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Agriculture and Food



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Plant density and seed rate of canola in low and medium rainfall areas of WA

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How Low can you go?



- Introduce the project and team
- Field establishment
- Grain yield
- Weeds
- Optimising \$

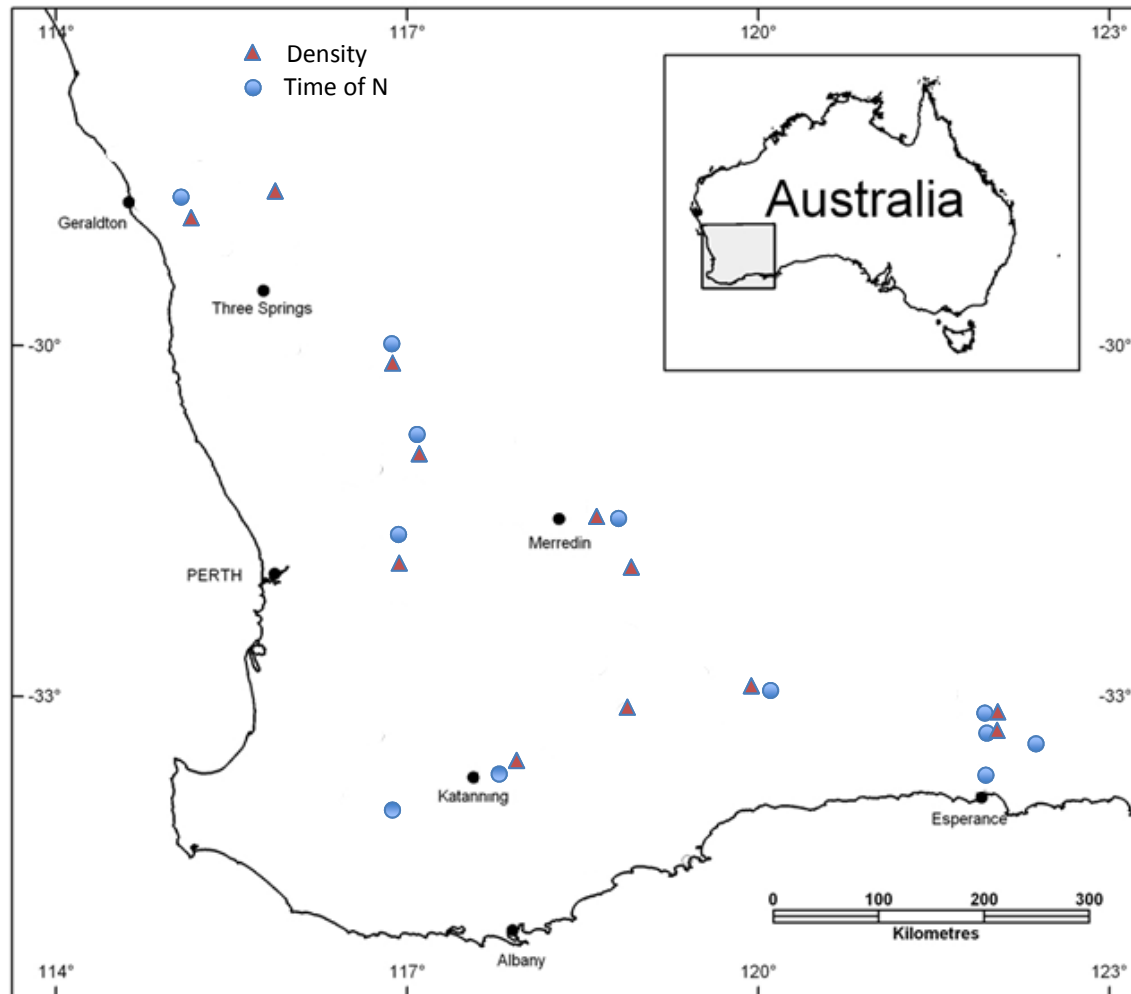


Tactical break crop agronomy in Western Australia

- 5 year GRDC project in partnership with DAFWA
- Every winter crop other than wheat and barley
 - But canola gets the most attention







Aim

- To compare the plant density response of hybrid and open pollinated TT and RR canola
- Why
 - Rate of OP TT canola releases slowing down
 - Costs of seed increase
 - Hopefully EPR solves this.....



Trial design - Variety x Density

- 4 Varieties
 - TT OP: CB Telfer or ATR Stingray
 - TT Hybrid: Hyola 450TT
 - RR OP: GT Viper
 - RR Hybrid: Hyola 404RR
- 8 Densities
 - 5, 10, 15, 20, 30, 40, 60 and 80 plants/m²



Disclaimer

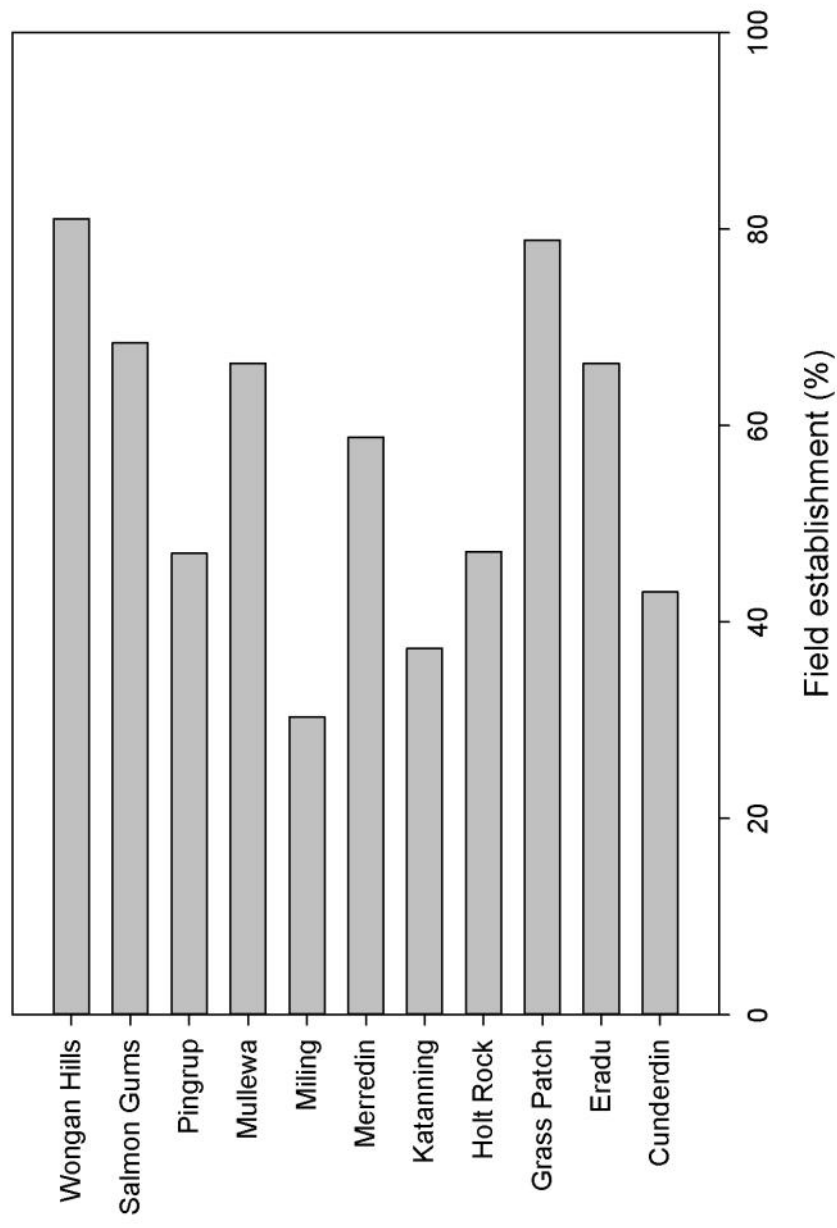
- Kind spring
 - Get out of jail card



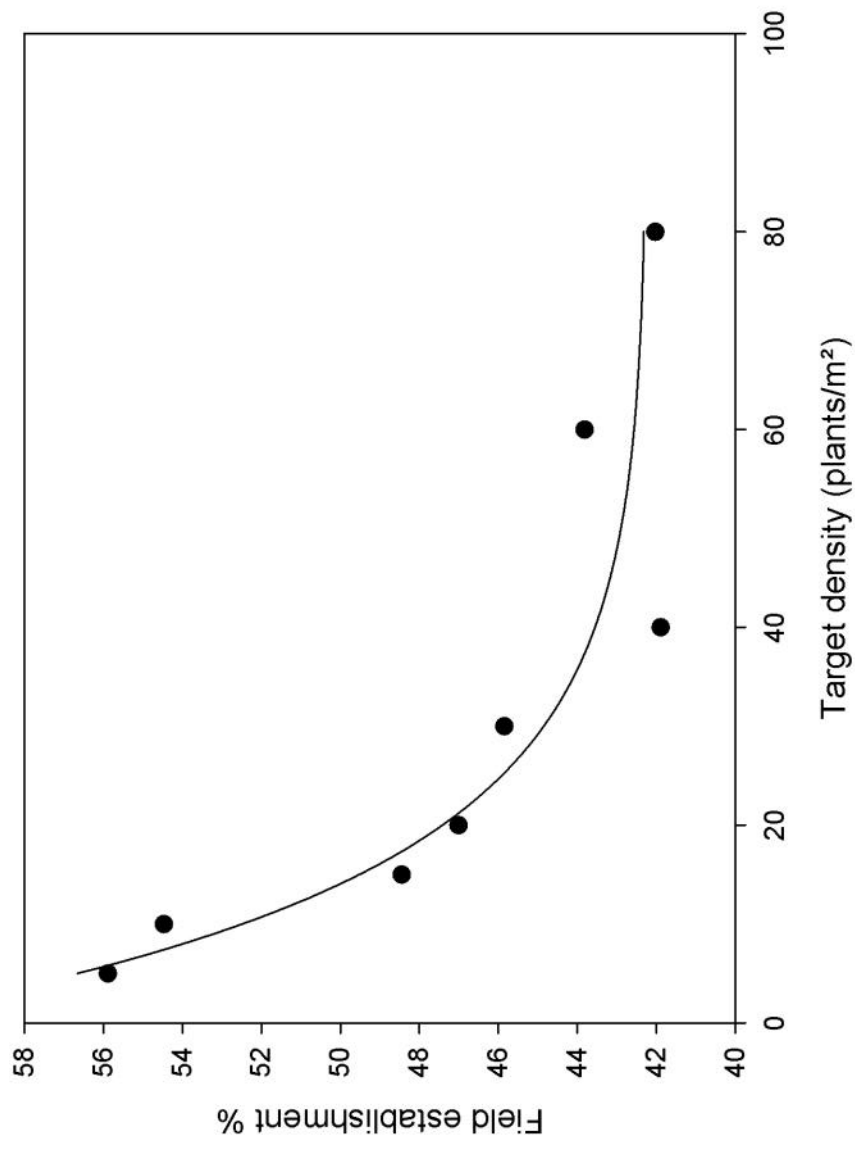
Field establishment



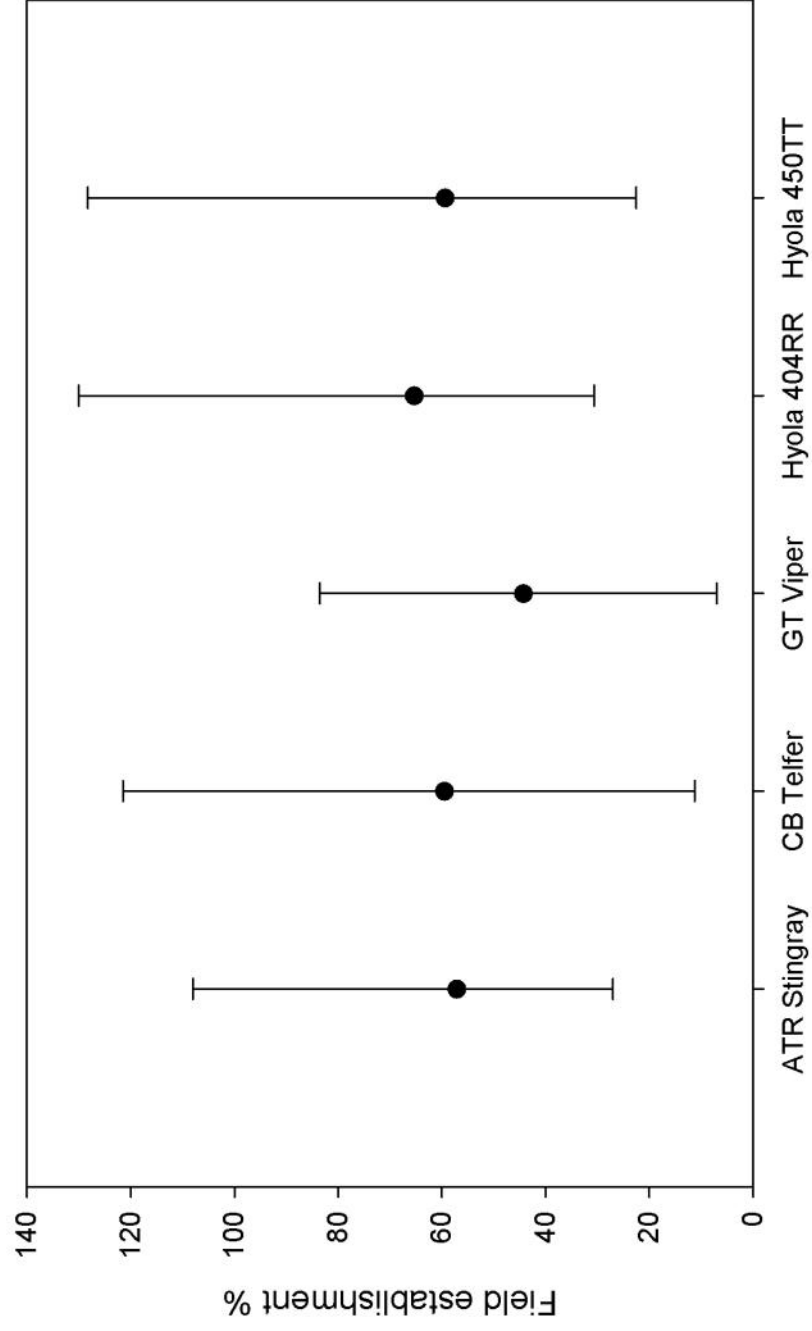
Mean of 2013 DAFWA Canola density trials



2013 DAFWA Canola density experiments



2013 DAFWA Canola density trials



Conditions	OP varieties	Hybrid varieties
Normal – just enough moisture to get into it	50	65
Excellent (Wet, warm, targeting 40 plants/m ²)	65	80
Dry sown, tough start	35	50
Dry sown but ok start	45	60



CANOLA IS A VERY FORGIVING





Hyola 404RR
20

Hyola 404RR
5

Salmon Gums
June 11 2013





Hyola 404RR
20

Hyola 404RR
5

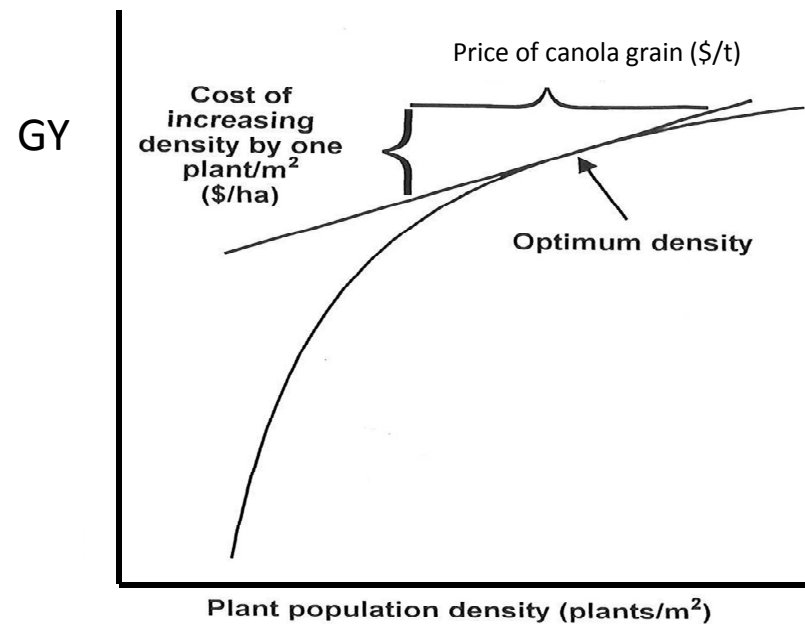
Salmon Gums
Sept. 2013



Calculating the optimum density

Assume \$1.10 return
for \$1 investment

Slope (kg/ha)	
TT OP	0.3
TT Hybrid	3
RR OP	5
RR Hybrid	6



Adapted from French *et al.* (1994) *Australian Journal of Experimental Agriculture* **34**, 491-497.

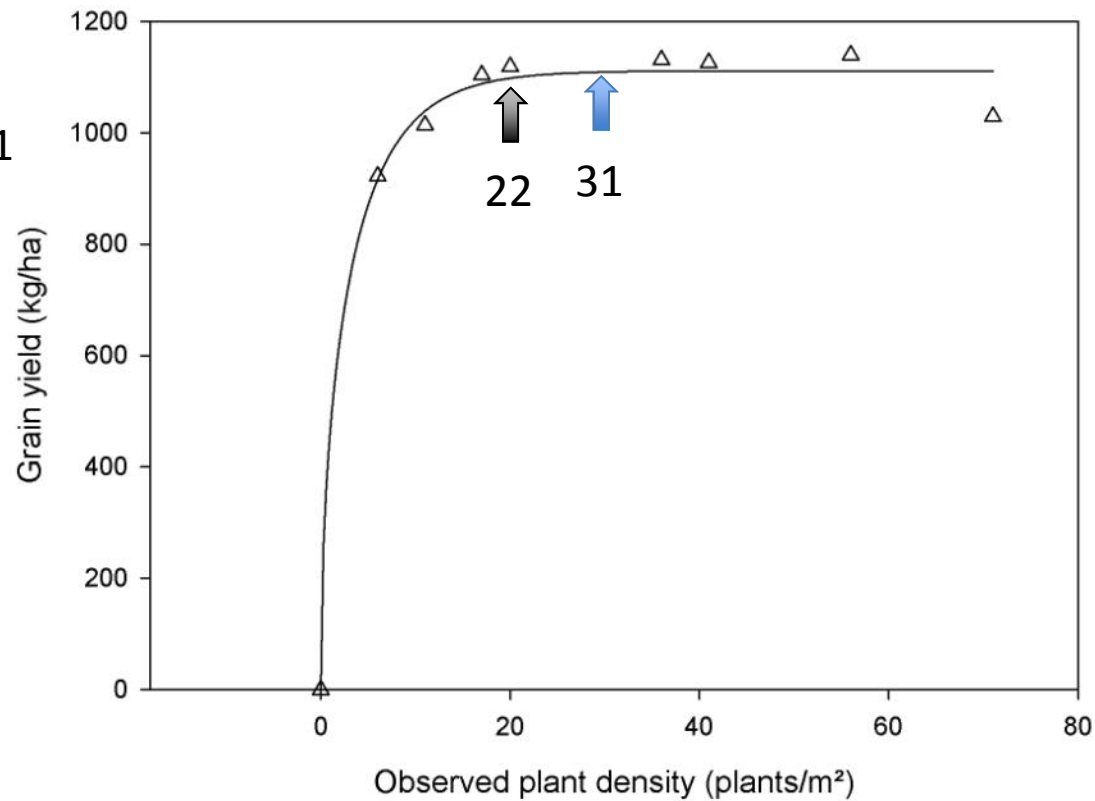


CB Telfer

\$2 to \$11/kg

Costs \$0.2 to 0.9/ha to
increase plant density by 1

13ED09 Salmon Gums TT OP



Seed rate:

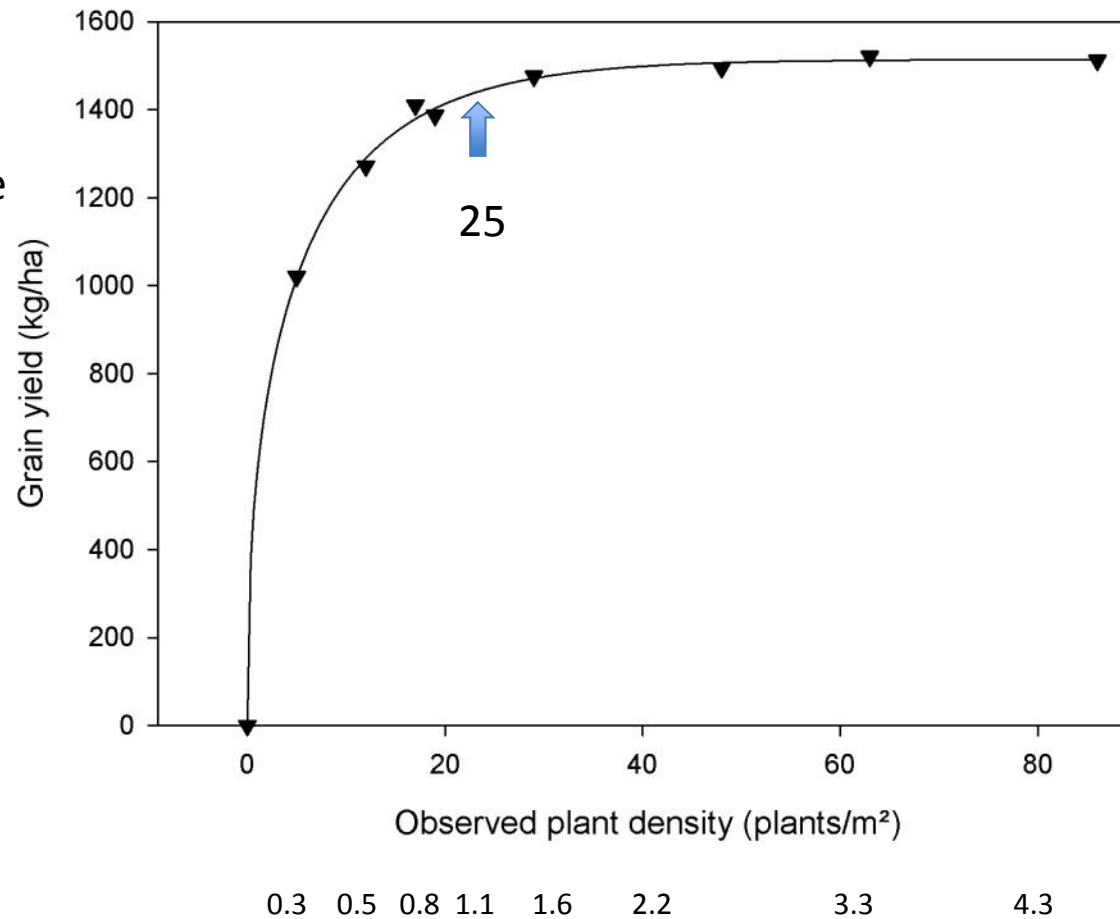
0.3 0.5 0.8 1.1 1.6 2.1 3.2 4.2



Hyola 450TT

\$24/kg

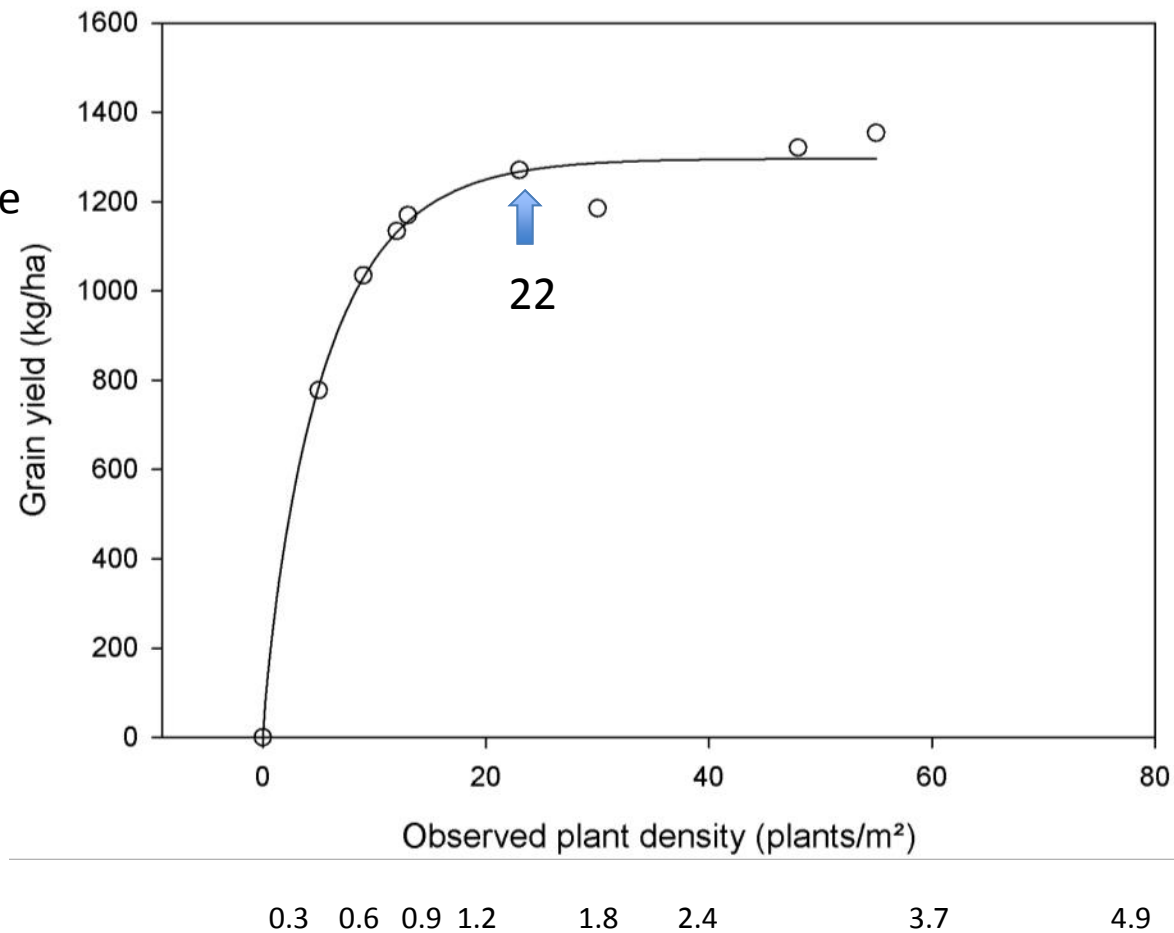
Costs \$1.5/ha to increase
plant density by 1



GT Viper

\$25/kg

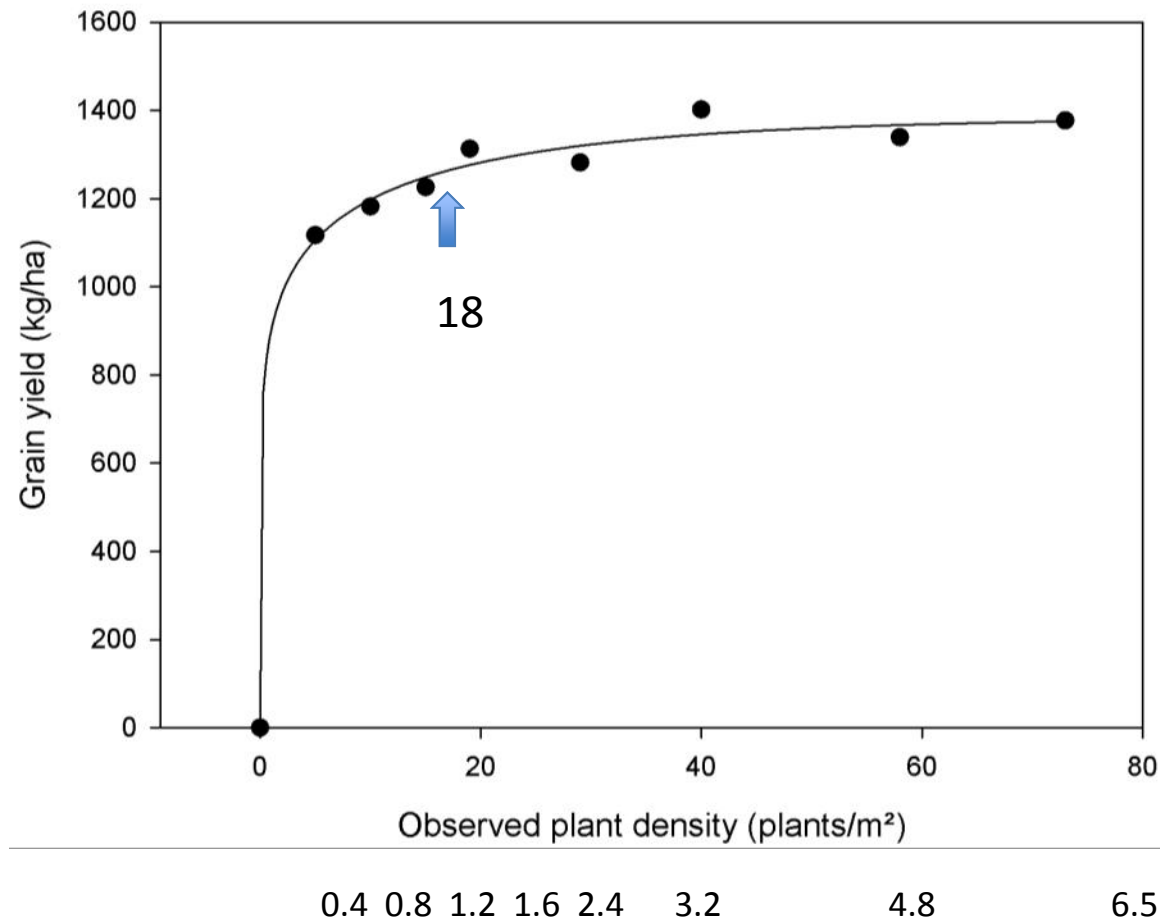
Costs \$2.30/ha to increase
plant density by 1

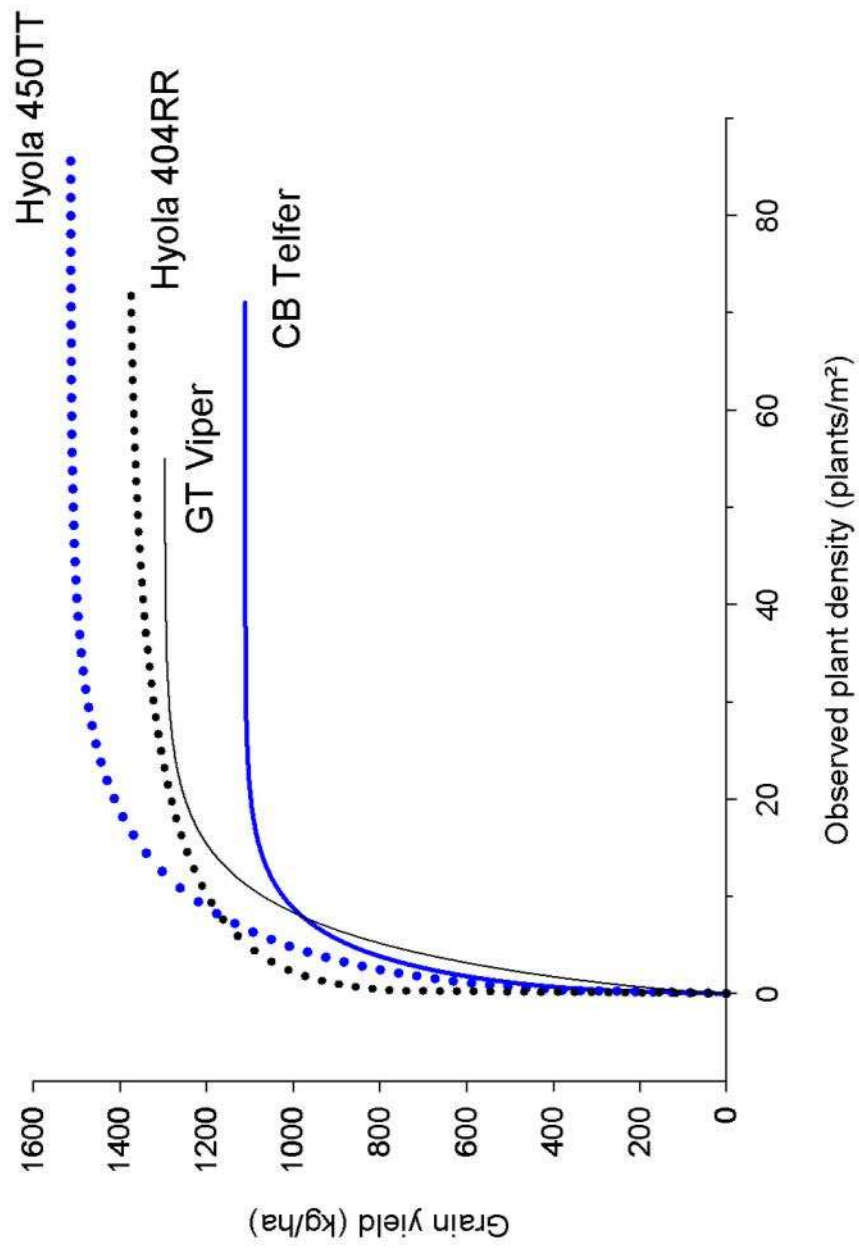


Hyola 404RR

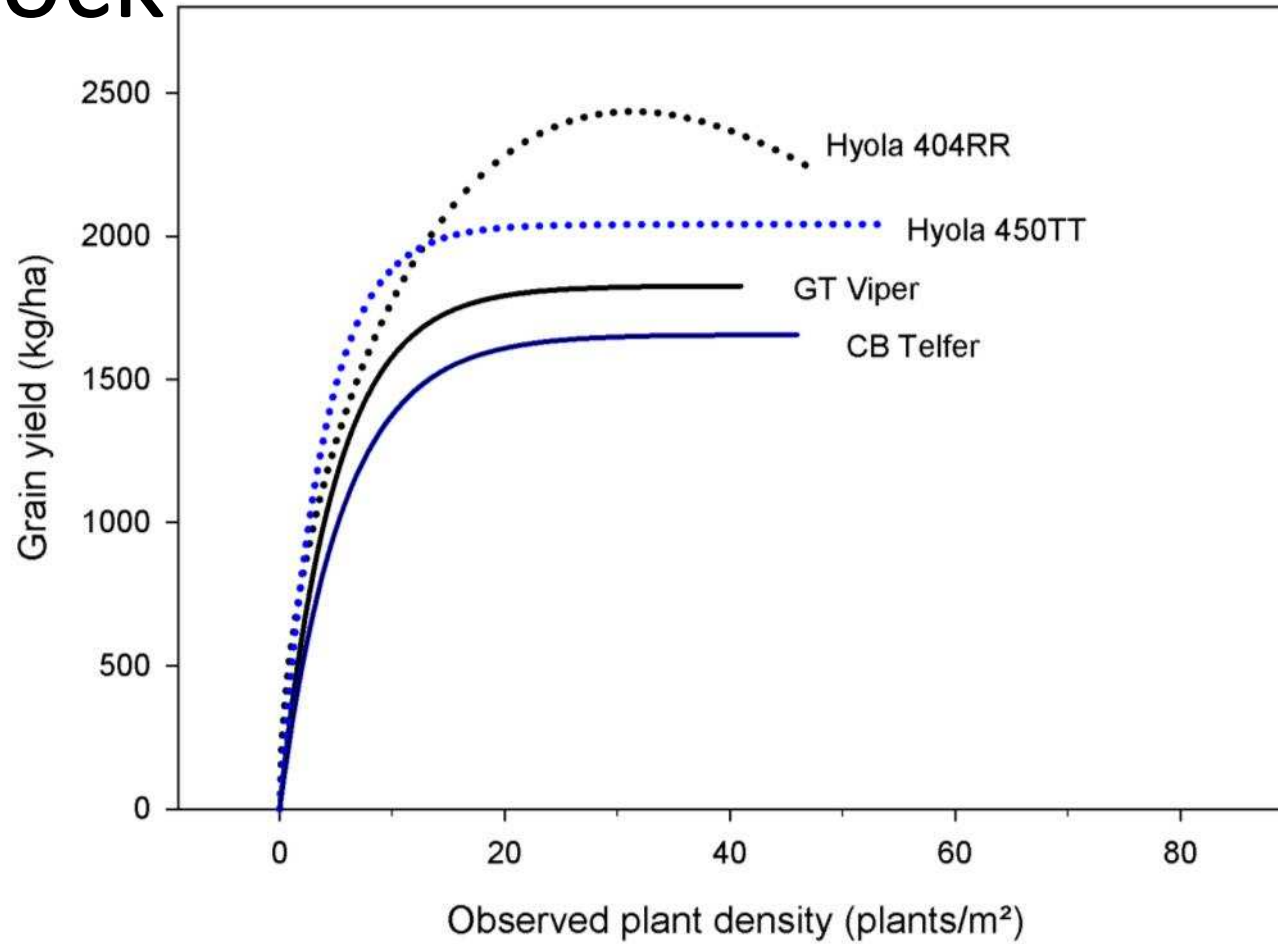
\$31/kg

Costs \$3/ha to increase
plant density by 1

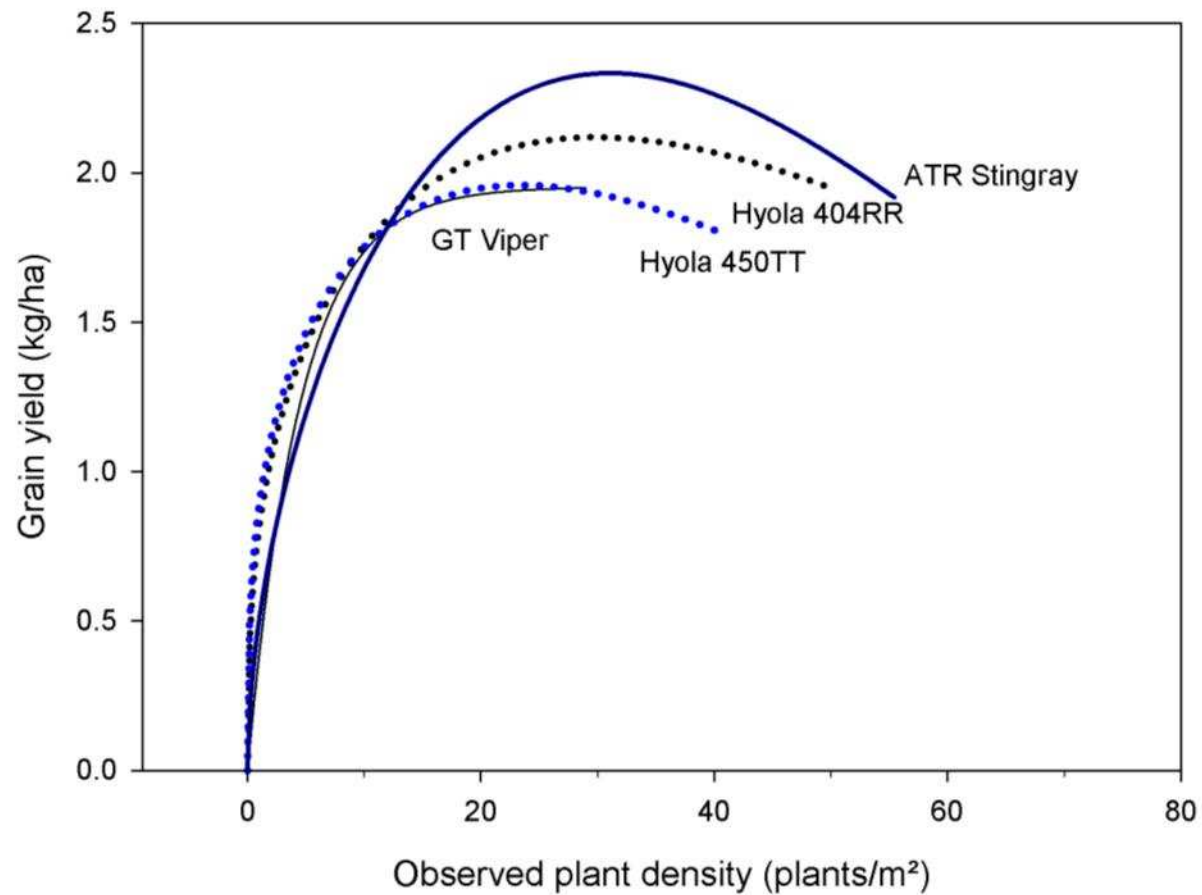




Holt Rock



Cunderdin



Mullewa July 5

GT Viper
10



Hyola 404RR
30



Sept 5

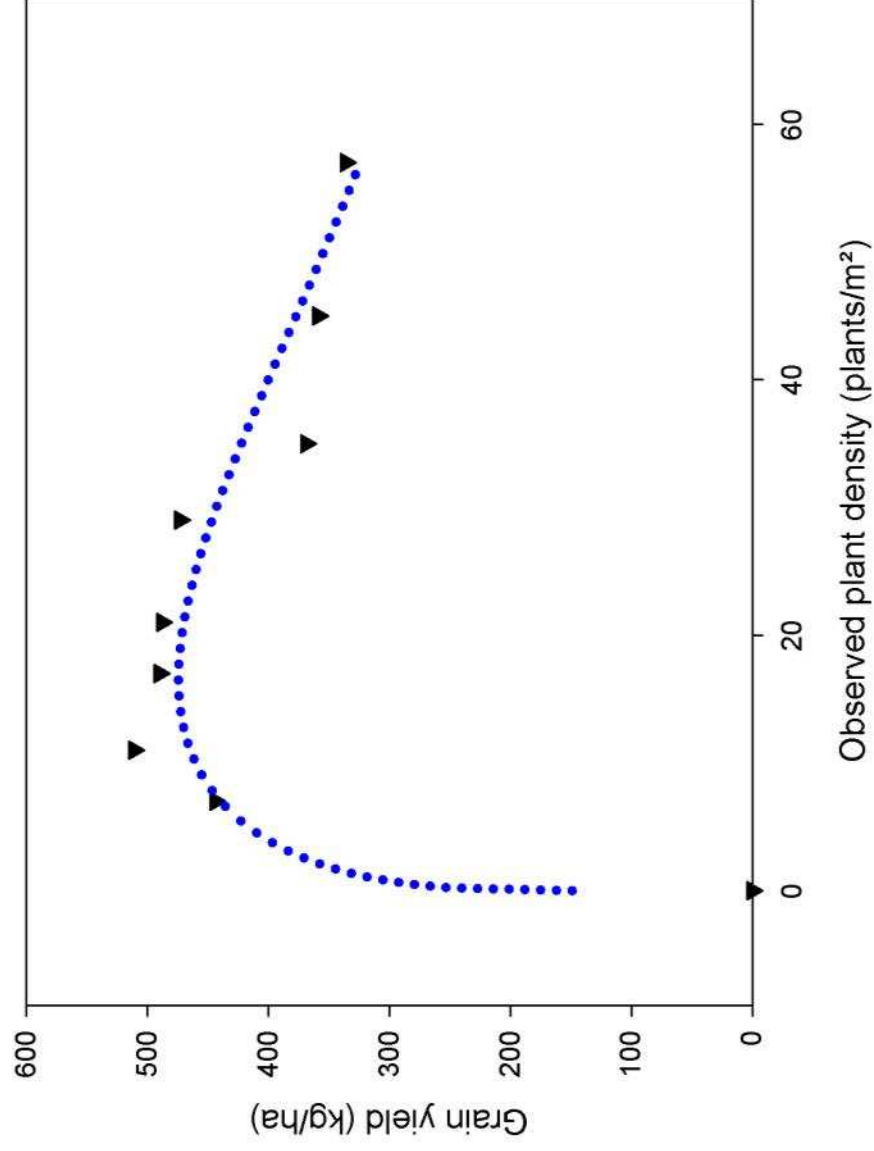
CB Telfer
30



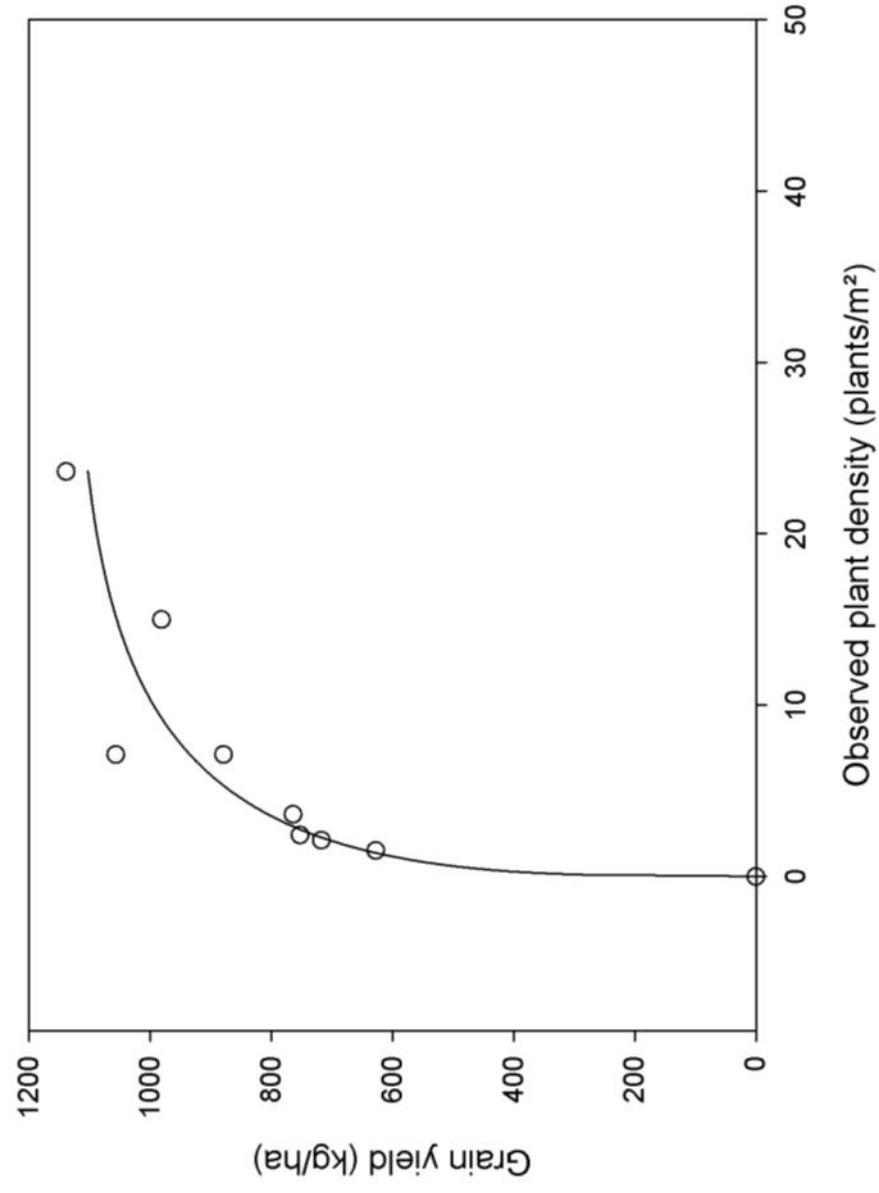
CB Telfer
80



13CH22 Mullewa TT HY



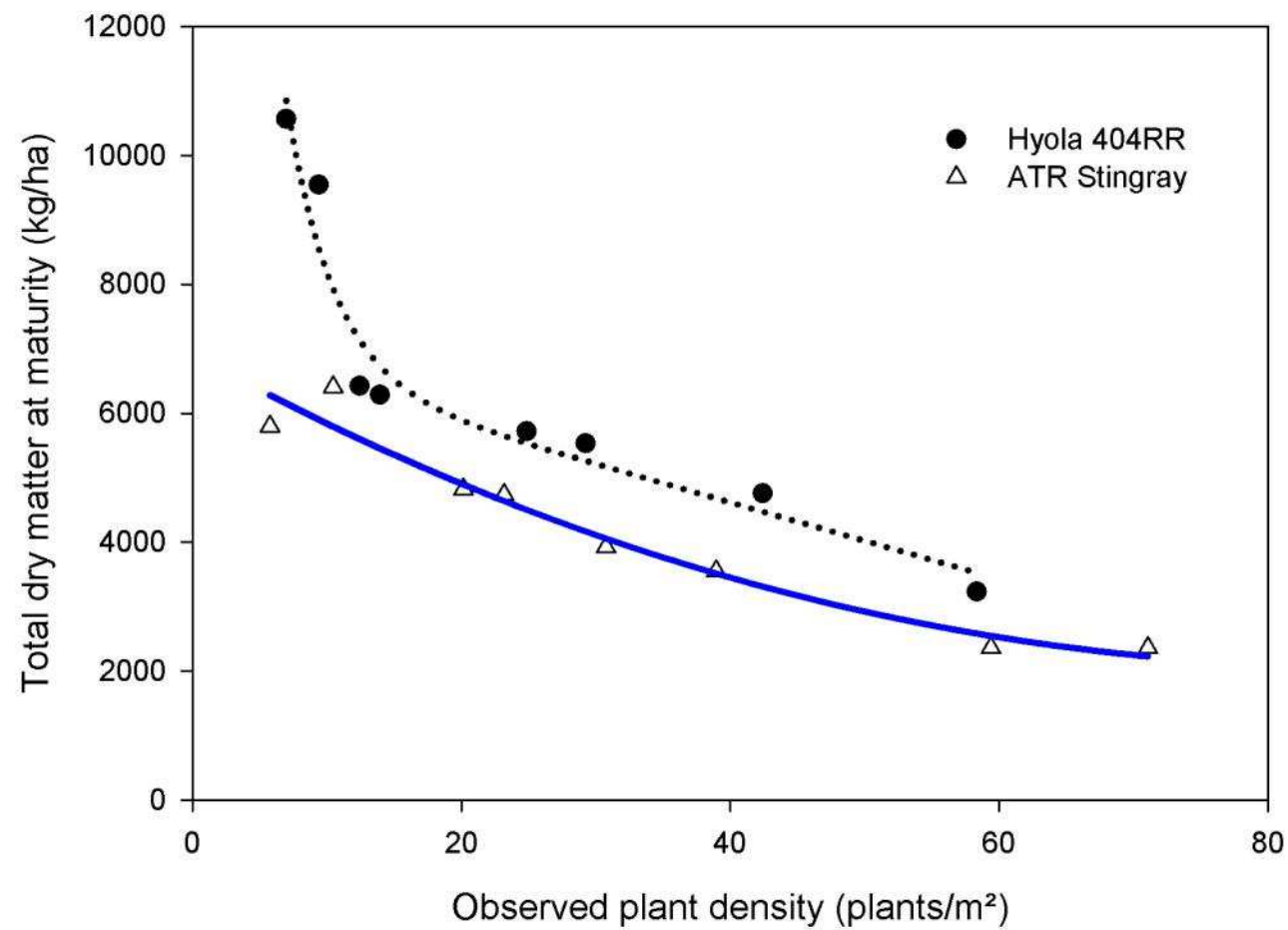
13WH12 Dalwalinnu RR OP

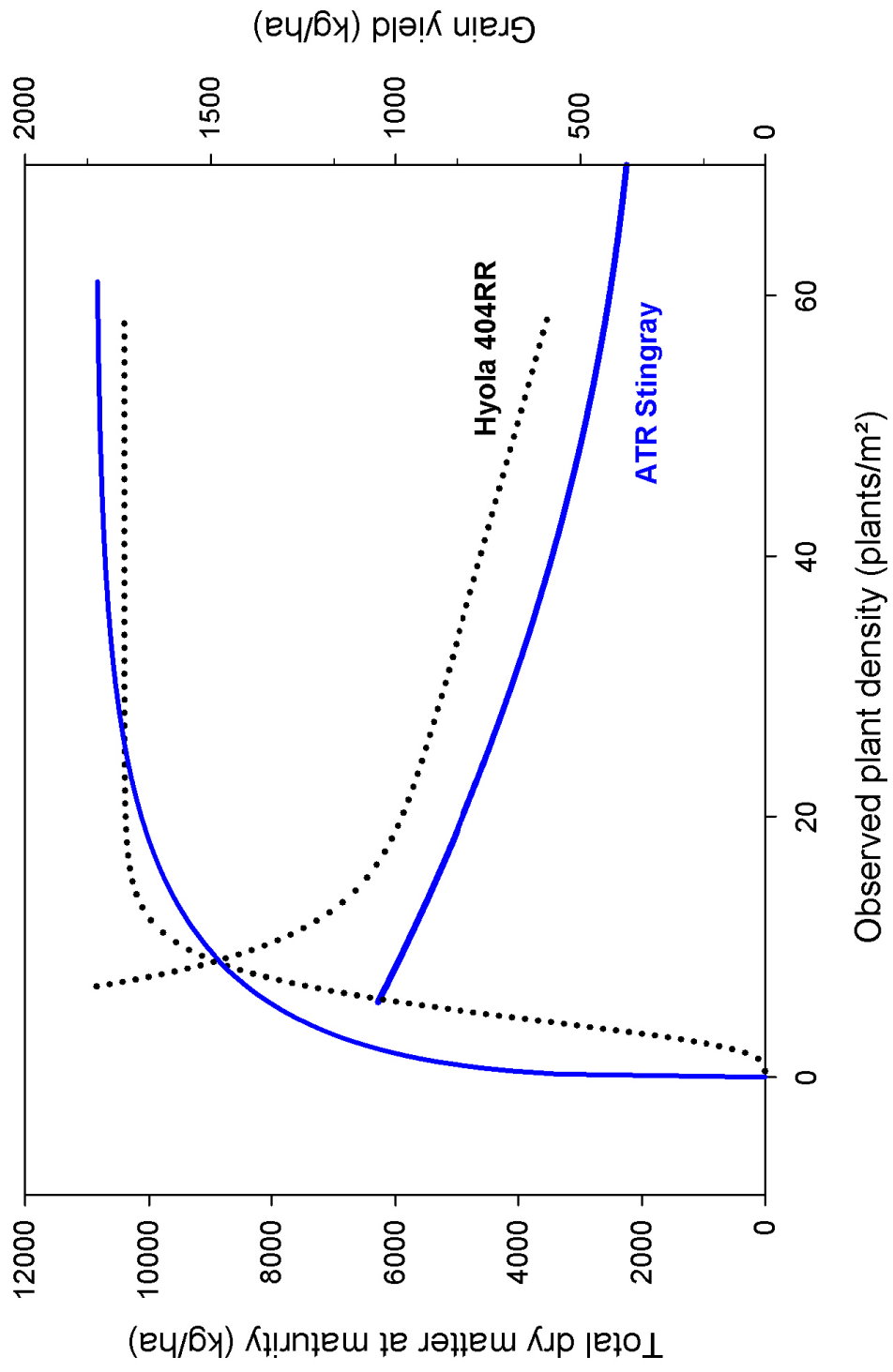


Tree trunks

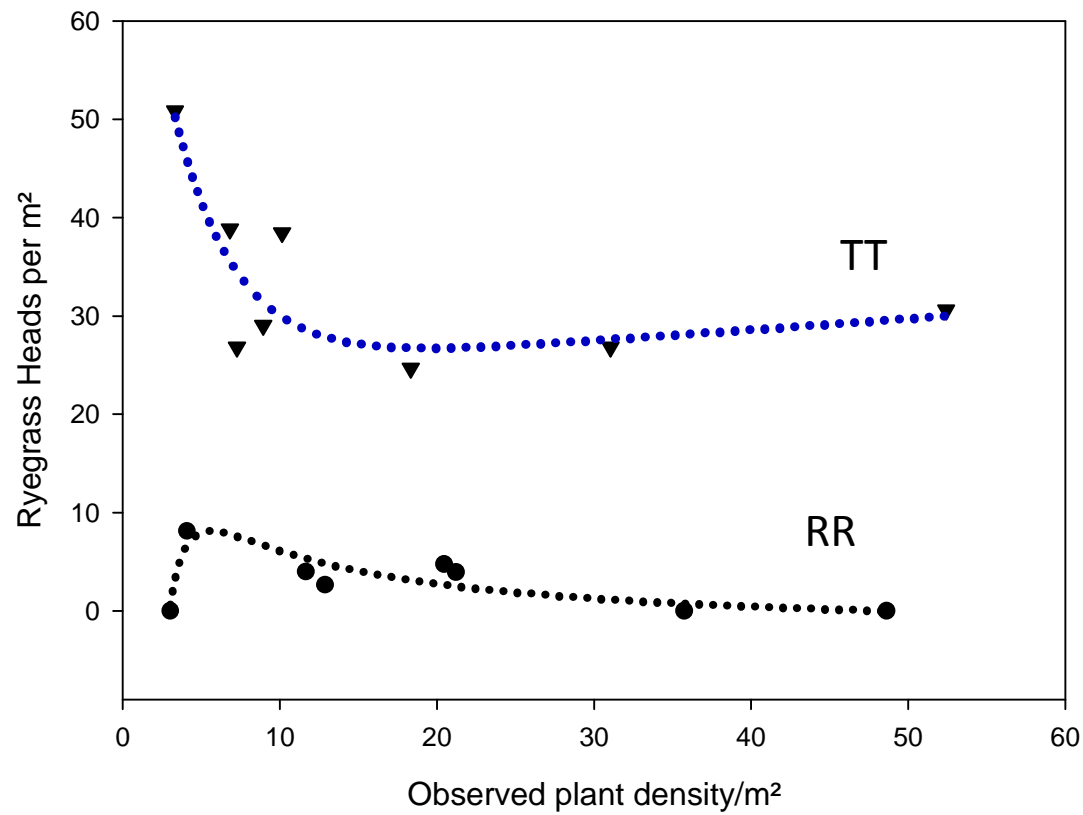


Eradu





Weeds



Liebe site



Optimum target densities and suggested seeding rates based on 2013 experiments are:

- *OP TT* - 31 plants/m²
 - which equates to a seeding rate of 2.1 kg/ha for ATR Stingray and 2.4 kg/ha for CB Telfer
 - but there is no economic reason not to go higher with farmer retained seed.
- *Hybrid TT* - 23 plants/m² (seed rate of ~ 1.4 kg/ha).
 - Using such a low seed rate may be risk so it may pay to increase seed rate if conditions are questionable or machine is not calibrated for low seeding rates
- *OP RR* – 24 plants/m² (seed rate of 2.2 kg/ha)
- *Hybrid RR* - 20 plants/m² equivalent to a seed rate of ~ 2.1 kg/ha.
 - Adjust seed rate for variety/seed lot seed size differences



Key messages

- Field establishment of canola can vary a lot
- Luckily canola can handle low densities
- Optimum economic densities of purchased seed is lower than retained seed





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Questions?

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Or phone the Esperance DAFWA office





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Seed rate

Target density (plants/m²) x 10,000 (m² in a hectare)

Seeds per kg x Field establishment x Germination rate





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20 plants/m² x 10,000 (m² in a hectare)

200,000 seeds per kg x 0.5 x 0.9

= 2.2 kg/ha





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	All sites	
	TT	RR
OP	2.1+	2.2
Hybrid	1.4	2.1



Treatname	Treat	Density	variety	g per plot	Seeds per kg	Seed size mg	Target density	Germ	FE	Seed rate kg/ha
CB Telfer 5 plants/m ²	1	5	CB Telfer	0.8	281,690	3.55	5	90	75	0.3
CB Telfer 10 plants/m ²	2	10	CB Telfer	1.5	281,690	3.55	10	90	75	0.5
CB Telfer 15 plants/m ²	3	15	CB Telfer	2.3	281,690	3.55	15	90	75	0.8
CB Telfer 20 plants/m ²	4	20	CB Telfer	3.0	281,690	3.55	20	90	75	1.1
CB Telfer 30 plants/m ²	5	30	CB Telfer	4.5	281,690	3.55	30	90	75	1.6
CB Telfer 40 plants/m ²	6	40	CB Telfer	6.1	281,690	3.55	40	90	75	2.1
CB Telfer 60 plants/m ²	7	60	CB Telfer	9.1	281,690	3.55	60	90	75	3.2
CB Telfer 80 plants/m ²	8	80	CB Telfer	12.1	281,690	3.55	80	90	75	4.2
Hyola 450TT 5 plants/m ²	9	5	Hyola 450TT	0.8	272,480	3.67	5	90	75	0.3
Hyola 450TT 10 plants/m ²	10	10	Hyola 450TT	1.6	272,480	3.67	10	90	75	0.5
Hyola 450TT 15 plants/m ²	11	15	Hyola 450TT	2.3	272,480	3.67	15	90	75	0.8
Hyola 450TT 20 plants/m ²	12	20	Hyola 450TT	3.1	272,480	3.67	20	90	75	1.1
Hyola 450TT 30 plants/m ²	13	30	Hyola 450TT	4.7	272,480	3.67	30	90	75	1.6
Hyola 450TT 40 plants/m ²	14	40	Hyola 450TT	6.3	272,480	3.67	40	90	75	2.2
Hyola 450TT 60 plants/m ²	15	60	Hyola 450TT	9.4	272,480	3.67	60	90	75	3.3
Hyola 450TT 80 plants/m ²	16	80	Hyola 450TT	12.5	272,480	3.67	80	90	75	4.3
GT Viper 5 plants/m ²	17	5	GT Viper	0.9	243,309	4.11	5	90	75	0.3
GT Viper 10 plants/m ²	18	10	GT Viper	1.8	243,309	4.11	10	90	75	0.6
GT Viper 15 plants/m ²	19	15	GT Viper	2.6	243,309	4.11	15	90	75	0.9
GT Viper 20 plants/m ²	20	20	GT Viper	3.5	243,309	4.11	20	90	75	1.2
GT Viper 30 plants/m ²	21	30	GT Viper	5.3	243,309	4.11	30	90	75	1.8
GT Viper 40 plants/m ²	22	40	GT Viper	7.0	243,309	4.11	40	90	75	2.4
GT Viper 60 plants/m ²	23	60	GT Viper	10.5	243,309	4.11	60	90	75	3.7
GT Viper 80 plants/m ²	24	80	GT Viper	14.0	243,309	4.11	80	90	75	4.9
Hyola 404 RR 5 plants/m ²	25	5	Hyola 404 RR	1.2	161,812	6.18	5	90	85	0.4
Hyola 404 RR 10 plants/m ²	26	10	Hyola 404 RR	2.3	161,812	6.18	10	90	85	0.8
Hyola 404 RR 15 plants/m ²	27	15	Hyola 404 RR	3.5	161,812	6.18	15	90	85	1.2
Hyola 404 RR 20 plants/m ²	28	20	Hyola 404 RR	4.7	161,812	6.18	20	90	85	1.6
Hyola 404 RR 30 plants/m ²	29	30	Hyola 404 RR	7.0	161,812	6.18	30	90	85	2.4
Hyola 404 RR 40 plants/m ²	30	40	Hyola 404 RR	9.3	161,812	6.18	40	90	85	3.2
Hyola 404 RR 60 plants/m ²	31	60	Hyola 404 RR	14.0	161,812	6.18	60	90	85	4.8
Hyola 404 RR 80 plants/m ²	32	80	Hyola 404 RR	18.6	161,812	6.18	80	90	85	6.5

