

### Supplementary Material

#### **Identification of environment similarities using a crop model to assist the cultivation and breeding of a new crop in a new region**

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**Supplementary Table S1** APSIM genotypic parameters for a super-short duration pigeonpea cultivar

Parameter	Parameter value					
x_photoperiod_hi_incr units="h"	1		24			
y_harvest index_incr units="1/days" description="rate of HI increase (optional)"	0.004		0.012			
x_harvest index_max_pot_stress	0		1			
y_hi_max_pot	0.5		0.5			
cumvd_emergence description="cumulative vernal days"	0					
tt_emergence units="°Cd" description	580		580			
est_days_emerg_to_init units="d"	20					
x_photoperiod_end_of_juvenile description="h"	12.9 h	16.0 h	16.1 h			
y_tt_end_of_juvenile description="Thermal time (°Cd) from end juvenile - floral initiation"	1	100	100			
x_photoperiod_floral_initiation units="h"	1 h		24 h			
y_tt_floral_initiation units="°Cd" description="Thermal time from initiation - flowering"	10		10			
x_photoperiod_flowering units="h"	1 h		24 h			
y_tt_flowering units="°Cd" description="Thermal time from flowering - start grain fill"	50		50			
x_photoperiod_start_grain_fill units="h"	1 h		24 h			
y_tt_start_grain_fill units="°Cd"	600.5		600.5			
tt_end_grain_fill units="°Cd"	32.5					
tt_maturity units="°Cd" description="Thermal time (°Cd) from maturity - harvest ripe"	36					
x_stem_wt units="g" description="Stem weight per plant"	0	4	9	25	85	130
y_height units="mm" description="Plant height at given stem weight"	0	600	1000	1300	2000	2100

**Supplementary Table S2** APSIM genotypic parameters for an extra-short duration pigeonpea cultivar

Parameter	Parameter value					
x_photoperiod_hi_incr units="h"	1 h		24 h			
y_harvest index_incr units="1/days" description="rate of HI increase (optional)"	0.003		0.006			
x_harvest index_max_pot_stress	0		1			
y_harvest index_max_pot	0.5		0.5			
cumvd_emergence description="cumulative vernal days"	0					
tt_emergence units="°Cd" description	780		780			
est_days_emerg_to_init units="d"	20					
x_photoperiod_end_of_juvenile description="h"	12.9 h	16.0 h	16.1 h			
y_tt_end_of_juvenile description="Thermal time (°Cd) from end juvenile - floral initiation"	1	150	150			
x_photoperiod_floral_initiation units="h"	1 h		24 h			
y_tt_floral_initiation units="°Cd" description="Thermal time from initiation - flowering"	10		10			
x_photoperiod_flowering units="h"	1 h		24 h			
y_tt_flowering units="°Cd" description="Thermal time from flowering - start grain fill"	50		50			
x_photoperiod_start_grain_fill units="h"	1 h		24 h			
y_tt_start_grain_fill units="°Cd"	600.5		600.5			
tt_end_grain_fill units="°Cd"	32.5					
tt_maturity units="°Cd" description="Thermal time (°Cd) from maturity - harvest ripe"	36					
x_stem_wt units="g" description="Stem weight per plant"	0	4	9	25	85	130
y_height units="mm" description="Plant height at given stem weight"	0	600	1000	1300	2000	2100