

Supplementary Materials: Relationships of *Brassica* Seed Physical Characteristics with Germination Performance and Plant Blindness

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Table S1: CF-Analyzer, VideometerLab , Q2 parameters and greenhouse parameters for all stages of the study.

[Full data file download link.](#)

Table S2: Q2 parameters. Seed respiration values calculated for control seeds at 20 and 15 °C and blindness-induced seeds at 15 °C.

Control seeds - 20°C- 72 hours																							
Variety	Seed Lot	R75		75% O ₂ values AUC75		R75 POD curve		R50		50% O ₂ values AUC50		R50 POD		R25		25% O ₂ values AUC25		R25 POD		O ₂ levels at time points			
		Mean	SD	Mean	SD	R75(50)	Final (%)	Mean	SD	Mean	SD	R50(50)	Final (%)	Mean	SD	Mean	SD	R25(50)	Final (%)	Mean	SD	Mean	SD
A	1	23.58	12.40	21.44	13.10	21.25	100%	33.69	17.02	28.55	21.16	28.83	100%	42.76	25.01	32.25	25.87	34.88	100%	11.9%	20.0%	8.3%	16.3%
	2	24.20	4.38	21.18	4.57	23.50	100%	32.50	7.70	26.51	6.61	31.40	100%	38.00	4.12	28.16	4.64	37.67	98%	8.3%	11.4%	5.9%	8.3%
B	3	32.09	12.45	29.53	12.37	28.00	98%	44.80	19.92	37.98	17.64	38.20	98%	52.11	21.72	40.38	18.39	45.67	96%	29.8%	29.2%	14.2%	25.1%
	4	24.98	4.32	23.51	7.32	24.00	98%	33.76	5.05	29.06	7.91	33.13	98%	40.56	5.93	31.61	8.25	39.20	98%	12.1%	16.0%	5.7%	12.4%
C	5	24.50	6.01	22.67	6.18	22.40	100%	34.00	9.02	28.68	7.83	30.86	100%	41.78	12.65	31.51	9.01	37.00	98%	14.4%	17.0%	8.3%	10.0%
	6	24.15	5.63	21.92	6.20	23.50	100%	32.67	6.70	27.44	7.30	31.60	100%	40.72	8.60	30.38	7.92	39.25	100%	13.4%	13.2%	5.8%	5.7%

Control seeds - 15°C- 50 hours																							
Variety	Seed Lot	R75		75% O ₂ Values AUC75		R75 POD curve		R50		50% O ₂ Values AUC50		R50 POD		R25		25% O ₂ Values AUC25		R25 POD		O ₂ levels at time points			
		Mean	SD	Mean	SD	R75(50)	Final (%)	Mean	SD	Mean	SD	R50(50)	Final (%)	Mean	SD	Mean	SD	R25(50)	Final (%)	Mean	SD	Mean	SD
A	1	29.33	9.21	26.66	8.24	31.25	85%	37.87	8.43	31.28	7.40	43.00	67%	41.65	8.55	30.51	7.28	-	37%	43.6%	27.9%	-	-
	2	22.49	4.06	20.60	3.53	21.00	93%	34.14	5.55	27.65	4.06	34.00	88%	43.55	4.68	30.32	3.11	45.83	69%	27.6%	22.7%	-	-
B	3	30.16	7.14	27.08	6.13	33.50	70%	41.13	7.43	33.04	5.64	-	34%	44.50	5.45	30.44	3.32	-	9%	60.6%	22.4%	-	-
	4	25.16	5.35	23.11	4.74	24.50	93%	38.55	6.74	31.37	5.64	38.00	87%	46.04	4.47	32.09	3.31	50.67	52%	36.0%	20.7%	-	-
C	5	30.62	6.70	27.73	5.84	30.00	85%	41.25	4.68	33.81	3.92	45.00	70%	45.92	2.61	33.74	2.07	-	26%	46.9%	23.3%	-	-
	6	26.35	7.23	24.07	6.45	24.50	87%	36.55	5.30	29.73	4.16	37.75	72%	44.62	4.29	31.97	3.23	49.00	57%	38.3%	28.2%	-	-

Blindness induced seeds - 15 °C- 72 hours																							
Variety	Seed Lot	R75		75% O ₂ Values AUC75		R75 POD curve		R50		50% O ₂ Values AUC50		R50 POD		R25		25% O ₂ Values AUC25		R25 POD		O ₂ levels at time points			
		Mean	SD	Mean	SD	R75(50)	Final (%)	Mean	SD	Mean	SD	R50(50)	Final (%)	Mean	SD	Mean	SD	R25(50)	Final (%)	Mean	SD	Mean	SD
A	1	41.33	14.82	35.96	13.08	49.00	68%	51.92	13.45	40.52	11.08	-	27%	57.29	9.18	37.90	5.26	-	16%	74.5%	20.0%	61.7%	28.5%
	2	26.22	8.74	22.95	7.92	24.50	89%	38.55	9.93	30.15	7.69	38.00	83%	47.81	10.16	32.33	5.81	53.00	70%	37.2%	30.4%	26.6%	33.5%
B	3	42.00	9.85	36.44	8.53	-	41%	58.18	9.29	45.73	7.17	-	24%	56.33	9.29	41.13	7.07	-	7%	80.9%	17.7%	76.1%	28.2%
	4	33.02	11.90	28.45	10.36	30.00	98%	45.97	10.37	35.68	8.01	45.00	80%	52.41	7.03	36.39	5.44	58.00	59%	48.2%	22.6%	26.4%	27.9%
C	5	27.09	11.38	23.75	9.88	28.67	72%	40.23	12.58	31.03	9.46	59.00	57%	48.71	8.87	32.43	5.88	-	46%	58.2%	31.9%	45.0%	38.4%
	6	36.25	11.62	30.95	10.22	41.00	70%	47.61	9.33	36.78	7.41	71.00	50%	56.80	8.64	39.10	6.08	-	43%	66.5%	25.9%	48.2%	38.0%

Table S3: Eigenvalues and percentage of explained variance from the multiple factor analysis of selected list of parameters exhibiting correlation to blindness.

Dimension/ Component	Eigenvalue	Percentage of variance	Cumulative percentage of variance
1	5.435778	57.86%	57.86%
2	1.342053	14.29%	72.15%
3	0.842101	8.96%	81.11%
4	0.622046	6.62%	87.73%
5	0.492336	5.24%	92.97%
6	0.375554	4.00%	96.97%
7	0.129190	1.38%	98.35%
8	0.094251	1.00%	99.35%
9	0.039180	0.42%	99.77%
10	0.017044	0.18%	99.95%
11	0.004833	0.05%	100.00%

Figure S1: Brassica control seed respiration curves at 20 °C. Oxygen depletion curves for 46 individual seeds of each kohlrabi F1 Variety (columns) and seed lot (rows) tested at 20 °C for 72 h. Dashed lines represent the median (red) and average (black) oxygen depletion time courses for the entire seed population.

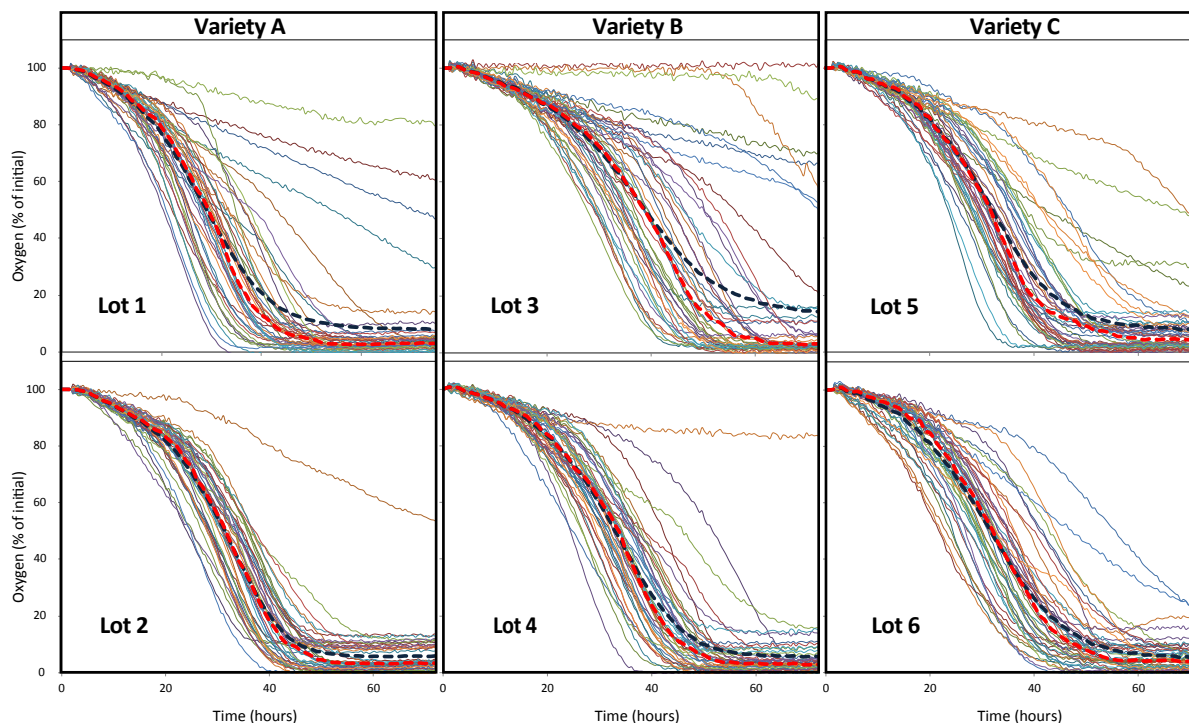


Figure S2: Brassica control seed respiration curves at 15 °C. Oxygen depletion curves for 46 individual seeds of each kohlrabi F1 Variety (columns) and seed lot (rows) tested at 15 °C for 50 h. Dashed lines represent the median (red) and average (black) oxygen depletion time courses for the entire seed population.

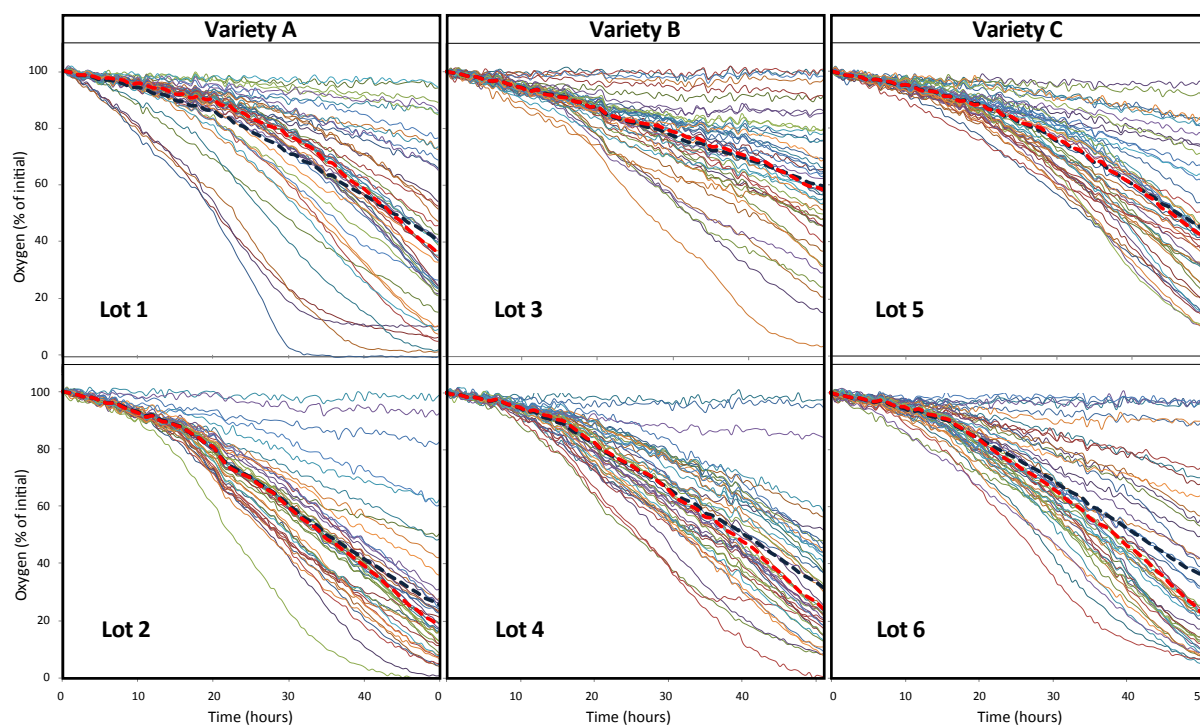


Figure S3: Pearson correlation matrix of selected parameters from the CF Analyzer (rows and columns 1-2, dashed green), the VideometerLab (rows and columns 3-40 and 46, dashed purple) the Q2 respirometer (rows and columns 41-45, dashed orange) and greenhouse tests (rows and columns 47-48) (Table 1) for all seeds. Parameters are also organized in the order they were captured in the different stages of the study: dry seeds (rows and columns 1-30, brown bars), after the blindness induction (rows and columns 31-40, red bars), induced seeds during germination (rows and columns 41-46, orange bars) and in the greenhouse (rows and columns 47-48, green bars). The Pearson correlation coefficients between the row and column parameters are graphically displayed as circles; their size and color shadings indicate the strength of the correlation coefficients from 0 to 1 for a positive relation (blue color) or 0 to -1 for a negative relation (red color) (only correlation coefficients with significance level for p values below 0.01 are displayed).

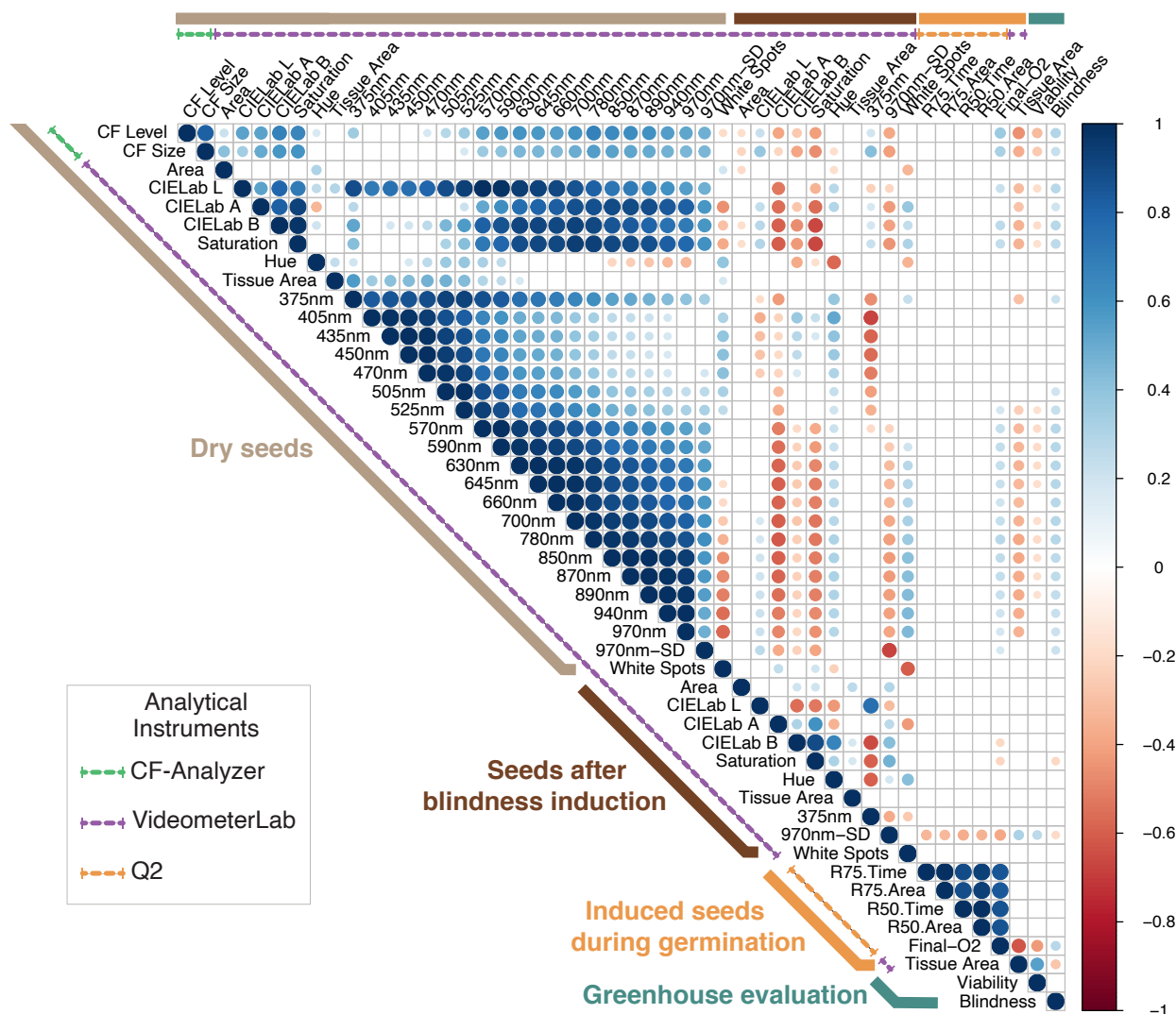


Figure S4: Full Pearson correlation matrix with most parameters from analytical equipment used here (CF-Analyzer, VideometerLab and Q2) and greenhouse measurements for stages of the study.

