HRI's Mission:

To direct, fund, promote and communicate horticultural research, which increases the quality and value of ornamental plants, improves the productivity and profitability of the nursery and landscape industry, and protects and enhances the environment.

Girdling by Roots and Ropes*

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Although problems with girdling are nothing new, they have been occurring with more frequency during the past 10 to 15 years. With the increased use of container grown plants and the replacement of jute and sisal with polyethylene ropes and mesh, problems with stagnating and dying plants, 3 to 5 years after being transplanted into the landscape, are occurring with greater frequency. The problems have been further accelerated by inexperience and careless persons doing the transplanting.

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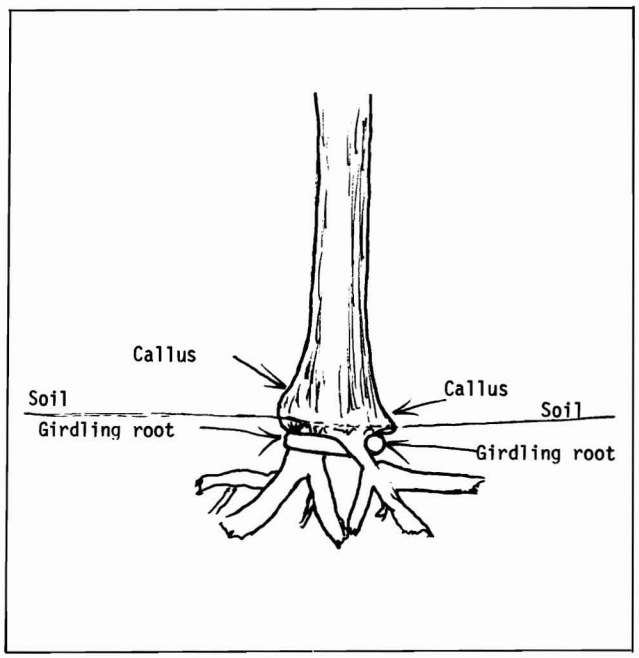

Fig. 1

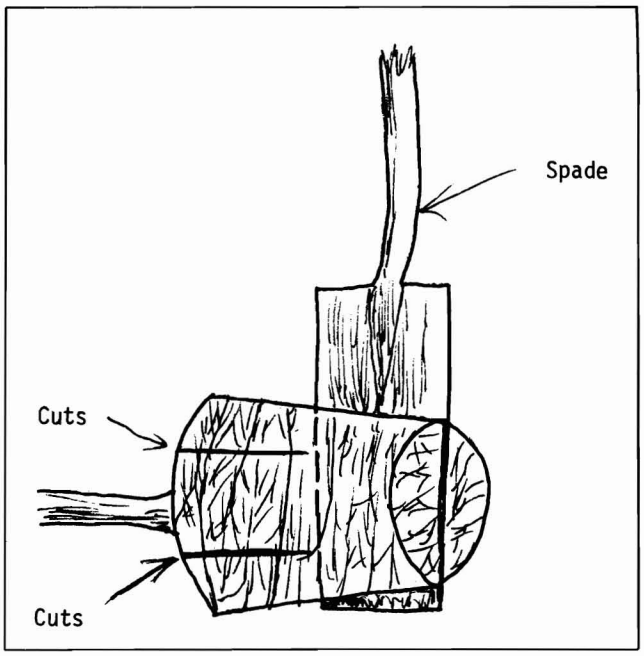

Fig. 2

In the past, root girdling problems were generally limited to lining-out stock that had been left to grow in 2 1/4" clay pots before being lined out in the nursery row. Most of these plants either died in the nursery or never grew to marketable size. In the landscapes, girdling was generally limited to negligence such as failure to remove labels, plant ties, marking tape or anchor wire and hose from around the stems or branches.

With increased use of container grown plants in landscaping and greater use of plastic rope and mesh by wholesale nurseries, we can anticipate more girdling problems in the future. It is unlikely that container designs and cultural practices will change much in the coming years, and organic fibers will again replace rot resistant plastics. Therefore if girdling problems are to be avoided we will have to adapt procedures that will prevent them from happening.

Consumers have become very "sue" conscious in recent years. If a plant dies 4, 5 or more years after it has been transplanted because of negligence on the part of the person who transplanted it, there is nothing to stop the consumer from suing for replacement and damages despite the fact the original guarantee may have been for one or two years. Negligence may be hard to prove in the case of girdling roots, but it will be relatively easy to prove where polyethylene materials have been left tightly wrapped around the trunks of plants. When buried in the ground, polyethylene materials remain almost indestructible.

The surface roots of trees and shrubs that have been grown in round containers tend to maintain a circular habit of growth long after being transplanted, unless the roots have been disturbed severely. As the trunk of a plant increases in diameter, the distance between the trunk and the undisturbed circling roots diminishes rapidly. If the plant happens to be a shade tree, the base of the trunk increases rapidly as it flares outward. In such instances girdling of the trunk by an undisturbed circling root can occur just beneath the soil. If the tree happens to be a maple or an oak, callus tissue can often form over the girdling roots giving the trunk its normal flared appearance (Fig. 1). Generally this problem goes unnoticed until the plant begins to lose vigor, the foliage appears sparse, the leaves are abnormally small and there is little terminal growth. This problem could have been avoided by simply cutting the roots along the top side of the root ball. Cutting the roots along the top of the root ball and "Butterflying" the bottom half of the root ball by spreading the roots apart, not only helps to eliminate the root girdling problem, but also hastens the establishment of container grown plants, especially when they are approaching pot-bound conditions (Fig. 2). We know from experience that many species of nursery crops produce as many as and often more roots in the bottom of containers than at the top. We know from extensive studies and from experience that the majority of the roots of landscape plants can be found in the upper 3" to 6" of soil. Therefore, cutting the surface roots and "Butterflying" the bottom half of the root ball by spreading these roots apart, reduces the chances of root girdles. "Butterflying" the root ball also increases the percentage of roots that are likely to become established in the surface soils (Fig. 3). In heavy soils, undisturbed roots at the bottom of the root ball of container grown plants often die because of inadequate oxygen or excess water.

Cutting the surface circling roots and "Butterflying" the bottom half of the root ball is a simple process that requires only a fraction of a minute with a digging spade or shovel. This practice should be part of a continuing training program and every crew foreman should enforce its use.

Another practice that should be enforced is the removal of all polyethylene materials from around the trunks of plants. In the good old days, when root balls were wrapped with jute or sisal, one could anticipate that these materials would decompose within 4 to 8 weeks after being buried in the ground. Even properly

treated burlap will decompose within 3 to 4 months. Today many nurseries are using polyethylene rope and woven polyethylene mesh to secure the root balls of field grown plants. When polyethylene materials are buried in the ground they remain almost indestructible. It is not uncommon to find trees and large shrubs, that had been growing well, exhibiting signs of decline despite regular maintenance. Investigations into some of these problems have uncovered polyethylene rope girdling the trunks below the soil line or mulch level. Similarly, woven polyethylene mesh, left wrapped around the trunks on top of the root ball, has created girdling problems. Some investigators have mentioned finding roots, which have penetrated the wrapping, being girdled by the polyethylene mesh. Therefore, it is important that planting crews be instructed to remove all ropes wrapped around stems and cut away or fold back all woven polyethylene mesh after plants have been positioned in their planting holes.

Negligence in planting container grown plants and balled plants wrapped with plastic ropes and mesh could some day haunt you long after the guarantee period is over. Cutting surface roots that are growing in circles along the outer edge of the root ball and "Butterflying" the bottom half of the root ball of container grown plants will not only minimize root girdling problems, but will also hasten their establishment. The removal of all plastic rope and wrapping materials from around the stems and roots should help avoid costly and embarrassing situations in the distant future.

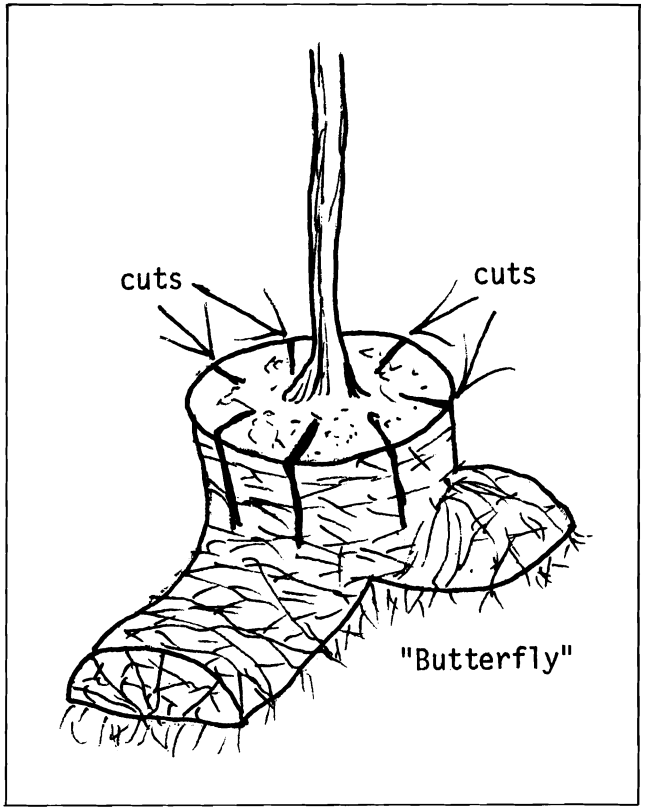

Fig. 3