

BRIEF State Report for WERA011

Official WERA rep: Keenan Amundsen

Email: kamundsen2@unl.edu

Phone: 402-472-8390

Faculty research projects addressing one of the WERA objectives are reported.

WERA OBJECTIVES:

1. *Develop improved turfgrass cultivars resistant to biotic and abiotic stresses important to the western states and identify genetic components conferring drought resistance and salinity tolerance to improve the efficiency of stress resistant germplasm identification and selection.*
2. *Exchange information on features and importance of newly developed cultivars and coordinate research to develop and evaluate optimal low-input management practices.*
3. *Develop, refine and disseminate sustainable turfgrass management protocols for turfgrass managers throughout the western United States*
4. *Coordinate reduced input turfgrass management practices*
Comments: a. Reduce turfgrass water use and improve irrigation management practices b. Evaluate the use of non-potable water sources. c. Identify germplasm and management practices to reduce salinity stress d. Coordinate research on nutrient and pesticide fate e. Develop integrated pest management strategies to address new and emergent pest issues. f. Evaluate the use of turfgrasses for bioremediation of contaminated soils
5. *Assess environmental impacts of turf management*
6. *Communicate research results and promote sustainable practices to the public through workshops, conferences, websites, extension publications, social media, and research publications*
Comments: WERA011 is beginning to evaluate the feasibility of joint education delivery to broaden educational opportunities throughout the region, taking advantage of regional expertise.

Outreach activities addressing objective 6:

State conference dates: January 8-10, 2019

Collaborating with other organizations on conference (yes/no): No

Attendance figure: 486

Research field day held (yes/no): Yes

If so, when: July 18, 2018

Attendance figure: 115

Other Extension activities: Backyard Farmer TV, Thursday nights ~20,000 viewers/episode

Web (yes/no): Yes

FaceBook/Twitter/social networking (yes/no): Yes

Turf iNfo - 589 subscribers

Joint Extension activities/publications with other regional collaborators over in the last two years:

Turfgrass Weed Control for Professionals: 2019. Patton; A., A. Hathaway, A. Thoms, B. Kreuser, B. Horgan, B. Branham, D. Gardner, D. Li, D. Soldat, G. Munshaw, J. Hoyle, J. Kao-Kniffin, J. Roberts, L. Miller, M. Elmore, N. Christians, P. Koch, P. Landschoot, R. Gaussoin, T. Nikolai, Z. Raudenbush. Turf-100. Purdue Extension Education Store

Staffing:

Additions:

Eric Chestnut joined UNL in August, 2018 as Roch Gaussoin's research technician. Eric is also pursuing a PhD.

Michael Carlson joined UNL in June, 2018 as Bill Kreuser's research technician. Michael is also pursuing a PhD.

Retirements/vacancies:

none

Position changes:

In January 2019, Tiffany Heng-Moss became Dean of the College of Agriculture and Natural Resources at UNL.

Teaching Program

Current undergraduate enrollment: 9

Declining enrollment, consistent with industry trends

Placement: 100%

Research (just published/in press pubs in the last 2 years, 2018-19).

1. Kreuser, W., G. Obear, D. Michael, and D. Soldat. 2018. Growing degree day models predict performance of paclobutrazol on bentgrass golf putting greens. *Crop Sci.* 58:1402-1408. DOI: 10.2135/cropsci2017.06.0395
2. Li L, M Sousek, R Gaussoin, Z Reicher. 2018. Buffalograss exhibits adequate turf tolerance to postemergence herbicides applied during or shortly after greenup. *Crop, Forage and Turfgrass Management.* 4(1):p. [1-3] DOI: 10.2134/cftm2017.09.0064
3. Pedersen MA, CJ Wegner, RE Gaussoin, R Zbasnik, G Sarath, VL Schlegel. 2018. Phenolic Content and Profile Alterations during Seedling Growth in Supina Bluegrass and Bermudagrass. *Crop Sci.* 58:2010–2019. doi: 10.2135/cropsci2018.02.0093.
4. Reasor, E.H., J. T. Brosnan, J. P. Kerns, W. J. Hutchens, D. R. Taylor, J. D. McCurdy, D. J. Soldat, and W. C. Kreuser. 2018. Growing Degree Day Models for Plant Growth Regulator Applications on Ultradwarf Hybrid Bermudagrass Putting Greens. *Crop Sci.* 58:1801-1807. doi:10.2135/cropsci2018.01.0077
5. Thammina, C.S., K. Amundsen, S.B. Bushman, M. Kramer, S.E. Warnke. 2018. Genetic Diversity of *Danthonia spicata* (L.) Beauv. Based on Genomic Simple Sequence Repeat Markers. *Genetics Resources and Crop Evolution* 65:1059. DOI: 10.1007/s10722-017-0596-z.
6. Thompson CS, RC Braun, JA Hoyle, B Van Ryzin. 2018. Mowing timing does not affect the efficacy of broadleaf herbicides applied to control dandelion (*Taraxacum officinale*). *Crop, Forage and Turfgrass Management.* November. 4(1): p. 1-2.
7. Pedersen, M.A., C.J. Wegner, R.E. Gaussoin, R. Zbasnik, G. Sarath and V.L. Schlegel. 2018. Phenolic Content and Profile Alterations during Seedling Growth in Supina Bluegrass and Bermudagrass *Crop Sci.* 58:2010–2019. doi: 10.2135/cropsci2018.02.0093
8. Li, L., M. Sousek, R. Gaussoin, and Z. Reicher. 2018. Buffalograss exhibits adequate turf tolerance to postemergence herbicides applied during or shortly after greenup. *Crop, Forage and Turfgrass Management.* 4(1):p. [1-3] DOI: 10.2134/cftm2017.09.0064
9. Patton, A.J., R.C. Braun, G.P. Schortgen, D.V. Weisenberger, B.E. Branham, B. Sharp, M.D. Sousek, R. E. Gaussoin and Z.J. Reicher. 2019. Long-Term Efficacy of Annual Bluegrass Control Strategies on Golf Course Putting Greens. *Crop, Forage & Turfgrass Management.* 5(1) 1-3. doi:10.2134/cftm2018.09.0068
10. Shaddox, T.W., H. Fu, D.S. Gardner, R.M. Goss, E.A. Guertal, W.C. Kreuser, G.L. Miller, B.R. Stewart, K. Tang, and J.B. Unruh. 2019. Solubility of ten iron fertilizers in eleven North American soils. *Agron J.* 111:1498-1505.

Student projects

Faculty member: Keenan Amundsen

Current or recently graduated graduate student: Elizabeth Niebaum

MS or PhD: MS

Project(s): Resolving mechanisms of buffalograss seed dormancy

Graduation date: December 2019

Faculty member: Keenan Amundsen

Current or recently graduated graduate student: Jesse Marshall

MS or PhD: MS

Project(s): Expand and genetically characterize Nebraska buffalograss germplasm

Graduation date: December 2019

Faculty member: Roch Gaussoin

Current or recently graduated graduate student: Eric Chestnut

MS or PhD: PhD

Project(s): TBD May 2023

Current or recently graduated graduate student: Luqi Li

MS or PhD: PhD

Project(s): Management, Ecology and Genetics of Yellow Nutsedge (*Cyperus esculentus* L.)

Graduation date: May 2019

Current or recently graduated graduate student: Dallas Williams

MS or PhD: MS

Project(s): A new method for measuring soil water infiltration into modified rootzones

Graduation date: July 2019

Current or recently graduated graduate student: John Dillingham

MS or PhD: MS

Project(s): Physical fatigue and work efficiency of a ride-on vs walk behind lawn aerator

Graduation date: Dec 2022

Faculty member: Bill Kreuser

Current or recently graduated graduate student: Mark Keck

MS or PhD: MS

Project(s): Mowing practices and plant growth regulators impact turfgrass clipping yield production.

Graduation date: August 2019

Current or recently graduated graduate student: Joe Foral

MS or PhD: MS

Project(s): Thermal imagery to assess water status and estimate crop coefficients

Graduation date: August 2019

Current or recently graduated graduate student: Jacob Fuehrer

MS or PhD: MS

Project(s): Air temperature impacts turfgrass clipping yield response to PGRs and nitrogen fertilizer.

Graduation date: August 2019

Current or recently graduated graduate student: Parker Johnson

MS or PhD: MS

Project(s): Integrating PGR GDD models into a leading turf decision support tool

Graduation date: May 2021

Current or recently graduated graduate student: Glen Obear

MS or PhD: PhD

Project(s): Rapid soil pedogenesis in sand-based root zones

Graduation date: December 2021

Current or recently graduated graduate student: Michael Carlson

MS or PhD: PhD

Project(s): Remote sensing technologies to improve nitrogen fertilization on golf course fairways

Graduation date: December 2022

Research Highlights:

W1: Completed greenhouse and field evaluations of 140 new buffalograss accessions during establishment. Evaluations continue to assess persistence, turf quality, and production traits. Data will help guide plant breeding decisions to develop broadly adapted buffalograss cultivars.

W1: Refining buffalograss breeding schemes by isolating traits in genetic lines and stacking traits to reduce time needed for cultivar development. Research is sponsored by Todd Valley Farms, The Native Turf Group, and the USGA.

W1: With Scott Warnke, USDA, Beltsville, MD, interspecific bentgrass hybrids were developed and will be evaluated in Nebraska for heat and drought tolerance. Germplasm will benefit bentgrass breeders and their ability to enhance abiotic stress tolerance in creeping bentgrass. Research is sponsored by the USGA.

W2: Currently managing four NTEP trials (cool-season low input, Kentucky bluegrass, perennial ryegrass, tall fescue). Data provides regional turfgrass performance data to turf managers giving them the necessary tools to make informed species and cultivar selections.

W3: Continuing to evaluate glyphosate tolerance of buffalograss with Doug Karcher at the University of Arkansas. Data will improve establishment of buffalograss into existing turf.

W4: Testing Kentucky bluegrass, creeping bentgrass, and buffalograss in response to varying levels of inputs as golf course fairway turf in Eastern Nebraska. The study will provide information on the balance between inputs, costs, and turf quality expectations.

W5: Completed year three of multi-state roadside turfgrass evaluation studies.

WERA or NCERA Collaborators (name, institution):

Shaun Bushman, USDA, Logan, UT

E. Watkins, University of Minnesota-Twin Cities