Crop establishment on non-wetting sand

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RESEARCH

Searching for answers

Location:
Lock
Rainfall
Av. Annual: 336 mm
Av. GSR: 250 mm
2016 Total: 401 mm
2016 GSR: 314 mm
Yield
Potential: 4.1 t/ha (W)
Actual: 0.96 t/ha
Paddock History
2016: Kord wheat
2015: Mace wheat
2014: Medic pasture
Soil Type
Non-wetting sand
Plot Size
12 m x 2 m x 3 reps

Key messages

- **Crop establishment was not improved by on-row seeding or by increasing seeding rate in 2016.**
- **Higher seeding rate increased early dry matter but this effect declined during the growing season.**
- **In 2016 row placement or seeding rate did not affect grain yield or grain quality.**
- **Sowing on-row may be an advantage on non-wetting soils with low moisture at seeding.**

Why do the trial?

The GRDC project 'Maintaining profitable farming systems with retained stubble - upper Eyre Peninsula' aims to produce sustainable management guidelines to control pests, weeds and diseases while retaining stubble to maintain or improve soil health, and reduce exposure to wind erosion. The major outcome to be achieved is increased knowledge and skills allowing farmers and advisers to improve farm profitability while retaining stubble in farming systems on upper Eyre Peninsula (EP).

One issue EP farmers identified as a problem with stubble retained systems was sowing into non-wetting sands and the resulting uneven and reduced germination. A trial was undertaken from 2013 to 2015 at Murlong (near Lock) to compare how crop establishment and performance is affected by time of sowing, sowing rate, row position and sowing depth on a non-wetting sand. The trial site was moved in 2016 to another non-wetting site near Lock.

2015 results are reported in EP Farming Systems Summary 2015, p140.

How was it done?

In 2016 the non-wetting trial was moved to a new site and was sown into existing cereal rows. It was simplified to two different row placements; on previous crop rows and between previous crop rows (inter) with two sowing rates of 50 and 70 kg/ha. The trial was sown with CL Kord wheat on 23 May at 30 cm row spacings and into good soil moisture. Base fertiliser was 18:20:0:0 (DAP) @ 60 kg/ha and a trace element mix of manganese sulphate at 1.5 kg Mn/ha, zinc sulphate at 1 kg Zn/ha and copper sulphate at 0.2 kg Cu/ha was also delivered as banded fluid at seeding.

The trial was sprayed with a knockdown of 1.5 L/ha of glyphosate, 1.5 L/ha trifluralin, 80 ml/ha of carfentrazone-ethyl and a wetter on 23 May. The whole trial was sprayed with imazepic and imazepyr on 6 of July and received an application of 50 kg/ha of urea spread on 6 August.

Measurements taken during the season were disease inoculum using PreDictaB, pre-seeding soil moisture, soil nutrition, emergence counts, early and late dry matter, grain yield and grain quality. The trial was harvested on 8 December.

What happened?

The sand had a near neutral pH (6.9 in $CaCl_2$), very high P reserves (Colwell P of 50 mg/kg in 0-30 cm), reasonable N reserves (mineral N was 111 kg/ha in the top 100 cm in March, 72 kg/ha in 0-30 cm) and very low phosphorus buffering index (8 in 0-30 cm). The initial soil moisture was 37 mm within the profile to 100 cm, which was lower than other sites measured. The MED non-wetting soil test was 1.2 which is moderate.

The site had a medium risk for Rhizoctonia (164 pg DNA/g soil) but all other disease risk levels were low.

Plant establishment was similar with either row placement or seeding rate (Table 1). Early plant dry matter was better with the higher seeding rate, however this had evened out across treatments by late in the season. Grain yield and quality were similar for both row placements and seeding rates. Grass weed numbers were low in 2016 at this site and were similar for all treatments.

Table 1 Plant growth, grain yield and quality as affected by seed placement and seeding rate at Lock in 2016

		Establishment (plants/m^2)	Early dry matter (t/ha)	Late dry matter (t/ha)	Yield (t/ha)	Protein (%)	Screenings (%)
Placement	On-row	51.3	0.32	2.82	0.86	11.2	13.0
	Inter-row	63.6	0.34	3.09	1.06	11.4	11.6
LSD (P=0.05)		*ns*	*ns*	*ns*	*ns*	*ns*	*ns*
Sowing rate	50 kg/ha	50.1	0.29	2.88	0.93	11.2	12.8
	70 kg/ha	64.8	0.38	3.03	0.99	11.3	11.8
LSD (P=0.05)		*ns*	*0.08*	*ns*	*ns*	*ns*	*ns*

What does this mean?

In 2016, for the non-wetting soil trial at a different location and with better soil moisture at seeding, there were no differences in crop establishment or yield due to seed placement or seeding rate. In 2015 in a similar trial but with a drier start to the season the seeding position of on-row resulted in better crop establishment which increased crop competition with brome grass.

In 2016 there were early dry matter differences due to the higher seeding rate but these reduced during the growing season. By the end of the season there were no differences in grain yield or grain quality due to seed placement or seeding rate.

In drier seeding conditions in 2015 seeding on-row increased crop establishment which also decreased brome grass germination, however in 2016 with low weed numbers at the site there were no detectable differences. Sowing on-row may be an advantage on non-wetting soils with low moisture at seeding.

This trial will be repeated at the same site for one more season.

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