

**Table S6.** Candidate genes across whole reference genome.

ID	Chr	Pos	Gene families
<i>Phvul.001G088900</i>	1	14088551	YELLOW STRIPE like 6
<i>Phvul.001G105400</i>	1	26290093	calcium exchanger 7
<i>Phvul.001G105400</i>	1	26290093	calcium exchanger 7
<i>Phvul.001G142750</i>	1	38584393	Cation efflux family protein
<i>Phvul.001G177500</i>	1	43453927	NRAMP metal ion transporter family protein
<i>Phvul.001G179100</i>	1	43666739	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G179100</i>	1	43666739	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G205300</i>	1	46324641	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G247400</i>	1	49894723	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G250300</i>	1	50100939	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G250300</i>	1	50100939	Heavy metal transport/detoxification superfamily protein
<i>Phvul.001G250300</i>	1	50100939	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G033800</i>	2	3382174	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G033800</i>	2	3382174	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G099700</i>	2	19275657	zinc transporter 10 precursor
<i>Phvul.002G100001</i>	2	19321798	zinc transporter 10 precursor
<i>Phvul.002G113500</i>	2	24370429	Vacuolar iron transporter (VIT) family protein
<i>Phvul.002G176300</i>	2	33458683	Cation efflux family protein
<i>Phvul.002G184200</i>	2	34468080	ZIP metal ion transporter family
<i>Phvul.002G205000</i>	2	37162538	Vacuolar iron transporter (VIT) family protein
<i>Phvul.002G205100</i>	2	37176246	Vacuolar iron transporter (VIT) family protein
<i>Phvul.002G205200</i>	2	37188537	Vacuolar iron transporter (VIT) family protein
<i>Phvul.002G205300</i>	2	37195863	Vacuolar iron transporter (VIT) family protein
<i>Phvul.002G208500</i>	2	37516072	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G262500</i>	2	43427768	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G285600</i>	2	45486348	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G292900</i>	2	46189860	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G314600</i>	2	48136994	Heavy metal transport/detoxification superfamily protein
<i>Phvul.002G322800</i>	2	48774556	vacuolar iron transporter 1
<i>Phvul.002G322900</i>	2	48779470	vacuolar iron transporter 1
<i>Phvul.002G323700</i>	2	48857307	vacuolar iron transporter 1
<i>Phvul.003G006400</i>	3	760614	YELLOW STRIPE like 7
<i>Phvul.003G006500</i>	3	765645	YELLOW STRIPE like 7
<i>Phvul.003G006500</i>	3	765645	YELLOW STRIPE like 7
<i>Phvul.003G021300</i>	3	2036314	Cation efflux family protein
<i>Phvul.003G022400</i>	3	2135327	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G086300</i>	3	16877488	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G092500</i>	3	21113140	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G099700</i>	3	25708027	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G104900</i>	3	23350962	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G108900</i>	3	27536901	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G108900</i>	3	27536901	Heavy metal transport/detoxification superfamily protein

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<i>Phvul.003G108900</i>	3	27536901	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G219900</i>	3	44817176	Heavy metal transport/detoxification superfamily protein
<i>Phvul.003G262400</i>	3	50155639	zinc transporter 10 precursor
<i>Phvul.003G262500</i>	3	50167952	zinc transporter 10 precursor
<i>Phvul.004G001200</i>	4	36383	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G019800</i>	4	2331722	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G049800</i>	4	6070640	calcium exchanger 7
<i>Phvul.004G052700</i>	4	7006062	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G077300</i>	4	13645167	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G096500</i>	4	15848521	Vacuolar iron transporter (VIT) family protein
<i>Phvul.004G106900</i>	4	35338479	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G116300</i>	4	40009283	Heavy metal transport/detoxification superfamily protein
<i>Phvul.004G138900</i>	4	43873548	YELLOW STRIPE like 7
<i>Phvul.004G161300</i>	4	46564258	Heavy metal transport/detoxification superfamily protein
<i>Phvul.005G048900</i>	5	5682746	zinc transporter 1 precursor
<i>Phvul.005G049300</i>	5	5742223	Cation efflux family protein
<i>Phvul.005G095400</i>	5	29797811	Heavy metal transport/detoxification superfamily protein
<i>Phvul.005G131500</i>	5	37041480	Heavy metal transport/detoxification superfamily protein
<i>Phvul.005G182000</i>	5	40667944	NRAMP metal ion transporter 6
<i>Phvul.005G182000</i>	5	40667944	NRAMP metal ion transporter 6
<i>Phvul.005G184600</i>	5	40802614	cation exchanger 2
<i>Phvul.006G001000</i>	6	321846	zinc transporter 1 precursor
<i>Phvul.006G015061</i>	6	2386258	YELLOW STRIPE like 1
<i>Phvul.006G060800</i>	6	16929318	cation exchanger 5
<i>Phvul.006G060800</i>	6	16929318	cation exchanger 5
<i>Phvul.006G067900</i>	6	17933066	cation exchanger 1
<i>Phvul.006G070200</i>	6	18248775	ZIP metal ion transporter family
<i>Phvul.006G080700</i>	6	19279972	Cation efflux family protein
<i>Phvul.006G080700</i>	6	19279972	Cation efflux family protein
<i>Phvul.006G083800</i>	6	19564418	YELLOW STRIPE like 7
<i>Phvul.006G093300</i>	6	20450587	cation exchanger 11
<i>Phvul.006G139900</i>	6	24687127	Heavy metal transport/detoxification superfamily protein
<i>Phvul.006G139900</i>	6	24687127	Heavy metal transport/detoxification superfamily protein
<i>Phvul.006G139900</i>	6	24687127	Heavy metal transport/detoxification superfamily protein
<i>Phvul.006G153400</i>	6	25863506	Heavy metal transport/detoxification superfamily protein
<i>Phvul.007G079100</i>	7	7671485	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G015500</i>	8	1278190	Cation efflux family protein
<i>Phvul.008G015500</i>	8	1278190	Cation efflux family protein
<i>Phvul.008G015500</i>	8	1278190	Cation efflux family protein
<i>Phvul.008G015500</i>	8	1278190	Cation efflux family protein
<i>Phvul.008G015500</i>	8	1278190	Cation efflux family protein
<i>Phvul.008G058500</i>	8	5220363	Heavy metal transport/detoxification superfamily protein
<i>Phvul.008G070000</i>	8	6339674	vacuolar iron transporter 1

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<i>Phvul.008G079500</i>	8	7719539	ZIP metal ion transporter family
<i>Phvul.008G104500</i>	8	11470299	cation exchanger 1
<i>Phvul.008G157800</i>	8	28064702	YELLOW STRIPE like 3
<i>Phvul.008G157800</i>	8	28064702	YELLOW STRIPE like 3
<i>Phvul.008G157800</i>	8	28064702	YELLOW STRIPE like 3
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G187600</i>	8	52505573	Vacuolar iron transporter (VIT) family protein
<i>Phvul.008G189300</i>	8	52746631	Heavy metal transport/detoxification superfamily protein
<i>Phvul.008G189400</i>	8	52754968	Heavy metal transport/detoxification superfamily protein
<i>Phvul.008G216200</i>	8	56526044	Heavy metal transport/detoxification superfamily protein
<i>Phvul.008G219600</i>	8	56886320	Heavy metal transport/detoxification superfamily protein
<i>Phvul.008G244200</i>	8	59266794	Cation efflux family protein
<i>Phvul.008G254900</i>	8	60275655	Cation efflux family protein
<i>Phvul.008G259200</i>	8	60615253	ZIP metal ion transporter family
<i>Phvul.008G261500</i>	8	60843461	cation exchanger 1
<i>Phvul.009G027600</i>	9	6422756	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G038800</i>	9	8217549	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G038800</i>	9	8217549	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G038800</i>	9	8217549	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G038800</i>	9	8217549	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G040800</i>	9	8411105	vacuolar iron transporter (VIT) family protein
<i>Phvul.009G040800</i>	9	8411105	vacuolar iron transporter (VIT) family protein
<i>Phvul.009G040800</i>	9	8411105	vacuolar iron transporter (VIT) family protein
<i>Phvul.009G048800</i>	9	9593088	YELLOW STRIPE like 3
<i>Phvul.009G048800</i>	9	9593088	YELLOW STRIPE like 3
<i>Phvul.009G069700</i>	9	12141306	NRAMP metal ion transporter 2
<i>Phvul.009G127900</i>	9	19429094	NRAMP metal ion transporter 6
<i>Phvul.009G127900</i>	9	19429094	NRAMP metal ion transporter 6
<i>Phvul.009G137100</i>	9	20653368	manganese tracking factor for mitochondrial SOD2
<i>Phvul.009G164900</i>	9	24527982	Heavy metal transport/detoxification superfamily protein
<i>Phvul.009G247600</i>	9	36846305	Heavy metal transport/detoxification superfamily protein
<i>Phvul.010G001500</i>	10	412065	cation exchanger 3
<i>Phvul.010G001500</i>	10	412065	cation exchanger 3
<i>Phvul.010G021600</i>	10	3076479	Vacuolar iron transporter (VIT) family protein
<i>Phvul.010G021700</i>	10	3083937	vacuolar iron transporter (VIT) family protein
<i>Phvul.010G034132</i>	10	4957830	Heavy metal transport/detoxification superfamily protein
<i>Phvul.010G059200</i>	10	9326694	ZIP metal ion transporter family
<i>Phvul.010G103800</i>	10	37309047	Heavy metal transport/detoxification superfamily protein

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<i>Phvul.010G103800</i>	10	37309047	Heavy metal transport/detoxification superfamily protein
<i>Phvul.010G110500</i>	10	38414889	NRAMP metal ion transporter 2
<i>Phvul.010G119900</i>	10	40027163	metal tolerance protein A2
<i>Phvul.010G119900</i>	10	40027163	metal tolerance protein A2
<i>Phvul.010G119900</i>	10	40027163	metal tolerance protein A2
<i>Phvul.010G119900</i>	10	40027163	metal tolerance protein A2
<i>Phvul.010G128500</i>	10	40925634	cation calcium exchanger 4
<i>Phvul.010G160800</i>	10	43922651	NRAMP metal ion transporter 6
<i>Phvul.010G160800</i>	10	43922651	NRAMP metal ion transporter 6
<i>Phvul.010G160800</i>	10	43922651	NRAMP metal ion transporter 6
<i>Phvul.011G058500</i>	11	5228604	ZIP metal ion transporter family
<i>Phvul.011G061200</i>	11	5460629	metal tolerance protein B1
<i>Phvul.011G061200</i>	11	5460629	metal tolerance protein B1
<i>Phvul.011G068500</i>	11	6085721	Heavy metal transport/detoxification superfamily protein
<i>Phvul.011G084200</i>	11	7945552	Heavy metal transport/detoxification superfamily protein
<i>Phvul.011G088100</i>	11	8454876	vacuolar protein sorting 41
<i>Phvul.011G178800</i>	11	48990728	Cation efflux family protein
<i>Phvul.011G178800</i>	11	48990728	Cation efflux family protein
<i>Phvul.L001741</i>	scaffold_142	17190	Heavy metal transport/detoxification superfamily protein
<i>Phvul.L002137</i>	scaffold_13	221624	Heavy metal transport/detoxification superfamily protein
<i>Phvul.L005301</i>	scaffold_14	415497	YELLOW STRIPE like 1
<i>Phvul.L005301</i>	scaffold_14	415497	YELLOW STRIPE like 1
<i>Phvul.L007443</i>	scaffold_15	499839	zinc transporter 11 precursor
<i>Phvul.L007543</i>	scaffold_15	504259	zinc transporter 11 precursor
<i>Phvul.L011443</i>	scaffold_15	796287	ZIP metal ion transporter family