

Kerang VIC

Irrigated trials conducted at the Kerang irrigated research centre 2021 were managed by the Irrigated Cropping Council.

Trial 1. Optimum Plant Population Under Surface Irrigation

Project Objective: To compare identical plant population x cultivar trials under overhead and surface irrigation

Location: Kerang, Victoria

FAR Code: ICC C21-01-4

Sown: 23rd April 2021

Cultivar: HyTTec® Trophy and 45Y28 RR

Harvested: 24th November 2021

Rotation position: Wheaten Hay (2020), Dryland vetch/brown manure (2019), Durum wheat (2018)

Soil Type: Neutral medium grey clay

Irrigation: Surface irrigation. Pre-irrigation in autumn plus 2 spring irrigations totalling 340mm (3.4 ML/ha)

GSR: April-October 160mm. Total water available 500mm

Key Messages:

- *There was no significant interaction between seeding rate and cultivar with both varieties lower yielding at plant populations of between 15-20plants/m².*
- *However, the yield effect of the lower plant population in 45Y28 was less pronounced (0.25-0.3t/ha compared to the optimum than with Trophy (0.45 – 0.8t/ha).*
- *Plant populations above 35 plants/m² (60 seeds/m²) and above 30 plants/m² with 45Y28RR produced the highest yields.*
- *Plant establishment rate for the trial averaged 75% and there was no significant detrimental yield effect from the highest plant populations in either cultivar, just an additional seed cost that was not cost effective.*
- *There were differences in biomass (dry matter) at green bud, with the trend to lower biomass at lower seeding rates and resultant plant populations.*
- *There was no additional biomass response to sowing seeding rates higher than 40 seeds/m² when assessed at early flower (GS62) or at harvest with crop canopies of 14.5-15t/ha producing the highest yields.*
- *Oil content was significantly different between varieties but not between seeding rates with higher oil content in the RR hybrid.*
- *While there was variation in the Harvest Index (HI) from 0.32 to 0.24, the trend was for higher HI at the lower planting populations.*
- *Water use efficiency was 10.0 kg/mm.*

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Table 1. Influence of plant population and cultivar on grain yield (t/ha) grown under flood irrigation.

Plants/m ² (actual)		Yield t/ha	
Trophy	45Y28	HyTTec® Trophy (Hybrid TT)	45Y28 RR (RR Y Series Hybrid)
16	17	3.35 -	4.16 -
34	31	3.99 -	4.46 -
41	39	3.80 -	4.45 -
57	53	4.15 -	4.41 -
Mean		3.82 b	4.37 a
LSD Seed Rate p = 0.05		0.2365	P val
LSD Cultivar p=0.05		0.1673	P val
LSD Seed Rate x		ns	P val

Highest seed yield was from the highest rate of 80 seeds/m² (53 plants/m²) in HyTTec Trophy and the 40 seeds/m² (31 plants/m²) in 45Y28. However, there was no statistical difference in the yields of 45Y28 across all seeding rates. However, there was a decline in yield of HyTTec Trophy at the lowest seeding rate.

Table 2. Establishment - Plant population (plants/m²) established from four seed rates with two different cultivars grown under flood irrigation.

Seed Rate	Established Population		Mean
	HyTTec® Trophy (Hybrid TT)	45Y28 RR (RR Y Series Hybrid)	
	Plants/m ²	Plants/m ²	Plants/m ²
20 seeds/m ²	16 -	17 -	17 d
40 seeds/m ²	34 -	31 -	32 c
60 seeds/m ²	41 -	39 -	40 b
80 seeds/m ²	53 -	57 -	55 a
Mean	36 -	36 -	
LSD Seed Rate p = 0.05		4	P val
LSD Cultivar p=0.05		ns	P val
LSD Seed Rate x		ns	P val

As seeding rates increased, so did the plant population. Average establishment rate was 75%.

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Table 3. Influence of plant population and cultivar on seed oil content (%) grown under flood irrigation.

Plants/m ² (actual)		Oil content (%)	
Trophy	45Y28	HyTTec® Trophy (Hybrid TT)	45Y28 RR (RR Y Series Hybrid)
16	17	43.4 -	49.1 -
34	31	44.7 -	48.7 -
41	39	44.3 -	47.0 -
57	53	43.7 -	48.8 -
Mean		44.0 b	48.4 a
LSD Plant Population p =		ns	P val
LSD Cultivar p=0.05		1.4	P val
LSD Seed Rate x Cultivar.		ns	P val

Oil content was not influenced by seeding rate (plant population), but differences were measured between the two cultivars.

Table 4. Influence of plant population and cultivar on dry matter (t/ha) at early flowering (GS62) grown under flood irrigation.

Plants/m ² (actual)		Dry Matter t/ha at GS62 (18 August)	
Trophy	45Y28	HyTTec® Trophy (Hybrid TT)	45Y28 RR (RR Y Series Hybrid)
16	17	4.99 -	4.77 -
34	31	6.01 -	6.54 -
41	39	5.72 -	6.75 -
57	53	6.75 -	6.30 -
Mean		5.87 -	6.09 -
LSD Seed Rate p = 0.05		0.90	P val
LSD Cultivar p=0.05		ns	P val
LSD Seed Rate x		ns	P val

Biomass (dry matter) at the beginning of flowering saw all but the lowest seeding rates have similar values, with no difference between cultivars. The suggested target of 7 t/ha of biomass at the beginning of flowering was not met.

This trend continued at harvest with the 40, 60 and 80 seeds/m² seeding rates and resultant populations having similar biomass irrespective of cultivar. The lowest biomass measured was in HyTTec Trophy at the 20 seeds/m² seeding rate.

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Table 5. Influence of plant population and cultivar on dry matter (t/ha) at harvest grown under flood irrigation.

Dry Matter t/ha at Harvest (30 October)					
Plants/m ² (actual)		HyTTec® Trophy	45Y28 RR		Mean
Trophy	45Y28	(Hybrid TT)	(RR Y Series Hybrid)		t/ha
16	17	10.03	13.09	-	11.56 b
34	31	14.98 -	14.64	-	14.81 a
41	39	14.53 -	15.83	-	15.18 a
57	53	16.39 -	16.27	-	16.33 a
Mean		13.98 -	14.96 -		
LSD Seed Rate p = 0.05		1.96	P val		<0.001
LSD Cultivar p=0.05		ns	P val		0.158
LSD Seed Rate x Cultivar		ns	P val		0.274

Table 6. Influence of plant population and cultivar on harvest index grown under flood irrigation.

Harvest Index					
Plants/m ² (actual)		HyTTec® Trophy	45Y28 RR		Mean
Trophy	45Y28	(Hybrid TT)	(RR Y Series Hybrid)		
16	17	0.32 -	0.30	-	0.30 a
34	31	0.25 -	0.29	-	0.27 ab
41	39	0.25 -	0.26	-	0.25 b
57	53	0.24 -	0.26	-	0.25 a
Mean		0.26 -	0.28 -		
LSD Seed Rate p = 0.05		0.04	P val		0.039
LSD Cultivar p=0.05		ns	P val		0.429
LSD Seed Rate x		ns	P val		0.567

The harvest index results showed a trend to lower HI values at the higher seeding rates. Harvest Index was influenced by sowing rate, with the low seeding rate of 20 seeds/m² having the highest index of 0.30, although the results should be viewed with caution due to the high cv%.

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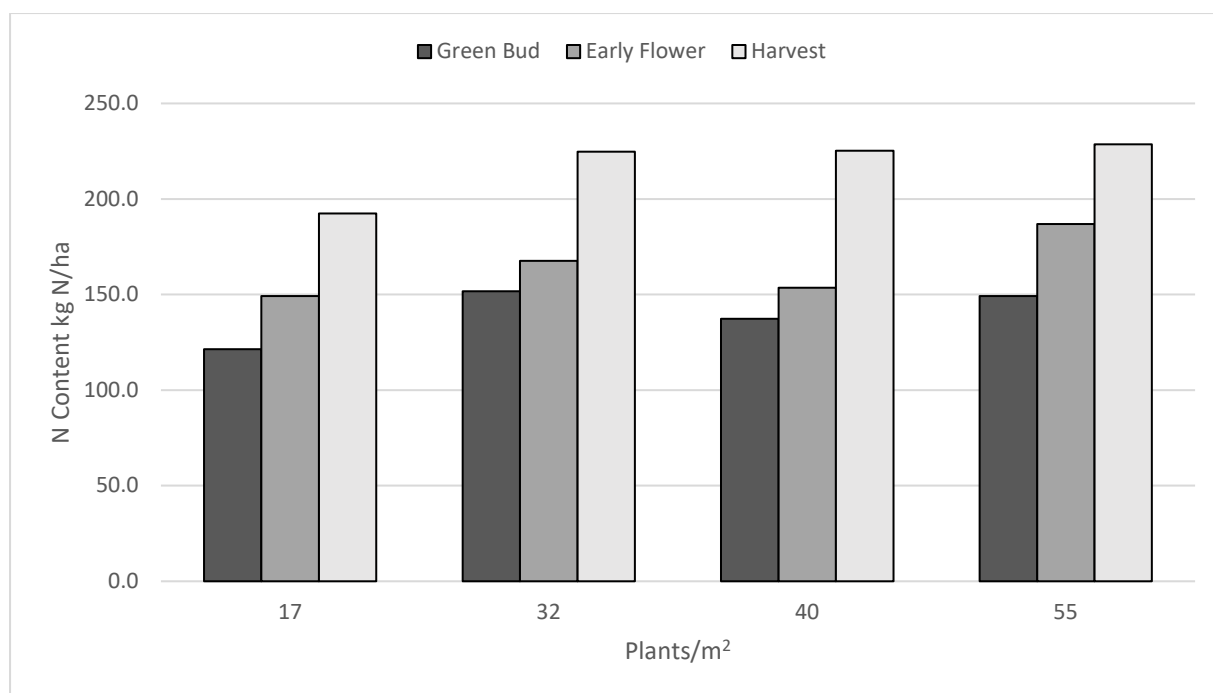


Figure 1. Influence of plant population on Nitrogen accumulation over time.

Starting soil N was 92 kg N/ha (0-60cm). By early flowering, another 160 kg N/ha had been applied. There were differences in biomass measured at green bud, with the low seeding rate TT treatment having the lowest biomass, but not significantly different to either the low RR or 40 seeds/m² HyTTec Trophy treatments.

Maximum biomass achieved at harvest was 16.39 t DM/ha by HyTTec Trophy at the highest seeding rate, but this was not significantly different to that of any other treatment.

The average yield for the trial was 4.09 t/ha. This represents a WUE of 10.0 kg/mm.

SAGI statistical analysis (Predicted values for Yield, Harvest dry matter, test weight and oil content)

The following statistical analysis of key harvest assessments has been carried out by SAGI. This analysis uses spatial statistical analysis to refine predicted values for key assessment values.

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