the spore producing bodies break through on the surface of the cankered areas and initiate new infections. To control the disease it is desirable to destroy the fallen leaves and to prune off and destroy all infected twigs and branches. Puratized Agricultural Spray or Bordeaux have been reported as giving satisfactory control when applied several times as the leaves are expanding (first after the buds have opened but before the leaves are half grown, etc.). Puratized Agricultural Spray has caused some damage to underplantings, so care must be exercised in its use.

Oak Root Rot: Although this disease is called oak root rot, the fungus involved attacks a wide range of host plants. The fungus is present in many canyon areas, in washes, stream beds and adjacent flood plains. Prolonged wet soil conditions during summer months favor the development and extension of the disease. This is why it is so often seen in destructive proportions in home plantings. Often, water loving plants, such as azaleas, camellias, ferns, etc., are planted under oaks and when water adequate to their needs is supplied, the oak root rot fungus thrives and the susceptible plants succumb more readily.

Above ground indications of the disease include a gradual decline of the plant or its sudden death, not unlike those due to other causes. However, the presence of the fungus can be rather easily detected. Diseased plants have a white or cream-colored, flat, fan-like mat of fungus material between the bark and affected root or crown tissues. Such diseased tissues have a strong mushroom odor. Brown to black "shoe-strings" which cling to the surface of the root and grow into the soil are also useful in identification, but they are not always present. Clusters of tan-colored mushrooms often appear at the base of diseased trees or from shallow roots in the surrounding area in late fall or winter. These are the reproductive stage of the fungus which causes the disease.

Since the disease develops most readily in moist warm soil, it is desirable that during the summer months, only the water needed for the growth of the oak trees be supplied. Thus, it is unwise to underplant with species needing a lot of water. One of the best ways to handle a planting under oak trees is to use flagstones and then plant in pots which can be watered individually. If a diseased tree is discovered in time, its life span can be extended considerably. Surgical removal of the diseased tissue in the root crown area and painting the exposed wounded area is often effective in slowing down the advance of the fungus. The life of the trees may be extended by removing the soil from the trunk and root crown, since exposure to air and drying is effective in retarding the advance of the fungus. In general, it is not feasible to control oak root rot by trenching or the installation of permanent barriers around diseased areas. However, plants which can tolerate a limited root area have been grown successfully in clean soil in concrete containers with adequate drainage. Carbon disulfied injection into the soil often is not practicable, because of the difficulty of getting adequate and uniform penetration under many situations. However, it may be useful under certain conditions.

Fireblight: This bacterial disease is common on flowering pear, apple, pyrocantha, cotoneaster, etc. It appears rather suddenly as a browning of blossoms, sepals, leaves and twigs. Dieback may extend down the twigs and give the appearance of having been scorched. Also dead leaves hang on and give the appearance of having been scorched, hence the name. During warm humid weather, recently infected areas may exude amber colored droplets made up of bacteria and plant juices. During dry weather this dries down to a thin glistening sheet. When the twig blight extends into the limb, trunk or root, localized or diffuse cankers develop which vary in size and shape. As these cankers dry out, they may be separated from the healthy tissues by small cracks.

The bacteria which cause this disease overwinter in the cankers, so it is well to remove them. When pruning out cankers, the cut should be made far enough below the canker so that all the diseased area is removed. This means that the cut should be made several inches below the visible canker. Also the pruning implement should be sterilized between

cuts. Spraying with fixed coppers or with antibiotics (Agrimycin 100, etc.) during the blossom period gives some control. No really desirable resistant varieties are currently available, so the best cultural practice to prevent fireblight is to avoid measures which favor the production of rapid tender growth, i.e., do not prune heavily, do not overfertilize with readily available nitrogen, etc.

Water molds: These are fungus diseases which usually start at the tips of main or lateral roots, but which may rapidly involve all below grounds parts. They develop under conditions where the soil moisture level is high. Two kinds of symptoms may develop: 1) a sudden wilting and death of all of the above ground parts due to death of the roots or, 2) a more gradual death of the plant by a branch at a time being affected and dying from the tip down. About the only recommended treatment is to cut down on watering. The use of captan, thiram, etc. as a soil treatment in established plantings has been used with varying degrees of success.

DISEASES OF LAWNS AND GROUND COVERS

Brown patch: This is a hot weather disease which appears rapidly from June through September during periods of high relative humidity when the day temperatures of 80-95 drop to night temperatures of 60-70. Dew, fog or irrigation late in the day favor the development of this disease. Also, overstimulation with nitrogen favors the development of the trouble. Wettable Thiram or ferrated Actidione give rather effective control when used as directed. Many golf greens apply fungicides every 2 or 3 weeks, but in home plantings Actidione may be used mainly as a preventative, by applying as soon as symptoms appear and about one week later or as indicated by conditions.

Dollar Spot: This is a cool weather disease (fall and spring inland and all year coastal). High humidity also favors this disease so it is unwise to water in the afternoon or early evening. The disease may be recognized by the irregular, roughly circular, brown patches which vary in size from an inch to three feet or larger. Usually, the grass is not completely killed within the spot. Recovery often starts at the center of the spot and spreads outward, while the margin may still be enlarging. Actidione (ferrated), Puraturf 177, Calocure, Calochlor and Kromad when used as directed have given satisfactory control.

Damping-off: This is especially bad on rye and is difficult if not impossible to control if the weather conditions favor the development of the disease. However, ferrated Actidione has proved effective in some areas and a mixture of captan and fermate has been recommended.

Melting out: This disease caused by a species of *Helminthosporium,* is apparently becoming more prevalent in the spring on golf courses. Early symptoms of this disease are an indefinite gradual yellowing of the plant. The most obvious symptoms consist of a bright yellow leaf blade or distinct yellowish-brown spots with darker borders. Dead spots may be found on leaf sheaths, stems and roots. Actidione and Kromad have been used with sporadic and somewhat unsatisfactory results.

Bacterial leaf-spot of Ivy: This disease is very common in the spring and can cause considerable damage. Cutting down and destroying the old foliage will reduce the disease somewhat in that the amount of inoculum is reduced. Following this, it is easier to protect the remaining leaves with fungicides. Bordeaux has been used satisfactorily except that the discoloration produced is objectionable in some areas. Agrimycin 100 and possibly Agrimycin 500 should be effective in controlling this leaf spot. Actispray is reported to control this disease effectively.

Various root rots of strawberry, ajuga, ivy, etc.: Several fungi, including Fusarium, Rhizoctonia, Verticillium, Pythium, Phytophthora, etc. are involved in causing root rots of a wide range of plants. In general, it is best to plant in clean, well drained soil, use good plants, etc. The use of various chemicals is effective depending upon the fungus involved.

Arboretum Plant Pathologist

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