Managing Dry Sowing for Wheat Yield and Grain Quality in Wheat-Canola-Wheat Systems Through Variety Selection and Agronomy at Wongan Hills.

Christine Zaicou-Kunesch and Mohammad Amjad, Department of Agriculture and Food, Western Australia

Key Messages

- Sowing the shorter maturing varieties, Emu Rock and Corack in early May was less productive than sowing Cobra, Mace, Magenta and Wyalkatchem.
- In 2013, the varieties sown in late May were higher yielding than varieties sown in early May however, screenings of Magenta and Emu Rock were greater than 5%. This response will vary from season to season so the disadvantages and advantages of early sowing need to be clearly considered.
- Nitrogen application increased wheat yield by 4.8 kg/ha for each kilogram of nitrogen (averaged across variety and sowing time) in 2013.

Aim/Background

Agronomy through better variety selection and management may reduce production risks and improve profitability in canola/wheat systems. This trial was conducted to investigate the value of nitrogen on the profitability of new wheat varieties in early (dry sowing) and late sowings in canola/wheat system at Wongan Hills.

Trial Details

Property	Wongan Hills Research Station
Plot size & replication	20m x 1.8m x 3 replications
Soil type	Yellow sands
Paddock rotation	2011: wheat, 2012: canola
Treatments	**6 Varieties** – Cobra, Corack, Emu Rock, Mace, Magenta, Wyalkatchem **2 Time of sowing** (Early sowing close to the break, Late sowing 3-4 weeks after the 1st sowing) **3 Nitrogen rates** – Nil, Low and High rates – Nil (basal fertiliser), 30 kg N - low (target 10% protein) 60 kg N- high target (11% protein)
Seeding date	Timing 1:0 6/05/13 Timing 2: 28/05/13
Seeding rate	Equivalent to 60 kg/ha based on plant density (150 plants/m²), seed weight (mg) and germination % for each variety. Established population was 140 plants/m^2
Fertiliser	100 kg/ha Super phosphate at seeding plus for 6 N: 12 kg/ha urea topdressed at seeding 30 N: 62 kg/ha urea topdressed at seeding +15kg/ha urea topdressed 6 weeks after seeding 60 N: 62 kg/ha urea topdressed at seeding + 80 kg/ha urea topdressed 6 wks after seeding.
Herbicide	**Whole site** 30/1/13: 1.2 L/ha Roundup + 0.6 L/ha Ester +0.5% Li700 6/5/13: 2 L/ha SpraySeed250 + 118g/ha Sakura 10/6/13: 300 mL/ha Axial + 0.5% Adigor **TOS1** 20/6/13: 0.67 L/ha Velocity + 1% Hasten **TOS2** 28/05/13: 2 L/ha SpraySeed250 + 118g/ha Sakura 22/07/13: 0.67 L/ha Velocity + 1% Hasten
Growing Season Rainfall	256 mm

Results and Discussion

In 2013, the 116mm of rain between Jan-Apr provided confidence in early sowing in the district. Growing season rainfall between May and October was 200mm, with a very dry period of 6mm experienced in June.

Grain yield of varieties sown on May 6th were less productive than when sown on 28th May. The dry June conditions is likely to have adversely affected head numbers and/or grain numbers for the varieties sown in early May however, data was not recorded. The 18mm of rain in October benefited the longer maturing variety at both sowing times. At the first sowing time, Emu Rock and Corack were less productive than the other varieties (Table 1). At the second sowing time, Magenta was significantly higher yielding than Emu Rock but not Corack (Table 1). Screenings for Magenta were greater than 5% at both sowing times.

Table 1: Effect of sowing time on grain yield (t/ha; LSD 0.22 t/ha) and screenings (%; LSD 0.88%) of wheat varieties sown at Wongan Hills in 2013.

	Grain yield (t/ha)		Screenings (%)	
	6th May	**28th May**	**6th May**	**28th May**
Emu Rock	1.53	2.33	3.37	5.40
Corack	1.63	2.51	1.84	2.97
Wyalkatchem	1.90	2.44	1.48	1.75
Cobra	1.95	2.42	3.13	4.33
Mace	1.98	2.40	2.26	2.64
Magenta	2.05	2.64	5.44	5.50

Varieties were responsive to increasing nitrogen from up to 60 kg/ha at both sowing times and they responded similarly. For each additional dollar of nitrogen (@315 $/t of urea), income was increased by over $6.50/ha (averaged across all varieties). The analysis is based on yield only because full grain quality testing is not available at the time of print.

Table 2: Effect of nitrogen (topdressed) on wheat grain yield and screenings (averaged across all varieties) at Wongan Hills in 2013. (For each row, different letters indicate a significant difference between varieties.) CV =10.8%

Nitrogen (topdressed)	Grain yield (t/ha)		Screenings (%)	
	6th May	**28th May**	**6th May**	**28th May**
N0	1.73[a]	2.27[a]	3.1[a]	4.2[a]
N30	1.85[b]	2.45[b]	2.9[b]	3.7[b]
N60	1.93[c]	2.65[c]	2.9[b]	3.4[b]

Comments

The agronomic research at Wongan Hills aims to help growers with decisions on variety choice and management. This wheat agronomy trial was repeated in 2012 and 2013 but following different rotations. In 2012 (refer to Liebe trials booklet for the 2012/13 season), yields averaged 1.1 t/ha when sown on 11th May and 0.9 t/ha when sown on 28th June. This contrasts with 2013 where yields were higher when sown in late May compared to mid May. Differences between varieties were evident in both years. Increasing nitrogen application did not improve grain yield in 2012 which is a contrast to 2013 where the varieties were responsive to added nitrogen. In 2012, there was lower rainfall in May and July and yield potential was lower; 2012 was sown on pasture and 2013 was sown on canola stubble. These two factors will affect productivity and nitrogen demands. In 2013, the varieties sown in late May were higher yielding than varieties sown in early May however, screenings of Magenta and Emu Rock were greater than 5%. This response will vary from season to season so the disadvantages and advantages of early sowing need to be clearly considered.

Acknowledgements

This research is jointly funded by DAFWA and GRDC through "Wheat Agronomy - building system profitability in the Western Region" (DAW00218). Special thanks to Bruce Haig, Shari Dougall and Bruce Thorpe for trial management and technical support. Thanks to Liebe Group committee for support of the wheat agronomy trials at Wongan Hills.

Reviewed by: Brenda Shackley, DAFWA

Contact:
Christine Zaicou-Kunesch, DAFWA
christine.zaicou-kunesch@agric.wa.gov.au
(08) 9956 8549