

ПРИЛОЖЕНИЯ

к статье Н.А. Потаповой, А.С. Злобина, И.Н. Леоновой, Е.А. Салиной, Я.А. Цепилова
«Использование метода BLUP для оценки селекционной ценности
образцов мягкой яровой пшеницы по содержанию микро- и макроэлементов в зерне»

Приложение 1. Оцененная селекционная ценность (обозначена BV) и средние значения содержания (обозначено mean_residuals) семи элементов в пшенице для 149 сортов

Sort_name	Ca_mean_residuals	Cu_mean_residuals	Fe_mean_residuals	K_mean_residuals	Mg_mean_residuals	Mn_mean_residuals	Zn_mean_residuals	Ca_BV	Cu_BV	Fe_BV	K_BV	Mg_BV	Mn_BV	Zn_BV
Kuibishev_1_2018	624.425	4.60225	40.81	3659	1390.25	35.0625	34.565	-95.7171	0.359039	-2.99958	-418.092	-25.2778	-2.20581	-3.89899
Lutesc840_1_2018	672.375	4.3605	35.9475	4359.5	1355.25	26.75	29.57	-137.035	0.313557	-3.04331	-129.219	-10.8576	-4.64479	-3.09536
Tulaik-belos_1_2018	737.775	5.05675	37.5825	3867	1344.75	31.8025	33.0325	9.56192	0.439791	-3.79207	-137.86	-47.1329	-2.45359	-4.23907
Tulaik-step_1_2018	682.8	5.094	45.1525	4179.75	1505.75	39.26	35.5225	-64.1469	0.372408	-1.43949	-84.2097	8.14026	-1.21665	-3.56951
Tulaik-zolot_1_2018	433.675	5.929	39.44	3585.75	1427.75	36.41	37.45	-224.128	1.093	-1.68106	-304.18	15.5959	-0.669555	-2.05818
Tulaik1_1_2018	777.95	4.07225	42.7725	3033.25	1298.5	37.22	34.31	26.0917	0.166851	-1.04821	-832.406	-59.6717	-1.15834	-3.87312
Tulaik10_1_2018	442.625	5.13875	45.9075	4045.25	1657.25	43.1275	41.315	-243.178	0.895193	-0.0913016	-130.552	65.7507	1.37489	-0.889594
Kinel40_1_2018	528.75	4.879	43.88	3455	1355	40.5975	37.8975	-109.453	0.499169	-2.14009	-161.142	-16.4327	0.244623	-2.77205
Kinel60_1_2018	288.35	4.11875	54.175	3739.25	1558	42.9675	44.0775	-282.036	0.224837	1.66115	-334.943	26.0852	1.2021	-0.623735
Bolgoural_1_2018	318.1	3.842	47.0625	3497.75	1385.125	33	34.8475	-303.886	0.416901	-0.538999	-513.346	-26.6814	-2.92052	-3.56007
Lutesc80_1_2018	401.65	4.11275	48.845	3731.5	1492.5	40.05	39.7775	-237.184	0.0987749	0.291213	-299.421	7.01946	-0.665805	-2.40185
Lutesc85_1_2018	570.55	4.38925	41.01	4093.25	1307.75	35.125	40.5425	-96.5159	0.271287	-1.5848	-142.536	-60.1592	-2.23682	-0.296122
Lutesc148_1_2018	629.45	3.986	39.8625	4094.5	1376.25	35.48	38.095	-102.757	0.0174876	-2.35863	-174.864	-18.222	-2.45177	-3.70403
Altai-prostor_1_2018	649.1	4.40725	47.3825	3564.5	1543	34.465	39.905	-102.518	0.160881	-0.224233	-368.646	27.3644	-3.05214	-1.24502
Altai92_1_2018	444.1	4.69175	39.925	2901.5	1287.25	33.06	34.7075	-208.903	0.425006	-2.17643	-711.053	-85.741	-3.26147	-1.40872
Altai99_1_2018	502.375	3.1845	43.4825	3427.25	1312.75	31.475	36.1025	-226.185	-0.182388	-1.68995	-392.886	-38.2649	-4.43207	-2.10497
Altai100_1_2018	615.925	4.0185	41.735	3465	1383.5	35.6325	36.975	-92.9069	0.150941	-1.90684	-434.733	-30.483	-1.77454	-2.22203
Altai325_1_2018	465.65	5.3245	43.6975	3562	1291	34.775	41.9425	-225.266	0.610029	-1.50631	-451.33	-59.3656	-2.65891	-0.775088
Altai530_1_2018	299.675	4.64375	41.965	3403.5	1288.275	33.4175	38.35	-325.884	0.462345	-1.79307	-555.47	-78.0613	-4.07047	-1.74348
Eritr72_1_2018	473.6	3.60325	42.5325	3847.25	1257.85	32.8975	34.6725	-225.213	-0.284939	-0.905268	-318.709	-126.861	-4.09438	-4.37483
Sibir12_1_2018	133.325	4.63675	45.0425	3524.5	1362.05	31.59	43.0175	-331.512	0.444606	0.91799	-293.909	-5.31778	-4.27901	-0.00412385
N15_1_2018	515.475	4.76825	40.2125	3509	1443	31.155	36.5625	-112.187	0.222986	-3.72428	-360.087	17.8731	-2.18786	-3.7018
N22_1_2018	616	4.8485	52.8725	4110	1570	34.87	41.93	-177.025	0.652891	3.67517	-155.298	35.6046	-3.78442	0.517749
N29_1_2018	666.275	3.83525	42.6375	4157.5	1493.25	32.59	39.12	-81.1678	-0.0303713	-1.8176	-234.747	-47.3083	-4.02677	-0.576477
N67_1_2018	478.6	3.16525	46.125	3815.5	1141.75	30.6125	35.925	-189.058	-0.166893	-0.9059	-337.435	-99.8648	-4.9041	-2.29482
N81_1_2018	645.775	4.95825	48.855	4134.5	1410.75	36.5925	44.2125	-77.282	0.357886	-0.0402935	-92.5784	-9.32262	-1.84675	-0.574616
N89_1_2018	655.325	4.17875	41.2725	3747.25	1276.75	29.185	41.14	-92.3401	0.0040828	-2.14614	-280.467	-83.5636	-6.12449	-1.13701
N91_1_2018	1002.675	4.327	44.17	3419.5	1450	29.6825	41.0775	184.85	0.330198	-0.5302	-533.872	-18.1651	-5.14603	-0.396718
Lutesc25_1_2018	443.475	3.319	44.9825	3226	1645.5	33.9675	43.765	-189.662	-0.0328244	-2.44329	-333.75	31.3863	-3.55691	-2.87737
Samsar_1_2018	934.975	4.909	49.08	4250.25	1612.75	44.0725	41.1425	165.112	0.686204	0.616538	11.9126	62.2707	2.61091	-0.620229
Obskaya14_1_2018	379.325	3.70075	45.5825	4227	1433.5	32.785	40.585	-272.796	-0.135067	-1.68944	-257.59	-34.9196	-4.62955	-1.81374
Kantegir89_1_2018	759.2	4.17175	42.5825	3810	1325.25	29.2575	42.6625	-80.6705	0.0510462	-1.97886	-313.178	-77.401	-5.62819	-0.948994
Alexandrina_1_2018	775.65	4.43225	43.49	3573.25	1645.25	40.8575	41.46	23.2881	0.477284	-0.0222183	-329.689	51.0557	1.27572	1.22035
Udacha_1_2018	611.7	4.156	41.825	3750.75	1462.25	36.83	38.6575	-73.1098	-0.0889735	-1.45378	-118.697	-7.90948	-1.53484	-0.568126
Polushko_1_2018	650.1	4.02075	39.48	3711.25	1569.5	43.7525	36.775	-112.016	0.222242	-3.70412	-358.421	17.6022	-2.18273	-3.70463

Продолжение приложения 1

Sort_name	Ca_mean_ residuals	Cu_mean_ residuals	Fe_mean_ residuals	K_mean_ residuals	Mg_mean_ residuals	Mn_mean_ residuals	Zn_mean_ residuals	Ca_BV	Cu_BV	Fe_BV	K_BV	Mg_BV	Mn_BV	Zn_BV
Bagan93_1_2018	284.85	4.1995	46.4075	2962.5	1606	31.93	38	-341.352	0.0820299	1.06511	-674.268	95.0465	-3.97438	-1.96746
Krasa2_1_2018	381.15	4.95625	50.885	3774.25	1424.75	40.3575	45.65	-233.028	0.386196	0.324071	-239.671	-8.04987	-1.0868	-0.0470245
Krasnoyar90_1_2018	463.9	4.19125	43.985	3800	1434.25	40.695	44.2575	-160.294	0.20389	-1.9224	-359.341	-40.1971	-0.254028	-1.77372
Vesnyanka8_1_2018	380.475	3.6995	44.22	3161.75	1632	36.695	46.425	-170.994	-0.00548375	-2.10209	-453.458	28.3295	-2.09406	-1.99167
Albidum73_1_2018	554.1	3.061	47.685	3575.5	1446.75	40.635	45.81	-154.793	-0.445173	0.814878	-444.622	-7.89912	0.0202612	1.62217
Ribinsk127_1_2018	499.525	3.29675	40.055	2776.25	1438.75	33.9525	42.515	-189.234	-0.552135	-2.25701	-950.203	23.742	-2.9587	1.79516
Angarida_1_2018	727.275	4.2535	43.01	3451.5	1593.75	36.9125	44.3975	-50.6532	0.0914418	-1.89276	-450.7	52.1923	-1.92567	-0.451285
Mana2_1_2018	601.275	4.1625	42.205	3295.5	1354.25	34.42	38.2025	-111.76	0.108522	-1.89542	-421.924	-52.5079	-3.74759	-1.9252
Tuleev_1_2018	727.625	4.8575	44.38	4110.25	1400.75	43.29	46.4725	-48.6787	0.547756	-0.381524	-151.151	-28.9932	1.98452	3.29902
Izida_1_2018	439.075	3.316	38.28	4062.75	1551.5	33.405	39.195	-210.86	-0.230815	-2.41978	-61.0052	41.1182	-3.72645	-1.58344
Mariya_1_2018	508.05	4.344	50.2125	4240	1649.5	38.8875	46.77	-105.705	0.207527	0.528138	-239.564	0.260509	-2.44977	0.169619
AN-34_1_2018	375.15	5.6135	49.4475	3815	1448.25	42.48	44.03	-174.308	0.84711	2.14474	-266.967	-55.683	0.537891	1.48725
Salimovka_1_2018	693.45	4.577	39.6925	4278.75	1557	32.64	38.945	-89.0222	0.319128	-2.75954	-76.9036	59.5432	-4.67256	-1.71555
Kiiskaya_1_2018	657.125	5.366	50.825	3922.5	1326.5	42.7875	42.6875	-154.335	1.01312	2.68492	-217.411	-51.599	1.19715	1.43973
Nostalgia_1_2018	526.675	3.7705	44.2225	3606.25	1250.75	33.5475	41.985	-235.706	0.0932945	-0.735332	-357.072	-66.2384	-3.46875	-0.0621728
Aleshina_1_2018	817.975	4.5535	51.935	3770	1512	38.98	48.04	-7.08545	0.358497	2.3116	-243.363	49.9607	0.851437	3.06255
Darnitsa_1_2018	903.125	6.13875	47.0975	3726.5	1318.5	43.9325	43.645	65.9642	1.06297	0.436518	-241.027	-39.0968	2.32836	0.691945
Serebrina_1_2018	547.075	4.20575	40.1675	3762.75	1212.875	35.8925	38.22	-199.73	0.370614	-1.9659	-389.426	-59.2604	-1.76388	-1.45664
Rechka_1_2018	561.225	3.934	38.825	3428.5	1339.25	32.6775	36.3525	-133.913	0.0082373	-2.5585	-351.652	-25.8965	-2.66128	-3.07177
Latona_1_2018	590.65	3.5845	41.955	3838.75	1544.25	32.9625	38.41	-100.834	0.0811836	-2.98049	-301.805	-13.2711	-3.25965	-2.53298
Provinc_1_2018	459.225	3.62875	51.3275	4031	1455.5	34.6925	49.1825	-204.794	-0.272275	1.44895	-229.06	-7.7156	-3.012	1.71419
Bell_1_2018	547.325	3.538	45.095	4024	1459.75	32.8475	42.6025	-150.683	-0.112813	-1.08195	-195.086	4.10022	-3.18369	-0.570014
Ustyа_1_2018	516.45	3.03175	44.865	3983.5	1484.25	30.5825	37.9275	-168.874	-0.425706	-0.831575	-284.807	6.08955	-3.59678	-1.27623
Chernyava_1_2018	477.7	4.0965	42.7225	3769	1513	37.2325	41.41	-194.879	0.0771732	-1.03042	-301.609	-3.80776	-1.95309	-0.263269
Zlotosara_1_2018	729.8	3.86875	46.3875	3556.25	1667.5	37.115	43.525	-13.9268	0.0883072	1.17947	-329.004	49.3077	-0.681947	0.578955
Tyumen99_1_2018	748.85	4.0715	34.9725	3736	1556.75	37.5425	43.8375	-15.5718	-0.00248321	-4.50732	-276.268	46.5721	-1.98135	0.386743
Ikar_1_2018	496.1	3.82375	42.635	4290	1619.5	42.28	44.4375	-201.999	0.031283	-1.51621	-95.5245	53.8227	1.7673	1.49396
Skent_1_2018	904.225	5.15	43.6575	3705.25	1313.25	41.9125	40.7625	105.762	0.600629	-1.84078	-272.318	-59.9533	0.910867	-2.33014
Ilinskaya_1_2018	641.1	4.221	42.9775	3708.5	1507.25	40.875	36.2875	-95.7674	0.445486	-1.26337	-426.144	6.3738	0.858859	-2.85683
Turinskaya_1_2018	659.75	4.132	40.08	3714.75	1429.75	35.13	34.5425	-61.6405	0.0579059	-4.46704	-322.955	-3.84386	-2.81087	-4.40148
Surenta1_1_2018	672.975	3.9665	46.085	3422	1402.25	31.12	38.6525	-110.01	0.13171	1.9915	-412.48	22.764	-2.89176	-0.228002
Surenta4_1_2018	623.05	4.663	44.805	3799.25	1436.75	37.2825	39.3875	-140.125	0.427012	-0.649809	-358.62	-24.6983	-1.33047	-1.21432
Surenta5_1_2018	715.45	3.96975	42.8625	3765.75	1393.75	37.965	35.34	-24.7947	0.34251	-1.48747	-330.883	-11.081	-0.439657	-2.17882
Surenta6_1_2018	657.55	4.66875	42.95	4213.75	1561	40.7075	37.66	-39.7088	0.280406	-3.59467	-101.928	-12.1057	-0.59494	-2.25743
Surenta7_1_2018	536.225	4.2385	41.84	3784.5	1392	34.915	36.5	-143.552	0.156278	-2.00602	-150.762	4.5608	-2.097	-2.12208
Dias2_1_2018	811.075	4.818	43.9375	3694.5	1460.25	41.75	40.445	-73.4061	0.113075	-1.1495	-291.437	13.077	-1.10503	-3.14704
Katyusha_1_2018	388.075	3.959	42.0425	3749.25	1579.25	39.7775	39.37	-194.768	0.186865	-2.47377	-273.718	13.8834	-0.17248	-2.74709
Tarskaya6_1_2018	713.925	5.06325	41.9025	3767.25	1367.5	47.445	38.1125	-38.1261	0.544557	-2.16197	-325.53	-42.0314	4.04554	-1.69661

Продолжение приложения 1

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Sonata_1_2018	322.95	3.65375	39.965	3858.25	1645	38.1375	42.775	-189.13	-0.0665025	-2.45099	-203.68	-4.78313	-0.574773	0.421457
Strada_1_2018	775.875	3.68625	39.8825	3554.25	1407.125	40.6375	42.3325	-68.1271	-0.13073	-2.02901	-351.499	-10.005	-1.81298	-1.38301
Otrada_1_2018	659.4	3.51925	42.2825	3537	1452.25	42.65	33.55	-67.947	-0.217701	-1.04018	-347.973	-15.094	2.05604	-4.06515
Tertciya_1_2018	360.525	4.17625	35.775	3937.5	1482.25	32.9175	36.28	-262.472	-0.0159035	-2.82357	-273.875	-16.6539	-3.36607	-3.33673
Priirtish_1_2018	654.3	3.276	30.535	3446.25	1394.75	28.78	30.2425	-66.1809	-0.262757	-5.04583	-368.767	9.8084	-4.47081	-4.99893
Rosinka_1_2018	661.65	4.49175	47.185	3909.75	1598.5	42.28	42.25	-55.1075	0.273121	-1.05931	-223.07	29.2958	0.781626	-0.319241
Om20_1_2018	736.15	4.46975	44.85	4033.25	1358.75	41.05	37.145	58.8918	0.273038	-1.87446	-136.51	-97.0037	-0.0661973	-3.47285
Om23_1_2018	627.7	4.05775	46.15	4077	1477.25	40.4825	34.6475	-131.239	0.109179	1.09875	-248.36	0.682763	-1.03047	0.357905
Om24_1_2018	777.2	4.3085	41.6375	3842.5	1411.5	42.305	38.8525	-52.6488	0.215514	-1.34674	-180.759	0.841042	-0.208566	-1.46531
Om26_1_2018	573.325	4.36725	45.1125	4050.5	1579.75	39.3675	40.7825	-141.239	-0.0973723	-1.64467	-248.446	16.985	-1.86995	-3.13618
Om28_1_2018	713.725	4.12975	39.04	3735.5	1315.75	39.185	43.0475	-30.4057	0.1973	-2.80804	-272.063	-52.5692	-0.0597075	0.769602
Om29_1_2018	897.475	4.0565	41.5075	4098.5	1186.65	35.1275	37.5075	53.1303	0.197275	-1.44336	-143.309	-82.6588	-1.55188	-2.72159
Om32_1_2018	839.35	3.43625	38.8025	3944.5	1211	35.6425	37.5125	32.1862	-0.0381693	-2.588	-141.518	-73.2952	-1.73576	-2.10501
Om33_1_2018	805.4	4.08275	42.09	3727	1394	36.54	41.59	66.361	0.265366	-1.83775	-272.327	-50.5959	-0.894693	0.428972
Om34_1_2018	760.225	4.56675	41.93	4129	1388.25	35.535	41.685	-46.6278	0.380037	-1.96253	-117.767	-13.8763	-2.07933	-1.32135
Om36_1_2018	714.85	4.27575	43.92	3681.75	1464	37.715	42.135	21.6621	0.199371	-0.61439	-246.286	-23.6829	-0.617633	-0.550144
S29_1_2018	617.9	5.9455	29.9825	4474.25	1639.75	27.785	42.085	-2.74137	0.516081	-3.52528	-18.0698	-1.8603	-1.71801	-2.56005
S42_1_2018	765.825	4.386	41.385	3828.75	1519.25	35.585	37.3875	-12.5923	0.406955	-1.7322	-198.674	23.6085	-1.90088	-2.17709
YA.P_1_2018	480.025	4.02075	35.775	3776	1489.5	32.64	28.5225	-152.619	-0.0466486	-5.01561	-108.792	34.7228	-2.8696	-6.63814
S.29_YA.P_1_2018	703.375	4.401	35.6075	3723.75	1476.25	33.7975	29.98	21.5458	0.230611	-2.7591	-53.0053	22.9543	-0.954473	-3.48618
Obskaya2_1_2018	537.675	4.0175	35.3775	4571.5	1620.25	38.3775	39.7525	-100.792	0.25326	-3.60402	149.585	69.6592	0.52144	-0.243071
Tulun_1_2018	608.225	4.435	39.055	4155.5	1616.75	35.36	41.36	-100.519	0.298863	-3.51244	11.6125	85.249	-2.36038	0.0556065
Skala_1_2018	735.575	3.09175	42.29	4256.75	1480.25	36.7225	30.2975	-89.0394	-0.169625	-1.61354	-206.113	10.9592	-2.07937	-3.60498
Irtyshtanka_1_2018	891.275	3.45325	39.145	4308.25	1324	35.6875	35.5175	-31.8806	0.101306	-1.85121	-92.2711	-37.1048	-1.69906	-4.56645
Tselinnaya_1_2018	991.575	3.38925	33.625	3728.75	1239	36.6275	32.4325	194.834	-0.25089	-5.50287	-133.778	-43.7799	1.20941	-3.78898
Belorusskaya_1_2018	1107.025	3.4755	45.6325	5037.75	1613	41.6825	58.08	270.059	-0.416008	-0.320215	736.642	45.6448	2.05747	2.83085
Rassvet_1_2018	1308.875	2.12425	40.7175	4628.25	1718	41.385	27.24	429.567	-1.03486	0.793467	684.049	178.331	2.34467	-6.4007
Festivalnaya_1_2018	1116.75	2.986	43.32	4576	1422	41.6675	40.595	323.043	-0.447998	0.314911	676.849	46.0782	3.04161	2.95636
T.dicoccum_1_2018	929.05	4.54175	42.4875	4518	1584	40.7375	53.825	204.848	0.455175	0.411156	498.874	123.935	3.52125	12.417
744_1_2018	1011.225	3.58	56.26	4639.25	1599.5	46.34	43.5625	257.884	-0.226799	4.77189	280.654	45.5704	5.0992	1.97932
760_1_2018	1132.325	3.11325	55.5125	3500.25	1640	50.6825	49.6575	266.746	-0.606208	4.11461	280.564	2.87063	4.6421	0.171929
811_1_2018	1297.25	2.9065	43.7775	4734	1287.5	44.1275	41.3325	322.188	-0.308613	-0.469961	219.395	-23.8412	2.0221	-0.926831
821_1_2018	825.375	3.17725	43.175	4389.5	1321	39.52	39.27	154.629	-0.808654	4.42421	813.123	-1.58229	2.82714	1.80997
832_1_2018	842.05	3.34625	56.85	5649.25	1546.75	40.2875	48.165	126.958	-0.637051	4.63195	916.013	11.6458	2.56804	2.18716
837_1_2018	835.825	2.782	48.615	4762.75	1573.5	40.2275	50.185	126.996	-0.729579	6.55151	992.381	41.5539	4.15571	6.30677
842_1_2018	903.125	2.90125	52.2175	6683	1476	41.975	42.215	144.331	-0.631195	4.63509	1072.63	11.7371	2.85597	1.92827
141_1_2018	711.05	3.34325	47.7975	5142.25	1451	40.105	35.8575	1.41966	-0.680921	0.604314	360.263	-19.1345	-0.369626	-4.22104
157_1_2018	887.275	3.58425	58.765	4473.25	1429.75	47.635	53.91	118.114	-0.57988	6.94847	224.414	-8.70442	5.4057	6.03134

Окончание приложения 1

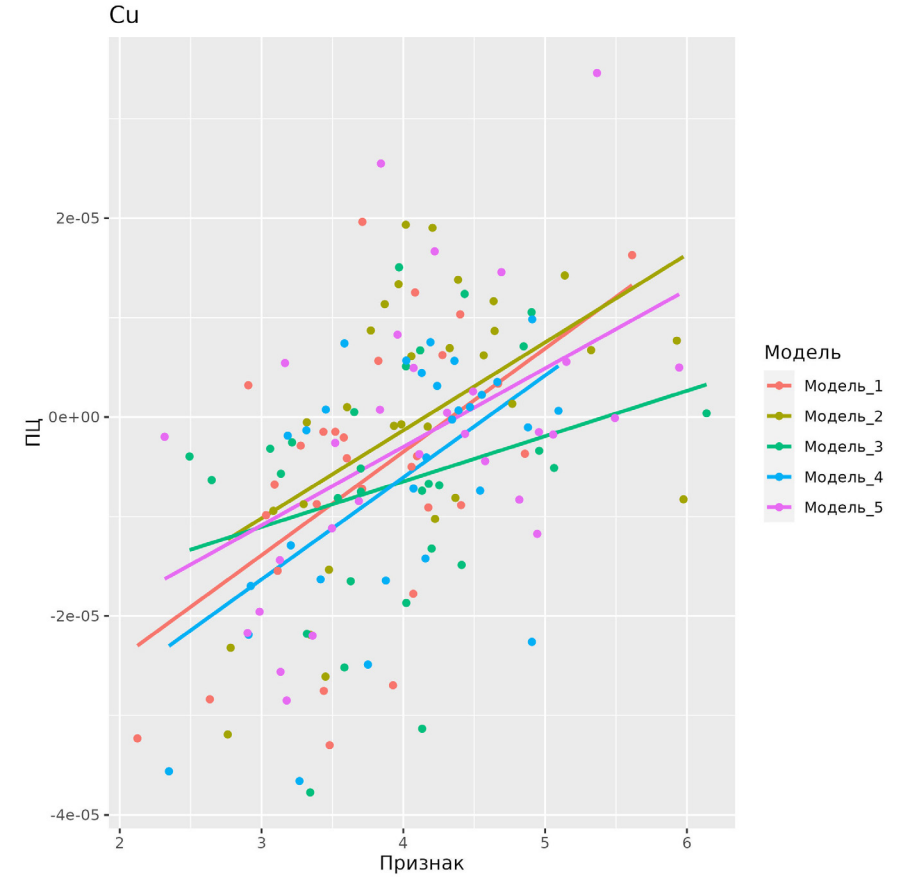
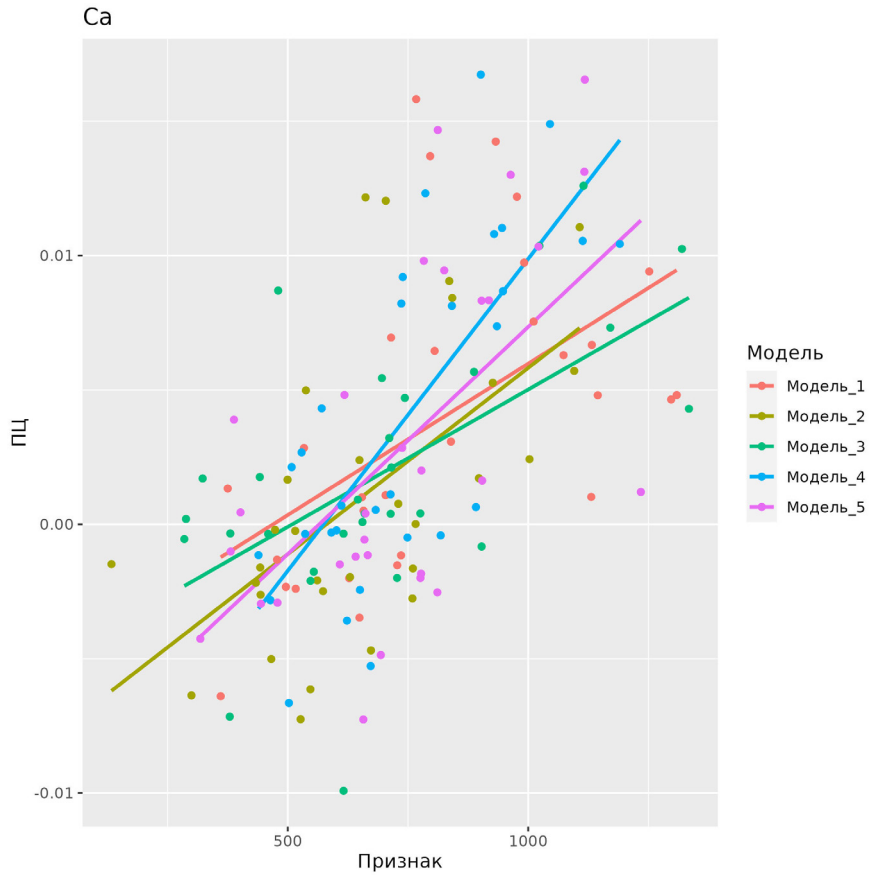
Sort_name	Ca_mean_ residuals	Cu_mean_ residuals	Fe_mean_ residuals	K_mean_ residuals	Mg_mean_ residuals	Mn_mean_ residuals	Zn_mean_ residuals	Ca_BV	Cu_BV	Fe_BV	K_BV	Mg_BV	Mn_BV	Zn_BV
175_1_2018	926.275	2.7615	44.34	4634.5	1223.75	37.89	34.545	109.759	-0.933986	4.22555	672.278	-79.2901	0.409357	-3.44586
178_1_2018	739.15	3.2675	52.745	4904.25	1410	37.6175	38.53	106.77	-0.935894	4.28091	684.515	-77.801	0.308104	-3.33016
184_1_2018	841.275	2.34675	47.6025	4753.5	1181.5	37.6325	32.4425	98.1061	-0.959638	4.0793	653.727	-79.6875	0.236718	-3.73843
10_1_2018	1021.425	3.129	50.455	4919.25	1306	41.34	31.31	232.897	-0.558872	5.31372	670.043	-70.5045	2.48415	-3.83156
28_1_2018	1023.3	4.13275	52.9275	5648.25	1377	43.7975	35.6825	223.608	-0.53078	5.31307	713.337	-69.4606	2.37984	-3.80568
38_1_2018	786.125	3.75025	57.06	4647.75	1467.75	37.575	45.89	150.276	-0.504322	9.33365	716.749	-30.4922	3.72268	1.46802
67_1_2018	441.8	3.1365	44.1175	3826	1482	39.4325	32.975	-158.243	-0.248384	0.279559	-1.32756	-8.43233	0.100527	-2.18382
94_1_2018	649.05	4.2235	50.8275	4174.25	1413.25	44.065	47.1025	-85.9247	-0.0149265	3.70367	114.273	-1.07167	2.77129	4.25917
140_1_2018	533.7	3.6015	45.0025	4088.5	1486.5	38.655	36.5925	-95.407	-0.0249978	0.826024	69.6297	-21.4017	-0.485846	-2.67049
191_1_2018	976.55	3.439	41.4625	3917.25	1411.75	45.375	37.0025	230.519	-0.720394	0.122639	101.39	-36.13	5.13434	-1.27636
199_1_2018	963.525	3.35975	59.47	4500.5	1538	49.1625	52.285	239.782	-0.488136	7.09066	430.201	30.7425	7.13155	6.92709
206_1_2018	796.1	2.63525	38.3225	4042.75	1261.75	40.785	35.405	183.521	-0.919743	-1.54821	129.87	-54.1606	4.40383	-2.35373
208_1_2018	1045.325	2.9085	49.2575	4546.25	1578.75	47.815	46.96	307.668	-0.716723	0.894401	143.142	5.88893	6.39774	2.14309
676_1_2018	695.775	2.64825	51.6675	3791.5	1408.25	42.0025	49.16	-2.49949	-0.686216	6.28252	-119.138	-48.1577	3.25241	7.32612
699_1_2018	1234.25	2.31625	41.57	4228	1403.25	39.4325	43.6675	257.076	-0.675991	0.631309	74.9844	-57.661	0.689977	3.17527
728_1_2018	1131.075	4.07	37.9675	4056.25	1394.75	41.1	35.765	259.367	-0.0751995	-3.11137	-116.039	-7.98357	3.18585	-2.19282
732_1_2018	661.675	3.451	42.365	3987.75	1370	39.1675	44.945	56.3362	-0.641684	1.14033	107.939	-66.2225	2.24071	3.15341
183_2-2_1_2018	1334.25	3.215	32.9025	4571.25	1247	38.3025	36.4975	308.688	-0.207972	-5.58056	42.851	-60.3937	0.220822	-3.21407
190_4-1_1_2018	1319.75	3.32	56.35	4549.75	1462.25	43.435	47.1225	491.083	-0.618576	5.3763	393.328	-15.3981	2.87136	4.00133
190_5-3_1_2018	1117.725	3.134	40.81	4361.5	1269	37.26	36.675	385.3	-0.694205	0.261986	355.612	-63.4794	0.0683143	0.0301892
190_6-1_1_2018	1190.5	2.9235	42.2775	4965.75	1354.75	38.245	37.76	270.213	-0.416166	-0.31646	736.85	45.6116	2.06405	2.8335
191_3-3_1_2018	1170.75	2.492	42.445	4921.75	1220.5	32.285	37.99	350.126	-0.830672	-0.760766	494.48	-110.291	-3.52085	-0.457059
195-3_1_2018	918.225	3.49675	49.6775	4954	1572.5	45.57	54.7575	169.206	-0.287608	1.45808	792.666	68.8938	4.48924	8.99684
196-1_1_2018	947.525	3.4165	41.75	5227.25	1553.5	43.29	46.48	178.537	-0.336954	1.16298	810.897	71.688	4.48298	8.4804
200-3_1_2018	1113.375	3.8765	49.2825	4850.5	1522	38.1725	44.9825	344.346	-0.174828	3.10193	739.934	61.5414	1.38905	4.72864
202-2_1_2018	901.425	4.90675	52.3275	4905.25	1398.25	46.475	61.0425	227.069	0.352512	3.61232	662.58	-56.5305	5.26741	12.538
206-2_1_2018	1073.475	3.711	40.1625	4301.5	1251.25	38.6775	44.32	267.365	0.113072	1.02369	311.263	-79.8052	2.94663	8.42228
213-1_1_2018	767	3.92725	44.0675	5039.5	1443.75	41.815	37.8175	269.066	-0.416052	-0.335453	734.353	45.1223	2.06187	2.79511
221-1_1_2018	703.8	3.0835	49.5325	6272.5	1569.5	44.06	51.11	44.1603	-0.705647	4.47254	1750.04	87.7696	5.30403	8.95069
226-7_1_2018	811.925	4.94425	56.8275	4183.75	1827	50.8325	70.3275	128.159	0.561734	7.42034	204.492	197.725	8.80997	19.656
31_1_2018	1144.675	3.48025	49.955	5265.5	1663.75	41.785	37.7575	423.517	-1.03284	0.810565	688.658	178.355	2.31889	-6.32725
29_1_2018	945.625	3.20625	50.0775	5077.5	1812.25	41.0525	35.565	226.84	-0.508121	3.40074	729.795	202.716	2.37446	-3.30866
19_1_2018	743.425	4.9045	48.26	5300	1508	41.9025	52.1675	25.0466	0.664019	3.84126	819.45	83.2872	3.80728	10.0952
20-1_1_2018	782.925	5.49225	52.4925	4629.75	1591	46.925	64.76	125.304	0.696933	4.50289	447.673	63.9918	6.04704	13.913
25-2_1_2018	1095.65	5.976	62.6475	5020	1637.75	52.545	65.87	296.335	1.04361	11.5884	785.169	110.525	9.68238	15.3201
34-1_1_2018	932.475	3.52	45.2325	5003.75	1598.25	40.12	34.625	234.413	-0.218736	2.47685	848.799	134.487	3.27211	-0.695114
13-3_1_2018	1115	4.41125	51.59	5279	1547.25	49.8675	51.3525	357.433	0.201773	5.41545	1023.58	91.6648	9.83059	9.71386
15-7_1_2018	1251.7	3.7095	48.1775	5212.75	1605.5	50.1075	49.2975	419.886	-0.212791	2.45086	982.763	124.896	7.57657	5.01248

Приложение 2. Информация об оцененной корреляции, доверительных интервалах и *p*-value между оцененной селекционной ценностью и реальными данными фенотипов для семи микро- и макроэлементов. Представлена информация по каждой из использованных моделей для каждого изученного элемента

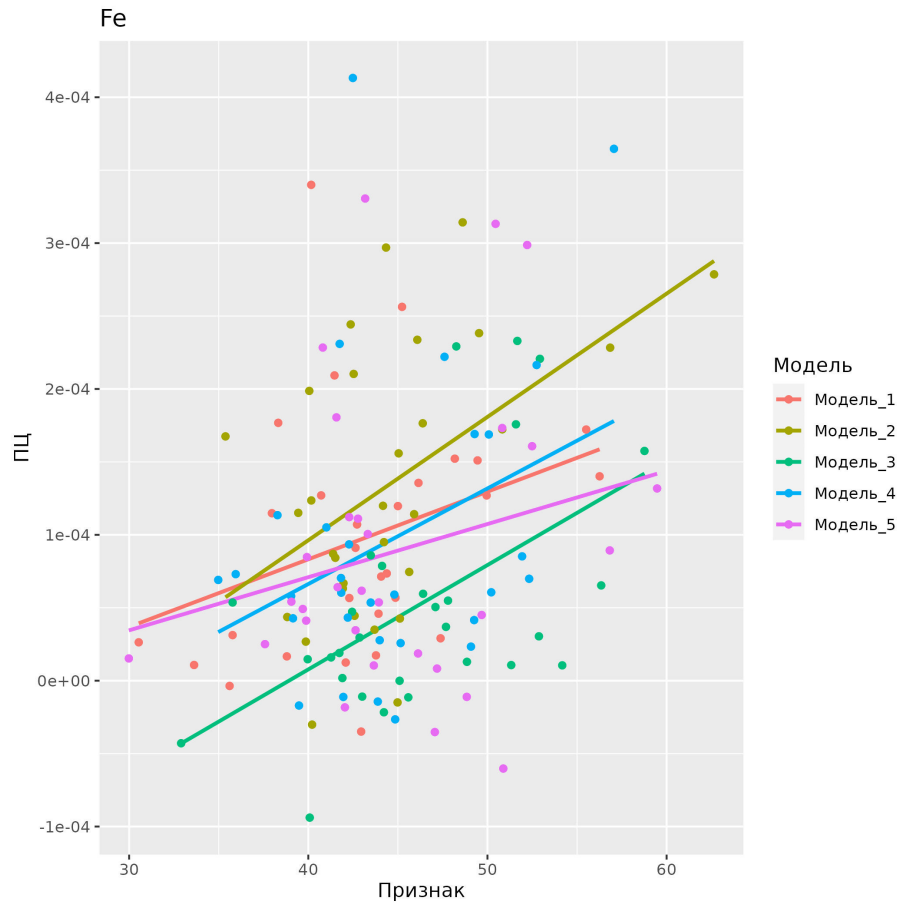
Элемент	Модель	Корреляция	Нижняя граница доверительного интервала	Верхняя граница доверительного интервала	<i>p</i> -value
Ca	модель 1	0.54	0.21	0.75	0.003
	модель 2	0.57	0.27	0.77	0.0009
	модель 3	0.59	0.29	0.79	0.0007
	модель 4	0.73	0.51	0.87	3.741e-06
	модель 5	0.61	0.31	0.79	0.0003
Cu	модель 1	0.53	0.2	0.75	0.003
	модель 2	0.52	0.2	0.74	0.003
	модель 3	0.28	-0.09	0.59	0.13
	модель 4	0.56	0.24	0.76	0.001
	модель 5	0.49	0.16	0.72	0.006
Fe	модель 1	0.32	-0.05	0.61	0.09
	модель 2	0.49	0.15	0.72	0.006
	модель 3	0.53	0.2	0.75	0.003
	модель 4	0.33	-0.03	0.62	0.071
	модель 5	0.22	-0.15	0.54	0.24
K	модель 1	0.46	0.11	0.7	0.01
	модель 2	0.79	0.6	0.9	1.85e-07
	модель 3	0.64	0.35	0.81	0.0002
	модель 4	0.75	0.54	0.88	1.5e-06
	модель 5	0.73	0.51	0.86	4.11e-06
Mg	модель 1	0.39	0.03	0.66	0.037
	модель 2	0.33	-0.03	0.62	0.073
	модель 3	0.43	0.08	0.69	0.02
	модель 4	0.45	0.11	0.7	0.012
	модель 5	0.38	0.03	0.65	0.036
Mn	модель 1	0.41	0.05	0.67	0.03
	модель 2	0.55	0.24	0.76	0.001
	модель 3	0.68	0.42	0.84	5.03e-05
	модель 4	0.35	-0.01	0.63	0.05
	модель 5	0.52	0.2	0.74	0.003
Zn	модель 1	0.28	-0.09	0.59	0.14
	модель 2	0.51	0.18	0.74	0.004
	модель 3	0.49	0.15	0.73	0.007
	модель 4	0.53	0.22	0.75	0.002
	модель 5	0.51	0.19	0.74	0.004

Приложение 3. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для кальция

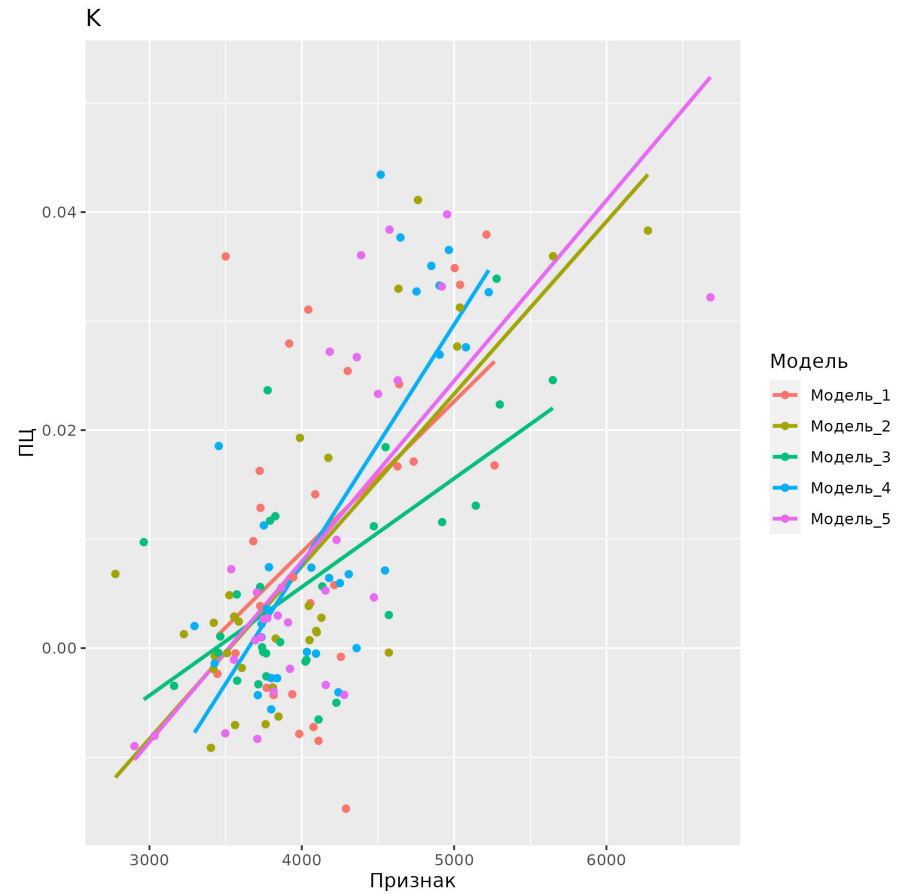
Приложение 4. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для меди



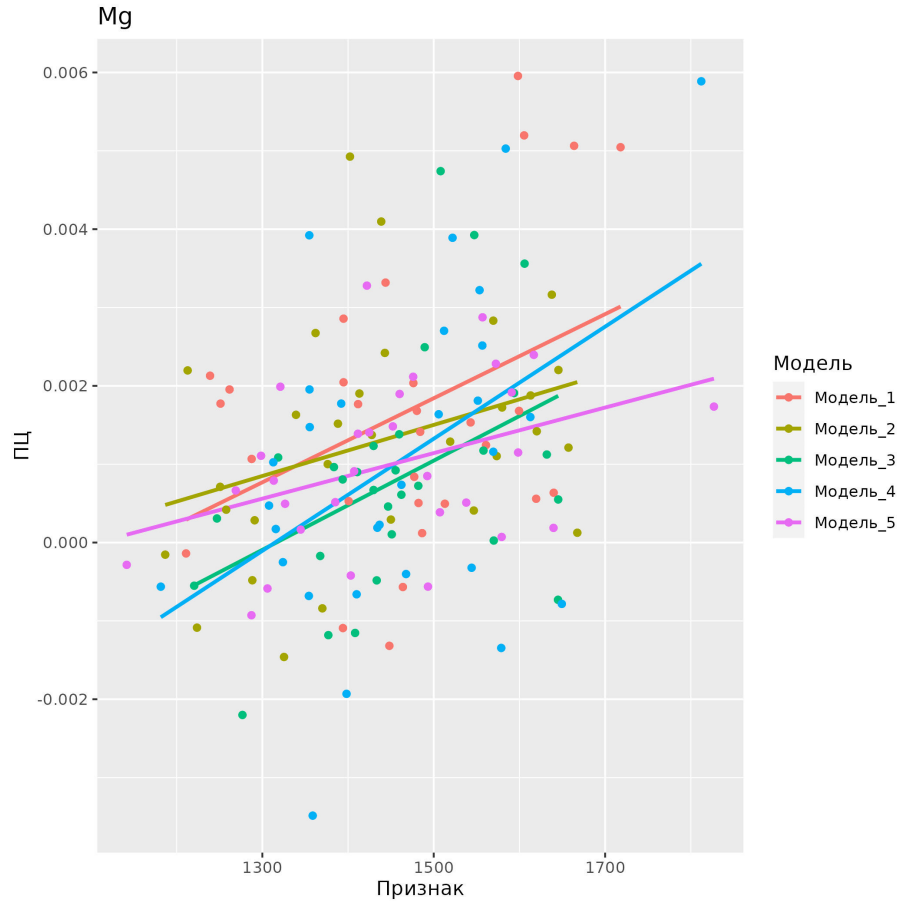
Приложение 5. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для железа



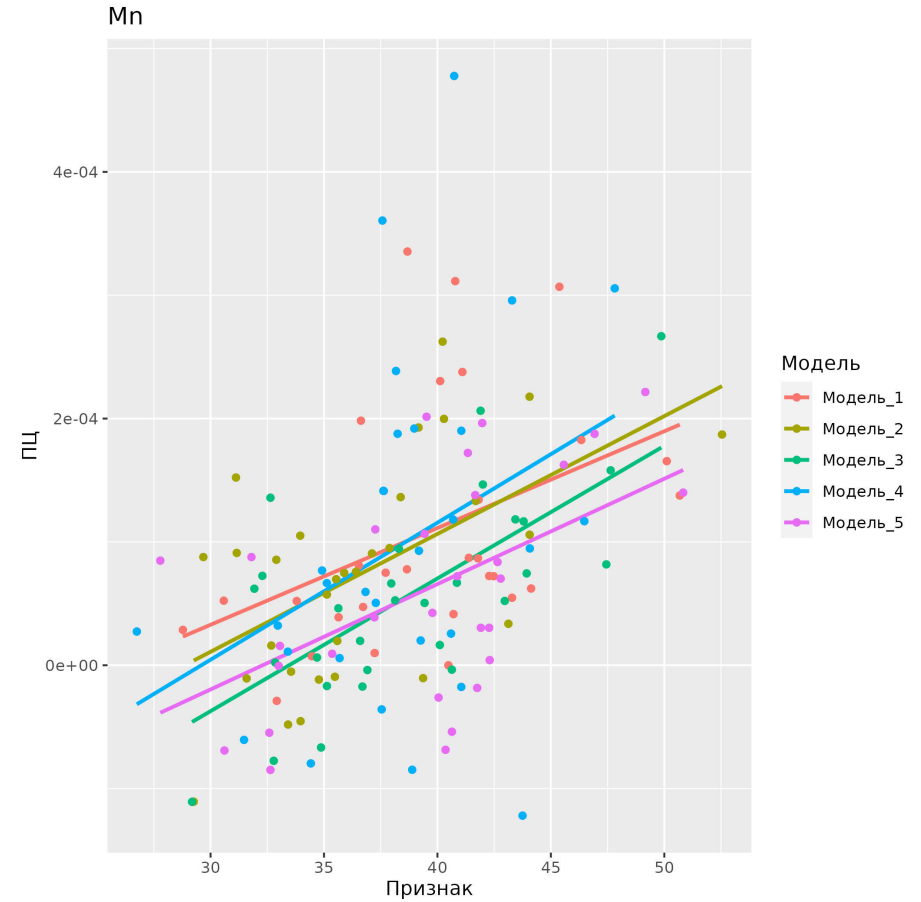
Приложение 6. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для калия



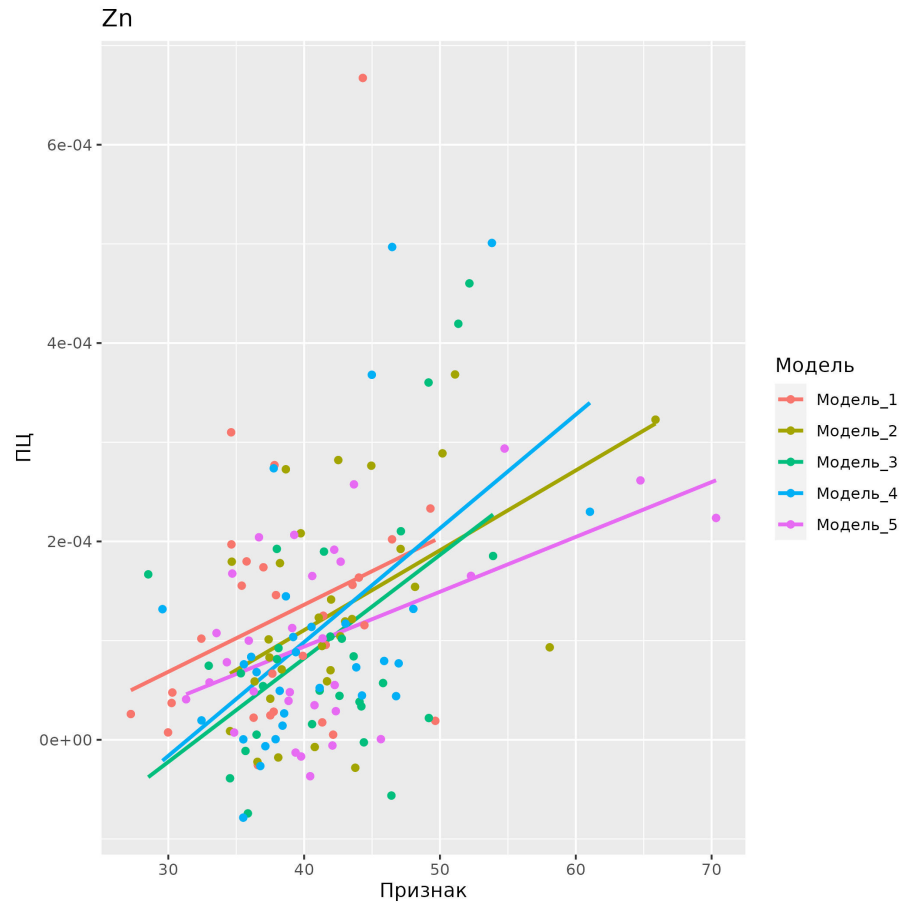
Приложение 7. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для магния



Приложение 8. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для марганца



Приложение 9. Диаграмма рассеяния для оцененной селекционной ценности и реальных фенотипов для цинка



Приложение 10. Список зарегистрированных баз данных с оценками селекционной ценности ОНП для семи элементов

Название элемента	Номер свидетельства о государственной регистрации базы данных в Роспатент	Название базы данных (на русском и английском языках)
Ca	2023621647	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию кальция (КЦКCa) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by calcium content (CBVCa)
Cu	2023622284	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию меди (КЦМ) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by cuprum content (CBVCu)
Fe	2023622283	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию железа (КЦЖ) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by ferrum content (CBVFe)
K	2023622285	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию калия (КЦК) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by magnesium content (CBVMg)
Mg	2023622542	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию магния (КЦMg) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by potassium content (CBVK)
Mn	2023622543	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию марганца (КЦMn) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by manganese content (CBVMn)
Zn	2023622544	Коэффициенты однонуклеотидных полиморфизмов для оценки селекционной ценности пшеницы по содержанию цинка (КЦЦ) / Coefficients of single nucleotide polymorphisms for evaluation the breeding value of wheat by zinc content (CBVZn)