PRACTICAL farmers of Iowa
working together, always learning

Field Crops Research

Winter Triticale Seeding Rate

Staff Contact:
Stefan Gailans – (515) 232-5661
stefan@practicalfarmers.org

Web Link:
http://bit.ly/pfi_fieldcrops

Cooperator:
- **Paul Mugge - Sutherland**

Funding By:
This project is supported in part by
Walton Family Foundation

In a Nutshell

- Seeding rates of small grains, like triticale, are important to achieve optimal plant stands, yields and yield quality.
- Paul Mugge compared two seeding rates of winter triticale.

Key Findings

- The two seeding rates resulted in equivalent final plant populations and yields.

Project Timeline
2016

Paul Mugge stands in a field of triticale in June at his farm near Sutherland. Photo courtesy of Iowa State University.

Background

Crop rotations that include small grains along with corn and soybeans have been shown to improve productivity, profitability and environmental quality (Davis et al., 2012; Cambardella et al., 2015). Growing quality and high-yielding small grains is considered a challenge in Iowa due to climate conditions affecting plant growth and development (i.e., high heat and humidity during pollination or grain fill). Often times, careful crop management can help to overcome these challenges. Seeding date and seeding rate are chief among small grain crop management concerns. For fall-seeded small grains like winter wheat and winter triticale, growers must take into account anticipated winter survival when deciding on seeding date and rate. Typically, seeding rate is increased as seeding date is delayed into the fall. An optimal plant population for fall-seeded small grains ranges between 900,000 and 1.3 million plants/ac (21–30 plants/ft^2) (Hansen, 1994; Wiersma et al., 2010). With that range in optimal plant population in mind, the objective of this study was to determine the effect on winter triticale yield resulting from two seeding rates. Paul typically seeds at 90-100 lb/ac but has a hunch that triticale needs to be seeded at a higher rate.

Methods

Farmer-cooperator, Paul Mugge, conducted this trial on his organic farm near Sutherland in O'Brien County in NW Iowa. Treatments were winter triticale seeded at two rates: 85 vs. 135 lb/ac. Paul implemented five replications (10 paired strips total) with strips measuring 30 ft wide and running the length of the field (approx. 3,000 ft).

Winter triticale was drilled into strips for both seeding rate treatments on Oct. 15, 2015. Row width was 8 in. Triticale was drilled into soybean stubble. Red clover was frost-seeded into triticale at a rate of 13 lb/ac the following spring on March 22, 2016 as a green manure cover crop for next year's corn.

Stand counts were collected near harvest in July.

Triticale was harvested from each strip separately on July 14, 2016, weighed with a weigh wagon and yields were corrected for 13% moisture.

Data were analyzed using JMP Pro 12 statistical software (SAS Institute Inc., Cary, NC). Means separations between treatments are reported using the least significant difference (LSD) generated from a t-test. Statistical significance is reported at the $P \leq 0.05$ level.

Results and Discussion

Mean monthly temperature and total monthly rainfall for the experimental period near Paul's farm compared to the long-term averages is presented in **Table 1** (Iowa Environmental Mesonet, 2016). November and December 2015 were particularly warmer and wetter than average. These made for very favorable conditions for winter triticale establishment and winter survival. Paul estimated 80% germination and establishment across the two seeding rates. June 2016 was quite drier than normal which reduced potential for disease pressure.

Winter triticale stands

Paul collected stand counts from strips just before harvest in July. Final plant populations coming were 30 vs. 31 plants/ft^2 for the 85 and 135 lb/ac seeding rates, respectively. These final plant populations were not significantly different (LSD = 6; $P \leq 0.05$). These populations also fall within the recommended range of 21–30 plants/ft^2 for fall-seeded small grains (Hansen, 1994; Wiersma et al., 2010).

Winter triticale yields

Figure 1 shows the triticale yields Paul observed from each individual strip as well as the means for both treatments. Mean yield of the triticale seeded at 85 lb/ac was 72 bu/ac while mean yield of triticale seeded at 135 lb/ac was 74 bu/ac. The calculated LSD was 4 bu/ac, thus, the seeding did not result in any significant effect on triticale yields. Looking at the yields for individual replications bears this out as there was little difference in yield observed among all the strips.

Economic considerations

Paul reported the cost of the triticale seed as $0.24/lb ($12/50-lb bag). Thus, the 85 lb/ac seeding rate cost $20.40/ac and the 135 lb/ac seeding rate cost $32.40. Given that there were no differences in yield (**Figure 1**) the $12 disparity between the two seeding rates is effectively an unnecessary increase in expense.

Conclusions and Next Steps

In conducting this trial, Paul Mugge wanted to determine if he should be seeding his winter triticale at a higher rate than he has previously (90-100 lb/ac). That the two seeding rates (85 lb/ac vs. 135 lb/ac) resulted in equivalent final plant populations and yields came as somewhat of a surprise. "Trial results depend a lot on weather and other variables not controlled for," Paul says. Though he still suspects he needs to seed winter triticale higher than 85 lb/ac, Paul is not going to up the rate too much: "I think I will shoot for 100-105 lb/ac this fall."

Table 1

Mean monthly temperature and total monthly rainfall for October 2015–July 2016 and long-term averages near Paul Mugge's farm

Month[a]	Temperature (˚F)		Rainfall (in.)	
	2015-16	*Average*	*2015-16*	*Average*
Oct. '15	55	51	1.89	1.95
Nov. '15	40	35	5.87	1.26
Dec. '15	27	21	3.27	0.88
Jan. '16	15	16	0.58	0.61
Feb. '16	25	22	1.42	0.79
Mar. '16	39	34	2.00	1.67
Apr. '16	47	48	3.42	2.81
May '16	58	60	4.53	3.73
Jun. '16	72	70	2.49	4.66
Jul. '16	71	74	2.87	3.81

[a] Rainfall and temperature data were accessed from the Primghar (65 years; 11 mi. from Paul's) weather station (Iowa Environment Mesonet, 2016).

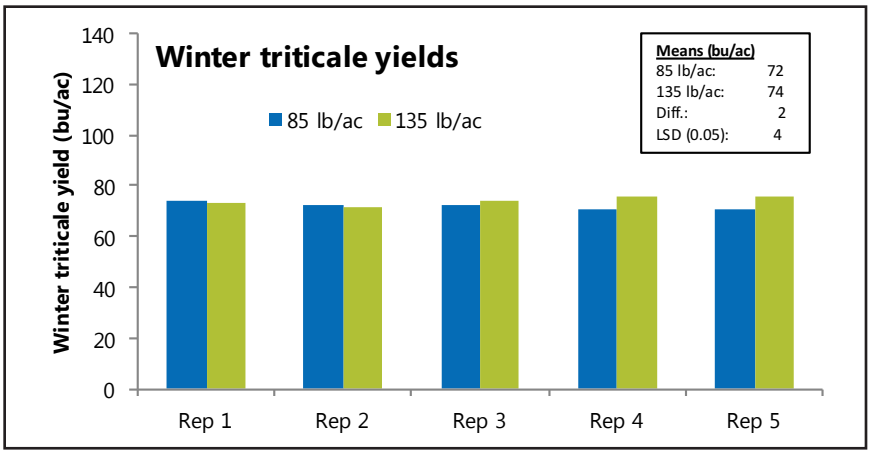

Figure 1. Winter triticale yields from each of the 10 strips across the five replications at Paul Mugge's farm near Sutherland in O'Brien County in 2016. Triticale was seeded on Oct. 15, 2015 and harvested on July 14, 2016. Mean yields and the least significant difference (LSD) at the $P \leq 0.05$ level are indicated in the inset table. If the difference between the two treatment means is greater than the LSD, the treatments are considered significantly different.

References

Cambardella, C., K. Delate, and D. Jaynes. 2015. Water quality in organic systems. Sustainable Agriculture Research. 4:60-69. http://www.ccsenet.org/journal/index.php/sar/article/download/50106/26958 (accessed Apr. 29, 2016).

Davis, A., J. Hill, C. Chase, A. Johanns, and M. Liebman. 2012. Increasing cropping system diversity balances productivity, profitability and environmental health. PLoS ONE 7: e47149. doi: 10.1371/journal.pone.0047149. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0047149 (accessed Apr. 27, 2016).

Hansen, R. 1994. Small grain production for Iowa–Winter. PM 1498. Iowa State Univ. Extension. Ames, IA.

Iowa Environmental Mesonet. 2016. Climodat Reports. Iowa State University, Ames, IA. http://mesonet.agron.iastate.edu/climodat/ (accessed Sept. 23, 2016).

Wiersma, J., K. Moncada, and M. Brakke. 2010. Small Grains. In Risk Management for Organic Producers. K. Moncada and C. Sheaffer (eds.). Univ. Minnesota. St. Paul, MN. http://organicriskmanagement.umn.edu/sites/organicriskmanagement.umn.edu/files/small_grains.pdf (accessed Apr. 27, 2016).

PFI Cooperators' Program

PFI's Cooperators' Program gives farmers practical answers to questions they have about on-farm challenges through research, record-keeping, and demonstration projects. The Cooperators' Program began in 1987 with farmers looking to save money through more judicious use of inputs. If you are interested in conducting an on-farm trial contact Stefan Gailans @ 515-232-5661 or stefan@practicalfarmers.org.