Time of sowing and seeding rate in wheat

This trial was funded by GRDC and conducted in collaboration with SARDI.

Key findings

- The highest yielding wheat variety in the time of sowing trial at Hart in 2010 was Yitpi (4.81 t/ha) sown on May 1st.
- Wheat varieties Axe and Gladius increased grain yield as time of sowing was delayed from May 1st until May 29th.

Why do the trial?

To measure the effect of time of sowing (TOS) and plant density on wheat and durum varieties with different development habits and maturities.

How was it done?

Plot size 1.4m x 10m

Seeding date
TOS 1 - 1st May 2010
TOS 2 - 14th May 2010
TOS 3 - 29th May 2010

Fertiliser 32:10 (DAP/Urea) @ 80 kg/ha
UAN @ 100 L/ha 19th August

The trial was a randomised block design with 3 replicates 3 wheat varieties and 1 durum variety, 3 plant densities and 3 times of sowing.

The wheat and durum varieties used were Axe (early maturing), Gladius (early-mid maturing), Tjilkuri durum (WID801) (mid maturing) and Frame (mid-late maturing).

The plant densities achieved are shown in Table 1.

Sowing rate	Plant density (plants/sq m)
Low	93
Medium	121
High	161
LSD (0.05)	5.8

Table 1: Wheat and durum plant density (plants per square metre) averaged across variety and time of sowing at Hart in 2010.

Plot edge rows were removed prior to harvest. All plots were assessed for grain yield, protein, test weight, grain weight and screenings with a 2.0 mm screen.

Results

Grain yields of the earlier maturing varieties (Axe and Gladius) were highest at the latest time of sowing (TOS 3 29th May)(Table 2 or Figure 1). However, for the later maturing variety Yipti, grain yield was highest (4.81 t/ha) at TOS1 1st May. This was not significantly different to Yitpi sown at TOS 2 or TOS 3. The grain yield of Tjilkuri durum averaged 4.15 t/ha and was not significantly affected by time of sowing or plant density. There was no significant response in grain yield to plant density for any of the wheat varieties.

Table 2: Grain yield (t/ha) for time of sowing and variety at Hart in 2010, averaged for sowing rate.

Time of Sowing		Grain yield (t/ha)				
		Axe	Gladius	Tjilkuri	Yitpi	Average
TOS 1	May-01	3.59	4.21	4.04	4.81	4.16
TOS 2	May-14	3.92	4.31	4.19	4.74	4.29
TOS 3	May-29	4.58	4.61	4.22	4.70	4.53
Average		4.03	4.38	4.15	4.75	
LSD (0.05)						
TOS				0.13		
Variety				0.12		
TOS*Variety				0.21		

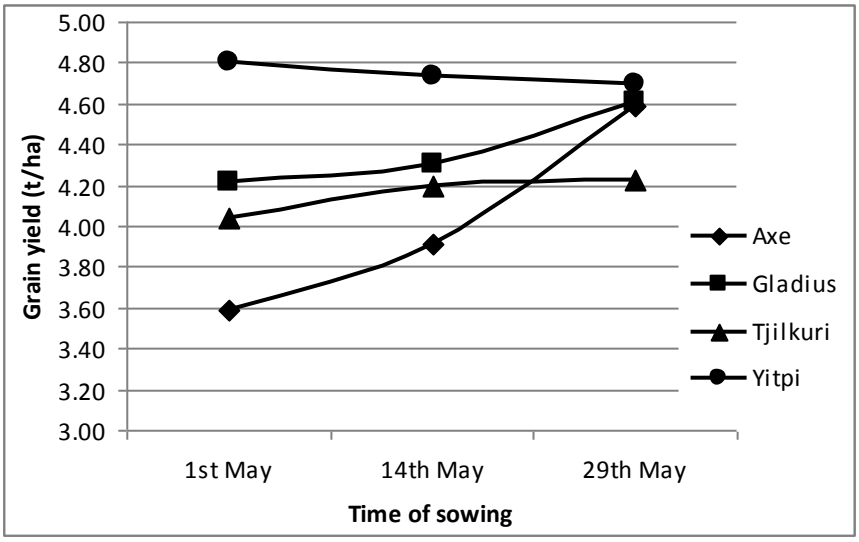

Figure 1: Grain yield (t/ha) for time of sowing and variety at Hart in 2010, averaged for sowing rate.

For all times of sowing Axe produced the highest grain protein (Table 3). In contrast, grain protein for Gladius was not influenced by time of sowing. The longer season varieties Tjilkuri and Yitpi produced higher grain protein as time of sowing was delayed, ranging from 9.2% for both Tjilkuri and Yitpi sown May 1st to 9.8% (Tjilkuri) and 10.1% (Yitpi) sown May 29th.

Table 3: Grain protein (%) for time of sowing and variety at Hart in 2010, averaged for sowing rate.

Time of Sowing		Grain protein (%)				
		Axe	Gladius	Tjilkuri	Yitpi	Average
TOS 1	May-01	11.0	10.2	9.2	9.2	9.9
TOS 2	May-14	10.8	10.1	9.4	9.5	9.9
TOS 3	May-29	10.4	10.1	9.8	10.1	10.1
Average		10.7	10.1	9.4	9.6	
LSD (0.05)						
TOS				ns		
Variety				0.2		
TOS*Variety				0.4		

All treatments produced test weights equal or above 74 kg/hL, the minimum requirement for maximum achievable grade for all varieties (Table 4). The highest test weight was produced by Yitpi (76.8 kg/hL) when sown at the medium sowing rate. Time of sowing did not significantly affect test weight.

Table 4: Grain test weight (kg/hL) for seeding rate and variety at Hart in 2010, averaged for time of sowing.

Variety	Grain test weight (kg/hL) Seeding rate			
	Low	Medium	High	Average
Axe	74.8	75.0	74.0	74.6
Gladius	75.6	75.2	75.5	75.4
Tjilkuri	75.1	75.4	75.3	75.3
Yitpi	75.4	76.8	76.4	76.2
Average	75.4	75.8	75.7	
LSD (0.05)				
Seed rate		ns		
Variety		0.5		
Seed rate*Variety		0.9		

Screenings for all treatments in the wheat time of sowing trial at Hart in 2010 were below 1.5% (Table 5). Axe and Gladius produced the lowest screenings of only 0.5%.

Table 5: Grain screenings for time of sowing and variety at Hart in 2010, averaged across sowing rate.

Time of Sowing		Screenings (%)				
		Axe	Gladius	Tjilkuri	Yitpi	Average
TOS 1	May-01	0.5	0.6	1.3	1.1	0.9
TOS 2	May-14	0.5	0.6	0.9	0.8	0.7
TOS 3	May-29	0.4	0.5	0.9	0.7	0.6
Average		0.5	0.5	1.1	0.9	
LSD (0.05)						
TOS				ns		
Variety				0.1		
TOS*Variety				0.3		

Head density increased with sowing rate and was not significantly affected by time or sowing (Table 6). Axe, Gladius and Yitpi all produced statistically similar head numbers, averaging 140 heads per square metre (Table 7). Tjilkuri produced the lowest head number of only 116 heads per square metre.

Table 6: Head density (heads per square metre) for seeding rate at Hart in 2010, averaged across variety and time of sowing.

Seeding rate	Head density (heads/sq m)
Low	117
Medium	135
High	150
LSD (0.05)	10

Table 7: Head density (heads per square metre) for variety at Hart in 2010, averaged across seeding rate and time of sowing.

Variety	Head density (heads/sq m)
Axe	141
Gladius	143
Tjilkuri	116
Yitpi	137
LSD (0.05)	11