

Table S1. Sum of precipitation and mean temperatures during season 2017/18 in the sites of study.

Month	Precipitation			Temperature		
	Winna Góra	Swojczyce	Wrocław	Winna Góra	Swojczyce	Wrocław
X	44.1	71.4	61.3	11.1	11.2	10.9
XI	32.9	34.8	26.9	5.7	5.7	5.5
XII	37.7	27.1	14	2.1	3	2.4
I	57	20.6	15.6	2.1	2.9	2.6
II	2.8	2.8	0.5	-2.7	-2.7	-2.7
III	36.4	26.5	9.6	1.2	1.1	1.4
IV	28.9	24.6	11.3	13.7	13.9	13.8
V	37.2	49.4	40.6	17.5	17	16.8
VI	48.0	51.1	70.6	19.0	19.5	18.7
VII	112.8	72.9	54.6	20.9	20.8	19.8

Table S2. Sum of precipitation and mean temperatures during season 2018/19 in the sites of study.

Month	Precipitation					Temperature				
	Lipnik	Czesławice	Swojczyce	Wrocław	Mydlniki	Lipnik	Czesławice	Swojczyce	Wrocław	Mydlniki
X	16.2	41.3	46.1	32.2	52.6	13.4	9.2	10.5	10.6	8.2
XI	5.9	15.2	12.5	10.1	42.5	8.4	3.9	5.3	5.3	3.3
XII	70.0	70.8	41.7	40.3	45.6	3.7	-0.2	2.6	2.6	-0.9
I	28.0	31.5	49.6	33.2	44.6	-2.5	-3.4	-0.2	-0.2	-0.9
II	32.0	14.6	27.4	25.0	13.1	-1.6	2.5	3.2	3.5	-2.7
III	37.5	27.1	23.9	27.7	21.2	3.4	5.5	6.5	6.7	1.4
IV	2.5	39.0	40.7	29.4	77.1	8.6	10.3	10.2	10.6	15.7
V	39.5	87.0	92.8	57.0	207.6	13.4	14.4	12.2	12.0	16.9
VI	35.0	11.2	23.3	8.8	22.8	16.8	22.9	22.5	22.3	18.8
VII	22.0	46.3	48.1	33.0	54.1	18.4	20.0	19.9	19.3	20.1

Table S3. Sum of precipitation and mean temperatures during season 2019/20 in the sites of study.

Month	Precipitation		Temperature	
	Czesławice	Mydlniki	Czesławice	Mydlniki
X	37	37.7	12.6	8.7
XI	56.3	42.4	6.6	3.7
XII	46.3	38.0	2.6	-0.8
I	14.1	15.2	1.2	-2.1
II	76.5	41.3	3.2	-0.5
III	26.0	15.0	4.7	9.3
IV	19.0	8.1	8.6	10.8
V	111.4	91.2	11.2	12.0
VI	170.2	87.4	17.9	21.0
VII	67.8	72.9	18.6	19.6

Table S4. The *t*-test values and *p*-values for comparison between empirical and theoretical models for biomass competition in replacement series design in 2017-2018.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Winna	<i>t</i> -test	-0.69	-0.58	-2.75 *	-0.81	-0.40	-2.57 *
Góra	<i>p</i> -value	0.494	0.565	0.010	0.424	0.690	0.015
Swojczyce	<i>t</i> -test	-0.79	0.25	-2.13 *	-1.86	1.96	0.49
	<i>p</i> -value	0.434	0.807	0.041	0.072	0.058	0.625
Wrocław	<i>t</i> -test	-0.66	0.85	0.44	-1.36	1.56	0.32
	<i>p</i> -value	0.511	0.399	0.662	0.184	0.128	0.748

* P<0.05

Table S5. The *t*-test values and *p*-values for comparison between empirical and theoretical models for number of seeds competition in replacement series design in 2017-18.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Winna	<i>t</i> -test	-1.41	1.54	0.82	-0.57	1.60	1.73
Góra	<i>p</i> -value	0.167	0.132	0.415	0.570	0.120	0.092
Swojczyce	<i>t</i> -test	-0.81	1.87	2.32*	-1.73	2.78**	1.70
	<i>p</i> -value	0.423	0.071	0.026	0.093	0.009	0.098
Wrocław	<i>t</i> -test	-1.03	1.75	2.27*	-0.92	2.48*	3.68***
	<i>p</i> -value	0.311	0.090	0.029	0.363	0.018	<0.001

* P<0.05; ** P<0.01; *** P<0.001

Table S6. Mean squares from the three-way analysis of variance for the competitive ratio of winter wheat (WW) and herbicide-resistant or susceptible cornflower (B) calculated for the relative plants' biomass (CRb) and relative seed number (CRse) at two plant ratios 6WW:4B and 4WW:6B, in the seasons 2017-2018.

Source of variation	d.f.	CRse	CRb
Site	2	422.44**	78.36**
Ratio	1	58.23	10.65
Biotype	1	194.86	96.66**
Site × Ratio	2	70.00	9.85
Site × Biotype	2	325.56**	54.28*
Ratio × Biotype	1	28.81	18.02
Site × Ratio × Biotype	2	12.27	32.37
Residual	24	54.55	11.70

d.f. – the number of degrees of freedom; * P<0.05; ** P<0.01

Table S7. Results of discrimination analysis for the first and second canonical variables (CV₁, CV₂) for seven parameters of winter wheat (WW) in competition with herbicide-resistant or susceptible cornflower (B) in the season 2017-2018, depending on hydrothermal conditions and soil texture at the study sites.

Parameter of WW	CV ₁	CV ₂
Length of plant	0.4262	-0.8011*
Yield	0.6741*	0.5826
TGW	0.6651*	-0.7162*
Biomass of plant	-0.2369	-0.5994
Number of grains per plant	-0.5160	-0.6717*
Days from sowing till emergence	-0.5135	0.1830
Day-difference between the emergence of WW and B	0.6005	-0.5885

* P<0.05

Table S8. The *t*-test values and *p*-values for comparison between empirical and theoretical models for biomass competition in replacement series design in 2018-2019.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Lipnik	<i>t</i> -test	-0.52	2.59*	2.79**	-0.18	3.19**	4.61***
	<i>p</i> -value	0.604	0.014	0.009	0.857	0.003	<0.001
Czesławice	<i>t</i> -test	-0.93	1.07	0.48	-0.11	1.48	3.35**
	<i>p</i> -value	0.357	0.292	0.631	0.915	0.149	0.002
Swojczyce	<i>t</i> -test	-0.69	0.95	0.41	-0.90	1.03	0.32
	<i>p</i> -value	0.496	0.347	0.684	0.377	0.311	0.754
Wrocław	<i>t</i> -test	-0.72	0.53	-0.76	-0.37	0.00	-0.84
	<i>p</i> -value	0.477	0.597	0.455	0.717	1.000	0.405
Mydlniki	<i>t</i> -test	-0.13	-0.84	-1.92	-0.18	-0.74	-2.40*
	<i>p</i> -value	0.894	0.407	0.064	0.860	0.465	0.022

* P<0.05; ** P<0.01; *** P<0.001

Table S9. The *t*-test values and *p*-values for comparison between empirical and theoretical models for number of seeds competition in replacement series design in 2018-2019.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Lipnik	<i>t</i> -test	-1.37	3.26**	2.58*	-1.12	3.62***	4.22***
	<i>p</i> -value	0.181	0.003	0.014	0.271	0.001	<0.001
Czesławice	<i>t</i> -test	-0.58	1.19	1.07	-0.28	1.22	2.64*
	<i>p</i> -value	0.568	0.244	0.294	0.782	0.230	0.013
Swojczyce	<i>t</i> -test	-0.34	1.22	1.86	-0.58	0.88	0.52
	<i>p</i> -value	0.733	0.232	0.071	0.567	0.387	0.607
Wrocław	<i>t</i> -test	1.31	0.08	2.64*	1.18	-0.10	1.94
	<i>p</i> -value	0.199	0.934	0.012	0.248	0.921	0.061
Mydlniki	<i>t</i> -test	-0.42	-0.42	-2.40*	-0.39	-0.58	-3.29**
	<i>p</i> -value	0.680	0.674	0.022	0.700	0.563	0.002

* P<0.05; ** P<0.01; *** P<0.001

Table S10. Mean squares from the three-way analysis of variance for the competitive ratio of winter wheat (WW) and herbicide-resistant or susceptible cornflower (B) calculated for the relative plants' biomass (CRb) and relative seed number (CRse) at two plant ratios 6WW:4B and 4WW:6B, in the seasons 2018-2019.

Source of variation	d.f.	CRse	CRb
Site	4	55.35***	22.61***
Ratio	1	4.44	0.89
Biotype	1	21.50**	0.57
Site × Ratio	4	4.18	0.77
Site × Biotype	4	7.88*	1.95
Ratio × Biotype	1	1.22	0.02
Site × Ratio × Biotype	4	7.21	2.41
Residual	40	2.92	3.09

d.f. – the number of degrees of freedom; * P<0.05; ** P<0.01; *** P<0.001

Table S11. Results of discrimination analysis for the first and second canonical variables (CV₁, CV₂) for seven parameters of winter wheat (WW) in competition with herbicide-resistant or susceptible cornflower (B) in the season 2018-2019, depending on hydrothermal conditions and soil texture at the study sites.

Parameter of WW	CV ₁	CV ₂
Length of plant	-0.3401	-0.5686
Yield of grains	0.8209**	0.4905
TGW	-0.4375	0.8008**
Biomass of plant	0.8758***	0.4330
Number of grains per plant	0.9396***	0.2475
Days from sowing till emergence	0.0671	-0.1402
Day-difference between the emergence of WW and B	0.4554	0.4690

** P<0.01; *** P<0.001

Table S12. The *t*-test values and *p*-values for comparison between empirical and theoretical models for biomass competition in replacement series design in 2019-2020.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Czesławice	<i>t</i> -test	-0.43	1.37	2.26*	0.73	0.95	3.65***
	<i>p</i> -value	0.671	0.180	0.030	0.473	0.348	<0.001
Mydlniki	<i>t</i> -test	0.03	-0.39	-1.11	-0.68	-0.67	-2.73*
	<i>p</i> -value	0.976	0.696	0.273	0.499	0.507	0.010

* P<0.05; *** P<0.001

Table S13. The *t*-test values and *p*-values for comparison between empirical and theoretical models for number of seeds competition in replacement series design in 2019-2020.

Site		RYr	RYww	TRY	RYs	RYww	TRY
Czesławice	<i>t</i> -test	-0.26	1.13	1.87	-0.12	0.66	1.08
	<i>p</i> -value	0.799	0.267	0.071	0.906	0.517	0.286
Mydlniki	<i>t</i> -test	0.74	-0.19	1.46	-0.48	-0.26	-2.14*
	<i>p</i> -value	0.465	0.848	0.155	0.638	0.793	0.040

* P<0.05

Table S14. Mean squares from the three-way analysis of variance for the competitive ratio of winter wheat (WW) and herbicide-resistant or susceptible cornflower (B) calculated for the relative plants' biomass (CRb) and relative seed number (CRse) at two plant ratios 6WW:4B and 4WW:6B, in the seasons 2019-2020.

Source of variation	d.f.	CRse	CRb
Site	1	0.00	0.50
Ratio	1	0.34	0.13
Biotype	1	0.66	0.13
Site × Ratio	1	0.01	0.33
Site × Biotype	1	0.08	0.17
Ratio × Biotype	1	0.03	0.01
Site × Ratio × Biotype	1	0.19	0.19
Residual	16	0.26	0.18

d.f. – the number of degrees of freedom;

Table S15. Results of discrimination analysis for the first and second canonical variables (CV₁, CV₂) for seven parameters of winter wheat (WW) in competition with herbicide-resistant or susceptible cornflower (B) in the season 2019-2020, depending on hydrothermal conditions and soil texture at the study sites.

Parameter of WW	CV ₁	CV ₂
Length of plant	-0.9889*	0.0498
Yield of grains	-0.9589*	-0.2217
TGW	-0.5040	-0.8267
Biomass of plant	-0.9995***	0.0079
Number of grains per plant	-0.9936**	0.0224
Days from sowing till emergence	-0.9836*	-0.0353
Day-difference between the emergence of WW and B	-0.7093	0.3521

* P<0.05; ** P<0.01; *** P<0.001