

The effects of wheat seed quality are greatest in high yielding environments

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Average grain nutrient content for Mace: 2011-2013 NVT trials

	Kernel wt	GPC	P	K	S	Mn	B	Cu	Zn
	(mg)	(%)	(mg/kg)						
Mean	36.9	11.0	2715	3909	1434	40	1.7	3.9	18
Minimum	27.9	8.0	1600	3300	1090	26	0.9	1.4	9
Maximum	46.0	15.0	4000	5000	1720	62	3.6	5.3	29
SA average 2009 ^A			3354	4641	1729	41	1.9	4.9	23
Halberd 1971-1974^B		11.9	2600	4100	1600	37		6	18
Critical value ^C			2700	5000	1200	20	<2	1-2.5	5-15

^A Rob Norton (2012)

^B Shultz & French (1978)

^C Reuter and Robinson (1997)

Seed source did not consistently affect yield

Seed source	Minnipa 2012	T'field 2012	Karoonda 2013	Minnipa 2013	T'field 2013	Karoonda 2014	Minnipa 2014	T'field 2014
	(t/ha) ^A							
Booloroo	1.33	3.23						
Keith						1.32	3.41	4.10
Mitchellville	1.36	3.19						
Nangari	1.32	3.00	1.82	2.83	3.39	1.54	3.33	4.10
Nunjikompita	1.33	3.35	1.77	2.87	3.41	1.58	3.49	4.26
Penong			1.81	2.94	3.45	1.42	3.45	4.28
Turretfield	1.38	3.31	1.83	2.94	3.47	1.40	3.50	4.53
Wanbi	1.35	3.21	1.80	2.90	3.46			
Wolesely	1.32	3.24						
Signif	ns	***	ns	*	ns	ns	**	**
Difference		10%		4%			5%	10%

^A Averages of between 3 and 7 varieties and small and large seed

Does seed size affect nutrient concentration?

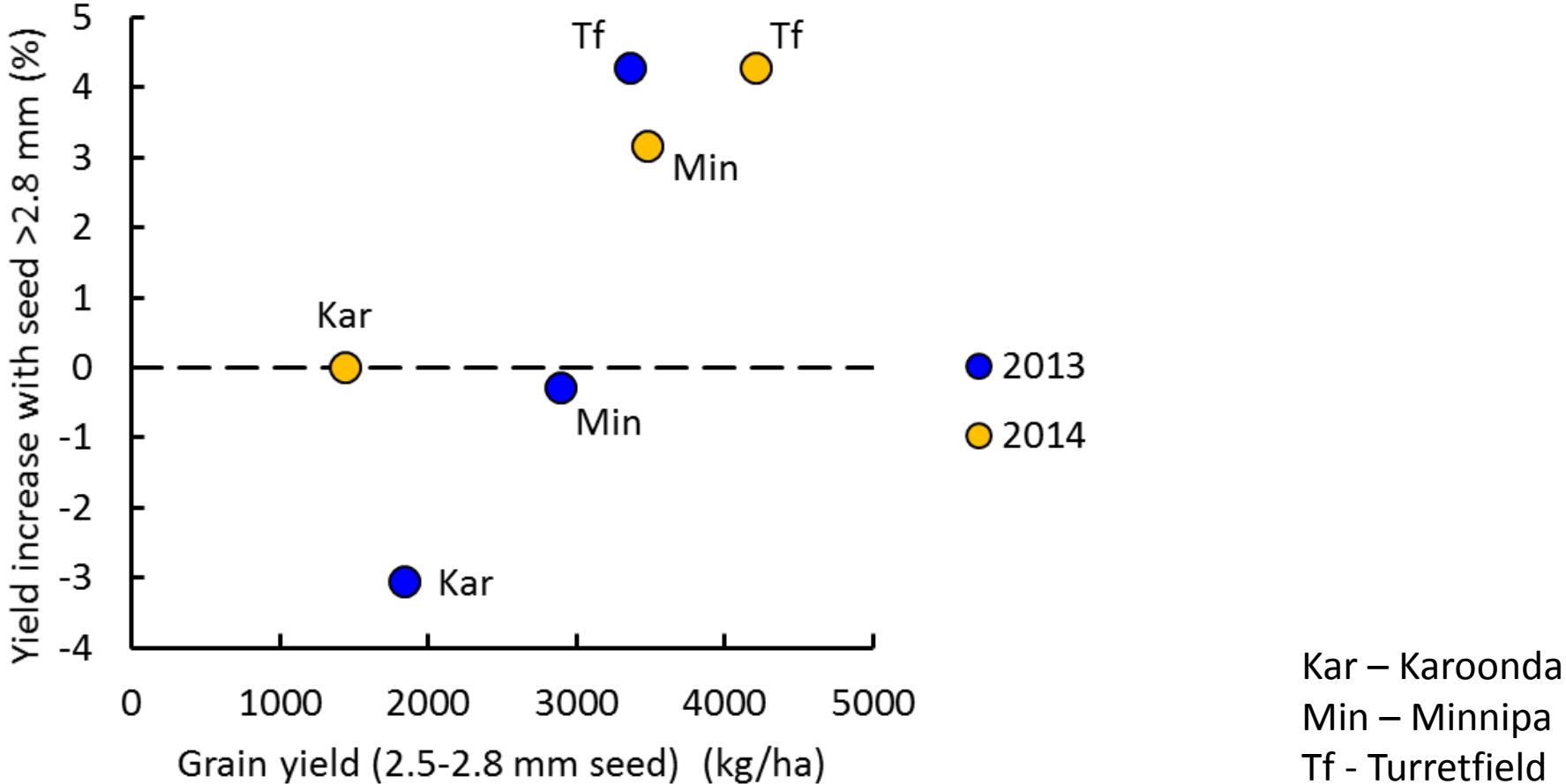
Seed size	KWt (mg)	GPC (%)	P (mg/kg)	K (mg/kg)	S (mg/kg)	Zn (mg/kg)	Mn (mg/kg)
Seed source: Turretfield							
<2.0	17 ± 0.8	15.2 ± 0.6	4217 ± 237	5720 ± 217	1753 ± 60	23 ± 1	48 ± 5
2.0-2.5	29 ± 0.9	15.3 ± 0.3	4170 ± 197	5490 ± 310	1767 ± 15	21 ± 1	46 ± 3
2.5-2.8	38 ± 1.3	14.8 ± 0.8	3970 ± 78	5097 ± 78	1723 ± 59	21 ± 1	45 ± 2
>2.8	46 ± 2.4	14.4 ± 0.9	3750 ± 267	4710 ± 220	1700 ± 51	20 ± 1	44 ± 3
Seed source: Nangari							
<2.0	16 ± 0.9	10.8 ± 0.3	1830 ± 61	3567 ± 99	1363 ± 55	10 ± 0.2	31 ± 2
2.0-2.5	28 ± 0.5	10.4 ± 0.3	1755 ± 21	3725 ± 162	1335 ± 7	10 ± 0.3	33 ± 2
2.5-2.8	40 ± 0.3	10.5 ± 0.5	1833 ± 105	3797 ± 150	1353 ± 67	10 ± 0.6	34 ± 4
>2.8	49 ± 3.0	11.3 ± 0.4	2046 ± 92	3773 ± 125	1450 ± 66	11 ± 0.1	36 ± 4

Larger seeds led to greater plants/m² and early growth

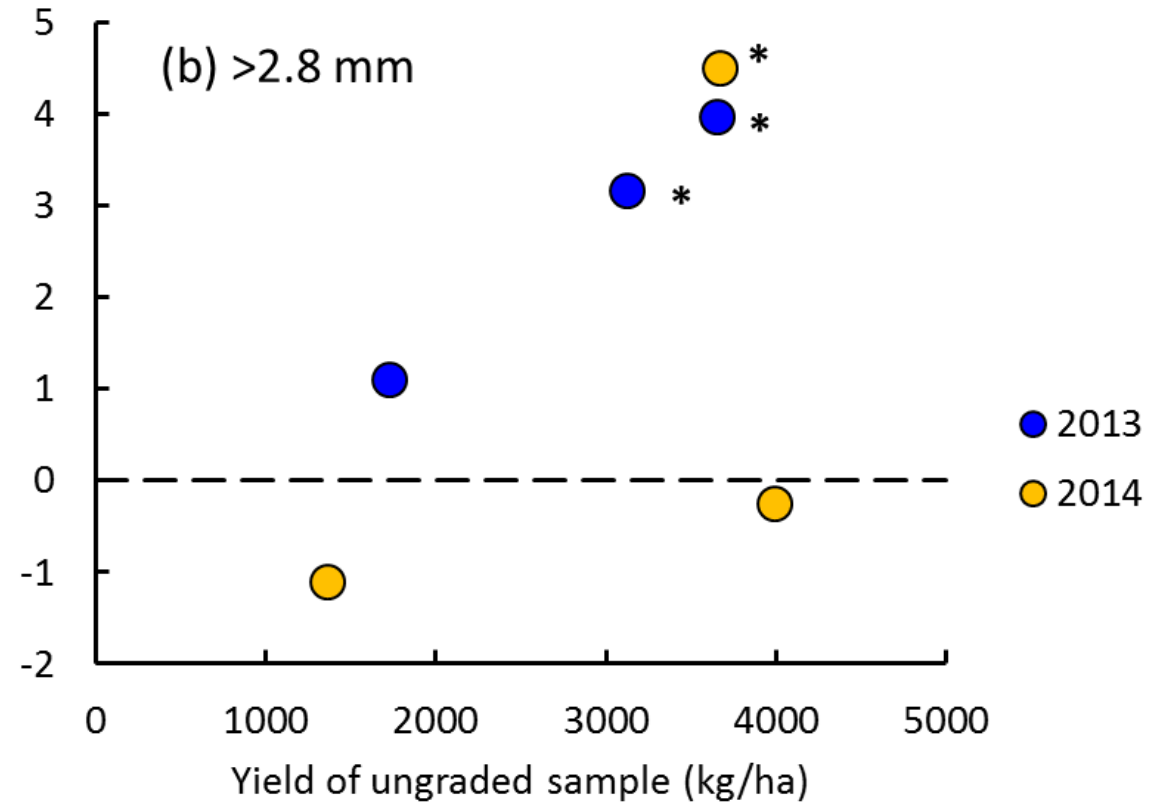
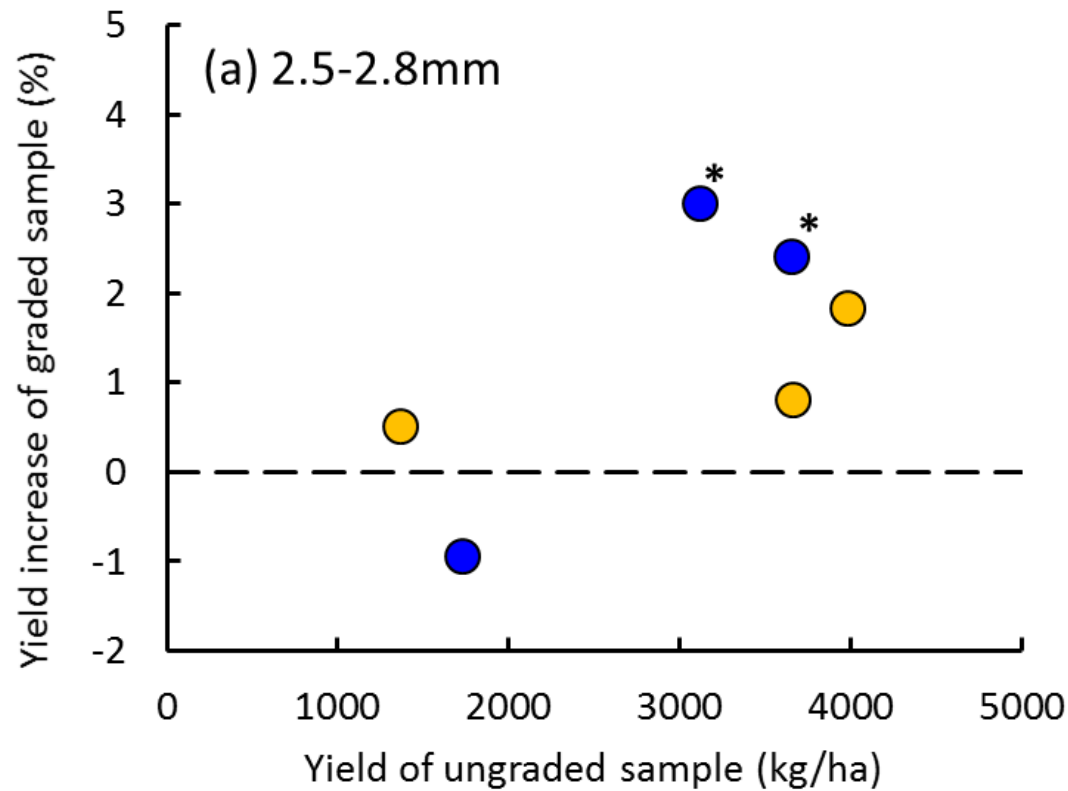


Average increase in plants/m²
7.0 ± 1.9%
(range: 4.2-9.2%)

Greater yield benefits from larger seed occurred at higher yielding sites



Greater yield benefits from larger seed occurred at higher yielding sites



* = Significant increase

Summary & conclusions

- Seed source can have a significant effect on yield due to variation in grain P , K and Zn
- Grading seed has little effect on seed nutrient concentrations
- Seed size was more important than seed source in affecting yield
- Any beneficial effects of high seed quality were most consistently observed when yields were high (>~3 t/ha)