues of isocycloseram in/on almond, hulls; almond, oil; almond, roasted; apple, wet pomace; barley, grain; barley, hay; barley, straw;

buckwheat, grain; buckwheat, forage; buckwheat, hay; buckwheat, straw; corn, field, grain, forage, and stover; corn, pop, grain; corn, pop, stover; cotton, gin byproducts; cottonseed, subgroup 20C; fruit, citrus, group 10-10; fruit, pome, group 11-10; fruit, stone, group 12-12, cereal, forage, fodder and straw, group 16; nut, tree, group 14-12; oat, grain; oat, forage; oat, hay; oat, straw; onion, bulb, subgroup 3-07A; onion, green, subgroup 3-07B; orange, citrus oil; orange, dried pulp; orange, peel; orange, wet pulp; peas and bean, dried shelled, except soybean, subgroup 6C; peanut, nutmeat; pearl millet, grain; pearl millet, forage; pearl millet, hay; pearl millet, straw; peas, hay; peas, vine; plum, prunes; proso millet, grain; proso millet, forage; proso millet, hay; proso millet, straw; rapeseed, subgroup 20A; rye, grain; rye, forage; rye, hay; rye, straw; soybean, seed; soybean, hulls; teosinte, grain; teosinte, forage; teosinte, hay; teosinte, straw; tomato, dried pomace; tomato, sun-dried; tomato, wet pomace; triticale, grain; triticale, forage; triticale, straw; vegetables, *brassica*, head and stem, group 5-16; vegetables, cucurbit, group 9; vegetables, fruiting, subgroup 8-10A; vegetables, fruiting, subgroup 8-10B; vegetables, leafy, group 4-16; vegetables, tuberous and corm, subgroup 1C at; wheat, grain; wheat, forage; wheat, hay; wheat, straw; cattle, fat; cattle, kidney; cattle, liver; cattle, meat; cattle, meat byproducts; milk; milk, cream; goat, fat; goat, kidney; goat, liver; goat, meat; goat, meat byproducts; horse, fat; horse, kidney; horse, liver; horse, meat; horse, meat byproducts; sheep, fat; sheep, kidney; sheep, liver; sheep, meat; sheep, meat byproducts; poultry (muscle, fat, offal); birds' egg. The public comment period closed on April 22, 2022, with one comment received on the notice of filing and one on the notice of receipt. These comments are discussed in **Section V. Public Comments.**

### III. USE PROFILE

**Table 1** provides an outline of the use patterns for isocycloseram. These use patterns differ from those in the submitted data package as a result of risk mitigation measures. Ten products (one technical and nine end-use formulations) containing isocycloseram are being registered. One end-use product is a cockroach gel bait applied as a crack and crevice, spot, or void treatment in commercial, industrial, agricultural and residential areas. Another product is for pest infestations of ants, termites, cockroaches, and bed bugs (indoor only) applied as a crack and crevice, spot, void, or perimeter treatment in and around commercial, industrial, agricultural and residential structures. Two products are seed treatments applied as a coating to seeds. The remaining five end use products for isocycloseram are suspension or dispersible concentrates that are applied to soil at planting (corn only) or foliarly applied to listed crops via aerial, airblast, groundboom, chemigation, fogger (greenhouse only), electrostatic sprayer (greenhouse only), backpack sprayer, manually pressurized handwand or mechanically pressurized handgun. The labels stipulate that applicators and other handlers must wear long-sleeved shirts and long pants, socks, shoes, and chemical-resistant gloves for some applications. The labels also stipulate a restricted entry interval (REI) of 12 hours, a crop-dependent preharvest interval (PHI) of 1- 30 days, and minimum re-treatment intervals of 7 days. Refer to Section VI.H. for additional use directions and limitations.

**Table 1. Summary of Use Directions for Isocycloseram.**

Application Timing, Type, and Equipment	Formulation	Maximum Application Rate <sup>1</sup>	Max No. Applications per Year	Max Yearly Application Rate	Use Directions and Limitations <sup>2</sup>
<b>Berry and Small Fruit Crop Group: Crop Group 13; Berry and Small Fruit Crop Group: Crop Group 13-07</b>					
Broadcast  Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo <sup>®</sup> INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.134 lb ai/A (indoor)  0.065 lb ai/A (outdoor)	4 at highest labeled rate, 6 at lowest labeled rate (outdoor)  2 at highest labeled rate, 6 at lowest labeled rate (indoor)	0.32 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• For retail sale to consumers only</li> </ul>
<b>Brassica Head and Stem Vegetables, Crop Group 5-16; Brassica Leafy Greens, Crop Subgroup 4-16B (Except Watercress); Leafy Greens, Crop Subgroup 4-16A</b>					
Broadcast  Groundboom	A21377 CP (Alternate Name: Incipio <sup>®</sup> ) 18.3% ai (1.67 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast  Groundboom	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast  Groundboom	A21550 CP (Alternate Name: Vertento <sup>®</sup> ) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>

Broadcast  Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack. Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.052 lb ai/A	3	0.16 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 1 day</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• <b>DO NOT</b> use vegetable plants treated with Atexzo for commercial vegetable production or sell those plants for use by commercial vegetable producers.</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Bulb Vegetable Group, Crop Group 3-07</b>					
Broadcast  Groundboom, Chemigation	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.107 lb ai/A	2	0.214 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 7 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast  Groundboom, Chemigation	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.107 lb ai/A	2	0.214 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 7 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast  Groundboom, Chemigation	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.107 lb ai/A	2	0.214 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 7 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>

Broadcast  Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.104 lb ai/A (indoor)  0.065 lb ai/A (outdoor)	4 at highest labeled rate, 6 at lowest labeled rate (outdoor)  3 at highest labeled rate, 6 at lowest labeled rate (indoor)	0.32 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 7 days</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• <b>DO NOT</b> use vegetable plants treated with Atexzo for commercial vegetable production or sell those plants for use by commercial vegetable producers.</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Cereals<sup>11</sup>, Small Grain (barley, buckwheat, oats, pearl millet, proso millet, rye, teosinte, triticale, wheat)</b>					
Seed Treatment  Commercial seed treatment equipment	A22241 ST (Alternate Brand Name: Equento™ 100FS) 9.35% ai (0.83 lb ai/gal)	0.0075 lb ai/100 lb seed	1	0.019 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Do not use for at-plant applications (e.g., hopper box, planter box, etc.)</li> <li>• Do not exceed 0.019 lb ai/acre/year (22 g ai/ha/year) of isocycloseram when planting treated seeds.</li> <li>• Store treated seed away from food and feedstuffs.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
Seed Treatment  Commercial seed treatment equipment	A22725 ST (Alternate Brand Name: Equento™ 400FS) 34.8% ai (3.34 lb ai/gal)	0.0075 lb ai/100 lb seed	1	0.019 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Do not use for at-plant applications (e.g., hopper box, planter box, etc.)</li> <li>• Do not exceed 0.019 lb ai/acre/year (22 g ai/ha/year) of isocycloseram when planting treated seeds.</li> <li>• Store treated seed away from food and feedstuffs</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
<b>Citrus Fruit, Crop Group 10-10</b>					
Broadcast  Groundboom, Airblast	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.0665 lb ai/A	No more than 2 applications at 12.3 fl oz/A per year; no more than four applications in total per year.	0.188 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: Use rate of 4.2 fl oz/A: 7 days; Use rate of &gt;4.2 fl oz/A: 21 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast  Groundboom, Airblast	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.0665 lb ai/A	No more than 2 applications at 6.1 fl oz/A per year; no more than four applications in total per year.	0.188 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: Use rate of 2.1 fl oz/A: 7 days; Use rate of &gt;2.1 fl oz/A: 21 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>

Broadcast Groundboom, Airblast	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.0665 lb ai/A	No more than 2 applications at 3.0 fl oz/A per year; no more than four applications in total per year.	0.188 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: a. Use rate of 1.1 fl oz/A: 7 days b. Use rate of &gt;1.1 fl oz/A: 21 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.065 lb ai/A (outdoor) 0.078 lb ai/A (indoor)	3 at the highest labeled rate, 4 at the lowest labeled rate (outdoor) 2 at the highest labeled rate, 4 at the lowest labeled rate (indoor)	0.21 lb ai/A/year (Plants Grown Outdoors; Plants Grown Indoors and Outdoor Containerized Production)	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 1 day</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• For retail sale to consumers only</li> </ul>
<b>Corn (field, pop, and seed)</b>					
Broadcast Groundboom, Air	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.0266 lb ai/A	2	0.0532 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: Forage: 7 days; Stover and Grain: 21 days</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• Aerial application to Corn is only permitted in the following states: Colorado, Kansas, Nebraska, Oklahoma and Texas.</li> </ul>
At planting Soil directed In-furrow, 2x2 application, T-banded Groundboom	A22466 CP 25.7% ai (2.5 lb ai/gal)	0.133 lb ai/A	1	0.133 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• PHI: Forage: 14 days; Stover and Grain: 30 days</li> <li>• Do not apply this product through any type of irrigation system.</li> <li>• Do not apply this product as a T-band treatment unless the product can be incorporated into the top one inch of soil.</li> <li>• If a cultivation/lay-by timing application of A22466 CP is made, do not apply any foliar applications of isocycloseram-containing products,</li> <li>• Not registered for use by California</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves, protective eyewear.</li> </ul>
<b>Cotton, Crop Subgroup 20C</b>					

Broadcast Groundboom, Air	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>
Broadcast Groundboom, Air	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>
Broadcast Groundboom, Air	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
<b>Cucurbit Vegetables, Crop Group 9</b>					
Broadcast Groundboom	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 3 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast Groundboom	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.0532 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 3 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>

Broadcast Groundboom	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 3 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.052 lb ai/A	3	0.16 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 3 days</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• <b>DO NOT</b> use vegetable plants treated with Atexzo for commercial vegetable production or sell those plants for use by commercial vegetable producers.</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Pulses, Dried Shelled Bean (Except Soybean) Crop Subgroup 6-22E and Pulses, Dried Shelled Pea Crop Subgroup 6-22F<sup>12</sup></b>					
Seed Treatment Commercial seed treatment equipment	A22241 ST (Alternate Brand Name: Equento™ 100FS) 9.35% ai (0.83 lb ai/gal)	0.01 lb ai/100 lb seed	1	0.03 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Do not use for at-plant applications (e.g., hopper box, planter box, etc.)</li> <li>• Do not exceed 0.03 lb ai/acre/year (33.6 g ai/ha/year) of isocycloseram when planting treated seeds.</li> <li>• Store treated seed away from food and feedstuffs.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
Seed Treatment Commercial seed treatment equipment	A22725 ST (Alternate Brand Name: Equento™ 400FS) 34.8% ai (3.34 lb ai/gal)	0.01 lb ai/100 lb seed	1	0.03 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Do not use for at-plant applications (e.g., hopper box, planter box, etc.)</li> <li>• Do not exceed 0.03 lb ai/acre/year (33.6 g ai/ha/year) of isocycloseram when planting treated seeds.</li> <li>• Store treated seed away from food and feedstuffs.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
<b>Fruiting Vegetables, Crop Group 8-10</b>					

Post-emergence/transplant Broadcast Groundboom	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.0665 lb ai/A	2	0.133 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Post-emergence/transplant Broadcast Groundboom	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.0665 lb ai/A	2	0.133 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Post-emergence/transplant Broadcast Groundboom	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.0665 lb ai/A	2	0.133 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 1 day</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
Broadcast Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.065 lb ai/A (outdoor) 0.104 lb ai/A (indoor)	4 at highest labeled rate, 6 at lowest labeled rate (outdoor) 3 at highest labeled rate, 6 at lowest labeled rate (indoor)	0.32 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 1 day</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• <b>DO NOT</b> use vegetable plants treated with Atexzo for commercial vegetable production or sell those plants for use by commercial vegetable producers.</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Ornamentals<sup>8</sup></b>					

<p>Broadcast</p> <p>Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)</p>	<p>Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)</p>	<p>0.065 lb ai/A (outdoor) 0.134 lb ai/A (indoor)</p>	<p>4 at the highest labeled rate, 6 at the lowest labeled rate (outdoor) 2 at the highest labeled rate, 6 at the lowest labeled rate (indoor)</p>	<p>0.32 lb ai /A/year (Outdoor and indoor)</p>	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
<b>Peanut</b>					
<p>Broadcast</p> <p>Groundboom, Chemigation</p>	<p>A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)</p>	<p>0.053 lb ai/A</p>	<p>2</p>	<p>0.107 lb ai/A/year</p>	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Overhead chemigation is permitted only for suppression of corn rootworm larvae.</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
<p>Broadcast</p> <p>Groundboom, Chemigation</p>	<p>A21708 CP 9.27% ai (0.83 lb ai/gal)</p>	<p>0.053 lb ai/A</p>	<p>2</p>	<p>0.107 lb ai/A/year</p>	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Overhead chemigation is permitted only for suppression of corn rootworm larvae.</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>

Broadcast Groundboom, Chemigation	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Overhead chemigation is permitted only for suppression of corn rootworm larvae.</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• <b>DO NOT</b> apply by air</li> </ul>
<b>Pome Fruit, Crop Group 11-10; Stone Fruit, Crop Group 12-12; Tree Nuts</b>					
Broadcast Groundboom, Airblast	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.0665 lb ai/A	No more than 3 applications per year for pome fruit and tree nuts; no more than 2 for stone fruit	0.200 lb ai/A/year for pome fruit and tree nuts; 0.133 lb ai/A/year for stone fruit	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• <b>DO NOT</b> apply by air</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
Broadcast Groundboom, Airblast	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.0665 lb ai/A	No more than 3 applications per year for pome fruit and tree nuts; no more than 2 for stone fruit	0.200 lb ai/A/year for pome fruit and tree nuts; 0.133 lb ai/A/year for stone fruit	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• <b>DO NOT</b> apply by air</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>
Broadcast Groundboom, Airblast	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.0665 lb ai/A	No more than 3 applications per year for pome fruit and tree nuts; no more than 2 for stone fruit	0.200 lb ai/A/year for pome fruit and tree nuts; 0.133 lb ai/A/year for stone fruit	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• <b>DO NOT</b> apply by air</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>

Broadcast Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.065 lb ai/A (outdoor) 0.078 lb ai/A (indoor)	3 at highest labeled rate, 4 at lowest labeled rate	0.24 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI = 14 days</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Rapeseed (Canola Varieties Only)</b>					
Seed Treatment Commercial seed treatment equipment	A22725 ST (Alternate Brand Name: Equento™ 400FS) 34.8% ai (3.34 lb ai/gal)	0.2 lb ai/100 lb seed	1	0.016 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Do not use for at-plant applications (e.g., hopper box, planter box, etc.)</li> <li>• Do not exceed 0.016 lb ai/acre/year 17.9 g ai/ha/year) of isocycloseram when planting treated seeds.</li> <li>• Store treated seed away from food and feedstuffs.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
<b>Soybean</b>					
Broadcast Groundboom, Air	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• Aerial application to Soybean is only permitted in the following states: Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee and Texas.</li> </ul>
Broadcast Groundboom, Air	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> <li>• Aerial application to Soybean is only permitted in the following states: Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee and Texas.</li> </ul>

Broadcast Groundboom, Air	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.053 lb ai/A	2	0.107 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> <li>• Aerial application to Soybean is only permitted in the following states: Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee and Texas.</li> </ul>
<b>Tropical and Subtropical Fruit, Edible Peel Group: Crop Group 23; Tropical and Subtropical Fruit, Inedible Peel Group: Crop Group 24</b>					
Broadcast  Groundboom, Airblast, Chemigation, Mechanically Pressurized Handgun, Backpack. Hand Pressurized Hand Wand, Automatic Cold Fogger equipment (greenhouse only), Electrostatic equipment (greenhouse only)	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.134 lb ai/A (indoor)  0.065 lb ai/A (outdoor)	4 at highest labeled rate, 6 at lowest labeled rate (outdoor)  2 at highest labeled rate, 6 at lowest labeled rate (indoor)	0.32 lb ai/A/year	<ul style="list-style-type: none"> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• Aerial application is prohibited.</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li>• <b>DO NOT</b> apply by air</li> <li>• Only for retail sale to consumers.</li> </ul>
<b>Tuberous and Corm Vegetables, Crop Subgroup 1C</b>					
Broadcast  Groundboom, Air (only for Potato), Overhead Chemigation	A21377 CP (Alternate Name: Incipio®) 18.3% ai (1.67 lb ai/gal)	0.053 lb ai/A	3	0.160 lb ai/A/year	<ul style="list-style-type: none"> <li>• Aerial application is prohibited for all crops in Tuberous and Corm Vegetables, Crop Subgroup 1C except Potato</li> <li>• REI = 12 hours</li> <li>• Minimum Application Interval: 7 days</li> <li>• PHI: 14 days</li> <li>• Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>• Do not use in residential areas or residential landscapes.</li> <li>• Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>• PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>

Broadcast Groundboom, Air (only for Potato)	A21708 CP 9.27% ai (0.83 lb ai/gal)	0.053 lb ai/A	3	0.160 lb ai/A/year	<ul style="list-style-type: none"> <li>Aerial application is prohibited for all crops in Tuberous and Corm Vegetables, Crop Subgroup 1C except Potato</li> <li>REI = 12 hours</li> <li>Minimum Application Interval: 7 days</li> <li>PHI: 14 days</li> <li>Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>Do not use in residential areas or residential landscapes.</li> <li>Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>PPE = Long-sleeved shirt, long pants, shoes and socks, chemical resistant gloves.</li> </ul>
Broadcast Groundboom, Air (only for Potato), Overhead Chemigation	A21550 CP (Alternate Name: Vertento®) 34.8% ai (3.33 lb ai/gal)	0.053 lb ai/A	3	0.160 lb ai/A/year	<ul style="list-style-type: none"> <li>Aerial application is prohibited for all crops in Tuberous and Corm Vegetables, Crop Subgroup 1C except Potato</li> <li>REI = 12 hours</li> <li>Minimum Application Interval: 7 days</li> <li>PHI: 14 days</li> <li>Do not use in nurseries, plant propagation houses, or greenhouses on plants being grown for transplanting.</li> <li>Do not use in residential areas or residential landscapes.</li> <li>Ultra-low volume (ULV) applications, spray volumes &lt;2 gallons per acre, are prohibited.</li> <li>PPE = Long-sleeved shirt, long pants, shoes and socks.</li> </ul>
<b>Turf<sup>9</sup></b>					
Broadcast Groundboom, Chemigation, Mechanically Pressurized Handgun, Backpack, Hand Pressurized Hand Wand	Atexzo® INSECTICIDE 18.3% ai (1.67 lb ai/gal)	0.107 lb ai/A	Do not exceed 3 at the highest labeled rate, 14 at the lowest labeled rate	0.32 lb ai /A/year	<ul style="list-style-type: none"> <li>REI = 12 hours</li> <li>Minimum Application Interval: 7 days</li> <li>PPE = long-sleeved shirt, long pants, shoes plus socks</li> <li><b>DO NOT</b> apply by air</li> </ul>
<b>Food/Feed-Handling areas and Non-Food Areas of Commercial, Industrial, Institutional, Agricultural, and Residential areas; Livestock/Poultry/Companion Animal Housing.</b>					
Indoor Crack-and-crevice, spot, void  Backpack, handheld applicators, ULV equipment, foam generating equipment	A21550 400SC INSECTICIDE (Alternate Name: Vanecto® 400SC) 34.8% ai (3.33 lb ai/gal)	0.134 lb ai/A	--	--	<ul style="list-style-type: none"> <li>For normal pest situations or maintenance applications, a treatment interval of 30 days is usually sufficient to maintain control.</li> <li>To gain control of heavy infestations, make two applications at 7-day intervals, then revert to maintenance application intervals.</li> <li>For indoor use, apply no more than 1 gallon per 1,000 sq ft.</li> <li>Apply to food/feed areas of food/feed handling establishments as a crack-and-crevice or void treatment only.</li> <li>For applications to exterior and/or interior areas of agricultural/commercial structures used to house livestock and poultry, crack-and-crevice, spot application, or surface spray application may be used.</li> <li>PPE = long-sleeved shirt, long pants, shoes plus socks</li> </ul>

<p>Outdoor Crack-and-crevice, spot, void, general surface, perimeter banded</p> <p>Backpack, handheld applicators, ULV equipment, high- volume sprayers</p>	<p>A21550 400SC INSECTICIDE (Alternate Name: Vanecto® 400SC) 34.8% ai (3.33 lb ai/gal)</p>	<p>0.134 lb ai/A</p>	<p>Do not exceed 15 applications per structure per year at the high rate of 0.2% dilution.</p>	<p>0.32 lb ai/A/year (outdoor applications)</p>	<ul style="list-style-type: none"> <li>Outdoor application is prohibited for drywood termites</li> <li>For normal pest situations or maintenance applications, a treatment interval of 30 days is usually sufficient to maintain control.</li> <li>To gain control of heavy infestations, make two applications at 7-day intervals, then revert to maintenance application intervals.</li> <li>For outdoor use with backpack or other hand sprayers, 1-4 gallons per 1,000 sq ft is recommended.</li> <li>Apply to food/feed areas of food/feed handling establishments as a crack-and-crevice or void treatment only.</li> <li>For applications to exterior and/or interior areas of agricultural/commercial structures used to house livestock and poultry, crack-and-crevice, spot application, or surface spray application may be used.</li> <li>PPE = long-sleeved shirt, long pants, shoes plus socks</li> </ul>
<p>Wood injection for drywood termite control</p>	<p>A21550 400SC INSECTICIDE (Alternate Name: Vanecto® 400SC) 34.8% ai (3.33 lb ai/gal)</p>	<p>0.0042 lb ai/gal</p>	<p>--</p>	<p>0.32 lb ai/A/year (outdoor applications)</p>	<ul style="list-style-type: none"> <li>For normal pest situations or maintenance applications, a treatment interval of 30 days is usually sufficient to maintain control.</li> <li>To gain control of heavy infestations, make two applications at 7-day intervals, then revert to maintenance application intervals.</li> <li>For indoor use, apply no more than 1 gallon per 1,000 sq ft.</li> <li>For outdoor use with backpack or other hand sprayers, 1-4 gallons per 1,000 sq ft is recommended.</li> <li>Apply to food/feed areas of food/feed handling establishments as a crack-and-crevice or void treatment only.</li> <li>For applications to exterior and/or interior areas of agricultural/commercial structures used to house livestock and poultry, crack-and-crevice, spot application, or surface spray application may be used.</li> <li>PPE = long-sleeved shirt, long pants, shoes plus socks</li> </ul>
<p>Backpack, handheld applicators</p>	<p>A21550 400SC INSECTICIDE (Alternate Name: Vanecto® 400SC) 34.8% ai (3.33 lb ai/gal)</p>	<p>0.0167 lb ai/gal (0.134 lb ai/A)</p>	<p>--</p>	<p>0.32 lb ai/A/year (outdoor application)</p>	<ul style="list-style-type: none"> <li>For normal pest situations or maintenance applications, a treatment interval of 30 days is usually sufficient to maintain control.</li> <li>To gain control of heavy infestations, make two applications at 7-day intervals, then revert to maintenance application intervals.</li> <li>For indoor use, apply no more than 1 gallon per 1,000 sq ft.</li> <li>For outdoor use with backpack or other hand sprayers, 1-4 gallons per 1,000 sq ft is recommended.</li> <li>Apply to food/feed areas of food/feed handling establishments as a crack-and-crevice or void treatment only.</li> <li>For applications to exterior and/or interior areas of agricultural/commercial structures used to house livestock and poultry, crack-and-crevice, spot application, or surface spray application may be used.</li> <li>PPE = long-sleeved shirt, long pants, shoes plus socks</li> </ul>

<p>Indoor/Outdoor Crack-and-crevice, spot, void</p> <p>RTU Gel bait</p>	<p>A22128 Cockroach Gel Bait (Alternate Name: Vanecto® Cockroach Gel Bait) 1% ai (0.01 lb ai/lb)</p>	<p>40 spots<sup>10</sup> per 100 sq ft of treated area = 0.00044 lb ai/100 ft<sup>2</sup></p>	<p>Do not make more than 12 applications per individual 100 sq ft area per year</p>	<p>--</p>	<ul style="list-style-type: none"> <li>• Apply to food/feed areas of food/feed handling establishments as a crack-and-crevice or void treatment only.</li> <li>• Light to moderate infestations: 10-30 spots per 100 sq ft; Heavy infestations or for larger cockroach species: 30-40 spots per 100 sq ft.</li> <li>• Do not treat areas that are easily accessible to children and pets.</li> <li>• Do not apply to food preparation surfaces.</li> <li>• Do not allow open foods to contact the bait.</li> <li>• PPE = long-sleeved shirt, long pants, shoes plus socks</li> </ul>
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<sup>1</sup> Application Rate (lb ai/gal) = [fl oz/A x (1 gal/128 fl oz) x (lb ai/gal)] / (gal solution/A).

<sup>2</sup> REI = restricted-entry interval, PHI = pre-harvest interval; PPE = personal protective equipment

<sup>3</sup> Label directs using a minimum of 100 gallons carrier volume per acre.

<sup>4</sup> Label directs using a minimum of 10 gallons carrier volume per acre.

<sup>5</sup> Label directs using a minimum of 30 gallons carrier volume per acre.

<sup>6</sup> Label directs using a minimum of 2 gallons carrier volume per acre.

<sup>7</sup> Label directs using a minimum of 5 gallons carrier volume per acre.

<sup>8</sup> Includes field and container-grown plants produced in greenhouses and nurseries (including shade houses, lath houses and other outdoor growing structures), evergreen (including conifer) and deciduous tree nurseries, forest nurseries, Christmas tree farms, residential and commercial landscapes, parks, and interior plantscapes.

<sup>9</sup> Includes golf courses; institutional, commercial, and residential lawns and landscapes; sod farms; sports fields; parks; municipal grounds; and cemeteries.

<sup>10</sup> According to the label, each bait spot is approximately 1/4 inch in diameter and approximately equal to 0.5 grams of product.

<sup>11</sup> Cereal grains include: Labels A22725 and A22241: barley, buckwheat, oats, pearl millet, proso millet, rye, teosinte, triticale, wheat.

<sup>12</sup> Peas and Beans include: Chickpea, Lentil field peas, field bean, kidney bean, lima bean (dry), navy bean, pinto bean, tepary bean, adzuki bean, blackeyed pea, catjang, cowpea, Crowder pea, moth bean, mung bean, rice bean, southern pea, urd bean, fava bean, Guar, hyacinth bean Pigeon pea.

## IV. EVALUATION

In evaluating a pesticide registration application, EPA assesses a wide variety of exposure information (*i.e.*, where and how the pesticide is used) as well as environmental fate (*i.e.*, how the chemical will move in the environment) and toxicity studies (*i.e.*, effects on humans and other non-target organisms) based on chemical-specific data to determine the likelihood of adverse effects (*i.e.*, risk) from exposures associated with the use of the product. Risk assessments are developed to evaluate the environmental fate of the compound as well as how it might affect a wide range of non-target organisms including humans, terrestrial and aquatic wildlife (plants and animals). The potential for persistence, bioaccumulation and toxicity are considered in these assessments. In addition, a benefits assessment may be conducted. EPA then weighs findings from these assessments and determines if the overall risk for use of the pesticide is deemed “unreasonable.” Based on these assessments, EPA evaluates and approves language for each pesticide label to ensure the directions for use and safety measures are appropriate to mitigate potential risks that outweigh benefits. In this way, the pesticide label communicates essential limitations and mitigations that are necessary for public safety. It is a FIFRA violation to use a pesticide in a manner inconsistent with its labeling. Consistent with Endangered Species Act (ESA) Section 7(a)(2), EPA also assesses the potential effects of the use of isocycloseram on federally listed threatened or endangered (hereafter referred to as “listed”) species and their designated critical habitats (CHs).

## A. Assessment of Risks to Human Health

The EPA requires a wide range of studies in order to assess a pesticide use scenario. For the uses of isocycloseram, listed in Table 1, the database of studies required to support the assessment of risk to human health is adequate for dose-response assessment, exposure assessment and risk characterization and Food Quality Protection Act (FQPA) Safety Factor (SF) consideration for registration in the U.S.

This section summarizes EPA's Human Health Risk Assessment for New Active Ingredient Isocycloseram. The complete assessment can be found in docket ID number EPA-HQ-OPP-2021-0641 at [www.regulations.gov](http://www.regulations.gov).

### 1. Toxicology Profile

Isocycloseram is a new broad-spectrum insecticide belonging to the chemical group of isoxazolines. It binds to a site on the gamma-aminobutyric acid (GABA) receptor, resulting in a blockage of inhibitory neurotransmission and leading to hyperexcitation and death of target insects. The pesticidal mode of action is classified by the Insecticide Resistance Action Committee (IRAC) as a Group 30 insecticide (GABA-gated chloride channel allosteric modulator). Isocycloseram contains two stereocenters and is manufactured as a mixture of four stereoisomers (in order of percentage of the test material: SYN548088 [89.2%], SYN548090 [4.7%], SYN548089 [2.7%], and SYN548091 [0.3%]). In a 28-day, rat isomer toxicity study, reduced body weight was noted in males with the major isomer (SYN548088) but no adverse effects were noted with SYN548089, SYN548090, or a mixture of the three more prominent isomers (SYN548088 + SYN548089 + SYN548090). Although there was some variability in isomer composition used for the toxicity studies, SYN548088 is the major component of the isomer mixture (89.2-98.9%), and the available studies provide protective points of departure (PODs).

Isocycloseram has low acute mammalian toxicity (Toxicity Category IV) via inhalation, dermal, and oral routes. It is a minimal eye irritant and not irritating to the skin (Toxicity Category IV) but is a dermal sensitizer.

Rats are the most sensitive mammalian species in the database, and male rats are more sensitive than female rats. The testes, epididymides, and liver were the target organs of isocycloseram in oral toxicity studies in rats. Tubular degeneration of testes, and cellular debris and reduced sperm in the epididymides were observed in subchronic, chronic/carcinogenicity, and one-generation reproduction studies in rats. Additionally, hepatocyte vacuolation and/or inflammatory cell infiltrate were noted in the chronic/carcinogenicity and one-generation reproduction studies in rats. Toxicity in the rat was observed at lower dose levels with increased duration of exposure. In the 28-day dermal toxicity study in rats, no adverse effects were observed up to the limit dose. No adverse effects were observed in mice following subchronic and chronic exposure. Decreased body weight and poor clinical conditions (vomiting and slight body tremors) were observed in dogs after subchronic exposure.

There was no evidence of qualitative or quantitative life-stage susceptibility in the rat and rabbit developmental toxicity studies tested up to 15 mg/kg/day, and in one- and two-generation rat reproduction studies tested up to 15 and 12 mg/kg/day respectively. In the two-generation rat reproduction study, there were no systemic parental, reproductive, or offspring adverse effects up to the highest dose tested (12 mg/kg/day). In the one-generation reproduction study, systemic parental and reproductive effects were observed at 45 mg/kg/day with a parental, reproductive and offspring no-observed adverse-effect level (NOAELs) of 15 mg/kg/day which is comparable to the NOAEL in the two-generation reproduction study.

Although the rat and rabbit definitive developmental studies did not test up to the limit dose and there is a potential for susceptibility at higher doses, the concern for susceptibility is low based on the following considerations: the highest dose tested in the definitive developmental toxicity studies in both rats and rabbits (15 mg/kg/day) did not elicit an adverse effect in either the maternal or fetal compartments. Minimal effects were seen in the range-finding studies for both species. In the rat range finding study, decreases in body-weight gain and absolute body weight (decreases of 20% and 7%, respectively) were noted at 15 mg/kg/day (highest dose tested) with no effects in the fetal compartment. In the rabbit range finding study, a 3% weight loss accompanied by a 61% decrease in food consumption was seen at 30 mg/kg/day (highest dose tested). These studies demonstrate that the animals were sufficiently challenged. In both species, marginal non-adverse maternal effects were seen in the absence of developmental toxicity, suggesting that the potential for lifestage sensitivity is low. In addition, data from a one-generation toxicity study in rats revealed no lifestage sensitivity even after a longer period of exposure (NOAEL for all lifestages = 15 mg/kg/day).

In the two-generation rat reproduction study, no adverse effects were observed up to the highest dose tested (12 mg/kg/day). The minimal effects (degeneration/atrophy of the epithelium in the seminiferous tubules with minimal to slight severity) noted in the F0 and F1 males are also an indication that the animals were adequately dosed during early life and there is no indication of lifestage sensitivity. Hence, the weight-of-evidence (WOE) indicates an overall low level of concern for lifestage sensitivity, and the selected PODs are protective of any potential effects that would be observed at a higher dose.

There was no evidence of neurotoxicity in the acute and subchronic neurotoxicity studies up to the highest dose tested (1000 mg/kg for acute and 33 mg/kg/day for subchronic).

Isocycloseram is classified as “Not Likely to be Carcinogenic to Humans.” No treatment-related increase in tumors was observed in the carcinogenicity studies in rats and/or mice at doses that were considered adequate to assess carcinogenicity. Additionally, there was no evidence of mutagenicity *in vivo* or *in vitro*.

The Food Quality Protection Act safety factor (FQPA SF) of 10x was reduced to 1X for all exposure scenarios. Although there was potential evidence of neurotoxicity in the 28-day dog study (slight body tremors), the selected endpoints are protective of the observed effects, and clear NOAEL and LOAEL values have been identified in this study. There was no evidence of qualitative or quantitative fetal or postnatal susceptibility.

A summary of the PODs selected for human health risk assessments can be found in **Tables 2** and **3**. This section, Assessment of Risks to Human Health, is a summary of the standard assessment that the agency conducts; the full Human Health Risk Assessment can be found in docket ID number EPA-HQ-OPP-2021-0641 at [www.regulations.gov](http://www.regulations.gov).

<b>Table 2. Summary of Toxicological Doses and Endpoints for Isocycloseram for Use in Dietary and Non-Occupational Human Health Risk Assessments.</b>				
<b>Exposure Scenario</b>	<b>POD</b>	<b>Uncertainty/FQPA Safety Factors</b>	<b>RfD, PAD, LOC for Risk Assessment</b>	<b>Study and Toxicological Effects</b>
Acute Dietary (All Populations)	No hazard or appropriate acute endpoint attributable to a single exposure was identified from the available oral toxicity database at the doses tested.			
Chronic Dietary (All Populations)	NOAEL = 2 mg/kg/day	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X FQPA SF = 1X	cRfD = 0.02 mg/kg/day  cPAD = 0.02 mg/kg/day	<u>Combined chronic toxicity/carcinogenicity in rat (MRID 51252102)</u>  LOAEL = 7 mg/kg/day based on reduced testes size, increased incidence and severity of tubular degeneration in the testes, reduced sperm and cellular debris in the epididymis, and increased incidence and severity of liver vacuolation in males.
Incidental Oral/Adult Oral Short-Term (1-30 days) and Intermediate-Term (1-6 months)	NOAEL = 11 mg/kg/day	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X FQPA SF = 1X	Residential LOC for MOE = 100	<u>Subchronic toxicity in rat (MRID 51252110)</u>  LOAEL = 22 mg/kg/day based on decreased body weight in males, tubular degeneration of testes, and cellular debris and reduced sperm in the epididymis.
Dermal Short-Term (1-30 days)	No hazard identified in the 28-day dermal toxicity study up to the limit dose. The effect on the target organ (testes) was not observed in the dermal toxicity study or orally at short-term exposures; based on a weight-of-evidence approach there is low concern for susceptibility.			
Dermal Intermediate-Term (1-6 months)	NOAEL = 11 mg/kg/day  DAF = 7%  DED = 157 mg/kg/day	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X FQPA SF = 1X	Residential LOC for MOE = 100	<u>Subchronic toxicity in rat (MRID 51252110)</u>  LOAEL = 22 mg/kg/day based on decreased body weight in males, tubular degeneration of testes, and cellular debris and reduced sperm in the epididymis.

**Table 2. Summary of Toxicological Doses and Endpoints for Isocycloseram for Use in Dietary and Non-Occupational Human Health Risk Assessments.**

Exposure Scenario	POD	Uncertainty/FQPA Safety Factors	RfD, PAD, LOC for Risk Assessment	Study and Toxicological Effects
Inhalation Short-Term (1-30 days) and Intermediate-Term (1-6 months)	NOAEL = 11 mg/kg/day  Assumption: inhalation-absorption equivalent to oral absorption	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X FQPA SF = 1X	Residential LOC for MOE = 100	<u>Subchronic toxicity in rat (MRID 51252110)</u>  LOAEL = 22 mg/kg/day based on decreased body weight in males, tubular degeneration of testes, and cellular debris and reduced sperm in the epididymis.
Cancer (oral, dermal, inhalation)	Classification: “Not Likely to be Carcinogenic to Humans”; therefore, a cancer risk assessment is not required.			

Point of departure (POD) = A data point or an estimated point that is derived from observed dose-response data and used to mark the beginning of extrapolation to determine risk associated with lower environmentally relevant human exposures. NOAEL = no-observed adverse-effect level. LOAEL = lowest-observed adverse-effect level. UF = uncertainty factor. UF<sub>A</sub> = extrapolation from animal to human (interspecies). UF<sub>H</sub> = potential variation in sensitivity among members of the human population (intraspecies). FQPA SF = Food Quality Protection Act Safety Factor. PAD = population-adjusted dose (c = chronic). RfD = reference dose. LOC = level of concern. DAF = dermal absorption factor. DED = dermal-equivalent dose. MOE = margin of exposure.

**Table 3. Summary of Toxicological Doses and Endpoints for Isocycloseram for Use in Occupational Human Health Risk Assessments.**

Exposure Scenario	POD	UFs	LOC for Risk Assessment	Study and Toxicological Effects
Dermal Short-Term (1-30 days)	No hazard identified in the 28-day dermal toxicity study up to the limit dose. The effect on the target organ (testes) was not observed at short-term exposure and based on a weight-of-evidence approach, there is low concern for susceptibility.			
Dermal Intermediate-Term (1-6 months)	NOAEL = 11 mg/kg/day  DAF = 7%  DED = 157 mg/kg/day	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X	Occupational LOC for MOE = 100	<u>Subchronic toxicity in rat (MRID 51252110)</u>  LOAEL = 22 mg/kg/day based on decreased body weight in males, tubular degeneration of testes, and cellular debris and reduced sperm in the epididymis.
Inhalation Short-Term (1-30 days) and Intermediate-Term (1-6 months)	NOAEL = 11 mg/kg/day  Assumption: inhalation-absorption equivalent to oral absorption	UF <sub>A</sub> = 10X UF <sub>H</sub> = 10X	Occupational LOC for MOE = 100	<u>Subchronic toxicity in rat (MRID 51252110)</u>  LOAEL = 22 mg/kg/day based on decreased body weight in males, tubular degeneration of testes, and cellular debris and reduced sperm in the epididymis.
Cancer (oral, dermal, inhalation)	Classification: “Not Likely to be Carcinogenic to Humans”			

Point of departure (POD) = A data point or an estimated point that is derived from observed dose-response data and used to mark the beginning of extrapolation to determine risk associated with lower environmentally relevant human exposures. NOAEL = no-observed adverse-effect level. LOAEL = lowest-observed adverse-effect level. UF = uncertainty factor. UF<sub>A</sub> = extrapolation from animal to human (interspecies). UF<sub>H</sub> = potential variation in sensitivity among members of the human population (intraspecies). LOC = level of concern. DAF = dermal absorption factor. DED = dermal equivalent dose. MOE = margin of exposure.

## 2. Dietary (Food + Water) Risks

In estimating dietary exposure to isocycloseram, EPA considered exposure to food and drinking water.

An acute dietary exposure assessment was not conducted for isocycloseram as no appropriate acute endpoints were identified for any population subgroup (*i.e.*, no toxic effect attributable to a single dose identified). Isocycloseram is classified as “Not Likely to be Carcinogenic to Humans”; therefore, a cancer dietary risk assessment is not required.

The chronic aggregate dietary (food and drinking water) exposure and risk assessment was conducted using the Dietary Exposure Evaluation Model software with the Food Commodity Intake Database (DEEM-FCID) Version 4.02. This software uses 2005-2010 food consumption data from USDA’s National Health and Nutrition Examination Survey What We Eat in America (NHANES/WWEIA). The unrefined chronic dietary assessment was conducted using tolerance-level residues (primary crops), calculated residues (livestock), and 100 percent crop treated (PCT) assumptions. Calculated residues for livestock were derived from feeding studies and accounted for isocycloseram as well as the following residues of concern for risk assessment: SYN549431 and SYN551475 for fat; SYN549543, SYN549544, SYN548569, and SYN551583 for meat byproducts; and SYN549431, SYN551479, and SYN549436 for eggs. As a result, residues for risk assessment were incorporated at levels higher than the livestock tolerances. The model-derived estimated drinking water concentrations (EDWCs) (0.0099 mg ai/L; parts per million [ppm]) for all direct and indirect water sources were used for the chronic assessment. This assessment incorporated tolerances derived from field trials conducted at application rates higher than, and thus protective of the rates on the labels modified in response to potential ecological concerns.

There are no chronic dietary (food and drinking water) risk estimates of concern for the general U.S. population and all population subgroups. The most highly exposed population subgroup is children (1-2 years old) at 67% of the chronic population-adjusted dose (cPAD).

## 3. Occupational Handlers Risks

Based on the uses, short- and intermediate-term exposures are expected. However, no short-term dermal hazard was identified up to the limit dose; therefore, only intermediate term dermal and short-/intermediate-term inhalation exposures were assessed.

Short- and intermediate-term occupational handler inhalation and intermediate-term dermal combined risk estimates are not of concern (*i.e.*, margins of exposure (MOEs) greater than or equal to ( $\geq$ ) the level of concern (LOC) of 100) at baseline attire. Aerial applications were assessed using engineering controls (*e.g.*, closed cockpits and gloves), and no risk estimates of concern were identified (*i.e.*, MOEs  $\geq$  the LOC of 100).

Intermediate-term commercial/on-farm seed treatment inhalation and dermal combined risk estimates are not of concern (*i.e.*, MOEs  $\geq$  the LOC of 100) at baseline attire with required personal protective equipment (PPE) consisting of chemical-resistant gloves for all uses.

Intermediate-term dermal occupational post-application risk estimates are not of concern (MOEs  $\geq$  LOC of 100) on the day of application using chemical-specific turf transferable residue (TTR) and dislodgeable foliar residue (DFR) data.

Isocycloseram is classified as Toxicity Category IV via the dermal route, Toxicity Category IV for skin irritation potential, and Toxicity Category IV for eye irritation potential. It is a skin sensitizer. Short- and intermediate-term post-application risk estimates are not a concern on day 0 (12 hours following application) for all post-application activities. Under 40 C.F.R. § 156.208(c)(2), active ingredients (AIs) classified as Acute III or IV for acute dermal, eye irritation and primary skin irritation are assigned a 12-hour REI. Therefore, the 40 C.F.R. Part 156, subpart K Worker Protection Statement interim REI of 12 hours is adequate to protect agricultural workers from post-application exposures to isocycloseram. All the labels list an REI of at least 12 hours and are considered protective of potential post-application exposures.

Based on the Agency's current practices, a quantitative non-cancer occupational post-application inhalation exposure assessment was not performed for isocycloseram at this time. If new policies or procedures are put into place, then the Agency may revisit the need for a quantitative occupational post-application inhalation exposure assessment for isocycloseram.

#### **4. Residential Handler Risk and Post Application Risks**

A residential short-term post-application exposure assessment for dermal exposure was not quantified as there is no short-term dermal hazard identified up to the limit dose and intermediate-term residential post-application exposures are unlikely to occur.

The end-use products are not intended for use by residential handlers; therefore, a quantitative residential handler assessment has not been conducted. Residential indoor uses are to be applied using a ready-to-use (RTU) gel bait or low-pressure spray as a crack and crevice, spot, or void treatment that results in no residential post-application inhalation potential.

A quantitative residential post-application inhalation exposure assessment was not performed, as inhalation exposure is expected to be negligible from these types of applications. However, an inhalation exposure assessment was performed for occupational handlers (*i.e.*, treaters, handlers, *etc.*), and this exposure scenario should be considered protective of any potential low-level post-application inhalation exposure to bystanders that could result from these types of applications.

#### **5. Residential Risk**

Residential post-application short-term incidental oral exposures resulting from indoor and lawn/turf applications were assessed for children 1 to < 2 years old. Default residue assumptions were used for assessment of indoor uses as no chemical-specific indoor data are available at this time. Chemical-specific turf transferable residue (TTR) data were used for assessment of

lawn/turf applications. No incidental oral risk estimates of concern were identified (*i.e.*, all MOEs are greater than the LOC of 100).

## **6. Aggregate Risk**

In accordance with the FQPA, Health Effects Division (HED) must consider and aggregate (add) pesticide exposures and risks from three major sources: food, drinking water, and residential exposures. In an aggregate assessment, exposures from relevant sources are added together and compared to quantitative estimates of hazard (*e.g.*, a NOAEL or PAD), or the risks themselves can be aggregated. When aggregating exposures and risks from various sources, HED considers both the route and duration of exposure.

No acute residential scenarios have been identified for the uses of isocycloseram. Additionally, an acute dietary exposure assessment was not performed for isocycloseram as a toxicological endpoint attributable to a single dose was not identified in the database. Therefore, an acute aggregate risk assessment was not conducted for isocycloseram.

A short-term aggregate risk assessment was conducted for isocycloseram which incorporates the residential scenarios identified in the Human Health Risk Assessment for children 1 to < 2 years old. The residential scenarios have been combined with the dietary (food plus drinking water) exposures identified in the Human Health Risk Assessment. The short-term aggregate MOEs for children (1 to < 2 years old, MOE = 300) are above the LOC (100) and are not of concern.

Based on the uses for isocycloseram, a chronic residential assessment was not conducted; therefore, the chronic aggregate risk assessment consists of only the chronic dietary exposures (food plus drinking water); there are no chronic aggregate risk estimates of concern.

## **7. Cumulative Risk**

Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to isocycloseram and any other substances. For the purposes of this action, therefore, EPA has not assumed that isocycloseram has a common mechanism of toxicity with other substances. As a result, a cumulative risk assessment has not been conducted at this time.

## **8. Non-Occupational Spray Drift Exposure and Risk**

HED conducts human health spray drift assessments to determine potential risk from indirect exposure to pesticides that may drift during or immediately after an application. Pesticide applications made in the form of a spray and applied aerially or via airblast or groundboom may result in pesticide drift and deposition in non-target areas adjacent to the application site.

Isocycloseram will be used on turf, thus EPA considered whether the risk assessment for the turf uses may be considered protective of any type of exposure expected to result from spray drift. If the maximum application rate on crops adjusted by the amount of drift expected is less than or equal to existing turf application rates, the existing turf assessment is considered protective of

spray drift exposure. Note that this assumes similar formulations are being applied to the agricultural crops and the residential turf (*i.e.*, if a granular product is registered for use on residential turf, the scenarios assessed for that use may not be protective of liquid applications made to agricultural crops). The maximum single application rate of isocycloseram for several crops is 0.134 lb ai/A. The highest degree of spray drift noted for any application method immediately adjacent to a treated field (Tier 1 output from the aerial application using fine to medium spray quality) results in a deposition fraction of 0.26 of the application rate. A quantitative spray drift assessment for isocycloseram is not required because the maximum application rate to a crop/target site multiplied by the adjustment factor for drift of 0.26 is less than the maximum direct spray residential turf application rate (0.134 lb ai/A). As a result, the turf post-application MOEs (see Section 5 above) can be considered protective of any potential non-occupational spray drift exposures.

## **9. Non-Occupational Bystander Post-Application Inhalation Exposure and Risk Estimates**

Volatilization of pesticides may be a source of post-application inhalation exposure to individuals nearby pesticide applications. A quantitative residential post-application inhalation exposure assessment was not performed, as inhalation exposure is expected to be negligible from these types of applications. However, EPA performed an inhalation exposure assessment for occupational handlers (*i.e.*, treaters, handlers, *etc.*), and EPA considers this exposure scenario protective of any potential low-level post-application inhalation exposure to bystanders that could result from these types of applications.

### **B. Endocrine Disruptor Screening Program**

The FFDCA Section 408(p) requires EPA to develop a screening program to determine whether certain substances (including pesticide active and other ingredients) may have an effect in humans similar to an effect produced by a “naturally occurring estrogen, or other such endocrine effects as the Administrator may designate.” (21 U.S.C. § 346a(p)). In carrying out the Endocrine Disruptor Screening Program (EDSP), FFDCA Section 408(p)(3) requires that EPA “provide for the testing of all pesticide chemicals,” which includes “any substance that is a pesticide within the meaning of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), including all active and pesticide inert ingredients of such pesticide.” (21 U.S.C. 231(q)(1) and 346a(p)(3)). However, FFDCA Section 408(p)(4) authorizes EPA to, by order, exempt a substance from the EDSP if the EPA “determines that the substance is anticipated not to produce any effect in humans similar to an effect produced by a naturally occurring estrogen.” (21 U.S.C. § 346a(p)(4)).

As described in Appendix H of the human health risk assessment, no additional data are needed at this time to support EPA’s assessment of the potential for adverse estrogen, androgen, or thyroid hormone effects in humans.

The current PODs for human health risk assessment for isocycloseram are based on potential adverse androgen effects. Since the human health risk assessment did not identify any risks of concern, EPA has completed its FFDCA Section 408(p)(6)-related commitments and obligations

“to ensure the protection of public health” at this time. For additional details of the EDSP, please visit <https://www.epa.gov/endocrine-disruption>.

### C. Assessment of Environmental and Ecological Risks

The ecological risk assessment (ERA) examines the potential for adverse effects to non-listed non-target organisms associated with uses of isocycloseram. The EPA also conducted a Biological Evaluation (BE) that assesses the effects on federally listed threatened/endangered species and includes EPA’s predictions of the potential likelihood of future jeopardy (J) for listed species and adverse modification (AM; collectively referred to as J/AM) of designated critical habitats (CHs), as well as the EPA’s assessment of how mitigations are identified to avoid such findings. However, while EPA is predicting the potential likelihood of future J/AM, the U.S. Fish and Wildlife Service or the National Marine Fisheries Service (collectively referred to as the Services) are responsible for making the actual J/AM findings for these species and have the sole authority to do so.

The taxa evaluated in the ERA include mammals, birds (which serve as surrogates for reptiles and terrestrial-phase amphibians), bees, fish (where freshwater fish serve as surrogates for aquatic-phase amphibians), aquatic invertebrates, and aquatic and terrestrial plants. Ecological risk characterization integrates environmental exposure and ecotoxicity data to evaluate the likelihood of adverse ecological effects using a risk quotient (RQ) method. For this method, RQs are calculated by dividing point estimates of exposure (*i.e.*, estimated environmental concentrations [EECs]) by point estimates of toxicity ( $RQ = EEC/\text{toxicity endpoint}$ ), for both acute and chronic effects. The RQs are then compared to EPA’s acute and chronic risk levels of concern (LOCs) for each taxon. The LOCs are well-established levels used by EPA to indicate potential risk to non-target organisms and are meant to be protective of community-level effects. The LOC indicates whether a pesticide, when used as directed, has the potential to cause adverse effects to non-target organisms. RQs below a LOC indicate there are no risks of concern for that taxon. If the RQ exceeds the LOC, then the EPA further characterizes and describes the associated risk of concern.

These findings can also play a role in the EPA’s assessment of effects to listed species and their designated CH, as required by the Endangered Species Act (ESA). Where RQs have been calculated, if the RQs are below the listed species LOC (indicating potential exposures are below threshold doses) for a particular taxon, then the EPA does not expect direct effects to listed species in that taxon. However, further refinement or analysis may be necessary to complete an effects determination for listed species within that taxon because there may also be indirect effects to a listed species from potential direct effects to another taxon on which the listed species depends for pollination, prey, habitat, and/or dispersion (PPHD). In making its effects determinations, EPA evaluates both potential direct and indirect effects to listed species and designated critical habitats.

EPA has determined that based on the use patterns all relevant data requirements specified in Title 40, Part 158 of the Code of Federal Regulations (40 C.F.R. Part 158) have been satisfied. This section summarizes the EPA’s ERA and BE for isocycloseram. The complete assessment can be found in docket ID number EPA-HQ-OPP-2021-0641 at [www.regulations.gov](http://www.regulations.gov).

## 10. Environmental Fate Profile

Isocycloseram is moderately soluble in water and is not likely to volatilize from water and dry surfaces. Isocycloseram is moderately persistent to persistent in aerobic soil systems,<sup>1</sup> with aerobic soil time to 50% decline in mass/concentration (DT<sub>50</sub>) values ranging from 56.3 days (d) to 293 d. Unextracted residues accounted for >10% applied radioactivity (AR) in all soil studies; however, EPA considers these residues as bound to the soil and do not represent a potential source of exposure. Isocycloseram degraded faster in water than in soil, with DT<sub>50</sub> values ranging from 9.94 to 37.1 d and 2.29 d to 5.94 d in aerobic and anaerobic aquatic metabolism studies, respectively. Isocycloseram is not systemic in plants and is not expected to be translocated to pollen or nectar via plant uptake and distribution. Based on a log octanol-water partition coefficient (log K<sub>ow</sub>) of 4.9 the compound has the potential to bioaccumulate in aquatic organisms; however, the parent compound has measured whole fish bioconcentration factors (BCF) ranging from 823 to 982 L/kg-wet weight fish and achieved >95% depuration after 14 days, indicating a low potential for bioaccumulation or bioconcentration. Radioactive residues in fish were primarily (84-89%) parent and additional data provided by Syngenta show that all residues besides parent accounted for <3% of the applied radioactivity (AR). Additionally, modeling conducted with the K<sub>ow</sub>-based aquatic bioaccumulation model (KABAM; v. 1.0) did not indicate risks of concern due to bioconcentration/bioaccumulation.

Isocycloseram breaks down into multiple degradation products, with 24 major (>10% AR) and 4 minor (<10% AR) degradates identified. The parent compound is slightly to hardly mobile in soil (FAO, 2000), and thus is expected to sorb to sediment. This is largely consistent with what is observed in the terrestrial field dissipation (TFD) studies. Mobility data for SYN549107 and SYN550738, two major degradates in aerobic soil metabolism studies, indicate that degradate SYN549107 is more mobile than parent (slightly mobile) and degradate SYN550738 is less mobile (immobile). As empirical batch equilibrium data were only submitted for these two degradates, EPA used the Estimation Program Interface suite (EPI Suite™; version 4.1) to estimate the organic carbon-normalized distribution coefficient (K<sub>oc</sub>) values for all other degradates, with estimated mobilities both higher and lower than that of the parent. Based on submitted toxicity data, percent formation data, and structure-activity relationship analysis, the Residues of Concern (ROC) for ecological risk include the parent compound and degradates SYN549431, SYN549107, SYN550738, SYN551203, SYN550737, and SYN55103.

For the exposure assessment, the EPA calculated EECs for parent and parent plus residues of concern using the Total Residue (TR) method (referred to collectively as TR throughout the document). To account for degradate persistence and low mobility of parent, the EPA calculated EECs using TR model input half-lives and the parent K<sub>oc</sub> values. In the selection of EECs, EPA conducted a Formation-Decline modeling analysis which demonstrated that the EECs are driven by parent mobility rather than that of the most mobile ROC. The EECs based on the TR half-

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<sup>1</sup> Goring, C. A. I., Laskowski, D. A., Hamaker, J. H., & Meikle, R. W. 1975. Principles of pesticide degradation in soil. In R. Haque & V. H. Freed (Eds.), *Environmental dynamics of pesticides*. NY: Plenum Press. Available at [https://link.springer.com/chapter/10.1007%2F978-1-4684-2862-9\\_9](https://link.springer.com/chapter/10.1007%2F978-1-4684-2862-9_9).

lives using parent mobility are comparable to the results from higher-tier Formation-Degradation modeling.

The TFD studies have parent DT<sub>50</sub> values ranging from 4.22 d to 382 d in soil that are similar to but outside of the range of aerobic soil metabolism half-lives (range: 56 – 293 days). Residues recovered on-field are consistent with those identified in the aerobic soil metabolism studies. Detected degradates generally do not exceed a depth of 30 cm and reach either similar or lesser depths compared to parent.

## 11. Ecological Effects and Risk

The EPA took a comprehensive approach in evaluating potential risk concerns for all taxa (including freshwater and estuarine/marine fish and invertebrates, aquatic vascular and nonvascular plants, birds, mammals, terrestrial invertebrates, and terrestrial plants) using registrant-submitted ecotoxicity data on the effects of isocycloseram. Ecological effects and risks to taxa evaluated in this assessment are described below, followed by a summary of RQ values considered (**Table 5**). Application of isocycloseram in accordance with the labels poses risks of concern for non-target aquatic and terrestrial invertebrates from all uses evaluated except for the cockroach gel bait, and for terrestrial vertebrates from the seed treatment uses.

### *Aquatic Vertebrates*

Isocycloseram is categorized as highly toxic to fish (and aquatic-phase amphibians for which freshwater fish serve as surrogates) on an acute exposure basis. Chronic exposure of aquatic vertebrates resulted in reductions in post-hatch survival, mean length and wet weight. RQs based on isocycloseram TR with the parent K<sub>oc</sub>, and parent alone are below the acute and chronic risk LOCs.

### *Aquatic Invertebrates*

Isocycloseram is categorized as very highly toxic to aquatic invertebrates on an acute exposure basis. One group of invertebrates (*i.e.*, mollusks which include aquatic and terrestrial snails, oysters and clams) is less sensitive to isocycloseram by several orders of magnitude. Chronic exposure of aquatic non-mollusk invertebrates to isocycloseram resulted in reductions in growth and survival. Risk estimates for aquatic (freshwater and estuarine/marine) invertebrates in the water column exceed both the acute and chronic risk levels of concerns (LOCs) (acute LOC=0.5; chronic LOC=1.0). For TR with parent K<sub>oc</sub>, acute RQ values range from 0.14 to 86.4 and chronic RQ values range from 0.68 to 413. For benthic invertebrates (freshwater and estuarine/marine), most uses exceed the acute and chronic risk LOC whether based on TR with parent K<sub>oc</sub> or parent alone (TR with parent K<sub>oc</sub> acute RQ range: 0.01-8.50; TR with parent K<sub>oc</sub> chronic RQ range: 0.05-86.2; based on benthic porewater EECs). EPA notes that the aquatic modeling for seed treatment products includes some conservative assumptions such that 100% of the material on the treated seed is available for runoff. The label mitigations include measures to reduce effects of runoff on aquatic invertebrates. By implementing these mitigations on the label (section VI), the potential risk to aquatic invertebrates decreases by approximately one order of magnitude.

### *Terrestrial Invertebrates*

For terrestrial invertebrates, the available data indicate that technical grade isocycloseram is highly toxic both on an acute (single dose) oral and contact exposure basis to honey bee (*Apis mellifera*) adults and larvae, which serve as surrogates for both *Apis* and non-*Apis* bees. Isocycloseram degradate SYN549431 is more toxic to honey bee adults than the parent, on acute oral and contact exposure basis. However, in a semi-field residue study focused on this degradate (SYN549431), residues were below the limit of quantification (10 µg/kg) in both pollen and nectar. Chronic (repeat oral [dietary] dose) exposure of adult honey bees to technical grade isocycloseram resulted in a NOAEL of 0.0028 µg ai/bee/day based on a 15% increase in mortality at the LOAEL of 0.0042 µg ai/bee/day. For honey bee larvae, chronic exposure resulted in a NOAEL of 0.0040 µg ai/larva/day based on a 21% increase in larval mortality, a 61% increase in pupal mortality and a 79% reduction in adult emergence at the LOAEL of 0.011 µg ai/larva/day. Studies evaluating the toxicity of isocycloseram residues to adult honey bees from applications of formulated end-use products to foliage resulted in residual times to 25% mortality (*i.e.*, RT<sub>25</sub>) of less than 3 hours. Risk estimates for oral exposure to larvae and adult bees exceed the acute risk LOC of 0.4 (RQ range: 4.6-53.8). Chronic risk estimates for larval and adult honey bees exceed the chronic risk LOC of 1.0 as well (RQ range: 91.8-1,537).

The weight-of-evidence across the multiple semi-field honey bee studies indicates that the colonies did not exhibit any prolonged adverse effect over the duration of the studies which extended across multiple brood (*i.e.*, developing eggs, larvae and pupae) cycles. While there were transient effects on individual bee mortality, the absence of consistent or prolonged adverse effects to colonies in the semi-field studies may in part be due to measured residues in nectar that are several orders of magnitude lower than model-estimated exposure values, the relatively short dissipation half-life (average DT<sub>50</sub> <3 days), and the short time (<3 hr) where residues on leaves would be toxic to adult bees upon contact. When based on measured residues, the maximum acute oral RQ for adult bees is 0.54 while the maximum acute oral RQ for larval bees is 0.79. Although these RQ values still exceed the acute risk LOC, they are an order to two orders of magnitude lower than RQs based on model-estimated exposure values. Again, based on measured residues, the maximum chronic RQ for adult bees is 56 and the maximum chronic RQ for larval bees is 16. While these RQ values still exceed the chronic risk LOC of 1.0, they are two orders of magnitude below those based on model-estimated exposure values. Also, as noted earlier, isocycloseram is not systemic in plants and is not expected to be translocated to pollen or nectar via plant uptake and distribution therefore reducing the extent to which residues can enter pollen/nectar.

The Agency is implementing FIFRA mitigations (Section VI) to address potential effects on insect pollinators including measures to reduce spray drift and restricting applications during bloom. The spray drift measures will reduce the likelihood of offsite exposure by approximately two orders of magnitude.

### *Terrestrial Vertebrates*

Isocycloseram is categorized as slightly toxic to birds (and reptiles and terrestrial-phase amphibians for which birds serve as surrogates) on both an acute oral and sub-acute dietary exposure basis. Chronic exposure of birds resulted in reduced growth. Risk estimates exceed the chronic risk LOC (LOC=1) for birds which serve as surrogates for reptiles and terrestrial-phase

amphibians from the seed treatment uses on rapeseed (RQ: 0.74-19.8). There are no acute risk LOC exceedances for birds, reptiles, or terrestrial-phase amphibians from the foliar applications of isocycloseram.

Isocycloseram is classified as practically non-toxic to mammals on an acute oral exposure basis. Chronic exposure of mammals based on a two-generation rat reproduction study resulted in no isocycloseram-related adverse apical effects on reproduction, growth or survival at the multiple exposure levels tested. Chronic exposure of dogs, however, resulted in a 13% reduction in male body weight when exposed to higher doses. Risk estimates exceed the chronic risk LOC (LOC=1) for mammals from the seed treatment of rapeseed only (RQ: 0.27-16.1). There are no acute risk LOC exceedances for mammals from the uses of isocycloseram.

With a log  $K_{ow}$  of 4.9, isocycloseram has the potential to bioconcentrate and bioaccumulate as it moves through different trophic levels of an aquatic community. Although the measured whole fish bioconcentration factor in freshwater fish ranges up to 982 L/kg (wet weight) and does not suggest the extent of bioconcentration that might be expected from such a lipophilic compound, there is uncertainty regarding the extent to which other species/taxa may bioconcentrate the compound. Chronic risk quotients were estimated using KABAM ( $K_{ow}$ -based Aquatic Bioaccumulation Model) for several bird and mammal species that consume aquatic organisms. The chronic RQs do not exceed the Agency's LOC of 1.0 across any of the feeding strategies evaluated. Thus, based on the available data, the likelihood of adverse effects in terrestrial vertebrate species that consume aquatic organisms containing residues of isocycloseram is expected to be low from the uses.

#### *Aquatic and Terrestrial Plants*

There is a low likelihood of adverse effects to plants for all uses; RQs based on isocycloseram total residues (TR) and parent alone are below the LOC for risk to non-listed plants.

**Table 5. Summary of Risk Quotient (RQ) Values for Non-listed Taxonomic Groups from Uses of Isocycloseram.**

Taxa	Exposure Duration	Risk Quotient Range	RQ Exceeds LOC?	Additional Information/ Lines of Evidence
Freshwater Fish	Acute	≤0.01	No	RQs based on isocycloseram total residues and parent alone are below the acute and chronic risk LOCs.
	Chronic	<0.01		
Estuarine/ Marine Fish	Acute	<0.01		
	Chronic	<0.01-0.02		
Freshwater Invertebrates (Water-Column Exposure)	Acute	ROC: 0.17-86.4 Parent: 0.12-81.4	Yes	RQs exceed the acute risk LOC using EECs for TR and parent alone across most of the uses.
	Chronic	ROC: 0.68-312 Parent: 0.45-284	Yes	RQs, based on a NOAEC above which there was a 21% reduction in percent emergence, 39% reduction in weight, and a 15-18% reduction in development rate at the LOAEC of 0.0045 µg ai/L; exceed the chronic LOC for most of the uses and for both TR and parent EECs.
Estuarine/ Marine Invertebrates	Acute	ROC: 0.14-67.6 Parent: 0.09-63.7	Yes	RQs exceed the acute risk LOC for most of the uses and for both TR and parent EECs.

Taxa	Exposure Duration	Risk Quotient Range	RQ Exceeds LOC?	Additional Information/ Lines of Evidence
(water-Column Exposure)	Chronic	ROC: 0.90-413 Parent: 0.60-378	Yes	RQs, based on a NOAEC= 0.00098 µg ai/L) above which there was a 15% reduction in parental survival at the LOAEC of 0.0022 µg ai/L, exceed the chronic risk LOC for all uses, except residential uses, and for both TR and parent EECs.
Mollusks	Acute	<0.01 – 0.02	No	---
	Chronic	<0.01 – 0.10	No	---
Freshwater Invertebrates (Sediment Exposure)	Acute	ROC: 0.01-8.50 Parent: 0.01-7.21	Yes	RQs exceed the acute risk LOC for most of the uses based on both TR and parent EECs for pore water.
	Chronic	ROC: 0.14-86.2 Parent: 0.09-71.4	Yes	RQs exceed the chronic risk LOC for most of the uses and for both TR and parent EECs for pore water. The RQ is based on a NOAEC above which there is a 21% reduction in percent emergence, 39% reduction in weight, and a 15-18% reduction in development rate at the LOAEC of 0.0045 µg ai/L.
Estuarine/ Marine Invertebrates (Sediment Exposure)	Acute	ROC: 0.01-6.65 Parent: 0.01-5.64	Yes	RQs exceed the acute risk LOCs for most of the uses for both parent and TR EECs for pore water.
	Chronic	ROC: 0.05-30.3 Parent: 0.03-25.1	Yes	RQs exceed the chronic risk LOC for most of the uses and for both TR and parent EECs for pore water. The RQ is based on a NOAEC above which there is a significant reduction in survival and dry weight of 41 and 17%, respectively at the LOAEC of 0.0096 µg ai/L.
Mammals	Acute Dose Based (Foliar Uses)	<0.01	No	---
	Acute Dose Based (Seed Uses)	<0.01-0.08	No	---
	Acute LD <sub>50</sub> /ft <sup>2</sup>	<0.01	No	---
	Chronic Dose Based (Foliar Uses)	<0.01-0.29	No	RQs are based on the NOAEL from the dog study ( <i>i.e.</i> , 50 mg ai/kg bw) above which there was a statistically significant 13% reduction in body weight of male dogs at the LOAEL of 80 mg ai/kg bw. When based on the NOAEL of 50 mg ai/kg bw, both dose- and dietary-based RQ values drop well below the chronic risk LOC.
	Chronic Dietary (Foliar Uses)	0.02 – 0.27	No	---
	Chronic (Seed Uses)	0.27-16.1	Yes	RQ values based on NOAEL from a dog study ( <i>i.e.</i> , 50 mg ai/kg bw) with a definitive LOAEL exceed the chronic risk LOC for rapeseed treatment only. There are no LOC exceedances for other seed treatment uses ( <i>i.e.</i> , dried shelled pea and bean & small grain cereals). If the RQs were based on the LOAEL from the dog study ( <i>i.e.</i> , 80 mg ai/kg bw),

Taxa	Exposure Duration	Risk Quotient Range	RQ Exceeds LOC?	Additional Information/ Lines of Evidence
				RQ values exceed the chronic risk LOC for all-sized mammals (RQ range: 1.1-2.4).
Birds	Acute Dose Based (Foliar Uses)	--	No	RQs are not calculated because the endpoint was non-definitive (LD <sub>50</sub> >1,500 mg ai/kg-bw), with no mortality recorded. There was no mortality recorded in any other bird species tested (LD <sub>50</sub> values are >2,000 mg/kg bw). Therefore, acute risk to birds is expected to be low for all foliar uses. If a conservative LD <sub>50</sub> value of 1,500 mg ai/kg bw was used to calculate RQ, the values will be <0.01-0.04.
	Acute Dietary – Based (Foliar Uses)	<0.01-0.03	No	---
	Acute Dose Based (Seed Uses)	--	No	RQs were not calculated because the endpoint was non-definitive (LD <sub>50</sub> >1,500 mg ai/kg-bw), with no mortality recorded. There was no mortality recorded in any other bird species tested (LD <sub>50</sub> values are >2,000 mg/kg bw). Therefore, acute risk to birds is expected to be low for all seed uses.
	Acute LD <sub>50</sub> /ft <sup>2</sup>	<0.01-0.01	No	There are no exceedances for any seed use ( <i>i.e.</i> , rapeseed, dried shelled pea and bean, and small grain cereals).
	Chronic Dietary (Foliar Uses)	0.03-0.64	No	---
	Chronic (Seed Uses)	0.74-19.8	Yes	RQ values based on a NOAEL of 101 mg ai/kg bw and above which there was a 10% reduction in 14-day survivor weight, exceed the chronic risk LOC only for rapeseed treatment use alone. There are no LOC exceedances for other seed treatment uses ( <i>i.e.</i> , dried shelled pea and bean & small grain cereals).
Bees	Acute Adult (Contact)	1.01-5.03	Yes	RQs exceed the acute risk LOC for all uses for isocycloseram parent (RQ =0.28-1.39). However, the degradate SYN5494331 is 4x more toxic to honey bees ( <i>Apis mellifera</i> ) than the parent.
	Acute Adult Dietary	10.8-53.8	Yes	RQs for the isocycloseram parent and degradate SYN5494331 exceed the acute risk LOC for all foliar uses when based on model-estimated exposure. When based on measured residues, acute oral RQ values range up to 0.54.
	Chronic Adult	310-1,537	Yes	RQs, based on a NOAEL of 0.0028 µg ai/bee/day above which there was a 15% increase in mortality at the LOAEL (0.0042 µg ai/bee/day), exceed the chronic risk LOC across all uses when based on model-estimated exposure. When based on measured residues, adult chronic RQs range up to 56.
	Acute Larval	4.59-22.8	Yes	RQs for the isocycloseram parent exceed the acute risk LOC for all foliar uses when based on model-estimated exposure. When based on measured residues, acute RQs for larvae range up to 0.79.

Taxa	Exposure Duration	Risk Quotient Range	RQ Exceeds LOC?	Additional Information/ Lines of Evidence
	Chronic Larval	91.8-455	Yes	RQs, based on NOAEL of 0.0040 µg ai/larva/d above which there was a 21% increase in larval mortality, a 61% increase in pupal mortality and a 79% reduction in adult emergence, exceed the chronic risk LOC for larvae when based on model-estimated exposure. When based on measured residues, chronic RQs for larvae range up to 16.
Aquatic Plants	Vascular	<0.01	No	---
	Non-Vascular	<0.01		---
Terrestrial Plants	Seedling Emergence	0.02-0.86	No	RQ values are below the LOC for risk to plants when considering TR.
	Vegetative Vigor	≤0.1	No	For the vegetative vigor study (MRID 51229457) the most sensitive monocot and dicot species could not be determined due to lack of plant response; none of the variables evaluated (dry weights, height, or survival) achieved 25% inhibition within the isocycloseram treatment levels (EC <sub>25</sub> > 0.67 lb ai/A; NOAEC = 0.67 lb ai/A; LOAEC > 0.67 lb ai/A).
<p>Level of Concern (LOC) for risk to non-listed species Definitions:</p> <ul style="list-style-type: none"> <li>• Terrestrial Vertebrates: Non-listed (Acute=0.5, Chronic=1.0)</li> <li>• Terrestrial Invertebrates: Acute=0.4; Chronic=1.0</li> <li>• Aquatic Animals: Non listed (Acute=0.5, Chronic=1.0)</li> <li>• Plants: Non-listed = 1.0</li> </ul> <p>ROC: Residue of Concern  NOAEC/L: No Observable Adverse Effect Concentration/Level  LOAEC/L = Lowest Observable Adverse Effect Concentration  EEC = estimated environmental concentration  EC<sub>x</sub> = x% effect concentration  LD<sub>x</sub> = x% (or Median) Lethal Dose  TR = Isocycloseram total residues with parent organic carbon-normalized soil partition coefficient (K<sub>oc</sub>)</p>				

## 12. Effects Determinations under the Endangered Species Act

Consistent with ESA Section 7(a)(2), the EPA assessed the potential effects of isocycloseram on listed species and designated CHs. The federal action area is the overall geographic extent or footprint of the federal action plus any additional areas where effects are reasonably expected to occur based on the agricultural uses. The EPA conducted an overlap analysis to determine which listed species and designated CHs occur within this action area. In making the ESA effects determination and predictions of the likelihood of potential J/AM, the EPA considered direct effects and effects to a listed species' PPHD using the best available scientific information. The term "direct effects" refers to decreases in the survival, growth, or reproduction of individuals of a listed species due to exposure to isocycloseram. When making effects determinations and predictions on the potential likelihood of adverse modification for designated CHs, the EPA considered whether there may be potential effects to listed species within the CH or effects to the Physical or Biological Features (PBFs) of the CH.

The EPA used the risk to listed species LOCs in the FIFRA ecological risk assessment as an initial screen to inform the ESA assessment. The RQs for isocycloseram exceed the lower, more conservative listed species LOC for aquatic and terrestrial invertebrates, and terrestrial vertebrates. Based on the listed species LOC exceedances, EPA evaluated the effect of the action on the 1,735 species which the Services had listed as threatened or endangered or proposed and 951 CHs designated as final or proposed as of October 2024. Effects determinations for listed species and CHs are summarized in **Table 6**. For those federally listed species and CHs with may affect (MA) determinations, EPA distinguished whether isocycloseram is likely to adversely affect (LAA) an individual when considering the species-specific habitat, life history, and other considerations of exposure and toxicity. EPA made LAA determinations for 1,082 listed species and 236 CHs. For the 236 CHs with LAA determinations, adverse effects on essential physical and biological features (PBFs; or inferred PBFs) related to invertebrates, habitat quality for the listed species and water quality were the primary factors leading to the determinations. The numbers of determinations/predictions summarized in **Table 6** may differ from those in the preliminary decision document and reflect mitigations identified subsequent to the public comment phase.

Although the Services are responsible for making the final J/AM determinations for species and CHs with LAA determinations, the EPA made predictions of the potential likelihood of J/AM as part of this assessment to better inform mitigation discussions prior to completion of a final Biological Evaluation (BE) and consultation with the Services. After incorporation of mitigations on the product labels (Section VI), the EPA predicted potential likelihood of future jeopardy for 7 species (0.5% of listed species as of October 2024) and, thus, EPA identified pesticide use limitation areas (PULA) for those species and mitigations in those PULAs (thereby avoiding jeopardy). The EPA predicted potential likelihood of future adverse modification for 0 designated CHs after incorporation of mitigations. By incorporating the label mitigations and the PULAs, EPA predicts no likelihood of J/AM.

Because the EPA has made LAA determinations for species under the authority of both Services, the EPA will initiate formal consultation with both Services on these registration actions. Section VI.B. discusses the mitigations addressing the EPA’s predictions of potential likelihood of future J/AM.

**Table 6. Number of Federally Listed Threatened/Endangered/Proposed Species Effects Determinations and Predictions of Potential Likelihood of Future Jeopardy or Adverse Modification by Taxon.**

Taxon	Number of Species / CH <sup>1</sup>	NE	NLAA	LAA, Predicted Not Likely J/AM	LAA, Predicted Likelihood of J/AM Before Taxa Level Mitigations	Predicted Likelihood of J/AM After Taxa Level Mitigations	PULAs Needed	Predicted Likelihood of J/AM After Listed Species Mitigations
Amphibians <sup>2</sup>	47	0	1	45	1	0		0
Aquatic Invertebrates	202	0	162	35	5	5	5 <sup>4a</sup>	0
Birds	96	7	12	76	1	0		0
Fish	172	0	10	147	15	0		0
Mammals	96	30	20	44	2	0		0

Taxon	Number of Species / CH <sup>1</sup>	NE	NLAA	LAA, Predicted Not Likely J/AM	LAA, Predicted Likelihood of J/AM Before Taxa Level Mitigations	Predicted Likelihood of J/AM After Taxa Level Mitigations	PULAs Needed	Predicted Likelihood of J/AM After Listed Species Mitigations
Plants	942	306	41	480	115	0		0
Reptiles <sup>2</sup>	59	24	5	30	0	0		0
Terrestrial Invertebrates <sup>3</sup>	121	18	17	74	12	2	2 <sup>4b</sup>	0
Total Listed Species	1,735	385	268	931	151	7	7	0
Designated Critical Habitat	951	423	292	211	25	0	0	0

CH = designated critical habitat; NE = no effect; NLAA = not likely to adversely affect; LAA = likely to adversely affect; J = jeopardy; AM = adverse modification; PULA = pesticide use limitation area.

<sup>1</sup> Reflects the species federally listed as endangered or threatened or proposed and critical habitats designated as final or proposed as of October, 2024.

<sup>2</sup> "Amphibians" and "Reptiles" include those species that have both a terrestrial and aquatic phase.

<sup>3</sup> "Terrestrial Invertebrates" includes species which have both a terrestrial and aquatic phase.

<sup>4a</sup> Five aquatic invertebrate require additional runoff mitigations (2-4 points, depending on use) in PULAs.

<sup>4b</sup> One terrestrial invertebrate, the Hine's Emerald Dragonfly (*Somatochlora hineana*), which has an aquatic phase, requires additional runoff mitigations (2-4 points, depending on use) in a PULA; one wholly terrestrial invertebrate (*i.e.*, Rusty Patched Bumble Bee; *Bombus affinis*), requires a PULA prohibiting use on cucurbits in bloom from two hours after sunrise until two hours before sunset.

## D. Benefits Assessment

For all the foliar agricultural and non-agricultural uses and some seed treatment uses, the registration of isocycloseram would be the first Insecticide Resistance Action Committee (IRAC) Group 30 insecticide. A novel mode of action (MOA) is important to the user because when used in rotation with other effective and different modes of action, the integration of a novel chemistry can prevent or slow insecticide resistance development within an insect population. Some of the target insect species on the labels of isocycloseram are inherently prone to insecticide resistance development, such as diamondback moth in *Brassica* vegetables and Colorado potato beetle in potatoes. Other pests on the labels, such as tarnished plant bug (a cotton pest), requires a robust season long pest management program (*i.e.*, multiple insecticide applications). Too few modes of action in the rotation of chemistries for tarnished plant bug, diamondback moth, and Colorado potato beetle may mean that the same MOA is used too frequently and could accelerate resistance in a population to one or more registered active ingredients. The Agency considers a new MOA as highly beneficial for the user in their insecticide resistance management programs. Collectively across most of the foliar uses of isocycloseram, the likely alternative active ingredients or those to likely to use in rotation with isocycloseram include carbamates (*e.g.*, methomyl), organophosphates (*e.g.*, acephate), pyrethroids (*e.g.*, bifenthrin), neonicotinoids (*e.g.*, clothianidin), sulfoxaflor, and diamides (*e.g.*, chlorantraniliprole). For a more detailed discussion of the Agency evaluation of isocycloseram, please see the Benefits Assessment, which can be found in the Docket.

Based on the submitted information, isocycloseram provides comparable, and in some cases, better performance against target pests compared to likely alternative active ingredients in the foliar agricultural and non-agricultural uses and seed treatment uses. These alternative chemistries are known to be effective and are recommended against the target pests in the uses of isocycloseram. In particular, when considering a combination of a new MOA, the potential of labeled target pests to rapidly develop resistance, and similar performance of isocycloseram compared to registered alternatives in insecticide trials submitted by the registrant and published independently, the Agency found that the registration of isocycloseram would have a high benefit to the user on all *Brassica* vegetables, citrus, cotton, leafy vegetables, and tuberous and corm vegetables (and potato in particular) from the standpoint of a novel MOA for resistance management. BEAD previously identified isocycloseram as a new MOA in corn as a soil directed application. However, broflanilide, which is also an IRAC group 30 insecticide, is registered for the soil-directed use in corn and targets some of the same pests. Regardless, there is still a benefit of isocycloseram to the user in corn because it can be applied at planting or at lay-by (i.e., within 60 days of seedling emergence). Also, across different products, isocycloseram can be applied to the soil, if used at planting, and foliage of corn. Broflanilide has less application flexibility with only a soil-directed use pattern at corn planting only. Generally, there is a benefit of a new MOA for the other foliar agricultural uses to mitigate resistance development in insect populations.

The option to apply insecticides aerially or by ground application equipment offers the user flexibility. The applicator can choose the option best suited for their crop and pest situation. However, for corn, cotton, soybean, and potato, the benefit to the user of an aerial application method may be high. In these uses, crop height, intense rain events that result in long periods with wet soil, and/or agronomic practices to irrigate crops and conserve water on the field would likely preclude the ground application of any insecticide, including isocycloseram, for timely insect pest management. Aerial application is considered an important use pattern for the users in corn, cotton, soybean, and potato. The ability to use isocycloseram aerially would be important because it is a new effective insecticide with a novel MOA that can be used in rotation aerially with other active ingredients to mitigate insect resistance development in their fields.

The product performance review of isocycloseram for the cockroach gel bait supported the claim of 7-day control against German cockroaches and other cockroach species. While several active ingredients are available to provide ‘acceptable’ control, a recent evaluation of commercial baits indicated that German cockroach populations in California have reduced susceptibility to several active ingredients. Therefore, if isocycloseram is registered for use as a cockroach gel bait, then it is likely to afford resistance management benefits for the management of German cockroach populations that have developed resistance to other chemical modes of action commonly used in bait products.

In some instances, isocycloseram may replace tank mixing to manage a broader spectrum of pests in uses where multiple pests co-occur, which offers the user some convenience compared to mixing together multiple active ingredients to achieve the same spectrum of control. Isocycloseram may offer the user benefits compared to likely alternatives of increased flexibility with respect to bloom application timing for cucurbit vegetables and against a wider range of “motile” spider mite life stages in corn and tree nuts. For seed treatments of small cereal grains,

dry peas, beans (except soybeans), and rapeseed (canola varieties only), isocycloseram would offer effective control against target pests. For seed treatment of bulb onion, isocycloseram also would offer effective control of target pests, but this use is no longer being pursued for registration at this time. For turf and ornamental uses, isocycloseram would provide benefits in terms of application flexibility, effective control against target pests, and by having a new MOA for resistance management of insects.

### **E. Greater than Additive Effects**

The applicant (Syngenta Crop Protection) completed an evaluation (MRID 51811503)<sup>2</sup> of U.S. patents to identify any incidence of greater-than-additive (GTA; synergy) claims for isocycloseram with other agricultural chemicals. Syngenta based their analysis on the EPA interim guidance document entitled “*Process for Receiving and Evaluating Data Supporting Assertions of Greater Than Additive (GTA) Effects in Mixtures of Pesticide Active Ingredients and Associated Guidance for Registrants*” (USEPA 2019).

Seven patents were identified and evaluated for relevancy based on the five OPP criteria identified in the 2019 *Process for Receiving and Evaluating Data Supporting Assertions of Greater Than Additive (GTA) Effects*; however, none of the patents met all the criteria (DP Barcode 645757).<sup>3</sup> Therefore, based on the information provided by Syngenta, EFED concludes that none of the identified patents contain greater-than-additive effects information relevant to an isocycloseram ecological risk assessment as conducted by EFED.

## **V. PUBLIC COMMENTS**

On March 22, 2022, and March 23, 2022, the EPA published the Notice of Filing (NOF) for a petition to establish tolerances for residues of isocycloseram and Notice of Receipt (NOR) requesting the registration of isocycloseram, respectively, in the Federal Register. EPA announced 30-day public comment periods for the NOF and NOR. One substantive comment from the United States Department of Agriculture (USDA) was submitted to the docket EPA-HQ-OPP-2021-0641 in response to the Notice of Receipt, pointing to several prospective benefits of isocycloseram, namely its wide range of applications, its overall lack of systemicity in plants, and its potential to aid in pest resistance management. This comment and all other substantive comments submitted to the docket (see below) are addressed in the in the Response to Public Comments (RTC) document published to the docket alongside this Final Decision Memo. An additional comment was received in response to the Notice of Filing; however, EPA did not consider the comment to be substantive.

On May 9, 2025, the EPA published the Proposed Decision Memo (PD) for the registration of isocycloseram in the Federal Register and announced a 30-day public comment period, which

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<sup>2</sup> Cueva, J. (2022) Patent Search Results for Active Ingredient Combinations with Isocycloseram Supplemental. Project Number: TK0666207. Unpublished study prepared by Syngenta Crop Protection. 6p.

<sup>3</sup> USEPA 2022. Review of Submitted Data Relating to Claims of Greater-than-Additive (GTA) Mixture Toxicity Associated with the Proposed New Active Ingredient, Isocycloseram (PC Code 129220). Memorandum dated November 29, 2022.

closed on 6/20/2025. The agency received 275 comments. The agency has responded to those comments in the RTC. Please consult the RTC for details on the comments and the agency's responses.

## **VI. FINAL REGULATORY DECISION**

In accordance with FIFRA, the EPA only registers a pesticide when it determines that it will not cause unreasonable adverse effects on humans or the environment, while taking into account the economic, social, and environmental costs and benefits of the use of the pesticide. Under FIFRA, the EPA is charged with balancing risks posed by the use of a pesticide against its benefits. The EPA must determine if the benefits in light of its use outweigh the risks in order for the EPA to register a pesticide. FIFRA section 3(c)(5) requires the EPA to approve a registration if the Agency determines that:

- (a) its composition is such as to warrant the claims for it;
- (b) its labeling and other material required to be submitted comply with the requirements of this subchapter;
- (c) it will perform its intended function without unreasonable adverse effects on the environment; and,
- (d) when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment.

The EPA has determined that the database is complete for assessment of risks to human health and the environment, and that there are no data gaps regarding the uses. Furthermore, the EPA has determined that registering these products containing isocycloseram for all uses will not cause unreasonable adverse effects on human health or the environment, taking into account the risks and benefits of isocycloseram. Therefore, considering the assessed risk to human health and the environment, the EPA concludes that isocycloseram meets the regulatory standard under FIFRA section 3(c)(5).

### **F. Rationale and Risk Mitigation**

The EPA is issuing unconditional registrations under FIFRA section 3(c)(5) for the end-use products A21377 CP (100-1712), A21708 (100-1713), A21550 CP (100-1711), A22466 CP (100-1710), A22725 ST (100-1708), A22241 ST (100-1705), A21550 400SC (100-1707), Atexzo (100-1703), and A22128 CRGB (100-1706), as well as the technical product Isocycloseram Technical (100-1702) for several uses (See Table 1). Considering the assessed risks to human health and the environment, and the evaluated prospective benefits, the Agency concludes that isocycloseram meets the regulatory standard under FIFRA.

The EPA reviewed the compositions of all products and determined that the claims made are warranted as the data and product label support the approval of the registrations. The labeling, which has been revised to include additional mitigation measures to address potential ecological risks, contains all the necessary requirements and restrictions and complies with the requirements of FIFRA. To determine whether the products will cause unreasonable adverse effects under

FIFRA, the EPA is charged with considering the economic, social, and environmental costs and benefits of the use of the pesticide. To determine the risks and benefits, the EPA reviewed a large body of information to determine how these products will be used according to the labeling. The EPA determines whether a product will generally cause unreasonable adverse effects by considering whether the benefits of the product outweigh any potential risks of concern or adverse impacts from its use.

When considering the assessed risk to human health, the EPA identified commercial seed treatment risks of concern for exposures related to treating seed and cleaning of seed treatment equipment (canola, sesame, mustard). These commercial seed treatment risks of concern were addressed through the reduced application rates agreed upon by Syngenta, baseline attire and chemical resistant gloves. Although human health risks of concern were address for all crops under subgroup 20A, in an effort to address risk to listed species the registration is limited to varieties of canola.

To address risks to listed species specific to seed treatment products, Syngenta agreed to reduce the annual rates for subgroup 20A and subgroups 6-22E/6-22F and removed from the labels all individual crops under subgroup 20A except for canola varieties. The reduced yearly rate, combined with the 2 inherent run-off relief points in counties in which canola varieties, crops under subgroups 6-22E/6-22F and cereal grains may be planted in California, New Mexico and Oregon, was sufficient to predict no likelihood of J/AM and thus to support seed treatments to all these uses.

To mitigate the potential risks to terrestrial vertebrates outlined in section IV.C.2, the EPA is requiring label language instructing growers how to effectively cover or collect spilled treated seeds or treated seeds that have become exposed on the soil surface. Label language is also being required for the management of excess treated seeds (*e.g.*, spilled, unused, or expired treated seeds).

To mitigate the potential risks to non-target terrestrial and aquatic invertebrates, the single application rates, number of applications, and annual rates were reduced for some uses.

To mitigate the potential risks to aquatic invertebrates via run-off, erosion and spray drift outlined in section IV.C.2, the EPA is requiring label statements restricting application during rain and when soils are saturated or above capacity. The EPA is also requiring certain labels to include a link to the EPA mitigation menu with runoff mitigation options growers can choose from. Applicators must choose at least 2 points worth of mitigations from the mitigation menu. To mitigate potential risk to listed species, two runoff points are required for all outdoor uses except for seed treatments, corn soil applications, and golf courses (when only applied to tees, greens, and fairways). Although this mitigation is based on risks estimated for listed species as part of the ESA work, it is in the general label and intended to protect listed and non-listed species.

To mitigate the potential risks to non-target terrestrial and aquatic invertebrates via spray drift outlined in section IV.C.2, the EPA is prohibiting aerial application for all uses except corn, cotton, soybean, and potato. The Agency is permitting these aerial uses in select states and

regions due to their significant benefits outlined in Section IV.D. The EPA is also requiring labels to include updated spray drift management language and spray drift buffer zone requirements for aerial, ground, and airblast applications, as well as prohibiting the use of end-gun chemigation and requiring certain labels include a list of chemigation drift mitigation options.

To mitigate the potential risks to pollinators inside the field outlined in section IV.C.2, the EPA is requiring the inclusion of label language restricting application during bloom for most uses. EPA is requiring the prohibition of applications 3-days before and during bloom of orchard crops; for indeterminate blooming crops, EPA is prohibiting applications during hours of the day when insect pollinators are most active. The EPA is not requiring bloom restrictions for plants harvested before bloom unless these are grown for seed production. Because isocycloseram is not systemic in plants and is not expected to be translocated to pollen or nectar via plant uptake, restrictions to applications during bloom are not being required for isocycloseram-treated seeds. However, EPA is requiring advisories to protect pollinators from dust potentially generated from abrasion of isocycloseram-treated seed coatings during planting, and that certain labels include precautions, advisories, and best practices related to pollinators from the FIFRA Interim Ecological Mitigation (IEM).

As discussed in section IV.D, the EPA finds a clear benefit in the use of isocycloseram as it offers a significant, valuable option that is needed in pesticide resistance management for growers. Moreover, for some uses, isocycloseram is an alternative to pesticides that may pose higher risks to human health and/or the environment. The EPA has concluded that the benefits of the registration outweigh the risks to non-listed species. While there remain potential risks to terrestrial and aquatic invertebrates due to spray drift and run-off/erosion, the EPA concludes that the new use will not cause unreasonable adverse effects on the environment and meets the criteria for registration under FIFRA Section 3(c)(5).

The EPA is not requiring any additional data to assess risk to human health or the environment. The EPA has concluded that the benefits of the registration outweigh the potential risks. Therefore, the EPA concludes that the use of isocycloseram in the capacities outlined in this document will not cause unreasonable adverse effects on the environment and meets the criteria for unconditional registration under FIFRA Section 3(c)(5).

### **G. Endangered Species Assessment and Mitigation for Listed Species**

ESA Section 7(a)(2) provides that “[e]ach Federal agency shall, in consultation with the Secretary (*i.e.*, the Secretary of the Interior or the Secretary of Commerce) insure that any action authorized, funded, or carried out by such agency. . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. . . .”

The EPA completed the effects determinations for federally listed threatened and endangered species (listed species) for the uses of isocycloseram in the areas where it may be applied. The EPA evaluated whether the registration of the products containing this active ingredient pose any reasonable expectation of effects to listed species and designated CH within the action area in the

listed species effects determination. The effects determination makes use of the best available scientific and commercially available information and considers both direct and indirect effects. The term “direct effects” refers to decreases in the survival, growth, or reproduction of individuals of a listed species due to exposure to isocycloseram. The term “indirect effects” refers to impacts on individuals of a listed species that may be the result of the effects of isocycloseram on organisms which the listed species depends upon for prey, pollination, habitat, and/or dispersal.

In the effects determination, the EPA preliminarily concluded that the use of the isocycloseram products MA, and is LAA, multiple listed species and designated CHs. When considering an action (*e.g.*, the registration of a pesticide product), the ESA directs federal agencies to avoid jeopardizing listed species or adversely modifying their designated critical habitats. An LAA determination is not equivalent to a jeopardy determination; however, the EPA can assess the potential likelihood for future J/AM to help inform the formal consultation with the Services and resulting Biological Opinions developed by the Services. See 50 C.F.R. § 402.40(b)(1). The purpose of the EPA’s prediction of the potential likelihood of future J/AM is to inform mitigations to avoid and minimize exposures to listed species earlier in the consultation process. Therefore, for those species and critical habitats with preliminary LAA determinations, the EPA further assessed the potential likelihood that the isocycloseram products would lead to future J/AM. The Services though will make the final determination as to any jeopardy to listed species and any adverse modification to designated CH.

The EPA concluded that the FIFRA mitigations outlined in section VI.F address the initial predictions of potential likelihood of future J/AM for over 95% of listed species. The EPA continues to predict that potential likelihood of future J/AM for all 7 remaining listed species and designated CH is addressed by using Pesticide Use Limitation Areas (PULAs) developed to support Bulletins that EPA will publish on the Bulletins Live! Two system.<sup>4</sup> The Bulletin in these PULAs includes the need to achieve a total of four to six points of runoff/erosion mitigation (from the mitigation menu referenced in section VI.A) to avoid the potential likelihood for future J/AM to 6 listed species from runoff and erosion. The number of points depends on the use, see Table 8. In addition, one terrestrial invertebrate (*i.e.*, Rusty Patched Bumble Bee), requires a PULA prohibiting use on cucurbits in bloom from two hours after sunrise until two hours before sunset. The EPA recently released a process for developing PULAs and may be used to develop the PULAs needed for the species identified in this registration (<https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>).

The EPA developed the PULAs in concert with a broad range of stakeholders. Syngenta and the Center of Biological Diversity voluntarily developed the core maps that were reviewed by the EPA and the U.S. Fish and Wildlife Service and subsequently used for development of PULAs for isocycloseram.

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<sup>4</sup> Endangered Species Protection Bulletins are a part of EPA's Endangered Species Protection Program. Bulletins set forth geographically specific pesticide use limitations for the protection of threatened and endangered (listed) species and their designated critical habitat.

**Table 7. List of counties affected by Pesticide Use Limitation Areas (PULAs)**

Entity ID <sup>1</sup>	Species common name (scientific name)	State	County
490	Conservancy Fairy Shrimp ( <i>Branchinecta conservatio</i> )	California	Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Los Angeles, Madera, Mariposa, Mendocino, Merced, Monterey, Napa, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Ventura, Yolo, Yuba.
491	Longhorn Fairy Shrimp ( <i>Branchinecta longiantenna</i> )	California	Alameda, Contra Costa, Kern, San Joaquin, San Luis Obispo.
493	Vernal Pool Fairy Shrimp ( <i>Branchinecta lynchi</i> )	California	Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Los Angeles, Madera, Mariposa, Merced, Monterey, Napa, Nevada, Placer, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Shasta, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Ventura, Yolo, Yuba.
		Oregon	Jackson.
494	Vernal Pool Tadpole Shrimp ( <i>Lepidurus packardi</i> )	California	Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Joaquin, San Mateo, Santa Clara, Shasta, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Trinity, Tulare, Tuolumne, Yolo, Yuba.
		Oregon	Jackson, Josephine, Klamath.
10757	Slenderclaw crayfish ( <i>Cambarus cracens</i> )	Alabama	Dekalb, Marshall.
445	Hine's Emerald Dragonfly ( <i>Somatochlora hineana</i> )	Illinois	Cook, DuPage, Kane, Lake, McHenry, Will, Winnebago.
		Michigan	Alcona, Alpena, Charlevoix, Mackinac, Menominee, Presque Isle.
		Missouri	Crawford, Dent, Iron, Morgan, Phelps, Reynolds, Ripley, Shannon, St. Francois, Washington, Wayne.
		Wisconsin	Brown, Dane, Door, Grant, Iowa, Kewaunee, Ozaukee, Richland, Rock, Sauk, Vernon.
10383	Rusty patched bumble bee ( <i>Bombus affinis</i> )	Illinois	Boone, Bureau, Carroll, Champaign, Cook, Dekalb, De Witt, DuPage, Henry, Jo Daviess, Kane, Kendall, Lake, LaSalle, Lee, Macon, McHenry, McLean, Ogle, Peoria, Putnam, Rock Island, Stephenson, Tazewell, Will, Winnebago, Woodford.
		Indiana	Fountain, Hamilton, Lake, Marion, Montgomery, Parke.

Entity ID <sup>1</sup>	Species common name (scientific name)	State	County
		Iowa	Allamakee, Benton, Black Hawk, Boone, Buchanan, Cedar, Cerro Gordo, Chickasaw, Clayton, Clinton, Delaware, Dubuque, Fayette, Floyd, Hamilton, Hancock, Howard, Iowa, Jackson, Jasper, Johnson, Jones, Linn, Mitchell, Polk, Scott, Story, Webster, Winnebago, Winneshiek, Worth.
		Maine	Waldo.
		Maryland	Allegany, Garrett.
		Minnesota	Aitkin, Anoka, Benton, Blue Earth, Carver, Chisago, Dakota, Dodge, Filmore, Freeborn, Goodhue, Hennepin, Houston, Jackson, Le Sueur, McLeod, Mower, Nicollet, Olmsted, Ramsey, Rice, Scott, Sherburne, Stearns, Wabasha, Waseca, Washington, Winona, Wright.
		Ohio	Lucas
		Virginia	Alleghany, Augusta, Bath, Clarke, Fauquier, Highland, Loudoun, Nelson, Rockingham.
		West Virginia	Grant, Greenbrier, Mineral, Nicholas, Pendleton, Pocahontas, Preston, Randolph, Tucker, Webster.
		Wisconsin	Bayfield, Brown, Buffalo, Calumet, Chippewa, Columbia, Crawford, Dane, Dodge, Door, Dunn, Eau Claire, Fond du Lac, Grant, Green, Green Lake, Iowa, Jackson, Jefferson, Juneau, Kenosha, Kewaunee, La Crosse, Lafayette, Manitowoc, Marinette, Marquette, Milwaukee, Monroe, Outagamie, Ozaukee, Pepin, Pierce, Polk, Portage, Racine, Richland, Rock, Sauk, Shawano, Sheboygan, St. Croix, Trempealeau, Vernon, Walworth, Washington, Waukesha, Waushara, Winnebago, Wood.

<sup>1</sup> A unique identifier assigned to a specific species or population of a species by the U.S. Fish and Wildlife Service used to track and manage information about that species, including its listing status under ESA.

**Table 8. Runoff Mitigation Points Needed After Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Mitigations by Use Pattern**

Use <sup>1</sup>	App Rate (App Number x Amount Applied in lb a.i./A)	Runoff Mitigation Points Needed in PULAs After FIFRA Mitigations	Total Runoff Mitigation Points required
Brassica	2 x 0.053	4	6
Peanut	2 x 0.053	4	6
Bulb Vegetables	2 x 0.107	4	6
Citrus	4 x 0.067	4	6
Corn (foliar) <sup>2</sup>	2 x 0.027	2	4
Cotton	2 x 0.053	4	6
Cucurbits	2 x 0.053	4	6
Fruiting Vegetables	2 x 0.08	4	6
Leafy Vegetables	2 x 0.053	4	6
Pome Fruit	3 x 0.067	4	6
Soybean	2 x 0.053	2	4
Stone Fruit	2 x 0.067	2	4
Tree Nuts	3 x 0.067	4	6
Tuber and Corm Vegetables	3 x 0.053	4	6

Use <sup>1</sup>	App Rate (App Number x Amount Applied in lb a.i./A)	Runoff Mitigation Points Needed in PULAs After FIFRA Mitigations	Total Runoff Mitigation Points required
Turf (sod farms) <sup>3,4</sup>	2 x 0.107 + 0.105	4	6
Nursery (outdoor/field) <sup>3,5</sup>	4 x 0.067 + 0.052	4	6
Christmas Trees <sup>6</sup>	4 x 0.067 + 0.052	4	6
Corn (in-furrow) <sup>2</sup>	1 x 0.133	4	4

App = application; a.i. = active ingredient; PPHD = prey, pollination, habitat, and/or dispersal

<sup>1</sup> Uses not listed (*i.e.*, residential, cockroach gel bait) do not need runoff mitigation points.

<sup>2</sup> If using both corn (foliar) and corn (in-furrow) applications at same use site, 4 total points are still needed.

<sup>3</sup> Both turf and nursery modeled as 2 applications of 0.134 lb a.i./A plus one application at 0.052 lb a.i./A. Registrant has since lowered the maximum annual rate to 0.107 lb a.i./A for turf and 0.067 lb a.i./A for nursery, and so these updated rates were used to determine needed mitigations.

<sup>4</sup> All other turf uses do not need runoff mitigation points in PULAs.

<sup>5</sup> This includes all outdoor nurseries, including shade houses, lath houses, and other outdoor growing structures, as well as deciduous tree and forest nurseries. All other nursery/commercial/residential uses (residential and commercial landscapes, parks, interior plantscapes, and greenhouses) do not need runoff mitigation points in PULAs.

<sup>6</sup> This includes evergreen (including conifer) and Christmas tree farms

<sup>7</sup> Some retail sale crops have higher rates than crops grown in agricultural fields, but the Nursery rate listed in this table is the maximum. Please consult the product labels for specific application rates.

## H. Label Requirements

The following mitigation language is captured on the isocycloseram labels. The Agency worked with the applicant to develop the label language below. Mitigation language for 100-1702 is intentionally omitted as the Agency has determined that no label mitigations are needed for this technical product.

### **End-Use Products: 100-1712 (A21377 CP), 100-1713 (A21708 CP), and 100-1711 (A21550 CP)**

#### **Aerial application prohibitions**

- “Aerial application is prohibited for all uses except corn, cotton, potato, and soybean.”
- “**DO NOT** apply by air” for all other uses.

#### **Aerial application geographical restrictions and permissions**

- “Aerial application to corn is only permitted in the following states: Colorado, Kansas, Nebraska, Oklahoma and Texas.”
- “Aerial application to soybean is only permitted in the following states: Alabama, Arkansas, Georgia, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee and Texas.”
- “Aerial application is prohibited for all crops in Tuberous and Corm Vegetables Subgroup 1C except Potato.”
- Aerial application to cotton is permitted.

## **Pollinator IEM Advisory Language**

**“The following Best Management Practices (BMPs) can help reduce risk to pollinators:**

- Develop and maintain clear communication with local beekeepers to help protect bees. To the extent possible, advise beekeepers within a 1-mile radius 48-hrs in advance of the application, and confirm hive locations before spraying.
- Use Pollinator Protection Plans when they are available. These plans may be available from state lead agencies and promote communication between growers, landowners, farmers, beekeepers, pesticide users, and other pest management professionals to reduce exposure of bees and other pollinators to pesticides.
- Use integrated pest management to prevent or mitigate potential negative effects to pollinators and consider multiple management options before resorting to a pesticide application.
- Mow understory weeds or cover crops in orchards and vineyards can prevent flowering of weeds and reduce exposure to bees where and when pesticides are applied.

**The following Best Management Practices (BMPs) can help promote the health and habitat of ground-nesting bees:**

- For uncultivated land, leave large undisturbed patches of land unmowed and untilled can provide nesting and forage sites.
- For uncultivated land, mow at the highest cutting height possible (minimum of 8-10 inches if possible) can increase and diversify food sources.

For additional resources on pollinator BMPs and Pollinator Protection Plans, visit

<https://www.epa.gov/pollinator-protection/find-best-management-practices-protect-pollinators.>”

### **Pollinator mitigation for determinate (bloom period $\leq$ 4 wks) crops**

- “DO NOT apply 3 days prior to flowering until the end of the flowering period” for Pome Fruit, Crop Group 11-10; Stone Fruit, Crop Group 12-12; and Tree Nuts.
- “DO NOT apply 3 days prior to flowering until the end of the flowering period. In areas where the authorities provide a declaration or definition of the flowering period, observe defined flowering periods as established by local university extension offices, County Agricultural Commissioners, or other state/tribal lead agencies.” for Citrus.
- “Foliar application of this product is prohibited during pollen shed unless: (i) the application is made before 10am or after 3 pm: OR (ii) the application is being made at a time when the temperature at the application site is 50°F or less.” for Corn.

**Pollinator mitigation for indeterminate crops (bloom either continuously or intermittently for multiple weeks and/or for most of the crop’s growing season that bloom for longer than four consecutive weeks).<sup>5</sup>**

- “Foliar application of this product is prohibited from the onset of flowering until flowering is complete unless: (i) the application is made before 10am or after 3 pm: OR (ii) the application is being made at a time when the temperature at the application site is 50°F or less.” for Soybean and Cotton.
- “For Potato, foliar application of this product is prohibited from onset of flowering until flowering is complete unless: (i) the application is made before 10am or after 3 pm: OR (ii) the application is being made at a time when the temperature at the application site is 50°F or less. Do not apply more than two times during bloom.”

- “For all crops in Tuberous and corm vegetables subgroup 1C except Potato, Foliar application of this product is prohibited from onset of flowering until flowering is complete unless; (i) the application is being made between 2-hrs prior to sunset and 2-hrs after to the following sunrise: OR, (ii) the application is being made at a time when the temperature at the application site is 50°F or less.”
- “Foliar application of this product is prohibited from onset of flowering until flowering is complete unless; (i) the application is being made between 2-hrs prior to sunset and 2-hrs after to the following sunrise: OR, (ii) the application is being made at a time when the temperature at the application site is 50°F or less.” for Cucurbit Vegetables, Crop Group 9; Fruiting Vegetables, Crop Group 8-10; and Peanut.

#### **Pollinator mitigation for crops grown for seed**

- “For crops grown for seed, **DO NOT** apply 3 days prior to flowering until the end of the flowering period.”

#### **Spray drift mitigation**

##### **“SPRAY DRIFT MANAGEMENT:**

##### **For All Applications:**

- During application, the Sustained Wind Speed, as defined by the National Weather Service (standard averaging period of 2 minutes), must register between 3 and 15 miles per hour.
- Do not apply when wind speeds exceed 15 miles per hour at the application site.
- Wind speed and direction must be measured on location using a windsock, an anemometer (including systems to measure wind speed or velocity on an aircraft), or an aircraft smoke system.
- Wind speed must be measured at the release height or higher, in an area free from obstructions such as trees that are not the target crop, buildings, and farm equipment.
- Do not apply during temperature inversions.

##### **For Aerial Application:**

- Select nozzle and pressure that deliver medium or coarser spray droplets as indicated in nozzle manufacturer’s catalogues and in accordance with the most current American Society of Agricultural & Biological Engineers standards (ASABE S641). When applying to crops via aerial application equipment, the spray boom must be mounted on the aircraft to minimize drift caused by wing tip or rotor blade vortices.
- When the wind speed is between 11-15 miles per hour, the boom length must be 65% or less of the wingspan for fixed wing aircraft and 75% or less of the rotor diameter for helicopters. Otherwise, the boom length must be 75% or less of the wingspan for fixed-wing aircraft and 90% or less of the rotor diameter for helicopters.
- When the wind speed is between 11-15 miles per hour, applicators must use a minimum of  $\frac{3}{4}$  swath displacement upwind at the downwind edge of the field. Otherwise, applicators must use a minimum of  $\frac{1}{2}$  swath displacement upwind at the downwind edge of the field.
- Do not release spray at a height greater than 10 feet above the crop canopy unless a greater application height is required for pilot safety.

**For Ground Boom Application:**

- Select nozzle and pressure that deliver medium or coarser spray droplets as indicated in nozzle manufacturer's catalogues and in accordance with the most current American Society of Agricultural & Biological Engineers standards (ASABE S572).
- Spray at the appropriate boom height based on nozzle selection and nozzle spacing, but do not exceed a boom height of 4 feet above ground or crop canopy. Set boom to lowest effective height over the target pest or crop canopy based on equipment manufacturer's directions.

**For Airblast Application:**

- Sprays must be directed into the canopy.
- User must turn off outward pointing nozzles at row ends and when spraying outer row.

**For ground, aerial, and airblast applications, always maintain a no-application area (buffer) from the downwind edge of the last spray row and any non-managed area (*i.e.*, the protection area). Non-managed areas are defined as anything that is not part of the "managed areas" listed below.**

**Downwind managed areas that can represent spray drift buffers**

When spray drift buffers are identified as mitigation, the following managed areas can be included as part of the buffer footage if they are downwind and are immediately adjacent/contiguous to the treated field and people are not present in those areas (including inside closed buildings/structures). If the pesticide product label or bulletin, or the state or local government in which the application area is located has a requirement that prohibits or restricts spray drift in any area, including these specific managed areas, that prohibition/restriction must be followed.

- a. Agricultural fields, pastures, forage fields, and private rangelands, including untreated portions of the treated areas;
- b. Roads, paved or gravel surfaces, mowed grassy/fallowed areas adjacent to the treated area, and areas of bare ground from recent plowing or grading that are contiguous with the treated area;
- c. On-site buildings and their perimeters, or other man-made structures with walls and/or roof;
- d. Areas present and/or maintained as a runoff/erosion measure as listed on EPA's Mitigation Menu website. Examples include vegetative filter strips (VFS), field borders, grassed waterways, vegetated ditches that retain runoff on-site, riparian areas, managed/constructed wetlands, or other areas of intentional habitat improvement;
- e. Areas present and/or maintained as a drift buffer reduction measure as listed on EPA's Mitigation Menu website. Examples include vegetative windbreaks, hedgerows, shelterbelts, riparian areas, private forests, woodlots, and shrublands;
- f. Conservation Reserve Program (CRP)<sup>1</sup> and Agricultural Conservation Easement Program (ACEP) lands;

- g. On-site contained irrigation water resources that are not connected to adjacent water bodies, including on-farm irrigation canals and ditches, water conveyances, managed irrigation/runoff retention basins, farm ponds, and tailwater collection ponds.

<sup>1</sup> Applicators may need to ensure that pesticide use does not cause degradation of CRP habitat.

### Spray Drift Buffers for Broadcast Applications

Wind-directional ecological spray drift buffers are required for applications as follows in **Table A**:

**Table A. Wind-directional Ecological Spray Drift Buffers**

Application Method	Droplet Size Distribution (DSD)	Minimum Buffer Distance from Non-Managed Areas
Aerial	Medium or coarser	300 feet
Groundboom (2 - 4-foot boom height)	Medium or coarser	25 feet
Airblast	NA	85 feet

### Reduction Options for All Ecological Wind-Directional Drift Buffers:

The applicator may choose among the ecological drift buffer reduction options on EPA’s Mitigation Menu Website (<https://www.epa.gov/pesticides/mitigation-menu>) to reduce the wind-directional ecological buffer distance before applying this product. All buffer reduction options selected must align with the minimum droplet size and release height requirements on this label.

To reduce the buffer distance for the application, the buffer reduction options must be employed in accordance with the instructions and descriptions on EPA’s Mitigation Menu Website. These buffer reduction options do not apply to areas occupied by humans for residential or commercial purposes (such as lawns, sidewalks, outdoor recreational areas, athletic fields, buildings/homes, farmworker housing, schools, daycare centers, nursing homes, and hospitals).

When using more than one option during the application, the percent reduction in the buffer distances may be added together. The maximum buffer reduction that can be achieved by a combination of buffer reduction options is 100% (i.e., no drift buffer required).

The website includes the full menu of wind-directional ecological drift buffer reduction options for each application method. The following are examples, but may not be applicable for all application methods:

- Reduce single application rate [all]
- Increase in droplet size above the minimum size required [ground and aerial]
- Use targeted applications (e.g., hooded sprayers, layby application, deflectors, or drop nozzles) [ground and airblast only]
- Lower release boom height [ground only]
- Reduce the number of passes across the field [all]
- Install a downwind windbreak, hedgerow, or artificial screen [all]

- Apply when the relative humidity > 60% [ground and aerial only]

EPA may periodically update the Mitigation Menu Website, for example, by adding new drift buffer reduction options or updating an option's description.

When tank mixing, the most restrictive of the products' label or bulletin requirements must be followed (e.g., drift buffers that are not wind-directional, Application Exclusion Zone drift requirements, drift buffers to residences, schools, and parks where bystanders could be present, use prohibitions, timing restrictions, and application method prohibitions)."

## **SPRAY DRIFT ADVISORIES**

**THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT.** Be aware of nearby non-target sites and environmental conditions.

### **IMPORTANCE OF DROPLET SIZE**

An effective way to reduce spray drift is to apply large droplets. Consider the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.

#### **Controlling Droplet Size – Ground Application**

- Volume – Increasing the spray volume so that larger droplets are produced will reduce spray drift. Consider using the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate.
- Pressure – Using the lowest spray pressure recommended for the nozzle will produce the target spray volume and droplet size.
- Spray Nozzle – Consider using a spray nozzle that is designed for the intended application, as well as using nozzles designed to reduce drift.

#### **Controlling Droplet Size – Aerial Application**

**Adjust Nozzles** – Applicators should follow nozzle manufacturers' recommendations for setting up nozzles. Generally, to reduce fine droplets, nozzles should be oriented parallel with the airflow in flight.

#### **RELEASE HEIGHT – Ground Application**

For ground equipment, the boom should remain level with the crop and have minimal bounce. Automated boom height controllers are recommended with large booms to better maintain optimum nozzle-to-canopy height. Excessive boom height will increase the potential for spray drift.

#### **RELEASE HEIGHT – Aerial Application**

Higher release heights increase the potential for spray drift.

## **HOODED (OR SHIELDED) SPRAYERS**

Shielding the boom or individual nozzles can reduce spray drift. Consider using hooded sprayers. Applicators should verify that the shields are not interfering with the uniform deposition of the spray on the target area.

### **TEMPERATURE AND HUMIDITY**

When making applications in hot and dry conditions, consider using larger droplets to reduce effects of evaporation.

### **TEMPERATURE INVERSIONS**

Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions.

### **WIND**

Drift potential generally increases with wind speed.

Applicators need to be familiar with local wind patterns and terrain that could affect spray drift.

### **MEASURING WIND SPEED AND WIND DIRECTION**

Best management practices for measuring wind speed and wind direction:

- Applicators should check and acquire the predicted wind speed and direction for the application site within 12 hours prior to conducting applications to determine the time periods wind speed is likely to fall outside the applicable thresholds.
- Applicators should reassess wind speed and direction at the application site at least every hour while applications are in progress.
- Measuring wind speed and direction can be done by:
  - o Relying on equipment on the application equipment that measures wind speed (*e.g.*, aerial equipment).
  - o Using a tower anemometer with telemetry or handheld anemometer. Users should read user manual on how to calibrate, operate and interpret the output from an anemometer. Ground applicators should stop at least every hour to take a reading with a tower anemometer with telemetry or handheld anemometer. Some anemometers may have software that would allow users to view wind measurements in real time while making an application, and, those cases, applicators would not have to stop to take measurements.
  - o Using a windsock. Wind can be estimated with a windsock using the strips on a windsock. The applicator should consult the user manual for the windsock on wind speed estimation and direction of wind. Applicators should look at the sock at least every hour to estimate wind speed and direction. The windsock should be pointed in the opposite direction of the windbreak and the non-managed area.

- o Using an aircraft smoke system. Laying down several puffs of smoke along different lines using an aircraft smoke system can provide an accurate view of what the wind speed and direction for the application.
- o Checking behind the spray rig at least every hour to see if the spray has changed direction from when the application started.”

## **Chemigation Restrictions**

### **For Chemigation**

If unmanaged areas are present less than 25 feet from the application site, the following restrictions apply for applications via overhead chemigation systems, such as center pivot or traveler systems:

- Turn off end-guns AND select **two** of the following options:
  - o Reduce the pressure to  $\leq 20$  lbs per square inch (psi).
  - o Reduce the release height to  $\leq 5$  feet from the ground or crop canopy.
  - o Maintain a downwind drift barrier (windbreak, hedgerow, or shelterbelt) from the application site based on the description of this measure on EPA’s mitigation menu website (<https://www.epa.gov/pesticides/mitigation-menu>).

Unmanaged areas are defined in comparison to managed areas--anything that is not a managed area is an unmanaged area. Refer to the “Managed Areas Definition” section of this label for information on managed areas.

### **For Non-End Gun Impact Sprinkler Chemigation Systems**

If unmanaged areas are present less than 25 feet from the application site, the following restrictions apply when making applications with non-end gun impact sprinkler chemigation systems:

- Limit the throw distance to the edge of the field. This can be accomplished by reducing the pressure or reducing the throw angle.
- Maintain a downwind drift barrier (windbreak, hedgerow, or shelterbelt) based on the description on EPA’s mitigation menu website (<https://www.epa.gov/pesticides/mitigation-menu>).

Unmanaged areas are defined in comparison to managed areas--anything that is not a managed area is an unmanaged area. Refer to the “Managed Areas Definition” section of this label for information on managed areas.

### **Runoff mitigations**

#### **“MANDATORY RUNOFF MITIGATION**

- **DO NOT** apply when soils are saturated or above field capacity.
- **DO NOT** apply during rain.

Applicators must access and search Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins> within six months prior to or on the day of the application to determine whether the application site falls within a Pesticide Use Limitation Area (PULA). If you are located inside a PULA, follow the instructions in the “Inside a PULA”

section below and in the BLT bulletin. If the application site falls outside of a PULA, follow the instructions in the “Outside a PULA” section below.

**Outside a PULA:**

TWO mitigation points are required for all crops listed on this label. Follow the steps below to determine which applications need to achieve points, determine your eligibility for mitigation relief, and determine options to achieve mitigation points.

**Inside PULAs:**

Different runoff/erosion mitigation point(s) are required inside specific PULAs. Access Bulletins Live! Two within 6 months prior to or on the day of the application to determine if you are inside a PULA. If your application site is located within a PULA, points are required for all uses. Access the BLT to determine the total number of points required. Follow the steps below to determine which applications need to achieve the points, determine eligibility for mitigation relief, and determine options to achieve mitigation points.

**Steps to Achieve Points:**

Step A. To achieve the mitigation points specified above, visit EPA’s mitigation menu website ([www.epa.gov/pesticides/mitigation-menu](http://www.epa.gov/pesticides/mitigation-menu)) to determine which applications need to achieve points and for a full list of mitigation and mitigation relief options.

Step B. Determine if you are eligible for mitigation relief. Runoff/erosion mitigation is NOT needed if certain field/application parameters are present at the time of application (*e.g.*, subsurface or tile drains with controlled outlet, perimeter berm systems, irrigation tailwater return systems, etc). Refer to the mitigation menu for a complete list of field/application parameters.

Step C. If the application site does not meet the field/application parameters specified on EPA’s mitigation menu website, choose among the mitigation and/or mitigation relief options on EPA’s mitigation menu website to meet or exceed the required points noted on this label before applying this product.

Step D. To achieve mitigation points for the application, the mitigation and mitigation relief measures must be:

- Employed in accordance with the instructions and descriptions on EPA’s Mitigation Menu Website.
- In place during the application unless a different timing (such as before or after application) is specifically provided in the measure’s description on EPA’s Mitigation Menu Website.

Step E. Additional restrictions may be present in bulletins—always follow the most restrictive bulletin instructions. If you are located in an area where PULAs overlap, follow the most restrictive requirements across all bulletins. When tank mixing, the most restrictive requirements must be followed between the products' labels and bulletins.

EPA may periodically update the Mitigation Menu Website, for example, by adding new mitigation measures or updating a mitigation measure description.

### **Ecological incidents**

**“REPORTING ECOLOGICAL INCIDENTS:** For guidance on reporting ecological incidents, including death, injury, or harm to plants and animals, including bees and other non-target insects, see EPA’s Pesticide Incident Reporting website: <https://www.epa.gov/pesticide-incidents> or call (registrant phone number).”

### **ESA requirements**

#### **“Endangered and Threatened Species Protection Requirements**

Before using this product, you must obtain any applicable Endangered Species Protection Bulletins (Bulletins) within six months prior to or on the day of application. To obtain Bulletins, go to Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins>. When using this product, you must follow all label directions and restrictions contained in any applicable Bulletin(s) for the area where you are applying the product, including any restrictions on application timing if applicable. It is a violation of Federal law to use this product in a manner inconsistent with its labeling, including this labeling instruction to follow all directions and restrictions contained in any applicable Bulletin(s). For general questions or technical help, call 1-844-447-3813, or email [ESPP@epa.gov](mailto:ESPP@epa.gov).”

### **End-Use Product: 100-1703 (Atexzo)**

#### **Spray drift mitigation**

**“MANDATORY SPRAY DRIFT MITIGATION:**

#### **DO NOT APPLY VIA AERIAL APPLICATION EQUIPMENT**

##### **For All Applications:**

- During application, the Sustained Wind Speed, as defined by the National Weather Service (standard averaging period of 2 minutes), must register between 3 and 15 miles per hour.
- Do not apply when wind speeds exceed 15 miles per hour at the application site.
- Wind speed and direction must be measured on location using a windsock, an anemometer (including systems to measure wind speed), or an aircraft smoke system.
- Wind speed must be measured at the release height or higher, in an area free from obstructions such as trees that are not the target crop, buildings, and equipment.
- Do not apply during temperature inversions.

##### **For Ground Boom Applications:**

- *For all uses except golf course:* Select nozzle and pressure that deliver medium or coarser spray droplets as indicated in nozzle manufacturer’s catalogues and in accordance with

the most current American Society of Agricultural & Biological Engineers standards (ASABE S572).

- *For all uses except golf course:* Spray at the appropriate boom height based on nozzle selection and nozzle spacing, but do not exceed a boom height of 4 feet above ground or plant canopy. Set boom to lowest effective height over the target pest or crop canopy based on equipment manufacturer's directions.
- *For golf course use only:* Select nozzle and pressure that deliver coarse or coarser spray droplets as indicated in nozzle manufacturer's catalogues and in accordance with the most current American Society of Agricultural & Biological Engineers standards (ASABE S572).
- *For golf course use only:* Spray at the appropriate boom height based on nozzle selection and nozzle spacing, but do not exceed a boom height of 2 feet above ground or plant canopy. Set boom to lowest effective height over the ground or plant canopy based on equipment manufacturer's directions.

#### **Airblast Applications:**

- Sprays must be directed into the canopy.
- User must turn off outward pointing nozzles at the row end and when spraying outer row.

**For ground and airblast applications, always maintain a no-application area (buffer) from the downwind edge of the last spray pass and any non-managed area (i.e., the protection area). Non-managed areas are defined as anything that is not part of the “managed areas” listed below.**

#### **Downwind managed areas that can represent spray drift buffers for agricultural (e.g., sod farms) and non-agricultural use patterns (e.g., golf courses, commercial turf)<sup>5</sup>**

When spray drift buffers are identified as mitigation, the following managed areas can be included as part of the buffer footage if they are downwind and are immediately adjacent/contiguous to the treated field and people are not present in those areas (including inside closed buildings/structures). If the pesticide product label or bulletin, or the state or local government in which the application area is located has a requirement that prohibits or restricts spray drift in any area, including these specific managed areas, that prohibition/restriction must be followed.

- Agricultural fields, pastures, forage fields, and private rangelands, including untreated portions of the treated area. For golf courses only: this includes untreated portions of the golf course, including tees, greens, fairways, collars, intermediate roughs, and roughs.
- Roads, paved or gravel surfaces, mowed grassy/fallowed areas adjacent to the treated area, and areas of bare ground from recent plowing or grading that are contiguous with the treated area;
- On-site buildings and their perimeters, silos, or other man-made structures with walls and/or roof;

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<sup>5</sup> EPA's Final Decision defines managed areas for Ag and Non-Ag into the same instructions. This aims to lessen the complexity of the instructions and does not impact the assessed risks and benefits.

- Areas present and/or maintained as a runoff/erosion measure as listed on EPA’s Mitigation Menu website. Examples include vegetative filter strips (VFS), field borders, grassed waterways, vegetated ditches, riparian areas, managed/constructed wetlands, or other areas of intentional habitat improvement;
- Areas present and/or maintained as a drift buffer reduction measure as listed on EPA’s Mitigation Menu website. Examples include vegetative windbreaks, hedgerows, shelterbelts, riparian areas, private forests, woodlots, and shrublands;
- Conservation Reserve Program (CRP) and Agricultural Conservation Easement Program (ACEP) lands (applicators may need to ensure that pesticide use does not cause degradation of the CRP habitat).
- On-site contained irrigation water resources that are not connected to adjacent water bodies, including on-site irrigation canals and ditches, water conveyances, managed irrigation/runoff retention basins, ponds, and tailwater collection ponds.

**For Spray Drift Buffers for Broadcast Applications**

Applicators must access and search Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins> within six months of the application to determine whether the application site falls within a Pesticide Use Limitation Area (PULA) that has a Bulletin in BLT. Wind-directional ecological spray drift buffers are required for applications as follows in **Table A**:

**Table A. Ecological Spray Drift Buffers**

<b>Application Method</b>	<b>Droplet Size Distribution (DSD)</b>	<b>Minimum Buffer Distance for agricultural sites (e.g., Sod Farms)</b>	<b>Minimum Buffer Distance for non-agricultural sites (e.g., golf courses)</b>
Groundboom for field crops (2 – 4 foot boom height)	Medium or coarser	25 feet	--
Groundboom (< 2 foot boom height)	Coarse or coarser	--	15 feet
Airblast Sprayer	NA	85 feet	--

DSD = droplet size distribution; NA = not applicable

**Reduction Options for Ecological Wind-Directional Drift Buffers for Use Sites Other than Golf Courses:**

The applicator may choose among the ecological drift buffer reduction options on EPA’s Mitigation Menu Website (<https://www.epa.gov/pesticides/mitigation-menu>) to reduce the wind-directional ecological buffer distance before applying this product. All buffer reduction options selected must align with the minimum droplet size and release height requirements on this label.

To reduce the buffer distance for the application, the buffer reduction options must be employed in accordance with the instructions and descriptions on EPA’s Mitigation Menu Website. These

buffer reduction options do not apply to areas occupied by humans for residential or commercial purposes (such as lawns, sidewalks, outdoor recreational areas, athletic fields, buildings/homes, farmworker housing, schools, daycare centers, nursing homes, and hospitals).

When using more than one option during the application, the buffer distances may be added together. Combining multiple buffer reduction options can eliminate the need for an ecological wind-directional buffer altogether.

### **Ground Spray Drift Buffer Reduction Options for Golf Course Use Only:**

*The following mitigation options allow for reduction of the total buffer:*

- A reduction in the required wind-directional buffer distance can be made if reducing the single application rate. The percent reduction in buffer directly corresponds to the application rate reduction from the maximum on the pesticide product label.
- A 10-foot reduction in the required wind-directional buffer distance can be made if the relative humidity is 60% or more at the time of application.

*The incorporation of one of the following mitigation options results in no buffer (i.e., 0 feet) on golf courses:*

- Over-the-top hooded sprayer.
- Restrict the number of passes to the treated site/field to 10 or less.
- If a windbreak or shelterbelt (e.g., trees or riparian hedgerows) between the application site and non-managed area is present and meets either the basic or advanced the criteria listed in the ‘**Windbreak-Shelterbelt Criteria**’ section of this label.
- If a windbreak or shelterbelt consists of riparian/forests/shrubland/woodlots that are 60 ft wide or greater.

When tank mixing, the most restrictive of the products’ label or bulletin requirements must be followed (e.g., drift buffers that are not wind-directional, Application Exclusion Zone drift requirements, drift buffers to residences, schools, and parks where bystanders could be present, use prohibitions, timing restrictions, and application method prohibitions).”

## **SPRAY DRIFT ADVISORIES**

THE APPLICATOR IS RESPONSIBLE FOR AVOIDING OFF-SITE SPRAY DRIFT. Be aware of nearby non-target sites and environmental conditions.

## **IMPORTANCE OF DROPLET SIZE**

An effective way to reduce spray drift is to apply large droplets. Consider the largest droplets that provide target pest control. While applying larger droplets will reduce spray drift, the potential for drift will be greater if applications are made improperly or under unfavorable environmental conditions.

### **Controlling Droplet Size – Ground boom**

- Volume – Increasing the spray volume so that larger droplets are produced will reduce spray drift. Consider using the highest practical spray volume for the application. If a greater spray volume is needed, consider using a nozzle with a higher flow rate.

- Pressure – Using the lowest spray pressure recommended for the nozzle will produce the target spray volume and droplet size.
- Spray Nozzle – Consider using a spray nozzle that is designed for the intended application, as well as using nozzles designed to reduce drift.

### **RELEASE HEIGHT – Ground Boom**

For ground equipment, the boom should remain level with the crop and have minimal bounce. Automated boom height controllers are recommended with large booms to better maintain optimum nozzle to canopy height. Excessive boom height will increase the potential for spray drift.

### **HOODED (OR SHIELDED) SPRAYERS**

Shielding the boom or individual nozzles can reduce spray drift. Consider using hooded sprayers. Applicators should verify that the shields are not interfering with the uniform deposition of the spray on the target area.

### **TEMPERATURE AND HUMIDITY**

When making applications in hot and dry conditions, consider using larger droplets to reduce effects of evaporation.

### **TEMPERATURE INVERSIONS**

Drift potential is high during a temperature inversion. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. The presence of an inversion can be indicated by ground fog or by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing. Avoid applications during temperature inversions.

### **WIND**

Drift potential generally increases with wind speed.

Applicators need to be familiar with local wind patterns and terrain that could affect spray drift.

### **MEASURING WIND SPEED AND WIND DIRECTION**

#### **Best management practices for measuring wind speed and wind direction:**

- Applicators should check and acquire the predicted wind speed and direction for the application site within 12 hours prior to conducting applications to determine the time periods wind speed is likely to fall outside the applicable thresholds.
- Applicators should reassess wind speed and direction at the application site at least every hour while applications are in progress.
- Measuring wind speed and direction can be done by:
  - o Relying on equipment on the application equipment that measures wind speed.
  - o Using a tower anemometer with telemetry or handheld anemometer. Users should read user manual on how to calibrate, operate and interpret the output from an anemometer. Ground applicators should stop at least every hour to take a reading with

- a tower anemometer with telemetry or handheld anemometer. Some anemometers may have software that would allow users to view wind measurements in real time while making an application, and, those cases, applicators would not have to stop to take measurements.
- o Using a windsock. Wind can be estimated with a windsock using the strips on a windsock. The applicator should consult the user manual for the windsock on wind speed estimation and direction of wind. Applicators should look at the sock at least every hour to estimate wind speed and direction. The windsock should be pointed in the opposite direction of the windbreak and the non-managed area.
  - o Checking behind the spray rig at least every hour to see if the spray has changed direction from when the application started.”

### **Chemigation restrictions**

“**DO NOT** apply via end-gun chemigation.

#### **For Chemigation**

If unmanaged areas are present less than 25 feet from the application site, the following restrictions apply for applications via overhead chemigation systems, such as center pivot or traveler systems:

- Turn off end-guns AND select from two of the following:
  - o Reduce the pressure to  $\leq 20$  lbs per square inch (psi).
  - o Reduce the release height to  $\leq 5$  feet from the ground or top of target vegetation.
  - o Maintain a downwind drift barrier (windbreak, hedgerow, or shelterbelt) from the application site based on the description of this measure on EPA’s mitigation menu website (<https://www.epa.gov/pesticides/mitigation-menu>).

Unmanaged areas are defined in comparison to managed areas--anything that is not a managed area is an unmanaged area. Refer to the “Managed Areas Definition” section of this label for information on managed areas.

#### **For Non-End Gun Impact Sprinkler Chemigation Systems**

If unmanaged areas are present less than 25 ft from the application site, the following restrictions apply when making applications with non-end gun impact sprinkler chemigation systems:

- Limit the throw distance to the edge of the field. This can be accomplished by reducing the pressure or reducing the throw angle.
- Maintain a downwind drift barrier (windbreak, hedgerow, or shelterbelt) based on the description on EPA’s mitigation menu website (<https://www.epa.gov/pesticides/mitigation-menu>).

Unmanaged areas are defined in comparison to managed areas--anything that is not a managed area is an unmanaged area. Refer to the “Managed Areas Definition” section of this label for information on managed areas.

### **Runoff mitigations**

#### **“MANDATORY RUNOFF MITIGATION**

- **DO NOT** apply when soils are saturated or above field capacity.
- **DO NOT** apply during rain.

- Certain turf uses (including golf courses, managed roughs, institutional and commercial turf and residential and commercial landscapes; sports fields, parks, municipal grounds, and cemeteries) and certain ornamental uses (residential and commercial landscapes, parks, and interior plantscapes) only require runoff mitigation points if the application site falls within a PULA.
- For golf course use only, no points are required if limiting applications to tees, greens, and fairways.

Applicators must access and search Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins> within six months prior to or on the day of the application to determine whether the application site falls within a Pesticide Use Limitation Area (PULA). If you are located inside a PULA, follow the instructions in the “Inside a PULA” section below and in the BLT bulletin. If the application site falls outside of a PULA, follow the instructions in the “Outside a PULA” section below.

#### **Outside a PULA:**

TWO mitigation points are required for all crops listed on this label. Follow the steps below to determine which applications need to achieve points, determine your eligibility for mitigation relief, and determine options to achieve mitigation points.

#### **Inside PULAs:**

Different runoff/erosion mitigation point(s) are required inside specific PULAs. Access Bulletins Live! Two within 6 months prior to or on the day of the application to determine if you are inside a PULA. If your application site is located within a PULA, points are required for all uses. Access the BLT to determine the total number of points required. Follow the steps below to determine which applications need to achieve the points, determine eligibility for mitigation relief, and determine options to achieve mitigation points.

#### **Steps to Achieve Points:**

Step A. To achieve the mitigation points specified above, visit EPA’s mitigation menu website ([www.epa.gov/pesticides/mitigation-menu](http://www.epa.gov/pesticides/mitigation-menu)) to determine which applications need to achieve points and for a full list of mitigation and mitigation relief options.

Step B. Determine if you are eligible for mitigation relief. Runoff/erosion mitigation is NOT needed if certain field/application parameters are present at the time of application (*e.g.*, subsurface or tile drains with controlled outlet, perimeter berm systems, irrigation tailwater return systems, etc). Refer to the mitigation menu for a complete list of field/application parameters.

Step C. If the application site does not meet the field/application parameters specified on EPA’s mitigation menu website, choose among the mitigation and/or mitigation relief options on EPA’s mitigation menu website to meet or exceed the required points noted on this label before applying this product.

Step D. To achieve mitigation points for the application, the mitigation and mitigation relief measures must be:

- Employed in accordance with the instructions and descriptions on EPA’s Mitigation Menu Website.
- In place during the application unless a different timing (such as before or after application) is specifically provided in the measure’s description on EPA’s Mitigation Menu Website.

Step E. Additional restrictions may be present in bulletins—always follow the most restrictive bulletin instructions. If you are located in an area where PULAs overlap, follow the most restrictive requirements across all bulletins. When tank mixing, the most restrictive requirements must be followed between the products' labels and bulletins.

EPA may periodically update the Mitigation Menu Website, for example, by adding new mitigation measures or updating a mitigation measure description.

### **Pollinator IEM advisory language**

**“The following Best Management Practices (BMPs) can help reduce risk to pollinators:**

- Develop and maintain clear communication with local beekeepers to help protect bees. To the extent possible, advise beekeepers within a 1-mile radius 48-hrs in advance of the application, and confirm hive locations before spraying.
- Avoid applications during bloom.
- Avoid applications when bees are actively foraging.
- Apply pesticides in the evening or early morning hours when fewer bees are foraging.
- Use Pollinator Protection Plans when they are available. These plans may be available from state lead agencies and promote communication between growers, landowners, farmers, beekeepers, pesticide users, and other pest management professionals to reduce exposure of bees and other pollinators to pesticides.
- Use integrated pest management to prevent or mitigate potential negative effects to pollinators and consider multiple management options before resorting to a pesticide application.
- Avoid applying pesticides to plants in bloom, including flowering weeds.
- Mow understory weeds or cover crops in field nurseries can prevent flowering of weeds and reduce exposure to bees where and when pesticides are applied.

**The following Best Management Practices (BMPs) can help promote the health and habitat of ground-nesting bees:**

- For uncultivated land, leave large undisturbed patches of land unmowed and untilled can provide nesting and forage sites.
- For uncultivated land, mow at the highest cutting height possible (minimum of 8-10 inches if possible) can increase and diversify food sources.

For additional resources on pollinator BMPs and Pollinator Protection Plans, visit <https://www.epa.gov/pollinator-protection/find-best-management-practices-protect-pollinators>.”

### **Ecological incidents**

**“REPORTING ECOLOGICAL INCIDENTS:** For guidance on reporting ecological incidents, including death, injury, or harm to plants and animals, including bees and other non-target

insects, see EPA’s Pesticide Incident Reporting website: <https://www.epa.gov/pesticide-incidents> or call (registrant phone number).”

### **ESA requirements**

#### **" Endangered and Threatened Species Protection Requirements**

Before using this product, you must obtain any applicable Endangered Species Protection Bulletins (Bulletins) within six months prior to or on the day of application. To obtain Bulletins, go to Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins>. When using this product, you must follow all label directions and restrictions contained in any applicable Bulletin(s) for the area where you are applying the product, including any restrictions on application timing if applicable. It is a violation of Federal law to use this product in a manner inconsistent with its labeling, including this labeling instruction to follow all directions and restrictions contained in any applicable Bulletin(s). For general questions or technical help, call 1-844-447-3813, or email [ESPP@epa.gov](mailto:ESPP@epa.gov).”

### **Pollinator mitigations**

- “For crops grown for seed, **DO NOT** apply 3 days prior to flowering until the end of the flowering period.”
- “**DO NOT** apply 3 days prior to flowering until the end of the flowering period. In areas where the authorities provide a declaration or definition of the flowering period, observe defined flowering periods as established by local university extension offices, County Agricultural Commissioners, or other state/tribal lead agencies” for Citrus.
- “Foliar application of this product is prohibited from onset of flowering until flowering is complete unless; (i) the application is being made between 2-hrs prior to sunset and 2-hrs after to the following sunrise: OR, (ii) the application is being made at a time when the temperature at the application site is 50°F or less.” for several uses.

### **End-Use Product: 100-1710 (A22466 CP)**

#### **Pollinator IEM advisory**

**“The following Best Management Practices (BMPs) can help reduce risk to pollinators:**

- Develop and maintain clear communication with local beekeepers to help protect bees. To the extent possible, advise beekeepers within a 1-mile radius 48-hrs in advance of the application, and confirm hive locations before spraying.
- Use Pollinator Protection Plans when they are available. These plans may be available from state lead agencies and promote communication between growers, landowners, farmers, beekeepers, pesticide users, and other pest management professionals to reduce exposure of bees and other pollinators to pesticides.
- Use integrated pest management to prevent or mitigate potential negative effects to pollinators and consider multiple management options before resorting to a pesticide application.
- Mow understory weeds or cover crops in orchards and vineyards can prevent flowering of weeds and reduce exposure to bees where and when pesticides are applied.

**The following Best Management Practices (BMPs) can help promote the health and habitat of ground-nesting bees:**

- For uncultivated land, leave large undisturbed patches of land unmowed and untilled can provide nesting and forage sites.
- For uncultivated land, mow at the highest cutting height possible (minimum of 8-10 inches if possible) can increase and diversify food sources.

For additional resources on pollinator BMPs and Pollinator Protection Plans, visit <https://www.epa.gov/pollinator-protection/find-best-management-practices-protect-pollinators>.”

**Runoff mitigations**

- “**DO NOT** apply when soils are saturated or above field capacity.”
- “**DO NOT** apply during rain.”
- “Uses listed in this label will require a total of **FOUR** points in specific Pesticide Use Limitation Areas.”

“Applicators must access and search Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins> within six months prior to or on the day of the application to determine whether the application site falls within a Pesticide Use Limitation Area (PULA) that has a Bulletin in BLT. If you are located inside a PULA, follow the instructions in the bulletin.

**Steps to Achieve Points:**

Step A. To achieve the mitigation points specified above, visit EPA’s mitigation menu website ([www.epa.gov/pesticides/mitigation-menu](http://www.epa.gov/pesticides/mitigation-menu)) to determine which applications need to achieve points and for a full list of mitigation and mitigation relief options.

Step B. Determine if you are eligible for mitigation relief. Runoff/erosion mitigation is NOT needed if certain field/application parameters are present at the time of application (*e.g.*, subsurface or tile drains with controlled outlet, perimeter berm systems, irrigation tailwater return systems, etc). Refer to the mitigation menu for a complete list of field/application parameters.

Step C. If the application site does not meet the field/application parameters specified on EPA’s mitigation menu website, choose among the mitigation and/or mitigation relief options on EPA’s mitigation menu website to meet or exceed the required points noted on this label before applying this product.

Step D. To achieve mitigation points for the application, the mitigation and mitigation relief measures must be:

- Employed in accordance with the instructions and descriptions on EPA’s Mitigation Menu Website.
- In place during the application unless a different timing (such as before or after application) is specifically provided in the measure’s description on EPA’s Mitigation

Menu Website. EPA may periodically update the Mitigation Menu Website, for example, by adding new mitigation measures or updating a mitigation measure description.

Step E. Additional restrictions may be present in bulletins—always follow the most restrictive bulletin instructions. If you are located in an area where PULAs overlap, follow the most restrictive requirements across all bulletins. When tank mixing, the most restrictive requirements must be followed between the products' labels and bulletins.

EPA may periodically update the Mitigation Menu Website, for example, by adding new mitigation measures or updating a mitigation measure description.

### **Ecological incidents**

**“REPORTING ECOLOGICAL INCIDENTS:** For guidance on reporting ecological incidents, including death, injury, or harm to plants and animals, including bees and other non-target insects, see EPA’s Pesticide Incident Reporting website: <https://www.epa.gov/pesticide-incidents> or call (registrant phone number).”

### **ESA requirements**

#### **“Endangered and Threatened Species Protection Requirements**

Before using this product, you must obtain any applicable Endangered Species Protection Bulletins (Bulletins) within six months prior to or on the day of application. To obtain Bulletins, go to Bulletins Live! Two (BLT) at <https://www.epa.gov/pesticides/bulletins>. When using this product, you must follow all label directions and restrictions contained in any applicable Bulletin(s) for the area where you are applying the product, including any restrictions on application timing if applicable. It is a violation of Federal law to use this product in a manner inconsistent with its labeling, including this labeling instruction to follow all directions and restrictions contained in any applicable Bulletin(s). For general questions or technical help, call 1-844-447-3813, or email [ESPP@epa.gov](mailto:ESPP@epa.gov).”

### **End-Use Products: 100-1705 (A22241 ST) and 100-1708 (A22725 ST)**

#### **Personal Protective Equipment**

Baseline attire and chemical resistant gloves.

“Users must rinse extraction probes within the pesticide container prior to removal of the probes.”

#### **Seed treatment dye statement**

##### **“REQUIRED DYE STATEMENT**

Seed treated with this product must be visually identifiable from untreated seed by the use of an approved colorant or dye to prevent accidental use of treated seed as food for humans or feed for animals. Refer to 21 CFR, Part 2.25. Any colorant or dye added to treated seed must be cleared for use in accordance with 40 CFR, Part 153.155(c).”

#### **Seed treatment location and equipment restriction**

“This product must be applied with commercial seed-treating equipment with closed transfer and application systems. Use is permitted in commercial seed treatment facilities and as an end-use seed treatment on agricultural establishments before planting. DO NOT use for at-plant applications (e.g., hopper box, planter box, *etc.*). This product is to be used in liquid or slurry treaters only.”

### **Instructions for treated seed products produced using on-farm seed treatment (not for distribution or sale of the seed) with a FIFRA registered pesticide**

#### **“Use of On-Farm Treated Seed (when treated seeds are not for sale or distribution)**

Treated seed sold or distributed for a use not permitted by the following labeling does not qualify as an exempted treated article under 40 CFR 152.25(a) and is therefore sale or distribution of an unregistered pesticide, pursuant to FIFRA section 12.

- Store treated seed away from food and feedstuffs. Do not allow children, pets, or livestock to have access to treated seeds.
- Treated seeds are for planting purposes only. Do not use for food, feed, or oil purposes. Do not use treated seeds for fuel or ethanol production purposes.
- Do not plant treated seed by broadcasting to the soil surface. Ensure that all planted seeds are thoroughly incorporated by the planter during planting. Additional incorporation may be required to thoroughly cover exposed seeds.
- Treated seeds exposed on the soil surface may be hazardous to wildlife. Cover or collect treated seeds spilled during loading and planting (such as in row ends).
- Manage excess treated seeds (*e.g.*, spilled, unused, or expired treated seeds) by one or more of the following methods:
  - o Collect excess treated seeds for reuse for planting.
  - o Bury excess treated seeds (only allowed if totaling 1 pound or less) at least 30 feet away from bodies of water at a depth of 6 inches or double the planting depth, whichever is greater.
  - o Dispose of excess treated seed by placing them in a landfill in accordance with applicable laws in your state.
  - o Excess treated seeds may be returned to the supplier if permitted by the state.
- Do not contaminate bodies of water when disposing of equipment wash water.
- Pollinators can be exposed to dusts from treated seed when it is carried by air or when it is deposited onto flowering crops, flowering weeds, or water. **Avoid** planting treated seed in dry and windy conditions close to areas where pollinators may be active and **avoid** planting if pollinators are foraging downwind. **Control** nearby flowering weeds before planting to ensure pollinators are not attracted to the site. **Avoid** releasing dust that may have accumulated in bags and bulk seed containers during transport. **Aim** to keep any dust in the treated seed bag by not shaking the bags when filling the planting machines. Loading operations should occur at least 10 yards inside the field to be planted, **avoiding** proximity to apiaries/beehives, hedges, water sources of flowering crops and weeds. When using vacuum pneumatic sowing machines, the exhaust air should be re-directed to the soil and released close to the soil surface. Use of downward deflectors may decrease off-site movement of dust. The use of seed flow lubricants or polymer coatings may help

decrease the amount of dust released during planting. **Follow** the recommendations of the planter manufacturer regarding the use of seed flow lubricants.

### **Required Seed Bag Labeling Instructions that Go on the FIFRA Registered Label**

For pesticide products allowed for use to treat seeds in commercial facilities or on-farm where the treated seed product is intended for sale or distribution (instructions must appear on seed bag tags when treated seeds are to be sold or distributed)

### **“Use of Seeds Treated in Commercial Facilities Or On-Farm and Are Intended To Be Sold Or Distributed After Treatment**

Bags containing treated seed shall be labeled with the statements listed in Section 7.1. Any seed treated with [PRODUCT NAME, A22725 OR A22241] that is sold or distributed without the statements listed in Section 7.1 or that is sold or distributed for a use not permitted on this label does not qualify as an exempted treated article under 40 CFR 152.25(a) and is therefore sale or distribution of an unregistered pesticide, pursuant to FIFRA section 12(a)(1)(A).

### **Required Seed Bag Labeling Instructions that Go on the Seed Bag Tag**

For pesticide products allowed for use to treat seeds in commercial facilities or on-farm where the treated seed product is intended for sale or distribution (instructions must appear on seed bag tags when treated seeds are to be sold or distributed).

### **“Seed Treatment in Commercial Facilities or Seed Treatment On Farm (when treated seed are to be sold or distributed) – Seed Bag Labeling Requirements**

- This seed has been treated with (insert name of active ingredient of pesticide).
- Do not use for food, feed, or oil purposes.

This seed has been treated with [INSERT PRODUCT NAME(s) (EPA REG. NO(s))] containing [INSERT NAME(S) OF ACTIVE INGREDIENT(S)]. Any seed treated with [PRODUCT NAME] that is sold or distributed for a use not permitted by the following labeling does not qualify as an exempted treated article under 40 CFR 152.25(a) and is therefore sale or distribution of an unregistered pesticide, pursuant to FIFRA section 12(a)(1)(A).

- The contents of this bag are for planting purposes only. Do not use for food, feed, or oil purposes. Do not use for fuel or ethanol production purposes.
- Store treated seed away from food and feedstuffs.
- **Do not allow children, pets, or livestock to have access to treated seeds.**
- Do not plant treated seed by broadcasting to the soil surface. Ensure that all planted seeds are thoroughly incorporated by the planter during planting, additional incorporation may be required to thoroughly cover exposed seeds.
- Treated seeds exposed on the soil surface may be hazardous to wildlife. Cover or collect treated seeds spilled during loading and planting, including in row ends.
- Manage excess treated seeds (*e.g.*, spilled, unused, or expired treated seeds) by one or more of the following methods:

- o Collect excess treated seeds for reuse for planting.
- o Bury excess treated seeds (only allowed if totaling 1 pound or less) at least 30 feet away from bodies of water at a depth of 6 inches or double the planting depth, whichever is greater.
- o Dispose of excess treated seed by placing them in a landfill in accordance with applicable laws in your state.
- o Excess treated seeds may be returned to the supplier if permitted by the state.
- Do not contaminate bodies of water when disposing of equipment wash water.
- Dispose of seed packaging or containers in accordance with local requirements."
- Pollinators can be exposed to dusts from treated seed when it is carried by air or when it is deposited onto flowering crops, flowering weeds, or water. **Avoid** planting treated seed in dry and windy conditions close to areas where pollinators may be active and **avoid** planting if pollinators are foraging downwind. **Control** nearby flowering weeds before planting to ensure pollinators are not attracted to the site. **Avoid** releasing dust that may have accumulated in bags and bulk seed containers during transport. **Aim** to keep any dust in the treated seed bag by not shaking the bags when filling the planting machines. Loading operations should occur at least 10 yards inside the field to be planted, **avoiding** proximity to apiaries/beehives, hedges, water sources of flowering crops and weeds. When using vacuum pneumatic sowing machines, the exhaust air should be re-directed to the soil and released close to the soil surface. Use of downward deflectors may decrease off-site movement of dust. The use of seed flow lubricants or polymer coatings may help decrease the amount of dust released during planting. **Follow** the recommendations of the planter manufacturer regarding the use of seed flow lubricants.

**End-Use Products: 100-1707 (A21550 400 SC) and 100-1706 (A22128)**

**Down the Drain exposure mitigations**

“

- Do not pour down drains or sewers. Call your local solid waste agency for local disposal options.
- When applying near sewers or drains, only apply using a coarse, low-pressure spray. {only for the product A21550 400SC (EPA Reg. No. 100-1707)}
- When applying near drains or sewers (that are not storm or runoff drainage systems), only apply to the external perimeters (mouth/rim of sewer) and underside of sewer lids. Do not apply inside sewers or drains.
- Do not apply to storm drains.
- Do not use on washable textiles or fabrics.”

**Down the Drain restriction graphic**



## **VII. SUPPORTING DOCUMENTS**

All supporting documents can be found in docket ID number EPA-HQ-OPP-2021-0641 at [regulations.gov](https://www.regulations.gov).