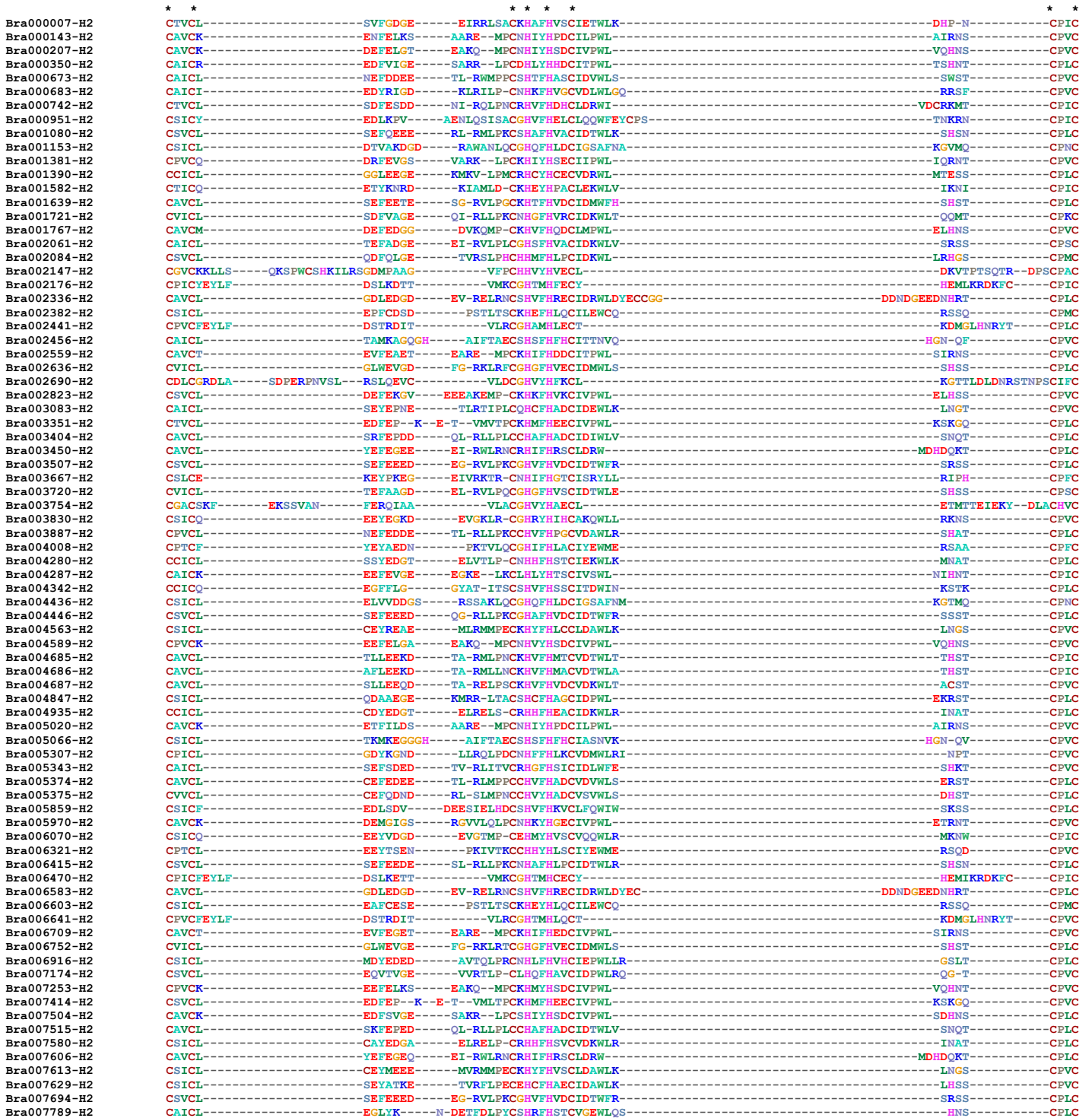


Supplementary Information

Genome-wide identification, evolution and expression analysis of RING finger protein genes in *Brassica rapa*

Intikhab Alam, Yan-Qing Yang, Yong Wang, Mei-Lan Zhu, Heng-Bo Wang, Boulos Chalhouh, Yun-Hai Lu\*

Figure S1 Multiple sequence alignment of 371 RING-H2 domains of *B. rapa*.



Bra007847-H2	CAICL	DDFES	KTMSMFPCCFHQFHRECLLEWTERS	RHGGS	CPIC	
Bra007848-H2	CAICL	EDMSE	QAFQPPCCVHVFEHDCVFKWLCR	HDS	CPIC	
Bra008015-H2	CPICL	NEFEDEE	TLRLIPKCCVHFPDCIDAWFQ	SHAT	CPIC	
Bra008016-H2	CPVCL	NEFEDEE	RLRLIPKCCVHFPDCIDAWFQ	SHPT	CPIC	
Bra008018-H2	CPVCL	NEFEDEE	SLRLIPKCNHAFHSCIDTWLRL	SHTN	CPIC	
Bra008028-H2	CAICL	SDLVKGD	KA-RLIPKCNHSHFVPCIDMWFQ	SHST	CPIC	
Bra008075-H2	CVVCL	SELAEGD	KA-KLLPSCKHWFHACIDAWLE	SHAT	CPIC	
Bra008257-H2	CAICL	TEFAAGD	EL-RVLPQCGHGFHVSICDITWLG	SHSS	CPIC	
Bra008462-H2	CPVCL	ERLDQDTGG	ILTMCNHSFHSCISKNWPD	S	CPIC	
Bra008475-H2	CCICL	ARYGDDE	EVRELP-CLHVFVDCVDKWLK	INAT	CPIC	
Bra008518-H2	CRICQ	DEFEGGE	QV-RSLRNCARVHFKTCIDRW	IHDDKMT	CPIC	
Bra008671-H2	CAICM	GDFVVKE	KVTR-LPCWHYHFGECIVPWL	EMKNT	CPIC	
Bra008675-H2	CPICL	EEYTSN	PKIVTKCSHHFHLGCIYEMWE	RSBD	CPIC	
Bra009015-H2	CSICQ	EEYVDGD	EVGTMP-CEHMVHVSQVQWLR	MKNW	CPIC	
Bra009037-H2	CSVCL	SEFEDEE	GV-RLIPKCSHAFHVSICDITWLL	SHKN	CPIC	
Bra009136-H2	CAVCL	ARFEPTE	VL-RLIPKCKHAFHVSICDITWLD	ABST	CPIC	
Bra009297-H2	CSICL	CDYVARD	PVRCIPECNHCFHADCVDEWLRP	SAT	CPIC	
Bra009323-H2	CAVCK	DEMDVGT	EAVG-LPCDHKYHTECIVPWL	KTRNT	CPIC	
Bra009570-H2	CVICK	EEMSEGR	DVCEMP-CQHLPHFKICLIPWL	SKRNT	CPIC	
Bra009663-H2	CSVCL	QDFQVGE	TVRSLPHCHHMFHLPCIDKWL	RGHAS	CPIC	
Bra009800-H2	CSICQ	EEYVDGD	EVGTLP-CQHMVHVSQVQWLR	MKNW	CPIC	
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Bra009960-H2	CAICL	NEFQDDE	TL-RLIPKCDHVFHPCIGAWLQ	GHVT	CPIC	
Bra009962-H2	CAICL	TEFGDDE	TL-RFLPKCDHVFHACIGAWLQ	GHVT	CPIC	
Bra010289-H2	CVVCI	EGFRQGG	WCRKLPCCGHVFRKCVDFWL	VKVT	CPIC	
Bra010349-H2	CSVCL	SKFESVE	IL-RLIPKCRHAFHVSICDITWLE	QHAT	CPIC	
Bra010370-H2	CVICM	TAINLRQR	TSDFMVTFCEHFFHFGICLQR	WMDTKME	CPIC	
Bra010473-H2	CAICR	EPM	KAKRLHCNHLFHLGCLRSWLDQGL	NDVYS	CPIC	
Bra010532-H2	CAICL	MEFSDEE	EI-RLIPKCRHAFHVSICDITWLT	SRSS	CPIC	
Bra010641-H2	CAICL	NELEDRE	TV-RLIPKCNHVFHPCIDAWLY	SHAT	CPIC	
Bra010702-H2	CGACSRPLS	EKSLWSSQKMFMTNELSVSA	ILACGHVHGECL	EKMTPEIDKF	DPS	
Bra010752-H2	CSICL	ESFTPOD	PATVTSCKEYHLCQIEIWSQ	RSKE	CPIC	
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Bra011359-H2	CCICL	AKYANNE	ELRELP-CSHFFHFKCVDKWLK	INAS	CPIC	
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Bra011991-H2	CIICL	SKFEDEE	TV-KVIPHCGLHVFHVDCTWLN	SHVT	CPIC	
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Bra013751-H2	CCVCL	GEFELKE	ELVEMPSCKHIFHLDCIHLWL	YSHTT	CPIC	
Bra013876-H2	CAICR	EPMA	KAKRLHCNHLFHLGCLRSWLDQGL	NEVYS	CPIC	
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Bra015142-H2	CSVCL	SNFEEDS	EINKL-KCGHLPHFKICVKEKID	YWNIT	CPIC	
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Bra015221-H2	CCICQ	EEYAGD	DLGTL-EGHVFHVSICDITWLL	LKNL	CPIC	
Bra015225-H2	CAICL	DQFKTGE	TLVHLP-CTHVFHVSICDITWLL	NA-Y	CPIC	
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Bra017732-H2	CSVCL	QDFQVGE	TVRSLPHCHHMFHLPCIDNWL	LRHS	CPIC	
Bra017859-H2	CGICL	QSAKAGR	GTAIFTAECSTHFFHVSICDITWLL	DLTLLAA	CPIC	
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Bra019304-H2 CPICL-----EYETEN-----PRLLTCKRHDHFLACLILEWME-----RSES-----CPVC  
Bra019382-H2 CAVCT-----EVFEAGA-----EGRE--MPCKHIFHGDCIVPWL-----SIRNS-----CPVC  
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Bra019672-H2 CPICL-----DEWSEGD-----VAAEMP-CRKHFFHRCIVPWL-----GRQAT-----CPLC  
Bra019673-H2 CGLCNRYIS--QKPPCGRSIVRNQDMPVTG-----VLPQHVFAECL-----DQSTPKAHRN--DPPCPVC  
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Bra020183-H2 CVICT-----EEMFLA-----EATSMPCSSHVHSSCIKWLQ-----VGNK-----CPLC  
Bra020234-H2 CAICL-----TAMKAGQGH-----AIFTAECSSHTFHFCITNVK-----HGM-QI-----CPVC  
Bra020313-H2 CAVCT-----EVFEAET-----EARE--MPCKHIFHGDCIVPWL-----SIRNS-----CPVC  
Bra020410-H2 CDLCDDRLA--SDPERNASL--RSLQEAC-----VLACGHVHFKCL-----RGTTLLDLDN--PSCILC  
Bra020507-H2 CPICFEYFL--ESRNDVT-----VLPCHHTHOKL-----EEMREHYQYA-----CPLC  
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Bra021160-H2 CIICR-----EEMT-----TAKKLCGHLFHVHICIRSWLER-----QQT-----CPTC  
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Bra021618-H2 CIVCL-----FDFAIDD-----KV-RQLPNCRHVHFKRCDRWI-----VDCKRIT-----CPIC  
Bra021697-H2 CAICH-----NELGASG-----ELNLTVCNHSVHQCILEGWK-----MNLF-----CPVC  
Bra022125-H2 CGICL-----EELNPRG-----EIVFDMPCSHQPHDLCISRWLR-----RSKI-----CPLC  
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Bra022310-H2 CPICCEFLF--TSSEAVR-----ALPCGHYMHSAF-----QAYT--CSHYT-----CPTC  
Bra022354-H2 CVICL-----SDFVAGE-----RI-RLLPNCNHGFHVRICIDKWLQ-----QHLT-----CPKC  
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Bra022849-H2 CPICC-----KEFGTEG-----DINSLNCEHSFHHICILDWVK-----KSLT-----CPVC  
Bra023041-H2 CPICL-----GDYKGNH-----LLRQLPDCRHLFHLKCIDTWLRL-----NPT-----CPVC  
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Bra023101-H2 CAICL-----EYVVEGE-----ELGELKCGGHDVHGCGIKWLS-----MKNS-----CPIC  
Bra023261-H2 CSICL-----LEFMDDD-----TM-RLISTCNHVFHICIDLWFE-----SHKT-----CPVC  
Bra023539-H2 CAICK-----DEIVVNE-----KVKR--LPCRHLYHKECIVPWL-----GIRNT-----CPVC  
Bra023814-H2 CSAICL-----NEFHVNE-----TV-RVIPHCFHLPFVDCVD--P-----KNVS-----CPLC  
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Bra025085-H2 CVICL-----VEYEGD-----TIRTLT-CHHEFHRTCVDRWLKE-----IHRV-----CPLC  
Bra025417-H2 CAICR-----EELTANE-----RLSE--LPCSHCRHDCISNWL-----SNRNT-----CPLC  
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Bra025597-H2 CAVCL-----CEFTKED-----KL-RLLPTCSHAFHVCIDTWLQ-----SNST-----CPLC  
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Bra025846-H2 CAICL-----TEFSAGD-----EL-RVMPQCGHGFHLSCIDTWLG-----SHSS-----CPSC  
Bra026165-H2 CVVCL-----SELHGED-----EVKRL-ECGHVFHFKFCLEGWLH-----HLHFT-----CPLC  
Bra026337-H2 CVVCL-----FELADGD-----KA-KFLPSCKHWFHARCIDPWLE-----SHAT-----CPIC  
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Bra026849-H2 CSICL-----EWSSEGD-----VAAEMP-CRKHFFHRCIVPWL-----GRHAT-----CPLC  
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Bra026955-H2 CCICL-----SAYEDGT-----ELRELP-CGHFFHSCVVDKWLQ-----INAT-----CPLC  
Bra027034-H2 CAICH-----NELGASG-----DLNLTVCNHSVHQCILEGWK-----MNLF-----CPVC  
Bra027282-H2 CTRICQ-----ENYKNQD-----KIATLD-CRHEVHAECLKWLQ-----IKNI-----CPVC  
Bra027349-H2 CVVCL-----SNLVDGD-----KA-RVMPCTCKHCFHVCIDKWLQ-----CNSI-----CPVC  
Bra027436-H2 CIVCL-----DDFEIGV-----EAKEMP-CRKHFFHSECLLPLW-----ELHSS-----CPVC  
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Bra027664-H2 CAVCL-----YDFENDD-----EI-RRLTNCRHIFHKECIDRWI-----MDYSQMT-----CPLC  
Bra027782-H2 CAVCL-----YDFENHD-----EI-RRLTNCRHIFHKECIDRWI-----MDYNQIT-----CPLC  
Bra028004-H2 CSVCL-----GDYQADD-----KLQIPACGHTFHMDCIDLWL-----TSHTS-----CPLC  
Bra028075-H2 CAICL-----NEFDGDE-----EL-RLMPACSHAFHPCIDVWLS-----SRST-----CPVC  
Bra028093-H2 CPVCL-----CEFEADD-----KL-RLLPKCSHAFHVCIDTWLL-----SHST-----CPLC  
Bra028138-H2 CSICL-----EDLSKS-----QOSIEMPNCLHMFHQCILFEWLG-----RKNS-----CPLC  
Bra028140-H2 CSICL-----EDFSVS-----HENIIMWPCQKHVHQCILEFELS-----RQNS-----CPLC  
Bra028173-H2 CIVCM-----EDFVPEG-----EATE--LPCRHLYHKNCTPWL-----RLHNS-----CPIC  
Bra028213-H2 CPTCL-----DDYTPEN-----PKIITRCSHFFHLSCIYEWME-----RSET-----CPVC  
Bra028453-H2 CAVCL-----CEFTERD-----KL-RLLPMSHAFHLCIDTWLQ-----SNST-----CPLC

Bra028464-H2 CAICL EDLLVGS AASTLP-CQHFFHTGCILEWLKN SR-F CPTC  
Bra028731-H2 CSICL ADVKRTD MIRVLPCNHLPHDKCVDLPWLK HPT CPVC  
Bra028866-H2 CVICK EEMGEGR DVCEMP-CQHLFHWKCILPWL SKRNT CPFC  
Bra028915-H2 CAICL GEFADGE KV-RVLPCCNHSFHMSCIDTWLV SHSS CPNC  
Bra028935-H2 CSVCL DEFERGV EAKEMP-CKHKFHWKCIIVPWL ETHSS CPVC  
Bra028950-H2 CCICL AKYKDKE EVRKLPL-CSHKFHLKCVQDQWLR IISG CPLC  
Bra029441-H2 CSICL DNLVSV-DKHGVSTRMTCSHVFEKCLLVWFQ RKNT CPLC  
Bra029442-H2 CSICL DNLVSVGRSNSKRGIPTRMTCSHVFDGCLLEWLQ RKNT CPLC  
Bra029869-H2 CPVCO DRFEMGS SARK-MPCRHIYHSECIVPWL FOHNS CPVC  
Bra030136-H2 CAVCK DAMVMSE IGKK-LPCGHFHDNCILPWL ETRNS CPVC  
Bra030218-H2 CSICS QSVKPGQ GTAIFTAECSSHTFHFPCVTSRAAAA DHNRLVT CPVC  
Bra030408-H2 CSICL EEEYEDDH EIMRLNK-CGHIHFHFCMDSWLA RHRS CPNC  
Bra030712-H2 CAICL DEIRKEDGK AIFTAECSSHSFHDCTISNVK HGN-RI CPLC  
Bra030854-H2 CSVCL DEFELGV EAKEMP-CEHKFHWKCIIVPWL ELHSS CPVC  
Bra030982-H2 CPICW EEFQTEL DINSLSNHTYHHHCISNWVE KTLT CPVC  
Bra030987-H2 CSICL SPFKPED RL-RHLLPLCSHAFHDCISTWLI SNKTU CPLC  
Bra031056-H2 CPICHEYIF TSNPAK ALPCGHVHMSACF QEYT-CSHYT CPIC  
Bra031193-H2 CGACSRPLS QKSLSSQKIFATNELSVAA ILACGHVHSECL EQMTPEADKF-DFQCPVC  
Bra031441-H2 CSACM NEFHVNE TV-RVIPHCFHLPHDPCVD P KNVN CPVC  
Bra031849-H2 CCICL QRVHSDQIN STAIFTAECSSHSFHLSCAVRLQD KR CPFC  
Bra032086-H2 CAICL EDMSEES E-QVLCQPPPECLHMFHEDCTINWLDL HDS CPLC  
Bra032514-H2 CSVCL NEFQEDE KL-RIIPNCCVHFHDCIDLDWLQ GNAN CPLC  
Bra033193-H2 CSVCL GDYQANE KLQIIPPCGHTFHMDCIDLDWL THTT CPLC  
Bra033599-H2 CAACARPLS EKSLWSRQNIFFMTELNSVSA VLACGHVHGDCL EQMPEVDKF-DFSPIC  
Bra033652-H2 CCICQ EETEGD DMGLE-CGHEFHSQCIKEWLK QKNL CPIC  
Bra033680-H2 CSVCL NEFQEEE KL-RIIPHCSHLPHDIDLDWLQ NNAN CPLC  
Bra033777-H2 CLICL EEFHGH EVRGLP-CAHNFHVECIDQWLR LNVT CPFC  
Bra033953-H2 CAICK \* EEFVGE EGKE-LKCLHLVHPSICIVSWL NHTT CPIC  
Bra033963-H2 CCICL SSEDGI ELVTLPL-CNHFFHSTCIVKWLK MNAT CPLC  
Bra034152-H2 CLICL GDFVGE KV-RVLPKCNHGFHDCIDTWLL SRDS CPFC  
Bra034259-H2 CAICL EDLWT N-KQLKPLHCSHQFHFRCISKWLQS RNS CPFC  
Bra034573-H2 CSVCL SEFESEE TL-RLLPKCRHAFHVECIDTWLR SHTN CPVC  
Bra034865-H2 CCICL GLEEGE KMKV-LPLCRHCYHCECVDRLW MTES CPVC  
Bra035010-H2 CPVCL ENIESCO SARLVPGCNHGFHQLCADTWL SHNTV CPVC  
Bra035230-H2 CIVCL SDFESDD DI-RQLPNCRHVFHRCIDLDRI VDCCKVT CPVC  
Bra035284-H2 CSICL DNLVGS SSIHGSATLMNCSHVHRCISLDWLQ QKNT CPFC  
Bra035483-H2 CSICL IDFMDDD TM-RLISTCNHFFHICIDLDWFE SHKT CPVC  
Bra035660-H2 CIVCL EDFEVND VV-RLVGCXHFHVECIDSWC FYKLT CPVC  
Bra035785-H2 CSICL QWEEGQ VGRKLERCGHTFHMKCIDWDF LRQS CPIC  
Bra035835-H2 CAVCM DEFEDGG DVKQVP-CKHVHQCDCMLPWL ELHNS CPVC  
Bra036197-H2 CAICR EKLAPSE RLSE-LPCRHVYHDCISSWL TNRNT CPVC  
Bra036491-H2 CIVCM ATIDLRRR TNDVMVTPCEHFLHSGCQLR WMDKME CPFC  
Bra036631-H2 CAICL NEFEDDE TL-CLLPKCDHVHPHICGAWLE GHVT CPVC  
Bra036816-H2 CSVCL MRMEDED AIKSLP-CSHEFSLCVDVDFDV SRKIC CPVC  
Bra037002-H2 CSVCL SEFESEE ML-RLLPKCRHAFHSLCIDTWLR SHTN CPVC  
Bra037109-H2 CSVCL DDFEVGV EAKQMP-CKHNFHADCLLPWL ELHSS CPVC  
Bra037333-H2 CPICF EDYEADN PKIKTNCEDHFLSLCLEWME KSDG CPIC  
Bra037367-H2 CSICY EDLKPA AENLQSIACGHVHFLCQLQWFEYCPS TNKRN CPIC  
Bra037410-H2 CCICN CPLTKTFS TLRVRFNCGHATHLQCEVS ESETSSSG CPVC  
Bra037561-H2 CAICL SEFVSCE RV-KLLPKCHHGFHRCIDRWLS SHSS CPFC  
Bra037562-H2 CIVCL SDFVAGE QV-RLLPKCNHGFHRCIDRWLK QHT CPFC  
Bra037592-H2 CPICCEFLF TSSETVR ALPCGHVHMSACF QAYT-CSHYT CPIC  
Bra037644-H2 CSICL QDAEAGE KMRR-LTACGCHVFHDCIDPWL EKRSST CPFC  
Bra037800-H2 CAVCK DGMVIGE TVKK-LPCGHCYHNCILPWL GTRNS CPVC  
Bra037999-H2 CCVCL DDFEMGT VCKQMP-CKHIFHSDCLLPWL QHSS CPVC  
Bra038051-H2 CAVCL SEFESEE PG-RVLPNCKHAFHVECIDMWFL SHSS CPVC  
Bra038109-H2 CTRIC ESFKNEE KIATLD-CGHEYHAGCILEKWLV VKNV CPFC  
Bra038199-H2 CAVCL GLEDGD EV-RELRNCSHVHRCIDRWLDYEC DDNDGEDNHT CPVC  
Bra038240-H2 CIVCR LDYEDDD DLILPL-CKHSHSECNINWLK INKI CPVC  
Bra038246-H2 CAVCM DEFEDGG DVKQMP-CKHVHQCDCMLPWL ELHNS CPVC  
Bra038386-H2 CAVCL NEYKEDD ML-RLLPKCGHVFHVCIDWFS YRST CPIC  
Bra038545-H2 CPVCL CEFEAED KL-RLLPKCRHAFHVECIDTWLL SHST CPVC  
Bra038813-H2 CVVCL DGFRRGQ WCRNLPCGCVHFRKCVDTWLL LKAAS CPIC  
Bra039168-H2 CPICL EETSEN PKVITKCSHFFHLCGCIYRWE RSEN CPVC  
Bra039281-H2 CPICL SEYASKE TVRCIPECEHCFFHICIDAWLK LHGS CPVC  
Bra039282-H2 CPICL SEYASKE TIRFMPEDHCFHVECIDVWLK IHGS CPVC  
Bra039287-H2 CPICL CEYKAE MLRMMPECKHYFHLCCLDWLK LNSG CPVC  
Bra039317-H2 CCVCL CEYEDGT ELRELV-CRHHFHEACIDKWLK INAT CPVC  
Bra039318-H2 CCVCL CEYEDGT ELRELV-CRHHFHEACIDKWLK INAT CPVC  
Bra039430-H2 CSICL DTVAKDGD RAWANLQCGHFLHDCIGSAFNA KQVMQ CPNC  
Bra039454-H2 CAICL NEFEDDE TL-RLVPKCDHVHPHICGAWLE AHVT CPVC  
Bra039652-H2 CSICL ESFTNGD MLISLP-CTHSFSSCNPWLRKA CG-D CPVC  
Bra039659-H2 CTRIC ESFKNEE KIATLD-CGHEYHAECLKWLII VKNV CPIC  
Bra039822-H2 CCQQC STFDE-GG GLQVTRGLCLHAHTSCLVS LKSFPPHTAPAG YVCPSC  
Bra039842-H2 CCICQ EEAEGD DLGLE-CGHEFHDCKIKQWVM LKNL CPIC  
Bra040087-H2 CCICL AKYANNE ELRELP-CSHFFHKECVDKWLK INAS CPVC  
Bra040450-H2 CIVCQ LKYKIGE KQMLNP-CKHVHSECSIKWLS INKI CPVC  
Bra040498-H2 CCICL NSVKTGQ GTAKYTAECSSHVHFFPCVTDVVS KHGKLV CPVC  
Bra040540-H2 CSICL ETVTKEGD RAWAKLHCGHEFHLDICGSAFNT KQVMQ CPNC  
Bra040564-H2 CAVCL SHLVDGD KA-RVLPNCGHGFHVCIDMWFL SHST CPVC  
Bra040642-H2 CAICL NEFEDDE TL-RLLPKCDHVHPHICIDAWLE AHVT CPVC  
Bra040855-H2 CPVCL NEFEDDE TL-RLLPQCHVHFHPCIDAWLR SHAT CPVC  
Bra040966-H2 CCICL CEYEDGV ELRELP-CNHFFHCTCDKWLH INSR CPVC  
Bra008196-H2 SSTCSNDLATGSHYASSEGWLSLNTFSELGGVSKGQMMSSVAALVACGHVHAECLVETVTE IEKYDPA CPIC  
Bra002312-H2 CAICL RNHIMDLCECQANQASATSEECTVAVGVCNHFHFCISRWL KTRQV CPIC  
Bra006565-H2 CAIC RNHIMDLCECQANQASATSEECTVAVGVCNHFHFCISRWL KTRQV CPIC  
Bra020111-H2 CAIC RNHIMDLCECQANQASATSEECTVAVGVCNHFHFCISRWL KTRQV CPIC  
Bra006585-H2 CCIR KENLVIG-DRMQE-LP-CKHTFHPCLKRWL DEHNS CPIC  
Bra016327-H2 CAVC LCFESBD-DKLR-LPVCSHAFHDCIDTFFFAAGDDGER EPAENDIR CGKR  
Bra027290-H2 CWIC REFVSDNAPD-DRSQDFKCTQCAHKYHGVCLQRS KRREPPF TYFC  
Bra010204-H2 CSVC LGDYQAD-DKLQ-ILSGGHTFHMDCIDLDWL TSHST CPVC

Figure S2 Multiple sequence alignment of 262 RING-HC domains of *B. rapa*.

Bra000043-HCa CAICFDARR DCFFLPCG-HCVSCY-CQGTKIA EAAGSCPV-C  
Bra000106-HCa CAICLETVFN PYALKCG-HIF-CK-ACACSAASVMIFQG VKAAPQCSKPI-C  
Bra000249-HCa CPVCTNLMY PPINCPNGHTL-CS-SCKQQVN TCFP-C  
Bra000250-HCa CVICMD LSKPEPVNCG-HLY-CW-PCLRYWLEVSVAK ECPV-C

Bra000425-HCa	CPICIEPLS	IPIFQCDNGHLA	CS	SCCPKLN		KCPS	C
Bra000480a-HCa	CCICFEQV	CTIEVKDCG	HQM	CA	QCTLALCCHNKPNPTTS	TVTPP	VCPP
Bra000480b-HCa	CTKQNMIELSEGCA	TVQCRCG	HSF	CY	RCG	ANAG	CCPH
Bra000646-HCa	CFVLETEPH	HSVVLLCSSYHKG	CRPYMCATGNRFSNCL	EQYKNAYARDEK		SGKPAELICPL	C
Bra000729-HCa	CGICMDIIV	DRGLLDCCQ	HWF	CF	ECIDNWSS	IMNLICPL	C
Bra000784-HCa	CRVCMGRKKGAA	FIPCG	HTF	CR	VCSREVWLNRG	SCPL	C
Bra000997-HCa	CPICLSNPK	NMAFCGG	HQT	CC	ECGPDLK	VCPI	C
Bra001159-HCa	CGICLSEEDMRR	LKGTLDCCS	HYF	CF	TCIMEWSK	VESRCPL	C
Bra001236-HCa	CCVCQVRIKQAT	FTSCG	HTF	CK	LCSKELMAQKG	HCPV	C
Bra001285-HCa	CSVCLDRVLSKATPGER	KFGLLTECH	HPF	CI	QCIRNWRSSAPVSGMD	VNSTLRACPI	C
Bra001477-HCa	CRSCGKGEA	SVLLLPFR	HMCLCS	VCGSS		VYTCPV	C
Bra001901-HCa	CPICNNLYDRA	TTISECL	HTFYCK	RCIEDKLVVENL		KACPV	C
Bra002208-HCa	CVICLTEPK	DTAVMPCR	HLCLCS	DCAKELRFQSN		KCPI	C
Bra002699-HCa	CAVCLERK	CTVSADGGC	HEF	CT	NCALYLSTTNTSSKIT	SQATPGSVPCPL	C
Bra003133-HCa	CVICLTEPR	DTTVLPCR	HMCMS	GCALLRFQTN		LCPI	C
Bra003180-HCa	CMLCQSLLF	DSTRCVFCT	HVF	CK	VCLAR	FKD	CPL
Bra003314-HCa	CNICLD	LSKEFVLTCGG	HLV	CW	FCLFQWLQISEAK	BCPV	C
Bra003315-HCa	CPVCTNLMY	PPIHQCPNGHTL	CS	NCKARVQN		TCPT	C
Bra003473-HCa	CPVCTNSMY	PPIHQCHNGHTL	CS	TCKNRVHN		RCPT	C
Bra003493-HCa	CAVCAADNLEW	VAYGSCG	HREVCS	TCVVRLEFVLD		FRCCI	C
Bra003533-HCa	CPICQVDPATP	FIALPCQ	HRV	CY	YCIIRTCASAAS	FRCLR	C
Bra003669-HCa	CFVLESPEH	NAVLLLCSSYHKG	CRPYMCATSSRFANCLDQYRKS	SYGNSEQ		AQLICPL	C
Bra003806-HCa	CPICWEFFNVFENV	PVVLWCG	HTI	CK	DCLLALHRAVVIKSSGF	PFHLEFFVCPW	C
Bra004082a-HCa	CKICRQVMTL	FVETPCA	HNH	CK	ACLEDKFAQTIVRERSRGGRT	LRAMKNMCKPC	C
Bra004082b-HCa	CSFCIQLPFR	FVITPCG	HNH	CL	KCFE	KWIG	QKRCIAK
Bra004174-HCa	CPVCFQALT	QHVFCQNGHIA	CS	SCCRELRN		KCPA	C
Bra004176-HCa	CPICLEPLR	GPIYQCCHNGHT	CS	FCLPRVYK		HCPV	C
Bra004260-HCa	CPICLVLPK	NMAFNCG	HQT	CS	DCGEDLH	VCPI	C
Bra004339-HCa	CRVCFEDPI	NVLLPCR	HHVLS	TCCEK		CKKCI	C
Bra004373-HCa	CPICFESFNIVENV	PVVLWCG	HTL	CQ	NCVVALQPAVLRSS	Q	DIKVEFFVCPW
Bra004401-HCa	CPVCHALT	NPIFQCDNGHIA	CS	SCCTNLRN		KCPV	C
Bra004402-HCa	CPVCHALT	RPVFCQNGHIA	CS	SCCTNLRS		KCPS	C
Bra004478-HCa	CAVCAENLEW	VAYGFCG	HREVCS	TCVVRLEFVLD		RRCCI	C
Bra004666-HCa	CVVCLD	LSKEFVVTCGG	HLF	CW	SCLYRWLVQSEAK	BCPV	C
Bra004829-HCa	CNICLE	KAEDPILTCGG	HLF	CW	GCYQLPFTYLNK	BCPV	C
Bra004879-HCa	CKANCD	RSKEVVITKCF	HLF	CN	PCVKLIITRQ	RKCP	C
Bra005128-HCa	CAICFDADR	DCFFLPCG	HCVACY	QCCKIT		EAAGSCPI	C
Bra005251-HCa	CSICLNWVHD	VVTAAPCL	HNH	CN	GCFS	EMRRS	EARHQHVLCPQ
Bra005352-HCa	CLICMKDEA	SVVELPCA	HQVVEA	SCSESEFM		GGDKATPC	C
Bra005381-HCa	CCVCNASQD	ETLLYRCG	HMCTCL	RCANELQCNGG		KCPI	C
Bra005541-HCa	CPICMQVIVD	AFLTACG	HSF	CY	MCIITHLRN	K	SDCPC
Bra005682-HCa	CGICLEIRNK	VVLPTCN	HSM	CI	NCYRDWRGRSQS		CPF
Bra005685-HCa	CAICFDADR	DCFFLPCG	HCVACY	QCCKIT		ETSGF	CPV
Bra006081-HCa	CAICQEKMH	TPILLRCK	HMF	CE	DCVSEWER	ER	TCPL
Bra006112b-HCa	CEHALFESATG	TGSSYDVSLCS	HSF	CW	NCTQDAHRPVDCCRVSQWIRKNS	VEAENTKWLIDNSKCPK	C
Bra006205-HCa	CSVCHTRYNED	ERVPLLLQCG	HGF	CK	DCLSKMFSSSS	DTSL	ACPR
Bra006253-HCa	CPICLSSPK	DMAFG	CG	HQT	CC	ECGPDLE	MCPI
Bra006505-HCa	CAICLNAIFLQ	ETAMVKGCE	HTY	CV	TCILRWASCKESPT	CPQ	C
Bra006634-HCa	CPICLEAFED	AVLTPCA	HRV	CR	ECLLASWRNSSS	GLCPV	C
Bra006745-HCa	CGICMEMNSL	AVLPNCT	HSL	CI	KCYRDWRGRSQS		CPF
Bra007068-HCa	CMLCQALLY	DSSRCVPT	HVF	CK	VCVAR	FKD	CPL
Bra007376-HCa	CPVCTNLMY	PPIHQCPNGHTL	CS	NCKARVQN		TCPT	C
Bra007725-HCa	CVICLDRKC	DAVLELQCG	HMCCLC	TCSLSLELQK		RCP	C
Bra007810a-HCa	CGICLQVMNF	FVETPCA	HNH	CK	GCLEDKFAQTIVRERSRGGRT	LRAMKNMCKPC	C
Bra007810b-HCa	CSFCIQLLER	FVITPCG	HNH	CL	KCFV	KWTE	QKRCIAK
Bra008335-HCa	CSVLESPEH	NAVLLLCSSYHKG	CRPYMCATSTRFANCLDQYRKS	HSGSEQ		LPILICPL	C
Bra008536-HCa	CSICRN	PFLNFPVVTNCN	HYF	CN	LCALM	HHEKNT	NCV
Bra008758-HCa	CPICLSNPK	DMAFCGG	HQT	CC	ECGPDLO	MCPI	C
Bra008900-HCa	CAICLDITFLQ	ETAMVKGCE	HAY	CV	TCILRWASYKEIHT	CPQ	C
Bra009089-HCa	CPICISPPRD	IIITRCA	HIF	CR	SCILQTLQRTKP		SCPL
Bra009278-HCa	CAVCLERT	CTVAEGCE	HQL	CV	RCALYLCSSSNVPSVT	VDPGSI	PCPL
Bra009452-HCa	CVCCDNIH	DALLYRCG	HMCCTS	CCANELVRNGG		KCP	C
Bra009546-HCa	CVICLSEPR	DVLVLPFR	HMCMV	GCANELRFQTN		LCPV	C
Bra009629-HCa	CVRCDFPIA	IYGRINPCD	HAF	CL	ECAR	SDSICYL	C
Bra010392-HCa	CPICNTNSMY	PPIHQCHNGHTL	CS	TCKNRVHN		RCPT	C
Bra010403-HCa	CNICLD	TAHDPVVTLCCG	HLF	CW	FCYKWLHVKLSFVSDHHH	NTCPV	C
Bra010714-HCa	KNVCFESPT	AAIPLPCR	HFLCLC	SCSLA		CSECI	PCPL
Bra010963-HCa	CGICLEPCIK	MVLNCC	HAM	CI	KCYRNWTKSES		CPF
Bra011479-HCa	CPICFGSFTV	PCRGDCG	HWF	CG	SCILQYWN	YAAVSR	CKCFM
Bra011582-HCa	CLNCGSDGET	RVLELPCR	HLCCT	ECEAG		LWVPI	C
Bra011923-HCa	CCICFEQA	CTIEVKDCG	HQM	CA	QCTLALCCHNKPNPTTS	TVTPP	VCPP
Bra011996b-HCa	CGKQNMIELSQG	CIRIKRCG	HEF	CY	QCGAE	ARRCPH	G
Bra012331-HCa	CSICHGNFSA	PCQANCS	HWF	CG	NCIMLVWR	HGSTLR	CKKPL
Bra012354-HCa	CPICCEPLK	IPIFQCDNGHLA	CS	QCCEKVKK		ICPS	C
Bra012512-HCa	CGICLEPCIK	MVLNCC	HAM	CI	KCYRNWTKSES		CPF
Bra012532-HCa	CKRGEREA	SVLVLPFR	HLCCT	VCGSA	L	LQCPV	C
Bra012650-HCa	CSICRRNSA	TVMALPCR	HVLCK	CGDGGD		VRVPI	C
Bra013017-HCa	CKICLIKEV	DITIVPCG	H	VLCR	ECSA	SVARCP	C
Bra013241a-HCa	CCVLELLEYK	PVLSG	HLS	CF	WCVHKSMELE	SHCP	C
Bra013241b-HCa	CSACKELLVR	PVVLNCG	HVY	CE	GCVDMF	QEGEK	IKQE
Bra013423-HCa	CKRGEREA	SVLVLPFR	HLCCT	VCGSA	L	LRTCPV	C
Bra013447-HCa	CCVCEMPV	ESLLYRCG	HMCCT	KCAHELOWSSK		KCPI	C
Bra013499-HCa	CADCHLAIKLVSKVYEREIVVRDRSRFHFKDGS	CQDYCLSLFSDAASLSCN	HV	FCN	ECIVKSMKV	DATCPV	C
Bra013775-HCa	CVICFEERR	NCFFVPCG	HSATCR	GCAEKIMS		EENKVCPI	C
Bra014051-HCa	CRFCGVREV	CMLLPCK	HMCLCK	ECERK		LSSCP	C
Bra014247-HCa	CVICEDASS	EAAVCVPCG	HVAGCV	SCLEIK		NKR	CPI
Bra014421-HCa	CPVCTNSMY	PPIHQCPNGHTL	CS	TCKNRVHN		RCPT	C
Bra014589-HCa	CPVCTNLMY	PPIHQCPNGHTL	CS	NCKARVQN		TCPT	C
Bra014591-HCa	CNICLD	VSKEFVLTCGG	HLV	CW	LCLFQWLNISEAK	BCPV	C
Bra014932-HCa	CLICMDAPS	DGICVPCG	HVAGCM	SCLTQIK		SHASECI	C
Bra014934-HCa	CSICLDAPS	EAVCVPCG	HVAGCM	SCLEIK		AKWGPCV	C
Bra015086a-HCa	CCVLELLEYK	PVLSG	HLS	CF	WCVHRSMSGLRV	SHCP	C
Bra015086b-HCa	CSACKELLVR	PVVLNCG	HVY	CE	GCVDMMDQSEK	IKKE	C
Bra015092-HCa	CCVCMVRSGAA	FIPCG	HTF	CR	LCSRELWVQRG	NCPL	C
Bra015262-HCa	CPICLGIIIRKT	RTFMELC	HRF	CO	ECIDKSMRFGN	HECPA	C
Bra015389-HCa	CGLCHESAED	SVVTS	HVF	CK	ACLIDFSASLKG	VSCPT	C
Bra015392-HCa	CGLCHESAED	NVVTSCA	HVF	CK	ACLIDFSASLRK	VSCPT	C
Bra015877-HCa	CNICLE	MAREPIVTLCCG	HLF	CW	PCLYKWIHFHSQSK	HCPV	C
Bra015952-HCa	CRICFEREI	SVLLPCR	HRVLCR	NCSEK		CKKCP	C
Bra016082-HCa	CSICHSHFTA	PCQANCS	HWF	CG	NCIMLVWR	HGSTLP	CKKPL

Bra016385-Hca	CCVCLERVLKPTPAER	KFGILTECD	HAF	CI	GCIRNWRSSSPSTCMD	VNSTLRACPI	C	
Bra016557-Hca	CRVCFEREI	SLVLLPCR	HRVLCR	ICSDK		CKKCPA	C	
Bra016898-Hca	CLACTNLMY	PPIFQCPNGHTL	CS	TCKLKVHN		TCPT	C	
Bra017091-Hca	CPICLENLTHR	RAAVIPSCR	HGY	CL	GCIRKWSGLKRS	CPL	C	
Bra017094-Hca	CAICLETVFN	PYALKCG	HIY	CK	ACACSSASVMIFQG	VKAAPQCSKPI	C	
Bra017511-Hca	CRICRRRAA	TVLALPCR	HLVLCK	GCDG	S	VRVCP	C	
Bra017614-Hca	CPICFSSFTV	PCRGNG	HWY	CG	SCILQYWN	YAAVSKPKCPM	C	
Bra017691-Hca	CLNCGLNGET	RVLFPCR	HLCCCT	GCEGD		LVLCPI	C	
Bra017935-Hca	CPVCLQSYDGESTL	FRVLSGC	HTA	CE	ECLTNI	PKKFPDIRCPA	C	
Bra018162-Hca	CGICMEMNSM	VVLPNCT	HSL	CI	KCYRDWHGRSES	CPF	C	
Bra018221-Hca	CEYALELH-EDLLEDDDLDFG	VVCLCG	HTF	CF	SCITLESHPVTCNDASVWFS	STLD-TLKSNAWLLLENTRKCPN	C	
Bra018266-Hca	CPICCVPLT	SNIFQCDNGHIA	CP	TCCNKLNR		KCPS	C	
Bra018428-Hca	CKMCHGKEV	SVLVVPCR	HLSLCK	ECDF	F	TGFCPV	C	
Bra018847-Hca	CRACND	PPEAPVITLGG	HIF	CY	QCVSEYITGDE	NSCPV	C	
Bra019048-Hca	CNICLD	TALDPVVTLGG	HLF	CW	FCIYKWLHVQLSSSLSTDHHR	NNCPV	C	
Bra019242-Hca	CVICFEERR	NCFVFLCG	HSATCK	GALRIMS		EENKVCPI	C	
Bra019391-Hca	CCVCMGRRGAA	FIPCG	HTF	CR	VCSREIWMNRG	SCPL	C	
Bra019817-Hca	CGICLETCTK	MVLPNCC	HSM	CI	KCYRNWNLKSQS	CPF	C	
Bra019910-Hca	CRMCNAREV	SVLVVPCR	HLSLCK	ECDF	F	TGVCVP	C	
Bra020414-Hca	CAVCLERK	CTVAADCGG	HEF	CT	NCALYLSTTNTSSKT	SQATPGSGVPCPL	C	
Bra020415-Hca	CAVCLERKTVAA	DCCG	HEF	CT	NWELYLSTTNTSSKT	PQATPGSDPCPL	C	
Bra020415-Hca	CAVCLERK	CTVAADCGG	HEF	CT	NWELYLSTTNTSSKT	PQATPGSDPCPL	C	
Bra020684-Hca	CPICMCFPTE	EMSTKCG	HIF	CK	GCIMK	AISKQKCP	C	
Bra020773-Hca	CVICMTEAK	DTAVLPCR	HLCMCS	CAKELRLQSN		KCPI	C	
Bra020883-Hca	CPICLSLFN	SAVSLCN	HVF	CN	ACIVK	SMKVDPATCPV	C	
Bra021742b-Hca	CFRCRRIE	KNQGCN	HM	TCSA	PCR	FQFCWI	C	
Bra021889-Hca	CPVCLGLIKPNA	VIKVLPNCK	HMF	YE	ECIARWL	ESHHTCPV	C	
Bra022858-Hca	CPVCHALT	NPIFQCDNGHIA	CS	ACCINMRN		KCPS	C	
Bra023148-Hca	CGVCD-ETQV	EAVLYMCG	HMCCTL	KCANELHWSGG		KCPI	C	
Bra023274-Hca	CLICMGNEV	SVVFLPCA	HQVVCG	SCSDNFFSSNN		GGGGVTCPC	C	
Bra023282-Hca	CKGRTREA	TVVMLPCR	HLSCIP	ECDR	T	ALACPL	C	
Bra023465-Hca	CPICLSNPK	DMAFG	CG	HQT	CC	ECGFDLQ	C	
Bra024213-Hca	CNICLD	QVRDPVVTLGG	HLF	CW	FCIYKWTHTNNTNRQVRVDQYDKKE	SSKCPV	C	
Bra024254-Hca	CPICLTKPK	DMAFS	CG	HTT	CK	ECGVVVK	TCPM	C
Bra024967-Hca	CRICWRRSA	TVLALPCR	HLILCK	GCDG	S	VRVCP	C	
Bra025434-Hca	CPICYELPT	VPIFQCDNGHIA	CS	SCCPKLSN		KCHA	C	
Bra025676-Hca	CTVCLKLLY	EPATPCG	HTF	CR	SCLFQ	SMDRGNKCP	C	
Bra025727-Hca	CNICFD	LAQDPVITLGG	HLF	CW	FCIYKWLHLHSTSS	ECPV	C	
Bra026271-Hca	CNICLD	QVRDPVVTLGG	HLF	CW	FCIYKWTYSTNNTRRRVDQYDKKE	SEKCPV	C	
Bra026301-Hca	CPVCTCSMY	PPIHQCHNGHTL	CS	TCKVRVHN		RCPT	C	
Bra026346-Hca	CNICLD	TAHDPVVTLGG	HLF	CW	FCIYKWLHVQLTSVSDQH	SNCPV	C	
Bra026920-Hca	CGICLETCTK	MVLPNCC	HSM	CI	KCYRNWNLKSQS	CPF	C	
Bra027538-Hca	CPICLGLIKKT	RTVMACL	HRF	CR	ECIDKSMRLGN	KECPA	C	
Bra027588-Hca	CKRGGERTA	SVLVVPCR	HLCLCT	VCGSA	L	LQACP	C	
Bra027667-Hca	CVICLEHNY	NAVFVPCG	HMCCT	AC	SSHLS	CPL	C	
Bra028153-Hca	CPICFEAFT	IPIFQCDNGHIA	CS	SCCPKISN		KCPT	C	
Bra028364-Hca	CKRGGERTA	SVLVVPCR	HLCLCT	VCGSA	L	LQSCP	C	
Bra028395-Hca	CPICCEPLK	APIFQCDNGHIA	CS	VCCTKVRN		ICPS	C	
Bra028419-Hca	CVICVDASA	EVAFCVCG	HVAGCI	SCILKEIK		NKKLGCPI	C	
Bra028646-Hca	CPVCDYAIKRHDEVPSEDF	DVVCLCG	HIF	CV	SCQLESHPVTCNNASFVNLN	ELLYKSRNLARTAKRIKHCP	C	
Bra028846-Hca	CPVLSLELR	DTIVLPCR	HMCMS	GCAKALRFQKN		ECPV	C	
Bra029623-Hca	CCVCHVIRKAT	FAPCG	HTF	CK	LCSKELMAQKG	HCPV	C	
Bra029631-Hca	CPICMCFPTE	EVSTKCG	HIF	CK	KCIKL	AVSVQAKCP	C	
Bra029788-Hca	CVICLSERP	DTIVLPCR	HMCMS	GCAKVLRFQTN		RCPI	C	
Bra029846-Hca	CCVCDTDI	DALLYRCG	HMCCT	NCGNELVRTGG		KCPL	C	
Bra030604-Hca	CGLCHPEAED	NVVTSC	HVF	CK	ACLIDFAASLGE	VSCPT	C	
Bra030874-Hca	CGVCFD	RPKEVVMKCF	HLF	CK	QCIRSLLEIRH	RKCPG	C	
Bra030900-Hca	CVICVTRRR	IPAFIPCG	HVVCCR	YCALTVER		GLNPKCP	C	
Bra031030-Hca	CRVCFEREI	SLVLLPCR	HRVLCR	ICSDK		CTKCP	C	
Bra031038-Hca	CTVCLKLLY	DPATPCG	HTF	CR	SCLFQ	SMDRGNKCP	C	
Bra031184-Hca	CKVCFESPT	ATILLPCR	HFCLCK	CSSLA		CSECP	C	
Bra031225-Hca	CCICYAGDAN	AVLVPCS	IRS	CY	GCI-TRHL	LNCQR	C	
Bra031418-Hca	CPSCVKILTNTM	SIVALSSCG	HVF	CK	KCGEK	FMPVDKVLV	C	
Bra031420-Hca	CPSCVKILTNTM	SIVALSSCG	HVF	CK	KCGEK	FMPVDKVLV	C	
Bra031495-Hca	CKSNVKEV	SVLVVPCR	HLSLCK	DCDV	F	TGFCPV	C	
Bra031942-Hca	CPICLTPNK	DMAFCG	HTT	CK	ECGVVVK	ICPM	C	
Bra032048-Hca	CPICFHLPT	IPIFQCDNGHIV	CS	TCCEKLSQ		KCAT	C	
Bra032145-Hca	CNICFE	LAQDPVITLGG	HLF	CW	FCIYKWLHHSHSQ	ECPV	C	
Bra032532-Hca	CPCLKLLN	QVLLP	CD	HIF	CD	SCIHE	SSQVESGCPV	C
Bra032581-Hca	CSICLDTVFD	PISLTCG	HIY	CY	MCACSAASVNVVDG	LKAADPSEKCP	C	
Bra032793-Hca	CPICLVRTK	NMAFNCG	HQT	CD	ECGEAIQ	TCPI	C	
Bra032944-Hca	CPICLEYPLC	PQITSCG	HIF	CF	PCVLQYLLIGEDNHKAECF	KRCPL	C	
Bra033002-Hca	CAICLETICR	PSTTTCG	HSF	CK	KLRSAAD	KCG	RKCPK	C
Bra033065-Hca	CFWCKSML	LWANFP	PCR	HKLWCS	SCKHK	IAESAGDHRKCV	C	
Bra033093-Hca	CPICWESFNIVENV	PVVLWCG	HTM	CK	NCILGLQWAIVKLPT	H	FVQLEFISCPW	C
Bra033268-Hca	CPICRE	SFVDPVVTKCK	HYF	CE	HALK	HHTKNK	KCFV	C
Bra033353-Hca	CSICLDTVFD	PISLTCG	HIY	CY	MCACSAASVNVVDG	LKTADPSEKCP	C	
Bra033393-Hca	CVMCLSEEM	SVIFLPCA	HQVLCF	TCNQLHE		KEGMKDCPS	C	
Bra033597-Hca	CKVCFESPT	AAFLPPCR	HFCLCK	SCSLA		CSECP	C	
Bra033682-Hca	CPICLESADD	PILTPCA	HRM	CR	ECLTTSWRSTSC	GLCPI	C	
Bra033732-Hca	CPICLGLIKKT	RTVMACL	HRF	CR	ECIDKSMRLGN	NECPA	C	
Bra033848-Hca	CPICLTIKRD	VAFCCG	LMI	CR	DGCSR	ISNCP	C	
Bra034017-Hca	CVICWTGFS	STRGILPCG	HRF	CY	SCIQQVDRLV	ERKTTCP	C	
Bra034086-Hca	CVICLSEPS	DTIVLPCR	HMCMS	GCAKVLRFQTN		RCPI	C	
Bra034121-Hca	CVICDADI	DALLYRCG	HMCCT	NCGNELVRTGG		KCPL	C	
Bra034212-Hca	CNICLD	SVQEPVVTLGG	HLF	CW	FCIHKWLHVQTEDEHQHQHK	QCPV	C	
Bra034501-Hca	CCVCMGREKGA	FIPCG	HTY	CR	VCSREIWMNRG	SCPL	C	
Bra034718-Hca	CRGCGKEA	SVLLEPCR	HMCCT	VCGSS		VNTCPV	C	
Bra035092-Hca	CRSGESES	CVLVVPCR	HLCLCG	VCGSS		VHTCPI	C	
Bra035112-Hca	CPICLTIK	DVAFCG	HMT	CG	ECGSRIS	NCPI	C	
Bra035664-Hca	CCICFEQV	CTIEVKDCCG	HQM	CA	QTLALCCHKNPNTLTS	TVNPP	VCP	C
Bra036164-Hca	CPICMCFPTE	EMSTKCG	HIF	CK	GCIMK	AISRQKCP	C	
Bra036227-Hca	CVMCLSEEM	SVIFLPCA	HQVLCF	TCNQLHE		KEAMDDCPS	C	
Bra036439-Hca	CPICEL	PFLDPVVITCD	HYF	CN	LCARK	HHKDP	TCFV	C
Bra037471-Hca	CPICMCFPTE	ETSTKCG	HIF	CK	GCIMK	AISRQKCP	C	
Bra037967-Hca	CVICVTRRR	VPAFIPCG	HVVCCR	QCASTVER		EVNPKCP	C	
Bra038276-Hca	CEYALELH-EDLLEDDDLDFG	VVCLCG	HTF	CF	SCITLESHPVTCNKREASVWSS	STLD-TLKSNAWLLLENTRKCPN	C	
Bra038348-Hca	CKVCFENPV	NVLLPCR	HYVLCF	TCKCK		CKT	CPI	C
Bra038415-Hca	CCVCLERVLKPTPAER	KFGLLTECD	HAF	CI	GCIRNWRSSSPSTCMD	VNSTLRACPI	C	
Bra038515a-Hca	CQICRKMSS	PVTTPCA	HNF	CK	ECLTGKFAGITQVRQSRSGRT	LRAQKVMKCP	C	

Bra038515b-HCa CSICLQLPER PVVTPCG HNF CL KCFQ KKWAG KRKPTCGT C

Bra038659-HCa CPGCSYPIEFHKGTDA EEEYGLNVVCLCG HNF CC RCSLETHRPVTCNNASDWLSRDLOKLEASDKLSFLWIEDNTEETCPH C

Bra039105-HCa CPICLSNPK NMAFGCG HQT CC ECGPGLK VCPY C

Bra039354-HCa CRSCGKGEA SVLLLPFR HMCLCS VCGSS INTCPY C

Bra039449-HCa CPICLGPIL QESYLDTCF HKF CF RCIKQWIKVSSKVK PLSSVKPL C

Bra039533-HCa CRRCGERA SVLVLPFR HMLCT VCGSA L LQACPV C

Bra039871-HCa CVCDETFV EAVLYRCG HMTCL KCANELHWSGG KCPY C

Bra040048-HCa CSCVLDRLVLSKATPGER KFGLLTECH HPF CI QCIRNWRSSAPVSGMD VNSTRACPI C

Bra040255-HCa CRFCGVGV CMLLLPCK HMLCK ECERN LSSCPL C

Bra040332-HCa CKACND RSKEVVITKCF HLF CN FCVLKITCTRQ RKCPY C

Bra040362-HCa CCVCQVNIKAT FTFCG HMF CK LSKELSAQKG HCPY C

Bra040424-HCa CVVLERKC DAAFVPCG HMCCCL TC ALKLLGK PCPL C

Bra000504a-HCb CSICIDNNS AIQMFSDVDCG HRF CS ECVKRYIEAKLLGNR LKCPHDCG C

Bra001543-HCb CMICMDEKSP SDIFRGTSTCT HYY CT ECTVRYVMTKIEGNIA MIKCPDVC C

Bra001771-HCb CNICND PEPNVVTLCCG HRF CY QCVSEHNGDE NVCPVRC C

Bra001960-HCb CDICVEDE GHHMTRMDCG HCF CN NCWAAHFTVKINEGQ SK RIRCMAYK C

Bra002501a-HCb CLICFNID PERMFSIGKCS HRF CF QCVKHVEVKLLHGM I PNCPHDK C

Bra002501b-HCb CGKQHMIELSQGCN HITRCG HEF CY NCGGG WNKGKGTGCVKQ C

Bra002502a-HCb CLICFNID PERMFSIGKCS HRF CF QCVKHVEVKLLHGM I PNCPHDK C

Bra002502b-HCb CGKQHMIELSQGCN HITRCG HEF CY NCGGG WNKGKGTGCAKQ C

Bra005642-HCb CGICFESYL RKEIATVSCG HPY CK TCWTSYITEKINNGPGCL MIKCPHDCG C

Bra006057-HCb CPICLCEVDG YSLEGCS HLF CK ACILLEQLEASMRNF D AFFILCSHTDC C

Bra006112a-HCb CGICFDYFC RIDIIVMCG HAF CS TCWTSYISIAINDGPGCL MQKCPHDCG C

Bra006671-HCb CLICYNET IERMFSAKCR HRF CF HCSKHVEVKLLHGM I PNCPHDK C

Bra007078-HCb CPACYAHVSP RHKLEVSGCF HRI CF TCIRDCVSSQLARGD TLLCPVPC C

Bra007801-HCb CAICLETD AGRMFSTBQCL HRF CF SCVKQYVEVKLLSGIV FTLCEGG C

Bra009038-HCb CPICLSEVDG YSLEGCS HLF CK ACILLEQLEASMRNF D AFFILCSHTDC C

Bra010152-HCb CCICFSESAG FDFVKLCEP HFF CV CKMKTYYDIHVSEGTVN KLQCPHDCG C

Bra011524-HCb CDVLEDDV AEQ MKRMDCG HCF CN DCWTEHFTVQINEGQ SK RIRCMAYK C

Bra011996-HCb CAICLDEDLN ADMFSDVDCG HRF CS ECVKRIEVLKLEGGF VRCPPHRC C

Bra012536-HCb CSICCEDRR AEMMLTLKCT HKS CS YCMKTYVQGRVESSEV PIRCPVQC C

Bra013417-HCb CSICCEDRL SEMMLTLKCT HRF CS YCMKTYVEGKVNSEV PIRCPVQC C

Bra014815-HCb CRKGEWCR LPVITPCR HLL CL DCVS LDSECTFPDC C

Bra015067-HCb CGICFDTFN AEQMFVASCG HEF CV ECVKRHIEVRVEGDDVH ITRCPY YIC C

Bra015460-HCb CGICFKLLSL ERSASVSCG HRV CK FCWRSHINKSINKIADVDWYG TLKCPYDC C

Bra015463-HCb CGICFEFFQ REEVVSLACG HRF CS TCWTSYITINDGPGCL MLKCPHDCG C

Bra018584-HCb CPACYTVRSH PHKLEVRSGCF HLI CF TCIRDCVSSQLARGD TVLCPYPC C

Bra020455a-HCb CIICLDDVD SDLMFYVERCG HRF CI NCVKQHINVKLVGDKI PNCPHDCG C

Bra020457-HCb CRICLDDVD SDLMFYVERCG HRF CI NCVKQHINVKLVGDKI PNCPHDCG C

Bra021726-HCb CGICFDYFP FEKIASVSCG HPF CT TCWTSYITINDGPGCL MLRCPDPC C

Bra021742a-HCb CGICFESYF QKDIATVSCG HPY CM TCWNGYITAKITGGPGCL MVCPHDCG C

Bra022479-HCb CGICFEYTL SDKLHAAACG HRF CD SCWEGYISTAINDPG C CLMLR C

Bra022845-HCb CGICFDSPY PEKFSVSCG HPF CT TCWTSYITINDGPGCL MLRCPDPC C

Bra022865a-HCb CGICFDSYT QKEVTLSCG HPY CN VCWTSYITINDGPG C CLTVK C

Bra023338-HCb CGICDFKFR RKKIVEVSCG HRF CS TCWNGYITINDGSGCL MQKCPHDCG C

Bra026648a-HCb CAICLDDVN ADMFTVVKCG HRF CS ECVKRHIEVRLEGGV MTCPPHRC C

Bra026648b-HCb CGKQHMIEL SKGCVLVVRCG HRF CF RCGANARSCHTGLGHMFPQPQ ELESPPAPPCWAQ C

Bra027352-HCb CMICMDEKPS SDFRGSVCT HAY CT QCTIRYVASKIKENSA RIKCPDVC C

Bra029725-HCb CMICMDEKSP SDFRGNCT HSY CT ECTVRYVETKIGENVA GIKCPDVC C

Bra031452-HCb CNICND SPEDAVVSCG HRF CK QCFYECTGDD NLCPIAN C

Bra033024-HCb CDICMEDDL PSHAMTGMCCG HSF CN DCWKEHFTIKINEGQ SK RIRCMAYK C

Bra034292-HCb CGICFDDLE AHQMFVALCC HRF CF ECVRRYINVLMEGRA FCCPHFC C

Bra035824-HCb CNICDD PEPNVVTLCCG HRF CY QCVSEHNGDE NVCPVRC C

Bra037371-HCb CPACYAHVSP RHKLEVRSGCF HRI CF TCIRDCVSSQLARGD SVLCPYPC C

Bra037375-HCb CVICYEGIT DTKFTV SCGF HRI CF ECMRNYITHSLRHS ATLCPYPC C

Bra038285a-HCb CVICYEGIT VDKMFSVDCG HRF CF SCMKQHVEIKLLGGKT RICPDSGC C

Bra038306-HCb CLICMDEKSP SDIFRGTSTCT HSY CT ECTVRYVTVKEENAARA RIKCPDMNC C

Bra038573-HCb CNICND SPEDAVVSCG HRF CK QCFYECTGDD NLCPIAN C

Bra039068-HCb CEICMDDDL QSYMTMRMDCG HCF CN NCWKEHFTVKINEGM SK RIRCMAYK C

Figure S3 Multiple sequence alignment of 44 RING-v domains of *B. rapa*.

Bra000030-V \* \* CRICHLGVVETSG ---GGA ---IELGCSCKEDLAGAHRQCAGTWFKIKGDKLVAHRQCAETWFKIKG ---DKICEIC

Bra001193-V CRICL-DVLEEGRNT ---LKMESCCKGDLR ---LVHBCALKWFSYTKG ---TRTCDVC

Bra001210-V CRICRSABEPGNA ---LMHPCSCRSIK ---VYHDCILFLWNRNR ---YKQCEVC

Bra002470-V CRICLVDLCEGGET ---FKMECSCKGELA ---LAHKDCALKWFTIKG ---NKTCEVC

Bra002600-V CRICHLPLETTNKADCECEDSDPEQEEQBBEED EEEYGLPIQLGCSCKDLG ---LAHSHCAETWFKIKG ---NMTCEIC

Bra005147-V CRICHLGVVETSG ---GGA ---MELGCSCKEDLA ---IAHRQCAETWFKIKG ---DKICEIC

Bra005444-V CRICHVGSQDTPDR ---VSKRTV ---VSLLELQIGCKCKNELA ---LAHFHCAEAWFKIRG ---NSVCEIC

Bra005697-V CRICHLGLESSRR ---ECGD FVILGCSCKDDL G ---VYHRQCAETWFKIKG ---DKICEIC

Bra009138-V CRICHTMLDANLN ---ESGV GIELGCSCKDDLA ---AAHKCAETWFKIKG ---NKICEVC

Bra009367-V CRVCCAESDRRD ---AALGFLGITPPVSEPRRSSNAKKQETTDHKTGGFELISPDGEVFCANEDIEMGAWG-HRDITLLELGCSCKNDLA ---LVHYACALKWFSYTKG ---STVCEIC

Bra010084-V CRICQDED-SVKM ---LECPSCSGSLK ---YAHRCVQRWCNEKG ---DITCEIC

Bra011370-V CRICQSPPEPNP ---LRHPCACRGSIK ---VYHDCILFLWNRNR ---SKHCEIC

Bra011487-V CRICRNPGADNP ---LRYPCACSGSIK ---FVHQDCLLQWLNRHSN ---ARQCEVC

Bra014329-V CRICHDED-LDCN ---METFPCSCSGSLK ---YAHRCVQRWCNEKG ---DITCEIC

Bra014845-V CRICKSEVG ---YQ ---QGL ---IELGCSCKGDLA ---FSHRCQCAETWFKIKG ---NQVCEIC

Bra017626-V CRICRNPGADNP ---LRYPCACSGSIK ---FVHEDCLLQWLSFSK ---ARHCEVC

Bra018136-V CRICQED-ITNN ---LETPCACNGSLK ---YAHRCVQRWCNEKG ---DITCEIC

Bra018414-V CRICLENSDILG ---DELISPCMKGTQQ ---FVHRCLDHWRSVKGFAFASHCTC

Bra019507-V CRICQED-TIQN ---LEAPCANGSLK ---YAHRCVQRWCNEKG ---DITCEIC

Bra020240-V CRICLVDLCEGGET ---LKMESCCKGELA ---LAHKDCALKWFTIKG ---NKTCEVC

Bra020758-V CRICL-DECEGNT ---LKMESCCKGDLR ---LVHBCALKWFSYTKG ---TRTCDVC

Bra022967-V CRICHFSGSDQTPDR ---VSGKS ---VSDVLEIGCKCKNELG ---LAHFHCAEAWFKIRG ---NSVCEIC

Bra023691-V CRICL-DVCEGNT ---LKMESCCKGDLR ---LVHBCALKWFSYTKG ---TRTCDVC

Bra024797-V CRICQDEC-PIKT ---LESFPCACSGSLK ---YAHRCVQRWCNEKG ---NICEIC

Bra024893-V CRICHDED-LDSN ---METFPCSCSGSLK ---YAHRCVQRWCNEKG ---NTNCEIC

Bra026840-V CRICQEES-AIKN ---LESFPCSCNGSLK ---YAHRCVQRWCNEKG ---NTICEIC

Bra028398-V CRICHDED-EDSN ---METFPCSCGTLK ---FAHHCQIQRWNEKG ---DITCEIC

Bra028747-V CRICHMSLDSVNL ---ESGV ---IELGCSCKNDLA ---AAHKCAETWFKIKG ---NKICEVC

Bra028847-V CRICMVELGDESA ---FKMECSCKGELA ---LSHKCAETWFKIKG ---NITCDVC

Bra029202-V CRVCSAESDRRD ---AALGFLGIT ---LKTNADET ---VDDN ---VSKST ---ETDIEMGILQHQDPLLELGCSCKNELA ---STVCEIC

Bra029259-V CRICQED-SVKM ---LESFPCSCSGSLK ---YAHRCVQRWCNEKG ---DITCEIC

Bra029597-V CRICRSPEEPGNP ---LRYPCACRGSIK ---FVHQDCLRWLRIRG ---NNKCEVC

Bra029786-V CRICLVELGDESA ---FKMECSCKGELA ---LAHKDCALKWFSYTKG ---NKTCDVC

Bra029787-V CRICMVELGDESA ---FKMECSCKGELA ---LAHKDCALKWFTIKG ---NKTCDVC

Bra030264-V CRICLETD ---G ---RDFIAPCKCKGTSK ---LVHRDCLDHWRAIKGFAFASHCTC

Bra030491-V CRICLDVG ---G ---EDLIGPCNCKGTQR ---VYHRDCLDHWRSVKGFAFASHCTC

Bra030505-V CRICHEE-PESY ---FEAPCSCGTLK ---FVHRDCLQWRNEKG ---NTICEIC

Bra031231-V CRICLESD ---G ---RDFIAPCKCKGTSK ---LVHRDCLDHWRAIKGFAFASHCTC

Bra031736-V CRICLENDCELG ---DELISPCMKGTQQ ---LVHRDCLDHWRSVKGFAFASHCTC

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Bra033335-V CRICHEEEEAESY-----FEAPCSCSGTVK-----FAHRDCIQRWCDEKG---NTICEIC
Bra036295-V CRICHEEE-RESF-----FEVPCACSGTVK-----FAHRDCIQRWCNEKG---NITCEIC
Bra037753-V CRVCHSTESDRRD-AALGLLEITPPVPEARKSNADAE---EAEQKSCIVKSN---IDIELGIQQQHQAALIELGSCCKNELA---LVHYACALKWFLNHG---STVCEIC
Bra038662-V CRVCHSVESDRRD-TALGLGILTPPIPEARKSNADDVSKDTEAEQKSSIVKSN---VNPIDIEMGIQQ-HQDALIELGSCCKNELA---LVHYACALKWFLNHG---STVCEIC
Bra040226-V CRICL-DVLEEGNT-----LKMESCKGDLR-----LVHEACAIKWFSTKG---TRTCDVC

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Figure S4 Multiple sequence alignment of 38 RING-C2 domains of *B. rapa*.

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Bra000934-C2 CHQCKN-LTDK-----VNLVFCSCCKKRY-CYDCIKK-----WYPETTSEEVQAAACPFC
Bra000936-C2 CHQCKN-LTDK-----VDLVFCSCCKKRY-CYDCIKR-----WYPERTPPEVVDACPCFC
Bra004233-C2 CYICRYRQEQP-----LDCVCEGFVL-CFRCATLPHKLRVYKH-----EHLVLFYSYKEYADDELWYCEIC
Bra005845-C2 CQICSDNVGKTV-----GDRFVACDVGCFV-CRCPYEF-----ERK-----DGNQSCPQC
Bra006036-C2 CQICGDEIELSD-----GESFVACNECAFFV-CRCPYEF-----ERR-----EGNQSCPQC
Bra006407-C2 CEICGDIQGLTVE-----DGLFVACNECGFPA-CRCPYEF-----ERR-----EGSQNCPQC
Bra006677-C2 CPLCAEMDLT-----DQQLKPKC-CGYQI-CVWCWHH-----IVDMAEKDQIEGRCPAC
Bra008170-C2 CPLCAEMDLT-----DLLFQCASCSEYKM-CLFCYNN-----INE-----STRVCPQC
Bra009365-C2 CPHCQSRVEKSDNY-----LRIVTC-CGYAF-CWRCLK-----PEEDHRGGLDYCFEV
Bra010131-C2 CPICYEDLDLT-----DSSLFPC-CGFRL-CLFCHK-----ICD-----GDGRCPQC
Bra011345-C2 CQICGDHAGLTET-----GDLFVACNECAFFV-CRCPYEF-----ERK-----DGTQCCPC
Bra011429-C2 CPVYCEDAQFTV-----FNRRHCHRLCGRVF-CAKCAAN-----SIPSPSDEAKSHBESSDRRIRVNCYC
Bra011865-C2 CQICGDDIELSVN-----GELFVACNECAFFV-CRCPYEF-----ERR-----EGNQACPQC
Bra011940-C2 CPLCAEMDLT-----DQHFVKPK-CGYQI-CVWCWHR-----IEMAEDKDTGRCPCAC
Bra012578-C2 NNTCGEEIGVKPN-----GEFVACHCESFP-CKACLEY-----EFK-----EGRRICLR
Bra013525-C2 CHWCGT-RGS-----EDLISCLSCSEKEFF-CVDCIEK-----RNKGS-KEEVEKRCPCV
Bra015887-C2 CPICSEGMDAT-----DLSFLPC-CGFRL-CLFCHK-----INE-----NDGRCPAC
Bra016801-C2 CHQCFK-GER-----RFLFICTCEEKLY-CFPCIKK-----WYPHLSHDDVIEKCPFC
Bra018086-C2 CPICYEDLDLT-----DSNFLPC-CGFRL-CLFCHK-----ICD-----GDGRCPQC
Bra020455b-C2 CPKCYHMVGRSYG-----CNRITCR-CGNAF-CYKCGY-----LWNRGIHGDCNQD
Bra022865b-C2 CIVAIDFASGRS-----EHYDVSCL-CSYEF-CWNCGEDAHRPVDCDTSVKWISKNTDESENTNWLANTKPCPC
Bra023952-C2 CQICGDHAGLTET-----GDLFVACNECAFFV-CRCPYEF-----DRK-----DGTQCCPC
Bra024324-C2 CKICRDEIELTV-----GEPFVACNECAFFV-CRCPYEF-----ERR-----EGNQACPQC
Bra027055-C2 CHQCLK-GER-----ITLLVCSCEETMY-CLQCIRK-----WYPHLSEDDIVDKPCFC
Bra028768-C2 CQICSDNVGKTV-----GDRFVACDVGCFV-CRCPYEF-----ERK-----HGNQSCPQC
Bra029238-C2 CPICYEDLDST-----DASFFPC-CGFKL-CLFCHK-----IYD-----GDGRCPQC
Bra029664-C2 CHQCQR-NDN-----GEVVRQNCDDRKY-CHKLET-----WYPRIPHEEDIAKRCPCFC
Bra029874-C2 CQICTENVGRAEN-----GYPFVACDVCSFSV-CRCPYEF-----ERR-----YGNQSCPQC
Bra030754-C2 CHHCLR-KDR-----ERLISCLCNQRAF-CDACITT-----QYSDIPLSEEVEKVCPCAC
Bra031904-C2 CEICRDEIESTVD-----GEPFVACNECAFFV-CRCPYEF-----ERR-----EGNQACPQC
Bra033714-C2 CRICRDEVDKGDN-----GQTFVACHVCAFFV-CKPCYEF-----ERS-----NGNKCPCQC
Bra035692-C2 CPLCAEMDLT-----DQHLNPKC-CGYQI-CVWCWHQ-----IEMAEDKDTGRCPCAC
Bra037394-C2 CHQCKIMSSK-----TDLVFCSICVKNRY-CKDCLK-----WYPERTPPEGVKAAACPFC
Bra037793-C2 CEICRDEVELTV-----GEPFVACNECAFFV-CRCPYEF-----ERR-----EGNQACPQC
Bra038282-C2 CPLCAEMDLT-----DQQLNPKC-CGYQI-CVWCWHH-----IIDMAEKDQIEGRCPAC
Bra038285b-C2 CIRCNMVELAFG-----CYHITCR-CGYEF-CYTGAEWK-----NKKATCACPIW
Bra038775-C2 CHWCGT-RGF-----EDLISCLSCSEKEFF-CVDCIEK-----RNKGS-KEEVEKRCPCV
Bra040045-C2 CKTCGKRYKKNVKSQAQRDLRHFHSSWSCPSCRV-----CEVCRRT-----GDP-----NKVFCCKRC

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Figure S5 Sequence alignment of 731 RING domains in 715 putative proteins of *B. rapa*.

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Bra000007-H2 CIVC-----LSVFDGG-----EIRRR-LSA-----CK-HAF-HVS-C-----IET-----WL-KDH-PN-----CPI-C 42
Bra000143-H2 CAVC-----KENFELK-----SAARE-MP-----CN-HIY-HPD-C-----LLP-----WL-AIR-NS-----CPV-C 41
Bra000207-H2 CAVC-----KDFEELK-----TEAKQ-MF-----CN-HIY-HSD-C-----IVP-----WL-VQH-NS-----CPV-C 41
Bra000350-H2 CAIC-----REDFVIG-----ESARR-LP-----CD-HLY-HHD-C-----ITP-----WL-TSH-NT-----CPL-C 41
Bra000673-H2 CAIC-----LNEFDDE-----ETLRW-MFP-----CS-HTF-HAS-C-----IDV-----WL-SSW-ST-----CPV-C 42
Bra000683-H2 CAIC-----LEDYRIG-----DKLRI-LP-----CN-HKF-HVG-C-----VDL-----WL-GOR-RSF-----CPV-C 42
Bra000742-H2 CIVC-----LSDFESD-----DNIRQ-LFN-----CR-HVF-HDH-C-----LDLRIV-DCR-KMT-----CPI-C 44
Bra000951-H2 CSIC-----YEDLK-PVAEN-----LQ-SISA-----CG-HVF-HEL-C-----LQ-----QWFE-YCP-STNKRN-----CPI-C 48
Bra001080-H2 CSVC-----LSEFQEE-----ERIRM-LFK-----CS-HAF-HVA-C-----IDT-----WL-KSH-SN-----CPL-C 42
Bra001153-H2 CSIC-----LDTVARDGD-----RAWAN-LQ-----CG-HQF-HLD-C-----CG-----IG-----SAFNKGVGMQ-----CPN-C 45
Bra001381-H2 CPVC-----QDRFEVG-----SVARK-LP-----CK-HIY-HSE-C-----IIP-----WL-IQR-NT-----CPV-C 41
Bra001390-H2 CCIC-----LQGLIERG-----EKRVY-LFM-----CR-HCY-HCC-C-----VDR-----WL-MPE-SS-----CPL-C 42
Bra001582-H2 CIVC-----QEVTKR-----DKIAM-LD-----CK-HEY-HPA-C-----LE-----KWL-IRN-Y-----CPI-C 42
Bra001639-H2 CAVC-----LSEFERT-----ESGRV-LPG-----CK-HTF-HVD-C-----IDM-----WF-HSH-ST-----CPL-C 42
Bra001721-H2 CIVC-----LSDFVAG-----EQRL-LK-----CN-HGF-HVR-C-----IDK-----WL-TQQ-MT-----CPK-C 42
Bra001767-H2 CAVC-----MDEFEDG-----GDWQK-MP-----CK-HVF-HQD-C-----LMP-----WL-ELH-NS-----CPV-C 41
Bra002061-H2 CAIC-----LTFEADG-----EIRV-LPL-----CG-HSF-HVA-C-----IDK-----WL-VSR-SS-----CPS-C 42
Bra002084-H2 CSVC-----LQDFQIG-----ETVRS-LPH-----CH-HMF-HLP-C-----IDK-----WL-LRH-GS-----CFM-C 42
Bra002147-H2 CSVC-----KKLLSQKSPWCSHKILRSQDMPAAGV-----FP-----CH-HVY-HVE-C-----LDKVTPT-SQTRDPS-----CPA-C 59
Bra002176-H2 CPIC-----YE-YLFDLS-----KD-TIVMK-----CG-HTM-HFE-C-----CG-----HTM-RDKFC-----CPI-C 43
Bra002312-H2 CAIC-----RNHIMDLCTEQCANQASATSEECTVAV-----GV-----CN-HAF-HFH-C-----ISR-----WL-KTR-QV-----CPL-D 56
Bra002336-H2 CAVC-----LGDLEDG-----DEVRE-LRN-----CS-HVF-HRE-C-----IDRWLYECCGGDD-NDGEED-NHRT-----CPL-C 56
Bra002382-H2 CSIC-----LPEFCDSDP-----ST-LTS-----CK-HEF-HLQ-C-----LL-----EWC-QRS-SQ-----CFM-C 41
Bra002441-H2 CPVC-----FE-YLFDST-----RD-ITVLR-----CG-HAM-HLE-C-----TKDM-----GL-HNRVT-----CPL-C 43
Bra002456-H2 CAIC-----LTAMKAGQ-----GHAI-FTAE-----CS-HSF-HFH-C-----ITTN-----VQGN-QF-----CPV-C 44
Bra002559-H2 CAVC-----TEVFEAE-----TEARE-MP-----CK-HIF-HDD-C-----ITP-----WL-SIR-NS-----CPV-C 41
Bra002636-H2 CIVC-----LGLWEVG-----DFGRK-LRF-----CG-HGF-HVE-C-----IDM-----WL-SSH-SS-----CPL-C 42
Bra002690-H2 CDLC-----GRDLASDPERP-----NVS-LRSLQEVCVLD-----CG-HVY-HFK-C-----LKG-----TLDD-LDNRS-TNPS-----CPI-C 58
Bra002823-H2 CSVC-----LDEFKGVY-----EAKRE-MP-----CK-HKF-HVK-C-----IVP-----WL-ELH-SS-----CPV-C 43
Bra003083-H2 CAIC-----LSEIEFN-----ETIRM-IFL-----CQ-HCF-HAD-C-----IDB-----WL-KLN-GP-----CPV-C 42
Bra003351-H2 CIVC-----LSDFEFK-----ETVMY-TE-----CK-HMF-HBE-C-----IVP-----WL-KSK-QG-----CPL-C 41
Bra003404-H2 CAVC-----LSRFEED-----DQLRL-LPL-----CC-HAF-HAD-C-----IDI-----WL-VSN-QT-----CPL-C 42
Bra003450-H2 CAVC-----LVEFEGE-----EIRW-LRN-----CR-HIF-HRS-C-----LD-----RWM-DHQ-KT-----CPL-C 43
Bra003507-H2 CSVC-----LSEFEKE-----DEGRV-LPK-----CG-HVF-HVD-C-----IDT-----WF-RSR-SS-----CPL-C 42
Bra003667-H2 SCLC-----EKEVPKE-----GEIVR-KTR-----CN-HIF-HGT-C-----IS-----RVL-LR-IPH-----CPF-C 42
Bra003720-H2 CIVC-----LTFEFAAG-----DELRV-LPQ-----CG-HGF-HVS-C-----IDT-----WL-ESH-SS-----CPS-C 42
Bra003754-H2 CGAC-----SKPEKSSVANFERQIAA-----VL-A-----CG-HVY-HAE-C-----LEMTTE-IEKYDLA-----CHV-C 51
Bra003830-H2 CSIC-----QEEYEGK-----DEVGK-LR-----CG-HRY-HIR-C-----AK-----QWLL-RKN-S-----CPV-C 41
Bra003887-H2 CPVC-----LNEFDDE-----ETLR-LK-----CC-HVF-HPG-C-----VDA-----WL-RSH-AT-----CPL-C 42
Bra004008-H2 CPIC-----FYEYAEENPKT-----VLQ-----CG-HIF-HLA-C-----IK-----EWM-ERS-AA-----CPF-C 41
Bra004280-H2 CCIC-----LSSYEDG-----TELVT-LP-----CN-HHF-HST-C-----IY-----WL-RMN-AT-----CPL-C 41
Bra004287-H2 CAIC-----KEEFVVG-----EKGKE-LTS-----CL-HLY-HTS-C-----IVS-----WL-NIH-NT-----CPI-C 41
Bra004342-H2 CCIC-----QEGFFLGGY-----AT-ITS-----CS-HVF-HSS-C-----ITD-----WI-NKS-TK-----CPL-C 41
Bra004436-H2 CSIC-----LELVVDGGS-----RSSAK-LQ-----CG-HQF-HLD-C-----CG-----IG-----SAFNKGVGMQ-----CPN-C 45
Bra004446-H2 CSVC-----LSEFVEE-----DQGR-LFK-----CG-HVF-HVD-C-----IDT-----WF-RSS-ST-----CPL-C 42
Bra004563-H2 CSIC-----LCEYREA-----EMIRM-MPE-----CK-HYF-HLC-C-----LDA-----WL-KLN-GS-----CPV-C 42
Bra004589-H2 CPVC-----KEEFELG-----AEAKU-MP-----CN-HVY-HSD-C-----IVP-----WL-VQH-NS-----CPV-C 41
Bra004685-H2 CAVC-----LPLLEEK-----DTARM-LFN-----CK-HVF-HMT-C-----VDT-----WL-TTH-ST-----CPI-C 42
Bra004686-H2 CAVC-----LAPLEEK-----DTARM-LAN-----CK-HVF-HMA-C-----VDT-----WL-ATH-ST-----CPI-C 42
Bra004687-H2 CAVC-----LSSLLEEQ-----DTARE-LPS-----CK-HVF-HVD-C-----VDK-----WL-TAC-ST-----CPV-C 42
Bra004847-H2 CSIC-----LQDAEAG-----EKMR-LTA-----CS-HCF-HAG-C-----IDP-----WL-EKR-ST-----CPL-C 42
Bra004935-H2 CCIC-----LCDYEDG-----TELRE-LS-----CR-HHF-HEA-C-----IDK-----WL-RIN-AT-----CPL-C 41
Bra005020-H2 CAVC-----KETFILD-----SAARE-MP-----CN-HIY-HPD-C-----ILP-----WL-AIR-NS-----CPV-C 41
Bra005066-H2 CSIC-----LTRMKGGG-----GHAI-FTAE-----CS-HSF-HFH-C-----IASN-----VKHGN-QV-----CPI-C 44

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Bra005307-H2	CPIC		LDGDKGN	DLRQ	LPD	CN	HFF	HLK	C	VDM	WL	RIN	PT	CPV	C	42		
Bra005343-H2	CAIC		LSEFSD	DTVRL	ITV	CR	HGF	HSI	C	IDL	WF	ESH	KT	CPV	C	42		
Bra005374-H2	CAVC		LCEFEDE	ETLRL	MFP	CC	HVE	HAD	C	VSV	WL	SER	ST	CPL	C	42		
Bra005375-H2	CVVC		LCEFDQD	DRLSL	MPN	CC	HVY	HAD	C	VDD	WL	SDH	ST	CPL	C	42		
Bra005859-H2	CSIC		FEDLS	DVDEE	SI	ELMD	CS	HVE	HKV	C	LEF	QWLV	SKS	S	CPL	C	43	
Bra005970-H2	CAVC		KDEMGIG	SRGVVLQP	LP	CN	HKY	HGE	C	IVP	WL	ETR	NT	CPV	C	43		
Bra006070-H2	CSIC		QDEYVDC	DEVGT	MP	CE	HMY	HVS	C	VQ	QWLR	MKN	W	CPI	C	41		
Bra006321-H2	CPTC		LEEYTSNPKI	VTK		CC	HBY	HLS	C	IY	EVM	ERS	OD	CPV	C	41		
Bra006415-H2	CSVC		LSEFEED	ESLRL	LPK	CN	HAF	HLP	C	IDT	WL	RSJ	SN	CPL	C	42		
Bra006470-H2	CPIC		FE	YLDLSL	KE	TVMK	CG	HFM	HCE	C	ISR	YHEMK	RDKFC	CPI	C	43		
Bra006565-H2	CAIC		RNIIMDLCECQANQASATSEBCIVAW	GV		CN	HAF	HFA	C	ISR	WL	KTR	QV	CPL	D	56		
Bra006583-H2	CAVC		LQDLEED	DEVR	LRN	CS	HVE	HRE	C	FVK	WL	GRU	DS	CPL	C	53		
Bra006585-H2	CCTR		KENLVIC	DRMG	LP	CK	HFT	HFP	C	LKP	WL	DEL	NS	CPL	C	41		
Bra006603-H2	CSIC		LEARCESEP	ST	LFS	CK	HEV	HLQ	C	LL	EWK	QRS	SQ	CFM	C	41		
Bra006641-H2	CPVC		FE	YLDST	RD	ITVLR	CG	HFM	HLQ	C	TKDM	GL	HNRVT	CPV	C	43		
Bra006709-H2	CAVC		TEVEGEE	TEARE	MP	CK	HIF	HED	C	IVP	WL	SIR	NS	CPV	C	41		
Bra006752-H2	CVIC		LGLEVEG	EFGRR	LRT	CG	HGF	HVE	C	IDM	WL	SSH	ST	CPL	C	42		
Bra006916-H2	CSIC		LMDVEDE	DAVTQ	LFR	CN	HLE	HVL	C	IEP	WL	LR	GLT	CPL	C	43		
Bra007174-H2	CSVC		LEQVTVG	EVVRT	LP	CL	HQF	HAV	C	IDP	WL	RQD	GT	CPV	C	41		
Bra007253-H2	CPVC		KEEFELK	SEAKQ	MP	CK	HMY	HSD	C	IVP	WL	VQH	NT	CPV	C	41		
Bra007414-H2	CSVC		LEDFELK	ETVML	TP	CK	HMF	HBE	C	VQ	WL	SKS	GQ	CPV	C	41		
Bra007504-H2	CAVC		KEDFVVG	ESAKR	LP	CS	HIY	HSD	C	IVP	WL	SDH	NS	CPL	C	41		
Bra007515-H2	CAVC		LSKFEFE	DQLRL	LFL	CC	HAF	HAD	C	IDT	WL	VSN	QT	CPL	C	42		
Bra007580-H2	CSIC		LCAVEDEG	AELRE	LP	CR	HMF	HVS	C	VDK	WL	RIN	AT	CPL	C	41		
Bra007606-H2	CAVC		LYEVEG	QELRW	LRN	CR	HIF	HRS	C	LD	RWMD	HDO	KT	CPL	C	43		
Bra007613-H2	CSIC		LCEYME	EMVRM	MPE	CK	HMF	HVS	C	IDA	WL	KLN	GS	CPV	C	42		
Bra007629-H2	CSIC		LSEYATEK	ETVRF	LPE	CE	HCF	HAE	C	LDA	WL	KLH	SS	CPV	C	42		
Bra007694-H2	CSVC		LSEFEDE	DEGRV	LPK	CG	HVF	HVD	C	IDT	WL	RSR	SS	CPL	C	42		
Bra007789-H2	CAIC		LEGLVKND	TF	DLPY	CS	HVF	HST	C	LL	EWT	ERS	RKGGGS	CPL	C	42		
Bra007847-H2	CAIC		LDDFELK	FMSM	FFG	CF	HGF	HRE	C	LL	EWT	ERS	RKGGGS	CPL	C	45		
Bra007848-H2	CAIC		LEDMSES	QAFVC	QFPFC	CV	HVF	HED	C	FVK	WL	GRU	DS	CPL	C	43		
Bra008015-H2	CPIC		LANEVED	ETLRL	LPK	CC	HVE	HPC	C	IDA	WL	QSH	AT	CPL	C	42		
Bra008016-H2	CPVC		LANEFEDA	ERLRL	LPK	CC	HVE	HPC	C	IDA	WL	QSH	PT	CPL	C	42		
Bra008018-H2	CPVC		LANEFED	ESLRL	LPK	CN	HAF	HIS	C	IDT	WL	RSJ	TN	CPL	C	42		
Bra008028-H2	CAIC		LSLDVKG	DKARL	LPK	CN	HSP	HVE	C	IDM	WL	QSH	ST	CPL	C	42		
Bra008075-H2	CVVC		LSELAEG	DKAKL	LPS	CK	HWF	HAI	C	IDA	WL	ESH	AT	CPI	C	42		
Bra008196-H2	SSTC		SNDLATGSHYASSGKGMWLNITFSELGQ	VFSKQ	GMMSSVAVLA	CG	HVY	HAE	C			LETVTTE	IEKYDPA	CPI	C	74		
Bra008257-H2	CAIC		LTEFAAG	DELVR	LQD	CG	HGF	HVS	C	IDT	WL	GSH	SS	CPS	C	42		
Bra008462-H2	CPVC		LERLDQ	DTGG	LI	TM	CN	HSP	HCS	C	ISN	WF	DSS	CPV	C	40		
Bra008475-H2	CCIC		LARYGDD	EVRE	LP	CL	HVE	HVD	C	VDK	WL	KLN	AT	CPL	C	41		
Bra008518-H2	CRIC		QDEFEG	EQVRS	LRN	CA	HVE	HKT	C		IDRWIH	DDK	MT	CPL	C	43		
Bra008671-H2	CAIC		MGDVVK	EKVT	LP	CW	HYY	HGE	C	IVP	WL	EMK	NT	CPV	C	41		
Bra008675-H2	CPTC		LEEYTSNPKI	VTK		CS	HMF	HLS	C	IY	EVM	ERS	ED	CPV	C	41		
Bra009015-H2	CSIC		QDEYVDC	DEVGT	MP	CE	HMY	HVS	C	VQ	QWLR	MKN	W	CPI	C	41		
Bra009037-H2	CSVC		LSEFEED	EGVRL	LPK	CS	HAF	HVS	C	IDT	WL	LSH	KN	CPL	C	42		
Bra009136-H2	CAVC		LARFEP	EVRLR	LPK	CK	HAF	HVE	C	VDV	WL	DAH	ST	CPL	C	42		
Bra009297-H2	CSIC		LCDVVAR	DPVRC	IPE	CN	HCF	HAD	C			VDEWLR	TSAT	CPL	C	42		
Bra009323-H2	CAIC		NDEMDVQ	TEAVG	LP	CD	HKL	HTE	C	IVP	WL	KTR	NF	CPV	C	41		
Bra009570-H2	CVIC		KEEMSG	RDVCE	MP	CG	HLE	HKC	C	ILP	WL	SKR	CPV	C	41			
Bra009663-H2	CSVC		LQDFVQ	ETVRS	LPH	CH	HMF	HLP	C	IDK	WL	RGH	AS	CPL	C	42		
Bra009800-H2	CSIC		QDEYVDC	DEVGT	LP	CQ	HMY	HVS	C	AQ	QWLR	MKN	W	CPI	C	41		
Bra009912-H2	CPDC			NAM	E	CN	HSP	HLH	C	ILK	WV	NSQ	TSQAH	CFM	C	34		
Bra009960-H2	CAIC		LNVEFDD	ETLRL	LPK	CD	HVE	HPIH	C	IGA	WL	QGH	VL	CPV	C	42		
Bra009962-H2	CAIC		LTEFGDD	ETLRL	LPK	CD	HVE	HAI	C	IGA	WL	QGH	VL	CPV	C	42		
Bra010204-H2	SVIC		LGDYQAD	DKLQ	ILS	GG	HTF	HMD	C	IDL	WL	TSJ	ST	CPL	C	42		
Bra010289-H2	CVVC		LEGFRGG	QCGRK	LPG	CG	HVE	HKK	C	VDF	WL	VKV	GT	CPI	C	42		
Bra010349-H2	CSVC		LSKFEV	ELRL	LPK	CR	HAF	HIG	C	IDP	WL	EQH	AT	CPL	C	42		
Bra010370-H2	CVIC		MTAINLROKRTSD	FM	VTP	CE	HFF	HIG	C	LQ	RWMD	IKM	E	CPI	C	44		
Bra010473-H2	CAIC		REFM	KA	KRLH	CN	HLE	HLG	C	LR	WL	DQGLN	DVYS	CPI	C	41		
Bra010532-H2	CAIC		LMFESDG	ETLRL	LPL	CR	HAF	HVA	C	IDK	WL	TSR	SS	CPS	C	42		
Bra010641-H2	CAIC		LNVELDR	ETVRL	LPV	CN	HLE	HVA	C	IDA	WL	YSH	AT	CPV	C	42		
Bra010702-H2	CGAC		SRPLSEKLSWSSQKMFMTNELSVSA	IL	A	CG	HVY	HGE	C			LEKMTPE	IDKFDPS	CPI	C	59		
Bra010752-H2	CSIC		LESFPTQDP	AT	VTS	CK	HEV	HLQ	C	II	EWS	QRS	KE	CPI	C	41		
Bra010969-H2	CCVC		LCGFKKE	EVESE	LVS	CK	HFF	HRA	C	LD	NWFG	NNH	TT	CPL	C	43		
Bra011068-H2	CSVC		LSKFEV	ELRL	LPK	CR	HAF	HVG	C	IDQ	WL	EQH	AT	CPL	C	42		
Bra011187-H2	CVIC		LDGFRQ	QCRR	LPG	CG	HVE	HKK	C	IDP	WL	VKV	GT	CPL	C	42		
Bra011188-H2	CAVC		LSKFEV	ELRL	LPK	CR	HAF	HVA	C	IDP	WL	EQH	AT	CPL	C	42		
Bra011215-H2	CVIC		LDYEMN	ETGKQ	MPA	CQ	HKE	HVC	C	LDY	WL	QJH	SS	CPV	C	41		
Bra011359-H2	CCIC		LAKVANN	EELRE	LP	CS	HFF	HKE	C	VDK	WL	KLN	AS	CPL	C	41		
Bra011618-H2	CAIC		LTEPTD	ETLRL	LPL	CN	HAF	HVA	C	IDK	WL	TSR	SS	CPS	C	42		
Bra011643-H2	CSVC		LQDFVQ	ETVRS	LPH	CH	HMF	HLP	C	IDN	WL	LPH	GS	CFM	C	42		
Bra011873-H2	CGAC		SRPLSEKSMWSSQKIFMTNELSVSA	IL	A	CG	HVY	HGE	C			LEQKMTPE	IDKFDPS	CPI	C	59		
Bra011991-H2	CIIC		LSKFEV	ETVRF	IPH	CG	HLE	HVD	C	VDT	WL	NSH	VF	CPL	C	42		
Bra012055-H2	CAIC		LEDVRF	DSLRL	LP	CQ	HAF	HLS	C	IDS	WL	TKW	GTS	CPV	C	42		
Bra012134-H2	CVIC		LDELKND	AS	TIA	CG	HDF	HVE	C	IK	NWLM	VKN	K	CPL	C	41		
Bra012251-H2	CAIC		LTEFSD	DELVR	LQD	CG	HGF	HVS	C	IDT	WL	GSH	SS	CPS	C	42		
Bra012330-H2	CPVC		LNGFED	ETLRL	LPQ	CC	HVE	HPC	C	IDA	WL	RSJ	VT	CPL	C	42		
Bra012441-H2	CVIC		LEEKAK	ETVKE	MP	CK	HVF	HGG	C	VEK	WL	GLH	GS	CPV	C	41		
Bra012630-H2	CAIC		LLEFEDHV	L	RL	LTT	CY	HVF	HQE	C	IDL	WF	ESH	KT	CPV	C	42	
Bra012814-H2	CSIC		LVDYAE	DAVTH	LFR	CN	HLE	HIN	C	IEP	WL	LS	GHLT	CPL	C	43		
Bra013006-H2	CAVC		REEMSVG	NEVAE	LP	CR	HKY	HGE	C	IVP	WL	GIR	NF	CPV	C	41		
Bra013110-H2	CTIC		LEPLVTRD	DRRTFVLR		CG	HKF	HLD	C			SLIK	IG	SFAVAKGFMD	CPN	C	47	
Bra013118-H2	CCQC		QAAPDES	GGLT	KLK	CL	HAF	HVS	C	LV	SLLK	SIP	PHYAPPGV	CPI	C	51		
Bra013211-H2	CSVC		LNKFEV	GSDV	KLS	CG	HLE	HKE	C			VEKID	VRI	TT	CPL	C	42	
Bra013267-H2	CSIC		LSEFEDE	ESLRL	LPL	CG	HIF	HVY	C	IDR	WL	SM	SN	CPL	C	42		
Bra013268-H2	CAIC		LLEFDDHV	L	RL	LTT	CY	HVE	HQE	C	IDL	WF	ESH	KT	CPV	C	42	
Bra013751-H2	CCVC		LSEFELK	EELVE	MPS	CK	HIF	HLD	C	IHL	WL	YSH	TT	CPL	C	42		
Bra013876-H2	CAIC		REFMAKA	KKLIH		CN	HLE	HLG	C	LRS	WL	DQGLN	EVYS	CPI	C	42		
Bra014043-H2	CCVC		QEEVKEG	EMGV	LE	CG	HDF	HSQ	C	IK	EMLK	RKN	L	CPL	C	41		
Bra014174-H2	CVIC		LSDFVCG	EKLR	LPK	CN	HGF	HVR	C	IDK	WL	KQH	LT	CPK	C	42		
Bra014175-H2	CVIC		LSDFVCG	EKLR	LPK	CN	HGF	HVR	C	IDK	WL	QQH	LPT	CPK	C	42		
Bra014177-H2	CVIC		LSEFVSE	ERVKL	LPT	CH	HGF	HVR	C	IDK	WL	SSH	SS	CPI	C	42		
Bra014221-H2	CSIC		LESFPTG	DMLIS	LS	CT	HSP	HSS	C	LN	PWLI	ACG	D	CPY	C	41		
Bra014266-H2	CAVC		KEVFLG	NETTQ	LP	CL	HLV	HPIH	C	IVP	WL	GAR	NS	CPL	C	42		
Bra014339-H2	CVIC		LSTLKSQ	EVVRK	LQ	CR	HVE	HLQ	C	LE	GWL	QHL	NFK	CPL	C	41		
Bra014424-H2	CSIC		LSEYASS	ETVGC	LTI	CE	HCF	HVE	C	IDT	WL	QLR	SS	CPI	C	42		
Bra014435-H2	CAVC		LYEVEG	QELRW	LRN	CR	HIF	HRS	C	LD	RWMD	HDO	KT	CPL	C	43		
Bra014499-H2	CPIC		LYPLFPE	DGESD	OMP	FMKL	MS	HCF	HCE	C	ILRWV	NWL	HTE	KRADS	VNGNSGSDVSKLGN	CPV	C	68
Bra014508-H2	CAVC		LQEAEBG	DRMR	LTI	CR	HCF	HAD	C	IVP	WL	GEM	SST	CPL	C	43		
Bra014684-H2	CPVC		KEEFELK	SEAKQ	MP	CK	HVF	HSD	C	IVP	WL	VQH	NT	CPV	C	41		
Bra015142-H2	CSVC		LSNFEE	DSRIN	KLK	CG	HLE	HKT	C			LEKVID	YWN	TT	CPL	C	42	
Bra015160-H2	CTIC		FTLRLP	AVL	FM	CM	HSP	HQR	C			LG	DNK	TE	CPV	C	36	
Bra015221-H2	CCIC		QDEFEG	DLGT	LE	CG	HIF	HVA	C	IK	QWLM	RKN	Y	CPI	C	41		
Bra01																		

Table with columns for protein IDs (e.g., Bra016880-H2), domain types (e.g., CAVC), domain names (e.g., LSVFEQ), domain positions (e.g., 1-20), domain types (e.g., DTARE), domain positions (e.g., 1-20), domain types (e.g., CR), domain positions (e.g., 1-20), domain types (e.g., HVE), domain positions (e.g., 1-20), domain types (e.g., HVD), domain positions (e.g., 1-20), domain types (e.g., C), domain positions (e.g., 1-20), domain types (e.g., IDT), domain positions (e.g., 1-20), domain types (e.g., WL), domain positions (e.g., 1-20), domain types (e.g., TTC), domain positions (e.g., 1-20), domain types (e.g., ST), domain positions (e.g., 1-20), domain types (e.g., CPV), domain positions (e.g., 1-20), domain types (e.g., C), domain positions (e.g., 1-20).

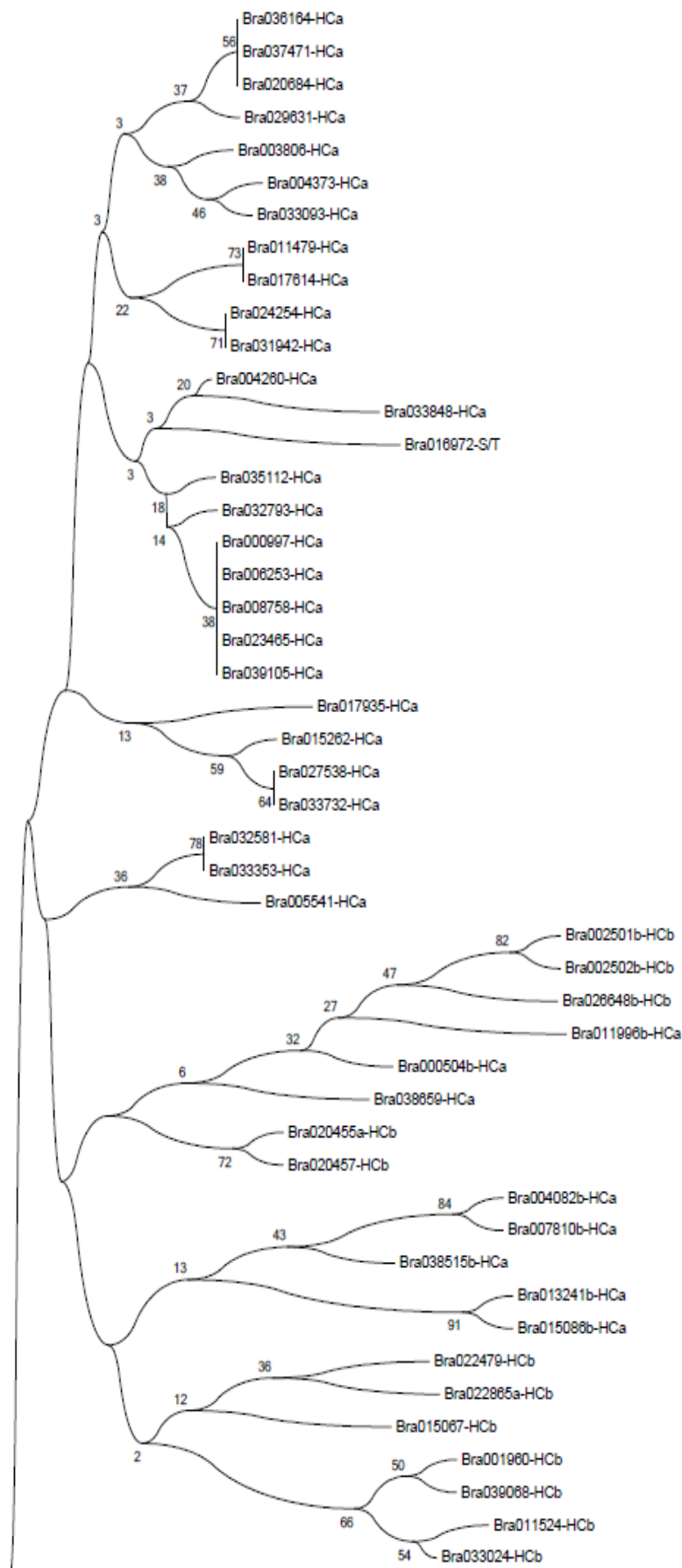
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Bra029869-H2 CPVC QDRFEMG -SSARK-MF CR--HIY -HSE C IVP -WL -EQH -NS - CPV-C 41
Bra030136-H2 CAVC KDAMVMS -EIGKK-LP CG--HFY -HDN C ILP -WL -ETR -NS - CPV-C 41
Bra030218-H2 CGIC SQSVKFGQ -GTAL-FTAE CS--HTF -HFF C -VTSR - -AAAADHN RLVI - CPV-C 47
Bra030408-H2 CSIC LEVEEDD -HEIMR-LNK CG--HIF -HFF C MD -SWL -ARH -RS - CPN-C 42
Bra030712-H2 CAIC LDEFKED -KCAL-FTAE CS--HSF -HFD C -ITSN - -VKGN -RI - CPL-C 44
Bra030854-H2 CSVC LDEFKG -VEAK-MF CE--HVF -HGE C LLP -WL -ELH -SS - CPV-C 41
Bra030982-H2 CPIC WEFEPT -ELDIN-SLS CN--HTY -HHD C -ISN - -WV -EKT -LT - CPY-C 42
Bra030987-H2 CSIC LSPFKFE -DRIRI-LFP CS--HAF -HLD C -IST -WL -ISN -KT - CPL-C 41
Bra031056-H2 CPIC HEYTFISNPA -KA-LP CG--HVM -HSA C -FOEYI - -CS -HYT - CPL-C 42
Bra031193-H2 CGAC SRPLSQSKLSSSKIPATNELSVAA -IL-A- CG--HVI -HSE C - - -LEQMTPE -ADKDFDQ - CPV-C 59
Bra031441-H2 CSIC MNEFVN -ETVRY-LPH CG--HLE -HID C -IDL - -WF -ESH -KT - CPV-C 42
Bra031849-H2 CSIC LQRVSDQT -NSITV-FTAE CS--HSF -HLS C - -AVRL - -QDK -K - CPL-C 43
Bra032086-H2 CAIC LEDMSKEES -EVLCC-QPPE CL--HMF -HED C -LTN - -WL -DRH -DS - CPL-C 45
Bra032514-H2 CSVC LNEFQED -EKLR-IPI-CN--HVF -HID C -IDI - -WL -QGN -AN - CPL-C 42
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Bra033599-H2 CAAC ARPLSEKSLWRSQNIEMINELSVSA -VL-A- CG--HVV -HGD C - - -LEQMTPE -VDFKDPDS - CPI-C 59
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Bra033777-H2 CLIC LEEFHIG -HEVGG-LP CA--HNF -HVE C -IDQ - -WL -RLN -VK - CPR-C 41
Bra033953-H2 CAIC KEEFEVG -EEKKE-LK CL--HLY -HPS C -IVS - -WL -NLH -NT - CPL-C 41
Bra033963-H2 CCIC LSSYEDG -IELVI-LP CN--HMF -HST C -IK - -WL -KMN -AT - CPL-C 41
Bra034152-H2 CLIC LGDFVEG -EKVRY-LPK-CN--HGF -HVR C -IDT - -WL -LSR -DS - CPY-C 42
Bra034259-H2 CAIC LEDLWYN -KQLK-LPH CS--HGF -HFR C -ISK - -WL -QSR -NS - CPL-C 41
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Bra035284-H2 CSIC LDNLVGS -SSIHGSAT-IMN CS--HVF -HER C -LS -DWLG -QKN -T - CFM-C 45
Bra035483-H2 CSIC LIDFMD -DYMRL-IST CN--HVF -HIT C -IDL - -WF -ESH -KT - CPV-C 42
Bra035560-H2 CVIC LEDFEVI -DVRV-LVG CK--HVF -HVE C -IDS - -WC -FYK -LH - CPV-C 42
Bra035785-H2 CSIC LGDFVEG -QVGR-LER CG--HTF -HMK C -ID - -WF -LRQ -VS - CPL-C 42
Bra035835-H2 CAVC MDEFEDG -GDVKG-VB CK--HVF -HOD C -LMP - -WL -ELH -NS - CPV-C 41
Bra036197-H2 CAIC REKLAP -ERLSE-LP CR--HYV -HKD C -ISS - -WL -TNR -NT - CPL-C 44
Bra036491-H2 CVIC MATIDLRRRTND -CM-VIP CE--HLE -HSG C -LQ -RWMD -IKM -E - CPY-C 44
Bra036631-H2 CAIC LNEFEDD -ETLCL-LPK CD--HVF -HPH C -IGA - -WL -EGH -VT - CPV-C 42
Bra036816-H2 CSVC LMRDED -DAIKS-LP CS--HEF -HSL C -VDT - -WF -DVS -RKC - CPL-C 43
Bra037002-H2 CSVC LSEFEVE -EMLR-LPK CR--HAF -HLS C -LDT - -WL -RSH -TN - CPL-C 42
Bra037109-H2 CSVC LDDFEVG -VEAKQ-MF CK--HNF -HAD C -IDD - -WL -ELH -SS - CPV-C 41
Bra037333-H2 CPIC FEDYEADPKI -KYN CS--HDF -HLS C -IL - -EWK -EKS -DG - CPI-C 41
Bra037367-H2 CSIC YEDLK-PALEN -LQ-SISA CG--HVF -HCE C -LQ - -WFE -VCP -STNKRN - CPL-C 48
Bra037410-H2 CCIC NCPLKTFPS -TLRVR-VFN CG--HAT -HLQ C - - -EVSSE -TSSSG - CPV-C 45
Bra037561-H2 CAIC LSEFVGG -ERVKL-LPK CH--HGF -HVR C -IDK - -WL -SSH -SS - CPY-C 42
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Bra037644-H2 CSIC LQDAEG -EKRRR-LTA CG--HCF -HAE C -IDP - -WL -EKR -ST - CPY-C 42
Bra037900-H2 CAIC NDGMVIC -ETVKK-LP CG--HCV -HGN C -ILP - -WL -GTR -NS - CPV-C 41
Bra037999-H2 CVIC LDDFEMG -EKIKL-LP CG--HIF -HSD C -SLP - -WL -QIR -NS - CPV-C 41
Bra038051-H2 CAIC LSEFEES -EPRV-LFN CK--HAF -HVE C -IDM - -WF -LSH -SS - CPL-C 42
Bra038109-H2 CVIC QSEFKVE -EKIAT-LD CG--HEV -HAG C -LE - -KVLV -VKN -V - CPL-C 41
Bra038199-H2 CAVC LGDLEDG -DEVRE-LRN CS--HVF -HRE C - -IDRMLDVEG -DD -NDGEED -NHRT - CPL-C 53
Bra038240-H2 CVIC RLDVEDD -DDLIL-LP CK--HSY -HSE C -INN - -WL -KIN -KI - CPV-C 41
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Bra038386-H2 CAVC LNEFKED -EMLR-LP CG--HVF -HVA C -VDI - -WF -SYR -ST - CPL-C 42
Bra038545-H2 CPVC LCFEAE -DKLR-LPK CS--HAF -HVD C -VDT - -WL -LSH -ST - CPL-C 42
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Bra039168-H2 CPIC LEEYTSNPKI -VTK CS--HMF -HLS C -ID - -EWK -ERS -EN - CPV-C 41
Bra039281-H2 CPIC LSEYASK -ETVRC-IPE CE--HCF -HIE C -YA - -WL -KLH -GS - CPL-C 42
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Bra039454-H2 CAIC LNEFEDD -ETLRL-VFK CG--HVF -HPH C -IGA - -WL -EAG -VT - CPV-C 42
Bra039652-H2 CCIC LSEFTNG -DMGIS-LP CD--HVF -HSS C -LA - -WFLK -AG -D - CPL-C 41
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Bra039822-H2 CCVC QSTDFDGG -GLVT-RLG CL--HAI -HTS C - -LV -SLIK -SEF -PHITAPAGV - CPY-C 51
Bra039842-H2 CCIC QEEVAG -DDLGT-LE CG--HEF -HKD C -IK - -QVW -LKN -L - CPL-C 41
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Bra000106-Hca CAIC LETVFN -YA-LK CG--HIF -CKA C -ACSAASV -MIFQ -GVK -AAPQCSK - CPY-C 49
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Bra000425-Hca CPIC LEPLSIPF -Q -DNHGLA -CSS C - -CFK -LKN -CPS-C 36
Bra000480-Hca CPIC FEQVCTIE -VKD CG--HQM -CAQ C -TLA - -LCCH -NKP -NEFTTSTVTFPV -CPY-C 49
Bra00054b-Hca CRIC LEIPIHSV -V-L-L- CG--HSE -CVR C - - -AT -GANAGC -CPM -CPY-C 48
Bra000646-Hca CPIC -MDIT -VD-RGLDC CG--HYG -CRPMC - - -AT -SRA -ASA - -KRYKAYARDEKSKPAELL - CPL-C 63
Bra000729-Hca CSIC -MRKK -GAE-IP CG--HMF -CFE C -IDN - -WR -SSI -MML - CPL-C 38
Bra000784-Hca CRVC LSNENK -MA-FG CG--HTF -CRV C - - -SREVMAR -GS -CPL-C 37
Bra000997-Hca CPIC LSEEDMR -RLKG-TLDC CG--HQT -CCB C - - -GS -GP -D-LKV -CPL-C 38
Bra001159-Hca CGIC -CVRIK -GATF-TS CS--HVF -CFT C - -IMENK -VESR -CPL-C 38
Bra001236-Hca CCVC LDRVLSKATF -GERKFGILLTE CG--HTF -CKL C - -SKELMAG -GH -CPV-C 47
Bra001285-Hca CSVC -GKGEAS -VLL-LP CH--HFP -CIQ C -IRN -WR -SSAFV -SGMDVNSTLRA - CPL-C 49
Bra001477-Hca CRSC -NNLYDR -ATT-ISE CR--HMCL -CSV C - -G -SSVYI -CPV-C 36
Bra001901-Hca CPIC LTFPKDT -AV-MF CL--HTFY -CKR C - -AK -LEDKL -VVENLKA -CPV-C 41
Bra002208-Hca CVIC LERKCTVSA -DG CR--HCL -CSD C - -AK -ELRF -QSN -K -CPL-C 39
Bra002699-Hca CAVC LTFPRDT -TV-LP CG--HEF -CTN C - -ALVLTSTTTNTSKTTSGATPGS -VF -CPL-C 52
Bra003133-Hca CVIC QS-LLEDST -RC-VN CR--HMCM -CSG C - -AK -LRF -QTN -L -CPL-C 40
Bra003180-Hca CMLC LLSLKE -PVL-TC CT--HVF -KVV C -L -AR -FKD -CPL-C 34
Bra003314-Hca CNIC TNLMYFPIN -Q CG--HLY -CWF C -LF -OWLG -ISE -AKE -CPY-C 39
Bra003315-Hca CPVC TNLMYFPIN -Q CPNHTL -CSS C -KA -RV -QNT -CPT-C 36
Bra003473-Hca CPVC ADNLK -WVAG -S -CHNGHTL -CST C -KN -RV -HNR -CPT-C 47
Bra003493-Hca CAVC -QVDPATP -FIA-LP CG--HRE -CST C - -VV -RFR -VLC -DPR -CCT-C 32
Bra003533-Hca CPIC LESPINAM -L-L-L- CG--HRY -CIV C -IRI -RC -ASA -ASFR -CLR-C 40
Bra003669-Hca CPVC WEFEPT -EN-VEPYLW CG--HYG -CRPMC - - -AT -SRA -ASA - -KRYKAYARDEKSKPAELL - CPL-C 63
Bra003806-Hca CPIC RQVMUL -PVT-TP CG--HTI -CKD C -LLALARAIVVIXSSGFF -FIL -PEFT -CFM-C 52
Bra004082a-Hca CRIC IQLPER -PVT-TP CA--HNF -CKA C -LEDKFAGQTLRERSRGR -TLRA -QKN -VMN -CPC-C 57
Bra004082b-Hca CSFC FOALTOVVF -Q -CA--HNF -CLK C - - -KWIIG -QCK -RI -CAK-C 38
Bra004174-Hca CPVC -LEPLR -GPI -YQ -DNHGLA -CSS C -CR -ELRN -K -CPL-C 36
Bra004176-Hca CPIC LWFIPN -MA-FN -CHNGHTL -CSF C -LPRVY -KI -EDLHV -CPL-C 36
Bra004260-Hca CPIC FEDPINV -VLL-LP CG--HQT -CSD C - -G -EDLHV -CPL-C 34
Bra004339-Hca CRVC FEFNIV -EN-VEPYLW CR--HVL -CST C - -V -CEK -CKK -CPL-C 39
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Bra004478-Hca CAVC LLSLKE -PVV-TN CG--HRE -CST C -VV -RFR -ILG -DRR -CCI-C 41
Bra004666-Hca CVVC LEKED -PIL-TC CG--HLE -CWS C -LY -RWLG -VSE -AKE -CPV-C 40
Bra004829-Hca CNIC NDRSKE -VVI-TC CG--HLE -CWE C - -FYQLPFT -VLN -IKK -CPL-C 41
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Bra005128-Hca CAIC LNVMDIV -VTA-AP CG--HVA -CYQ C -GT -KITE -AAG -RS -CPL-C 40
Bra005251-Hca CSIC MKDEV -VVF-LP CL--HNF -CNG C - - -FEEMR -RSEARHQVL -CPQ-C 44
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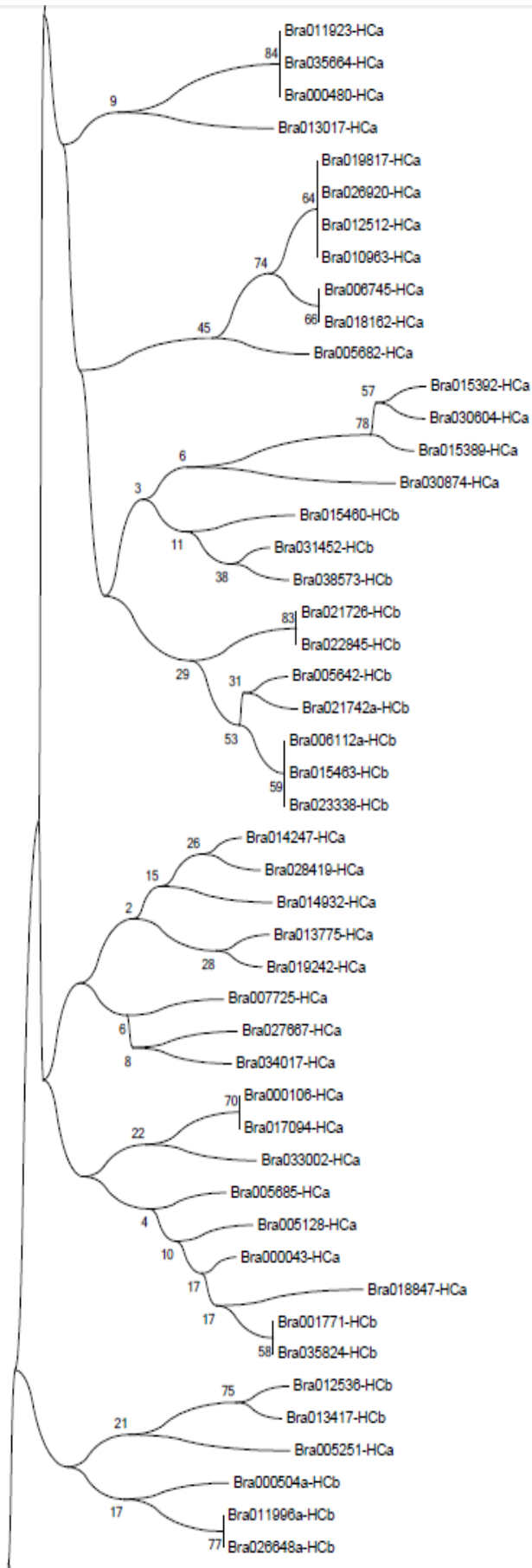




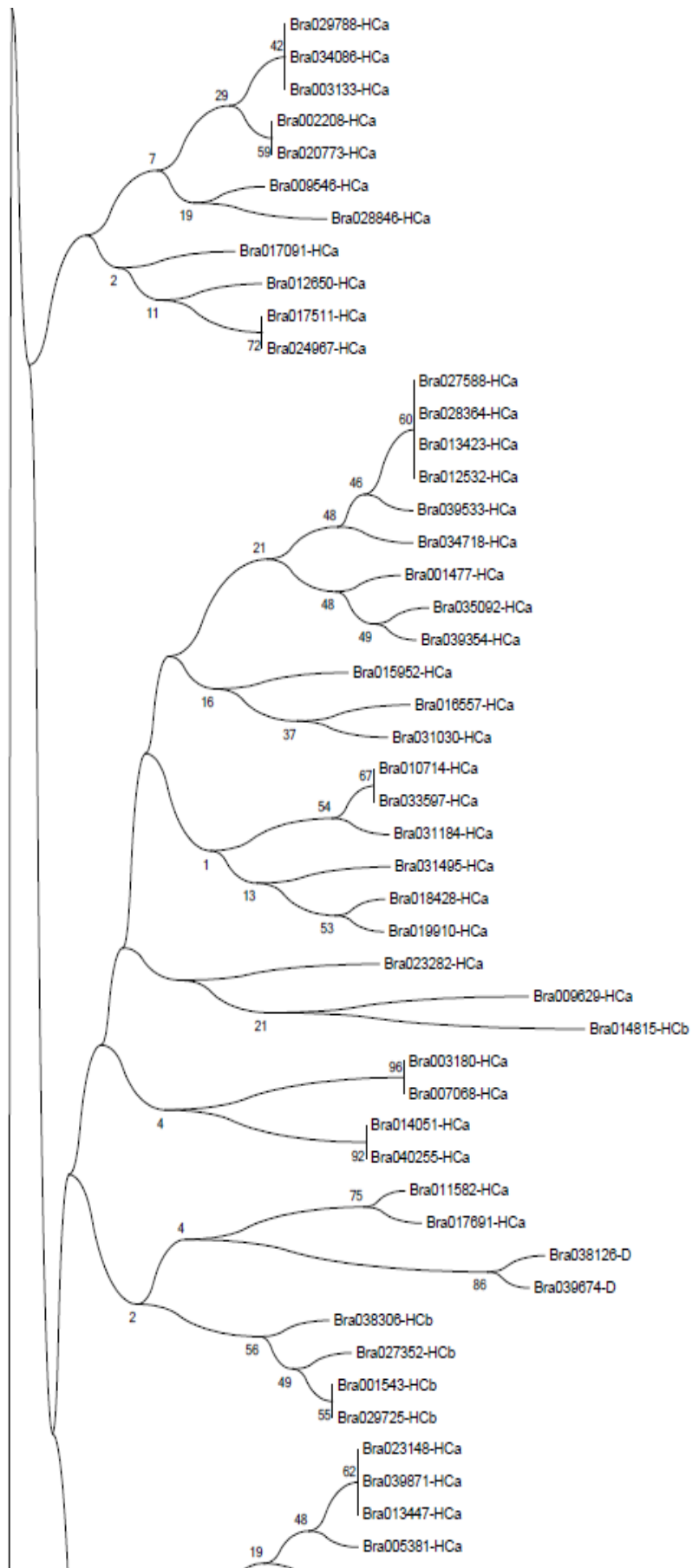
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Bra023691-V	CRIC	LDVCE	EGNTL-KME	CS	CKGDLRLVHEH	C		AI	KWFS-TKG	TRI	CDV	C	47		
Bra024797-V	CRIC	QDECPILTK	LE-SF	CA	CSGSLKYAHRR	C		VQ	RWCN-EKG	NLI	CEI	C	46		
Bra024893-V	CRIC	HDEDLDSN	ME-TP	CS	CSGSLKYAHRR	C		VQ	RWCN-EKG	NTN	CEI	C	46		
Bra026840-V	CRIC	QEEESALKN	LE-SF	CS	CNGSLKYAHRR	C		VQ	RWCN-EKG	NTI	CEI	C	46		
Bra028398-V	CRIC	HDEDENSN	MD-TP	CS	CSGTLKFAHHQ	C		IQ	RWCN-EKG	DTL	CEI	C	46		
Bra028747-V	CRIC	HMSLDSVNL	ESGVF-IELG	CS	CKNDLAAAHKII	C		AE	TKWF-LKG	NKI	CEV	C	48		
Bra028874-V	CRIC	MVELGE	DSEAF-KME	CM	CKGELALSHKA	C		TI	KWFF-LKG	NIT	CDV	C	52		
Bra029202-V	CRVCHSSESDDRKGDAALGFGLGITLTKNNADETVDDNVSKSSTE	TDIEMGLLQ	HQDPL-LELQ	CS	CKNELLALVHYA	C		AL	KWFL-NHG	STV	CEI	C	90		
Bra029259-V	CRIC	QEEESVKN	LE-SF	CS	CSGSLKYAHRR	C		VQ	RWCN-EKG	DTI	CEI	C	46		
Bra029597-V	CRIC	RSPEEPGNP	LR-YF	CL	CRGSLKRVHQD	C		LR	TWLLI-RRG	NNK	CEV	C	47		
Bra029786-V	CRIC	LVELGE	DSEAF-KME	CM	CKGELALSHKA	C		TI	KWFF-LKG	NRT	CDV	C	48		
Bra030264-V	CRIC	MVELGE	DSEAF-KME	CM	CKGELALSHKA	C		TI	KWFF-LKG	NRT	CDV	C	48		
Bra030264-V	CRIC	LETDGRDF	IA-P	CK	CKGTQKIVARD	C		LD	HWR-AIK	EGFAFAH	CTT	C	48		
Bra030491-V	CRIC	LDVCG	GE-DLIGP	CM	CKGTQKIVARS	C		LD	HWR-STK	EGFAFAS	CTE	C	48		
Bra030505-V	CRIC	HEEE-PESV	FE-AP	CS	CSGTLKFAHRD	C		IQ	RWCN-EKG	NTI	CEI	C	46		
Bra031231-V	CRIC	LESDDRF	IA-P	CK	CKGTQKIVARD	C		LD	HWR-AIK	EGFAFAH	CTT	C	48		
Bra031736-V	CRIC	LENDCEL	LG-DELISP	CM	CKGTQQIVARS	C		LD	HWR-SVK	EGFAFAS	CTT	C	52		
Bra033335-V	CRIC	HEEEAESV	FE-AP	CS	CSGTVKFAHRD	C		IQ	RWCN-EKG	NTI	CEI	C	47		
Bra036295-V	CRIC	HEEE-AESF	FE-VE	CA	CSGTVKFAHRD	C		IQ	RWCN-EKG	NIT	CEI	C	46		
Bra037753-V	CRVCHSSESDDRKGDAALGELLEITPPEARKSNADAEA	EAEQKSCIVKSN	IDIELLQIQQ	HQGAL-IELG	CS	CKNELLALVHYA	C	AL	KWFL-NHG	STV	CEI	C	98		
Bra038662-V	CRVCHSSESDDRKGDAALGELLEITPPEARKSNADVSKDTAEA	QKSSIVKSN	GVNVIDIEMGLQHQDAL	-LELG	CS	CKNELLALVHYA	C	AL	KWFL-NHG	STV	CEI	C	105		
Bra040034-C2	CHQC	LDVLE	EGNTL-KME	CS	CKGDLRLVHEA	C		AI	KWFS-TKG	TRT	CDV	C	47		
Bra040034-C2	CHQC	KN-LTQKVN	LVF	CSK	CTKKRY	CDV			IKKWYPERITSEE	VQAA	CPF	C	48		
Bra040034-C2	CHQC	KN-LTQKVD	LVF	CSK	CTKKRY	CDV			IKKWYPERITSEE	VRDA	CPF	C	48		
Bra040233-C2	CYIC	RYRQEQP	LD	CVB	CGFVL	CFR			ATLPHKLYR	KHD	EHLIVFSYKRYADDDDELYW	CEI	C	60	
Bra0405845-C2	CYIC	SDNVGKIV	DGRF-VA	CNE	CGFPV	CRP			CDV-FCR	YR	FBRKD	GNQS	CPF	C	46
Bra0406036-C2	CYIC	GDIEELS	DGESE-VA	CNE	CGFPV	CRP				YE	YERRE	GNQS	CPF	C	46
Bra0406407-C2	CEIC	GDQIGLTV	EGDLE-VA	CNE	CGFPA	CRP				YE	YERRE	GNQS	CPF	C	46
Bra0406677-C2	CFIC	AEEMD-LTDQ	LK-P	CK	CGYQI	CWV			WHIIVD	MAEKDK	TEGR	CPA	C	48	
Bra0408170-C2	CFIC	AERMD-ATDLL	FE-Q	CAS	CEYRM	CLF			YNM-T	NES	TRV	CPG	C	43	
Bra0409365-C2	CHQC	QSRVKKSDSNV	LR-IVT	CV	CSYAF	CWR			LR	FEEDIR	GGLDY	CFE	V	48	
Bra0410131-C2	CFIC	YEDLD-LTSS	FL-P	CF	CGFRL	CLF				HKIIDG	DR	CPG	C	42	
Bra0411345-C2	CYIC	GDHAGLVE	TGDLF-VA	CNE	CGFPV	CRP				YE	YERKD	GTQC	CPH	C	46
Bra0411429-C2	CPVC	YECDAGFT	VFNK-RHII	CRL	CGRVE	CAK			AANSISPSDEAKD	SHESSSDR	RIRV	CNY	C	62	
Bra0411865-C2	CYIC	YEDLD-LTSS	FL-P	CNE	CGFPV	CRP				YE	YERRE	GNQA	CPQ	C	46
Bra0411940-C2	CFIC	AEEMD-LTDQ	FK-P	CK	CGYQI	CWV			WHRIIE	MAEKDK	TEGR	CPA	C	48	
Bra0412578-C2	CNTC	GEEIGVKP	NGEPE-VA	CHE	CSFPI	CKA				LEY	EFEGRRI	CLR	C	46	
Bra0413525-C2	CHWC	GTRG	SE-DLIS	CLS	CEKEFF	CDV				IEKRNGKSKKEE	VEKK	CPV	C	46	
Bra0415887-C2	CFIC	SEGMD-ATDLS	FL-P	CF	CGFRL	CLF				HKQINEN	DGR	CPA	C	42	
Bra0416801-C2	CHQC	FK	GERR-LFI	CTF	CEEKL	CFP				IKKWYPHLSHDD	VIEK	CPF	C	47	
Bra0418086-C2	CFIC	YEDLD-LTSS	FL-P	CF	CGFRL	CLF				HKIIDG	DR	CPG	C	42	
Bra0420455b-C2	CFKC	YHMVGRSYG	ENRIT	CR	CGNAF	CYK			GY	LWNR	GLH	GD	CNQ	D	44
Bra0422865b-C2	CTVA	IDP	ASGSRSEHYDVS	CL	CSYEF	CWN				GEDAHRFPVDDTVSKWISKNIDESENINWILLANITKP		CNP	C	70	
Bra0423952-C2	CYIC	GDNAGLVE	TGDLF-VA	CNE	CGFPV	CRP				YE	YDRKD	GTQC	CPQ	C	46
Bra0424324-C2	CKIC	RDEIELTV	DGEPF-VA	CNE	CGFPV	CRP				YE	YERRE	GNQA	CPQ	C	46
Bra0427055-C2	CHQC	LK	GERTI-LIV	CSE	CEETMY	CLG				IRKWYPHLSHDD	IVDK	CPF	C	47	
Bra0428768-C2	CYIC	SDNVGKIV	DGRF-VA	CDI	CGFPV	CRP				YE	YERKI	GNQS	CPF	C	46
Bra0429238-C2	CFIC	YEDLD-LTSS	FL-P	CF	CGFRL	CLF				HKIIDG	DR	CPG	C	42	
Bra0429664-C2	CHQC	GRINDG	EIVR	QCN	CCDRKRY	CHK				LETWYFPHIED	IAKK	CPF	C	48	
Bra0429874-C2	CYIC	TENVGRAE	NGVPE-VA	CDV	CSFSV	CRP				YE	YERV	GNQS	CPQ	C	46
Bra0430754-C2	CHWC	LR-KDRER	IL-S	CLK	CNGRAF	CDV				ITITQSDIPLEE	VEKV	CPA	C	47	
Bra0431904-C2	CEIC	RDEIESTV	DGEPF-VA	CNE	CGFPV	CRP				YE	YERRE	GNQA	CPQ	C	46
Bra0433714-C2	CRIC	RDEIKDGD	NGQTP-VA	CHV	C-AFPV	CKP				YE	YERSN	GNKC	CPQ	C	46
Bra0435692-C2	CFIC	AEEMD-LTDQ	LK-P	CK	CGYQI	CWV				WHQIE	MAEKDK	TEGR	CPA	C	48
Bra0437394-C2	CHQC	KIMMSKID	LVF	CSI	CVNKRY	CKD				IKKWYPERITPEG	VQAA	CPF	C	49	
Bra0437793-C2	CEIC	RDEIELTV	DGEPF-VA	CNE	CGFPV	CRP				YE	YERRE	GNQA	CPQ	C	46
Bra0438282-C2	CFIC	AEEMD-LTDQ	LK-P	CK	CGYQI	CWV				WHIIVD	MAEKDK	SEGR	CPA	C	48
Bra0438285b-C2	CIR	NNMVELAFG	CYHIT	CR	CGYEF	CYT				GAEWKI	KKATCA	CPI	W	45	
Bra0438775-C2	CHWC	GTRG	FE-DLIS	CLS	CGREFF	CDV				IEKRNGKSKKEE	VGKK	CPV	C	46	
Bra0440045-C2	CKTC	GKVKHKNCKSWAQIRDLPHSWSW		CPS	CRV	CEV			R	RTGDEN	KFVE	CKR	C	54	
Bra0405461a-D	CPVC	LGLLIPKNV	VIKV-LFN	CK	HMF	DEE			IGR	WL	ESH	VT	CPF	C	42
Bra0405461b-D	CPVC	LRLIPKNV	VIKV-LFN	CK	HMF	DEE			IGR	WL	ETH	VT	CPF	C	42
Bra0416527-D	CTIC	LEEFKSG	VNVE-LP	CG	HEF	DDA			IGH	WF	ETN	HI	CPI	C	41
Bra0418733-D	CTIC	LEEFKSG	GRVPE-LA	CG	HEF	DEE			IVK	WF	ETN	HV	CPI	C	41
Bra0418734-D	CTIC	LEEFKSG	GRVPE-LP	CG	HEF	DEE			IVK	WF	ETS	HV	CPI	C	41
Bra0421889-D	CPVC	LGLLIPKNV	VIKV-LFN	CK	HMF	DEE			IAR	WL	ESH	TT	CPF	C	42
Bra0425686-D	CRIC	LQDFNNG	GMVVT-LS	CG	HEF	DDE			IVK	WF	ETS	HV	CPI	C	41
Bra0438122-D	CTIC	LQDFNNG	ATVVT-LP	CA	HDF	DDE			IVK	WF	EIN	IL	CPF	C	41
Bra0438126-D	CNAC	WREL-CGRA	IS-TT	CG	HLL	CTE				-ASKILSND	GA	CPI	C	39	
Bra0439674-D	CNAC	WREL-EGRA	IS-TT	CG	HLL	CTE				-ASKILSND	GA	CPF	C	39	
Bra0406028-S/T	CPVS	REQSDVYNNP	MM-MP	CR	HVL	CKE			IL	RL	SK	CLC	C	35	
Bra0410618-S/T	CPVS	KEQASDNPP	MM-MS	CG	HVL	CKQ				INMKSNG	AKS	SFK	CPY	C	45
Bra0411793-S/T	CPVS	KEQASDNPP	MM-MS	CG	HVL	CKQ				ITRMSNG	AKT	SFK	CPY	C	45
Bra0416972-S/T	CFIC	HETLRNGKM	VFQ	CG	HST	CCFF				MTERGS	VHETMRKVVW	CPI	C	46	
Bra0438613-S/T	CFIC	LERLIDP	DTSGILS-TL	CD	HSPQ	CSC				SKWTY	LS	CDV	C	40	
Bra0428834-G	CLIC	MERVINGDDHQ	VCC-LP	CG	HLY	GFS			IKK	WL	KQP	RSACK	CPQ	C	46

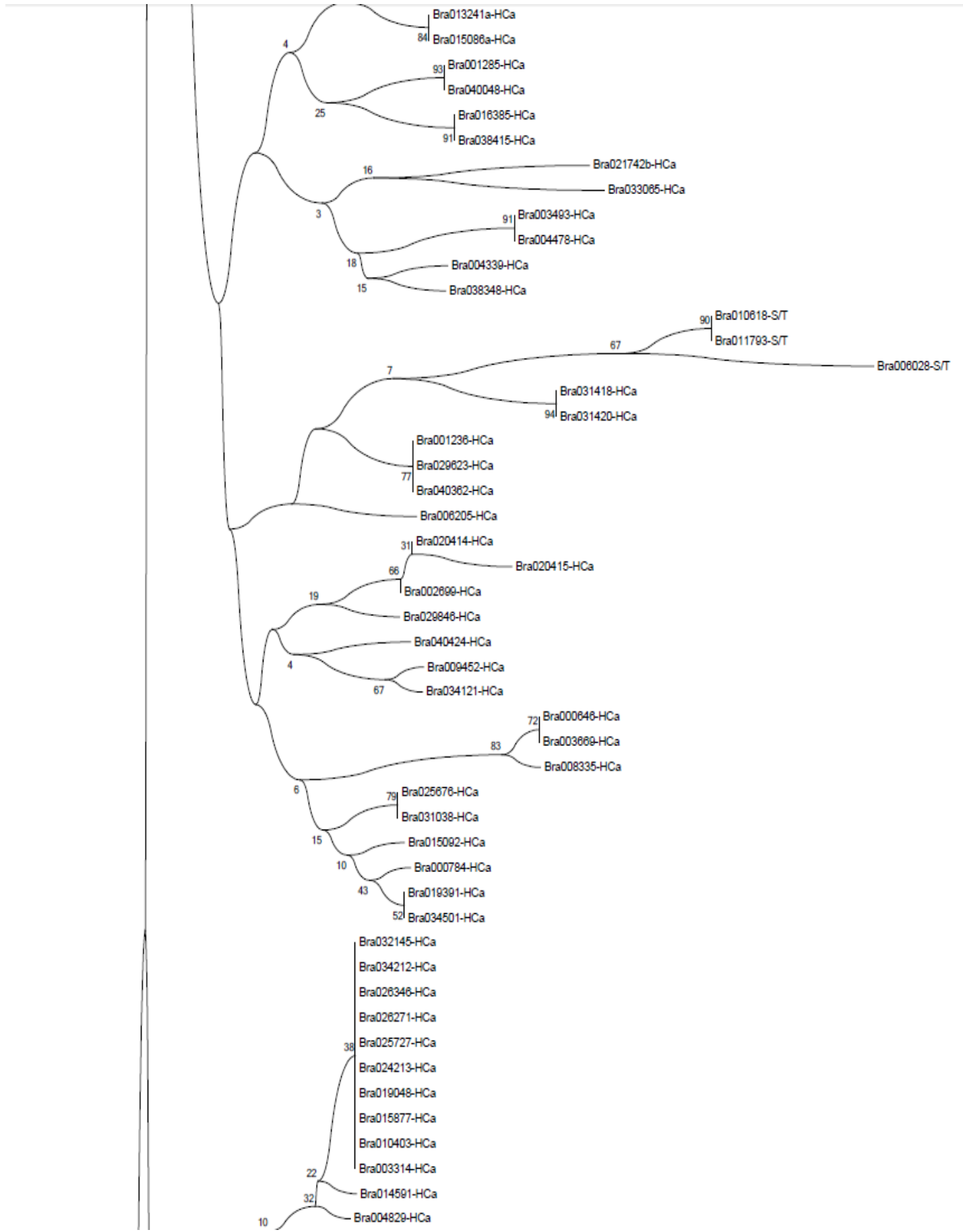
**Figure S6** Phylogenetic tree based on multiple sequence alignment of 731 *B. rapa* RING domains. The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test (1000 replicates) are shown next to the branches. The evolutionary distances were computed using the Poisson correction method and are in the units of the number of amino acid substitutions per site.

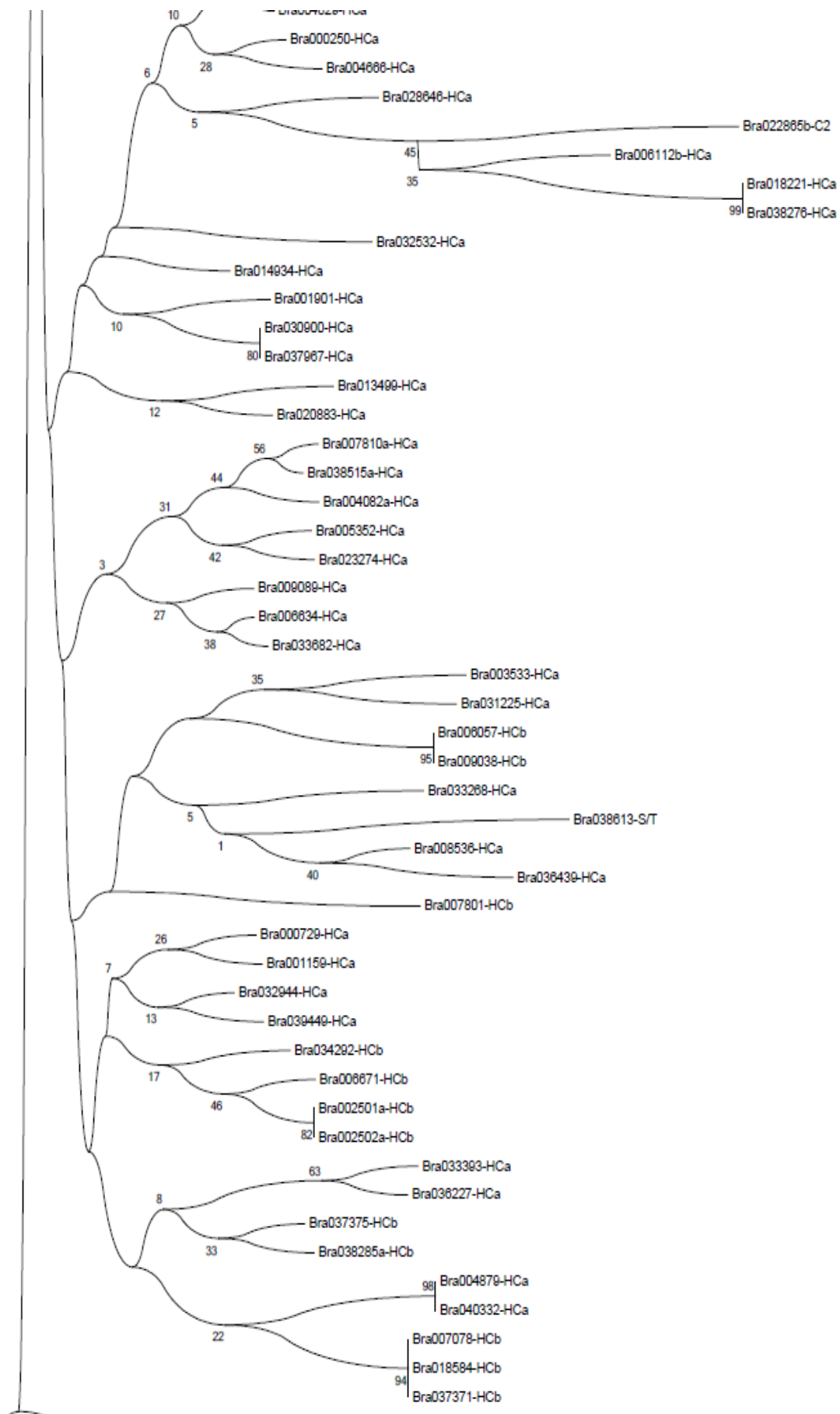


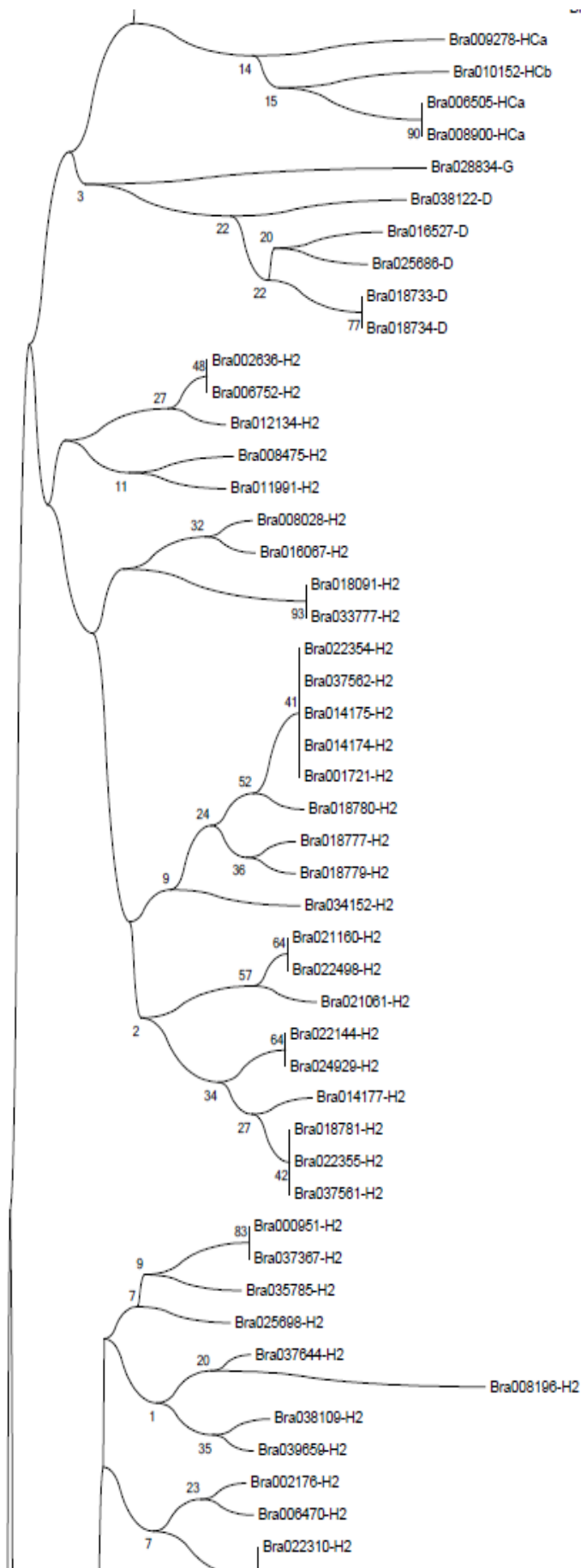


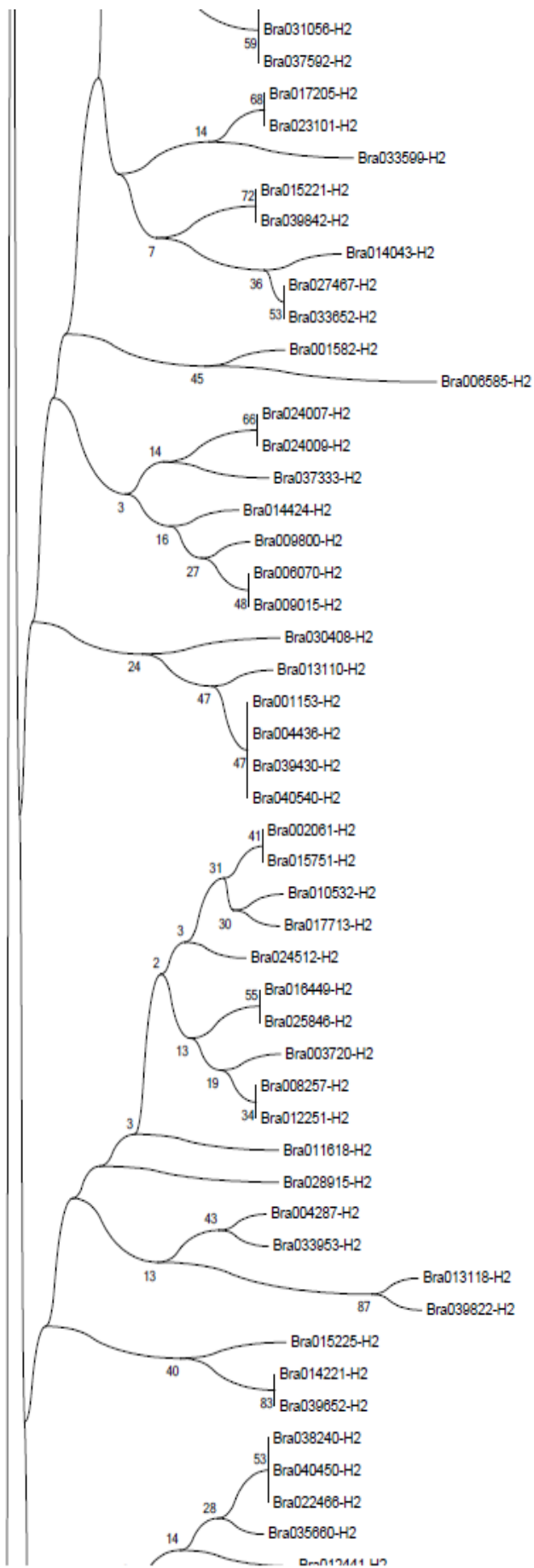


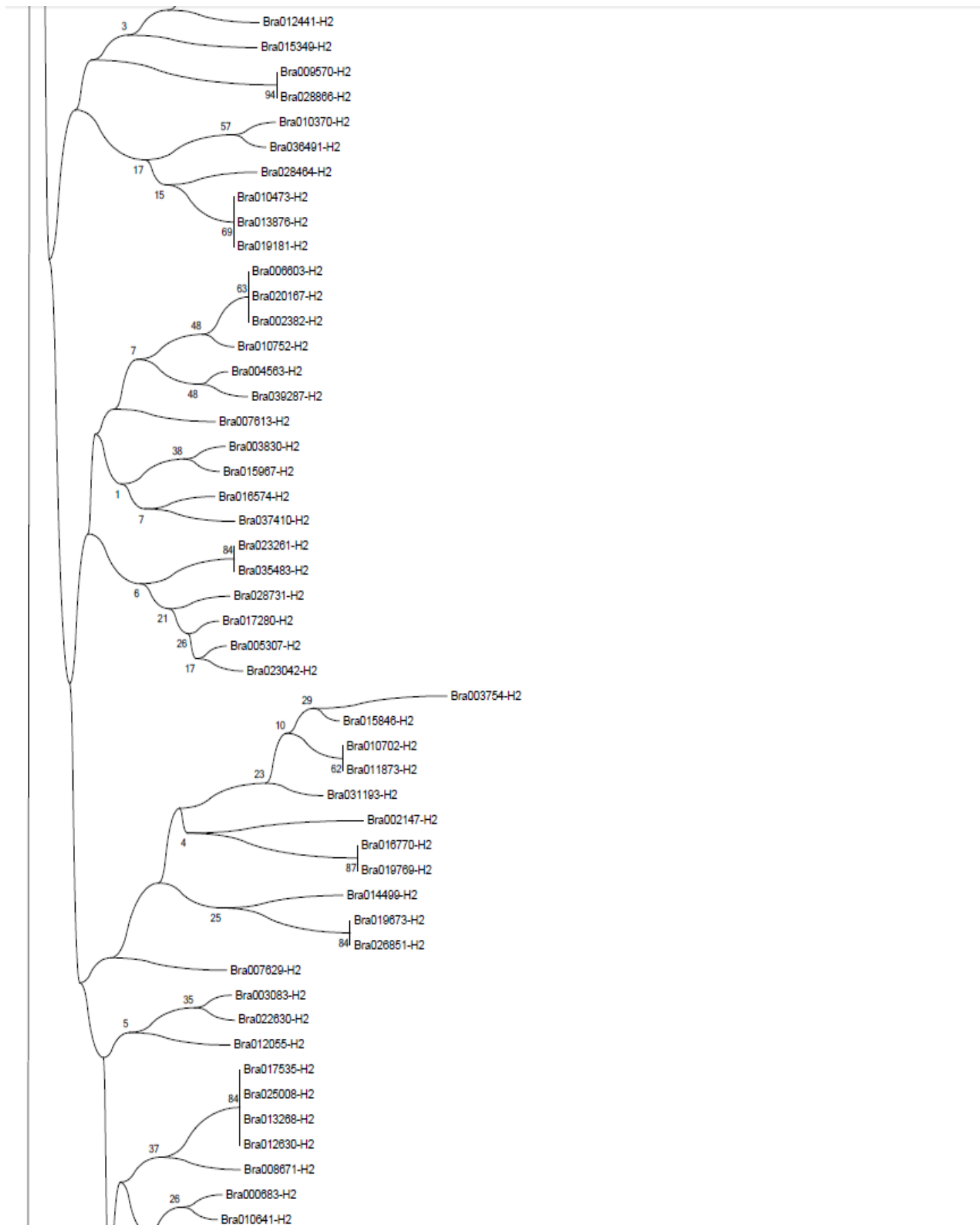


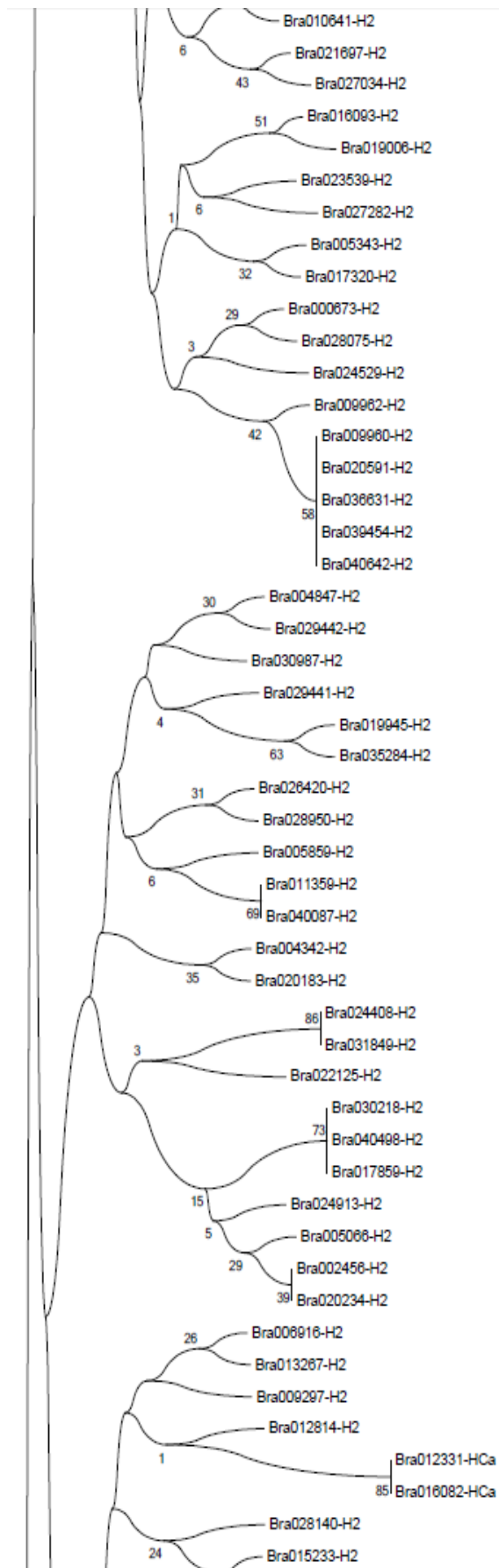


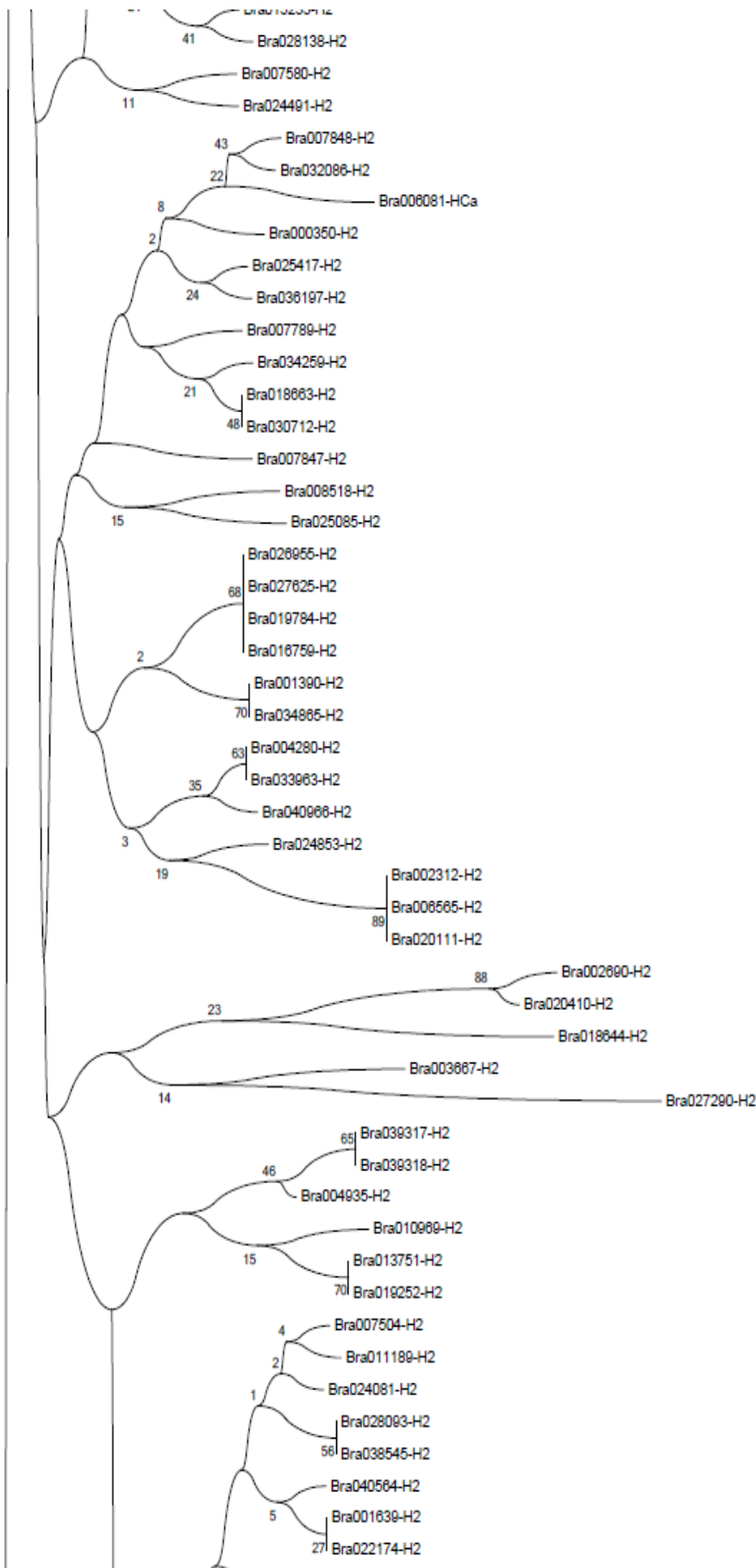




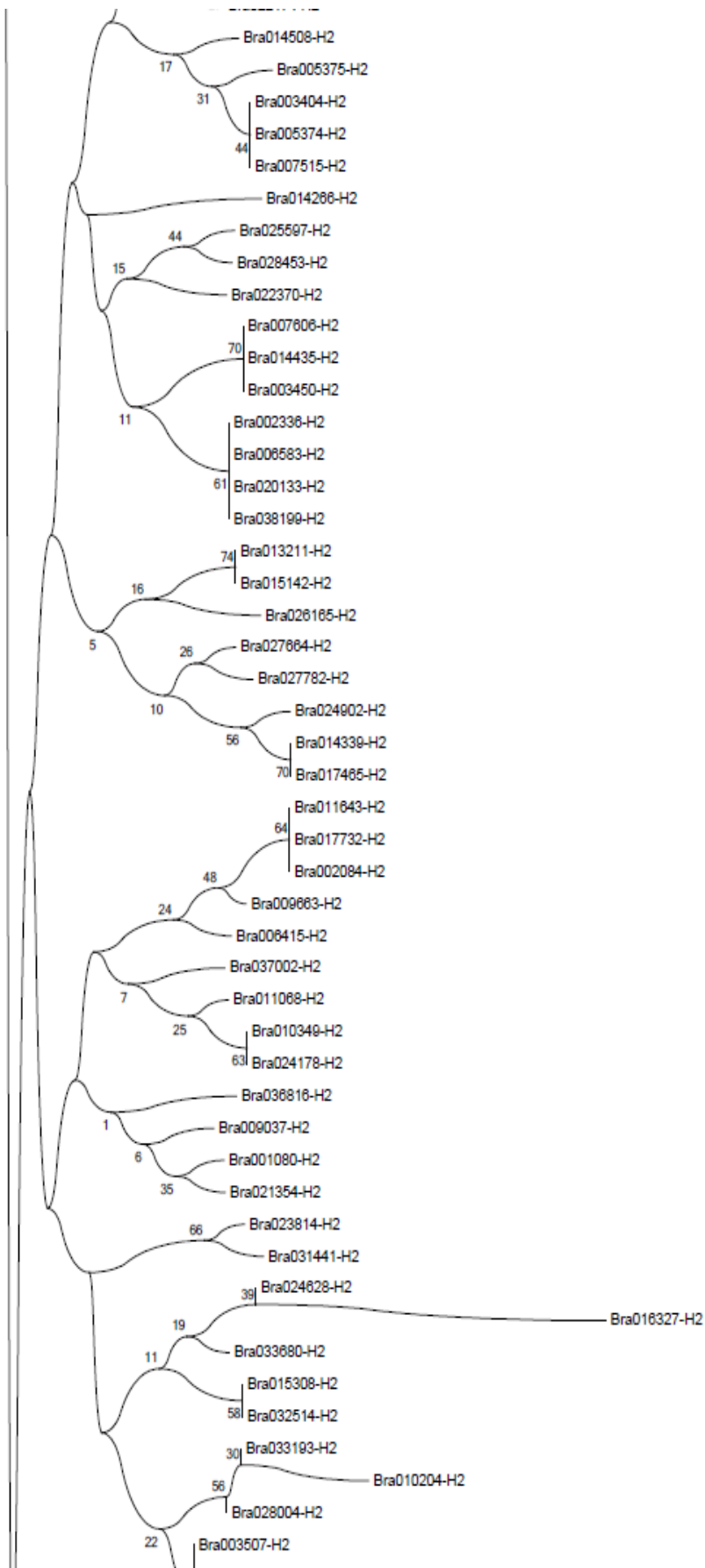


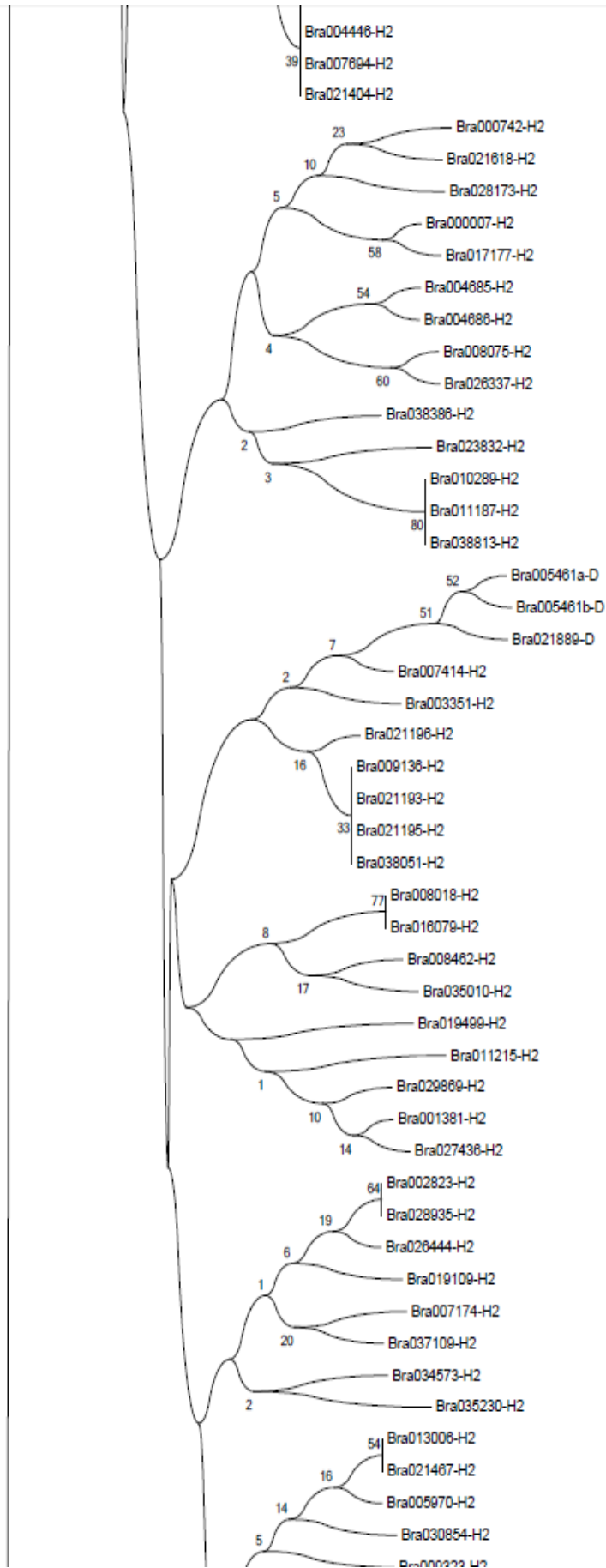


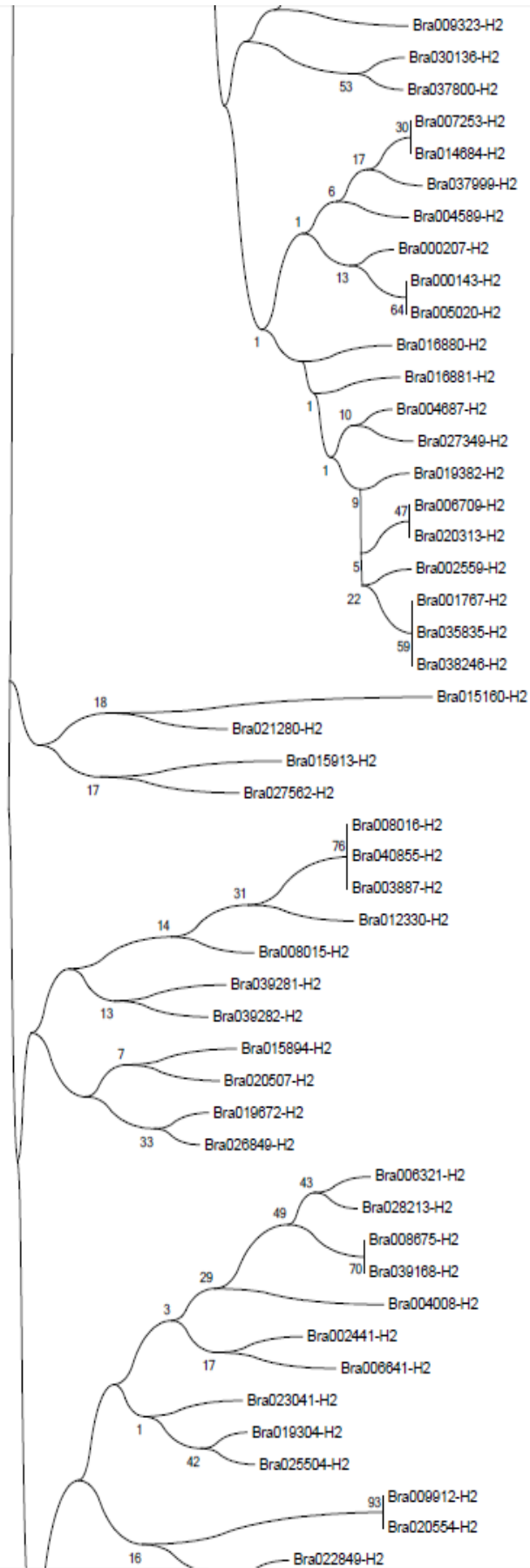


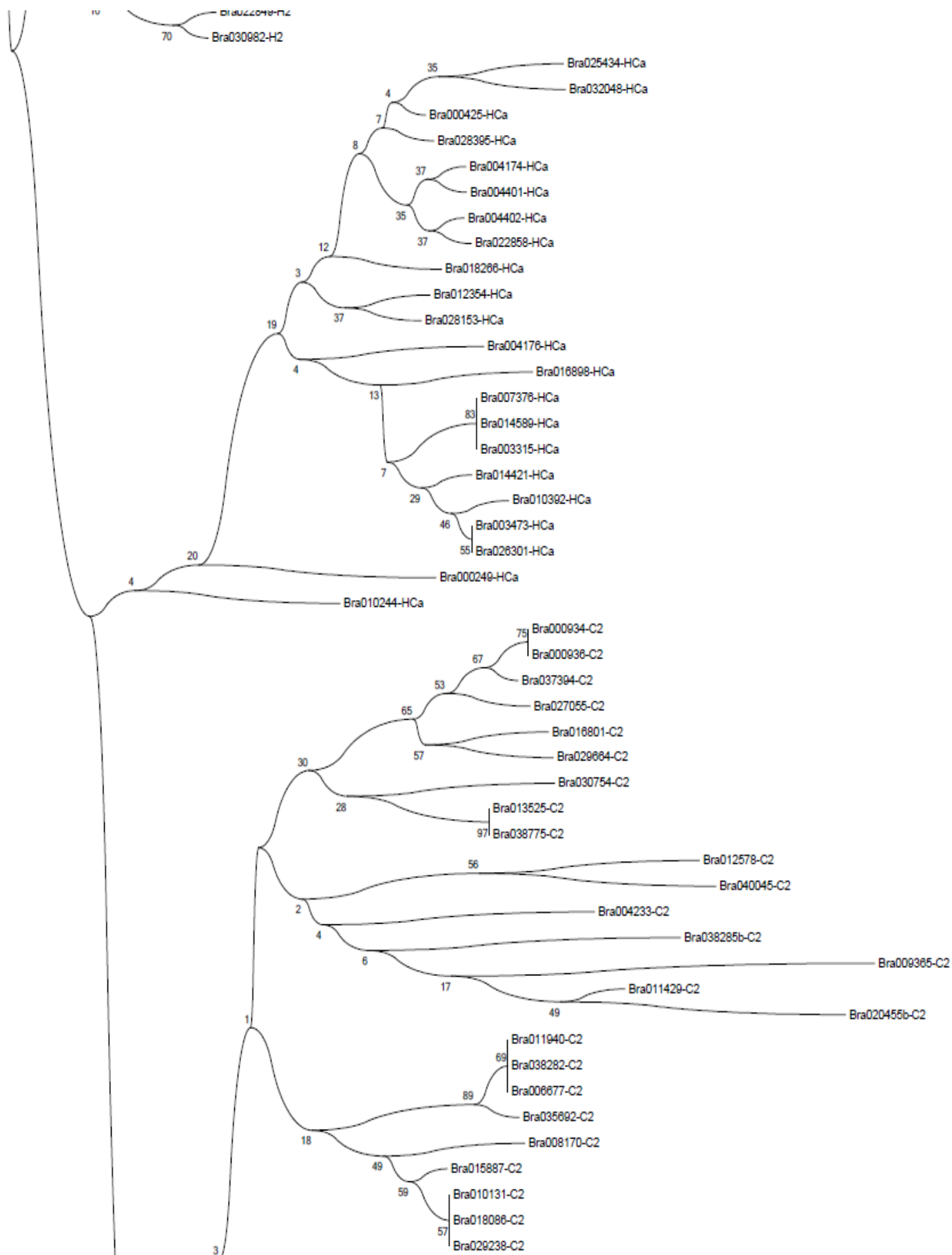


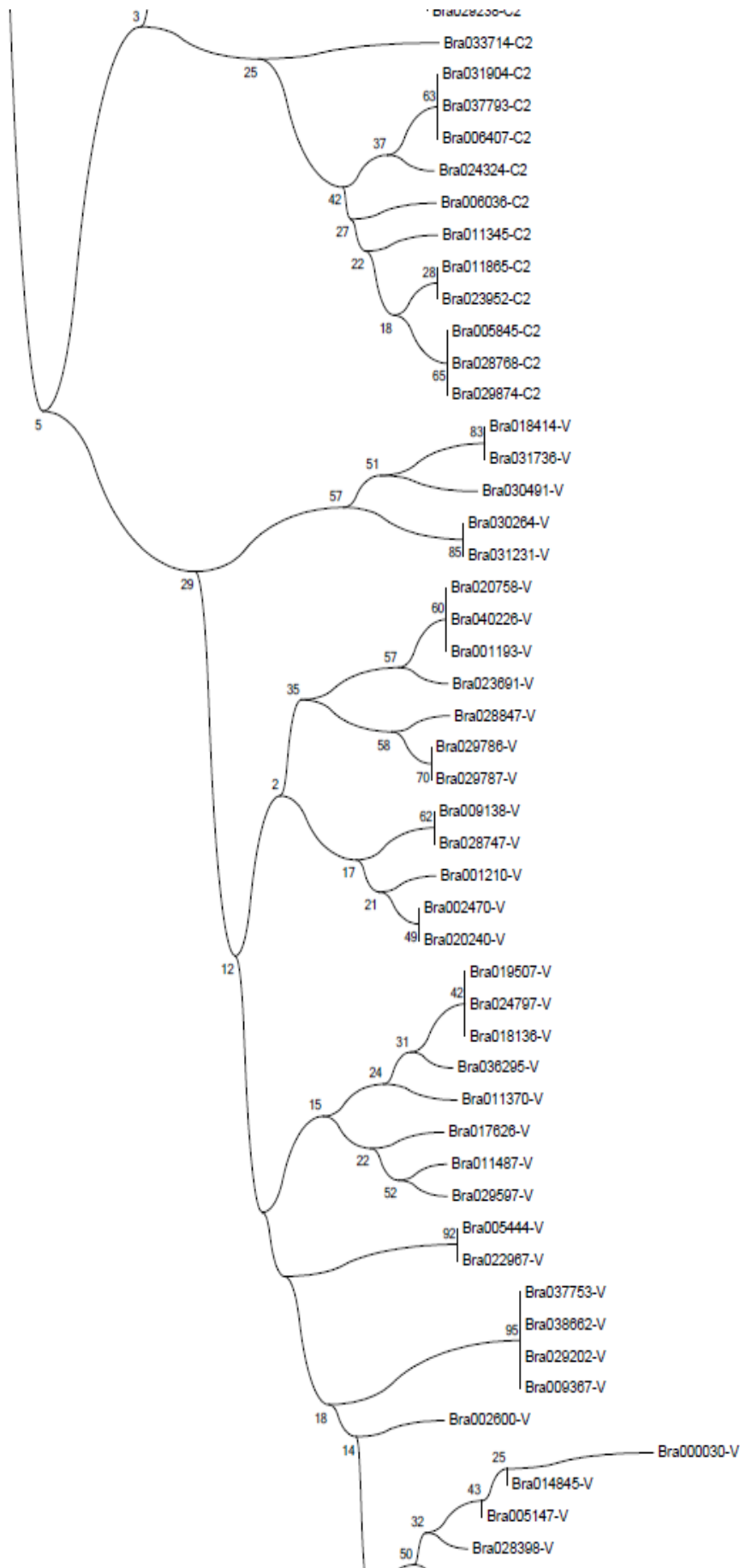


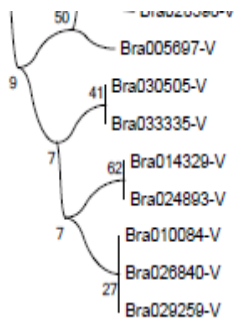




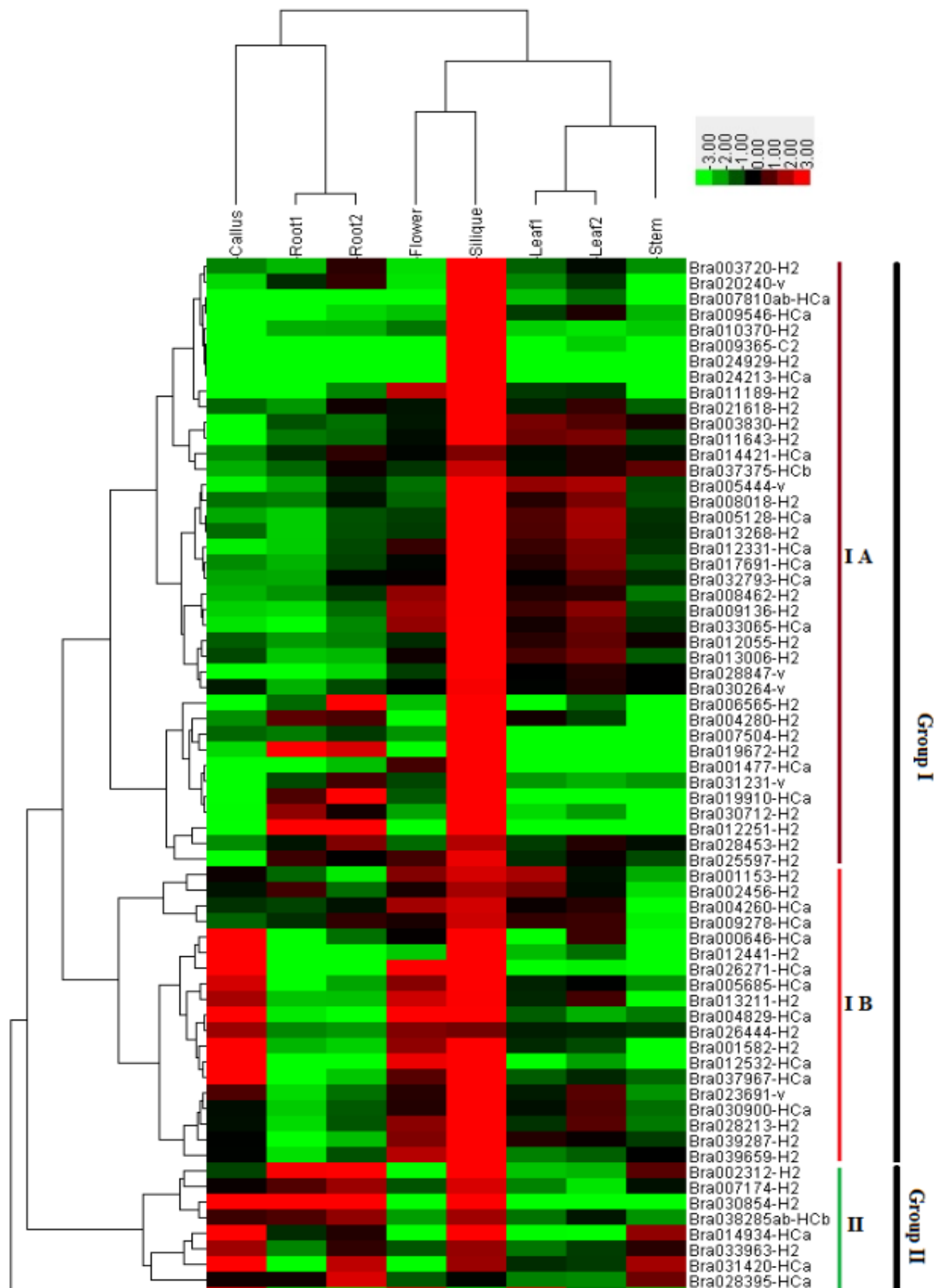


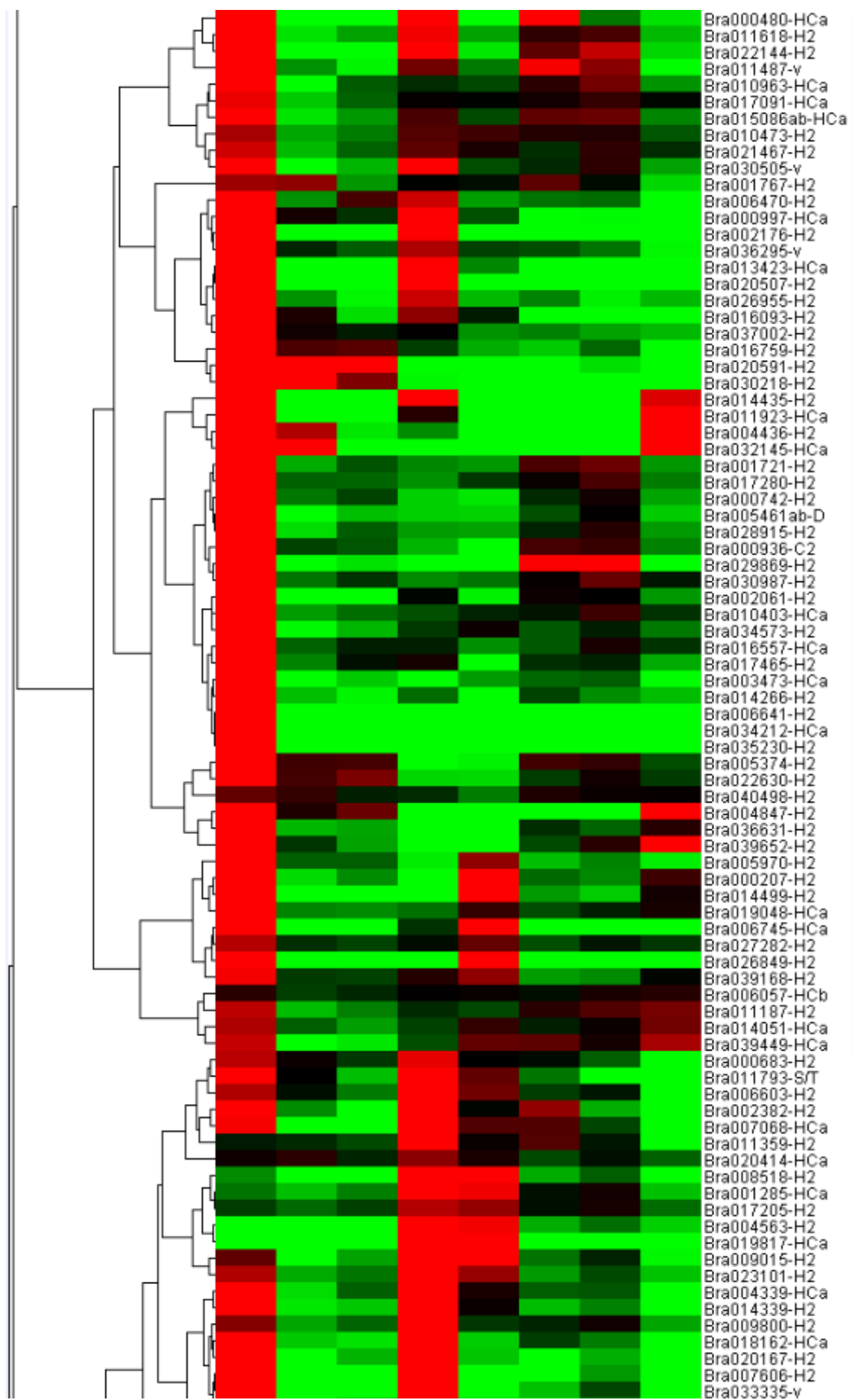






**Figure S7** Expression profile of 667 RING finger protein genes in *B. rapa*, subdivided into groups (I-VII). The scale indicating the relative expression signal values is shown above.





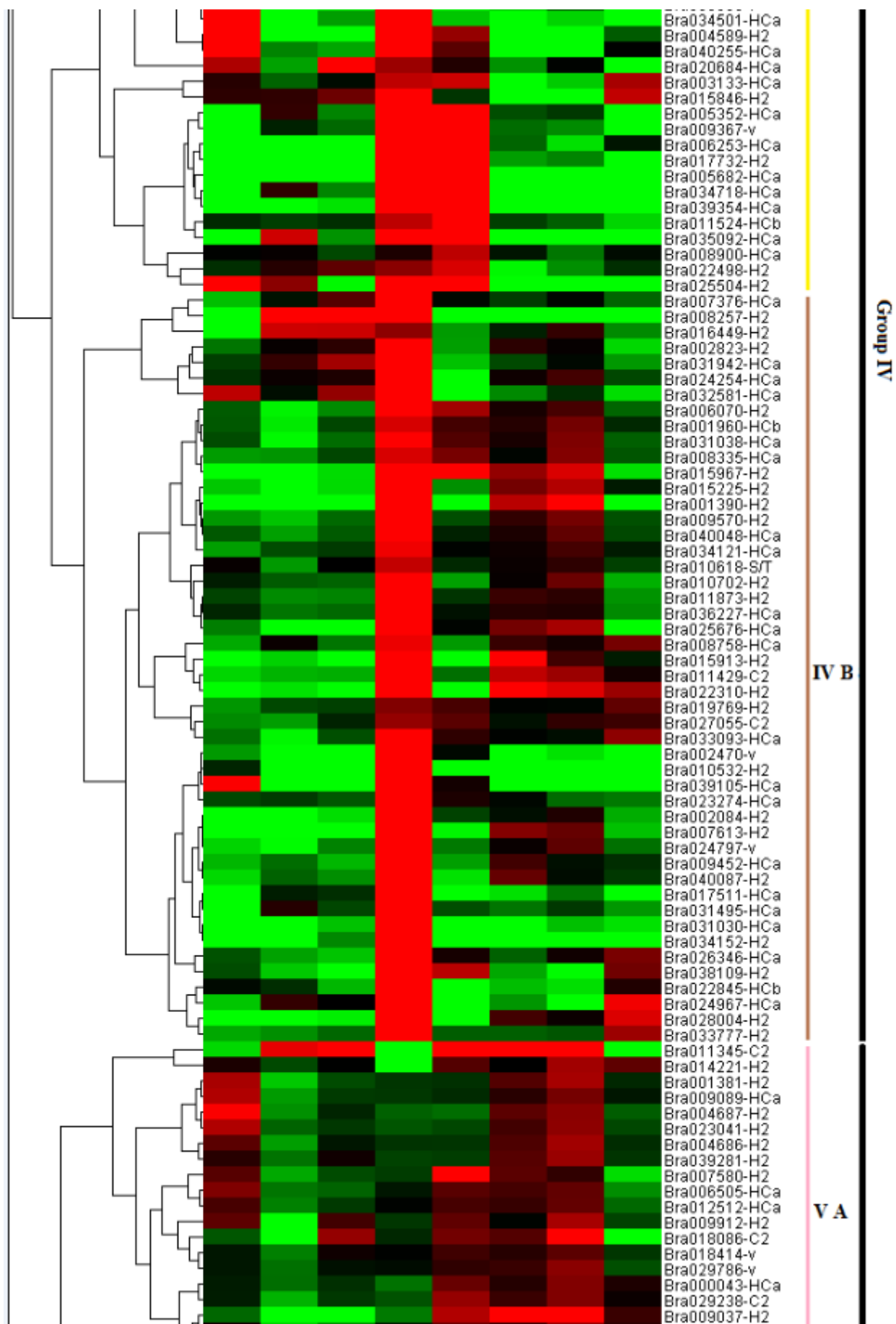
Bra000480-HCa  
 Bra011618-H2  
 Bra022144-H2  
 Bra011487-v  
 Bra010963-HCa  
 Bra017091-HCa  
 Bra015086ab-HCa  
 Bra010473-H2  
 Bra021467-H2  
 Bra030505-v  
 Bra001767-H2  
 Bra006470-H2  
 Bra000997-HCa  
 Bra002176-H2  
 Bra036295-v  
 Bra013423-HCa  
 Bra020507-H2  
 Bra026955-H2  
 Bra016093-H2  
 Bra037002-H2  
 Bra016759-H2  
 Bra020591-H2  
 Bra030218-H2  
 Bra014435-H2  
 Bra011923-HCa  
 Bra004436-H2  
 Bra032145-HCa  
 Bra001721-H2  
 Bra017280-H2  
 Bra000742-H2  
 Bra005461ab-D  
 Bra028915-H2  
 Bra000936-C2  
 Bra029869-H2  
 Bra030987-H2  
 Bra002061-H2  
 Bra010403-HCa  
 Bra034573-H2  
 Bra016557-HCa  
 Bra017465-H2  
 Bra003473-HCa  
 Bra014266-H2  
 Bra006641-H2  
 Bra034212-HCa  
 Bra035230-H2  
 Bra005374-H2  
 Bra022630-H2  
 Bra040498-H2  
 Bra004847-H2  
 Bra036631-H2  
 Bra039652-H2  
 Bra005970-H2  
 Bra000207-H2  
 Bra014499-H2  
 Bra019048-HCa  
 Bra006745-HCa  
 Bra027282-H2  
 Bra026849-H2  
 Bra039168-H2  
 Bra006057-HCb  
 Bra011187-H2  
 Bra014051-HCa  
 Bra039449-HCa  
 Bra000683-H2  
 Bra011793-ST  
 Bra006603-H2  
 Bra002382-H2  
 Bra007068-HCa  
 Bra011359-H2  
 Bra020414-HCa  
 Bra008518-H2  
 Bra001285-HCa  
 Bra017205-H2  
 Bra004563-H2  
 Bra019817-HCa  
 Bra009015-H2  
 Bra023101-H2  
 Bra004339-HCa  
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 Bra009800-H2  
 Bra018162-HCa  
 Bra020167-H2  
 Bra007606-H2  
 Bra033335-v

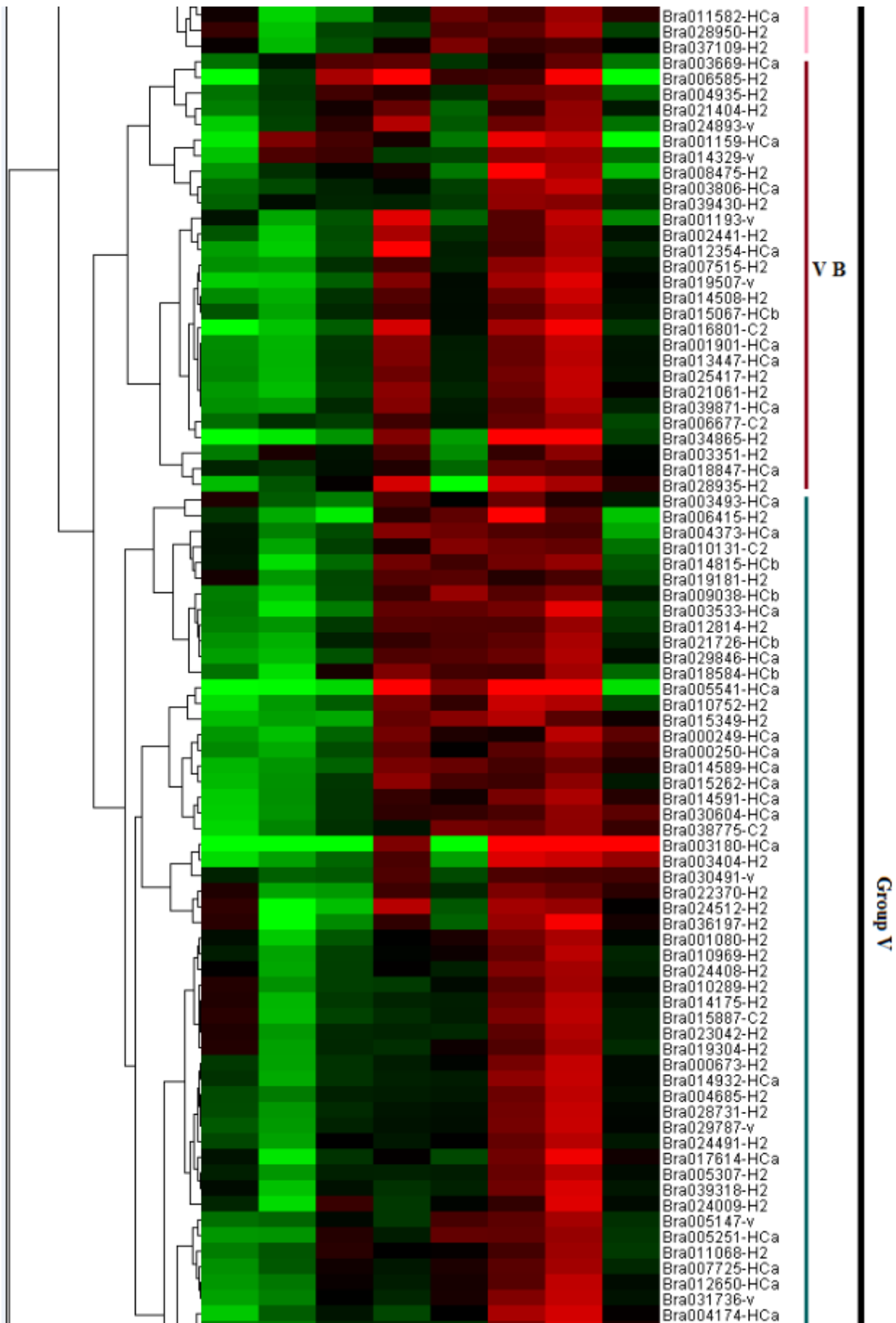
III

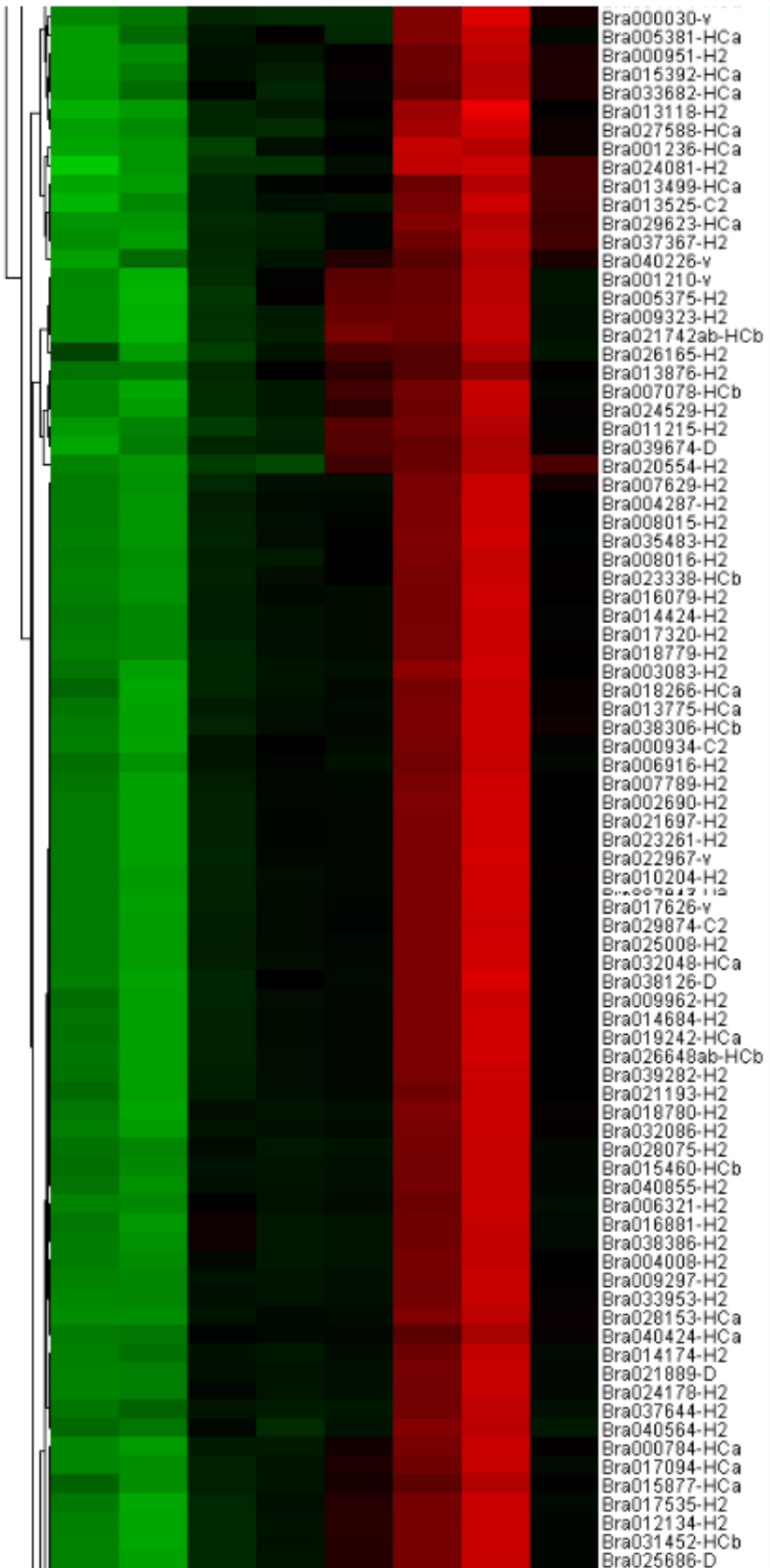
Group III

IV A









VC

