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Winter Survival of Experimental Bermudagrasses in the Upper Transition Zone

Mingying Xiang
Kansas State University, mxiang@ksu.edu

Jack Fry
Kansas State University, jfry@ksu.edu

Yanqi Wu
Oklahoma State University, Stillwater, OK

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Abstract

A winter with very cold temperatures in 2017–2018 allowed for good separation of standard and experimental bermudagrasses for freezing tolerance. When evaluated in May 2018, survival of commonly used cultivars was: Tifway, 0%; Latitude 36, 20%; Northbridge, 25%. Some experimental progeny had up to 98% winter survival on the same rating date.

Keywords

bermudagrass, turfgrass, cold hardiness

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Winter Survival of Experimental Bermudagrasses in the Upper Transition Zone

Mingying Xiang, Jack Fry, and Yanqi Wu¹

Summary

A winter with very cold temperatures in 2017–2018 allowed for good separation of standard and experimental bermudagrasses for freezing tolerance. When evaluated in May 2018, survival of commonly used cultivars was: Tifway, 0%; Latitude 36, 20%; Northbridge, 25%. Some experimental progeny had up to 98% winter survival on the same rating date.

Rationale

Winter survival is the limiting factor in selecting and developing new bermudagrass cultivars for use in the transition zone. Latitude 36 and Northbridge were released by Oklahoma State University in 2010, based in part on their improved cold hardiness. The bermudagrass breeding program continues to develop experimental bermudagrasses that may soon be released as cultivars. More information is needed on the hardiness of these experimental genotypes relative to standard cultivars.

Objective

The objective of this study was to compare new, experimental bermudagrasses to existing cultivars for winter survival in Kansas.

Study Description

On July 19, 2016, vegetative plugs of 60 new bermudagrass progeny, along with the standard cultivar Latitude 36, NorthBridge, TifTuf, Tifway, and Patriot were planted at the Rocky Ford Turfgrass Research Center in Manhattan, KS. Bermudagrass progeny came from the breeding program at Oklahoma State University.

¹Yanqi Wu, Department of Plant and Soil Sciences, Oklahoma State University, Stillwater, OK.

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Plots measured 4 × 4 ft and were replicated 3 times. The soil type was a silty clay loam (fine, smectitic, mesic, Aquertic Argiudoll) with a pH of 7.3. Plots were mowed 3 times per week at 0.625 in. using a triplex reel mower. Nitrogen (N) from urea was applied twice during the summer to provide 1 lb of N at each application. Ronstar was applied in April 2018 to prevent annual grassy weeds, and Trimec was applied at the same time to remove broadleaves. The first freezing temperature occurred on October 27, 2017, and bermudagrasses started to lose color. After December 25, 2017, there were 17 days on which the low temperature was < 10°F; the lowest temperature occurred on January 1, 2018 (-8°F). Data were collected on winter injury on a 0 to 100% scale on May 25, 2018. Data were analyzed using PROC GLM, and results are presented in Table 1.

Results

In 2018, progeny showed a wide range of variability in cold hardiness. Tifway, an industry standard, exhibited 0% survival in May 2018, whereas Latitude 36 and NorthBridge had winter survival of 20% and 25%, respectively. Several new, experimental bermudagrass progeny exhibited > 90% winter survival on the same rating date.

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Table 1. Winter survival of bermudagrass progeny and standard cultivars on May 25, 2018, in Manhattan, KS

Entry	Survival (%) ^z
OSU1656	98.3
OSU1666	96.7
OSU1675	93.3
OSU1680	93.3
OSU1629	90.0
OSU1406	88.3
OSU1337	86.7
OSU1433	86.7
OSU1649	86.7
OSU1657	85.0
OSU1682	83.3
OSU1664	81.7
OSU1687	80.0
OSU1673	78.3
OSU1257	75.0

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Entry	Survival (%) ^z
OSU1628	73.3
OSU1639	73.3
OSU1662	71.7
OSU1601	68.3
OSU1620	68.3
OSU1625	63.3
OSU1641	63.3
OSU1695	63.3
OSU1435	61.7
OSU1636	60.0
OSU1439	56.7
OSU1644	53.3
OSU1631	51.7
OSU1696	50.0
OSU1604	46.7
OSU1674	46.7
OSU1403	43.3
OSU1691	43.3
OSU1402	38.3
OSU1409	38.3
OSU1318	36.7
OSU1614	36.7
OSU1408	35.0
OSU1645	35.0
OSU1617	28.3
OSU1423	26.7
OSU1605	26.7
OSU1412	25.0
OSU1640	23.3
OSU1425	21.7
OSU1634	21.7
OSU1669	21.7
OSU1607	20.0
OSU1610	20.0
OSU1606	18.3
OSU1420	15.0
OSU1615	15.0
OSU1611	13.3

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Entry	Survival (%) ^z
OSU1603	8.3
OSU1612	8.3
OSU1417	5.7
OSU1310	5.0
OSU1616	3.3
OSU1418	2.7
OSU1415	0.7
Patriot	30.0
NorthBridge	25.0
DT-1	22.7
Latitude 36	20.0
Tifway	0.0
LSD ^y	23.6

^zWinter survival was rated visually on a 0 to 100% scale; results are averaged over three replicates.

^yTo determine statistical differences among entries, subtract one entry's mean from another entry's mean. Statistical differences occur when this value is larger than the corresponding LSD value ($P < 0.05$).

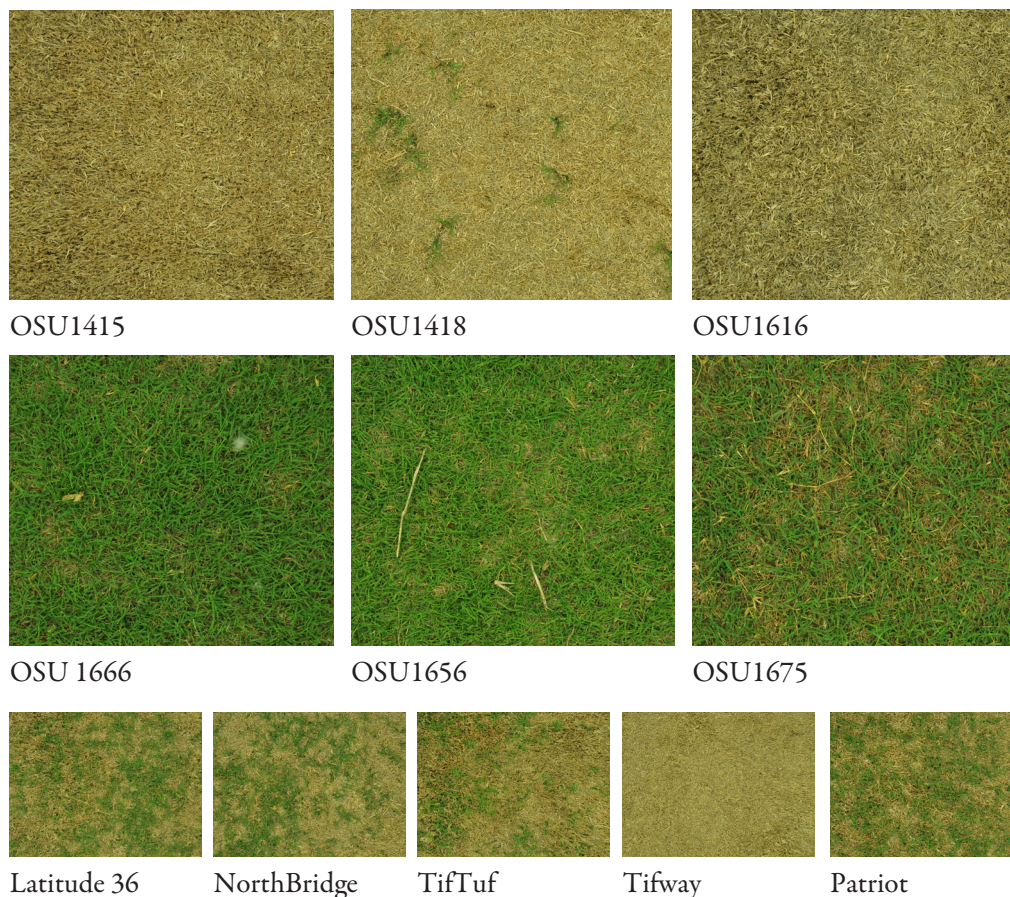


Figure 1. Overhead photos of new bermudagrass progeny and standard cultivars taken above a single, representative plot on May 28, 2018, in Manhattan, KS.

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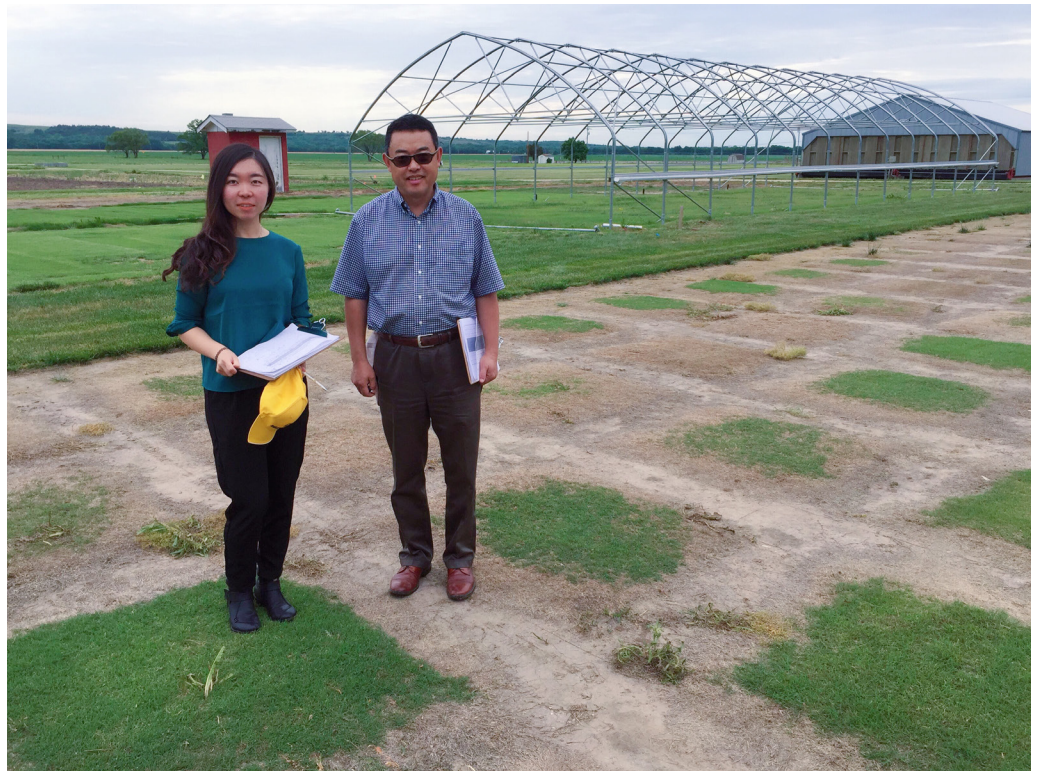


Figure 2. Dr. Yanqi Wu, turfgrass breeder at Oklahoma State University, and Dr. Mingying Xiang, recent Ph.D. graduate at Kansas State University, rate plots in Manhattan, KS, in May 2018.

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