

**PROPOSAL FOR RELEASE AND COMMERCIALIZATION
OF A NEW TURF BERMUDAGRASS CULTIVAR**

KIND: Bermudagrass, *Cynodon dactylon* (L.) Pers. x *C. transvaalensis* Burt-Davy

EXPERIMENTAL DESIGNATION: OKC 1119

DESCRIPTION, ORIGIN AND HISTORY: OKC 1119 is a clonally propagated F₁ hybrid from a cross of *Cynodon dactylon* accession A12198 (2n=4x=36) x *C. transvaalensis* OSU selection '2747' (2n=2x=18). A12198 was collected in Beijing, PRC. *C. transvaalensis* 2747 was selected from a broad genetic base breeding population. Crossing of the two parent plants was achieved by planting clonal plants of each parent in close proximity in a small nursery isolated from other bermudagrass. Seed harvested in 1999 from plants of the respective parents in the crossing block was used to start 609 individual spaced plants in a screening nursery in May 2000 on the Agronomy Research Station EFAW farm. In fall 2001, 14 plants from the EFAW screening nursery were advanced to a second level two-replicate screening test on the Agronomy Research Station. The hybrid plant designated as OKC 11-19 (OKC 1119) had A12198 as its maternal parent. In summer 2004, OKC 1119 was included in a replicated mowing evaluation test at the Turf Research Center, Stillwater, OK. This test was conducted under a golf course fairway management protocol and evaluated entries for many criteria influencing performance. OKC 1119 was entered in the 2007 National Turfgrass Evaluation Program (NTEP) bermudagrass test. OKC 1119 has 2n=3x=27 chromosomes, having presumably inherited 18 chromosomes from the A12198 *C. dactylon* parent and 9 chromosomes from the *C. transvaalensis* parent. It is sterile and must be vegetatively propagated. OSU SSR molecular marker DNA profiling experiments definitely indicated OKC 1119 is a unique genotype, distinct from other commercial cultivars, and OKC 1134 and OKC 70-18 (Wang et al., 2010).

CHARACTERISTICS AND PERFORMANCE: OKC 1119 has been evaluated in several OSU experiments, and more comprehensively and extensively at 19 locations in the National Turfgrass Evaluation Program (NTEP) 2007 National Bermudagrass Test. Eight trial locations provided data for test year 2007, 16 locations for 2008, and all 19 locations for 2009 (see 2007 Progress Report NTEP No. 09-2; 2008 Progress Report NTEP No. 09-1; 2009 Progress Report NTEP No. 10-4) (<http://www.ntep.org/bg.htm>). The major performance characteristics of OKC 1119 are described as follows:

Turf Quality: Turf quality of OKC 1119 is very high as indicated by ratings for 2008 and 2009 from the 2007 NTEP test. In this test, the turf quality of OKC 1119 has been statistically equal to that of Tifway and Premier. These three varieties along with another OSU entry (OKC 1134), have had the highest quality ratings of all 31 entries at most locations (2008 NTEP Tables 1A&C, 2A&C, 3A&C, & 4A&C; 2009 NTEP Tables 1A&C, 2A&C, 3A&C, & 4A&C). The high turf quality of OKC 1119 as indicated by NTEP data is supported by data

from initial OSU testing indicating it to have turf quality equal to or better than other current industry standard bermudagrass varieties.

Cold Tolerance and Spring Greenup: Freeze tolerance evaluations conducted at OSU provided T_{mid} values ($^{\circ}C$, cultivars followed by the same letter are not significantly different in freeze tolerance at $P \leq 0.05$) for OKC 1119 (-8.4a), Midlawn (-8.3a), Tifway (-7.5b). The results indicated OKC 1119 has a level of freeze tolerance on a par with that of Midlawn and superior to Tifway. Midlawn has been widely known as one of the most cold hardy turf bermudagrass varieties. Spring greenup ratings of OKC 1119, 6.3 in 2008 and 6.2 in 2009, were statistically higher than or equal to that of Tifway (5.5 and 5.7), Premier (5.3 and 6.0), and Midlawn (5.3 and 4.3) (2008 NTEP Table 8C and 2009 NTEP Table 10C). Spring greenup ratings are a good indicator for winter hardiness of bermudagrass based on field evaluations. The level of winter hardiness of OKC 1119 should allow it to be used in the transition zone environment with reduced risk of freeze injury relative to Tifway.

Genetic Color: OKC 1119 was rated statistically equal to Tifway and Premier, and superior to Midlawn in genetic color (2008 NTEP Table 7C and 2009 NTEP Table 9C). OKC 1119 is lighter green in color than 'Patriot' bermudagrass.

Leaf Texture: OKC 1119 has finer leaf texture than Tifway, Premier and Midlawn (2008 NTEP Table 9C and 2009 NTEP Table 11C). Its stem diameter is about the same as Tifway and Premier.

Sod Tensile Strength: OKC 1119 has provided excellent sod tensile equivalent to that of Tifway under testing conditions at Stillwater, OK (Han, 2009). Tifway has been a standard for sod tensile strength and handling quality for several decades. Sod tensile strength (kg/dm^2) for OKC 1119 (185.6 in Yr 2004 and 162.7 in 2005) and for Tifway (161.3 in 2004 and 143.7 in 2005) were not statistically different (Han, 2009).

Sod Density: Ratings in spring, summer and fall in multiple locations over both 2008 and 2009 indicated sod density of OKC 1119 is slightly higher than or about equal to that of Tifway and Premier, and significantly higher than that of Midlawn (2008 NTEP Tables 10C, 11C, 12C; 2009 NTEP Tables 12C, 13C & 14C).

Seedhead Ratings: In 2008, OKC 1119 had seedhead ratings better than or equal to Tifway, Premier and Midlawn in most locations, but produced more seedheads than Midlawn and Tifway in TX2 (2008 NTEP Tables 21C, 22C, 23C & 24C). In 2009, OKC 1119 had seedhead ratings better than or equal to Tifway, Premier and Midlawn in all locations (2009 NTEP Tables 24C, 28C, 29C, 30C & 31C).

Disease Response: OKC 1119 has demonstrated a high level of resistance to Large Patch disease (2009 NTEP 27C).

Insect Response: No significant insect problems have been observed for OKC 1119 except in FL1, where the mole cricket damage rating of OKC 1119 was numerically lower than that of Tifway, Midlawn and Premier although the differences were not statistically significant (2009 NTEP Table 26C).

Salinity Response: Grown under saline stress at Las Cruces, NM, OKC 1119 has demonstrated a high level of salinity tolerance, better than Midlawn, Premier and Tifway in 2008, better than Midlawn and Premier and equal to Tifway in 2009 (2008 NTEP Table 6C, 2009 NTEP Table 8C).

Traffic Tolerance: Traffic tolerance ratings of OKC 1119 were equal to that of Tifway and Premier, better than that of Midlawn at Arkansas test site 2 (AR2) and Florida test site 2 (FL2) (2009 NTEP Tables 5C, 6C). OKC 1119 had traffic tolerance better than or equal to Tifway, Premier and Midlawn at North Carolina test site 1 (NC 1) (2009 NTEP Table 7C). OKC 1119 under traffic stress tested in 2008 was lower in traffic tolerance than Tifway, equal to Premier, and superior to Midlawn in FL2 (2008 NTEP Table 5C).

Herbicide Tolerance: OSU field experiments indicated the effects of various postemergence herbicides on the establishment rate of OKC 1119 compared to OKC 1134, OKC 7018 and Tifway (Koh et al., 2010). Herbicide treatments were as follows: 1) Untreated control, 2) MSMA at 2.2 kg ai/ha, 3) MSMA at 4.4 kg ai/ha, 4) Quinclorac at 0.8 kg ae/ha, 5) Quinclorac at 1.6 kg ae/ha, 6) Metsulfuron at 0.025 kg ai/ha, and 7) Metsulfuron at 0.050 kg ai/ha. There was no negative effect on OKC 1119 establishment rate when treated with the labeled rates of the herbicides. In addition, OKC 1119 performed equal to Tifway and OKC 1134 and greater than OKC 7018 in herbicide tolerance ratings and reached 100% establishment at 8 weeks after planting.

Establishment: Establishment ratings of OKC 1119 were better than that of Tifway, and equal to that of Premier and Midlawn at Stillwater, OK (OK1) and TX2 (2007 NTEP Tables 21C & 23C), equal to that of Premier, Tifway and Midlawn in AZ1, MS2, TN2 (2007 NTEP Tables 17C, 19C, 22C), was slower than that of Premier, equal to that of Midlawn, and higher than that of Tifway in LA1 (2007 NTEP Table 18C), better than Midlawn and Tifway, and lower than that of Premier in NC2 (2007 NTEP Table 20C). OKC 1119 had an establishment rate slightly slower than Premier and Tifway, but quicker than Midlawn in FL2 (2008 NTEP Table 28C), and slower than Premier and Tifway and equal to Midlawn in FL3 (2008 NTEP Table 29C).

Summary Comparative Performance: The major strengths of OKC 1119 are its exceptional turf quality, fine texture, improved winter hardiness, high sod density, and very good sod tensile strength. The combined performance data indicate it has less risk of winter injury than Tifway, perhaps Premier, while providing higher or equal turf quality. Compared to Midlawn, its turf quality is much improved. OKC 1119 is also better than Midlawn in sod tensile strength, a major consideration for sod growers.

AVAILABLE SOD: Approximately 3,000 ft² of Breeder Class sod is available.

PROPOSED METHOD OF RELEASE: License a limited number of sod growers that have experience in producing proprietary varieties under pedigree stock production conditions in certification programs.

VARIETY PROTECTION: Submission for US Plant Patent Protection is desired. A decision on sharing of expenses for patent protection will be made in consultation with licensees at the appropriate time.

SUGGESTED NAME: A name will be determined for the variety in consultation with licensee(s).

PERSONNEL INVOLVED: Y.Q. Wu, D.L. Martin, C.M. Taliaferro, J.A. Anderson, J.Q. Moss, N.R. Walker, and G.E. Bell

REFERENCES CITED

1. Han, H. 2009. Development of Improved Turf-type Bermudagrass. M.S. Thesis. Oklahoma State University, Stillwater, OK.
2. Koh, K, J.Q. Moss, D.L. Martin, K. Su, and Y.Q. Wu. The effects of various postemergence herbicides on the establishment rate of selected experimental interspecific hybrid bermudagrasses. Proceedings of the 2010 Southern Weed Science Society of America Annual Meetings, Little Rock, AR. Available at <http://www.weedscience.msstate.edu/swss/> (in press).
3. National Turfgrass Evaluation Program. 2007 Progress Report NTEP No. 09-2. <http://www.ntep.org/bg.htm> accessed as of June 20, 2010.
4. National Turfgrass Evaluation Program. 2008 Progress Report NTEP No. 09-1. <http://www.ntep.org/bg.htm> accessed as of June 20, 2010.
5. National Turfgrass Evaluation Program. 2009 Progress Report NTEP No. 10-4. <http://www.ntep.org/bg.htm> accessed as of June 20, 2010.
6. Wang, Z., Y.Q. Wu, D.L. Martin, H. Gao, T. Samuels, and C.C. Tan. 2010. Identification of vegetatively propagated turf bermudagrass cultivars using simple sequence repeat markers. Crop Sci. (accepted).