

(a)

Wild-type SpARR11 : MMDTTTRDRTGRVVDDDTWKKMKKCYVTTCCARDARRGRKDGVDVNMMDMGKMDVNNASKRRKDVAADKCSSTSDTG : 80

sparr11-ko line1 allele 1 : MMDTTTRDRTGRVVDDDTWKKMKKCYVTTCCARDARRGRKDGVDVNMMDMGKMDVNNASKRRKDVAADKCSSTSDTG : 80

sparr11-ko line1 allele 2 : MMDTTTRDRTGRVVDDDTWKKMKKCYVTTCCARDARRGRKDGVDVNMMDMGKMDVNNASKRRKDVAADKCSSTSDTG : 80

sparr11-ko line2 allele 1 : MMDTTTRDRTGRVVDDDTWKKMKKCYVTTCCARDARRGRKDGVDVNMMDMGKMDVNNASKRRKDVAADKCSSTSDTG : 80

sparr11-ko line2 allele 2 : MMDTTTRDRTGRVVDDDTWKKMKKCYVTTCCARDARRGRKDGVDVNMMDMGKMDVNNASKRRKDVAADKCSSTSDTG : 80

Wild-type SpARR11 : STSKRARVVWTVDHKKAVKGKGGKDSMNWVTRNVASHKYRYSRKDNNGDKRVSDHDVDCCKNSDHTNDDSRNRKGDKSDA : 160

sparr11-ko line1 allele 1 : STSKRARVVWTVDHKKAVKGKGGKDSMNWVTRNVASHKYRYSRKDNNGDKRVSDHDVDCCKNSDHTNDDSRNRKGDKSDA : 160

sparr11-ko line1 allele 2 : STSKRARVVWTVDHKKAVKGKGGKDSMNWVTRNVASHKYRYSRKDNNGDKRVSDHDVDCCKNSDHTNDDSRNRKGDKSDA : 160

sparr11-ko line2 allele 1 : STSKRARVVWTVDHKKAVKGKGGKDSMNWVTRNVASHKYRYSRKDNNGDKRVSDHDVDCCKNSDHTNDDSRNRKGDKSDA : 160

sparr11-ko line2 allele 2 : STSKRARVVWTVDHKKAVKGKGGKDSMNWVTRNVASHKYRYSRKDNNGDKRVSDHDVDCCKNSDHTNDDSRNRKGDKSDA : 160

Wild-type SpARR11 : DKCSDAKVTVARHMSDHSADNNRKYWNDSNNSHHYRSTNNCSRADS AVAGKDYKRWDNHGRDADDMGSSHDARDWC : 240

sparr11-ko line1 allele 1 : DKCSDAKVTVARHMSDHSAGRG*----- : 183

sparr11-ko line1 allele 2 : DKCSDAKVTVARHMSDHSADNNRKYWNDSNNSHHYRSTNNCSRADS AVAGKDYKRWDNHG---TRM*----- : 227

sparr11-ko line2 allele 1 : DKCSDAKVTVARHMSDHSAGRG*----- : 183

sparr11-ko line2 allele 2 : DKCSDAKVTVARHMSDHSADNNRKYWNDSNNSHHYRSTNNCSRADS AVAGKDYKRWDNHG---TRM*----- : 226

Wild-type SpARR11 : GASCDTAHSSSYVVKSDSDCNDGMKCTDGKKVACRTRSSGGDR TARSGDGRGRARVTDGVARHRDRKAWARM* : 312

sparr11-ko line1 allele 1 : ----- : -

sparr11-ko line1 allele 2 : ----- : -

sparr11-ko line2 allele 1 : ----- : -

sparr11-ko line2 allele 2 : ----- : -

(b)

Wild-type SpPHL2 : MYSAHSGDGSVYHRHSSSDCTNGDSCVMTSDKRRWTAHDRVDAVAGGDKATKTRTMGVKGTYHKSHKYRGKAGKSTNSKS : 80

spphl2-ko line1 allele 1 : MYSAHSGDGSVYHRHSSSDCTNGDSCVMTSDKRRWTAHDRVDAVAGGDKATKTRTMGVKGTYHKSHKYRGKAGKSTNSKS : 80

spphl2-ko line1 allele 2 : MYSAHSGDGSVYHRHSSSDCTNGDSCVMTSDKRRWTAHDRVDAVAGGDKATKTRTMGVKGTYHKSHKYRGKAGKSTNSKS : 80

spphl2-ko line2 allele 1 : MYSAHSGDGSVYHRHSSSDCTNGDSCVMTSDKRRWTAHDRVDAVAGGDKATKTRTMGVKGTYHKSHKYRGKAGKSTNSKS : 80

spphl2-ko line2 allele 2 : MYSAHSGDGSVYHRHSSSDCTNGDSCVMTSDKRRWTAHDRVDAVAGGDKATKTRTMGVKGTYHKSHKYRGKAGKSTNSKS : 80

Wild-type SpPHL2 : VRKRSSYVTARVMVRKHVRRRSGKYRKACKANDTVAAGAARS AKSHDSSDKMSSDTTTDSRRKTNVVRGDCSVNSCTST : 160

spphl2-ko line1 allele 1 : VRKRSSYVTARVMVRKHVRRRSGKYRKACKANDTVAAGAARS AKSHDSSDKMSSDTTTDSRRKTNVVRGDCSVNSCTST : 159

spphl2-ko line1 allele 2 : VRKRSSYVTARVMVRKHVRRRSGKYRKACKANDTVAAGAARS AKSHDSSDKMSSDTTTDSRRKTNVVRGDCSVNSCTST : 159

spphl2-ko line2 allele 1 : VRKRSSYVTARVMVRKHVRRRSGKYRKACKANDTVAAGAARS AKSHDSSDKMSSDTTTDSRRKTCDE-HCSVCTCTA- : 158

spphl2-ko line2 allele 2 : VRKRSSYVTARVMVRKHVRRRSGKYRKACKANDTVAAGAARS AKSHDSSDKMSSDTTTDSRRKTCDE-HCSVCTCTA- : 147

Wild-type SpPHL2 : ATHGASNANA AAKRRVGNSSNMVVMHSG* : 190

spphl2-ko line1 allele 1 : ATHGASNANA AAKRRVGNSSNMVVMHSG* : 189

spphl2-ko line1 allele 2 : ATHGASNANA AAKRRVGNSSNMVVMHSG* : 189

spphl2-ko line2 allele 1 : --WGSK*----- : 163

spphl2-ko line2 allele 2 : ----- : -

(c)

Wild-type SpNF-YA10 : MTTVYKYTNTGHSSATMRWTAGSHSTASKSVNTTKTDDSMVKDVKNRVANTSSGTRTVRASVTVKTSYHSDSGGSMVYTY : 80

spnf-ya10-ko line1 allele 1 : MTTVYKYTNTGHSSATMRWTAGSHSTASKSVNTTKTDDSMVKDVKNRVANTSSGTRTVRASVTVKTSYHSDSGGSMVYTY : 80

spnf-ya10-ko line1 allele 2 : MTTVYKYTNTGHSSATMRWTAGSHSTASKSVNTTKTDDSMVKDVKNRVANTSSGTRTVRASVTVKTSYHSDSGGSMVYTY : 80

spnf-ya10-ko line2 allele 1 : MTTVYKYTNTGHSSATMRWTAGSHSTASKSVNTTKTDDSMVKDVKNRVANTSSGTRTVRASVTVKTSYHSDSGGSMVYTY : 80

spnf-ya10-ko line2 allele 2 : MTTVYKYTNTGHSSATMRWTAGSHSTASKSVNTTKTDDSMVKDVKNRVANTSSGTRTVRASVTVKTSYHSDSGGSMVYTY : 80

Wild-type SpNF-YA10 : SYGDSYGVM SAYGMAGRMDSSDDGYVNAKYNRRRHRAKAVSRTKARKAYMHSRHHARRRGCGGRKTKTDGGMNSNSNM : 160

spnf-ya10-ko line1 allele 1 : SYGDSYGVM SAYGMAGRMDSSDDGYVNAKYNRRRHRAAGGTS-NHSSGVYA*----- : 131

spnf-ya10-ko line1 allele 2 : SYGDSYGVM SAYGMAGRMDSSDDGYVNAKYNRRRHRAARRN*----- : 122

spnf-ya10-ko line2 allele 1 : SYGDSYGVM SAYGMAGRMDSSDDGYVNAKYNRRRHRAAGGTS-NHSSGVYA*----- : 131

spnf-ya10-ko line2 allele 2 : SYGDSYGVM SAYGMAGRMDSSDDGYVNAKYNRRRHRAAGTNGNNSRGYMASSRRGT---GCGGRKTKTDGGMNSNSNM : 157

Wild-type SpNF-YA10 : TSHSSSGSDNVTNSKTHTGNSGSATSMTYTRGNCCNANTARGVAHCCCNKA* : 210

spnf-ya10-ko line1 allele 1 : ----- : -

spnf-ya10-ko line1 allele 2 : ----- : -

spnf-ya10-ko line2 allele 1 : ----- : -

spnf-ya10-ko line2 allele 2 : TSHSSSGSDNVTNSKTHTGNSGSATSMTYTRGNCCNANTARGVAHCCCNKA* : 207

(d)

Wild-type SpMYB84 allele 1 : MGRACCDKANVKKGWSDTAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

Wild-type SpMYB84 allele 2 : MGRACCDKANVKKGWSDAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

spmyb84-ko line1 allele 1 : MGRACCDKANVKKGWSDTAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

spmyb84-ko line1 allele 2 : MGRACCDKANVKKGWSDAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

spmyb84-ko line2 allele 1 : MGRACCDKANVKKGWSDTAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

spmyb84-ko line2 allele 2 : MGRACCDKANVKKGWSDAKKSYNGTGGNNAWKRCGKSCRRWNYNRNRHGGSDNCSYSGSRWSAAGRTDNDKNYWNTRKKK : 80

		*	100	*	120	*	140	*	160	
Wild-type SpMYB84 allele 1	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSASDHSNGSMVSNVMSSNMYSGSTGGYVSSSD								: 160
Wild-type SpMYB84 allele 2	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSTSD--SNGSMVSNVMSSNMYSGSTGGYVSSSD								: 159
spmyb84-ko line1 allele 1	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSASDHSNGSMVSNVMSSNMYSGSTGGYVSSSD								: 160
spmyb84-ko line1 allele 2	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSTSD--SNGSMVSNVMSSNMYSGSTGGYVSSSD								: 158
spmyb84-ko line2 allele 1	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSASD--HSSMVSNVMSSNMYSGSTGGYVSSSD								: 158
spmyb84-ko line2 allele 2	:	GKRKHYNARRSGGNMMTMNKVSYWVSYSDARGVNDHTSRRMKGGRSTSD--SNGSMVSNVMSSNMYSGSTGGYVSSSD								: 159

		*	180	*	200	*	220	*		
Wild-type SpMYB84 allele 1	:	THNNTYHSSGSGMIMGSHGCGNSSSNGMVDGNSTDDYNNNNNRNVDSNMTVDMARSSSVYNHYSVHSTTTNVNKYDH*								: 237
Wild-type SpMYB84 allele 2	:	THNNTYHSSGSGMIMGSYGCGNSSSHGMVDGNSTDDYNN--RNVDNMTVDMARSSSVYNHYSVHSTTTNVNKYDH*								: 234
spmyb84-ko line1 allele 1	:	THNNTYHDCWCYKTHSKSRCS*-----								: 181
spmyb84-ko line1 allele 2	:	THNNTYHDCWCYKTHSKSRCS*-----								: 179
spmyb84-ko line2 allele 1	:	THNNTYH-----WVRNGY-VTRT*-----								: 175
spmyb84-ko line2 allele 2	:	THNNTYHSSGTGMIMGSYCGNSSSHGMVDGNSTDDYNN--RNVDNMTVDMARSSSVYNHYSVHSTTTNVNKYDH*								: 234