

Common Plant & Pest Combinations in the Albuquerque Area

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Plant Name	Pest	Type of damage/ Symptoms/Clues	Control Considerations
Deciduous Trees & Shrubs			
Ash (<i>Fraxinus</i> spp.); Oleaceae	Ash flower gall (<i>Eriophyes fraxinifolia</i>); a mite	Attacks male flower clusters, causing lumpy, distorted galls. Flower stems elongate, flower pedicles may fuse, all tissue curls and twists. Flower clusters branch irregularly. Galls green at first, then darkening and turning black late in the season.	These mites do very little actual damage to the trees. Control is only required for aesthetic reasons. Apply horticultural oil or carbaryl just before bud break in the spring; prune out and destroy early forming galls.
	Ash/lilac borer (<i>Podosesia syringae</i>); Lepidoptera; day-flying moth, adults look like wasps	Larva make tunnels in, and feed on, bark and wood of stems, trunks, branches, weakening it and exposing tree to other pests and diseases. Signs include slight sap flow mixed with frass at penetration site, accumulation of light-colored "sawdust" around entrance holes and on ground, visible external holes and scars (lower irregular entrance hole connected to upper round exit hole by tunnel gallery)	Eggs most often laid near wounds, so avoid pruning early in the spring, as well as other physical damage. Fertilize and water to keep trees strong. In fall prune out and destroy infested branches. Timing is critical if attempting chemical control. Thorough coating of trunk and larger limbs is needed; use either permethrin or chlorpyrifos (latter restricted use); spray 10 days after first trapping of adults in pheromone traps, or make three applications at 14 day intervals starting in mid April.
	Ash bark beetle (<i>Hylesinus californicus</i>); Coleoptera (beetle)	Injury to trees results from tunnelling into the inner bark and surface of the sapwood. The large egg gallery has two branches extending across the wood	Keep the trees healthy and make sure they have sufficient water. Ash bark beetles primarily attack weakened trees. No chemical controls are

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Ash (<i>Fraxinus</i> spp.); Oleaceae		grain in opposite directions from the bark entrance. Larval galleries radiate outward from the egg gallery. The bark may be covered with exit holes of around 1mm. Small branches may break straight across due to girdling by larva.	listed.
Apple, including crab apple (<i>Malus</i> spp.); Rosaceae	Codling moth (<i>Cydia pomonella</i>); Lepidoptera	The codling moth can cause two types of damage: stings and deep entries. Stings are entries where larvae bore a short distance into the flesh before dying. The deep entries occur when larvae penetrate the fruit skin, bore into the core, and feed into the seed cavity. Larvae may enter the sides, stem end, or calyx end of the fruit. One or more holes plugged with frass on the fruit's surface is a characteristic sign of codling moth infestation. Entries into the calyx are often difficult to detect without cutting into the fruit.	See NMSU Horticulture Guide H-427 for details of control options, which include cultural, biological, pheromone trapping, and spraying.
	Woolly apple aphid (<i>Dysaphis plantaginea</i>); Homoptera (true bugs)	This aphid is a very harmful species, causing severe distortion of plants. Leaves curl up and may drop prematurely, twigs become distorted and natural 'fruit drop' is impeded, fruits remaining attached in large numbers, small and bumpy. Vast quantities of honeydew are also produced and sooty molds develop upon it.	Early season infestations may be hosed off with a strong jet of water, sprayed with insecticidal soap, rotenone, neem oil, permethrin, imidacloprid, carabaryl and others. Only present on apple in spring and fall, spends summer on plantain (<i>Plantago</i> spp.). Encourage/augment beneficials such as lace-wings, ladybugs, minute pirate bugs and aphid midges.
	Crown gall (<i>Agrobacterium tumefaciens</i>); bacteria	Swellings or galls may form above ground on stems or branches or below ground on roots. The galls are usually rounded with a rough surface and a spongy texture. The	The most effective method to manage crown gall is through prevention and sanitation. Plant disease-free, healthy nursery stock in uninfested soil.

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<p>Apple, including crab apple (<i>Malus</i> spp.); Rosaceae</p>		<p>galls may darken and crack with age. The galls can be confused with galls made by insect or mites and also by physiological responses to wounding or grafting. However, the interior of the gall caused by an insect will have chambers or cavities where the insect developed. The interior of a gall due to crown gall will have a mass of disorganized vascular tissue. It is often necessary to isolate the bacteria through diagnostic methods in order to make a positive identification. The effect that crown gall may have on a plant may range from having little to no impact on the growth and production to plant, to declining plant vigor, to plant death. The disease has a greater impact on young plants and is of great concern to the nursery industry.</p>	<p>Avoid planting into areas that have previously had plants infected with crown gall for 2 to three years. Destroy infected plants. Use care during propagation to avoid transmitting bacteria to healthy plants. Sterilize pruning tools frequently using a disinfectant such as 70% alcohol or 20% solution of household bleach. Avoid mechanical wounding to young plants.</p> <p>The biological control agent, <i>Agrobacterium radiobacter</i>, strain K84 has been very successful in preventing crown gall in apples, peaches, blackberries and some ornamental crops. It does not work for grapes. This strain is not pathogenic and is antagonist to pathogenic bacteria. It is very effective when used as a preventative, but will not cure infections after they have occurred.</p>
<p>Boxelder (<i>Acer negundo</i> L.); Aceraceae</p>	<p>Boxelder bug (<i>Leptocoris trivittatus</i>); Homoptera</p>	<p>The bugs preferred food is primarily the female boxelder tree but they will also infest and feed on maple, plum, cherry, peach, pear and ash trees. They cause some distortion of leaf shape and damage to seed viability. The nymphs have a long beak which they use to pierce plant leaves, fruit, soft seeds and suck the sap.</p>	<p>Damage to trees is minimal. Of more concern is their habit of seeking out overwintering sites in homes. Tolerate them, vacuum up the masses collecting against walls, or spray with permethrin or carbaryl.</p>
	<p>Redshouldered bug (<i>Jadera haematoloma</i> (H.-S.); Homoptera</p>	<p>Similar to boxelder bug.</p>	<p>Similar to boxelder bug.</p>

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Catalpa (<i>Catalpa speciosa</i>); Bignoniaceae	Melon aphid (<i>Aphis gossypii</i>); Green peach aphid (<i>Myzus persicae</i>); Homoptera	Feeding activities cause distorted growth, reduced growth, quality and yield. Excretion of the sugary fluid called honeydew by aphids is colonized by a black fungus called sooty mold, causing plants to become unsightly and stressed, because mold-coated leaves are shielded from sunlight needed for photosynthesis. Numerous cast skins from aphid development are also unsightly.	Early season infestations may be hosed off with a strong jet of water, sprayed with insecticidal soap, rotenone, neem oil, permethrin, imidacloprid, carabaryl and others. Encourage/augment beneficials such as lace-wings, ladybugs, minute pirate bugs and aphid midges.
	Verticillium wilt (<i>Verticillium alboatrum</i> , <i>V. dahliae</i>); fungus	Acute symptoms include leaf curling, drying, or abnormal reddening or yellowing; defoliation; wilting; dieback; and death. These symptoms may be restricted to one branch or may involve an entire tree. Young trees are often killed within one year of infection, but older trees may live several years and gradually deteriorate over time. Other symptoms include reduced twig growth, branch dieback, and sparse crowns. Vascular streaking and discoloration in branch sapwood may be evident. In severely wilted trees, sapwood may be discolored to the tips of wilted branches. In others, the discoloration may be limited to the trunk sapwood. Chronic phases of the disease include slow growth, sparse and stunted leaves, leaf scorch, and dieback. Acute and chronic symptoms may occur simultaneously.	Prevention is the best method for managing Verticillium wilt in trees and shrubs. Never plant susceptible trees in soils where other plants are known to have died from the disease. Trees suffering from a chronic infection may benefit from simple cultural practices. For example, a balanced fertilizer (10-10-10) may help alleviate symptoms in infected trees; never use high-nitrogen fertilizers. Infected trees should be watered frequently to decrease wilt symptoms, and dead branches should be removed and burned. Because <i>Verticillium</i> is a vascular wilt pathogen, surface-applied fungicides are not effective. Even with systemic fungicides, chemical control of Verticillium wilt is not practical for established trees.
Cherry, purple plum, other <i>Prunus</i> spp.; Rosaceae	Peachtree borer (<i>Synanthedon exitosa</i>); Lepidoptera	Larvae overwinter in bark or soil and in spring tunnel into the inner bark near the soil level. The larvae vary in size from an	Keep trees healthy, as vigorous trees are less susceptible. Avoid injuring the trunk. White latex paint applied to

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<p>Cherry, purple plum, other <i>Prunus</i> spp.; Rosaceae</p>		<p>eighth inch to 1.5 inches long. The adult clear wing moth looks like a dark blue-black wasp with yellow markings. There is typically one generation per year. Peachtree borers are found wherever peaches are grown.</p> <p>The first sign of injury is a mass of gum and evidence of brown, sawdust-like frass (manure) at the base of the trunk.</p> <p>The eggs are deposited on the trunk at or near the base. Females lay 500-600 eggs on average. The larvae will begin to hatch in 9 to 10 days. Upon hatching, the larvae wander down the trunk to the soil line and burrow into the bark, often entering through a crack or wound. When full grown, the larva is 1-1/4 in long, cream colored with a dark brown head. The winter is spent as a larva under the bark. In the spring the larva will construct a silken cocoon and cover it with tiny bits of chewed wood. The borer will remain in the pupal stage from 18 to 30 days before emerging as an adult. There is a single generation per year.</p> <p>Infestation by the peachtree borer is often identified by oozing of gum around the base of the tree. The gum is usually mixed with dirt and reddish-brown frass. Frequently empty brown pupal cases can be found around the base of damaged trees, either at the head of the larval gallery or in the soil close to the tree trunk.</p>	<p>the trunk of the tree to prevent sunscald can help seal cracks in the bark (where the female moths lay their eggs.) Use a knife or flexible wire to carefully probe and kill the borers.</p> <p>Another method of peachtree borer control uses an insect parasitic nematode, <i>Steinernema carpocapsae</i>. Nematodes are tiny, eel-like roundworms. This species parasitizes peachtree borer (and other Lepidopteran) larvae. Spray the nematode on damaged bark at the root crown while the borer larvae are active, or apply by clearing the tunnel entrance of frass, then insert the nozzle applicator as far as possible into the gallery (tunnel). Inject the suspension until the gallery is filled, then plug the tunnel entrance with rope putty or grafting wax. Make sure the borer holes are not blocked by the mass of gum. One week after application, check that each gallery is still plugged. Retreat any that are unplugged and cover the opening again.</p> <p>Pheromones can also be used for both monitoring and for mating disruption, the latter often successfully enough to eliminate need for spraying.</p> <p>Chemical control is preventive when insecticide is applied to trees before borer eggs hatch, so that small borer</p>

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Cherry, purple plum, other <i>Prunus</i> spp.; Rosaceae			larvae contact a toxic residue as they crawl into trees. Control may also be achieved by fumigant action of the insecticide, which can kill larvae already in trees at the time of application. An insecticide with long residual action gives the best control of peachtree borer. Protection from peachtree borer is most critical during the first three to five years after planting. When new trees are planted, the roots and crowns can be dipped in insecticide before planting to protect them from borers during their first year. In established plantings, insecticide should be applied as a bark drench at a rate of one-half to one gallon of spray mix per tree. Thorough coverage is necessary. The insecticide should run down the trunk and soak the ground at the base of the tree. Any prunings, debris, or weeds at the base of trees should be removed so that they do not block the treatment. Chemical controls include permethrin and carbaryl.
	Leafcurl plum aphid (<i>Brachycaudus helichrysi</i>); Homoptera	Aphid feeding produces curled leaf reaction. The leaf curl plum aphid is typically pale green to yellow in color during the summer and darker green to brown later in the year. The aphids overwinter as eggs on plum and prune trees, then may migrate to various summer hosts or remain on the plum trees. Feeding by the leaf curl plum aphid causes severe	Management options: control honeydew-feeding ants, which may protect aphid colonies; encourage natural predators and parasites, including ladybird beetles, lacewings, and parasitic wasps, that help control aphid populations; provide proper nutrition (high levels of nitrogen in the foliage encourage aphid

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Cherry, purple plum, other <i>Prunus</i> spp.; Rosaceae		curling of leaves on plum.	reproduction; switch to a slow-release or low-nitrogen fertilizer); remove aphids by hand (when practical) to control small infestations; wash aphids from plants with a strong stream of water. Don't rush to treat, as beneficials take time to catch up with aphid populations. Spray controls include dormant oil, neem products, insecticidal soap, permethrin, carbaryl and others.
Cottonwood, aspen, poplar (<i>Populus</i> spp.); Salicaceae	Cottonwood borer (<i>Plectrodera scalator</i>); Coleoptera	Larvae (grubs) tunnel around the crown and buttress roots. Galleries, at and below the soil line, vary in length and form tunnels up to 8-inches long to 2- to 3-inch diameter oval areas, depending on tree size and infestation site. They are often packed with wood shavings (frass). Adults can be found on infested host plants during the daytime. Young trees may be killed when larvae tunnel under the bark (through the xylem tissue) all the way around the base of the tree, girdling it. More commonly, they structurally weaken the tree causing it to fall over in high winds. Adults feed on leaf stems (petioles) and bark of tender shoots, occasionally causing shoots to break, wilt and die, a symptom called, "flagging."	Most wood-boring insects are considered secondary invaders, so the first line of defense against infestation is to keep plants healthy. Good horticultural practices include: Choosing and preparing a good planting site to avoid plant stress, freeze damage, sun scald and wind burn; Minimizing plant stress and stimulating growth by using proper watering and fertilization practices; Avoiding injury to tree trunks. Properly thinning and pruning during colder months; Removing and destroying infested, dying or dead plants or plant parts, including fallen limbs. Chemical control very difficult. Permethrin, imidacloprid, and carbaryl can all be used as preventative sprays. Cottonwood trees are fast-growing, short-lived.
	Cottonwood leaf beetle (<i>Chrysomela scripta</i>); Coleoptera	Larvae skeletonize foliage by removing the parts of the leaves between the leaf veins, leaving the upper leaf surface	Healthy trees usually don't need treatment, as damage is largely cosmetic. However, in some cases

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Cottonwood, aspen, poplar (<i>Populus</i> spp.); Salicaceae		intact. Injured portions of leaves soon turn rusty, reddish-brown, and dry skeletonized leaves fall to the ground. Adults eat roughly circular holes in leaves. Large numbers of the beetle can completely defoliate young trees and may negatively impact plant health. Sometimes, damage may extend to the stem tips, which, may result in the formation of multiple leaders. Repeated defoliation reduces growth, causes stem deformation, and may kill young trees.	damage from these pests may severely stress trees/shrubs and even cause death. This is most common when very young trees, recently transplanted trees, and/or trees that are under stress from other factors (i.e. insects, diseases, environmental) are involved. These additional factors are often producing stress that combined with leaf defoliation, leads to plant demise. Even with healthy trees, several years of repeated, heavy defoliations can severely stress a tree. Again, these instances are uncommon and aesthetic injury is most often the only problem. <i>Bacillus thuringiensis</i> subsp. <i>tenebrionis</i> (<i>B.t.</i> subsp. <i>kurstaki</i>) have apparently shown some effectiveness in controlling the larvae. Horticultural oil may also control the larvae. Imidacloprid and permethrin will also control them.
	Petiole gall aphid, (<i>Pemphigus populitransversus</i>); Homoptera	The aphids overwinter as eggs on the cottonwood's leafless twigs. The eggs hatch in the spring as the leaves develop. When the newly hatched nymphs feed on leaf petioles, they cause galls to form and the small, dark-colored aphids move inside. The aphids secrete a white, waxy material which coats their body. After two weeks, the females bear live young that mature into winged females. These females leave the gall and find plants in the mustard family, where they bear more female, mustard-eating aphids. In the fall,	Control is generally not necessary. Damage is not significant enough to warrant action.

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Cottonwood, aspen, poplar (<i>Populus</i> spp.); Salicaceae		winged forms appear on the mustards, and these fly back to the cottonwoods, where a male and female generation is produced, and then one egg is laid by each female somewhere on a cottonwood twigs, that egg overwinters, and the life cycle begins again next spring.	
	Fall webworm (<i>Hyphantria cunea</i>); Lepidoptera	Defoliating larvae live and feed inside bag-like webs on branch ends. Very serious infestations could set back tree's growth, but in most cases damage is cosmetic.	Control is generally not necessary. Webs may be dislodged from tree with strong jet of water; branch tips may be pruned out; Bt could be effective but web may limit effectiveness; other sprays such as carbaryl likewise effective if they get through the web. More than 50 species of parasites and 36 species of predators of this pest are known in the U.S.
Elm (<i>Ulmus pumila</i>); Ulmaceae	Elm leaf beetle (<i>Pyrrhalta lutiola</i>); Coleoptera	The insect feeds on the leaves, causing the leaves to dry up and die. This foliage feeding by itself generally will not kill the tree, but it will weaken the tree and make it more susceptible to branch dieback and attack from other insects and diseases.	Low to moderate levels of infestation will likely not harm trees; even occasional heavy infestations can be tolerated. <i>Bacillus thuringiensis</i> (varieties <i>san diego</i> and <i>tenebrionus</i>) are effective against young larval. Spinosad, neem, permethrin and carbaryl products will suppress the beetles.
	Aphids, various	Sap feeding depletes tree of sap, but most infestations are light to moderate and fairly short-lived.	Allow natural aphid enemies to flourish: encourage and augment beneficial insects. Neem, insecticidal soap, horticultural oil, permethrin, rotenone, and carbaryl can all help control severe infestations
Golden Raintree (<i>Koelreuteria paniculata</i>);	See Boxelder; same pests, same controls.	See Boxelder; same pests, same controls.	See Boxelder; same pests, same controls.

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Sapindaceae			
Lilac (<i>Syringia</i> spp.); Oleaceae	Ash/lilac borer (<i>Podosesia syringae</i>); Lepidoptera; day-flying moth, adults look like wasps	See discussion under Ash.	See discussion under Ash.
	Lilac leaf miner (<i>Caloptilia syringella</i>); Lepidoptera	The larvae of this little moth begin their existence as miners on the leaves of lilac and privet, and when partly grown, leave the blotch mines, roll the leaf, and feed within the roll. The adult is a tiny ash-gray moth with narrow wings.	Minor infestations need no treatment. Treatment is difficult due to feeding habit. Permethrin or carbaryl can give some control of newly emerging adults if sprayed just before they emerge.
Mulberry (<i>Morus</i> spp) and Paper Mulberry (<i>Broussonetia papyrifera</i>); Moraceae	Fall webworm (<i>Hyphantria cunea</i>); Lepidoptera	See discussion under Cottonwood.	See discussion under Cottonwood.
	Mulberry whitefly (<i>Tetraleurodes mori</i>); Homoptera	Mulberry leaves are commonly infested and a favorite host, although the insect occurs on many other kinds of trees and shrubs. The oval nymphs or larvae occur on the undersides of the leaves, and are dark brown or black, fringed with marginal white wax. The wings of the adult are white, spotted with red and brownish black.	Usually, control measures are not employed. If the tree is used for ornamental purposes, imidacloprid can be applied to the soil as a systemic; insecticidal soap, permethrin and carbaryl might also be used.
Poplar (<i>Populus</i> spp.); Salicaceae	Poplar borer (<i>Saperda calcarata</i>); Coleoptera	Larvae are white and about 1 1/4 inch long, legless, and yellow-white in color. The eggs incubate for about two weeks and hatch, after which 1/4-inch long larvae, enter the bark and move into the heartwood. The larvae can take from two to five years to mature, generally three years in our area. Damage appears as swollen areas on trunks and larger branches. Exit holes where adults emerge, and woodpecker activity, are other signs	The poplar borer is difficult to control because of its long life-cycle. Cultural practices include the planting of trees in an appropriate site, planting trees in groups where the trunks are shaded, and maintaining good health by applying proper amounts of water and fertilizer. Heavily infested trees should be removed as they can harbor a large number of poplar borers that may

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Poplar (<i>Populus</i> spp.); Salicaceae		of infestation. Chronically infested trees show a varnish-like stain on the bark below the points of attack, with reddish sap running down the trunk. These repeated infestations may not kill larger trees, but the trunk or branches may be weakened and prone to wind damage which in turn allows for the introduction of disease pathogens and decline of the tree. Smaller trees can be killed by the girdling effect of numerous galleries in the trunk.	infest other nearby trees. There are at least three naturally occurring insect parasites that impact poplar borers. Insect-attacking nematodes injected into borer holes have given partial control of poplar borer larvae. These nematodes belong to the genus <i>Steinernema</i> and are sold under the trade names "Biosafe", "Biovector", and "Exhibit". In addition to these, woodpeckers may consume up to 60% of larvae. Most insecticide treatments are directed at the adults and small larvae at the time of egg-laying or hatch. For this reason, proper timing of insecticide treatments is essential. Insecticides currently labeled for borer control on poplars include certain formulations of acephate, diazinon, dimethoate, and permethrin.
Sycamore (<i>Platanus</i> spp.); Platanaceae	Fall webworm (<i>Hyphantria cunea</i>); Lepidoptera	See discussion under Cottonwood.	See discussion under Cottonwood.
	Sycamore scale (<i>Stomococcus platani</i>);	The sycamore scale is so tiny, about 1/16 inch long, that many people fail to recognize it as an insect and mistake it for a disease symptom. To detect this pest, examine the yellowish to brown dots on the undersides of leaves with a hand lens. A tiny scale will be present in the center of the spot. Scales are yellow to brown at maturity. Females can be recognized by the cottony white tufts that emerge from beneath the body and protrude from bark cracks and crevices. The orangish yellow	Sycamore scale damage is most obvious during late spring when leaves may be severely spotted. Treatments are not recommended at this time because it is difficult to thoroughly spray the undersides of leaves where scales feed. In addition, the lower leaf surface of native <i>Platanus racemosa</i> has dense mats of tiny hairs that protect the scales from the spray. Two species of lady beetles are commonly found under bark

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Sycamore (<i>Platanus</i> spp.); Platanaceae		<p>eggs are laid within these cottony tufts; each female produces from 50 to 100 eggs. When the eggs hatch, the young crawlers are also orangish yellow in color. Leaves infested by this pest develop yellow spots where each scale is feeding. These spots gradually turn brown as the affected tissue dies. Young infested leaves are often distorted and smaller than healthy leaves and drop prematurely. Premature leaf drop, however, may also be caused by sycamore anthracnose, a plant disease caused by the fungus <i>Apiognomonium veneta</i>. Anthracnose can be distinguished from sycamore scale by leaf symptoms; it causes a browning along the leaf veins, often including large portions of leaves, not the circular spots that are characteristic of a sycamore scale infestation.</p> <p>In addition to the effect on the tree's leaves, sycamore scale also feeds on the bark and causes the surface of infested twigs and branches to develop a rough texture. The impact of this bark feeding on the tree's overall health has not been studied.</p>	<p>plates of trees feeding on sycamore scales. These small black beetles have two red spots or four yellow to orange spots on their backs.</p> <p>If sycamore scale was a problem the previous spring or summer, monitor regularly for sycamore bud break. Inspect terminals about once each week to determine the occurrence of bud break. Bud break, which varies from year-to-year and among locations, occurs when local conditions become favorable for the resumption of tree growth. These same conditions trigger the emergence of sycamore scale crawlers, the stage most susceptible to insecticides. Examine the woody areas of the tree and look for tiny masses of white, cottony wax in the cracks of bark and under bark plates. The orangish yellow eggs are laid within these masses and can be seen with the use of a hand lens (20X). Both eggs and crawlers can be seen as yellow spots within the white, cottony material. If scales are abundant and damage cannot be tolerated, apply 1% horticultural oil or insecticidal soap at bud break (i.e., just as the buds begin to open). If bud break is missed, application can be made during early leafing-out (before leaves are fully expanded), but this may be less effective because of</p>

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Sycamore (<i>Platanus</i> spp.); Platanaceae			poorer coverage when foliage is present. When bud break occurs, the crawlers are present in their highest density and can be sprayed before the foliage will interfere with coverage. Thoroughly spray branch tips and use a high-pressure sprayer to reach scales under the bark plates on trunks and large limbs.
Evergreen Trees & Shrubs			
Euonymus (<i>Euonymus</i> spp.); Celastraceae	Euonymus scale (<i>Unaspis euonymi</i>); Homoptera	Can cause complete defoliation and death of the plants. Examine leaves in June and July for feeding or sucking injury. It appears as small yellowish or whitish spots along the main vein of the leaf. Look at the underside of the leaf to see scales. Twigs may be covered with small, greyish-white bumps which can be easily scraped off with the thumb nail. Leaf drop and plant death can occur. Plants near buildings tend to be more prone to attack. These are areas of poor air circulation, high temperatures, and low soil moisture.	Where possible prune out and destroy infested branches or plants before crawlers emerge. When planning a chemical control program for scales, remember that insecticides will not penetrate the shell or protective scale once it has formed. Strategies must be aimed at the overwintering adult and the crawler. Dormant oils will provide good control for the overwintering female scales. In order to be effective, the oils should be applied in a large volume of water. Stems must be thoroughly covered in order to suffocate the overwintering adults. Using oils may burn leaves on broad-leaved euonymus selections. Crawlers hatch over two to three weeks. To monitor for crawlers, wrap black electrical tape, with the sticky surface facing out, around the twig. The tape should be placed on the twig above the overwintering females.

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Euonymus (<i>Euonymus</i> spp.); Celastraceae			<p>Crawlers will stick to the tape as they migrate to feeding sites. Four sprays, applied 10 to 12 days apart as the crawlers begin to emerge, may be necessary.</p> <p>Avoid using insecticides unless the plant is very valuable and in serious danger from scale. Insecticides will often kill the naturally occurring enemies of scale. Adult scales are relatively protected from insecticides by their waxy covering. Their immature forms, called crawlers, are susceptible, however. Horticultural oil can be used as a dormant spray. It kills some adults by smothering them. Spray before new growth begins in the spring. If insecticides are necessary, the following are effective against crawlers: malathion, carbaryl, and acephate. Make sure that crawlers are present before using them. Apply three sprays at 10-day intervals.</p>
Juniper (<i>Juniperus</i> spp.); Cupressaceae	Cypress bark beetle (<i>Phloeosinus cristatus</i> and <i>P. spinosus</i>); Coleoptera	In weakened or stressed trees, adult beetles colonize the bole (trunk) and larger branches of the tree where they mate and lay eggs. Here, significant damage to the tree is caused by a 25-75 mm long, linear gallery (tunnel) with closely spaced niches at either side where eggs are laid. After the eggs hatch, the larvae (grubs) create new galleries which radiate outward from the central gallery. As they consume the inner bark (phloem),	Cultural practices can significantly reduce potential beetle colonization. Dead and dying material should be pruned out of individual trees during winter. Cut, dead, or down material should be promptly removed from the area. Maintaining tree health and vigor will reduce the risk of beetle colonization. Supplemental fertilization is not generally recommended. New trees should be

Plant	Pest	Damage, Symptoms, Clues	Controls
Juniper (<i>Juniperus</i> spp.); Cupressaceae		cambium, and outer sap-wood, the tree is girdled cutting off the flow of nutrients to the lower portion of the tree. Beetle colonization often causes top-kill and branch mortality, but can lead to tree mortality. Trees are colonized in the spring and summer. One generation per year is common. Newly emerged adults fly to a new host tree where they bore into small twigs a few inches from the branch tips. This kills the branch tip causing it to fade in color. Upon close inspection of the branch tips, a hollow area can be seen where the beetle mined the twig.	planted in the fall if cypress bark beetles have recently been active in the area. Control is not practical once the bole of the tree is colonized. Some pesticides are labeled for prevention of bark beetles, but they are not recommended for use against cypress bark beetles. Healthy, vigorous trees can tolerate high levels of twig colonization and beetles will usually be unsuccessful in entering the trunk and limbs due to the tree's innate ability to exude pitch.
	Spider mites (<i>Oligonychus</i> spp. and <i>Tetranychus</i> spp.);	Spider mites have tiny mouthparts modified for piercing individual plant cells and removing the contents. This results in tiny yellow or white speckles. When many of these feeding spots occur near each other, the foliage takes on a yellow or bronzed cast.	Forceful jet of water directed at affected foliage; encouragement and augmentation of natural predators (of which there are many: predatory mites (several species), lacewings, ladybugs); insecticidal oils and soaps; severe outbreaks may need to be treated with a miticide, most of which are restricted use materials.
	Spittle bug (<i>Aphrophora</i> spp. and <i>Clastoptera</i> spp.); Homoptera	This insect often leaves white foam on some junipers. Although unsightly, the foam is relatively harmless to the junipers.	If deposits are numerous, you can blast the bugs and foam off with a strong spray of water.
	Western cedar borer (<i>Trachykele blondeli</i>); Coleoptera	Adults feed on foliage and deposit eggs under bark scales on the branches of living trees. The larvae bore from the branches to the bole, mining in the heartwood for 2-3 or more years.	No effective controls for these flat-headed borers. Remove and destroy severely infested trees.
Eldarica, mugho and ponderosa pine (<i>Pinus</i> spp.) Pinaceae	Pine tip moths (<i>Rhyacionia</i> spp.); Lepidoptera	At least eight different species in NM. All mine buds and terminal shoots; injury most severe on young trees. Eggs laid on new shoots or buds from March through	Heavily attacked trees may require treatment. Sprays need to cover branch tips at egg laying and egg hatching times. Pheromone traps can

Plant	Pest	Damage, Symptoms, Clues	Controls
Eldarica, mugho and ponderosa pine (<i>Pinus</i> spp.) Pinaceae		June. Larvae feed at bases of needles then bore into buds, laterals and terminals and mine pith. No pitch nodule is formed, but site of attack is marked by small resin flow.	be used to monitor for timing. Bt, carbaryl, acephate and some restricted-use synthetic pyrethroids can be used.
	Bark beetles (<i>Ips</i> spp. and <i>Dendroctonus</i> spp.); Coleoptera	Adult beetles attack trunk, chew through bark and excavate a chamber in the cambium tissue. Eggs are laid in niches along chamber. Larvae bore away from egg gallery at right angles, molt several times and then pupate beneath bark. Attacks most common on stressed trees. Beetles may introduce blue stain fungus, which will further injure, or kill, trees. Foliage high in tree fades first. Boring dust can be found around tree base, in bark crevices under entrance holes and on branch tops at intersection with trunk. Pitch tubes may or may not be present.	Keep trees well watered and healthy. Preventative sprays of permethrin or carbaryl may deter initial attacks. Once trunk infested, no effective remedy or control exists. Cut infested trees into firewood and solarize to kill beetles; firewood over one season old will not have beetles. Alternatively, cut and remove, burn or bury infested trees to limit (?) spread. Under current epidemic conditions, spread will probably happen anyway.
Pinyon pine (<i>Pinus edulis</i>); Pinaceae	Bark beetles (<i>Ips</i> spp.); Coleoptera	See discussion immediately above.	See discussion immediately above.
	Bark moths and pitch moths (<i>Dioryctria</i> spp. and <i>Vespamima</i> spp.); Lepidoptera	Eggs are laid in bark crevices or near wounds. New larvae tunnel under bark, feed on pitch the tree produces in response to their tunneling. Oozing pitch masses one to three inches cover entry holes and conceal larvae.	Most infestations are not serious enough to warrant action. Repeated attacks on young and/or weak trees can be a problem. No insecticides are registered for this insect. Remove larvae from under bark with thin knife blade or thin, stiff wire. Avoid pruning or mechanical injury to bark in summer when eggs are being laid.
	Giant bark aphids (<i>Cinara</i> spp.); Homoptera	Feed mostly on twigs and branches. Often tended by carpenter ants or other ants	Rarely damaging. Water spray, encourage beneficials.
	Pinyon needle scale (<i>Matsucoccus acalyptus</i>); Homoptera	Small, black, bean-shaped bumps on surface of one-year old pinyon needles. Early in the year (March, in Albuquerque)	Only crawler stage vulnerable to control. Clean up all egg masses found before they hatch, except for

Plant	Pest	Damage, Symptoms, Clues	Controls
Pinyon pine (<i>Pinus edulis</i>); Pinaceae		females lay yellow eggs in cluster bound together by white cottony webbing; clusters are found around root collar, undersides of large branches, cracks in rough bark, and sometimes even a few feet away from tree on rock or log. Newly hatched crawlers climb tree in spring, settle down on last year's needles and become immobile and covered by protective waxy coating.	one very visible mass. With hand lens, observe eggs often until tiny red eye spots appear inside eggs (about a month after laying). In 7 – 10 days after this, eggs will hatch and crawlers will begin to climb. Spray at this point with insecticidal soap, carbaryl or acephate; may need to repeat in 7-10 days for late hatchings.
	Twig beetles (<i>Pityophthorus</i> spp. and <i>Pityogenes</i> spp.); Coleoptera	Branches brown and fade throughout crown. Tiny entrance/exit holes visible on twigs just behind needles; cambium in these twigs is eaten, thus destroying tree's ability to move photosynthates away from leaves, or water and nutrients to needles.	Like bark beetles, only smaller. Keep trees well watered and healthy. Preventative sprays in early spring may help (carbaryl, permethrin). Aggressive pruning of affected branches may control, but infestation is often not evident until damage is severe.
Pyracantha (<i>Pyracantha</i> spp.); Rosaceae	Apple aphid (<i>Aphis pomi</i>); Homoptera	As they feed, apple aphids cause foliage of terminal growth to curl. They also excrete honeydew in which sooty molds sometimes grow. Heavily infested plants are often sticky with honeydew, dark with sooty molds, and disfigured by distorted new growth and cast aphid skins.	As with other aphids: strong water spray, encourage and augment beneficials; horticultural oils and insecticidal soaps will control; also, permethrin and carbaryl.
	Fire blight (<i>Erwinia amylovora</i>); bacteria	Fire blight gets its name from the burnt appearance of affected blossoms and twigs. Flowers turn brown and wilt; twigs shrivel and blacken, the ends often curling. In more advanced cases of bacterial infestation, cankers, discoloured oozing patches, form on branches.	There is, as yet, no cure for fire blight; best way to deal with the infection is to remove infected stems and branches cutting no less than 8 inches up from the infected area. Because the bacteria are so easily transmitted, care should be taken in disposing of infected plant material. Either burn or discard in the trash. Do not leave infected material where

Plant	Pest	Damage, Symptoms, Clues	Controls
Pyracantha (<i>Pyracantha</i> spp.); Rosaceae			<p>the bacteria might be spread to surrounding bushes or trees. Care should also be taken with tools which have come into contact with the bacteria. Tools can be sterilized in an alcohol solution (three parts denatured alcohol to one part water). Diluted household bleach can also be used (one part bleach to nine parts water) as long as the tools are wiped dry after disinfecting to prevent corrosion.</p> <p>A variety of bactericides have been developed to combat fire blight, many of the most common containing streptomycin sulphate.</p>
Spruce (<i>Picea</i> spp.); Pinaceae	Cooley spruce gall adelged (<i>Adelges cooleyi</i>); Homoptera	On Douglas-fir, nymphs suck out the juice of current needles which turn yellow and fall off. On spruce, nymphs form galls on the tips of twigs and branches. Look for galls on spruce. In late spring, the unopened galls are green with shades of pink or purple. Nymphs may be found inside them. Open galls, found in late August, are brown, dry, and resemble small cones. Look for oval, black nymphs with a white, waxy fringe or oval, dark brown adults covered with white, woolly wax on current Douglas-fir needles during spring and summer months.	Brown lacewings in genus <i>Hemerobius</i> give natural control; damage is rarely severe enough to warrant action.
Vines			
Grape (<i>Vitis</i> spp.) and Boston Ivy (<i>Parthenocissus</i>	Western grapeleaf skeletonizer (<i>Harrisina brillians</i>); Lepidoptera	First through the early fourth instar larvae feed on the lower leaf surface, leaving only the veins and upper cuticle. This	Two insect parasites, <i>Apanteles harrisinae</i> and <i>Amedoria misella</i> (<i>Sturmia harrisinae</i>), attack western

Plant	Pest	Damage, Symptoms, Clues	Controls
<i>tricuspidata</i>) Grape (<i>Vitis</i> spp.) and Boston Ivy (<i>Parthenocissus</i> <i>tricuspidata</i>); Vitaceae		gives leaves a whitish paperlike appearance; eventually the entire leaf turns brown. The late fourth and all fifth stage larvae skeletonize the leaves, leaving only the larger veins. When abundant, larvae can defoliate vines by July. When vines are severely defoliated, larvae will then feed on grape clusters, which can result in bunch rot. Defoliation can also result in sunburn of the fruit and quality loss. Defoliation after harvest may weaken vines by affecting food reserves.	grapeleaf skeletonizer larvae. These are commercially available. Kryolite, Bt, and carbaryl will give control – early stage larva easier to control.
Grasses			
Kentucky bluegrass (<i>Poa</i> <i>pratensis</i>) and Bermuda grass (<i>Cynodon dactylon</i>); Poaceae	White grub (several species in several genera); Coleoptera	Grass is brown in patches, especially during hot or dry weather. Lawn feels soft or spongy when you walk on it. Chunks of grass can easily be pulled up by hand. Small sections of grass can easily be rolled back. Raccoons, opossums, skunks or moles are frequently digging into your lawn.	Only densities of 10 grubs per square foot, or more, warrant chemical control. Mechanical control is possible with turf-spike shoes, on small scale. Mid summer treatment with imidacloprid will have good control effect.

This list is a partial list only. Other plant/insect combinations will be added over time. Please provide comments/critiques to Joran Viers, Extension Horticulture Agent, Bernalillo County Cooperative Extension Service.

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