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Supplementary Material

Do wheat breeders have suitable genetic variation to overcome short coleoptiles and poor establishment in the warmer soils of future climates?

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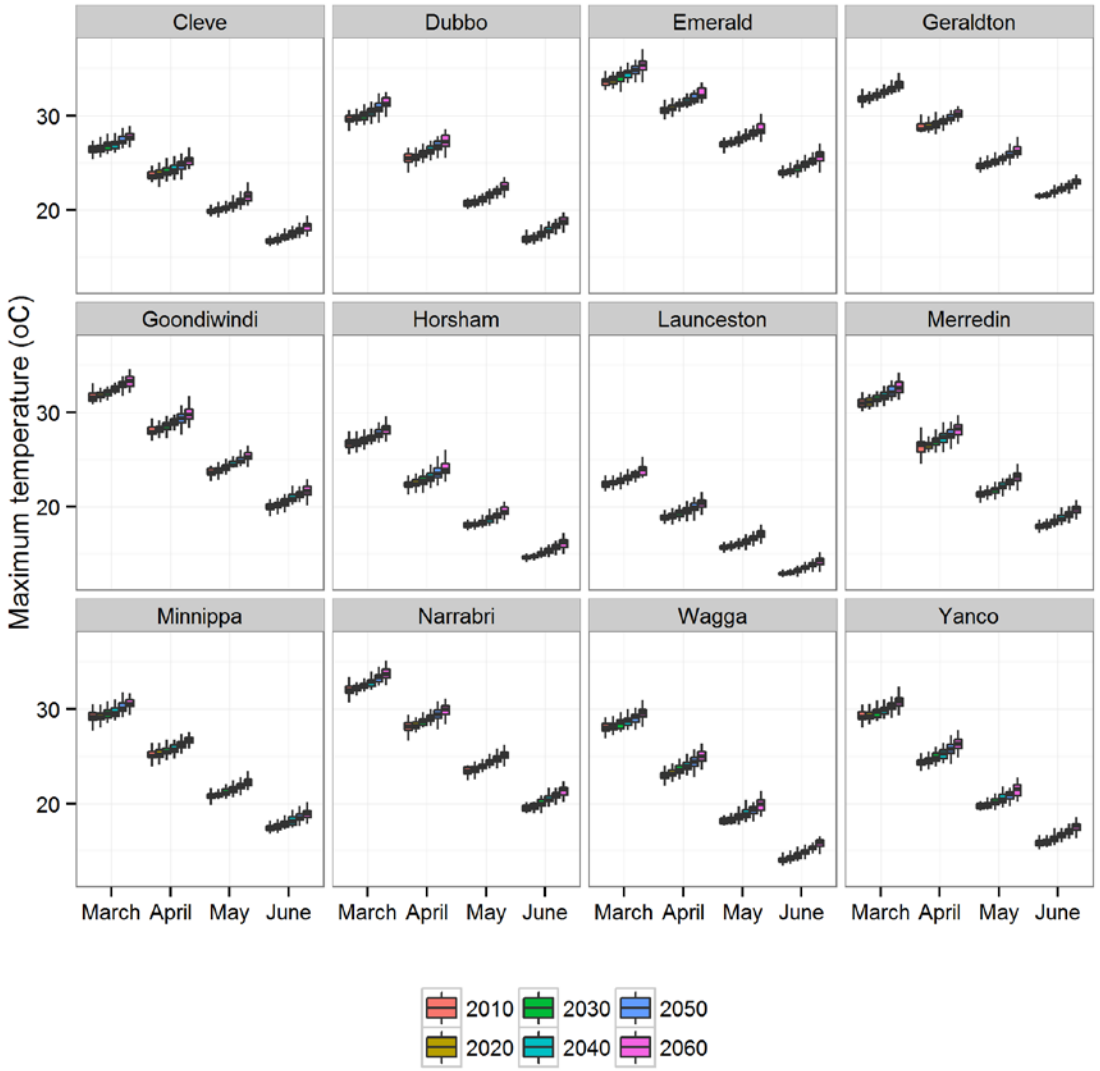

Fig S1. Box-plots summarising predicted maximum daily air temperatures for April–June sowings throughout the Australian wheatbelt over the next 50 years. The whiskers represent the 5th and 95th percentiles, the boxes the 25th and 75th percentiles, and the solid and dashed lines the median and mean, respectively for each site × year × sowing date combination.

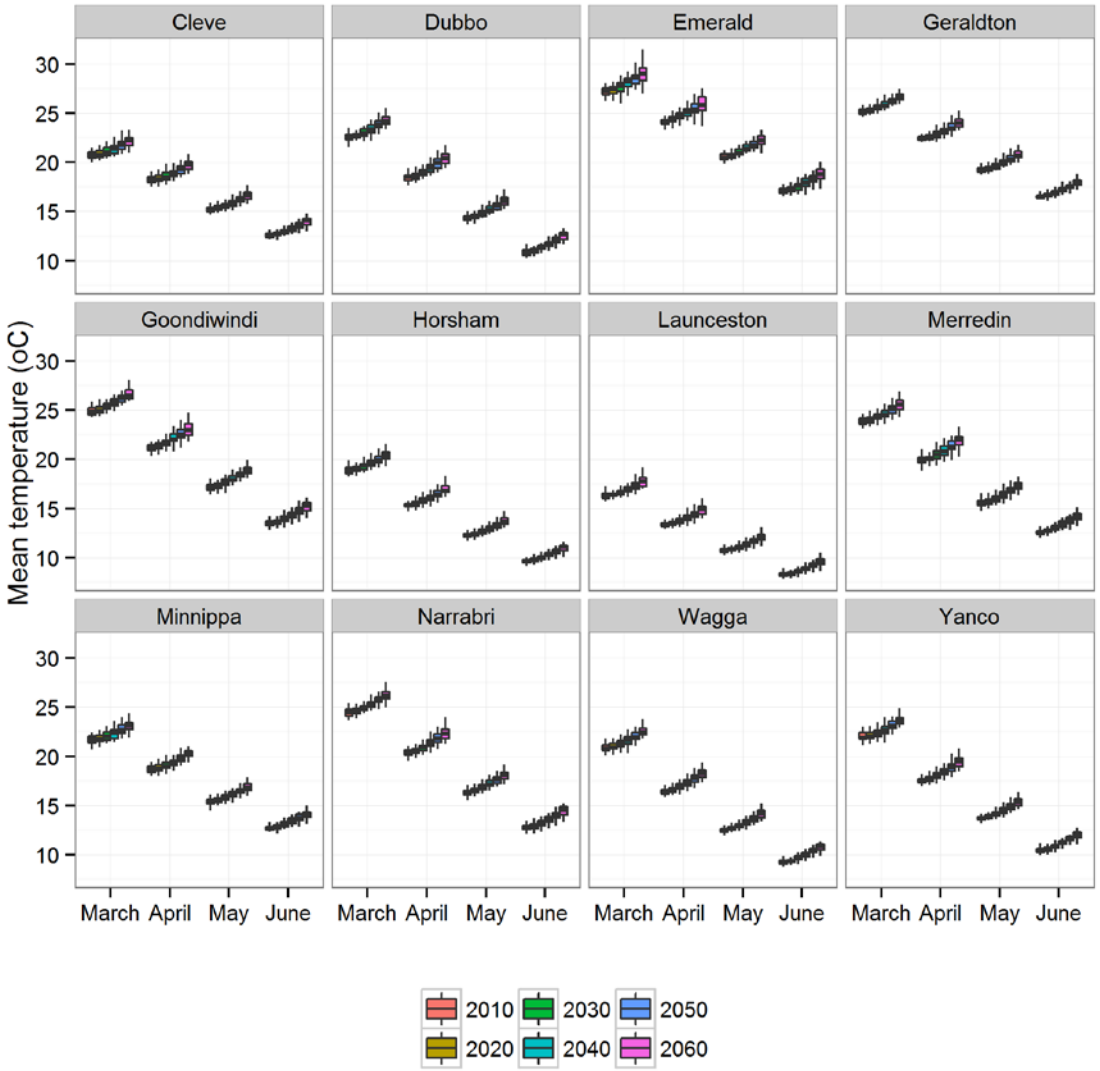

Fig S2. Box-plots summarising predicted daily mean air temperature for April–June sowings throughout the Australian wheatbelt over the next 50 years. The whiskers represent the 5th and 95th percentiles, the box boundaries the 25th and 75th percentiles, and the solid and dashed lines the median and mean, respectively for each site × year × sowing date combination.

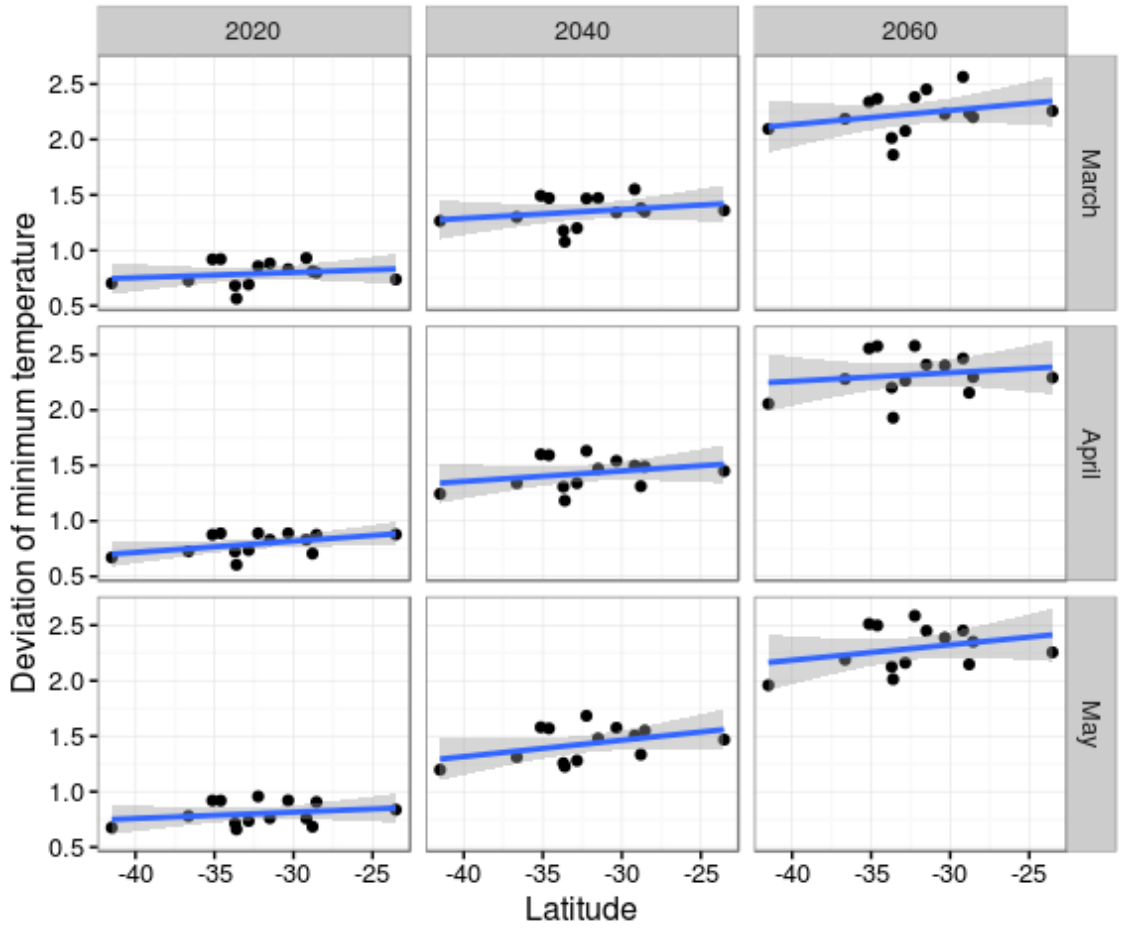

Fig. S3. The trend of deviation of maximum temperature across latitude in three target years (2020, 2040 and 2060) and 3 months (March, April and May).

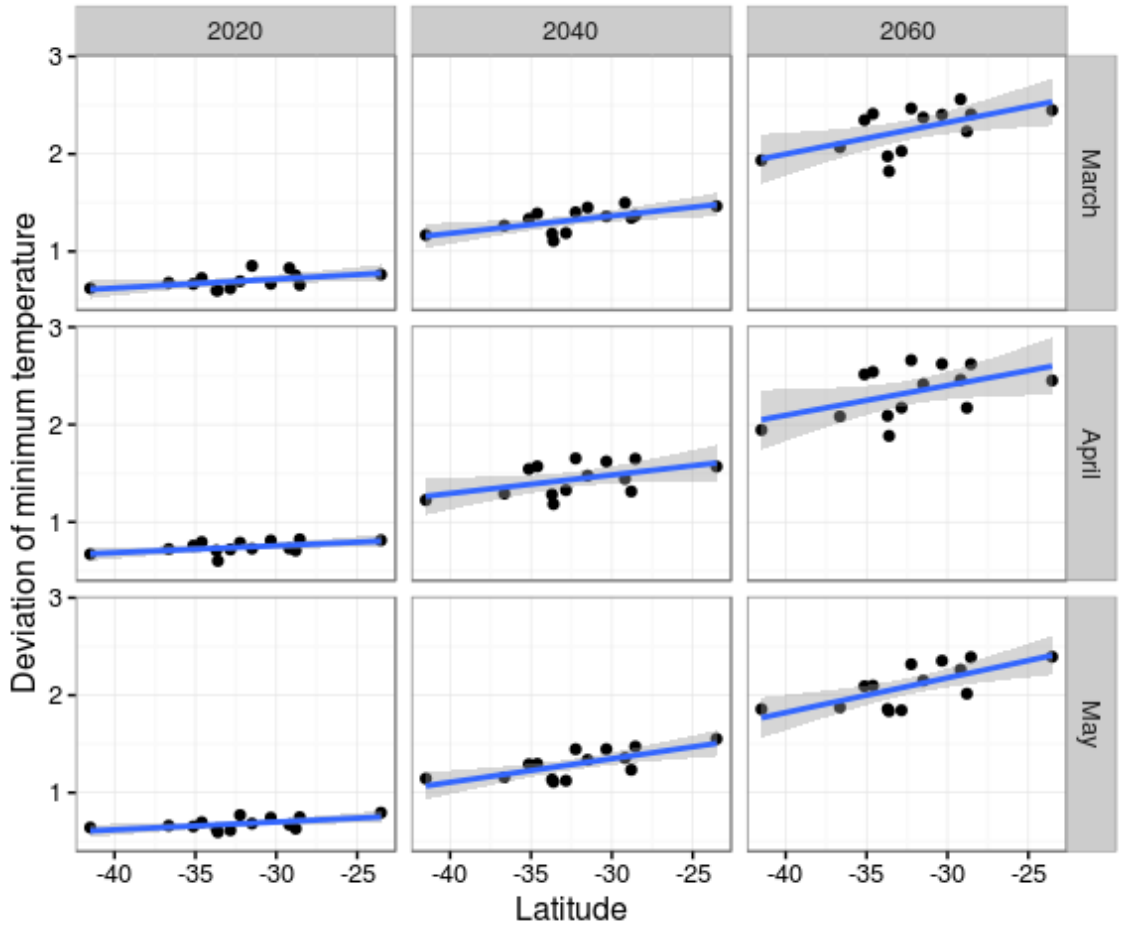

Fig S4. The trend of deviation of minimum temperature across latitude in three target years (2020, 2040 and 2060) and three months (March, April and May).

Table S1. The statistical (covariance) analysis for factors contributing to predicted deviation in maximum temperature in future climates

The linear model is used to study the impact of latitude (continuous variable), month (factor), target year (factor) and their interactions on deviation of minimum temperature

Variable	df	Model SS	MS	F-value	Pr(>F)
Latitude	1	0.3296	0.3296	16.4352	0.0001
Month	2	0.0580	0.0290	1.4465	0.2377
Target	5	81.1199	16.2240	808.9067	0.0000
Latitude x month	2	0.0091	0.0045	0.2265	0.7975
Latitude x target	5	0.0196	0.0039	0.1953	0.9641
Month x target	10	0.0940	0.0094	0.4685	0.9090
Latitude x month x target	10	0.0284	0.0028	0.1417	0.9991
Residual	216	4.3322	0.0201		

Table S2. The statistical (covariance) analysis for factors contributing to deviation in predicted minimum temperature in future climates

The linear model is used to study the impact of latitude (continuous variable), month (factor), target year (factor) and their interactions on deviation of minimum temperature

Variable	df	Model SS	MS	F-value	Pr(>F)
Latitude	1	1.3846	1.3846	85.8616	0.0000
Month	2	0.6480	0.3240	20.0912	0.0000
Target	5	86.5720	17.3144	1073.7344	0.0000
Latitude x month	2	0.0105	0.0052	0.3250	0.7229
Latitude x target	5	0.4010	0.0802	4.9730	0.0002
Month x target	10	0.2619	0.0262	1.6239	0.1012
Latitude x month x target	10	0.0064	0.0006	0.0395	1.0000
Residual	216	3.4831	0.0161		