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sirable than during dormancy. Our experience suggests spring transplanting is still number one but fall is second best. This disagrees with Himelick's discussion, but each area of the country has its best time for transplanting. Our concern with fall transplanting is frost heaving or dessication during the winter.

Pine and spruce are best moved during mid-August through early September. This is probably due to photoperiod and warm soil conditions favoring rapid root development. These allow the plant to establish a hold prior to dormancy. Planting beyond early September can result in problems with these two plants. Fall planting results in poor root growth and, therefore, a major decrease in transplanting success.

Container grown trees suffer the least shock during transplanting.

Age also affects transplanting success. The smaller or younger the plant, the easier to transplant. Generally, one should have a high degree of transplanting success (above 90%) with trees up to 1 to 1½-inches in trunk diameter.

In larger trees, attention should be paid to the ball size to make sure it is no smaller than the minimum developed by either the American Association of Nurserymen or the International Society of Arboriculture.

With the advent of large tree moving equipment, it has become more common to attempt moving these 4 inch trunk diameter trees. Ease of transplanting is certainly a prime consideration but good rules of transplanting must still be considered. Further, all trees should be mulched heavily with composted wood chips, pine needles, or peat moss.

Species of trees & shrubs certainly has significant impact on transplanting success. Some trees, e.g. willow, alder *(Alnus)*, catalpa, and honey locust *(Gleditsia)*, transplant with a high degree of success while other plants, e.g. birch *(Betula)*, hickory *(Carya)*, and sassafras, are very difficult to transplant. For tree species that have shown historically to be difficult to transplant, one should carefully move the plants only during early spring or winter dormancy. For a more complete list of plant species and their relative ease or difficulty in moving, I suggest you obtain a copy of E.B. Himelick's "Tree and Shrub Transplanting Manual."

Shrub transplanting can be unique. Generally speaking, the discussion above for deciduous trees would be similar when considering timing and method of planting, e.g. bare root, balled and burlapped, or container grown. One main variant in transplanting time is for shrubs in the ericaceous family, e.g. rhododendron, azalea, mountain laurel. These shrubs can be moved almost any time from early spring through early fall (mid-September); avoid the period of rapid growth or elongation. The root system is compact—fibrous, being rarely over 18 inches in depth. Thus the plant can be dug and transplanted with minimum root loss.

Root pruning can often be the difference between success or failure in transplanting. One must realize that the main difference between nursery grown and native trees is the fact that nursery grown trees are root pruned at least every other year. This results in a more compact, well branched, fibrous root system. Therefore, transplanting success is significantly increased.

With the advent of large ball and burlap equipment, some have felt that trees can be transplanted simply from the wild and not cared for in the nurseryman's time-proven manner, e.g. frequent root pruning. This has resulted in trees that are often slow in becoming established with borer damage and frequently other declining symptoms. If the tree does become established, it takes 3 to 4 years before growth again is significant. Root pruning remains a key factor in nursery production and transplanting success.

Antitranspirants offer another opportunity to prolonging the transplanting season while increasing success. Early research by Smith and Chadwick showed clearly that the antitranspirant was not effective over long periods of time but would afford protection during short periods just after application. As new antitranspirants have been developed, similar early studies should again be repeated to see if current products have improved over original compounds. Even though antitranspirants are not effective totally, they are one tool which can improve transplanting success for late spring plantings.

Site can be the difference between success and failure. Generally speaking, most trees and shrubs should be transplanted into well-drained soils. As Herbert Dow once said, "Clay on sand, trees in hand; sand or clay often resulted in tree death."

Sub-surface drainage is critical in moving most trees and shrubs. Therefore, one should condition the soil or, even in extremely heavy conditions, bore down through the clay to provide some form of drainage. Midland, Michigan and Chicago, Illinois are essentially lake bottoms, that is heavy clay soils and sub-surface drainage in these areas is frequently the difference between success and failure. There has been, in the past several years, a considerable amount of research discussing the "bath tub effect" in planting trees. Sub-surface drainage remains an important fact in transplanting success.

The **mechanics of transplanting** are similar for trees or shrubs. The hole the tree is to be placed in should be dug 6 to 12 inches deeper and wider than the size of the root system. Top soil or organic matter should be mixed with the ambient soil. The plant is then placed in the hole. Then the hole is filled ⅔ with soil; watered thoroughly. This first watering is an important step in that it eliminates air pockets, and affords intimate contact between soil and roots.

Sub-surface drainage is critical in moving most trees and shrubs.

The planting depth should be essentially the same as it was when

Continued on page 54

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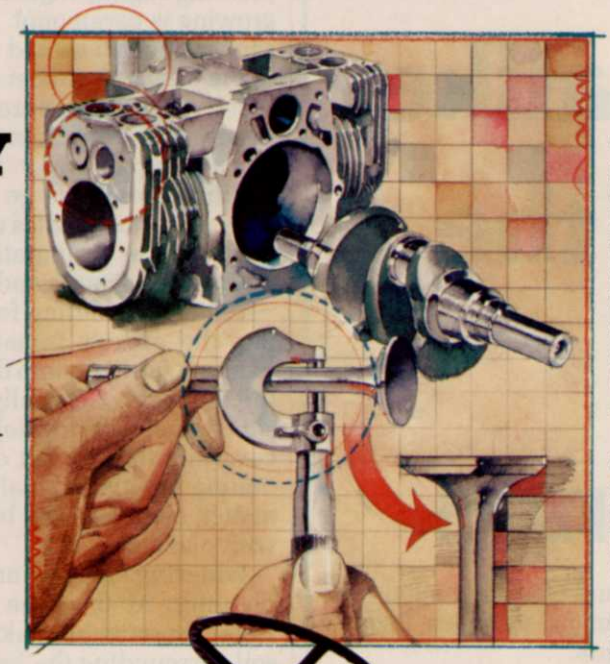

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TRANSPLANTING *from page 52*

the plant was growing in the nursery. One exception would be with transplanting large trees. Here the weight of the ball would often cause the soil to compact under the tree. This settling often results in the tree being planted 4 to 5-in. too low. For large trees transplanting slightly higher than the depth at which it was growing is paramount. After backfilling completely, a saucer of earth should be developed around the base of the tree. This saucer of earth is extremely helpful in that it collects moisture and, therefore, on sites where watering is difficult, provides maximum chance to collect and supply water.

When moving large trees, our greatest success results when the plant is mulched heavily. Mulching not only reduces evaporation and frost heaving but also limits weed growth and, therefore, competition.

When considering fertilization at the time of planting, the experts remain at odds. One recommends working fertilizer into the soil; another, no fertilizer for the first year. Generally speaking, our experience has shown that working dehydrated manure, e.g. sheep or cow, into the soil not only provides some soil conditioning but also a small amount of nutrients. Organic matter certainly has been one factor in assisting us with plant success.

Watering has been and remains paramount in transplanting. At the time of transplanting, one should water thoroughly, soaking the root ball as well as the soil surrounding the ball. This eliminates air pockets. Watering the plant provides sufficient moisture for 5 to 7 days. A thorough watering every 7 to 10 days dramatically increases the success ratio. More frequent watering not only encourages root rot but dramatically decreases transplanting success. More trees rail from overwatering than from underwatering.

Staking of trees—to stake or not! Most agree that evergreens, e.g. pines, spruce, should be either staked or wired in place. This reduces the opportunity for the tree to blow over or becoming loose in the ball. Our experience has shown some desirability to stake 2 to 3-in. trees. Whether this truly helps the tree or simply provides another barrier to keep lawn mowers from the tree trunk is a moot point and certainly not one that has been heavily researched. But in moving large trees, we still feel staking has a place.

The degree of transplanting success certainly includes a science, e.g. time, species selection, mulching, and hole preparation; an art—lacing a ball so that the soil does not become loose around the root system; and luck. If weather conditions are favorable, again, the degree of success is increased, although transplanting can be done almost any time of the year with some success. One must still follow good practices for consistant results, e.g. timing, species selection, site preparation, and watering. **WTT**

WINTER OVERSEEDING: OLD PRACTICE GROWS UP

By BRUCE F. SHANK

Overseeding bermudagrass greens as they enter winter dormancy is not new. Studies on overseeding with annual ryegrass date back to the mid-20's. What is new is the development and marketing of overseeding mixtures by seed companies to serve this special need.

Overseeding protects the dormant warm-season turfgrass, usually bermudagrass, while improving appearance and playability of greens and other surfaces. Competition from overseeded cool-season turfgrasses can hold back encroachment by annual bluegrass during dormancy of the primary turfgrasses. Traffic wear to dormant grasses is also reduced by overseeding. The purpose of overseeding is more than for appearance.

Courses from the transition zone to southernmost Florida overseed.

The area to be overseeded need not be a golf green, nor bermudagrass. St. Augustine and centipedegrass are overseeded in some cases. Golf course superintendents from Florida into the transition zone use overseeding for winter management. Purdue University's William Daniel advises overseeding of zoysia is not necessary for protective reasons.

The primary seed used for overseeding are annual and perennial ryegrasses; bentgrass (often Seaside); rough bluegrass (Poa trivialis); red, hard, or chewings fescues; and Kentucky bluegrass (Poa pratensis). Research in the 60's proved mixtures of these grasses performed better than single members alone. Most commercial mixtures have three or more of the above turfgrasses.

Annual and perennial ryegrass are included for fast germination. Bentgrass is slow to establish but offers appearance and transition benefits the following spring. Texas A&M's Jim Beard reported decline of the ryegrasses in very cold weather with recovery in March. Rough bluegrasses showed good cold tolerance in Beard's study. It yields slowly in the spring to the warm-season turfgrass for good spring transition. The fescues establish quickly in the fall and these tough grasses provide protection to less wear tolerant grasses. Kentucky bluegrass is slow to establish but can provide color benefits in late winter and spring.

These grasses are applied at very high seed rates and remain juvenile throughout the period. They can be vulnerable to diseases during establishment. If the seed does not make good soil contact it is virtually wasted.

Timing varies according to location. Seeding should take place in late September in the northernmost limits and in early December in southern Florida.

If seeding is done too early, the competition from the warm-season grass will render it useless. If done too late, the temperature may be too low to achieve good germination. Three weeks of preparation may be required before seeding.

O. M. Scotts recommends very low mowing without scalping followed by vertical mowing in several directions to open up the soil, remove thatch, and prevent obvious rows. Debris should be removed. Coring to solve compaction should take place three weeks prior to seeding to allow the holes to heal. Some of these steps can be consolidated by use of a seeder which uses a disc to cut grooves for the seed.

The seeding rate can approach 20 lbs. per 1,000 square feet or more. After the seed is down, the area may be dragged to improve seed/soil contact.

Research has shown that topdressing greatly improves germination. Daniel recommends spiking between seeding and topdressing. A complete starter fertilizer should then be applied and the area keep moist for three weeks or more. Application of a fungicide is often recommended to prevent serious brown patch injury.

Mowing can begin a week after seeding at a 5/16-inch until the mixture is established. A second application of nitrogen should follow germination with regular feeding thereafter.

In the spring as the temperatures rise and the warm-season turfgrass begins growing again, the cool-season grasses should not compete with it. Whereas bermuda may leave dormancy in less than two weeks in the deep South, it may take five weeks or more in the transition zone. This should be considered when selecting an overseeding mixture. Also, different species and cultivars respond differently to overseeding. Some adjustment may be needed.

Winter overseeding protects warm-season grasses while in dormancy.

John Madison, former turfgrass specialist at the University of California, recommended in his book, *Practical Turfgrass Management*, that heating cables in the soil surface could eliminate the need for overseeding by preventing dormancy of the warm-season turfgrass. This idea has apparently lost out to the believers in overseeding. **WTT**

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VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *Could birds be killing the main leader of a spruce tree by perching on it? I was told that this could be the reason that some of my trees have multiple leaders. (New York)*
A: Large birds such as redwing blackbirds have reportedly killed or damaged the main leader of certain pines and spruces, resulting in competitive lateral growth. If, as the laterals turn upward, they, too, are damaged, the top of the tree appears almost as a witches' broom. Injury occurs to tender candle growth in the spring, particularly when trees are planted next to open fields.

Q: *I have noticed that peat-vermiculite added to soil as an amendment will absorb water within a few days but that milled bark stays relatively dry for weeks. Since this can affect the survival rate of new plantings, how can we wet the bark more rapidly? (California)*
A: Milled pine bark attained only 58 to 78 percent moisture saturation within 45 days, according to a report from the California Cooperative Extension Service. Preparing the soil mix well in advance of planting should solve the problem. Wetting agents may also be helpful.

Q: *During this past spring high winds broke large limbs and uprooted trees in our area. The roots of the trees were very shallow. What can we do to increase rooting depth and reduce storm damage? (Illinois)*
A: Contrary to popular opinion, the bulk of tree roots occur in the top three feet of soil with many of the feeder roots near the surface. Roots grow where soil conditions support growth. They cannot grow where oxygen is limited or where the soil is compacted and hard to penetrate. The availability of oxygen decreases and the resistance to penetration usually increases with soil depth. In addition, the highest concentration of available nutrients usually occurs near the soil surface. Therefore, this is where most of the roots are located.

Deeper rooting can be encouraged by aerating the soil within the root area. Vertical holes drilled to a depth of two feet and spaced 18"-24" apart is the most common practice. Pressure injection of liquid soluble or suspension fertilizers will also increase the porosity of soils while providing nutrients below the soil surface.

Pruning to reduce wind resistance and cabling and bracing to support weak crotches are standard practices for minimizing the potential for storm damage.

Q: *What is the best method of seeding a small slope with turfgrass to prevent erosion? (Ohio)*
A: After preparing the soil, seed and gently rake for good seed-soil contact. Protect the newly seeded area with a mulch such as straw, burlap, cheesecloth or Soil-Gard, a biodegradable latex material. It is important to keep the seeds moist until proper establishment. Ryegrass is sometimes added to the seed mix to provide more rapid germination and soil stabilization.

Q: *We have a gravel footpath on campus which is being eliminated. If we remove the gravel, can we overseed the area with grass? (Pennsylvania)*
A: If a soil sterilant was used, test the soil for residual either by chemical analysis or bioassay with ryegrass. Other problems that may have to be corrected before establishing turfgrass are alkaline soil reaction induced by limestone gravel and compaction from foot traffic.

Q: *Have you heard of using a type of bandaid to treat wounds caused by mowers? (Ohio)*
A: I am not aware of a commercially available product, but perhaps you are referring to a home remedy.

Wrap the damaged bark in place with moist cloth and cover with plastic. Keep the cloth moist for several weeks. If the surface is green when scratched, regeneration has occurred and the wrapping can be removed.

Q: *Exactly what is a surfactant and when should we use one in our spray mix for trees? (New York)*
A: Surfactant is an abbreviation for *surface active ingredient.* It refers to materials that are active on the surface of water molecules, wettable powders, emulsions or other components of a spray mixture. The surfactants for which arborists have the most use are wetting agents (spreaders), stickers, compatibility agents, antitranspirants and foam suppressants. Since the term surfactant includes a wide variety of chemicals and applications, you must know the purpose of the recommendation to "add a surfactant" in order to determine when and what type of surfactant to use.

Q: *I have recently become superintendent of a golf course which has had very little ferilization and aerification in the last ten years. The fairways are about 80% tall fescue and 10% chickweed which is spreading. We don't have watered fairways. What's the best way to establish bluegrass? (Illinois)*
A: If you prefer only bluegrass on the fairway, it is best to get rid of existing vegetation by using Roundup and then re-establishing the bluegrass.

Or, if you don't mind tall fescue with bluegrass, first try to control the chickweed by using Trimec or Dicamba (Banvel) herbicide. Then verticut, rake and seed the fairway with bluegrass seed. Bluegrass seeds are very slow to germinate and establish.

Send your questions or comments to: Vegetation Management c/o WEEDS TREES & TURF, 757 Third Avenue, New York, NY 10017. Leave at least two months for Roger Funk's response in this column.

PRODUCTS

Vandermolen presents its new Super 88 Mistblower. The sprayer is especially effective on gypsy moths with its 40 foot reach that reaches the lower third of the tree where the moth egg masses are found. The large six gallon capacity provides the equivalent of 60 gallons of hydraulic spray mix. The blower is powered by a 52cc Kawasaki engine with an electronic ignition.

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Orbex has added High Lift Universal blades to its line of Aladdin blades. According to the manufacturer, the configuration of the blades works to produce a vacuum action that lifts each blade of grass until cut. Clippings, leaves, thatch and debris are then projected into the catcher bag. All 16 models of the blades are made of .156-in. thick high carbon steel tempered for hardness and ribbed for rigidity.

New **High Lift Universal Blades**

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