

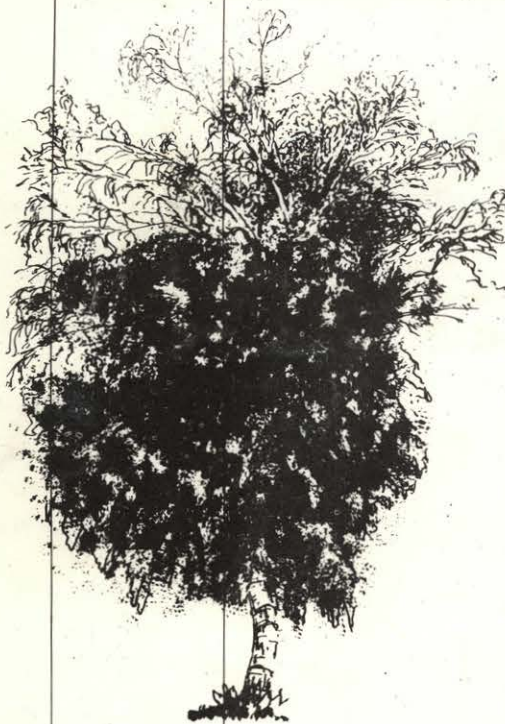


February 1975

Technical Report
Number 2

College of Forestry, Wildlife and Range Sciences

PLANTING & CARE OF ORNAMENTAL BIRCH TREES IN IDAHO



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Trees established on hardpan can be helped by punching holes in the layer with a soil auger or a post-hole digger. If holes of one to two inches in diameter are made, five to six holes per square yard should be sufficient. If the holes are three to four inches in diameter, probably one hole per square yard will be adequate. Drainage holes at these spacings should be provided all around the tree to at least three feet beyond the drip line of the branches. All drainage holes should completely penetrate the hardpan layer if possible. The holes should be filled with sand or gravel to keep the clay from filling them up again. This procedure may have to be repeated in four to five years as the silt particles forming the hardpan layer filter back into the sand- or gravel-filled holes.

When transplanting trees, a portion of the hardpan can be removed and replaced with an appropriate soil mixture. Some materials which serve this purpose are native soil, sand, sawdust, peat moss, and leaf mold. A good mixture to begin with is 50 percent sawdust, leaf mold or peat moss, 15 percent sand, and 35 percent native soil. Place a quantity of the mixture in a flower pot and soak it thoroughly with water. After the mixture is dry, test it for firmness. If it is hard and does not readily accept water again, it has too much native soil. Conversely, if water passes quickly through it then there is too much of one of the other constituents. By experimenting with mixtures and making these simple tests, a good mixture can be found.

Proper water management is the most important factor affecting birch trees in Idaho, particularly in the southern portion where the summers are hot and dry but regular irrigation is practiced. All trees should

be watered slowly so the water soaks down to the depths of tree roots. Quick watering or light sprinkling may make the soil appear well watered soon after the water is applied, but during the hot weather this amount of water is very quickly evaporated. On the other hand, even relatively moderate amounts of water may lead to overwatering if soil drainage is poor and the water is trapped by a clay layer below the surface.

Soil alkalinity and fertilization. In the more arid regions of Idaho, particularly the Snake River plains and the benches along the Boise River Valley, the soil is alkaline. This condition causes a chemical binding of many nutrients into forms which make them unavailable to plants. Iron is one of the most common nutrients bound up in this manner. Manganese, zinc, copper, magnesium and others are similarly unavailable in alkaline soils. The most economical method of correcting these deficiencies is to use a complete fertilizer rather than adding one nutrient at a time. Fertilizers are discussed further on page 9.

DISEASE AND INSECT DESCRIPTIONS

Birch dieback is the most common problem of ornamental birch trees. It is a combination of inadequate care followed by the attack of a beetle called the bronze birch borer (*Agrilus anxius*). The most conspicuous symptom of dieback is the dying of shoots and buds. The leaves dry and turn brown from the outer edges inward. The general appearance of the tree is the dying and browning from the top downward and from the tips of branches inward toward the trunk. The attack by the bronze birch borer and the poor health of the tree are explained separately below. Remember that these conditions generally occur together and most of the symptoms described can be found on the same tree.

The bronze birch borer is one of the most devastating enemies of birch trees, particularly those in poor vigor. This beetle occurs throughout the range of birch. Adults are deep green-bronze in color and 1/2 to 1 inch (14-28 mm) long. The pre-adult stage is a flattened grub, about 1-1/2 inches (42 mm) long with two spines at the head end.

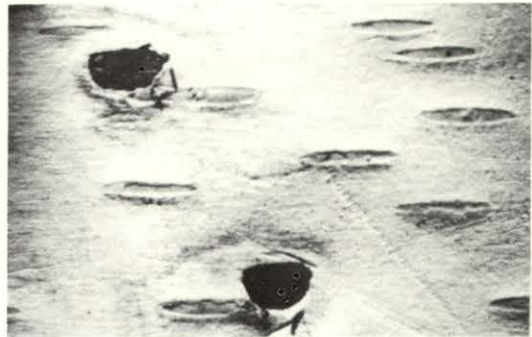
The majority of the damage occurs in summer and is caused by the grubs making tunnels or galleries just under the tree bark. This activity girdles the trunk, causing death to the parts of the tree above the girdling.



The first noticeable symptoms of the borer attack are a dying back of the tree-top and small round holes in the bark caused by borer grubs. By the time these symptoms are present, it is usually too late to apply any control measures.



Birch Dieback is nearly always associated with the bronze birch borer. The dieback symptoms are also the usual symptoms for a number of root disturbances. These disturbances, which often contribute to the dieback, may



be root diseases or root damage caused by digging tools, soil compaction, drought, overwatering, or poor drainage. Frequently when symptoms are advanced enough to be noticeable, the tree is so badly injured that it may not recover. This will not always be true in the case of drought or overwatering. In these two instances, when water is supplied in sufficient quantity or, in the case of overwatering, withheld to permit some drying out, the tree will produce new buds and eventually, new leaves. If the conditions of drought or overwatering persist for a long period the tree dies.

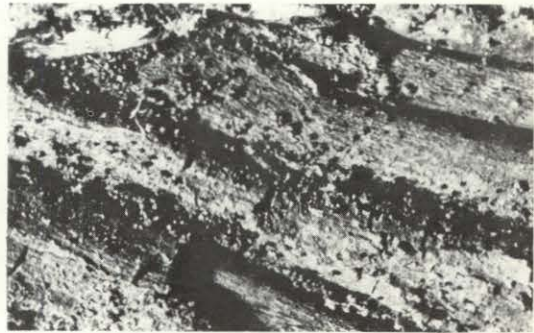
Nectria cankers, (*Nectria galligena* and related species), are widespread in North America on hardwood trees. They do not often kill mature trees, but small trees may be completely girdled and die. The cankers are unsightly, but their chief danger to trees is the weakening of the trunks and branches predisposing them to breaking by wind, ice, snow, or other mechanical stresses.

The initial symptom of Nectria cankering is a reddish or darkened area on the tree trunk with a watersoaked appearance around the opening in the bark through which the fungus entered the tree.

As the canker develops, the bark over the entrance area dries and cracks. Eventually, the cracked bark falls away and exposes the underlying wood. Old cankers on mature trees have a target-like appearance, while on young trees they are usually areas of deep depression, almost like holes, surrounded by rings of woody tissue.



During moist weather in the fall small white tufts of fungus material protrude through cracks in the bark on and around the cankered area. About the same time tiny round or oval red fruiting bodies, about the size of a pinhead, appear in the center and around the edges of the canker. When these fruiting bodies mature, their spores are ejected and are carried away by wind and rain. The spores can cause infection of other trees.



Cytospora canker, *Cytospora chrysosperma* (*Valsa sordida*). This fungus has two names as indicated above but it is usually referred to as "Cytospora." Spores of the fungus invade the trunk and branches of birch trees through wounds in the bark. Infections begin as more or

less circular, sunken, discolored areas of bark called cankers; the wood beneath the discolored bark is frequently brown rather than white or green. As the fungus matures it forms small, dark, pimple-like fruiting structures on the bark covering the cankers. During wet or humid weather red-



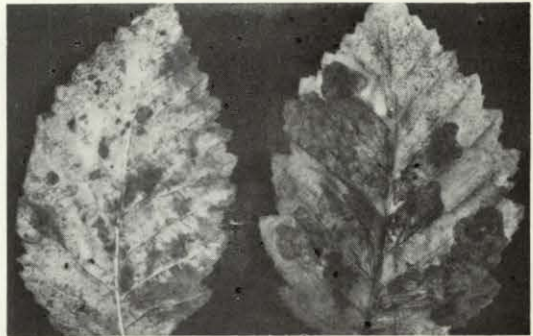
dish or yellowish tendrils erupt from the fruiting structures and form tiny curled masses resembling the tendrils on peas. Each tiny tendril contains thousands of spores, and each spore is capable of inciting a new infection if it chances to land in a favorable place.

Twigs, small branches, and even small trees are often girdled and killed by this fungus. If a number of branches or twigs are infected at nearly the same time the over-all appearance of the tree may resemble birch dieback or severe drought.

Birch aphids congregate on leaves and twigs where they obtain food by sucking the sap from plant tissue. A sticky, shiny substance, called honeydew, is usually found on leaves and on objects under the tree; this is the excrement of aphids. The attacked leaves are small and wrinkled. Numerous small green aphids are usually present, congregated on the underside of leaves. Unchecked by predators or parasites, tremendous numbers of aphids may be produced during the summer. As winter approaches, winged males and females are produced; these adults mate and produce eggs which overwinter on twigs and small branches.

Birch leaf miner (*Fenusa pusilla*),

Larvae of this leaf-mining wasp feed on tissues between the leaf surfaces. Young larvae form kidney-shaped mines which coalesce and form large wrinkled, hollowed-out brown areas in the leaves.



Leaves turn brown and brittle, but older foliage may not be affected.

Larvae, when mature, drop from the leaves and transform to the adult in the soil.

Larvae of the birch skeletonizer, *Bucculatrix canadensiella*, a leaf-mining moth, feed from late July through August. Young larvae enter the leaves to feed, making serpentine (s-shaped) tunnels; later they emerge and form small webs on the underside of leaves. After their feeding, only a skeleton of the leaf remains. Heavy infestations cause severe defoliation. Later, they fall to the ground where they overwinter. The adults emerge from their cocoons in spring and lay eggs on the leaves.

IRON CHLOROSIS AND OTHER PROBLEMS

Iron chlorosis and some other mineral deficiencies are caused by a chemical condition which binds the minerals in forms which make them unavailable to plants. Iron is only one of several minerals essential for the growth of all green plants.

The symptom of iron chlorosis, often called iron deficiency, is a conspicuous yellowing of the leaves with the leaf veins remaining green. Deficiencies of magnesium, sulphur, and sometimes even calcium, produce

symptoms which may resemble those of iron deficiency. Therefore, mineral deficiencies should be treated with a complete fertilizer containing as many of the nutrient elements as possible. The constituents of fertilizers are listed on the package. Most fertilizers contain nitrogen, phosphorus, and potassium which are indicated by three numbers on the package. The first of these numbers is the percentage of nitrogen that the fertilizer contains; the second is the percentage of phosphorus and the third is the percentage of potassium or potash. The micronutrients, i.e., those required in small amounts, are listed on another part of the package.

Drought, overwatering, or poor drainage. Drought, or lack of water, is familiar to most people. But overwatering and/or poor drainage which produce drought-like symptoms are not generally recognized. Overwatering is simply applying too much water. However, even moderate amounts of water can produce similar symptoms and tree death if soil drainage is poor.

Herbicides, or weed killers, invade trees and shrubs in two primary ways. One is through the leaves which have acquired the damaging chemical from drifting spray. Many garden chemicals may drift hundreds of yards or even miles on a wind or breeze that is scarcely noticeable. Another entrance route of herbicides is through the root system. This happens when a "weed and feed" fertilizer is applied to lawn grasses in amounts greater than recommended or, perhaps, by mistakes or accidents with the spreader or other mechanical applicator. A more common occurrence is the intentional application of chemicals on noxious weeds in areas near

enough to trees to enter the root system. Weeds along driveways, sidewalks, and fences are especially targets of this kind of application.

The leaves or needles of trees which have been subjected to air-borne chemicals are usually twisted, curled, and deformed; often they are so distorted that they cannot be recognized as belonging to the tree on which they are found. In addition to the malformations, such leaves are discolored, usually pale green or yellow and sometimes with darker green streaks. Trees absorbing these chemicals through the roots have similar symptoms but may have more extremes in the discolorations, sometimes approaching white or extremely pale yellow.

DIAGNOSIS AND TREATMENT

The following pages present a table of injuries, diseases, and damages occurring on birch trees. In the first column the injuries are divided into two groups, (1) those that occur on foliage (leaves) and, (2) those that occur on trunks and branches as well as leaves. The second column gives the name of the disease or insect causing the injury; the third column gives a recommended treatment. The fourth column contains remarks about how or when to apply the control measures. The reader will gain a better understanding of disease or insect processes by carefully comparing the information in this table with the descriptions given in the text.

ORNAMENTAL BIRCH TREE PROBLEMS AND CONTROL RECOMMENDATIONS

Place of Injury	Cause of Disease Injury or Damage	Recommended Control	When and Where to Control
Damage to foliage	Aphids	Malathion Diazinon Dimethoate	Spray on foliage as needed
	Birch Leaf Miner or Birch Skeletonizer	Malathion Dimethoate Lindane Sevin	Spray when first leaves are fully formed. Apply a second spray if needed in 4-6 weeks.
	Mineral Deficiencies	Treat with a complete fertilizer.	Three to 4 pounds of fertilizer should be applied for each inch of trunk diameter measured at 4 1/2 feet above the ground. Trees smaller than 6 inches in diameter, use only half this amount. The fertilizer must be uniformly distributed around the tree 2 or 3 feet beyond the drip line of the branches. No fertilizer should fall closer than 6 to 8 inches from the trunk of the tree. Annual application should be adequate.
Damage to foliage, trunk, and branches	Bronze Birch Borer	Lindane	Spray the adults which emerge in late April or May. Adults are difficult to control and several applications 4 to 6 weeks apart may be necessary. Apply to trunk and larger limbs. This is an excessive amount of lindane and should be applied only to the infected trees or adjacent trees being protected. Keep trees in a vigorous growing condition. Trees less than 3 or 4 years old may be protected with "Tree Wrap" around the bole. This paper should also be treated during spray programs.
	Birch Dieback	Maintain a vigorous growing tree. Follow a good planting, watering, and fertilizing plan. Avoid soil compaction or root damage.	Birch dieback is a complex of physiological stresses and bronze birch borer invasion. If a tree is neglected and begins to decline it becomes susceptible to invasion by insects and disease.
	Nectria canker Cytospora canker	Cut out the cankered area and prune infected branches. Burn the pruned off material.	Pruning should not be done in moist or rainy weather as spores enter trees through cracks or breaks in the bark. Therefore, WHEN PRUNING STERILIZE TOOLS IN ALCOHOL BETWEEN EACH CUT and paint the fresh cut with shellac or tree wound dressing. The best time to prune is late winter or early spring.
	Herbicide Damage	Do not use fertilizers containing weed or crab-grass killing chemicals except in those formulations guaranteed by the manufacturer to be harmless to trees and shrubs. Use great care when spraying weeds with herbicides to insure no drift occurs outside of the intended area.	Herbicide damage usually does not kill a tree, and if the trees are not further damaged they will recover.
	Drought, Overwatering, or Poor drainage	Maintain the proper watering plan.	The proper amount of water for a tree may be ascertained by digging down 3 to 4 inches or more and pinching the soil between thumb and forefinger. If the soil is so dry the particles do not cling together, the tree should be watered as recommended in the text. If a hardpan soil is present, water may gather around the roots and drown the tree. This condition may be improved by increasing water drainage.

The above recommendations are based on the best information currently available for each chemical listed. To avoid excessive chemical residues, FOLLOW LABEL RECOMMENDATIONS CAREFULLY with respect to dosage levels, numbers of applications, and minimum intervals between applications. Brand names have been used for reference only. No preference is intended.

