

## ***IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004***

The following ***Pest Control Products/Pest Solutions List*** contains brief description of numerous pest control materials that have been introduced over the last several years. Additionally, it contains information on some “older” crop protection chemicals that are believed to have room for new uses. Many of these pest control tools offer great promise to fill the pest management voids expected from the cancellation of pesticides/pesticide uses associated with the Food Quality Protection Act. Some 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 than some of the existing products.

### **HERBICIDES**

Herbicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
AEB171509	Bayer Environmental Sciences	Nirtopyrazole, PPO Inhibitor	Control of <u>Lamium</u> , <u>Stellaria</u> , <u>Viola</u> , and <u>Veronica</u> spp.	No plans to develop for ornamental uses.
<u>Alternaria destruens</u> (SMOLDER)	UAP	Microbial biopesticide	Controls dodder (swamp, largeseed, field, and smallseed)	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Aminopyralid (DE-750)	Dow Agrosience	Pyridine (Cell division inhibitor)	Pre-emergence and post-emergence to control annual broadleaf weeds.	Not presently registered. No plans to develop for ornamental uses.
Amicarbazone (DINAMIC)	Arvesta	Triazolinone	Applied at rates up to 500 g ai/ha (0.45 lb ai/A) to the soil preplant or pre-emergence. It also has burndown activity. Soil and burndown activity is primarily on broadleaf weed species.	No plans to develop for ornamental uses.
Beflubutamid (UBH-820)	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)	No plans to develop for ornamental uses.
Bispyribac sodium (VELOCITY)	Valent USA Kumiai	Pyrimidinyloxybenzoic acid	Annual/perennial grasses and broadleaf weeds including herbicide resistant barnyardgrass.	<b>Candidate Reduced Risk Product.</b> Registration pending 3 <sup>rd</sup> Q 2004 for use on turf. No plans to develop in ornamental crops, but will continue to expand label on turf.
Butafenacil (REBIN) (INSPIRE)	Syngenta	PPO Inhibitor	Controls important grasses, broadleaf and sedge weeds as a desiccant and defoliant.	<b>OP Replacement.</b> No plans to develop for ornamental uses.
Carfentrazone-ethyl (QUICKSILVER T/O)	FMC	Aryl triazolinone (PPO Inhibitor)	Numerous broadleaf weeds, including cocklebur and water hemp.	<b>Reduced Risk Product.</b> High interest by FMC to develop use in ornamentals for moss and algae control.
Catechin	Colorado State University	A component from Spotted knapweed ( <u>Centaurea maculosa</u> )	Controls many weeds.	No plans to develop for ornamental uses.
Cinidon-ethyl (LOTUS)	BASF	Isoindoldione (Inhibits protoporphyrinogen oxidase).	It is particularly active post-emergence on <u>Galium aparine</u> , among other broadleaf species, in small grains at 30 to 50 g ai/ha (0.027 to 0.045 lb ai/A).	Not registered in the USA. Therefore, no plans to develop for ornamental uses in the USA.

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Clethodim (ENVOY)	Valent USA	Cyclohexanone ACCase inhibitor	Selective postemergence herbicide for control of annual and perennial grasses.	For use on Conifer trees, Non-Bearing Food Crops, Ornamentals and Non-Crop or Non-Planted areas. No additional data required on ornamental crops.
Clodinafop-propargyl (DISCOVER)	Syngenta	Pyridylory-phenoxy propionate (ACC ase)	Selective post-emergence of wild oats, annual grasses and other weeds.	No plans to develop for ornamental uses at the present time.
Clomazone	FMC	Isonazolidinone - Carotenoid biosynthesis inhibitor	Material controls a broad spectrum of grasses and broadleaf weeds.	No plans to develop for ornamental uses.
Cloransulam-methyl (FIRSTRATE)	Dow AgroSciences	Sulfonamide (ALS Inhibitor)	Pre-emergence or post-emergence to control annual broadleaf weeds	No plans to develop for ornamental uses.
<u>Colletotrichum gloesporioides</u> f. sp <u>malvae</u> (MALLET WP)	Encore Technologies	Fungus	It is pathogenic to round-leaved mallow, small flowered mallow, common mallow, and velvetleaf.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Cyhalofop-butyl (CLINCHER)	Dow AgroSciences	Phenoxy-propionate	Post-emergence graminicide	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Diclosulam (STRONGARM)	Dow AgroSciences	Sulfonamide (ALS Inhibitor)	Pre- or post emergence for broadleaf weeds such as morning glory, cocklebur, velvetleaf and nutsedge	No plans to develop for ornamental uses.
Diflufenzopyr (OVERDRIVE)	BASF	Pyridine (Auxin transport inhibitor)	Annual grasses and broadleaf weeds. Sold in a pre-mix with dicamba.	<b>Reduced Risk Product.</b> Ornamental crop safety studies needed to ascertain crop safety to formulation. Not presently supported as a stand-alone product.
Dimethenamid-P (OUTLOOK)	BASF	Chloroacetamide, single isomer of dimethenamid	Annual grasses, broadleaf weeds, yellow nutsedge	<b>Reduced Risk Product.</b> Will support development in ornamentals.
Dithiopyr (DIMENSION)	Dow AgroSciences	Pyridine (Cell division inhibitor)	Selective for annual grasses	Registered on turf and for use on landscape ornamentals. Considering registration on container and field grown ornamental and nursery plants.
<u>Drechslera monoceras</u> (MTB-951)	Mitsui Chemical	Biopesticide	Barnyardgrass	No plans to develop for ornamental uses.
Flazasulfuron (MISSION) (KATANA)	Syngenta & ISK	Sulfonylurea (ALS inhibitor)	Active against many grasses and broadleaf weeds with pre- and post-emergence activity at 50 grams/ha	No plans to develop for ornamental uses.
Floransulam (PRIMUS) (BOXER)	Dow AgroSciences	Triazolopyrimidine sulfonanilide, (ALS inhibitor)	Provides post-emergence control of broadleaf weeds, particularly <u>Galium aparine</u> (catchweed bedstraw) at rates of 0.0045 to 0.0067 lb ai/A.	No plans to develop for ornamental uses.
Fluazolate (JV 485)	Bayer Environmental Sciences and Monsanto	Pyrazole Benzoate	Pre-emergence control of broadleaf weeds and grasses	No plans to develop for ornamental uses.
Flucarbazone-sodium (EVEREST 70 WG)	Arvesta	Sulfonylaminocarbonyl-triazolinone,(ALS inhibitor)	Low rate post-emergence material that controls grass and certain broadleaf weeds	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.

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Flufenacet (DEFINE)	Bayer Environmental Sciences	Oxyacetimide	Soil applied for annual grasses and some broadleaf weeds.	No plans to develop for ornamental uses as a standalone product. Possibly as a pre-mix with iodosulfuron.
Flufenpyr-ethyl (S-3153)	Valent USA	PPO Inhibitor	Excellent control of velvetleaf and morning glories.	<b>Candidate Reduced Risk Product.</b> No plans to develop for ornamental uses.
Flumetsulam (BROADSTRIKE)	Dow AgroSciences	Sulfonamide (ALS Inhibitor)	Controls broadleaf and grass weeds.	No plans to develop for ornamental uses.
Flumiclorac-pentyl (RESOURCE)	Valent USA	N-phenylphthalimide derivative (PPO Inhibitor)	Post-emergence control of velvetleaf and other broadleaf weeds	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Flumioxazin (SUREGUARD) (BROADSTAR G)	Valent USA	N-phenylphthalimide derivative (PPO Inhibitor)	Low use rate pre-emergence broadleaf herbicide with contact activity and residual soil activity.	BroadStar Herbicide (0.25G) and SureGuard 51WDG registered for use in ornamentals. Registrant is interested in adding new plants and pests to label.
Fluroxypyr (VISTA)	Dow AgroSciences	Pyridine. (Cell division inhibitor)	Post-emergence applications to control annual and perennial broadleaf weeds.	<b>Reduced Risk Product.</b> Registered on turf. No plans to develop ornamental uses.
Foramsulfuron (RECOVER)	Bayer Environmental Sciences	Sulfonylurea (ALS inhibitor)	Post-emergence control of annual grasses/ryegrass transition & volunteer, tall fescue	Registered on warm season turf grasses. Registrant endorses adding new plants to label.
Glyphosate (ROUNDUP PRO) (AQUAMASTER)  (ACCORD) (GLYPRO) (RODEO) (GLYPHOSATE)  (TOUCHDOWN PRO)	Monsanto   Dow AgroSciences   Syngenta	Glycine (EPSPS inhibitor)	Non-selective foliar systemic for control of a broad spectrum of emerged annual & perennial grasses, broadleaf weeds and woody plants.	Roundup Pro and Touchdown Pro: Used in areas such as airports, apartment complexes, Christmas trees & Christmas tree farms, ditch banks, dry ditches, dry canals, fencerows, golf courses, industrial sites, lumber yards, manufacturing sites, office complexes, ornamental nurseries, parks, parking areas, petroleum tank farms and plumbing installations, railroads, rangeland, recreational areas, residential areas (commercial applicators only), roadsides, schools, storage areas, utility substations, warehouse areas, wildlife refuges, other public areas and similar industrial and noncrop sites. Accord: Use in forests, utility rights-of-way, including aquatic areas and wildlife habitat areas within these sites. Aquamaster and Rodeo: For aquatic weed and brush control. Controls annual and perennial weeds and woody plants in and around aquatic and other noncrop sites; also for use in wildlife habitat areas, for perennial grass release and grass growth suppression.
Halosulfuron (MANAGE)	Monsanto	Sulfonylurea (ALS inhibitor)	Nutsedge, velvetleaf, cocklebur, and other broadleaf weeds	<b>Methyl Bromide Alternative.</b> Registered on turf and post-directed around woody ornamentals in landscape uses.
Imazamox	BASF	Imidazolinone (ALS inhibitor)	Annual grasses and some broadleaf	<b>Reduced Risk Product.</b> Product is being evaluated in selective non-crop areas. Due to potential crop injury, no plans to develop for production ornamentals.

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Herbicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Imazapyr (STALKER)	BASF	Imidazolinone (ALS inhibitor)	Controls most annual & perennial grasses and broadleaf weeds, in addition to many brush & vine species.	Applied to noncropland areas such as railroads and highway rights-of-way. Will not develop for ornamental uses.
Imazapyr + Diuron (SAHARA)	BASF	Imidazolinone (ALS inhibitor) + phenylurea	Controls most annual & perennial grasses and broadleaf weeds, in addition to many brush & vine species.	Applied to noncropland areas such as railroads and highway rights-of-way. Will not develop for ornamental uses.
Imazapic (PLATEAU)	BASF	Imidazolinone (ALS inhibitor)	Pre- and post-emergence control of annual & perennial grasses, broadleaf weeds and vine species.	Provides weed control and/or turf height suppression on pastures, rangeland, Federal Conservation Reserve Program land and noncropland areas. Support for Christmas tree production or other field production for invasive weed control on state specific request possible.
Iodosulfuron	Bayer Environmental Sciences	Sulfonylurea (ALS inhibitor)	Early to mid-POST applications for control of grass and broadleaf weeds.	<b>Candidate Reduced Risk Product.</b> No plans to develop for ornamental uses as a standalone product. Possibly as a pre-mix with flufenacet.
Isoxaflutole	Bayer Environmental Sciences	Isoxazole	Soil applied for many annual grasses and some broadleaf weeds.	No plans to develop for ornamental uses.
Mesosulfuron-methyl	Bayer Environmental Sciences	Sulfonylurea (ALS inhibitor)	Early and mid post-emergence control of grasses and some broadleaf weeds including annual ryegrass, annual bluegrass, wild oat, canarygrass, downy brome, Japanese brome wild mustard, Tansy mustard, blue mustard.	<b>Candidate Reduced Risk Product.</b> No plans to develop for ornamental uses.
Mesotrione (CALLISTO)	Syngenta	Cyclohexanedione, It disrupts carotenoid biosynthesis by inhibit of phydroxyphenylpyruvate dioxygenaset.	Pre-and post-emergence control of annual grasses and broadleaf weeds, including sulfonylurea resistant weeds. Will be marketed as a stand-alone product, as well as a premix.	<b>Reduced Risk Product.</b> Interested in development for ornamentals. Need efficacy and crop safety data.
Metosulam (BARKO)	Dow AgroSciences	ALS inhibitor	Preemergence control of broadleaf weeds	No plans to develop for ornamental uses.
Oxasulfuron (DYNAM)	Syngenta	Sulfonylurea, (ALS inhibitor)	Post-emergence for cocklebur, ragweed, and other broadleaf weeds	No plans to develop for ornamental uses.
Oxaziclomefone (MY-100)	Bayer Environmental Sciences	Phenyl olazinone	Grass weeds	No plans to develop for ornamental uses.
Pelargonic Acid (SCYTHE)	Dow AgroSciences	Fatty acid	Contact, non-selective broad spectrum foliar applied material	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Penoxsulam (DE-638)	Dow AgroSciences.	Triazolopyrimidine sulfonamide (an ALS inhibitor)	It controls grasses, broadleaf and sedge weeds including SU resistant sedge. Weaknesses are sprangletop and broadleaf signalgrass and large barnyardgrass. It will be applied at 10-50 g ai/ha	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.

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Herbicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Pethoxamid (SUCCESSOR 600)	Tokuyama	Acetamide	Selectively controls certain grasses and broadleaf weeds	No plans to develop for ornamental uses.
Picolinafen (PICO) (SNIPER)	BASF	Aryloxycolinamide (inhibits phytoene desaturase)	Post-emergence use to control annual broadleaf weeds. The application rate will be 50 g ai/ha (0.045 lb ai/A). It will be sold as a pre-mix	Registration pending in Canada. No plans to develop for ornamental us in the USA.
Profoxydim (AURA) (TETRIS)	BASF	Cyclohexanone graminicide, (ACCCase inhibitor)	Controls grass weeds at use rates ranging from 50 to 200 g ai/ha (0.045 to 0.18 lb ai/ha)	No plans to continue development in any crop.
Prosulfuron (PEAK)	Syngenta	Sulfonylurea (ALS inhibitor)	Post-emergence for cocklebur, kochia, lambsquarter, pigweed, and velvetleaf	No plans to develop for ornamental uses.
Propoxycarbazone (OLYMPUS)	Bayer Environmental Sciences	Sulfonylaminocarbonyl triazolinone (ALS inhibitor)	Post-emergence grass weed control. Broadleaf weeds in the Cruciferous family are also controlled. Also controls <u>Bromus</u> sp.	No plans to develop for ornamental uses.
Propyzamide (RAPSOL)	Sumitomo		Controls annual grasses and broadleaf weeds	No plans to develop for ornamental uses.
<u>Puccinia thlaspeos</u> (ROAD WARRIER)	Greenville Farms	Biological herbicide- Dyers Woad Rust	Specific to Dyer's Woad	No plans to develop for ornamental uses.
Pyraflufen-ethyl (ET)	Nichino America	Prototox inhibitor	Post-emergence herbicide for general non-selective control of weeds or use as desiccant. Low use rates, 1 g ai/A	<b>OP Alternative.</b> Registered on turf and unspecified ornamentals. Interested in development for ornamentals. Need efficacy and crop safety data.
Pyribenzoxium (PYANCHOR)	Dow AgroSciences	Benzophenone	Post emergence material with activity on numerous annual and perennial grasses, broadleaf and sedges.	No plans to develop for ornamental uses.
Pyriftalid (APRIRO ACE)	Syngenta	Acetolactate synthase inhibitor	Mainly a grass material, pre- and post-emergence for barnyardgrass.	No plans to develop for ornamental uses.
Quinclorac (DRIVE)	BASF	Quinoline carboxylic acid	Post-emergence control of annual grasses and broadleaf weeds	Registered in turf. No plans to develop for ornamental uses due to plant injury.
S-metolachlor (PENNANT MAGNUM)	Syngenta	Chloracetanilide	Controls many annual grasses, certain annual broadleaf weeds, and yellow nutsedge.	Pennant MAGNUM may be used on commercial and residential warm-season turfgrasses and other noncrop land, including, but not limited to the following: airports, roadsides, golf courses, sports fields, public recreational areas, ornamental gardens, cemeteries, other landscaped areas, etc. Pennant MAGNUM may also be used in and around container and field-grown ornamentals, non-bearing nursery stock, and on sod farms. <b>DO NOT USE IN GREENHOUSES OR OTHER ENCLOSED STRUCTURES.</b> Registered in ornamentals. Registrant endorses adding new plants to the label.
Sethoxydim (VANTAGE)	BASF Gro-Pro LLC	Cyclohexanone (ACCCase inhibitor)	Post emergence grass herbicide	For use in bedding plants, cut flowers, Christmas trees, centipedegrass & fine fescue turf, fine fescue seed production, nonbearing food crops, wildflowers, and noncrop sites.

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Herbicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Sulfentrazone	FMC	Aryl triazolinone (PPO Inhibitor)	Low use rate pre-emergence broadleaf herbicide with contact activity and residual soil activity.	High interest by FMC to develop use in ornamentals. Need to characterize nutsedge activity and length of residual control.
Sulfosulfuron (OUTRIDER)	Monsanto	Sulfonylurea (ALS inhibitor)	Johnsongrass, Sedges, Cheatgrass, some broadleaves..	Registered for roadside turf. Interested in labeling in fine turf as Battalion for selective grass control. No plans to develop for ornamental uses.
Tepraloxydim (EQUINOX)	BASF	Cyclohexanedione, (ACCcase inhibitor)	Provides post-emergence grass weed control in broadleaf crops, at rates of 50 to 75 g ai/ha (0.045 to 0.067 lb ai/A). At rates of 100 g ai/ha (0.089 lb ai/A) it will control perennials such as johnsongrass, and suppress Bermuda grass.	Registered in soybeans. No plans for development in ornamentals for the foreseeable future.
TM 435	Arvesta	Not disclosed.	Post emergence control of broadleaf weeds	No plans to develop for ornamental uses.
Tralkoxydim (ACHIEVE)	Syngenta	Cyclohexandione (ACCcase inhibitor)	Post-emergence for grass weeds such as wild oats, green and yellow foxtail, and annual ryegrass.	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Triasulfuron (AMBER)	Syngenta	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	No plans to develop for ornamental uses.
Trifloxysulfuron (ENFIELD)	Syngenta	Sulfonylurea (ALS inhibitor)	Broadleaf weeds	<b>Methyl Bromide Alternative.</b> Need efficacy and crop safety data to support an ornamental registration.

## PLANT GROWTH REGULATORS

Plant Growth Regulators (TRADE)	Registrant	Chemistry	Pest Control Spectrum	Status
Ammonium/Calcium Nitrate (BUD BREAK)	Western Farm Services	Ammonium/Calcium Nitrate	Promotes uniform bud break	No plans to develop for ornamental uses.
Ammonium thiosulfate	Siemer	Ammonium thiosulfate	Active as blossom thinner	No plans to develop for ornamental uses.
Aviglycine (RETAIN)	Valent USA	Aminoethoxyvinylglysine Lysine analog	Plant growth regulator that improves harvest management by inhibiting ethylene biosynthesis.	No plans to develop for ornamental uses.
<u>Bacillus cereus</u> Strain BP01	Microflo	Bacteria	Cotton in boll retention and size. It also promotes increase in root mass, earlier fruit initiation and increased fruit retention.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
6-Benzyladenine+ Gibberelic Acid A4 A7 (FASCINATION)	Valent USA	Benzylamicyo-purine and gibberelic acid A4 and A7	Prevent leaf yellowing, prolongs flower life in lilies.	<b>Biopesticide.</b> Registered for use on lilies. Registrant endorses adding new ornamental plants to label.
6-Benzyladenine (No tradename)	Valent USA	Benzylamicyo-purine	Branching agent	Not currently labeled on ornamentals. Planning to label for use in ornamental crops. Need efficacy and crop safety data.

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Plant Growth Regulators (TRADE)	Registrant	Chemistry	Pest Control Spectrum	Status
Clofencet (DETASSELOR)	Monsanto	Carboxylic acid	Hybridizing agent	No plans to develop for ornamentals.
Chlormequar Chloride (CYCOCEL)	BASF Olympic Horticultural	Chlormequar Chloride	PGR on azaleas, poinsettias, and geraniums.	BASF will submit an extensive, revised label to the EPA. Tank mix evaluations may be supported by Olympic Horticultural.
Copper Ethylenediamine (INFERNO)	DuPont	Copper organic complex	Desiccant and harvest aid	No plans to develop for ornamental uses.
Diphenylamine	Syngenta	Diphenylamine	Protects the fruit from scald	No plans to develop for ornamental uses.
1,2,6-DIPN (AMPLIFY)	UAP	Diisopropyl naphthalene	Controls sprout on storage potatoes. Works in synergy with CIPC	No plans to develop for ornamental uses.
Ethephon (PROXY) (FLOREL)	Bayer Environmental Sciences, DuPont	Mimics the effect of ethylene gas.	Promotes earlier coloration and maturity, promotes abscission and/or accelerates ripening. Will delay bloom in peach and blueberry	No plans to develop for ornamental uses.
Gibberellic Acid (PROGIB T&O)	Valent USA	Gibberellic acid A3	Promotes cell elongation and plant growth.	<b>Biopesticide.</b> Registered on lilies, ornamentals (azela, calla lily, camellia, geranium, pomptom chrysanthemum, spathiphyllum), cut flowers (aster, baby's breath, matthiola, delphinium, larkspur, Queen Ann's lace, statice, sweet William) unspecified bedding plants, unspecified annual and perennial potted crops and turfgrass. Registrant endorses adding new ornamental plants to label.
Glutamic Acid (AUXI GRO)	Emerald Bioagriculture	Glutamic acid	Enhances crop growth and yield	No plans to develop for ornamental uses
Harpin Protein (MESSENGER)	Eden Bioscience	Protein which switches natural plant defenses in plant	Enhance, fruit set, size and yield. Also shown to be a disease resistance activator.	<b>Biopesticide.</b> Registrant is interested in developing for ornamentals. Need efficacy and crop safety data.
LPE 94T	NutraPark	Phospholipid	Ripening and shelf life enhancement	<b>Biopesticide.</b> No plans to develop for ornamental uses.
1-MCP (SMART- FRESH)	AgroFresh Inc.	Cyclopropene	Inhibits the attachment of ethylene to ethylene receptor for a post- harvest storage extension	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Mepiquat Chloride (PIX)	BASF	Quaternary ammonium	Shortens plant internodes and plant height	No plans to develop for ornamentals uses.
NAA	Amvac	Napthalene Acetic Acid	Tree sucker control, manages crop load	No plans to develop for ornamental uses.
Paclobutrazol (CLIPPER)	Syngenta	Chlorophenyl Triazole	Ornamental tree shoot growth inhibitor.	Need additional efficacy and crop safety on woody and conifer trees.
Prohexadione Calcium (APOGEE)	Kumiai Chemical	Calcium carboxylate	Reduces vegetative growth-better balance between canopy development and fruit production	BASF has returned the ornamental rights back to Kumiai who is seeking a partner to evaluate the product on ornamentals.
Sodium nitrophenolate (ATONIK)	Asahi Mfg. Ltd.	Combination of sodium nitrophenolates and nitroguatalolate	Increased nutrient uptake, resulting in improved yields	No plans to develop for ornamentals uses.
Trinexapac-methyl (PALISADE)	Syngenta	Cyclohexane carboxylic acid	Growth regulator with use resulting in less potential for lodging, more efficient seed harvest, and improved seed set.	Registered on ryegrass seed Interested in development on ornamentals. Need efficacy and crop safety data.

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Plant Growth Regulators (TRADE)	Registrant	Chemistry	Pest Control Spectrum	Status
Uniconazole (SUMAGIC)	Valent USA	Triazole	Growth retardant, reduces plant height by reducing internode elongation	Registered on poinsettia, unspecified bedding plants, bulb crops, geraniums, Easter lily, chrysanthemums, florist azaleas, and unspecified woody landscape ornamentals and ixora. Registrant endorses adding new plants to label.

## INSECTICIDES

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Abamectin (AVID)	Syngenta	Macrocylic lactone glucoside (Avermectin)	Broad-spectrum acaroids with activity on leafminers, Colorado potato beetle, mites and pear psylla. Weak against sucking insects and thrips. Good IPM tool with short re-entry interval. Translaminar activity providing long residual activity.	For use on ornamental plants including shadehouse, greenhouse, field-grown ornamentals, foliage plants, Christmas trees, and other woody ornamentals. Registrant endorses adding new plants to label.
Acequinocyl (KANEMITE) (PITON)	Arvesta	Quinolinone	Broad spectrum mite control (no rust mite activity). Unique mode of action Easy on beneficials with long residual activity	<b>Reduced Risk Product.</b> Undecided on ornamental development.
Acetamiprid (TriStar 70 WSP)	Cleary Chemical Co. Nisso America	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 Alternative.</b> Registered for unspecified greenhouse ornamental crops. Requests regional pest efficacy and crop safety data.
Azadirachtin (AZA-DIRECT)	Gowan	Extract from neem oil which acts as a hormonal analogue	Disrupts insect molting. Target pests include whitefly, leafminer, and Lepidoptera	<b>Biopesticide.</b> High interest in development for ornamentals.
<u>Bacillus thuringiensis</u> (FORAY)	Valent USA	Bacteria	Lepidoperan species	<b>Biopesticide.</b> Registered on forests, shade trees ornamental shrubs, ornamental trees, and non-bearing fruit and nut trees. Registrant endorses adding new plants to label.
<u>Beauveria bassiana</u> (MYCOTROL) (NATURALIS)	Emerald Bioagriculture Troy Bio-Sciences	Insect pathogenic fungi	Corn borer, grasshopper, cricket, locust, aphids and whitefly	<b>Biopesticide.</b> No plans to develop for ornamentals uses.
<u>Beauveria brongniartii</u>	Federal Republic of Germany	Insect pathogenic fungi	Targeted for soil dwelling pests	<b>Biopesticide.</b> No plans to develop for ornamentals uses.
Bifenazate (FLORAMITE)	Crompton	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> Product registered for homeowner and commercial use on ornamentals. Interested in developing additional ornamental uses.



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Bifenthrin (ASTAR) (ONYX)	FMC	Pyrethroid	Broad spectrum activity on aphids, armyworms, cutworms, flea beetles, mites, corn borers.	Interested in developing Onyx for ornamental uses. Expand label on beetles and borers. Additional crop safety data needed comparing Onyx to Astro.
Bistrifluron (DBI-3204)	Dongbu Hannong Chemical	Benzoylphenyl urea	Active against lepidopteran pests, whitefly. It acts by inhibiting chitin synthesis (Insect Growth Regulator)	No plans to develop for ornamentals uses.
BioMite™	Natural Plant Protection	Combination product containing Citronellol Geraniol Nerolidol and Farnesol	Unspecified mites	<b>Biopesticide.</b> No plans to develop for ornamentals uses.
Buprofezin (TALUS)	Nichino America SePRO	Thiadiazine - IGR, unique mode of action, inhibits chitin synthesis	Good activity for nymphal stages of leafhoppers, plant hoppers, scales, mealybugs, psylla, and whiteflies. Very safe to bees.	<b>Reduced Risk and OP Alternative.</b> Registered on indoor and outdoor ornamentals. Interested in further development, including scale/mealy bug control, for ornamentals.
CHECKMATE CM-F	Suterra	Pheromone	Codling Moth	No plans to develop for ornamental uses.
Chlorfenapyr (PYLON)	BASF Olympia	Pyrrole	Controls selective leptopteran larva, mites, thrips, and foliar nematodes.	Registered on begonia, chrysanthemum, Transvaal daisy, vervain and several flowering greenhouse plants. No plans to expand label for production ornamentals in container and field nurseries at the present time.
Chromafenozide (MATRIC)	Nippon Kayaku Sankyo	Insect Growth Regulator	Specific to lepidopteran pests, novel ecodyosone agonist.	No plans to develop for ornamentals uses.
<u>Chrysoperla carnea</u> (KAGETARO)	Arvesta	Bio-insecticide	Controls aphids	<b>Biopesticide.</b> No plans to develop for ornamentals uses.
Cinnamaldehyde (CINNACURE) (CINNAMITE)	Proguard	Natural Product	Aphids, mites and the diseases downy mildew, powdery mildew, botrytis, and brown rots.	<b>Biopesticide.</b> No plans to develop for ornamentals uses.
Clofentezine (OVATION)	Makhteshim-Agan	Tetrazine	Acaricide for eggs of <u>Panonychus ulmi</u> and <u>Tetranychus</u> spp.	No plans to develop for ornamentals uses.
Clothianidin (PONCHO) (CLUTCH)	Arvesta (soil & foliar markets) Bayer Environmental Sciences (seed)	Neonicotinoid	Contact and stomach activity. Activity on plum curculio, aphids, leafhoppers, apple maggot, leafminers, leaf rollers, codling moth, and pear psylla.	<b>OP replacement.</b> No plans to develop for ornamental uses.
Clove/Cinnamon/Mint Oils (VALORAM II)	Soil Technologies Corp.	Natural Product	Shown to contact kill and repel numerous insect pests	No plans to develop for ornamentals uses.
Chromfenozide (MATRIC)	Nippon Kayaku, Sankyo	Insect Growth Regulator	Specific to lepidopteran pests.	No plans to develop for ornamentals uses.
<u>Cydia pomonella</u> granulose virus (VIROSOFT CP4) (GRANUPOM)	Arysta Biobest	Granulosis Virus	Controls Codling moth	<b>Biopesticide.</b> No plans to develop for ornamentals uses.

## **IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004**

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Cyfluthrin (TEMPO)	Bayer Environmental Sciences	Pyrethroid	Controls cabbage looper, potato leafhopper, Colorado potato beetle, European corn borer, flea beetle, potato tuberworm, citrus thrips.	Interested in developing for ornamental uses. Need efficacy and crop safety data.
Cypermethrin (DEMON)	FMC	Pyrethroid	Residual activity on cutworms, thrips, leaf hopper, weevils, armyworms, lygus bug, plant bugs, corn earworm, aphids, and beetles.	For use on lawns and ornamentals in landscaped areas in and around buildings. NOT FOR USE in commercial greenhouses or nurseries. No plans to develop for ornamentals uses.
Cyromazine (CITATION)	Syngenta	Triazine with insecticide growth regulator activity	Leafminers, maggots, fungal gnats; and shore flies in certain ornamentals.	For use in landscape ornamentals; container grown ornamentals; greenhouse, lath and shadehouse grown ornamental bedding plants, and ornamental crops; and interiorscapes; and shore flies, only in greenhouse ornamental crops and interiorscapes. Registrant endorses adding new plants to label.
Deltamethrin (DELTA GARD)	Bayer Environmental Sciences	Pyrethroid	A broad spectrum residual insecticide for the control of ants, beetles, bugs, armyworms, mites, centipedes, chiggers, cockroaches, crickets, cutworms, wasps, skipper, fire ants, firebrats, grasshoppers, lawn moths, leafhoppers, silverfish, sod webworms, spiders, springtails, ticks, and weevils.	<b>OP Alternative.</b> For use in turfgrasses, landscape ornamentals (including interior plantscapes) and around perimeters of residential, commercial and recreational areas. No interest in further development for ornamental uses.
Diflubenzuron (ADEPT)	Crompton	Substituted benzoylurea, Insect Growth Regulator	Wide range of leaf feeding insects.	No interest in further development for ornamental uses.
Dinotefuran (STACKLE)	Valent USA Mitsui	Nitroguanidine,	Systemic uptake via roots, traslaminar with foliar application. Different mode of action than neonicotinoids. Controls aphid, thrips, leaf miners, soft scale, armored scale, mealy bug, codling moth, whitefly, flea beetle, and Colorado potato beetle.	<b>Reduced Risk Product and OP Alternative.</b> Registration pending 1 <sup>st</sup> Q 2004 for use on ornamentals. Registrant endorses adding new ornamental plants and pests to label.
Emamectin Benzoate (PROCLAIM) (STRATEGY) (DENIM)	Syngenta	Synthetic Avermectin analogue	Effective on larval Lepidoptera (Beet/fall armyworms, cabbage webworms, corn earworms, imported cabbage worm, cabbage looper) and leafminers	<b>OP Alternative.</b> No interest in further development for ornamental uses.
Ethiprole (RPA 107382)	Bayer Environmental Sciences	Phenylpyrazole	Broad spectrum activity against chewing and sucking insects	No plans to develop for ornamental uses.
Etoxazole (TETRASAN)	Valent USA	Oxazoline	Insecticide/acaricide for control of <u>Panonychus</u> spp and <u>Tetranychus</u> spp, including hexythiazox resistant mite strains. Inhibition of molting, effective on eggs, larvae, & nymphs.	<b>Reduced Risk Product.</b> Registered on unspecified bedding plants, flowering plants, foliage plants, ground covers, non-bearing fruit trees, non-bearing nut trees, unspecified ornamental shrubs and ornamental trees.

## ***IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004***

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Fenoxycarb (AWARD) (PRECISION)	Syngenta	Non-neurotoxic carbamate - IGR	AWARD: Fire ants and Big-Headed ant control. PRECISION: selected insect control, including whiteflies, soft scales, fungus gnats, thrips, shore flies, and Lepidopterous leafminers.	AWARD: May be used in and around container and field-grown ornamental and nonbearing nursery stock, and on sod farms (commercial turf). Award may also be used on turf and other non-agricultural land including, but not limited to, airports, roadsides, school grounds, golf courses, parks, picnic grounds, sports fields, other recreational areas, ornamental gardens, cemeteries, and other landscaped areas. PRECISION: For use in container and landscape ornamentals, nonbearing fruit and nut trees in nurseries, Christmas tree plantations, ground covers, greenhouse, lath and shade house ornamental crops, and interiorscapes.
Fenpropathrin (TAME)	Valent USA	Pyrethroid	Aphids, whitefly, various worms, mites, glassy winged sharpshooter, and stinkbugs.	Registered on unspecified ornamentals shrubs, conifers, deciduous trees, non-deciduous trees, palms and non-bearing nursery fruit trees.
Fenpyroximate (AKARI)	Nichino America  SePRO	Phenoxypropylazoles	Controls mites, including two-spotted, European, red and citrus rust mite, and psylla.	<b>Reduced Risk Product.</b> Interested in further development in ornamentals.
Fipronil (CHIPCO CHOICE) (TOPCHOICE) (CEASEFIRE)	BASF (liquid)  Bayer Environmental Sciences (Granular)	Phenylpyrazole - A broad spectrum neurotoxin, unique mode of action	Controls mole crickets, nuisance ants, imported fire ants, fleas, and ticks. Systemic activity, with long residual.	The granular formulation is registered and marketed by Bayer for use on turfgrass such as golf turf, sport fields, commercial lawns, cemeteries, parks, campsites, recreational areas, home lawns, school grounds, and sod farms. Also for use in landscape beds. Possible interest by both Bayer and BASF in additional ornamental uses. Bayer is not interested in further development for ornamental uses.
Fonicamid (ARIA)	FMC & ISK	Cyanomethoxy trifluoromethyl nicotinamide.	Effective against aphids, thrips, leafhoppers, plant bug and other sucking pests. Provides rapid anti-feeding activity. Non-toxic to beneficials	<b>OP Replacement Product.</b> Pending use on greenhouse ornamentals and field nursery crops. Additional crop safety data needed.
Fluacrypyrin (TITARON)	Nippon Soda	Methoxyacrylate	Acaricide	No plans to develop for ornamental uses.
Flufenzin	Chinoin	Not disclosed.	Acaricide	No plans to develop for ornamental uses.
Flupyraxozol (SEON BONG)	Dongbu Hannong	Not disclosed.	Diamondback moth	No plans to develop for ornamental uses.
V4C Virus (GALAXY)	Analytica	Viral Insecticide	Effective against lepidopteran insects.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Gamma-Cyhalothrin (PYTECH)	Dow AgroSciences	Pyrethroid	Same use as other pyrethroids, but at lower rate.	No plans to develop for ornamental uses.
Halofenozide (MACH 2)	Dow AgroSciences	Molt accelerating compound	Controls grubs and Lepidoptera larvae.	Considering registration on container and field grown ornamental and nursery plants.
Hexythiazox (SAVEY)	Gowan	Carboxamide	Mites eggs and immature stages	No plans to develop for ornamental uses.

## ***IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004***

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Hydramethylnon (AMDRO)	BASF	Amidinohydrazone	Slow acting insecticide, formulated as a bait that is effective on ants	For use in and around container or field grown ornamental and non-food bearing nursery stock, and on sod farms (commercial turf). May also be applied to the soil around non-bearing fruit or nut trees. For use on lawns, landscaped areas, golf courses and other noncropland areas such as airports, roadsides, cemeteries, commercial grounds, parks, school grounds, picnic grounds, athletic fields and other recreational areas, as well as on grounds surrounding poultry houses or corrals and other animal holding areas. May also be applied to grass forage in certain states. No plans for additional development in ornamentals.
Imidacloprid (MARATHON II)	Bayer Environmental Sciences	Chloronicotinyl	Primarily effective against sucking insects (aphid, whitefly, scale, etc.) as well as beetles and grubs. Controls numerous pests that are resistant to insecticides.	<b>OP Alternative.</b> Interested in developing ornamental uses. Need crop safety data.
Indian Meal Moth Granulosis Virus (FRUITGUARD-V) (NUTGUARD-V)	AgriVir, LLC	Virus	Indian meal moth	<b>Biopesticide.</b> Registered on dried fruit and nuts. No plans to develop for ornamental uses.
Iron Phosphate (SLUGGO)	W. Neudoff	Iron salt	Slugs and snails	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Jjoba Oil (DETUR/E-RASE)	IJO Products	Natural Product	Controls whitefly and powdery mildew	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Kaolin (SURROUND)	Engelhard Corporation	Clay	Various insect and mite pest.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Lambda-Cyhalothrin (DEMAND) (SCIMITAR)	Syngenta	Pyrethroid	Broad spectrum insect control.	DEMAND: For use by commercial applicators in, on and around buildings and structures where turf and ornamentals are grown including lawns, ornamental trees and shrubs around residential, institutional, public, commercial, agricultural and industrial buildings; and parks, recreational areas and athletic fields. SCIMITAR: For use in ornamentals and lawns in landscaped areas around residential, institutional, public, commercial and industrial buildings, parks, recreational areas and athletic fields.
<u>Metarhizium anisopliae</u> (GREENGUARD)	Bio-Care	<u>Metarhizium anisopliae</u>	Locust	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Metarhizium anisopliae</u> (TAERAIN)	Earth BioScience	<u>Metarhizium anisopliae</u>	Controls black vine weevil, whitefly, thrips, and mites.	<b>Biopesticide.</b> Interested in developing for ornamentals.
Methoxyfenozide (INTREPID) (RUNNER)	Dow AgroSciences	Diacylhydrazine – (Molt accelerating compound)	Similar to tebufenozide in that it only controls Lepidoptera larvae. Better on budworm/bollworm, leafminers and diamondback moth. Excellent fit with IPM programs.	No plans to develop for ornamental uses.
Metofluthrin (S-1264)	Valent USA	Pyrethroid	Broad spectrum insect control.	Not registered in the USA. Therefore, no plans to develop for ornamental uses in USA.
Milbemectin (ULTRAFLORIA)	Sankyo & Gowan	Macrocylic lactone	Excellent miticide, also controls aphids, leafminers, thrips, leafhoppers	<b>Reduced Risk Product and OP Alternative.</b> No plans to develop for ornamental uses.

## ***IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004***

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Novaluron (PEDESTAL)	Makhteshim-Agan & Crompton	Insect Growth Regulator (chitin synthesis inhibitor)	Effective against Lepidoptera, mealy bugs, silver leaf whitefly, Western flower thrips, leaf miner, and some mites. Strictly a contact material, no systemic activity.	<b>Reduced Risk Product.</b> Registered for all container grown ornamentals except poinsettias.
Noviflumuron (DE-007)	Dow AgroSciences	Difluorobenzamide (Chitin synthesis inhibitor)	Insect growth regulator for control of urban pests, such as ants and termites.	No plans to develop for ornamental uses.
Olive Fly Attract and Kill	Thermo Trilogy	Pheromone	Olive fruit fly.	No plans to develop for ornamental uses.
<u>Paelamyces fumosoroseus</u> (PRE FE RAL)	Biobest	Microbial	Whitefly.	<b>Biopesticide.</b> Interested in development for ornamentals.
PAVOIS Granulosis virus	Bayer Environmental Sciences	<u>Carpocapsa</u> spp.	Product controls two generations of susceptible insects.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Profluthrin (S-1840)	Valent USA	Pyrethroid	Broad spectrum insect control.	Not registered in the USA. Therefore, no plans to develop for ornamental uses in USA.
Propylene glycol monolaurate (ACARITOUCH)	Toagosei Co., Ltd.	Propylene glycol	Tetranychid mites.	Pending use on unspecified ornamentals.
Pymetrozine (ENDEAVOR)	Syngenta	Pyridine azomethine	Controls sucking insects (aphids/whiteflies). The product has a rapid knockdown on aphids if direct sprays contact them.	<b>Reduced Risk Product and OP Alternative.</b> For use on landscape ornamentals, field grown ornamentals, container grown ornamentals, nonbearing fruit and nut trees in nurseries, Christmas trees, ground covers, and ornamental plants in greenhouses, lath- and shade-houses and interiorscapes.
Pyridaben (SANMITE)	BASF	Pyridazinone	Activity on mites and whiteflies. A new class of insecticide offering long-term residual control. Good for IPM/ resistance management.	Fully registered in nurseries and greenhouses. Scotts interested in expanding label for control of additional pests. Data needed to demonstrate consistent control of aphids, mealybugs and scales.
Pyridalyl (S-1812)	Valent USA	Pyridine	Good activity against lepidoptera and thrips. Effective against pyrethroid resistant insects. Safe on beneficials.	<b>Potential OP Replacement Product.</b> Registration pending 3 <sup>rd</sup> Q 2004 for use on ornamentals. Need efficacy data for lepidopteran insects.
Pyriproxyfen (DISTANCE IGR)	Valent USA	Pyridine (IGR-selective juvenile hormone analog).	Controls scales, whiteflies, thrips, pear psylla, codling moth, ants, euonymus scale, fungus gnats, shore flies and suppression of mealy bugs. Effective on eggs and immature stages, not effective on adults. Excellent for IPM Programs.	<b>Reduced Risk Product and OP Alternative.</b> Registered shrubs, ornamental plants, flowering plants, foliage plants, ornamental trees and groundcovers <u>except</u> salvia, ghost plant, Boston fern, schefflera, gardenia, coral bells and poinsettia after bract formation. Need efficacy data for additional scale species.

## IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
QCIDE	BioProspect	Plant derived bio-insecticide.	Broad spectrum insecticide.	
Rosemary Oil (HEXACIDE)	EcoSmart Technologies	Natural Product	Kills scale insects on contact, minimal impact on beneficials.	<b>Biopesticide.</b> Interested in development for ornamentals. No plans to develop for ornamental uses.
Spinosad (CONSERVE) (GF-120 NATURALYTE)	Dow AgroScience	Macrocyclic lactone	Controls thrips, Lepidopterous larvae, sawflies, Chrysomelid leaf feeding beetles, Dipterous gall midges, Dipterous leafminers fire ants and fruitflies. Has low environmental impact, good residual activity, and is safe to many beneficial insects making it ideal for use in IPM programs.	<b>Reduced Risk Product and OP Alternative.</b> For use in turfgrass and herbaceous & woody ornamentals in nurseries or in greenhouses. Fire Ant applications may be made in turfgrass and ornamentals in greenhouses and in other outdoor areas.
Spirodiclofen (BAJ 2740)	Bayer Environmental Sciences	Spirocyclic phenyl-substituted tetronic acid	Broad-spectrum activity against mites, psyllid nymphs, and scale crawlers. Very active on eggs, larvae, and quiescent stages). <u>Tetranychus</u> species. It is ideal for IPM programs, easy on predatory mites and insects.	No plans to develop for ornamental uses.
Spiromesifen (FORBID)	Bayer Environmental Sciences	Spirocyclic phenyl-substituted tetronic acid	Effective against all-important whitefly and mite species as a contact insecticide/acaricide. Juvenile mite stages are often more susceptible than adults, Highly effective against whitefly nymphs. Significant effect on the otherwise difficult to control pupal stage.	Interested in developing for ornamentals. Need crop safety data, especially on flowering part of the plant..
<u>Spodoptera exigua</u> Nuclear Polyhedral virus	Biosys	Viral Insecticide	<u>Spodoptera</u> larvae	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Sucrose Octanoate Esters	AVA Chemical Ventures	Biochemical Sugar	Being evaluated for control for glassy-winged sharpshooter.	No plans to develop for ornamental uses.
Tebufenpyrad (PYRANICA)	United Agri. Products, & Nichino America	Pyrazole	Broad spectrum miticide.	Registered on greenhouse ornamentals. Future of this product uncertain at present time.
Tebufenozide (CONFIRM)	Dow AgroSciences	Diacylhydrazine – (Molt accelerating compound)	Controls only Lepidoptera larvae. Safe to beneficial insects with low environmental impact. Excellent for IPM programs.	<b>Reduced Risk Product and OP Alternative.</b> No plans to develop for ornamental uses.
Tebupirimphos (AZTEC*) *A combination product with cyfluthrin	Amvac	Organophosphate and Pyrethroid	A soil insecticide, active against a wide range of insets, including corn rootworm, wireworm, white grub and seed corn maggot.	No plans to develop for ornamental uses.
Tefluthrin (FORCE)	Syngenta	Pyrethroid	Controls a wide range of soil insects including rootworms, cutworms, wireworms and grubs.	No plans to develop for ornamental uses.

## IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004

Insecticides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Thiamethoxam (FLAGSHIP)	Syngenta	Second-generation neonicotinoid. Systemic in plant by root uptake and transport in xylem	Broad-spectrum foliar and systemic activity against soil pests, and many sucking/chewing pests. Effective against aphids, fire ants, galls, whitefly, thrips, leafhopper, mealybugs plant bugs, and larvae of certain beetles, chafers, Black turfgrass atenioides and Aphodius spp.	<b>OP Alternative.</b> For use on ornamental plants grown in greenhouses, lath and shadehouses, containers, field nurseries (including non-bearing fruit and nut trees) and on Christmas trees. Registrant endorses adding new plants and pests to label.
Thiacloprid	Bayer Environmental Sciences	Second generation neonicotinoid.	Broad spectrum systemic control of sucking and chewing pests including aphids, whiteflies, leafhoppers, plant bugs, pear psylla, weevils, fruit flies, oriental fruit moth, leafminers and codling moth. <u>Very safe to bees.</u>	Interested in developing for ornamental uses. Need efficacy and crop safety data.
Thiocyclam (EVISECT)	Arvesta	Trithianamine	Insect IGR.	No plans to develop for ornamental uses.
Tolfenpyrad (HACHIHACHI)	Nichino America	Pyrazole	Effective against diamondback moths, other moths, thrips and aphid.	Under evaluation for development in ornamental crops.
<u>Verticillium lecanii</u> (MYCOTAL)	Arvesta	Bio-insecticide	Effective against whitefly.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
VIROSOFT Viral Insecticide	Biotepp	<u>Mamestra configurata</u> Granulosis virus	Can be applied as a preventative treatment at planting or a curative foliar treatment for bertha armyworm.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
VIRTUOSO	AgraQuest	Streptomyces based bio-insecticide	Broad spectrum activity against selective lepidoptera, flea, flies and mites.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Zeta-cypermethrin (FURY) (MUSTANG)	FMC	Pyrethroid	Controls cutworms, thrips, and armyworms, ect.	<b>OP Alternative.</b> No plans to develop for ornamental uses.

## FUNGICIDES

Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Acibenzolar (ACTIGARD) (BLOCKADE)	Syngenta	Benzothiadiazole, (Systemic Acquired Resistance Inducer)	Induces resistance to tomato spotted wilt virus, Blue mold, bacterial diseases, Downy Mildew, Sclerotinia	No plans to develop for ornamental uses.
<u>Agrobacterium radiobacter</u> (GALLTROL-A)	AgBioChem	Bacteria	Control of hairy root and root mat, crown gall	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Ampelomyces quisqualis</u> isolate M-10 (AQ 10)	Ecogen	Fungus	Hyperparasite of Powdery mildew	<b>Biopesticide.</b> Interested in developing for use in ornamentals.

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Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Azoxystrobin (HERITAGE)	Syngenta	Strobilurin	Broad spectrum preventative fungicide with systemic & curative properties for control of many plant diseases including Cladosporium, Venturia, Botryosphaeria, Mycosphaerella, Pyrenophora, Puccinia, Pyricularia, Plasmopara, Guignardis, Pseudoopeziza, Alternaria, Sphaerotheca, Erysiphe, Leveillula, Septoria, Pythium, Uncinula, Rhizoctonia etc.	Reduced Risk Product. For the control of certain diseases of bed or field grown ornamentals in greenhouses, shade-houses, outdoor nurseries, retail nurseries, production nurseries, gardens, and other residential and commercial landscape areas. For use on golf courses, lawns, and landscaped areas around residential, institutional, public, commercial and industrial buildings, parks, recreational areas and athletic fields. Also for use on conifers in production and landscape situations. Registrant endorses adding new plants and pests to label.
<u>Bacillus licheniformis</u> Strain SB 3086 (GREEN-RELEAF) (ECOGUARD)	Nocozymes Biologicals	Microbial	Controls dollar spot.	<b>Biopesticide.</b> Pending use on turf, ornamental plants, conifers, tree seedlings. Registrant endorses adding new plants and pests to label.
<u>Bacillus pumilus</u> strain 2808 (SONATA AS)	AgraQuest	Microbial	Botrytis downy and powdery mildews, rusts, Sclerotinia blight, and rots	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Bacillus pumilus</u> GB 34	Gustafson	Microbial	Suppression of Rhizoctonia & Fusarium	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Bacillus subtilis</u> strain QST 713 (RHAPSODY)	AgraQuest	Microbial	Broad spectrum fungicide that controls Anthracnose, Alternaria, Cercospera, Helminthsporium, etc.	<b>Biopesticide.</b> Registered for use on greenhouse ornamentals. Registrant endorses adding new plants to label.
<u>Bacillus subtilis</u> var. amyloliquefaciens strain FZB24 (TAEGRO)	Taensa	Microbial	Broad spectrum fungicide that controls Anthracnose, Alternaria, Cercospera, Helminthsporium, etc.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Bacillus subtilis</u> strain GB03	Growth Products Ltd	Microbial	Broad spectrum fungicide that controls Anthracnose, Alternaria, Cercospera, Helminthsporium, etc.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Bacillus subtilis</u> strain MB 1600 (SUBTILEX)	Becker Underwood	Microbial	Seed treatment use	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Bacteriophages (AGRIPHAGE)	Agriphi	Microbial	Manages bacteria spot and bacteria speck	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Benthiavalicarb (KIF-230)	Kumiai	Carbamate	Controls downy mildew and oomycete fungi	Development is on "hold". No plans to develop for ornamental uses.
Boscalid (EMERALD)	BASF	Nicotinamide	Manages powdery mildew, Alternaria, Botrytis, Sclerotinia and Monillia	<b>Reduced Risk Product.</b> Interested in developing for ornamental uses. Efficacy and crop safety needed.
Boscalid & Pyraclostrobin (PRISTINE)	BASF	Multi active ingredients	Broad-spectrum activity on Anthracnose, Alternaria, downy mildew, powdery mildew, Botrytis, Sclerotinia and Monilinia.	<b>Reduced Risk Product.</b> Interested in developing for ornamental uses. Efficacy and crop safety needed.



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Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
<u>Candida oleophila</u>	Ecogen	Biofungicide	Post-harvest diseases.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Candida saitoana</u> (BIOCURE)	Micro Flo	Biofungicide	Post-harvest disease control in fruits, both preventative and curative activity.	<b>Biopesticide.</b> No plans to develop for ornamentals.
Chitosan (ELEXA-4)	SafeScience	Carbohydrate-Chitin based product, plant defensive booster	Downy and powdery mildew, gray mold and Botrytis.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Cinnamaldehyde (CINNACURE) (CINNAMITE)	Proguard	Natural Product	Downy mildew, powdery mildew, botrytis, brown rots, aphids and mites.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Coninthyrium minitans</u> (CONTANS WG)	Prophyta Encore Technologies	Fungus	Controls Sclerotinia sclerotium and S. minor.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Copper Octanoate (NEU 1140F)	W. Neudorff	Copper Octanoate	Downy mildew, powdery mildew, blue mold, white rust, anthracnose.	No plans to develop for ornamental uses.
Cyazofamid (RANMAN)	ISK Biosciences	Cyanoimidazole – Inhibitor of mitochondrial electronic transport.	Oomycete and Plasmodiophoromycetes (late blight & downy mildew).	<b>Reduced Risk Product.</b> Interested in further development for ornamentals. Registrant endorses adding new plants and pests to the label.
Cyflufenamid (NF-149) (PANCHO)	Nippon Soda	Phenylacetamid	Excellent activity on various powdery mildews and brown rots.	No plans to develop for ornamental uses.
Cyproconazole (ALTO)	Syngenta	Triazole	Coffee rust.	No plans to develop for ornamental uses.
Cyprodinil (VANGARD)	Syngenta	Anilinopyrimidine	Ascomycetes and Deuteromycetes such as: Botrytis, Alternaria, Monilinia, Venturia, Pseudocerosporella, Pyrenophora, Septoria, Erysiphe, Erysiphe, Rhynchosporium Glomerella, Coccoomyces, and Colletotrichum.	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Cyprodinil/Fludioxonil (SWITCH)	Syngenta	Anilinopyrimidine and Phenylpyrrole	Controls Botrytis, Alternaria and brown rot.	<b>Reduced Risk Product.</b> Plan to submit ornamental registration in 2004. Registrant endorses adding new plants to label.
Diallyl Sulfide (ALLI-UP)	UAP/Platt	Diallyl sulfide, classified as biochemical.	White rot.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Difenoconazole (DIVIDEND)	Syngenta	Triazole	Smuts, bunts, Aspergillus, Fusarium, Penicillium, Septoria, Cochliobolus, Pyrenophora, Pseudocercospora, and Gaeumannomyces.	No plans to develop for ornamental uses.

## IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004

Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Dimethomorph (STATURE DM)	BASF SePRO	Cinnamic acid derivative	Downy mildew, late blight, Phytophthora, Plasmopara, Pseudoperonospora Bremia, and Peronospora. Should be mixed with other fungicides for resistance management.	SePRO will market this product in ornamentals. Registration in California is pending. Future ornamental development plans are unclear at this time.
Dimoxystrobin (BAS 505F)	BASF	Strobilurin	Sclerotinia and Rhizoctonia	No plans to develop for ornamentals uses.
Dithianon (DELAN)	BASF	Quinone	Scab, downy mildew, rust, leaf spot.	Not registered in the USA. No plans to develop for ornamentals uses.
Epoxiconazole (OPUS)	BASF	Triazole	Leaf spots, powdery mildew, black spots.	Not registered in the USA. No plans to develop for ornamentals uses.
Ethaboxam (GUARDIAN)	L G Chemicals Sumitomo	Thiazole carboxamide	Useful for grape downy mildew, potato and tomato late blight, pepper blight and cucumber downy mildew. Preventive and curative activity	No plans to develop for ornamental uses.
Extract of Neem Oil	Olympic Horticultural	Extract of Neem oil,	Useful for control of powdery mildew and rust.	Efficacy data in California needed.
Fenamidone (FENOMEN)	Bayer Environmental Sciences	Imidazolinone (Respiration Inhibitor)	Foliar protectant and curative activity against Oomycete fungi. Also effective against ascomycete and Alternaria. Inhibits electronic transport.	<b>Candidate Reduced Risk Product.</b> Registrant endorses ornamental uses.
Fenbuconazole (INDAR) (ENABLE)	Dow AgroSciences	Triazole	Powdery mildew, rusts, apple scab, brown rot, cotton ball, mummy berry (Monilinia spp.), smuts, bunts, Cladosporium, Mycosphaerella, Cercospora, Septoria, Rhizoctonia, Pyrenophora, Helminthosporium & related genera, and Colletotrichum sp.	No plans to develop for ornamental uses.
Fenhexamid (DECREE)	Arvesta	Hydroxyanilide	Non-systemic protectant fungicide that is effective against Botrytis cinerea, Monilina, Sclerotina sclerotiorum of lettuce.	<b>Reduced Risk Product.</b> Registered on ornamentals. Registrant endorses adding new plants to label.
Fenpropimorph (BAS-421)	BASF	Morpholine	Controls powdery mildew, rust, Helminthosporium, Rhynchosporium, Septoria, etc.	No plans to develop for ornamental uses.
Fluazinam (OMEGA)	Syngenta & ISK	Pyridinamine	Broad spectrum disease control: Alternaria, Botrytis, Cladosporium, Colletotrichum, Phytophthora, Plasmopara, Rhizoctonia, Sclerotinia, Venturia, Streptomyces, and some mites.	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.

## IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004

Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Fludioxonil (MEDALLION)	Syngenta	Phenylpyrrole	A protectant fungicide for the control of certain diseases such as Botrytis, Cythrodium, Fusarium, Rhizoctonia, Myrothecium, Cercospora, Pythium, Phytophthora, Alternaria, Sclerotium, Septoria, and Thielaviopsis.	<b>Reduced Risk Product.</b> For use in turfgrass including golf courses, institutional, commercial and residential lawns, sod farms, sports fields, parks, municipal grounds and cemeteries, and on ornamentals grown in interiorscapes, field nursery plantings, (ash, non-bearing cherry, non-bearing peach, crabapple, magnolia, maple and oak) container nurseries, forest nurseries, residential and commercial landscapes, green houses, lath and shade houses, or other enclosed structures. Registrant endorses adding new plants to the label.
Fluoxastrobin (HEC 5725)	Bayer Environmental Sciences	Strobilurin	Alternaria, Early Blight and Sclerotinia. Can be used as seed treatment or foliar use.	Pending use as seed treatment on turf. No plans to develop for ornamental uses.
Flutolanil (PROSTAR)	Bayer Environmental Sciences Nichino America	Benzamide	Rusts, sheath blight, and other diseases caused by Rhizoctonia,	Registered for use on turf and ornamentals. Registrant endorses adding new plants to the label.
Fosetyl-AL (ALIETTE) (CHIPCO SIGNATURE)	Bayer Environmental Sciences	Aluminum phosphate	ALIETTE: Controls Phytophthora, Pythium and Alternaria diseases, fire blight and Downy mildew, and bacterial blight suppression. CHIPCO SIGNATURE: Controls Pythium and yellow tuft.	ALIETTE: For use on ornamentals and bedding plants grown in field nurseries, greenhouse, landscaping, and conifer nurseries.  CHIPCO SIGNATURE: For use on common turfgrasses on golf courses, sod farms, and other commercial turf areas.  Registrant endorses adding new plants to label.
Glutamic Acid (AUXI GRO)	Emerald Bioagriculture	Glutamic acid	Controls brown rot and suppresses shot hole	No plans to develop for ornamental uses.
<u>Gliocladium catenulatum</u> Strain J1446 (PRESTOP)	Verdera Oy (AgBio, Inc.)	Fungus	Recommended for control of Botrytis, Didymella, Pythium and Rhizoctonia	<b>Biopesticide.</b> Registered on ornamentals. Registrant endorses adding new plants to label.
Harpin Protein (MESSENGER)	Eden BioSciences	Protein which switches natural plant defenses in plant	Bacterial leaf spot wilt, blight, and fungal diseases such as botrytis, bunch rot, and powdery mildew.	<b>Biopesticide and Methyl Bromide Replacement.</b> No plans to develop for ornamental uses.
Hexaconazole (PROSEED)	Syngenta	Triazole	Controls loose smut and common root rot via seed treatment	No plans to develop for ornamental uses.
Hydrogen peroxide (OXIDATE)	Bio Safe Systems	Hydrogen peroxide	Broad spectrum bactericide and fungicide	No plans to develop for ornamental uses.
Hymexazol	Sankyo	Azole	Seed rot, Aphanomyces	No plans to develop for ornamental uses.
Ipconazole (VORTEX)	Crompton and Gustafson	Triazole	Protects against seed borne and soil borne fungi, which causes seed decay, damping off, and seedling blight.	Pending seed treatment use on conifers and ornamental flowers. Registrant endorses adding new plants to label.
Iprovalicarb (MELODY)	Bayer Environmental Sciences	Amino-acid amide carbamate	Activity on oomycete fungi, downy mildew, and Phytophthora	No plans to develop for ornamental uses.
Kresoxim-methyl (CYGNUS)	BASF Scotts	Strobilurin	Mildews, Septoria, Rusts, Scab, Phomopsis, Black Rot. Provides protectant, curative and eradicator control of powdery mildew.	Registered as a greenhouse/nursery product. Presently licensed to Scotts. No plans for further development in ornamentals with current product.

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Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Laminarine (IODUS 40)	Goemar	Oligosaccharide	It acts as a disease resistance activator on a wide range of pathogens including <i>Septoria</i> spp.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Mefenoxam (SUBDUE MAXX)	Syngenta	Active isomer of metalaxyl	Same spectrum as metalaxyl	<b>Reduced Risk Product.</b> Registered on ornamentals. Registrant endorses adding new plants to label.
Mepaniprim (FRUPICA) (COCKPIT) (JAPICA)	Kumiai, Sipcam, Certis	Anilinopyrimidine	Controls Botrytis, scab ( <i>Venturia</i> spp.) and Powdery Mildew. Mostly a preventive material but has curative properties. Unique mode of action/no cross-resistance.	No plans to develop for ornamental uses.
Metconazole (CARAMBA)	BASF and Kureha	Triazole	Broad spectrum	No plans to develop for ornamental uses.
Metrafenone (FLEXITY)	BASF	Dimethylbenzophenone	Controls powdery and downy mildew.	Not registered in the USA. Therefore, no plans to develop for ornamental uses in the USA.
MILSANA Bioprotectant	KHH BioScience	Extract from giant knotweed	Induces phytoalexins that confer resistance to powdery mildew and other diseases such as Botrytis.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Muscodor albus</u>	AgraQuest	Biofungicide	Fungus produces volatile compounds that are effective against plant pathogenic and bacteria.	<b>Biopesticide and potential Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
Myclobutanil (EAGLE) (SYSTHANE)	Dow AgroSciences	Triazole	A systemic, protectant and curative fungicide for the control of powdery mildews, rusts, anthracnose, red thread, various leaf spots, various blights, brown patch, melting out, crown rot, summer patch, Zoysia large patch, 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.)	EAGLE: For use in turfgrass, landscape ornamentals and ornamental tree fruits. Not for use in commercial greenhouses or nurseries. Registrant endorses adding new plants to label.  SYSTHANE: For greenhouse or field grown ornamental plants. Registrant endorses adding new plants to label.
Orysastrobin	BASF	Strobiluron	Mildews, Rusts, and Scab.	No plans to develop for ornamental uses in the USA.
Oxolinic Acid (STARNER)	Valent USA	Quinoline	Controls gram-negative bacteria and fireblight	Not registered. No plans to develop for ornamental uses.
<u>Pantoea agglomerans</u> C9-1	Plant Health Technology	Bacteria	Fireblight	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Peroxyacetic Acid	Ecolab Inc.	Peroxyacetic acid	Post harvest decay and rot	No plans to develop for ornamental uses.
Phosphonic Acid (ALLUDE)	Cleary Chemical Co.	Phosphorus acid	Downy mildew, scab, and root rot	Registered in turf and ornamentals. Requests ornamental crop safety data.
Physpe (VACCIPLANT)	Agrimar	Glucan from brown alage.	Bacterial diseases	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Picoxystrobin (ACANTO)	Syngenta	Second generation strobilurin	Wide spectrum of diseases	No plans to develop for ornamental uses.

## **IR-4 ORNAMENTAL HORTICULTURE PRODUCTS/PEST SOLUTION LIST – February 2004**

Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Polyoxin D (ENDORSE)	Cleary Chemical Co.	Fungal antibiotic derived from Streptomyces.	Broad spectrum control as a translaminar penetrant. New mode of action. Rhizoctonia, Fusarium, Colletotrichum, Dreschlera, Microdochium, Typhula, Pycularia, Laetisaria, Botrytis, Alternaria, Erysiphe.	<b>Reduced Risk Product and EPA Biopesticide classification.</b> Registered in turf. Interested in development for use on ornamentals.
Potassium Bicarbonate (KALIGREEN & ARMICARB)	Toagosei, Church & Dwight	Inorganic salt	Powdery mildew	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Potassium Dihydrogen Phosphate (eKsPunge)	Lido Chemical	Potassium dihydrogen phosphate	Powdery mildew	No plans to develop for ornamental uses.
Potassium Phosphate (PRO-PHYT)	Pamol	Potassium Phosphate	Downy mildew, late blight and root rots	No plans to develop for ornamental uses.
Potassium Phosphite/Phosphate (BIOPHOS)	Foliar Nutrients, Inc. (AgBio, Inc.)	Potassium Phosphite/Phosphate	Systemic via root or foliar for control of Phytophthora, Pythium, Downy/Powdery mildew, Thielaviopsis	<b>Biopesticide.</b> Registered on turf and ornamentals. Registrant endorses adding new plants to label.
Propamocarb Hydrochloride (BANOL)	Bayer Environmental Sciences	Carbamate – Systemic root uptake & acropetal distribution throughout the plant.	Pythium and Phytophthora. Should be mixed with other fungicides for resistance management.	<b>Candidate Reduced Risk.</b> For use on turfgrass and certain ornamentals (not for field grown), including woody ornamentals. No plans to develop further for ornamental uses.
Prochloraz (BUMPER)	Makhteshim- Agan	Carboxamide	Powdery mildew, Fusarium spp, leaf blotch, Botrytis, Alternaria, and others.	No plans to develop for ornamental uses.
Propiconazole (BANNER MAXX)	Syngenta	Triazole	A systemic fungicide for the control of various blights, leafspots, powdery mildew, rusts, and smuts.	For use on turfgrasses, ornamentals and other landscape and nursery plantings. Registrant endorses adding new plants to the label.
Prothioconazole (JAU 6476)	Bayer Environmental Sciences	Triazolothione- Demethylation inhibitor	Effective against Septoria spp, Fusarium spp, Rhynchosporium secalis, and Rhizoctonia. It has protectant, curative and eradicant activity. Can be applied as seed treatment or as foliar spray	No plans to develop for ornamental uses.
Pseudomonas chloroaphis Strain 63-28 (AtEze)	EcoSoil Systems	Bacteria	Target pest include soil borne diseases Rhizoctonia solani and Pythium spp. Outcompetes phytopathogenic species.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Pseudomonas fluorescens PRA-25	Good Bugs, Inc.	Bacteria	Controls Pythium seed rot and damping off.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
<u>Pseudomonas syringae</u> (BIOSAVE)	EcoScience	Bacteria	Controls Fusarium and post harvest storage rots.	<b>Biopesticide.</b> No plans to develop for ornamental uses.

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Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Pseudozyma flocculosa Strain PF-A22 (SPORODEX WP)	Plant Products Ltd.	Bacteria	The product antagonizes a number of powdery mildew species	<b>Biopesticide.</b> Registered on greenhouse roses.
Pyraclostrobin (INSIGNIA)	BASF	Strobilurin- Mitochondrial electron transport Inhibitor	Broad spectrum activity on Anthracnose, Alternaria, downy mildew, Cercospora leaf spot, rust, powdery mildew, Septoria, Phytophthora, Pythium, and Rhizoctonia.	<b>Reduced Risk Product.</b> Registered on golf course turf. Supplemental label submitted for use on ornamentals, conifers, Christmas trees, bulb production, commercial/retail greenhouses/nurseries, commercial and residential turf. Registrant endorses adding new plants to label.
Pyrimethanil	Bayer Environmental Sciences	Anilinopyrimidine	Active against Botrytis spp., Venturia spp., Alternaria solani, Alternaria mali, Sphaerotheca macularis and Monilinia spp.	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Quinoxyfen (ARIUS) (QUINTEC)	Dow AgroSciences	Quinoline-Disrupts early cell signaling activities	Has shown activity against powdery mildew in a wide range of crops.	<b>Reduced Risk Product.</b> No plans to develop for ornamental uses.
Simeconazole (SANLIT) (MONGARIT)	Sankyo	Triazole	Effective as seed treatment against Basidiomycetes	No plans to develop for ornamental uses.
Silthiophan (LATITUDE)	Monsanto	Carboxamide	Control of Take-All via seed treatment.	No plans to develop for ornamental uses.
Spiroxamine	Bayer Environmental Sciences	Morpholine	Powdery mildew, most rusts, Rhynchosporium leaf blotch. Chemical shows protective, curative and eradivative effects.	No plans to develop for ornamental uses.
Streptomyces griesoviridis (MYCOSTOP)	Verdera Oy AgBio Inc.	Bacteria.	Damping off/root rots caused by Fusarium, Pythium, Alternaria and other pathogens.	<b>Biopesticide.</b> WP standard formulation for hydroponic and pot crops. New registration of Mycostop Mix for greenhouse/field/seed treatment applications.
Streptomyces lydicus WYEC 108	Natural Industries	Bacteria.	Control of soil borne plant root and damping off fungi	<b>Biopesticide.</b> No plans to develop for ornamental uses.
SYP-L190	Shenyang Research	Cinnamic acid derivative (analog of Dimethomorph)	Effective against oomycete fungi, including downy mildew.	No plans to develop for ornamental uses.
Tebuconazole (LYNX)	Bayer Environmental Sciences	Triazole	Powdery mildew, rusts, smuts, bunts, apple scab, Pyrenophora, Septoria, Coccoomyces, Monilinia, Cercospora, Cercosporidium, Ceratocystis, Guignardia, Sclerotium Rhizoctonia Coccoomyces, Rhynchosporium, Colletotrichum, and Botrytis	Interested in developing for ornamental uses. Need crop safety data.
Tetraconazole (EMINENT 125SL) (TM 415)	Sipcam Agro	Triazole	Controls Cercospora leaf spot, powdery mildew, leafspots, rusts, web bloch, and others.	No plans to develop for ornamental uses.

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Fungicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum/Traits	Status
Thiophanate-methyl (FANATE)  (C3336 F) (FUNGO)	Cerexagri  Cleary Chemical	Benzimidazole	Broad spectrum fungicide which controls a wide variety of foliar stem and root diseases	Registered on turf and unspecified annual and perennial flowers, bedding plants, foliage plants, ground covers, deciduous and evergreen trees and shrubs except except Swish ivy, Boston fern and Easter cactus.
Thifluzamide (RH - 0753)	Dow AgroScience	Thiazole-carbomanilide - Inhibits succinic acid metabolism in fungi.	Sclerotina and Rhizoctonia.	No plans to develop for ornamental uses.
Trichoderma harzianum T-39/(TRICHODEX)  T-22 (ROOTSHIELD G) (PLANTSHIELD HC)	Makhteshim-Agan  Bioworks	Fungi	Controls Botrytis foliar. Controls Fusarium, Pythium, Rhizoctonia with soil applications.	<b>Biopesticide.</b> Interested in developing for ornamental uses.
Trifloxystrobin (COMPASS)	Bayer Environmental Sciences	Strobilurin	Broad spectrum fungicide with protective and curative activity against Rhizoctonia, anthracnose, Corticium, Limonomyces, leaf spots, rust, pink snowmold, Fusarium, summer patch	<b>Reduced Risk Product.</b> For use on turfgrass including golf courses, institutional, commercial and residential lawns, sod farms, sports fields, parks, municipal grounds and cemeteries, and of ornamentals grown in interiorscapes, forest nurseries and residential and commercial landscapes. Interested in developing for ornamental uses. Need crop safety data.
Triflumizole (TERRAGUARD)	Crompton	Imidazole	Powdery mildew, rusts, apple scab, Rhizoctonia, Cylindrocladium, Thielaviopsis, Myrothecium, Alternaria, Helminthosporium and related genera.	Interested in developing for ornamental uses.
Triticonazole (TRITON)	Bayer Environmental Sciences	Triazole	Used as a seed treatment	Interested in developing for ornamental uses. Need crop safety data.
Zoxamide (ZOXIUM)	Dow AgroScience	Amide (Inhibits mitosis by binding to fungal tubulin proteins)	Control of foliar phycamycetes and albugo. Also protectant against Oomycete fungi. Will be mixed with mancozeb for broader activity.	No plans to develop for ornamental uses.

## NEMATICIDES

Nematicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum	Status
Bacillus firmus (BIONEM) (BIOSAFE)	Minrav Infrastructurer	Bacterial nematicide.	Controls root knot and other nematodes including <u>Heterodera avenae</u>	No plans to develop for ornamental uses.
Benclonthiaz (CGA 235860)	Syngenta	Benzisothiazole.	Controls several key soil nematodes.	No plans to develop for ornamental uses.
Dazomet (BASAMID)	BASF	Thiadiazine (carbon disulfide generator)	Similar to metam sodium	<b>Partial Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.

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Nematicides (TRADE)	Registrant	Chemistry	Pest Control Spectrum	Status
DMDP	BTG	Derived from <u>Lonchocarpus felipei</u>	DMDP is phloem mobile, making it suitable for foliar applications	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Duramycin C	AgraQuest	Actinimycetes	Controls various nematode spp.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Fosthiazate (NEMATHORIN)	Syngenta & ISK	Lower risk Organophosphate	Controls various nematode spp.	<b>Partial Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
Iodomethane	Arvesta	Methyl Iodide	Similar to Methyl Bromide	<b>Potential Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
Myrothecium verrucaria strain AARC-0255 (DITERA)	Valent USA	Biopesticide	Controls root knot, cyst, lesion, citrus, stubby root, pin, reniform, dagger, sting, ring, stunt, lance, spiral, burrowing and other plant parasitic nematodes.	<b>Partial Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
NEMASYS (Steinernema feltiae)	Emerald BioAgriculture	Biopesticide	Controls various nematode spp.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
NEMASYS H (Heterohabditis megidis)	Emerald BioAgriculture	Biopesticide	Controls various nematode spp.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
NEMATAC C (Steinernema carpocapsae)	Emerald BioAgriculture	Biopesticide	Controls various nematode spp.	<b>Biopesticide.</b> No plans to develop for ornamental uses.
Paecilomyces lilacinus (BIO ACT)	Prophyta & Gustafson	Bio-nematicide	Controls root knot and cyst nematodes	<b>Biopesticide.</b> No plans to develop for ornamental uses.
PROPOXIDE	Aberco	Propylene oxide	Fumigant for stored nuts and spices. Potential for soil uses	<b>Potential Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
Sodium Azide	American Pacific	Sodium Azide	Many pests that are currently controlled by methyl bromide	<b>Potential Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
Sodium Tetrathiocarbonate (ENZONE)	DuPont Corporation & 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> No plans to develop for ornamental uses.
TELONE (INLINE Formulation)	Dow AgroSciences	1,3,dichloropropene + chloropicrin	Many soil insects, nematodes and plant diseases	<b>Partial Methyl Bromide Alternative.</b> No plans to develop for ornamental uses.
TERRAPY	Cognis Deutschland	Fatty acid preparation in alkyl(poly)glycoside	Shown to significantly reduce <u>Meloidogyne</u> infestations	<b>Biopesticide.</b> No plans to develop for ornamental uses.