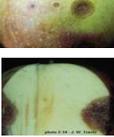


I. APPLE

No.	Disease/Insect	Symptoms	Possible Causes	Solutions
1	ALTERNARIA LEAF BLOTCH	 <p>Lesions first appear in late spring or early summer as small, round, purplish or blackish spots, gradually enlarging to 1/16 to 3/16 inch (1.5-5 mm) in diameter, with a brownish purple border</p> <p>Lesions may coalesce or undergo secondary enlargement and become irregular and much darker, acquiring a "frog-eye" appearance</p> <p>When lesions occur on petioles, the leaves turn yellow and 50 percent or more defoliation may occur. Severe defoliation leads to premature fruit drop.</p>	<p>Fungus can overwinter as mycelium on dead leaves on the orchard floor, in mechanical injuries in twigs, or in dormant buds. Primary infection takes place about one month after petal fall. The disease advances rapidly in the optimum temperature range of 77 to 86 F (25-30 C) and wet weather.</p>	<p>Mite populations should be monitored closely and maintained at less than six to eight per leaf in orchards where Alternaria blotch has been a problem because mite stress increases disease severity</p> <p>Strobilurin fungicides</p> <p>Chopping leaves with a mower or removing them from the orchard will help reduce the inoculum level for the following season.</p>
2	APPLE SCAB	 <p>Young lesions at both surfaces of the leaves are velvety brown to olive green and have feathery, indistinct margins</p> <p>As an infected leaf ages, the tissues adjacent to the lesion thicken, and the leaf surface becomes deformed. Young leaves may become curled, dwarfed, and distorted when infections are numerous.</p> <p>Infections of petioles and pedicels result in premature abscission of leaves and fruit, respectively.</p> <p>In late summer or early fall, lesions may appear whitish due to the growth of a secondary fungus on the lesion surface.</p> <p>Infections early in the season can cause fruit to develop unevenly as uninfected portions continue to grow. Cracks then appear in the skin and flesh, or the fruit may become deformed. Lesions on young fruit appear similar to those on leaves, but as the infected fruit enlarge, the lesions become brown and corky</p>	<p>Although research in New York has shown that the scab fungus can overwinter in trees as conidia on bud scales, the pathogen generally overwinters in leaves and fruit on the orchard floor.</p> <p>Ascospores are the major source of primary inoculum and are produced within pseudothecia that develop in leaves during the winter months.</p> <p>Once the fungus is established in the leaf or fruit, conidia form on the surface of the lesion and become the source of secondary inoculum for the remainder of the season. Conidia are disseminated to developing leaves and fruit by splashing rain and wind.</p>	<p>During the prebloom period, for both fresh and processing apples, determine apple scab infection periods by observing duration of leaf wetness and average temperatures during the wet period</p> <p>Scab-resistant cultivars such as Prima, Priscilla, Jonafree, Redfree, Liberty, Freedom, Goldrush, and Pristine.</p> <p>Sanitation: Leaf pickup and destruction in late autumn. Flail mowing in late autumn to chop litter can help reduce numbers of pseudothecia. Applications of 5% urea to foliage in autumn can hasten leaf decomposition, thus reducing formation of pseudothecia</p> <p>Chemical control: Protectant fungicides prevent the spores from germinating or penetrating leaf tissue; Postinfection fungicides control the scab fungus inside leaves and fruit.</p>
3	APPLE MOSAIC VIRUS	 <p>Pale to bright cream spots on spring leaves as they expand</p>	<p>Apple viruses are transmitted only through grafting. If an infected tree is present in the orchard, many viruses have been known to spread slowly to adjacent trees through natural root grafts.</p>	
4	APPLE UNION NECROSIS	 <p>Appear as infected trees reach bearing age. Bud break is often delayed in the spring, and leaves are small and sparse, their color a dull, pale green. Terminal shoot growth is reduced, with shortened internodes.</p> <p>Infected trees flower heavily and set large numbers of small, highly colored fruit.</p> <p>Leaf discoloration and leaf drop occurs prematurely in infected trees.</p> <p>Affected trees often produce large numbers of sprouts from the rootstock.</p> <p>Swelling may occur above the graft union. Partial to complete separation of the graft union is common on severely affected trees; sometimes the top breaks off at the union in strong winds</p> <p>Removal of the bark above and below the graft union reveals it to be abnormally thick, spongy, and orange-colored, and there is a distinct necrotic line at the scion/rootstock union</p> <p>Decline and death is possible</p>	<p>Tomato ringspot virus (TRSV). The virus is present in common broadleaf orchard weeds, such as dandelion, and may be spread from weeds to apple trees by dagger nematodes.</p> <p>Virus may also be spread through grafting and from orchard to orchard by seeds from infected dandelion.</p>	<p>Purchase certified virus-free trees grown in soil fumigated to control nematodes.</p> <p>Reduce populations of nematode vectors and weed hosts by cultivating the future orchard sites for two years before planting.</p>
5	BITTER ROT	 <p>The rot begins as a small, light brown, circular lesion. As lesions enlarge, they change to a dark brown and form sunken or saucer-shaped depressions.</p> <p>Under humid conditions, large numbers of spores are produced in a creamy mass, salmon pink in color, which are often arranged in concentric circles.</p> <p>Under dry conditions, the spore mass appears crystalline. The rotted flesh beneath the surface of the lesion is watery, appearing in a V-shaped pattern in cross section that narrows toward the core</p> <p>The fruit decays rapidly as it ripens and eventually shrivels into a mummy that may remain attached to the tree throughout the winter.</p>	<p>Fungi called anthracnose. The fungus overwinters in mummified fruit, in cracks and crevices in bark, and in cankers produced by the bitter rot fungus or by other diseases, such as fire blight. Jagged edges of broken limbs are also ideal sites.</p>	<p>Remove dead wood from the orchard or mulch the brush so that it decays over the period of a year.</p> <p>Inspect trees for apple mummies and remove them from the orchard if possible, since mummies remaining in the trees from the previous season can also serve as a source of inoculum.</p> <p>Application of fungicides on a 10- to 14-day schedule from petal fall through harvest is the most effective means for disease control.</p>
6	BLISTER SPOT	 <p>Infections of blister spot are first noticeable two to three months after petal fall as small, green, water-soaked, raised blisters that develop at fruit stomata</p> <p>These spots result in purplish black lesions associated with fruit lenticels. As the fruit increase in size, the lesions expand to about 3/16 inch (5 mm) and become darkened.</p> <p>A mid-vein necrosis of Mutsu apple leaves has been observed prior to fruit lesion development</p>	<p>The bacterium overwinters in a high percentage of apple buds, leaf scars, and diseased fruit on the orchard floor.</p> <p>Throughout the growing season, the bacterium can survive as an epiphyte on foliage and fruit in the orchard.</p> <p>The disease is mainly a problem on the apple cultivar Mutsu. When Mutsu is interplanted with other (normally) resistant apple cultivars (i.e. Red Delicious, Cortland, and others), the pathogen may spread into these, also.</p>	<p>The disease could be controlled with three well-timed antibiotic sprays, the first applied no later than 2 weeks after petal fall, and the others applied weekly thereafter.</p>
7	BLACK ROT	 <p>Leaf symptoms first occur early in the spring when the leaves are unfolding. They appear as small, purple spots on the upper surface of the leaves that enlarge into circular lesions 1/8 to 1/4 inch (3-6 mm) in diameter. The margin of the lesions remains purple, while the center turns tan to brown.</p> <p>In a few weeks, secondary enlargement of these leaf spots occurs. At this time, the lesions assume a characteristic "frog-eye" appearance</p> <p>Fruit infection, of which sepal infection is the most common form, can occur early in the season. These infections result in blossom-end rot later in the season. Early fruit infection usually appears at the calyx end of the fruit. These lesions begin as reddish spots which later turn purple and are bordered by a red ring. Infected areas on mature fruit become black, are irregular in shape, and are occasionally surrounded by a red halo. As the rotted area enlarges, a series of concentric bands of uniform width form which alternate in color from black to brown. The flesh of the rotted area remains firm and leathery. Black pycnidia are often seen on the surface of the infected fruit. Eventually, a dry mummy is produced that may remain attached to the tree.</p> <p>Lesions resulting in canker formation usually are associated with a wound in the bark. In the early stages, the bark is slightly sunken and reddish-brown in color. Some cankers remain small and may die out by the end of the year, while others enlarge from year to year. Some cankers are observed to be merely a superficial roughening of the bark</p> <p>The canker can kill the bark to the wood and the area becomes cracked</p>	<p>The black rot fungus often can be found on wood previously killed by fire blight or damaged by cold temperatures. The fungus overwinters in cankers, especially in those initiated by fire blight, in dead bark, and in mummified fruit.</p> <p>Early season infection of fruit also occurs through stomata. Later in the season, infection of fruit occurs through cracks in the cuticle or via wounds and possibly lenticels.</p>	<p>The main method of control is application of fungicides from silver tip through harvest.</p> <p>Monitor each tree for cankers. Cankers are a source of inoculum which can initiate leaf, fruit, and wood infections.</p> <p>Remove cankered wood from the orchard or mulch the brush so that it decays over the period of a year. Inspect trees for apple mummies and remove them from the orchard if possible, since mummies remaining in the trees from the previous season can also serve as a source of inoculum.</p> <p>Current-season prunings should be either removed from the orchard and burned or raked and then chopped with a flail or rotary mower. Piles of prunings on the orchard perimeter can serve as sources of fungal spores.</p>
8	BLACK FOX	 <p>Infection first appears on current season twigs as well-defined, conical, shiny black lesions which enlarge by the end of the first season.</p> <p>Fruit lesions are small, black, circular and slightly sunken</p> <p>Leaf lesions begin as red halos with light green centers, and become tan to brown with purple borders. Severe leaf infection may cause defoliation.</p>	<p>This wet weather fungus overwinters and produces conidia in old bark lesions. The optimum temperature for growth is 82F (28C).</p>	<p>Look for bark lesions on ten shoots per tree in blocks where this minor disease has been a problem.</p> <p>Most fungicides used in the cover sprays at 14-day intervals for summer diseases will control black fox.</p> <p>On early-maturing apple cultivars, postharvest sprays may be needed to reduce the buildup of the disease on leaves and twigs after harvest.</p>
		 <p>The rotted areas are soft, watery and light brown in color. The surface of older lesions may be covered by bluish-green spores that initially are nearly snow white in color. The lesions are of varying shades of brown, being lighter on the yellow or green varieties and on the pale cheeks of colored varieties and showing dark shades of brown on the most highly colored varieties. The soft, watery consistency of the rotted tissue seems to be a more distinguishing feature than the color variations.</p>	<p>The fungus, <i>Penicillium expansum</i>, not only causes fruit decay but also produces the carcinogenic mycotoxin patulin. All of the blue molds are primarily wound parasites, most frequently gaining entrance through fresh mechanical injuries such as stem punctures, bruises and insect injuries, finger-nail scratches by pickers, necrotic tissues of diverse origin or through normal stems or open calyx canals. Sometimes infections may occur through lenticels, especially when they are damaged by cracking after a sudden abundant supply of water following a period of dryness, or after bruising late in the storage season when fruit have been weakened by ripening and aging.</p>	<p>[1] General sanitation and avoidance of conditions favorable to infection. This includes reducing contamination of bins with orchard soil, which is a reservoir for the spores, sterilization of contaminated bins and packing machinery, and frequent changes of solutions and water used for drenching and handling fruit. Fruit should be picked at the proper maturity (not over-mature) and placed in cold storage as soon as possible. Picking wet fruit should be avoided. Bins containing harvested fruit in an orchard should be protected from rain so fruit will not become wet.</p>

9	BLUE MOLD				<p>(2) The avoidance of fruit injuries. Gentle handling of fruit by pickers during harvesting and care during the transportation of fruit from the orchard to the packinghouse may prevent many injuries. Attention should be given to mechanical features of the handling machinery in packinghouses to eliminate sources of injury from rough corners, unnecessary drops or gravity runs, or hard or unprotected receiving surfaces.</p> <p>(3) Chemical control. Killing spores in dump tanks, on bins, or in flume water with chlorine (100 ppm) or sodium O-phenylphenate (SOPP) (0.3 to 0.5%) has been effective in reducing the spore load and the resulting amount of decay. Ozone treatment, although not yet frequently used, can also be effective. The thiabendazoles (e.g. Mertect 16 fl oz/100gal) are the main fungicides available to combat decays in storage, and Captan 50W (2.5 lbs/100gal) is used to a lesser extent.</p> <p>(4) Biological control. BioSave 110 TM and Aspire (recently renamed Decco I-182) are the two biofungicides currently available. The active ingredients are a bacterium and a yeast, respectively. These biocontrol agents exhibit only prophylactic activity and are not effective against existing infections.</p> <p>(5) Integrated control. The control of blue mold may begin in the orchard with an application of calcium chloride (2 to 6 lb/acre), which is known to reduce bitter pit but may also reduce decay. Treatment of apples with hot air (38 C for 4 days) reduces decay by killing fungal spores but it has very little or no residual effect. Rapid cooling and storing of fruit under CA conditions reduces the development of blue mold.</p>
10	BROOKS SPOT		<p>First appears as irregular, slightly sunken dark green lesions typically on the calyx end of immature apple fruit</p> <p>As the fruit matures, the lesion turns dark red or purple on red areas of the fruit and remains dark green on green or yellow areas</p>	<p>Primary infection is initiated by ascospores which are discharged from overwintering leaves in late spring and early summer.</p>	<p>Most of the fungicides used in the early cover sprays for summer diseases are effective against the Brooks spot fungus.</p>
11	CEDAR-APPLE RUST		<p>Bright orange, glistening lesions on the leaves. Lesions which are not inhibited chemically may form small tufts of spore-producing structures (aecia) on the lower surface of the leaf by July or August.</p> <p>Appears on fruit first as bright orange, slightly raised lesions, but may take on a more brown and cracked appearance as the fruit enlarges.</p> <p>Stem infection causes a slight swelling of the stem and may result in abscission of the young fruit.</p> <p>On the cedar tree, cedar-apple rust produces brown, globular galls, ranging in size from 1/4 inch (6-7 mm) to nearly two inches (50 mm) in diameter. These are dimpled like a golf ball in the dormant season, but produce gelatinous, orange spore horns during spring rains</p>	<p>The fungus overwinters on galls on the cedar tree. Wetting of galls in the spring initiates expansion of the spore horns and production of basidiospores which are carried to the apple tree to infect leaves and fruit during extended wetting periods.</p>	<p>Fungicides that are effective against the rust diseases should be applied periodically from the pink stage of bud development through third cover to protect the emerging leaves and developing fruit.</p> <p>Removing cedars located within a 2-mile radius of the orchard interrupts the life cycle of the fungus and makes control with fungicides easier. Removing all cedars within 4 to 5 miles of the orchard will provide complete control.</p>
12	FIRE BLIGHT		<p>Overwintering cankers harboring the fire blight pathogen are often clearly visible on trunks and large limbs as slightly to deeply depressed areas of discolored bark, which are sometimes cracked about the margins.</p> <p>As with blossom infections, the pathogen often invades and kills a portion of the limb supporting the infected shoot. The first symptom on water sprouts and shoots that are invaded systemically from nearby active cankers is the development of a yellow to orange discoloration of the shoot tip before wilting occurs</p> <p>As the infection spreads down the shoot axis, the leaves first show dark streaks in the midveins, then wilt and turn brown, remaining tightly attached to the shoot throughout the season.</p> <p>The tips of young infected shoots wilt, forming a very typical "shepherd's crook" symptom</p> <p>Blossom blight symptoms most often appear within one to two weeks after bloom and usually involve the entire blossom cluster, which wilts and dies, turning brown</p> <p>In general, infections of any type that occur between petal fall and terminal bud set usually lead to the greatest limb and tree loss.</p>	<p>The bacterial pathogen causing fire blight overwinters almost exclusively in cankers on limbs infected the previous season.</p> <p>During the early spring, in response to warmer temperatures and rapid bud development, the bacteria at canker margins begin multiplying rapidly and produce a thick yellowish to white ooze that is elaborated onto the bark surface up to several weeks before the bloom period. Many insect species (predominantly flies) are attracted to the ooze, and subsequently disperse the bacteria throughout the orchard.</p>	<p>Concentrate monitoring in orchard blocks where the disease occurred during the previous season. Observe blighted limbs and shoots for removal during normal pruning operation.</p> <p>A very important aspect of fire blight management involves monitoring the weather for the specific conditions that govern the build-up of inoculum in the orchard, the blossom infection process and the appearance of symptoms. A weather station (discussed in chapter 10) that records the daily minimum and maximum temperatures and rainfall amounts is needed.</p> <p>Chemical and biological control: A copper spray applied at the 1/4-inch green tip stage may reduce the amount of inoculum on the outer surfaces of infected trees. At bloom, antibiotic sprays are highly effective against the blossom blight phase of the disease.</p>
13	FLY SPECK		<p>Characterized by clusters of 10 to 50 sharply defined black shiny specks on the fruit surface</p> <p>These superficial colonies are round to irregular and usually measure 1/16 to 1/8 inch (8-25 mm) in diameter.</p> <p>The individual dots or specks are fruiting structures in which spores are formed that cause secondary spread.</p>	<p>These fungi are commonly found on the stem surfaces of many woody plants, including apple shoots.</p> <p>Infections may occur on fruit as early as two to three weeks after petal fall, and are highly favored by frequent rain periods and poor drying conditions.</p>	<p>The diseases are managed by orchard sanitation and the use of fungicides.</p> <p>Removing reservoir hosts, especially brambles, from the orchard and surrounding hedgerows helps reduce the amount of inoculum from external sources, but in wet years this practice alone may not be adequate for disease control. Dormant and summer pruning to open up the tree canopy and thinning to separate fruit clusters.</p>
14	GOLDEN DELICIOUS NECROTIC LEAF BLOTCH		<p>Development of necrotic blotches or irregular areas of dead tissue in mature leaves</p> <p>Midshoot leaves are most often affected</p> <p>Affected leaves begin to turn yellow after about 4 days and abscise a few days later. Some green leaves with NLB are also lost by abscission.</p>	<p>The cause of necrotic leaf blotch (NLB) of apple is not known. It is apparently a physiological disorder whose occurrence is related to air temperature, light intensity and soil moisture. A hormonal imbalance may be involved because</p>	<p>The disorder is reduced where the dithiocarbamate fungicides ziram or thiram are used in the summer spray program.</p> <p>Foliar applications of zinc oxide also have been effective in reducing the severity of the disorder.</p>
15	NECTRIA TWIG BLIGHT		<p>Shoot growth on infected twigs begins to wilt and die</p> <p>In mid- to late summer, bright orange or coral-red structures (sporodochia) 1/8 to 1/6 inch in diameter appear on the surface of the cankers</p>	<p>Caused by the fungus <i>Nectria cinnabarina</i> (Tode) Fr., asexual state of <i>Tuberularia vulgaris</i> Tode.</p> <p>Wounds from fruit harvest, which probably take a long time to heal late in the season, combined with prolonged periods of wet weather after harvest, appear to favor the establishment of infection.</p>	<p>Removal of infected twigs helps reduce the carryover of inoculum.</p>
16	NECTRIA CANKER		<p>The fungus grows deep into the wood and kills new wound callus as it develops. This annual killing of successive layers of callus results in perennial, target-like, zonate cankers</p>	<p>Caused by <i>Nectria galligena</i> Bres., is occasionally found on apple nursery stock shipped into the eastern United States.</p>	<p>Nursery trees purchased from the western United States and Europe should be examined carefully for symptoms of the disease.</p> <p>Trees with cankers should be returned to the nursery for replacement or discarded.</p>
17	PHYTOPHTHORA ROOT, CROWN, AND COLLAR ROT		<p>Delayed bud break, leaf discoloration, and twig dieback.</p> <p>The most obvious symptom found on infected trees is a partial or complete girdling of the trunk</p> <p>Close examination of the roots often reveals reddish-brown, water-soaked areas of necrotic tissue located at the base of the root at the point of attachment to the rootstock</p>	<p>The pathogen belongs to a group of fungi known as water molds that require high levels of moisture and cool temperatures for growth and reproduction.</p> <p>It may survive in soils for several years in a resting spore (oospore) stage that is resistant to drought periods or chemical treatments.</p> <p>New infections are most numerous between the pink stage of blossom development and the beginning of shoot elongation.</p>	<p>Careful selection of orchard sites and rootstocks for new plantings. Avoid planting susceptible rootstocks in areas with heavy, poorly drained soils.</p>
18	POWDERY MILDEW		<p>Whitish lesions on curled or longitudinally folded leaves</p> <p>Stunted whitish-gray twig growth evident on dormant shoots</p> <p>Fruit russetting</p> <p>Economic damage occurs in the form of aborted blossoms, reduced fruit finish quality, reduced vigor, poor return bloom and yield of bearing trees, and stunted growth and poor form of nonbearing trees.</p>	<p><i>Podosphaera leucotricha</i>. It is the only fungal apple disease that is capable of infecting without wetting from rain or dew.</p> <p>The mildew fungus overwinters mainly as mycelium in dormant blossom and shoot buds produced and infected the previous growing season.</p>	<p>Where mildew-susceptible cultivars are grown, include a mildewicide in the scab program to control both diseases.</p> <p>Begin sprays at tight cluster and continue until terminal growth stops.</p>
19	QUINCE RUST		<p>Usually, the entire calyx end of the fruit is involved and the flesh is deformed to the core. The fungus may produce powdery, fluorescent orange spores in tube-like structures (aecia) on the calyx end of apple fruit</p>	<p>Gymnosporangium clavipes. Basidiospores are produced on quince rust cankers on the cedar tree and released under conditions similar to those for cedar-apple rust.</p> <p>Fruit infection occurs only during extended wetting periods when the blossom is most susceptible, primarily from pink to the petal fall stage.</p>	

20	SOOTY BLOTCH		Appears as sooty smudges or olive-green spots on mature fruit. Individual spots or smudges vary from discreet circular colonies to large lesions with diffused margins. Different colony appearances are attributable to different fungal pathogens which comprise the disease complex.	These fungi are commonly found on the stem surfaces of many woody plants, including apple shoots. Infections may occur on fruit as early as two to three weeks after petal fall, and are highly favored by frequent rain periods and poor drying conditions.	The diseases are managed by orchard sanitation and the use of fungicides. Removing reservoir hosts, especially brambles, from the orchard and surrounding hedgerows helps reduce the amount of inoculum from external sources, but in wet years this practice alone may not be adequate for disease control. Dormant and summer pruning to open up the tree canopy and thinning to separate fruit clusters.
21	SOUTHERN BLIGHT		Presence of a white, web-like mycelium, which often forms at the bases and on the lower stems of affected trees. Tree death usually occurs rapidly. Light brown to yellow, round sclerotia 1/16 to 1/8 inch in diameter form in the mycelial mat.	Caused by the fungus <i>Sclerotium rolfsii</i> Sacc.	Avoid planting sites where the disease has been severe on previous crops such as peanuts, clover, tomato, and soybean. Keep the soil around the bases of trees free of dead organic matter that may serve as a food base for <i>S. rolfsii</i> .
22	THREAD BLIGHT		Leaves wilt and turn brown, usually in the interior or shaded portions of the tree. Dead, curled leaves cling to blighted branches, frequently in mid-branch, with unaffected leaves still appearing on both sides of the diseased area. A sparse, white mycelial fan can be observed in advance of dead areas on partially blighted leaves. This mycelium can frequently be traced as fine white threads back to the leaf petiole and twigs.	Caused by the fungus <i>Corticium stevensii</i> Burt	Thread blight, once established in an orchard, is difficult to control with fungicides. Preventative fungicide sprays applied to trees prior to infection may protect the orchard from thread blight. Avoiding "hollows" and other shaded and poorly ventilated areas when selecting an orchard site should help prevent the disease. Under light disease pressure, pruning out blighted twigs and branches may provide adequate control. Pruning to promote better penetration of sunlight and air may also help.
23	WHITE ROT		Lesions begin as small, slightly sunken brown spots that may be surrounded by a red halo. As the decayed area expands, the core becomes rotten and eventually the entire fruit rots. Black fruiting structures may be observed on the surface of the rotted fruit in advanced stages. Red-skinned apple cultivars may "bleach" during the decay process and become light brown in color. New infections on twigs and limbs become evident in early summer and originate around lenticels, appearing as small, circular spots or blisters. As the lesions expand, the area becomes depressed and a watery exudate may appear on the bark around the blisters.	The white rot fungus overwinters in cankered wood, wood that had been previously killed by fire blight, dead bark, and in mummified fruit. Ascospores and conidia are produced on these structures throughout the growing season. It has also been observed that moisture stress (drought) and winter injury facilitate canker development, especially on older limbs.	The pruning and removal of all dead wood, including spurs, twigs, and branches, is essential because the fungus survives in these structures. Trees should be irrigated during periods of hot, dry weather to minimize drought stress which predisposes the tree to twig and branch infections.
24	WOOD ROT		Breakage of the limbs or main trunk and the presence of fruit bodies on the bark or wood surface. The symptoms are usually seen on the portions of large branches where the bark is still smooth. Where the outer bark separates from the inner bark, a tan to bronze-colored, brittle, paper-like quality to the bark occurs. Smaller branches arise at the point where the limb is still healthy, and the infected part of the branch dies back to this point.	Several fungi cause wood rot, including <i>Trametes versicolor</i> , <i>Schizophyllum commune</i> , <i>Polyporus hirsutus</i> , and <i>Chondrostereum purpureum</i> . Wood rotting fungi are opportunistic wound pathogens that colonize winter-injured or mechanically injured tissues. Where pruning is performed improperly, cut surfaces may remain wet for long periods of time, thus creating a favorable environment for wood rotting fungi.	Free nutrition should be balanced. Excessive fertilization with nitrogen and late-season irrigation should be avoided. Horizontal pruning cuts should be avoided so that water won't accumulate and stand on the cut surfaces. Large cuts, which generally should be avoided, should not be made late in the growing season, and should be made in such a way that the branch collar is preserved. The use of sealants or paints on pruning cut surfaces is not recommended.
25	X-SPOT		Small, circular, depressed, necrotic spot typically on the calyx end of apple fruit in the mid-Atlantic region	not known	Fungicides applied for summer diseases provide effective control of X-spot.