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One way to quantify DU is to measure it with "catch cans". These can be any size, larger with deeper sides are better to avoid loss from splashing. Larry recommends purchasing Tupperware containers 6"x 8"x 4", or you can purchase commercially made catch cans. They just all need to be of the same size. You will need at least 24 containers. For greens the spacing should be 15 feet. For fairways the spacing should be 25 feet.

- DU is a ratio:  $\frac{\text{Beneficially used water}}{\text{Water applied}}$
- This should ideally equal 1.
- A ratio of over 80% is considered excellent.
- A ratio of less than 55% is considered poor.

To improve DU, take steps by answering these questions:

- Are the heads the correct size for the area?
- Is the head spacing correct?
- Are the nozzles worn? Replacing worn nozzles is the cheapest fix.
- Are the pipes the correct size?
- Is the head pressure correct?

Measuring soil moisture is another way to quantify watering efficiency using TDR (Time Domain reflectometry). This is a newer, very reliable technology being used. It is a wireless hand held tool and can be purchased from a variety of suppliers. It provides information on field capacity and specific wilt points for specific soils. Basically what it does is identify areas that need supplemental irrigation. It replaces the low tech method of pulling a core and looking at it to see if it's wet or dry. It can help improve effectiveness of hand watering by measuring soil moisture consistency across a selected turf area.

Water repellency in soils is another problem for turf managers. Hydrophobic soils can be very problematic affecting plant hydration and water distribution. It can severely decrease irrigation efficiency. It is caused by the decomposition of organic matter in the soil. The roots exude organic acids and the acids coat the soil particles. The acid accumulation inhibits the soil to wet uniformly and decrease overall water penetration.

A water drop penetration test (WPDT) can be performed to access soil hydrophobicity. Remove a soil core 4-6" deep from desired soil area. Dry it out for a week. Use an eye dropper and put a drop of water at 1" spacing and measure how long it takes to infiltrate the soil sample. If it takes more than 5 seconds there is some degree of repellency.

Wetting agents and soil surfactants can assist in regaining water penetration and uniform distribution.

The wetting agent attaches to the organic coating on the soil particle and helps reestablish soil polarity undoing the repellency and improving infiltration. A study at Ohio State University in 2002 by Surfactants can reduce run off by 20% or more.

For more information about controlling your water or an irrigation audit, contact Larry Lennert at: [llennert@aquatrols.com](mailto:llennert@aquatrols.com). -OC





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