

High-Tech Tools Mow Down Test Turfgrass in Greenhouses

By Shawn Askew

Imagine mowing your rough with scissors. That was threatening to be the situation for students at Virginia Tech as we continued to add greenhouse research trials to the project's docket.

PHOTO 1



Adjustable metal racks hold potted turfgrass beneath angle-iron tracks.

PHOTO 2



A cordless lawn mower traverses the bench and mows potted turf. Clippings are collected in a bag made of quarter-inch hardware cloth.

Some trials require more than 1,000 pots of turfgrass that must be mowed weekly or more often depending on the desired height. The old way of mowing these pots was to pick up the pot, turn it sideways over a garbage can, and cut the turf to a desired height using scissors. Small pruning shears provided an alternative method of mowing the grass, but neither option could be done efficiently.

We felt there must be an easier way. Last spring I sat down with my technician, Phil Keating, and a local machinist, John Long, and designed a greenhouse system for turfgrass culture.

The system consists of adjustable metal racks that hold potted turfgrass beneath angle-iron tracks. The tracks allow a cordless lawn mower to traverse the bench and mow potted turf. Clippings are collected in a bag made of quarter-inch hardware cloth after it was noted that the manufacturer's bag limited airflow such that clippings fell through the bench and not into the bag.

The system allows for the culture of thousands of potted turfgrass plants, and mowing takes only a few minutes instead of several hours. Thus, superintendents who would like to experiment with pesticide combinations without risking the aesthetics of the golf course can maintain turf in the greenhouse with minimal input.

The system at Virginia Tech utilizes a lawn timer to automate irrigation. Irrigation to the benches is supplied by a half-inch PVC pipe with small sprinkler nozzles spaced every 4 feet. The whole irrigation system for 2,000 pots cost \$200.

The mowing track was about \$2,500, and the cordless lawn mower (Black and Decker) was \$300.

This system allows us to culture turf-
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PHOTO 3



The aeroponics system consists of several 20-gallon containers with submersible pumps that work on 110-volt alternating current.



Bayer Environmental Science

QUICK TIP

As sure as spring is just around the corner, *Poa annua* seedheads will be popping up in greens and fairways. Reduced flowering through use of plant growth regulators will gradually lower the *Poa* seedbank in the soil and aid in *Poa* reduction. Proxy® plant growth regulator provides excellent *Poa* and white clover seedhead suppression. Apply Proxy approximately 10 days before expected spring flush of *Poa* seedheads.

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grass year round and conduct herbicide efficacy and other trials. We even grow weeds and mow them just like a typical turfgrass system. We have a large experiment underway that will evaluate hundreds of herbicide combinations on mature dallisgrass.

The dallisgrass plants were established in pots from rhizomes collected from Chatmoss Country Club near Martinsville, Va. The new system has allowed us to acclimate these dallisgrass plants for the past six months in the greenhouse. By starting from mature rhizomes and culturing the plants for an entire season in the greenhouse, we are able to better simulate what would happen in the field. Without the mower track system, we could not afford the manpower necessary to manage all those dallisgrass plants for such duration.

If you want to ramp your greenhouse technology to the next level, try growing turfgrass without soil. That has been one of our goals for the past several years. By growing turfgrasses in nutrient solution, one can produce clean roots and monitor the effects of various chemicals on roots in an efficient manner.

But we continue to have problems when growing turfgrass hydroponically for our laboratory studies. We just could not get enough oxygen to the roots in the aqueous nutrient solutions. Repeated attempts with aquarium pumps and other oxygenating devices met with only limited success.

The problem of oxygen delivery was solved by utilizing a method of plant culture called aeroponics. Turfgrass plants are transplanted into foam discs, and the roots are sprayed with a nutrient solution inside an empty container. The roots are always wet but are simply hanging inside an empty container full of oxygen. It's really not much different than what is happening in the soil. The gravity water drains off, and the roots are left with air-filled cavities. This has been the best method of producing clean roots for our experiments that we've seen.

The aeroponics system consists of several 20-gallon containers with submersible pumps that work on 110-volt alternating current. The pumps are linked with flexible tubing to a rack of PVC pipe containing sprinkler nozzles. When the pump is activated, the nozzles spray nutrient solution from the container below onto the roots of plants growing through the lid of the container above. It is a bit high-tech for the average superintendent, but it helps produce research results that shape the way we use turf protection chemicals.

In some experiments, students are spiking the nutrient solution with various herbicides to gauge the effects of herbicides on turfgrass roots. In the same way, products reported to promote rooting can be closely evaluated for effects on roots. Just simply lift the lid and inspect your roots as easily as you inspect the foliage.

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