Efficacy of Strobilurin Fungicides on Yield and Milling Quality Traits in Red Lentil

Presented by
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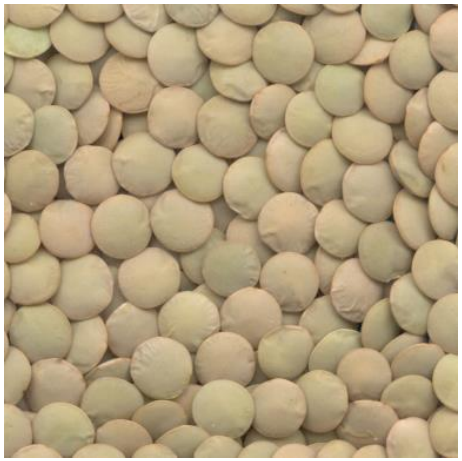
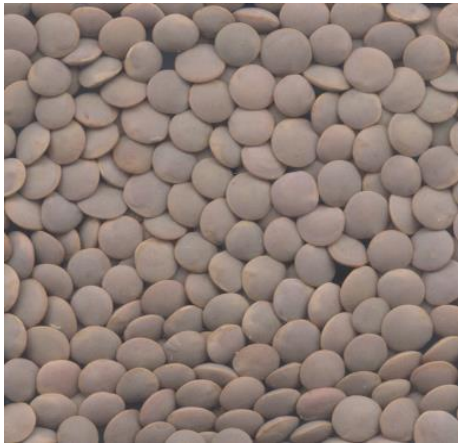
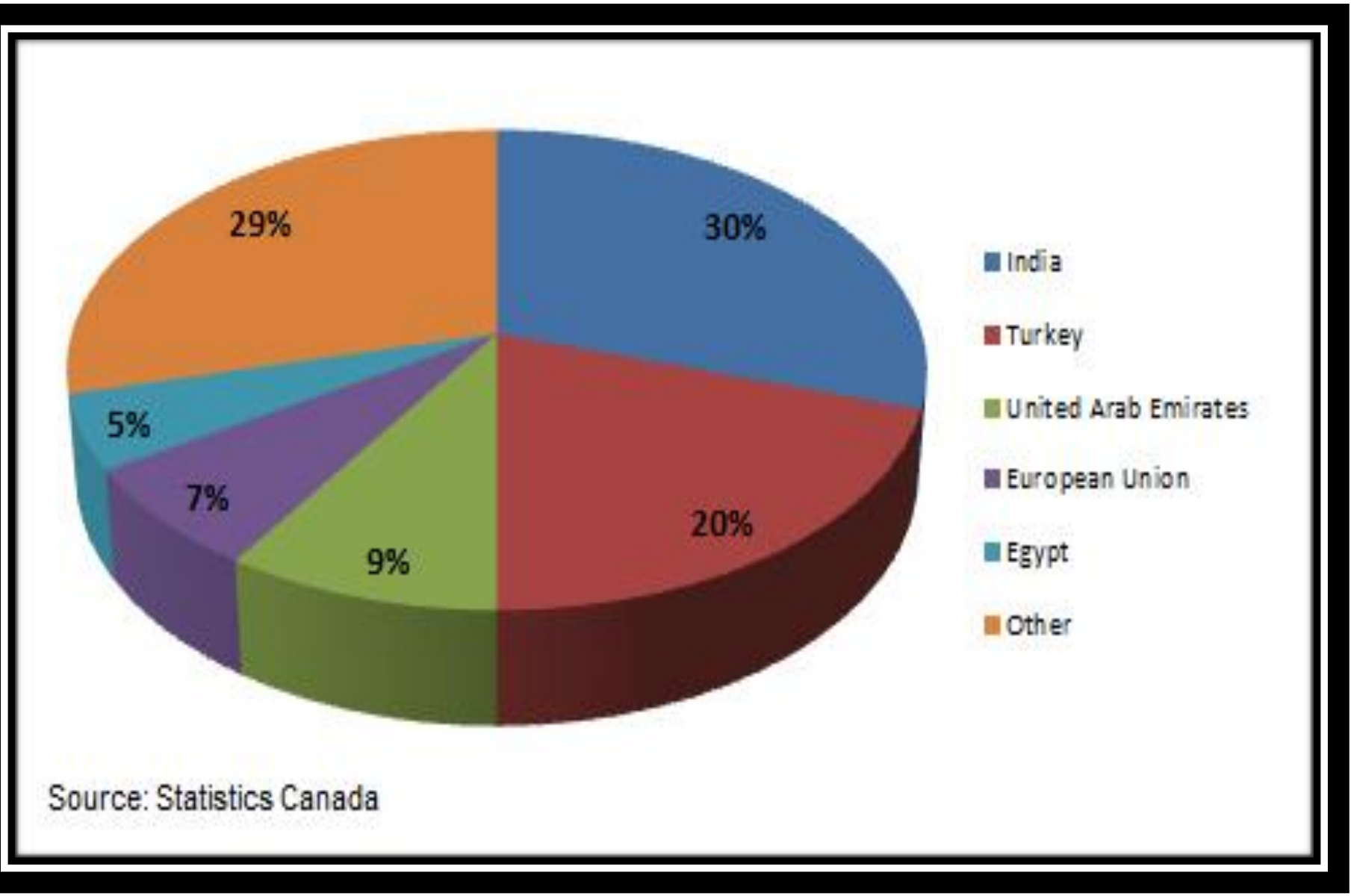
Why Lentil (*Lens culinaris* Medik.) Is Important?

- Lentil is an important pulse crop globally.
- 2.18 M ha in 2016 growing season only in Saskatchewan.
- Saskatchewan exports about 2.5 Mt lentil per year.
- Red lentil is the major export market class.





Countries Importing Red Lentil from Canada



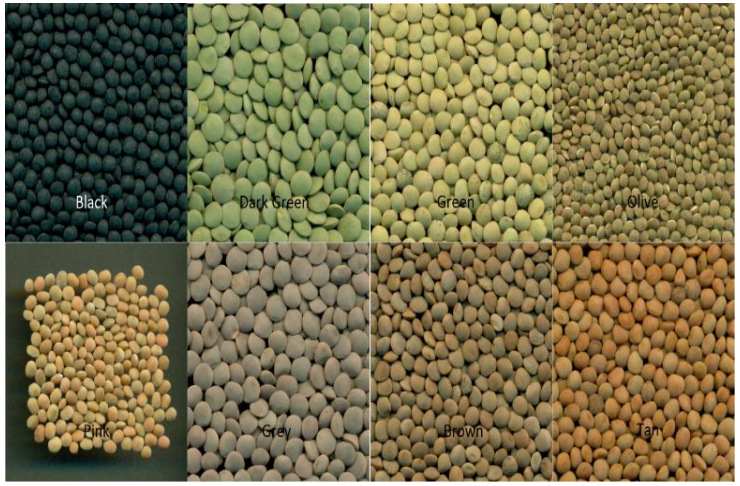
Why Do We Care Milling Quality of Lentil?

- 90% red lentil is consumed as de-hulled form.
- Improves nutritional and cooking quality (Wang, 2008; DellaValle et al., 2013).
- Milling quality of Canadian lentil is erratic.
- The regions where lentil is harvested as the temperature is dropping and the conditions become more moist.
- 10 to 40% yield loss has been reported during milling process.



Factors Influencing Milling Quality?

- ❑Mid-season applied fungicides
- ❑Foliar diseases
- ❑Crop-harvest aids
- ❑Seed characteristics and genetics



Fungicides Used in Lentil Production

Hypothesis

Foliar applied strobilurin fungicides formulation and their mode of action can improve seed yield, seed dimension and milling qualities of lentil

Objectives

Determine the effect of foliar- applied strobilurin fungicides on seed yield, seed dimension and milling qualities of lentil

Materials and Methods

Field Experiments

Treatments Combinations:

a) Lentil cultivars:
CDC Maxim and CDC Dazil

b) Fungicide treatments:
- ❑ Headline (pyroclostrobin EC-250g L^{-1})
- ❑ Quadris (azoxystrobin -250g L^{-1})
- ❑ Bravo (chlorothalonil 500g L^{-1})
- ❑ water as control

Locations: SPG and Preston sites, Saskatoon, Saskatchewan

Years: 2013 and 2014

Design: RCBD with 4 replicates

Preston site- 2013

Preston site- 2014

SPG site-2013

SPG site- 2014

Data Collection

- Seed yield
- Seed dimension (diameter, thickness and plumpness)
- Milling qualities (dehulling efficiency, milling and football recovery)

Statistical Analysis: PROC MIXED by SAS 9.3

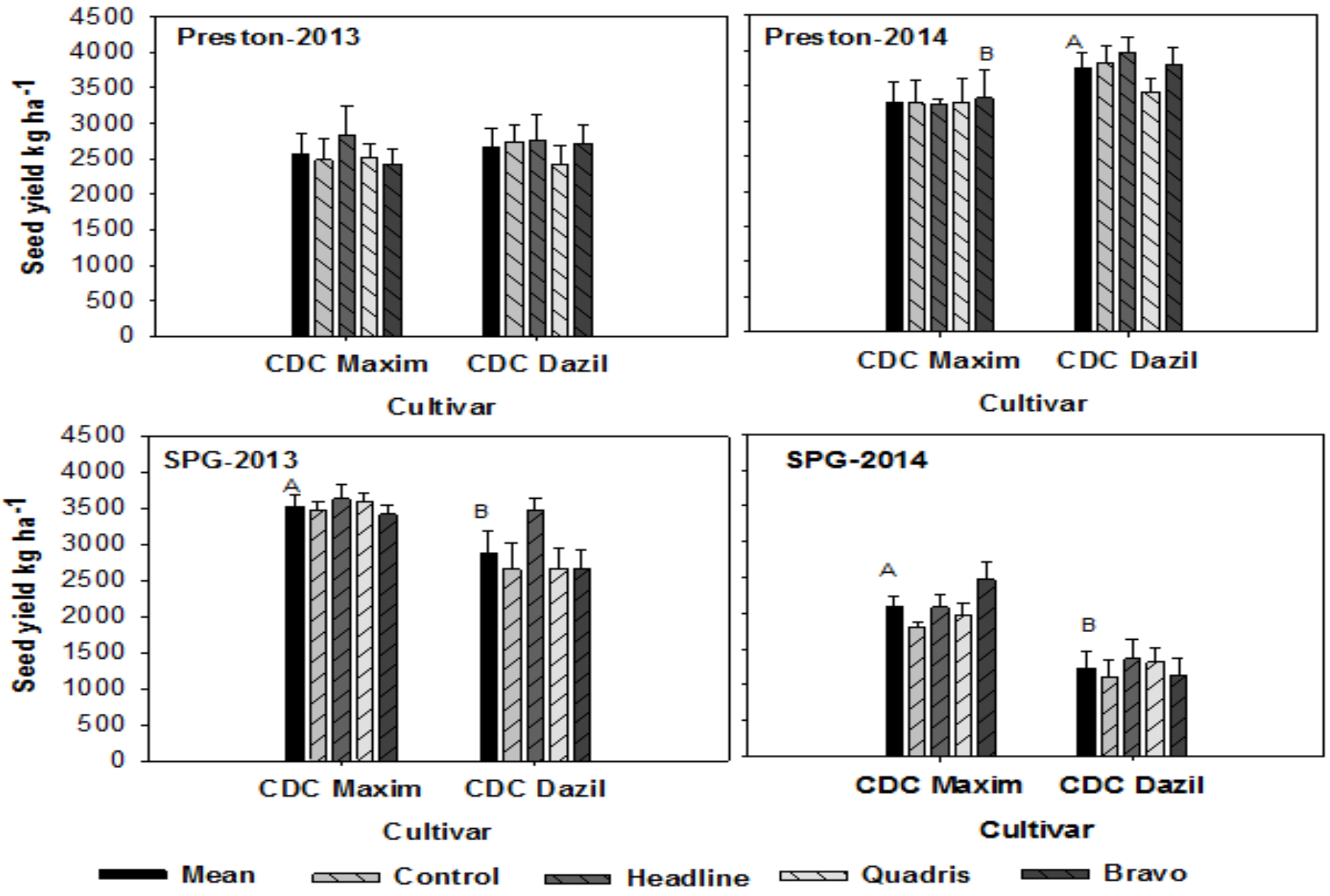
Dehulling Procedure

Results

ANOVA Results for Seed Yield and Quality

Source	Df	Seed			
		Yield	Diameter	Thickness	Plumpness
Site-year (SY)	3	0.06	0.13	0.22	0.16
Cultivar (C)	1	0.51	0.00**	0.12	0.09
Fungicide (F)	3	0.07	0.04*	0.03*	0.44
C × F	3	0.43	0.93	0.49	0.10
C × SY	3	0.00***	0.16	0.12	0.13
F × SY	8	0.52	NA	NA	NA
C × F× SY	8	0.73	0.35	NA	NA

Seed Yield (kg/ha)



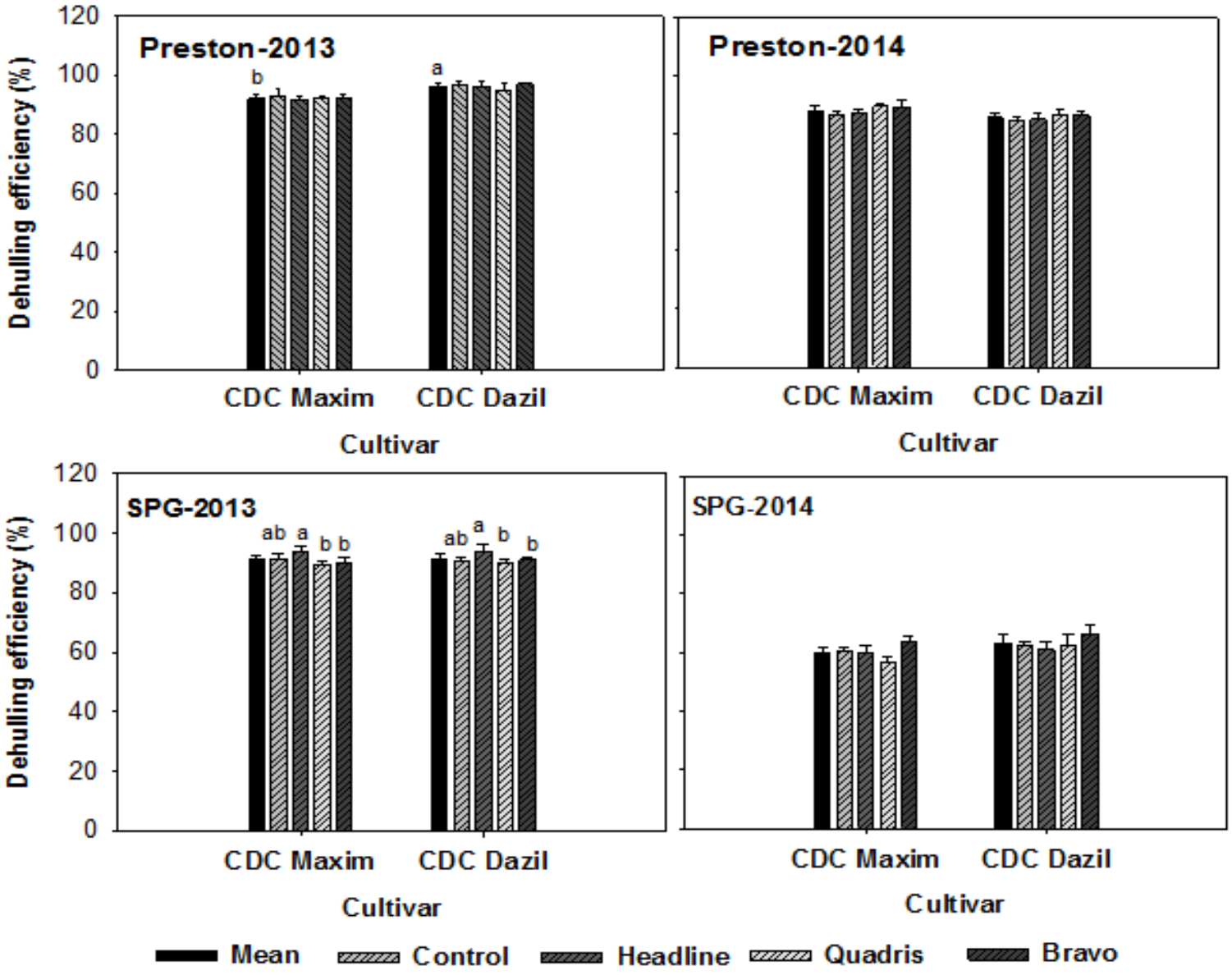
Seed Diameter, Thickness and Plumpness

Treatment	Seed diameter (mm)			Seed thickness (mm)			Seed plumpness		
	CDC Dazil	CDC Maxim	Mean	CDC Dazil	CDC Maxim	Mean	CDC Dazil	CDC Maxim	Mean
Control	4.38	4.59	4.48ab	2.32	2.37	2.35ab	0.53	0.51	0.52
Headline	4.37	4.60	4.47b	2.31	2.37	2.34b	0.52	0.51	0.52
Quadris	4.43	4.60	4.49ab	2.33	2.39	2.36a	0.53	0.52	0.53
Bravo	4.39	4.61	4.51a	2.34	2.40	2.36a	0.53	0.52	0.52
Mean	4.39b	4.59a		2.34	2.38		0.53	0.52	0.52
HSD (0.05)	0.09			0.07		0.018			
CV(%)	3.15			2.58			2.29		

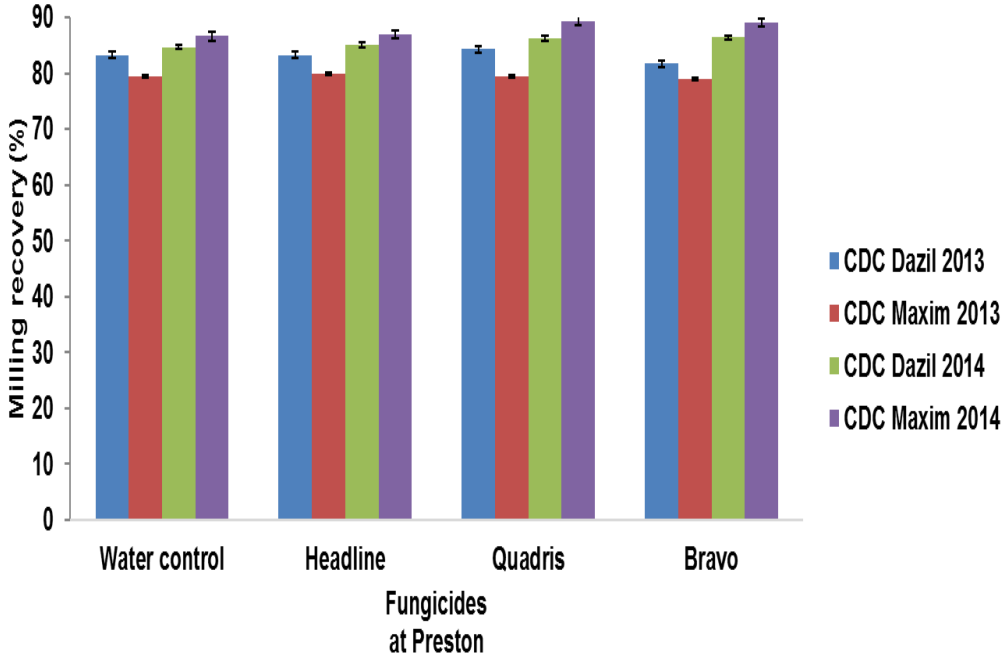
ANOVA Results for Milling Quality

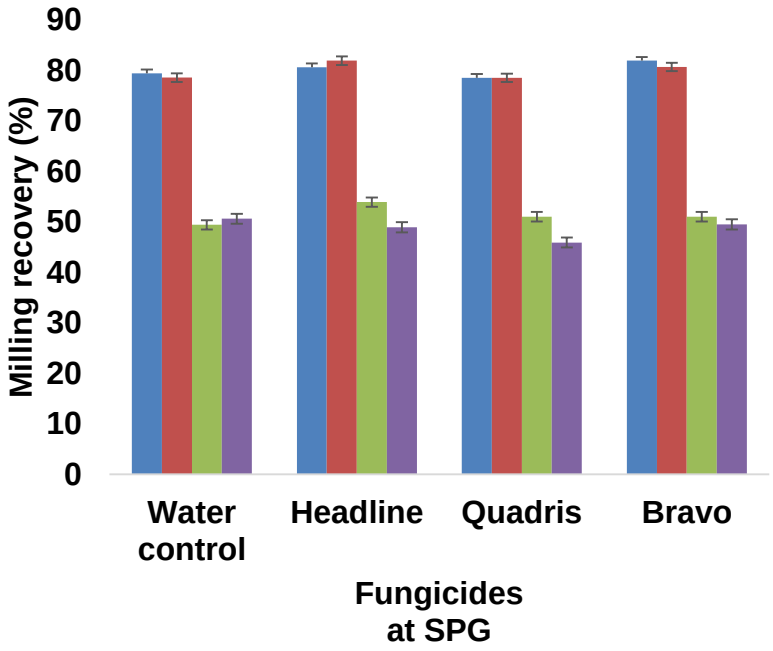
Source	Df	Dehulling efficiency	Milling recovery	Football recovery
Site-year (SY)	3	0.00***	0.22	0.22
Cultivar (C)	1	0.46	0.47	0.58
Fungicides (F)	3	0.51	0.58	0.74
C × F	3	0.82	0.66	0.30
C × SY	3	0.00***	0.26	0.24
F × SY	8	0.00***	0.23	0.60
C × F × SY	8	0.00***	0.01*	0.00***

Dehulling Efficiency (%)



Milling Recovery (%)





Conclusions

- Fungicide treatments had a minimal effect on seed yield, seed dimension and milling qualities.
- Application of pyraclostrobin (Headline) produced significantly smaller seed without affecting seed yield.
- Growing environment had a significant impact on seed yield and milling quality.
- A modest positive effect of pyraclostrobin (Headline) on dehulling and other milling quality parameters confirmed that application of pyraclostrobin fungicides under modest disease pressure may be economically beneficial to lentil growers for better milling .

Thank you

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Questions ?