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Comparative kernel growth and yield components of two- and six-row barley (*Hordeum vulgare*) under terminal drought simulated by defoliation

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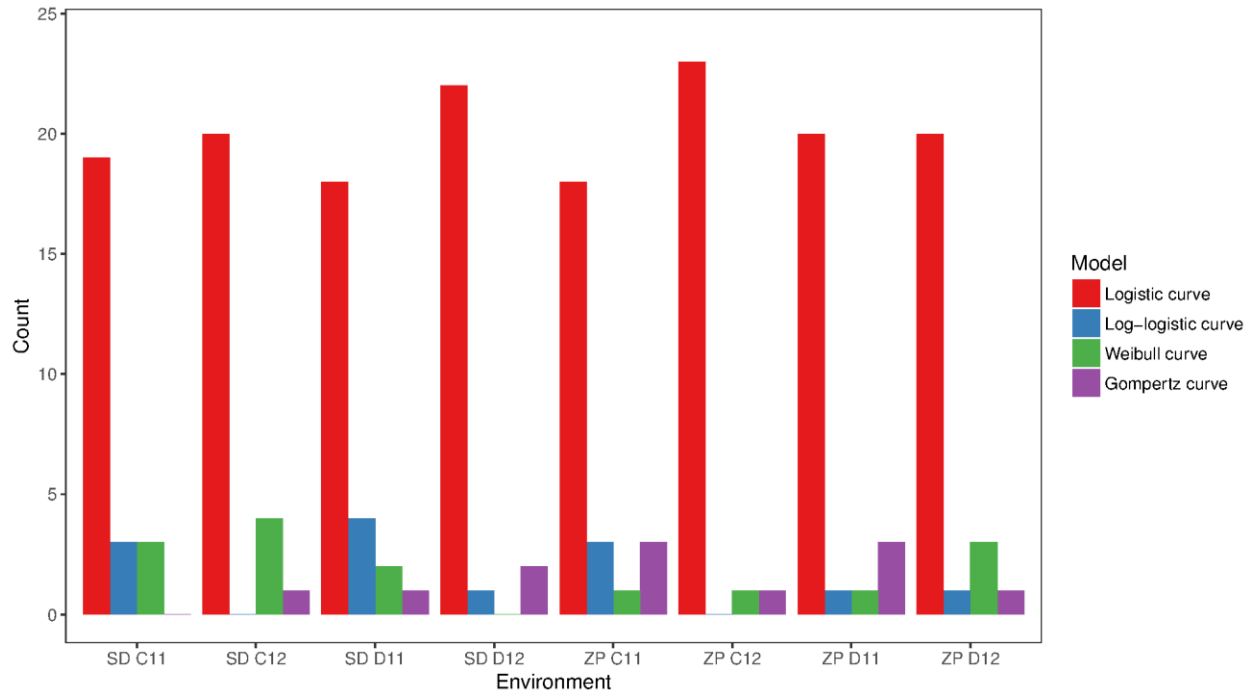
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Supplementary Material Figure 1. Diagram showing the number of cases for each of compared s-shaped models when best fitted (based on Akaike information criteria) to the observed kernel weight mean corresponding to 25 barley genotypes grown under control (C) and desiccation (D) over two year (11 = 2011; 12 = 2012) and two sites (ZP = Zemun Polje; SD = Skolsko Dobro)



Supplementary Material Table 1. Name, germplasm status, year of release, origin and pedigree of the 15 two-row and 10 six-row barley genotypes

Name	Status	Year of release*	Origin	Pedigree
1 NS 565	C	2003	NS, RS	Sonate//OSK.5.197-10.85
2 Rekord	C	1999	KG, RS	SSK 13//NS 183
3 NS 519	C	1998	NS, RS	Rodnik//Corona
4 Bingo	C	2006	OS, CR	NS 331//Rex
5 Nectaria	C	2006	SECR, FR	n/a
6 Maksa	C	2003	KG, RS	Rodnik//NS 307
7 ZP 12/I	L	n/a	ZP, RS	Premium//NS 519
8 Boreale	C	2006	SECR, FR	n/a
9 Nektar	C	2009	ZP, RS	NS 183// Iris/Alpina/Novum
10 Vanessa	C	2007	SJB, DE	n/a
11 PKB Pivan	C	2007	PKB, RS	PKB L 1038//PKB L 1036
12 IBSP-W/04- 22	L	n/a	ICARDA, SY	Mal1-4-3094-2//YEA762- 2/YEA605-5/3/...
13 Jagodinac	C	1992	KG, RS	NS 313//KG 442
14 Kristal	C	1987	ZA, RS	NS 183//OSK-4197/12-84
15 NS 525	C	1999	NS, RS	NS Rani-1//NS 293//NS 327-3//Sladoran
16 ZP 34/II	L	n/a	ZP, RS	Iris/Alpina/NS 331//Rodnik/Kristal
17 Leotar	C	2007	NS, RS	Gotic//Tamaris
18 Sremac	C	2007	NS, RS	Gotic//NS 150
19 ZP 33/II	L	n/a	ZP, RS	Iris/Alpina/NS 331//Alkar/Sonja
20 Grand	C	2002	KG, RS	Rodnik//KM-304
21 ZP 154/II	L	n/a	ZP, RS	ZA 262//ZA 167
22 NS 313	C	1987	NS, RS	Dura//NS 150
23 Nonius	C	2003	NS, RS	Plaisant//NS 313
24 Ozren	C	2004	NS, RS	Galeb//Botond
25 Atlas	C	2005	NS, RS	NS 717//Botond

*Year of release in Serbia. Two-row genotypes are bolded. C- cultivar; L-breeding line; ZP- Maize Research Institute “Zemun Polje”, Belgrade; NS-Institute of Field and Vegetable Crops, Novi Sad; PKB-Agroekonomik, Belgrade; KG-Small Grains Research Centre, Kragujevac; ZA-Centre for Agricultural and Technological Research, Zajecar; OS-Agricultural Institute, Osijek; SECR-SECOBRA Recherches S.A., Centre de Bois-Henry, Maule; SJB-Saatzucht Josef Breun GmbH & Co, Herzogenaurach; ICARDA-The International Centre for Agricultural Research in the Dry Areas, Aleppo. RS-Republic of Serbia; CR-Croatia; FR-France; DE-Germany; SY-Syria.

Supplementary Material Table 2. Monthly average temperatures (°C), number of days with maximum temperature over 30°C and precipitation (mm) for barley cycle in 2011 and 2012 seasons and long term average (1992-2012)

Season	Month	Temperature			Days > 30°C	Precipitation	Irrigati on*
		Mean	Max	Min			
2010- 2011	Nov.–Feb.	4.8	7.5	0.9	0	190.4	
	March	8.0	11.9	2.2	0	18.6	+10
	April	14.4	19.1	7.6	0	14.1	+40
	May	17.5	22.6	11.2	0	94.8	
	June	22.2	27.3	15.4	7	23.0	
Average (March.–June)		15.5	20.2	9.1	7.0	150.5	
2011- 2012	Nov.–Feb.	2.2	5.2	-0.7	0	168.2	
	March	8.9	15.3	1.7	0	2.5	+30
	April	13.5	19.3	7.7	0	73.3	
	May	17.3	22.7	11.5	1	81.8	
	June	24.3	29.9	16.4	14	16.1	
Average (March.–June)		15.9	21.8	9.3	15.0	173.3	
1992- 2012	March	8.0	12.7	3.8	0	30.1	
	April	13.3	18.3	8.7	0	53.3	
	May	18.5	23.9	13.3	3	56.1	
	June	21.8	27.0	16.6	9	85.5	
Average (March.–June)		15.4	20.5	10.6	12.0	225.0	

Amount of water (mm) added by irrigation

Supplementary Material Table 3. Total sum of squares from analysis of variance for grain yield (GY), thousand kernel weight (TKW), hectoliter weight (HW), maximum value of kernel weight (Y_{max}), thermal time needed to reach the maximum kernel weight (X_{max}), inflection point (X_{inf}) and the mean rate of kernel growth (RG) for the 25 barley genotypes obtained from defoliated/non-defoliated plants grown in two years and two sites (***, **, * = significant at the $P < 0.001$, $P < 0.01$ and $P < 0.05$, respectively)

Source of variation	df	GY (g m ⁻²)	TGW (g)	HW (kg hl ⁻¹)	Y_{max} (mg)	X_{max} (GDD)	X_{inf} (GDD)	RG (mg GDD ⁻¹)
Year (Y)	1	1105138***	1118***	281***	1163***	12044	1607	5.04E-03***
Site (S)	1	158766***	45***	2	80***	37923**	8594**	3.20E-05
Treatment (T)	1	2501413***	1161***	70***	1748***	151	26519***	4.19E-03***
Genotype (G)	24	1539719***	5872***	315***	6858***	49891**	172192***	1.44E-02***
Y × S	1	1031479***	261***	39***	433**	1436	15400***	1.03E-03***
Y × T	1	69901*	10*	138***	8	30653**	22	1.20E-04
S × T	1	2988	1	104***	128***	19091*	1842	4.90E-05
Y × G	24	490360	128**	52	147	64098*	46905	6.95E-04
S × G	24	479385	93*	23	191	73638*	42065	7.85E-04
T × G	24	239448	103*	27	254*	66168	31843	7.12E-04
Y × S × T	1	86	27***	27***	14	2074	2542	8.92E-05
Y × S × G	24	527508*	53	22	175	56413	40168*	6.20E-04
Y × T × G	24	200315	29	30	121	61720	25469	6.39E-04
S × T × G	24	105123	24	20	130	82286	28780	7.48E-04
Residuals	24	260229	45	41	100	78265	19744	7.63E-04

Supplementary Material Table 4. Number of spikes per square meter for tested two-row and six-row barley genotypes at harvest time at Skolsko Dobro (SD) and Zemun Polje (ZP) sites in 2011 and 2012 seasons (six-row genotypes are bolded)

Genotype	2011				2012			
	Control		Defoliation		Control		Defoliation	
	SD	ZP	SD	ZP	SD	ZP	SD	ZP
NS 565	671	625	638	687	501	677	498	630
Rekord	664	629	649	610	602	624	616	598
NS 519	629	703	616	684	692	631	656	593
Bingo	570	673	574	693	601	628	579	612
Nectaria	585	585	552	575	523	460	510	449
Maksa	635	656	646	671	609	696	595	675
ZP 12/I	686	635	652	637	693	595	667	594
Boreale	566	507	548	482	572	529	582	491
Nektar	670	652	652	630	662	635	655	594
Vanessa	573	576	554	564	582	562	553	527
PKB Pivan	607	600	640	591	611	596	593	542
IBSP/04-22	548	615	505	586	527	560	526	539
Jagodina	667	654	658	650	648	629	626	598
Kristal	594	647	578	618	608	590	579	569
NS 525	432	447	406	438	406	422	390	418
ZP 34/II	434	427	406	413	427	401	418	393
Leotar	398	428	387	403	405	364	378	356
Sremac	386	355	367	325	339	360	304	341
ZP 33/II	403	397	412	378	361	342	346	329
Grand	391	350	373	338	359	331	328	309
ZP 154/II	349	394	333	363	380	354	362	320
NS 313	384	369	344	340	385	330	369	303
Nonius	337	314	351	290	357	317	332	283
Ozren	346	356	335	322	355	354	322	331
Atlas	351	370	324	346	349	371	314	363
Aver. 2-row	606	614	591	608	589	589	575	562
Aver. 6-row	378	376	363	352	372	352	347	333

Supplementary Material Table 5. Flag leaf area at heading time for tested two-row and six-row barley genotypes in control treatment in 2011 and 2012 seasons (averaged across sites)

Genotype	Season	
	2011	2012
NS 565	7.6	7.3
Rekord	8.0	9.5
NS 519	7.3	8.4
Bingo	7.9	8.9
Nectaria	9.1	10.3
Maksa	7.8	8.5
ZP 12/I	6.8	7.7
Boreale	9.8	11.1
Nektar	8.7	9.2
Vanessa	7.4	9.1
PKB Pivan	7.2	9.2
IBSP/04-22	9.2	12.8
Jagodinac	7.6	10.1
Kristal	8.2	10.8
NS 525	8.0	9.8
ZP 34/II	7.9	10.0
Leotar	9.1	12.1
Sremac	8.7	11.8
ZP 33/II	9.5	13.6
Grand	9.4	12.6
ZP 154/II	12.9	13.3
NS 313	11.6	13.1
Nonius	11.9	12.7
Ozren	7.5	9.6
Atlas	7.8	9.7
Aver. 2-row	8.0	9.5
Aver. 6-row	9.6	11.9

Flag leaf area was calculated as leaf length \times maximum leaf width \times 0.75 (constant). Six-row genotypes are bolded.