EXTENSION

Utah State University

Blossom-End Rot

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Blossom-end rot is a non-parasitic disease affecting tomato, pepper, and watermelon fruit in Utah. Fruits are usually affected when about one-third or more grown, but the disease can occur during any growth stage of the fruit. Losses caused by blossom-end rot vary from negligible to severe.

SYMPTOMS

The first symptom of the disorder is a slight, water-soaked discoloration on the blossom end (opposite of the stem) of the fruit. As the lesions enlarge, turning leathery and dark brown or black, they often become sunken into the fruit. Although the affected tissue is normally dry, bacteria and fungi may invade the lesion, producing a soft, watery rot.

CAUSE

Blossom-end rot is a physiological disorder due to a shortage of calcium in the young fruit. Moisture imbalances or water stress aggravate the problem by interfering with calcium uptake in the plant.

During the day, the pores on the leaves are open and water transpires from them drawing sap into the leaves. Since the fruit do not lose much water by transpiration, they receive little of the calcium-containing sap. At night, the leaf pores close, root pressure forces sap into the plant, and the developing fruit get their share of calcium and other nutrients. If the plant is water stressed at night, the system fails and the fruit receive very little calcium, causing blossom-end rot.

Excessive salts in the soil, including ammonium, potassium, and magnesium interfere with calcium uptake by plants and can result in blossom-end rot. Root damage caused by improper cultivation practices or excess soil water may also lead to blossom-end rot. The incidence of blossom-end rot varies with the variety and is greatly influenced by environmental conditions.

CONTROL

To avoid blossom-end rot, the grower should use cultural practices that allow for proper uptake of calcium by the plant.

Avoid water stress of fluctuating soil moisture by using infrequent, deep irrigation to keep the soil uniformly moist. Do not allow plants to be water stressed at night. The best way to maintain even soil moisture is by using organic or plastic mulch to prevent wide fluctuations in soil moisture.

Avoid over-fertilizing; do not use ammonium-based nitrogen fertilizers. To avoid injuring roots, do not hoe or cultivate near plants. Pull weeds next to plants or use a plastic mulch. Do not overwater, especially in heavy clay soils.

EXTENSION

Utah State UNIVERSITY

Bitter Pit of Apple

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Bitter pit is a nonparasitic disease – a physiological disorder resulting from calcium deficiency in the fruit. Low levels of calcium in the fruit are due to competition with shoots for calcium, which may be aggravated by weather conditions. Hot, dry weather in July or August tends to increase the incidence of bitter pit. Irregular irrigation may also increase bitter pit.

Heavy dormant-season pruning, overthinning, and excessive nitrogen fertilizer promote bitter pit. Injury to trunks, such as winter freezes, interferes with calcium movement. Bitter pit occurs most severely in years of light crops.
'Northern Spy', 'Gravenstein', 'Grimes Golden', and 'Baldwin' are very susceptible to bitter pit. 'Golden Delicious' is moderately susceptible. 'Delicious' and 'Winesap' are fairly resistant.

SYMPTOMS

Circular or slightly irregular depressed spots appear on fruit surface, beneath which are brownish or streaked necrotic areas. Pits are more numerous on blossom end of the fruit. These may appear on the tree or in storage after harvest.

CULTURAL CONTROL

Prune lightly by thinning out branches rather than by heading. Head new shoot growth in summer on an overly vigorous tree. This may be done up until a month before harvest. Where possible, use over-tree sprinklers to cool trees in unusually hot weather. Avoid excess nitrogen. Use chemical thinning to avoid alternate-year bearing. Avoid damaging trunks. Maintain a constant soil moisture supply. To avoid the condition in stored fruit, rapidly cool fruit after harvest then store at low temperatures, high humidity and under controlled atmosphere.

EXTENSION

UtahState UNIVERSITY

Iron Chlorosis

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SYMPTOMS

Iron chlorosis is the most common micronutrient problem of ornamentals, shrubs, vines, small fruits, and trees in Utah. Leaves of affected plants are yellow, light green, or white with distinct green veins resulting in interveinal chlorosis. In severe cases, the leaves may be entirely white. The margins of severely chlorotic leaves often scorch and die during hot periods. Some willows, oaks, and other plants express iron deficiency with distinct black spots between the veins. Iron chlorosis may be persistent or it may vary during the season or year to year depending on environmental conditions. If iron chlorosis is persistent for several years, individual limbs or the entire plant may die.

CAUSES

Iron chlorosis is the result of the inability of the plant to extract sufficient iron from the soil. Utah soils are typical of arid and semiarid soils around the world with lime or calcium carbonate in most of the soil profile. These soils are alkaline with pH ranging between 7.2 and 8.3. Iron chlorosis is common in these soils and is exaggerated by excessive soil moisture, soil salinity, high concentrations of phosphorous, and relatively high concentrations of copper, manganese, and zinc in the soil, low or high soil temperatures, large additions of organic matter, or inefficient root function caused by nematodes or fungal pathogens. The most important factor is the presence of lime in the soil as a predisposing factor.

Plants vary in their ability to obtain and utilize iron. This is particularly evident when adjacent plants may show marked differences in chlorosis. Some plant species are capable of obtaining iron from alkaline soils whereas others cannot be grown successfully in native high Ph soils.

CONTROL

Preventing and controlling iron chlorosis is difficult and often gives poor results. The following are recommended procedures for controlling iron chlorosis:

Iron-efficient plants

The best control of iron chlorosis is the selection of plant cultivars that are iron efficient. A good way to determine the best adapted plants for soils in your area is to examine neighborhood plants or botanical gardens. Improper selection of plants will result in disappointment and long term efforts to correct the mistake. The correction of iron availability in soils is very difficult and expensive. Therefore, the best solution to the correction of chlorosis may be to replace susceptible plants with iron-efficient plants.

Soil moisture management: Water management is probably the most important consideration when growing plants in alkaline soils. In excessively wet or poorly drained

soils, the chemistry of the soil changes and iron becomes unavailable. Irrigation applications should wet the entire plant root zone and should not be repeated until the soil moisture has been reduced by plant use and evaporation. Frequent irrigation in heavy clay soils or cold temperatures often results in a persistent deficiency of iron.

Correction with iron fertilizers or soil amendments: Numerous iron compounds are available for treating iron chlorosis; however, responses to soil and foliar applied materials varies considerably and no single product has proven to be consistently successful.

Soil Application: Many compound labels claim to correct iron chlorosis; however, most do not work in our highly buffered, alkaline soils. If your soil pH is below 7.2, it is possible that some products will work, but most of the soils in Utah have a pH greater than 7.2. Under these conditions it is very difficult to correct iron deficiency.

Inorganic iron sulfate will give good results when applied to turf but their utility in other situations is generally unsuccessful. Iron sulfate will cause unsightly rust-colored spots on pavement when misapplied.

Chelated iron compounds consist of an organic molecule that binds iron and makes it more available to plants. One of the best compounds is EDDHA, a synthetic chelate that is available as Sequestrene 138 and Millers Ferriplus. For example, it will work on raspberries when the soil pH exceeds 7.5 whereas other chelating compounds are only effective when the pH is between 7.2 to 7.5.

Chelated compounds must be placed into the root zone to be most effective. Incorporate lightly into the soil or irrigate in. Applications should be made in the spring to coincide with the first flush of growth. In most cases, it is necessary to treat every year.

Acidified mining residues have a very low pH and work primarily by reducing the soil pH. Soil applications result in small zones where the pH is acidic and, consequently, iron is more available. These compounds are only effective until the surrounding soil neutralizes the acidity. When they work, they usually only last one year and are only effective in some soils. Soil incorporation of inorganic compounds such as iron sulfate are not effective in most Utah soils.

Foliar Application: Iron compounds sprayed on leaves give the most rapid but temporary response. Usually green spots can be seen on the leaves a few days after spraying. Repeated applications are necessary as new foliage appears.

Chelated iron compounds or 0.1% ferrous sulfate can be applied as foliar sprays. Use a spreader-sticker to obtain better results. Avoid applications when fruit are present because staining may occur.

Artificial soils or raised beds: An alternative to applying costly iron-soil amendments is to import non-calcareous soils (some are available at higher elevations in Utah mountains) or to prepare artificial soils from peat moss, silica sand and compost. These soil mixes can be used to make raised beds or small areas with improved soil quality. This approach is ideal for growing inefficient iron sensitive plants such as strawberries or raspberries.

EXTENSION

Utah State University

Herbicide Injury to Yard and Garden Plants

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Herbicide injury to plants can result from misuse or misapplication of herbicide used in yards and gardens. Damage from herbicide exposure can be extensive and is often permanent, resulting in the loss of valuable plants.

HOW PLANTS ARE EXPOSED TO HERBICIDES:

Drift or Volatilization

With even the slightest breeze any herbicide applied as a liquid spray can drift onto nearby plants and cause damage. Some herbicides such as 2,4-D and dicamba may volatilize after application. These herbicides can evaporate for hours after application and move as an herbicide cloud onto other plants. Herbicide volatiles can be just as injurious as liquid sprays. Herbicides are most likely to volatilize when air temperatures are in excess of 80F.

Leaching or Run-off

Many herbicides are active in soil, which means that they can injure or kill susceptible plants whenever roots come into contact with the herbicide. Most injuries involving soil-active herbicides are the result of the chemical moving from the original site of application into the root zone of another plant. Movement occurs by leaching (water moving an herbicide through the soil), or by run-off of treated soil into an area where it is not wanted. Injury is often the result of both types of movement.

Misapplication

Using the wrong chemical, applying higher than the recommended rate, or improper timing of an herbicide can cause plant injury. Misapplication can also result from using a sprayer contaminated with small amounts of herbicide.

Contaminated Soil Amendments

Herbicide injury can occur when herbicide-contaminated material such as compost, mulch, soil, manure, or fertilizer is used around susceptible plants. Be sure to obtain these materials form a source known to be free of herbicides.

TYPICAL INJURY SYMPTOMS FROM COMMON HERBICIDES:

Phenoxy Herbicides (2,4-D, dicamba, mecroprop, dandelion killer, etc)

Phenoxy herbicides and other growth regulators cause distorstion and curling of foliar plant parts. Stems and leaf peioles are often twisted or bent, and leaves may be cupped. Abnormal growth is accompanied or followed by leaf yellowing (chlorosis) and

browning (necrosis). Herbicides in this group typically injure the youngest tissues first. They affect most broadleaf plants, but symptoms are not normally produced on grasses.

Paraquat

Paraquat, Gramoxone and other contact herbicides cause rapid burning or necrosis of leaf and stem tissue. These herbicides only damage the plant tissue which they come into contact with. If spray coverage is thorough, the affected plant parts may be completely dead. If injury is the result of minor spray drift, affected plants may be dotted or speckled with necrotic tissue. Old and new tissue are affected equally, and both grasses and broadleaf plants are vulnerable.

*Glyphosate (*Roundup, Kleenup, etc.)

Glyphosate exposure causes yellowing, wilting, browning, and eventual death of foliage and plants. Damage usually appears first in new tissues, and the herbicide can translocate from one part of the plant to other susceptible tissues. Glyphosate may be stored over the winter in some plant tissues. Perennial plants such as lilac, honeysuckle, and poplar that are sprayed during the summer or fall may not have noticeable injury until the following season. This injury will appear as stunted, narrow, trap-like, and chlorotic leaves. Glyphosate affects both grass and broadleaf plants.

Soil-Applied Residual Herbicides (atrazine, simazine, etc.)

Soil sterilants are often used around driveways, fences, or sidewalks to stop all weed growth. They are also applied under new asphalt to prevent weeds from breaking through. These herbicides are persistent and very slow moving in the soil profile. Symptoms may not appear until years after the herbicide application. The first indication of injury is a mild yellowing or chlorosis around the margins and interveinal areas of leaves. Mild cases can resemble iron chlorosis and may be temporary. Severe injury can last for years and may eventually result in the death of the plant. Leaf chlorosis is followed by necrosis, and the leaf symptoms progress inward and down (toward the leaf base) on individual leaves, and from older to younger leaves on the same plant. Very young leaves may appear normal. Both grass and broadleaf plants are affected.

CORRECTIVE MEASURES

Washing

If you suspect herbicide spray or drift is on your plants, wash the foliage thoroughly with water. Water dilutes the herbicide and washes it off the plant. Applying water soon after suspected herbicide exposure may minimize damage. Washing more than three or four hours after exposure may not give any control. This treatment does not apply to soil-active herbicides since water may move the chemical deeper into the root zone of the plants.

Inactivation Activated Charcoal

Most soil-active herbicides can be inactivated or absorbed by applying activated charcoal at a rate of 1 to 2 lbs. per 100 sq. ft. and incorporating it to a depth of 6 inches. Early treatment is essential to prevent the movement of herbicide deeper into the ground.

Root Pruning

If tree roots have grown into an area treated with a soil sterilant, a trench can be dug between the tree and the treated area. This cuts the roots and prevents further uptake of the soil sterilant. Damage to the tree from the herbicide will be prevented, but the water availability to the tree may also be reduced.

Soil or Dust

Glyphosate can be detoxified immediately by spreading dust or soil on exposed plant surfaces. Delays of even a few minutes may make this method ineffective.

Soil Replacement

In some cases, it may be necessary to completely remove the contaminated soil and replace it with clean soil. Be absolutely sure that the injury is the result of herbicide contaminated soil before resorting to this costly procedure.

Patience

If plants receive a sub-lethal dose of herbicide, they may show herbicide symptoms or injury for several seasons but may eventually recover. Rather than remove a large or valuable tree the first year damage shows, it is often wise to wait another season or two to see if the level of injury diminishes. If the tree seems to improve the following year, chances are good that it will recover.

PREVENTATIVE MEASURES

Although corrective measures work, it is far better to prevent herbicide exposure. Guidelines for prevention are as follows:

Read and follow label directions on all chemicals. Use correct rates and apply as recommended. You should calibrate your sprayer before applying any herbicide.

Do not mix two chemicals together unless they are compatible. If chemicals are combined, be sure they are mixed thoroughly in the sprayer before spraying.

Never spray when it is windy. Any herbicide can drift due to the slightest breeze. Drift can be reduced by lowering sprayer pressure to produce coarse spray droplets.

Keep spray boom or nozzles close to the ground and spray only the targeted area.

When applying herbicides containing 2,4-D, use only the amine or the low volatile formulations and spray when air temperatures are below 80F.

Do not apply soil-active herbicides where water run-off could carry the chemical to non-target plants.

Homeowners should not use soil sterilants or long-term vegetation control chemicals.

Never use your herbicide spray equipment to apply insecticides or fungicides.

Know the source of soil, manure, etc. added to your garden. If it has been treated with a soil-active herbicide, do not use it.

EXTENSION

Utah State University

Leaf Scorch of Trees

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Leaf scorch is a physiological disease of plants which occurs when the roots are unable to obtain sufficient water to supply the top of the plant. Leaf scorch occurs when plants are transpiring rapidly during periods of high temperatures with hot, dry winds or during droughts. Any plant may experience this, but symptoms are more commonly seen on broadleaf trees such as maple, ash, elm, chestnut and poplar.

SYMPTOMS

Symptoms may begin with yellowing along the margins or between veins of leaves, or you may simply notice dead, brown patches in these areas. Seriously affected trees will have many leaves scorched and brown with only small amounts of green tissue on the leaves. The whole tree may develop symptoms, but frequently only the leaves on one side or a few branches turn brown. The tree will not die from leaf scorch unless it is seriously deficient from water.

In Utah, symptoms usually begin to show up in July and August. Newly transplanted trees may also develop leaf scorch because they have not had time to establish a good root system. Trees with damaged roots (from construction, etc.) or growing in areas surrounded by pavement also have difficulty in obtaining sufficient water and leaf scorch results. Often, similar leaf symptoms can be caused by excess salts in the soil which are taken into the plant and moved out into the leaves. Overfertilization and leaching of road salt applied during the winter can make soils high in salts.

CONTROL

The best control for leaf scorch is to prevent conditions which usually create scorch. Deep irrigation during periods of drought and/or high temperatures are essential, especially during windy periods. Keep trees vigorous with proper fertilization in spring or late fall, and prevent injury to the roots and trunks from construction, lawn mowers or girdling roots.

EXTENSION

UtahState UNIVERSITY

Winter Injury

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Winter injury of ornamentals is a common problem in Utah and can be difficult to diagnose because symptoms may not be apparent for several months after the event. Symptoms in the spring include dead twigs and branches, small leaves, or retarded growth.

LOW TEMPERATURE INJURY

Low temperature injury occurs when any of the following winter conditions occur: winter temperatures are much below normal, unusually low temperatures in early fall or late spring when trees are not fully dormant, or winter temperatures that fluctuate during the dormant period so that dormancy is broken and plant tissues are damaged. Severely cold temperatures will cause cavitation or air bubbles to form in the vascular elements making them nonfunctional. Marginally hardy trees, such as peach, may leaf out in the spring but, ultimately, die when the demand for water exceeds the capacity of the functioning vascular tissues.

Low temperature injury cannot be totally eliminated but can be reduced with some cultural techniques. Select cultivars of trees and shrubs that are known to be hardy in your area. Identify trees in your neighborhood that are doing well. Harden off plants early in the year. Do not fertilize trees after June 30. Avoid late summer pruning which may stimulate new growth. Irrigate your landscape plants late in the fall but prior to ground freezing. Trees and shrubs withstand severe winter temperatures better if soil moisture is adequate. Mulching the root zone with a thick layer of wood chips, sawdust, leaves, or straw retains moisture and moderates the temperature of the soil.

WINTER DESICCATION

Winter desiccation can cause severe injury to ornamentals. Even though trees are dormant during the winter, they are still transpiring water. If the soil is dry or completely frozen, the plant experiences conditions similar to drought. Browning of the needles or scorching of evergreen leaves, particularly on the southwest side, is a common symptom.

Winter desiccation can be prevented by watering trees and shrubs deeply in the fall prior to ground freezing. A thick mulch of wood chips, sawdust, leaves, or straw applied over the root zone after soil temperatures drop below 45 F will conserve soil moisture and moderate the soil temperature. Avoid planting most conifers and evergreen shrubs in unprotected southern exposures or areas where they are exposed to winter winds.

WINTER SUNSCALD

Sunscald, or southwest winter injury, is a problem of thin-barked trees such as maple, ash, crabapple, Mountain ash, and fruit trees. It is especially a problem on newly transplanted trees. Winter sunscald occurs when the bark on the south and west side of a tree warms during the day and then freezes at night. In the spring, a dead patch of sunken bark is apparent on the trunk. Later, this dead or weak tissue may become infected with the cytospora fungus which causes Cytospora canker. Evidence of cytospora infection is noticeable when the dead bark peels away in paper-like sheets and black fungal pycnidia are present. The fungus can girdle and kill the tree if it occurs on the main trunk.

Sunscald can be prevented by wrapping the trunk of newly transplanted trees with burlap or other commercial white wrapping materials. The wrap should be kept in place for two years and examined periodically to make sure it is not constricting the growth of the tree. White latex paint can also be used to reflect the heat of the winter sun. Other materials such as wooden lathe offer protection from the direct exposure to the southwest winter sun.

SNOW BREAKAGE

Snow breakage is a problem of multi-stemmed evergreens such as yews, arborvitae, and junipers. Heavy snow loads cause the branches to bend and separate from the center of the plant. If the snow load is heavy enough, the branch can break.

Evergreens can be protected from snow breakage by tying the branches together with strong rope or twine. If snow accumulates, it should be knocked off.

CORRECTING WINTER DAMAGE

If winter damage occurs, the following steps can be taken to correct the damage:

Prune out dead branches in the spring. Fertilize the damaged ornamentals with a complete fertilizer. Winter damaged ornamentals should be watered deeply during dry period. Branch dieback may occur due to girdling at the base of the tree.

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Frost Damage

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Frost and, more specifically, alternate freezing and thawing can destroy plant cell walls, often killing tender plants. Flowers, shoots, buds and leaves of hardier plants may also blacken or become distorted, and in severe frosts the bark of woody plants can split. Damage is more likely to be seen on tender plants, those that have put on growth in late autumn or early spring, and golden-leaved or variegated plants.

Frost can damage apples when the fruits are only marble-size, causing brown corky layers to form at the flower end of the fruit ('Bramley's Seedling' seems most susceptible). Strawberry flowers damaged by frost exhibit characteristic 'black eye' symptoms, where the centre of the flower turns black. Damaged flowers don't develop into fruit.

PREVENTION

Choose planting positions carefully to avoid 'frost pockets' (where cold air settles at the bottom of a slope), or a position in early morning sun. Don't apply nitrogen-rich fertilisers late in the season as they stimulate soft, sappy growth which is especially vulnerable to cold damage. Cover plants with a double layer of horticultural fleece when frosts are forecast.

CURE

If no more frost is expected prune out any damaged growth, cutting to an undamaged sideshoot or bud. Otherwise delay pruning until weather is more settled. After pruning apply a top dressing of a general purpose fertiliser such as Growmore at the manufacturer's recommended rates to encourage strong re-growth.

EXTENSION

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Needle Drop of Evergreens

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Contrary to popular belief, evergreen foliage does not remain attached indefinitely. Older, inner needles discolor and drop-off after one to several years depending on the species involved.

In late summer and throughout the fall, many homeowners observe a discoloration of the leaves or needles on their evergreens and fear that some insect or disease has affected the plants. They should not be alarmed; this is a natural condition.

Evergreen shrubs and trees remain green throughout the year because they do not lose all of their foliage at one time. Usually needle drop goes unnoticed because new needles conceal the old, inside needles and foliage that have turned yellow and brown. Sometimes the drop occurs slowly, but on other occasions, many needles discolor and drop simultaneously. Most evergreens drop their needles in the fall, but some evergreens shed their needles in the spring or early summer. Each species of evergreen is different. Evergreens that normally shed one-year-old leaves or needles are arborvitae and white pine.

White pines are the most dramatically affected. This species commonly bears three years' needles in the summer and two in the winter. In October or November of some years, this species may have only one year of needles still attached. Matured white pine needles turn yellow throughout the tree. The tree will appear unhealthy when the yellowed needles outnumber green ones of the current season.

Australian and Scotch pine usually retain their needles for three years. Spruce and fir trees retain their needles for several years. Needle drop may not be visible unless one looks for it on the inner branches. Few needles turn yellow and drop in late spring or early summer of their third year.

CAUSES

Mites

Seasonal needle drop can be confused with needle loss due to spider mite damage. When mites are involved the needles are off color, generally stippled, and gradually turn an off- yellow color. A light webbing is associated with heavy mite infestations. Spruces are particularly susceptible to spider mite injury. If mites are suspected, hold a white sheet of paper under a branch and sharply tap the branch. Look closely for small moving mites on the white paper.

Drought

If evergreens are not provided sufficient water during the dry part of the summer, leaf or needle drop may be earlier and more severe than normal.

Planting care

Most evergreens around the home are grown in sites far removed from their native habitat. Special care is often required at the time of transplanting. Planting evergreens under the eve of a house can result in drought in the winter.
Break and loosen the ball of soil surrounding the roots to provide better aeration after transplanting.

Nutrition

A lack of nutrition often means short yearly growth and premature leaf or needle drop. Yearly applications of phosphorus, nitrogen, and perhaps iron are essential to maintain healthy and vigorously growing shrubs and trees. Iron deficiency is common in soils with high pH and more serious with some evergreen species.

Herbicides

Some forms of herbicides applied to the lawn or in the vicinity of evergreens may cause sufficient injury to result in needle yellowing and non-seasonal drop.

Winter damage

Prevent winter injury or winter drought by irrigating in late fall and periodically during the winter if inadequate precipitation occurs. Be sure that shrubs or trees planted under the eaves have sufficient water in the winter.

Wet or poorly drained soils

Evergreens planted in wet these soils will not be vigorous and will often show an abnormal amount of premature needle drop.

Don't confuse natural seasonal drop of evergreens with various insect disease problems that can reduce the vitality and aesthetic value of shrubs and trees. Normal needle drop is a seasonal occurrence, and the symptoms are distributed generally throughout the interior portion of the plant. If you have doubts about accurate diagnosis, examine the leaves and needles carefully. Needles that yellow and drop normally from age may have occasional spots and blemishes. Old needles sometimes show mottled brown coloration from invasion by nondisease-causing fungi. On the other hand, spots or blemishes on the current season's leaves or needles may be caused by insects or disease. An accurate diagnosis of the condition will determine whether chemical sprays are necessary to arrest the problem.

EXTENSION

Utah State University

Needle Blight of Evergreens

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Needle blight is a non-parasitic disease of many of the ornamental evergreens grown throughout Utah. The disease occurs most frequently on spruces and pines but is also present on juniper, arborvitae, and yew. Needle blight is most often caused by drought, winter injury, sunscald and root rot. In most areas of Utah there is a low concentration of evergreens and therefore damage caused by infectious diseases is rare. Evergreens grown at high elevations are the only trees observed with fungal infections.

SYMPTOMS

Needle blight may first be noticed when an unusual number of needles begin to turn brown, red or purple. The blight may begin either at the tops or the bases of needles and may be on new or old needles (outside or inside needles of the tree respectively). When only the older or inner needles are affected and the new needles appear healthy then the condition is probably normal. Trees with needle blight may have so many needles affected that the whole tree will have a brownish appearance. Spruce trees will frequently have only a few isolated branches with symptoms. Severely affected trees may die after one or two seasons but if the growing conditions are corrected trees may respond and live for years.

CAUSE

The primary cause of the disease is an improper water supply but is also complicated by other factors such as soil conditions, adverse weather, or herbicides. Drought conditions or excessive soil moisture cause death of the fine feeder rootlets. Needle blight occurs when the delicate balance between the foliage of the tree and the feeder rootlets is altered. The combination of summer drought plus winter drying causes needles of spruces, especially the Blue spruce, to turn purple. Radical changes in irrigation procedures or timing may also cause needle blight.

CONTROL

Evergreens should be irrigated deeply during hot, dry, summer weather. The ground under evergreens should have soil moisture at least 4 ft. deep throughout the year to avoid drought. However, do not over-irrigate. Excessively wet soils cause root rot. Maintain a natural mulch of fallen needles since it helps maintain soil moisture as well as protect the shallow roots from excessive heat. Avoid construction near trees which would destroy roots. Protect the trees from winter injury by irrigating all evergreens deeply in late fall and again in midwinter if the soil has dried out. Fertilize trees in the spring with nitrogen fertilizer. A balanced fertilizer such as 5-10-5 could also be used.

EXTENSION

Utah State University

Oedema

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Oedema is caused by a physiological upset in the water balance of affected parts which occurs when the roots take in water faster than it can be transpired through the leaves. This water builds up pressure in the mesophyll cells (interior cells) of the leaf causing them to enlarge and burst producing water soaked spots on the affected leaves. These spots enlarge forming swollen blister-like areas which break through the leaf epidermis to form tan or brown wart-like, corky protuberances predominantly on the lower leaf surface. These areas harden and darken with age. In severe cases, these corky growths also form on the petioles and stems. If injury continues, the leaves will turn yellow, droop and fall from the plants. Severely affected plants become spindly and cease growth.

Oedema usually is associated with a high level of soil moisture and reduced transpiration of moisture from the leaf surfaces. Cool nighttime temperatures along with high relative humidity surrounding the foliage tend to suppress transpiration. While plant roots continue to absorb water, the plant does not lose enough water through transpiration.

Oedema occurs frequently in greenhouses in late winter and during cloudy weather. Cloudy weather may help cause oedema by reducing the rate of transpiration, whereas a reduction in atmospheric pressure increases the rate of transpiration, thus relieving the tendency for oedema to occur.

PREVENTATIVE MEASURES

Overwatering, high humidity and low light intensities are factors which favor the development of oedema. Therefore, maintaining an environment unsuited for the development of oedema is essential for control. Avoid overwatering susceptible plants especially during cool temperatures when they should be kept slightly on the dry side. Keep the relative humidity below 70% in the winter. Improving the flow of air over the leaves by spacing the plants farther apart and increasing ventilation will help reduce humidity. Increasing the exposure to sunlight is also beneficial. Affected plants often recover from oedema with the return of more favorable growing conditions in the spring and early summer, especially if they are placed outside as soon as weather conditions permit in the spring.