

# Ross C. Braun

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## EDUCATION

### **Doctor of Philosophy, Horticulture, 2017.**

Kansas State University, Manhattan, KS

Dissertation: *Environmental and Management Impacts in Turfgrass Systems: Nitrous Oxide Emissions, Carbon Sequestration, and Drought and Traffic Stress*

### **Master of Science, Horticulture, 2014**

Kansas State University, Manhattan, KS

Thesis: *Cultural Strategies to Improve Zoysiagrass Acceptability and Performance in the Transition Zone*

### **Bachelor of Science, Sports & Urban Turfgrass Management, 2011**

Minor: **Horticulture**, North Dakota State University, Fargo, ND

## PROFESSIONAL EXPERIENCE

- **Assistant Professor**, Kansas State University, 2022-present
- **Director of Rocky Ford Turfgrass Research Center**, Kansas State University, 2022-present
- **Lead Research Scholar**, Purdue University, 2019–2022
- **Postdoctoral Research Associate**, Purdue University, 2018–2019
- **Postdoctoral Research Associate**, Kansas State University, 2017–2018
- **Graduate Research Assistant**, Kansas State University, 2012–2017
- **Graduate Teaching Assistant**, Kansas State University, 2013–2016
- **Golf Course Intern and Maintenance Staff**,
  - Spring Hill Golf Club, Wayzata, MN, 2011,
  - Oxbow Country Club, Oxbow, ND, 2010,
  - The Powder Horn Golf Course, Sheridan WY, 2010
- **Self-Employed**, Braun Lawn Care, Leeds, ND, 2002–2009

## TEACHING EXPERIENCE

### **Kansas State University (Primary Instructor, 2022-present)**

- **HORT 282**, Foundations of Horticultural Pest Management (1 credit hour, Spring)
- **HORT 515**, Basic Turfgrass Culture (3 credit hours; Spring)
- **HORT 550**, Horticultural Irrigation Systems (3 credit hours; Fall)
- **HORT 587**, Turfgrass Diseases and Their Management (1 credit hour; Fall even yr)
- **HORT 588**, Turfgrass Weeds and Their Management (1 credit hour: Fall even yr)
- **HORT 589**, Turfgrass Insects and Their Management (1 credit hour; Fall even yr)
- **HORT 490**, Horticulture Internship (3-6 credit hours; Fall, Spring, Summer)

### **Purdue University (2018-2022)**

- **AGRY/HORT 51200**, Integrated Turfgrass Systems (3 credit hours; Fall 2019) (co-taught with Drs. Aaron Patton and Quincy Law).

### **Kansas State University (2012-2018)**

- **HORT 515**, Basic Turfgrass Culture (3 credit hours; Spring) 4 Semesters (2013-2016) (lab instructor, teaching and lecturer assistant).
- **HORT 516**, Intensive Culture of Golf/Sports Turf (1 credit hour; Spring) – 4 Semesters (2013–2016) (lab instructor, teaching and lecturer assistant).

### **Invited Guest Lecturer**

- *“Research as a Career, Guest Panel”* Scientific Communication (AGCOM 810). *Kansas State University*, December 2023.
- *“What You Need to Know About Sod to Make the Best Turf”* Landscape Contracting and Management (HORT 31700). *Purdue University*, October (2020, 2021).

- “Utilizing Google Forms in the Workplace” Integrated Turfgrass Systems (HORT/AGRY 51200). *Purdue University*, October (2018, 2019, 2020, & 2021).
- “Networking” Golf Course and Sports Turf Operations (HORT 517). *Kansas State University*, September. 2014.

#### ACCEPTED PUBLICATIONS

##### Peer-reviewed Scientific Journal Publications (48)

1. **Braun, R. C.**, Mandal, P., Nwachukwu, E., & Stanton, A. (2024). The role of turfgrasses in environmental protection and their benefits to humans: 30 years later. *Crop Science*, <http://doi.org/10.1002/csc2.21383>
2. McNally, B. C., Chhetri, M., Patton, A. J., Liu, W., Hoyle, J. A., Brosnan, J. T., Richardson, M. D., Bertucci, M. B., **Braun, R. C.**, & Fry, J. D. (2024). Optimizing ethephon application timing for 'Meyer' zoysiagrass seedhead suppression. *Crop Science*, 1–13. <https://doi.org/10.1002/csc2.21350>
3. **Braun, R. C.**, & Patton, A. J. (2024). Growth responses to waterlogging stress among cool-season grass species. *Grass and Forage Science*. 1–12. <https://doi.org/10.1111/gfs.12655>
4. **Braun, R. C.**, Watkins, E., Hollman, A. B., & Patton, A. J. (2023). Assessing the fertilizer and pesticide input needs of cool-season turfgrass species. *Crop Science*, 63, 3079-3095. <https://doi.org/10.1002/csc2.21046>
5. Chandra, A., Genovesi, A., Fry, J., Patton, A., Meeks, M., **Braun, R.**, Xiang, M., Chhetri, M., & Kennelly, M. (2023). ‘DALZ 1701’, a third generation interspecific zoysiagrass hybrid. *Journal of Plant Registrations*, 17, 499–511. <http://dx.doi.org/10.1002/plr2.20319>
6. **Braun, R. C.**, Straw, C. M., Soldat, D. J., Bekken, M. A. H., Patton, A. J., Lonsdorf, E. V., & Horgan, B. P. (2023). Strategies for reducing inputs and emissions in turfgrass systems. *Crop, Forage and Turfgrass Management*. 9, e20218. <https://doi.org/10.1002/cft2.20218>
7. Yue, C., Lai, Y., Watkins, E., Patton, A., & **Braun, R.** (2023). A behavioral approach to the barriers to the adoption of new technology: A case study of low-input turfgrasses. *Journal of Agricultural and Applied Economics*, 55, 72–99. <https://doi.org/10.1017/aae.2023.7>
8. **Braun, R. C.**, Courtney, L. E., & Patton, A. J. (2023). Seed morphology, germination, and seedling vigor characteristics of fine fescue taxa and other cool-season turfgrass species. *Crop Science*, 63, 1613–1627. <https://doi.org/10.1002/csc2.20936>
9. Hong, M., Zhang, Y., **Braun, R. C.**, & Bremer, D. J. (2023). Simulations of nitrous oxide emissions and global warming potential in a C<sub>4</sub> turfgrass system using process-based models. *European Journal of Agronomy*, 142, 126668. <https://doi.org/10.1016/j.eja.2022.126668>
10. **Braun, R. C.**, Patton, A. J., Chandra, A., Fry, J. D., Genovesi, A. D., Meeks, M., Kennelly, M. M., Xiang, M., Chhetri, M., Richardson, M. D., Richmond, D. S., Pudzianowska, M. T., & Baird, J. H. (2022). Development of winter hardy, fine-textured zoysiagrass hybrids for the upper transition zone and similar climates. *Crop Science*, 62, 2486–2505. <https://doi.org/10.1002/csc2.20834>
11. **Braun, R. C.**, Bremer, D. J., Ebdon, J. S., Fry, J. D., & Patton, A. J. (2022). Review of cool-season turfgrass water use and requirements: II. Responses to drought stress. *Crop Science*, 62, 1685–1701. <https://doi.org/10.1002/csc2.20790>
12. **Braun, R. C.**, Bremer, D. J., Ebdon, J. S., Fry, J. D., & Patton, A. J. (2022). Review of cool-season turfgrass water use and requirements: I. Evapotranspiration and responses to deficit irrigation. *Crop Science*, 62, 1661–1684. <https://doi.org/10.1002/csc2.20791>
13. **Braun, R. C.**, Watkins, E., Hollman, A. B., Mihelich, N. T., & Patton, A. J. (2022). Management, harvest, and storage characteristics of low-input cool-season turfgrass sod mixtures. *Agronomy Journal*, 114, 1752–1768. <https://doi.org/10.1002/agj2.21051>
14. **Braun, R. C.**, & Patton, A. J. (2022). Species, clover-inclusion, and nitrogen fertilizer effects on sod tensile strength of fine fescue taxa. *Agronomy Journal*, 114, 1705–1716. <https://doi.org/10.1002/agj2.21039>
15. **Braun, R. C.**, Braithwaite, E. T., Kowalewski, A. R., Watkins, E., Hollman, A. B., & Patton, A. J. (2022). Nitrogen fertilizer and clover-inclusion effects on the establishment of fine fescue taxa. *Crop Science*, 62, 947–957. <https://doi.org/10.1002/csc2.20704>
16. **Braun, R. C.**, & Patton, A. J. (2022). Perennial ryegrass (*Lolium perenne*) culm and inflorescence density in lawns: Effects of nitrogen fertilization and scalping timing and height. *Crop Science*, 62, 489–502. <https://doi.org/10.1002/csc2.20665>
17. **Braun, R. C.**, Bremer, D. J., & Hoyle, J. A. (2022). Simulated traffic on turfgrasses during drought stress: II. Soil water content, soil compaction, and rooting. *International Turfgrass Society Research Journal*, 14, 516-527. <https://doi.org/10.1002/its2.62>

18. **Braun, R. C.**, Milla-Lewis, S., Carbajal, E., Schwartz, B. M., & Patton, A. J. (2021). Performance and playability of experimental low-input coarse-textured zoysiagrass in multiple climates. *Grass Research*, *1*, 10 1–12. <https://doi.org/10.48130/GR-2021-0010>
19. **Braun, R. C.**, Patton, A. J., Reiter, M., Elmore, M. T., & Tuck, D. P. (2021). Tolerance of fine fescues in minimal-to-no mow golf course rough to indaziflam formulations. *Crop Forage, & Turfgrass Management*, *7*, e20134, 1-4. <https://doi.org/10.1002/cft2.20134>
20. **Braun, R. C.**, Patton, A. J., Watkins, E., Hollman, A. B., Murphy, J. A., Park, B. S., Kowalewski, A. R., & Braithwaite, E. T. (2021). Optimal fine fescue mixture seeding dates in the northern United States. *Agronomy Journal*, *113*, 4413–4428. <https://doi.org/10.1002/aj2.20859>
21. **Braun, R. C.**, Watkins, E., Hollman, A. B., Mihelich, N. T., & Patton, A. J. (2021). Investigation of cool-season species, seeding rate, and nitrogen fertilization in sod production: I. Establishment and sod tensile strength. *Agronomy Journal*, *113*, 4176–4189. <https://doi.org/10.1002/aj2.20810> \*Top cited article in *Agronomy Journal* in 2021-2022 award
22. Patton, A. J., **Braun, R. C.**, Bearss, R. C., & Schortgen, G. P. (2021). Herbicide tolerance in eleven grass species for minimal-to-no-mow golf course rough. *Agrosystems, Geosciences & Environment*, e20204. <https://doi.org/10.1002/agg2.20204>
23. **Braun, R. C.**, Watkins, E., Hollman, A. B., Mihelich, N. T., & Patton, A. J. (2021). Investigation of cool-season species, seeding rate, and nitrogen fertilization in sod production: II. Management and shelf-life. *Agronomy Journal*, *113*, 3460–3474. <https://doi.org/10.1002/aj2.20777>
24. Law, Q. D., Trappe, J. M., **Braun, R. C.**, & Patton, A. J. (2021). Greenhouse gas fluxes from turfgrass systems: Species, growth rate, clipping management, and environmental effects. *Journal of Environmental Quality*, *50*, 547–557. <https://doi.org/10.1002/jeq2.20222>
25. Patton, A. J., & **Braun, R. C.** (2021). Measurement of turf height and growth using a laser distance device. *Crop Science*, *61*, 3110–3123. <https://doi.org/10.1002/csc2.20295>
26. **Braun, R. C.**, Bremer, D. J., & Hoyle, J. A. (2021). Simulated traffic on turfgrasses during drought stress: I. Performance and recovery of turf canopies. *Crop Science*, *61*, 2926–2938. <https://doi.org/10.1002/csc2.20324>
27. Alderman, E. J., Hoyle, J. A., **Braun, R. C.**, & Reeves, J. A. (2020). Winter golf cart traffic, colorants, and overseeding influence winter green cover and spring recovery of buffalograss. *Crop, Forage and Turfgrass Management*, *6*, e20077. <https://doi.org/10.1002/cft2.20077>
28. **Braun, R. C.**, Patton, A. J., Braithwaite, E. T., & Kowalewski, A. R. (2020). Establishment of low-input turfgrass from seed with patch and repair mixtures: Mulch and starter fertilizer effects. *Crop Science*, *60*, 3362–3376. <https://doi.org/10.1002/csc2.20266>
29. Patton, A. J., **Braun, R. C.**, Schortgen, G. P., Hoyle, J. A., & Reicher, Z. J. (2020). Irrigation following a fall proxy (ethephon) application affects spring seedhead suppression of ‘Meyer’ zoysiagrass. *Crop, Forage and Turfgrass Management*, *6*, e20023. <https://doi.org/10.1002/cft2.20023>
30. **Braun, R. C.**, Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brilman, L. A. (2020). Fine fescues: A review of the species, their improvement, production, establishment, and management. *Crop Science*, *60*, 1142–1187. <https://doi.org/10.1002/csc2.20122> \*Top cited article in *Crop Science* in 2020-2021 award
31. Patton, A. J., **Braun, R. C.**, & Weisenberger, D. V. (2019). Single applications of natural postemergence weed control options do not provide effective ground ivy control. *Crop, Forage and Turfgrass Management*, *5*, 180101. <https://doi.org/10.2134/cftm2018.12.0101>
32. Thompson, C. S., Hoyle, J. A., & **Braun, R. C.** (2019). Scalping tall fescue as soon as one day after treatment does not reduce glyphosate efficacy. *Crop, Forage and Turfgrass Management*, *5*, 180098. <https://doi.org/10.2134/cftm2018.12.0098>
33. **Braun, R. C.**, & Bremer, D. J. (2019). Carbon sequestration in zoysiagrass turf under different irrigation and fertilization management regimes. *Agrosystems, Geosciences & Environment*, *2*, 180060. <https://doi.org/10.2134/age2018.12.0060>
34. Alderman, E. J., Hoyle, J. A., Reeves, J. A., & **Braun, R. C.** (2019). Evaluating the effects of nitrogen rate and simulated golf cart traffic on ‘Cody’ buffalograss roughs. *Crop, Forage and Turfgrass Management*, *5*, 180079. <https://doi.org/10.2134/cftm2018.09.0079>
35. Patton, A. J., **Braun, R. C.**, Schortgen, G. P., Weisenberger, D. V., Branham, B. E., Sharp, B., Sousek, M. D., Gaussoin, R. E., & Reicher, Z. J. (2019). Long-term efficacy of *Poa annua* control strategies on golf course putting greens. *Crop, Forage and Turfgrass Management*, *5*, 180068. <https://doi.org/10.2134/cftm2018.09.0068>

36. **Braun, R. C.**, Hoyle, J. A., Van Ryzin, B., Sousek, M. D., & Thompson, C. S. (2018). Postemergence herbicide tolerance of buffalograss entering winter dormancy. *Crop, Forage and Turfgrass Management*, 4, 180064.  
<https://doi.org/10.2134/cftm2018.08.0064>
37. Hoyle, J. A., **Braun, R. C.**, Thompson, C. S., & Reeves, J. A. (2018). Late-season bermudagrass control with glyphosate, fluazifop, and mesotrione combinations. *Agrosystems, Geosciences & Environment*, 1, 180014.  
<https://doi.org/10.2134/age2018.06.0014>
38. **Braun, R. C.**, & Bremer, D. J. (2018). Nitrous oxide emissions in turfgrass systems: A review. *Agronomy Journal*, 110, 1–11.  
<https://doi.org/10.2134/agronj2018.02.0133>
39. Hoyle, J. A., **Braun, R. C.**, & South, P. E. (2018). The effect of human insect repellents on perennial ryegrass (*Lolium perenne*) injury and recovery. *Crop, Forage and Turfgrass Management*, 4, 180023.  
<https://doi.org/10.2134/cftm2018.03.0023>
40. **Braun, R. C.**, & Bremer, D. J. (2018). Nitrous oxide emissions in turfgrass receiving different irrigation amounts and nitrogen fertilizer forms. *Crop Science*, 58, 1762–1775. <https://doi.org/10.2135/cropsci2017.11.0688>
41. Hoyle, J. A., **Braun, R. C.**, Reeves, J. A., Keeley, S. J., & Bremer, D. J. (2018). Mowing height and cultivation effects on tall fescue conversion to buffalograss. *Crop, Forage and Turfgrass Management*, 4, 170061.  
<https://doi.org/10.2134/cftm2017.08.0061>
42. Thompson, C. S., **Braun, R. C.**, Hoyle, J. A., & Van Ryzin, B. (2018). Mowing timing does not affect the efficacy of broadleaf herbicides applied to control dandelion (*Taraxacum officinale*). *Crop, Forage and Turfgrass Management*, 4, 170074.  
<https://doi.org/10.2134/cftm2017.10.0074>
43. **Braun, R. C.**, Hoyle, J. A., Reeves, J. A., Flessner, M. L., & McElroy, J. S. (2018). Design and construction of mowing track for turfgrass experimentation in greenhouses. *Agronomy Journal*, 110, 1180–1183.  
<https://doi.org/10.2134/agronj2017.11.0625>
44. **Braun, R. C.**, Fry, J. D., Kennelly, M. M., Bremer, D. J., & Griffin, J. J. (2017). Single and sequential colorant application effects on buffalograss and zoysiagrass color during dormancy. *HortTechnology*, 27, 393–398.  
<https://doi.org/10.21273/HORTTECH03690-17>
45. Thompson, C., Fry, J., **Braun, R.**, & Kennelly, M. (2017). Rough bluegrass incidence in a new tall fescue sward as affected by seeding rate and mowing height. *Crop, Forage and Turfgrass Management*, 3, 1–4.  
<https://doi.org/10.2134/cftm2016.11.0074>
46. **Braun, R.**, Fry, J., Kennelly, M., Bremer, D., & Griffin, J. (2016). Colorant application volume and color persistence on a ‘Chisholm’ zoysiagrass lawn. *HortTechnology*, 26, 314–319. <https://doi.org/10.21273/HORTTECH.26.3.314>
47. Miller, G. L., Earlywine, D. T., **Braun, R.**, Fry, J. D., & Kennelly, M. M. (2016). Influence of nitrogen source and application timing on large patch of zoysiagrass. *Crop, Forage and Turfgrass Management*, 2, 1–9.  
<https://doi.org/10.2134/cftm2015.0189>
48. Thompson, C., **Braun, R.**, & Kennelly, M. (2014). Evaluation of fungicides for control of dollar spot and brown patch of greens height creeping bentgrass in Kansas. *2013 Plant Disease Management Reports*, 8, p. T041.

#### Trade Journals, Magazines, Newsletters, and Online Articles (35)

1. **Braun, R.** (2024). Cultivar selection when purchasing turfgrass seed or sod. Kansas Turfgrass Foundation *TurfNews*, September.
2. **Braun, R.** (2024). K-State turfgrass undergraduate program update. Kansas Turfgrass Foundation *TurfNews*, September
3. **Braun, R.** (2024). Research updates from the Braun Turfgrass Lab. Kansas Turfgrass Foundation *TurfNews*, January.
4. **Braun, R.** (2023). Reconsidering Fine Fescues for Kansas. Kansas Turfgrass Foundation *TurfNews*, September.
5. **Braun, R.** (2023). What are the potential ecosystem benefits of turfgrass? *Decode 6*. June 29, 2023.  
<https://decode6.org/articles/potential-turfgrass-ecosystem-services/>
6. **Braun, R.** (2023). How can I reduce turfgrass fertilization, mowing, irrigation, and pesticide use? *Decode 6*. June 29, 2023.  
<https://decode6.org/articles/reduce-turfgrass-inputs/>
7. **Braun, R.** (2023). 6 Ways to cut back on greenhouse gas while cutting your grass. *Decode 6*. June 12, 2023.  
<https://decode6.org/articles/6-ways-to-cut-back-on-greenhouse-gas-while-cutting-your-grass/>
8. **Braun, R.**, Bremer, D., Ebdon, S., Fry, J., & Patton, A. (2023). Breaking down the research on cool-season turfgrass water use and needs. *Golfdom*, June, 79,34-43.
9. **Braun, R.** (2023). Where does all the nitrogen go after an application? Kansas Turfgrass Foundation *TurfNews*, April, 3–4.
10. **Braun, R. C.**, Chandra, A., Patton, A. J., & Fry, J. D. (2023). Zoysiagrass hybrid development for the transition zone: A systematic process. *Golf Course Management*, February, 58–62.
11. Fry, J., & **Braun, R.** (2023). New zoysiagrass cultivar coming out. Kansas Turfgrass Foundation *TurfNews*, January, 3.

12. **Braun, R.** (2022). Hello from the new guy on the K-State turf & landscape management team. *Kansas Turfgrass Foundation TurfNews*, July, 3–4.
13. **Braun, R.,** & Hoyle, J. (2022). Efficacy of late-season bermudagrass removal using herbicide combinations. *Golfdom*, October, 24–29.
14. **Braun, R. C.,** & Patton, A. J. (2021). Identifying water submersion tolerance differences. *Golf Course Management*, December, 74.
15. Patton, A. J., & **Braun, R. C.** (2021). Herbicide tolerance of grass species used in minimal-to-no mow golf course rough. *Golf Course Management*, November, November, 75–79.
16. **Braun, R. C.,** Bremer, D. J. & Hoyle, J. A. (2021). The impacts of golf cart traffic on turfgrass during and after drought. *Golf Course Management*, May, 63–67.
17. **Braun, R. C.,** Patton, A. J., Milla-Lewis, S., Carbajal, E. & Schwartz, B. (2021). Zoysiagrass for golf course roughs. *Golf Course Management*, March, 85.
18. **Braun, R. C.,** & Bremer, D. J. (2020). Specific management practices can reduce greenhouse gas emissions and promote carbon sequestration in golf course fairways. *United States Golf Association Green Section Record*, 58(13):1–10. <https://www.usga.org/content/usga/home-page/course-care/green-section-record/58/13/specific-management-practices-can-reduce-greenhouse-gas-emission.html#>
19. **Braun, R. C.,** Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brilman, L. A. (2020). Use of fine fescues on golf courses: IV. Biotic stresses. *Golf Course Management*, September, 82–87.
20. **Braun, R. C.,** Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brilman, L. A. (2020). Use of fine fescues on golf courses: III. Abiotic stresses. *Golf Course Management*, August, 64–69.
21. **Braun, R. C.,** Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brilman, L. A. (2020). Use of fine fescues on golf courses: II. Availability, establishment, and management. *Golf Course Management*, July, 52–58.
22. **Braun, R. C.,** Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brilman, L. A. (2020). Use of fine fescues on golf courses: I. Introduction and history. *Golf Course Management*, May, 60–64.
23. Patton, A. J., **Braun, R. C.,** Schortgen, G. P., Weisenberger, D. V., Branham, B. E., Sharp, B., Sousek, M. D., Gaussoin, R. E., & Reicher, Z. J. (2020). Controlling annual bluegrass on golf course putting greens. *Golfdom*, 76(5):26–30. <https://www.Golfdom.com/controlling-annual-bluegrass-on-golf-course-putting-greens>
24. **Braun, R. C.,** Thompson, C. S., & Hoyle, J. A. (2019). Scalping timing for tall fescue control with glyphosate. *Golf Course Management*, September, 63–67. <https://www.gcmonline.com/research/news/scalping-tall-fescue-glyphosate>
25. Alderman, E. J., Hoyle, J. A., Reeves, J. A., & **Braun, R. C.** (2019). Effects of nitrogen rate and simulated golf cart traffic on Cody buffalograss roughs. *Golf Course Management*, July, 68–71. <https://www.gcmonline.com/research/news/buffalograss-golf>
26. Hoyle, J. A., **Braun, R. C.,** & South, P. E. (2018). Perennial ryegrass injury and recovery from human insect repellent. *Golfdom*, 74(12):55. <<https://www.Golfdom.com/ryegrass-injury-and-recovery-from-human-insect-repellent/>>
27. **Braun, R. C.,** & Bremer, D. J. (2018). Fertilization and irrigation strategies reduce greenhouse gas emissions and conserve water. *Golf Course Management*, December, 64–73. <https://www.gcmonline.com/course/environment/news/turfgrass-nitrous-oxide>
28. **Braun, R. C.,** & Bremer, D. J. (2018). Reducing nitrous oxide emissions in turfgrass with better management practices. *CSA News*, 63(8):10.
29. **Braun, R.,** Bremer, D., & Hoyle, J. (2017). Performance and recovery of cool- and warm-season turfgrass species subjected to traffic during drought stress. *Turfnews: The Kansas Turfgrass Foundation Newsletter*, September, 5–7.
30. Koehler, J., Miller, L., **Braun, R.,** & Kennelly, M. (2017). Debunking a large patch myth. *Golfdom*, 73(3):30–33. <http://www.Golfdom.com/debunking-a-large-patch-myth>
31. **Braun, R.,** Bremer, D., & Hoyle, J. (2016). GCSAA research update: Performance and recovery of four turfgrass species subjected to golf cart traffic during prolonged drought. *Golf Course Management*, November, 79–80.
32. Fry, J., Kennelly, M., & **Braun, R.** (2015). Development of large patch resistant and cold hardy zoysiagrass cultivars for the transition zone. *United States Golf Association Green Turfgrass and Environmental Research Online*, 14(2):30–32.
33. **Braun, R.,** Bremer, D., & Fry, J. (2014). Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and N fertilization. *SportsTurf*, June, 30(6):17.
34. **Braun, R.,** Fry, J., Kennelly, M., Bremer, D., & Griffin, J. (2014). Using colorants to improve color of dormant warm-season turfgrasses in the transition zone. *SportsTurf*, June, 30(6):17–18.
35. Fry, J., Kennelly, M., & **Braun, R.** (2014). Development of large patch resistant and cold hardy zoysiagrass cultivars for the transition zone. *United States Golf Association Green Turfgrass and Environmental Research Online*, 13(1):20–21.

## Research Reports (30)

1. **Braun, R.** (2023). Quantifying the influence of the aggressiveness and ratio of Kentucky bluegrass on sod strength of tall fescue/Kentucky bluegrass seed mixtures. *TurfNews [TPI]*. September/October 2023. 42-43.
2. Amgain, N., Patton, A., & **Braun, R.** (2023). Sod strength characteristics of 24 fine fescue cultivars. *TurfNews [TPI]*. September/October 2023. 31-35.
3. Patton, A., & **Braun, R.** (2022). Sod strength characteristics of 24 fine fescue cultivars. *TurfNews [TPI]*. September/October 2022. 24-25.
4. Chandra, A., Fry, J., Patton, A., McFadden, D., Kennelly, M., Genovesi, D., Meeks, **Braun, R.**, Richardson, M., Goatley, M., Sandor, D., Sorochan, J., Kenworthy, K., & Buhlman, J. (2022). Development of cold hardy zoysiagrass cultivars for golf courses in the transition zone. *Mike Davis Program for Advancing Golf Course Management: 2022 Progress Reports*. 58-71.
5. Hong, M., Zhang, Y., **Braun, R.**, & Bremer, D. (2022). Simulation of nitrous oxide in zoysia turfgrass using DAYCENT and DNDC Ecosystem Models. *Kansas Agricultural Experiment Station Research Reports*, Vol. 8. Issue 5. Article 2. <https://doi.org/10.4148/2378-5977.8321>
6. Chandra, A., Fry, J., Patton, A., McFadden, D., Kennelly, M., Genovesi, D., Meeks, M., Wang, T., Chhetri, M., **Braun, R.**, Miller, L., Richardson, M., Goatley, M., Sandor, D., Sorochan, J., Kenworthy, K., Buhlman, J., Dorrian, S., & Earlywine, D. (2021). Development of cold hardy zoysiagrass cultivars for golf courses in the transition zone. *Mike Davis Program for Advancing Golf Course Management: 2021 Progress Reports*. 49-57.
7. **Braun, R.**, & Patton, A. (2021). Identification of successful nitrogen fertilization establishment regimes for fine fescue sod production – Final Report. *TurfNews [TPI]*. September/October 2021. 20-23.
8. **Braun, R.**, & Patton, A. (2021). Sod strength characteristics of 24 fine fescue cultivars. *TurfNews [TPI]*. September/October 2021. *TurfNews [TPI]*. September/October 2021. 33.
9. Fry, J., Kennelly, M., Chhetri, M., McFadden, D., Patton, A., **Braun, R.**, Chandra, A., & Genovesi, D. (2021). On-course evaluations of new zoysiagrass hybrids. *Mike Davis Program for Advancing Golf Course Management: 2021 Progress Reports*. 374-379.
10. Hong, M., Zhang, Y., **Braun, R.**, & Bremer, D. (2021). Simulation of nitrous oxide emissions in zoysia turfgrass using DAYCENT and DNDC. *Mike Davis Program for Advancing Golf Course Management: 2021 Progress Reports*. 342-351.
11. **Braun, R.**, & Patton, A. (2020). Identification of successful nitrogen fertilization establishment regimes for fine fescue sod production. *TurfNews [TPI]*. September/October 2020. 20-21.
12. Chandra, A., Fry, J., Patton, A., Kennelly, M., Genovesi, D., Meeks, M., Wang, T., Chhetri, M., & **Braun, R.** (2020). Development of cold hardy zoysiagrass cultivars for golf courses in the transition zone. *United States Golf Association 2020 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 59–67.
13. Patton, A., **Braun, R.**, Milla-Lewis, S., & Schwartz, B. (2020). Exploring the use of coarse zoysiagrass phenotypes as low-input turf golf course roughs. *United States Golf Association 2020 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 68-74.
14. Hong, M., Zhang, Y., **Braun, R.** & Bremer, D. J., (2020). Simulation of nitrous oxide emissions and carbon sequestration in zoysiagrass fairway turf using the DAYCENT model. *United States Golf Association 2020 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 333–340.
15. Fry, J., Kennelly, M., Chhetri, M., Patton, A., **Braun, R.**, Chandra, A., & Genovesi, D. (2019). On-course evaluations of new zoysiagrass hybrids. *United States Golf Association 2019 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 401–404.
16. Patton, A., **Braun, R.**, Milla-Lewis, S., & Schwartz, B. (2019). Exploring the use of coarse zoysiagrass phenotypes as low-input turf golf course roughs. *United States Golf Association 2019 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 58–63.
17. Hong, M., Zhang, Y., **Braun, R.** & Bremer, D. J., (2019). Simulation of nitrous oxide emissions and carbon sequestration in zoysiagrass fairway turf using the DAYCENT model. *United States Golf Association 2019 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 382–385.
18. Genovesi, D., Chandra, A., Fry, J., Kennelly, M., Patton, A., Meeks, M., Chhetri, M., & **Braun, R.** (2019). Development of cold hardy zoysiagrass cultivars for golf courses in the transition zone. *United States Golf Association 2019 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 52–57.

19. **Braun, R. C.**, & Bremer, D. J. (2019). High and low management input regimes result in similar net carbon sequestration rates in zoysiagrass golf course fairway turf. *Kansas Agricultural Experiment Station Research Reports*, Vol. 5: Issue 5. <https://doi.org/10.4148/2378-5977.7767>
20. Hong, M., Bremer, D. J., & **Braun, R.** (2018). Simulation of nitrous oxide emissions and carbon sequestration in zoysiagrass fairway. *United States Golf Association 2018 Research Summaries, Turfgrass and Environmental Research Program United States Golf Association Turfgrass Environment Research Online*, 338–341.
21. **Braun, R.**, & Bremer, D. (2017). Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and nitrogen fertilization (Year 2). *Kansas Agricultural Experiment Station Research Reports*, Vol. 3. Issue 4. Article 10. <https://doi.org/10.4148/2378-5977.7159>
22. **Braun, R.**, Bremer, D., J. Hoyle, & N. Bloedow. (2017). Performance and recovery of turfgrasses subjected to drought and traffic stresses. *Kansas Agricultural Experiment Station Research Reports*, Vol. 3. Issue 4. Article 9. <https://doi.org/10.4148/2378-5977.7158>
23. **Braun, R.**, Bremer, D., & Fry, J. (2016). Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and nitrogen fertilization (Year 1). *Kansas Agricultural Experiment Station Research Reports, Turfgrass Research*, Vol. 2. Issue 4. 1–7.
24. Bremer, D., **Braun, R.**, & Fry, J. (2015). Nitrous oxide emissions and carbon sequestration in turfgrass: effects of irrigation and nitrogen fertilization. *United States Golf Association Green Turfgrass and Environmental Research Online*, 14(1):6–7.
25. **Braun, R.**, Fry, J., & Kennelly, M. (2015). Evaluation of new zoysiagrass experimental lines for winter hardiness and turf quality in the transition zone. *Kansas Agricultural Experiment Station Research Reports*, Vol. 1. Issue 6.
26. **Braun, R.**, Fry, J., Kennelly, M., Bremer, D., & Griffin, J. (2015). Evaluation of overseeding and colorants on ‘Chisholm’ zoysiagrass during winter dormancy. *Kansas Agricultural Experiment Station Research Reports*, Vol. 1: Issue 6.
27. **Braun, R.**, Fry, J., Kennelly, M., Bremer, D., & Griffin, J. (2015). Evaluation of colorants on ‘sharpshooter’ and ‘Cody’ buffalograss. *Kansas Agricultural Experiment Station Research Reports*, Vol. 1: Issue 6.
28. Fry, J., Kennelly, M., & **Braun, R.** (2014). Development of large patch resistant and cold hardy zoysiagrass cultivars for the transition zone. *United States Golf Association Green Turfgrass and Environmental Research Online*, 13(1):20–21.
29. **Braun, R.**, Fry, J., & Kennelly, M. (2014). Evaluation of colorants on ‘Meyer’ zoysiagrass. *Kansas Agricultural Experiment Station Research Reports*. <http://www.ksre.ksu.edu/bookstore/pubs/SRP1107I-ZOYSIA-COLORANTS.pdf>
30. **Braun, R.**, & Fry, J. (2013). Evaluation of turf colorants on dormant ‘Chisholm’ zoysiagrass. *Kansas Agricultural Experiment Station Research Reports*, 1089. 10–13.

### Scientific Journal Publication Cover Images and Magazine Cover Images (3)

1. **Braun, R.C.** (2023). Cover Image, Volume 68, Issue 9. *CSA News*. <https://access.onlinelibrary.wiley.com/toc/23253584/2023/68/9>
2. **Braun, R.C.** (2022). Cover Image, Volume 114, Issue 3. *Agronomy Journal*. <https://doi.org/10.1002/agj2.20734>
3. **Braun, R.C.** (2021). Cover Image, Volume 61, Issue 5. *Crop Science*. <https://doi.org/10.1002/csc2.20646>

### Abstracts (28)

1. **Braun, R.** (2024). Introduction to Carbon and other GHG cycling in turfgrass systems. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. (invited symposium speaker) <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/156880>
2. Nwachukwu, E., & **Braun, R.** (2024). Seeding mixture ratio and Kentucky bluegrass aggressiveness effect on tall fescue-Kentucky bluegrass mixture sod strength. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158151> (presenting author)
3. Nwachukwu, E., & **Braun, R.** (2024). The influence of Kentucky bluegrass aggressiveness classification on sod strength. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. (presenting author) <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158143>
4. Mandal, P., & **Braun, R.** (2024). Influence of irrigation amounts and frequency on coated turfgrass seed establishment. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/157359>
5. Mandal, P., & **Braun, R.** (2024). Assessing the impact of short-term storage temperature on coated vs. non-coated turfgrass seeds. *ASA, CSSA, SSSA International Annual Meeting*, San Antonio, TX. <https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/157361>
6. Nwachukwu, E., & **Braun, R.** (2024). Germination and establishment speed differences of Kentucky bluegrass cultivars.

ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

<https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158139>

7. Nwachukwu, E., & **Braun, R.** (2024). Quantifying rhizomatous tall fescue sod strength and rhizome production. ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.  
<https://scisoc.confex.com/scisoc/2024am/meetingapp.cgi/Paper/158148>
8. Amgain, N. R., McNally, B. C., **Braun, R.**, & Patton, A. J. (2023) Sod tensile strength of fine fescue cultivars. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.  
<https://scisoc.confex.com/scisoc/2023am/meetingapp.cgi/Paper/152315>
9. Ojeokun, O., Fry, J. D., **Braun, R.**, McFadden, D. (2023). Impact of nitrogen and mowing height at grower on performance of zoysiagrass sod after harvest. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.  
<https://scisoc.confex.com/scisoc/2023am/meetingapp.cgi/Paper/148972>
10. **Braun, R. C.**, Patton, A. J., Kowalewski, A. R., Braithwaite, E. T., Watkins, E., & Hollman, A. (2021). Nitrogen fertilizer and clover inclusion effects on the establishment of fine fescue taxa. *Abstract 134377 of the ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT. (**presenting author**)
11. **Braun, R. C.**, Patton, A. J., Watkins, E., Hollman, A., & Mihelich, N. (2021). Evaluation of harvest and storage limitations of low-input cool-season mixtures for sod production. *Abstract 134368 of the ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT. (**presenting author**)
12. Patton, A. J., **Braun, R. C.**, Chandra, A., & Fry, J. D. (2021). Freeze tolerance of experimental zoysiagrass genotypes bred for the upper transition zone. *Abstract 134385 of the ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT. (**presenting author**)
13. Hong, M., Zhang, Y., **Braun, R. C.**, & Bremer, D. J. (2021). Simulation of nitrous oxide emissions in turfgrass using the Daycent and DNDC. *Abstract 137610 of the ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT.
14. Chhetri, M., Fry, J. D., Patton, A. J., Brosnan, J. T., Richardson, M. D., Hoyle, J. A., **Braun, R. C.**, & Kennelly, M. M. (2021). Models to optimize ethephon application timing for seedhead suppression in Meyer zoysiagrass. *Abstract 136027 of the ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT.
15. Carbajal Melgar, E. M., Patton, A. J., **Braun, R. C.**, Schwartz, B., & Milla-Lewis, S. (2020). Exploring the use of coarse zoysiagrass phenotypes as a low-input turf for golf course roughs. *Abstract 126436 of the ASA, CSSA and SSSA International Meetings*, online.
16. Hong, M., Zhang, Y., **Braun, R. C.**, & Bremer, D. J. (2020). Simulating nitrous oxide emissions from zoysiagrass using the Daycent Model. *Abstract 126043 of the ASA, CSSA and SSSA International Meetings*, online.
17. Patton, A. J., **Braun, R. C.**, Watkins, E., Mihelich, N. T., & Hollman, A. (2020). Effect of seeding rate and nitrogen fertility on the production, quality, shelf-life, and harvest limitations of low-input sod. *Abstract 128137 of the ASA, CSSA and SSSA International Meetings*, online. (**presenting author**)
18. **Braun, R. C.**, Patton, A. J., Watkins, E., Koch, P., Anderson, N. P., Bonos, S. A., & Brillman, L. A. (2020). Recommended taxonomic classifications of fine fescue taxa used in turfgrass systems. *Abstract 128127 of the ASA, CSSA and SSSA International Meetings*, online. (**presenting author**)
19. **Braun, R. C.**, Patton, A. J., Kowalewski, A., & Braithwaite, E. T. (2019). Evaluation of low-input turfgrass patch and repair ingredients. *Abstract 418–4 of the ASA, CSSA and SSSA International Meetings*, San Antonio, TX. (**presenting author**)
20. Patton, A. J., & **Braun, R. C.** (2019). Measurement of turf height using a laser distance device. *Abstract 310–4 of the ASA, CSSA and SSSA International Meetings*, San Antonio, TX.
21. Genovesi, D. A., Meeks, M., Fry, J. D., Kennelly, M. M., Patton, A. J., Xiang, M., **Braun, R. C.**, & Chhattri, M. (2019). Breeding for large patch disease tolerance and cold hardiness in zoysiagrass. *Poster 1602 of the ASA, CSSA and SSSA International Meetings*, San Antonio, TX.
22. **Braun, R. C.**, Hoyle, J. A., Van Ryzin, B., Sousek, M. D., & Thompson, C. S. (2018). Postemergence herbicide tolerance of buffalograss entering winter dormancy. *Abstract 112613 of the ASA and CSSA International Meetings*, Baltimore, MD. (**presenting author**)
23. Hoyle, J. A., Thompson, C. S., Van Ryzin, B., & **Braun, R. C.** (2017). Mowing timing does not affect common affect common broadleaf herbicide efficacy. *Abstract 107741 of the ASA, CSSA and SSSA International Meetings*, Tampa, FL. (**presenting author**)
24. **Braun, R.**, Bremer, D. J. Hoyle, J. A., & Bloedow, N. (2016). Performance and recovery of four turfgrass species subjected to golf cart traffic during prolonged drought. *Abstract 198–6 of the ASA, CSSA and SSSA International Meetings*, Phoenix, AZ. (**presenting author**)
25. **Braun, R.**, Bremer, D. J. & Fry, J. D. (2016). Nitrous oxide emissions in a turfgrass environment. *Abstract 99621 of the ASA, CSSA and SSSA International Meetings*, Phoenix, AZ. (**presenting author**)



26. Bremer, D. & **Braun, R.** (2016). Nitrous oxide emissions in turfgrass: Effects of irrigation amounts and nitrogen fertilizer types. *Abstract 300–2 of the ASA, CSSA and SSSA International Meetings*, Phoenix, AZ. (**presenting author**)
27. **Braun, R.**, & Bremer, D. J. (2015). Nitrous oxide emissions and carbon sequestration in turfgrass: effects of irrigation and N fertilization. *Abstract 83–8 of the ASA, CSSA and SSSA International Meetings*, Minneapolis, MN. (**presenting author**)
28. **Braun, R.**, Fry, J. D., Kennelly, M. M., Bremer, D. J. & Griffin, J. (2014). Enhancing winter aesthetics of zoysiagrass in the transition zone with colorants. *Abstract 119–7 of the ASA, CSSA and SSSA International Meetings*, Long Beach, CA. (**presenting author**)

#### Extension Publications (9)

1. Patton, A. J., & **Braun, R. C.** (2022). Maintenance calendar for fine fescue lawns. *Purdue University*, TURF-13-W. April (2022).
2. Patton, A. J., **Braun, R. C.**, Barnes, M., Nelson, K., Reiter, M., Watkins, E., Kowalewski, A., Koch, P., & Murphy, J. (2021). Fine fescues: Understanding the differences. *Purdue University, University of Minnesota, Oregon State University, University of Wisconsin, Rutgers University*, TURF-63-W. April (2022).
3. Patton, A. J., & **Braun, R. C.** (2022). Establishment of fine fescues. *Purdue University*, TURF-64-W. April (2022).
4. Patton, A. J., & **Braun, R. C.** (2022). Management of fine fescues. *Purdue University*, TURF-65-W. April (2022).
5. Patton, A. J., & **Braun, R. C.** (2022). Recommended fine fescue cultivars for Indiana turf. *Purdue University*, TURF-66-W. April (2022).
6. Patton, A. J., **Braun, R. C.**, Reiter, M., Watkins, E., Kowalewski, A., Koch, P., & Murphy, J. (2021). Fine fescues in minimal-to-no-mow areas. *Purdue University, University of Minnesota, Oregon State University, University of Wisconsin, Rutgers University*, TURF-67-W April (2022).
7. Patton, A. J., & **Braun, R. C.** (2022). Measuring turf areas. *Purdue University*, TURF-24-W.
8. Hoyle, J. A., & **Braun, R. C.** (2018). Watering your lawn. *Kansas State University Agriculture Experiment Station and Cooperative Extension Service*, MF2059. April (2018).
9. Hoyle, J. A., & **Braun, R. C.** (2018). Aerating your lawn. *Kansas State University Agriculture Experiment Station and Cooperative Extension Service*, MF2130. February (2018).

#### Blog Posts, Social Media, and Websites (11)

<https://lowinputturf.umn.edu/>

1. **Braun, R.** & Patton, A. (2022). How much nitrogen fertilizer do fine fescues need during establishment? *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/how-much-nitrogen-fertilizer-do-fine-fescues-need-during-establishment>
2. **Braun, R.** & Patton, A. (2022). Six new fine fescue extension publications now available! *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/six-new-fine-fescue-extension-publications-now-available>
3. **Braun, R.** & Patton, A. (2021). Optimum seed date for fine fescue: Part 2. *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/optimum-seed-date-fine-fescue-part-2>
4. Patton, A., & **Braun, R.** (2021). Video: Identification tips for fine fescues. *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/video-identification-tips-fine-fescues>
5. **Braun, R.**, & Patton, A. (2020). Video: Research updates from Purdue University. *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/video-research-updates-purdue-university>
6. **Braun R.**, & A. Patton. (2020). What are the fine fescues? *Low Input Turf Using Fine Fescues*. <https://lowinputturf.umn.edu/news/what-are-fine-fescues>

<https://blogs.k-state.edu/turf/>

7. **Braun, R.** (2022). Two-Minute Turf Extension Video: It's Seeding Time! *Kansas State University Turfgrass Research and Extension Blog*. <https://www.youtube.com/watch?v=7SpP9p4DD5o>
8. Alderman, E., **Braun, R.**, & Hoyle, J. (2015). The art of knowing your seed label. *Kansas State University Turfgrass Research and Extension Blog*. <https://blogs.k-state.edu/turf/the-art-of-knowing-your-seed-label>
9. Hoyle, J., & **Braun, R.** (2014). Do you want green zoysiagrass, buffalograss, or bermudagrass in the winter? *Kansas State University Turfgrass Research and Extension Blog*. <https://blogs.k-state.edu/turf/do-you-want-green-zoysiagrass-buffalograss-or-bermudagrass-in-the-winter/>

<https://sustainable-secure-food-blog.com/>

10. **Braun, R.** (2022). What is sustainable turfgrass? *Sustainable, Secure Food Blog*. <https://sustainable-secure-food-blog.com/2022/07/07/what-is-sustainable-turfgrass/>

#### *Social media accounts*

11. Social media manager for USDA-SCRI-funded “Low-Input Turf” Accounts (2018–present)
  - a. Twitter (<https://twitter.com/LowInputTurf>), Facebook (<https://www.facebook.com/LowInputTurf>), Pinterest (<https://www.pinterest.com/lowinputturf/>), Instagram (<https://www.instagram.com/lowinputturf/>).

#### *Personal lab website*

12. Braun Turfgrass Lab (2022–present) <http://www.braunturfgrass.com/>

#### Grant Proposals Funded (awarded \$2,008,897)

1. **Braun, R.** (2024). 2024 National Tall Fescue Trial. *National Turfgrass Evaluation Program*. **Funded - \$10,000**
2. **Braun, R.** (2024). 2023 National Kentucky Bluegrass Trial. *National Turfgrass Evaluation Program*. **Funded - \$5,000**
3. **Braun, R.** (2024). Increasing the Diversity of Sod Production Through Sustainable Turfgrass Adoption. *U.S Department of Agriculture (USDA), Agricultural Marketing Service (AMS) Specialty Crop Multi-State Program (SCMP)*. **Funded - \$993,207**
4. **Braun, R.** (2024). Braun turfgrass program – 6 Experiments related to sod production, seed coating and storage, and warm-season input assessments. *Kansas Turfgrass Foundation*. **Funded - \$15,000**
5. **Braun, R.** (2024). Management cost and input comparisons of seeded vs. sodded turfgrass areas - Year 2. *Heart of America Chapter of Golf Course Superintendents Association of America*. **Funded - \$7,000**
6. **Braun, R.** (2023). Contributions of Turfgrass to Soil Quality, Soil Health, and Sustainability of Urban and Suburban Environment. *Responsible Industry for a Sound Environment (RISE)*. **Funded - \$25,000**
7. **Braun, R.** (2023). Evaluation of fine fescue cultivar performance in Kansas. *Blue Moon Farms*. **Funded - \$7,500**
8. **Braun, R.** (2023). Quantifying the Influence of the Aggressiveness and Ratio of Kentucky Bluegrass on Sod Strength of Tall Fescue-Kentucky Bluegrass Seed Mixtures. *The Lawn Institute*. **Funded - \$31,251**
9. **Braun, R.** (2023). Cool-season water use review articles. *United States Golf Association*. **Funded - \$3,000**
10. **Braun, R.** (2023). Braun turfgrass program – 9 experiments related to sod production, seed coating and storage, and warm-season input assessments. *Kansas Turfgrass Foundation*. **Funded - \$15,000**
11. **Braun, R.** (2023). Management cost and input comparisons of seeded vs. sodded turfgrass areas. *Heart of America Chapter of Golf Course Superintendents Association of America*. **Funded - \$7,500**
12. Chandra, A., Segars, C., Fry, J., Patton, A., **Braun, R.** & Torres, A. (2022). FARM to LAWN: Enhancing the production, establishment, and marketability success of zoysiagrass sod. U.S Department of Agriculture (USDA), Agricultural Marketing Service (AMS) Specialty Crop Multi-State Program (SCMP) (USDA-AMS-TM-SCMP). **Funded - \$748,040**
13. Patton, A., & **Braun, R.** (2020). Sod strength characteristics of 24 fine fescue cultivars. *The Lawn Institute*. **Funded - \$22,847**.
14. **Braun, R.**, & Patton, A. (2020). Investigation of water submersion tolerance of fine fescues (*Festuca* spp.) in comparison to other cool-season turfgrass species. *Golf Course Superintendents Association of America*. **Funded - \$26,373**.
15. Patton, A., & **Braun, R.** (2019). Identification of successful nitrogen fertilization establishment regimes for fine fescue sod production. *The Lawn Institute*. **Funded – \$7,437**.
16. **Braun, R.**, & Bremer, D. (2017). Simulation of nitrous oxide emissions and carbon sequestration in zoysiagrass fairway turf using the DAYCENT model. *United States Golf Association*. **Funded – \$76,812**.
17. Bremer, D., Hoyle, J., & **Braun, R.** (2015). Performance and recovery of four turfgrass species subjected to golf cart traffic during prolonged drought. *Golf Course Superintendents Association of America*. **Funded - \$7,930**.

#### INVITED PRESENTATIONS

##### **Extension/Outreach (100) (Estimated audience reach of >12,000 industry professionals)**

1. “Does turfgrass seed coating actually help?” (2024). *Kansas State University Turf & Ornamentals Field Day*, Manhattan, KS.
2. “Tall fescue and Kentucky bluegrass sod options” (2024). *Kansas State University Turf & Ornamentals Field Day*, Manhattan, KS.
3. “Herbicide tolerance of 11 grass species for minimal-to-no mow golf course rough areas” (2024). GCSAA 2024 Conference, Phoenix, AZ.
4. “Distinguishing fine fescues: A comprehensive guide to proper utilization” (2024). GCSAA 2024 Conference, Phoenix, AZ.
5. “Managing perennial ryegrass seedheads to improve turf quality” (2024). GCSAA 2024 Conference, Phoenix, AZ.

6. "Turf traffic management during suboptimal growing conditions" (2023). *73<sup>rd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
7. "Customized agronomic programs for better turf results" (2023). *73<sup>rd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
8. "Mowing Basics" (2023). *73<sup>rd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
9. "Cultivation" (2023). *73<sup>rd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
10. "Fine fescue and tall fescue NTEP trials" (2023). *Kansas State University Turf & Ornamentals Field Day*, Olathe, KS.
11. "Drought tolerant lawns of Kansas - Warm Season Turfgrasses" (2023). *K-State Garden Hour*, online.
12. "Managing minimum to no-mow areas of the golf course" (2023). *Nebraska Turf Conference*, La Vista, NE.
13. "Busting weed control myths" (2023). *Nebraska Turf Conference*, La Vista, NE.
14. "Seeding tips for turf areas" (2023). *Nebraska Turf Conference*, La Vista, NE.
15. "Managing minimum to no-mow turf areas on the golf course and landscape" (2022). *72<sup>nd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
16. "New Zoysia Update" (2022). *72<sup>nd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
17. "Mowing Basics" (2022). *72<sup>nd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
18. "Cultivation" (2022). *72<sup>nd</sup> Annual Kansas Turf and Landscape Conference*, Manhattan, KS.
19. "Managing minimum to no-mow areas of the golf course" (2022). *Washington Turf and Landscape Show*, Virtual.
20. "Busting weed control myths" (2022). *Washington Turf and Landscape Show*, Virtual.
21. "New zoysiagrass cultivars finds its way out!" (2022). *Kansas State University Turf & Ornamentals Field Day*, Haysville, KS.
22. "Busting weed control myths" (2022). *Iowa Pesticide Applicators Continuing Instruction Course Program*, Virtual (2,280 attendees).
23. "Using fine fescues successfully in Indiana" (2022). *Indiana Green Expo Online*, Virtual.
24. "Sod production research at Purdue" (2022). *Indiana Green Expo Online*, Virtual.
25. "Turf cultural practices" (2022). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. March
26. "Management of turf weeds" (2022). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. March.
27. "Using fine fescues successfully in Indiana" (2022). *Indiana Green Expo*, Indianapolis, IN.
28. "Sod production research at Purdue" (2022). *Indiana Green Expo*, Indianapolis, IN.
29. "Turf math: Making the complicated seem simple" (2022). *Indiana Green Expo*, Indianapolis, IN.
30. "Busting weed control myths" (2021). *Iowa Pesticide Applicators Continuing Instruction Course Program*. Online.
31. "Seeding tips for home lawns and sports fields" (2021). *Turf and Landscape Seminar*. Online.
32. "Turf traffic management during suboptimal growing conditions" (2021). *Turf and Landscape Seminar*. Online.
33. "Busting weed control myths" (2021). *Indiana Professional Lawn & Landscape Association*. Danville, IN.
34. "Managing perennial ryegrass seedheads to improve turf quality" (2021). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
35. "How turfgrass grows: The basics of turf maintenance" (2021). *Pest Management and Lawn Maintenance: A Workshop for Lawncare Professionals*. Online. June.
36. "Turf cultural practices" (2021). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. March
37. "Management of turf weeds" (2021). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. March.
38. "Helpful advice for identifying turfgrasses" (2021). *Michigan Green Industry Association 34th Annual Trade Show & Convention*. Online.
39. "Busting weed control myths" (2021). *Michigan Green Industry Association 34th Annual Trade Show & Convention*. Online.
40. "Preemergence herbicides you can use when seed goes down" (2021). *Michigan Green Industry Association 34th Annual Trade Show & Convention*. Online.
41. "Fine fescue sod production" (2021). *Turf Producers International online series*. Online.
42. "Seeding tips for sports fields" (2021). *Indiana Green Expo*. Online.
43. "Busting weed control myths" (2021). *Indiana Green Expo*. Online.
44. "How turfgrass grows: The basics of turf maintenance" (2020). *Pest Management and Lawn Maintenance: A Workshop for Lawncare Professionals*. Online. December.
45. "Busting weed control myths" (2020). *70<sup>th</sup> Annual Kansas Turfgrass Conference*. Online.
46. "Developing a weed control program" (2020). *70<sup>th</sup> Annual Kansas Turfgrass Conference*. Online.

47. "Preemergence herbicides you can use when seed goes down" (2020). *70<sup>th</sup> Annual Kansas Turfgrass Conference*. Online.
48. "Busting weed control myths" (2020). *2020 Herbicide Workshop*. Online.
49. "Busting weed control myths" (2020). *Turf and Landscape Seminar*. Online.
50. "Managing minimal-to-no mow areas on the golf course" (2020). *Turf and Landscape Seminar*. Online.
51. "How turfgrass grows: The basics of turf maintenance" (2020). *Pest Management and Lawn Maintenance: A Workshop for Lawncare Professionals*. West, Lafayette, IN. October.
52. "What are fine fescues and how can you use them?" (2020). *Illinois Landscape Contractors Association Turf Education Day*. Online.
53. "Busting weed control myths" (2020). *Illinois Landscape Contractors Association Turf Education Day*. Online 8/20.
54. "Steps for successful fine fescue establishment" (2020). *Golf Course Superintendents Association of America (GCSAA) Webinar Series*. Online.
55. "Zoysiagrasses for the Midwest: Research updates" (2020). *Purdue Turf and Landscape Field Day*. Online.
56. "Fine fescue establishment and management: Research updates" (2020). *Purdue Turf and Landscape Field Day*. Online.
57. "How turfgrass grows: The basics of turf maintenance" (2020). *Pest Management and Lawn Maintenance: A Workshop for Lawncare Professionals*. Online. June.
58. "Turf cultural practices" (2020). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 26.
59. "Management of turf weeds" (2020). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 26.
60. "Steps to successful fine fescue establishment" (2020). *Indiana Green Expo*, Indianapolis, IN.
61. "Turf cultural practices" (2020). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 4.
62. "Management of turf weeds" (2020). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 4.
63. "The art of knowing your turfgrass seed label, and identification, calculation, and establishment tips" (2019). *Turf and Landscape Seminar*, West Lafayette, IN.
64. "Environmental and management impacts in turfgrass systems: nitrous oxide emissions and carbon sequestration" (2019). *2019 Horticulture and Landscape Architecture Seminar*, Purdue University. West Lafayette, IN.
65. "Helpful advice for identifying turfgrasses" (2019). *Lawn Care Diagnostic Training*, West Lafayette, IN.
66. "Low-input options for grassing Indiana lawns" (2019). *Lawn Care Diagnostic Training*, West Lafayette, IN.
67. "Fixing dead spots: The number one reason homeowners fire their lawn care company" (2019). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
68. "Zoysiagrass for roughs in Indiana? Low maintenance options" (2019). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
69. "Performance of low input grasses" (2019). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
70. "Turf cultural practices" (2019). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 20.
71. "Management of turf weeds" (2019). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 20.
72. "Enhancing winter aesthetics of warm season turf" (2019). *Professional Landscape Management School*, Evansville, IN.
73. "Turf cultural practices" (2019). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 13.
74. "Management of turf weeds" (2019). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN. February 13.
75. "Consumer preferences in lawns" (2019). *Indiana Green Expo*, Indianapolis, IN.
76. "Using pigments and colorants on dormant warm season turf" (2019). *Indiana Green Expo*, Indianapolis, IN.
77. "Customized agronomic programs for better turf results" (2018). *Turf and Landscape Seminar*, West Lafayette, IN.
78. "What are fine fescues and how can you use them?" (2018). *Lawn Care Diagnostic Training*, West Lafayette, IN.
79. "Where does all the nitrogen go after an application?" (2018). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
80. "Weed ID and control tour" (2018). *Purdue Turf and Landscape Field Day*. West Lafayette, IN.
81. "Turf cultural practices" (2018). *Commercial Pesticide Applicator Category 3b: Turf Management Training Program*. West Lafayette, IN.
82. "Weed ID & management in turf" (2017). *Commercial Pesticide Applicator Recertification Workshop*. Wichita, KS.
83. "Disease ID & management in turf" (2017). *Commercial Pesticide Applicator Recertification Workshop*. Wichita, KS.

84. "Performance and recovery of turfgrasses subjected to golf cart traffic during prolonged drought" *United States Golf Association Turfgrass Environmental Research Committee*, Site visit to Kansas State University, Manhattan, KS.
85. "Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and N fertilization" *United States Golf Association Turfgrass Environmental Research Committee*, Site visit to Kansas State University, Manhattan, KS.
86. "Environmental stewardship: Can smarter fertilizer and irrigation practices reduce greenhouse gas emissions?" (2016). *66<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
87. "'No carts today' - The effects of traffic on drought-stressed turfgrasses" (2016). *66<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
88. "Carts during drought - How does the turf respond?" (2016). *Kansas State University Turf & Ornamentals Field Day*, Manhattan, KS.
89. "Water use management" (2015). *65<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
90. "Fertilization" (2015). *65<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
91. "Managing turfgrass under stress" (2015). *Kansas State University Turf & Ornamentals Field Day*, Olathe, KS.
92. "Waterwise solutions with warm season grass turf" (2015). *Kansas Water Symposium*, Hesston, KS.
93. "Colorants for warm-season grasses" (2014). *64<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
94. "Mowing basics" (2014). *64<sup>th</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
95. "Using colorants and paints" (2014). *Kansas State University Turfgrass Field Day*, Manhattan, KS.
96. "Managing turfgrass in HD: Paints, pigments, and more" (2013). *63<sup>rd</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
97. "Mowing basics" (2013). *63<sup>rd</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
98. "Fertilization" (2013). *63<sup>rd</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.
99. "Painting dormant warm-season grasses green" (2013). *Kansas State University Turfgrass Field Day*, Haysville, KS.
100. "Mowing basics" (2012). *62<sup>nd</sup> Annual Kansas Turfgrass Conference*, Topeka, KS.

## Academic Symposia (14)

### Oral

1. "Nitrogen fertilizer and clover inclusion effects on the establishment of fine fescue taxa" (2021). *ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT.
2. "Recommended taxonomic classifications of fine fescue taxa used in turfgrass systems" (2020). *ASA, CSSA and SSSA International Meetings*, Online.
3. "Evaluation of low-input turfgrass patch and repair ingredients" (2019). *ASA, CSSA and SSSA International Meetings*, San Antonio, TX.
4. "Performance and recovery of four turfgrass species subjected to golf cart traffic during prolonged drought" (2016). **1<sup>st</sup> Place**. Graduate Student Oral Competition: Golf Turf Management. *ASA, CSSA and SSSA International Meetings*, Phoenix, AZ.
5. "Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and N fertilization" (2015). **2<sup>nd</sup> Place**. Graduate Student Oral Competition: Turfgrass Cultural Practices, Ecology and Environment. *ASA, CSSA and SSSA International Meetings*, Minneapolis, MN.
6. "Enhancing winter aesthetics of zoysiagrass in the transition zone" (2015). Graduate Student Competition. *Kansas State Graduate Research, Arts and Discovery Forum*, Manhattan, KS.
7. "Enhancing winter aesthetics of zoysiagrass in the transition zone" (2014). Graduate Student Competition: Weeds, Diseases, and Growth Regulation. *ASA, CSSA and SSSA International Meetings*, Long Beach, CA.

### Poster

1. "Evaluation of harvest and storage limitations of low-input cool-season mixtures for sod production" (2021). *ASA, CSSA and SSSA International Meetings*, Salt Lake City, UT.
2. "Evaluation of low-input turfgrass patch and repair ingredients" (2019). *ASA, CSSA and SSSA International Meetings*, San Antonio, TX.
3. "Postemergence herbicide tolerance of buffalograss entering winter dormancy" (2018). *ASA, CSSA and SSSA International Meetings*, Baltimore, MD.
4. "Mowing timing doesn't affect common broadleaf herbicide efficacy" (2017). *ASA, CSSA and SSSA International Meetings*, Tampa, FL.
5. "Nitrous oxide emissions in a turfgrass environment" (2017). **1<sup>st</sup> Place**. Graduate Student Competition. *Kansas State Graduate Research, Arts and Discovery Forum*, Manhattan, KS.
6. "Nitrous oxide emissions in a turfgrass environment" (2016). **3<sup>rd</sup> Place**. Graduate Student Competition: Turf Ecology and Management. *ASA, CSSA and SSSA International Meetings*, Phoenix, AZ.

7. "Nitrous oxide emissions and carbon sequestration in turfgrass: Effects of irrigation and N fertilization. (2015). Graduate Student Competition. *Research and the State*. Manhattan, KS.

#### Interviews

##### **CSA News Magazine** (<https://access.onlinelibrary.wiley.com/toc/23253584/2023/68/9>)

- Coyne, K. (2023). Maintaining Turf in a Changing Climate. *CSA News*, 68(9), 4-11. <https://doi.org/10.1002/csan.21113>  
(I also provided the cover image of this volume)

##### **Kansas State Agriculturist Magazin** - Interview with K. Johnson in "Turf Titans" , pg. 70-71.

- <https://www.flipsnack.com/kstateagcomaged/fall-2024-agriculturist-magazine/full-view.html>

##### **Emerging Trends - Frankly Speaking with Dr. Ross Braun Podcast Interview**

- Available on TurfNet Radio podcast on Spotify or Apple Music  
[https://www.turfnet.com/podcasts/rossi/emerging\\_trends\\_ross\\_braun/%E2%80%8B](https://www.turfnet.com/podcasts/rossi/emerging_trends_ross_braun/%E2%80%8B)

##### **Turfgrass Epistemology Channel/Posdcast**

- Discussion with Dr. Travis Shaddox on "Do new turfgrasses need less fertilizer and pesticides?"
- <https://www.youtube.com/live/1i--97imRak?si=pi-DYcgnRa1eZzV2>

#### LEADERSHIP, SERVICE, & MEMBERSHIP RECORD

##### **National/International**

1. North American Colleges & Teachers of Agriculture, lifetime member, 2022-present
2. International Turfgrass Society, 2018-present.
3. Turfgrass Producers International (TPI), Educator, 2022-present.
4. Irrigation Association, Lifetime Technical Member, 2022-present.
5. American Society of America, Crop Science Society of America, and Soil Science Society of America (ASA, CSSA, SSSA), 2014–present.
6. American Society of Horticultural Science (ASHS), Professional, 2014–present.
7. Golf Course Superintendents Association of America (GCSAA), 2008–present.
8. Judge for C-5 Graduate Student Competitions, ASA, CSSA and SSSA *International Meetings*. 2020–present
9. Judge for Collegiate Turf Bowl, Golf Course Superintendents Association of America (GCSAA), 2023–present
10. *Ad hoc* manuscript reviewer for: Crop Science, Agronomy Journal, Crop, Forage and Turfgrass Management, International Turfgrass Research Journal, HortTechnology, HortScience, Journal of Environmental Quality, European Journal of Horticultural Science, Natural Sciences Education, Journal of American Water Resources Association, Agrosystems Geosciences & Environment, Urban Ecosystems, Agronomy. 2017–present.
11. Guest editor: Advancing Resilient Agricultural Systems: Adapting to and Mitigating Climate Change (special virtual issue across multiple journals by ASA, CSSA, SSSA).

##### **University/Local**

1. Director of Rocky Ford Turfgrass Research Center, 2022-present
2. Advisor of the K-State Chapter of the Golf Course Superintendents Association (GCSAA) Undergraduate Student Club, Kansas State University, 2022-present.
3. Board of Directors Member, Kansas State University Golf Course Management and Research Foundation, 2023-present
4. Horticulture and Landscape Architecture Diversity Committee, Purdue University, 2021–2022.
5. Riverside Covenant Church, West Lafayette, IN. (Youth group leader: 2021–2022), (Welcome team 2019–2021).
6. The First Green, The Fort Golf Course, Indianapolis, IN. September 2018.
7. Kansas State University Horticulture and Natural Resources Graduate Organization, 2013–2017 (President: 2015–2016).
8. Gamma Sigma Delta Honor Society, 2015–2018.
9. Kansas State University Graduate Student Council Participant, 2014–2017.
10. North Dakota State University (NDSU) Plant Sciences Curriculum Committee, 2009–2011.
11. North Central Turfgrass Association, 2009–2012 (Undergraduate Student Representative: 2010–2011).
12. North Dakota State University Student GCSAA Chapter, 2008–2012 (President: 2010–2011).
13. YouthFront Camp West service day volunteer, Edgerton, KS. 2015–2016.
14. Wildcat Ministries, Manhattan, KS. 2015–2017.
15. Habitat for Humanity ReStore volunteer, Manhattan, KS. 2015–2017.

16. National Society of Collegiate Scholars, 2008–2011.

#### SCHOLARLY AND PROFESSIONAL AWARDS & HONORS

1. 2022 Editor's Citation for Excellence Award for the Crop, Forage and Turfgrass Management Scientific Journal for outstanding professional contributions for manuscript review in 2022.
2. Top cited article 2021-2022 in *Agronomy Journal*, Investigation of cool-season species, seeding rate, and nitrogen fertilization in sod production: I. Establishment and sod tensile strength.
3. Top cited article 2020-2021 in *Crop Science* journal, Fine fescues: A review of the species, their improvement, production, establishment, and management.
4. Gamma Sigma Delta Graduate Student PhD Research Award, Kansas State University. 2017.
5. 1<sup>st</sup> Place Agricultural Sciences Poster Competition: *Kansas State University Graduate Research, Arts and Discovery Forum*, 2017.
6. 1<sup>st</sup> Place Graduate Student Oral Competition: Golf Turf Management. *ASA, CSSA and SSSA International Meetings*, 2016
7. 3<sup>rd</sup> Place Graduate Student Poster Competition: Turf Ecology and Management. *ASA, CSSA and SSSA International Meetings*, 2016.
8. Timothy R. Donoghue Graduate Scholarship, *Kansas State University*, 2014–2017.
9. Richard Elmore Brown Outstanding College of Agriculture Graduate Student Teaching Award, *Kansas State University*, 2016.
10. Chris Stiegler Turfgrass Science Student Travel Award, *ASA, CSSA and SSSA International Meetings*, 2015.
11. 2<sup>nd</sup> Place *ASA, CSSA and SSSA International Meetings* Photo Contest, 2015.
12. 2<sup>nd</sup> Place Graduate Student Oral Competition: Turfgrass Cultural Practices, Ecology and Environment. *ASA, CSSA and SSSA International Meetings*, 2015.
13. North Dakota State University Undergraduate Representative, *Jacobsen Future Turf Managers Program*, Charlotte, NC. 2012.
14. Graduated with honors of Magna Cum Laude, *North Dakota State University*, 2011.
15. North Dakota State University Academic Dean's List, 2008–2011.

#### CERTIFICATIONS

1. Kansas Department of Agriculture, 2023–present  
Kansas Commercial Pesticide Applicator License Number: 303998  
Categories(s): 3A & 3B (Core, Ornamentals, Turf Pest)
2. Office of Indiana State Chemist, West Lafayette, IN, 2018–2023  
Indiana Commercial Pesticide Applicator License Number: PB274276  
Categories(s): 3B (Core, Turf Management)
3. Minnesota Department of Agriculture, St. Paul, MN, 2011–2012  
Minnesota Non-Commercial Pesticide Applicator License Number: 20128343  
Categories(s): A & E (Core, Turf and Ornamentals)