GELS, WETTING AGENTS FOR TREES AND SHRUBS

The success of these products in reducing moisture stress in turf is well documented, but their ability to do the same for woody plants may be a pleasant surprise.

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Moisture management is important for the health of all woody plants. It is especially critical for newly-transplanted materials. Loss of plant materials on new landscapes from moisture stress is all too common.

Moisture stress is usually the result of excessively dry conditions on new transplants, but can also be due to excessively wet conditions that smother the roots. Losing plant materials is costly to both landscapers and nurserymen who must replace the lost plants and absorb these additional costs.

Landscape managers should more effectively manage moisture levels in newly-transplanted trees and shrubs. Wetting agents and, more recently, super-absorbent gels, have been used extensively with turf to improve survival and establishment. Why not use them on woody plants?

Wetting agents

Wetting agents are chemicals that lower the surface tension of water, and thereby allow a more rapid and even penetration of irrigation water in the soil or growing medium. They are in a class of chemicals known as surfactants.

The objectives of using a wetting agent are to promote even soil wetting, to minimize runoff and to provide better aeration and drainage; all of which will improve conditions for root growth. Despite widespread use of wetting agents in turfgrass management, these agents have not been widely used on woody plants.

A study was conducted in 1985 in Central Park, New York City, using the wetting agent Aqua-Gro around newly-planted trees and shrubs in an attempt to improve woody plant sur-

Wetting agents allow water to penetrate deeper and be distributed more evenly; providing better rooting conditions for woody plants.

The survival rate of three species studied at this Florida site was improved when a super-absorbent gel was used during transplanting.

vival. During the study, the City of New York imposed a total watering ban. Test plants received only rainwater, no supplementary irrigation. Most of the trees and shrubs treated with the wetting agent producd increased terminal growth in comparison to the untreated plants.

Further studies using the same wetting agents were conducted in 1986 and 1987 in western Massachusetts on newly-planted trees and shrubs on new condominium sites. The test materials consisted of azaleas, Rhododendron spp., P.J.M. rhododendrons, P.J.M. Hybrid rhododenrons, *Potentilla fruticosa*, flowering crabapples, Malus spp. and Norway maples (*Acer platanoides.*) On most sites the survival rates and overall condition of the plants treated with the wetting agent was improved over the untreated controls.

Research continues on the specific effects on plant roots. It is known, however, that plant growth is favored by uniform levels of soil moisture as well as adequate soil aeration.

A possible explanation for this increased survival and growth of the plants treated with the wetting agents in these studies is that the wetting agent improved the soil environment for root growth by increasing water penetration and providing more even distribution of water.

Super-absorbent gels

Super-absorbent gels are very long molecules (polymers) that have the capacity to absorb 50 to 600 times their weight in water. They are used to store water in the soil around plants and then release that water to the soil during dry periods. Forty to 98 percent of the water absorbed by the gels will eventually be available to the plant roots or soil.

The two general types of superabsorbent gels are starch-based and synthetic-based. But due to their limited stability in the soil, starch-based gels are not widely used. Most gels used in landscaping are synthetic-based and are known to be effective for at least two years in the soil.

Gels are applied at recommended rates in a dry state and mixed with soil at the bottom of the planting hole and backfill soil. The plant is then irrigated and the gel becomes completely hydrated in less than one hour.

Using a super-absorbent gel during planting provides a water reservoir to minimize moisture stress and provides conditions for root establishment, thereby improving plant condition and avoiding plant loss.

A 1987-88 study in south Florida used the synthetic-based super-absorbent gel Supersorb-C. The author studied its effects on survival and growth of ligustrum (*Ligustrum ovalifolium*), Ixora, Ixora sp.; and hibiscus (*Hibiscus rosa-sinensis*) recently transplanted in landscapes. All plants were transplanted from one-gallon containers. The study was conducted with plantings made throughout the year, in both wet and dry seasons.

The survival rate of all three species was improved when the super-absorbent gel was used during transplanting when compared to controls. In addition, the average growth rate was also greater when the gel was used during transplanting. The soil condition around the gel-treated plants was noticeably softer and more spongy to the touch than untreated soils.

In western Massachusetts, at the University of Massachusetts' research nursery, a study was conducted last summer to determine survival and condition effects of the same super-absorbent gel on native trees and shrubs. The following plants were used: eastern white pine (*Pinus strobus*), white spruce (*Picea alba*), Colorado blue spruce (*P. pungus*), amur privet (*Ligustrum amurense*), eastern hemlock (*Tsuga canadensis*), weigela *Weigela florida*), common mockorange (*Phadelphus coranarus*) red spirea (*pirea frobelli*), arrowood viburnum (*Viburnum dentatum*) and yellow twig dogwood (Cornus lutea).

All the plants were local B & B stock. Planting was done in midsummer and irrigation was provided only at the time of planting. Equal numbers of each species were planted with the super-absorbent gel and without the gel.

Early results positive

Very few plants were lost in either treatment to this date. However, the gel-treated plants were consistently rated higher in condition than the untreated plants. This study is part of a long-range effort to determine the most effective strategies for moisture management in the landscape and will continue for at least three years.

Moisture management is critical for successful establishment of trees and shrubs in the landscape. Studies with a wetting agent and with a super-absorbent gel have indicated that these types of materials may provide a beneficial affect to plant condition, survival and growth of trees and shrubs. The landscape contractor may wish to consider the use of wetting agents and super-absorbent gels in new landscape installations as aids to successfully establishing plant materials. **LM**