

# IR-4 New Products/Transitional Solution List

12/2/08

Compiled by IR-4 Project Headquarters

This *IR-4 New Products/Transitional Solutions List* primarily contains brief descriptions of pest control products that have been introduced in recent years. It also contains information on some “older” crop protection chemicals that are believed to have potential for new uses. Many of these pest control tools offer great promise to fill the pest management voids created from cancellation of pesticides/pesticide uses associated with the Food Quality Protection Act. A number of these new products have been classified by the EPA as **Reduced Risk** for one or more uses, while others have characteristics that make them more desirable (i.e. **Organophosphate [OP] Replacement**) than some existing products. In the product tables which follow, the status of product uses on crops/crop groups/crop subgroups is classified as either Registered (tolerance and label approved by EPA), Pending (tolerance petition submitted and awaiting EPA review, or residue study in progress), or Potential (possible registrant or IR-4 project). The usefulness of some products for specialty crops is still being explored.

This document is available on the IR-4 website (<http://ir4.rutgers.edu/FoodUse/NewProductsTransitionalSolutionsList.pdf>) from where it can be viewed or printed. Revisions to this list are now made on the website version as information is received, making this a continually-updated, dynamic document, rather than a static version updated once a year. The information contained herein is to the best of our knowledge accurate, based on input from registrants and published literature. However, always consult product labels to confirm crops and use patterns that are registered. In addition to searching product labels on specific registrant websites, a good source for all product labels is the CDMS agrochemical database at [www.cdms.net/labelsmsds/lmdefault.aspx?t](http://www.cdms.net/labelsmsds/lmdefault.aspx?t); also you can get a glimpse at EPA’s recently approved new uses by viewing the EPA work plan at [www.epa.gov/opprd001/workplan/newuse.htm](http://www.epa.gov/opprd001/workplan/newuse.htm) (both these websites appear as links on the IR-4 website by clicking on the “Food Crops” tab on the home page, then in the first column headed by “Food Crops Program Information” or on the “Related Links” page by clicking “Links” at the bottom of the home page).

If you see corrections that are needed in this document or if you have any questions on the material presented here, please contact Van R. Starner at IR-4 HQ, ([starner@aesop.rutgers.edu](mailto:starner@aesop.rutgers.edu) or phone 732-932-9575 x4621).

## Herbicides

Herbicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
AEB171509	Bayer Crop Science	Nitropyrazole, PPO inhibitor	Control of <i>Lamium</i> , <i>Stellaria</i> , <i>Viola</i> , and <i>Veronica</i> spp.	Potential on wheat and barley.
<i>Alternaria destruens</i> (SMOLDER)	UAP	Microbial biopesticide	Dodder (swamp, largeseed, field, smallseed)	<b>Biopesticide</b> Registered use on cranberry. Potential on pepper, tomato, unspecified crops.
Ammonium pelargonate (RACER)	Falcon Lab. LLC	Ammonium salt of fatty acids	Broad spectrum, non-selective	<b>Biopesticide</b> Pending in unspecified crops.
Aminopyralid (MILESTONE)	Dow AgroSciences	Pyridine carboxylic-amino analog of clopyralid-halopyridine	Broad spectrum	<b>Reduced Risk Product</b> Registered on grass, wheat. Potential on barley, canola, corn, grass seed, oat, rice.
Amicarbazone (DINAMIC)	Arysta LifeSciences	Triazolinone	Soil and burndown activity is primarily on broadleaf weed species	Registered in corn (field) (not marketed). Potential on sugarcane.
Bencarbazone		Thioamide		
Beflubutamid (HERBAFLEX)	Ube Industries	Phenoxybutanamide (inhibits phytoene desaturase)	Post-emergence control of broadleaf weeds at rates of 170 to 255 g ai/ha (0.15 to 0.23 lb ai/A)	Potential on barley, rye, triticale, wheat.
Bensulfuron methyl (LONDAX)	DuPont Crop Protection	Sulfonylurea	Most broadleaf and sedge weeds	Registered on rice.

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Bispyribac sodium (REGIMENT)	Valent & K-I Chemical	Sulfonylurea (ALS Inhibitor)	Annual/perennial grasses and broadleaf weeds including herbicide resistant barnyardgrass	<b>Candidate Reduced Risk Product</b> Registered on rice.
Carfentrazone-ethyl (AFFINITY, AIM)	FMC	Aryl triazolinone (PPO Inhibitor)	Numerous broadleaf weeds, including cocklebur and water hemp; main use in specialty crops is for row middles and with shielded sprayer	<b>Reduced Risk Product</b> Registered on acerola, atemoya, avocado, banana, berry crop group, biriba, borage, Brassica leafy vegetable crop group, bulb vegetable crop group, cacao, cactus, canistel, canola, cereal grain crop group, cherimoya, citrus fruit crop group, crambe, coconut, coffee, cotton, cucurbit vegetable crop group, custard apple, date, feijoa, fig, flax, fruiting vegetable crop group, herb/spice crop group, hops, horseradish, ilama, grape, grass, guava, guayule, jaboticaba, juneberry, kava, kiwifruit, leafy vegetable crop group, legume vegetable crop group, lingonberry, Longan, lychee, mango, mulberry, mustard seed, okra, olive, palm heart, papaya, passion fruit, pawpaw, peanut, persimmon, pineapple, pome fruit crop group, pomegranate, pulasan, pummelo, rambutan, rapeseed, root & tuber vegetable crop group, safflower, salal, sapodilla, sapote (black, mamey), sorghum (sweet), soursop, soybean, Spanish lime, stone fruit crop group, starfruit, strawberry, sugar apple, sugarcane, sunflower, tea, tree nut crop group, pistachio, wasabi, wax jambu. Pending on mint. Potential on sesame.
Catechin	Colorado State University	A component from spotted knapweed ( <i>Centaurea maculosa</i> )	Controls many weeds	Potential on corn, wheat and other grass crops.
Clethodim (SELECT) (PRISM) (ARROW)	Valent & Makhteshim Agan	Cyclohexanone ACCase inhibitor	Activity only on grass weeds	Registered on alfalfa, apple, asparagus, Brassica leafy vegetable crop group, bulb vegetable crop group, canola, cilantro, clover, cotton, cranberry, cucurbit vegetable crop group, field corn, flax, fruiting vegetable crop group, grape, mint, mustard seed, peanut, root/tuber vegetable crop group, soybean, strawberry, sunflower, turnip (greens), herb subgroup, hops, leafy vegetable crop group, legume vegetable crop group, safflower, sesame. Pending on artichoke, blueberry, caneberry, grass (fescue), stone fruit crop group. Potential on pome fruit crop group.
Clodinafop-propargyl (DISCOVER)	Syngenta Crop Protection	Aryloxyphenoxy propionate (ACC ase)	Selective post-emergence of wild oats, annual grasses and other weeds	Registered on wheat.
Clomazone (COMMAND)	FMC	Isonazolidinone – carotenoid biosynthesis inhibitor	Pre-emergence control of a broad spectrum of grasses and broadleaf weeds	Registered on bean (snap), cabbage, cotton, cucurbit vegetable crop group, mint, pea (succulent), rice, soybean, sugarcane, sweet potato, tuberous and corm vegetables. Pending on broccoli, rhubarb, pepper. Potential on bean (dry, garbanzo), pea (shelled), lentil.
Clopyralid (STINGER)	Dow AgroSciences	Pyridone	Post-emergence control of a broad spectrum of broadleaf weeds including Canada thistle	Registered on asparagus, barley, beet (garden, sugar), Brassica leafy vegetable crop group, canola, corn (field, sweet, pop), crambe, cranberry, flax, grass seed, hops, mint, mustard seed, oat, rapeseed, spinach, stone fruit crop group, turnip (root & greens), wheat. Pending on bushberry subgroup, Swiss chard, pome fruit crop group, strawberry
Cloransulam-methyl (FIRSTRATE)	Dow AgroSciences	Sulfonamide (ALS inhibitor)	Pre-emergence or post-emergence to control annual broadleaf weeds	Registered on soybean (in combination with other products). Pending on cotton. Potential on Southern pea and bean. (snap)

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<i>Colletotrichum gloesporioides</i> f. sp <i>malvae</i> (LOCK-DOWN)	Encore Technologies	Fungus	Pathogenic to round-leaved mallow, small flowered mallow, common mallow, velvetleaf, Northern joint vetch	<b>Biopesticide</b> Pending on rice, soybean.
Cyhalofop-butyl (CLINCHER)	Dow AgroSciences	Phenoxy-propionate	Post-emergence grass herbicide	<b>Reduced Risk Product</b> Registered on rice. Potential on oat, barley and wheat (International registrations approved).
DE-742	Dow AgroSciences		Broad-spectrum graminicide	Pending on wheat.
Diflufenzopyr (DISTINCT)	BASF	Semicarbazone (auxin transport inhibitor)	Annual grasses and broadleaf weeds; sold in a pre-mix with dicamba	<b>Reduced Risk Product</b> Registered on corn (field, sweet, pop), pasture grass.
Dimethenamid-P (OUTLOOK)	BASF	Chloroacetamide, single isomer of dimethenamid	Annual grasses, broadleaf weeds, yellow nutsedge	<b>Reduced Risk Product</b> Registered on bean (dry), beet (sugar) corn (field, sweet, seed, pop), garlic, horseradish, leek, onion (dry bulb, green, Welsh), peanut, shallot (dry bulb, fresh leaves), sorghum (grain), soybean, tuberous & corm vegetable crop group, squash Pending on grass (seed), hops, potato, turf (golf courses) Potential on cotton, okra, pea (Southern), sorghum (sweet).
<i>Drechslera monoceras</i> (MTB-951)	Certis	Biopesticide	Barnyardgrass	Registered on turf. Potential on rice (international use pending).
Flazasulfuron (MISSION) (KATANA)	ISK Biosciences	Sulfonylurea (ALS inhibitor)	Active against grasses and broadleaf weeds with pre- & post-emergence activity	<b>Reduced Risk Product</b> Registered on turf. Potential on citrus, grape, olive (international registrations approved), non-crop right- of-ways, Christmas trees, certain other perennial tree crops.
Florasulam (PRIMUS) (BOXER)	Dow AgroSciences	Triazolopyrimidine sulfonanilide, (ALS inhibitor)	Provides post-emergence control of broadleaf weeds, particularly <i>Galium aparine</i> (Catchweed Bedstraw) at rates of 0.0045 to 0.0067 lb ai/A	Registered on barley, oat, wheat. Pending on grassland and turf.
Fluazolate (JV 485)	Monsanto	Pyrazole benzoate	Pre-emergence control of broadleaf weeds and grasses	Registered on corn. Potential on wheat.
Flucarbazone-sodium (EVEREST 70 WG)	Arysta LifeScience	Sulfonylaminocarbonyl- triazolinone,(ALS inhibitor)	Low rate post-emergence material that controls grass and certain broadleaf weeds	<b>Reduced Risk Product</b> Registered use on wheat. Pending on grass (seed). Potential on alfalfa, bean (succulent, dry), carrot, celery, cotton, cucumber, flax, spinach, sunflower.
Flucetosulfuron	LG Lifesciences	Sulfonylurea (ALS inhibitor)	Highly effective on <i>Echinochloa spp.</i>	Potential on rice, unspecified cereals.
Flumetsulam (BROADSTRIKE)	Dow AgroSciences	Sulfonamide (ALS inhibitor)	Controls broadleaf and grass weeds	Registered on corn, bean (dry), soybean (as part of a premix).
Flumiclorac-pentyl (RESOURCE)	Valent (Sumitomo Chemical)	N-phenylphthalimide derivative (PPO inhibitor)	Post-emergence control of velvetleaf and other broadleaf weeds	<b>Reduced Risk Product</b> Registered on corn, soybean.

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Flumioxazin (VALOR 50 WD) (CHATEAU 51 WDG)	Valent (Sumitomo Chemical)	N-phenylphthalimide derivative (PPO inhibitor)	Pre-emergence broadleaf herbicide with contact activity and residual soil activity	Registered on asparagus, bean (dry), blueberry, almond, cotton, grape, mint, onion (dry), peanut, pistachio, pome fruit crop group, shallot, soybean, stone fruit crop group, strawberry, sugarcane, tuberous and corm vegetables, melon, okra, alfalfa, fruiting vegetable crop group, tree nut crop group Pending on artichoke, cabbage, celery, cucurbit vegetable crop group, hops, garlic, pecan, prickly pear cactus. Potential on caneberry, carrot, onion (green), olive, pomegranate, field corn.
Flupyr-sulfuron-methyl (LEXUS)	DuPont Crop Protection	Sulfonylurea (ALS inhibitor)		Potential on barley, oat, rye, wheat.
Fluroxypyr (STARANE F) (VISTA)	Dow AgroSciences	Picolinic acid	Controls broadleaf weeds, including vol. potato, kochia and nightshade	<b>Reduced Risk Product</b> Registered on millet, onion (dry bulb), barley, corn (field, sweet), pasture/range grass, oat, sorghum, wheat, pome fruit crop group Pending on cereal grain crop group (except rice), mint.
Fluthiacet-methyl (APPEAL) (BLIZZARD)	K-I Chemical & Chemtura	Prototox inhibitor	Post-emergence control for velvetleaf, lambsquarters and other broadleaf weeds	<b>OP Replacement</b> Registered on corn (field, sweet, pop), soybean, cotton, cotton (defoliant).
Foramsulfuron (REVOLVER) (OPTION)* <small>*Foramsulfuron plus safener</small>	Bayer CropScience	Sulfonylurea (ALS inhibitor)	Post-emergence control of annual grasses (foxtails, barnyard, shatter cane, <i>Panicum</i> spp., crabgrass)	<b>Registered</b> on corn (field, pop). Pending on corn (sweet).
Glufosinate (LIBERTY) (RELY)	Bayer CropScience	Butanoic acid	Post-emergence non-selective material that controls a broad spectrum of weeds	<b>Reduced Risk Product</b> Registered on apples, banana, barley, beet (sugar), bushberry subgroup, buckwheat, canola, corn (field), cotton, grape, lingonberry, juneberry, oat, potato, rice, rye, salal, soybean, teosinate, tree nut crop group, triticale, wheat. Pending on corn (sweet), pistachio. Potential on mint, stone fruit crop group, sugarcane
Halosulfuron (PERMIT) (SEMPRA) (SANDEA)	Nissan, Gowan,	Sulfonylurea (ALS inhibitor)	Nutsedge, velvetleaf, cocklebur, and other broadleaf weeds	<b>Methyl Bromide Alternative</b> Registered on alfalfa, asparagus, bean (succulent, dry), corn (field, sweet), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, pea (succulent), rice, sorghum (grain), sugarcane, tree nut crop group, pistachio. Pending on okra, potato, caneberry Potential on citrus fruit crop group, grape, pome fruit crop group, stone fruit crop group.
Imazamox (RAPTOR)	BASF	Imidazolinone (ALS inhibitor)	Annual grasses and some broadleaf weeds	<b>Reduced Risk Product</b> Registered on alfalfa, bean (lima), canola, chicory, clover, pea (Southern), soybean, sunflower, wheat. Pending on grass, rice. Potential on all crops due to exemption from requirement of a tolerance.
Imazapyr	BASF	Imidazolinone (ALS inhibitor)	Broad spectrum control of annual grasses and some broadleaf weeds	Registered on grass (range grass), lettuce (head & leaf), soybean.

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Imazethapyr (PURSUIT)	BASF	Imidazolinone (ALS inhibitor)	Broad spectrum control of annual grasses and some broadleaf weeds	<b>Reduced Risk Product</b> Registered on alfalfa, bean, corn (biotech field), endive, lettuce, pea, peanut, rice (biotech), soybean. Pending on clover. Potential on canola (import tolerance established).
Imazapic (CADRE 2AS)	BASF	Imidazolinone (ALS inhibitor)	Pre- and post-emergence control of annual grasses and broadleaf weeds	<b>Reduced Risk Product</b> Registered on grass, peanut. Pending on soybean, sugarcane.
Imazosulfuron (V-10142)	Valent	Sulfonylurea (ALS inhibitor)	Controls problem broadleaf weeds, yellow/purple nutsedge, marestail; also suppresses annual grasses	<b>Potential Methyl Bromide Alternative</b> Pending on rice, fruiting vegetable crop group, potato, grape. Potential on blueberry, caneberry, cucurbit vegetable crop group, lettuce, pome fruit crop group, stone fruit crop group, sugarcane, tree nut crop group, pistachio.
Iodosulfuron-methyl sodium (HUSAR) (AUTUMN)	Bayer CropScience	Sulfonylurea (ALS inhibitor)	Early to mid-POST applications for control of grass and broadleaf weeds	Registered use on corn, soybean (pre-plant), turf.
IR-6396	Isagro	PPO Inhibitor		Potential on almond, corn, soybean and numerous unspecified crops.
Isoxaben	Dow AgroSciences	Benzamide cell wall inhibitor	Pre-emergence control of many broadleaf weeds	Pending on grape, tree nut crop group, stone fruit crop group, pome fruit crop group. Potential on blueberry, caneberry.
Isoxaflutole (BALANCE)	Bayer CropScience	Isoxazole	Soil applied for many annual grasses and some broadleaf weeds	Registered on field corn (geographically restricted). Pending on sweet corn, wheat, and barley. Potential on potato, sweet potato, chickpea, GM soybeans, GM sugarcane, buckwheat.
Mesosulfuron-methyl (OSPREY) (SILVERADO) (MESOMAXX)	Bayer CropScience	Sulfonylurea (ALS inhibitor)	Early and mid post-emergence control of grasses and some broadleaf weeds	<b>Reduced Risk Product</b> Registered on barley, triticale, wheat.
Mesotrione (CALLISTO)	Syngenta Crop Protection	Cyclohexanedione, (disrupts carotenoid biosynthesis)	Control of annual grasses and broadleaf weeds, including sulfonylurea resistant weeds	<b>Reduced Risk Product</b> Registered on corn (field, sweet, pop), asparagus, blueberry, cranberry, flax, grass (seed production), lingonberry, millet, oat, okra, raspberry, rhubarb, sorghum (grain, sweet), sugarcane, turf (sod farms, golf courses) Pending on mint. Potential on ginseng, onion.
Metamifop	Dongbu Hannong	Aryloxyphenoxy propionate	Post-emergence herbicide for control of <i>Poa annua</i>	Potential on cereal crops, rice.
Metosulam (BARKO)	Dow AgroSciences	ALS inhibitor	Preemergence control of broadleaf weeds	Potential on corn and soybean (International registrations approved).
Nicosulfuron (ACCENT)	DuPont Crop Protection & ISK	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	Registered on corn. Potential on cranberry, grass (Bermuda, Eastern gamma).
Orthosulfamuron (IR-5878) (STRADA)	Isagro	Sulfonylurea (ALS inhibitor)	Annual and perennial monocots, dicots and sedges	Registered on rice. Potential on turf, sugarcane, canola, wheat.

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Pelargonic Acid (SCYTHE)	Dow AgroSciences	Fatty acid	Contact, non-selective broad spectrum foliar applied material	<b>Biopesticide</b> Registered on all crops.
Penoxsulam (GRANATE) (GRASP)	Dow AgroSciences	Triazolopyrimidine sulfonamide (an ALS inhibitor)	Postemergence with soil residual activity; broad spectrum control of weeds including grass & sedge	<b>Reduced Risk Product</b> Registered on rice. Pending on cereals, grape, pome fruit crop group, sorghum, stone fruit crop group. Potential on leafy vegetables, pasture/range grass, sugarcane.
Pethoxamid (SUCCESSOR 600)	Tokuyama	Acetamide	Selectively controls certain grasses and broadleaf weeds	Potential on corn, soybean and grass.
Pinoxaden (AXIL)	Syngenta Crop Protection	Phenylpyrazolin-inhibits fatty acid biosynthesis	Broad spectrum annual grass control	<b>Reduced Risk Product</b> Registered on barley, wheat. Potential on beet (sugar), Brassica leafy vegetables, canola, pea, potato, sunflower.
Prosulfuron (PEAK)	Syngenta Crop Protection	Sulfonylurea (ALS inhibitor)	Post-emergence for cocklebur, kochia, lambsquarter, pigweed, and velvetleaf	Registered on sorghum, wheat, and cereals. Potential on sugarcane.
Propoxycarbazone-sodium (OLYMPUS)	Bayer Crop Science	Sulfonylaminocarbonyl triazolinone (ALS inhibitor)	Bromus spp, grassy weeds and some weedy members of the cruciferous family	Registered on barley, oat, rye, triticale, wheat.
Pyroxasulfone (KIH 485)	K-I Chemicals	Sulfonylioxazoline (ALS inhibitor)	Controls many annual grasses when applied either pre- or post-emergence	Potential on cilantro, collard, corn, kale, mustard greens, turnip, wheat.
Pyroxulam (DE-742)	Dow AgroSciences	Triazolo-pyrimidine sulfonamide	Annual grasses and broadleaf weeds	Pending on cereal grains.
<i>Puccinia thlaspeos</i> (WOAD WARRIER)	Greenville Farms	Biological herbicide-Dyers Woad Rust	Specific to Dyer's Woad	Pending on range grass.
Pyraflufen-ethyl (ET)	Nichino America (Nihon Noyahku)	Protoporphyrin oxidase inhibitor	Post-emergence for non-selective control of weeds or use as desiccant	<b>OP Replacement</b> Registered corn (field) cotton (defoliant), potato (desiccation), soybean, wheat. Pending on sugarcane, grass forage/fodder/hay. Potential on grass seed, hops, rice, watercress, unspecified crops.
Pyrasulfotole (AE 0317309)	Bayer CropScience	Phenyl pyrazolyl ketone		Potential on cereals.
Pyribenzoxium (PYANCHOR)	Dow AgroSciences & LG Chem	Benzophenone	Post emergence on numerous grasses, broadleaf & sedges	Potential on rice (international registrations approved).
Pyrimisulfan KIH-5996 KUH-021	KI Chemicals	Sulfonamide		
Quinclorac (FACET) (PARAMOUNT)	BASF; Albaugh	Quinoline carboxylic acid (ACCCase inhibitor)	Post-emergence control of annual grasses and broadleaf weeds	Registered on rice, sorghum, wheat. Pending on barley, canola, grass (pasture), cranberry, rhubarb.
Quizalofop-ethyl (ASSURE) (TARGA)	DuPont Crop Protection & Gowan	Phenoxy propionic ester	Post emergence grass herbicide	Registered on barley, flax, beans (dry, succulent), beet (sugar), canola, cotton, flax, lentil, lupine, mint, pea (cowpea, dry, succulent), pineapple, soybean, sunflower, wheat. Pending on mustard seed, pineapple (PR). Potential on basil, dill, coffee, grass, kenaf, sorghum.

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Rimsulfuron (MATRIX)	DuPont Crop Protection	Sulfonylurea (ALS inhibitor)	Annual grass and broadleaf weeds	<p><b>Methyl Bromide Alternative</b> Registered on field corn (as part of a pre-mix), tomato, potato. Pending on cantaloupe, citrus fruit crop group, chicory (mix with thifensulfuron), grape, pome fruit crop group, stone fruit crop group, tree nut crop group, pistachio. Potential on blueberry, caneberry.</p>
S-Metolachlor (DUAL MAGNUM)	Syngenta Crop Protection	Chloracetanilide (single isomer of metolachlor)	Same spectrum as metolachlor (DUAL)	<p><b>Reduced Risk Product</b> Registered on asparagus, barley, Brassica-head &amp; stem subgroup, buckwheat, carrot, cucurbit vegetable crop group, bean (dry, edible podded, succulent), beet (sugar), bulb vegetables, cabbage, celery, corn (field, sweet, pop), cotton, fruiting vegetable crop group, grass seed, horseradish, leafy petioles subgroup, oat, peanuts, pea (dry, edible podded), peach (NJ only), pumpkin, rhubarb, rice, root &amp; tuber vegetable crop group, rye, safflower, sorghum, soybean, spinach, sunflower, Swiss chard, tomato, winter squash, wheat, borage, okra, dill, turnip (greens). Pending on blueberry, caneberry, sesame, sorghum (sweet), leafy Brassica subgroup. Potential on cilantro, lettuce (leaf), parsley, strawberry.</p>
Saflufenacil (KIXOR)	BASF	Amide/Uracil	Dicot weeds, including those resistant to glyphosate and other ALS-resistant biotypes	<p>Pending on corn, sorghum, noncrop uses.</p>
Sethoxydim (POAST)	BASF	Cyclohexanone (ACCase inhibitor)	Post emergence grass herbicide	<p>Registered on alfalfa, artichoke, asparagus, bean (dry &amp; succulent), beets (garden, sugar), blueberry, borage, Brassica head and stem subgroup, bulb vegetable crop group, caneberry, canola, carrot, celery, cilantro, citrus fruit crop group, clover, corn (sethoxydim resistant field &amp; sweet), cotton, cranberry, cucurbit vegetable crop group, dill, endive, flax, fruiting vegetable crop group, grape, horseradish, juneberry, leafy vegetable crop group, lingonberry, mint, pea (dry, succulent, lentil), pome fruit crop group, salal, soybean, stone fruit crop group, strawberry, sunflower, tree nut crop group, pistachio, tuberous and corm vegetable crop group, buckwheat, fig and date (non-bearing), root vegetables (except beet (sugar)) subgroup, buckwheat, okra, borage, dill. Pending on grasses, turnip (greens), collard, kale, kenaf, safflower, camilinia, rapeseed. Potential on fig and date (bearing), chives, kiwifruit, persimmon, pomegranate, sesame, vernonia, watercress.</p>
Sulfentrazone (SPARTAN)	FMC	Aryl triazinone (PPO inhibitor)	Controls both broadleaf and grass species	<p>Registered on asparagus, bean (dry shelled, garbanzo, lima-TN only), cabbage, corn (field), horseradish, mint, pea (dried, shelled), cowpea, lentil, peanut, potato, soybean, sugarcane, sunflower. Pending on blueberry, Brassica leafy vegetable crop group cantaloupe, flax, fruiting vegetable crop group, melon, pea (succulent), strawberry, turnip (root &amp; greens), wheat, wheat, safflower. Potential on apple, grape, rhubarb, peach.</p>
Sulfosulfuron (MAVERICK)	Monsanto	Sulfonylurea (ALS inhibitor)	Grasses/ broadleaf weeds including quackgrass, bromes and mustards	<p>Registered on wheat. Pending on barley, oats &amp; cereals. Potential on potato, tomato.</p>

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SYN 523	Syngenta Crop Protection & Sumitomo Chemical		Broad spectrum burndown and residual activity at low rates	Potential on unspecified fruit crops.
Tembotrione (AE 0172747) (LAUDIS)	Bayer CropScience	Cyclohexanedione-HPPD inhibitor	Controls pigweed species (including water hemp, common lambsquarters, common ragweed, giant ragweed, Pennsylvania smartweed, common cocklebur, kochia giant foxtail, yellow foxtail, shattercane, barnyardgrass, large crabgrass, and woolly cupgrass	Pending on corn (field, sweet, pop).
Tepaloxymidim (EQUINOX)	BASF/Nisso	Cyclohexanedione, (ACCCase inhibitor)	Provides post-emergence grass weed control	Registered on canola, cotton, soybean.
Thiencarbazon	Bayer			
Thifensulfuron-methyl (HARMONY)	DuPont Crop Protection	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	Registered on barley, canola, cotton, flax, oat, corn (field), rice, sorghum, soybean, wheat. Pending on chicory (mix with rimsulfuron), safflower, tomato. Potential on alfalfa, millet.
TM 435	Arysta Lifescience	Aryl-triazolinone	Post emergence control of broadleaf weeds	Pending on barley, corn (field), oat, wheat.
Tobacco Mild Green Mosaic Tobamovirus (SOLVINEX)	BioProdex, Inc	Microbial	Post emergent control of tropical soda apple	<b>Biopesticide</b> Pending on citrus, pasture/rangeland, sugarcane.
Tropamezone (IMPACT)	AMVAC & BASF	Methanone – HPPD inhibitor	Major grass and broadleaf weeds including morningglory species, ragweed species, common sunflower, and kochia; grass weeds controlled at higher rates include barnyardgrass, goosegrass, giant foxtail, and crabgrass	Registered on corn (field, sweet, pop). Potential on cranberry, sweet potato.
Tralkoxydim (ACHIEVE)	Syngenta Crop Protection	Cyclohexanedione (ACCCase inhibitor)	Post-emergence for grass weeds such as wild oats, green and yellow foxtail, and annual ryegrass	<b>Reduced Risk Product</b> Registered on barley, wheat.
Triasulfuron (AMBER)	Syngenta Crop Protection	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	Registered on barley, grass (pasture, rangeland), wheat.
Tribenuron-methyl (EXPRESS)	DuPont Crop Protection	Sulfonylurea (ALS inhibitor)	Broadleaf weed	Registered on barley, canola (imazethapyr tolerant only), corn (field), cotton, flax, rice, sorghum, soybean, sunflower, wheat. Pending on blueberry (lowbush only).
Triflurosulfuron-methyl (UPBEET)	DuPont Crop Protection	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	Registered on beet (sugar), chicory. Pending on beet (garden).
Trifloxysulfuron sodium (ENFIELD) (ENVOKE)	Syngenta Crop Protection	Sulfonylurea (ALS inhibitor)	Broadleaf weeds, including nutsedge, morningglory, hemp sesbania, sicklepod, cocklebur and pigweed	<b>Methyl Bromide Alternative</b> Registered on cotton, tomato, sugarcane.

### Plant Growth Regulators

Plant Growth Regulators (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum	Status
Ammonium/Calcium Nitrate (BUD BREAK)	Western Farm Services	Inorganic salt	Promotes uniform bud break	Pending on grape, cherry and apple.
Ammonium thiosulfate	National Chelating & Siemer	Ammonium thiosulfate	Active as blossom thinner	Pending on apple.
Aviglycine HCL (AVG) (RETAIN)	Valent BioSciences	Aminoethoxyvinyl-glycine lysine analog	Plant growth regulator that improves harvest management by inhibiting ethylene biosynthesis	Registered on pome fruit crop group, stone fruit crop group (pre-harvest). Pending on cucumber, stone fruit crop group (post-harvest), walnut. Potential on cotton, melon, tomato, unspecified tropical fruit.
<u>Bacillus cereus</u> Strain BP01	Microflo	Bacteria	Cotton in boll retention and size; also promotes increase in root mass, earlier fruit initiation and increased fruit retention	<b>Biopesticide</b> Registered on cotton and other unspecified crops.
Benzyladenine (PROMALIN) (MAXCEL)	Valent BioSciences	Benzylamicyo-purine	Produces typier larger fruit	<b>Biopesticide</b> Registered on apple, pistachio. Pending on pear.
Clofencet (DETASSELOR)	Monsanto	Carboxylic acid	Hybridizing agent	Registered on barley, wheat, and soybean.
CMMP	FL Department of Citrus	Nitropyrole	Citrus abscission agent	Pending on processing citrus grown in Florida.
Copper Ethylenediamine (INFERNO)	SePro	Copper organic complex	Desiccant and harvest aid	Registered on potato.
Diphenylamine	Syngenta Crop Protection	Diphenylamine	Protects the fruit from scald	Registered on apple. Pending on pear.
1,2,6-DIPN (AMPLIFY)	UAP/Platt	Diisopropyl naphthalene	Controls sprout on storage potatoes; works in synergy with CIPC	Pending on potato. Potential on unspecified crops.
Forchlorfenuron (PRESTIGE)	KIM-C1 & Valent	Synthetic cytokinin - phenylurea	Influences fruit set, berry growth and development	Registered on grape, kiwifruit. Pending on almond, apple, blueberry, cranberry, fig, olive, pear, plum.
Gibberellic Acid (RELEASE) (PROVIDE)	Valent BioSciences	Mixtures of gibberellins	Differing activities on crops, depending on specific mixture of gibberellins and stage of target crop	<b>Biopesticide</b> Registered on rice, cotton, apple, grape, cherry, and citrus.
Glutamic Acid (AUXI GRO)	Emerald Bioagriculture	Gamma- amino butyric acid	Enhances crop growth and yield	Registered on broccoli, cabbage, cauliflower, cotton, tomato, bell peppers, lettuce, peanut, potato, snap bean, spinach, melon, almond and stone fruit crop group.
Harpin Protein	Eden	Protein which switches	Enhance, fruit set, size and yield; also	<b>Biopesticide</b>

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Plant Growth Regulators (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum	Status
(MESSENGER)	Bioscience	natural plant systems	a disease resistance activator	Registered on citrus fruit crop group and tomato as PGR. Potential on all crops.
LPE 94	NutraPark	Phospholipid	Ripening and shelf life enhancement	<b>Biopesticide</b> Registered on apple, citrus fruit crop group, cranberry, nectarine, peach, pear, strawberry, tomato, grape, blueberry, cherry, pepper. Potential on many crops.
MBTA (ECOLYST)		Substituted tertiary amine	Novel PGR that promotes sugar accumulation in processing oranges	<b>Reduced Risk Product</b> Registered on orange. Pending on grapefruit.
1-methyl cyclopropene (SMART- FRESH)	AgroFresh Inc.	Cyclopropene	Inhibits the attachment of ethylene to ethylene receptor for a post-harvest storage extension	<b>Reduced Risk Product</b> Registered on apple. Pending on melon, tomato, and avocado. Potential on broccoli, head lettuce, leafy vegetable subgroup, cabbage, fruits.
Mepiquat Chloride (PIX)	BASF & Dupont	Quaternary ammonium	Shortens plant internodes and plant height	Registered on cotton, grape. Potential on garlic, melon, okra, onion, pecan, pepper, sweet potato.
NAA	Amvac	Napthalene Acetic Acid	Tree sucker control, manages crop load	Registered on grape, citrus fruit crop group, and pear. Pending on almond, grapefruit, plum, pomegranate and walnut.
Prohexadione Calcium (APOGEE)	BASF & K-I Chemical	Calcium carboxylate	Reduces vegetative growth-better balance between canopy development and fruit production; activity on fire blight on apple and pear	<b>Reduced Risk Product</b> Registered on apple, grass (seed), peanut, pear. Potential on alfalfa, avocado, barley, cherry (sweet), hops, mango, mint, potato, strawberry, sweet potato, wheat.
Sodium nitrophenolate (ATONIK)	Asahi Mfg. Ltd.	Combination of sodium nitrophenolates and nitroguatalolate	Increased nutrient uptake, resulting in improved yields	Potential on all crops.
Trinexapac-methyl (PALISADE)	Syngenta Crop Protection	Cyclohexane carboxylic acid	Growth regulator with use resulting in less potential for lodging, more efficient seed harvest, and improved seed set.	Registered on rye grass seed. Pending on grass(hay, seed), pome fruit crop group, sugarcane, wheat, barley. Potential on alfalfa, peanut, potato, rice, sorghum, soybean, strawberry.

## IR-4 New Products/Transitional Solution List Insecticides

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Acequinocyl (KANEMITE) (SHUTTLE) (PITON)	Arysta LifeScience & Agro Kanesho	Quinolinone	Broad spectrum mite control (no rust mite activity); unique mode of action, asy on beneficials with long residual	<b>Reduced Risk Product</b> Registered on citrus fruit crop group, pome fruit crop group, strawberry. Pending on bean (snap, succulent shelled), cherry, fruiting vegetable crop group, grape, hops, okra, tree nuts, cucurbit vegetable crop group, caneberry Potential on bean (dry), carambola, guava, longan, lychee, mango, stone fruit crop group, sorghum (seed), sugarcane.
Acetamiprid (ASSAIL 70 WP) (ADJUST)	Nisso/United Phosphorus, Inc.,	Chloronicotinyl	Broad-spectrum control with contact and systemic activity via foliar applications; excellent on sucking pests like aphids and whitefly	<b>Reduced Risk Product and OP Replacement</b> Registered for foliar use on Brassica leafy vegetable crop group, citrus fruit crop group, cotton, fruiting vegetable crop group, grape, leafy vegetable crop group, pome fruit crop group, tuberous & corm vegetables, bulb vegetable crop group, cucurbit vegetable crop group, stone fruit crop group, strawberry, tree nut crop group, pistachio, legume vegetables (succulent), berry group, cranberry. Registered for seed treatment use on canola, mustard. Pending on tomato (GH), asparagus, clover. Potential on caneberry, collard, mushroom, papaya.
Amdoflumet	Sumitomo Chemical (Valent)	Sulfonylamiino Benzoate	Mites	
Ammonium Bicarbonate with Spiroketal (OLIVE FLY ATTRACT & KILL)	Certis USA	Pheromone plus ammonium bicarbonate	Olive fruit fly	Registered on olive.
Azadirachtin (NEEMIX) (NIMBECIDINE)	Certis USA PBT Int. Gowan, AMVAC	Extract from neem oil which acts as a hormonal analogue	Disrupts insect molting; target pests include whitefly, leafminer, and Lepidoptera	<b>Biopesticide</b> Registered on alfalfa, bulb vegetable crop group, Brassica leafy vegetable crop group, citrus fruit crop group, corn (field, sweet), cotton, cranberry, cucurbit vegetable crop group, fruiting vegetable crop group, grape, herb/spice crop group, legume vegetable crop group, pome fruit crop group, root/tuber vegetable crop group, berry crop group, stone fruit crop group, strawberry, tree nut crop group, pistachio.
<i>Bacillus sphaericus</i> (VECTOLEX)	Valent BioSciences	Bacteria	Mosquito larval management	<b>Biopesticide</b> Registered on rice, pasture, stone fruit crop group, pome fruit crop group, citrus fruit crop group and other crops.
<i>Bacillus thuringiensis</i>	Valent BioSciences and others	Bacteria	New strains are being discovered that have activity against numerous pests	<b>Biopesticide</b> Registered on most crops as a spray. Also registered as plant-incorporated protectant in genetically-modified cotton, potato, corn and sweet corn.
<i>Beauveria bassiana</i> (MYCOTROL) (NATURALIS)	Laverlam International, Troy Biosciences and others	Insect pathogenic fungi	Corn borer, grasshopper, cricket, locust, aphids and whitefly	<b>Biopesticide</b> Potential on unspecified crops.
<i>Beauveria brongniartii</i>	German Gov.	Insect pathogenic fungi	Targeted for soil dwelling pests	<b>Biopesticide</b> Potential on pome fruit crop group, stone fruit crop group.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Bifenazate (ACRAMITE)	Chemtura	Carbazate - new mode of action with no cross resistance	Controls spider and European red mites, including eggs and motiles; provides quick knockdown, safe on predator mites	<b>Reduced Risk Product</b> Registered on caneberry, cotton, cucurbit vegetable crop group, fruiting vegetable crop group, grape, guava, hops, lychee, mango, mint, nectarine, okra, papaya, peach, pome fruit crop group, strawberry, tree nut crop group, pistachio, pea (succulent, edible-podded), tuberous & corm subgroup, stone fruit crop group, shelled/edible-podded legumes, tropical fruits, soybean. Pending on avocado, basil, bean (dry), carambola, cranberry, grass, sugar apple, tomato. Potential on orange, wheat.
Bistrifluron (DBI-3204)	Dongbu Hannong Chemical	Benzoylphenyl urea	Active against lepidopterous pests, whitefly; acts by inhibiting chitin synthesis (Insect Growth Regulator)	Potential on apple, Brassica leafy vegetables, persimmon, tomato, unspecified fruit/vegetables.
Buprofezin (APPLAUD) (COURIER)	Nichino America	Thiadiazine - IGR, unique mode of action, inhibits chitin synthesis	Good activity for nymphal stages of leafhoppers, planthoppers, scales, mealybugs, psylla, and whiteflies; very safe to bees	<b>Reduced Risk and OP Replacement</b> Registered on acerola, atemoya, avocado, banana, bean (snap), biriba, canistel, carambola, celery, cherimoya, citrus fruit crop group, cotton, cucurbit vegetable crop group, custard apple, eggplant, feijoa, fruiting vegetables group, grape, guava, ilama, jaboticaba, okra, olive, leafy vegetable crop group, longan, lychee, mango, papaya, passion fruit, peach, pome fruit crop group, pulasan, rambutan, sapodilla, sapote (black, mamey), soursop, Spanish lime, spinach, star apple, star fruit, strawberry, sugar apple, tomato, tree nut /pistachio crop group, wax jambu. Pending on coffee, stone fruit crop group, berry group, cranberry. Potential on Brassica leafy vegetable crop group, kiwi, pomegranate, turnip (greens).
California Red Scale Pheromone	HHB Partnership	Pheromone	California redsScale	<b>Biopesticide</b> Registered on citrus fruit crop group.
CHECKMATE BAW	Suterra	Pheromone	Biochemical mating disruption for beet armyworm	<b>Biopesticide</b> Registered on unspecified crops.
CHECKMATE CM-F	Suterra	Pheromone	Biochemical mating disruption for codling moth and hickory shuckworm	<b>Biopesticide</b> Registered on pome fruit crop group, stone fruit crop group, and tree nut crop group.
CHECKMATE DBM--F	Suterra	Pheromone	Biochemical mating disruption for diamondback moth	<b>Biopesticide</b> Registered on Brassica leafy vegetable crop group.
CHECKMATE OFM	Suterra	Pheromone	Biochemical mating disruption for Oriental fruit moth	<b>Biopesticide</b> Registered on pome fruit crop group, stone fruit crop group, and tree nut crop group.
CHECKMATE OLR	Suterra	Pheromone	Biochemical mating disruption for omnivorous leaf roller	<b>Biopesticide</b> Registered on pome fruit crop group, stone fruit crop group, tree nut crop group, fruiting vegetable crop group, kiwifruit, pomegranate and grape.
CHECKMATE PBW-F	Suterra	Pheromone	Biochemical mating disruption for pink bollworm	<b>Biopesticide</b> Registered on cotton.
CHECKMATE TPW	Suterra	Pheromone	Biochemical mating disruption for tomato pinworm	<b>Biopesticide</b> Registered on pome fruit crop group, stone fruit crop group, tree nut crop group, fruiting vegetable crop group, kiwifruit, pomegranate and grape.
<i>Chenopodium ambrosiodes</i> var. <i>ambrosiodes</i> extract	AgraQuest Inc.	Plant extract	Spectrum of activity includes mites, aphids, thrips, and whitefly	<b>Biopesticide</b>

## IR-4 New Products/Transitional Solution List

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Chlorantraniliprole (DPX-E2Y45) (RYNAXYPYR) (ALTACOR) (CORAGEN)	Dupont Crop Protection, Syngenta Crop Protection (mixtures only)	Anthranilic diamide: novel mode of action - ryanodine receptor activator	Excellent activity against a broad range of lepidopterous larvae	<b>Reduced Risk Product/OP Replacement</b> Registered on grape, pome fruit crop group, stone fruit crop group, cotton, potato, Brassica leafy vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, turf, ornamentals. Pending on caneberry, tree nut crop group, pistachio. Potential on bean (snap), blueberry, citrus fruit crop group, corn (sweet), GH vegetables, mint, peanut, strawberry, artichoke.
Chromafenozide (MATRIC)	Nippon Kayaku & Sankyo	Insect Growth Regulator	Specific to lepidopterous pests, novel ecdyosone agonist	Potential on apple, bulb vegetable crop group, cotton, grape, rice, soybean, tea, unspecified fruit/ vegetables.
<i>Chromobacterium suttsuga</i>	USDA	Bacterium	Effective against Colorado potato beetles, corn rootworms, diamondback moths, whiteflies and green stinkbug	<b>Biopesticide</b> Potential on unspecified crops.
<i>Chrysoperla carnea</i> (KAGETARO)	Arysta LifeSciences	Bio-insecticide	Controls aphids	<b>Biopesticide</b> Potential on strawberry and pepper.
Cinnamaldehyde (CINNACURE) (CINNAMITE)	Proguard	Natural Product	Aphids, mites and the diseases downy mildew, powdery mildew, botrytis, and brown rots	<b>Biopesticide</b> Registered on avocado, peppermint, spearmint, banana, dates, figs, mangoes, papayas, beet greens, chicory, artichoke, blueberry, raspberry, blackberry, gooseberry, currant, Brassica leafy vegetable crop group, bulb vegetable crop group, cereal grains, citrus fruit crop group, cranberry, grape, strawberry, cucurbit vegetable crop group, fruiting vegetable crop group, herbs and spice crop group, hops, corn (sweet, pop), kiwifruit, leafy vegetable crop group, legume vegetable crop group, pasture grass, alfalfa, pistachio, persimmon, pome fruit crop group, soybean, stone fruit crop group, meadowfoam, safflower, tree nut crop group.
Citronellol (BIOMITE)	Arysta & Natural Plant Protection	Combination product containing citronellol, geraniol, nerolidol and narnesol	Two-spotted mite, Pacific mite, Willamette mite, citrus rust mite, broad mite, European red mites	<b>Biopesticide</b> Exempt on all crops, registered on cucurbit vegetable crop group, grape, pome fruit crop group, stone fruit crop group, tree nut crop group.
Clofentezine (APOLLO)	Makhteshim-Agan	Tetrazine	Acaricide for eggs of <i>Panonychus ulmi</i> and <i>Tetranychus spp.</i>	<b>Reduced Risk Product</b> Registered on almond, grape, pome fruit crop group, persimmon, stone fruit crop group, walnut. Potential on avocado, cucurbit vegetable crop group, fruiting vegetable crop group, guava, papaya, persimmon, strawberry, sugar apple.
Clothianidin (PONCHO) (CLUTCH)	Bayer CropScience (seed treatment only), and Sumataka (Valent)	Neonicotinoid	Contact and stomach activity; when applied to soil there is activity on corn root worm, cutworms, wireworms, chinch bug, white grub and flea beetle; may be used with biotech rootworm hybrids; foliar activity on plum curculio, aphids, leafhoppers, apple maggot, leafminers, leaf rollers, codling moth, lygus bugs and pear psylla	<b>Reduced Risk and OP replacement</b> Registered as seed treatment on canola, corn (field, sweet, pop), cotton, beet. Registered for foliar use on pome fruit crop group, sorghum, potato, grape. Pending seed treatment use on bulb vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, mustard greens, potato, root vegetable subgroup, sorghum, leafy Brassica group, leafy vegetable group. Pending foliar use on cranberry, cucurbit vegetable crop group, fruiting vegetable crop group, peach, artichoke, strawberry. Potential on corn (field), head/stem Brassica subgroup, herb subgroup, leafy vegetable crop group, legume vegetable crop group, mushroom houses.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Clove/Cinnamon/Mint Oils (VALORAM II) (ARMOREX II)	Soil Technologies Corp	Natural Product	Shown to contact kill and repel numerous insect pests	Potential on all crops.
Cyazypyr (HGW86)	DuPont	Anthranilic diamide-binds to the ryanodine receptor.	Lepidoptera, flea beetles, whiteflies, leafminers, Colorado potato beetle, aphids	Potential on Brassica crops, fruiting vegetables, leafy vegetables, cucurbit vegetables, tree fruit, greenhouse vegetables, dry bulb onion, GH tomato.
<i>Cydia pomonella</i> granulose virus (CARPOVIRUSINE)	Arysta LifeScience, Biotepp, & Certis USA	Granulosis virus	Controls codling moth	<b>Biopesticide</b> Registered on apple.
Cyenopyrafen (NC-512)	Nissan Chemical	Miticide	Unspecified mites	
Cyfluthrin (BAYTHROID) (RENOUNCE 20 WP)	Bayer CropScience	Pyrethroid	Controls cabbage looper, potato leafhopper, Colorado potato beetle, European corn borer, flea beetle, potato tuberworm, citrus thrips	Registered on alfalfa, almond, bean (dry, shelled), carrot, citrus fruit crop group, corn (field, sweet, pop), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, grape, grass, Brassica leafy vegetable crop group, hops, leafy vegetable crop group, mustard greens, pea (chick, dry, shelled, Southern), lentil, pome fruit crop group, potato, peanut, pecan, pistachio, radish, sorghum, soybean, spinach, stone fruit crop group, sugarcane, sunflower, tree nut crop group, pistachio, tuberous & corm vegetable subgroup, turnip greens, wheat, sugar beet. Pending on barley, flax, oat, pea (succulent), rice, rye. Potential on coffee, mango.
Cyenopyrafen NC 512	Canyon Group & Nissan	Acrylonitrile inhibits mitochondrial respiration	Spider and other mites	Unspecified fruits and vegetables.
Cyflumetofen (OK-5101) (DANISATABA)	Otsuka Chemical	Benzoxylcyanoacetate derivative - acaricide	Effective against <i>Tetranychus</i> and <i>Panonychus</i> mites	Potential on citrus fruit crop group, cucurbit vegetable crop group, fruiting vegetable crop group, pome fruit crop group, strawberry, stone fruit crop group, unspecified vegetables.
Cypermethrin (AMMO)	FMC	Pyrethroid	Activity on cutworms, thrips, leafhopper, weevils, armyworms, lygus bug, plant bugs, corn earworm, aphids, and beetles	Registered on cotton, pecans, head lettuce, potato, bulb vegetables, and Brassica leafy vegetables.
Cyromazine (TRIGARD)	Syngenta Crop Protection	Triazine with insecticide growth regulator activity	Leafminers, maggots, fungal gnats	Registered on bean (lima, dry), Brassica leafy vegetable crop group, bulb vegetable crop group, celery, corn (sweet), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, mushroom, pea (Southern, black-eyed), potato, radish. Pending on bean (snap), mango. Potential on mustard greens, GH tomato.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Deltamethrin (DECIS) (BATTALION)	Bayer CropScience & Arysta LifeScience	Pyrethroid	Beetles, bugs, Lepidoptera	<b>OP Replacement</b> Registered on artichoke, barley, Brassica leafy vegetable crop group, bulb vegetable crop group, canola, corn (field, sweet, pop), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, oat, pome fruit crop group, rapeseed, rice, root & tuber vegetable (except sugar beet) crop group, rye, sorghum, soybean, stone fruit crop group, sunflower, tree nut crop group/pistachio, wheat. Pending on carambola, flax, grape. Potential on lychee (import tolerance established) juneberry, olive, starfruit (import tolerance established).
DE 175 (RADIANT) (DELEGATE)	Dow AgroSciences	Macrocyclic lactone – chemically-modified second generation spinosads	Broader spectrum than spinosad, including codling moth, oriental fruit moth	<b>Reduced Risk Product</b> Pending on grape, pome fruit crop group, stone fruit crop group, tree nut crop group, and other crops covered by spinosad registration.
Diflubenzuron (DIMILIN)	Chemtura	Substituted benzoylurea, Insect Growth Regulator	Wide range of leaf feeding insects	Registered on artichoke, citrus fruit crop group, cotton, grass (pasture/rangeland), mushroom, pear, pepper, rice, soybean, stone fruit crop group (except cherry, plum), tree nut crop group/pistachio, small grains, Brassica-leafy greens subgroup, peanut, turnip (greens), pummel, triticale, barley, wheat. Pending on lemon, alfalfa. Potential on Brassica head & stem subgroup, carrot, cherry, eggplant, lychee, rhubarb, okra.
Dinotefuran (VENOM 70SG) (STARKLE) (ALBARIN)	Mitsui Chemical/Valent	Nitroguanidine, systemic by root uptake and translaminar via foliar applications	Effective on aphid, thrips, leaf miners fly, cabbageworm, diamondback moth, stink bugs, mealybugs, whitefly, and flea beetle	<b>Reduced Risk Product/OP Replacement</b> Registered on Brassica head & stem subgroup, cotton, cucurbit vegetable crop group, fruiting vegetable crop group, grape, GH tomato, leafy vegetable crop group, potato. Pending on, leafy Brassica subgroup, onion (green), watercress. Potential on herb subgroup, onion (bulb), rice, peach.
ESOSEX CM	Esosect	Pheromone	Codling moth	<b>Biopesticide</b> Registered on apple, pear.
ESOSEX GBM	Esosect	Pheromone	Grape berry moth	<b>Biopesticide</b> Registered on grape.
ESOSEX TPW	Esosect	Pheromone	Tomato pin worm	<b>Biopesticide</b> Registered on tomato.
ESOSEX PTB	Esosect	Pheromone	Peach twig borer	<b>Biopesticide</b> Registered on peach.
ESOSEX OFW	Esosect	Pheromone	Oriental fruit moth	<b>Biopesticide</b> Registered on apple.
Essential Oils (BUGOIL)	Plant Impac	Vegetable oils-tagetes, thyme and wintergreen oils	Mites, aphids and other insects	<b>Biopesticide</b> Potential on unspecified crops.
Ethoxy Dodecyl Phenol (EDP)	Cal Agri Products	Insect Growth Regulator	Aphids and whitefly	<b>Biopesticide</b> Pending on unspecified crops.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Etofenprox (TREBON) (MTI-500)	ADVAN, Mitsui Chemical	Phenoxybenzyl ether	Broad spectrum: rice bugs, rice water weevil, leafhoppers, weevils, stink bugs, various Lepidoptera; broad label approved in Japan for rice, fruits, vegetables, ornamentals, wheat, soybean, potato, turf, termites, mosquitos	Pending on rice (marketed in Japan since 1987) Potential on wheat, soybean, root and tuber vegetables, corn, fruiting vegetable crop group, cucurbit vegetable crop group, Brassica leafy vegetable crop group, legume vegetable crop group, pome fruit crop group, stone fruit crop group, citrus fruit crop group and tree nut crop group. Section 18 (until 12/31/09) on rice.
Etoxazole (ZEAL) (S-1283)	Valent (Yashima)	Oxazoline – Insect Growth Regulator	Manages mites ( <i>Panonychus spp</i> and <i>Tetranychus spp</i> ) by inhibition of molting; effective on eggs, larvae, & nymphs stages	<b>Reduced Risk Product</b> Registered on cotton, pome fruit crop group, strawberry, citrus nursery, cherry, hops, melon. Pending on avocado, caneberry, cucumber, grape, mango, mint, papaya, stone fruit crop group, tomato (GH) tree nut /pistachio crop group. Potential on alfalfa (seed), bean, Brassica leafy vegetable crop group, citrus fruit crop group, corn (sweet), cucurbit vegetable crop group, fruiting vegetable crop group, plum, sorghum.
Fenazaquin	Gowan; Great Lakes	Insecticide		Registered import tolerances on apple, citrus fruit crop group, pear. Pending on ornamentals, non-bearing fruit/nut trees.
Fenoxycarb (COMPLY)	Syngenta Crop Protection	Non-neurotoxic carbamate – Insect Growth Regulator	Fire ants and a wide range of other insects	Pending on pome fruit crop group, tree nut crop group, pasture and citrus.
Fenpropathrin (DANITOL)	Valent (Sumitomo Chemical)	Pyrethroid	Aphids, whitefly, various worms, mites, glassy winged sharpshooter and stink bugs	Registered on Brassica head & stem subgroup, bushberry subgroup, citrus fruit crop group, cotton, cucurbit vegetable crop group, fruiting vegetables crop group, grape, juneberry, lingonberry, pea (pigeon, succulent, dry), peanut, pome fruit crop group, salal, strawberry. Pending on avocado, barley, canistel, caneberry, carambola, currant, guava, jaboticaba, lychee, mango, olive, papaya, passion fruit, sapodilla, sapote (black, mamey), soybean, star apple, stone fruit crop group, sugar apple, tree nut crop group, pistachio, wax jambu, stone fruit group. Potential on arrugula, beet (garden), collard, pea (dry), persimmon, sweet potato.
Fenpyroximate (FUJIMITE)	Nichino	Phenoxy-pyrazole	Controls mites, including two-spotted, European red and citrus rust and red mite, psylla and broad mites	<b>Reduced Risk Product</b> Registered on citrus fruit crop group, cotton, grape, pome fruit crop group, tree nut crop group, pistachio, hops, mint. Pending on fruiting vegetable crop group, melon, okra. Potential on avocado, caneberry, cherry, cucumber, grass, guava, lychee, mango, melon, peach, sorghum, squash, strawberry, tomato, watermelon.
Flonicamid (CARBINE 50 WG) (BELEAF)	FMC & ISK Biosciences	Pyridine carboxamide (nicotinamide)	Aphids, thrips, leafhoppers, plant bug and other sucking pests; provides rapid anti-feeding activity; non-toxic to beneficials	<b>OP Replacement</b> Registered on Brassica-head & stem subgroup, cotton, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, mustard greens, pome fruit crop group, potato, stone fruit crop group. Pending on caneberry, cilantro, hops, okra, root & tuber vegetable crop group, tuberous and corm vegetables, turnip greens, strawberry. Potential on blueberry, mint, orange, sunflower, wheat, pistachio.
Fluacrypyrin (TITARON)	Nippon Soda	Methoxyacrylate	Acaricide	Potential on citrus fruit crop group, pome fruit crop group.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Flubendiamide (PHOENIX-JAPAN) (BELT) (SYNAPSE) (NAI-2310) (TOURISMO-NNI-0772*) (VETICA-NNI-0871*) (*mixed with buprofezin)	Bayer CropScience & Nichino	Substituted phthallic acid diamide; a novel biochemical mode of action – activates ryanodine receptor	Highly selective on Lepidopteran pests, adults and larvae, including cutworms, diamondback moth, <i>Helicoverpa</i> , leafrollers, loopers and armyworms; fast acting with residual control, by ingestion only; low toxicity to beneficials	Pending on Brassica leafy vegetable, corn (field, sweet), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, grape, leafy vegetable crop group, pome fruit crop group, stone fruit crop group, tree nut crop group. Potential on alfalfa, artichoke, berries, caneberry, herb subgroup, legume vegetable crop group, strawberry, sugarcane, tropical crops, watercress, cranberry.
Flufenerim	Valent (Sumitomo Chemical	Pyrimdinamine		
Flufenoxuron (CASCADE) (TENOPA)	BASF	Benzylurea		Registered import tolerances on apple, grape, orange, pear.
Flufenzine	Chinoin	Tetrazine	Acaricide	Unknown status on apple, cotton, citrus fruit crop group, grape, unspecified vegetable crops.
Flupyrazolos (SEON BONG)	Dongbu Hannong		Diamondback moth	Potential on Brassica leafy vegetable crop group.
GALAXY V4C	Analytica	Viral Insecticide		<b>Biopesticide</b> Pending on Brassica leafy vegetable crop group, cereal grains, cotton, soybean.
gamma-Cyhalothrin (PROAXIS) (PROLEX)	Pytech (Dow AgroSciences & Cheminova)	Pyrethroid	Same use as other pyrethroids, but at lower rate	Registered on alfalfa, barley, bean (dry, succulent), bulb vegetable crop group, Brassica leafy vegetable crop group, canola, corn (field sweet, pop), cotton, fruiting vegetable crop group, lettuce (head & leaf), oat, olive, pea (Southern, succulent, dry), peanut, pome fruit crop group, rice, rye, sorghum, soybean, stone fruit crop group, sugarcane, sunflower, tree nut crop group, triticale, wheat. Pending on okra, pistachio. Potential on avocado.
<i>Helicoverpa zea</i> Nuclear Polyhedrosis Virus (GEMSTAR)	Certis	Biopesticide	Controls corn earworm, cotton bollworm, tobacco budworm	<b>Biopesticide</b> Registered on alfalfa, asparagus, beet (garden, sugar), bean, broccoli, cabbage, cauliflower, celery, corn (field, sweet), cotton, cucumber, escarole, lettuce, onion, pea, peanut, pepper, potato, soybean, sweet potato, tomato, wheat.
Hexythiazox (SAVEY) (ONAGER)	Gowan	Carboxamide	Mite eggs and immature stages	Registered on alfalfa (seed), almond, caneberry, citrus, cotton, cranberry, date, grape, hops, mint, pome fruit crop group, stone fruit crop group, strawberry, tree nuts/pistachio crop group. Pending on corn (field), potato. Potential on bean (dry).

## IR-4 New Products/Transitional Solution List

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Imidacloprid (ADMIRE) (PROVADO) (GAUCHO)	Bayer CropScience	Chloronicotinyl	Primarily effective against sucking insects (aphid, whitefly, scale, etc.), as well as beetles and grubs; controls numerous pests that are resistant to insecticides; used as a seed treatment, soil treatments in-furrow and foliar product	<b>OP Replacement</b> Registered on acerola, artichoke, avocado, beet (green, sugar), blueberry, Brassica leafy vegetable crop group, canistel, canola, cilantro, citrus fruit crop group, corn (field, sweet, pop), cotton, cranberry, cucurbit vegetable crop group, currant, elderberry, feijoa, fruiting vegetable crop group, gooseberry, grapes, guava, hops, huckleberry, jaboticaba, juneberry, leafy vegetable crop group, legume vegetable crop group, lingonberry, longan, lychee, mango, mustard seed, okra, papaya, passion fruit, pecan, persimmon, pome fruit crop group, pulasan, rambutan, root and tuber vegetable crop group, salal, sapodilla, sapote (black, mamey), Spanish lime, starfruit, stone fruit crop group, strawberry, turnip (greens), upland watercress, watercress, wax jambu, banana, caneberry, coffee, herb subgroup, pomegranate, tree nut crop group, peanut, pistachio, sugar apple, sunflower/oil seed crop group, atemoya, plantain, soursop, almond, cherimoya. Pending on cucumber (GH), kava, millet, oat, peanut, soybean, tomato (GH), bulb onion.
Indian Meal Moth Granulosis Virus (FRUITGUARD-V) (NUTGUARD-V)	AgriVir, LLC	Virus	Indian meal moth	<b>Biopesticide</b> Registered on dried fruit and nuts
Indoxacarb (AVAUNT) (STEWARD)	DuPont Crop Protection	Oxadiazine - unique mode of action that inhibits sodium ion entry into nerve cells	Controls most major Lepidoptera pest species; also active on leafhoppers, tarnished plant bug, grasshoppers, mole crickets and some beetles; soft on beneficials, so it is a good fit with IPM	<b>Reduced Risk Product and OP Replacement</b> Registered on alfalfa, apple, Brassica head & stem subgroup, corn (sweet), cotton, fruiting vegetable crop group, lettuce (head/leaf), peach (EUP), pear, peanut, potato, soybean, celery, cranberry, cucurbit vegetable crop group, grape, mint, okra, pea (Southern), pome fruit crop group, spinach, stone fruit crop group, sweet potato, swiss chard, collards. Pending on bean (dry, snap), beet (garden), blueberry, Brassica leafy subgroup, turnip (greens). Potential on avocado, caneberry, grass, sapodilla, strawberry, tree nut crop group, pistachio.
Isomate-CM/LR TT	Pacific Biocontrol Corp.	Pheromone	Lepidopteran pheromone used in orchards for mating disruption of codling and leafroller moths	<b>Biopesticide</b> Pending on pome fruit crop group.
Iron Phosphate (SLUGGO)	W. Neudoff	Iron salt	Slugs and snails	<b>Biopesticide</b> Registered on strawberry, caneberry, cantaloupe, cucumbers, squash, eggplant, and asparagus.
Jojoba Oil (DETUR/E-RASE]	IJO Products	Natural Product	Controls whitefly and powdery mildew	<b>Biopesticide</b> Registered on grape.
Kaolin (SURROUND)	BASF	Clay	Various insect and mite pests	<b>Biopesticide</b> Registered on pome fruit crop group, stone fruit crop group, citrus fruit crop group, berry crop group, cranberry, grape, legume vegetable crop group, root and tuber vegetable crop group, fruiting vegetable crop group, bulb vegetable crop group, cucurbit vegetable crop group, leaf vegetable crop group, Brassica leafy vegetable crop group, cotton, alfalfa, avocado, banana, guava, mango, papaya, pineapple, artichoke, fig, hops, ginseng, kiwifruit, olive, Pawpaw, peanut, persimmon, pomegranate, corn, wheat, barley, rice, rye, and oat.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Lambda-Cyhalothrin (KARATE) (WARRIOR)	Syngenta Crop Protection	Pyrethroid	Broad spectrum insect control	<p><b>OP Replacement</b> Registered on alfalfa, barley, bean (dry, succulent), bulb vegetable crop group, Brassica leafy vegetable crop group, canola, corn (field sweet, pop), cotton, cucurbit vegetables, fruiting vegetable crop group, lettuce (head &amp; leaf), oat, okra, olive, pea (Southern, succulent, dry), peanut, pistachio, pome fruit crop group, rice, rye, sorghum, soybean, stone fruit crop group, sugarcane, sunflower, tree nut crop group, triticale, wheat, wild rice, grasses, sweet potato. Pending on asparagus, buckwheat, flax, millet (pearl), root &amp; tuber vegetable crop group, spinach. Potential on avocado (domestic), berry crop group, carambola, celery, pineapple.</p>
Lepimectin (E-237) (ANIKI)	Sankyo Agro, Co., Ltd.	Chemically modified milbemectin macrolide	Highly effective against lepidopteran hemipteran and dipteran pests; should fit IPM programs	Potential on Brassica leafy vegetable crop group, citrus fruit crop group, grape, pome fruit crop group, stone fruit crop group, unspecified vegetables, ornamentals.
Metaflumizone (BAS 320 I) (ALVERDE 2 C)	BASF & Nichino	Semicarbazone	Highly active against major lepidopterous larvae and coleopteran (larvae & adults) pest species; no cross resistance to existing chemistries	<p><b>Reduced Risk Product</b> Registered as fire ant bait. Pending on Brassica leafy vegetables, cotton, fruiting vegetable crop group, leafy vegetable crop group, potato, sweet potato, citrus, grape, blueberry. Potential on alfalfa, artichoke, avocado, beet (sugar, garden), bean (dry, kidney), blueberry, caneberry, corn, cotton, cucurbit vegetable crop group, grass (seed), herbs, mint, olive, pea, pome fruit crop group, stone fruit crop group, strawberry, sugarcane, sunflower, soybean, tree nut crop group, pistachio, tuberous and corn vegetable subgroup, watermelon, wheat.</p>
<i>Metarhizium anisopliae</i> (TAERAIN) (GREENGUARD)	Earth BioScience & Bio-Care	<i>Metarhizium anisopliae</i>	Controls whitefly, thrips, mites, locust	<p><b>Biopesticide</b> Pending on unspecified vegetables, fruit and nut trees.</p>
Methoxyfenozide (INTREPID) (RUNNER)	Dow AgroSciences	Diacylhydrazine – (molt accelerating compound)	Similar to tebufenozide in that it only controls Lepidoptera larvae; better on budworm/bollworm, leaf miners and diamondback moth; excellent fit with IPM programs	<p><b>Reduced Risk Product and OP Replacement</b> Registered on artichoke, avocado, bean (dry shelled), blueberry, barley, bean (succulent), beet (garden, sugar), Brassica leafy vegetable crop group, canistel, coriander leaves, corn (field, sweet), cotton, cranberry, cucurbit vegetable crop group, fruiting vegetable crop group, grape, grasses, guava, onion (green), passion fruit, peanut, herb subgroup, leafy vegetable crop group, longan, lychee, mango, mint, oat, onion (dry), okra, papaya, pea (succulent, blackeye, Southern), pome fruit crop group, pulasan, rambutan, rice, root vegetable subgroup, rye, sapodilla, sapote (black, mamey), soybean, Spanish lime, star apple, strawberry, stone fruit crop group, tree nut crop group, pistachio, turnip (greens), wheat, alfalfa, sweet potato. Pending on citrus fruit crop group, clover, dry pea. Potential on atemoya, herb subgroup, pineapple, sorghum, sugar apple.</p>
NNI-0771	Nichino			

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Novaluron (DIAMOND) (RIMON) (PEDESTAL)	Makhteshim-Agan & Chemtura	Benzoylphenyl urea - Insect Growth Regulator (chitin synthesis inhibitor)	Effective against Lepidoptera, mealy bugs, silver leaf whitefly, Western flower thrips, leaf miners, and some mites; strictly a contact material	<b>Reduced Risk Product and OP Replacement</b> Registered on Brassica head & stem subgroup, cotton, pome fruit crop group, tuberous/corm vegetable subgroup. Pending on bean (dry, lima, snap), blueberry, Brassica leafy vegetables, corn (sweet), cucurbit vegetable crop group, fruiting vegetable crop group, okra, stone fruit crop group, strawberry, sugarcane, swiss chard, turnip (greens), cranberry. Potential on avocado, beet (sugar), caneberry, carrot, citrus fruit crop group, lychee, mango, papaya, pea (dry, edible podded, succulent).
<i>Paecilomyces fumosoroseus</i> Strain FE9901 (NOFLY)	FutureEco	Entomopathogenic fungi	Egg, larvae and adults of whitefly	<b>Biopesticide</b> Potential on unspecified crops.
Parasitic Nematodes (NEMASYS)	Becker Underwood	Various parasitic nematodes that control specific insect pests	Manages fungus gnats, sciarid flies, vine weevil, slugs, cranberry girdler, leafminer	<b>Biopesticide</b>
PAVOIS Granulosis virus	Bayer CropScience	<i>Carpocapsa</i> spp.	Product controls two generations of susceptible insects	<b>Biopesticide</b> Potential on pome fruit and walnut (international registrations approved).
<i>Paelamyces fumosoroseus</i> (PRE FER AL)	Biobest	Microbial	Whitefly	<b>Biopesticide</b> Potential on cucumber and tomato.
Potassium Silicate	PQ Corpotation		Unspecified insects and mites	<b>Biopesticide</b> Registered on grape, nut crop/pistachio crop group and other unspecified crops.
Propylene glycol monolaurate (ACARITOUCH)	Toagosei Co., Ltd., Otsuka Chemical Co., LTD	Miticide	Tetranychid mites, two-spotted spider mite, citrus mite; especially effective on mite eggs	Potential on citrus and other unspecified crops.
Pyridalyl (S-1812)	Valent (Sumitomo Chemical)	Insecticide (pyridine chemistry – new mode of action)	Good activity against Lepidoptera; not effective on mites or aphids; safe to beneficials	<b>Organophosphate (OP) Alternative</b> Pending on cotton, fruiting vegetable crop group, Brassica leafy vegetable crop group, turnip (greens), leafy vegetable crop group, ornamentals. Potential on avocado, bean (snap), sweet corn, sweet potato.
Pyrifluquinazon (NNI-0101)	Nichino	New mode of action, quinazolinone chemistry	Safe on beneficials, expected to reduce virus spread by white flies; is an insect behavior modifier; has spectrum of buprofezin plus aphids.	Potential on trees, nuts, vines, vegetables, cotton, cucurbits.
Pyrimidifen (MITECLEAN)	Sankyo Agro	MET inhibitor-ethylpyrimidine amine	Spider and rust mites	Potential on citrus fruit crop group, pome fruit crop group, unspecified vegetables.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Pyriproxyfen (KNACK) (DISTANCE) (ESTEEM) (SEIZE)	Valent (Sumitomo Chemical)	Pyridine (Insect Growth Regulator selective juvenile hormone analog)	Controls scales, whiteflies, thrips, pear psylla, codling moth, and ants; is slow acting with a long residual, safe to beneficial insects, non-toxic to man and wildlife; effective on eggs and immature stages, not effective on adults; excellent for IPM programs	<b>Reduced Risk Product and OP Replacement</b> Registered on acerola, atemoya, avocado, biriba, Brassica leafy vegetable crop group, bushberry subgroup, canistel, carambola, cherimoya, citrus fruit crop group, cotton, cucurbit vegetable crop group, custard apple, feijoa, fig, fruiting vegetable crop group, grape, grass, guava, ilama, jaboticaba, juneberry, lingonberry, legume vegetable crop group, longan, lychee, mango, okra, olive, onion (bulb), papaya, passion fruit, pome fruit crop group, puulasan, rambutan, salal, sapodilla, sapote (black, mamey, white), soursop, Spanish lime, star apple, star fruit, strawberry, stone fruit crop group, sugar apple, tree nut crop group, pistachio, wax jambu. Pending on artichoke, asparagus, banana, bulb vegetable crop group, cacao, caneberry subgroup, canola, celery, cereal grain crop group, cranberry, date, GH pepper, GH tomato, herb subgroup, kiwifruit, leafy vegetable crop group, non-grass animal feeds, Pawpaw, peanut, pineapple, plantain, pomegranate, root and tuber vegetable crop group, safflower, sesame, sugarcane, tea, ugi fruit, watercress. Potential on mint.
QCIDE	BioProspect	Plant derived biopesticide	Controls aphids, whitefly, spider mites, and mealybugs	Unspecified fruits and vegetables.
RED SCALE DOWN	HBB Partnership	Mating disruption pheromone	Red scale	<b>Biopesticide</b> Pending on unspecified crop.
Rosemary Oil (HEXACIDE)	EcoSmart Technologies	Natural Product	Kills scale insects on contact, minimal impact on beneficials	<b>Biopesticide</b> Potential on all crops.
<i>Serratia entomophila</i> (BIOSHIELD)	Balance Agri-Nutrients	Bacterial based bio-insecticide	Grass grubs ( <i>Costelytra zealandiia</i> )	Potential on range and pasture grass.
Sodium Metasilicate (TRIAD)	Environmental Safe Systems, Inc	Fused silicate	Suppression mealybugs and leafhoppers	<b>Biopesticide</b> Pending on almond, Brassica leafy vegetable crop group, citrus fruit crop group, grape, leafy vegetable crop group, stone fruit crop group.
Spinetoram (XDE 175) (RADIANT) (DELEGATE)	Dow AgroSciences	Macrocyclic lactone – chemically modified second generation spinosads	Broader spectrum than spinosad, including codling moth, oriental fruit moth	<b>Reduced Risk Product</b> Registered on most crops for which spinosad is registered.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
<p style="text-align: center;">Spinosad (SUCCESS) (SPINTOR) (ENTRUST<sup>1</sup>) (GF-120<sup>2</sup>)</p> <p><sup>1</sup>Organix formulation and certification <sup>2</sup>Fruit fly bait</p>	Dow AgroSciences	Macrocyclic lactone – mixture of Spinosyn A & D	Controls Coleoptera, Diptera, Hymenoptera, Isoptera, Lepidoptera, Thysanoptera, Siphonoptera, and mites; has low environmental impact, good residual activity, and is safe to many beneficial insects making it ideal for use in IPM programs	<p><b>Reduced Risk Product and OP Replacement</b> Registered on acerola, alfalfa, almond, amaranth, artichoke, asparagus, atemoya, avocado, banana/plantain, barley, biriba, Brassica leafy vegetable crop group, buckwheat, bulb vegetable crop group, berry crop group, canistel, cherimoya, citrus crop group, coriander, corn (field, pop, sweet), cotton, cranberry, custard apple, feijoa, fig, fruiting vegetable crop group, grape, grass, grass seed, guava, hops, ilama, jaboticaba, juneberry, leafy vegetable crop group, legume vegetables (edible podded subgroup, dry shell pea and bean subgroup, succulent shelled pea and bean subgroup), lingonberry, longon, lychee, mango, millet (pearl, proso), mint, oat, okra, papaya, passion fruit, pasture (rangeland), peanut, pome fruit crop group, pulasan, rambutan, root &amp; tuber vegetable crop group, rye, salal, sapodilla, sapote (black, mamey, white), sorghum, soursop, soybean, Spanish lime, star apple, star fruit, stone fruit crop group, strawberry, sugar apple, sugar beet, teosinate, ti leaves, tree nut crop group, pistachio, watercress, wax jambu, wheat, pineapple, spices. Pending on coffee, herb subgroup, olive. Potential on mushroom.</p>
Spirodiclofen (ENVIDOR 240 SC) (DANIEMON)	Bayer CropScience	Spirocyclic phenyl-substituted tetronic acid-ketoenols; inhibits lipid biosynthesis	Broad-spectrum activity against mites, psyllid, nymphs and scale crawlers; very active on eggs, larvae, and quiescent stages; safe on predatory mites/insects	Registered on citrus fruit crop group, grape, pome fruit crop group, stone fruit crop group, tree nut crop group, pistachio, Christmas trees, hops. Pending on blueberry, caneberry, avocado, guava, lychee, mango, papaya. Potential on caneberry, figs, kiwifruit, olives, sugar apple, unspecified tropical fruit.
Spiromesifen (OBERON 2 SC)	Bayer CropScience	Spirocyclic phenyl-substituted tetronic acid-ketoenols; inhibits lipid biosynthesis	Effective against whitefly and mites; juvenile stages are more susceptible than adults	Registered on bean (dry, succulent), Brassica leafy vegetable crop group, corn (field), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, leafy greens subgroup, strawberry, tuberous and corm vegetable subgroup, tomato (GH), oats. Pending on okra, grasses crop group, pea (dry, succulent) Potential on carrot, cranberry, mint, pome fruit crop group, soybean.
Spirotetramat (BYI 8330) (MOVENTO)	Bayer CropScience	Spirocyclic phenyl-substituted tetronic acid-ketoenols; inhibits lipid biosynthesis	Aphids, whitefly, mealybugs, psyllids, Phylloxera, some scales, <i>Thrips tabaci</i> , other sucking insects; systemic activity	<p><b>Reduced Risk Product</b> Pending on vegetable (Brassica leafy, cucurbit, fruiting, leafy, tuberous) crop groups, citrus crop group, pome fruit crop group, stone fruit crop group, grapes, tree nut crop group, pistachio, hops, Christmas trees. Potential on cotton, legume vegetable crop group, soybean, tropical fruits, banana, coffee, bulb onion.</p>
<i>Spodoptera exigua</i> Nuclear Polyhedral virus (SPOD-X)	Certis USA	Viral insecticide	Beet armyworm	<p><b>Biopesticide</b> Registered on unspecified fruits and vegetables.</p>
<i>Steinernema riobavis</i> (BIOVECTOR)	Becker Underwood	Nematode	Weevils	Registered on citrus fruit crop group.
<i>Streptomyces galbus</i> strain QST 6047	AgraQuest	Microbial	Control of lepidopterous pests	<p><b>Biopesticide</b> Pending on unspecified crops.</p>

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Sucrose & Sorbitol Octanoate Esters	AVA Chemical Ventures	Biochemical sugar	Registered for mites, thrips, sciarid fly larvae, plant bugs, lace bugs, whitefly, aphids, leafhoppers, glassy-winged sharpshooter, soft scales, mealybugs	<b>Biopesticide</b> Registered on alfalfa, artichoke, asparagus, banana, Brassica leafy vegetable crop group, berry crop group, canola, citrus fruit crop group, coffee, cotton, cucurbit vegetable crop group, fruiting vegetable crop group, herb subgroup, hops, leafy vegetable crop group, legume vegetable crop group, pineapple, peanut, pome fruit crop group, root/tuber vegetable crop group, soybean, stone fruit crop group, tree nut crop group, pistachio, watercress, wheat. Potential on all crops.
Tebufenpyrad (PYRANICA) (MASAI)	UAP & Nichino America	Pyrazole carboxamide MET inhibitor	Broad spectrum miticide against all growth stages; good knockdown and residual activity; good fit into IPM programs	Potential on cotton, citrus fruit crop group, grape, pome fruit, unspecified vegetables.
Thiamethoxam (ACTARA) (PLATINUM) (CENTRIC) (CRUISER) (HELIX)	Syngenta Crop Protection	Second-generation neonicotinoid; systemic in plant by root uptake and transport in xylem	Broad-spectrum activity against soil dwelling, sucking and some chewing pests; effective against aphids, whitefly, thrips, leafhopper and certain beetles; being marketed for seed, soil and foliar treatments	<b>OP Replacement</b> Registered as seed treatment on barley, corn (field, sweet, pop), canola, cotton, legume vegetable crop group, oilseed crop group, sorghum, sunflower, wheat. Registered for foliar and/or soil use on artichoke, barley, berry crop group, hops, grape, Brassica leafy vegetable crop group, leafy vegetable crop group, cotton, cranberry, cucurbit vegetable crop group, fruiting vegetable crop group, juneberry, lingonberry, mint, mustard seed, pecan, pome fruit crop group, root & tuber vegetable crop group (except sugar beet), Juneberry, lingonberry, salal, stone fruit crop group, strawberry, turf. Pending seed treatment use on cucurbit vegetables, sugar beet. Pending foliar use on avocado, citrus fruit crop group, tree nut crop group, oilseed crop group, papaya, peanut, radish/root crop subgroup, cherimoya. Potential foliar use on bean (succulent), coffee (import tolerance established), herb subgroup.
Thiocyclam (EVISECT)	Arysta LifeScience, Nippon Kayaku	Hydrogen oxalate	Coleopteran and lepidopteran insects	Potential on Brassica leafy vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, sugarcane.
Thymol (API LIFE VAR)	Bushy Mountain Bee Farm & Vita Limited	Thyme oil	Used to control varroa mites on bees	<b>Biopesticide</b> Pending on honey and bees wax.
Tolfenpyrad (HACHI) (OMI-88) (NAI-2302/NAI-2303)	Nichino America (Nichino)	Pyrazole - Carboxamide	Effective against diamondback moth, thrips, aphid, other leps, whitefly, homopterans, coleoptera; suppresses spider mites and powdery mildew; active also on pear psylla, pear rust mite, citrus rust mite	Pending on Brassica leafy vegetable crop group, citrus fruit crop group, cotton, cucurbit vegetable crop group and pome fruit crop group. Potential on bulb vegetables.
<i>Verticillium lecanii</i> (MYCOTAL)	Arysta LifeSciences	Bio-insecticide	Effective against whitefly	<b>Biopesticide</b> Potential on tomato, cucumbers and pepper.
VIROSOFT Viral Insecticide	Biotepp	<i>Mamestra configurata</i> Granulosis virus	Can be applied as a preventative treatment at planting or a curative foliar treatment for bertha armyworm	<b>Biopesticide</b> Registered on canola.

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Insecticides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Zeta-cypermethrin (MUSTANG) (MUSTANG MAXX)	FMC	Pyrethroid	Controls cutworms, thrips, and armyworms, ect.	<b>OP Replacement</b> Registered on citrus fruit crop group, safflower, wild rice, alfalfa, bean (dry, succulent), berry crop group, bulb vegetable crop group, Brassica leafy vegetable crop group, canola, cilantro, corn (sweet, pop), cotton, fruiting vegetable crop group, forage and hay crop group, grape, leafy vegetable crop group, pea (dry succulent), rice, sorghum, soybean, sugarcane, tree nut crop group, wheat, cucurbit vegetable crop group, okra, ornamentals, peanut, barley, rangeland/pasture/grasses (grown for seed), non-grass animal feeds, sunflower, stone fruit crop group, pome fruit crop group, root & tuber crop group, turf, turnip (greens), okra, oilseed crops. Pending on artichoke, avocado. Potential on herb subgroup, longan, lychee, mango.

## Fungicides

Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Acibenzolar (ACTIGARD) (BLOCKADE)	Syngenta Crop Protection	Benzothiadiazole, (Systemic Acquired Resistance [SAR] inducer)	Induces resistance to tomato spotted wilt virus, blue mold, bacterial diseases, downy mildew, <i>Sclerotinia</i>	Registered on banana, Brassica crops, spinach, tobacco, tomato. Pending on cucurbit vegetable crop group, onion (dry, green), peppers (non-bell). Potential on cilantro, coriander, lettuce, strawberry, turnip greens.
<i>Agrobacterium radiobacter</i> (GALLTROL-A)	AgBioChem	Bacteria	Control of hairy root and root mat, crown gall	<b>Biopesticide</b> Registered on almond, blackberry, blueberry, cranberry, grape, pecan, raspberry, stone fruit crop group, walnut.
<i>Ampelomyces quisqualis</i> isolate M-10 (AQ 10)	Certis USA	Fungus	Hyperparasite of powdery mildew	<b>Biopesticide</b> Pending registration on all crops.
AgroGuard Z	Bio-Oz Biotechnologies Ltd	Viruscide	Zucchini yellow mosaic virus	<b>Biopesticide</b> Pending on cucurbit vegetable crop group.
Amisulbrom (NC-224)	Nissan Chemical	Sulfonamide - inhibit fungal respiration	Oomycete diseases, downy mildew, late blight	Pending on grape, potato, unspecified vegetables.
<i>Aspergillus flavus</i> AF 36	USDA	Fungus	Competitive inhibition of aflatoxin production by natural <i>Aspergillus</i> strain	<b>Biopesticide</b> Registered on cotton. Potential on pistachio.
<i>Aspergillus flavus</i> (AFLA-GUARD)	Circle One Global	Fungus	Competitive inhibition of aflatoxin, production by natural <i>Aspergillus</i> strain	<b>Biopesticide</b> Registered on peanut.

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Azoxystrobin (QUADRIIS) (ABOUND) (AMISTAR 80 WG)	Syngenta Crop Protection	Strobilurin	Broad spectrum pathogen control: <i>Cladosporium</i> , <i>Venturia</i> , <i>Botryosphaeria</i> , <i>Mycosphaerella</i> , <i>Pyrenophora</i> , <i>Puccinia</i> , <i>Pyricularia</i> , <i>Plasmopara</i> , <i>Guignardis</i> , <i>Pseudopeziza</i> , <i>Alternaria</i> , <i>Sphaerotheca</i> , <i>Erysiphe</i> , <i>Leveillula</i> , <i>Septoria</i> , <i>Pythium</i> , <i>Uncinula</i> , <i>Rhizoctonia</i> , etc.	<b>Reduced Risk Product</b> Registered on acerola, artichoke, asparagus, atemoya, avocado, banana, barley, bean (dry, succulent, shelled), biriba, Brassica leafy vegetable crop group, bulb vegetable crop group, berry crop group, canistel, canola, cherimoya, chives, corn (field, sweet, pop), cotton, citrus fruit crop group, coriander, crambe, cranberry, cucurbit vegetable crop group, custard apple, eggplant, feijoa, flax, grape, grass (seed), guava, herb crop group, hops, ilama, jaboticaba, jackfruit, juneberry, leafy vegetable crop group, lingonberry, longan, loquat, lychee, mango, mint, mustard seed, okra, passion fruit, Pawpaw, papaya, parsley, peanut, pecan, pepper, persimmon, potato, pulasan, rambutan, rapeseed, rice, root and tuber vegetable crop group, safflower, salal, sapodilla, sapote (black, mamey, white), soursop, soybean, Spanish lime, star apple, star fruit, strawberry, stone fruit crop group, sugar apple, sunflower, tamarind, tobacco, tomato, tree nut crop group, pistachio, turnip (greens), watercress, wax jambu, wheat, citrus fruit crop group (post harvest), non-grass animal feeds, pea (dry, succulent, shelled), foliage of legume vegetables. Pending on coffee, potato (post harvest), wild rice, sorghum, non-grass animal feeds, sugarcane. Potential on stevia, sugarcane, bean (snap).
<i>Bacillus pumilus</i> Strain 2808 (SONATA ASO) (BALLARD)	AgraQuest	Microbial	<i>Botrytis</i> , <i>Phytophthora</i> , downy and powdery mildews, rusts, <i>Sclerotinia</i> blight, and rots	<b>Biopesticide</b> Registered on artichoke, asparagus, berry crop group, Brassica leafy vegetable crop group, bulb vegetable crop group, cereal grains crop group, corn (sweet), cucurbit vegetable crop group, fruiting vegetable crop group, grape, grass/grass seed, hops, leafy vegetable crop group, legume vegetable crop group, mint, oilseed crop group, pome fruit crop group, root/tuber vegetable crop group, stone fruit crop group, strawberry.
<i>Bacillus pumilus</i> -GB 34 (YIELD SHIELD)	Gustafson	Microbial	Suppression of <i>Rhizoctonia</i> & <i>Fusarium</i> as seed treatment	<b>Biopesticide</b> Registered on soybean. Pending on barley, beet (sugar) carrot, corn, cotton, cucurbit vegetable crop group, legume vegetable crop group, oat, peanut, radish, triticale, wheat.
<i>Bacillus subtilis</i> Strain QST 713 (SERENADE) (SERENADE ASO)	AgraQuest	Microbial - protectant with SAR activity	Controls <i>Botrytis</i> , powdery and downy mildews, early blight, bacterial spot, fire blight	<b>Biopesticide</b> Registered on avocado, broccoli, berry crop group, citrus fruit crop group, cucurbit vegetable crop group, grape, guava, hops, leafy vegetables, mango, papaya, peanut, pepper, pome fruit crop group, potato (pre and post harvest), stone fruit crop group, strawberry, tomato, walnut. Potential on unspecified fruits, nuts, vegetables.
<i>Bacillus subtilis</i> var. <i>amyloliquefaciens</i> Strain FZB24 (TAEGRO)	Earth Bioscience	Micribial		<b>Biopesticide</b> Pending on herbs/spices crop group, pome fruit crop group, stone fruit crop group, citrus fruit crop group, grape, bushberry subgroup, miscellaneous vegetables.
<i>Bacillus subtilis</i> Strain D-747	Kumiai	Microbial	<i>Botrytis</i>	<b>Biopesticide</b> Potential on citrus fruit crop group, grape, unspecified vegetables.
<i>Bacillus subtilis</i> Strain GB03	Growth Products Ltd	Microbial		<b>Biopesticide</b> Pending of apples, broccoli, celery, citrus, cotton, grapes, lettuce (head & leaf), melons, onions, potatoes, herbs and spices, strawberries, sunflower, tomato.

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<i>Bacillus subtilis</i> Strain MB 1600 (SUBTILEX)	Becker Underwood	Microbial	Seed treatment use	<b>Biopesticide</b> Potential on cotton, legume vegetable crop group, peanut, soybean, alfalfa, wheat, rye, oat, corn.
Bacteriophages (AGRIPHAGE)	Agriophi		Manages bacteria spot and bacteria speck	<b>Biopesticide</b> Pending on tomato and pepper.
Benoximate	Bayer CropScience	Strobilurin		
Benthiavalicarb (KIF-230)	K-I Chemical/ Kumiai Chemical	Amino acid carbamate	Controls downy mildew and oomycete fungi, including <i>Phytophthora capsici</i> (both preventive and curative activity)	Registered on grape, raisins, tomato (import tolerance). Potential on Brassica leafy vegetables, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, potato.
Boscalid (ENDURA)	BASF	Nicotinamide	Active on powdery mildews, leafspots, <i>Alternaria</i> , <i>Botrytis</i> , <i>Sclerotinia</i> , <i>Didymella</i> , and <i>Monilinia</i>	<b>Reduced Risk Product</b> Registered on banana (import tolerance), bean (dry, succulent), Brassica leafy vegetable crop group, carrot, canola, celery, cucurbit vegetable crop group, fruiting vegetable crop group, grape, hops, pea (dry shelled, succulent shelled), peanut, pome fruit crop group, potato, soybean, spinach, stone fruit crop group, strawberry, sunflower, tree nut crop group, ornamentals Pending on celeriac, tomato (GH), turnip (greens), radicchio, ginseng, berry crop group, cotton, tropical fruit, garlic, onion. Potential on coffee.
Boscalid/Pyraclostrobin (BAS 516F) (PRISTINE)	BASF	Multi active ingredients; nicotinamide and strobiluron	Broad-spectrum activity on <i>Anthracoze</i> , <i>Alternaria</i> , downy mildew, powdery mildew leaf spots & rusts, <i>Botrytis</i> , <i>Sclerotinia</i> , <i>Monilinia</i>	<b>Reduced Risk Product</b> Registered on berry crop group, Brassica leafy vegetable crop group, bulb vegetable crop group, carrot, celery, cucurbit vegetable crop group, grape, hops, lettuce (head & leaf), pome fruit crop group, stone fruit crop group (pre-harvest), spinach, strawberry, sunflower, tree nut crop group, pistachio, swiss chard. Pending on artichoke, Belgium endive, celery, parsley, persimmon, root crop subgroup, spinach, sunflower, tomato (GH). Potential on guava, lychee, sugar apple, turnip (roots and tops), avocado, mango, papaya.
<i>Candida saitoana</i> (BIOCURE)	Micro Flo	Biofungicide	Post-harvest disease control in fruits, both preventative and curative activity	<b>Biopesticide</b> Pending on apple and citrus fruit crop groups. Potential on unspecified crops.
Chitosan (ELEXA-4)	SafeScience	Carbohydrate-chitin based product, plant defensive booster	Downy and powdery mildew, grey mold and <i>Botrytis</i>	<b>Biopesticide</b> Registered on grapes, strawberry, tomato, pome fruit, stone fruit, cucurbit vegetables, and grapes. Pending on other fruiting vegetables.
Cinnamaldehyde (CINNACURE) (CINNAMITE)	Proguard	Natural Product	Downy mildew, powdery mildew, botrytis, brown rots, aphids and mites	<b>Biopesticide</b> Registered on avocado, peppermint, spearmint, banana, dates, figs, mangoes, papaya, beet (greens), chicory, artichoke, blueberry, raspberry, blackberry, gooseberry, currant, Brassica vegetables, bulb vegetables, cereal grains, citrus, cranberry, grape strawberry, cucurbit vegetable, fruiting vegetables, herbs and spice, hops, corn (sweet, pop), kiwifruit, leafy vegetables, legume vegetables, pasture grass, alfalfa, pistachio, persimmon, pome fruit, soybean, stone fruit, meadowfoam, safflower, and tree nuts.
<i>Coninthyrium minitans</i> (CONTANS WG)	Prophyta & Encore Technologies	Fungus	Controls <i>Sclerotinia sclerotiorum</i> and <i>S. minor</i>	<b>Biopesticide</b> Registered on all crops.

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Copper Octanoate (NEU 1140F)	W. Neudorff	Copper octanoate	Downy mildew, powdery mildew, blue mold, white rust, anthracnose	Registered on beans, peas, beets, broccoli, Brussels sprouts, cantaloupes, cucumbers, pumpkins, squash, carrot, celeriac, celery chicory, chive, corn, currant, gooseberry, eggplant, pepper, tomato, endive, lettuce, garlic, leek, onion, shallots, ginseng, grape, hops, kale, kohlrabi, potato, quince, spinach, chard, strawberry, sunflowers, and turnip.
Cyazofamid (RANMAN)	ISK Biosciences & FMC	Phenylimidazole – mitochondrial transport inhibitor	<i>Phytophthora, Plasmopara, Pythium, Pseudoperonospora, Plasmodiphora</i>	<b>Reduced Risk Product</b> Registered on cucurbit vegetable crop group, potato, tomato, turf, ornamentals. Pending on Brassica leafy vegetables, carrot, grape, pepper, vegetable transplants, spinach. Potential on beans (snap, lima), hops, leafy vegetable crop group, onion, rice, strawberry.
Cyflufenamid (NF-149) (PANCHO)	Nisso America (Nippon Soda)	Phenylacetamid	Excellent activity on various powdery mildews and brown rots	Potential on barley, buckwheat, cucurbit vegetable crop group, grape, fruiting vegetable crop group, persimmon, pome fruit crop group, rye, stone fruit crop group, strawberry, triticale, wheat.
Cymoxanil (CURZATE)	DuPont Crop Protection	Acetamide	Downy mildew, late blight, <i>Phytophthora, Plasmopara, Pseudoperonospora, Albugo</i>	Registered on cucurbit vegetable crop group, hops, potato, tomato. Pending on bulb vegetable crop group, caneberry, grape, cilantro, leafy vegetable crop group.
Cyproconazole (ALTO)	Syngenta Crop Protection	Triazole – contact and systemic activity	Powdery mildew, white mold, <i>Septoria</i> , rusts	Pending on corn, soybean, wheat. Potential on coffee (import tolerance established), legume vegetable crop group, peanut.
Cyprodinil (VANGARD)	Syngenta Crop Protection	Anilinopyrimidine	Ascomycetes and Deuteromycetes such as: <i>Botrytis, Alternaria, Monilinia, Venturia, Pyrenophora, Septoria, Erysiphe, Colletotrichum</i>	<b>Reduced Risk Product</b> Registered on almond, grape, pome fruit crop group, stone fruit crop group. Pending on kiwifruit. Potential on asparagus.
Cyprodinil/Fludioxonil (SWITCH) (PALLADIUM-ornamentals)	Syngenta Crop Protection	Multi active ingredients anilinopyrimidine and phenylpyrrole	Controls <i>Botrytis, Alternaria</i> and brown rot, powdery mildew	<b>Reduced Risk Product</b> Registered on bean (dry, succulent), Brassica leafy vegetable crop group, bulb vegetable crop group, berry crop group, herb subgroup, juneberry, lettuce (head, leaf), lingonberry, longan, lychee, melons, pistachio, pulasan, rambutan, salal, Spanish lime, strawberry, turnip (greens), watercress. Pending on avocado, carrot, cucurbit vegetable crop group, grape, GH cucumber, GH pepper, GH tomato, lemon, lime, mango, mint (fresh), mustard seed, papaya, parsley, sapote (mamey), tomato, root vegetables, kiwifruit, leaves of root and tuber vegetables, garlic. Potential on asparagus, atemoya, carambola, celery, grapefruit, guava, orange, sugar apple, Swiss chard, passion fruit, pepper, potato, yam.
Diallyl Sulfide (ALLI-UP)	UAP/Platt	Biochemical	White rot	<b>Biopesticide</b> Registered on bulb vegetable crop group.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Difenoconazole (DIVIDEND)	Syngenta Crop Protection	Triazole	Smuts, bunts, <i>Aspergillus</i> , <i>Fusarium</i> , <i>Penicillium</i> , <i>Septoria</i> , <i>Cochliobolus</i> , <i>Pyrenophora</i> , and <i>Gaeumannomyces</i>	Registered as seed treatment on barley, canola, cotton, corn (sweet), rye, wheat, oats triticales. Registered for foliar use on pome fruit group, stone fruit group, beet (sugar), grape (import tolerance), fruiting vegetable crop group, tuberous and corm group, papaya (import tolerance). Pending seed piece treatment on arracacha, sweet potato, yam. Pending foliar use on atemoya, Brassica leafy vegetables, cucurbit vegetable crop group, grape. Potential on garlic, sugar apple.
Dimethomorph (ACROBAT) (FORUM)	BASF	Cinnamic acid derivative	Downy mildew, late blight, <i>Phytophthora</i> , <i>Plasmopara</i> , <i>Pseudoperonospora</i> , <i>Bremia</i> , and <i>Peronospora</i>	Registered on Brassica leafy vegetable crop group, bulb vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, hops, lettuce (head, leaf), potato, taro. Pending on bean (lima), ginseng, grape, onion (green), tanager, turnip (greens). Potential on atemoya, cucumber (GH), papaya, sugar apple.
Dimethomorph/ Pyraclostrobin (BAS 536)	BASF	Combination of cinnamic acid derivative and strobilurin	Dimethomorph spectrum (see above) plus <i>Alternaria</i> , <i>Anthracoze</i> , <i>Septoria</i> , <i>Cercospora</i>	Pending on bulb vegetables, cucurbit vegetable crop group, potato, tomato.
Dithianon (DELAN)	BASF	Dicarbonitrile	Scab, downy mildew, rust, leaf spot	Registered on hops, pome fruit crop group. Pending on grape (import tolerance) Potential on grapes.
Enestroburin SYP-Z071	Shenyang Research	Strobilurin	Novel strobilurin fungicide, with similar control spectrum as with dimethomorph and azoxystrobin; some activity on lepidopteran pests	Potential on cucurbit vegetable crop group, wheat.
Epconazole (CRUSOE) (VORTEX)	Bayer CropScience, Chemtura	Triazole	Seed treatment use	Registered on corn, cotton, sorghum. Potential on beans, cereals, peanut, soybean.
Ethaboxam (GUARDIAN)	LG Life Science Ltd. & Valent	Thiazole carboxamide	Useful for downy mildew, and blights; has preventive and curative activity	Registered on grape (import tolerance). Potential on Brassica leafy vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, leafy vegetable crop group, legume vegetable crop group, potato, unspecified crops.
Famoxadone (FAMOXATE) (EQUATION) (CONTACT) (TANOS*) *with Cymoxanil	DuPont Crop Protection	Oxazolinedione	Broad-spectrum fungicide, including early blight, downy mildews and other ascomycetes; can be combined with cymoxanil to pick up late blight; famoxadone may suppress some bacterial diseases	<b>Reduced Risk Product</b> Registered on cucurbit vegetable crop group, fruiting vegetable crop group, lettuce (head), lychee, potato, caneberry, grape, hops. Pending on Brassica-leafy subgroup, bulb vegetable crop group, leafy vegetable crop group. Potential on apple, avocado, banana, bean (snap, lima), blueberry, Brassica head & stem subgroup, citrus fruit crop group, guava, lychee, mango, tree nut crop group, pistachio, papaya, pea (succulent), pecan, plantain, root vegetable subgroup, strawberry, sugar apple.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Fenamidone (REASON)	Bayer CropScience	Imidazolinone (respiration inhibitor)	Foliar protectant and curative activity against Oomycete fungi; also effective against ascomycete and <i>Alternaria</i> ; inhibits electronic transport	<b>Reduced Risk Product</b> Registered on bulb vegetable crop group, cucurbit vegetable crop group, tobacco, tomato, tuberous/corm vegetable subgroup, Brassica leafy vegetable crop group, carrot, cotton, fruiting vegetable crop group, leafy vegetable crop group, strawberry, sunflower. Pending on: grape, turnip (greens), wheat, snap bean, lima bean, ginseng. Potential on bean (dry), beet (sugar), blueberry, citrus fruit crop group, corn, hops, okra, papaya, pineapple, basil.
Fenbuconazole (INDAR) (ENABLE)	Dow AgroSciences	Triazole	Powdery mildew, rusts, apple scab, <i>Monilinia</i> smuts, bunts, <i>Cladosporium</i> , <i>Mycosphaerella</i> , <i>Cercospora</i> , <i>Septoria</i> , <i>Rhizoctonia</i> , & <i>Colletotrichum</i>	Registered on almond, apple, beet (sugar), citrus fruit crop group, pecans, banana, stone fruit crop group, grape (import tolerance), bushberry subgroup, cranberry, peanut, wheat. Pending on pepper. Potential on celeriac, Swiss chard, mustard greens, watercress.
Fenhexamid (ELEVATE)	Arysta LifeScience	Metraoxycyclohexame carboxamideHydroxyanilide class	Non-systemic protectant fungicide effective against <i>Botrytis cinerea</i> , <i>Monilinia</i> , <i>Sclerotinia sclerotiorum</i> of lettuce	<b>Reduced Risk Product</b> Registered on almond, apple (postharvest), berry crop group, cilantro, fruiting vegetable transplants, ginseng, grape, juneberry, leafy greens subgroup (except spinach), lingonberry, kiwifruit, mayhaw, pear, pepper, pomegranate, salal, strawberry, stone fruit crop group (pre & post harvest), pear, pistachio, quince, GH cucumber Pending on apple, asparagus, citrus fruit crop group, fruiting vegetable crop group, GH vegetables, onion
Fluazinam (OMEGA)	Syngenta Crop Protection & ISK Bioscience	Pyridinamine	Broad spectrum disease control: <i>Alternaria</i> , <i>Botrytis</i> , <i>Cladosporium</i> , <i>Colletotrichum</i> , <i>Phytophthora</i> , <i>Plasmopara</i> , <i>Rhizoctonia</i> , <i>Sclerotinia</i> , <i>Venturia</i> , <i>Streptomyces</i> , and some mites	<b>Reduced Risk Product</b> Registered on peanut, potato, bushberry, edible-podded legumes, turnip greens, ginseng, Brassica leafy vegetables. Pending on carrot, lettuce (head, leaf), onion (dry bulb), apple, cantaloupe, pepper. Potential on almond, celery, pistachio, pumpkin, spinach, sweet potato, tropical fruits.
Fludioxonil (MAXIM) (SCHOLAR) (CANNONBALL)	Syngenta Crop Protection	Phenylpyrrole	<i>Fusarium</i> , <i>Helminthosporium</i> , <i>Rhizoctonia</i> , <i>Aspergillus</i> , <i>Alternaria</i> , <i>Ascochyta</i> , <i>Sclerotinia</i> , <i>Septoria</i>	<b>Reduced Risk Product</b> Registered on most crops as seed treatment (MAXIM). Registered as in-furrow or crown-dip on asparagus. Registered as post-harvest treatment (SCHOLAR) on citrus, kiwifruit, pome fruit crop group, pomegranate, stone fruit crop group, sweet potato. Registered as drip irrigation application on melon. Potential use on cucurbit crops, carambola, blueberry.
Flumorph SYP-L190	Shenyang Research	Cinnamic acid derivative	Effective against oomycete fungi, including downy mildew and <i>Phytophthora</i>	Potential on Brassica leafy vegetable crop group, cucurbit vegetable crop group, grape, tomato.
Fluopicolide (INFINITO) (RELIABLE*) *premix with Propamocarb HCL	Valent (Sumitomo Chemical) & Bayer CropScience	Acylpicolides, a new chemistry & mode of action with translaminar and xylem systemic properties; effects several life cycle stages	Oomycetes - downy mildew, late blight, <i>Phytophthora</i> , <i>Pythium</i> , <i>Plasmopara</i> , <i>Peronospora</i> , <i>Pseudoperonospora</i> and <i>Bremia</i>	Registered on grapes, cucurbit vegetables, fruiting vegetables, leafy vegetables, ornamentals, potato, wheat, cotton. Pending use of INFINITO on bulb vegetable crop group, head & stem Brassica subgroup, root & tuber vegetable crop group. Potential use of INFINITO for avocado, citrus fruit crop group, stone fruit crop group, pome fruit crop group. Potential use of RELIABLE on potato.
Fluopyram	Bayer Crop Science	Benzamide	Very active on Botrytis and powdery mildew.	

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Fluoxastrobin (EVITO) (DISARM-in turf)	Arysta LifeScience	Strobilurin	<i>Alternaria</i> , early blight and <i>Sclerotinia</i> ; can be used as seed treatment or foliar use	Registered on alfalfa, fruiting vegetable crop group, leafy petiole subgroup, peanut, tuberous & corm vegetable crop group. Pending on leafy greens subgroup, ornamentals. Potential on almond, beet (sugar), grape, oil seed crops, pome fruit crop group, strawberry, soybean, field corn, rice.
Flusilazole (FUSION)	Dupont Crop Science	Triazole	Asian soybean rust	Pending on legume vegetables crop group. Potential on cereals, grape, grass, pome fruit crop group, stone fruit crop group, sugar cane.
Flusulfamide (NEBIJIN) (SCABLOCK)	Mitsui Chemical	Sulfonanilide	Manages clubroot disease ( <i>Plasmodiophora brassica</i> ) in Brassica	Potential on Brassica leafy vegetables.
Flutianil (PINPOINT) (V-10118)	Valent	Benzanilide	Effective on powdery mildew at 0.01- 0.03 lb/ai/A	<b>Candidate Reduced Risk Product</b> Pending on cherry, cucurbit vegetable crop group, grape, hops, leafy vegetable crop group, mustard greens, pome fruit crop group, strawberry, turnip (greens). Potential on Brassica leafy vegetable crop group, cilantro, grass seed, GH vegetables, hops, stone fruit crop group.
Flutolanil (CONVOY)	Gowan and Nichino America	Triazole	Rusts, sheath blight, and other diseases caused by <i>Rhizoctonia</i>	Registered on peanut, potato, rice. Pending on Brassica leafy vegetable crop group, ginseng, corn, cotton. Potential on beet (sugar), blueberry, carrot, cucumber, strawberry, sweet potato.
Flutriafol	Cheminova	Aluminum phosphonate	Asian soybean rust, powdery mildews, apple scab, other diseases.	Pending on apple, soybean. Potential on grape, peanut, stonefruits, pecan, almond, cucurbits, pepper, tomato, strawberry, filbert, grapefruit
Fosetyl-AL (ALIETTE)	Bayer CropScience	Glutamic acid	Controls <i>Phytophthora</i> diseases, <i>Alternaria</i> diseases and downy mildew	Registered on arrugula, asparagus, avocado, banana, Brassica leafy vegetable crop group, caneberry, cucurbit vegetable crop group, grape, ginseng, hops, salal, juneberry, leafy vegetable crop group, lingonberry, macadamia, pineapple, pome fruit crop group, strawberry, tomato. Tolerance established, waiting on registration for bushberry subgroup, bulb vegetable crop group, citrus fruit crop group, cranberry, pea (succulent), turnip (roots & greens). Potential on GH tomato, GH lettuce, GH cucumber.
Glutamic Acid (AUXI GRO)	Emerald Bioagriculture	Fungus	Controls brown rot and suppresses shot hole	<b>Biopesticide</b> Registered on grape, almond and stone fruit crop group. Potential on all crops.
<i>Gliocladium catenulatum</i> Strain J1446 (PRESTOP) (SOILGUARD)	Kemira Agro Certis USA	Copper based	Recommended for control of <i>Pythium</i> and <i>Rhizoctonia</i>	<b>Biopesticide</b> Registered on unspecified vegetable crops.
GX569 (KOCIDE 3000)	Dupont	Protein which switches natural plant defenses in plant		Unspecified

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Harpin Protein (MESSENGER)	Eden Bioscience	Hydrogen peroxide	Bacterial leaf spot wilt, blight, and fungal diseases such as botrytis, bunch rot, and powdery mildew	<b>Biopesticide and Methyl Bromide Replacement</b> Registered on apple, citrus fruit crop group (pre & post harvest), cucumber, fruiting vegetable crop group, grape, melon, rice, stone fruit crop group, strawberry, wheat. Pending on banana, corn, cotton, peanut, soybean, sugarcane. Potential on all other crops.
Hydrogen peroxide (OXIDATE)	Bio Safe Systems	Azole	Broad spectrum bactericide and fungicide	Registered on potato, fruiting vegetable crop group, cucurbit vegetable crop group, onion and strawberry. Pending on beans, Brassica vegetables, citrus fruits, filbert, banana, grape, and stone fruit. Potential on all crops when applied post-harvest.
Hymexazol (TACHIGAREN)	Sankyo Agro	Alkylbenzene sulfonate	Effective against <i>Aphanomyces</i> , <i>Pythium</i> , <i>Fusarium</i> , <i>Corticium</i>	<b>Reduced Risk Product</b> Registered as seed treatment on beet (sugar). Potential on canola, cotton, cucumber, pea, spinach, tomato.
Iminoctadine Albesilate (BELLKUTE)	Nisso America (Nippon Soda)	Triazole	<i>Botrytis</i> , <i>Anthrancnose</i> , <i>Penicillium</i> , grey mold	Potential for post-harvest uses on fruit crops and commercial turf.
Ipconazole (VORTEX)	Chemtura, Bayer CropScience & Kureha	Amino acid amide	Protects against seed borne and soil borne fungi, which causes seed decay, damping off, and seedling blight	Registered seed treatment on Brassica leafy vegetable crop group, canola, cereal grain crop group, corn (field), cotton, cucurbit vegetable crop group, grass, leafy vegetable crop group, mustard seed, rapeseed, root & tuber vegetable crop group, sorghum, sunflower. Pending on legume vegetable crop group, peanut.
Iprovalicarb	Bayer CropScience	Anilide	Early and late blight, downy mildew	Tolerance established on tomato for import.
Isotianil	Bayer CropScience	Aminoglycoside antibiotic from <i>Streptomyces</i> <i>kasugaensis</i> – inhibition of protein synthesis		
Kasugamycin (hydrochloride) (KASUMIN) (TM 416)	Arysta LifeScience & Hokko	Nucleic RNA-polymerase inhibitor	A product with preventative and curative action on bacteria ( <i>Pseudomonas</i> , <i>Erwinia</i> and <i>Agrobacterium</i> ), <i>Xanthomonas</i>	Registered with fruiting vegetable import tolerance. Pending on pome fruit, fruiting vegetables, walnuts. Potential on almond, potato, rice, unspecified vegetables, leafy vegetables, cucurbits, strawberries, GH vegetables.
Kiralaxyl IR6141, IRF060 (FANTIC, SIDECAR, STADIO, CAPRI)	Isagro	Strobilurin	<i>Phytophthora</i> , <i>Plasmopara</i> , <i>Bremia</i> and <i>Pythium</i> spp; systemically active	Pending on grape, lettuce, onion, potato, strawberry, tomato.
Kresoxim-methyl (SOVRAN) (CYGNUS)	BASF	Oligosaccharide	Powdery and downy mildews, <i>Septoria</i> , rusts, scab, <i>Phomopsis</i> , black rot	Registered on cucurbit vegetable crop group, grape, pome fruit crop group, pecans.
Laminarine (IODUS 40)	Goemar	Carboxylic acid amide- binds with wax layer in plant tissue, forming a protective barrier against fungal establishment.	It acts as a disease resistance activator on a wide range of pathogens including <i>Septoria</i> spp	<b>Biopesticide</b> Potential on wheat, barley, grape, and pome fruit.
Mandipropamid (REVUS) (REVUS TOP [with difenoconazole])	Syngenta Crop Protection	Active isomer of metalaxyl	Targets Oomycetes (except <i>Pythium</i> ) - <i>Phytophthora</i> blight, late blight, downy mildews.	<b>Reduced Risk Product</b> Registered on Brassica leafy vegetable crop group, cucurbit vegetable crop group, fruiting vegetable crop group, grape, leafy vegetable crop group, bulb vegetable crop group, potato. Pending on ginseng.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Mefenoxam (RIDOMIL GOLD)	Syngenta Crop Protection	Anilinopyrimidine	Same spectrum as metalaxyl	<b>Reduced Risk Product</b> Registered on alfalfa, almonds, apple, artichoke, asparagus, atemoya, avocado, beets (sugar), blueberry, Brassica head & stem subgroup, bulb vegetable crop group, canistel, cereals, citrus fruit crop group, clover, cotton, cranberry, cucurbit vegetable crop group, fruiting vegetable crop group, custard apple, ginseng, grass, herb subgroup, hops, kiwifruit, leafy vegetable crop group, legume vegetable crop group, lima bean, lingonberry, mango, papaya, peanut, pineapple, raspberry, root & tuber crop group, sapodilla, sapote (black, mamey), soybean, star apple, starfruit, stone fruit crop group, strawberry, sugar apple, turnip (roots/greens), walnut. Pending foliar use on bean (snap) broccoli raab, caneberry, carambola, canola, collard, kale, mustard greens. Potential on lychee, mint (fresh) passion fruit.
Mepanipyrim (FRUPICA) (COCKPIT) (TD-2448)	KI Chemical		Controls <i>Botrytis</i> , scab ( <i>Venturia</i> spp.) and powdery mildew; mostly a preventive material but has curative properties; unique mode of action/no cross-resistance	Potential on bean (kidney), citrus fruit crop group, cucurbit vegetable crop group, eggplant, grape (import tolerance established), peach, pome fruit crop group, strawberry (import tolerance established), tomato (import tolerance established).
Meptyldincap	Dow AgroSciences	Triazole		
Metconazole (CARAMBA) (OPRETTA)	BASF, Valent, & Kureha	Benzophenone – new mode of action; acts on germination process	<i>Septoria</i> , powdery mildew, <i>Alternaria</i> , <i>Cercospora</i> , <i>Fusarium</i> , rusts	Registered on banana (import tolerance), canola. Pending on potato, blueberry, peach, corn, soybean, beet (sugar), wheat, stone fruit crop group, papaya, tree nut crop group, apple, barley, oats, rice, cotton
Metrafenone (FLEXITY) (VIVANDO)	BASF	Biofungicide	Compound confers preventive, curative and antispore properties on powdery mildew	Registered on grape (import tolerance). Potential on cereal crops, cherry, cucurbit vegetable crop group, hops, leafy greens, pome fruit crop group, strawberry.
<i>Muscodor albus</i> Strain QST 20799 (ARABESQUE) (PIROUETTE) (GILSSADE)	AgraQuest	Triazole	Fungus produces volatile compounds that are effective against plant pathogens and bacteria	<b>Biopesticide and potential Methyl Bromide Alternative</b> Pending on citrus fruit crop group, fruiting vegetable crop group, pome fruit crop group, stone fruit crop group, strawberry. Potential on other unspecified fruits and vegetables.
Myclobutanil (RALLY) (NOVA) (LAREDO)	Dow AgroSciences	Natural product	Powdery mildews, rusts, apple scab, brown rot ( <i>Monilinia</i> spp.), shothole ( <i>Stimina</i> spp.), cherry leaf spot ( <i>Coccomyces</i> spp.) grape black rot ( <i>Guignardia</i> spp.)	Registered on almond, artichoke, asparagus, banana, bean (snap), caneberry, cilantro, cucurbit vegetable crop group, currant, gooseberry, grapes, grass (seed), mango, mint, papaya, pome fruit crop group, soybean, stone fruit crop group, strawberry, tomato, hops, sugarbeet, leafy vegetables (except spinach), eggplant, okra, pepper. Pending on grass, black sapote, canistel, fruiting vegetable group, leafy greens (ex. spinach), mamey sapote, sapodilla, star apple. Potential on atemoya, Chinese cabbage, collards, dill, mustard greens, sugar apple.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
NAI-4201	Nichino	Bacteriaacide	Fireblight, other bacterial diseases	
NAI-4203	Nichino	Bacteria	Fireblight, other bacterial diseases	
<i>Pantoea agglomerans</i> C9-1	Nufarm	Bacteria	Fire blight	<b>Biopesticide</b> registered on apple and pear.
<i>Pantoea agglomerans</i> E-325	Northwest Agriculture Products	Carboxamide	Fire blight	<b>Biopesticide</b> Pending on apple and pear.
Penthiopyrad (MTF 753) (LEM 17)	Mitsui Chemicals, Inc., DuPont	Peroxyacetic acid	Activity on strobilurin and DMI resistant diseases (grey mold, powdery mildew, apple scab, rusts, <i>Rhizoctonia</i> ,	Pending on citrus fruit crop group, cucurbit vegetable crop group, fruiting vegetable crop group, stone fruit crop group, pome fruit crop group, leafy vegetables, cilantro, strawberry.
Peroxyacetic Acid	Ecolab Inc.	Phosphorus acid	Post harvest decay and rot	Registered on cereal grains, herbs/spices crop group, tree nut crop group, stone fruit crop group, pome fruit crop group, fruiting vegetable crop group, and cucurbit vegetable crop group.
Phosphonic Acid (FOLI-R-FOS) (AGRI-FOS)	Wilbur-Ellis Fluence		Downy mildew, scab, and root rot	Potential on asparagus, avocado, blueberry, Brassica leafy vegetable crop group, caneberry, citrus fruit crop group, cucurbit vegetable crop group, ginseng, hops, leafy vegetable crop group, pineapple, pome fruit crop group, bulb onion, strawberry and tomato.
Physpe (VACCIPLANT)	Agrimar	Strobilurin	Bacterial diseases	<b>Biopesticide</b> Potential on pome fruit crop group and tomato.
Picoxystrobin (Acanto)	DuPont Crop Protection	Allofuranuronic acid; chitin inhibitor, derived from the streptomycin group of fungi-use rate may be limited to 6.2 oz. prod/A.		Potential on cereals, soybeans.
Polyoxin D zinc salt (ENDORSE) (VERANDA)	Arysta LifeScience	Inorganic salt	Foliar and translaminar activity against <i>Alternaria</i> , <i>Botrytis</i> , powdery mildew, leaf spots, <i>Rhizoctonia</i> , <i>Anthraco</i>	<b>Biopesticide (potential OMRI listing)</b> Potential on almond, blueberry, celery, cilantro, ginseng, mustard greens, pumpkin, strawberry, Swiss chard, tomato, turnip (greens), leafy vegetables, carrot.
Potassium Bicarbonate (KALIGREEN) (ARMICARB) (MILSTOP)	Arysta LifeScience, Church & Dwight, BioWorks	Potassium dihydrogen phosphate	Powdery mildew, cercospora leaf spot, blossom rot	<b>Biopesticide</b> Registered on banana, barley, Brassica leafy vegetable crop group, bulb vegetable crop group, cucurbit vegetable crop group, date, ginseng, grape, herb & spice crop group, hops, leafy vegetable crop group, legume vegetable crop group, mango, mint, papaya, pineapple, pome fruit crop group, root & tuber vegetables, small fruits and berries, stone fruit crop group, strawberry, wheat. Potential registration on all crops.
Potassium Dihydrogen Phosphate (eKsPunge) (KDP)	Lido Chemical & Cal Agri Products	Potassium Phosphite	Powdery mildew	Registered on apple, cherry, cucumber, grape, mango, melon, nectarine, peach, pepper, plum, squash, tomato, and watermelon.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Potassium Phosphite (PRO-PHYT)	Pamol	Carbamate – systemic root uptake & acropetal distribution throughout the plant	Downy mildew, late blight and root rots	Potential on cucurbit vegetable crop group, tomato and avocado.
Propamocarb Hydrochloride (PREVICUR FLEX)	Bayer CropScience	Triazole	Downy mildew, late blight, <i>Pythium</i> , <i>Phytophthora</i> , and <i>Aphanomyces</i> ; should be mixed with other fungicides for resistance management	Registered on cucurbit vegetable crop group, lettuce (head, leaf, GH), pepper, potato, tomato (GH). Pending on bean (lima), wheat. Potential on atemoya, bulb vegetable crop group, cabbage, caneberry, carambola, corn (sweet), herb subgroup, leafy vegetable crop group, longan, lychee, root & tuber vegetable crop group, strawberry, sugar apple.
Propiconazole (TILT) (ORBIT)	Syngenta Crop Protection	Quinazolinone	Powdery mildew, rusts, smuts, <i>Pyrenophora</i> , <i>Septoria</i> , <i>Cercospora</i> , <i>Cercosporidium</i> , <i>Ascochyta</i> , <i>Pseudocercospora</i> , <i>Mycosphaerella</i> , <i>Fusicladium</i> , <i>Gaeumannomyces</i> , <i>Monilinia</i> , <i>Clasterosporium</i> , <i>Helminthosporium</i> and related genera, <i>Kabatella</i> , <i>Ceratocystis</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Rhynchosporium</i> , and <i>Rhizopus</i>	Registered on alfalfa, almond, beet (sugar), leaf petiole subgroup, cereals, corn (field, sweet, pop), grasses grown for seed, onion, peanut, pineapple, sugarcane, berry crop group, carrot, juneberry, mint, salal, sorghum, Swiss chard, tree nut crop group, pistachio, cranberry, soybean, strawberry, wheat, rice. Pending on bean (dry, succulent), beet (garden), hay, parsley, pineapple (post harvest), turnip (roots & greens), citrus (post-harvest). Potential on artichoke, atemoya, Brassica leafy greens subgroup, celeriac, cilantro, dill, radish, sugar apple, dandelion, millet, basil, avocado, pome fruit (post harvest)
Proquinazid (DPX-KQ926)	DuPont Crop Protection	Triazolinthone-demethylation inhibitor	Powdery mildew - extended residual disease control for four to six weeks	Potential on barley, Brassica leafy vegetable crop group, corn (sweet), cotton, cucurbit vegetable crop group, fruiting vegetable crop group, grape, leafy vegetable crop group, legume vegetable crop group, oat, root & tuber vegetable crop group, pome fruit crop group, stone fruit crop group, tree nut crop group, pistachio, triticale, wheat.
Prothioconazole (PROLINE) (PROVOST)	Bayer CropScience	Bacteria	<i>Ascochyta</i> , <i>Puccinia</i> , <i>Septoria</i> spp, <i>Sclerotonia</i> , <i>Fusarium</i> spp, rusts and <i>Rhizoctonia</i> as seed trt or foliar with protectant, curative & eradicate activity	Registered on barley, canola, pea (dry), bean (dry), wheat. Pending on beet (sugar), corn, cotton, oilseed crop group, rice, soybean.
<i>Pseudomonas chloroaphis</i> Strain 63-28 (AtEze)	EcoSoil Systems	Bacteria	Target pest include soil borne diseases <i>Rhizoctonia solani</i> and <i>Pythium</i> spp; outcompetes phytopathogenic species	<b>Biopesticide</b> Registered on GH vegetables. Potential on all crops.
<i>Pseudomonas fluorescens</i> PRA-25	Good Bugs, Inc.	Bacteria	Controls <i>Pythium</i> seed rot and damping off	<b>Biopesticide</b> Registered on bean (snap), corn (sweet), pea.
<i>Pseudomonas syringae</i> (BIOSAVE)	EcoScience	Bacteria	Controls <i>Fusarium</i> and post harvest storage rots	<b>Biopesticide</b> Registered for seed/storage potato and post harvest on citrus fruit crop group, apple, pear, and cherry. Potential on cranberry, banana, peach, plum and nectarine.
<i>Pseudozyma flocculosa</i> Strain PF-A22 (SPORODEX WP)	Plant Products Ltd.	Strobilurin - mitochondrial electron transport inhibitor	The product antagonizes a number of powdery mildew species	<b>Biopesticide</b> Registered on GH cucumber. Pending on all crops.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Pyraclostrobin (HEADLINE) (CABRIO)	BASF	Mitochondrial electron transport inhibitor	Broad spectrum activity on <i>Anthraco</i> nose, <i>Alternaria</i> , downy mildew, <i>Cercospora</i> leaf spot, rust, powdery mildew, <i>Septoria</i> , <i>Phytophthora</i> , <i>Pythium</i> , and <i>Rhizoctonia</i>	CABRIO registered on berry crop group, Brassica leafy vegetable crop group, bulb vegetable crop group, cherry, cucurbit vegetable crop group, filbert, fruiting vegetable crop group, hops, leafy vegetable crop group, pistachio, pome fruit crop group, root vegetable subgroup, strawberry, turnip (greens). HEADLINE registered on barley, bean (dry, edible podded, succulent shelled), citrus fruit crop group, corn, grass seed, mint, pea (dry, succulent), peanut, pecan, rye, soybean, tuberous and corm vegetable subgroup, beet (sugar), sunflower, triticale, wheat. CABRIO pending on barley, tropical fruits, oil seed crops, oats Potential on asparagus.
Pyribencarb (KIF 7767) (KUF-1204)	Kumiai Chemical, Ihara Chemical, K-I Chemicals	Anilinopyrimidine	Gray molds, Botrytis, stem rots	Evaluation on cucurbits and other vegetable crops.
Pyrimethanil (SCALA) (PH-066)	Bayer CropScience & Janssen	Quinoline - disrupts early cell signaling activities	Active against <i>Botrytis</i> spp., <i>Venturia</i> spp., <i>Alternaria solani</i> , <i>Alternaria mali</i> , <i>Sphaerotheca macularis</i> and <i>Monilinia</i> spp.	<b>Reduced Risk Product</b> Registered on almond, banana, bulb vegetable crop group, citrus fruit crop group (post harvest), grape, pistachio, pome fruit crop group, stone fruit crop group (except cherry), strawberry, tomato (field & GH), tuberous and corm subgroup.
Quinoxifen (QUINTEC)	Dow AgroSciences	Extract from giant knotweed	Activity against powdery mildew	<b>Reduced Risk Product</b> Registered on cherry (sweet & sour), grape, hops, eggplant, lettuce (head & leaf), melons, strawberry, pepper. Pending on artichoke, cilantro, nectarine, parsley, peach, plum, pumpkin, squash (winter). Potential on avocado, beet (greens), Brassica leafy vegetable crop group, caneberry, cereal grains crop group, gooseberry, guava, lychee, mango, mint, papaya.
<i>Reynoutria sachalinensis</i> (MILSANA Bioprotectant)	KHH BioScience		Induces phytoalexins that confer resistance to powdery mildew, <i>Botrytis</i> , bacterial blight	<b>Biopesticide</b> Registered on cucurbit vegetable crop group, grape, lettuce (head & leaf), peppers, strawberry, tomato, walnut. Potential on all crops.
Saponins of <i>Chenopodium quinoa</i> SA-110201	Headsup Plant Protectants Sipcam	Triazole	Oomycetes, including a high level of efficacy particularly against <i>Phytophthora</i>	
Simeconazole (SANLIT) (MONGARIT)	Sankyo Agro	Carboxamide	Effective as seed treatment against Basidiomycetes	Potential on apple, barley, corn, rice, strawberry, wheat.
Silthiophan (LATITUDE)	Monsanto	Fused silicate	Control of Take-All via seed treatment	Potential on wheat and barley (international uses approved).

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
Sodium Metasilicate (TRIAD)	Environmental Safe Systems, Inc	Bacteria	Suppression of powdery mildew	<b>Biopesticide</b> Pending on almond, Brassica leafy vegetable crop group, citrus fruit crop group, grape, leafy vegetable crop group, stone fruit crop group.
<i>Streptomyces griesoviridis</i> (MYCOSTOP)	AgBio Inc.	Bacteria	Damping off/root rots caused by <i>Fusarium</i> , <i>Pythium</i> , <i>Alternaria</i> and other pathogens	<b>Biopesticide</b> WP standard formulation for hydroponic and pot crops; new registration for mix with field/seed treatment applications.
<i>Streptomyces lydicus</i> (ACTINOVATE)	Natural Industries	Bacterium	Soil borne diseases	<b>Biopesticide</b> Exemption established for all crops.
<i>Streptomyces lydicus</i> WYEC 108 (ACTINOVATE)			Control of soil borne plant root and damping off fungi	<b>Biopesticide</b> Registered on unspecified crops.
SYP-Z048	Shenyang Research	Triazole	Active against Ascomycete, Basidiomycete and Deuteromycete fungi	Potential on apple, cucurbit vegetable crop group, peanut, tomato.
Tebuconazole (FOLICUR) (ELITE) (RAXIL)	Bayer CropScience	Triazole	Powdery mildew, rusts, smuts, bunts, apple scab, <i>Pyrenophora</i> , <i>Septoria</i> , <i>Coccomyces</i> , <i>Monilinia</i> , <i>Cercospora</i> , <i>Ceratocystis</i> , <i>Guignardia</i> , <i>Sclerotium</i> , <i>Rhizoctonia</i> , <i>Rhynchosporium</i> , <i>Colletotrichum</i> , and <i>Botrytis</i>	Registered on banana, cherry, grape, grass seed, nectarine, peanut. Pending on asparagus, bean (snap, lima, dry), beets (garden, sugar), bulb vegetable crop group, corn (field, sweet, pop), cotton, cucurbit vegetable crop group, hops, lychee, mango, Brassica leafy greens, okra, plum, pome fruit crop group, stone fruit crop group, soybean, sunflower, tree nut crop group, pistachio turnip (greens, roots), wheat, pepper. Potential on carrot, coffee (import tolerance pending), herb subgroup, leafy vegetable crop group, sweet potato, tropical fruit, yam, watercress, sugarcane, barley.
Tetraconazole (EMINENT 125SL)	Valent, Sipcam, & Isagro	Sulfonamide	Foliar diseases including <i>Cercospora</i> , <i>septora</i> , powdery mildew and others	Registered on beet (sugar), peanut, pecan, soybean. Pending on grape, strawberry. Potential on banana (import tolerance), blueberry, unspecified tree fruit/nuts, bean (snap, lima), southern pea.
TF-991	Sumitomo Chemical (Valent)	Natural Product		
Thyme Oil (PROUD)	Bio Huma Netics		Foliar fungicide that control a broad spectrum of fungal diseases	<b>Biopesticide</b> Registered on unspecified vegetables.
Tolnifanide	Sumitomo (Valent)	SAR compound	Alternaria blotch	Potential on apple.
Tiadanil	Nichino	Fungi	Fireblight	
<i>Trichoderma harzianum</i> T-39/(TRICHODEX) T-22 (ROOTSHIELD)	Makhteshim- Agan and Bioworks	Fungi	Controls <i>Botrytis</i>	<b>Biopesticide</b> Registered use on grapes and strawberry. Pending on cabbage, garlic and soybean. Potential on all other crops.

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Fungicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
<i>Trichoderma harzianum</i> <i>Rafai strain KRL-AG2</i> (PLANTSHIELD)	Bioworks Inc.	Mixture of conidiospores of two selected <i>Trichoderma</i> strains	Controls <i>Botrytis</i>	<b>Biopesticide</b> Registered use on berry crop group, grapes and strawberry, citrus fruit crop group, pome fruit crop group, stone fruit crop group, and tree nut crop group/pistachio.
<i>Trichoderma harzianum</i> & <i>T. Viride</i> (REMEDIER)	Isagro	Strobilurin	Colonizes the rhizosphere and the soil thereby competing for nutrients and moisture	<b>Biopesticide</b> Pending on pepper, strawberry, tomato.
Trifloxystrobin (FLINT) (TWIST) (GEM 500 SC) (STRATEGO*) *with propiconazole	Bayer CropScience	Imidazole	Active against powdery mildew and leaf spot diseases; also provides significant control of scab, rusts, downy mildew and other diseases	<b>Reduced Risk Product</b> Registered on asparagus, papaya, barley, canola, cotton, corn (field, pop, sweet), carrot, citrus fruit crop group, cucurbit vegetable crop group, fruiting vegetable crop group, grape, hops, leaf petiole subgroup, legume vegetable crop group, mustard seed, oats, peanut, pome fruit crop group, potato, radish, sorghum, soybean, beet (sugar), stone fruit crop group, tree nut crop group, pistachio, rice, wheat, vegetable root (except sugar beet) subgroup, strawberry. Registered as seed treatment on bean (dry), corn (sweet). Pending foliar use on canistel, mango, sapote (black & mamey), sapodilla, star apple, Brassica leafy greens subgroup, leafy greens subgroup. Pending seed treatment use on canola, cotton, mustard seed, legume vegetable crop group, rapeseed, sorghum. Potential on banana, blueberry, bulb vegetable crop group, cilantro, grass (seed), yam.
Triflumizole (PROCURE) (TERRAGUARD)	Nisso & Chemtura	Triazole	Powdery mildew, rusts, apple scab, <i>Rhizoctonia</i> , <i>Cylindrocladium</i> , <i>Thielaviopsis</i> , <i>Myrothecium</i> , <i>Alternaria</i> , <i>Helminthosporium</i> , <i>Ramularia</i>	Registered on apple, cherry (sweet & tart), cucurbit vegetable crop group, dandelion, filbert, grape, parsley, pear, pineapple, pome fruit, strawberry, turnip (greens), collards, kale, kohlrabi, mustard greens, Chinese napa cabbage, broccoli, coriander/cilantro. Pending on blueberry, hops, lettuce (head, leaf), papaya, pineapple, Swiss chard, head and stem Brassica, GH cucurbits. Potential on almond, atemoya, fruiting vegetable crop group (GH), sugar apple, garden beet, carrot.
Triticonazole (CHARTER)	BASF	New chemistry & different mode of action	Used as a seed treatment against smut, common bunt and soil borne seed rots	Registered on wheat, barley, turf. Pending on corn, cotton, oat, potato, sorghum (grain). Potential on bean, Brassica leafy vegetable crop group, bulb vegetable crop group, corn (sweet, pop), lettuce.
V-10135	Valent	Dipeptide	Effective on <i>Botrytis</i> , <i>Monilinia</i> , <i>Sclerotinia</i> and other fungi as preventive and curative treatment; has translaminar activity	Pending on stone fruit crop group, tree nut crop group. Potential on bean (dry, succulent), blueberry, caneberry, fruiting vegetable crop group, grape, ginseng, leafy vegetable crop group, kiwifruit, onion, pome fruit crop group, pomegranate, potato, strawberry, pistachio, stone fruit (post-harvest).
Valiphenal (IR-5885)	Isagro	Natural product:extract from <i>Saccharomyces</i>	Oomycete diseases (late blight and downy mildew)	Potential on grape, potato, unspecified vegetables.
Yeast Extract Hydrolysate (KeyPlex 350)	Morse Enterprises	Rhamnolipid biosurfactant	Prevents bacterial leaf spot disease of tomatoes, post-bloom fruit drop and greasy spot diseases of citrus	<b>Biopesticide</b> Registered on unspecified crops.
ZONIX	Jeneil Biosurfactant		Manages downy mildew, <i>Pythium</i> and <i>Phytophthora</i>	<b>Biopesticide</b> Potential on unspecified crops.

## IR-4 New Products/Transitional Solution List Nematicides

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Nematicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum	Status
AJ 1629	Ajay SQM	Iodine Complex	Nematodes and soil borne fungal pathogens	<b>Potential Methyl Bromide Alternative</b>
AKD-3088	Agro Kanesho	Organophosphate nematicide		Potential on fruits and vegetables.
<i>Bacillus firmus</i> (BIONEM) (BIOSAFE)	Minrav Infrastructurer	Bacterial nematicide	Controls root knot and other nematodes including <i>Heterodera avenae</i>	Potential on tomato, cucumber, and pepper. International registration (Israel) approved.
Dazomet (BASAMID)	Agro-Kanesho & Certis USA	Thiadiazine (carbon disulfide generator)	Similar to metam sodium	<b>Partial Methyl Bromide Alternative</b> Pending on strawberry, tomato.
DMDP	BTG	Derived from <i>Lonchocarpus felipei</i>	DMDP is phloem mobile, making it suitable for foliar applications	<b>Biopesticide</b> Potential on banana and potato.
Dimethyl disulfide (DMDS)	Arkema, Inc.	Fungicide compound derived from <i>Allium</i>	Broad spectrum fumigant that has nematicide, fungicide insecticide and herbicide effects; being tested with chloropicrin	<b>Methyl Bromide Alternative</b> Pending on vegetable and fruit crops, floral crops, nursery/ornamental crops.
Fosthiazate (NEMATHORIN)	Syngenta & ISK Bioscience	Lower risk organophosphate	Controls nematodes	<b>Partial Methyl Bromide Alternative</b> Registered on tomato. Pending on banana, coffee, peanut, potato, strawberry.
Harpin Protein (N-HIBIT)	Eden Bioscience	Biopesticide	Root knot nematode	Registered on cotton as a seed treatment.
Imicyafos (NEMAKICK) (AKD-3088)	Agro Kanesho	Phosphonothioate (OP)	Non-fumigant that is effective against root-knot, root lesions, cyst nematodes. High contact activity and fast diffusion in soil	<b>Potential Partial Methyl Bromide Alternative</b> Radish, potato, tomato and other vegetable crops.
Iodomethane (MIDAS)	Arysta LifeScience	Methyl Iodide	Similar to Methyl Bromide – soil fumigant	<b>Methyl Bromide Alternative (federal label October 2007)</b> Registered on strawberry, pepper, tomato, ornamentals, stonefruit.
<i>Muscodor albus</i> Strain 20799 (ARABESQUE)(ANDA NTE) (GLISSADE)	AgraQuest	Fungus		<b>Biopesticide and Potential Methyl Bromide Alternative</b> Registered on unspecified fruits, nuts, seeds grains and bulbs.
<i>Myrothecium verrucaria</i> strain AARC-0255 (DITERA)	Valent BioSciences	Biopesticide	Controls root knot, cyst, lesion, citrus, stubby root, pin, reniform, dagger, sting, ring, stunt, lance, spiral, burrowing and others	<b>Partial Methyl Bromide Alternative</b> Registered on citrus, broccoli, cabbage, cauliflower, Brussels sprouts, and grapes. Pending on strawberry and tomato.
<i>Paecilomyces lilacinus</i> Strain 251 (BIO ACT) (MELO-CON WG)	Prophyta & Gustafson	Fungus	Controls burrowing, root knot and cyst nematodes	<b>Biopesticide</b> Registered on banana, citrus fruit crop group, cocoa, coffee, cucurbit vegetable crop group, fruiting vegetable crop group, grape, pineapple. Potential on all crops.

## IR-4 New Products/Transitional Solution List

12/2/08

Nematicides (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum	Status
<i>Pasteuria penetrans</i>	Pasteuria Bioscience	Parasitic bacterium	Root knot nematode	<b>Biopesticide</b> Potential on peanut, unspecified vegetables.
PROPOXIDE	Aberco	Propylene oxide	Fumigant for stored nuts and spices. Potential for soil uses	<b>Potential Methyl Bromide Alternative</b> Registered on nut crops.
Sodium Azide (SEP-100)	American Pacific	Sodium azide	Many pests that are currently controlled by methyl bromide	<b>Potential Methyl Bromide Alternative</b>
Sodium lauryl sulfate (PFA 2000)	Acme International	Biochemical	Wide spectrum material including anti-fungal properties	<b>Potential Methyl Bromide Alternative</b> Registered on unspecified crop
Sodium Tetrathiocarbonate (ENZONE)	Helena	Sodium tetrathiocarbonate (carbon disulfide generator)	Water-soluble soil fumigant for management of, plant parasitic nematodes, various soil borne pathogens and other soil pests	<b>Potential Methyl Bromide Alternative</b> Registered on grape and citrus.
TELONE (INLINE Formulation)	Dow AgroSciences	1,3-dichloropropene + chloropicrin	Many soil insects, nematodes and plant diseases	<b>Partial Methyl Bromide Alternative</b> Registered on all crops including cotton, potato, tomato, onion, sweet potato, grape, mint, hops, pineapple, sugar beet, peanut, citrus fruit crop group, pome fruit crop group, stone fruit crop group.
TERRAPY	Cognis Deutschland	Fatty acid preparation in alkyl(poly)glycoside	Shown to significantly reduce <i>Meloidogyne</i> infestations	<b>Biopesticide</b> Potential on tomato, carrot, cucumber, sugar beet, potato.
Thiazosulfene (MCW2) (Supporter) (Namer)	Makhteshim-Agan SDS Biotech	Fluoroalkenyle (thioether) – Kill nematodes through contact.	Highly effective on root-knot nematodes ( <i>Meloidogyne</i> spp.); also targets <i>Rhizopholus</i> spp. and <i>Pratylenicus</i> spp.	Potential on fruiting vegetables, cucurbits, potato, banana, tobacco.

## Other Types of Pest Control Products

Chemical (TRADE)	Registrant(s)	Chemistry/Mode of Action	Pest Control Spectrum/Traits	Status
9-10 Anthraquinone (AVIPEL)	Airepel, LLC	Natural Product	Goose and other bird repellent	Potential on cherry, corn (field), grape, blueberry.
Methyl Anthranilate (BIRD SHIELD)	Becker Underwood & Bird Shield Repellent Corp	Methyl anthranilate	Bird repellent	Registered on apple, blueberry, cherry, corn, grape, strawberry, sunflower, wild rice. Potential on all crops.