Table 2b Analysis of variance and mean comparison for wheat yield and protein content at Melita, Roblin, Arborg and Carberry in 2019

		Location							
		Melita		Roblin		Carberry		Arborg	
		Yield kg ha^{-1}	Protein%	Yield kg ha^{-1}	Protein%	Yield kg ha^{-1}	Protein%	Yield kg ha^{-1}	Protein%
Variety†	1	3974a	14.4c	4802	12.6b	4459	13.9	5860a	12.1b
	2	3688b	15.8a	4361	13.8a	4879	13.7	5188b	13.5a
	3	4150a	15.2b	4646	11.4c	4621	13.8	5728a	12.3b
Fert‡	1	3901	15.2	4175b	12.2b	4442b	14.3a	5466	12.4b
	2	3974	15.2	5031a	13.0a	4864a	13.4b	5718	12.9a
Var*Fert	1*1	4000	14.5d	4228	12.4	4470	14.5	5823	12.1
	2*1	3682	15.6b	3761	13.5	4662	14.1	5140	13.0
	3*1	4020	15.4bc	4536	10.6	4194	14.2	5434	12.0
	1*2	3948	14.4d	5375	12.7	4449	13.4	5898	12.1
	2*2	3694	16a	4961	14.1	5097	13.3	5235	14.0
	3*2	4280	15.2c	4757	12.3	5047	13.4	6022	12.6
P values	**Var**	**0.001**	**<0.001**	0.574	**<0.001**	0.524	0.909	**0.036**	**0.001**
	Fert	0.324	0.891	**0.029**	**0.003**	0.182	**0.035**	0.212	**0.027**
	Var*Fert	0.213	**0.049**	0.441	0.082	0.504	0.933	0.481	0.236
	CV%	4	1	16	4			7	4

†Variety 1=Elevate, Variety 2=Gateway, Variety 3=Wildfire; ‡Fert 1=100% Spring applied, Fert 2=Balanced application

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3.0 Fusarium Head Blight Winter Wheat, Spring Wheat, Barley and Durum

Project duration: 2018/19-2020/21
Collaborators: Dr. Paul R. Bullock, Manasah Mkhabela –University of Manitoba

Objectives

To develop models for a more accurate prediction of Fusarium Head Blight (FHB) in wheat, barley and durum under weather conditions that prevail on the Prairies

Background

Fusarium Head Blight (FHB), also known as head scab, is a devastating disease of wheat, barley and durum with a worldwide distribution especially in areas where weather conditions are warm and humid. The fungal disease is capable of causing significant losses in grain yield, test weight and seed germination. In addition to losses in grain yield, fusarium species produce mycotoxins such as deoxynivalenol (DON) in suitable environments, which compromise grain quality as well as the lives of humans and livestock (Prandini et al. 2008). There are various prediction models currently in place but more accurate and specific ones are essential, especially for varying Prairie weather conditions. These tools are essential in assisting producers with estimates of FHB risk levels and develop plans to curb the disease either through timing of fungicide sprays or timing of planting. Some of the available models that are currently in use include; the Penn State and the Ontario DonCast models. Because of their specificity to their place of origin, very few models have been adapted to other regions that experience varying weather conditions (Giroux et al. 2016), hence the need to develop or modify existing models to suit Prairie environmental conditions. Given the severe losses in production and quality caused by the FHB, the ability to accurately predict its occurrence will play a significant role in reducing year to year risk for producers. Therefore, modification of the already available models would be essential for accurate prediction of FHB based on weather conditions on the Prairies.

Materials and Methods

Five plot sites in each of the three Prairie provinces, Alberta, Manitoba and Saskatchewan were established in 2018/19 growing season. Winter wheat, spring wheat, durum and barley were laid out in a split plot design with 4 main plots for crop type and a randomized complete block design of 4 replicates and 3 varieties inside each main plot (except durum – 1 variety) for a total of 10 treatments. As a result of a shortage of seed, winter wheat was only replicated 3 times during the 2018/19 growing season but an additional replicate will be added in successive years.

Melita location was established on Waskada loam soil under no till system and on oat stubble. Winter wheat was seeded on 21 September 2018 while spring wheat, barley and durum were seeded on 14 May 2019. Preemergence weed control in winter wheat was done using 0.75 L ac^{-1} Roundup, 0.021 L ac^{-1} Heat LQ tank mixed with 0.2 L ac^{-1} Merge surfactant, while no herbicides were applied as burn off for spring cereals. Post emergence weed control in barley and spring wheat was done using 0.5 L ac^{-1} Mextrol, 0.15 L ac^{-1} Puma and 0.48 L ac^{-1} Axial while only Mextrol and Puma were applied in durum at the same rate.

Fertilizer application for winter wheat was done first at seeding at a rate of 67.7-35-0-0 (N-P-K-S) actual lb ac^{-1} followed by top dressing with 60 lb ac^{-1} N in spring. For spring seeded cereals, fertilizer was side banded during seeding at a rate of 108-35-20-7-2Zn (N-P-K-S) actual lb ac^{-1}. Seeding depth for winter wheat was 0.5" while 1" depth was used for spring cereal as a result of differences in soil moisture at time of seeding. Adhesive type spore traps were installed at 2 central spots within the plots at the beginning of anthesis (BBCH 61) to capture FHB spores. The spore traps were replaced weekly for 4 weeks ensuring the traps were place at the same height as the cereals in the plots. Additional data collected included; plant counts, days to heading, maturity, harvest, protein content, thousand kernel weight, grain moisture content at harvest, FHB score on affected head and weed pressure where necessary. Grain analysis for protein and moisture was done at WADO using IM9500 NIR grain analyzer. The data were analyzed by the collaborator at the University of Manitoba.

Fusarium Head Blight rating in wheat at Melita, July 2019

Results and Discussion

The research trial is in its first year and progress report will be made available upon completion of the analysis by the collaborators.

References

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