Supplementary tables and figures for Komyshev et al. paper

Table S1. Results of ANOVA, Levene´s test, and Kruskal-Wallis test to assess the similarity of spike characteristics in three types of spikes (compact, normal, and speltoid). Significant differences (p<0.05) are marked in bold.

Trait	ANOVA		Levene´s test, from medians	Kruskal-Wallis test for equal medians	
	F	*p*	*p*	Hc (tie corrected):	*p*
SL	182.6	**8.726E-45**	**0.00001951**	128	**1.609E-28**
SFW	17.53	**1.044E-07**	**0.04675**	34.14	**3.865E-08**
SSW	54.76	**1.816E-19**	**0.000004232**	79.77	**4.759E-18**
SSC	4.167	**0.01695**	0.7521	7.592	**0.02246**
SDI	126.2	**1.78E-35**	**1.88E-09**	121.8	**3.58E-27**
q_x1s	1.437	0.2402	0.1207	3.155	0.2065
q_x2s	60.34	**5.70E-21**	**0.004361**	73.8	**9.44E-17**
q_x3s	2.75	0.06653	0.06262	3.351	0.1872
q_y1s	5.738	**0.003813**	**0.002028**	13.38	**0.001246**
q_y2s	31.78	**1.29E-12**	**0.00146**	55.55	**8.66E-13**
q_L	45.68	**6.77E-17**	0.5884	66.52	**3.58E-15**
q_S1	4.237	**0.01585**	**0.01146**	6.509	**0.0386**
q_S2	2.837	0.06109	0.3941	5.129	0.07696
q_S3	0.9832	0.376	0.3681	3.648	0.1614
q_S	1.473	0.2319	**0.03268**	3.402	0.1825
q_ym	34.46	**1.78E-13**	**1.46E-09**	52.85	**3.34E-12**
c_P	11.32	**2.28E-05**	0.3071	21.14	**2.57E-05**
c_SA	2.12	0.1229	**0.03512**	4.895	0.0865
c_AA	9.621	**0.0001052**	**1.80E-06**	6.9	**0.03175**
c_CI	29.4	**7.77E-12**	**0.0006935**	63.57	**1.57E-14**
c_R	33.29	**4.19E-13**	**2.44E-08**	83.08	**9.12E-19**
c_So	0.2249	0.7988	0.2709	0.2992	0.861
c_Ru	1.756	0.1756	0.6349	15.74	**0.0003815**

Table S2. Confusion matrix for plant classification by species (full feature set, Box-Cox transformation applied to input data). Erroneous classifications are shown in red. Number of correct predictions 168.

	ASP	TAE	TAN	TCO	TMA		TSP	TSH	TYU	Total
ASP	8	1	0	0	0		0	0	0	9
TAE	4	39	0	2	3		0	0	2	50
TAN	0	0	18	0	0		0	2	0	20
TCO	0	0	0	63	0		0	0	0	63
TMA	0	0	0	0	8		0	0	1	9
TSP	4	0	0	0	0		10	0	0	14
TSH	0	0	2	0	0		0	16	0	18
TYU	1	0	0	0	0		0	0	6	7
Total	17	40	20	65	11		10	18	9	190

Table S3. Confusion matrix for classifying plants by spike type (full feature set, Box-Cox transformation applied to input data). Erroneous classifications are shown in red. Number of correct predictions 177.

	Spelt	Normal	Compact	Total
Spelt	34	5	0	39
Normal	6	43	1	50
Compact	0	1	100	101
Total	40	49	101	190

Table S4. Detailed description of the plant specimen used in the work.

Species	Accession/Cultivar	Country of origin	Reproduction date, month-year	Plants= images
T. aestivum	k1386/#37*	Tajikistan	IX-2016, V-2017	18
	AUS 90069/Triple Dirk D	Australia	IX-2016	1
	ANK-23	Russia	IX-2016, II-2018	17
	Babilo	Tajikistan	IX-2016	10
	Novosibirskaya 67	Russia	II-2017	4
T. spelta	K-53660**	Tajikistan	IX-2016	1
	K-19092**	Latvia	II-2018	7
	K-1731/ Rother Sommer Kolben**	Germany	IX-2016, II-2018	6
T. antiquorum	k-56397	Tajikistan	IX-2016	10
	k-56398	Tajikistan	IX-2016	10
T. compactum	WAG 1326***	Netherlands	IX-2016	1
	WAG 8326***	Netherlands	IX-2016	8
	k1709/#29*	Tajikistan	IX-2016, V-2016	9
	k1711/#31*	Tajikistan	IX-2016, V-2016	18
	k1713/#33*	Tajikistan	V-2016	27
T. macha	k-28195	Georgia	II-2018	6
	k-28170	Georgia	II-2018	3
T. sphaerococcum	k-14976*	Pakistan	II-2018	8
	k-33750*	Pakistan	II-2018	10
T. yunnanense	KU 508****	China	IX-2016	7
Amphyploid speltiforme	Aminov	Azerbaijan	V-2016	9

* - H.Yusufbekov Pamir Biological Institute, National Academy of Sciences of Tajikistan (Khorog, Tajikistan); ** - VIR; *** - Wageningen Agricultural University (the Nederland); **** - Kyoto Univ.; ***** - Genetic Resources Institute of the Azerbaijan National Academy of Sciences, Baku, Azerbaijan; others – collection by the Wheat genetics sector of the IC&G SB RAS, Novosibirsk, Russia.

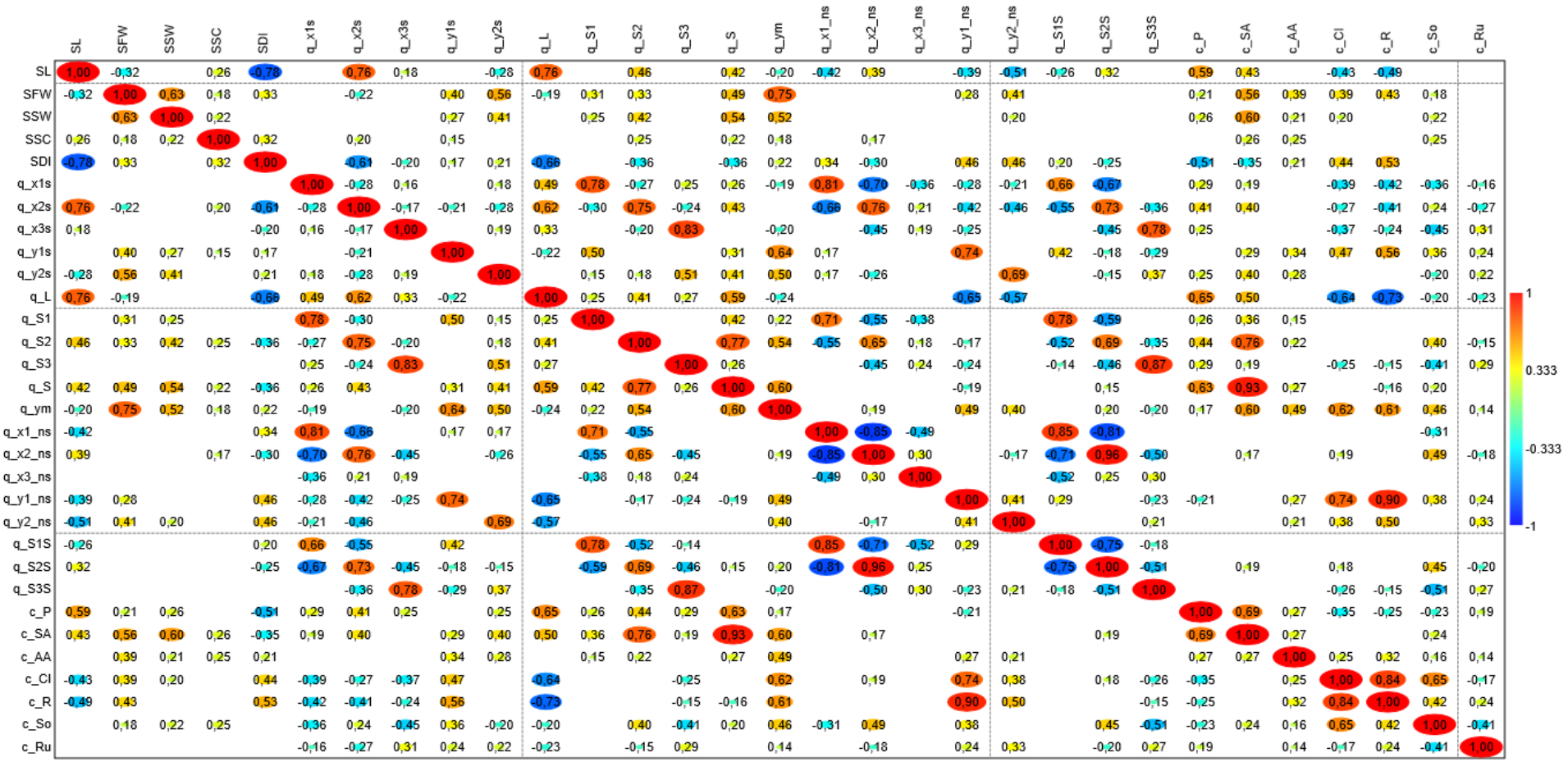

Figure S1. Pearson correlation coefficients *r* for pairs of wheat spike traits. 5 traits estimated manually and 26 traits obtained from image analysis are separated by solid dark grey line. Non-significant *r* values ($p>0.05$) are not shown in the figure. The correspondence between *r* and color is shown to the right of the figure.

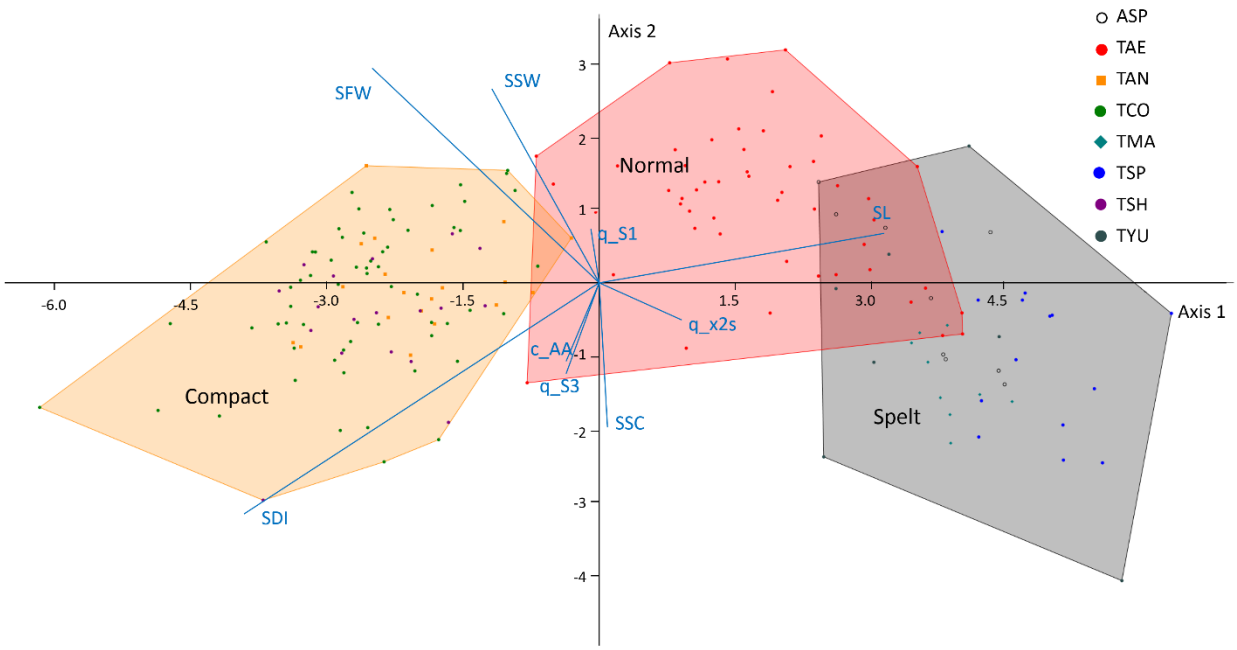

Figure S2. LDA biplot for classification of wheat plants into three spike types using combined set of species and Box-Cox transformation for input data. Polygons for 3 classes are shown by different color. The marker types for species/hybrid are shown to the right of the diagram. Projections for most important traits are shown by blue lines.