

PESTICIDES for ornamentals

1976 Recommendations for greenhouses, nurseries, garden centers, parks, roadsides

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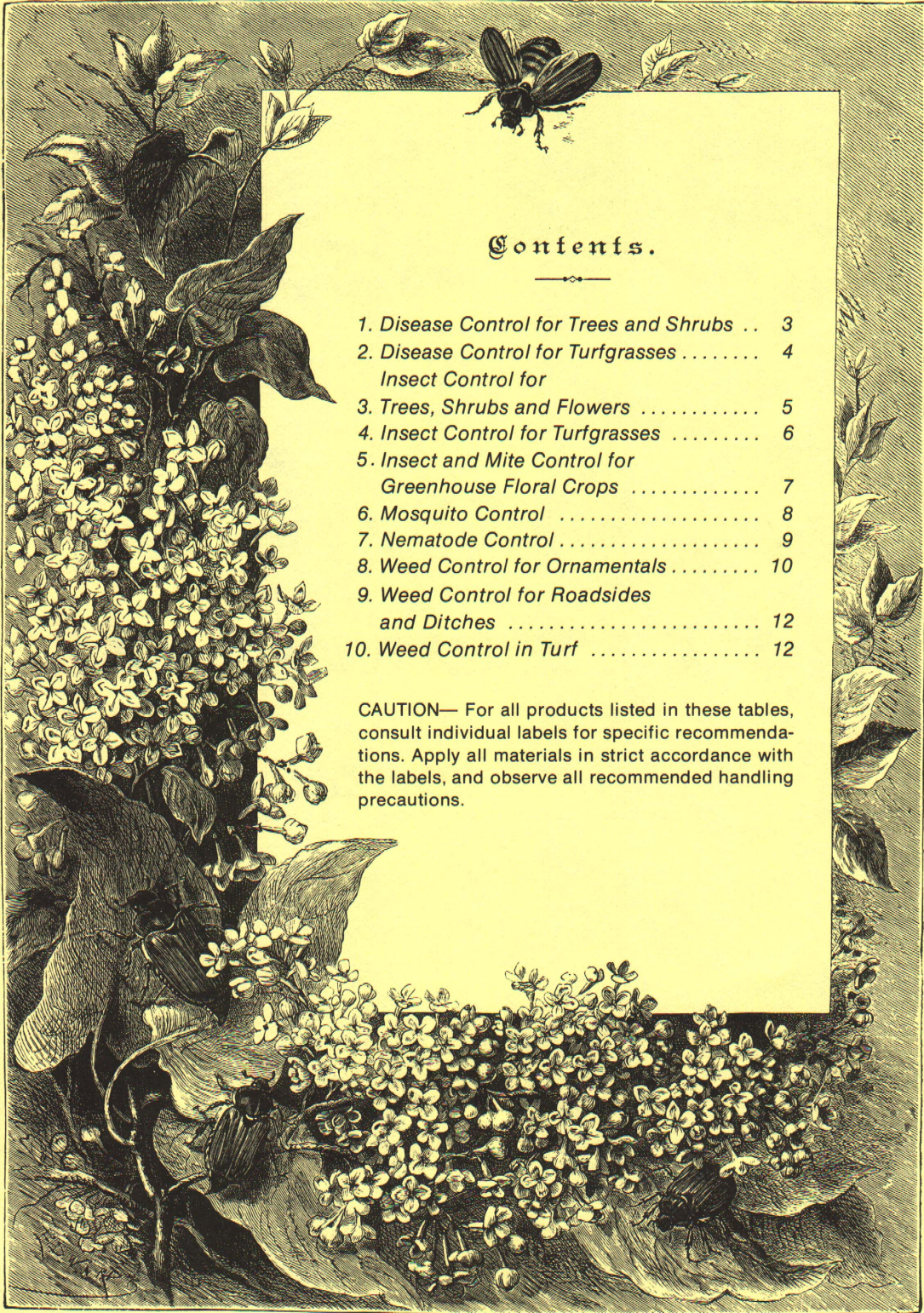
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CAUTION— For all products listed in these tables, consult individual labels for specific recommendations. Apply all materials in strict accordance with the labels, and observe all recommended handling precautions.

1. Disease Control for Trees and Shrubs

By Franklin Laemmlen

Season	Host	Disease	Material per 100 gallon water	Number of sprays	Days between sprays
Feb-April	Flowering peach	Leaf curl	Bordeaux (4-3-100); Lime sulfur (liquid) 8 gal	Apply while trees are dormant.	
Feb-April	Oak	Leaf blister	Bordeaux (4-3-100); Lime sulfur (liquid) 8 gal	Apply while trees are dormant.	
April-May	Dogwood	Anthracnose	Benomyl, ½ lb; Mancozeb, ½ lb (80%)	As needed starting at bud break.	7-14
April-May	Cotoneaster, Japanese quince, Mountain ash, Hawthorn, Spirea, Flowering crab, or Pear	Fireblight	Streptomycin (50-100 ppm); Bordeaux mixture, 2-6-100	Apply first at pink bud and at 7—14 days until dry weather or shoot elongation stops.	
April-May	Elm	Dutch elm	Benomyl, 2 lb	Apply in spring when trees approach full leaf. Injection or foliar spray may be used.	
April-May	Hawthorne, Crab apple etc	Rusts	Ferbam 2 lbs (75%); Zineb 1½—2 lbs (75%) Mancozeb 1½—2 lbs	3—4. Start when flower buds open or when orange rust masses appear on juniper.	10
April-May	Juniper	Rusts	Cycloheximide 50 (380 mg) tablets or 3 lb (0.0027%) or 2 T/gal; Zineb, 2 lb; Mancozeb, 2 lb	1. Apply as soon as orange rusts masses appear.	
April-May	Pine, Spruce, Douglas fir	Tip blight	Fixed copper (50%), 4 lb; Bordeaux mixture 8-8-100	2. Apply first at bud swell stage.	10
April-May	Sycamore	Anthracnose	Dodine, 1½ lb; Zineb, 2 lb; Mancozeb, 2 lb; Bordeaux, 4-4-100*	1 — 2. Apply at bud break and 10 days later if average temperature remains below 55°F.	14-21
April-May	Maple, Willow	Tar spot	Zineb, 2 lb; Captan, 2 lb; Ferbam, 2 lb; Bordeaux, 8-8-100; or Mancozeb 2 lb	1—2.	21
April-June	Honeysuckle	Leaf blight	Mancozeb, 1½ lb (80%)	As needed.	7-10
April-July	Crab apple Hawthorn Mountain ash	Scab, other leafspots	Mancozeb, 1½ lb (80%); Captan, 2 lb; Dodine, ½ lb; Benomyl, ½ lb; Folpet (75%), 1 lb	2—4. Apply at green tip and 10—14 days through July.	14
May	Juniper	Twig blight	Benomyl, ½—1 lb	2—3. Start when new growth appears.	10-21
May-June	Ash, Maple, Oak	Anthracnose	Dodine 1½ lb; Captan, 2 lb	1. Apply at bud break.	

continued

* 4-4-100 or 8-8-100 indicates lb of copper sulfate—lb of lime—gal of water.

1. Disease Control for Trees and Shrubs (cont'd)

Season	Host	Disease	Material per 100 gallon water	Number of sprays	Days between sprays
May-June	Elm	Black leaf spot	Dichlone, 1 lb; Zineb, 2 lb; Ferbam, 2 lb; Bordeaux, 4-4-100; Mancozeb, 2 lb	3.	14-21
May-June	Horse chestnut, Buckeye	Leaf blotch	Zineb, 1½ lb (75%); Mancozeb, 1½ lb	3. Apply at bud swelling, bud break, and 10 days later.	
May-July	Douglas fir	Swiss Needle-cast	Maneb, 2½ lb; Mancozeb, 2½ lb	Begin about May 31 (3—4) to early August.	21
May-Oct	Garden beds	Root rots, nematodes, insects	Ethylene dibromide (capsule), 15 in apart and 5 in deep	10 days before planting at soil temperature 50°F or above.	
June-July	Hawthorn	Leaf blight	Cycloheximide 5 (380 mg) tablets; Captan, 2 lb; Benomyl, ½ lb; Mancozeb, 2 lb	Apply at bud break and thereafter as needed to maintain control.	
June-July	Spruce	Needlecast	Bordeaux 8-8-100	2. First application June 5—10.	21
June-July	Walnut	Leafspot	Zineb, 2 lb; Benomyl, ½ lb; Maneb, 2 lb; Dodine, ½ lb; Mancozeb, 2 lb	3—4.	14-21
July-August	Juniper	Rust	Ferbam, 2 lb; Mancozeb, 2 lb	3. First application when apple, hawthorn, etc. rust spots mature.	21-28
July-Aug	Ornamentals (general)	Powdery mildew	Benomyl, ½ lb; Dinocap, ½ lb; Wettable sulfur, 2 lb	Apply at first sign of disease and thereafter as needed.	
July-Sept	Pine	Needlecast	Maneb, 2½ lb; Chlorothalonil, 2½ lb (75%), or 3⅓ pt (54%)	2 if light; 3 if heavy infection. Apply Aug 1 and Sept 1; or July 25, Aug 15, Sept 10.	
As nec	All ornamentals	Fungus wound rots	Thiram, 1% paint as wound dressing. Bordeaux mixture plus linseed oil (homemade)	Apply as a thick paint.	
As nec	Pine and fir species	Seed decay Seed blight	TBZ slurry, 0.5 fl oz in 1.33 qt water; TBZ, 3lb/acre		

See small gallonage conversion table on page 12.

2. Disease Control for Turfgrasses

Prepared by J.M. Vargas, Jr.

Season	Host	Disease	Cultural control	Chemical control
April-Nov	Bluegrass, Kentucky bluegrass (mostly Merion and Windsor)	Stripe smut (<i>Ustilago striiformis</i>)	Blends of resistant cultivars. Fungicide must be drenched and applied while turf is dormant. Helminthosporium control is also needed.	Tersan 1991, Spot Kleen, Fungo, Cleary's 3336
April-Nov	Bentgrass, bluegrass, fescue	Melting Out, Fading Out, Leaf Spot (<i>Helminthosporium spp</i>)	Remove clippings. Raise cutting height. Resistant Kentucky bluegrass cultivars: A-20, Baron, Majestic, Adelphi, Galaxy, Touchdown, Parade	Fore, Daconil 2787, Acti-dione, Thiram, Dyrene, Tersan LSR, Proturf F + FI

continued

2. Disease Control for Turfgrasses (cont'd)

Season	Host	Disease	Cultural control	Chemical control
April-Nov	All turf areas	Fairy ring (Many <i>Basidiomycetes</i>)	Removal of infested sod and soil and replacing with clean soil and reseed or sod.	Soil Fumigants: Methyl bromide, Chloropicrin, Vapam, Vorlex
May-Oct	All grasses, most commonly found on Kentucky bluegrass	Fusarium blight, Nematodes (<i>Tylenchorhynchus dubius</i> + <i>Cricone-moides spp</i>) Interacting with <i>Fusarium roseum</i> and <i>F. tricinctum</i>	Light frequent waterings during dry periods. Fungicides must be drenched to be effective.	Tersan 1991, Spot Kleen
May-Nov	Bentgrass, bluegrass, fescue	Dollar Spot (<i>Sclerotinia homeocarpa</i>)	Increase nitrogen. Remove dew (Guttation).	Daconil 2787, Proturf DSB, Tersan 1991, Dyrene, Acti-dione Thiram, Cleary's 3336, Fungo, Spot-Kleen, Bromosan
July-Aug	Bentgrass, bluegrass	Brown patch (<i>Rhizoctonia solani</i>)	Avoid high nitrogen fertilizers. Increase air circulation.	Daconil 2787, Dyrene, Acti-dione Thiram, Tersan LSR, Fore, Proturf Fung. III
July-Aug	Bentgrass, bluegrass, ryegrass	Pythium blight (<i>Pythium spp.</i>)	Improve soil drainage. Increase air circulation.	Tersan SP, Koban, Proturf Fung. II
July-Nov	Kentucky bluegrass (shaded areas)	Powdery mildew (<i>Erysiphe graminis</i>)	Reduce shade. Resistant cultivars. Nuggett, Warren's A-34.	Tersan 1991
July-Nov	Kentucky bluegrass, Manhattan ryegrass	Stem rust (<i>Puccinia spp</i>)	Fertilize with nitrogen.	Tersan LSR, Fore
Sept-May	Bentgrass, bluegrass, fescue	Fusarium patch (Pink snow mold) (<i>Fusarium nivale</i>)	Avoid fall nitrogen fertilization that leads to lush growth.	Tersan 1991, Fore, Fungo, Cleary's 3336, Spot Kleen
Sept-Nov	All grasses but mostly fescues, Manhattan ryegrass	Red thread (<i>Corticium fuciforme</i>)	Increased nitrogen.	Daconil 2787, Fungo, Cleary's 3336
Under snow	Bentgrass, bluegrass	Typhula blight (Gray Snow mold) (<i>Typhula itoana</i>)	Avoid fall nitrogen fertilization that leads to lush growth.	Tersan SP, Proturf Fung. II

* Unless specified, Blue grass refers to both annual bluegrass (*Poa annua*) and Kentucky bluegrass (*P. pratensis*).

Note: See small gallonage conversion table on page 12.

3. Insect Control for Trees, Shrubs and Flowers

(For specifics on the above insects on Christmas trees, check MSU Bulletin E-353.)

For specific insect and mite control for homeowners, refer to MSU Bulletin E-534, "Controlling Pests of Trees and Shrubs."

Prepared by W.E. Wallner

Insect	Control Materials
Aphids: Free living aphids, gall aphids	Malathion, Diazinon, Cygon, Meta-systox R, or Orthene Lindane, Thiodan, or Meta Systox-R
Bagworm	Sevin, Dursban, Diazinon, Malathion, Dylox, Orthene, Dipel or Thuricide

continued

3. Insect Control for Trees, Shrubs and Flowers (cont'd)

Insect	Control Materials
Black vine weevil	Chlordane (June—July)
Borers	Lindane, Thiodan, or Dursban
Box elder bug	Sevin, Cygon, Lindane, or Malathion
Defoliators, e.g. Cankerworm, Elm Leaf Beetle, Fall Webworm, Tent Caterpillars	Sevin, Cylox, Diazinon, Orthene, Dipel, Thuricide, Dursban or Imidan
Lace bug	Sevin, Guthion, or Orthene
Miners: Soil treatment, Foliage Treatment	Di-syston (for Birch Leaf Miner only — beneath tree) Malathion, Sevin, Cygon, Meta-Systox R, Orthene, Diazinon or Imidan
Mites	Morestan, Tedion, Kelthane, or Pentac
Scale: Dormant, Crawler	Dormant Oils (60-70 sec), Liquid Lime Sulfur, or Ethion and Oil Malathion, Cygon, Diazinon, Sevin, or Guthion
Mealybugs	Malathion, Dursban, Orthene, or Dormant Oil
Millipede, Pillbugs	Diazinon

4. Insect Control for Turfgrasses

Prepared by W.E. Wallner

Insect	Control Materials
<i>Soil insects:</i> White grubs, wireworms	100 lb 10% Chlordane granules/acre
<i>Leaf feeders:</i> Sod webworms, cutworms, armyworms and aphids	<i>To treat 5,000 sq ft:</i> 10 fl oz 22% Dursban emulsion or 2 qt 25% Diazinon emulsion or 4 qt 50% Sevin wettable powder or 2½ pt Ethion 4E or 1 lb 80% Dylox soluble powder or 2¾ oz 70% Baygon wettable powder
	<i>For sod webworm</i> 2% Diazinon, or ½% Dursban granules will give good control. Apply according to label instructions.

5. Insect and Mite Control for Greenhouse Floral Crops

Prepared by M. Keith Kennedy and W.E. Wallner

Control materials	Major pest controlled	Precautions
Aramite, 2 lb 15% W.P.	Spider mites (eggs only)	
Azinphosmethyl (Guthion), 8 oz 25% W.P. or 1 pt 22.2% E.C.	Lacebugs, whiteflies, spidermites, aphids, thrips	Do not use E.C. formulation on Poinsettias when bracts are present or discoloration may occur.
<i>Bacillus thuringiensis</i> (Thuricide, HPC, Dipel Biotrol XK), 2 qt	Caterpillars	non-poisonous
Carbaryl (Sevin), 2 lb 50% W.P. or 1¼ lb 80% W.P.	Loopers, leafrollers, leaf miners, lacebugs, corn borer	Injures Boston ivy
chlordane, 2½ lb 40% W.P. or 2 pt 45% E.C.	Ants, soil insects, strawberry root and black vine weevils	
Chlorobenzilate, 1 lb 25% W.P.	Spider mites (active mites only)	Injures hydrangeas
Dichlorvos (DDVP, Vapona), 1 fl oz or 4 lb/gal insecticide/10,000 cu ft	Aphids, spider mites, leafrollers, leaf miners, plume moths	Do not use on mum varieties, Pink Champaign, and Nightengale, or on Shasta lily.
Demeton (Systox), Spray 1 pt 23% S.C.; Drench 1 T. 23% E.C./3 gal water 4 oz solution to 6-in pot	Aphids, mealybugs, some mites and scales, whiteflies	Soil drench may injure some chrysanthemum varieties and Easter lily.
Diazinon, 2 lb 50% W.P. or 1 pt 48% E.C.	Fungus gnat larvae, aphids, spider mites, leaf miners, carnation bud mites, whiteflies, thrips, garden symphilids	May injure stephanotis, ferns, gardenia, hibiscus, poinsettia, Saintpaulia, and Pilea.
Dicofol (Kelthane), 1½ lb 18.5% W.P. or 1 pt 18.5% E.C.	Spider mites (active mites only) and cyclamen mites	Use E.C. for cyclamen mite; not compatible with sulfur.
Dimethoate (Cygon), Spray 1½ pt 30.5% E.C. Drench 3 oz 30.5% E.C. diluted in enough water to treat 500 sq ft of bench	Aphids, some scales, some mites, leaf miners, leafrollers, fungus gnat larvae, whiteflies	Avoid use on chrysanthemum, Chinese holly or Easter lillies. Dimethoate has caused injury to varieties of hydrangea, fern, African violet, schefflera, azalea, and gloxinia.
Endosulfan (Thiodan), 1 pt 25% E.C. or 1 lb 25% W.P.	Aphids, whiteflies, cyclamen mites	Will injure some geranium varieties; E.C. has injured some chrysanthemum varieties.
Fenthion (Baytex), 2 pt S.C. containing 4 lb actual insecticide per gal	Aphids, loopers, mites	Injures rose variety, "Delightful." Effect on other varieties not known.
Lindane, 1 lb 25% W.P. or 1½ pt 20% E.C.	Aphids, leaf miners, mum gall midge	
Malathion, 1½ pt 57% E.C. or 2½ lb 25% W.P.	Aphids, scales, thrips, leaf miners, some mites, mealybugs, whiteflies	May injure hydrangea, crassula, ferns, petunia, orchid, Saintpaulia, violets, gloxinia, and some rose or red carnation varieties.
Metaldehyde, 15% dust applied to bed or bait, 1 lb/1,000 sq ft	Slugs, snails	Injures Cattleya and Phalaenopsis orchids.
Morestan, ½ lb 25% W.P.	Spider mites (eggs and active mites)	Do not suggest combining with other chemicals; injures some rose varieties.
Parathion, 1½ lb 15% W.P. or 1 pt 25% E.C.	Aphids, spider mites, scales, thrips, whiteflies, mealybugs, lace bugs, mum gall midge	May injure gladiolus, aster, crassula, Boston and maiden ferns, kalanchoes, gardenia, hydrangea. May cause leaf drop on rose if used in conjunction with sulfur.
Oxydemethonmethyl (Meta-Systox-R), Spray 1½ pt or 2 lb/gal 25% E.C. Drench 1 T 25% E.C. or 2 lb/gal in 3 gal water, apply 4 oz of solution to 6-in pot	Aphids, spider mites, white flies, leaf miners	May injure chrysanthemum, especially Hurricane, Iceburg, Whitetop, and Pennant varieties and Easter lily.

continued

5. Insect and Mite Control for Greenhouse Floral Crops (cont'd)

Control materials	Major pest controlled	Precautions
Pentac, 8 oz 50% W.P.	Spider mites (active mites only)	May cause damage to chrysanthemum foliage.
Plictran, 6 oz 50% W.P.	Spider mites (active mites only)	May cause damage to chrysanthemum blossoms and poinsettia bracts.
Resmethrin, 1 pt — 1 qt 24.3% E.C.	Whiteflies	Repeat application weekly for 4 weeks.
Sulfotepp (Dithio), 1 lb 5% Aerosol 50,000 cu ft	Aphids, mealybugs, scales, spider mites, whiteflies	
Tedion, 1 lb 25% W.P. or 2 pt 10% E.C.	Spider mites (eggs only)	May injure rose, especially Cinderella and White Butterfly varieties.
Temik (Aldicarb), Applied as 10% granules to plants in pots or linear rows at different application rates. Follow label directions for applying this pesticide	Whiteflies, leafhoppers, aphids, spider mites, mealybugs, thrips, leaf miners	For use only by trained personnel in commercial greenhouses. DO NOT use in the home or home garden.
TEPP, ¼ pt 40% E.C. or ½ pt 20% W.P.	Mealybugs, whiteflies, thrips, aphids, spider mites, scales	
Trichlorfon (Dylox), 1 lb 50% W.P.	Caterpillars, plant bugs, (Dipterous leaf miners)	Injures some carnation, chrysanthemum and zinnia varieties.
Zectran, 1 qt 22% E.C. or 1 lb 25% W.P.	Slugs, snails, leafrollers	Excess dosage may cause injury to ageratum, phlox, rose, petunia and alyssum. Do not use on maidenhair fern.

6. Mosquito Control

Outdoor Ground Applied Space Spray

Operation	Material Rate and Notes
For Mist Blowers — Adult:	<p>Malathion, 57% Emulsion. 2 gal/98 gal water. Apply 60 to 100 gal/hr on swath width of 200 ft at vehicle speed 3—5 mph.</p> <p>Baytex (Fenthion) 45% Emulsion. Mix 2½ to 4¼ gal of concentrate/100 gal water. Apply at 100 gal/hour, traveling at 4 mph, swath width up to 350 ft.</p> <p>Dursban. See label.</p>
For Thermal Fogger — Adult:	<p>Malathion, 95% Concentrate.* Mix 2.6 gal concentrate/100 gal fogging solution.</p> <p>Baytex (Fenthion) 45% Concentrate. Mix 1—2 gal concentrate/100 gal fogging solution.</p> <p>Dibrom 14 (Naled)*. Mix 3.1 qt concentrate/100 gal fogging solution.</p> <p style="text-align: right;"><i>Thermal fogging mixtures should be applied at the rate of 40 gal/hr at a machine speed of 5 mph.</i></p>
Larvicide	<p>Abate — 4E. 0.5—1.8 oz/acre. Repeat application as necessary. Don't use on crops used for food, forage or pasture.</p> <p>Dursban — 2E or granules. Follow label. May cause problems with fish.</p>

* This insecticide may require the use of special additive to prevent the formulation of a sludge-like precipitate when mixed with No. 2 fuel oil, diesel oil or other kerosene-type oil suitable for insecticide use. Consult dealer for specific recommendations.

7. Nematode Control

Prepared by George W. Bird

In addition to nematode control through use of soil fumigants or nematicides, it is important to prevent occurrence of nematode problems through use of good horticultural practices and production of high quality stock grown and maintained in nematode-free, fumigated or nematicide-treated soil.

The soil fumigants and nematicides listed below are not registered for use on all ornamentals.

Preplant Soil Treatment

Material	Rate	Limitations, Directions
DBCP (Nemagon, Fumazone)†	2—4 gal/acre broadcast, or ¾ to 1½ oz/100 linear ft	Do not use on carnations, lilies, or amaryllis. Wait at least 14 days after application for planting. See tolerant species listed on page 10.†
1, 3-D (D-D, Telone II)	15—20 gal/acre broadcast, or 8 oz/100 linear ft	Wait at least 21 days after application before planting.
1, 3-D + Chloropicrin (Terr-o-cide-30-D, Terr-o-cide 15-D, DD-Pic, Telone C)	20 gal/acre broadcast, or 8 oz/100 linear ft	Wait at least 21 days after application before planting.
EDB (Dowfume W-40, Soilbrom-40)	18 gal/acre broadcast, or 7 oz/100 linear ft	Do not use on soil to be used for growing lilies, or amaryllis. Wait at least 21 days after application before planting.
(Dowfume W-85, Soilbrom-85)	6 gal/acre broadcast, or 3 oz/100 linear ft	Do not use on soil to be used for growing lilies, or amaryllis. Wait at least 21 days after application before planting.
EDB + Chloropicrin (Terr-o-cide-30, Terr-o-cide-15)	15 gal/acre broadcast, or 4 oz/100 linear ft	Wait at least 21 days after application before planting. See other limitations for EDB.
Methyl Bromide and Chloropicrin (Dowfume MC-2, Brom-O-Gas)	2 lb/100 sq ft	Commercial use only. Apply under a plastic cover, removing cover 48 hr before seeding or 4 days prior to transplanting. Do not use on soil to be planted to bromine sensitive plants. Effective against many weed seeds, soil fungi, insects, and bacteria as well as nematodes.
MIC (Vorlex)	25-50 gal/acre broadcast, or 15 oz/100 sq ft	Wait at least 21 days after application before planting. High rates are effective against soil fungi and some weeds as well as nematodes.
Oxamyl (Vydate L)*	3—10 gal/acre in a minimum of 20 gal water	For professional application only and for use only in commercial plantings. Thoroughly incorporate to a depth of 4—8 in immediately after application.*
VPM (Vapam)	32 oz/100 sq ft	Wait at least 14 days after application before planting. Tarp treated area for best results. Effective against some weed seeds & soil fungi, as well as nematodes.

Preplant Root Dips

Oxamyl (Vydate L)*	2—4 pt/100 gal water (1½ T/5 gal)	Root, corm or bulb dip. For professional application only. For use only in commercial operations. Place plant material in solution for 1 to 30 minutes. Use higher rates and longer soaking times for more severe nematode infestation.*
Aldicarb (Temik 10G)	50—60 lb/12,000 linear ft of row. 4—6 lb/1,000 linear ft of row.	For control of nematodes associated with bulbs. FOR PROFESSIONAL APPLICATION ONLY. FOR USE ONLY IN COMMERCIAL OPERATIONS. Registered for use as a nematicide only on lilies and bulbs.
DBCP E.C. (Nemagon, Fumazone)†	Broadcast: 2—4 gal or ¾ to 1½ oz/100 linear ft	Do not use on sensitive plants. See tolerant species listed on page 10†.
Fensulfothion‡ (Dasanit 15G)	1 lb actual/1,000 sq ft 6.7 lb of 15% G	Treatment of beds and benches. Apply dosage evenly over area and work thoroughly into soil 4—6 in. Do not apply to newly seeded areas. FOR COMMERCIAL USE ONLY. MUST BE APPLIED BY A PROFESSIONAL APPLICATOR. See recommended plants listed on page 10.‡

†‡, see footnotes on page 10.

*Registered only for azalea, bird's nest fern, boxwood, chrysanthemum, croton, dieffenbachia, picta, dracaena, gardenia, gladiolus, Hindu rope, leather leaf fern, maranta, peony, peperomia, philodendron, rose, sansevieria and snapdragon.

continued

7. Nematode Control (cont'd)

Material	Rate	Limitations, Directions
At Planting or Post Planting Nematicides		
Fensulfothion (Dasanit 15G)	0.03 oz actual/ft ³	Potting soil. Mix material thoroughly with soil. Do not treat peony, begonia, hydrangea, and <i>Aucuba</i> spp. Do not use in or near human dwellings. FOR COMMERCIAL USE ONLY. MUST BE APPLIED BY A PROFESSIONAL APPLICATOR. See recommended plants listed below.‡
Oxamyl (Vydate L)*	Soil mix treatment: 2¾ oz/10 gal water	Spray 2½ to 10 gal of the dilute mix onto one cubic yard of soil while tumbling in a soil mixer. FOR PROFESSIONAL APPLICATION ONLY. FOR USE ONLY IN COMMERCIAL OPERATIONS.
	Foliar treatment: 2—8 pt/100 gal water	Spray on foliage to run-off. Make 4 applications on 2 to 3 week schedule. FOR PROFESSIONAL USE ONLY. FOR USE ONLY IN COMMERCIAL OPERATIONS.
	Liquid drench: 1 pt/100 gal water	Apply drench at rate of 4—8 oz/6 in pot., or 2—4 oz/4 in pot. FOR PROFESSIONAL APPLICATION ONLY. FOR USE ONLY IN COMMERCIAL OPERATIONS.

*see footnote, page 9.

†Can be used preplant, at planting or postplant and can be applied either by chisel injection or in irrigation water.

TOLERANT SPECIES: *Acanthopanax pentaphyllum*, African violet, aglaema, ajuga, amaryllis, anchusa, Andromeda, apple, *Ardisia japonica*, *Aronia arbutifolia* (chokeberry), arrowwood, asclepias, ash, asparagus fern, astilbe, azalea, barberry (red leaf and dwarf), *Buxus harlandi* (boxwood), *Buxus japonica*, *buxus sempervirens arborescens*, *Buxus sempervirens suffruticosa*, calanthea, *Callistemon rigidus* (bottle brush), caryopteris, centranthus, cherry (Mahaleb root stock), columbine, coreopsis, *Cotoneaster divaricata*, crab apple, crepemyrtle, purple; croft lily, cryptantha, daisy, deutzia, *Dianthus grenadin*, dicentra, dieffenbachia, dogwood, dracaena, elder, elm, euonymus vegetus, exochorda, fatschedera, fiethorn, forget-me-not, funkia, gypsophila, heliopsis, helleborus, hemlock, hibiscus, holly, hypericum, *Ilex crenata convexa*, *Ilex rotundifolia*, incarvillea, lavandula, ligustrum (privet), Lily of the valley, locust (seedlings), ionicera (honeysuckle), macrophyllum, maple, red; maranta, mountain ash, nephthytis, oak, live; oak, northern red; oak, white; pachysandra, pansy, peach, pear, peony, peperomia, periwinkle, philadelphus (mockorange), philodendron, *Physocarpus opulifolius aureus*, pilea, pine, Japanese black; pine, white; pittosporum, plum, pothos, potentilla, podocarpus, pyrethrum (seed) rudbeckia, *Salix discolor* (pussywillow), *Salix purpurea nana*, sansevieria, schefflera, sedum, spirea, *symphoricarpos albus* (common snowberry), sweet pea (perennial), syringa (lilac), *Tamarix africana*, thuja (arborvitae), tritoma, violet, *Vitex angus* (*Castus latifolia*), weigela, yew, Japanese; zinnia.

MODERATELY TOLERANT SPECIES: artemisia, blueberry, camellia japonica, (var. pink Perfection and var. Elixabeth), Camellia sasanqua (var. Shell Pink), campanula, chrysanthemum, delphinium, echinops, forsythia, *Gardenia fortuniana* (var. Mystery), *Gardenia jasminoides* (var. Florida and var. August Beauty), *Gardenia radicans*, geum, gladiolus, lythrum, *Magnolia grandiflora*, *Magnolia soulangeana*, phlox, Pine, Austrian; Pine, slash; *Polygonum distortum*, *Pyrethrum* (plants), *Rosa fortuneana* (var. Happiness Rose), *Rosa* sp. (var. Jimmy Cricket, var. Dr. Huey, var. Contessa Vandal, var. Isobel Harkness), stantolina, *Taxus cuspidata compacta*, *Taxus cuspidata thayerae*, *Taxus media andersonii*, *Taxus media hatfieldii*, *Taxus media hicksii*, *Tsuga canadensis* (hemlock), and vinca (periwinkle).

‡Registered for use as a nematicide on FLOWERING SHRUBS: azalea, blue mist camellia, Chinese hibiscus, gardenia, honeysuckle, jasmine, jungleflame, metrosideros, pyracantha, Surinam cherry, roses and viburnum. PERENNIAL FLOWERS: aloe, butterfly iris, century plant, chrysanthemum, cyclamen, Easter lily, gladiolus and gloxinia. VINES: Bougainvillea. OTHER SHRUBS: ardisia, boxwood, croton, dwarf yaupon, euonymus, eurya, gallberry, holly, holly leaf osmanthus, Japanese yew, juniper, privet, natal plum, red leaf barberry and yew.

8. Weed Control for Ornamentals

By Alan R. Putnam

Always check the label for ornamental species that will tolerate each herbicide

Problem	Material	Amount/A	Amount/1,000 sq ft	Time of Application and comments
Transplanted Flowers and Ground Covers				
Annual weeds	Eptam 7-E Eptam 2.3G	5¾ pt	4 T 5 lb	Apply to soil prior to transplanting and rototill into soil to a depth of 2—3 in. Granules may also be raked or watered in. Granules can be applied after transplanting but must be applied before the weeds come up.
	Treflan 4EC Treflan 5G	1—2 pt 10—20 lb	¾—1½ T 3½—7 oz	Apply to soil prior to transplanting and rototill into soil to a depth of 2—3 in. Granules may also be raked or watered in. Granules can be applied after transplanting but must be applied before the weeds come up. Use the lower rate on sandy soils and the higher rate on clay loam soils.
	Enide 50W	8—12 lb	3—4½ oz	Apply to the soil surface after transplanting. Irrigation after spraying will increase the effectiveness of the herbicide. Use the lower rate on sandy soils and the higher rate on clay loam soils.

continued

8. Weed Control for Ornamentals (cont'd)

Problem	Material	Amount/A	Amount/1,000 sq ft	Time of Application and comments
	Dacthal 75W Dacthal 5G	14—16 lb	2—5 oz 3¾—7 lb	Apply to the soil surface after transplanting. Irrigation after spraying will increase the effectiveness of the herbicide. Use the lower rate on sandy soils and the higher rate on clay loam soils.
Newly Planted Nursery Stock (Liners)				
Annual weeds	Treflan 4EC Treflan 5G	1—2 pt 10—20 lb	¾—1½ T 3½—7 oz	Apply to the soil prior to transplanting and rototill into the soil to a depth of 2—3 in. Granules may also be raked or watered in. Granules can be applied after transplanting, but should be applied before the weeds come up.
	Casoron W50 Casoron 4G	8—12 lb 100—150 lb	3—4½ oz 2½—3½ lb	Granular formulation is preferred unless the chemical is incorporated or irrigated in. Do not use until 4 weeks after transplanting. Use the lower rate on sandy soils and the higher rate on clay loam soils.
	Enide 50W	8—12 lb	3—4½ oz	Apply to the soil surface after transplanting. Irrigation after spraying will increase the effectiveness of the herbicide. Use the lower rate on sandy soils and the higher rate on clay loam soils.
Established* Nursery Stock				
Annual weeds	Princep 80W Princep 4G	2½—3¾ lb 50—75 lb	1¼—1¾ oz 18—27 oz	In fall or spring before weeds emerge. Use the lower rate on sandy soils and the higher rate on clay loam soils.
	Treflan 4EC Treflan 5G	1—2 pt	¾—1½ T 3½—7 oz	Should be incorporated with a cultivator or rototiller or irrigated in after application. Use the lower rate on sandy soils and the higher rate on clay loam soils.
	Enide 50W	8—12 lb	3—4½ oz	Irrigation after spraying will increase the effectiveness of the herbicide. Use the lower rate on sandy soils and the higher rate on clay loam soils.
Quackgrass and annual weeds	Casoron 4G	100—150 lb	2¼—3½ lb	Apply in November prior to snowfall for quackgrass control. Use the lower rate on sandy soils and the higher rate on clay loam soils.
	Kerb 50W	2—4 lb	¾—1½ oz	Use the higher rate for quackgrass control. Apply in November prior to snowfall.
Under Established† Ornamental Trees				
Quackgrass, annuals and perennials	Amizine or Princep 80W and Cytrol Amitrole-T	7 lb 4 lb and 2 qt	2½ oz 1½ oz and 3 T	Apply when weeds are 6—8 inches high. Do not allow the spray to touch the foliage of trees.
	Princep 80W and Paraquat CL	2½ lb and 1 qt	1.2 oz and 1½ T	Apply when weeds are 6—8 inches high. Do not allow the spray to touch the foliage of trees. Add a wetting agent at 8 oz/100 gal spray.
	Casoron 50W Casoron 4G	12 lb 150 lb	4½ oz 3½ lb	Apply in the fall or early spring and cover with an organic mulching material such as wood chips. The herbicide may also be pre-mixed with mulch and applied under trees. This is particularly effective for sloping sites and highway plantings.

continued

* Plants that are in the field at least a year.

† Established in the field at least one year.

9. Weed Control for Roadsides and Ditches

Problem	Material	Amount/A	Time of Application and comments
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Roadside

Brush	2, 4-D plus 2, 4,5-T	½—2 gal/A formulation (Use 2—4 lb/A actual)	Cannot be used around water.
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Ditches

Cattails	Dowpon (Dalapon) Amitrol-T (Amitrole)	15 lb 2 lb	
Broadleaf weeds	2, 4-D	4 lb	

10. Weed Control in Turf

Dandelion, Plantain	2, 4-D Amine		Spring, Fall
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Chickweed, Henbit and other hard-to-kill broadleaves	2,4-D+2,4,5-TP (Silvex)		Early Spring or Fall
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General Vegetation Control

(Industrial sites, substations, fuel holding yards, etc.)

Amizine (Amitrole + Simazine)	10 lb	Fenavar (Amitrole + Bromacil + Fenac)	3—10 lb	Hyvar X-L (Bromacil)	4—12 lb	Pramitol (Prometone)	10—100 lb
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Pounds active ingredients per acre. Use lower rates for control of annual weeds and higher rates for deep rooted perennials.

CONVERSION TABLE FOR SMALL GALLONAGE AMOUNTS

CHEMICAL	Material per 100 gal	Material per gal equivalent	CHEMICAL	Material per 100 gal	Material per gal equivalent
Benomyl 50%	1 lb.	1 Tbsp.	Dodine 65%	1 lb.	2 tsp.
Bordeaux	1-1-100	⅓ Tbsp.-	Ferbam 75%	1 lb.	1¼ Tbsp.
		1 Tbsp.-1 gal.	Folpet 50%	2 lbs.	2 Tbsp.
Captan 50%	1 lb.	1 Tbsp.	Maneb 80%	1 lb.	½ Tbsp.
Chlorothalonil 54%	3½ pts.	1 Tbsp.	Streptomycin	½ lbs./100	
Copper sulfate 100%	1 lb.	1 tsp.		= 100 ppm	
Cycloheximide	3 lb. 2 oz. (0.027%) = 1 ppm	2 Tbsp.	Sulfur (wetable)	1 lb.	½ Tbsp.
Dichlone 50%	1 lb.	2 tsp.	Thiram 95%	1 lb.	¾ Tbsp.
Dinocap 48% E.C.	4 fl. oz.	2 tsp./3 gal.	Zinc-ion maneb 80%	2 lbs.	1½ Tbsp.
			Zineb 75%	2 lbs.	1½ Tbsp.

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