Table S1. Physicochemical property aspects of TaMAPK-TaMAP4K											
Gene Name			**Gene ID**	**Chr start**	**Chr end**	**Length (aa)**	**MW (kDa)**	**pI**	**Subcellular Localizatio**	**GRAGY**	**Transmembrane**
TaMAPK1			TraesCS6B02G296700.2	532338556	532341647	460	51.60	9.71	Nucleus	-0.388	none
TaMAPK2			TraesCS4A02G336800.2	619184426	619188858	445	50.90	6.14	Nucleus	-0.345	none
TaMAPK3			TraesCS4A	120604688	120608133	369	42.83	5.46	Nucleus	-0.298	none
TaMAPK4			TraesCS1D02G088000.2	73674523	73680096	553	62.75	8.85	Nucleus	-0.513	none
TaMAPK5			TraesCS1D02G422800.1	478142725	478147790	605	68.33	7.71	Nucleus	-0.561	none
TaMAPK6			TraesCS7B	5513957	5521157	393	44.24	5.50	Nucleus	-0.238	none
TaMAPK7			TraesCS7D02G342800.3	439463570	439478002	421	48.54	8.91	Nucleus	-0.426	none
TaMAPK8			TraesCS3D02G225600.1	307226730	307233549	613	69.88	9.04	Nucleus	-0.554	none
TaMAPK10			TraesCS6B02G146300.1	146837429	146841338	369	42.36	6.67	Nucleus	-0.187	none
TaMAPK11			TraesCS1A02G086500.1	73295476	73300550	549	62.31	8.74	Nucleus	-0.492	none
TaMAPK12			TraesCS7A02G422500.1	612990989	612994043	824	47.32	8.24	Nucleus	-0.195	none
TaMAPK13			TraesCS6D02G245500.3	347684447	347687540	460	51.56	9.71	Nucleus	-0.406	none

TaMAPK14	TraesCS1A02G184500.1	334446534	334452739	377	42.87	5.75	Nucleus	-0.328	none
TaMAPK16	TraesCS3B02G270200.1	434980667	434986997	586	67.17	9.32	Nucleus	-0.551	none
TaMAPK17	TraesCS6B02G127800.1	123702609	123715378	598	56.88	6.43	Nucleus	-0.374	none
TaMAPK18	TraesCS7D02G044100.1	22581173	22585094	485	55.11	9.49	Nucleus	-0.487	none
TaMAPK19	TraesCS7A02G111300.1	68086983	68094361	396	44.44	5.50	Nucleus	-0.223	none
TaMAPK20	TraesCS7D02G403700.1	520827434	520832219	581	65.47	7.32	Nucleus	-0.482	none
TaMAPK22	TraesCS7D02G414900.1	533432518	533434635	377	43.02	8.04	Nucleus	-0.157	none
TaMAPK23	TraesCS3D02G221700.1	301965173	301974102	488	55.77	6.82	Nucleus	-0.425	none
TaMAPK24	TraesCS3D02G242200.2	337303815	337310057	584	66.87	9.32	Nucleus	-0.539	none
TaMAPK25	TraesCS4D02G198600.1	344940376	344943564	369	42.82	5.46	Nucleus	-0.312	none
TaMAPK26	TraesCS5D02G534000.2	548349748	548354652	441	50.24	5.74	Nucleus	-0.322	none
TaMAPK27	TraesCS1B02G104900.1	115953191	115959231	549	62.38	8.92	Nucleus	-0.492	none

TaMAPK28	TraesCS1B02G192600.3	344838254	344842121	376	42.86	5.75	Nucleus	-0.329	none
TaMAPK29	TraesCS1B02G431400.2	655781234	655786592	556	63.02	9.04	Nucleus	-0.513	none
TaMAPK30	TraesCS7A02G335300.2	490831796	490841117	421	48.45	8.83	Nucleus	-0.414	none
TaMAPK31	TraesCS4A02G434800.1	705502495	705508717	484	54.84	9.50	Nucleus	-0.476	none
TaMAPK33	TraesCS1D02G410100.1	471618853	471623653	555	62.75	9.33	Nucleus	-0.523	none
TaMAPK34	TraesCS1D02G428900.1	480888268	480894402	599	66.65	9.22	Nucleus	-0.416	none
TaMAPK35	TraesCS6A02G099600.1	67126390	67137086	500	57.25	6.36	Nucleus	-0.429	none
TaMAPK36	TraesCS6A02G118100.1	88854990	88859282	380	43.50	7.20	Nucleus	-0.181	none
TaMAPK37	TraesCS6A02G269400.1	495685844	495688911	460	51.54	9.71	Nucleus	-0.4	none
TaMAPK38	TraesCS3B02G256700.1	414020367	414026235	602	68.57	8.99	Nucleus	-0.534	none
TaMAPK39	TraesCS3A02G242100.1	454510686	454516596	582	66.51	9.25	Nucleus	-0.522	none
TaMAPK40	TraesCS3A02G231700.1	432855223	432868359	490	56.03	6.17	Nucleus	-0.429	none

TaMAPK41	TraesCS1A02G402400.2	566009663	566015714	548	62.14	9.06	Nucleus	-0.49	none
TaMAPK42	TraesCS1A02G415300.1	574351875	574357108	606	68.45	7.71	Nucleus	-0.581	none
TaMAPK43	TraesCS1A02G421000.1	577468378	577474524	598	66.51	9.27	Nucleus	-0.409	none
TaMAPK44	TraesCS6D02G082900.2	47937796	47944111	505	58.04	6.48	Nucleus	-0.437	none
TaMAPK45	TraesCS6D02G108100.1	72229215	72231632	382	43.82	7.63	Nucleus	-0.205	none
TaMAPK46	TraesCS7A02G049000.1	22930536	22936407	492	56.02	9.46	Nucleus	-0.457	none
TaMAPK47	TraesCS7A02G029700.1	12115497	12118204	324	37.21	9.16	Nucleus	-0.237	none
TaMAPK49	TraesCS7A02G410700.2	598216576	598222568	578	65.15	6.85	Nucleus	-0.496	none
TaMAPK50	TraesCS5B02G536500.1	692559588	692565223	443	50.42	6.04	Nucleus	-0.351	none
TaMAPK52	TraesCS7B02G246900.3	457243859	457252780	421	48.49	8.91	Nucleus	-0.418	none
TaMAPK53	TraesCS7B02G309900.1	553883880	553888100	578	65.21	6.85	Nucleus	-0.485	none
TaMAPK54	TraesCS7B02G322900.1	573261339	573264067	377	43.19	7.20	Nucleus	-0.188	none

TaMAPKK1	TraesCS6D02G328800.1	433408096	433409202	368	39.62	9.30	Cytoplasm. Nucleus	-0.323	none
TaMAPKK2	TraesCS5B02G565100.3	710226104	710231942	525	58.65	7.89	Nucleus	-0.329	none
TaMAPKK3	TraesCS5D02G130900.2	207244486	207252504	525	58.60	5.34	Nucleus	-0.242	none
TaMAPKK4	TraesCS5A02G122700.4	267940928	267946212	299	33.60	5.89	Nucleus	-0.039	none
TaMAPKK5	TraesCS4B02G049000.1	37296414	37297430	338	36.34	8.23	Nucleus	-0.117	none
TaMAPKK6	TraesCS4B02G048100.1	36012946	36013977	343	36.19	8.95	Nucleus	0.076	none
TaMAPKK7	TraesCS4B02G048600.1	37084618	37085631	337	35.63	8.81	Nucleus	0.09	none
TaMAPKK8	TraesCS4B02G048900.1	37173459	37174463	334	35.92	8.62	Nucleus	-0.106	none
TaMAPKK9	TraesCS3B02G066300.1	39545184	39546200	338	36.26	7.72	Nucleus	-0.052	none
TaMAPKK11	TraesCS4D02G048800.1	25193488	25194492	334	35.95	7.76	Nucleus	-0.096	none
TaMAPKK12	TraesCS4D02G048500.1	25159546	25160577	343	36.26	8.76	Nucleus	0.077	none
TaMAPKK13	TraesCS5D02G549600.1	556549608	556556744	523	58.42	5.71	Nucleus	-0.228	none

TaMAPKK14			TraesCS4A02G265900.1	578007015	578008028	337	36.11	7.15	Nucleus	-0.061	none
TaMAPKK15			TraesCS4A02G266000.1	578175110	578176265	337	36.26	8.21	Nucleus	-0.07	none
TaMAPKK16			TraesCS4A02G266100.1	578233482	578234994	334	35.77	8.84	Nucleus	-0.082	none
TaMAPKK17			TraesCS4A02G266200.1	578382450	578383463	337	35.60	8.88	Nucleus	0.098	none
TaMAPKK18			TraesCS5B02G122600.1	220811093	220817726	476	53.82	5.74	Nucleus	-0.311	none
TaMAPKK	**MEKK**	TaMEKK1	TraesCS2A	663319194	663325688	827	89.98	9.73	Nucleus	-0.671	none
TaMAPKK2		TaMEKK2	TraesCS4D02G027600.1	12408039	12412107	570	63.22	8.89	Nucleus	-0.375	none
TaMAPKK3		TaMEKK3	TraesCS4B02G210600.2	449128767	449134380	705	77.22	6.53	Nucleus	-0.286	none
TaMAPKK4		TaMEKK4	TraesCS6A02G245000.3	456595800	456610297	878	94.93	9.94	Nucleus	-0.624	none
TaMAPKK4-1		TaMEKK4-1	TraesCS6B02G279300.1	504591712	504606525	786	84.73	9.83	Nucleus	-0.606	none
TaMAPKK5		TaMEKK5	TraesCS2A02G199700.1	172214508	172218294	543	60.97	6.59	Nucleus	-0.452	none
TaMAPKK7		TaMEKK7	TraesCS3B02G289500.1	464615550	464617173	473	49.83	4.64	Nucleus	-0.147	none
TaMAPKK8		TaMEKK8	TraesCS3B02G288100.1	462866244	462867785	477	51.60	5.26	Nucleus	-0.138	none

TaMAPKKK9	TaMEKK9	TraesCS3B02G288300.1	462890522	462891675	366	38.24	4.55	Nucleus	-0.172	none
TaMAPKKK10	TaMEKK10	TraesCS4D02G211300.2	363679689	363686267	710	77.70	6.55	Nucleus	-0.295	none
TaMAPKKK11	TaMEKK11	TraesCS5D02G475900.1	515114772	515119147	534	59.81	6.43	Nucleus	-0.45	none
TaMAPKKK12	TaMEKK12	TraesCS4A02G093800.2	101741028	101746878	710	77.72	6.55	Nucleus	-0.306	none
TaMAPKKK14	TaMEKK14	TraesCS5A02G118200.1	242531195	242538426	553	62.10	6.37	Nucleus	-0.344	none
TaMAPKKK15	TaMEKK15	TraesCS5A02G463100.2	643328443	643333346	534	59.83	6.43	Nucleus	-0.448	none
TaMAPKKK16	TaMEKK16	TraesCS5B02G474500.1	647940529	647944797	535	59.93	6.31	Nucleus	-0.464	none
TaMAPKKK17	TaMEKK17	TraesCS5A02G200800.1	406667546	406672895	682	74.39	6.29	Nucleus	-0.559	none
TaMAPKKK18	TaMEKK18	TraesCS2B02G526200.3	720473250	720486136	1324	146.41	5.83	Nucleus	-0.298	none
TaMAPKKK20	TaMEKK20	TraesCS2A02G498000.3	728546777	728559173	1323	146.44	5.86	Nucleus	-0.301	none
TaMAPKKK21	TaMEKK21	TraesCS6A02G149900.1	133414193	133419353	543	61.18	6.83	Nucleus	-0.552	none
TaMAPKKK22	TaMEKK22	TraesCS5A02G392500.1	588731002	588738966	825	89.69	5.31	Nucleus	-0.504	none

TaMAPKK K23		TaMEKK23	TraesCS6D02G139200.1	108447173	108452128	509	57.60	6.71	Nucleus	-0.504	none
TaMAPKK K24		TaMEKK24	TraesCS5B02G199400.1	359309183	359314533	680	74.21	6.29	Nucleus	-0.554	none
TaMAPKK K25		TaMEKK25	TraesCS5B02G196400.1	354227906	354229839	518	56.47	6.01	Nucleus	-0.16	none
TaMAPKK K26		TaMEKK26	TraesCS2D02G093700.1	45528501	45538616	1335	146.06	8.01	Nucleus	-0.051	none
TaMAPKK K27		TaMEKK27	TraesCS2B02G110500.1	72570247	72580245	1335	146.06	8.01	Nucleus	-0.049	none
TaMAPKK K28		TaMEKK28	TraesCS2A02G095300.1	48855363	48865404	1332	145.87	8.09	Nucleus	-0.042	none
TaMAPKK K29		TaMEKK29	TraesCS5D02G206500.1	312603930	312609217	682	74.38	6.29	Nucleus	-0.547	none
TaMAPKK K30	**ZIK**	TaZIK1	TraesCS5D02G145100.1	231743581	231750603	640	70.63	5.71	Nucleus	-0.606	none
TaMAPKK K31		TaZIK2	TraesCS6D02G236400.1	332952908	332957161	616	68.85	4.86	Nucleus	-0.325	none
TaMAPKK K32		TaZIK3	TraesCS2A02G195900.2	165847896	165850719	701	78.40	5.53	Nucleus	-0.506	none
TaMAPKK K33		TaZIK4	TraesCS6B02G270400.1	487199066	487203196	617	69.03	4.89	Nucleus	-0.367	none
TaMAPKK K34		TaZIK5	TraesCS2D02G197600.1	145361837	145364153	319	35.94	6.46	Nucleus	-0.443	none

TaMAPKKK36		TaZIK7	TraesCS2B02G223600.1	213252738	213256205	703	78.63	5.61	Cell membrane. Nucleus	-0.529	none
TaMAPKKK37		TaZIK8	TraesCS2B02G216800.1	202919276	202921526	322	36.36	6.41	Nucleus	-0.466	none
TaMAPKKK38		TaZIK9	TraesCS1D02G026200.2	10715309	10722269	615	68.76	5.04	Nucleus	-0.631	none
TaMAPKKK39		TaZIK10	TraesCS6A02G255100.2	472517606	472521858	616	68.94	4.82	Nucleus	-0.35	none
TaMAPKKK40		TaZIK11	TraesCS5B02G146100.1	273714479	273721500	640	70.50	5.55	Nucleus	-0.6	none
TaMAPKKK41	**Raf**	**TaRaf1**	TraesCS6A02G172600.1	183765974	183767047	341	38.49	8.87	Nucleus	-0.263	none
TaMAPKKK42		**TaRaf2**	TraesCSU02G203100.1	302673848	302675171	281	31.63	8.28	Nucleus	-0.288	none
TaMAPKKK43		**TaRaf3**	TraesCS3B02G110300.1	76121219	76122267	146	16.52	6.20	Nucleus	-0.304	none
TaMAPKKK44		**TaRaf4**	TraesCS2D02G003900.1	2448415	2452565	666	73.48	6.20	Nucleus	-0.047	yes
TaMAPKKK45		**TaRaf5**	TraesCS3D02G273200.1	378922472	378925538	601	67.50	9.28	Nucleus	-0.586	none
TaMAPKKK46		**TaRaf6**	TraesCS2D02G050700.1	18755065	18763417	842	93.01	6.62	Chloroplast. Nucleus.	-0.078	yes
TaMAPKKK47		**TaRaf7**	TraesCS7D02G022200.1	10480193	10483005	454	50.76	5.30	Cell membrane. Cytoplasm. Nucleus.	-0.418	none

TaMAPKKK48	**TaRaf8**	TraesCS7D02G079100.1	46798827	46802577	590	66.29	5.16	Nucleus	-0.153	yes
TaMAPKKK50	**TaRaf10**	TraesCS7D02G099200.2	59413722	59416749	662	73.14	5.78	Cell membrane. Nucleus.	-0.05	yes
TaMAPKKK51	**TaRaf11**	TraesCS7D02G230200.1	191491327	191494118	411	45.94	7.61	Cell membrane. Nucleus.	-0.084	yes
TaMAPKKK52	**TaRaf12**	TraesCS7D02G230500.1	191554886	191558690	421	46.94	8.84	Cell membrane. Nucleus.	-0.037	yes
TaMAPKKK53	**TaRaf13**	TraesCS1B02G372400.1	603091105	603093899	804	88.12	5.43	Nucleus	-0.064	yes
TaMAPKKK54	**TaRaf14**	TraesCS7D02G503600.1	608808978	608814007	714	79.66	6.28	Chloroplast. Cytoplasm.	-0.306	yes
TaMAPKKK56	**TaRaf16**	TraesCS3A02G039100.1	20834670	20837048	483	54.10	7.10	Cell membrane.	-0.083	yes
TaMAPKKK	**TaRaf17**	TraesCS3D	15371189	15373968	644	70.45	7.43	Nucleus. Cell	0.016	yes
TaMAPKKK58	**TaRaf18**	TraesCS3B02G259800.1	417712407	417716508	385	42.62	7.57	Nucleus	-0.375	none
TaMAPKKK59	**TaRaf19**	TraesCS2A02G216900.1	203718668	203726292	669	72.89	6.26	Nucleus	-0.092	yes
TaMAPKKK60	**TaRaf20**	TraesCS2A02G217000.1	203756927	203768418	687	76.38	5.89	Nucleus	-0.231	yes
TaMAPKKK	**TaRaf21**	TraesCS7D	498527161	498529159	396	44.67	9.19	Nucleus	-0.357	none
TaMAPKKK62	**TaRaf22**	TraesCS4A02G313900.1	604208153	604212003	1095	118.89	6.14	Cell membrane.	0.239	yes

TaMAPKKK63	**TaRaf23**	TraesCS4A02G383000.1	660923030	660926301	607	67.95	6.00	Nucleus	0.011	yes
TaMAPKKK64	**TaRaf24**	TraesCS4A02G465900.2	729138021	729142814	722	80.84	5.28	Nucleus	-0.2	none
TaMAPKK	**TaRaf24-1**	TraesCS4A	728455965	728458756	168	18.72	5.85	Nucleus	-0.07	none
TaMAPKKK65	**TaRaf25**	TraesCS4A02G465000.1	728517691	728524395	741	82.77	5.79	Nucleus	-0.107	none
TaMAPKKK66	**TaRaf26**	TraesCS1D02G273800.2	368278445	368281075	421	46.94	8.84	Cell membrane. Nucleus.	-0.037	yes
TaMAPKKK67	**TaRaf27**	TraesCS1D02G360600.1	443716098	443718946	804	88.21	5.44	Nucleus	-0.071	yes
TaMAPKKK68	**TaRaf28**	TraesCS1D02G431400.1	481556383	481559743	710	76.79	6.00	Nucleus	-0.097	yes
TaMAPKKK69	**TaRaf29**	TraesCS2D02G588200.1	645705545	645712161	597	66.95	5.48	Nucleus	-0.416	none
TaMAPKKK70	**TaRaf30**	TraesCS1D02G423800.1	478411677	478415662	374	41.10	7.05	Cytoplasm. Nucleus.	-0.299	none
TaMAPKKK71	**TaRaf31**	TraesCS6A02G004500.1	1877233	1883101	794	90.75	5.59	Nucleus	-0.357	none
TaMAPKKK72	**TaRaf32**	TraesCS3A02G003900.1	1924585	1928794	687	72.42	6.26	Nucleus	-0.429	yes
TaMAPKKK73	**TaRaf33**	TraesCS3A02G039200.1	20841799	20844493	682	73.97	7.78	Cell membrane. Nucleus.	0.019	yes
TaMAPKKK74	**TaRaf34**	TraesCS3A02G039400.1	20931615	20935238	632	69.75	8.19	Chloroplast.	-0.007	yes

TaMAPKKK75	**TaRaf35**	TraesCS3A02G096500.1	61445227	61448967	653	69.90	8.98	Chloroplast.	0.034	yes
TaMAPKKK76	**TaRaf36**	TraesCS3A02G246100.1	461839239	461841696	813	89.58	6.40	Chloroplast.	-0.155	yes
TaMAPKKK78	**TaRaf38**	TraesCS3D02G501400.1	590305938	590309917	716	79.31	5.85	Cell membrane. Nucleus.	-0.111	yes
TaMAPKKK79	**TaRaf39**	TraesCS3A02G493900.1	720213465	720223668	704	78.64	5.75	Cell membrane.	-0.082	yes
TaMAPKKK80	**TaRaf40**	TraesCS2A02G217600.1	204885066	204888307	477	50.96	8.00	Nucleus	-0.255	yes
TaMAPKKK81	**TaRaf41**	TraesCS5A02G292500.1	502584783	502592915	775	88.02	6.28	Nucleus	-0.284	none
TaMAPKKK82	**TaRaf42**	TraesCSU02G072500.1	63290513	63296324	840	92.42	5.99	Cell membrane. Nucleus.	-0.135	yes
TaMAPKKK83	**TaRaf43**	TraesCS5A02G351500.1	554181335	554183861	310	34.93	7.61	Nucleus	-0.235	none
TaMAPKKK84	**TaRaf44**	TraesCS5A02G351000.1	553490210	553499037	848	93.63	7.05	Cell membrane. Nucleus.	-0.176	yes
TaMAPKKK85	**TaRaf45**	TraesCS5A02G352000.1	554234499	554238433	836	92.61	7.09	Nucleus	-0.204	yes
TaMAPKKK86	**TaRaf46**	TraesCS5D02G386800.1	456607644	456612314	373	41.35	8.53	Nucleus	-0.355	none
TaMAPKKK88	**TaRaf48**	TraesCS1A02G422800.1	578196408	578199395	690	75.15	5.95	Nucleus	-0.066	yes

TaMAPKKK90	**TaRaf50**	TraesCS7A02G152100.1	105511739	105513870	362	40.41	7.04	Nucleus	-0.274	none
TaMAPKKK91	**TaRaf51**	TraesCS4D02G089300.1	64706830	64719914	755	85.85	6.45	Nucleus	-0.263	none
TaMAPKKK92	**TaRaf52**	TraesCS5B02G337300.1	520868787	520875955	598	65.62	5.78	Nucleus	-0.393	none
TaMAPKKK93	**TaRaf53**	TraesCS5D02G018800.1	11301422	11304114	645	72.62	6.00	Nucleus	-0.296	yes
TaMAPKKK94	**TaRaf54**	TraesCS5B02G012000.1	11764765	11774531	1017	106.30	4.67	Cell membrane	0.122	yes
TaMAPKKK95	**TaRaf55**	TraesCS5B02G204900.1	373215862	373220653	439	48.20	9.72	Nucleus	-0.515	none
TaMAPKKK96	**TaRaf56**	TraesCS5B02G292000.2	477512642	477518372	788	88.84	8.46	Nucleus	-0.263	none
TaMAPKKK97	**TaRaf57**	TraesCS5B02G353800.1	533375142	533376026	225	25.29	6.52	Nucleus	-0.145	none
TaMAPKKK98	**TaRaf58**	TraesCS5D02G482000.1	519649924	519653802	418	45.49	8.00	Nucleus	-0.276	none
TaMAPKKK99	**TaRaf59**	TraesCS3A02G001500.1	1028128	1031945	365	40.72	9.31	Nucleus	-0.247	none
TaMAPKKK100	**TaRaf60**	TraesCS3A02G274000.1	502835637	502839127	601	67.35	9.31	Nucleus	-0.593	none
TaMAPKKK101	**TaRaf61**	TraesCS5D02G019400.1	11949643	11952687	1014	105.97	6.33	Cell membrane	0.123	yes

TaMAPKKK102	**TaRaf62**	TraesCS7D02G474700.1	587069445	587072872	425	47.20	6.43	Nucleus	-0.185	none
TaMAPKKK103	**TaRaf63**	TraesCS7A02G326700.1	474729873	474737049	536	60.15	5.48	Nucleus	-0.332	none
TaMAPKKK104	**TaRaf64**	TraesCS1D02G273600.1	367915349	367918308	681	73.38	6.00	Nucleus	-0.117	none
TaMAPKK	**TaRaf64-1**	TraesCS1B	492327989	492331022	678	73.33	6.38	Nucleus	-0.141	yes
TaMAPKKK105	**TaRaf65**	TraesCS3A02G045200.1	24205959	24209204	399	43.36	6.72	Nucleus	-0.193	none
TaMAPKKK106	**TaRaf66**	TraesCS4A02G456900.1	722287491	722294625	647	71.63	6.20	Cell membrane. Nucleus	-0.133	yes
TaMAPKKK107	**TaRaf67**	TraesCS7A02G032700.1	13832914	13835159	480	54.35	8.59	Cell membrane. Nucleus	-0.128	yes
TaMAPKKK108	**TaRaf68**	TraesCS3D02G023600.1	7496834	7501605	830	91.83	7.19	Chloroplast. Nucleus	-0.208	yes
TaMAPKKK109	**TaRaf69**	TraesCS2D02G219800.1	186995581	186997635	684	74.88	6.00	Cell membrane. Cytoplasm. Nucleus	-0.064	yes
TaMAPKKK110	**TaRaf70**	TraesCS4B02G289100.1	574169282	574171714	680	72.78	6.51	Nucleus	0.061	yes
TaMAPKKK111	**TaRaf71**	TraesCS3A02G315100.1	556354721	556361160	810	89.49	6.45	Nucleus	-0.054	yes
TaMAPKKK112	**TaRaf72**	TraesCS5D02G359500.1	438720779	438724678	846	93.64	6.60	Nucleus	-0.159	yes

TaMAPKKK113	**TaRaf73**	TraesCS3D02G108500.1	61696216	61699845	669	72.21	8.21	Nucleus	-0.039	yes
TaMAPKKK115	**TaRaf75**	TraesCS3A02G229800.1	429615380	429618754	720	74.97	8.84	Nucleus	-0.402	yes
TaMAPKKK116	**TaRaf76**	TraesCS1B02G454000.2	670025362	670028705	663	72.92	7.09	Nucleus	-0.105	yes
TaMAPKKK117	**TaRaf77**	TraesCS3D02G097000.1	48958881	48962702	648	69.64	8.85	Chloroplast. Nucleus	0.04	yes
TaMAPKKK119	**TaRaf79**	TraesCS2A02G577000.1	771236940	771242936	558	62.29	5.51	Nucleus	-0.427	none
TaMAPKKK120	**TaRaf80**	TraesCS4A02G317600.1	606796989	606806238	674	73.40	8.38	Chloroplast. Nucleus	-0.119	yes
TaMAPKKK121	**TaRaf81**	TraesCS2D02G066900.1	27998176	28002775	997	108.03	6.01	Cell membrane	0.119	yes
TaMAPKKK122	**TaRaf82**	TraesCS2A02G214000.1	199713870	199715915	681	74.62	6.07	Cytoplasm. Extracell. Nucleus	-0.088	yes
TaMAPKKK123	**TaRaf83**	TraesCS5D02G358700.1	438557604	438562390	839	92.71	6.63	Nucleus	-0.161	yes
TaMAPKKK	**TaRaf83-1**	TraesCS5D	438454390	438456577	457	50.56	8.22	Nucleus	-0.216	yes
TaMAPKKK125	**TaRaf85**	TraesCS7D02G153800.1	101736527	101739826	826	90.93	6.86	Nucleus	-0.133	yes
TaMAPKKK126	**TaRaf86**	TraesCSU02G011500.1	15720917	15724380	644	72.97	6.33	Nucleus	0.023	yes
TaMAPKKK127	**TaRaf87**	TraesCS6D02G339600.1	438942402	438946634	928	104.30	5.77	Chloroplast. Cytoplasm. Nucleus	-0.412	none

TaMAPKKK128	**TaRaf88**	TraesCS1B02G446500.1	666535726	666539402	372	40.91	7.54	Nucleus	-0.281	none
TaMAPKKK129	**TaRaf89**	TraesCS6B02G320800.1	567847786	567851826	986	108.30	6.21	Cell membrane	0.086	yes
TaMAPKKK130	**TaRaf90**	TraesCS7A02G044600.1	20510405	20512958	405	46.16	6.25	Nucleus	-0.169	yes
TaMAPKKK131	**TaRaf91**	TraesCS6B02G215100.2	290710332	290718338	860	93.43	5.41	Nucleus	-0.228	none
TaMAPKKK132	**TaRaf92**	TraesCS5B02G353600.1	533033821	533038318	846	93.47	5.85	Nucleus	-0.136	yes
TaMAPKKK133	**TaRaf93**	TraesCS1D02G004300.1	2108471	2112601	656	68.93	9.64	Nucleus	-0.394	yes
TaMAPKKK134	**TaRaf94**	TraesCS5D02G547500.1	555555819	555559333	765	83.36	6.02	Cell membrane	0.191	yes
TaMAPKKK135	**TaRaf95**	TraesCS2D02G598800.1	650601306	650604027	499	55.24	5.84	Nucleus	-0.286	none
TaMAPKKK136	**TaRaf96**	TraesCS2B02G241600.1	245686727	245691716	675	72.70	5.94	Nucleus	0.015	yes
TaMAPKKK137	**TaRaf97**	TraesCS3D02G472000.1	574118271	574125655	746	80.84	5.82	Nucleus	-0.239	yes
TaMAPKKK139	**TaRaf99**	TraesCS3A02G493500.1	719931689	719937693	711	79.40	6.02	Cell membrane	-0.137	yes
TaMAPKKK140	**TaRaf100**	TraesCS5D02G097900.1	108527463	108535238	753	83.11	7.94	Nucleus	-0.646	none

TaMAPKKK141	**TaRaf101**	TraesCS7D02G000800.1	981342	987541	965	107.83	6.39	Cytoplasm. Nucleus	-0.301	yes
TaMAPKKK142	**TaRaf102**	TraesCS2A02G032200.1	14729078	14730418	323	36.46	5.40	Nucleus	-0.275	none
TaMAPKKK144	**TaRaf104**	TraesCS3D02G501100.1	590199543	590205678	713	79.61	5.82	Cell membrane. Nucleus	-0.134	yes
TaMAPKKK145	**TaRaf105**	TraesCS2B02G242300.1	246113761	246119395	669	72.81	6.05	Cell membrane. Nucleus	-0.096	yes
TaMAPKKK146	**TaRaf106**	TraesCS2B02G241400.1	245317184	245320539	667	72.23	6.12	Chloroplast. Nucleus	0.058	yes
TaMAPKKK147	**TaRaf107**	TraesCS2A02G216600.1	203325595	203329022	668	73.47	8.53	Nucleus	-0.128	yes
TaMAPKKK148	**TaRaf108**	TraesCS1A02G003900.1	2391500	2393497	341	39.38	6.23	Nucleus	-0.331	none
TaMAPKKK150	**TaRaf110**	TraesCS3B02G008600.2	4323030	4327039	686	71.89	6.26	Nucleus	-0.438	yes
TaMAPKKK151	**TaRaf111**	TraesCS3B02G123800.1	96812311	96816428	577	63.83	5.79	Nucleus	-0.202	none
TaMAPKKK152	**TaRaf112**	TraesCS3B02G259100.1	416805836	416810951	698	72.98	5.89	Nucleus	-0.449	yes
TaMAPKKK153	**TaRaf113**	TraesCS3B02G351800.1	561590530	561591713	302	33.43	6.25	Nucleus	0.002	none
TaMAPKKK154	**TaRaf114**	TraesCS3B02G478400.1	726770459	726780334	770	87.44	5.95	Nucleus	-0.318	none

TaMAPKKK155		**TaRaf115**	TraesCS6B02G217100.1	298820612	298821648	318	36.07	5.20	Nucleus	-0.025	none
TaMAPKKK1			TraesCS1A02G181900.1	328244901	328253761	714	79.25	6.11	Nucleus	-0.543	none
TaMAPKKK2			TraesCS1B02G199100.2	357209635	357218446	724	80.56	6.27	Nucleus	-0.537	none
TaMAPKKK3			TraesCS1D02G185000.2	255824893	255833850	731	81.45	6.30	Nucleus	-0.555	none
TaMAPKKK4			TraesCS2A02G233400.1	278445853	278467939	692	76.02	6.97	Nucleus	-0.665	none
TaMAPKKK5			TraesCS2B02G249900.1	259009416	259028116	692	76.08	7.00	Nucleus	-0.672	none
TaMAPKKK6			TraesCS2D02G232200.1	204990636	205004380	692	76.09	7.00	Nucleus	-0.654	none
TaMAPKKK7			TraesCS4B02G395600.1	670201548	670229484	629	69.54	9.51	Nucleus	-0.468	none
TaMAPKKK8			TraesCS4B02G398400.3	672296531	672306045	744	82.04	6.52	Nucleus	-0.471	none
TaMAPKKK9			TraesCS5A02G187400.1	389131980	389133955	518	56.50	5.80	Nucleus	-0.191	none
TaMAPKKK10			TraesCS5A02G392500.1	588731002	588738966	825	89.69	5.31	Nucleus	-0.504	none
TaMAPKKK11			TraesCS5A02G556400.5	707802354	707810757	742	82.08	6.89	Nucleus	-0.448	none

TaMAPKKKK12	TraesCS5B02G397300.1	574952105	574960822	858	93.17	5.31	Nucleus	-0.522	none
TaMAPKKKK13	TraesCS5D02G203600.1	308863403	308865114	518	56.49	5.75	Nucleus	-0.201	none
TaMAPKKKK14	TraesCS5D02G402300.1	468166467	468175209	822	89.42	5.24	Nucleus	-0.519	none
TaMAPKKKK15	TraesCS6A02G149900.1	133414193	133419353	543	61.18	6.83	Nucleus	-0.552	none
TaMAPKKKK16	TraesCS6A02G353400.1	585174093	585176268	348	38.89	8.97	Nucleus	-0.25	none
TaMAPKKKK17	TraesCS6A02G353500.1	585187497	585195069	672	74.09	6.39	Nucleus	-0.444	none
TaMAPKKKK18	TraesCS6B02G177800.1	195805196	195810462	542	61.16	7.02	Nucleus	-0.579	none
TaMAPKKKK19	TraesCS6B02G386100.1	660664103	660676384	695	76.96	6.31	Nucleus	-0.415	none
TaMAPKKKK20	TraesCS6D02G335800.1	436870500	436887069	695	76.92	6.26	Nucleus	-0.413	none
TaMAPKKKK21	TraesCS6D02G139200.1	108447173	108452128	509	57.60	6.71	Nucleus	-0.504	none
TaMAPKKKK22	TraesCS7A02G232300.1	203511879	203521492	700	77.96	6.18	Nucleus	-0.559	none
TaMAPKKKK23	TraesCS7B02G130700.1	157674223	157684150	700	77.91	6.11	Nucleus	-0.578	none

TaMAPKKK24	TraesCS7D02G232400.1	193922055	193930244	709	78.76	5.99	Nucleus	-0.417	none
TaMAPKKK25	TraesCSU02G115300.1	99866931	99876736	741	81.70	6.34	Nucleus	-0.486	none

1(A,B,D)chromosomes	**TaMAPK41**			TraesCS1A02G402400.2
	TaMAPK42			TraesCS1A02G415300.1
	TaMAPK43			TraesCS1A02G421000.1
	TaMAPK11			TraesCS1A02G086500.1
	TaMAPK14			TraesCS1A02G184500.1
	TaMAPK27			TraesCS1B02G104900.1
	TaMAPK28			TraesCS1B02G192600.3
	TaMAPK29			TraesCS1B02G431400.2
	TaMAPK4			TraesCS1D02G088000.2
	TaMAPK5			TraesCS1D02G422800.1
	TaMAPK33			TraesCS1D02G410100.1
	TaMAPK34			TraesCS1D02G428900.1
3(A,B,D)chromosomes	**TaMAPK39**			TraesCS3A02G242100.1
	TaMAPK40			TraesCS3A02G231700.1
	TaMAPK16			TraesCS3B02G270200.1
	TaMAPK38			TraesCS3B02G256700.1
	TaMAPK8			TraesCS3D02G225600.1
	TaMAPK23			TraesCS3D02G221700.1
	TaMAPK24			TraesCS3D02G242200.2
4(A,B,D)chromosomes	**TaMAPK31**			TraesCS4A02G434800.1
	TaMAPK2			TraesCS4A02G336800.2
	TaMAPK3			TraesCS4A02G106400.1
	TaMAPK25			TraesCS4D02G198600.1
5(A,B,D)chromosomes	**TaMAPK50**			TraesCS5B02G536500.1
	TaMAPK26			TraesCS5D02G534000.2
6(A,B,D)chromosomes	**TaMAPK35**			TraesCS6A02G099600.1
	TaMAPK36			TraesCS6A02G118100.1
	TaMAPK37			TraesCS6A02G269400.1
	TaMAPK17			TraesCS6B02G127800.1

6(A,B,D)chromosomes	**TaMAPK1**			TraesCS6B02G296700.2
	TaMAPK10			TraesCS6B02G146300.1
	TaMAPK13			TraesCS6D02G245500.3
	TaMAPK44			TraesCS6D02G082900.2

7(A,B,D)chromosomes	**TaMAPK19**			TraesCS7A02G111300.1
	TaMAPK12			TraesCS7A02G422500.1
	TaMAPK30			TraesCS7A02G335300.2
	TaMAPK46			TraesCS7A02G049000.1
	TaMAPK47			TraesCS7A02G029700.1
	TaMAPK49			TraesCS7A02G410700.2
	TaMAPK52			TraesCS7B02G246900.3
	TaMAPK53			TraesCS7B02G309900.1
	TaMAPK54			TraesCS7B02G322900.1
	TaMAPK6			TraesCS7B02G009200.1
	TaMAPK7			TraesCS7D02G342800.3
	TaMAPK18			TraesCS7D02G044100.1
	TaMAPK20			TraesCS7D02G403700.1
	TaMAPK22			TraesCS7D02G414900.1

3(A,B,D)chromosomes	**TaMAPKK9**			TraesCS3B02G066300.1

4(A,B,D)chromosomes	**TaMAPKK14**			TraesCS4A02G265900.1
	TaMAPKK15			TraesCS4A02G266000.1
	TaMAPKK16			TraesCS4A02G266100.1
	TaMAPKK17			TraesCS4A02G266200.1
	TaMAPKK5			TraesCS4B02G049000.1
	TaMAPKK6			TraesCS4B02G048100.1
	TaMAPKK7			TraesCS4B02G048600.1
	TaMAPKK8			TraesCS4B02G048900.1
	TaMAPKK11			TraesCS4D02G048800.1
	TaMAPKK12			TraesCS4D02G048500.1

5(A,B,D)chromosomes	**TaMAPKK4**			TraesCS5A02G122700.4
	TaMAPKK2			TraesCS5B02G565100.3
	TaMAPKK18			TraesCS5B02G122600.1
	TaMAPKK3			TraesCS5D02G130900.2
	TaMAPKK13			TraesCS5D02G549600.1

6(A,B,D)chromosomes	**TaMAPKK1**			TraesCS6D02G328800.1

2(A,B,D)chromosomes	**TaMAPKKK5**	**MEKK**	TaMEKK5	TraesCS2A02G199700.1
	TaMAPKKK1		TaMEKK1	TraesCS2A02G407600.1
	TaMAPKKK28		TaMEKK28	TraesCS2A02G095300.1
	TaMAPKKK20		TaMEKK20	TraesCS2A02G498000.3
	TaMAPKKK27		TaMEKK27	TraesCS2B02G110500.1
	TaMAPKKK18		TaMEKK18	TraesCS2B02G526200.3
	TaMAPKKK26		TaMEKK26	TraesCS2D02G093700.1
3(A,B,D)chromosomes	**TaMAPKKK7**		TaMEKK7	TraesCS3B02G289500.1
	TaMAPKKK8		TaMEKK8	TraesCS3B02G288100.1
	TaMAPKKK9		TaMEKK9	TraesCS3B02G288300.1
4(A,B,D)chromosomes	**TaMAPKKK12**		TaMEKK12	TraesCS4A02G093800.2
	TaMAPKKK3		TaMEKK3	TraesCS4B02G210600.2
	TaMAPKKK2		TaMEKK2	TraesCS4D02G027600.1
	TaMAPKKK10		TaMEKK10	TraesCS4D02G211300.2
5(A,B,D)chromosomes	**TaMAPKKK17**		TaMEKK17	TraesCS5A02G200800.1
	TaMAPKKK22		TaMEKK22	TraesCS5A02G392500.1
	TaMAPKKK14		TaMEKK14	TraesCS5A02G118200.1
	TaMAPKKK15		TaMEKK15	TraesCS5A02G463100.2
	TaMAPKKK16		TaMEKK16	TraesCS5B02G474500.1
	TaMAPKKK24		TaMEKK24	TraesCS5B02G199400.1

	TaMAPKKK25		TaMEKK25	TraesCS5B02G196400.1
	TaMAPKKK11		TaMEKK11	TraesCS5D02G475900.1
	TaMAPKKK29		TaMEKK29	TraesCS5D02G206500.1
6(A,B,D)chromosomes	**TaMAPKKK21**		TaMEKK21	TraesCS6A02G149900.1
	TaMAPKKK4		TaMEKK4	TraesCS6A02G245000.3
	TaMAPKKK4-1		TaMEKK4-1	TraesCS6B02G279300.1
	TaMAPKKK23		TaMEKK23	TraesCS6D02G139200.1
1(A,B,D)chromosomes	**TaMAPKKK38**	**ZIK**	TaZIK9	TraesCS1D02G026200.2
2(A,B,D)chromosomes	**TaMAPKKK32**		TaZIK3	TraesCS2A02G195900.2
	TaMAPKKK36		TaZIK7	TraesCS2B02G223600.1
	TaMAPKKK37		TaZIK8	TraesCS2B02G216800.1
	TaMAPKKK34		TaZIK5	TraesCS2D02G197600.1
5(A,B,D)chromosomes	**TaMAPKKK40**		TaZIK11	TraesCS5B02G146100.1
	TaMAPKKK30		TaZIK1	TraesCS5D02G145100.1
6(A,B,D)chromosomes	**TaMAPKKK39**		TaZIK10	TraesCS6A02G255100.2
	TaMAPKKK33		TaZIK4	TraesCS6B02G270400.1
	TaMAPKKK31		TaZIK2	TraesCS6D02G236400.1
1(A,B,D)chromosomes	**TaMAPKKK148**	**Raf**	**TaRaf108**	TraesCS1A02G003900.1
	TaMAPKKK88		**TaRaf48**	TraesCS1A02G422800.1
	TaMAPKKK53		**TaRaf13**	TraesCS1B02G372400.1
	TaMAPKKK104-1		**TaRaf64-1**	TraesCS1B02G283400.1
	TaMAPKKK128		**TaRaf88**	TraesCS1B02G446500.1
	TaMAPKKK116		**TaRaf76**	TraesCS1B02G454000.2
	TaMAPKKK104		**TaRaf64**	TraesCS1D02G273600.1
	TaMAPKKK66		**TaRaf26**	TraesCS1D02G273800.2
	TaMAPKKK67		**TaRaf27**	TraesCS1D02G360600.1
	TaMAPKKK68		**TaRaf28**	TraesCS1D02G431400.1

	TaMAPKKK70	**TaRaf30**	TraesCS1D02G423800.1
	TaMAPKKK133	**TaRaf93**	TraesCS1D02G004300.1
2(A,B,D)chromosomes	**TaMAPKKK119**	**TaRaf79**	TraesCS2A02G577000.1
	TaMAPKKK80	**TaRaf40**	TraesCS2A02G217600.1
	TaMAPKKK59	**TaRaf19**	TraesCS2A02G216900.1
	TaMAPKKK60	**TaRaf20**	TraesCS2A02G217000.1
	TaMAPKKK147	**TaRaf107**	TraesCS2A02G216600.1
	TaMAPKKK142	**TaRaf102**	TraesCS2A02G032200.1
	TaMAPKKK122	**TaRaf82**	TraesCS2A02G214000.1
	TaMAPKKK145	**TaRaf105**	TraesCS2B02G242300.1
	TaMAPKKK146	**TaRaf106**	TraesCS2B02G241400.1
	TaMAPKKK136	**TaRaf96**	TraesCS2B02G241600.1
	TaMAPKKK69	**TaRaf29**	TraesCS2D02G588200.1
	TaMAPKKK135	**TaRaf95**	TraesCS2D02G598800.1
	TaMAPKKK44	**TaRaf4**	TraesCS2D02G003900.1
	TaMAPKKK46	**TaRaf6**	TraesCS2D02G050700.1
	TaMAPKKK109	**TaRaf69**	TraesCS2D02G219800.1
	TaMAPKKK121	**TaRaf81**	TraesCS2D02G066900.1
	TaMAPKKK111	**TaRaf71**	TraesCS3A02G315100.1
	TaMAPKKK105	**TaRaf65**	TraesCS3A02G045200.1
	TaMAPKKK99	**TaRaf59**	TraesCS3A02G001500.1
	TaMAPKKK100	**TaRaf60**	TraesCS3A02G274000.1
	TaMAPKKK115	**TaRaf75**	TraesCS3A02G229800.1
	TaMAPKKK79	**TaRaf39**	TraesCS3A02G493900.1
	TaMAPKKK72	**TaRaf32**	TraesCS3A02G003900.1
	TaMAPKKK73	**TaRaf33**	TraesCS3A02G039200.1
	TaMAPKKK74	**TaRaf34**	TraesCS3A02G039400.1
	TaMAPKKK75	**TaRaf35**	TraesCS3A02G096500.1
	TaMAPKKK76	**TaRaf36**	TraesCS3A02G246100.1
	TaMAPKKK56	**TaRaf16**	TraesCS3A02G039100.1
	TaMAPKKK139	**TaRaf99**	TraesCS3A02G493500.1

3(A,B,D)chromosomes	**TaMAPKKK150**	**TaRaf110**	TraesCS3B02G008600.2
	TaMAPKKK151	**TaRaf111**	TraesCS3B02G123800.1
	TaMAPKKK152	**TaRaf112**	TraesCS3B02G259100.1
	TaMAPKKK153	**TaRaf113**	TraesCS3B02G351800.1
	TaMAPKKK154	**TaRaf114**	TraesCS3B02G478400.1
	TaMAPKKK43	**TaRaf3**	TraesCS3B02G110300.1
	TaMAPKKK58	**TaRaf18**	TraesCS3B02G259800.1
	TaMAPKKK144	**TaRaf104**	TraesCS3D02G501100.1
	TaMAPKKK137	**TaRaf97**	TraesCS3D02G472000.1
	TaMAPKKK45	**TaRaf5**	TraesCS3D02G273200.1
	TaMAPKKK57	**TaRaf17**	TraesCS3D02G040600.1
	TaMAPKKK78	**TaRaf38**	TraesCS3D02G501400.1
	TaMAPKKK113	**TaRaf73**	TraesCS3D02G108500.1
	TaMAPKKK117	**TaRaf77**	TraesCS3D02G097000.1
	TaMAPKKK108	**TaRaf68**	TraesCS3D02G023600.1
4(A,B,D)chromosomes	**TaMAPKKK106**	**TaRaf66**	TraesCS4A02G456900.1
	TaMAPKKK62	**TaRaf22**	TraesCS4A02G313900.1
	TaMAPKKK63	**TaRaf23**	TraesCS4A02G383000.1
	TaMAPKKK64	**TaRaf24**	TraesCS4A02G465900.2
	TaMAPKKK64-1	**TaRaf24-1**	TraesCS4A02G464700.1
	TaMAPKKK65	**TaRaf25**	TraesCS4A02G465000.1
	TaMAPKKK91	**TaRaf51**	TraesCS4D02G089300.1
5(A,B,D)chromosomes	**TaMAPKKK81**	**TaRaf41**	TraesCS5A02G292500.1
	TaMAPKKK83	**TaRaf43**	TraesCS5A02G351500.1
	TaMAPKKK84	**TaRaf44**	TraesCS5A02G351000.1
	TaMAPKKK85	**TaRaf45**	TraesCS5A02G352000.1
	TaMAPKKK92	**TaRaf52**	TraesCS5B02G337300.1
	TaMAPKKK94	**TaRaf54**	TraesCS5B02G012000.1
	TaMAPKKK95	**TaRaf55**	TraesCS5B02G204900.1
	TaMAPKKK96	**TaRaf56**	TraesCS5B02G292000.2
	TaMAPKKK97	**TaRaf57**	TraesCS5B02G353800.1

5(A,B,D)chromosomes	**TaMAPKKK132**	**TaRaf92**	TraesCS5B02G353600.1
	TaMAPKKK98	**TaRaf58**	TraesCS5D02G482000.1
	TaMAPKKK101	**TaRaf61**	TraesCS5D02G019400.1
	TaMAPKKK93	**TaRaf53**	TraesCS5D02G018800.1
	TaMAPKKK86	**TaRaf46**	TraesCS5D02G386800.1
	TaMAPKKK123	**TaRaf83**	TraesCS5D02G358700.1
	TaMAPKKK123-1	**TaRaf83-1**	TraesCS5D02G358200.1
	TaMAPKKK134	**TaRaf94**	TraesCS5D02G547500.1
	TaMAPKKK140	**TaRaf100**	TraesCS5D02G097900.1
6(A,B,D)chromosomes	**TaMAPKKK71**	**TaRaf31**	TraesCS6A02G004500.1
	TaMAPKKK41	**TaRaf1**	TraesCS6A02G172600.1
	TaMAPKKK155	**TaRaf115**	TraesCS6B02G217100.1
	TaMAPKKK131	**TaRaf91**	TraesCS6B02G215100.2
	TaMAPKKK129	**TaRaf89**	TraesCS6B02G320800.1
	TaMAPKKK127	**TaRaf87**	TraesCS6D02G339600.1
7(A,B,D)chromosomes	**TaMAPKKK90**	**TaRaf50**	TraesCS7A02G152100.1
	TaMAPKKK130	**TaRaf90**	TraesCS7A02G044600.1
	TaMAPKKK103	**TaRaf63**	TraesCS7A02G326700.1
	TaMAPKKK107	**TaRaf67**	TraesCS7A02G032700.1
	TaMAPKKK102	**TaRaf62**	TraesCS7D02G474700.1
	TaMAPKKK47	**TaRaf7**	TraesCS7D02G022200.1
	TaMAPKKK48	**TaRaf8**	TraesCS7D02G079100.1
	TaMAPKKK50	**TaRaf10**	TraesCS7D02G099200.2
	TaMAPKKK51	**TaRaf11**	TraesCS7D02G230200.1
	TaMAPKKK52	**TaRaf12**	TraesCS7D02G230500.1
	TaMAPKKK61	**TaRaf21**	TraesCS7D02G384700.1
	TaMAPKKK125	**TaRaf85**	TraesCS7D02G153800.1
	TaMAPKKK54	**TaRaf14**	TraesCS7D02G503600.1
	TaMAPKKK141	**TaRaf101**	TraesCS7D02G000800.1
	TaMAPKKK82	**TaRaf42**	TraesCSU02G072500.1

Un	**TaMAPKKK42**		**TaRaf2**	TraesCSU02G203100.1
	TaMAPKKK126		**TaRaf86**	TraesCSU02G011500.1
1(A,B,D)chromosomes	**TaMAPKKKK1**			TraesCS1A02G181900.1
	TaMAPKKKK2			TraesCS1B02G199100.2
	TaMAPKKKK3			TraesCS1D02G185000.2
2(A,B,D)chromosomes	**TaMAPKKKK4**			TraesCS2A02G233400.1
	TaMAPKKKK5			TraesCS2B02G249900.1
	TaMAPKKKK6			TraesCS2D02G232200.1
4(A,B,D)chromosomes	**TaMAPKKKK7**			TraesCS4B02G395600.1
	TaMAPKKKK8			TraesCS4B02G398400.3
5(A,B,D)chromosomes	**TaMAPKKKK9**			TraesCS5A02G187400.1
	TaMAPKKKK10			TraesCS5A02G392500.1
	TaMAPKKKK11			TraesCS5A02G556400.5
	TaMAPKKKK12			TraesCS5B02G397300.1
	TaMAPKKKK13			TraesCS5D02G203600.1
	TaMAPKKKK14			TraesCS5D02G402300.1
6(A,B,D)chromosomes	**TaMAPKKKK15**			TraesCS6A02G149900.1
	TaMAPKKKK16			TraesCS6A02G353400.1
	TaMAPKKKK17			TraesCS6A02G353500.1
	TaMAPKKKK18			TraesCS6B02G177800.1
	TaMAPKKKK19			TraesCS6B02G386100.1
	TaMAPKKKK20			TraesCS6D02G335800.1
	TaMAPKKKK21			TraesCS6D02G139200.1
7(A,B,D)chromosomes	**TaMAPKKKK22**			TraesCS7A02G232300.1
	TaMAPKKKK23			TraesCS7B02G130700.1
	TaMAPKKKK24			TraesCS7D02G232400.1
	TaMAPKKKK25			TraesCSU02G115300.1

RefSeq version			IWGSC version		TGACv1 version	
TaMAPK1		TraesCS6B02G296700.2	**TaMAPK1**	Traes_6BL_BF59BFB93.2		
TaMAPK2		TraesCS4A02G336800.2	**TaMAPK2**	Traes_4AL_6F3D0ACCA.1		
TaMAPK3		TraesCS4A02G106400.1	**TaMAPK3**	Traes_7AL_F5620757F.2	**TaMAPK3**	TRIAE_CS42_4AS_TGACv1_306486_AA1008960/4BL_TGACv1_320270_AA1033300/4DL_TGACv1_344691_AA1148960
TaMAPK4		TraesCS1D02G088000.2	**TaMAPK4**	Traes_1DS_66BD773BF.2	**TaMAPK4**	TRIAE_CS42_1AL_TGACv1_000118_AA0003960/1BL_TGACv1_030274_AA0084790/1DL_TGACv1_061983_AA0206840
TaMAPK5		TraesCS1D02G422800.1	**TaMAPK5**	Traes_1DL_52D511CDD.1		
TaMAPK6		TraesCS7B02G009200.1	**TaMAPK6**	Traes_1BL_7FA80EF00.2	**TaMAPK6**	TRIAE_CS42_7AS_TGACv1_570369_AA1834630/7BS_TGACv1_593766_AA1954300/7DS_TGACv1_622461_AA2040040
TaMAPK7		TraesCS7D02G342800.3	**TaMAPK7**	Traes_7DL_FE0ECD387.2	**TaMAPK7**	TRIAE_CS42_7AL_TGACv1_558385_AA1792950/7BL_TGACv1_576902_AA1859240/7DL_TGACv1_603035_AA1974260/7DL_TGACv1_603254_AA1979200
TaMAPK8		TraesCS3D02G225600.1	**TaMAPK8**	Traes_3DL_5D82311EA.1		
TaMAPK10		TraesCS6B02G146300.1	**TaMAPK10**	Traes_6BS_17C1E5829.1		
TaMAPK11		TraesCS1A02G086500.1	**TaMAPK11**	Traes_1AS_C9CFD7AC8.1	**TaMAPK11**	TRIAE_CS42_7AL_TGACv1_555982_AA1751700/7BL_TGACv1_580661_AA1914980/7DL_TGACv1_603600_AA1986180
TaMAPK12		TraesCS7A02G422500.1	**TaMAPK12**	Traes_7AL_4AF13CC8B.2		
TaMAPK13		TraesCS6D02G245500.3	**TaMAPK13**	Traes_6DL_F48A5E31E.2		
TaMAPK14		TraesCS1A02G184500.1	**TaMAPK14**	Traes_1AL_89DDB4243.1	**TaMAPK14**	TRIAE_CS42_6AS_TGACv1_487866_AA1573320/6BS_TGACv1_514340_AA1658600/6DS_TGACv1_544171_AA1747030
TaMAPK16		TraesCS3B02G270200.1	**TaMAPK16**	TRAES3BF058500020CFD	**TaMAPK16**	TRIAE_CS42_1AS_TGACv1_020601_AA0078640/1BS_TGACv1_049733_AA0160590/U_TGACv1_642759_AA2122920

TaMAPK17		TraesCS6B02G127800.1	**TaMAPK17**	Traes_6BS_2D0054D1F.2	**TaMAPK17**	TRIAE_CS42_7AL_TGACv1_556562_AA1765430/U_TGACv1_641980_AA2108810/7DL_TGACv1_604680_AA2000630
TaMAPK18		TraesCS7D02G044100.1	**TaMAPK18**	Traes_7DS_C268073F4.3		
TaMAPK19		TraesCS7A02G111300.1	**TaMAPK19**	Traes_7DS_1D8A8BFA2.1		
TaMAPK20		TraesCS7D02G403700.1	**TaMAPK20**	Traes_7DL_FB75EA9C3.2	**TaMAPK20**	TaMAPK20-1: TRIAE_CS42_3AL_TGACv1_194002_AA0624350/3B_TGACv1_224428_AA0796670/3DL_TGACv1_253300_AA0894090. TaMAPK20-2: TRIAE_CS42_1AL_TGACv1_002534_AA0042880/1BL_TGACv1_030959_AA0104540/1DL_TGACv1_063491_AA0227870. TaMAPK20-3: TRIAE_CS42_7AL_TGACv1_557823_AA1786610/7BL_TGACv1_577050_AA1864020/7DL_TGACv1_604962_AA2003380. TaMAPK20-4: TRIAE_CS42_3AL_TGACv1_195023_AA0643580/3B_TGACv1_225288_AA0806810/3DL_TGACv1_250331_AA0866300. TaMAPK20-5: TRIAE_CS42_1AL_TGACv1_001596_AA0032670/1BL_TGACv1_032512_AA0130820/U_TGACv1_643598_AA2133390
TaMAPK22		TraesCS7D02G414900.1	**TaMAPK22**	Traes_7DL_73DF29BF0.1		
TaMAPK23		TraesCS3D02G221700.1	**TaMAPK23**	Traes_3DL_281B6BCBF.2		
TaMAPK24		TraesCS3D02G242200.2	**TaMAPK24**	Traes_3DL_38B762939.1	**TaMAPK24**	TRIAE_CS42_U_TGACv1_640751_AA2072490 & AA2072480/BS_TGACv1_513631_AA1646180/6DS_TGACv1_543835_AA1744530
TaMAPK25		TraesCS4D02G198600.1	**TaMAPK25**	Traes_4DL_15045954F.1	**TaMAPK25**	TRIAE_CS42_5AL_TGACv1_375843_AA1227850/5BL_TGACv1_405765_AA1334990
TaMAPK26		TraesCS5D02G534000.2	**TaMAPK26**	Traes_5DL_8DC610F26.1		

TaMAPK27		TraesCS1B02G104900.1	**TaMAPK27**	Traes_1BS_26C55B2B1.1		
TaMAPK28		TraesCS1B02G192600.3	**TaMAPK28**	Traes_1BL_C5CD09285.1		
TaMAPK29		TraesCS1B02G431400.2	**TaMAPK29**	Traes_1BL_9360D8CEC.1		
TaMAPK30		TraesCS7A02G335300.2	**TaMAPK30**	Traes_4AS_5015DF7A2.1		
TaMAPK31		TraesCS4A02G434800.1	**TaMAPK31**	Traes_4AL_E432524A0.2		
TaMAPK33		TraesCS1D02G410100.1	**TaMAPK33**	Traes_1DL_8C6B737E9.1		
TaMAPK34		TraesCS1D02G428900.1	**TaMAPK34**	Traes_1DL_73AAC8631.1		
TaMAPK35		TraesCS6A02G099600.1	**TaMAPK35**	Traes_6AS_50BE5D59F.1		
TaMAPK36		TraesCS6A02G118100.1	**TaMAPK36**	Traes_6AS_8225741A6.2		
TaMAPK37		TraesCS6A02G269400.1	**TaMAPK37**	Traes_6AL_BE97161B9.2		
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TaMAPK39		TraesCS3A02G242100.1	**TaMAPK39**	Traes_3AL_669FE0293.1		
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TaMAPK42		TraesCS1A02G415300.1	**TaMAPK42**	Traes_1AL_14DCD6020.1		
TaMAPK43		TraesCS1A02G421000.1	**TaMAPK43**	Traes_1AL_A7173BBAE.1		
TaMAPK44		TraesCS6D02G082900.2	**TaMAPK44**	Traes_6DS_6424C38F2.2		

TaMAPK45		TraesCS6D02G108100.1	**TaMAPK45**	Traes_6DS_A61864DB2.2		
TaMAPK46		TraesCS7A02G049000.1	**TaMAPK46**	Traes_7AS_E1135D559.1		
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TaMAPK49		TraesCS7A02G410700.2	**TaMAPK49**	Traes_7AL_81A545A54.2		
TaMAPK50		TraesCS5B02G536500.1	**TaMAPK50**	Traes_5BL_A39EC2FCD.1		
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TaMAPK53		TraesCS7B02G309900.1	**TaMAPK53**	Traes_7BL_992E1F443.4		
TaMAPK54		TraesCS7B02G322900.1	**TaMAPK54**	Traes_7BL_95B1705A2.2		
TaMAPKK1		TraesCS6D02G328800.1	**TaMAPKK1**	Traes_6DL_8D2D914D7.2	**TaMKK1**	TaMKK1-1: TRIAE_CS42_4AL_TGACv1_290148_AA0982230/7AS_TGACv1_570427_AA1835590/7DS_TGACv1_622118_AA2033130. TaMKK1-2: TRIAE_CS42_6AS_TGACv1_485693_AA1550190/6BS_TGACv1_513382_AA1639520/U_TGACv1_644387_AA2139180. TaMKK1-3: TRIAE_CS42_7DS_TGACv1_623511_AA2053970
TaMAPKK2		TraesCS5B02G565100.3	**TaMAPKK2**	Traes_5BL_BB574E77D.2		
TaMAPKK3		TraesCS5D02G130900.2	**TaMAPKK3**	Traes_5DL_0886CB561.2	**TaMKK3**	TaMKK3-1: TRIAE_CS42_3B_TGACv1_228257_AA0826360. TaMKK3-2: TRIAE_CS42_5BL_TGACv1_405566_AA1330480/5DL_TGACv1_432926_AA1394740. TaMKK3-3: TRIAE_CS42_5AL_TGACv1_373997_AA1187200/5BL_TGACv1_405070_AA1319320/5DL_TGACv1_435057_AA1445420
TaMAPKK4		TraesCS5A02G122700.4	**TaMAPKK4**	Traes_5AL_5EFCEDAFB.2	**TaMKK4**	TRIAE_CS42_6AL_TGACv1_472053_AA1517260/6BL_TGACv1_502626_AA1625820/6DL_TGACv1_528809_AA1716310

TaMAPKK5		TraesCS4B02G049000.1	**TaMAPKK5**	Traes_4BS_EE048CC01.1	**TaMKK5**	TRIAE_CS42_7AS_TGACv1_572257_AA1851770/7BS_TGACv1_592906_AA1946090/7DS_TGACv1_623332_AA2052160
TaMAPKK6		TraesCS4B02G048100.1	**TaMAPKK6**	Traes_4BS_59F3F68D1.1	**TaMKK6**	TRIAE_CS42_4AL_TGACv1_290485_AA0985860/4BL_TGACv1_320624_AA1044950/4DL_TGACv1_342786_AA1122060
TaMAPKK7		TraesCS4B02G048600.1	**TaMAPKK7**	Traes_4BS_84D913A2E.1		
TaMAPKK8		TraesCS4B02G048900.1	**TaMAPKK8**	Traes_4BS_BDB56BC90.1		
TaMAPKK9		TraesCS3B02G066300.1	**TaMAPKK9**	TRAES3BF024700110CFD		
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TaMAPKK12		TraesCS4D02G048500.1	**TaMAPKK12**	Traes_4DS_7A016C2E4.1		
TaMAPKK13		TraesCS5D02G549600.1	**TaMAPKK13**	Traes_5DL_F89F21E65.1		
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TaMAPKK15		TraesCS4A02G266000.1	**TaMAPKK15**	Traes_4AL_429683D72.1		
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TaMAPKKK1	TaMEKK1	TraesCS2A02G407600.1	TaMEKK1	Traes_2BL_23D01E7F4		
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TaMAPKKK5	TaMEKK5	TraesCS2A02G199700.1	TaMEKK5	Traes_2AS_6DA49285E		
TaMAPKKK7	TaMEKK7	TraesCS3B02G289500.1	TaMEKK7	TRAES3BF169900020CFD_g		
TaMAPKKK8	TaMEKK8	TraesCS3B02G288100.1	TaMEKK8	TRAES3BF036800120CFD_g		
TaMAPKKK9	TaMEKK9	TraesCS3B02G288300.1	TaMEKK9	TRAES3BF036800100CFD_g		
TaMAPKKK10	TaMEKK10	TraesCS4D02G211300.2	TaMEKK10	Traes_4DL_94E10E6EB		
TaMAPKKK11	TaMEKK11	TraesCS5D02G475900.1	TaMEKK11	Traes_5DL_ADFFAE33D		
TaMAPKKK12	TaMEKK12	TraesCS4A02G093800.2	TaMEKK12	Traes_4AS_DF85CBD39		
TaMAPKKK14	TaMEKK14	TraesCS5A02G118200.1	TaMEKK14	Traes_5AS_9A8A9187C		
TaMAPKKK15	TaMEKK15	TraesCS5A02G463100.2	TaMEKK15	Traes_5AL_DEDF36AD2		
TaMAPKKK16	TaMEKK16	TraesCS5B02G474500.1	TaMEKK16	Traes_5BL_35A6B4387		
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TaMAPKKK18	TaMEKK18	TraesCS2B02G526200.3	TaMEKK18	Traes_2BL_84B12F4F8		
TaMAPKKK20	TaMEKK20	TraesCS2A02G498000.3	TaMEKK20	Traes_2AL_66079157A		
TaMAPKKK21	TaMEKK21	TraesCS6A02G149900.1	TaMEKK21	Traes_6AS_E690A27CA		
TaMAPKKK22	TaMEKK22	TraesCS5A02G392500.1	TaMEKK22	Traes_5AL_F9C2BEAF3		
TaMAPKKK23	TaMEKK23	TraesCS6D02G139200.1	TaMEKK23	Traes_6DS_185723D1E		

TaMAPKKK24	TaMEKK24	TraesCS5B02G199400.1	TaMEKK24	Traes_5BL_3EFFD8013		
TaMAPKKK25	TaMEKK25	TraesCS5B02G196400.1	TaMEKK25	Traes_5BL_38DB82ACF		
TaMAPKKK26	TaMEKK26	TraesCS2D02G093700.1	TaMEKK26	Traes_2DS_122AEE879		
TaMAPKKK27	TaMEKK27	TraesCS2B02G110500.1	TaMEKK27	Traes_2BS_8506C57C5		
TaMAPKKK28	TaMEKK28	TraesCS2A02G095300.1	TaMEKK28	Traes_2AS_F0521C4F2		
TaMAPKKK29	TaMEKK29	TraesCS5D02G206500.1	TaMEKK29	Traes_5DL_243735D6C		
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TaMAPKKK31	TaZIK2	TraesCS6D02G236400.1	TaZIK2	Traes_6DL_F70F83614		
TaMAPKKK32	TaZIK3	TraesCS2A02G195900.2	TaZIK3	Traes_2AS_2B84A0A98		
TaMAPKKK33	TaZIK4	TraesCS6B02G270400.1	TaZIK4	Traes_6BL_4A17F7221		
TaMAPKKK34	TaZIK5	TraesCS2D02G197600.1	TaZIK5	Traes_2DS_AA3E486F3		
TaMAPKKK36	TaZIK7	TraesCS2B02G223600.1	TaZIK7	Traes_2BS_18264AA5C		
TaMAPKKK37	TaZIK8	TraesCS2B02G216800.1	TaZIK8	Traes_2BS_1E887CFE5		
TaMAPKKK38	TaZIK9	TraesCS1D02G026200.2	TaZIK9	Traes_1DS_34EFDA767		
TaMAPKKK39	TaZIK10	TraesCS6A02G255100.2	TaZIK10	Traes_6AL_48165ABE5		
TaMAPKKK40	TaZIK11	TraesCS5B02G146100.1	TaZIK11	Traes_5BL_4002B5518		
TaMAPKKK41	**TaRaf1**	TraesCS6A02G172600.1	TaRaf1	Traes_6DS_D8750EB5A		

TaMAPKKK42	**TaRaf2**	TraesCSU02G203100.1	TaRaf2	Traes_2BL_4CAF2C184		
TaMAPKKK43	**TaRaf3**	TraesCS3B02G110300.1	TaRaf3	Traes_6BL_01E6CE316		
TaMAPKKK44	**TaRaf4**	TraesCS2D02G003900.1	TaRaf4	Traes_2DS_DFE006BB6		
TaMAPKKK45	**TaRaf5**	TraesCS3D02G273200.1	TaRaf5	Traes_3DL_CFCA7AA6B		
TaMAPKKK46	**TaRaf6**	TraesCS2D02G050700.1	TaRaf6	Traes_2DS_0BFF3B23D		
TaMAPKKK47	**TaRaf7**	TraesCS7D02G022200.1	TaRaf7	Traes_7DS_361EC0618		
TaMAPKKK48	**TaRaf8**	TraesCS7D02G079100.1	TaRaf8	Traes_7DS_A3EB5BFEB		
TaMAPKKK50	**TaRaf10**	TraesCS7D02G099200.2	TaRaf10	Traes_7DS_D56FBFFD4		
TaMAPKKK51	**TaRaf11**	TraesCS7D02G230200.1	TaRaf11	Traes_7DS_5A97B2141		
TaMAPKKK52	**TaRaf12**	TraesCS7D02G230500.1	TaRaf12	Traes_7DS_342F25C32		
TaMAPKKK53	**TaRaf13**	TraesCS1B02G372400.1	TaRaf13	Traes_1BL_C9B36DE76		
TaMAPKKK54	**TaRaf14**	TraesCS7D02G503600.1	TaRaf14	Traes_7DL_F0110933B		
TaMAPKKK56	**TaRaf16**	TraesCS3A02G039100.1	TaRaf16	Traes_3DS_4E61EE6EA		
TaMAPKKK57	**TaRaf17**	TraesCS3D02G040600.1	TaRaf17	Traes_3DS_6801BD0D2		
TaMAPKKK58	**TaRaf18**	TraesCS3B02G259800.1	TaRaf18	Traes_3DL_B28036C5B		
TaMAPKKK59	**TaRaf19**	TraesCS2A02G216900.1	TaRaf19	Traes_2AS_9219695D6		
TaMAPKKK60	**TaRaf20**	TraesCS2A02G217000.1	TaRaf20	Traes_2AS_79A94F84A		

TaMAPKKK61	**TaRaf21**	TraesCS7D02G384700.1	TaRaf21	Traes_7DL_705BA7CDD		
TaMAPKKK62	**TaRaf22**	TraesCS4A02G313900.1	TaRaf22	Traes_4AL_1C557F688		
TaMAPKKK63	**TaRaf23**	TraesCS4A02G383000.1	TaRaf23	Traes_4AL_06A8F8B8F		
TaMAPKKK64	**TaRaf24**	TraesCS4A02G465900.2	TaRaf24	Traes_4AL_FEFC21AAB		
TaMAPKKK64-1	**TaRaf24-1**	TraesCS4A02G464700.1				
TaMAPKKK65	**TaRaf25**	TraesCS4A02G465000.1	TaRaf25	Traes_4AL_C217A20A1		
TaMAPKKK66	**TaRaf26**	TraesCS1D02G273800.2	TaRaf26	Traes_1DL_FB90601E7		
TaMAPKKK67	**TaRaf27**	TraesCS1D02G360600.1	TaRaf27	Traes_1DL_F49D0E56A		
TaMAPKKK68	**TaRaf28**	TraesCS1D02G431400.1	TaRaf28	Traes_1DL_A0FB3E1D3		
TaMAPKKK69	**TaRaf29**	TraesCS2D02G588200.1	TaRaf29	Traes_2DL_C5A0BDC60		
TaMAPKKK70	**TaRaf30**	TraesCS1D02G423800.1	TaRaf30	Traes_1DL_56B195A26		
TaMAPKKK71	**TaRaf31**	TraesCS6A02G004500.1	TaRaf31	Traes_6AS_006C344A3		
TaMAPKKK72	**TaRaf32**	TraesCS3A02G003900.1	TaRaf32	Traes_3AS_A2CECBF17		
TaMAPKKK73	**TaRaf33**	TraesCS3A02G039200.1	TaRaf33	Traes_3AS_769E90DDD		
TaMAPKKK74	**TaRaf34**	TraesCS3A02G039400.1	TaRaf34	Traes_3AS_5AF26B2FC		
TaMAPKKK75	**TaRaf35**	TraesCS3A02G096500.1	TaRaf35	Traes_3AS_A542EC6F6		
TaMAPKKK76	**TaRaf36**	TraesCS3A02G246100.1	TaRaf36	Traes_3AL_7F6E774BB		

TaMAPKKK78	**TaRaf38**	TraesCS3D02G501400.1	TaRaf38	Traes_3AL_60BB7086F		
TaMAPKKK79	**TaRaf39**	TraesCS3A02G493900.1	TaRaf39	Traes_3AL_F384515F5		
TaMAPKKK80	**TaRaf40**	TraesCS2A02G217600.1	TaRaf40	Traes_2AS_0C8932B8E		
TaMAPKKK81	**TaRaf41**	TraesCS5A02G292500.1	TaRaf41	Traes_5AL_3FE725FD4		
TaMAPKKK82	**TaRaf42**	TraesCSU02G072500.1	TaRaf42	Traes_5AL_A236B0387		
TaMAPKKK83	**TaRaf43**	TraesCS5A02G351500.1	TaRaf43	Traes_5AL_CDD4A02E7		
TaMAPKKK84	**TaRaf44**	TraesCS5A02G351000.1	TaRaf44	Traes_5AL_13784C39B		
TaMAPKKK85	**TaRaf45**	TraesCS5A02G352000.1	TaRaf45	Traes_5AL_68C659562		
TaMAPKKK86	**TaRaf46**	TraesCS5D02G386800.1	TaRaf46	Traes_5AL_7B1C0342F		
TaMAPKKK88	**TaRaf48**	TraesCS1A02G422800.1	TaRaf48	Traes_1AL_C21696173		
TaMAPKKK90	**TaRaf50**	TraesCS7A02G152100.1	TaRaf50	Traes_7AS_81545C211		
TaMAPKKK91	**TaRaf51**	TraesCS4D02G089300.1	TaRaf51	Traes_4DS_7D8A5F90B		
TaMAPKKK92	**TaRaf52**	TraesCS5B02G337300.1	TaRaf52	Traes_5DL_3191490FE		
TaMAPKKK93	**TaRaf53**	TraesCS5D02G018800.1	TaRaf53	Traes_5BS_0B466F42F		
TaMAPKKK94	**TaRaf54**	TraesCS5B02G012000.1	TaRaf54	Traes_5BS_43731B6AC		
TaMAPKKK95	**TaRaf55**	TraesCS5B02G204900.1	TaRaf55	Traes_5BL_E44E042FD		
TaMAPKKK96	**TaRaf56**	TraesCS5B02G292000.2	TaRaf56	Traes_5BL_2DA8896EE		

TaMAPKKK97	**TaRaf57**	TraesCS5B02G353800.1	TaRaf57	Traes_5BL_11A7A1F5C		
TaMAPKKK98	**TaRaf58**	TraesCS5D02G482000.1	TaRaf58	Traes_5DL_294C4EDB3		
TaMAPKKK99	**TaRaf59**	TraesCS3A02G001500.1	TaRaf59	Traes_3AS_2A0765E10		
TaMAPKKK100	**TaRaf60**	TraesCS3A02G274000.1	TaRaf60	Traes_3AL_82306B917		
TaMAPKKK101	**TaRaf61**	TraesCS5D02G019400.1	TaRaf61	Traes_5DS_53F8C78FA		
TaMAPKKK102	**TaRaf62**	TraesCS7D02G474700.1	TaRaf62	Traes_7BL_46880A4FE		
TaMAPKKK103	**TaRaf63**	TraesCS7A02G326700.1	TaRaf63	Traes_7AL_9AD23808D		
TaMAPKKK104	**TaRaf64**	TraesCS1D02G273600.1	TaRaf64	Traes_1DL_0162A6BAC		
TaMAPKKK104-1	**TaRaf64-1**	TraesCS1B02G283400.1				
TaMAPKKK105	**TaRaf65**	TraesCS3A02G045200.1	TaRaf65	Traes_3AS_A0EA6D12C		
TaMAPKKK106	**TaRaf66**	TraesCS4A02G456900.1	TaRaf66	Traes_4AL_48E7FB1C6		
TaMAPKKK107	**TaRaf67**	TraesCS7A02G032700.1	TaRaf67	Traes_4AL_83D9333FE		
TaMAPKKK108	**TaRaf68**	TraesCS3D02G023600.1	TaRaf68	Traes_5DL_62B6846F6		
TaMAPKKK109	**TaRaf69**	TraesCS2D02G219800.1	TaRaf69	Traes_2DS_42A9CC22D		
TaMAPKKK110	**TaRaf70**	TraesCS4B02G289100.1	TaRaf70	Traes_4BL_3626CDB73		
TaMAPKKK111	**TaRaf71**	TraesCS3A02G315100.1	TaRaf71	Traes_3AL_5DC02A5FC		
TaMAPKKK112	**TaRaf72**	TraesCS5D02G359500.1	TaRaf72	Traes_5DL_0A74AE348		

TaMAPKKK113	**TaRaf73**	TraesCS3D02G108500.1	TaRaf73	Traes_3AS_C492FCE9A		
TaMAPKKK115	**TaRaf75**	TraesCS3A02G229800.1	TaRaf75	Traes_3AL_0187ECBAC		
TaMAPKKK116	**TaRaf76**	TraesCS1B02G454000.2	TaRaf76	Traes_1BL_1E2841006		
TaMAPKKK117	**TaRaf77**	TraesCS3D02G097000.1	TaRaf77	Traes_3DS_0B1914F50		
TaMAPKKK119	**TaRaf79**	TraesCS2A02G577000.1	TaRaf79	Traes_2AL_0E43EBBB6		
TaMAPKKK120	**TaRaf80**	TraesCS4A02G317600.1	TaRaf80	Traes_4AL_9601B9873		
TaMAPKKK121	**TaRaf81**	TraesCS2D02G066900.1	TaRaf81	Traes_2DS_964FA3D25		
TaMAPKKK122	**TaRaf82**	TraesCS2A02G214000.1	TaRaf82	Traes_2AS_DCD2F10331		
TaMAPKKK123	**TaRaf83**	TraesCS5D02G358700.1	TaRaf83	Traes_5DL_A367964F5		
TaMAPKKK123-1	**TaRaf83-1**	TraesCS5D02G358200.1				
TaMAPKKK125	**TaRaf85**	TraesCS7D02G153800.1	TaRaf85	Traes_7DS_81C827CE6		
TaMAPKKK126	**TaRaf86**	TraesCSU02G011500.1	TaRaf86	Traes_6BS_511AB47D71		
TaMAPKKK127	**TaRaf87**	TraesCS6D02G339600.1	TaRaf87	Traes_6DL_7662129AC		
TaMAPKKK128	**TaRaf88**	TraesCS1B02G446500.1	TaRaf88	Traes_1BL_CDC566E72		
TaMAPKKK129	**TaRaf89**	TraesCS6B02G320800.1	TaRaf89	Traes_6BL_658AE8589		
TaMAPKKK130	**TaRaf90**	TraesCS7A02G044600.1	TaRaf90	Traes_7AS_0BE0D89AC		
TaMAPKKK131	**TaRaf91**	TraesCS6B02G215100.2	TaRaf91	Traes_6BS_EAABDE59A		

TaMAPKKK132	**TaRaf92**	TraesCS5B02G353600.1	TaRaf92	Traes_5BL_17A56822E		
TaMAPKKK133	**TaRaf93**	TraesCS1D02G004300.1	TaRaf93	Traes_1BS_EA26D2661		
TaMAPKKK134	**TaRaf94**	TraesCS5D02G547500.1	TaRaf94	Traes_5DL_383D5A71F		
TaMAPKKK135	**TaRaf95**	TraesCS2D02G598800.1	TaRaf95	Traes_2DL_77990F25A		
TaMAPKKK136	**TaRaf96**	TraesCS2B02G241600.1	TaRaf96	Traes_2BS_C0AED9734		
TaMAPKKK137	**TaRaf97**	TraesCS3D02G472000.1	TaRaf97	Traes_3DL_73ACAB95C		
TaMAPKKK139	**TaRaf99**	TraesCS3A02G493500.1	TaRaf99	Traes_3AL_AB54706CA		
TaMAPKKK140	**TaRaf100**	TraesCS5D02G097900.1	TaRaf100	Traes_5BS_F1687AA56		
TaMAPKKK141	**TaRaf101**	TraesCS7D02G000800.1	TaRaf101	Traes_7DS_A46AFAE10		
TaMAPKKK142	**TaRaf102**	TraesCS2A02G032200.1	TaRaf102	Traes_2AS_CC27D1C41		
TaMAPKKK144	**TaRaf104**	TraesCS3D02G501100.1	TaRaf104	Traes_3DL_3D1CAD68F		
TaMAPKKK145	**TaRaf105**	TraesCS2B02G242300.1	TaRaf105	Traes_2BS_5C64FC44A		
TaMAPKKK146	**TaRaf106**	TraesCS2B02G241400.1	TaRaf106	Traes_4BS_C5AB35B0C		
TaMAPKKK147	**TaRaf107**	TraesCS2A02G216600.1	TaRaf107	Traes_2AS_E5AB3458C		
TaMAPKKK148	**TaRaf108**	TraesCS1A02G003900.1	TaRaf108	Traes_1BS_41E5F1990		
TaMAPKKK150	**TaRaf110**	TraesCS3B02G008600.2	TaRaf110	TRAES3BF061500080CFD_t1		
TaMAPKKK151	**TaRaf111**	TraesCS3B02G123800.1	TaRaf111	TRAES3BF104900080CFD_t1		

TaMAPKKK152	**TaRaf112**	TraesCS3B02G259100.1	TaRaf112	TRAES3BF026200090CFD_t1		
TaMAPKKK153	**TaRaf113**	TraesCS3B02G351800.1	TaRaf113	TRAES3BF086600060CFD_t1		
TaMAPKKK154	**TaRaf114**	TraesCS3B02G478400.1	TaRaf114	TRAES3BF078400040CFD_t1		
TaMAPKKK155	**TaRaf115**	TraesCS6B02G217100.1	TaRaf115	Traes_6BS_5BFDC774A		