

**Table S3** Variance-covariance matrices for equation 1 for (a) all species together, (b) cereals only, (c) pulses only and for equation 2 for (d) all species together, (e) cereals only and (f) pulses only.

(a) Equation 1 – all species.

	<b>M0</b>	<b>lambda</b>	<b>d</b>	<b>Ar</b>	<b>c</b>
<b>M0</b>	1.00				
<b>lambda</b>	-0.76	1.00			
<b>d</b>	-0.08	-0.27	1.00		
<b>Ar</b>	0.53	-0.61	-0.27	1.00	
<b>c</b>	-0.36	0.25	0.18	-0.16	1.00

(b) Equation 1 – cereals only.

	<b>M0</b>	<b>lambda</b>	<b>d</b>	<b>Ar</b>	<b>c</b>
<b>M0</b>	1.00				
<b>lambda</b>	-0.34	1.00			
<b>d</b>	0.00	-0.86	1.00		
<b>Ar</b>	0.28	-0.11	-0.22	1.00	
<b>c</b>	-0.58	-0.03	0.13	0.08	1.00

(c) Equation 1 – pulses only.

	<b>M0</b>	<b>lambda</b>	<b>d</b>	<b>Ar</b>	<b>c</b>
<b>M0</b>	1.00				
<b>lambda</b>	-0.89	1.00			
<b>d</b>	0.31	-0.16	1.00		
<b>Ar</b>	0.42	-0.33	0.06	1.00	
<b>c</b>	-0.46	0.27	0.17	-0.17	1.00

(d) Equation 2 – all species.

	<b>New seed mass</b>	<b>Total seed number</b>
<b>New seed mass</b>	1.00	
<b>Total seed number</b>	-0.70	1.00

(e) Equation 2 – cereals only.

	<b>Individual seed mass</b>	<b>Seed number per infructescence (Ns)</b>	<b>Infructescence number per plant (Ni)</b>
<b>Individual seed mass</b>	1.00	-	
<b>Seed number per infructescence (Ns)</b>	-0.17	1.00	
<b>Infructescence number per plant (Ni)</b>	0.01	-0.58	1.00

(f) Equation 2 – legumes only.

	<b>M0</b>	<b>Total seed number</b>
<b>M0</b>	1.00	
<b>Total seed number</b>	-0.81	1.00

**Table S4** Comparison of three statistical methods (pgls, lmekin and lme) used to analyse differences between crops and their progenitors. All traits were natural log transformed except  $d$ ,  $Ar$ ,  $c$  and  $\tilde{\lambda}$ .

Trait	pgls	lmekin	lme
$Y$ – total seed yield	1.5 × higher *	1.7 × higher **	1.8 × higher ***
$M_S$ – individual seed mass	1.9 × larger ***	1.8 × larger ***	1.9 × larger ***
$d$ - duration of growth	NS	NS	NS
$Ar$ - % reproductive mass	NS	NS	NS
$c$ - proportion of chaff	37% less chaff **	38% less chaff ***	40% less chaff ***
Total aboveground biomass	1.4 × larger *	1.4 × larger **	1.5 × larger ***
$\tilde{\lambda}$ – relative growth rate	NS	NS	4% lower **
Total seeds per plant	NS	NS	NS
Seed number per gram plant biomass	NS	NS	1.4 x higher ***
Height	NS	NS	1.1 × taller**
<b>Cereals only</b>			
Infructescence mass	2.1 × larger ***	1.8 × larger ***	1.8 × larger ***
$N_s$ - number seeds per infructescence	1.3 × more **	1.3 × more ***	1.3 × more ***
$N_i$ - number of infructescences	NS	NS	NS

**Table S5** Comparison of three statistical methods (pgls, lmekin and lme) used to analyse between-species correlations.

Correlation	pgls	lmekin	lme
ln (total seed yield) ~ ln (aboveground biomass)	$P < 0.0001$ Intercept = -1.1 Slope = 1.11 $R^2 = 0.86$	$P < 0.0001$ Intercept = -0.6 Slope = 0.85	$P < 0.0001$ Intercept = -1.1 Slope = 1.06
ln (total seed yield) ~ ln (individual seed mass)	$P < 0.001$ Intercept = -0.8 Slope = 0.58 $R^2 = 0.54$	$P < 0.0001$ Intercept = -0.1 Slope = 0.33	$P < 0.0001$ Intercept = -0.4 Slope = 0.59
ln (aboveground biomass) ~ ln (individual seed mass)	$P < 0.001$ Intercept = 0.3 Slope = 0.52 $R^2 = 0.60$	$P < 0.0001$ Intercept = 1.3 Slope = 0.21	$P < 0.0001$ Intercept = 1.4 Slope = 0.34