



BREEDING FOR “WINTERGREEN” SAVES TURF WATER

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- Warm-season grasses naturally use less water than cool-season grasses.
- In temperate climates such as coastal California, the biggest hurdle to expanding the use of warm-season grasses isn't surviving winter, its avoiding dormancy all together.
- Several USGA-supported scientists are developing bermudagrass and zoysiagrass cultivars that retain better winter color than commercially available cultivars.

The efficient use of resources is a principal goal of the turf breeding programs supported by the USGA. Native and warm-season grasses are attractive targets for improving resource use efficiency because they are naturally more tolerant of environmental and biotic stresses than other grasses. Accordingly, many warm-season and native grasses require fewer inputs than cool-season grasses in many regions of the United States. For these reasons, breeders often attempt to expand the use range or improve the

aesthetics and playability of warm-season and native grasses. The most common hurdles for these species to overcome include reduced tolerance to cold temperatures and shade, as well as in-season or dormant color differences than more commonly used grasses.

In the transition-zone and northern climates, surviving winter is the biggest challenge for warm-season species. As such, turf breeders in these regions seek warm-season grasses with cold tolerance. While other traits are considered concurrently, surviving winter in northern regions is most important to expand better drought tolerance characteristics into these locations.

In temperate climates, like coastal California, the biggest hurdle to expanding the use of warm-season grasses isn't surviving winter, its avoiding dormancy all together. Until recently, winter overseeding has been one of the primary methods of achieving desirable aesthetics when warm-season turf goes dormant. To reduce the need to irrigate during winter, many courses have started using turf colorants or dyes instead of overseeding. Now, turf breeders are again answering the industry's call to improve the winter aesthetics and playability of resource-efficient, warm-season grasses.

With perpetual water shortage concerns, California is one area in particular need of "wintergreen" warm-season grasses. Researchers at the University of California-Riverside are collaborating with turf breeders from the University of Florida, Oklahoma State University and Texas A&M University to develop warm-season species with improved color retention during dormancy. In total, more than 645 accessions of bermudagrass, 388 accessions of zoysiagrass, and 208 accessions of kikuyugrass have been under evaluation since 2016. Accessions are being hybridized and continuously evaluated in Riverside, California. In 2018 alone, 770 new bermudagrass hybrids were planted.

The 12 best-performing bermudagrass lines were selected in 2017 and planted in larger plots for evaluation through 2018. The test plots were established in Riverside, the Coachella Valley, and Fairfax, California. Since trial initiation, four advanced lines with better winter color retention than commercially available cultivars have been chosen for further testing. Zoysiagrasses were also evaluated in Riverside during the winter of 2017-18. The collection of zoysiagrass exhibited variable winter color retention characteristics and generally had improved winter color than the bermudagrass collection.

Researchers have identified very little variability among kikuyugrass accessions and are working to breed and expand the variability of their kikuyugrass collection. These efforts should improve the chances of identifying a less-aggressively growing kikuyugrass with fine texture, drought tolerance and winter color retention.

Similar projects to improve the winter color retention of bermudagrass and zoysiagrass are also underway at the University of Florida and the USDA Agriculture Research Service Forage and Range Research center in Logan, Utah.

Source: Marta Pudzianowska, Ph.D., University of California-Riverside

Additional Resources

[Improvement of Bermudagrass, Zoysiagrass, and Kikuyugrass for Winter Color Retention and Drought Tolerance](#)

[The Bermudagrass Line is Moving North in California](#)

[Breeding for Resistance to Winter Dormancy in Bermudagrass and Zoysiagrass](#)

[Identification of Bermudagrass and Zoysiagrass with Green Color Retention at Low Temperature](#)