

Seed Production of Fine Fescue Turfgrasses in Minnesota

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Turfgrass seed production in northern Minnesota

- Roseau and Lake of the Woods counties
- Kentucky bluegrass (*Poa pratensis*) 1950's 'Park'
- Currently 4,000 to 6,000 hectares of Perennial ryegrass (*Lolium perenne*)
- Turfgrass seed and legume seed – 50 million USD
- Fine fescue turfgrass seed?



Fine fescue turfgrasses are effective low – input turfgrasses!

- ✓ Reduced chemical inputs (Hugie et al. 2016)
- ✓ Tolerance to drought (Watkins et al. 2014)
- ✓ Tolerance to shade (Bonos et al. 2013)
- ✓ Tolerance to lead contaminated soils (Brown et al. 1992)
- ✓ Slower growth rate (Bonos et al. 2013)
- ✓ Winter hardiness (Bonos et al. 2013)

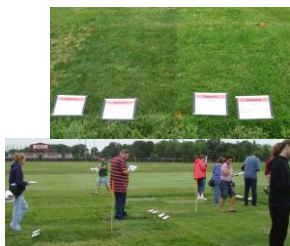
Photo Credit: Sam Bauer – FF turfgrass outside Minnesota Governor's Residence

Fine fescue variety trial, Roseau MN

Cultivar	Fescue species	Yield 2013 kg/ha	Yield 2014 kg/ha	Yield 2015 kg/ha
Windward	Chewings	172	1121	712
MNHD	Hard	77	1359	276
Culumbra II	Chewings	221	930	533
Barok	Sheep	5	761	229
Cindy Lou	Strong creeping red	220	460	146

Fertilizer application in 2014 mnturfseed.org 2016

Consumers value low-input attributes in turfgrasses



Important to meet consumer demand, how?

Turfgrass Attribute	Mean \$ per 1000 sq ft - USD
Irrigation less than once a week	9.70
Irrigation 1-2 times a week	5.85
Mowing - once a month	3.92
Mowing- every other week	2.97

Table 5 - Yue et al 2012



Consumer want low input attributes

Fine fescues have promise in management trials

Infrastructure already present in northern Minnesota/Growers adapt

Could Minnesota growers adopt fine fescue species for turfgrass seed production?



Investigate the effect of nitrogen fertility on fine fescue yield in northern Minnesota

Fine fescue species

Species	Common Name	Cultivar
<i>Festuca trachyphylla</i>	Hard fescue	'MNHD'
<i>Festuca ovina</i>	Sheep fescue	'Quatro'
<i>Festuca rubra</i> ssp. <i>commutata</i>	Chewings fescue	'Windward'
<i>Festuca rubra</i> ssp. <i>litoralis</i>	Slender creeping red fescue	'Cindy Lou'
<i>Festuca rubra</i> ssp. <i>rubra</i>	Strong creeping red fescue	'Shoreline'

Materials and methods

- Magnusson Research Farm in Roseau MN
- Soil Type: Borup Silt Loam
- Planted July 2016
- Seed production rows 5.6 kg ha⁻¹ seed density
- Plots were 6 m x 2 m,
- 3 rows of 25 plots



Nitrogen treatments (kg/ha)

	Fall Application	Spring Application	Total Nitrogen
Treatment 1	0	0	0
Treatment 2	22	22	44
Treatment 3		44	44
Treatment 4	44	44	88
Treatment 5		88	88

Materials and methods (cont.)

- Randomized complete block design (RCB) with three replications
- Harvesting: late June/early July
- One 1 square meter quadrat in 2017 and 2 in 2018
- Post harvest residue (clipping) removal
- Analyzed in R by year, package agricolae

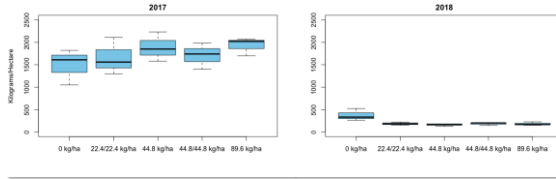


2017 & 2018 ANOVA Factorial Treatment Analysis – Seed yield in kg/ha

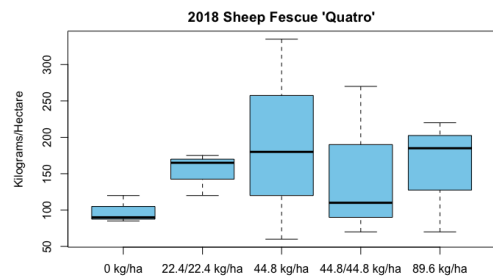
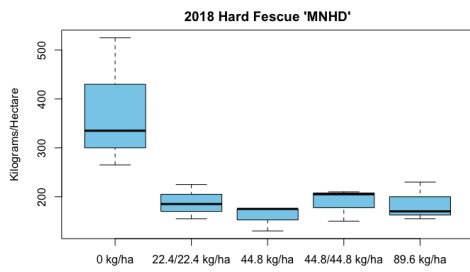
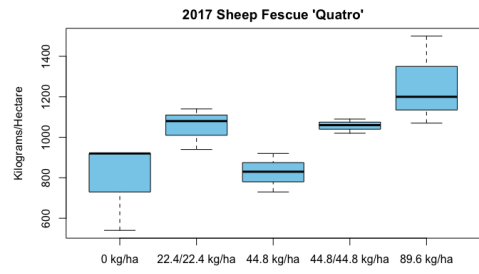
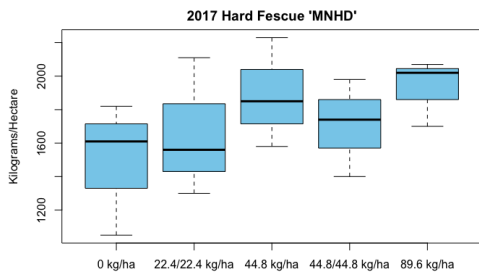
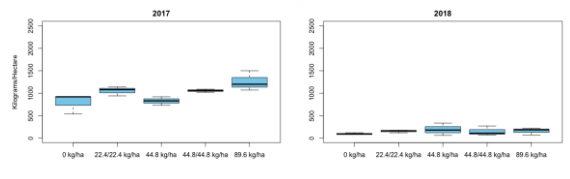
Variation	Degrees of Freedom	P-value 2017	P-value 2018
Blocks	2	0.00260 *	0.6004
Nitrogen Treatment (N)	4	0.00149 *	0.6479
Species Treatment (S)	4	< 2e-16 *	2.09e-10 *
(N)*(S)	16	0.04532 *	0.0117 *
Error	48		

Signif. codes: *** 0.05

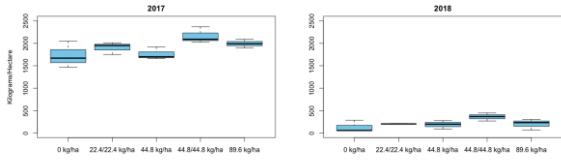
Hard fescue 'MNHD'



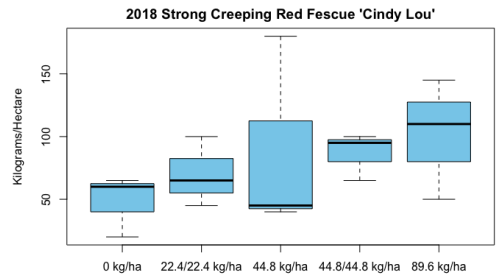
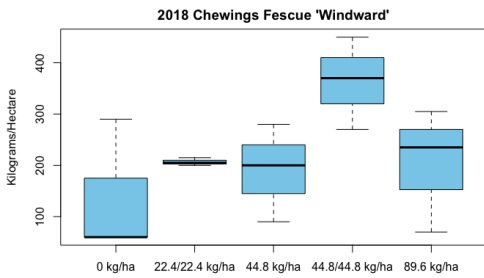
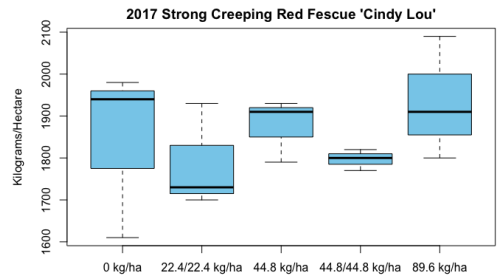
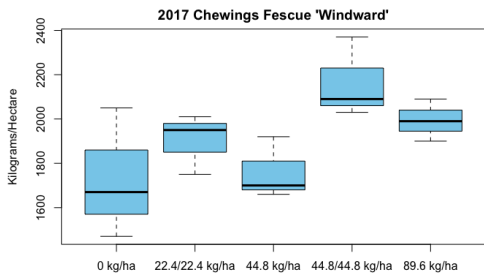
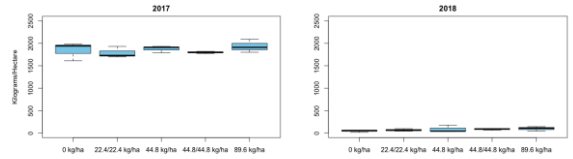
Sheep fescue 'Quatro'



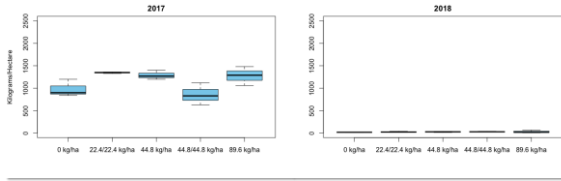
Chewings fescue 'Windward'



Strong creeping red fescue 'Cindy Lou'

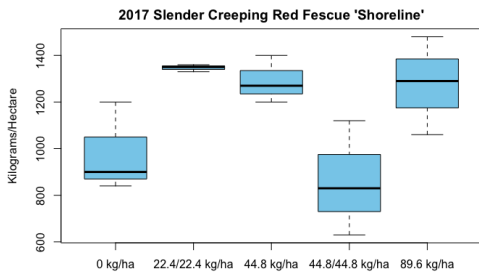


Slender creeping red fescue 'Shoreline'

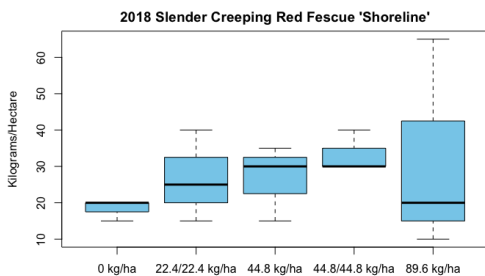


Summary of results

- There was a significant nitrogen species interaction 2017 & 2018
- Yields in 2017 were consistently higher than in 2018
- In 2017, hard fescue 'MNHD', Chewings fescue 'Windward', and strong creeping red fescue 'Cindy Lou' were among the highest yielding across nitrogen treatments 1800-2000 kg ha⁻¹
- 2017 sheep fescue 'Quatro' spring 89.6 kg N treatment yielded significantly different.
- 2018 hard fescue 'MNHD' no N treatment yielded significantly different



Could northern Minnesota growers adopt fine fescue species for turfgrass seed production?



Could Minnesota growers adopt fine fescue species for turfgrass seed production?

	Fine fescue	Perennial ryegrass
Range of yields	900-1800 kg ha ⁻¹	900-1600 kg ha ⁻¹
Price of seed (cost per lbs)	\$1.10 ~ \$1.20	\$.60
Profit margin	???	\$200 per acre
Years of seed production	2-3	1

Grafstrom 2018 Koeritz et al. 2013, Leah Brillman

Could Minnesota growers adopt fine fescue species for turfgrass seed production?

- Challenges of growing a fine fescue perennial cropping system
- Realize the value of fine fescue seed



Conclusion: Adequate yields are observed but...

Acknowledgements

- Minnesota Department of Agriculture Crop Research Grant
- Donn Velleckson
- Dave Grafstrom
- Turf lab.

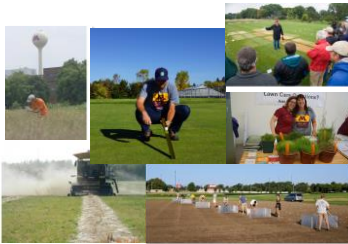


Photo credits: UMN Turf lab

Thank You Questions?



Photo: Dave Hansen