

Supplementary Materials

Gudkova P. D., Baiakhmetov E., Nobis M. Evidence of distant hybridization within Central Asian feather grasses (Poaceae: *Stipa*)

Table S1: List of samples used in the study. Samples used in the molecular analysis are in bold type. Vouchers presented by IDs of herbarium sheets and (numbers without acronyms represent a personal collection of P. D. Gudkova)

Taxon	Voucher	Locality	Coordinates	Altitude	Data	Collector
<i>Stipa drobovii</i>	003189	Kazakhstan, Kordai district, 2 km south of the Kenen village	N43°24'0.85" E75°4'7.28"	870 m	18.05.2014	P. D. Gudkova, M. Nobis
<i>Stipa drobovii</i>	TK-002721a	Kazakhstan, Zhambyl region, Moyinkum district, env. Khantau village, Khantau mountains, southern rocky slope	N44°16'04.7" E73°50'06.5"	726 m	14.05.2014	A. Ebel
<i>Stipa drobovii</i>	TK-002721					
<i>Stipa drobovii</i>	TK-002720	Kazakhstan, South Kazakhstan region, Suzak district, upstream Turlan river, rocky slope	N43°37'21.2" E 68°55'55.6"	970 m	18.05.2014	A. Ebel
<i>Stipa drobovii</i>	TK-000148	Kazakhstan, Eskeldinsky district, Taldykorgan environs (to the north)	N45°03'53.5" E78°20'09.5"	698 m	25.05.2019	P. D. Gudkova, M. Nobis, E. Baiakhmetov, A. Wróbel
<i>Stipa drobovii</i>	TK-001519	Kazakhstan, Korday district, the vicinity of Kenen	N43°24'26.6" E75°04'55.6"	842 m	29.05.2019	P. D. Gudkova, M. Nobis, E. Baiakhmetov, A. Wróbel
<i>Stipa drobovii</i>	000004					
<i>Stipa drobovii</i>	TK-000233	Kazakhstan, Eskeldinsky district, 10 km east of Taldykorgan	N45°02'28.7" E78°13'28.6"	526 m	25.05.2019	P. D. Gudkova, M. Nobis, E. Baiakhmetov, A. Wróbel
<i>Stipa drobovii</i>	003165	Karaganda region, Shetsky district, between the village Moynty and Sary-Shagan. Desert. Point 16	N46°30'00.7" E73°35'04.9"	390 m	04.07.2014	A. Ebel
<i>Stipa drobovii</i>	000057	Enbekshikazakh district, north-east of Kokpek	N43°27'09.9" E78°39'38.6"	1094 m	28.05.2019	P. D. Gudkova, M. Nobis, E. Baiakhmetov, A. Wróbel
<i>Stipa drobovii</i>	003160	Kazakhstan, Karlygash, Arkharly pass, destroyed rocks	N44°12'55" E77°42'14"	910 m	25.05.2001	–
<i>Stipa drobovii</i>	TK-001699	Kazakhstan, Zhanaarka region, 25 km southwest of Dzhambul, Wormwood-saline northern desert, rubble shell on clay soil	N47°03'58.1" E70°55'22.7"	607 m	20.06.2019	I. E. Smelansky
<i>Stipa × smelanskyi</i>	TK-001696					
<i>Stipa × smelanskyi</i>	TK-001697					
<i>Stipa × smelanskyi</i>	TK-001695					
<i>Stipa richteriana</i>	TK-001698					
<i>Stipa richteriana</i>	TK-002706a	Kazakhstan, Karaganda region, Aktogay district, Bektauata area, rocky steppe	N47°21'03.9" (approx.) E74°43'21.9" (approx.)	590 m	14.05.2014	A. Ebel
<i>Stipa richteriana</i>	TK-002707					
<i>Stipa richteriana</i>	TK-002708					

Taxon	Voucher	Locality	Coordinates	Altitude	Data	Collector
<i>Stipa richteriana</i>	TK-002711	Kazakhstan, Karaganda region, Ulytau district, env. Tyueoynak, desert steppe	N47°51'19.8" E 69°02'43.1"	320 m	24.05.2014	A. Ebel
<i>Stipa richteriana</i>	0452466 KRA	Kazakhstan, steppe grassland on hills, 2.5 km NNE of Karlygash settlements (100 km NE of Almaty)	N44°13'41.9" E77°42'30.6"	990 m	22.05.2014	M. Nobis, P. D. Gudkova
<i>Stipa richteriana</i>	0468818 KRA	Kazakhstan, steppe grassland on hills slopes, 3 km S of Kenen settlements (150 km W of Almaty)	N43°23'48" E75°04'02"	885 m	18.05.2014	M. Nobis, P. D. Gudkova
<i>Stipa richteriana</i>	001881	Kazakhstan, Zaysan depression, Northern Prizaysanie, Kara mountains, southeastern slope, hollow	N48°06'59.6" (approx.)	480 m	11.05.2001	Yu. A. Kotukhov
<i>Stipa richteriana</i>	001883		E 84°53'15.5" (approx.)			
<i>Stipa richteriana</i>	001691	Kazakhstan, Zhylyshchi region, Baylychovo-gray wormwood desert. Point 16	N46°30'00.0" E 55°40'00.0"	190 m	04.06.2019	E. A. Kriuchkova
<i>Stipa richteriana</i>	000265	Kazakhstan, Sarkand district, 20 km north-west of Lepsy towards Lake Balkhash	N46°25'49.4" E79°05'42.3"	379 m	23.05.2019	P. D. Gudkova, M. Nobis, E. Baiakhmetov, A. Wróbel
<i>Stipa richteriana</i>	001897	Kazakhstan, Northern Priaysanye, Karabiryuk mountains, southeastern rubble slope	N48°01'00.0" (approx.) E 84°35'00.0" (approx.)	440 m	12.05.2001	Yu. A. Kotukhov

Table S2: Contribution (%) by dimension of each character (abbreviations according to Table 1) in FAMD. The first five characters contributing the most are in bold type. Abbreviations of the qualitative variables and their contributions to the principal axes are underlined.

Character	Dimension 1	Dimension 2	Dimension 3	Dimension 4
LAwn	4.070991078	2.818955048	1.245650871	2.292441449
LCol.I	2.884616197	6.236668590	0.004322545	0.027933774
LHCol.I	6.235517914	0.023478047	0.019235299	0.049703785
LHS	5.978936509	0.001786838	0.030718506	0.169461126
WAwn	5.566682620	0.297775976	0.041266130	0.020094397
LAnt	6.116670728	0.046332118	0.026405282	0.652998435
LHCor	4.116067378	1.575737788	1.054676692	0.006204818
LHDor	5.744768263	0.467427431	0.044580438	1.408055124
LCal	3.871965302	0.004080679	0.883531251	0.627219931
LBasCaL	5.422087572	1.422787488	0.000352583	1.120300907
LG	6.415580592	0.008322413	0.066132604	0.059350338
LVL	2.454293306	9.313154770	3.030254480	3.342515712
DVL	0.327913191	9.124001847	7.720970310	1.248609125
LGL	1.201970949	13.589282856	2.245466022	2.078589650
DGL	0.021975152	6.738199571	6.133888523	0.679229478
LigV	2.204133037	0.647176888	10.353840491	0.019277183
LigVH	4.550764958	0.046856029	0.025266471	0.010673955
LigG	2.208008064	3.850252155	0.129040764	12.105743562
LigGH	1.259958817	0.324466657	4.874933857	1.222353570
<u>AbSVL</u>	<u>2.776682496</u>	<u>1.718926302</u>	<u>30.251022989</u>	<u>24.429169255</u>
<u>AdSVL</u>	<u>6.298364270</u>	<u>13.410847123</u>	<u>3.362146247</u>	<u>8.950978309</u>
<u>AbSGL</u>	<u>1.760966682</u>	<u>3.012869137</u>	<u>25.238129324</u>	<u>33.122410467</u>
<u>AdSGL</u>	<u>6.476918134</u>	<u>19.523357089</u>	<u>0.008172447</u>	<u>3.382310493</u>
<u>AG</u>	<u>6.115144071</u>	<u>0.911005546</u>	<u>0.008054297</u>	<u>0.440039811</u>
<u>CharHAnt</u>	<u>5.919022722</u>	<u>4.886251615</u>	<u>3.201941578</u>	<u>2.534335344</u>

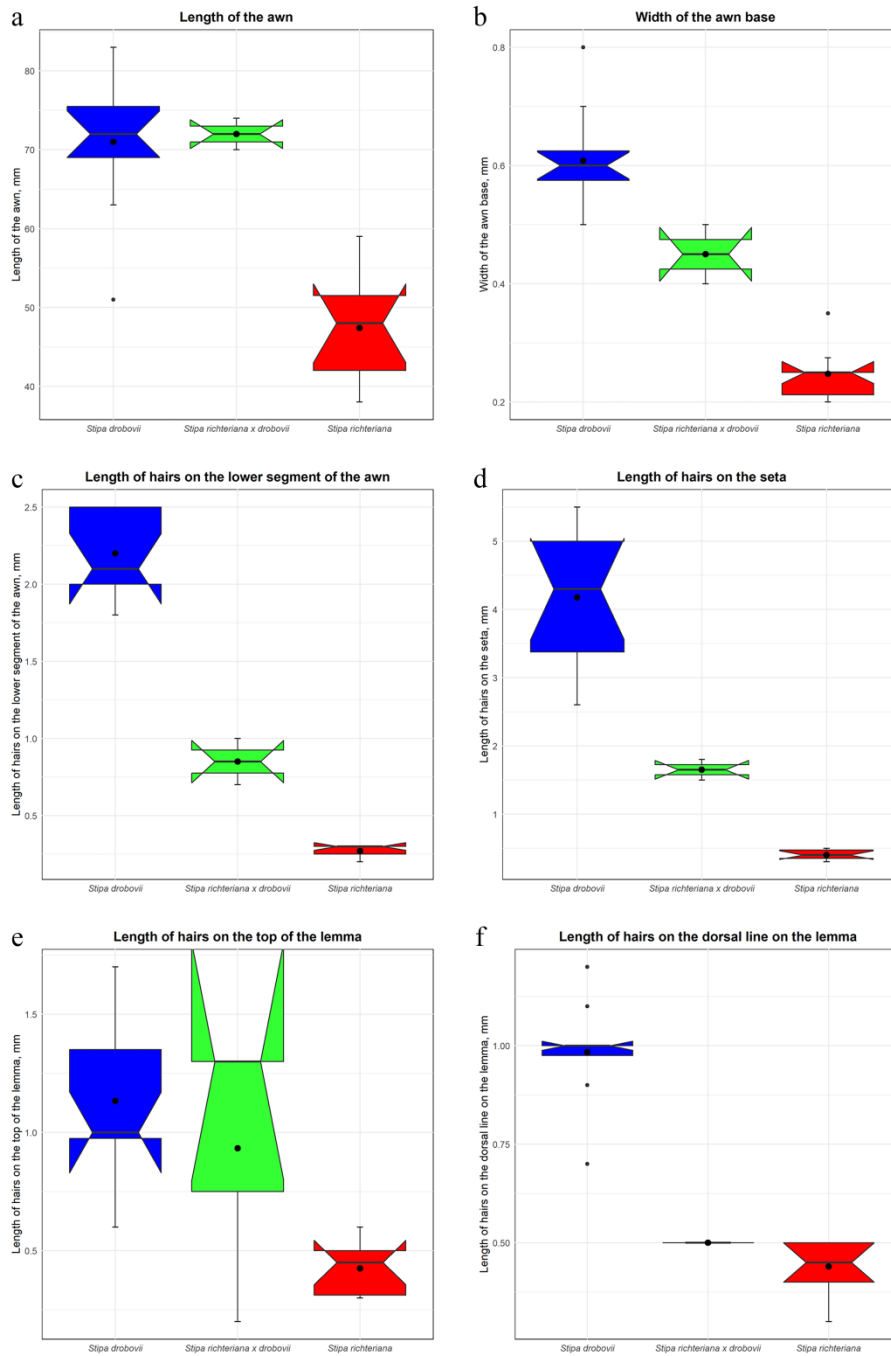


Figure S1: Notched boxplot demonstrating the mean (black bold circle), the median (dark black line), 95 % confidence interval around the median (notch), inter-quartile ranges (25 % to 75 %), whiskers (5 % and 95 %) minimum and maximum measurements (crosses) and possible outlier (black circle) of quantitative characters (a–f) for the studied species.

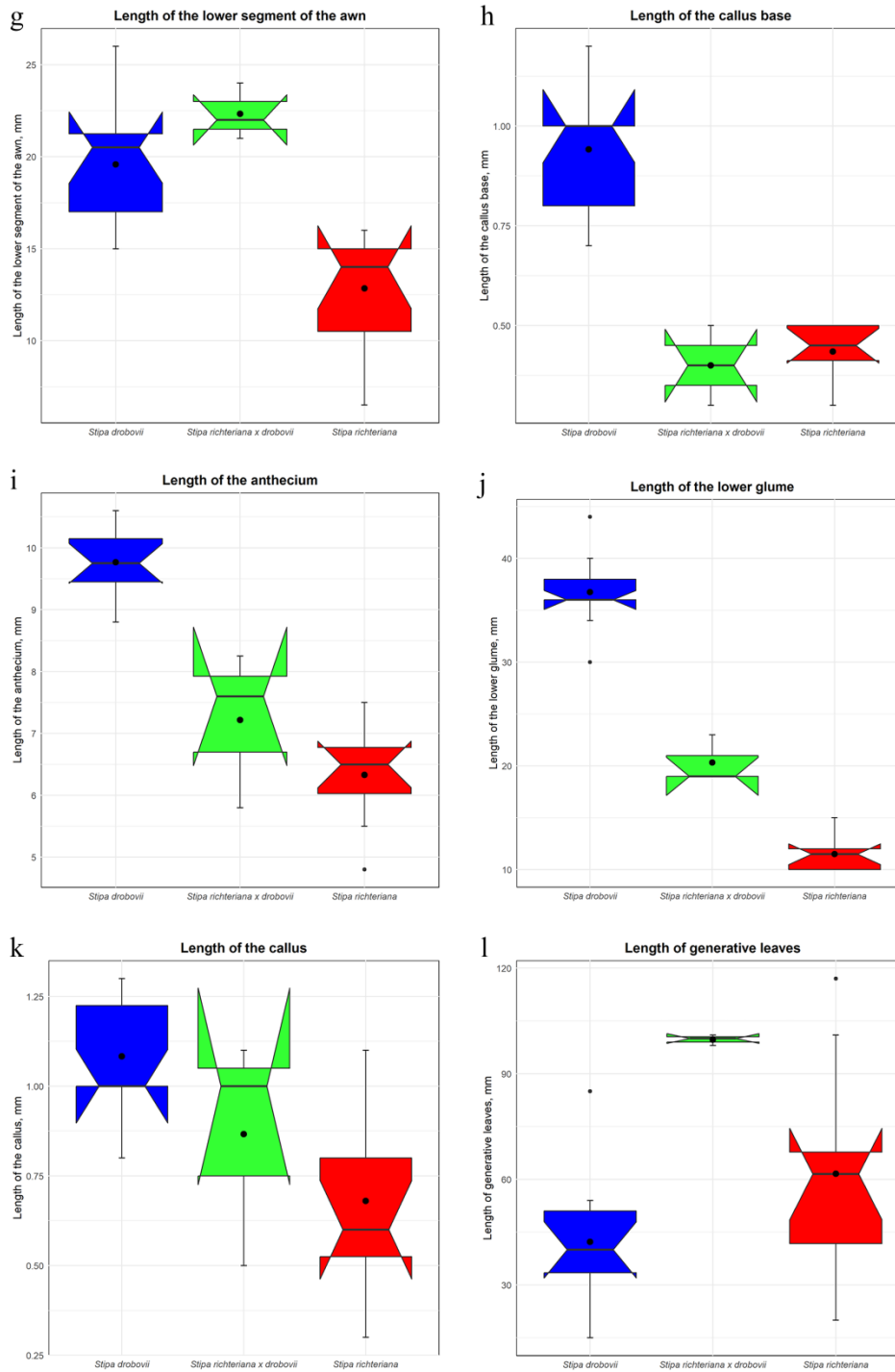


Figure S2: Notched boxplot demonstrating the mean (black bold circle), the median (dark black line), 95 % confidence interval around the median (notch), inter-quartile ranges (25 % to 75 %), whiskers (5 % and 95 % minimum and maximum measurements (crosses) and possible outlier (black circle) of quantitative characters (g–l) for the studied species.

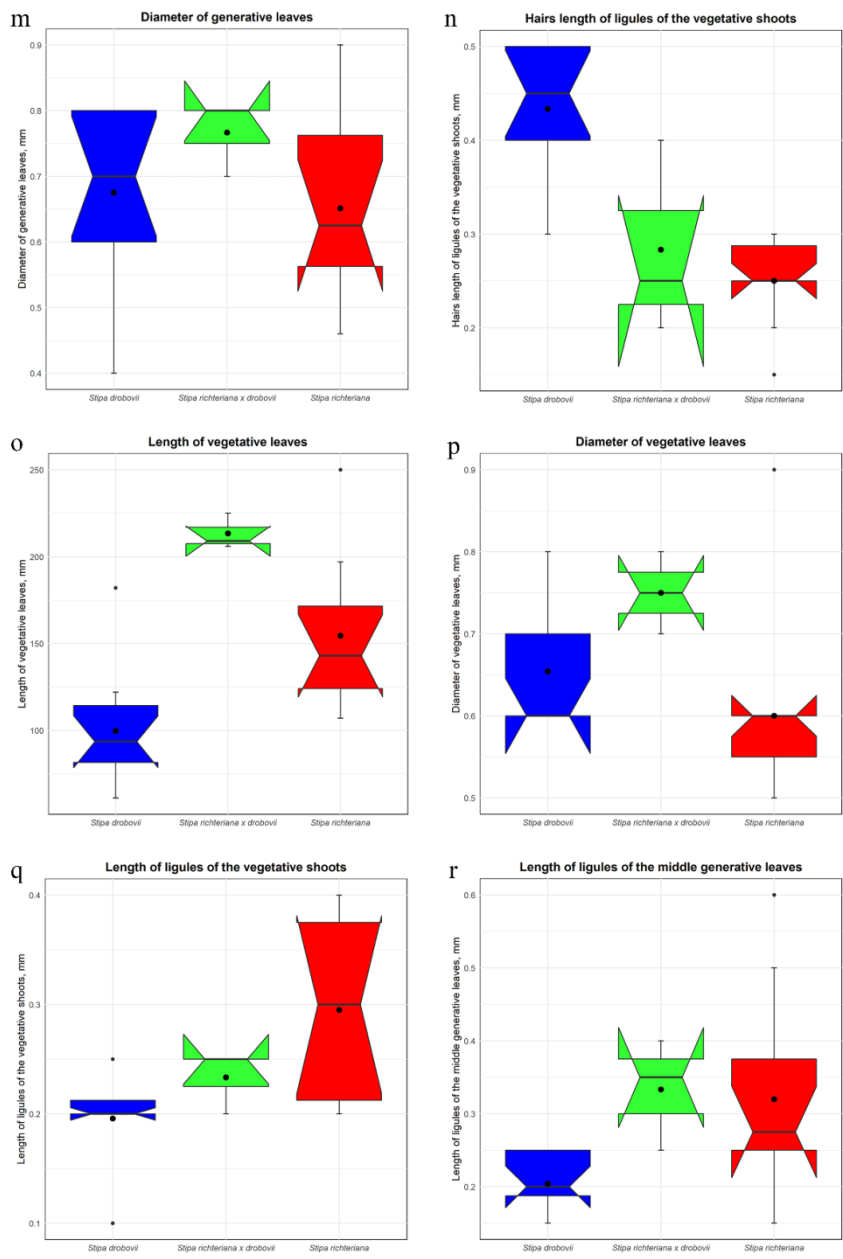


Figure S3: Notched boxplot demonstrating the mean (black bold circle), the median (dark black line), 95 % confidence interval around the median (notch), inter-quartile ranges (25 % to 75 %), whiskers (5 % and 95 % minimum and maximum measurements (crosses) and possible outlier (black circle) of quantitative characters (m–r) for the studied species.

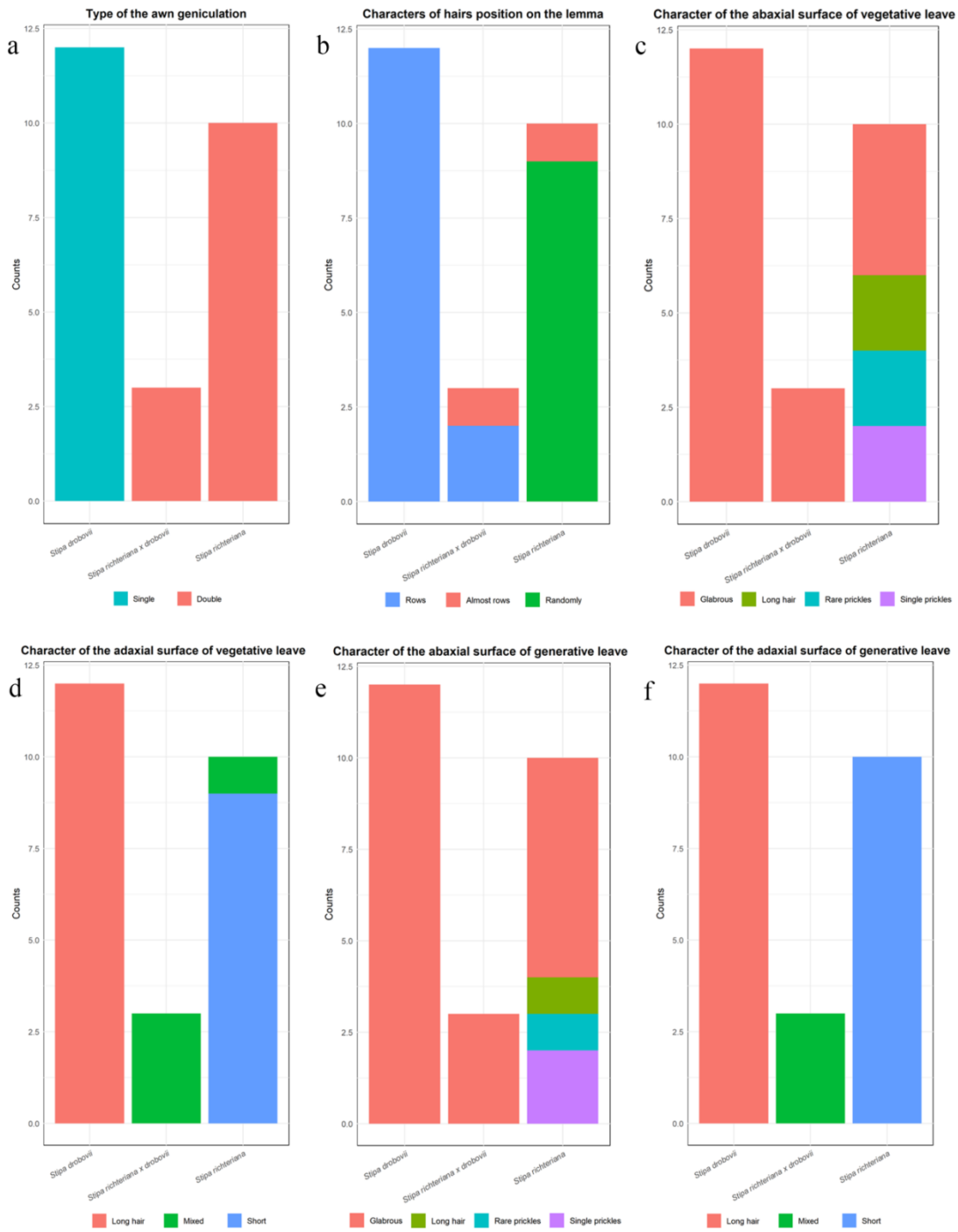


Figure S4: Bar charts displaying frequencies of the qualitative characters: a – AG; b – CharHAnt; c – AbsVL; d – AdSVL; e – AbSGL; f – AdSGL.