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Management of Wet Soils

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Compacted and/or clayey soils cause numerous watering problems. The most obvious is surface flooding caused by slow water penetration into the ground. When downward water movement is limited by dense or high-clay layers, soil becomes saturated and oxygen (which moves very slowly through water) is kept away from plant roots. If the saturated condition persists, roots will die from oxygen starvation. Highly compacted soils, even when dry, cause the same problem. Extended periods of water saturation also lead to increased availability of heavy metals such as iron and manganese, which in some soils may actually poison plants. Saturated conditions accelerate soil nitrogen losses, particularly in cool climates and seasons.

There are a number of ways to manage saturation problems in soil. One is to increase internal water movement by improving aggregation and pore space. There are several ways to do this:

- Increasing and maintaining organic material levels, changing or keeping pH in the range between 5.5 and 6.5, adding a soil conditioner such as very coarse sand, cultivating only when moisture levels are ideal, and avoiding compaction. But the addition of organic material is probably the single most effective action you can take.

- Another way to increase internal water movement in wet soils is to shatter subsoil pans. If just a few, deep passages for water are made down through the soil, large amounts of water will flow through them (assuming the underlying layers will accept the water). Or subsurface drainage can be installed beneath the soil to carry away excess water. This is usually expensive, but may be the only alternative in many situations. Still another approach is to limit the amount of water entering the soil by diverting surface water away from the poorly drained area, or by digging interceptor trenches just uphill from it. Plastic mulch can also be used to decrease total water penetration.

- The best way to avoid saturation problems, however, is to learn how to recognize sites and soils that are prone to them. First of all, look at their position in the landscape. Sites that lie low, particularly at the base of long slopes, receive considerable amounts of subsurface water flow and are almost always wet. Large flat areas with little surface drainage are also likely to have subsurface water problems, regardless of how high or low the large flat areas are. Gently sloping areas are always the best-drained, without being dry. Take care not to alter surface drainage patterns to ensure that storm run-off doesn't flood the site. But this is often already a problem on many suburban and urban sites where natural water drainage has been changed by construction. Areas with dense subsoil pans or bedrock-perched water should be avoided whenever possible. Home building and other construction activities often result in severe compaction or the exposure of clay subsoil material.

A number of soil properties are indicative of both poor drainage and water saturation; even a novice soil scientist (that's you) can learn to recognize them. Look at the soil horizon, or the way a soil is layered. Both permanent and fluctuating water tables turn soil gray. Solid gray colors down a soil horizon indicate almost permanent saturation. Fluctuating saturation will cause mottled gray within the background soil color. Free-draining soils will have bright brown, yellow, or red in their subsoils.

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