

Soil amendments and water savings

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Soil amendments are added to sandy turf root zones to increase water retention while maintaining the structural integrity of sands. Inorganic amendments, especially urea formaldehyde polymers, could provide a viable alternative to organic amendments for turfgrass root zones. Urea formaldehyde polymers have been used as amendments for potting soil in greenhouse plants for decades and to date no negative side effects have been reported. More recently, a urea formaldehyde polymer with the trade name 'Fytofoam' has been used successfully throughout Central and Southern Europe to modify root zones in green and tee construction, in athletic field renovation and construction, and in sod production. Research conducted at Michigan State University and at New Mexico State University showed that water retention increased from 7% to 15% after 20% (by volume) Fytofoam was added to sand. Because of the doubling of plant-available water in the soil profile, this technically translates into a 50% reduction in water needed for irrigation.

In practice however, this number is probably closer to 30% because of factors such as wind drift, sprinkler overlap, and drainage losses resulting from irrigation practices. If golf courses were watered during the day any irrigation would most certainly interfere with the play. As a result, irrigation can only be applied early morning when there are no golfers present. This frequently results in irrigating with volumes of water that can exceed the water holding capacity of the soil. These irrigation practices can lead to water losses in both amended and non-amended soils.

Laboratory research also showed that water is released more slowly from the Fytofoam/sand mix than from the sand/peat mix over a wide water tension range. This research suggests that urea formaldehyde polymer amended sand could provide more plant available water over a longer period of time than straight sand or a sand-peat mix. This could also lead to water savings in turfgrass irrigation, especially when a sand-Fytofoam mix is used instead of straight sand.

A 30% water savings in sandy root zones mixed with Fytofoam is an achievable goal when irrigation is applied with potable or drinking water. However, when the water is of low quality (effluent water from a water treatment plant or highly saline ground water) more irrigation water will have to be applied compared to irrigation with drinking or good quality water. The additional water, known as the leaching fraction, is necessary to move salts through the soil profile away from the roots. This leaching fraction must be applied to both amended and non-amended root zones if low quality saline water is used.

Adding Fytofoam to root zones will either increase or decrease water retention depending on the type of root zone. If Fytofoam is added to sand, water retention is increased by changing the average pore size from large to medium. Adding Fytofoam to fairways that consist of fine to very fine textured soils may actually increase the leaching and improve the growing conditions. In these soil types the pore sizes change from very small to medium. Due to the open cell structure of Fytofoam, channels are created within the root zone that increase drainage and decrease water retention.