HOME GROUNDS FACT SHEET

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A Look at Watering Practices

What can we expect from precipitation?

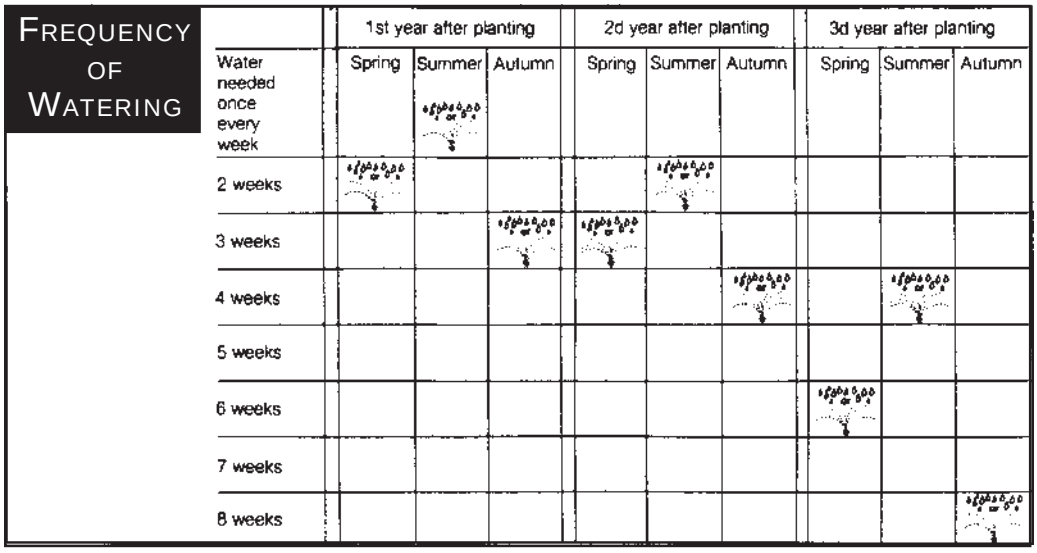
Precipitation records can be traced back over one hundred and fifty years on Long Island. Although there have been periods when rainfall has been excessive or deficient, tree ring studies have shown that there has been no significant overall upward or downward trend in mean precipitation since l702. The l960's drought was the most severe such event recorded in terms of both intensity and duration. Likewise, the torrential years of 1989 and 1990 exceeded the normal rainfall figure of 44" by at least 20," depending on location. If we consider rain gauge errors, actual annual precipitation probably ranges from 44" to 48". Precipitation is greatest along the North Shore and least along the South Shore. Drought is a common occurrence, with ten percent precipitation deficits often occurring on Long Island every three or four calendar years. Fifteen percent deficits occur every five to six years. Twenty percent deficits occur approximately every 12 to 17 years.

Soils, temperature, relative humidity, winds and exposure determine how much of the rain that falls on Long Island is available for plant growth. The calendar distribution of the precipitation and its relationship to the cycle of plant growth is critical. Short periods of water deficit may be particularly critical when plants have just completed a period of rapid growth. Studies commencing in 1991 on the grounds of the Cornell Cooperative Extension office using weather recording instruments and evapotranspiration (ET) data will, hopefully, indicate the appropriate amount of supplemental water required of our most commonly-grown turfgrasses.

How do plants respond to drought?

Plants respond to drought in a number of ways. Lawns typically develop a bluish haze in drier spots. Footprints become more apparent as the turf loses its turgidity. As drought progresses, grasses go dormant and change to a tan color. Some turfgrasses, i.e. fescues, tolerate this better than others when gradually conditioned to less frequent applications of water in spring.

Landscape plants may show obvious wilting symptoms or the leaves may scorch around the edges. With some species, brown areas may develop between the leaf veins. Some plants may drop leaves. The browning and dieback of new growth usually occurs first. Whole branches of shrubs or trees can die if a drought continues over an extensive period. Well-adapted native plants frequently show no adverse effects from anything but a very severe drought. Any period of water stress will decrease growth and cut down on the yield of fruits and vegetables. Newly- planted trees and shrubs are always more subject to drought damage than plants that are well established. Trees and larger plants generally take longer to establish than smaller ones. Although the establishment time varies greatly with the plant and the site, the following chart from Cornell Bulletin 24 by Lieberman and Weir provides a good generalization on supplemental water needs and establishment time.



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What happens when there is too much rain?

Aside from the soil getting "waterlogged," an imbalance occurs between the amount of air versus water in the soil. On heavier or compacted soils, such a situation should be of special concern. Plant roots, to carry on the process of respiration, must be able to take in oxygen. At the same time, the carbon dioxide that is given off must be able to escape through the soil and into the atmosphere.

When excessive rainfall occurs, plants suffer. Plants were directly affected following the spring and summer deluges of 1989 and 1990. In fact, this was the #1 cause, either direct or indirect, of plant mortality or decline. Unfortunately, many unknowing homeowners continued to provide supplemental water, only exacerbating an already existing problem. Where heavy or compacted soils are known to exist, corrective measures should be carried out now to reduce plant damage if excessive rainfall reoccurs.

What happens to water in the soil?

Water that moves through moist soil in response to gravity is called gravitational water. It percolates below the root zone within a few days after a rain. The water in the deep and more or less permanently saturated zone is called groundwater and the upper surface of this water is the water table. The true water table may be close to the surface or hundreds of feet below it, as is the case here on L.I. There are also local areas that may have perched or hanging water tables. When a water table is close to the surface it greatly limits the species of plants that can be grown.

The water left behind after the gravitational water has drained out of the upper layers of the soil remains in the form of film, coating the soil particle or as droplets completely filling small pore spaces. This capillary water does not respond to gravitational pull and is the source of almost all the water that plants extract from the soil.

A third type of water in the soil is called hydroscopic water. It is tightly held to the soil particles and is only slightly available to roots. It can, however, be eventually evaporated during severe drought.

How can we irrigate efficiently?

When we irrigate our aim is to replenish the capillary water lost to evaporation or taken in by plant roots. When irrigating, the ideal is to saturate the root zone of the plants without applying an excessive quantity of water that may be lost as gravitational water or run-off.

While we are concerned about what is happening within the soil, we also have to pay attention to what is happening on the soil surface. Compacted soils, whether on a slope or more generally on a flat surface, may absorb very little water before there is runoff or surface accumulation, respectively. Much of the runoff eventually goes to the street or somewhere else where the water is wasted, or to puddles on the ground with little penetration. When water occurs in the above conditions it does not necessarily mean that the area has received sufficient irrigation. It frequently means that the water has been delivered too rapidly. Slopes can be effectively irrigated by slowing down the rate of delivery and watering for a longer period.

A typical lawn sprinkler might be put on for thirty minutes, turned off for an hour and put on again for thirty minutes. An area might require two or more such sequences before water penetrates the four to six inches most beneficial for grass. A "soaker" hose or drip irrigation system might be useful for some landscape plantings. However, always bear in mind that water applied by these means does not travel very far horizontally within the soil. Where landscape situations exist, supplemental water is best applied using drip irrigation methods or above ground sprinklers that apply water slowly and only within the desired area.

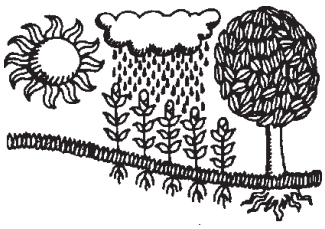
Mulching is an effective way to conserve irrigation water. An ideal mulch is relatively inexpensive, stays in place, looks attractive and allows even light rainfall to penetrate to the soil beneath. Shredded bark chips for closely-viewed small areas and wood chips for larger landscapes where economy is more important both seem to work effectively. A great variety of organic materials such as pine needles, cocoa hulls and buckwheat hulls can all be useful in certain situations. If the landscape bed to be mulched is well-raked and levelled, a one and a half inch to two inch layer of most mulches is adequate to both conserve water and control most weeds.

Coarser mulches require thicker layers. In vegetable gardens where appearance is less important, chopped up leaves, straw, grass clippings, black plastic or newspaper weighed down with stones can be used for mulching.

Good irrigation equipment can go a long way toward decreasing water consumption. Use pulsating or "rainbird" type sprinklers that deliver water in large droplets rather than sprinklers that atomize the water. Large droplet size means less loss from evaporation as the water moves from the sprinkler to the soil. Simple timers between the faucet and the hose can turn off the water after a predetermined amount has been applied. Make sure hoses and faucets do not leak so the water goes where you want it to go.

With average home water pressure, a half inch hose will deliver six hundred gallons per hour; a five-eighths inch hose, one thousand gallons per hour; and a three-fourths inch hose, nineteen hundred gallons per hour.

When should we irrigate?



The best answer is, "just before the plants really need it." Root growth is best if water is not always easily available close to the soil surface. Keep in mind that plant roots respire. Respira-tion requires oxygen, i.e. air, around the roots as well as water. Ideally, the pore space in the soil should have equal percentages of air and water. Do not think you are doing your lawn and landscape plants a favor by keeping them constantly wet. Many ornamentals are killed because of the overuse of irrigation systems combined with imperfectly-drained soils.

Early morning watering means less loss from evaporation than watering in midday, or the greater potential for disease activity when watering is applied in the evening. Irrigation is more efficient when winds are calm. Follow county regulations as well as additional ones imposed by certain water districts.

Will water for irrigation be a problem in the future?

Although water supply in most communities on Long Island seems adequate at present, there is concern on the part of county government that water be used wisely, both in the landscape and the home. Additionally, the NYS Department of Environmental Conservation, due to its concern regarding consumption vs recharge, imposed caps on pumpage for each water district in Nassau County in 1987. An unpredicted population increase, a drought or a severe pollution problem could put a stress on water supply at any time. One thing is almost certain. Water is sure to be a more important item in the family budget in the future. Getting into the habit of water conservation now will help to alleviate potential problems regarding quantity as well as cost of pumpage.

How will awareness of future water quantity problems modify landscaping?

Landscape architects and designers should be planning landscapes that have xeric (water-conserving) qualities and comply with all the accepted fundamentals of xeriscaping. These include:

- ▲ Use of turfgrass types and varieties that require less water and have other lawn maintenance attributes.
- ▲ The effective use of appropriate mulching materials.
- ▲ Use of drought-tolerant groundcover plants on slopes and as a substitute for lawns in areas where there is no traffic.
- ▲ Substituting drought-tolerant trees and shrubs for those requiring irrigation, even after establishment.
- ▲ Incorporating more efficient irrigation methods into designs wherever possible. Use drip irrigation in non-turf areas.
- ▲ More emphasis on soil improvement at planting time.
- ▲ Good follow-up maintenance is practiced.

As new lawns are planted, drought-tolerant grass types such as tall fescues should be considered. Mowing height should be kept at two to two and a half inches to encourage deeper rooting and more drought resistance. We may have to learn to tolerate the appearance of more summer dormant grass, at least in low use areas.

For more information on water, please see the following Home Grounds Fact Sheets:

C-1-33 Watering Lawns
C-1-34 Lawn Irrigation Systems
D-1-35 In-Ground Automatic Sprinklers
D-1-37 How to Water a Tree
D-1-38 Irrigation Consumer Bill of Rights

For more information on the proper care of ornamentals or turf, please see the Index of Home Ground Fact Sheets.