

Controlling Swirling Grain on Ultradwarf Bermudagrass Putting Greens

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Objectives:

1. To investigate the cause(s) of the the off-types seen in ultradwarf bermudagrasses that produce a “swirling grain” pattern of growth.

Start Date: 2006

Project Duration: two years

Total Funding: \$6,000

Swirling grain on ultradwarf bermudagrass putting greens has been observed in the last several years on some southeastern golf courses. These irregular shape swirling grain patches are off color and adversely affect the turf appearance and putting quality. They are worse than the off colors of creeping bentgrass cultivars during winter months.

The exact causes and possible controls are not fully understood. This project is initiated to identify the cause(s) and determine the control methods of swirling grain on ultradwarf bermudagrass putting greens. To do this, we have collected samples from several golf courses with swirling grain to examine leaf morphology, leaf orientation, shoot density, and nutrient concentration. We have also selected typical leaf and shoot samples for examination at the cellular level for morphological differences using light microscopy.

After two years of observations at several golf courses in the southeastern state, we observed swirling grain has been mainly caused by dominant direction of stolon growth that can have lighter or greener colors depending on the angle of viewing. The light color of the pattern represents that stolons growing direction is 90° degree away from the observer's eyes (the observer's two eyes is considered as a line) and the darker color represents the stolon growing direction is 90° degree towards to the observer's eyes.

These swirling patterns happens on more golf courses along the coast than inland.

The swirling pattern can continue beyond the green to the collar areas.

The swirling pattern can relatively remain weeks, months, even a whole season.

The most likely causes are the uneven water quality distribution under greens.

Direction of slope, mowing patterns, and other physical management have less impact on the occurrence of the



Based on the observations of “off-type bermudagrass” on several golf courses, the most likely cause may be the combination of genetic variation and contamination.

swirling patten than any practices affecting the water conditions under the green will have impacts.

The regular mowing has minimum impact to correct the patterns. However, vertical mowing, brooming, grooming will reduce the swirling pattern.

More research is needed to understand the causes for the direction of stolon growth and developing methods to reduce the one prevailing direction of stolon growth.

Summary Points

- Based on two years of observations, the most likely direct cause may be directions of stolon growth and the water conditions underneath the green with possibility of uneven distribution of salinity concentrations or other chemicals.

- The future research hypothesis is that the ultradwarf bermudagrass stolons are sensitive to the water quality and have a tendency to grow toward to better water availability.



The problem of “off-type” of ultradwarf bermudagrasses exhibiting a “swirling grain” continues to be a challenge for golf courses in southern states. Finding the cause(s) of this problem continues to be an important challenge.