

10 TREE-FRUIT PEST MANAGEMENT

Some important tree-fruit pests can be monitored by the home gardener. Monitoring is a way of assessing the presence of pests and the size of their population. It is a very useful part of integrated pest management (IPM).

Figure 1 (facing page) shows a calendar of events for apples in the Lake Plains area of New York. This calendar can give you an idea of the relationships between climate and biological phenomena (phenology) of the tree, the diseases, and the insects you may be faced with. Infection periods for diseases (primary and secondary) are included on the chart, as are estimates of activity for various life stages of the insect pests. This information, along with monitoring your specific situation for pests, will help you determine when activity begins and, in some cases, what the population levels are. From this information you can make decisions about what pests you need to manage in your fruit planting and where they can be most effectively controlled.



Do not spray insecticides when fruit trees are in bloom.

Visual traps, one monitoring tool, are available for some of these important tree-fruit pests. For example, both red sphere traps and yellow sticky-board traps are available to monitor the apple maggot fly. Visual traps are used to find out when adult flies are active near the apple tree.

Obviously, one must know what the adult apple maggot looks like to use these traps effectively. Monitoring will help in the development of specific pest management programs. In some cases, red sphere traps may be effective in controlling the apple maggot by trapping most of the females before they land on the real fruit and lay eggs. Synthetic apple volatile lures are now available, which greatly increase the efficiency of the traps. The emergence of black cherry fruit fly, cherry fruit fly, and blueberry maggot fly can also be monitored through the use of these traps. White rectangle traps are used to monitor the tarnished plant bug and European apple sawfly.

In addition to visual traps, pheromone traps are available. Pheromones are chemicals produced by insects and released into the environment to influence the behavior of other insects. Sex pheromones attract male insects, and the trap captures them. These traps are useful in determining the first emergence of males and the peak flight times.

The placement of traps for any of these monitoring tools is critical. Complete directions should be supplied by the manufacturer.

Effective pest management in home orchards depends on recognizing the pest problem, selecting appropriate pesticides, timing applications properly, and thoroughly covering the fruit and foliage with the spray.

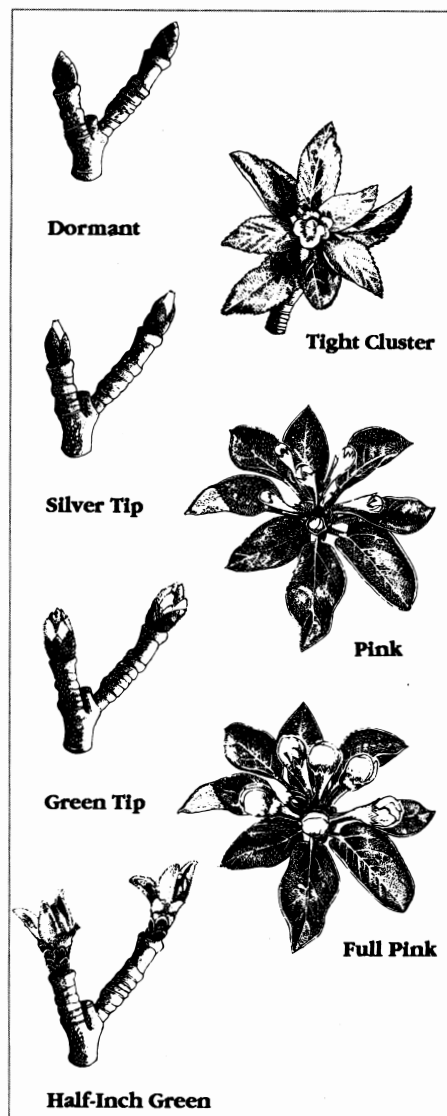


Figure 2. Key apple bud stages

If you are planting fruit trees, consider disease-resistant dwarf trees to minimize the need for fungicides.

Cultural pest management guidelines for tree-fruit follow. Pesticide guidelines are found in Part II, Tables 13 and 14.

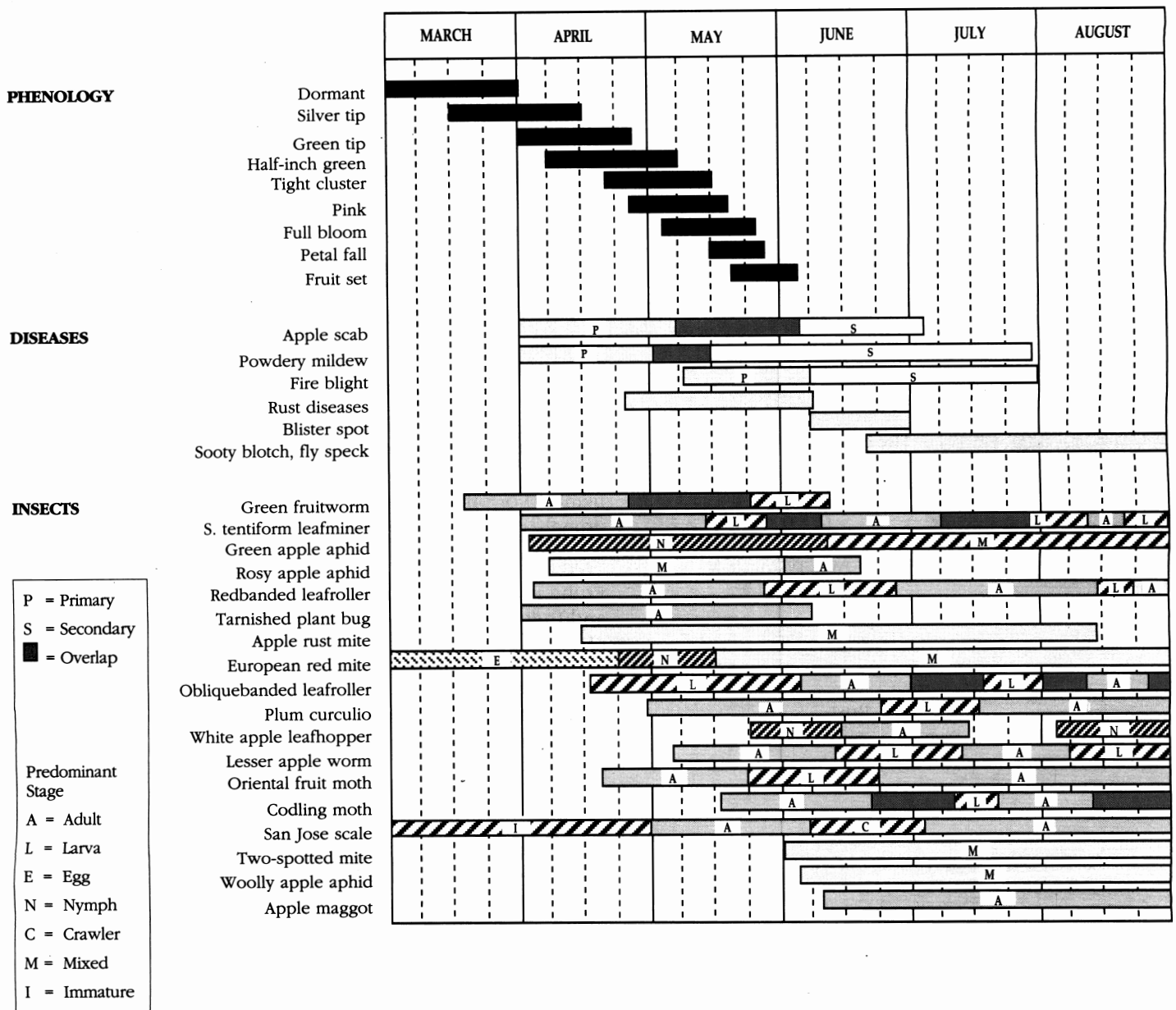


Figure 1. Calendar of events of apple in Lake Plains area of New York

Adapted with permission from 2000 Pest Management Guidelines for Commercial Tree-Fruit Production, 142RTE. College of Agriculture and Life Sciences at Cornell University, Ithaca, N.Y.

Table 12. Tree-fruit pest management


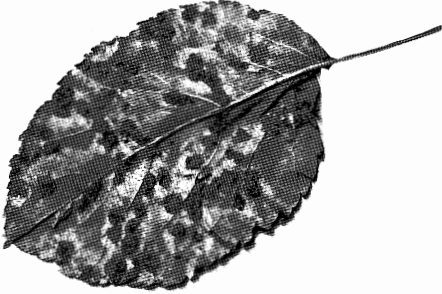
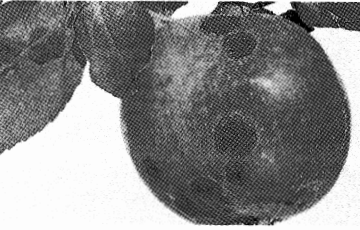
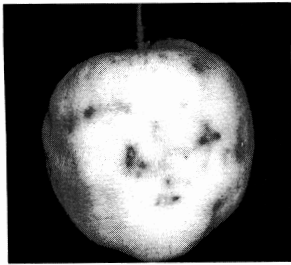
Plant	Pest/Disease	Description/Cultural Management
Apple (<i>Malus</i> sp.) 	Bitter rot	Primarily a problem in Hudson Valley and Long Island, New York, particularly in warm wet summers. Prune in early spring to remove all dead wood and promote good air circulation. Remove and destroy infected fruit as they appear in summer.
	Fire blight	Most serious on highly susceptible varieties (Fuji, Gala, Idared, Jonagold, Jonathan, Lodi, Mutsu, R. T. Greening, Paulared, Rome, Sir Prize, Spigold, 20-Ounce, York) and trees grown on fully dwarfing rootstocks. Practice plant sanitation: carefully remove and dispose of infected branches or fruit as soon as they appear, starting one to two weeks after bloom. Cut at least 6–12 in. below obvious signs of infection. Prune out remaining cankered branches during dormant season. Avoid high rates of nitrogen (including manure) or other practices that stimulate lush vegetative growth.
	Fire blight killing new shoot of apple	
	Powdery mildew	Prune out infected terminals as they develop late in summer. Prune in early spring to thin trees and allow air to circulate and fruit and leaves to dry quickly after rains. Highly susceptible varieties include Baldwin, Cortland, Idared, Jonathan, Monroe, Paulared, Rome, and Ginger Gold.
	Rust	Primarily a problem in southern half of state or in upstate locations where red cedars (<i>Juniperus</i> spp.) grow. Eliminate red cedars in and around orchard. Avoid highly susceptible varieties (Golden Delicious, Jonathan, Lodi, Prima, Roma, Summerred, 20-Ounce, York) in regions where rust is prevalent.
	Rust infections on an apple leaf	
	Scab	In autumn or as leaves or fruit drop in summer, rake and dispose of all fallen or diseased leaves and fruit. Prune in early spring to thin trees, which allows air to circulate and fruit and leaves to dry quickly after rains. Plant resistant varieties (Redfree, Prima, Liberty, Freedom, Jonafree, Macfree, Sir Prize, Gold Rush, Williams' Pride, Nova Spy, Enterpriz, and traditional russet apples such as Gold Russet and Rotburg Russet).
Apple scab infections on leaves and fruit		
	Sooty blotch and fly speck	Prune in early spring to remove dead wood, and thin trees to allow air to circulate and fruit and leaves to dry quickly after rains. Thin out crowded branches in late June to maintain good air circulation throughout summer. Adequate control can often be obtained with good pruning practices alone. These diseases more frequently a problem in downstate New York and in sites with abundant brambles nearby.

Table 12. Tree-fruit pest management (*continued*)

<i>Plant</i>	<i>Pest/Disease</i>	<i>Description/Cultural Management</i>	
Apple (<i>continued</i>)	Apple aphids	Small, often pear-shaped, soft-bodied insects that frequently occur in large colonies. Cause leaves to become twisted and rolled. Aphids excrete honeydew on which sooty mold, a black fungus, may grow. Rosy apple aphid may cause certain apple cultivars to become stunted and deformed and must be controlled early in growing season. Washing leaves with a strong stream of water may remove many aphids from plants. Green apple aphids on terminals will rarely require controls.	
	Apple maggot	Most destructive of all insects that attack apples. Commonly called railroad worm because of brownish trails larvae leave as they move through flesh of fruit. Late, hard "keeper" varieties more resistant. Infested fruit may drop prematurely. Pick up all drops in late August through September. Picking and destroying fallen apples weekly from early August through harvest destroys larvae within fruit and reduces potential for maggot injury the following year. This is most practical where trees are isolated and wild or abandoned trees are not nearby. Use visual traps for monitoring or control of one or a few dwarf trees. To help control flies, hang unbaited red sphere traps in trees at a rate of one trap per 100 to 150 fruit.	
		Apple maggot injury	
	Codling moth	Common "worm" found in apples. Pheromone traps can be used as monitoring tools. Band to trap. (To create substitute location for codling moth larvae to spin their cocoons and pupate, band tree trunks and large branches by tying 6-in. strips of burlap or cardboard around them. For central New York, band three times: May, mid-June to early July, and August. Timing in other locations may vary slightly. Check for larvae and cocoons and kill those you find.) Pick up all drops in late August and September.	
	European apple sawfly (eastern New York)	Distribution limited to Hudson Valley, Champlain Valley, and Long Island, New York. Adults lay eggs in calyx cup during bloom; larvae tunnel under skin of developing fruit, causing a characteristic spiral tunnel and misshapen apple. Later larval feeding in second- or even third-instar fruit may cause these fruit to drop. Pick up all drops in early June.	
	Leafrollers	Feed primarily on foliage, rolling and skeletonizing leaves, but may also feed on fruit, causing scarring. Sample frequently during July.	
	Mites	Cause bronzing of leaves. Predator mites usually keep them in check; if "soft," insecticides are used.	
	Plum curculio	One-quarter-inch-long roughened snout beetle that attacks all orchard fruit crops. Egg laying causes small crescent-shaped scar on fruit. Larvae bore toward center of fruit and feed there. Adults may cause injury by feeding either in fall or spring. Pick up and remove all drops in June and early	

continued

Table 12. Tree-fruit pest management (continued)

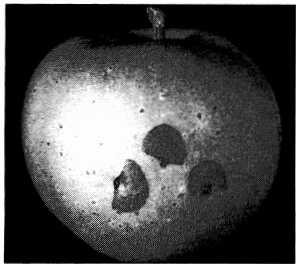



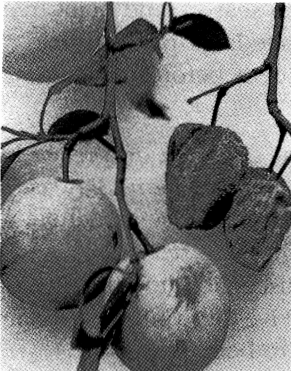
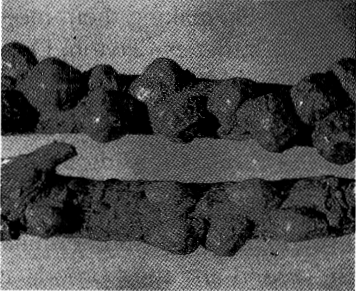
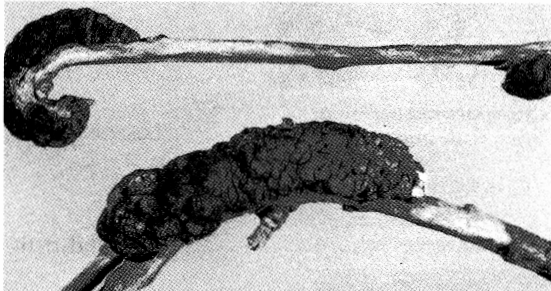
Plant	Pest/Disease	Description/Cultural Management
Apple (continued)		<p>July. Jarring, a mechanical method of control, is sometimes helpful; results may vary. If tree is suddenly jarred with a padded mallet, plum curculio beetles loosen their hold, contract their legs, and fall to the ground. Jarring should be done in early morning. Place sheets on ground to collect beetles and then destroy them. <i>Note:</i> Young trees can be severely damaged if hit too hard.</p>
Plum curculio injury to apple	Roundheaded appletree borer	<p>Redbanded leafroller Caterpillars feed on leaves and occasionally on fruit. Two broods present each year in New York. No cultural control available.</p>
	Roundheaded appletree borer	<p>Larvae bore into trunk and feed in sapwood. Tunnels weaken tree and may cut off sap flow, cause dieback, or kill tree. Injury predisposes tree to other pests. Downy woodpecker only known natural enemy. Ring bottom 12–24 in. of trunks with oviposition barriers in May. Oviposition barriers include wire mosquito netting, hardware cloth, tar paper, or several layers of newspaper. Barriers should be loose except at bottom (cover with soil) and top (tie with cord). Remove barriers at end of season (September). Remove borers from trees with knife and piece of wire with hooked tip. Clear litter away from bases of trees to help locate borers. Young borers can usually be cut out; older ones can be probed for with flexible wire. Cut with caution, being sure not to remove more wood than necessary. If cut carefully, wounds usually heal without noticeable injury to tree. Keeping trees healthy and vigorous by proper cultivation, fertilization, pest control, and watering will help infested trees overcome effects of borer injury.</p>
	San Jose scale	<p>Feeds by sucking sap from all parts of the tree and fruit. Fruit spotting may occur and branch dieback may result. Prune infested branches.</p>
Cherry (<i>Prunus</i> sp.)	Black knot	<p>Occurs on numerous cultivated and wild plums, prunes, and cherries (<i>Prunus</i> spp.). Disease is characterized by presence of warty, black gall and may vary in length from 1/2 in. to more than 1 ft. Remove wild choke cherries; remove and burn all cankers as soon as you notice them.</p>
	Brown rot	<p>See Peach, nectarine, and apricot.</p>
	Fungal leaf spot	<p>In autumn, rake and dispose of all fallen or diseased leaves and fruit. This will control leaf spot in addition to brown rot.</p>
	Cherry fruit flies	<p>Maggots attack developing cherries, feeding on flesh. Adult emergence begins in early June and continues about one month. Sticky traps can be used to monitor adult activity.</p>
	Plum curculio	<p>See Apple.</p>
Peach, nectarine, and apricot (<i>Prunus</i> sp.)	Brown rot	<p>Clean up fallen fruit before and during harvest; remove and dispose of all unharvested fruit and mummy fruit from trees after harvest.</p>

Table 12. Tree-fruit pest management (*continued*)

<i>Plant</i>	<i>Pest/Disease</i>	<i>Description/Cultural Management</i>
Peach, nectarine, and apricot (<i>continued</i>)  Cytospora canker on a stone-fruit branch	Cytospora canker	Delay annual pruning and bloom. Prune to thin trees and allow air to circulate and fruit and leaves to dry quickly after rains. Remove all weak, gumming, or dead twigs and branches during pruning; do not leave pruning stubs. Train new trees to promote wide angles between major scaffold branches and trunk. Promote winter hardiness: fertilize only early in season, withhold water late in season, and paint tree trunks with interior (water-based) white latex paint before winter. Remove old cankered peach trees before planting new peach trees.
	Peach leaf curl (peaches, nectarines)	Springtime disease of peach, nectarine, almond, and related ornamental species caused by <i>Taphrina deformans</i> . Disease not serious except in rainy years when it can cause defoliation of unsprayed trees early in the growing season. This weakens trees, making them more susceptible to winter injury. The varieties Clayton, Q 1-8, Five Star Curlless, Indian Blood Free, and others are reported to be resistant.
	Lesser peachtree borer	Adult is a clear-winged moth that feeds on cambium or inner bark of tree, often causing individual limbs to die back. Keep trees in good vigor and avoid wounding.
	Oriental fruit moth	First brood attacks young terminals of peach trees, causing death; second and third broods attack fruit. Plastic ties impregnated with sex pheromone are available commercially. Hang in trees (rate of 400/acre) after bloom to disrupt mating and prevent production of injurious larvae. Use in small orchard settings may not provide satisfactory control because mated females can move in from nearby alternate hosts.
	Peachtree borer	Adult is a clear-winged moth that feeds on cambium or inner bark of tree, girdling it. Entire tree may be killed. Gummosis often present but may be caused by other injuries. Keep trees in good vigor and avoid wounding. Painting lower 1 to 2 feet of trunk with white latex paint can help prevent bark splitting and may also deter egg laying by this pest.
	Plum curculio	See Apple.
Pear (<i>Pyrus</i> sp.)	Fabraea leaf spot	Primarily a problem in southern half of New York State. Use same control program as for scab.
	Fire blight	See Apple. Most common pear varieties, except for Seckel, are extremely susceptible. Resistant varieties include Harrow, Delight, Magness, and Moonglow.
	Scab	In autumn, rake and dispose of all fallen leaves. Scab seldom a problem on Bartlett.
	Aphids	See Apple.
	Pear psylla	Adults resemble tiny cicadas and may cause early defoliation of tree and loss of crop. Honeydew and sooty mold often found, soiling leaves and fruit. Three to four generations

continued

Table 12. Tree-fruit pest management (continued)

Plant	Pest/Disease	Description/Cultural Management
Pear (continued)		<p>occur each year. Entomopathogenic fungi are being investigated for control. Sucker trees regularly during the season to remove excess succulent leaf growth, which supports psylla populations.</p>
Plum and Prune (<i>Prunus</i> sp.)	<p>Black knot</p> <p>Brown rot</p> <p>Lecanium scale</p> <p>Plum curculio</p>	<p>Prune out and remove all knotted branches before bud-break. Rogue infected wild cherry trees in surrounding area.</p> <p>See Peach, nectarine, and apricot.</p> <p>Feed on branches and leaves, causing copious honeydew, sooty mold, and weakening or death of infested branches. Scales may predispose trees to other secondary pests. Prune out small infestations where practical.</p> <p>See Apple.</p>
		
<p>Brown rot-infected plums compared with healthy fruit</p>	<p>Lecanium scale</p>	<p>Black knot on plum trees</p>

FURTHER READING

Cornell Cooperative Extension Tree Fruit Fact Sheet Series. Cornell Cooperative Extension, Ithaca, N.Y.

Hall-Beyer, B., and J. Richard. 1989. *Ecological Fruit Production in the*

North. Bart Hall-Beyer, RR3, Scotstown, Que., JOB 3J0, Canada.

Howitt, A. H. 1993. *Common Tree Fruit Pests*. Michigan State University Extension. NCR63. 252 pp.

Jones, A. L., and A. S. Aldwinkle. 1990. *Compendium of Apple and Pear Diseases*. American Phytopathological Society, St. Paul, Minn. 100 pp.