

RUTGERS

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Bulletin

**2011 INSECT CONTROL
RECOMMENDATIONS FOR
SHADE TREES AND
COMMERCIAL NURSERY
CROPS**

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INSECT CONTROL RECOMMENDATIONS FOR SHADE TREES AND COMMERCIAL NURSERY CROPS

INTRODUCTION

A preventive program is the best approach to control most pests in ornamental plantings. Some important considerations include:

- Plant only disease-free plant material.
- Inspect new and established plantings at regular intervals for the presence of diseases and insects.
- Keep seasonal records of pest problems. Records are useful when developing preventive control schedules.
- Contact your local Rutgers Cooperative Extension County Agricultural Agent if you need assistance or additional information on specific problems.

NOTE—USE OF TRADE NAMES

In some instances, trade names are specified in this publication to avoid the use of long and complicated chemical names. No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.

ANDROMEDA (*Pieris*)-----

Azalea whitefly—abamectin, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, diflubenzuron, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, pymetrozine.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

ARBORVITAE-----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fenpropathrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad, tebufenozide.

niliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

European fruit lecanium scale—April: dormant oil. June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Fletcher scale—April: dormant oil. Late June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Juniper scale—April: dormant oil. Mid-June: acephate, acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Leafminer—May and August: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, carbofuran, chlorantraniliprole, clothianidin, deltamethrin, diflubenzuron, disulfoton, esfenvalerate, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, pyriproxyfen, spinosad, tebufenozide.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

ASH-----

Ash borer—late May, early June, and late August: bifenthrin, endosulfan, permethrin.

Fall webworm—early July August: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, pyridalyl, spinosad, tebufenozide.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Oystershell scale—April: dormant oil. Late May and early June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural

oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

AZALEA-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, flonicamid, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Azalea bark scale—April: 2% dormant oil. Mid-May to late June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Azalea lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Azalea leafminer—late May, mid-July and mid-August: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, paraffinic oil, permethrin, spinosad.

Azalea whitefly—abamectin, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, diflubenzuron, fluvalinate, fenpropathrin, horticultural oil, insecticidal soap, imidacloprid, lambda-cyhalothrin, permethrin, pymetrozine.

Black vine weevil—June and 3 week intervals until mid-September if damage is significant: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, diflubenzuron, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Rhododendron borer—mid-May and repeat 3 times at 3 week intervals: bifenthrin, permethrin.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

BEECH-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endo-

sulfan, esfenvalerate, fenoxycarb, flonicamid, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Beech scale—April: dormant oil sprays are effective but may cause injury. Early August and September: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Woolly beech aphid—late May: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenoxycarb, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

BIRCH-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Birch leafminer—mid-May and early June: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, cyromazine, deltamethrin, diflubenzuron, disulfoton, fenpropathrin, fenoxycarb, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Bronze birch borer—late May and mid-June: bifenthrin, imidacloprid, permethrin.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

BOXELDER-----

Boxelder bug—early Fall: acephate, bifenthrin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin.

BOXWOOD -----

Boxwood leafminer—mid-May: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, cyromazine, deltamethrin, diflubenzuron, dinotefuran, disulfoton, fenoxycarb, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Psyllid—April to mid-May: acetamiprid, azadirachtin, bifenthrin, carbaryl, deltamethrin, dinotefuran, endosulfan, esfenvalerate, horticultural oil, imidacloprid, insecticidal soap, lambda cyhalothrin, permethrin.

BUTTERNUT (see “Walnut”) -----

CAMELLIA -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, flonicamid, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Camellia scale—acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

CHAMAECYPARIS -----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Spruce spider mite—April before growth starts: 2% dormant oil. Mid-May: abamectin, bifenthrin, clofentezine, dicofol, etoxazole, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, methiocarb, spinosad, pyrethrins.

CHERRY (Flowering) -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Eastern tent caterpillar—late April early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, horticultural oil, fluvalinate, insecticidal soap, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, imidacloprid, insecticidal soap, lambda-cyhalothrin, fenpropathrin, permethrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

White prunicola (peach) scale—March April: dormant oil. June, July, and August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

COTONEASTER -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

CRABAPPLE -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, flonicamid, fluvalinate,

fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Eastern tent caterpillar—late April early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, horticultural oil, fluvalinate, insecticidal soap, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fenpropathrin, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

Tent caterpillar—late April: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, horticultural oil, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad, tebufenozide.

DOGWOOD-----

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

Sawfly—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, cyfluthrin, diflubenzuron, esfenvalerate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin, spinosad.

DOUGLAS FIR-----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlo-

rantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Cooley spruce gall adelgid—March: dormant oil. Early to mid-May: bifenthrin, carbaryl, cyfluthrin, deltamethrin, endosulfan, horticultural oil, imidacloprid, insecticidal soap, pyrethrins.

Pine needle scale—April: dormant oil. Early June and late August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, pyrethrins, pyriproxyfen.

ELM-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Elm bark beetle—azadirachtin, bifenthrin, carbaryl, permethrin.

Elm cockscomb gall aphid—in the spring just as leaves are fully expanded: abamectin, acephate, azadirachtin, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenpropathrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Elm leaf aphid—abamectin, acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenoxycarb, fenpropathrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Elm leaf beetle—mid May to early June: acephate, azadirachtin, *Bacillus thuringiensis* var. san diego, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad.

Elm leaf miner—late May: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

European elm scale—April: dormant oil. Early July: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil.

European fruit lecanium scale—April: dormant oil. June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin,

fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fenpropathrin, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Lecanium scale—April: dormant oil. Mid-July: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Linden looper—early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Native elm bark beetle—azadirachtin, bifenthrin.

Scurfy scale—April: dormant oil. Mid-May: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Two spotted mite—April: dormant oil. Mid-May: abamectin, bifenthrin, dicofol, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, paraffinic oil.

Wooly elm aphid—abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

EUONYMUS -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Euonymus scale—April: dormant oil. Early June and mid-August: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

FIR -----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Balsam twig aphid—late April: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, disulfoton, endosulfan, esfenvalerate, fenpropath-

rin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Spruce spider mite—April before growth starts: 2% dormant oil. Mid-May: abamectin, bifenthrin, clofentezine, dicofol, etoxazole, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, methiocarb, spinosad, pyrethrins.

FIRETHORN (*Pyracantha*) -----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Black vine weevil—June and 3 week intervals until mid-September if damage is significant: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, diflubenzuron, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

FORSYTHIA -----

Four lined plant bug—bifenthrin, carbaryl, cyfluthrin, deltamethrin, insecticidal soap, lambda-cyhalothrin, permethrin.

Whitefly—abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, clothianidin, cyfluthrin, diflubenzuron, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, horticultural oil, insecticidal soap, imidacloprid, lambda-cyhalothrin, permethrin, pymetrozine, pyriproxyfen.

HACKBERRY (*Celtis*) -----

Hackberry psylla—early May: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, permethrin, spinosad.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

HAWTHORN -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap,

lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Hawthorn leafminer—abamectin, acephate, azadirachtin, bifenthrin, deltamethrin, diflubenzuron, disulfoton, imidacloprid, fenoxycarb, fenpropathrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

HEMLOCK-----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Hemlock fiorinia scale—April: 2% dormant oil. Early June and late August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Hemlock looper—late May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Hemlock scale—April: 2% dormant oil. Late July: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Hemlock woolly adelgid—late April to mid-May: 2% dormant oil. July: bifenthrin, deltamethrin, dinotefuran, 1% horticultural oil, imidacloprid, insecticidal soap. September to late October: 2% dormant oil.

Needleminer—abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Spruce spider mite—April before growth starts: 2% dormant oil. Mid-May: abamectin, bifenthrin, clofentezine, dicofol, etoxazole, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, methiocarb, spinosad, pyrethrins.

HICKORY-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin,

Beauveria bassiana, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Walnut caterpillar—late June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, methoxyfenozide, permethrin, spinosad, tebufenozide.

HOLLY-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

European fruit lecanium scale—April: dormant oil. June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Holly berry midge—late May and early June: cyfluthrin, deltamethrin, lambda-cyhalothrin.

Holly leafminer—abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fenpropathrin, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Holly pitmaking scale—delayed dormant oil. Late June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate, fluvalinate, fenoxycarb, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

HONEY LOCUST-----

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Cottony maple scale—April: dormant oil. Late June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins.

Honey locust mite—late June: abamectin, bifenthrin, carbaryl, dicofol, fluvalinate, hexythiazox, horticultural oil, insecticidal soap.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

Mimosa webworm—mid-June, mid-July, and mid-August: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Plant bug—May: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, insecticidal soap, lambda-cyhalothrin, permethrin.

Poll gall midge—May and 10- to 14-day intervals to August until no further injury is noted: bifenthrin, carbaryl, cyfluthrin, deltamethrin, lambda-cyhalothrin, spinosad.

JUNIPER

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Juniper midge—mid-May: cyfluthrin, deltamethrin, lambda-cyhalothrin.

Juniper scale—April: dormant oil. Mid-June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Juniper tip midge—mid-May mid-June and early August: acephate, cyfluthrin, deltamethrin, lambda cyhalothrin. Prune out dead tips by April.

Juniper webworm—acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

LARCH

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Larch casebearer—early May and mid May: carbaryl, cyfluthrin, deltamethrin.

Woolly larch aphid—abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

LAUREL (*Kalmia*)

Azalea whitefly—abamectin, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, diflubenzuron, fluvalinate, fenpropathrin, horticultural oil, insecticidal soap, imidacloprid, lambda-cyhalothrin, permethrin, pymetrozine.

Black vine weevil—June and 3 week intervals until mid-September if damage is significant: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, diflubenzuron, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Laurel psyllid—April: azadirachtin, bifenthrin, carbaryl, deltamethrin, imidacloprid, insecticidal soap.

Rhododendron borer—permethrin, bifenthrin

LILAC

Giant hornet—late June and July: carbaryl, cyfluthrin.

Japanese weevil—late July: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, diflubenzuron, fenpropathrin, imidacloprid, lambda-cyhalothrin, permethrin.

Leopard moth borer—mid-May and repeat 3 times at 3-week intervals: permethrin. Dispose of infested branches and trees by chipping. Fall and winter: cut and dispose of infested branches and trees by chipping.

Lilac borer—early to mid-May and repeat 3 times at 3-week intervals: permethrin. Hang pheromone traps in mid-April to time adult activity. Prune out infested canes. Fall and winter: cut and dispose of infested branches that show swollen areas and cracked bark by chipping. Entomopathogenic nematodes for larvae control.

Lilac leafminer—mid-May and mid-June: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Oystershell scale—April: dormant oil. Late May and early June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural

oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

LINDEN-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, dinotefuran, esfenvalerate, imidacloprid, insecticidal soap, lambda-cyhalothrin, deltamethrin, fenpropathrin, permethrin.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Linden looper—early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

LOCUST-----

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

Leafminer—May and August: abamectin, acephate, azadirachtin, bifenthrin, carbaryl, carbofuran, chlorantraniliprole, clothianidin, deltamethrin, diflubenzuron, disulfoton, esfenvalerate, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, pyriproxyfen, spinosad, tebufenozide.

Mimosa webworm—mid-June, mid-July, and mid-August: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

LONDON PLANE-----

American plum borer—May: esfenvalerate, permethrin, lambda-cyhalothrin.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Lecanium scale—April: dormant oil. Mid-July: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Sycamore tussock moth—early to mid July: azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

MAGNOLIA-----

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Magnolia scale—April: dormant oil. Mid-August and early September: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, pyriproxyfen.

Tuliptree scale—April: dormant oil. Early September: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin.

MAPLE-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, flonicamid, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin.

Calico scale—mid-June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, del-

tamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Cottony maple scale—April: dormant oil. Late June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

Lecanium scale—April: dormant oil. Mid-July: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Linden looper—early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Maple bladder gall mite—when buds are green and repeat after 10 days: abamectin.

MIMOSA (Silk tree) -----

Mimosa webworm—mid-June, mid-July, and mid-August: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

MOUNTAIN ASH -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, dinotefuran, esfenvalerate, imidacloprid, insecticidal soap, lambda-cyhalothrin, deltamethrin, fenpropathrin, permethrin.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Linden looper—early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

OAK -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

European fruit lecanium scale—April: dormant oil. June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Golden oak scale—April: dormant oil. Mid-June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins.

Gypsy moth—mid-May: acephate, acetamiprid, azadirachtin, *Bacillus thuringiensis*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, insecticidal soap, lambda-cyhalothrin, methoxyfenozide, permethrin, pyridalyl, spinosad, tebufenozide.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Linden looper—early May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fluvalinate, lambda-cyhalothrin, permethrin, spinosad.

Oak blotch leafminer—abamectin, acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Obscure scale—April 3% dormant oil. June: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate,

fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, malathion, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

Pin oak sawfly—June and August: azadirachtin, *Beauveria bassiana*, carbaryl, cyfluthrin, diflubenzuron, horticultural oil, insecticidal soap, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

PACHYSANDRA-----

Euonymus scale—April: dormant oil. Early June and mid-August: acephate, acetamiprid, bifenthrin, carbaryl cyfluthrin, deltamethrin, dinotefuran, fluvalinate, fenoxycarb, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

PEACH (Flowering)-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Cankerworm—mid-May: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, methoxyfenozide, permethrin, spinosad, tebufenozide.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

PEAR (Flowering)-----

Aphid—abamectin, acephate, *Beauveria bassiana*, horticultural oil, imidacloprid, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin.

Caterpillar—acephate, *Bacillus thuringiensis*, *Beauveria bassiana*, permethrin.

Leaf feeding insects—acephate, esfenvalerate, diflubenzuron, imidacloprid, permethrin.

Leafhopper—acephate, imidacloprid, permethrin.

Leafminer—abamectin, acephate, esfenvalerate, imidacloprid, permethrin.

Mealybug—imidacloprid, permethrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, pyridaben, spinosad.

Pear psylla—abamectin, esfenvalerate, imidacloprid.

Thrips—imidacloprid.

Whitefly—imidacloprid, permethrin.

PINE-----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin, cyhalothrin, permethrin, spinosad, tebufenozide.

European pine shoot moth—April and late June early July: azadirachtin, carbaryl, cyfluthrin, fluvalinate, tebufenozide.

Maskell scale—April: dormant oil; OR: mid-June and August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

Nantucket pine tip moth—late April and mid-July: acephate, azadirachtin, bifenthrin, cyfluthrin, diflubenzuron, esfenvalerate, fluvalinate, imidacloprid, lambda-cyhalothrin, methoxyfenozide, permethrin, pyridalyl, spinosad, tebufenozide.

Pine bark adelgid—early April 2% dormant oil. Mid-May: bifenthrin, deltamethrin, endosulfan, horticultural oil, imidacloprid, insecticidal soap.

Pine needleminer—mid-June and late July: acephate, azadirachtin, bifenthrin, carbaryl, deltamethrin, diflubenzuron, disulfoton, fenpropathrin, fenoxycarb, fluvalinate, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Pine needle scale—April: dormant oil. Early June and late August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, pyrethrins, pyriproxyfen.

Pine sawfly—mid-May and early June and early July: acephate, azadirachtin, bifenthrin, carbaryl, cyfluthrin, diflubenzuron, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad.

Pine tortoise scale—April: 2% dormant oil. Late May: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

Pine tube moth—late April and early July: acephate, azadirachtin, bifenthrin, carbaryl, cyfluthrin, lambda-cyhalothrin.

Pine webworm—mid-June and mid-July and early August: *Bacillus thuringiensis*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, diflubenzuron, fluvalinate, lambda-cyhalothrin, permethrin, spinosad, tebufenozide.

Red-headed pine sawfly—mid-May to mid-June and July to August: azadirachtin, bifenthrin, carbaryl, cyfluthrin, diflubenzuron, esfenvalerate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

White pine aphid—April: dormant oil. Early May: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenoxycarb, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

White pine weevil—April: bifenthrin, diflubenzuron, imidacloprid. Early June: remove and destroy infested leaders. Be sure to make cuts below grubs.

PLUM (Flowering)-----

Asian ambrosia beetle—bifenthrin. Use the trap to determine when the adults are emerging, scout candidate hosts, and then apply chemicals.

Borer—acephate, bifenthrin, *Bacillus thuringiensis*, carbofuran, chlorantraniliprole, dinotefuran, endosulfan, esfenvalerate, horticultural oil, lambda-cyhalothrin, methomyl, methoxyfenozide, permethrin, spinosad, tebufenozide.

POPLAR -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Mottled willow borer—late August: permethrin. Destroy badly infested trees.

Poplar borer—late July: permethrin.

PRIVET (*Ligustrum*) -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Japanese weevil—late July: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, diflubenzuron, imidacloprid, fluvalinate, permethrin.

Lilac leafminer—mid-May and late May: abamectin, acephate, azadirachtin, bifenthrin, deltamethrin, diflubenzuron,

disulfoton, imidacloprid, lambda-cyhalothrin, permethrin, spinosad.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Thrips—abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, fenpropathrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, spinosad.

PYRACANTHA (see “Firethorn”)-----

RHODODENDRON (see “Azalea”)-----

Rhododendron midge—May, when new growth begins and early August: acephate.

ROSE -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Japanese beetle—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, esfenvalerate, fenpropathrin, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Leafhopper—acephate, acetamiprid, azadirachtin, bifenthrin, carbaryl, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, flonicamid, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, permethrin.

Leafroller—acephate, azadirachtin, *Bacillus thuringiensis*, bifenthrin, cyfluthrin, deltamethrin, horticultural oil, imidacloprid, lambda-cyhalothrin, paraffinic oil, permethrin.

Mite—abamectin, bifenthrin, carbofuran, clofentezine, dicofol, diflubenzuron, endosulfan, etoxazole, fenpropathrin, lambda-cyhalothrin, propargite, spinosad.

Rose chafer—azadirachtin, carbaryl, deltamethrin, imidacloprid, lambda-cyhalothrin, permethrin, pyrethrins.

Thrips—abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fenoxycarb, fenpropathrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, spinosad.

SPRUCE-----

(Oil sprays will discolor needles on blue spruce trees.)

Bagworm—mid-June: acephate, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, cyfluthrin, deltamethrin, diflubenzuron, dinotefuran, fluvalinate, lambda-cyhalothrin, cyhalothrin, permethrin, spinosad, tebufenozide.

Balsam twig aphid—late April: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, disulfoton, endosulfan, esfenvalerate, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Cooley spruce gall adelgid—March: dormant oil. Early to mid-May: bifenthrin, carbaryl, cyfluthrin, deltamethrin, endosulfan, horticultural oil, imidacloprid, insecticidal soap, pyrethrins.

Eastern spruce gall adelgid—March: dormant oil. Late April to mid-May: bifenthrin, carbaryl, cyfluthrin, deltamethrin, horticultural oil, imidacloprid, insecticidal soap.

Pine needle scale—April: dormant oil. Early June and late August: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, pyrethrins, pyriproxyfen.

Spruce bud scale—April before growth starts: 2% dormant oil. Mid-June and early July: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, fenoxycarb, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

Spruce spider mite—April before growth starts: 2% dormant oil. Mid-May: abamectin, bifenthrin, clofentezine, dicofol, etoxazole, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, methiocarb, spinosad, pyrethrins.

White pine weevil—April: bifenthrin, diflubenzuron, imidacloprid.

Woolly larch aphid—early May: abamectin, acephate, azadirachtin, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenoxycarb, fenpropathrin, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pyrethrins, pyriproxyfen.

SYCAMORE

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

TAXUS (Yew)

Black vine weevil—June and 3 week intervals until mid-September if damage is significant: acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, diflubenzuron, dinotefuran, endosulfan, esfenvalerate, fenpropathrin, fluvalinate, imidacloprid, lambda-cyhalothrin.

Fletcher scale—April: dormant oil. Late June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin,

dinotefuran, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Lecanium scale—April: dormant oil. Mid-July: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Taxus bud mite—early May, late May, mid-June and early July: bifenthrin, cyfluthrin, pyrethrins.

Taxus mealybug—April: 2% dormant oil. Mid-May and early June: acephate, azadirachtin, bifenthrin, carbaryl, cyfluthrin, imidacloprid, lambda-cyhalothrin, permethrin, pyrethrins.

Taxus pulvinaria scale—April 2% dormant oil. Late June and early July: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, esfenvalerate, fenoxycarb, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, pyriproxyfen.

TULIP TREE

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Tuliptree scale—April: dormant oil. Early September: acephate, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin.

VIBURNUM

Snowball aphid—April before buds break: dormant oil. Mid-May: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fenoxycarb, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Spider mite—abamectin, acephate, *Beauveria bassiana*, bifenthrin, clofentezine, dicofol, dormant oil, etoxazole, fenpropathrin, fluvalinate, hexythiazox, horticultural oil, insecticidal soap, lambda-cyhalothrin, methiocarb, *Paecilomyces fumosoroseus*, paraffinic oil, propargite, spinosad.

WALNUT

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid,

fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Lacebug—mid-May and early June: acephate, *Beauveria bassiana*, bifenthrin, carbaryl, chlorantraniliprole, clothianidin, cyfluthrin, deltamethrin, dinotefuran, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin.

Walnut petiole gall mite—late May and early June: carbaryl, fluvalinate.

WILLOW -----

Aphid—dormant oil. Mid-May when aphids become a problem: abamectin, acephate, acetamiprid, azadirachtin, *Beauveria bassiana*, bifenthrin, carbofuran, clothianidin, cyfluthrin, deltamethrin, dinotefuran, disulfoton, endosulfan, esfenvalerate, fenoxycarb, fenpropathrin, flonicamid, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, methomyl, paraffinic oil, *Paecilomyces fumosoroseus*, permethrin, pymetrozine, pyrethrins, pyriproxyfen.

Imported willow leaf beetle—late May and late June: azadirachtin, *Bacillus thuringiensis* var. san diego, bifenthrin, carbaryl, spinosad.

Mottled willow borer—late August: permethrin. Thoroughly cover bark of trees and branches.

Oystershell scale—April: dormant oil. Late May and early June: acephate, acetamiprid, bifenthrin, carbaryl, cyfluthrin, deltamethrin, dinotefuran, fluvalinate, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, paraffinic oil, permethrin.

Willow twig aphid—early August: abamectin, acephate, azadirachtin, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, deltamethrin, disulfoton, esfenvalerate, fluvalinate, fenpropathrin, horticultural oil, imidacloprid, insecticidal soap, lambda-cyhalothrin, *Paecilomyces fumosoroseus*, paraffinic oil, permethrin, pymetrozine, pyrethrins, pyriproxyfen,

ZELKOVA -----

Elm leaf beetle—mid May to early June: acephate, azadirachtin, *Bacillus thuringiensis* var. san diego, *Beauveria bassiana*, bifenthrin, carbaryl, cyfluthrin, cypermethrin, deltamethrin, fluvalinate, imidacloprid, insecticidal soap, lambda-cyhalothrin, permethrin, spinosad.

NOTES

NOTE 1. CONTROL OF SOIL PESTS

Root Weevil Larvae (Black vine weevil, two-banded Japanese weevil) and *White grubs* (Japanese, Oriental, Asiatic garden beetles, and chafers)

Azadirachtin (Azatin) or imidacloprid (Marathon 60WP) may be used to control immature root weevils in container nursery stock. Marathon may also be used on field grown nursery stock. Best control is achieved against young larvae. Apply to moist soil and irrigate after treatment to move insecticide to root zone of plant. Avoid runoff of water from the pot. Note that Marathon should be applied prior to egg hatch and water runoff from containers should be avoided for approximately 10 days after treatment.

Successful control has been obtained using entomopathogenic nematodes (*Steinernema carpocapsae*) in container nursery stock. Irrigate prior to application. Early morning or evening application periods are best. Irrigate with 1/2 inch of water after treatment. ALWAYS FOLLOW LABEL DIRECTIONS.

Fungus Gnats

Azadirachtin (Azatin) or *Bacillus thuringiensis* (Gnatrol) may be used to control fungus gnats in container nursery stock. Best control is achieved against young larvae. Apply to moist soil and irrigate after treatment to move insecticide to root zone of plant. Avoid runoff of water from the pot.

Successful control has been obtained using entomopathogenic nematodes (*Steinernema carpocapsae*) in container nursery stock. Irrigate prior to application. Early morning or evening application periods are best. Irrigate with 1/2 inch of water after treatment. ALWAYS FOLLOW LABEL DIRECTIONS.

NOTE 2. DORMANT OIL SPRAYS FOR DECIDUOUS AND EVERGREEN TREES AND SHRUBS

Control of Many Aphids, Adelgids, Scales, Mites, Mealybugs

Dormant oil sprays can be applied before buds break in the Spring and, when weather permits, during September and October. Select clear, mild days when the temperature is above 40°F but not over 75°F, humidity is low, and there is no danger of a freezing night. Do not spray late in the afternoon.

DECIDUOUS TREES: 2 to 3 gal of dormant oil for 100 gal of spray.

EVERGREENS: 2 gal of dormant oil for 100 gal of spray.

NOTE 3. BIORATIONAL CONTROLS

Biorational controls are products that are considered more “environmentally friendly” than traditional pesticides. Biorationals suppress pest populations while having the least harmful effects on other non-target organisms (ex., beneficials) and the environment. Biorationals available for insect management include horticultural oils, insecticidal soaps, neem oil, insect growth regulators (IRG), and microbial insecticides such as *Bacillus thuringiensis*, *Beauveria bassiana*, and entomopathogenic nematodes.

Horticultural oils and insecticidal soaps have had success in controlling a wide variety of mite and insect pests and some diseases. Thorough spray coverage of the target pest is required to obtain satisfactory control. For insect and mite control on shade trees and shrubs, use a 1% oil spray for pests such as aphids, adelgids, caterpillars, gall mites, lacebugs, leaf beetle larvae, mealybugs, immature plant bugs, immature psyllids, sawfly larvae, immature scales (crawlers), spider mites, and immature whiteflies. **Always follow label directions.**

NOTE 4. ELM BARK BEETLE CONTROL (for Dutch Elm Disease Management)

Spray applications may be made when weather conditions are favorable and temperatures are above freezing. The best results have been obtained when applications are made between March 1st and budbreak.

Thorough spray coverage is absolutely necessary to obtain protection. Be certain that smaller twigs in the tops of trees receive adequate coverage. Mist blower applications should be attempted only when there is little or no wind.

Do not allow the insecticide spray to drip onto automobiles because spotting or pitting may result. Some damage to lawn areas may result under trees.

Remove all dead or dying elms to eliminate potential breeding sites for the bark beetle vector.

NOTE 5. SYSTEMIC INSECTICIDE IMPLANTS

Application of systemic insecticide implants are suggested on a trial basis. Some of the target insect pests include aphids, bagworms, cankerworm, casebearer, eastern tent caterpillar, lacebugs, leafminers, mimosa webworm, Nantucket pine tip moth larvae, scale crawlers, thrips, and whitefly. Some host trees are ash, birch, non-bearing cherry, dogwood, elm, hawthorn, hemlock, holly, larch, lilac, linden, locust, maple, mimosa, oak, pine, fir, spruce, poplar, sycamore, tulip, and willow. Applications should be made just prior to expected insect activity or at the earliest indication of insect activity. FOLLOW ALL DIRECTIONS AND PRECAUTIONS STATED ON THE LABEL.

INSECTICIDES AND MITICIDES

NOTE: USE OF TRADE NAMES

In some instances we have found it advisable to use trade names in order to avoid using long and complicated chemical names. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

PESTICIDE NAME	TRADE NAME(S)	CLASSIFICATION	MANUFACTURER(S)
abamectin	Avid, Varsity	microbial toxin	Merck, Syngenta
acetimiprid	Tristar	neonicotinoid	Cleary
acephate	Orthene, Pinpoint, Lescro	organophosphate	Valent, Lescro
azadirachtin (Neem)	Azatin	IGR/botanical	Olympic Hort. Products
<i>Bacillus thuringiensis</i> var. <i>kurstaki</i> (caterpillars)	Dipel 2x, MVP II, Foray DiPel	biological	Abbott, Mycogen, Novo-Nordisk, Valent
<i>Bacillus thuringiensis</i> var. <i>israelensis</i>	Gnatrol	biological	Valent
<i>Bacillus thuringiensis</i> var. <i>san diego</i> (leaf beetles)	M-Trak	biological	Mycogen
<i>Beauveria bassiana</i>	Naturalis-O	biological	Troy BioSciences
bifenthrin	Talstar	pyrethroid	FMC
carbaryl	Sevin	carbamate	CHIPCO
carbofuran	Furadan	carbamate	FMC
chlorantraniliprole	Acelepryn		Dupont Professional
clofentezine	Apollo		Mana
clothianidin	Arena	neonicotinoid	Valent
cyfluthrin	Decathlon, Tempo	pyrethroid	Olympic Hort. Products, Bayer
cypermethrin	Cynoff	pyrethroid	FMC T&O
cryomazine	Citation	trizine growth inhibitor	Ciba-Geigy
lambda-cyhalothrin	Scimitar, Battle, Demand, Impasse	pyrethroid	Zeneca, LESCO Syngenta
deltamethrin	Deltaguard	pyrethroid	Bayer
dicofol	Kelthane	chlorinated hydrocarbon	Rohm & Haas
diflubenzum	Adept, Dimilin	growth regulator	Chemtura
dinotefuran	Safari	neonicotinoid	Valent
disulfoton	Di-Syston	organophosphate	Bayer
endosulfan	Thionex	chlorinated hydrocarbon	Mana
esfenvalerate	Adjourn, Asana	pyrethroid	Mana, Dupont Ag.
etoxazole	TetraSan	oxazoline	Andersons
fenoxycarb	Precision	carbamate	Novartis
fenpropathrin	Tame	pyrethroid	Valent
fluvalinate	Mavrik	pyrethroid	Sandoz Agro
flonicamid	Aria	pyridinecarboxamide	FMC T&O
hexythiazox	Hexygon	carboximide	Gowan
imidacloprid*	Merit	chloronicotinyl	Bayer
insecticidal soap	M-Pede, Insecticidal soap	fatty acid salts	Mycogen, Olympic Hort. Products
kaolin	Surround	clay	Engelhard
methiocarb	Mesural	carbamate	Gowan
methomyl	Lannate	carbamate	Dupont Ag.
methoxyfenozide	Intrepid 2F	growth regulator	Dow AgroSciences
oxythioquinox	Morestan	fungicide	Bayer
<i>Paecilomyces fumosoroseus</i>	PreFeRal	biological	Biobest

(continued)

*NOTE: Imidacloprid (Merit) is a systemic insecticide and must be applied early, usually prior to insect activity. Read the label to determine proper application time for specific pests.

Insecticides and Miticides, continued.

PESTICIDE NAME	TRADE NAME(S)	CLASSIFICATION	MANUFACTURER(S)
permethrin	Astro, Dagnet	pyrethroid	FMC
petroleum oils	Dormant, Summer, Superior	hydrocarbon oils	many
propargite	Ornamite	sulfite ester	Crompton-Uniroyal Chemical
pyridaben	Sanmite	pyridazinone	BASF
pyridalyl	Overture 35WP		Valent
pyriproxyfen	Distance	growth regulator	Valent
spinosad	Conserve SC	spinosyn	DowElanco
tebufenozide	Confirm	growth regulator	Dow AgroSciences

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