A Simplified Turfgrass Height-measuring Device

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Summary. A simplified design for measuring the height of turfgrass (or forage) was developed and used by the Louisiana Agricultural Experiment Station (LAES). The device is similar to the common “disc meter” devices used for turfgrass and forage height measurement, but it uses a constant-force spring to simplify construction and operation. Use of a constant-force spring allows a steady operating force on the sliding member of the device and eliminates the need for machining slots, thus greatly simplifying construction and reducing cost. The simplified device has worked well in the turfgrass research program of the LAES.

Materials and methods

A simplified disc meter for turfgrass research was constructed by the LAES. The design is shown in use in Fig. 1. The device used 74 inches (1.88 m) of nominal 2-inch (51-mm) PVC pipe for the stationary pipe and 36 inches (0.91 m) of nominal 2.5-inch (63.5-mm) PVC pipe for the vertically moving pipe. A 12-inch (305-mm) diameter disc of 0.25-inch (6.4-mm) clear acrylic plastic was glued to the bottom of the moving pipe. A hole matching the outside diameter of the 2.5-inch outer pipe was cut into the clear acrylic and the acrylic was glued to the outer pipe using PVC glue. The stationary pipe was first marked at 1-inch (25.4-mm) increments in such a way that the top of the moving pipe was at zero when the disc was resting.
on the ground (without turf). The original markings were made with a felt-tipped marker. A steel tape with marks at 0.25-inch increments was later added.

A mass of the moving components was counterbalanced by a single constant-force spring (Associated Spring, Dallas, Texas, Model CF043-0700), as shown in Figs. 2 and 3. A constant-force spring is similar to the tape insert in a metal tape measure; i.e., it consists of a strip of spring steel that is rolled into a helix. When the helix is restrained linearly, but allowed to rotate and the end unwound into a straight strip, the linear force on the Strip is essentially constant throughout the stroke. The spring used for this application had a nominal force of 7 lb (31 N) and a working extension of 33 inches (0.84 m). The spring helix was mounted on a pivot shaft in a PVC pipe cap fastened to the top of the stationary pipe, with the extension end fastened to the side of the moving pipe. No milled slots were needed in the pipes. There was no provision for locking the device in a particular setting.

**Results and discussion**

The simplified disc meter has been used extensively by LAES horticulturists to measure turfgrass and seedhead height in turfgrass research plots. Its performance was compared to older, less-convenient disc meters. It was found to give equivalent readings with less effort. It provided accurate measurements with substantially less fatigue than is associated with non-spring disc meters or disc meters with typical coil springs. Field workers liked using the device, and the professional horticulturists involved were quite satisfied with the accuracy and repeatability. It was much easier to build and the resulting unit was stronger than typical disc meters using coil springs operating in milled slots.

**Literature Cited**
