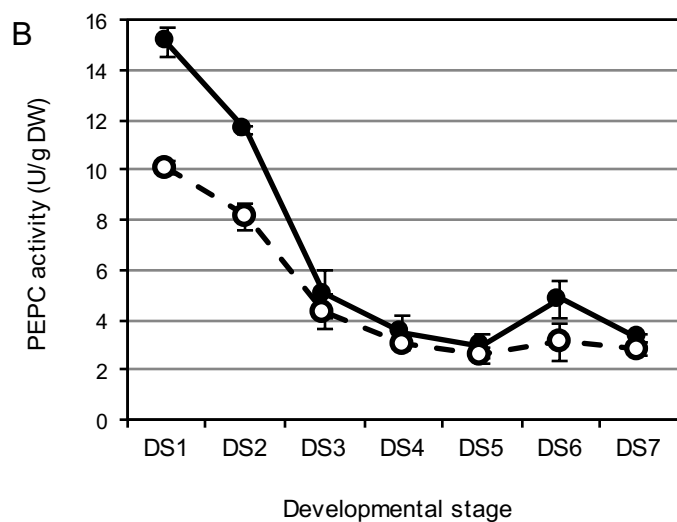
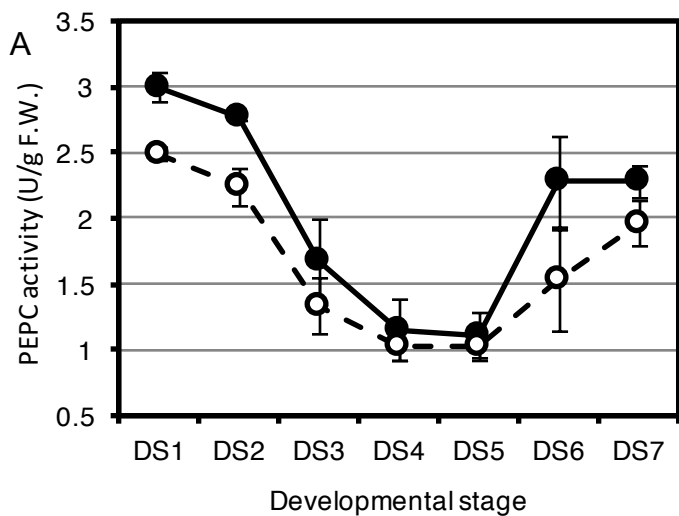


**Supplemental Figure 1.** Definition of the developmental stages in immature soybean seeds, designated according to the seed fresh (FW) weight from the early stage to the late stage of maturation in turn: DS1 (100-250 mg), DS2 (250-400 mg), DS3 (400-600 mg) and DS4 (600-700 mg), DS5 (700-900 mg), DS6 (900-600 mg), and DS7 (600-300 mg). **A:** Appearance of the immature seeds. **B:** Distribution of fresh weights of seeds that were used for analyses. White circles: Enrei. Black circles: Tamahomare. Error bar: std. dev. (n 3). **C:** Enrei seed water content (WC). Each plot indicates the average of WC from three or four seeds. White diamonds: DS1, black diamonds: DS2, white triangles: DS3, black triangles: DS4, white circles: DS5, black circles: DS6, and white squares: DS7. **D:** Tamahomare seed WC. Symbols for the stages are as described for Enrei.



**Supplemental Figure 2.** Changes in (A) PEPC activity per fresh weight (FW) and (B) PEPC activity per dry weight (DW) during seed maturation. Black circles: Enrei. White circles: Tamahomare. Error bar: std. error (n = 3).

Supplementary Table 1. Changes in water content and fresh weight of sampled see from plants of two cultivars, Enrei and Tamahomare, during maturation.

Enrei								
Fraction		DS1	DS2	DS3	DS4	DS5	DS6	DS7
Date		8/20	9/1	9/1	9/11	9/16	9/25	9/25
Sample count		4	4	4	4	3	3	3
Water cont.(%)	Av.* <sup>1</sup>	80.2	76.1	67.0	67.5	60.4	44.6	30.5
	S.E.* <sup>2</sup>	(0.7)	(1.0)	(0.4)	(0.6)	(4.5)	(3.9)	(3.2)
Fresh wt.(mg)	Av.* <sup>1</sup>	176.8	338.4	512.6	696.5	834.9	602.3	462.5
	S.E.* <sup>2</sup>	(21.8)	(32.0)	(13.1)	(52.4)	(31.3)	(14.2)	(12.4)

Tamahomare								
Fraction		DS1	DS2	DS3	DS4	DS5	DS6	DS7
Date		9/11	9/16	9/16	9/25	10/4	10/14	10/14
Sample count		4	4	4	4	3	3	3
Water cont.(%)	Av.* <sup>1</sup>	75.3	72.5	69.1	66.6	58.2	43.4	31.0
	S.E.* <sup>2</sup>	(0.7)	(0.6)	(0.9)	(0.1)	(4.4)	(3.8)	(3.2)
Fresh wt (mg)	Av. * <sup>1</sup>	177.6	326.2	448.6	636.8	748.5	634.5	432.9
	S.E.* <sup>2</sup>	(32.2)	(9.7)	(17.0)	(14.0)	(1.8)	(14.5)	(12.0)

\*<sup>1</sup> Average of values

\*<sup>2</sup> Standard error

Supplementary Table 2. Chemical compositions in mature seeds from individual plants of Cvs Enrei and Tamahomare.

Compounds	Enrei				Tamahomare				p value* <sup>4</sup>		
	n1	n2	n3	Av.* <sup>2</sup>	n1	n2	n3	Av.* <sup>2</sup>			
				Av.* <sup>2</sup>				Av.* <sup>2</sup>			
				S.E.* <sup>3</sup>				S.E.* <sup>3</sup>			
			% (DW)				% (DW)				
Protein* <sup>1</sup>	49.1	46.8	47.7	47.9	0.65	41.4	42.1	44.0	42.5	0.78	0.003
Oil	20.2	21.2	22.1	21.2	0.54	22.8	23.1	23.3	23.1	0.14	0.027
Carbohydrate	22.6	21.6	24.0	22.7	0.70	24.5	26.5	26.0	25.7	0.59	0.032
			mg/seed				mg/seed				
Protein* <sup>1</sup>	135.1	132.4	130.2	132.6	1.41	103.9	102.0	106.0	104.0	1.15	4.81E-05
Oil	55.6	60.0	60.2	58.6	1.50	57.2	56.1	56.0	56.4	0.38	0.113
Carbohydrate	62.3	61.0	65.4	62.9	1.31	61.5	64.3	62.6	62.8	0.80	0.474

\*<sup>1</sup> Conversion factor from nitrogen to protein is 5.71.

\*<sup>2</sup> Average of values (n=3)

\*<sup>3</sup> Standard error

\*<sup>4</sup> Probability of difference between Enrei and Tamahomare in Student's T test.