

# Appendices

**Table 47.** Poisoning hazard to honey bees of common small fruit pesticides<sup>†</sup>.

EXTREMELY TOXIC: DO NOT apply on blooming crops or weeds			
Pesticide*	Duration of hazard to honeybees	Pesticide*	Duration of hazard to honeybees
Diazinon	2 days	Lorsban (chlorpyrifos)	4-6 days
Guthion (azinphos methyl)	2.5 days	Malathion Dust	7 days
Imidan (phosmet)	1-4 days	Sevin (carbaryl)	1-7 days
Lannate (methomyl)	> 1 day		
HIGHLY TOXIC <sup>a</sup> : Apply ONLY during late evening if blooming plants are present.			
Agri-Mek EC (abamectin)	8 hours	Malathion EC	?
Brigade (bifenthrin)	?	Provado (imidachloprid)	<8 hours
Dibrom EC (naled)	?	Thiodan 50WP (endosulfan)- high rate	8 hours
Furudan (carbofuran)	?		
MODERATELY TOXIC <sup>a</sup> : Apply ONLY during late evening, night, or early morning if blooming plants are present.			
2,4-D	?	Pyrethrin (pyrethrin)	<2 hours
Dyfonate (fonofos)	?	Pyrellin (pyrethrin/rotenone mix)	<2 hours
Fusilade (fluazifop-P-butyl)	?	Rotenone	<2 hours
Methoxychlor	2 hours	Thiodan 50WP (endosulfan) - low rate	2-3 hours
Oil sprays (superior types)	<3 hours		
Princep (simazine)	?		
SLIGHTLY TOXIC OR NONTOXIC: Can be applied at any time with reasonable safety to bees.			
Bacillus thuringiensis		mancozeb	
Benlate (benomyl)		M-Pede (insecticidal soap)	
Bordeaux mixture		Gromoxone (paraquat)	
Captan		Sinbar (terbacil)	
Kelthane (dicofol)		Sulfur	
lime-sulfur		Vendex (hexakis)	

<sup>†</sup>Source: 1999 New England Apple Pest Management Guide.

<sup>a</sup>Late evening means after 6-8 PM and assumes that evening temperatures are not unusually high and that bees have stopped foraging. Late evening, night or early mornings means after 6-8 PM, and before 4-7 AM, depending on temperature. Shift time if abnormally high temperatures cause bees to start foraging earlier or continue later than usual (5:30 AM to 8:00 PM). Few honeybees forage when springtime temperature is below 51 1/2°F. Maximum foraging activity occurs at temperatures above 63 1/2°F. Evening applications are generally less hazardous to bees than early morning applications.

\*Where trade names are used, no discrimination is intended and no endorsement by Cooperative Extension is implied. Not a complete list.

**Table 48.** Relative toxicity of pesticides to mite predators *Neoseiulus fallacis*, *Typhlodromus pyri*, *Zetzelia mali* and *Stethorus punctum* (ladybird beetle).

Trade Name (common name)*	TOXICITY RATING				
	General Predators <sup>z</sup>	N. fallacis <sup>y</sup>	T. pyri	Z. mali	S. punctum
<b>INSECTICIDES</b>					
Agri-Mek (abamectin)	no data	++	++	++	++
Brigade (bifenthrin)	no data	+++	+++	no data	no data
Diazinon (diazinon)	++	no data	o data	no data	+
Dipel ( <i>Bacillus thuringiensis</i> )	0	+	+	0	0
Guthion (aziphosmethyl)	++	+	+	+	+
Imidan (phosmet)	+	+	+	+	+
Lannate (methomyl)	+++	+++	+++	++	++
Lorsban (chlorpyrifos)	++	++	++	++	+
Kelthane (dicofol)	+	++	+	+	+
Sevin (carbaryl)	++	++	+	++	+++
Superior oil	++	++	++	++	+
Thiodan (endosulfan)	++	+	+	no data	++
Vendex (hexakis)	+	+	+	+++	+
<b>FUNGICIDES</b>					
Bayleton (triadimefon)	no data	+	+	no data	+
Benlate (benomyl)	+	++	+	++	+
Captan (captan)	0	+	+	+	+
Dithane (mancozeb)	0	++	++	+	+
Nova (myclobutanil)	0	+	+	+	+
Ronilan (vinclozolin)	no data	+	no data	no data	no data
Rovral (iprodione)	no data	+	no data	no data	no data
Rubigan (fenarimol)	no data	+	+	no data	no data
Sulfur	no data	+	+	no data	no data
Syllitt (dodine)	no data	+	+	no data	no data
Thiram (thiram)	no data	+	no data	no data	+
Topsin-M (thiophanate-methyl)	0	+	+	++	+
Ziram (ziram)	0	++	++	+	+

0=no impact on population, +=low impact on population (less than 30% mortality in 48 hours), ++=moderate impact on population (between 30% and 70% mortality after 48 hours), +++=severe impact on population (over 70% mortality after 48 hours).

\*Where trade names are used, no discrimination is intended and no endorsement by Cooperative Extension is implied. Not a complete list.

<sup>y</sup>Formerly *Amblyseius fallacis*.

<sup>z</sup>General predator group includes coccinellids, lacewings, syrphid fly larvae, minute pirate bugs, and mullein plant bugs.

Adapted from 1999 New England Apple Pest Management Guide.

**Table 49.** Conversion factors to convert from one unit to another.

To convert from	to	Multiply by
lb/A	lb/100 sq ft	0.0023
tn/A	lb/100 sq ft	4.6
lb/A	kg/ha	1.12
kg/ha	lb/A	0.893
lb	oz	16
qt of fruit	lb of fruit	1.5
qt	pt	2.0
pt	qt	0.5
gal of liquid	lb of liquid	8.3
<b>STRAWBERRIES</b>		
lb/A	lb/100 ft of row	0.008
yield in lb/100 ft of row	lb/A	125
yield in qt/100 ft of row	b/A	188
<b>RASPBERRIES</b>		
lb/A	lb/100 ft of row	.0184
lb/A	oz/plant	0.009
yield in lb/100 ft of row	lb/A	55
yield in qt/100 ft of row	lb/A	73
<b>BLUEBERRIES</b>		
lb/A	oz/plant	0.015
yield in lb/100 ft of row	lb/A	44
yield in qt/100 ft of row	lb/A	58

## Resource Materials

### GENERAL REFERENCES FOR ALL SMALL FRUITS

The Berry Grower's Companion 2000. B.L. Bowling. Timber Press 133 S.W. Second Avenue, Suite 50, Portland, OR 97204; 503-227-2878 \$29.

Cornell Small Fruit Recommendations and Small Fruit Insect/Disease Fact Sheets. Cornell University Resource Center, 7 Cornell Business & Tech. Park, Ithaca NY 14850. Call for prices and order forms 607-255-2080.

Field Guide to On-Farm Composting 1999. Mark Dougherty, ed. NRAES-Natural Resource, Agriculture, and Engineering Service, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701. 118 pp. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst, MA 01003. 413-545-2717. \$14.

Journal of Small Fruit and Viticulture. R. E. Gough, ed. Quarterly Journal. Haworth Press, Inc. 10 Alice St., Binghamton, NY 13904. \$34/year.

Mechanical Weed Control for Vegetable Growers, 1996. Vern Grobinger, UVM Extension, 157 Old Guilford Rd., Brattleboro, VT 05301. \$12.

Midwest Small Fruit Pest Management Handbook, 1997. R. C. Funt, M. A. Ellis, and C. Welty, eds. The Ohio State University Cooperative Extension Publications, 385 Kottman Hall, 2021 Coffey Rd., Columbus Ohio 43210-1044, 614-292-1607 \$10

On-Farm Composting Handbook 1992. Robert Rynk, ed. NRAES-Natural Resource, Agriculture, and Engineering Service, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701. 186 pp. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst, MA 01003. 413-545-2717. \$20.

PennState Commercial Berry Production and Pest Management Guide. 2000-2001. Kathy Demchak, editor. Pennsylvania State University Collage of Agriculture. Publications Distribution Center, 112 Agricultural Administration Building, University Park, PA 16802. 814-865-6713. 130 pp. \$10

Small Fruit and Crop Management. 1990. Gene Galletta and David G. Himelrick, eds. Prentice-Hall, Englewood Cliffs, NY 07632.

Steel in the Field, A Farmer's Guide to Weed Management, 1997. Greg Bowman (ed.), 122 pages, Sustainable Agriculture Publications, Hills Bldg., UVM, Burlington, VT 05405. \$18.

Weeds of the Northeast. 1997. R. H. Uva, J. C. Neal, and J. M. DiTomaso. Cornell University Resource Center, 7 Cornell Business & Tech. Park, Ithaca NY 14850. 607-255-2080. 397 pp. \$29

#### BENEFICIAL ORGANISMS

Suppliers of Beneficial Organisms in North America. 1997. Charles D. Hunter. California Environmental Protection Agency, Dept. of Pesticide Regulation, Environmental Monitoring and Pest Management Branch, 1020 N. Street, Rm. 161, Sacramento CA 95814-5624. Free Downloadable from [www.cdpr.ca.gov/docs/ipminov/bensuppl.htm](http://www.cdpr.ca.gov/docs/ipminov/bensuppl.htm). 32 pp.

What you should know about controlling pest mites with predatory mites. 1993. Central Coast Insectary, 391 Hames Rd., Watsonville CA 95076 32pp.

#### SOURCES OF IPM TRAPS, LURES, AND BAITES

Great Lakes IPM (for traps, lures, and monitoring supplies)  
10220 Church St., NE  
Vestaburg, MI 48891  
(517)268-5693

Gempler's, Inc. (for traps, lures, and monitoring supplies)  
211 Blue Mounds Rd., P.O. Box 270  
Mr. Horeb, WI 53572  
(800)332-6744

AgriSense (for traps, lures, and monitoring supplies)  
4230 West Swift, Suite 106  
Fresno, CA 93722  
(209) 276-4250

#### SOURCES OF VARIOUS FIELD SUPPLIES

BioQuip Products (for aspirators, sweepnets, beating sheets, vials, magnifiers, and other collection supplies)  
17803 LaSalle Avenue  
Gardena, CA 90248  
(310)324-0620

Forestry Suppliers, Inc. (for magnifiers, optivisors, tally counters, and other field supplies)  
P.O. Box 8397  
Jackson, MI 39284  
(800)752-8460

Orchard Equipment and Supply Co. (OESCO) (for hand tools, sprayer equipment and replacement supplies, respirators and personal protection equipment, and other farm supplies)

P.O. Box 540. Rte. 116  
Conway, MA 01341  
(800)634-5557

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#### Strawberry

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Compendium of Strawberry Diseases. 1984. John Maas, editor. American Phytopathological Society. St. Paul, MN. 138 pp. Currently out of print, but new edition expected soon. (probably \$35) 1-800-328-7560.

Integrated Pest Management for Strawberries in the Northeastern United States. 1994. Daniel Cooley, Sonia Schloemann, Arthur Tuttle, eds. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst MA 01003. 413-545-2717. Bulletin C211. 52pp. \$7.

Ohio Strawberry Production, Management and Marketing Manual. Bull. No. 1726-436. Ohio Coop. Ext. Service Publications Office. 258 Kottman Hall, 2021 Cottey Rd., Columbus, OH 43210-1044. 43 pp. \$6.55 postpaid.

Strawberry IPM Scouting Procedures: a Guide to Sampling for Common Pests in New York State. 1991. Joseph Kovach, Wayne Wilcox, Arthur Agnello, and Marvin Pritts. Cornell University Resource Center, 7 Cornell Business & Tech. Park, Ithaca NY 14850. 607-255-2080. \$10

Strawberry Production Guide. 1998. Marvin Pritts and David Handley, eds. Northeast Regional Agricultural Engineering Service. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst MA 01003. 413-545-2717. 178 pages (115 color photos) \$50 postpaid.

Dayneutral Strawberry Production Guide. 1989. Marvin Pritts and Adam Dale. Cornell Cooperative Extension, Distribution Center, 7 Research & Technology Park, Ithaca NY. 14850. \$10.

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#### Highbush Blueberry

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Blueberry Culture. 1989. Paul Eck and Norman F. Childers, eds. 4th edition. Rutgers Univ. Press, New Brunswick, NJ.

Compendium of Blueberry and Cranberry Diseases. 1995. Frank L. Caruso and Donald C. Ramsdell, editors. American Phytopathological Society. St. Paul. MN. 87 pp. \$35 1-800-328-7560.

Highbush Blueberry Production Guide. 1992. Marvin Pritts and James Hancock, eds. Northeast Regional Agricultural Engineering Service. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst MA 01003. 413-545-2717. 200 pages (168 color photos) \$45 postpaid.

The Highbush Blueberry and its Management. 1994. Robert E. Gough. Haworth Press, Inc. 10 Alice St., Binghamton NY 13904.

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## Brambles

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Bramble Production Guide. 1989. Marvin Pritts and David Handley, eds. Northeast Regional Agricultural Engineering Service. Available from the UMass Extension Bookstore, Draper Hall/UMass, Amherst MA 01003. 413-545-2717. 189 pages (115 color photos) \$38 postpaid.

Brambles-Production, Management and Marketing 1999. R. C. Funt, M. A. Ellis, and C. Welty, eds. The Ohio State University Cooperative Extension Publications, 385 Kottman Hall, 2021 Coffey Rd., Columbus Ohio 43210-1044, 614-292-1607.

Compendium of Raspberry and Blackberry Diseases and Insects. 1991. Michael A. Ellis, Richard H. Converse, Roger N. Williams and Brian Williamson, eds. American Phytopathological Society. St. Paul MN. 100 pp. \$35 1-800-328-7560.

Bramble Production: The Management and Marketing of Raspberries and Blackberries, 1995. Perry C. Crandall. Haworth Press, Inc. 10 Alice St. Binghamton NY 13904.

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## Grape

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New York and Pennsylvania Pest Management Recommendations for Grapes. Publications Distribution Center, The PennState Univ., 112 Ag. Admin. Bldg., University Park, PA 16802. 814-865-6713. \$5.

Compendium of Grape Diseases. 1988. Roger C. Pearson and Austin C. Goheen, editors. American Phytopathological Society. St. Paul, MN. 93 pp. \$35 1-800-328-7560.

Grape IPM in the Northeast. Cornell University Resource Center, 7 Cornell Business & Tech. Park, Ithaca NY 14850. 607-255-2080. \$30

Wine and Juice Grape Varieties for Cool Climates. 1993. Bruce Reisch, et al., Cornell Cooperative Extension, Finger Lakes Grape Program, 110 Court St., Penn Yan NY 14527. \$4.75.

Table Grape Varieties for Cool Climates. 1993. Bruce Reisch, et al., Cornell Cooperative Extension, Finger Lakes Grape Program, 110 Court St., Penn Yan NY 14527. \$4.75.

## VIDEOS

Integrated Pest Management in Strawberries: a training video for growers. 1993. Minnesota Fruit and Vegetable Growers Association, 1207 Constance Blvd NE, Ham Lake MN 55304. 17.5 minutes \$16.50.

Vegetable Farmers and Their Weed-Control Machines. The Center for Sustainable Agriculture at the Univ. of VT, 590 Main St., Burlington, VT 05405. 802-656-5459. 76 minutes. \$10.

Farmers and Their Diversified Horticultural Marketing Strategies. The Center for Sustainable Agriculture at the Univ. of VT, 590 Main St., Burlington, VT 05405. 802-656-5459. 120 minutes. \$15

## UNUSUAL SMALL FRUITS

Uncommon Fruits Worthy of Attention. 1991. Lee Reich. Addison-Wesley Pub. Co., Inc. \$10.

Currants and Gooseberries Culture Guide, 1997. Monique Audette and Michel Lareau, CPVQ, 845 rue Marie-Vicorin, Saint-Nicholas Quebec, Canada. G7A 3S8 (418)831-7474. \$10

The Lingonberry: a versatile Wild Cranberry, 1996. Richard St. Pierre. Dept. of Hor Science, Univ. of Saskatchewan, Saskatoon, Saskatchewan Canada.

## Sample Plant Diagnostic Submission Form

Name \_\_\_\_\_ Date: \_\_\_\_\_  
Address: \_\_\_\_\_ Phone/Fax: \_\_\_\_\_  
E-mail: \_\_\_\_\_  
 homeowner  grower  landscaper/arborist  other

### SAMPLE FOR:

Insect Identification  
 Disease Diagnosis  
 Weed Identification  
 Cultural Information:  General  Pruning  Fertilizing  
 Other \_\_\_\_\_

PLANT/CROP NAME: \_\_\_\_\_  
(scientific or common name) (cultivar or variety)

### FOR PLANT DISEASES: Description of problem:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Symptoms:

wilting  leaf spot  yellowing  
 blight  streak  leaf drop  
 galls  mosaic  marginal burn  
 rot  other: \_\_\_\_\_

### Plant Part(s) Affected:

stems  flowers  
 roots  fruit  
 leaves  entire plant

### Distribution of Problem:

entire planting  edge of planting  
 random  low areas  
 wet areas  high areas  
 dry areas  sunny areas  
 shaded areas  \_\_\_\_\_

### Nature of Planting:

field  nursery  
 yard  orchard  
 forest  greenhouse  
 indoors  \_\_\_\_\_

### Soil Type:

sandy  clay  
 loamy  mulch  
 potting mix  
 \_\_\_\_\_

### Drainage:

good  
 fair  
 poor  
 \_\_\_\_\_

### Watering:

never  
 daily- morning  
 daily- evening  
 \_\_\_\_\_

### Chemicals and Fertilizers:

none applied  
 rate and date(s) applied: \_\_\_\_\_

Make additional copies of this form and send with submission to diagnostic clinic listed in the General Information Section of the New England Small Fruit Pest Management Guide or contact appropriate clinic for a copy of their form(s) and fee information.