

Supplementary Table 1. Effect of growing conditions across phenological stages for the RGB indexes assessed from the ground level.

		RGB Ground indexes						
		Intensity	Hue	Saturation	Lightness	a*	b*	u*
<u>Irrigation</u>	Heading							
	Anthesis	0.32 ± 0.00	100.28 ± 0.63	0.25 ± 0.00	42.63 ± 0.16	-21.81 ± 0.18	27.37 ± 0.25	-16.78 ± 0.22
	Milk Grain Filling	0.32 ± 0.00	94.22 ± 0.88	0.21 ± 0.00	40.54 ± 0.20	-16.40 ± 0.28	23.06 ± 0.30	-11.20 ± 0.32
	Senescence	0.36 ± 0.00	36.94 ± 0.70	0.30 ± 0.00	42.06 ± 0.27	1.86 ± 0.34	25.99 ± 0.31	14.63 ± 0.49
<u>Rainfed</u>	Heading							
	Anthesis	0.34 ± 0.00	90.55 ± 1.27	0.21 ± 0.00	42.66 ± 0.13	-20.58 ± 0.36	23.89 ± 0.28	-10.50 ± 0.49
	Milk Grain Filling	0.36 ± 0.00	49.79 ± 1.68	0.23 ± 0.01	42.34 ± 0.19	-20.35 ± 0.38	22.39 ± 0.42	6.17 ± 0.72
	Senescence	0.39 ± 0.00	27.81 ± 0.15	0.28 ± 0.00	44.26 ± 0.29	-8.37 ± 0.41	25.19 ± 0.21	21.85 ± 0.20
<u>Late</u>	Stem Elongation							
	Booting	0.35 ± 0.00	112.54 ± 1.56	0.17 ± 0.00	43.82 ± 0.25	-16.02 ± 0.41	21.99 ± 0.35	-16.95 ± 0.45
	Heading	0.35 ± 0.00	96.24 ± 1.06	0.24 ± 0.00	44.71 ± 0.29	-3.19 ± 0.45	27.44 ± 0.33	-15.02 ± 0.47
	Milk Grain Filling	0.34 ± 0.00	100.00 ± 1.25	0.26 ± 0.00	40.86 ± 0.21	6.75 ± 0.10	24.54 ± 0.32	-0.28 ± 0.48
		v*	GA	GGA	CSI	NGRDI	TGI	
<u>Irrigation</u>	Heading							
	Anthesis	32.14 ± 0.25	0.97 ± 0.00	0.86 ± 0.01	11.18 ± 0.63	0.26 ± 0.00	3582.32 ± 40.79	
	Milk Grain Filling	26.94 ± 0.31	0.88 ± 0.01	0.70 ± 0.01	20.96 ± 0.84	0.16 ± 0.01	2937.98 ± 48.67	
	Senescence	26.42 ± 0.33	0.05 ± 0.01	0.01 ± 0.00	85.91 ± 0.70	-0.13 ± 0.00	1184.70 ± 48.75	
<u>Rainfed</u>	Heading							
	Anthesis	28.15 ± 0.30	0.74 ± 0.01	0.62 ± 0.01	16.56 ± 0.60	0.08 ± 0.01	2872.36 ± 55.71	
	Milk Grain Filling	24.35 ± 0.37	0.32 ± 0.02	0.17 ± 0.02	53.64 ± 2.31	-0.05 ± 0.01	1408.36 ± 43.32	
	Senescence	25.33 ± 0.24	0.00 ± 0.00	0.00 ± 0.00	82.84 ± 0.65	-0.17 ± 0.00	517.70 ± 16.70	

<i>Stem Elongation</i>							
<i>Late</i>	<i>Booting</i>	27.46 ± 0.35	0.81 ± 0.01	0.75 ± 0.01	7.43 ± 0.36	0.20 ± 0.01	3312.18 ± 55.86
	<i>Heading</i>	32.54 ± 0.37	0.86 ± 0.01	0.75 ± 0.01	13.54 ± 0.83	0.16 ± 0.01	3775.96 ± 61.06
	<i>Milk Grain Filling</i>	26.84 ± 0.35	0.57 ± 0.02	0.24 ± 0.02	61.74 ± 1.52	0.01 ± 0.01	2189.40 ± 67.63

These indexes are defined at section Material and Methods. Values are means ± SE of the three replicates of the 23 wheat cultivars.

Supplementary Table 2. Effect of growing conditions across phenological stages for the RGB indexes assessed aerially.

		<i>RGB Aerial indexes</i>						
		<i>Intensity</i>	<i>Hue</i>	<i>Saturation</i>	<i>Lightness</i>	<i>a*</i>	<i>b*</i>	<i>u*</i>
<i>Irrigation</i>	<i>Heading</i>	0.56 ± 0.00	121.84 ± 2.73	0.05 ± 0.00	61.40 ± 0.35	-11.01 ± 0.13	13.48 ± 0.37	-8.43 ± 0.14
	<i>Anthesis</i>	0.51 ± 0.00	100.51 ± 1.62	0.08 ± 0.00	57.18 ± 0.37	-11.67 ± 0.14	16.81 ± 0.38	-7.73 ± 0.11
	<i>Milk Grain Filling</i>							
	<i>Senescence</i>							
<i>Rainfed</i>	<i>Heading</i>	0.56 ± 0.00	161.70 ± 2.35	0.04 ± 0.00	60.39 ± 0.36	-8.43 ± 0.12	8.52 ± 0.23	-7.21 ± 0.09
	<i>Anthesis</i>	0.61 ± 0.01	90.92 ± 2.04	0.06 ± 0.00	66.32 ± 0.48	-9.81 ± 0.16	16.79 ± 0.38	-5.15 ± 0.19
	<i>Milk Grain Filling</i>	0.59 ± 0.00	53.32 ± 1.18	0.09 ± 0.00	63.79 ± 0.47	-5.75 ± 0.21	18.04 ± 0.29	1.40 ± 0.24
	<i>Senescence</i>							
<i>Late</i>	<i>Stem Elongation</i>	0.59 ± 0.00	118.44 ± 2.15	0.03 ± 0.00	63.40 ± 0.35	-9.10 ± 0.13	12.51 ± 0.25	-6.20 ± 0.09
	<i>Booting</i>	0.62 ± 0.01	135.53 ± 3.32	0.04 ± 0.00	66.54 ± 0.58	-9.99 ± 0.18	12.08 ± 0.39	-7.75 ± 0.11
	<i>Heading</i>	0.48 ± 0.01	102.15 ± 1.04	0.07 ± 0.00	54.34 ± 0.73	-11.37 ± 0.18	15.79 ± 0.34	-7.71 ± 0.13
	<i>Milk Grain Filling</i>	0.38 ± 0.00	115.45 ± 2.38	0.04 ± 0.00	41.85 ± 0.44	-6.76 ± 0.14	9.42 ± 0.23	-4.13 ± 0.11
		<i>v*</i>	<i>GA</i>	<i>GGA</i>	<i>CSI</i>	<i>NGRDI</i>	<i>TGI</i>	
<i>Su</i>	<i>ppl</i> <i>Heading</i>	19.11 ± 0.47	0.87 ± 0.01	0.86 ± 0.01	1.12 ± 0.33	0.05 ± 0.00	1308.30 ± 42.94	

<u>Rainfed</u> <u>Late-Planting</u>	Anthesis	22.73 ± 0.47	0.94 ± 0.01	0.88 ± 0.01	5.71 ± 0.66	0.05 ± 0.00	1724.65 ± 45.29
	Milk Grain Filling						
	Senescence						
	Heading	12.53 ± 0.31	0.60 ± 0.02	0.59 ± 0.02	0.48 ± 0.04	0.04 ± 0.00	577.43 ± 32.35
	Anthesis	23.21 ± 0.48	0.86 ± 0.01	0.60 ± 0.03	30.75 ± 2.97	0.03 ± 0.00	1395.06 ± 48.41
	Milk Grain Filling	23.68 ± 0.38	0.35 ± 0.03	0.04 ± 0.01	91.46 ± 1.13	-0.01 ± 0.00	1043.35 ± 46.31
	Senescence						
	Stem Elongation	17.76 ± 0.34	0.75 ± 0.01	0.74 ± 0.01	2.01 ± 0.14	0.03 ± 0.00	962.98 ± 35.41
	Booting	17.53 ± 0.51	0.79 ± 0.02	0.78 ± 0.02	0.53 ± 0.05	0.04 ± 0.00	993.74 ± 55.45
	Heading	21.23 ± 0.47	0.86 ± 0.01	0.83 ± 0.01	2.53 ± 0.22	0.05 ± 0.00	1627.78 ± 45.79
	Milk Grain Filling	12.09 ± 0.30	0.66 ± 0.01	0.59 ± 0.01	10.69 ± 1.08	0.03 ± 0.00	688.83 ± 29.12

These indexes are defined at section Material and Methods. Values are means ± SE of the three replicates of the 23 wheat cultivars.

Supplementary Table 3. Effect of growing conditions across phenological stages for the multispectral indexes assessed aerially.

		<i>Multispectral indexes</i>						
		<i>NDVI.g</i>	<i>NDVI</i>	<i>SAVI</i>	<i>OSAVI</i>	<i>RDVI</i>	<i>EVI</i>	<i>PRI</i>
Supplementary	Heading	0.76 ± 0.00						
	Anthesis	0.76 ± 0.00	0.88 ± 0.00	0.70 ± 0.00	0.80 ± 0.00	0.66 ± 0.00	1.04 ± 0.01	0.19 ± 0.00
	Milk Grain Filling	0.68 ± 0.01	0.78 ± 0.01	0.55 ± 0.00	0.65 ± 0.01	0.54 ± 0.00	0.96 ± 0.01	0.20 ± 0.00
	Senescence	0.25 ± 0.01						
Rainfed	Heading	0.62 ± 0.00						
	Anthesis	0.58 ± 0.01	0.79 ± 0.01	0.59 ± 0.01	0.70 ± 0.01	0.56 ± 0.01	1.02 ± 0.01	0.16 ± 0.00

Late	Milk Grain Filling	0.38 ± 0.01	0.51 ± 0.01	0.34 ± 0.01	0.42 ± 0.01	0.34 ± 0.01	0.66 ± 0.05	0.16 ± 0.00
	Senescence	0.13 ± 0.00						
	Stem Elongation		0.73 ± 0.01	0.53 ± 0.01	0.62 ± 0.01	0.52 ± 0.01	1.64 ± 0.03	0.25 ± 0.00
	Booting	0.65 ± 0.01	0.79 ± 0.00	0.58 ± 0.00	0.69 ± 0.00	0.55 ± 0.00	1.02 ± 0.01	0.19 ± 0.00
	Heading	0.66 ± 0.01	0.75 ± 0.01	0.53 ± 0.00	0.63 ± 0.00	0.51 ± 0.00	0.99 ± 0.01	0.20 ± 0.00
	Milk Grain Filling	0.54 ± 0.01	0.69 ± 0.01	0.43 ± 0.01	0.54 ± 0.01	0.42 ± 0.01	0.78 ± 0.05	0.20 ± 0.00
		<i>MCARI</i>	<i>CCI</i>	<i>TCARI</i>	<i>TCARI/OSAVI</i>	<i>ARI2</i>	<i>CRI2</i>	<i>WBI</i>
Supplementa ry Irrigation	Heading							
	Anthesis	0.08 ± 0.00	0.27 ± 0.00	0.11 ± 0.00	0.14 ± 0.00	2.03 ± 0.06	3.97 ± 0.12	0.91 ± 0.00
	Milk Grain Filling	0.11 ± 0.00	0.26 ± 0.01	0.16 ± 0.00	0.24 ± 0.01	0.91 ± 0.02	2.21 ± 0.04	
	Senescence							
Rainfed	Heading							
	Anthesis	0.12 ± 0.00	0.21 ± 0.01	0.17 ± 0.00	0.24 ± 0.01	1.82 ± 0.04	4.07 ± 0.08	0.93 ± 0.00
	Milk Grain Filling	0.14 ± 0.00	0.11 ± 0.01	0.24 ± 0.00	0.58 ± 0.02	0.82 ± 0.01	2.54 ± 0.04	
	Senescence							
Late- Planting	Stem Elongation	0.14 ± 0.00	0.30 ± 0.00	0.20 ± 0.00	0.33 ± 0.00	0.37 ± 0.01	0.90 ± 0.04	0.83 ± 0.00
	Booting	0.09 ± 0.00	0.24 ± 0.01	0.13 ± 0.00	0.19 ± 0.00	0.95 ± 0.03	2.28 ± 0.07	0.86 ± 0.00
	Heading	0.11 ± 0.00	0.26 ± 0.00	0.17 ± 0.00	0.27 ± 0.00	0.64 ± 0.01	1.61 ± 0.02	
	Milk Grain Filling	0.11 ± 0.00	0.23 ± 0.00	0.16 ± 0.00	0.30 ± 0.01	0.72 ± 0.01	2.47 ± 0.05	0.91 ± 0.00

These indexes are defined at section Material and Methods. Values are means ± SE of the three replicates of the 23 wheat cultivars.

Supplementary Table 4. Effect of the growing conditions across phenological stages for the thermal measurements.

		<i>Thermal measurements</i>			
		<i>T.g</i>	<i>T.a</i>	<i>CTD.g</i>	<i>CTD.a</i>
Supplementary Irrigation	Heading	18.48 ± 0.15	20.84 ± 0.21	3.54 ± 0.13	1.18 ± 0.22
	Anthesis	24.16 ± 0.08	23.33 ± 0.13	4.97 ± 0.09	5.80 ± 0.12
	Milk Grain Filling	22.02 ± 0.18	22.50 ± 0.13	2.37 ± 0.12	1.88 ± 0.21
	Senescence				
Rainfed	Heading	19.81 ± 0.12	20.56 ± 0.14	1.94 ± 0.11	1.19 ± 0.15
	Anthesis	26.18 ± 0.15	24.51 ± 0.15	3.62 ± 0.11	5.29 ± 0.14
	Milk Grain Filling	23.69 ± 0.10	26.49 ± 0.20	1.39 ± 0.17	-1.41 ± 0.27
	Senescence				
Late-Planting	Stem Elongation				
	Booting				
	Heading	20.93 ± 0.08	26.71 ± 0.12	3.09 ± 0.11	-2.69 ± 0.17
	Milk Grain Filling	28.77 ± 0.06	31.06 ± 0.20	7.70 ± 4.41	5.41 ± 4.43

These measurements are defined at section Material and Methods. Values are means ± SE of the three replicates of the 23 wheat cultivars.

Supplementary Table 5. Effect of growing conditions across phenological stages for the Dualex measurements.

		<i>Dualex measurements</i>			
		<i>Chl</i>	<i>Flav</i>	<i>Anth</i>	<i>NBI</i>
<i>Supplementa ry Irrigation</i>	<i>Heading</i>	48.48 ± 0.35	1.34 ± 0.01	0.08 ± 0.00	36.37 ± 0.36
	<i>Anthesis</i>	51.93 ± 0.38	1.36 ± 0.01	0.07 ± 0.00	38.45 ± 0.35
	<i>Milk Grain Filling</i>	54.34 ± 0.37	1.35 ± 0.01	0.06 ± 0.00	40.57 ± 0.41
	<i>Senescence</i>				
<i>Rainfed</i>	<i>Heading</i>	45.87 ± 0.40	1.50 ± 0.01	0.09 ± 0.00	30.73 ± 0.32
	<i>Anthesis</i>	50.93 ± 0.38	1.48 ± 0.01	0.08 ± 0.00	34.73 ± 0.38
	<i>Milk Grain Filling</i>	38.55 ± 1.05	1.55 ± 0.02	0.14 ± 0.01	25.64 ± 0.83
	<i>Senescence</i>				
<i>Late-Planting</i>	<i>Stem Elongation</i>				
	<i>Booting</i>	50.86 ± 0.41	1.34 ± 0.01	0.09 ± 0.00	38.17 ± 0.41
	<i>Heading</i>	54.72 ± 0.47	1.32 ± 0.01	0.07 ± 0.00	42.20 ± 0.48
	<i>Milk Grain Filling</i>	35.93 ± 0.90	1.42 ± 0.02	0.13 ± 0.01	26.86 ± 0.79

These measurements are defined at section Material and Methods. Values are means ± SE of the three replicates of the 23 wheat cultivars.

Supplementary Table 6. Correlation coefficients of the relationships between the pigment measurements with the Dualex and the GY.

	Supplementary Irrigation		Rainfed			Late-Planting	
	<i>Anthesis</i>	<i>Grain filling</i>	<i>Anthesis</i>	<i>Grain filling</i>	<i>Booting</i>	<i>Heading</i>	<i>Milk Grain Filling</i>
<i>Chl</i>	-0.098	-0.074	-0.187	0.283 *	-0.028	-0.151	0.194
<i>Flav</i>	-0.046	-0.153	-0.096	-0.086	-0.251 *	-0.020	-0.425 ***
<i>Anth</i>	-0.097	-0.162	-0.120	-0.302 *	0.051	0.027	-0.299 *
<i>NBI</i>	-0.030	0.030	-0.035	0.226	0.208	-0.120	0.280 *

Correlations were studied across the three replicates of the 23 wheat cultivars. Levels of signification: *P < 0.05; **P < 0.01; ***P < 0.001.