

Table S2. Selected models for the \mathbf{G}_M matrix and number of estimated parameters (n_{par}) considering each trait separately. The Akaike (AIC) and Bayesian (BIC) information criteria were used to compare the structures of the variance-covariance matrix. The models for the \mathbf{G}_M matrix were selected according to the lowest value of the BIC criterion for BRIX (in °Brix), sucrose content of the cane (POL%C, in %), sucrose content of the juice (POL%J, in %), fiber content (FIB, in %), stalk height (SH, in m), stalk number (SN), stalk diameter (SD, in mm), stalk weight of the plot (SW, in kg), cane yield (TCH, in t ha⁻¹) and sucrose yield (TPH, in t ha⁻¹) for BPSG over three harvest years (2014, 2015 and 2016). Bold numbers represent the smallest AIC and BIC values.

Trait	\mathbf{G}_M matrix	Models	n_{par}	AIC	BIC
BRIX (°Brix)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	9648.05	9683.41
		(2) DIAG	3	9647.57	9694.71
		(3) AR1	3	8808.15	8849.41
		(4) AR1 (Het)	4	8782.15	8835.19
POL%C	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	11391.37	11426.73
		(2) DIAG	3	11395.26	11442.40
		(3) AR1	3	10565.16	10606.40
		(4) AR1 (Het)	4	10568.19	10621.22
POL%J	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	11833.11	11868.47
		(2) DIAG	3	11836.86	11884.01
		(3) AR1	3	11011.37	11052.62
		(4) AR1 (Het)	4	11013.35	11066.39
FIB (%)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	12860.77	12896.10
		(2) DIAG	3	12830.96	12878.08
		(3) AR1	3	12352.04	12393.26
		(4) AR1 (Het)	4	12184.22	12237.23
SH (m)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	1321.71	1357.09
		(2) DIAG	3	1299.04	1346.22
		(3) AR1	3	789.67	830.95
		(4) AR1 (Het)	4	727.05	780.13
SN	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	27714.26	27749.69
		(2) DIAG	3	27690.63	27737.88
		(3) AR1	3	27048.11	27089.45
		(4) AR1 (Het)	4	26919.81	26972.97
SD (mm)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	13341.12	13376.50
		(2) DIAG	3	13336.24	13383.41
		(3) AR1	3	12474.86	12516.14
		(4) AR1 (Het)	4	12440.50	12493.57

SW (Kg)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	27807.12	27842.51
		(2) DIAG	3	27667.89	27715.07
		(3) AR1	3	27400.02	27441.31
		(4) AR1 (Het)	4	27156.38	27209.46
TCH (t ha-1)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	28745.20	28780.58
		(2) DIAG	3	28605.96	28653.15
		(3) AR1	3	28338.09	28379.38
		(4) AR1 (Het)	4	28094.45	28147.54
TPH (t ha-1)	$\mathbf{G}_M = \mathbf{G}_{M \times M}$	(1) ID	1	18544.95	18580.26
		(2) DIAG	3	18361.52	18408.60
		(3) AR1	3	18131.39	18172.59
		(4) AR1 (Het)	4	17784.57	17837.54

* Do not converge.