

Irrigated Winter Wheat Trial

To have high yielding crops, they must grow sufficient plant biomass to support the grain as there is a relationship between total biomass and grain yield (harvest index). Early sowing of winter wheats gives the plant a lengthy period of time to grow a large amount of biomass without going to head too early. Winter wheats require a certain amount of cold weather before they change from vegetative growth (growing leaves and tillers) to reproductive growth (growing the head and stem).

This is the second attempt at proving the above theory. Issues to date include lack of ryegrass control, hampered by our Group A resistance and exacerbated by the rapid growth of grasses in March/April that make control difficult. Also estimating sowing rates that will eventually produce enough tillers for a 10 t/ha crop is a touch of guess work, and lower rates leave a lot of bare soil between wheat plants available for weeds.

The trial was sown on April 1st and watered up, with Adagio, Beaufort, Wedgetail, aiming at 120 and 180 plants/m² (53 – 103 kg/ha) and three lines three lines RAC2341, VO7041-39 and V09150-01 sown at rates to achieve 180 pl/m².

Adagio, Wedgetail, RAC2341 and V09150-01 (possible Wedgetail replacement) are true winter wheats and need to accumulate cold temperature before they begin stem elongation. RAC2341 seems to be a bit quicker to flower and fill grain than the other winter wheats which is an advantage as it may avoid the high temperatures that usually affect the late maturing wheats.

Beaufort (and probably VO7041-39) are late maturing spring wheats. That is, they do not need to accumulate cold temperature but rely on daylength to delay maturity.

Unfortunately this trait is not as robust as the cold, and so both Beaufort and VO7041-39 were at 1st node at the end of May and flag leaf emerging in early July.

The trial was topdressed with sufficient N for a 10 t/ha crop, and one application of a PGR was made across the trial at around Z31. The treatments with “+ PGR” received a second PGR application at full flag Z39. All plots received a preventative fungicide in mid-August as most leaves showed symptoms of disease/general yellowing and again at Z39.

The trial was harvested on December 13th. Beaufort and VO7041-39 did have grain in the heads but were badly affected by bird damage and were excluded from the data analysis.

Results

Variety Yield Evaluation. Varieties sown for a target population of 180 pl/m²

Variety I	Yield t/ha	Protein %	Screen %	Test Wt kg/hl
VO9150-01	7.16 ^a	12.7	0.8	77.0
Adagio	6.75 ^{ab}	11.6	1.3	76.5
Wedgetail	6.54 ^{ab}	12.5	0.9	77.5
RAC2341	5.71 ^b	13.7	0.1	80.0

p	0.007
lsd	1.1
cv%	7.3

Variety x Population Yields

	Yield t/ha		Protein %		Screenings %		Test Wt kg/hl	
Population	Adagio	Wedgetail	Adagio	Wedgetail	Adagio	Wedgetail	Adagio	Wedgetail
120 pl/m ²	6.33	6.24	11.0	12.2	1.8	0.7	76.5	76.5
180 pl/m ²	6.81	6.55	11.3	12.5	2.3	0.9	76.5	77.5
180 pl/m ² +PGR	6.70	6.46	11.6	12.5	3.1	0.7	75.5	76.5
Var X Pop'n p	0.96		0.772		0.189		0.271	
lsd	NS		0.65		0.6		NS	
cv%	8.9		3.0		10.1		1.1	

VO9150-01 was the highest yielding variety, but only significantly different to RAC2341.

Population made no difference to final yields or grain quality in either Wedgetail or Adagio. Wedgetail had higher grain protein and lower screenings than Adagio.

What does it mean?

While the theory that early sowing and late flowering builds biomass that delivers higher yields, in practice, higher yields have yet to be seen. The plots do produce more vegetation, but this has negative effects on tiller survival and exacerbates leaf disease. In comparison, Adagio and Wedgetail sown a month later in the variety trial yielded 9.85 t/ha and 8.46 t/ha respectively.