

Supplemental Figure 1. Phylip Alignment for CYP97 family members taken from the Cytochrome P450 website. This alignment was used to make Fig 1.

24	839				
97E1Skelet	-----	-----	-----	-----	-----
97E2diatom	-----	-----	-----	-----MCTK	LSSRRTLLAL
97E4Phaeod	MRSSDYSRAP	RWESFVVLAW	ATASAVLVGN	VFQQALPQPV	QAFGPALVPH
97F3Phaeod	-----	-----	-----	-----	-----
97F1diatom	-----	-----	-----	-----	-----
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----	-----
97B7Populu	-----	-----	-----	-----	-----
97B15Vitis	-----	-----	-----	-----	-----
97B2Glycin	-----	-----	-----	-----	-----
97B12Ginkg	-----	-----	-----	-----	-----
97B8Physco	-----	-----	-----	-----	-----
97B17Volvo	-----	-----	-----	-----	-----
97A13Volvo	-----	-----	-----	-----	-----
97A5Chlamy	-----	-----	-----	-----	-----
97A14Ostre	-----	-----	-----	-----	-----
97A11Vitis	-----	-----	-----	-----	-----
97A8Physco	-----	-----	-----	-----	-----
97C4Populu	-----	-----	-----	-----	-----
97C12Vitis	-----	-----	-----	-----	-----
97C9carota	-----	-----	-----	-----	-----
97C11tomat	-----	-----	-----	-----	-----
97C5Physco	-----	-----	-----	-----	-----
97C12Ostre	-----	-----	-----	-----	-----
97E1Skelet	-----	-----	-----	-----	-----
97E2diatom	YFAFTGCTAF	QLPSATPSRA	SITKAYSTHL	DKEIKSKTPL	VNPSKIYTQA
97E4Phaeod	LSRRCDLIQR	RVSSDLEDVD	VDVDNDAILG	SNNIPRRLRI	QGRGIPTRKD
97F3Phaeod	-----	-----	-----	-----	-----
97F1diatom	-----	-----	-----MMIHHS	RVCVLQLRIG	QHNTARAKEK
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----	-----
97B7Populu	-----	-----	-----	-----	-----
97B15Vitis	-----	-----	-----	-----	-----
97B2Glycin	-----	-----	-----	-----	-----
97B12Ginkg	-----	-----	-----	-----	-----
97B8Physco	-----	-----	-----	-----	-----
97B17Volvo	-----	-----	-----	-----	-----
97A13Volvo	-----	-----	-----	-----	-----
97A5Chlamy	-----	-----	-----	-----	-----
97A14Ostre	-----	-----	-----	-----	-----
97A11Vitis	-----	-----	-----	-----	-----
97A8Physco	-----	-----	-----	-----	-----
97C4Populu	-----	-----	-----	-----	-----
97C12Vitis	-----	-----	-----	-----	-----
97C9carota	-----	-----	-----	-----	-----
97C11tomat	-----	-----	-----	-----	-----
97C5Physco	-----	-----	-----	-----	-----
97C12Ostre	-----	-----	-----	-----	-----

97E1Skelet	-----MASY	ESDLLSTWDE	DPSLQKGFWD	EIEKLRRYFA	GLRQTPDGRW
97E2diatom	DIDTLDLSSY	ENELLAAWDT	DSSLQKGFWD	EIEKLRRNFA	GLRQREDGQW
97E4Phaeod	PIQPLDSMTY	ESDLIKTWEQ	DPSRQKGFWD	EIEKLRRYFA	GLRMRDDGVW
97F3Phaeod	-----	-----	-----	-----	-----
97F1diatom	PNPNMKFTTA	LAVLCWTSVT	NAFVPSSTFS	PALKNEQQQV	RASSPLYALD
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----	-----
97B7Populu	-----	-----	-----	-----MS	LTATSTSPLO
97B15Vitis	-----	-----	-----	-----	----MATCVL
97B2Glycin	-----	-----	-----	-----	--MSVDTSTT
97B12Ginkg	-----	-----	-----	-----MIT	VRSIPCSFSK
97B8Physco	-----	-----	-----	-----MAMA	SALPNAGPAS
97B17Volvo	-----	-MQQLNCRSG	ARGPLRIAAG	CSPRPRRAHA	FSPNPFNPSL
97A13Volvo	-----M	QOQHSRTLGG	RPOQQPQRLP	RCPVLSRAGI	SRSRPIVHAE
97A5Chlamy	-----	-----	-----	-----	----MLSFST
97A14Ostre	-----	-----	-----	-----	-----
97A11Vitis	-----	-----	-----	-----	-VIVCASSNG
97A8Physco	-----	-----	-----	-MDLASDGRA	RTIRAALNGG
97C4Populu	-----	-----	-----	-----	-----MSL
97C12Vitis	-----	-----	-----	-----	---MPSLMSL
97C9carota	-----	-----	-----	-----	-MPYHSISL
97C11tomat	-----	-----	-----	-----	---MPISVTI
97C5Physco	-----	-----	--MASPSLHV	GIGTRRPGCC	NRTIGPIHYD
97C12Ostre	-----	-----	-----	-----	-----

97E1Skelet	VRKSTLFEFL	VTNSPSKVVG	VGPDGERYES	PPKPVNIFDV	GVLVGKNTLT
97E2diatom	VRKPSLDFDL	VTNTPSNVVG	VSNTGERYES	PPKPVNMLDV	GLLITKNLLN
97E4Phaeod	VRQPSFFDFL	VSKSRSDPG-	-----N	APRPVGLVDV	VKLVLTNSLT
97F3Phaeod	-----	-----	-----	-----	----MQVGK
97F1diatom	TKEKEETTTA	TSASSTDTSS	TPAAAATEES	EGLPWWWEYI	WKLPMQPAE
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----	-----
97B7Populu	LPFTTSNGNY	LQRNDFGAVG	ISRFLSSKTK	GSPLIRCQST	STEEPKT--R
97B15Vitis	LQHFHVSDSC	FSRTPYLQSS	RTSQLSKLRP	GGSSIRCQST	STDKQKS--R
97B2Glycin	LSTVTDANLH	SRFHSRLVPF	THHFSLSQPK	RISSIRCQSI	NTDKKKSS-R
97B12Ginkg	DTVQFIGFRK	VLTVRNVVSC	GVSSSFRLPG	SKFFPRCESS	STERATKSNR
97B8Physco	LMNQNSGRR	LSSSKSTILG	HSFLLRHLPS	KTRSRGIQCL	KTDRKPENER
97B17Volvo	SSLATSPLRP	GRLSRSTGLQ	SRLIPAGLPD	PLAVGLFFAP	GFAALVYAYF
97A13Volvo	PTEGNQPDGS	KLFGLIPLRA	RGENLDARIE	SGEFTDAGST	KEKLTRPLRQ
97A5Chlamy	SISGCRFGSW	AVPSFGPRRA	PTSTPTCRLG	FDTGRSAARF	LADLGRQWRA
97A14Ostre	-----	-----	-----	-----	-----
97A11Vitis	RGPESELDGV	KKVERILEEK	RRAELSARIA	SGEFTVEKPG	N-----
97A8Physco	DKMEMVLDDA	DEAERLRVWQ	QDELASRIA	SGEFTVSQPS	NDLFL-TIRR
97C4Populu	TFSVSSLHPL	YKYKPISTTT	LPPKPRFLSI	KSS-----	----LDDETO
97C12Vitis	SSFALLTPPT	FNFKPTTLPP	NPSLPYLSIT	CSSD-----	----NNPKPT
97C9carota	SLLPIPIRQN	LSKHHPPFHQ	PPHSLPLSIK	SSLD-----	----NKPPKS
97C11tomat	SSFSLLTNP	HRTTVLRPKN	PLQNRSQLTI	KSSI-----	--DNKKPPST
97C5Physco	SKFSGAYKMG	LRGGPAGRVG	NFCDQGRLRV	RCSGGAEDND	NGRSSVEKSG
97C12Ostre	-----	-----	-----	-----	-----

97E1Skelet	WLGFGPNLGM	AAVPDAVIQK	YEGSFFTFIK	G-ALGGDLQT	LAG-GPLFLL
97E2diatom	TLGFGPSLGM	AAVPDAVIQK	YEGSFFSFIK	G-VLGGDLQT	LAG-GPLFLL
97E4Phaeod	SVGLGPALGM	AAVPAVAVIQK	YEGSFFSFIK	G-VLGGDLQT	LAG-GPLFLL
97F3Phaeod	SGEEISFGDS	ANVLRNTNIEQ	IYGGFPSLDG	CPLAEGELAD	IGD-GTMFIG
97F1diatom	PGTDIIFADS	ARVLRNTNIEQ	IYGGFPSLDQ	CPLAEGEITD	IAD-GTMFIG
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	---MDLLKPE	VRA-APLFVP
97B7Populu	NPLDKASNLL	TNLLSGGNLG	-----S	MPIAEGAVSD	LFS-RPLFFS
97B15Vitis	NLLDNASNLL	TNFLSGGSIG	-----S	MPVAEGAVSD	LFG-RPLFFS
97B2Glycin	NLLGNASNLL	TDLLSGGSIG	-----S	MPIAEGAVSD	LLG-RPLFFS
97B12Ginkg	TLLDNASNFL	TNLLSGGQLG	-----T	MPIAEGAVSD	LFG-KPLFFS
97B8Physco	TLLDNASNLL	TNLLSGGNMG	-----T	MPIAEGAVSD	LFG-RPLFFA
97B17Volvo	RGKGNLTDGL	SRLLTEISQ	YFQPDVGGKN	IPVAQGEISD	LAGDQPLFKA
97A13Volvo	ALAKEPIVGR	PVARFLADLG	RRWRSEAAKR	MPEARGDIRE	IVG-QPVFVP
97A5Chlamy	EASKRMPEVR	LELRPCDGGG	RASCPVLGKS	TYTARGDIRE	IVG-QPVFVP
97A14Ostre	-----	-----	-----	MPVASGDIRE	IAG-QPVFVP
97A11Vitis	---SLAKVGI	PSEILDFLFK	WMEVSEDYPK	VPEAKGSIRA	VRS-EAFFIP
97A8Physco	ILANS GPAGR	ALALQLAIYE	ARIKAEQSER	MPESRGDVGA	IVG-EFFFKP
97C4Populu	KQTSWVSPDW	LTSLTRSLSL	GRNDDSGIPI	ASAKLEDVSD	LLG-GALFLP
97C12Vitis	RSSSWVSPDW	LTSLSRSLTM	GQ-DDSGIPM	ATAKLEDDVSE	LLG-GALFLP
97C9carota	NQGSWVSPDW	LTSLTKSITL	SK-DDSNIP	ASAKLEDVSE	LLG-GALFLP
97C11tomat	KPQTSWVSPDW	LTKLTRSLTL	GQNDSDNIPI	ASAELDDVSE	LLG-GALFLP
97C5Physco	AGKSWVSPDW	LTKIVSLGKG	PD--TSGIPV	ADAKLEDVKD	LLG-GALFLP
97C12Ostre	-----APDW	MTQLNRLWGG	AS----EIPV	ADAKLEDITG	LLG-GGLFQP

97E1Skelet	LAKYYTDHGP	IFNLSFGPKS	-FLVISDPVM	ARHILRDSSP	EQYCKGMLAE
97E2diatom	LAKYYQDYGP	IFNLSFGPKS	-FLVISDPVM	ARHILRDSSP	EQYCKGMLAE
97E4Phaeod	LNKYFEVYGP	IFNLSFGPKS	-FLVSDPVM	ARHVLRETSP	DQYCKGMLAE
97F3Phaeod	LQNYRNYGS	PYKLCFGPKS	-FLVISDPVQ	AKHILKDAN-	TNYDKGVLAE
97F1diatom	LQRYQQOYGS	PYKLCFGPKS	-FLVISDPVQ	AKHVLRDAN-	TLYDKGILAE
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	LYDYYREYGG	VYNLGAGPKW	-FVVSDPVA	VRTMFKDKA-	DDFSKGILTD
97B7Populu	LFDWFIHGS	VYKLAFGPKA	-FVVSDPIV	ARHILRENA-	FSYDKGILAD
97B15Vitis	LYDWFIEHGS	VYKLAFGPKA	-FVVSDPIV	ARHILRENI-	FGYDKGVLAD
97B2Glycin	LYDWFIEHGA	VYKLAFGPKA	-FVVSDPIV	ARHILRENA-	FSYDKGVLAD
97B12Ginkg	LYDWFIEHGS	VYKLAFGPKS	-FVVSDPIV	VRHILRENA-	FAYDKGVLAD
97B8Physco	LYDWFMQHGP	VYKLAFGPKA	-YVVSDPIV	ARHILRENT-	FSYDKGVLAD
97B17Volvo	LYQWFIESGG	VYKLVFGPKA	-FIVSDPVV	VRHLLKDNA-	FNYDKGVLAE
97A13Volvo	LYKLFLVYGK	IFRLSFGPKS	-FVIISDPAY	AKQILLTNA-	DKYSKGLLSE
97A5Chlamy	LYKLFLVYGK	IFRLSFGPKS	-FVIISDPAY	AKQILLTNA-	DKYSKGLLSE
97A14Ostre	LYKLFLAYGE	MFVLAIGPKK	-FVVSDNAV	AKEMLLTQA-	KSFSKGLLSE
97A11Vitis	LYELYLTYGG	IFRLTFGPKS	-FLIVSDPSI	AKHVLRDNS-	KAYSKGILAE
97A8Physco	LQKLFLIYGG	VFRLTFGPKS	-FVIVSDPMV	XKHLKDNA-	KAYSKGILAE
97C4Populu	LFKWMNDYGP	IYRLAAGPRN	-FVIVSDPAI	AKHVLRNYG-	TKYAKGLVAE
97C12Vitis	LFRWMNMYGP	IYRLAAGPRN	-FVVSDPAI	AKHVLRNYG-	-KYAKGLVAE
97C9carota	LFKWMNMYGP	IYRLAAGPRD	-FVVSDPAI	AKHVLRNYG-	-KYAKGLVAE
97C11tomat	LYRWMNLYGP	IYRLAAGPRN	-FVIVSDPAI	AKHVLRNYG-	-KYGKGLVAE
97C5Physco	LFKWMMENGP	VYRLAAGPRN	-FVIVGPAV	AKHVLRNYG-	TKYSKGLVAE
97C12Ostre	LFKWMLEAGP	VYLLPTGPVT	SYVVSDAAC	IKQVLFNYG-	SKYIKGTIAE

97E1Skelet	ILEPIMGDGL	IPADPKIWKV	RRRAVVPGFH	KKWLNSMIGL	FGDCGDR-LV
97E2diatom	ILEPIMGDGL	IPADPKIWKV	RRRAVVPGFH	KKWLNNMVTL	FGDCGER-LV
97E4Phaeod	ILDPIMGKGL	IPADPATWKV	RRRAIVPSFH	KRWLNRMITL	FAERAEI-LA
97F3Phaeod	ILEPIMGKGL	IPADPETWSI	RRRQIVPAFH	KAWLEHIVGL	FGYCNQP-LI
97F1diatom	ILKPIMGKGL	IPADPETWSV	RRRAIVPAFH	KAWLNHMOVGL	FGYCNQ-LI
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	IMEPIMGDGL	IPANKETWAK	RRPVIGAGFH	GAWLKHMCNL	FGASAMR-LA
97B7Populu	ILEPIMGKGL	IPADFDTWKL	RRKVIAPGFH	ALYLEAMVKV	FTQCSER-SV
97B15Vitis	ILEPIMGKGL	IPADLDTWKQ	RRRVIAPGFH	ALYLEAMAKV	FTECSER-AI
97B2Glycin	ILEPIMGKGL	IPADLDTWKQ	RRRVIAPAFH	NSYLEAMVKI	FTTCSER-TI
97B12Ginkg	ILEPIMGKGL	IPADLGTWKP	RRKAIVPGFH	AAFLEAMVKV	FGDCSER-TI
97B8Physco	ILEPIMGKGL	IPADLETWKV	RRRAIVPGFH	AAYLEAMVEV	FDNCAER-TV
97B17Volvo	ILEPIMGRGL	IPADLDTWRV	RRRAVVPAFH	RQYYDAMVTM	FGRCADR-SS
97A13Volvo	ILDFVMGTGL	IPADGEVWKA	RRRAVVPALH	RKYVASMVGM	FGDCTVHGT-
97A5Chlamy	ILDFVMGTGL	IPADGEIWKA	RRRAVVPALH	RKYVMSMVDM	FGDCAAHGAS
97A14Ostre	ILDFVMGQGL	IPANGEVWKI	RRKVIVPSLH	KKYVTSMVDM	FGDCGLKGM-
97A11Vitis	ILEFVMGKGL	IPADGELWRV	RRRAIVPALH	QKYVAAMISL	FGQATDR-LC
97A8Physco	ILEFVMGTGL	IPADGEVWRV	RRRAIVPAVH	RKYVAAMMEV	FGQATQR-LC
97C4Populu	VSEFLFGSGF	AIAEGPLWTA	RRRAVVPALH	RKYLIVIVER	VFCCKAERLV
97C12Vitis	VSEFLFGSGF	AIAEGELWTR	RR-AVVPSLH	KRYLSIIVDR	VFCCKAERLV
97C9carota	VSEFLFGSGF	AIAEGPLWTA	RRRAVVPALH	KKYLIVIVER	VFCCKAERLV
97C11tomat	VSEFLFGSGF	AIAEGPLWTA	RRRAVVPALH	KKYLIVIVER	VFCRCAERMV
97C5Physco	VSEFLFGSGF	AIAEDQLWTA	RRRAVVPALH	KKYLSTMVDR	VFCRCSDALV
97C12Ostre	AGEFLFGLGV	ALQELEPWKV	RRKAVAPSLH	RKYVEAMVDR	CFALCADRMT

97E1Skelet	DDLEKRSTSD	-----KPV	IDMEERFCSV	TLDIIGKAVF	NYDFGSVTKE
97E2diatom	NDLDAR-ATA	-----KTP	VDMEERFCSV	TLDIIGKAVF	NYDFGSVTKE
97E4Phaeod	DDLQPK-SAK	-----GOV	VDMEERFCSV	TLDIIGKAVF	NYDFGSVTDE
97F3Phaeod	DTLNKRVDGD	-----GK	VEMESLFCSV	ALDIIGLSVF	NYEFGSVTQE
97F1diatom	ASLEEAACKN	DAPNGQQGK	IEMEEKFCSV	ALDIIGLSVF	NYEFGSVSEE
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	EKLDVAAEKG	-----TT	VELEGELYAM	ALDVIGKAVF	NYEFGALKQE
97B7Populu	LKIDELLEGE	DLHGKKT-VE	LDLEAEFSSL	ALDIIGLGVF	NYDFGSVTKE
97B15Vitis	LKFELLEGE	HLHGKKT-IE	LDLEAEFSNL	ALDIIGLGVF	NYDFGSVTKE
97B2Glycin	LKFNKLEGE	GYDGPDS-IE	LDLEAEFSSL	ALDIIGLGVF	NYDFGSVTKE
97B12Ginkg	NKLQSLLLAA	EADKTMH-ID	VDMEAEFSNL	ALDIIGLSVF	NYDFGSVTRE
97B8Physco	EKIEGLLDVAV	QKECKSQ-IE	IEMESEYSNL	ALDIIGLSVF	NYDFGSVTRE
97B17Volvo	DKLQALVEKG	QVGLGG--RV	VDMESEFLSL	GLDIIGLGVF	NYDFGSITSE
97A13Volvo	ATLDCAVASG	QS-----	IDMENYFSRL	ALDIIGKAVF	NYDFDSLTHD
97A5Chlamy	ATLDKYAASG	TS-----	LDMENFFSRL	GLDIIGKAVF	NYDFDSLTHD
97A14Ostre	SQLARAEEKAN	ES-----	VEMENFYSRF	ALDIIGKAVF	NYDFDSLSTD
97A11Vitis	KKLHAAASDG	ED-----	VEMESLFSHL	TLDIIGKAVF	NYDFDSLTDN
97A8Physco	DKLDEAAVSE	TS-----	VEMESLFSRL	TLDVIGKAVF	NYEFDLSLND
97C4Populu	EKLQADALNG	NA-----	VNMEEKFSQL	TLDVIGLSVF	NYNFDLSLTD
97C12Vitis	ENLRDADALNG	SA-----	VNMEEKFSQL	TLDVIGLSVF	NYNFDLSLTD
97C9carota	EKLEISALNG	SA-----	VNMEEQFSQL	TLDVIGLSVF	NYNFDLSLND
97C11tomat	EKLLPDAISG	SA-----	VNMEAKFSQL	TLDVIGLALF	NYNFDLSLTD
97C5Physco	AKLEKVVASG	AP-----	VNMEAQMSQL	TLDIIGLSVF	NYEFDLSLTD
97C12Ostre	TILEEEAANG	AVG-----S	VNLESRFSKT	ALDIIGISVF	NYDFKALTTA

97E1Skelet	SPIVKAVYRV	LREAEHRSSS	FIPYWNLPYA	EK--WMVGQV	EFRKDMGMLD
97E2diatom	SPIVKAVYRV	LREAEHRSSS	FIPYWDLPYA	DK--WMGGQV	EFRKDMGMLD
97E4Phaeod	SPIIKAVYRV	LREAEHRSSS	FIPYWNLPYA	DQ--WMGGQV	EFRKDMTMLD
97F3Phaeod	SPVIKAVYSA	LVEAEHRSM	PAPYWNLPPLA	NQ--LVPRLR	KFNSDLKLLN
97F1diatom	SPVIKAVYSA	LVEAEHRSM	PAPYWDLPFA	NE--VVPRLR	KFNSDLKVL
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	TPIIKAVYRV	LRESEHRSTF	PLQYWQIPGA	MD--LVPRQK	QFKEDMKMIN
97B7Populu	SPVIKAVYGA	LFEAEHRSTF	YVPYWKFPPLA	RW--LVPRQR	KFQKDLKVIN
97B15Vitis	SPVIKAVYGT	LFEAEHRSTF	YIPYWKVPLA	RW--IVPRQR	KFHSDLKVIN
97B2Glycin	SPVIKAVYGT	LFEAEHRSTF	YIPYWKIPLA	RW--IVPRQR	KFQDDLKVIN
97B12Ginkg	SPVIKAVYGT	LFEAEHRSTF	YIPYWKFPPLA	RW--LVPRQR	KFHEDLKIIN
97B8Physco	SPVLQAVYGT	LSEAEHRSTF	YIPYWKFPPLS	RW--LVPRQR	KFNEDLKVIN
97B17Volvo	SPVIKAVYGV	LKEAEHRSTF	YLPYWNLPPLA	DV--LVPRQA	KFRRLRVIN
97A13Volvo	DPVIQAVYTV	LREAEHRSTA	PLAYWNLPGA	TI--VVPRQR	RCQEALRIVN
97A5Chlamy	DPVIQAVYTL	LREAEHRSTA	PIAYWNIPGI	QF--VVPRQK	RCQEALVLVN
97A14Ostre	DPVIKAVYTV	LREAEYRSVT	FIPYWKVPPL	RW--LVPRQR	QCQEALQVNV
97A11Vitis	TGIVEAVYAV	LREAEEDRSVA	PIPFWEIPIW	KD--ISPRQR	KVNEALKLIN
97A8Physco	AGIVEAVYIT	LREAEEDRSIA	IFPYWNIPIL	RA--IVPRQR	RVAKALNIN
97C4Populu	SPVIDAVYTA	LKEAEARATD	LLPYWKIDAL	CK--IIPRQI	KAQKAVMVR
97C12Vitis	SPVIDAVYTA	LKEAEARSTD	LLPYWKVKAL	CK--IIPRQI	KAQESVTVIR
97C9carota	SPVIEAVYTA	LKEAEARSTD	ILPYWKIEAL	CK--IIPRQV	KAQKAVTVIR
97C11tomat	SPVIDAVYTA	LKEAEARSTD	LLPYWQIKAL	CK--FIPRQI	KAQNAVSLIR
97C5Physco	SPVIDAVYTA	LKETESRSTD	ILPYWQIPLL	CK--IVPRQO	KAQKAVEIIR
97C12Ostre	APVIQATYTA	LKEVETRSM	LLPTWRLEPQ	FLRIVSPRQR	NAQDAVTVIR

97E1Skelet	DILAKLINRA	VETROEAT--	--VEELEER--	ETSDDPSLLR	FLVDMRGEDL
97E2diatom	DILTCLINRA	IETRDEAS--	--VEELEDR--	DVGDDPSLLR	FLADMGRGEDL
97E4Phaeod	DILADLINKA	VSTRREAS--	--IEELEKR--	ENEDDPSLLR	FLVGMGRGEDL
97F3Phaeod	DVLDDLITRA	KQTRTVED--	--IEELENRNY	NEVQDPSLLR	FLVDMRGADI
97F1diatom	DVLTDLIDRA	KNSRQVED--	--IEELEKRDY	ANVKDPSLLR	FLVDMRGADI
97F2Euglen	-----IASA	LKNRDPAD--	--IADLEARDY	DEMDNPSLLR	ILVDMRGEET
97E6Ostreo	EELSTLINS	IESRNETG--	--LEEMERRDY	SNVEDASLLR	FLVDIRGDEA
97B7Populu	ECLDGLIRNA	KETROETD--	--VEKLQORDY	SNLKDASLLR	FLVDMRGADV
97B15Vitis	DCLDGLIKNA	KETROETD--	--VEKLQORDY	QNLKDASLLR	FLVDMRGADV
97B2Glycin	TCLDGLIRNA	KESRQETD--	--VEKLQORDY	LNLKDASLLR	FLVDMRGADV
97B12Ginkg	ECLDSLQGA	KETROEDD--	--IEALQGRDY	SKVKDASLLR	FLVDMKGV
97B8Physco	DCLDDLKRA	QSTRQEED--	--VESLQQRDL	SAAQDSSLLR	FLVDMRGEDA
97B17Volvo	DCLDDLIRKA	QETRVEED--	--AEALQNRDY	SKLRDPSLLR	FLVDMRGEDV
97A13Volvo	DTLDGLIDKC	KKLVEEEE---	--DMEFNEEF	LSDQDPSILH	FLLAS-GDEI
97A5Chlamy	ECLDGLIDKC	KKLVEEEE---	--DAVFGEFF	LSEDRDPSILH	FLLAS-GDEI
97A14Ostre	DTLDDLINRC	KAVVEEEE---	--DEEFVEEY	MNTDDPSILH	FLLAS-GDDV
97A11Vitis	STLDDLIAIC	KRMVEEEE---	--ELQFHEEY	MNEKDPSILH	FLLAS-GDDV
97A8Physco	EVLNLIAC	KRMVEEEE---	--DVQFEDEY	VNDRDPSILH	FLLAA-GDEV
97C4Populu	QTVEELIEKC	KKIVEIE---	--GEKINEEY	VNDNDPSILR	FLLAS-REEV
97C12Vitis	KTVEELIAKC	KEIVERE---	--GERIDEDEY	VNDSDPILR	FLLAS-REEV
97C9carota	TTVEELIEKC	KKIVDTE---	--GERISEEY	VNEADPSILR	FLLAS-REEV
97C11tomat	QTVEELIAKC	REIVETE---	--GERINEDEY	VNDRDPSILR	FLLAS-REEV
97C5Physco	ETVEKLVAQM	QEMVEAE---	--KETIEGEEY	VNESDPSVLR	FLLAS-REEV
97C12Ostre	DVTQRLVDDC	KRMVEEEEEKV	GGAEWARDY	LNESNPSVLR	YLIAA-REEV

97E1Skelet	TSKVLRDDLM	TMLIAGHETT	AAMLTWTMFG	LVSN--DPGM	MKEIQAEVRT
97E2diatom	TSKVLRDDLM	TMLIAGHETT	AAMLTWTVFG	LVSN--DSGL	MKEIQAEVRT
97E4Phaeod	SSMVLRDDLM	TMLIAGHETT	AAMLTWTLFE	LSRG--DPGL	LKEVQAEVRT
97F3Phaeod	DNKQLRDDLM	TMLIAGHETT	AAVLTWALFE	LTKN---PEI	MKELQDEIDE
97F1diatom	DNKQLRDDLM	TMLIAGHETT	AAVLTWALFE	LTKH---PEQ	MAKVRAEIDS
97F2Euglen	TNQQLRDDLI	TLLIAGHETT	ASALTWAI FE	LVQQ---PEL	LQRVQREVDE
97E6Ostreo	TSTQLRDDLM	TMLIAGHETT	AAVLTWTLYL	LAQH--PEIM	EEAVKEIEMC
97B7Populu	DDRQLRDDLM	TMLIAGHETT	AAVLTWAVFL	LAQN---PSK	MKKAQAEIDQ
97B15Vitis	DDXQLRDDLM	TMLIAGHETT	AAVLTWAVFL	LAQN---PSK	MKKAQAEIDS
97B2Glycin	DDRQLRDDLM	TMLIAGHETT	AAVLTWAVFL	LAQN---PSK	MKKAQAEVDL
97B12Ginkg	DNGQLRDDLM	TMLIAGHETT	AAVLTWALFL	LAQN---TDK	LVKAQAEIDT
97B8Physco	TNKQLRDDLM	TMLIAGHETT	AAVLTWATFH	LAQN---PDM	VAKAQAEIDR
97B17Volvo	TNKQLRDDLM	TMLIAGHETT	AAVLTWALYC	LMQS---PAA	LERVLREVDG
97A13Volvo	SSKQLRDDLM	TMLIAGHETT	AAVLTWTLYT	LAS--H-PEA	TEAIRREVDE
97A5Chlamy	SSKQLRDDLM	TMLIAGHETT	AAVLTWTLYL	LSQ--H-PEA	AAAIRKEVDE
97A14Ostre	TSKQLRDDLM	TLLIAGHETT	AAVLTWTFYL	LAK--H-PEV	KAKVFEEVDR
97A11Vitis	SSKQLRDDLM	TLLIAGHETS	AAVLTWAFYL	LSK--E-PSV	MSKLQNEVDS
97A8Physco	SSKQLRDDLM	TLLIAGHETS	AAVLTWTFYL	LAQ--N-PGA	VAKLQEEVDR
97C4Populu	SSVQLRDDLL	SMLVAGHETT	GSVLTWTLYL	LSK--D-SST	LMKAQEEVDR
97C12Vitis	SSVQLRDDLL	SMLVAGHETT	GSVLTWTLYL	LSK--N-SSS	LMKAQEEVDR
97C9carota	SSTQLRDDLL	SMLVAGHETT	GSVLTWTSYL	LSK--N-PSS	LVKAQAEVDR
97C11tomat	SSVQLRDDLL	SMLVAGHETT	GSVLTWTAYL	LSK--D-PSS	LEKAHEEVDR
97C5Physco	SSVQLRDDLL	SMLVAGHETT	GSVLTWTVYL	LSK--N-PAA	LAKVHEELDR
97C12Ostre	SSTQLRDDLL	SLLVAGHETT	ASVLTWGTYE	LLKPEN-AEQ	LRLRLRAELDE

97E1Skelet	VMGNKSRPDY	DDVVAMKKLR	YALIEALRLY	PEPPVLIRRA	ROEDTLPPGG
97E2diatom	VMGDKLRPDY	DDIAKMKKMR	YALIEALRLY	PEPPVLIRRA	RSEDNLPAGG
97E4Phaeod	VLKGKERPDY	DDIVAMKKLR	YSLIEALRLY	PEPPLLIRRA	RTEDNLPAGS
97F3Phaeod	VVGDR-MPNY	EDIKMKKFLR	LVVAETLRMY	PEPPLLIRRC	RTPDELPOGA
97F1diatom	VLGDR-TPTY	DDIKEMOYLR	LVVAETLRLY	PEPPLLIRRC	RTENKLPKGG
97F2Euglen	VLGDR-LPTM	DDIRGLLLCR	LCIAESLRMY	PEPPLLIRRV	LDDLTLPKGA
97E6Ostreo	VENADGVPTP	EEVRKLEKVR	MILAEGRMLY	PAPPILIRRA	IKDVTLPKGG
97B7Populu	VLGQG-RLTF	ELIKQLKYIR	LIVVESLRLY	PQPPLLIRRS	LKPDVLPGGY
97B15Vitis	VLGQG-RISF	ESLKKLEYIR	LIVAESLRLY	PQPPLLIRRS	LKSDSLPG-Y
97B2Glycin	VLGTG-RPTF	ESLKELOQYR	LIVVEALRLY	PQPPLLIRRS	LKSDVLPGGH
97B12Ginkg	ILDQR-KPTF	EDIKRLQYIR	LIIAEALRLY	PQPPLLIRRA	LRQDTIPGGY
97B8Physco	VLQGR-RPTL	KDIQNLTYIK	LIVAESLRLF	PQPPLLIRRS	LQPDTLPGGH
97B17Volvo	VVGDR-TPTP	GRIKAMPYLR	ATLGESLRMY	PQPPILIRRA	LGEDVLPGGI
97A13Volvo	VLGDR-APNV	EDFKSLRFTT	RVINEAMRLY	PQPPVLIRRA	LQEDKFD---
97A5Chlamy	LLGDR-KPGV	EDLRALKMTT	RVINEAMRLY	PQPPVLIRRA	LQDDHFD---
97A14Ostre	VVGDR-NPTV	ADMRALVYTT	RVINESMRLY	PQPPVLIRRA	LEPVTLG---
97A11Vitis	VLGDR-FPTI	EDMKKLYTT	RVINEALRLY	PQPPVLIRRS	LENDVLG---
97A8Physco	VLGDR-IPTV	EDMKKLYTT	RVINESLRLY	PQPPVLIRRS	LESMDLG---
97C4Populu	VLQGR-PPTY	DDIKDLKYLT	RCINESLRLY	PHPPVLIRRA	QVADVLPG--
97C12Vitis	VLQGR-SPSY	EDIKDLKFLT	RCINESMRLY	PHPPVLIRRA	KVADVLPG--
97C9carota	VLEGR-PPTY	DDIKNLKYLT	RCINESMRLY	PHPPVLIRRA	EVADELPG--
97C11tomat	VLGGR-SPTY	EDMKNLKYLT	RCITESLRLY	PHPPVLIRRA	QVADVLPG--
97C5Physco	VLAGR-KPQF	ADIKELKYLT	RCINESMRIY	PHPPVLLRRA	RVADVLPG--
97C12Ostre	VLGTRPYPTF	ADLAKMPYLE	RCFHESMRLY	PQPPVYTRRA	VVEDVLPN--

97E1Skelet	TGLSGGVKVL	RGTDIFISTW	NLHRAPEYWE	N-ADKYDPTR	WERPFKNPGV
97E2diatom	SGLSGGVKVL	RGTDIFISTW	NLHRAPEYWE	N-PEKYDPTR	WERRFKNPGV
97E4Phaeod	SDLKSGVKVL	RGTDMFISTW	NLHRSPDLWE	N-PEVFDPTR	WDRPFNNAGI
97F3Phaeod	---GREAKVI	RGMDIFMAVY	NIHRDERFWP	S-PDTFDPLR	FTRSHSNPDV
97F1diatom	---GREATVI	RGMDIFLSLY	NLHHDERFWP	E-PNEFKPER	WESKYINPEV
97F2Euglen	T-AKFEATLK	RATDIFLAIY	NIHHDGRFWP	N-PDFYDPER	FLRPYKNPEI
97E6Ostreo	N--GKEITLK	AGTDCFIAVW	NLHRSPDLWE	N-PEKFDPSR	FSRRFTNEAI
97B7Populu	KGDKDGYAIP	AGTDIFVSVY	NLHRSPYFWD	N-PNEFEPER	FLVTRNNDGI
97B15Vitis	KGKKDGH SIP	AGTDIFLSVY	NLHRSPYFWD	R-PHEFEPER	FQVPRNSD-I
97B2Glycin	KGEK DGYAIP	AGTDV F ISVY	NLHRSPYFWD	R-PDDFEPER	FLVQNKNEEI
97B12Ginkg	RGDKDGYLIP	KGTDIFISVY	NLHRSPYFWD	Q-PHEFRPER	FLIPKDNKGI
97B8Physco	KGDPNGYSIP	KGVDL F ISVY	NLHRSPYFWD	E-PEKFNPER	FLKAKLS DGI
97B17Volvo	RGDPAGYPIG	TGADL F ISVW	NLHRSPYLWK	D-PDTFRPDR	FFESYSNPDF
97A13Volvo	-----QYVVP	AGS D L F ISVW	NLHRSP ELWD	E-PDKFKPER	FGPLDG----
97A5Chlamy	-----QFTVP	AGS D L F ISVW	NLHRSPKLWD	E-PDKFKPER	FGPLDS----
97A14Ostre	-----GYNID	AGT D F F ISVW	NLHRNPRIWD	E-PDAFKPER	FP-IDA----
97A11Vitis	-----GYPIK	R-----	-----	-----	-----
97A8Physco	-----KYRIN	KGEDIFISTW	NIHRSPYLWE	D-PESFLPER	FP-LDG----
97C4Populu	-----NYKVN	AGQDIMISVY	NIHSSKVWE	R-AEEFVPER	FGLDG-----
97C12Vitis	-----NYKVN	AGQDIMISVY	NIHSSQVWE	R-AEDFLPER	FDLEG-----
97C9carota	-----SYKVN	PGQDIMISVY	NIHSSKVWD	R-AEEFIPER	FDLDG-----
97C11tomat	-----NYKVN	VGQDIMISVY	NIHSSSEVWD	R-AEEFDPER	FDLEG-----
97C5Physco	-----GYKIE	AGQDVMISVY	NIHHS PQVWD	N-AEEFVPER	FDVDG-----
97C12Ostre	-----GMTVP	KNQDLLVSIY	NLHRSPANWG	PTSQQFEMR	FGPLAN----

97E1Skelet	KG-WNGYDPE	KQSSQSLYPN	EITSDYAFLP	FGAGKRKCIG	DQFAMLEASV
97E2diatom	KG-WNGYDPE	KQSESSLYPN	EITADYAFLP	FGAGKRKCIG	DQFAMLEASV
97E4Phaeod	PG-WSGYNPD	KVSG--LYPS	ENAA D FAFLP	FGGGQRKCVG	DQFAMMEATV
97F3Phaeod	PG-WAGFDPK	KWEG-KLYPN	EVAS D FAFLP	FGGGARKCVG	DEFAILEATV
97F1diatom	PE-WAGYDPA	KWINTNLYPN	EVAS D FAYLP	FGGGARKCVG	DEFATLEATV
97F2Euglen	PE-WKGYDPE	GWKG-RLYPD	EVSSDYAFMP	FGAGPRRCLG	DVFATLEGTV
97E6Ostreo	EG-WGGLNPD	LMTG--LYPN	EQST D FSYP	FGGGQRRCAG	DQFAMLEAVT
97B7Populu	EG-WSGFDP	RSPG-ALYPN	EIIS D FAFLP	FGGGPRKCVG	DQFALMESTI
97B15Vitis	EG-WSGFDP	RSPG-ALYPN	EIVADFAFLP	FGGGPRKCVG	DQFALMESTI
97B2Glycin	EG-WAGLDPS	RSPG-ALYPN	EVIS D FAFLP	FGGGPRKCVG	DQFALMESTV
97B12Ginkg	EG-WAGFDPY	RSQG-ALYPN	EVLADFAFLP	FGGGPRKCVG	DQFALMESTV
97B8Physco	EG-WAGFDPK	RGQG-ALYPN	EVMADFAFLP	FGGGARKCVG	DQFALMESTV
97B17Volvo	EGKWAGAYAV	SGGA-ALYPN	EVGS D FAFIP	FGGGARKCVG	DQFAMFEATV
97A13Volvo	-----	P-----IPN	EVTFNFGYLP	FGGGRRKCIG	DQFALFEALV
97A5Chlamy	-----	P-----IPN	EVTFNFAYLP	FGGGRRKCIG	DQFALFEAVV
97A14Ostre	-----	P-----MPN	EYTEEYAYLP	FGGGQRKCVG	DQFAIFESIV
97A11Vitis	-----	-----	-----	-----	-----
97A8Physco	-----	P-----DPT	ESNQNFYLP	FGGGPRKCLG	DMFATFENIT
97C4Populu	-----	P-----VPN	ESNTDFRFIP	FSGGPRKCVG	DQFALLEAIV
97C12Vitis	-----	P-----VPN	ETNTDFRFIP	FSGGPRKCVG	DQFALLEAIV
97C9carota	-----	P-----VPN	ESNTDYRFIP	FSGGPRKCVG	DQFALLEAIV
97C11tomat	-----	P-----VPN	ETNTDFRFIP	FSGGPRKCVG	DQFALLEATI
97C5Physco	-----	P-----VPN	ETNTDFKYIP	FSGGPRKCVG	DQFAMLEATV
97C12Ostre	-----	G-----QPN	ELNTDYRYVP	FSAGPRRCPG	DKFAVYEXIV

97E1Skelet	TLSMIMNKFD	FTLVGTPEDV	G---MKTGAT	IHTMNGLNMM	VSPRSETNPI
97E2diatom	TLAMIINKFD	FTLVGSPKDV	G---MKTGAT	IHTMNGLNMV	VSRRSEDNPI
97E4Phaeod	TMALMIKKYD	FDFAIPAEDV	G---MKTGAT	IHTMNGLMMR	ARQVNEPEPV
97F3Phaeod	TLAMVLRRFE	FSFDESKFEG	----KDDILS	SAQGLNHPVG	MRTGATIHTR
97F1diatom	TLAMLLRRFE	FEFDSAKLAA	S---KIDIMD	HPEDLEHAVG	MRTGATIHTR
97F2Euglen	ALAMVLRRFD	FTFAAPTAQP	D-----	-----	-----
97E6Ostreo	SLSVLLKKFK	FELDCPPNDV	E---MITGAT	IHTKKGLPMK	IKRRE-----
97B7Populu	ALTLLLQKFD	VELRGSPEEV	E---LVTGAT	IHTKNGLWCR	LKKRSDVH--
97B15Vitis	ALTMLLQKFD	VELKGGPESV	E---LVTGAT	IHTKNGLWCR	MMKRSDLH--
97B2Glycin	ALTMLLQNF	VELKGTPEVS	E---LVTGAT	IHTKNGLWCN	LRKRSSLH--
97B12Ginkg	GLAMLLQKFE	VELKDPPESL	R---IVTGAT	IHTQNGLWCK	IKRRKHYESE
97B8Physco	ALAMLLQKFE	VELRGSPEEV	E---LVTGAT	IHTKDGLWCK	LSRRKSITNL
97B17Volvo	ALAVLLRRFS	FALEGPPEKV	G---MATGAT	IHTANGLMVR	VSRRTPPPPP
97A13Volvo	ALAMLVRRYD	FVLDTSKPPV	G---MTTGAT	IHTTGGLYMH	VKKRD---MS
97A5Chlamy	ALAMLRRYE	FNLDESKGTV	G---MTTGAT	IHTTNGLNMF	VRRRDPLTVP
97A14Ostre	SLAMLRRYD	FELDESKHPD	GECGTTGAT	IHTTNGLHVK	LKRRD-----
97A11Vitis	-----	-----	-----	-----	-----
97A8Physco	ALAMLVRRLE	FALAPDAPPV	G---MTTGAT	IHTSNGLHMS	VVRRRIKSDS
97C4Populu	ALAIFLQKIN	FELVPDQINR	----MTTGAT	IHTTDGLYMK	LSQRDT----
97C12Vitis	ALAIFVQHMN	FELVPDQINIS	----MTTGAT	IHTTNGLYMK	LTQRQIPSAF
97C9carota	SLAIFLQHLS	FELIPDQVIN	----MTTGAT	IHTTNGLYMK	VSKRQIKSAA
97C11tomat	ALAIFVQNFS	FELIPDQITIS	----MTTGAT	IHTTNGLYMK	VKQREKASVL
97C5Physco	ALAVLLQRFK	FDLVPNQITIG	----MTTGAT	IHTTTGLYMT	VTDRQOTKVP
97C12Ostre	IWATMLRRLD	LELKAGHDVI	----MTSGAT	IHTKSGLLAT	V-----

97E1Skelet	PGTNEWWTQ	HLMRGLSSTG	RPYTSDEDA	WTTSANGMRP	-----
97E2diatom	PETNDYWIQQ	HLSRGLNVNG	RPYSSNEDA	WTASSRDKNE	GVVSRLVN--
97E4Phaeod	QSAEGYWEMQ	HLKRGLNANG	RPYTTEEEAV	WQTSERLSHK	KEEEKPNNEG
97F3Phaeod	NGLHLVVEKR	GVPK-----	-----	-----	-----
97F1diatom	KGLHMVIRKR	EL-----	-----	-----	-----
97F2Euglen	-----	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----	-----
97B7Populu	-----	-----	-----	-----	-----
97B15Vitis	-----	-----	-----	-----	-----
97B2Glycin	-----	-----	-----	-----	-----
97B12Ginkg	LQ-----	-----	-----	-----	-----
97B8Physco	N-----	-----	-----	-----	-----
97B17Volvo	PAPAAGSPRE	EQLPRQPVAA	-----	-----	-----
97A13Volvo	GLAAAVRRQE	TPAYAFAYGT	STVAAMASPA	SSSPAAVAGG	GCPFHTGAAV
97A5Chlamy	PTSSSSVAETV	STGYAFACGP	AVMPVASAEV	VAAPATAAGG	GCPFHTAAGA
97A14Ostre	----GRGGR	EMDGTYYVTGM	ALSNLEDVDV	VRGSIDAPT-	-----
97A11Vitis	-----	-----	-----	-----	-----
97A8Physco	AKETPVTQTQ	SSNGLVSQGT	S-----	-----	-----
97C4Populu	-----	-----	-----	-----	-----
97C12Vitis	VPTSSR----	-----	-----	-----	-----
97C9carota	VSSISR----	-----	-----	-----	-----
97C11tomat	AAAP-----	-----	-----	-----	-----
97C5Physco	DLVVA-----	-----	-----	-----	-----
97C12Ostre	-----	-----	-----	-----	-----

97E1Skelet	-----	-----	-----	-----
97E2diatom	-----	-----	-----	-----
97E4Phaeod	GCPMHKM---	-----	-----	-----
97F3Phaeod	-----	-----	-----	-----
97F1diatom	-----	-----	-----	-----
97F2Euglen	-----	-----	-----	-----
97E6Ostreo	-----	-----	-----	-----
97B7Populu	-----	-----	-----	-----
97B15Vitis	-----	-----	-----	-----
97B2Glycin	-----	-----	-----	-----
97B12Ginkg	-----	-----	-----	-----
97B8Physco	-----	-----	-----	-----
97B17Volvo	-----	-----	-----	-----
97A13Volvo	PPPPPAAVAA	ASVTVGGATA	TLGGGVSIGP	SAPAGPAGL
97A5Chlamy	AVPAATMSLR	PTGPPSA---	-----	-----
97A14Ostre	-----	-----	-----	-----
97A11Vitis	-----	-----	-----	-----
97A8Physco	-----	-----	-----	-----
97C4Populu	-----	-----	-----	-----
97C12Vitis	-----	-----	-----	-----
97C9carota	-----	-----	-----	-----
97C11tomat	-----	-----	-----	-----
97C5Physco	-----	-----	-----	-----
97C12Ostre	-----	-----	-----	-----

Supplementary Figure 2

Alignment of CYP711 sequences taken from the Cytochrome P450 website. Conservation in SRS1-6 regions is highlighted in yellow with Arabidopsis CYP711A1 as the 100% control.

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19      577
711A7_Popu -----M  STDLQVLFTP  MVTPLCTVLA  MLLGLLGYLY  GPYWGVRKVP
711A8_Popu -----MD  LQVLFTDVPV  VTAIICTVFA  MLLGLLGYLY  GPYWGVRKVP
711A15_pap -MGLVEMLMG  VRWFNTTLP  AVSTFFTTILA  VAAGILVYLY  GPYWGVRKVP
711A14_Vit -MDAALQGLI  QIGVSFIRTP  MAPAFFTVLA  MLGGLLGYLY  EPYWRVRRVP
711A21_Toma-----  -MMFLSSAIQ  ESPIASTIFT  ILDGVLVYLY  RPYWRVRKVP
711A9_Lotu ----MVFMDF  EWLFPQIPV  WSSAMFTLLA  TIGGFLVYLY  GPYWGVRKVP
711A12_Med ----MVFMDL  EWLFPPIPIS  -VSFASTILA  LAGGWLIYLY  EPYWRVRKVP
711A10_Med -----M  LFSVILNVP  LASTIFILVT  LMGGLVGYLY  WPFWKLKVP
711A1_Arab ---MKTQHQQ  WEVLDPFLTQ  HEALIAFLTF  AAVVIVYLY  RPSWSVCNVP
711A3_rice -----ME  IISTVLGSTA  EYAVTLVAMA  VGLLLGYLY  EPYWKVRHVP
711A4_rice -----M  DISEVLGATA  EWAVTLVAMA  VGLLVVAYLY  EPYRKVWHVP
711A2_rice -----ME  ISTVLGAILA  EYAVTLVAMA  VGFLVVGYLE  EPYWKVRHVP
711A18_Zea -----M  LASAVLRAME  ECTFTSAAMA  VGFLLVVYLY  EPYWKVRHVP
711A5_rice MEASNCSIAL  EISHVATPGL  PVLLLGSSLA  LLAVFLVYFY  APFWSLRTVP
711A19_Zea ---MEITASC  DDGAVTAGAV  SGLLLASVLS  LFGAFLVYFY  APFWSVRRVP
711A6_rice ----MEALVA  AAAAAARDQP  WLLLPWSWLA  GVVVVVYFY  APWVGRRVP
711A13_Zea -----MEM  AGAAGTEAWL  PYVTTVASCA  VGVFLLYFY  APHWRIRDVP
711A11_Pic -----  -----  -----  -----  -----

711A7_Popu GPPVIPLLGH  LPLMAKHGPD  VFTLLAKLYG  PIFRFHMGRQ  PLIIVADPEL
711A8_Popu GPPVIPLLGH  LPLMAKHGPD  VFSVLAKRYG  PIFRFHMGRQ  PLIIVADPEL
711A15_pap GPPIIPLVGH  LPLMAKYGPD  VFSVLAKRHG  PIFRFHMGRQ  PLIIVADPEL
711A14_Vit GPPVFPLVGH  LPLMAKYGHD  VFSVLAKKYG  PIFRFHVGRQ  PLVIVADAEL
711A21_TomaGPPAFPLVGH  LPLMAKYGPD  VFSVLAKQYG  PIYRFHMGRQ  PLVIVADAEL
711A9_Lotu GPPSVPLIGH  LPLLAKYGPD  VFSVLAKQYG  PIYRFHMGRQ  PLIIVADAEL
711A12_Med GPPSLPLVGH  LPLLAKHGPD  VFSVLAKQYG  PIYRFHMGRQ  PLIIVADAEL
711A10_Med GPPSLPLVGH  LPLLAKYGPD  VFSVLAKQYG  PIYRFHMGRQ  PLIIVADAEL
711A1_Arab GPTAMPLVGH  LPLMAKYGPD  VFSVLAKQYG  PIFRFQMGRO  PLIIVAEEL
711A3_rice GPVPLPFIGH  LHLLAMHGPD  VFTVLARKYG  PVFRFHMGRQ  PLVMVADAEL
711A4_rice GPVPLPFIGH  LHLLAMHGPD  VFSVLARKHG  PVFRFHMGRQ  PLIIVADAEL
711A2_rice GPVPLPFIGH  LHLLAMHGPD  VFSVLTRKYG  PIFRFHMGRQ  PLVMVADAEL
711A18_Zea GPVPLPFVGH  LHLLARHGPD  VFLVLAKKYG  PIFRFHMGRQ  PLVIVANAEL
711A5_rice GPPTRFPIGH  LHLLAKNGPD  VFRAIAKEYG  PIFRFHMGRQ  PLVIVANAEL
711A19_Zea GPPARFPIGH  LHLLARNGPD  VFRAIAKEYG  PIFRFHMGRQ  PLVIVANAEL
711A6_rice GPAALPVVGH  LPLLAHNGPD  VFAVLAKKYG  PIFRFHGRQ  PLVIVAEEL
711A13_Zea GPPALPVVGH  LPLLARHGPD  VFGLLAKKYG  PIFRFHGRQ  PLVIVADPEL
711A11_Pic -----  -----  -----  -----  -----DL

711A7_Popu CREGIKKFK  DIPNRSIPSP  ISASPLHQKG  LFFT-RDAIW  STMRNSILSV
711A8_Popu CKEVAIKKFK  DIPNRSVPSP  ISASPLHQKG  LFFT-RDARW  STMRNTILSV
711A15_pap CREVGIKKFK  DIPNRSIPSP  ISASPLHQKG  LFFT-RDARW  STMRNTIVSV
711A14_Vit CREVGIKKFK  DIPNRSIPSA  ISASPLHQKG  LFFT-RDARW  STMRNTIISV
711A21_TomaCREVGIKKFK  DIPNRSIPSP  IAASPLHQKG  LFFT-RDSRW  STMRNTILSV
711A9_Lotu CKEAGIKKFK  DITNRSIPSP  ISASPLHQKG  LFFT-KRDSQW  STMRNTILSL
711A12_Med CKEVGIKKFK  DIPNRSTPSP  IKASPLHQKG  LFFS-RDSQW  STMRNTILSV
711A10_Med CKEVGIKKFK  EIPNRSIPSP  ISASPLHQKG  LFFT-RNSQW  STMRNTILSV
711A1_Arab CREVGIKKFK  DIPNRSIPSP  ISASPLHKKG  LFFT-RDKRW  SKMRNTILSL
711A3_rice CKEVGKFKFK  SIPNRSMPSA  IANSLINQKG  LCFT-RGSRW  TALRNMIISI
711A4_rice CKEVGKFKFK  SIPNRSMPSP  IANSPHKKG  LFFI-RGPRW  TSMRNMIISI
711A2_rice CKEVGKFKFK  NFPNRSMPSP  ITNSPVHQKG  LFFT-SGSRW  TSMRNMIISI
711A18_Zea CKEVGIKKFK  SMPNRSLPSP  IANSPHLLKG  LFST-RDSRW  SALRNMIISV
711A5_rice CKEVGIKKFK  DIRNRSTPPP  NVG-TLHQDA  LFLT-RDSTW  SSMRNMIISV
711A19_Zea CKEVGIKKFK  DIPNRSTPPP  SIG-SLHQDA  LFLT-RDSTW  SAMRSTVPL
711A6_rice CKEVGIRQFK  SIANRSLPAP  IAGSPLHQKG  LFFT-RDARW  SAMRNTIISL
711A13_Zea CREVGVRQFK  LIPNRSLPAP  IAGSPLHQKG  LFFT-RDERW  SAMRNTIISL
711A11_Pic CREVGIKKFK  QFSNRSIPSP  IASSPLHQKG  LFFT-RDSRW  SSMRGAIQPL

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711A7_Popu	YQPSHLASLV	PTMQSFIESA	TENFQSLKEE	E---ITFSNL	SLKLATDVIG
711A8_Popu	YQPSHLASLV	PTMQSFIESA	TDNFQSSNEE	----ITFSNF	SLKLATDVIG
711A15_pap	YQPSHLASLV	PTMQEFIESA	TQNLES--QQ	D---VNFSNM	SLKLATDVIG
711A14_Vit	YQPSHLANLV	PTMQAFIEPA	FRNLPSSEEE	D---ITFSNL	SLKLATDVIG
711A21_Toma	YQPSYLAALV	PIMQSYIESA	TKNLDS--EG	D---LTFSDL	SLKLATDVIG
711A9_Lotu	YQPSHLSRLV	PTMQSFIESA	TQNLDSDQ-NE	D---FIFSNL	SLSLATDVIG
711A12_Med	YQPSHLSRLV	PTMQSFIESA	TQNLDSDQ-KE	D---IFFSNL	SLKLATDVIG
711A10_Med	YQPSHLANLV	PKMQSFIESA	TQNLDSDTSKE	D---IIFSNL	SLRLATDVIG
711A1_Arab	YQPSHLTSLI	PTMHSFITS	THNLDSK-PR	D---IVFSNL	FLKLTDDIIG
711A3_rice	YQPSHLASLI	PTMQSCIECV	SKNLD--GQE	D---ITFSDL	ALGFATDVIG
711A4_rice	YQPSHLASLI	PTMESCIOQA	SKNLD--GQK	E---ITFSDL	SLSLATDVIG
711A2_rice	YQPSHLATLI	PSMESCIERA	AENLE--GQE	E---INFSKL	SLSFTTDDVLG
711A18_Zea	YQPSHLAGLI	PSMQSHIERA	ATNLDDGGEA	E---VAFSKL	ALSLATDVIG
711A5_rice	YQPARLAGLI	PTMQSYVDAL	VDNIAGCPDQ	D--CIPFCQL	SLCMAIDIIG
711A19_Zea	YQPARLAGLI	PVMQSYVDTL	AANIAACPQDQ	D--CVPFCQL	SLRMAIDIIG
711A6_rice	YQPSHLAGLI	PTMHSCVARA	ADAIAAAEQR	D---VDFSDL	SLKLATDVIG
711A13_Zea	YQPSHLAGLV	PTMQHCIERA	ADAIPAMVVQ	ENGLVDFSDL	SLKLATDIIG
711A11_Pic	YQTRISNLL	PVMERVVCL	KRKLAAKEET	D--DIDFSEL	LLRVATDIIG
711A7_Popu	QAAFVDFGL	SKPQSTDSF	NSF-----HS	QGK--NNTDV	SEFIKQHIYS
711A8_Popu	QAAFVDFGL	SKPQASDSI	NSF-----HN	QGK--DNCV	SEFINQHIYS
711A15_pap	RAAFVDFGL	SKPQSIDESI	NKK-----TN	QDDNVDDHEV	SSFINQHIYS
711A14_Vit	QAAFVDFGL	SKPPSSNEVK	-----	NSD-----EV	SEFINQHIYS
711A21_Toma	QASFVDFGL	SKPISDKMSH	HQ-----	DDS-----EV	QEFIKQHIYS
711A9_Lotu	QAAFVDFGL	SRPQSVRDES	G-----NKE	VRGSGAGNEV	SDFINQHIYS
711A12_Med	QAAFVDFGL	SQSHSVHNES	KNV--ATDNKD	LMNASGSNEV	TDFINQHIYS
711A10_Med	DAAFVDFGL	SKPHSICESM	N-----NV	EQSSANSDEV	SIFINQHIYS
711A1_Arab	QAAFVDFGL	SGKKPIKD--	-----	-----VEV	TDFINQHVYS
711A3_rice	QAAFVDFGL	SKISASSNDD	----DIDKIA	TDTSAEAKAS	SEFIRMVHHA
711A4_rice	LAAFVDFGL	SKLPVTPDDS	----NIDKIA	ADTSVEAKAS	SEFIKMHMHA
711A2_rice	QAAFVDFGL	SKKLASSDDD	E---DTRKIA	ADTCAEAKAS	SEFIKMHVHA
711A18_Zea	QAAFVDFGL	TTKPAAPPPH	HGPPRQHGE	DGDGSHSTRS	SEFIKMHHS
711A5_rice	RTAFVDFGL	SRKAADTAAG	-----DD	GDGGGDNDV	KEFLREYKKS
711A19_Zea	RTAFVDFGL	SKNAAGTGSS	SS-----ES	PGGEGEGDV	REFLREYKRS
711A6_rice	QAAFVDFGL	TAAAAAPRS	-----	DDADADGGEA	AEFIREHVHS
711A13_Zea	EAAFVDFGL	TASGP-----	-----	-----GCEA	AEFIREHVHS
711A11_Pic	EAAFVDFGL	TEETTTISS	-----	-----NPAEV	SEFIKQHVYS
711A7_Popu	TTQLKMDLSG	SFSIILGLLV	PILQEPFRQI	LKRIPGTMDW	KVDRTNKNIS
711A8_Popu	TTQLKMDLSG	SFSIILGLLV	PILQEPFRQI	LKRIPGTMDW	KVDRTNRNIS
711A15_pap	TTQLKMDLSG	SFSIILGLLI	PILQEPFRQI	LKRIPGAMDR	KVDQTNRKIS
711A14_Vit	TTNLKMDLSG	SFSIILGLLV	PILQKPVQHI	LKRIPGTMDW	KIYQTNKKLS
711A21_Toma	TTQLKMDLSG	SFSIILGLLV	PILQEPFRQV	LKRIPGTMDW	KVERTNKNLS
711A9_Lotu	TTQLKMDLSG	SFSIILGLLV	PILQEPFRQI	LKRIPGTMDW	KIECTNRKLS
711A12_Med	TTQLKMDLSG	SFSIILGLLV	PILQEPFRQI	LKRIPGTMDW	KIERTNEKLG
711A10_Med	TTQLKMDLSG	SFSIILGLIA	PILQEPFRQI	LKRIPGTMDW	KMECTNKNLT
711A1_Arab	TTQLKMDLSG	SLSIILGLLI	PILQEPFRQV	LKRIPGTMDW	RVEKTNARLS
711A3_rice	TTSLKMDLSG	SLSIILGQLL	PFLQEPFRQV	LKRIPWTADH	EIDHVNLAG
711A4_rice	TTSLKMDLSG	SLSILVGMLL	PFLQEPFRQV	LKRIPGMGDY	KIDRVNRALK
711A2_rice	TTSLKMDMSG	SLSIIVGQLL	PFLHEPFRQV	LKRLRWADH	EIDRVNLTG
711A18_Zea	TTSLKMDLSG	SLSTIVGTL	PVLQWPLRQL	LLRVPGAADR	EIQRVNGALC
711A5_rice	MEFIKMDLSS	SLSTILGLFL	PCVQTPCKRL	LRRVPGTADH	KMDQNERRLC
711A19_Zea	MEFVKMDLTS	SLSTILGLFL	PCVQTPCKRL	LRRVPGTADY	KMDQNERRLC
711A6_rice	TTSLKMDLSG	SLSIVLGLVA	PALQGPARRL	LSRVPGATADW	RTARANERLR
711A13_Zea	TTSLKMDLSA	PLSVVLGLVA	PALQGPVRRH	LSRVPGTADW	RVARTNARLR
711A11_Pic	TSSLKMDLNG	TFSILVGILF	PIAQELFRQI	LSRIPGTGDW	KVCINNRRLT

711A7_Popu GRLEEIVRKK MEEKNKGS-- ----- KDFLSLILRA RESETLSKN-
711A8_Popu GRLDEIVRKK MEEKNRGS-- ----- KDFLSLILRA RESETLSKK-
711A15_pap RKLDEIVTKR MKDIDKRSN- ----- VDFLSLILRA RESGTAAKN-
711A14_Vit SRLDEIVAKR MKDKDRGS-- ----- KDFLSLILNA RESEKAMKN-
711A21_TomaSRLDEIVAKR IEKDRSS-- ----- KDFLSLIMQA RESEKLAKN-
711A9_Lotu GRLDEIVEKR MKDKVRSS-- ----- KDFLSLILNA RESKTVSEN-
711A12_Med GRLDEIVEKR TKDRTRSS-- ----- KDFLSLILNA RESKAVSEN-
711A10_Med GRLLDIVKKR MEDKSRTS-- ----- KNFLSLILNT RESKSVSEN-
711A1_Arab GQLNEIVSKR AKEAETDS-- ----- KDFLSLILKA RESDPFAKN-
711A3_rice GQMDKIVAER AAAMERDQAA PHA----QQR KDFLSVVLAA RESNKSWARE-
711A4_rice THMDSIVAER EAAMEHDLAA S-----QQR KDFLSVVLTA RESNKSSRE-
711A2_rice RQLDRIVAER TAAMKRDPAALQ-----QR KDFLSVMLTA RESNKSSRE-
711A18_Zea RMMDGIVADR VAARERAPQA Q-----RQ KDFLSVVLAA RSDSAAARK-
711A5_rice RRIDAIAGR RRDRDAG--- -----DGAA LDFIAALLDA RESGGGGGGH
711A19_Zea SRIDAIAGR RRDRATRRRC GPGAAPAPAP LDFIAALLDA MESGGGGGGG
711A6_rice ARVGAVVARR ERAGGEAR-- -----RAR RDFLSAVLNA RDGGSDRMR-
711A13_Zea ARVDEIVVSR ARGRGQHG-- -----ERR KDFLSAVLDA RDR-SAALR-
711A11_Pic HRLNAIVEKR KKDVGVEKE-- -----KR MDFLSTVTGS KFS-----

711A7_Popu -----AFT PDYISAVTYE HLLAGSATTA FTLSSVVYLI AQHPEVEKKL
711A8_Popu -----VFT PDYISAVTYE HLLAGSITTS FTLSSVVYLV AQHPETEKKL
711A15_pap -----VFS PDYISAVTYE HLLAGSATTTS FTLSSVLYLV AGHPEVEKKL
711A14_Vit -----IFT SDYLNNAVTYE HLLAGSATTTS FTLSSIIYLI AEHPEVEKKL
711A21_Toma-----VFT SDYISAVTYE HLLAGSATTTS FTLSSIIYLV ACHPEVEQKL
711A9_Lotu -----VFT PDYISAVTYE HLLAGSATTTS FTLSSIVYLV AGHPEVEKKM
711A12_Med -----VFT PEYISAVTYE HLLAGSATTTS FTLSSVVYLV AAHPEVEKKM
711A10_Med -----VFS FDYISAVTYE HLLAGSATTTS FTLSSIVYLV AGHPNVEEKL
711A1_Arab -----IFT SDYISAVTYE HLLAGSATTA FTLSSVLYLV SGHLDVEKRL
711A3_rice -----LLT PDYISALTYE HLLAGSATTA FTLSTVLYLV SKHPEVEEKL
711A4_rice -----LLT PDYISALTYE HLLAGSTTTA FTLSTVLYLV AKHPEVEEKL
711A2_rice -----LLT PDYISALTYE HLLAGSATTA FTLTALYLV AKHPEVEEKL
711A18_Zea -----LLT PDYLSALTYE HLLAGSATTA FTLSSVLYLV AQHPRVEEKL
711A5_rice G-----FALE DRHVRALAYE HLIAGTKTTA FTVSSVVYLV SCHPRVEERL
711A19_Zea AGANKDFALA DRHVRALAYE HLIAGTKTTA FTLSSVVYLV SCHPLVEAKL
711A6_rice -----ALLT PDYVVGALTYE HLLAGSATTA FTLSSAVYLV AGHPGVEAKL
711A13_Zea -----ELLT PDHVSALTYE HLLAGSATTA FTLSSAVYLV AGHPEVEAKL
711A11_Pic --R---ELFS EEYISALTYE HLLAXSATTTS FTISVILYLV SAHPDVESKL

711A7_Popu LAEIDGFGPH ---EQMPTAQ DLQNEFPYLD QAIKEAMRFY VVSPLIARET
711A8_Popu LAEIDGFGPH ---EQIPTAH DLQNKFPYLD QAIKEAMRFY VVSPLVARET
711A15_pap LAEIDSGFGPH ---KKLPFTF HLQYNFPYLD QVIKESMRFY LVSPLIARET
711A14_Vit LAEIDGFGPP ---DQMPTAH DLQHKFPYLD QVK-EAMRFY TVSPLVARET
711A21_TomaLAEIDAFGPD ---DNMPTAN DLQKFPYLD QVIKEAMRCY IVSPLVARET
711A9_Lotu LQEIDGFGPV ---DQTPTSQ DLQEKFPYLD QVIKEAMRY TVSPLVARET
711A12_Med LEEIDGYGSL ---DQIPTSQ DLHDKFPYLD QVIKEAMRFY IVSPLVARET
711A10_Med LQEIDGFGPH ---DKIPNAK DLNESFPYLD QVIKEAMRIY TVSPLVARET
711A1_Arab LQEIDGFGNR ---DLIPTAH DLQHKFPYLD QVIKEAMRFY MVSPLVARET
711A3_rice LREIDGFGPH ---DHAPTAE DLQTKFPYLD QVVKESMRFY FLSPLIARET
711A4_rice LKEIDAFGPR ---YCVPMAD DLQTKFPYLD QVVKESMRFY IMSPLARET
711A2_rice LREIDGFGPR ---DRVPTAE DLQTKFPYLD QVLKEAMRY PSSPLIAREL
711A18_Zea LREVDAGFP ---DRVPTAE DLQSRFPYTD QVLKESMRF MVSPLVARET
711A5_rice LREIDGFAPR ---GRVPGAD ELHAGLPYLD QVIKEAMRFH LVSPLIARET
711A19_Zea LRELDGFAPR RGRGRAPDAD ELQSGFPYLD QVIKEAMRFY VVSPLIARQT
711A6_rice LDEVDRFGPP ---DAVPTAD DLEHKFPYLD QVIKEAMRFY TVSPLIARET
711A13_Zea LAEVDAFGPR ---GAVPTAD DLQHRFPYLD QVIKEAMRFY TVSPLIARVT
711A11_Pic LREIDFXXP ---DRXPAAE DLDIKFPYLT QVIKEAMRFY TVSPLVAREA

711A7_Popu SKEVEIGGYL LPKGTWIWLA PGVLAKDPKN FPEPDKFKPE RFDPNCEEEK
711A8_Popu SKEVEIGGYV LPKGTWIWLA PGVLAKDPKN FPEPDRFKPE RFDPNCEEEK
711A15_pap SKDAEVEIGGYF LPKGTWVWLA PGVLAKDPKN FPEPDKFKPE RFDPNCEEEK
711A14_Vit SAEVEIGGYV LPKGTWIWLA PGVLAKDPKN FPEPDKFKPE RFDPNCEEEK
711A21_TomaSAEVEIGGYK LPKGTWVWLA LGVLAKDPKN FPEPEKFKPE RFDPNCAEEK
711A9_Lotu SNEVEIGGYL LPKGTWVWLA LGVVAKDPKN FPEPEKFKPE RFDPKCEEMK
711A12_Med SNEVEIGGYL LPKGTWVWLA LGVLAKDHKN FPEPEKFKPE RFDPNCEEMK
711A10_Med SNEVEIGGYL LPKGTWVWLA LGVLAKDSRN YAEPEKFKPE RFDPKCGEMK
711A1_Arab AKEVEIGGYL LPKGTWVWLA LGVLAKDPKN FPEPEKFKPE RFDPNGEEK
711A3_rice CEQVEIGGYA LPKGTWVWLA PGVLAKDPKN FPEPEVFRPE RFDPNGEEK
711A4_rice LEQVEIGGYV LPKGTWVWLA PGVLAKDPKN FPEPEIFRPE RFDPNGEEK
711A2_rice NQOLEIGGYV LPKGTWVWMA PGVLGKDPKN FPEPEVFRPE RFDPNGEEK
711A18_Zea SEQVDIAGYV LPKSTWVWMA PGVLAKDPVN FPEPELFRPE RFDPADEQK
711A5_rice SEPVEIAGHL LPKGTWVWLA PGVLARDAQ FPEPEEFRPE RFAAEAAEER
711A19_Zea SERVEIGGYV LPKGAYVWLA PGVLARDAQ FPDPEEFRPE RFAPAEAEER
711A6_rice SEQVEVGGYT LPKGTWVWLA PGVLSRDEAQ FRDAGEFRPE RFDAGGEEER
711A13_Zea SRQTELGHT LPKGTWVWMA PGVLSRDAAN FEDPGAFRPE RFDPAEEQR
711A11_Pic SEPQIGGYM LPKGTWVWMA LNALAKDPY FPEPEMFNPE RFDPDCEEEK

711A7_Popu RRHPYALIPF GLGPRACIGQ KFSIQEIKLS LIHLYRKYLF RHSPHMEKPL
711A8_Popu RRHPCALIPF GIGPRACIGK KFSIQEIKLS LIHLYRKYLF RHPSTMEKPL
711A15_pap QRHPYAFIPF GIGPRACIGQ KFSIQEIKLL LIHLYRNYVF RHSPNMENPI
711A14_Vit QRHPYALIPF GIGPRACIGQ KFSIQEIKLS LIHLYRNYVF RHSPNMEKPL
711A21_TomaQRHPYANIPF GIGPRACIGQ KFSIQEIKLS LIHLYRKYIF QHSPLMESPL
711A9_Lotu RRHPYAFIPF GIGPRACIGQ KFSIQEIKLS LIHLYRKYLF RHSPNMENPL
711A12_Med QRHPYAFIPF GIGPRACIGQ KFSMQEIKLS LIHLYKLYLF RHPADMESPL
711A10_Med RRHPYAFIPF GIGPRACIGQ KFSIQEIKLT LIHLYRKYIF RHPSLNMEKPV
711A1_Arab RRHPYAFIPF GIGPRACVGO RFALQEQVLA LLHLYRNYIF RHPLEMEIPL
711A3_rice RRHPYAFIPF GIGPRACIGQ KFSIQEIKLS VIHLYRNYVF RHSPSMESPL
711A4_rice RRHPYAFIPF GIGPRVCIGQ KFSIQEIKLS MIHLYRHYVF RHSPSMESPL
711A2_rice RRHPYALFPF GIGPRACIGQ KFAIQEMKLS AIHFYRHYVF RHPSPMESPP
711A18_Zea RRHPYAFIPF GIGPRICIGQ RFSIQEIKLA LIHLYRQYVF RHSPSMESPL
711A5_rice ARHPYAHIPF GIGPRACVGH RFALQEQVLA AVSLYRHYVF RHPSPMESPI
711A19_Zea ARHPYAHIPF GIGPRACIGH KFAIQEQVLA VVELYRHYVF RHSPSMESPI
711A6_rice RRHAYAVPF GLGPRACVGR RFALQEQVLA MAHLYRRFVF RHPSPMESPP
711A13_Zea RRHPCAHIPF GIGPRACVGO RFALQEQVLA MLHLYRRFLF RHPSPMESPP
711A11_Pic NRHPYANSPF GIGPRACIGM KFAIQEIKVV LIHLYQLYTF RHPSPMENPL

711A7_Popu ELDYFGIVLNF RHGVKLRIVK RT-----
711A8_Popu EFEFGIVLNF KRGVKLRIK RT-----
711A15_pap ELEYGIVLNF KYGVKLRIVK RT-----
711A14_Vit ELEYGIILNF KHAVKLRAIK R-----
711A21_TomaELEYGIVLNY KHGVKVHAIK RK-----
711A9_Lotu ELEYGIVLNF KHGVKVRAIK RTERSC-
711A12_Med ELEYGIVLNF KHGVKFSVIK RTEMSC-
711A10_Med ELEYGLVLFNF KHGIKLRIVK RT-----
711A1_Arab QLDYGIILSF KNGVKLRTIK RF-----
711A3_rice EFQYSIVCNF KYGVKLRIVK RHTA---
711A4_rice EFFA-IICDF KYGVKLQAIK RHHA---
711A2_rice EFVYSIVSNF KNGAKLOVIK RHI----
711A18_Zea EFQFGVVLNF KHGVKLQSIK RHKC---
711A5_rice QFDYFDLVLAF RHGVKLRAIK RTNT---
711A19_Zea QFDYFDLVLAF RHGVKLRAIR RG-----
711A6_rice ELQFGMVLNF RRGVKLTAVE RRHAAAA
711A13_Zea ELQFGIVLNF KKGVKLVAVE RCAAMPL
711A11_Pic EFQFGIVVSV KYGIRLRLQH RRAQSPV

Supplementary Figure 3

Alignment of CYP701 sequences taken from the Cytochrome P450 website. Conservation in SRS1-6 regions is highlighted in yellow with Arabidopsis CYP701A3 as the 100% control.

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701A6_RICE          -----MEAFVPGGAG-----VAAAAVGGFVAAAALAERAGVIA 33
701A7_rice          -----MEAFVSGGAGGVGAAAVVGVFVAAAAVGGFVAAVALAERAGVIA 44
701A19_RICE_       -----MESLLAAGAGGIG-----VAAAAVGGFIAAATLAVAP---- 32
701A13_Hordeum     -----ALAAKAG-----VVG-----AG----- 12
CYP701_Zea         -----MESLVAALPAG---G-----AAAAAFGGLVAAAALAGKVGLVG 36
701A8_rice         MESMLVAGAGAAVAAVGG-----LVAAAALADKLVAAAPP 36
701A9_rice         -----MESLLAAGAGGIG-----VAAAADVVAATLAVVPP 30
701A5_Stevia_      MDAVTGLLTVPATAITIGG-----TAVALAVALIFWYLSKYSATSARRSQ 43
CYP701_tomato_CU914524.3_Solan MDAILNLQGVPLGTALTVG-----GPVVALGGISFWLLKEYVNDQKRK 43
701A20_PAPAYA      -----MSFSLFSILLG-----ILSLAFFLFLSLRRWRWFSTKR---- 31
701A21_PAPAYA      -----MSFFIFSIVLG-----VLSSAFFLFLSLKRKWFVVRK---- 31
701A3_Arab_        -----MAFFSMISILLG-----FVISSFIFIFFFKLLSFSRKNMS 36
701A18_COTTON_     -----MLPSLSNVAVA-----AVPFFIFFLFLKRFLLPSGRKMG-- 33
701A10_PEA_Pisum_sativum_pea_ -----MDTLTSLG-----FLSLFLFLFLLLKRSTHKHKS---- 29
701A17_M.truncatula_ -----MDTLQTLSTFGAF-----SLFFFLFLFLFRFRTRITHK---- 32
701A16_soybean     -----MEFLTSLSVTV-----AAAFSILFFFLRHAGAGAGS---- 31
701A2_pumpkin      -----MQKLVQMLQAP-----PYVAAAVQSSALLLTFFIGDWRKR 35
701A1_pumpkin      -----
701A23_Vitis_      -----MDMMGIEAVPFAT-----AVVLGGISLVVLIIFIRRFVSNRKR 37
701A11_POPLAR      --MDVATSILPAFQAMPYA-----TPAAVGGLVFAVFFINKFISNQKK 41
701A12_strawberry  -----MEFQAMTFaip-----ALAAVSWLFLYYIRVSYFTNNNKS 36
701B1_moss         -----MLNESTSGHSS-----DTCVQTSLGCRDGRRLNEMLETKVIA 38

701A6_RICE          PRKRPNAPPVPG-LPIIGNLHQLKEKKPHQTFKWAIEYGPIYTIRTGA 82
701A7_rice          PRKRPNAPPVPG-LPIIGNLHQLKEKKPHQTFKWAIEYGPIYTIRIGA 93
701A19_RICE_       PKNRRNPPPAVPG-LPIIGNLHQLKEKKPHQTFKWAIEYGPIYTIRTGA 81
701A13_Hordeum     ---RTTAPPVPG-LPLIGNLHQLKEKKPHKTFKAWSDIYGPIYTIKTGA 58
CYP701_Zea         SKKHLNAPPVSG-LPLIGNLHQLKEKKPHQTFKWAIEYGPIYTIRTGS 85
701A8_rice         RKNRANPPPAVPG-LPIIGNLHQLKEKKPHQTFKAWSETYGPIYTIKTGA 85
701A9_rice         KDRGNPPPAVPG-LPVIGNMHQLKEKKPHHTFTKWSKTYGPIYTIKTGA 79
701A5_Stevia_      S-NHLPRVPEVPG-VPLLGNLLQLKEKKPYMTFTRWAATYGPIYSIKTGA 91
CYP701_tomato_CU914524.3_Solan SPNFLPVPVPG-LPVIGNLLQTEKKPHKTFTRWAETYGPIYSIKTGA 92
701A20_PAPAYA      --TQLSRLPTVPG-VPLLGNLLQLKERKPYVVFTKWAIEYGPIYSIKRGS 78
701A21_PAPAYA      --SEFLQLPTVPG-IPLIGNLLQLKERKPHKTFKWAIEYGPIYSIKTGA 78
701A3_Arab_        EVSTLPSVPVPG-FPVIGNLLQLKEKKPHKTFTRWSEIYGPIYSIKMGS 85
701A18_COTTON_     -SNTLPTVPEVPG-LPIIGNLLQLKEKKPHKTFKWAETHGPVYSIRTGA 81
701A10_PEA_Pisum_sativum_pea_ ----LSHVPPVPG-LPVIGNLLQLKEKKPHKTFKMAQKYGPIFSIKAGS 74
701A17_M.truncatula_ ----LPHVPAVPG-LPLIGNLLQLKEKKPHKTFKMAHKYGPFSIKAGA 77
701A16_soybean     ----LPPVPAVPG-LPVIGNLLQLKEKKPYKFTTQMAHKHGPIYSIRTGA 76
701A2_pumpkin      RRSPLLLPAIPG-IPVLGNLLQLKEKKPHKTFQWSETYGPIYSIKAGA 84
701A1_pumpkin      ----LPPVPAIPG-LPVLGNLLQLKEKKPHKTFARWAETYGPIYSIRTGA 45
701A23_Vitis_      SVEGLPPVPDIPG-LPLIGNLLQLKEKKPHKTFARWAETYGPIFSIRTGA 86
701A11_POPLAR      GNPPLLPLPVPVPG-WPVIGNLLQLKEKKPHKTFLRWAEAYGPIYSIKTGA 90
701A12_strawberry  AYAKLPPVPVPG-LPVIGNLLQLKEKKPYKFTTQWAEYGPYSIRTGA 85
701B1_moss         HHVSHSPCAAIPGGLPVLGNLLQTEKKPHRTFTAWSKEHGPIFTIKVGS 88
. :.* *::*: *::*: *::*: *::*: *::*: *::*: *::*: *::*: *

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701A6_RICE SSVVVLNSTEVAKEAMVAKFSSI STRKLSKALTVLTRDKSMVATSDYCDF 132
701A7_rice SSVVVLNSTEVAKEAMVAKFSSI STRKLSKALTVLTRDKSMVATSDYGDF 143
701A19_RICE SSVVVLNSTEVAKEAMVAKFSSI STRKLSKALTVL SHDKSMVATSDSGDF 131
701A13_Hordeum SSVAVLNSSEVAKEAMVAKYSSI STRKLPKALSVLTRDKTMVATSDYGDF 108
CYP701_Zea STVVVLNSAQVAKEAMIAKFSSI STRKLSKALSALTRDKTMVATSDYGDF 135
701A8_rice SPVVVLNSTEVAKEAMIDKFSSI STRKLPKAMSVLTR-KSMVAISDYGDY 134
701A9_rice SSVVVLNSTEVAKEAMIEKFSSI STKKLPKALSVISR-KNMVVISDYGDF 128
701A5_Stevia TSMVVVSSNEIAKEALVTRFQSI STRNLSKALKVLTADKTMVAMSDYDDY 141
CYP701_tomato_CU914524.3_Solan NTIVVLSSSELAKEAMVTRYSSI STRKLTNALRILTCDKSIVAISDYDEF 142
701A20_PAPAYA RKLVISSSDIAKEAMVTRFASI STRKLPGLKVVTNNKGTVATSDYDNF 128
701A21_PAPAYA SKLIVISSSDIAKEAMVTRFASI STRKLPRAAMKIVSNDKGTLATSDYDDF 128
701A3_Arab SSLIVLNSTETAKEAMVTRFSSI STRKLSNALTVLTC DKSMVATSDYDDF 135
701A18_COTTON STVIVINSPEAKEAMVTRFSSI STRKLSNALKILTFDKCMVATSDYDEF 131
701A10_PEA Pisum sativum__pea SKIIVLNTAHLAKEAMVTRYSSI SKRKLSTALTILTS DKCMVAMSDYDNF 124
701A17_M.truncatula STIIVLNTAQLAQAMVTRFPSI STRKLSALTILTSNKCMVATSDYDNF 127
701A16_soybean STLIVLNSPLLAKEAMVTRFSSI STRKLSNALKILTS DKCMVATSDYNEF 126
701A2_pumpkin STVIVLNSDDLAKAMVTRYSSI SSRKLSKALTILTADKCMVAMSDYDNF 134
701A1_pumpkin STVIVLNTAEVAKEAMVTRYASMSGRKLSKALTILTS DKCMVAMSDYDNF 95
701A23_Vitis STMIVLNSSEVAKEVGFSRFSSI STRKLSNALKILTFDKCMVATSDYDNF 136
701A11_POPLAR STVIVLNSTEVAKEAMVTRYSSI STRKLSKALEVLT DNKSMVATSDYGDF 140
701A12_strawberry CTMVVLLNSSEQAKWAMVTTYSSI SNRKLSSALKILSADQCMVALSDYDNF 135
701B1_moss VPQAVVNNSEIAKEVLTKFASI SKRQMPMALRVLTRDKTMVAMSDYGEE 138
*:. . ** . : *:* :. . .: : : : : * :

701A6_RICE HKMVKRYVMS SMLGTS AQQFRD IRDMMI HNMLSTFHKLKVD-DPHAPLI 181
701A7_rice HKMVKRYVMS STLGTS AQKFRD TRDMMI NNMLSTFHKLKVD-DPHVPLI 192
701A19_RICE HKMGKRYIMLSMLGTS AQQFRD TRDMI INNMLSTFHQLKVD-DPHAPLI 180
701A13_Hordeum HKMIKRYIMTFMLGTS GQKFRD TRNMMVDNMLNTFHTLLMD-DPNSPLN 157
CYP701_Zea HKMIKRYIMTFMLGTS GQKFRD TRNMMVDNMLNTFHTLLMD-DPNSPLN 184
701A8_rice QKMAKRNI MIGMLGFNAQKFRGTRERMI SNVLS TLHLKLVSL-DPHSPLN 183
701A9_rice YKMAKRNI MLAILGFNAQKHFC DTRERMVSNVLS SLHLKLVAV-DPHSPLN 177
701A5_Stevia HKTVKRHILTA VLGPN AQKHHRI HRDIMMDNISTQLHEFVKNNPEQEEVD 191
CYP701_tomato_CU914524.3_Solan HKTAKRHILTSV LGPTAQKRFR IHRDTLVENVSKQLHDLVRTDPN-EAVN 191
701A20_PAPAYA HKMVKRFAI SNVLGANAQKRSWNRDLLIGNLLTQLHAHDKS-FPGQPIN 177
701A21_PAPAYA HRMAKRFMMS TLLSANAQKRSRWRNRTLVENLSTQLHAHAKS-FPDQPIN 177
701A3_Arab HKLVKRCLL NGLLGANAQKRHRHYRDAL IENVSSKLHAHARD-HPQEPVN 184
701A18_COTTON HKLAKRCLL TNLG SNAQRHRHRETMIENIYSKLHDSLK-DPIRPIN 180
701A10_PEA Pisum sativum__pea HKMVKKHILASV LGAN AQKRLRFHREVMMENMSSKFNEHVKT-LSDSAVD 173
701A17_M.truncatula HKMVKKHILANV LGAN AQKRHRFHREVMMENMFRQFSEHAKS-RPDSAVD 176
701A16_soybean HKTVKRHILTNFLGANAQKRHHI HREAMMENILSQFSEHVKT-FSDLAVN 175
701A2_pumpkin HKLVKRYILANV LGAN AQKRLRQRD TMIDNISR ELFACVKD-SSSESVN 183
701A1_pumpkin HKMVKKYILANV LGAN AQKRHRQRDS MIDNISR ELFAHVKT-SPSESVN 144
701A23_Vitis HKMVKGFI LRNV LGA PAQKRHRCHRDTL IENISKYLHAHVKT-SPLEPVV 185
701A11_POPLAR HKMVKRYILTNV LGA GAQRHRGHRDTLVENVSSQLLDHIKTNPOLQAVD 190
701A12_strawberry HKMIKRYIRANLLGSRAQKRLRTNRDTLRANVLSQSKSHVKN-SPLEAVN 184
701B1_moss HRMLKKLVMTNLLGPTQVHDHRVQQNPPCLKMCHVYASHSG-TPEEKIV 187
: * * . : : : : :

701A6_RICE FRDVFKDELFRLSMIQS-LGEDVSSVYVDEFG-RDISREEIYNATVTDMM 229
701A7_rice FRDVFKDELFRLSMIQS-LGEDVSSVYVDEFG-RDISKEEINYATVTDMM 240
701A19_RICE FRDVFKDELFRLSMIQS-LGEDVSSVYVDEFG-RDISKEEINYATVTDMM 228
701A13_Hordeum FREVFKDELFRLSLIQS-LGEDVDSVYVKEFG-REISKDEIYQITVVDMM 205
CYP701_Zea FREVFKNELFRLSLVQA-LGEDVSSIYVEEYG-KVISKEEIKATVVDMM 232
701A8_rice FRDVIYNELFSLSLIQS-LGEDVSSVYVEEFG-REISKDEIFDVLVHEMM 231
701A9_rice FREVYTTELFGLSLIQQLGEDVCSVYVEEFG-REISKEEIFHVLVHEIL 226
701A5_Stevia LRKIFQSELFLAMRQALG-KDVESLYVEDLK-ITMNRDEIFQVLVVDPM 239
CYP701_tomato_CU914524.3_Solan LRKSFQSELFLALKQALG-KDIEAIYVEGLD-ATLPREDLLNILVLDIM 239
701A20_PAPAYA FKKLFQSELFRFAMRQALG-RDVESVFVDELG-KTLSTEEIYKIIVLDMI 225
701A21_PAPAYA FKKLFQSELFGFAMRQAAFGRDVESVYVEELG-RSLSRKEILKVLVDMM 226
701A3_Arab FRAIFEHFLGVALKQAFG-KDVESIYVKELG-VTLSKDEIFKVLVHDM 232
701A18_COTTON FREVFESELFLAMRQALG-KDVESIYVEEIG--TLSRKEIHKVLVMDMM 227
701A10_PEA Pisum sativum__pea_ FRKIFVSELFLALKQALG-SDIESIYVEGLT-ATLSREDLYNTLVVDFM 221
701A17_M.truncatula_ FRKIFVSELFALALKQALG-SDVESIYVEELA-STLSREDLYNILVVEFM 224
701A16_soybean FRKIFVTQLFGLALKQALG-SNVETIYVEELG-STLSKEDIYKILVVDIM 223
701A2_pumpkin FRKIFESELFLALKETFGDRES-LYVDGLG-TTLREDLFRTLVIDPM 231
701A1_pumpkin FRKYFESELFLALKETLGDIES-IYCRWARYTTLPREDLFRVLVIDLM 193
701A23_Vitis LKKIFESEIFGLALKQALGKDIES-IYVEELG-TTLSREEIFAVLVVDPM 233
701A11_POPLAR FREIFESELFLSMKEALGKDMES-LYVDELQ-ATLSREEIFNVLVLDPM 238
701A12_strawberry FTRVFESSELFLAVKQVYGNIDIEPIYVGGTWCYTFKKLDFSGLVVRDIL 234
701B1_moss CSPAFYRRISPSGMEFG-CAEQKPIVEVLELG-TCVSTWMDALVVAPL 235

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701A6_RICE MC--AIEVDWRDFFPYLSWVPNKSFETRVTETRRRTAVMRALIKQOKER 277
701A7_rice MC--AIEVDWRDFFSYLSWVPNKSFETRVTAEARRTAVMRALIKQOKER 288
701A19_RICE MC--AIEVDWRDFFPYLSWVPNKSFETRVTETSRRTAVMRALIKQOKER 276
701A13_Hordeum MC--AIDVDWRDFFPYLSWIPNKSFETRVTAEARRTAVMRALIKQOKER 253
CYP701_Zea MC--AIEVDWRDFFPYLSWIPNRTFETRVLTEARRTTVMQALIKQOKER 280
701A8_rice MC--AVEADWRDYFPYLSWLPNKSFDITIVSTEFRRDAIMNALIKQOKER 279
701A9_rice SC--VVEPDWRDYFPYLSWLPNKSFETIVSSTEFRRDAVMNALIKRQOKER 274
701A5_Stevia MG--AIDVDWRDFFPYLKWVPNKKFENTIQQMYIRREAVMKSILKEHKKR 287
CYP701_tomato_CU914524.3_Solan EG--AIDVDWRDFFPYLKWVPNKSFEHRIQRKHLREAVMKALIADQOKR 287
701A20_PAPAYA EG--VTRVDWRDFFPYLKWVPNKSFEIDIQEKNFRRFVAVMNALIREHKKW 273
701A21_PAPAYA EA--GIEVDWRDFFPYLKWLPNKSFEIDIQEKNFRRFVAVMNALIREHKKEL 274
701A3_Arab EG--AIDVDWRDFFPYLKWIPNKSFEARIQQKHRRRLAVMNALIQDRLKQ 280
701A18_COTTON EG--AIDIDWRDFFPYLRWIPNKSFEMNIQRKHFRMALMNALIKDQMKR 275
701A10_PEA Pisum sativum__pea_ EG--AIEVDWRDFFPYLKWIPNKSFEKKIRRVDRQRKIIMKALINEQKKR 269
701A17_M.truncatula_ EG--AIEVDWRDFFPYLKWIPNKSLEMKIQKVDLGRKYIMKALINEQKKR 272
701A16_soybean EG--AIEVDWRDFFPYLKWIPNRRLEMKIQLYVRRIVAVMNALMNEQNNR 271
701A2_pumpkin EG--AIEVDWRDFFPYLRWIPNKGVEDRIRKMDFRRRVMTKSLMEKKKQ 279
701A1_pumpkin EG--AIEVDWRDFFPYLKWIPNKSVENKIRQMDYRRRVMTMSLIEEQKKR 241
701A23_Vitis AG--AIEVDWRDFFPYLSWIPNKS MEMKIQRMDFRRGALMKALIGEOKKR 281
701A11_POPLAR EG--AIDVDWRDFFPYLRWIPNKGFEEMKIERMNFRRQSVMNALVQEQKKR 286
701A12_strawberry DGGNRWLDWRDFFPYLRCILNKTLETKIQRHLSSRRKPVMTALINEQKKR 284
701B1_moss SA--VINVDWRDFFPALRWIPNRSVEDLVRTVDFKRNRSIMKGLIRAQRM 283

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701A6_RICE HSPVPLIPPRFVHEDTKLAGYDVPAGTEMVINLYGCNMNRKEWESPEEW 422
701A7_rice HSPVPLIPPRFVHEDTKLAGYDVPAGTEMVINLYGCNMNRKEWESPEEW 433
701A19_RICE HSPVPLIPPRFVNEDTMLAGYDVPAGTEMVINLYGCNMNRKEWESPEEWA 421
701A13_Hordeum HSPVPLVPPRFVHEDTKLAGYDVPAGTEIVINLYGCNMNRKEWESPEEWR 398
CYP701_Zea HSPVPLVPPRLVHENTNLAGYEVPAgtei I INLYGCNMNRKNDWAEPEEWK 425
701A8_rice HSPVPLVPPRFVHDDTTLAGYDIAAGTQMMINVYACHMDEKVWESPGEWS 427
701A9_rice HSPVPLVPTRFVHDDTTLAGYDVPAGTQVMINVFGCHMDEEAWESPGEWS 422
701A5_Stevia_ HSPVPIIPLRVHEDTVLGGYHVPAGTELVAVNIYGCNMMDKNVWENPEEWN 433
CYP701_tomato_CU914524.3_Solan YSPAPIVPLRVHEDTQVGGYRIPKGTEIAINIYGCNRDKNVWESPEEWA 428
701A20_PAPAYA HSPAPLVPIRYVHEDTQLRGYIPSGIEIMINIYGCNMNRKQWERPEQWM 421
701A21_PAPAYA HNPAPLVPLRYVHEDTQLGGYIPSGCEIAINIYGCNMNRKQWESPEKWI 421
701A3_Arab_ YSPAPLVPIRYAHEDTQIGGYHVPAGSEIAINIYGCNMMDKKRWERPEDWW 426
701A18_COTTON_ HSPAPLVVRYVHEDTQIGGYHIPSGSEIAINIYGCNMMDKNVWENPEEWN 421
701A10_PEA_Pisum_sativum__pea_ HSPVPIVPLRYVDEDETELGGYHIPAGSEIAINIYGCNMDSNLWENPDQWI 415
701A17_M.truncatula_ HSPVPIVPLRYVHEDTELGGYHIPAGSEIAINIYGCNMDSKDWENPQEWI 418
701A16_soybean HSPAPIVPLRYAHEDTKLGGYHIPAGSEIAINIYGCNMMDNLWENPNEWM 417
701A2_pumpkin YSPVSIVPLRYAHEDTQLGGYFIPAGSEVAVNIYACNMDDKKQWESPEEWK 425
701A1_pumpkin HSPVPIVPLRYVHEDAQLGGSFLFLOGVKIAVNIYACNMDDKRWESPEEAK 387
701A23_Vitis_ YSPAPIVPPRYAHEDTQLGGYHIPAGSQIAINIYGCNMNRKQWENPEEWA 427
701A11_POPLAR YSPAPIIIPLRVYAHEDTQIGGYVVPAGSEIAINIYGCNMMDKKRWENPEEWA 433
701A12_strawberry HSPAALVPLRYAHEDTQLGGYIPAGTEIAINIYGCNMNRKHQWESPEEWK 430
701B1_moss YTEVPLIPSRFVEEDITLGGYDIPKGYQILVNLFAIANDPAVWSNPDEKW 431
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701A6_RICE PERFAG-GRLEV-ADMYKTMAFGAGRRACAGSLQATHIACA AAVARFVQEF 470
701A7_rice PERFAG-GRLEV-ADMYKTMAFGAGRRACAGSLQVMHIACTAIARFVQEF 481
701A19_RICE PERFAG-GRFV-ADMYKTMAFGAGRRACAGSLQATHIACA AARFVQEF 469
701A13_Hordeum PERFMD-GRFEA-ADMYKTMAFGAGRRACAGSLQATSI SCAAIARFVQDF 446
CYP701_Zea PERFLD-GRFEA-VDMHKTMAFGAGRRACAGSMQAMNISCTAIGRFVQEF 473
701A8_rice PERFLG-EGFEV-ADRYKTMAFGAGRRACAGSLQAMNIACVAVARLVQEL 475
701A9_rice PERFLG-EGFKL-ADRYKTMAFGAGRRACAGSQQAVS IACVAIARFVQEL 470
701A5_Stevia_ PERFMK--ENET-IDFQKTMAFGGGKRVACAGSLQALLTASIGIGRMVQEF 480
CYP701_tomato_CU914524.3_Solan PERFLN-GKYDP-MELQKTMAFGAGKRVACAGAQQAMTISCTA IARLIQEF 476
701A20_PAPAYA PERFLD-EKYNI-SDLQKTMAFGAGRRICAGALQANLISCV AIGKFVQEF 469
701A21_PAPAYA PERFLD-EKFNI-IDLQKTMAFGAGRRVACAGALQASLIAS TAIARLVQEF 469
701A3_Arab_ PERFLDDGKYET-SDLHKTMAFGAGKRVACAGALQASLMAG IAIARLVQEF 475
701A18_COTTON_ PERFLD-EKYDP-LDLQKTMAFGAGKRVACAGSLQAMLLACG AIGRVLQEF 469
701A10_PEA_Pisum_sativum__pea_ PERFLD-EKYAQ-ADLYKTMAFGGGKRVACAGSLQAMLIAC TAIARLVQEF 463
701A17_M.truncatula_ PERFLD-EKYDS-SDLYKTMAFGGGKRVACAGSLQAMLIAC TXIGRFVQEF 466
701A16_soybean PERFLD-EKYDH-MDLYKTMAFGAGKRVACAGSLQAMLIAC TAIARLVQEF 465
701A2_pumpkin PERFLD-ESYDP-MDLYKTMAFGGGKRVACAGAPKAMLIAC TTLGRLVQGF 473
701A1_pumpkin PERFLD-EKYDP-MVLNKTMAFGGGKRVACAGALKAMLIAC TSIGRLXQEF 435
701A23_Vitis_ PERFLD-EKYDL-MDLHKTMAFGGGKRVACAGALQAMLIAC TSIGRFVQEF 475
701A11_POPLAR PERFLD-GKYDP-MDLHKTMAFGAGKRVACAGALQASLIAS ATIGKVAQEF 481
701A12_strawberry PERFLD-PKYDP-MDLYKTMAFGAGKRVACAGSLQAMLIAC PTIGRLVQEF 478
701B1_moss PERMLANKKVDMGFRDFSLMPFGAGKRMCAGITQAMFIIP MNVAALVQHC 481
***: . :.*.*:* *.* : :. . *

701A6_RICE	GWRLREGDEEKV-----DTVQLTAYKLHPLHVHLTRRGRM---	505
701A7_rice	GWRLTEGDEEKV-----DTVQFTAYKLHPLHVHLTPRGRM---	516
701A19_RICE_	GWRLREGDEEKV-----DTVQLTAYKLHPLHVHLTPRGRM---	504
701A13_Hordeum	AWRLKEGDEDNV-----DTVQLTSYKLHPLYVYLLPRGRK---	481
CYP701_Zea	AWRLEEGDEDKV-----DTIQLTTNRLYPLHVYLAPRGRK---	508
701A8_rice	EWRLREGDGDKE-----DTMQFTALKLDPLHVHLKPRGRM---	510
701A9_rice	QWTLREGDGDKE-----DTMQYTALKLHPLHVHLKPRG-----	503
701A5_Stevia_	EWKLDKMTQEEV-----NTIGLTTQMLRPLRAI IKPRI-----	513
CYP701_tomato_CU914524.3_Solan	EWSLKEGEEKNV-----ATMGLTTHKLHPMLAH IKPRN-----	509
701A20_PAPAYA	EWSLKDGEKEEV-----NTHSISSHKLHPLHAI IKPRG-----	502
701A21_PAPAYA	EWSLKDEEKEDV-----NTLGLTSQKLHPLHAI IKPRD-----	502
701A3_Arab_	EWKLRDGEENNV-----DTYGLTSQKLYPLMAI INPRRS-----	509
701A18_COTTON_	EWQLKDGEEEKV-----DTVGLTSQKLHPLHAVLKPRN-----	502
701A10_PEA Pisum sativum__pea_	EWELGHGEEENV-----DTMGLTTHRLHPLQVKLKPRNR IY--	499
701A17_M.truncatula_	EWEL-----	470
701A16_soybean	EWELGQGEENNV-----DTMGLTTHRLHPLLVLKLPRIK-----	499
701A2_pumpkin	TWKLREGDEEKV-----DTLGLTARKLQPLHIVAKPRIN----	507
701A1_pumpkin	XWKLGEGEEDKX-----DTLGLTARKXQPLHVIVKPR-----	467
701A23_Vitis_	EWKLMGEEENV-----DTVALTSQKLHPMQAI IKARE-----	508
701A11_POPLAR	EWRLKDGEEEHV-----DTVGLTTRKLOPLHVMIKTRNV----	515
701A12_strawberry	EWKLORAGEENNV-----DTVGLTTHKRDPMHAILKPRS-----	511
701B1_moss	EWRLSPQEISNINNKIEDVVYLTTHKLSPLSCEATPRISHRLP	524

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Supplementary Figure 4

Alignment of CYP88 sequences taken from the Cytochrome P450 website. Conservation in SRS1-8 regions is highlighted in yellow with Arabidopsis CYP88A3 as the 100% control.

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88A13_M.truncatula_  -----MGLLDYSQWLILVAALLGGYAFVFG--FLRRLNEWYY 35
88A14_M.truncatula_  -----MVLLDYSQWLILVAALLGGYAFVFG--FLRRLNEWYY 35
88A20_papaya         -----MDLVFLIFGVIVCAYVVLVFG--IVKRANNEWYY 30
88A21_papaya         -----MQYLNLLLLIFGGIVCGYVVVFG--LVRRVNEWYY 33
88D1_M.truncatula    -----MELQWFWMFAATLLACYIFVSK--VMRNLNGWYY 32
88D2_M.truncatula    -----MEFQWFWSVSTMLAIFLYILVSKVVRNLNEWYY 34
88D3_M.truncatula    -----MEMQWVYICTAALFACYVFNK--FLRRFNGWYY 32
84D6_licorice        -----MEVHWVCMSAATLLVCYIFGSK--FVRNLNGWYY 32
84D4_lotus           -----MELYWAWVCAATLATCYVLR-----RLNGWYY 27
84D5_lotus           -----MELYWAWVSAATLATCYVFVDI--FLRRLNGWYY 32
88A1_Zea             MLGVGMAAAVLLGAVALLLADAAARRAHWWYREAAEAVLVGAVALVVVDAARRAHGWYR 60
88A5_rice             -----MAAWAAGDLWVLAADVAGVVLVDVAVVRAHDWVR 36
88A15_Hordeum        -----MGEGAWVAVAALAVVALDAAVRAAHAWY 33
88A6_pea             -----MILEMGSWVVLMAIGGALLVLRSLKNNVNWLY 34
88A11_soybean        -----MCSMWMVVVLAIAIGALLVLRSLKNNVNWLY 32
88A7_pea             -----MASLWIFGAIAGALLVLRSLKNNVNWLY 30
88A8_poplar          -----MGLGSIWVVLVIFCGLGVGQWILKRVNWLY 32
88A9_poplar          -----MESGSIWVVLAVIFGGLGVGKWLKRVNWLY 32
88A23_vitis          -----MGLASSWVLYTAIFAGALALRVWLLRNVKWWY 32
88A24_vitis          -----MELGMIWVAFGAILGGVGVKVVLRANVWY 32
88A3_Arab            -----MAETTSWIPVWFPLMVLGCFGLNWLVRKVNWLY 34
88A4_Arab            -----MTETGLILMWFPLIILGLFVLKVVLRVNVWY 33
88A2_pumpkin         -----MESTWAVAAVVTAVVAVATVFSVLKWAAKSLNEWY 36
88A17_papaya         -----MASISAKIDEVSSIWMTALCIVVGLICLQWLMKRANWLY 40
88A18_papaya         -----MEFASTSKAEMGSILMAALCMVGLVSLRWLLKSVNEWMH 40
88A19_papaya         -----MDEFGSVWSTMICMVGLVGLKWLTRANWLY 33
88A12_Ginkgo         -----MASIFVPVCVSAVITITCLKFKFNGWRY 28
88E1_Selaginella     -----MNLKWAIAIATVAAATFFELLRNFRNFWY 29
88B1_tomato          -----MDFYNLALFFIALILGIFTFYAILMRINGWYY 32
88C1_petunia         -----MEYDSMFLYTLAVGILTIWVILKNGNGWY 31
                                     : :

88A13_M.truncatula_  VGRLGK-S-QNLPPGDMGWPFPGNMPTFAKYAK-SDPDSLIIYN-LISRYGRTGMYRTHLF 91
88A14_M.truncatula_  VGRLGK-S-QNLPPGDMGWPFPGNMPTFLKAFKSADPDSFINN-LVSRYGKTGMYRTHLF 92
88A20_papaya         VGRLGK-KKQLLPPGDMGWPLLGNLRAFIKAFKSQTPDNFIYE-LVKRYGRTGIYKTYLF 88
88A21_papaya         VRRLGK-KKQLLPPGDMGWPLLGNMPSFIKTFKSQTPDNFIYD-LVTRYGRTGIYKTYVF 91
88D1_M.truncatula    DLIFKN-KQYPLPPGDMGWPLIGNLWSFFKYFYSGRGEMFINN-IFKFGRTGIYKTHLY 90
88D2_M.truncatula    DIKFRN-KQFPLPPGDMGWPLIGNLWPFKYFSSGRDIFINN-IRRYGRTGIYKTHLY 92
88D3_M.truncatula    HLKLRN-KEYPLPPGDMGWPLIGNLWSFNKFNSSGQPSFTTN-LILKYGRDGIYKTHLY 90
84D6_licorice        DVKLRN-KEHPLPPGDMGWPLIGDLSFIKDFSSGHPDSFINN-LVLKYGRSGIYKTHLF 90
84D4_lotus           DVKLRK-KQYPLPPGDMGWPLIGNLIPFYKDFSSGRPNFSFINN-LLLKYGEGGIYKTHLF 85
84D5_lotus           DLKLC-KQHPLPPGDMGWPLIGNLISFYKDFSSGHPNSFTTN-LLLKYGQSGMYKTHLF 90
88A1_Zea             EAALGAARRARLPPGEMGWPLVGGMWAFLLRAFKSGKPDFAIAS-FVRRFGRTGVYRSFMM 119
88A5_rice             VAALGAERRSRLPPGEMGWPMVGSWAFLLRAFKSGNPDFAIAS-FIRRFGRGTGVYRTFMM 95
88A15_Hordeum        TASLGAGRRRLPPGDMGWPLVGGMWAFLLRAFKSGRPDSFIDS-FARRFGRAGLYRAFMM 92
88A6_pea             ESKLGV-KQYSLPPGDMGWPLIGNMWSFLRAFKSKDPDSFISS-IVSRYGSSGIYKALMF 92
88A11_soybean        ESKLGV-KQYSLPPGDMGWPLIGNMWSFSAFSAKDPDSFISS-FVSRFGRTGMYKTMMF 90
88A7_pea             EAKLGD-KQYSLPPGDMGWPLIGNMWSFLRAFKSKDPDSFMDS-IVKRFNGTGIYKVFMM 88
88A8_poplar          EAKLGA-KKDSLPPGDLGWPLIGNMWSFLRAFKSSDPDSFIRS-FVNRYGHTGIYKAFMM 90
88A9_poplar          EAQLGE-KQYSLPPGDLGWPLIGNMWSFLRAFKSSDPDSFMRT-FINKYGDNGIYKAFMM 90
88A23_vitis          EGRLKG-KSYHLPPGDLGWPLIGNMWTFLRAFKTKNPDSFISN-IVERYGKGGIYKTFMM 90
88A24_vitis          EVKLGE-KRYSLPPGDLGWPLIGNMWSFLRAFKSTDPDSFISS-FITRFGQTGMVKVLMF 90
88A3_Arab            ESSLGE-NRHYLPPGDLGWPLIGNMWSFLRAFKSTDPDSFTRT-LIKRYGPKGIYKAHMM 92
88A4_Arab            VSKLGE-KKHYLPPGDLGWPLIGNMWSFLRAFKSTDPESFIQS-YITRYGRTGIYKAHMM 91
88A2_pumpkin         EAKLGD-RRALPPGDLGWPLIGNMLGFLRAFKSNPETFIDG-YVSRYGKTGVYKVHFL 94
88A17_papaya         ESKLGD-KQYALPPGDMGWPLIGTMWTFLLRDMKSSNPDSFINN-LVQRYGRTGLYKTFMM 98
88A18_papaya         ESKLGH-KRCSLPPGDMGWPLIGTILTFLLRDMKSSDPDAFINNFKRCGPTGLYKTFMM 99
88A19_papaya         VSKLGD-KQYSLPPGDMGLPLIGSMWTFLLRYFKTRRPDSFIGS-FIKRYGRTGLYKTVLF 91
88A12_Ginkgo         ECLGSS--KKPLPPGDMGWPLLGNMWSFLIAFKFNRPNSFVSA-FVSRFGRTGLYKPFMM 85
88E1_Selaginella     EPKLPK-GOAPLPPGSLGWPIFGNMASFLRAFKSHNPDSFITK-YLHKYDRTGMYKAFMM 87
88B1_tomato          AIKPCS-NKYNI PNGYMLPYFGNTLSYFKASMCQPKSFIDF-FATRFGRGEGMYRAYIF 90
88C1_petunia         TFKFSS-NKCRLLPPGDMGWPFPGNMLHFVKCLSNYDLASFSVSY-FVTRFGKGGLYKAYMM 89
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88A13_M.truncatula_ GYPTVIVCSPETCRNVLKDEEHLKPGYPASAMALAGKKSFHGISSAEHKRLRKTSTP-- 149
 88A14_M.truncatula_ GSPSIIIVCTPETCRKVLTDDEENLKVGYPHSTMVLTGKRSHFHSVSHAEHKRLRRLITSP-- 150
 88A20_papaya GSPSIIIVSIPETCRKVLGDDQHAFALGYPASTKQLTGKRSHFHSVSHAEHKRLRRLTSSP-- 146
 88A21_papaya GSPSIIIVSIPETCRKVLADDEHFALGYPASTKQLTGKRSHFHSVSHAEHKRLRRLTSSP-- 149
 88D1_M.truncatula GSPSIIIVIAPAICCKVLIIDEVTFKIGYPKSALELGDSK----ILHKERGRFKQLVSSP-- 144
 88D2_M.truncatula GNPSIIIVIAAMCKKVLNDEVTFKLGYPKAITVLAAYNR----VLNNEHGRLRRLVTAP-- 146
 88D3_M.truncatula GNPSIIICDPEMCKRVLDDVNFKIGYPKSIQELTKCRPMIDVSNANHHKFRRLITAP-- 148
 84D6_licorice GNPSIIIVCEPQMCRRVLTDDVNFKLGYPKSIKELARCRPMIDVSNAEHRLRRLITSP-- 148
 84D4_lotus GNPSIIIVCEPEICMRVLTDDVNFVRYGYPPTTIKELIRLK---HISRAEHKQYRRLVNTLPI 142
 84D5_lotus GKPSIIIVCEAEICRRVLTDDVNFKFAYPESLRQLIPVQ---SISRAEHRQFRRLINTP-- 145
 88A1_Zea SSPTVLVTTAEGCKQVLMDDDAFVTGWPKATVALVGPFSVAMPYDEHRRIRKLTAAAP-- 177
 88A5_rice SSPTILAVTPEACKQVLMDDDEGFVTGWPKATVTLIGPKSFVNMSYDDHRRIRKLTAAAP-- 153
 88A15_Hordeum_ SSPTIMATTPPEACKQVLMDDDAFVTGWPKATVALIGPKSFVNMGYDEHRRIRKLTAAAP-- 150
 88A6_pea GNPSVIVTTPPEACKRVLTDDEKFTTGWQOSTIELIGKNSFIAMTYEEHKRLRRLTSSS-- 150
 88A11_soybean GNPSIIIVTTPPEICKRVLTDDEKFTTGWQOSTIELIGKNSFISMSYEEHKRLRRLTSSS-- 148
 88A7_pea GFPSVIVTSPEACKKVLTDDENFEPGWQOSTVELIGKNSFIKMPFEEHRRIRRLTSAS-- 146
 88A8_poplar GNPSVLVTTPEGCRRLTDDDAFVKGWPLATLKLIGKNSFIDIPYEEHKRLRRLTSAS-- 148
 88A9_poplar GNPSVIVTTPPEACKRVLNDDDAFVKGWPISTLKLIGKNSFIDISYEEHKRLRRLTSAP-- 148
 88A23_vitis GNPSILVTSPEGRKVLTDDEKFTTGWQOSTIELIGKNSFISMSYEEHKRLRRLTSAP-- 148
 88A24_vitis GNPSIIIVTTPPEACKRVLTDDEKFTTGWQOSTIELIGKNSFISMSYEEHKRLRRLTATP-- 148
 88A3_Arab GNPSIIIVTTSDCRRVLTDDDAFVKGWPTSTMELIGKNSFVGSFEEHKRLRRLTAAAP-- 150
 88A4_Arab GYPCVLVTTPETCRVLTDDDAFVHIGWPKSTMKLIGKNSFVGSFEEHKRLRRLTSAP-- 149
 88A2_pumpkin GNPSVVVTTPETCRKVLTDDEAFVQGWPRAAVELIGKNSFIQMPQEEHKRLRRLTSAP-- 152
 88A17_papaya GQPSVIATTPPETLKRVLTDDEAFVTSVWPKATVELMGKNSFVGSFEDHKRLRRLTAP-- 156
 88A18_papaya GHPSVIVTTPPEAMKRVLTDDDAFVSAWPKATLELTGKNSFVGSFEDHKRLRRLTAP-- 157
 88A19_papaya GHPCVLATAPETLKKVLTDDDAFVQSGWPKATIELMGKNSFVGSFEDHKRLRRLTATP-- 149
 88A12_Ginkgo_ GSPTILATTPPETCKQVLMDDAHFVPGWVSTVQLMGRKSFVALSHEDHDLRRLTAP-- 143
 88E1_Selaginella WQPTVLATTPPETCKVLSRDSLFETGWPSSTRRLIGTRSFAGVTGEEHLKRLRRLTAPA-- 145
 88B1_tomato GKPTIMVTKPEIIRKVLMDDEEYLERGLPNYMKKLIG----LTSIEEDKYFRRLTAP-- 143
 88C1_petunia GKPTILVTSPELCKRVVMDDENFDLGFPQYILELLRKEPIGGTTNQEDKLARRLTTP-- 146

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88A13_M.truncatula_ ING-HELNYIGLIEDIVVKNLEDSKTN--TPVEFLKEAKKFTFDVITSVFFS-SDRE- 204
 88A14_M.truncatula_ INGDEALSTYISLIEDSAVKHLEELSKMN--TPCEFLKEMRKAFAFEVITTIIFIS-SDRD- 206
 88A20_papaya ISGHTALSTYIPCMEDIAMTSLDEWASMQ--RPIEFLNEMRKAFAFKVITHIWLGS-HD- 201
 88A21_papaya INGHNALGMVYPIEDIVVSSLEWASMH--CPIEFLSEMRRKVAFKVITYIFLGS-HN- 204
 88D1_M.truncatula INGHNVLEMYLEIEDIVINKLEELSSMK--HPVEFLTEMKKASFVFIHIFLD-SCDQ- 200
 88D2_M.truncatula IAGNNVSTMYLERIEDIVINKLEELSSMK--HPVEFLKEMRKSIFNFIFQIFTG-SCDQ- 202
 88D3_M.truncatula MVGHKVLDMYLERLEDIAINSLEELSSMK--HPIELLKEMKVSFKSIIHVFMG-TSN-- 203
 84D6_licorice IVGHKALAMYLERLEEIVINSLEELSSMK--HPVELLKEMKVSFKAIHVFMG-SSN-- 203
 84D4_lotus LDHQALATLYLERIENIVTNSLEELSSMK--HPVELLKEMKVTFKVFIHILMG-SSIH- 198
 84D5_lotus IMNHQALAVYLERIENIMINSLEELSSMK--HPVELLKEMKVTFKVIIDILMG-TSIP- 201
 88A1_Zea INGFDALTYLFPIDRTVTSRLAWADHG--GSVEFLTELRRMTFKIIVQIFLGS-GADQA 234
 88A5_rice INGFDALTYLFSFDQTVVASLRRWSSPES-GQVEFLTELRRMTFKIIVQIFLGS-GADDA 211
 88A15_Hordeum_ INGFDALTSYLGFDIDTVVTLRGWSEGGGHFEFLTELRRMTFRIIVQIFLGS-GADER 209
 88A6_pea INGMEALSLEYLYIEENVIISLEKWSNMG---QIEFLTEIRKLTFFKIIMHIFLS-SESEP 206
 88A11_soybean INGMEALSLEYLYIEKNVKSLEKWANMG---QIEFLTEIRKLTFFKIIMHIFLS-SESEP 204
 88A7_pea INGYEALSLEYLYIEEIVISSLEKWTQMG---EIEFLTQMRKLTFFKIIHIFLGS-SESEP 202
 88A8_poplar VNGHEALSTYIPIEQNVIAELEKWTMTG---QIEFLTQMRKLTFFKIIHIFLGS-KTSE 204
 88A9_poplar VNGHEALSLEYIPIEENVIAMLEKWTMTG---KIEFLTQVRKLTFFKIIMYIFLGS-SESE 204
 88A23_vitis VNGHEALSLEYIPIEKNVISLEKWSKMG---NIEFLTQVRKLTFFKIIMYIFLGS-AESGD 204
 88A24_vitis VNGHEALSLEYIPIEENVISALNKWAAMG---EFELTLRKLTFKIIIMYIFLGS-SESE 204
 88A3_Arab VNGHEALSTYIPIEENVITVLDKWTMKG---EFELTLRKLTFKIIIMYIFLGS-SESE 206
 88A4_Arab VNGPEALSLEYIPIEETVNTDLEKWSKMG---EIEFLSHLRKLTFFKIVIMYIFLGS-SESE 205
 88A2_pumpkin VNGPEALSLEYIPIEKNVLESLEKWSKMG---PIEFLTQLRKLTFFKIVIMYIFLGS-SESE 208
 88A17_papaya INGHDALCLYLEYIEEIAVNALEELSKMG---EVQLLTQLRKLTFRIIMRIFLGS-EVSEA 212
 88A18_papaya INGHDALSGYLKFIIEEDAVSTLEKLSNMG---EIKFLTTELKLSFKIIMGIFLGS-ESESE 213
 88A19_papaya IKGHDALSVYLEYIEEITKTNLEKWKIDMG---PIEFLTTELKLSFKIIVHIFLGS-ESESE 205
 88A12_Ginkgo_ INGHEALSLEYLYIEEIVISLEKWTQMG---RIVLLNELKVTFFDIISYIFLGS-YESKT 199
 88E1_Selaginella LSNPKALEDYIPRMSNISKSAYEDWANQER---TLLLRMRKYAFRTIHIDIFLGS-KDSGL 201
 88B1_tomato VKSHGLLSDFYIDKTVSSTLEKYATTE--EPVEFLHKMHKLTFFVFMRLIG--DEVN 199
 88C1_petunia IKSHGLVSFFFDFLSENVKTSFEKWSASE--KPIELLAEMKKPTFAVLMRVLLGGEELVA 204

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88A13_M.truncatula_ HADLALVEHLYIDLLRGMRSQSINLPGFPFYKALKARKKLVKLLKGLVDHKRRNNNN--EK 263
88A14_M.truncatula_ HVDLGLVENLYIDLLKGMKSLAINLTGFAPFKALKARKKLMKLLQALVDQKRRNNNN--KV 264
88A20_papaya DSTRKLMEKYIDFSCGLKAVAINIPGFAPFKALKARKKLVLEILQGVLDERKRLKNE-DW 260
88A21_papaya DSIRKLMEKYVDFNYGLKAAAINIPGFAPFKALKAREKLVLEILQGVLEERKGLKNE-DW 263
88D1_M.truncatula DTVNKIGDLFNVMISIALLSFMPINVPGFAYNKALKARMEFVKIENIICGRRMAIKN-GQ 259
88D2_M.truncatula GTINKISDLFDVMSALFSLMPINVPGFAPFNKALKARKKFAKIVQNIIDERMMAKE-RQ 261
88D3_M.truncatula QNIVKNIGSSFDTLSKGMYSIPINAPGFTFHKALKARKKIAKSLQPVVDERRLI IKN-GQ 262
84D6_licorice QDI IKKIGSSFDTLYNGMFSIPINVPGFTFHKALEARKKLAQVQPVVDERRLMIEN-GP 262
84D4_lotus HMI IENMDTSFAELTNGILSAPINAPGFVYHKALKARKKLAQVQSVVDERRLRSKN-GQ 257
84D5_lotus HMITQNMESFFAELCNGMLSAPINAPGFVYHKALKARKKLAQVQSVVDERRLRKSKN-GQ 260
88A1_Zea_ --TTRALERSYTELNYGMRAMAINLPGFAYRGALRARRRLVAVLQGVLDERRAARAKGVS 292
88A5_rice --TMEALERSYTDLNYGMRAMAINLPGFAYYRALRARKLVSVLQGVLDGRRAAAAGKFA 269
88A15_Hordeum_ --TAAELERTYTELNYGMRAMAINLPGFAYHKAIRARRRLVAALQVLDERRARAGGKTA 267
88A6_pea --VMEALEKEYTILNHGVRAMQINVPGFAYYKALKARKNLVGFQSVVDDRRNIRK---V 261
88A11_soybean --VMEALEREY TALNHGVR----- 221
88A7_pea --VMEALEREYTVLNLGVRAMRINIPGFAPFKSLKARKNLVAIFQSVVDKRRNERRGKEP 260
88A8_poplar --VMEALEKEYTTLNYGIRAMAINLPGFAYYEALKARKKLVAFQSVVDGRRNLK---DD 260
88A9_poplar --VMEALEKDYTTLNYGVRAMAINLPGFAYYKALKARKKLVAFQSVVDERRNLRK---NS 260
88A23_vitis --VMEALEKEYTTLNYGVRALAINIPGFAPFKAFKARKKLVAFQSVVDERRRQRER---E 259
88A24_vitis --VMEALEREYTSLNYGVRAMAINLPGFAYHKAIRARRRLVAFQSVVNNRRNRK---G 259
88A3_Arab --VMDALEREY TALNYGVRAMAVNIPGFAYHRALKARKKTLVAFQSVIVTERRNQRK---Q 261
88A4_Arab --VMDSLEREYTNLNYGVRAMGINLPGFAYHRALKARKKLVAFQSVIVTNRNRQRK---Q 260
88A2_pumpkin --VMELEKEYTRLNYGVRDMRINLPGFAYHKAIRARRRLVAFQSVIVTERRRQK---LD 263
88A17_papaya --VMDVLEKEYTALNYGIRAMAINIPGFTFHRSLKARKKTLVAIFQSVVNDRRNKMR---N 267
88A18_papaya --IMEVFEKEYCALNYGLRSLAINIPGFYHRALKARKKLVAFQSVIVTARRDRK---N 268
88A19_papaya --IMNALEKEYTTLNAGLRAMADIPGFAYHKAIRARRRLVAFQSVVNNRRNRK---N 260
88A12_Ginkgo_ GTKLASLEREYTSLNMGIRAMAINLPGTAYHKALKARKKLVAFQSVTEERRSSPD---P 256
88E1_Selaginella D--VEEVSSLYEYGNQGISLPLINLPGTSYNRALKARKKLDVLLHRVLNKRRFSEK---- 255
88B1_tomato QELFDEMFEETAVISGVHNLPLINLPGFAYHKAIRARRRLVAFQSVIVTERRRQK---D 256
88C1_petunia RELLDVIFKENFRFAGLRSLPLINIPGFAPFKRAMKGRKEIKVFERVINERKVLIA---K 261

88A13_M.truncatula_ QQT--KKDLMELLME--ARDDEGEKLEDEDI IDLLLLFLLAGHESSAYGVLWTVINLTHN 319
88A14_M.truncatula_ KKM--KKDMDLLE--VKDEEGRMLEDEDI IDLLLLVFLLAGHESSAHGILWTI IYLIDH 320
88A20_papaya EDR--KRGMDLLE--VEDENSVKLEDEDI IDLLLLVFLLAGHESSAHAAMWALIYLNQH 316
88A21_papaya ENR--KRGMDLLE--VEDENGVKLEDEDI IDLLLLVFLLAGHESSAHAAMWAIYLNQH 319
88D1_M.truncatula IGE--NNNLLDIILE--TKDERGEKLEDDI IDLLIAFLFGAHSIATASMWVYLAQN 315
88D2_M.truncatula IGE--KKDLINILLE--MNDEAGEKLEDDI IDLLIALFFGGHDSIAAGMMLTIMYLTEH 317
88D3_M.truncatula HVG--EKKDLMDILLE--IKDENGRKLEDDI IDLLIGLLFAGHESTATGIMWSVAHLTQH 319
84D6_licorice QEGSQRKDLIDILLE--VKDENGRKLEDEDI IDLLIGLLFAGHESTATSLMWSITYLTQH 320
84D4_lotus EGK--DKVFLDNLE--AKDENGRKRDDEYI DVVLIAQLFAGHETSATALMWTIYLTOH 313
84D5_lotus EGK--DKAFIDSVLE--VNDENGRKLEDGYI IDLLIAILFAGHETSATMMWTIYVLTQH 316
88A1_Zea_ ---GGGVMDMDRLIE--AQDERGRHLDDDEI IDVLVYLNAGHESSGHITMWATVFLQEN 347
88A5_rice --RSGAMDMDRLIE--AEDERGRRLADDEI DVVLIMYLNAGHESSGHITMWATVFLQEN 325
88A15_Hordeum_ G--AAPVMDMDRLIA--VEDEGRRLQDDEI IDVLVYLNAGHESSGHITMWATVFLQEN 324
88A6_pea YSQKAKDMDSLID--VEDDNGRKLNDDEI IDIMLYLNAGHESSGHITMWATVFLQKH 319
88A11_soybean -----AMMDALID--LEDE--RKLSDDEI IDIMLYLNAGHESSGHITMWATVFLQKH 271
88A7_pea APGKAKDMDSLID--AVDENGRKLGDEI IDIMLYLNAGHESSGHITMWATVFLQRH 318
88A8_poplar VTNTKKDMDSLID--VEDENGRKLTDEEVIDIMLYLNAGHESSGHITMWATVFLQDH 318
88A9_poplar ARNAKKDMDSLIG--VEDENGRKLTDEEVIDIMLYLNAGHESSGHITMWATVFLQEH 318
88A23_vitis NSSAREKMDLALLH--VEDENGRKLTDEEVIDIMLYLNAGHESSGHITMWATVFLQGH 317
88A24_vitis NSQTMKMDMDALLD--IEDENGRKLSDEEVIDIMLYLNAGHESSAHVTMWATVFLQEN 317
88A3_Arab NILSNKMDLNLN--VKDEGKTLDDDEI IDVLLMYLNAGHESSGHITMWATVFLQEH 319
88A4_Arab NISSNRKMDLNLID--VKDENGRVLDDEEVIDLLMYLNAGHESSGHITMWATVFLQEH 318
88A2_pumpkin KWAPKRKMDMDQLID--IVDENGRKLDDEEVIDILIMYLNAGHESSGHITMWATVFLQEN 321
88A17_papaya NIASKRKMDMDHLLD--IKDEKGNKLDDEEVIDIMLYLNAGHESSGHITMWAVILMQEH 325
88A18_papaya NIASKAKDMDHFLD--IEDENGDKLGDDYVIDIMLYLNAGHESSGHITMWAAVILMQEN 326
88A19_papaya NIPSKGMDMDRLD--VEDEKDKLGDDDLVIDIMLYLNAGHESSGHITMWAVILMQNH 318
88A12_Ginkgo_ Q--AKSNKDVNLALLH--VKDENGSLLTDEEVIDLLVYLNAGHESSAHITMWAIIFLVSH 313
88E1_Selaginella ---PEKTDLSLMD--ATDENGRKLDKQIVDVLVYLNAGHDSSTAHLIWLIIIFLLKH 310
88B1_tomato GKSMKANI IDMLSNNDQYEAANMLSDKKI IEILVLFSAFAGFEPVALMSVKAIFHLQKH 316
88C1_petunia DKTRAKSNILDIMLS--TQDDDGKGLRDGNILKTLWYTFSGYESVAKVATQTMMLLQNH 319

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88A13_M.truncatula_ PHVFERAKKEQEEIMARRPSDQKGLTHTEIRQMKYLSQVIDEMLRKTSSIFANFRQAKVD 379
 88A14_M.truncatula_ PHVFQRAKKEQEEIMETRPSTQKGLNLKEIKQMQLSKVIDEMLRITTSIFANFRRAKVD 380
 88A20_papaya PDMLQKAKKEEQEEVVKRPPSTQKGLNFDEIRQMRYTSKVIDETLRRTNVSFSNFRQAKED 376
 88A21_papaya PDLLOKAKAHEEQEEVVKGRASTEKGLNLNEIRQMRYTSKVIDETLRRTSLSFSNFRQAKKD 379
 88D1_M.truncatula PLCLKKAKEEQEELKARSTSQRKLSIEEIKMIIYLSQVVDLIRHI-TIFSASFREAID 374
 88D2_M.truncatula PLCLKKAKEEQEELKARPPSQKRLSIEEIQKMTYLSQVDFDETLRIT-SVFATFREATTD 376
 88D3_M.truncatula PHILQKAKEEQEELKIRPASPQRKLSLNEVKQMIYLSYVIDEMLRFANIAFISIFREATSD 379
 84D6_licorice PHILKKAKEEQEEITRTRFSSQKQLSLKEIKQMVYLSQVIDETLRCANIAFATFREATAD 380
 84D4_lotus PHILEKAKKEEQEEMKARVSSQGRNLNQEIKQMVYLSQVIDETLRCANIVFTTFREAISD 373
 84D5_lotus PHILNKAKKEEQEKIMKVRVSSQTRLNLOEIKQMVYLSQVIDETLRCANIVFSMFREATS 376
 88A1_Zea PDMFARAKAEQEAIMRSIPSSQRGLTLRDFRKMAYLSQVIDETLRRLVNIISFVSFRQATRD 407
 88A5_rice PDIFARAKAEQEEIMRSIPATQNGTLRDFRKMFLSKVVDLRCVNIISFVSFRQATRD 385
 88A15_Hordeum_ PEILAKAKAEQEAIMRSIPPGQKGLTLRDFRKMAYLSQVVDLRFVNIISFVSFRQATRD 384
 88A6_pea PEYLKKAKEEQEEIIRKRPSTQKGLTLKEIRGMDFLYKVIDETMRVITFSLVVFREAKSD 379
 88A11_soybean PEYLQKAKAEQEEIIRRRPSTQKGLTLKEVREMDFLYKVIDETLRVITFSLVVFREAKTD 331
 88A7_pea PEFFRKAKEEQVEMLKRRPPSQKGLKLEDVRKMEYLSKVIDETMRVVTFSLMVFRQARND 378
 88A8_poplar PEYFQKAKKEEQEIIRKRPSTQKRLSLKEVREMKYLSKVIDETLRMVITFSLTVFREAKTD 378
 88A9_poplar PEFLQKAKKEEQEIVKRRPPAQNGLSLKEVREMDYLSKVIDETLRITFSLTVFREAKTD 378
 88A23_vitis PEIFQRAKAEQEEIVKRRPPTQKGLTLREVRKMEYLSQVIDETLRWLITFSLTVFREAKAD 377
 88A24_vitis PEFFQRAKAEQEEIIRKRPSTQKGLTLKEIREMEYLPKVIDETLRWITFSLTVFREAKAD 377
 88A3_Arab PEVLQRAKAEQEMILKSRPEGQKGLSLKETRMEFLSQVVDLRLVITFSLTAFREAKTD 379
 88A4_Arab PMILQKAKKEEQERIVKRRAPGQK-LTLKETREMVYLSQVIDETLRVITFSLTAFREAKSD 377
 88A2_pumpkin PEVLKKAKEEQEAIVRNRPAQTGLTLKECRDMEYLSKVVDELTRYVVSFSLVVFREAQMD 381
 88A17_papaya PEIFKKAKEEAEELVKKRRPPTQKGLNLKEIREMKYLDQVIDETLRVVSFSLVVFVAKKD 385
 88A18_papaya PEVFKKAKEEQENIVKRRPPTQKGLSLKETREMIYLNQIIDETLRWTSFALMVFRVARKD 386
 88A19_papaya PEVLKKAKEEQELIVERPSTQKGVNLKEIREMVYLNQIINETSRYVVSFSLMAFRETKKD 378
 88A12_Ginkgo_ PRLYAEAKAEQEKIVNKRDPGQTHLIMYEIREMNYLRKIIDESLRMVNISLVMVFREAMD 373
 88E1_Selaginella EIVYDKVKEEQELIASQKPLGDS-LSLSDVKKMSYLSRVINETLRVANISPMVFRRAVTD 369
 88B1_tomato PHFLEKAKKEEQEEIVKRRASSNAGLSFDEIRQMTFFVSKIINETLRVIATDQSVFLRDTSTT 376
 88C1_petunia PECLKKAKKEEQEEIVKRRTPNEGLNFSEIGQMKYVTNINETLRGSGTETVFLFRDARTD 379

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88A13_M.truncatula_ FNLNGGYTIPKGWVWVNRGVHMDPENYPNPKEFDPSRWEN-----FKARVGOFL 430
 88A14_M.truncatula_ VNINGGYTIPKGWVWVNRGVHMDPEIYTNPKKEYDPSRWEN-----YKAKAGSFN 431
 88A20_papaya VTING-YLIPKGWVWVNRGVHMDPEVHKNPTEFDPFRWED-----YKPKPSSFI 426
 88A21_papaya VTING-YLIPKGWVWVNRGVHMDPEIHKNPTEFSPSRWDD-----YKPKPTSFI 429
 88D1_M.truncatula VNING-YFIPKGWVWVLSALHMDPEIYSPNPKEFNPNTRWDD-----YNPGSFTFI 424
 88D2_M.truncatula ANING-YLIPKGWVWVNLNAMHMAPEHHSNPEEFNPSRWDD-----HNPTTGFTFL 426
 88D3_M.truncatula VNING-YLIPKGWRVLIWARAIHMDSEYYPNPKEFNPSRWKD-----YNAKAGTFL 429
 84D6_licorice VNING-YIIPKGWRVLIWARAIHMDSEYYPNPPEEFNPSRWDD-----YNAKAGTFL 430
 84D4_lotus VNING-YVIPNGWRVWVARAVHMNPKYYPNPPEEFNPSRWDD-----YHGKAGTFL 423
 84D5_lotus VNMSG-YVIPKGWRVLIWGRAVHMNPEYYPNPPEEFNPSRWDD-----YHGKAGTFL 426
 88A1_Zea VFNNG-YLIPKGWVWVLRVHMDPQVYDPDKKFDPSRWEG-----HSPRAGTFL 457
 88A5_rice IFVNG-YLIPKGWVWVLRVHMDPQVYDPDKKFDPSRWEG-----PPPKAGTFL 435
 88A15_Hordeum_ VFNNG-YLIPKGWVWVLRVHMDPQVYDPDKKFDPSRWEG-----PPPAGTFL 434
 88A6_pea VTING-YTIPKGWVWVWFRS VHLDP E I Y P N P K E F N P N R W N -----K E H K A G E F L 428
 88A11_soybean VNING-YTVPKGWVWVWFRS VHLDP E I F P D P K E F N P N R W N -----K E H K A G E F L 380
 88A7_pea VKVNG-YLIPKGWRVLTWFRS VHFDS E L Y P D P R E F N P E N F S -----V V R K A G E F L 427
 88A8_poplar FCMNG-YTIPKGWVWVWFRS I H L D P E V Y P N P K E F N P S R W D D -----Y T P K A G T F L 428
 88A9_poplar FSING-YIIPKGWVWVWFRS VHLDP E I Y Q N P K E F N P S R W D N -----Y T P K A G T F L 428
 88A23_vitis VNIGG-YLFPKGWVWVWFRS VHYDPEIYPNPPEVFNPSRWDNVYKLVHVNQFTPKAGTFL 436
 88A24_vitis INICG-YTIPKGWVWVWFRS LHFDP E T Y P D P K E F N P C R W D -----D Y T A K P G T F L 427
 88A3_Arab VEMNG-YLIPKGWVWVWFRS VHLDP E V F P D P R K F D P A R W D N G -----F V P K A G A F L 430
 88A4_Arab VQMDG-YIIPKGWVWVWFRS VHLDP E I Y P D P K K F D P S R W E G -----Y T P K A G T F L 427
 88A2_pumpkin VNLNG-YLIPKGWVWVWFRS I H Y D S E V Y P D P K K F D P S R W D G -----F V P K A G E F L 431
 88A17_papaya VDING-YLVPKGWVWVWFRS VHLDP E I Y L N P K E F N P S R W E G -----Y T P K P C S F V 435
 88A18_papaya VNING-YFIPKGWVWVWFRS VHLDP E V Y P D P K E F N P S R W D G -----F T P K P C S F V 436
 88A19_papaya VNING-YFIPKGWVWVWFRS VHLDP E I Y P N P K E F N P S R F E D -----Y I P K P C S F I 428
 88A12_Ginkgo_ VEING-YTIPKGWVWVWFRS VHLDP E V Y P N P T K F D P D R W D K -----L I P K S G M F I 423
 88E1_Selaginella VEVNG-FTIPKGWVWVWFRS VHLDP E V H M D P A V H S N P Q N F D P D R W A -----V I R P F T H L 417
 88B1_tomato FNING-YTIPKGWVWVWFRS VHLDP E V Y P N P K E F N P S R W D D -----I E T K P G I F L 426
 88C1_petunia VNLNG-YTIPEGWVWVWFRS VHLDP E V Y P N P K E F N P S R W D D -----L E V K P A S F L 429

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88A13_M.truncatula_	PFGYGSRYCPGSDLAKLEITIYLHFFLLNYRMERINPDCPITYLP IARPTDNCLARI IKV	490
88A14_M.truncatula_	PFGLGSR LCPGSDLAKLEITIYLHFFLLNYRMERINPDCPVTYLPVPRPKDNCLARI IKV	491
88A20_papaya	PFGGGSRICPGAELAKVEVYIFLHYFLLNYRLDRVNPASPVVYLP IPRPADYCLARI IKL	486
88A21_papaya	PFGGGSRICPGADLAKLEVISIFLHYFLLNYRLERLNPA SP IYLP IPRPADNCLARI IKL	489
88D1_M.truncatula	PFGVGRRLCPGRDLAKYEISIFLHYFVFNLYKLERINPECPIT SF PYSKPIDNCLAKVIKI	484
88D2_M.truncatula	PFGMGRRLCPGRDLSKYEMLI FLHYFVFNLYKLRINPECPITSLPYIKPTDNCLAKVTKL	486
88D3_M.truncatula	PFGAGSR LCPGADLAKLEISIFLHYFLLNYRLERINPDCPV T TLPQCKPTDNCLAKVIK	489
84D6_licorice	PFGAGSR LCPGADLAKLEISIFLHYFLLNYRLERINPECHVTSLPVSKPTDNCLAKVIK	490
84D4_lotus	PFGAGSR LCPGKDLAKLEISVFLHYFLLNYKLERINAECPI TFLPILKPVNDCLAKVIK	483
84D5_lotus	PFGVGSRLCPGKDLAKLEISIFLHYFLLNYKLERINPDCPI TFLP I PKPVNDCLAKVIK	486
88A1_Zea_	AFGLGAR LCPGNDLAKLEISVFLHFFLLGYKLARTNPRCVR YLP HPRPVNDCLAKITRV	517
88A5_rice	PFGLGAR LCPGNDLAKLEISVFLHFFLLGYXLKRANPKCRVR YLP HPRPVNDCLATITKV	495
88A15_Hordeum_	PFGLGTR LCPGNDLAKLEISVFLHFFLLGYKLTRKNPNCRVR YLP HPRPVNDCLAKITRL	494
88A6_pea	PFGAGTR LCPGNDLAKMEIAVFLHFFLLNYRLERLNPKCPI RYLP HTRPMDNCLGRVKKC	488
88A11_soybean	PFGGGSRLCPGNDLAKMEIAVFLHFFLLNYRFEQHNPNC PVR YLP HTRPMDNCLGRVRKC	440
88A7_pea	PFGAGTR LCPGNDLAKLEISVFLHFFLLKYELEQLNPKSP I RFLP HTRPLDNCLARIKKQ	487
88A8_poplar	PFGAGSR LCPGNNLAKLEISIFLHYFLLDYRLERQNPECS WRF LP HTRPIDNCLARIKKV	488
88A9_poplar	PFGAGSR LCPGNDLAKLEISIFLHYFLLDYMLERENPECR W MFLP HTRPTDN CVARIKKV	488
88A23_vitis	PFGAGSR LCPGNDLAKLEISVFLHYFLLNYRLERVNP GC ELM YLP HPRPVNDCLAIRKV	496
88A24_vitis	PFGLGSR LCPGNDLAKLEISVFLHFFLLNYQLERLNPGCP RMYLP HPSRPRDNCLAIRKV	487
88A3_Arab	PFGAGSH LCPGNDLAKLEISIFLHFFLLKYQVKRSNPECP VM YLP HTRPTDNCLARISYQ	490
88A4_Arab	PFGLGSH LCPGNDLAKLEISIFLHFFLLKYRVERSNPGCP VMFLP HNRPKDNCLARITRT	487
88A2_pumpkin	PFGAGSR LCPGNDLAKLEICIFVHYFLLNYNLEWLT PDCE ILYLP HSRPKDN CMAKITKK	491
88A17_papaya	PFGAGSR LCPGNDLAKLEIAITLHYFVLGYEVERINPKS PLVHLP HPRPVNDCLAIRVKQ	495
88A18_papaya	PFSAGAR LCPGKDLAKLEISVFLHYFVLSYEVERLNPSA PLIFLP HPRPVNDCSAIVIKH	496
88A19_papaya	PFGAGTRFCPGYDLAKLEISIFLHYFLLGYEIKRLNPKSS LV YLP HPSRPADNCLAIRVKQ	488
88A12_Ginkgo_	PFGAGSR LCPGSDLAKMEICVFIHLLLFHYKIERLNPD C PVR YLP HPRPTDYCKGRVRKL	483
88E1_Selaginella	PFGLGSR TCGNELAKLEACIIVHHLVLGYEVKPLNPDCE V TFLP HPRPKDYFVQVRRR	477
88B1_tomato	PFSMGPKSCPGSNLAKLQISVILHYFLLHYRVEQINPEAR C-----YPPENCLVKFKKL	480
88C1_petunia	PFGVGLRMCPGANLVRLEAVVFLHYFLLNYRLEMLDPDS-----TPEKCLARFKKL	480
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88A13_M.truncatula_	T-----	491
88A14_M.truncatula_	T-----	492
88A20_papaya	SNNST--	491
88A21_papaya	SNN----	492
88D1_M.truncatula	SDS----	487
88D2_M.truncatula	SDA----	489
88D3_M.truncatula	SRA----	492
84D6_licorice	SCA----	493
84D4_lotus	S-----	484
84D5_lotus	SCN----	489
88A1_Zea_	GS-----	519
88A5_rice	S-----	496
88A15_Hordeum_	SSSHG--	499
88A6_pea	-----	
88A11_soybean	SSTTT--	445
88A7_pea	EEA----	490
88A8_poplar	SSESV--	493
88A9_poplar	SSTSV--	493
88A23_vitis	A-----	497
88A24_vitis	AAESE--	492
88A3_Arab	-----	
88A4_Arab	MP-----	489
88A2_pumpkin	SSVAA--	496
88A17_papaya	NP-----	497
88A18_papaya	NP-----	498
88A19_papaya	NPWSSSG	495
88A12_Ginkgo_	ST-----	485
88E1_Selaginella	R-----	478
88B1_tomato	SISSNGN	487
88C1_petunia	SA-----	482

84A5_rice	VLQAQDGF	SNRPATTAIA	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	144
84A33_Zea_BT041447	VLQAQDGF	SNRPATAAIA	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	147
84A6_rice	VLQVQDGF	SNRPASIAIA	YLYT	GRADMAFASHYGHFWRQVRKLSAVRLFS	137
84A23_Brassica_	VLQVQDSV	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKVCVMKVS	145
84A24v1_Brassica	VLQVQDSV	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKVCVMKVS	145
84A25_Brassica	VLQVQDSI	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKVCVMKVS	138
84A1_Arab.	VLQVQDSV	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKVCVMKVS	145
84A26_papaya	VLQAQDSI	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	144
84A27_papaya	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFANYGPFWRQMRKICVMKVS	130
84A2_tom	VLQVQDNI	SNRPKTVAIS	YLYT	DRADMAFADYGPFWRQMRKLCVVKLFS	146
84A14v1_tobacco	VLQEHDI	IIFSNRPATVAIS	YLYT	DRADMAFADYGLFWRQMRKLCVVKLFS	149
84A9_Centaurium_	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFADYGPFWRQMRKLCVVKLFS	146
84A15_Camptotheca_	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	143
84A3_Liquidambar	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	143
84A31_vitis	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	142
84A10_poplar	VLQVQDNIF	SNRPANIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	143
84A11_poplar	VLQVQDNIF	SNRPANIAI	RYLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	143
84A16_Broussonetia_	VLQLQDNIF	SNRPANIAI	RYLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	147
84A17_M.truncatula	VLQVQDNIF	SNRPATVAIK	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	149
84A20_M.sativa_	VLQVQDNIF	SNRPATVAIK	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	149
84A19_M.sativa_	VLQVQDNIF	SNRPATVAIK	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	149
84A21_soybean_	VLQVQDNIF	SNRPATIAIS	YLYT	DRADMAFAHYGPFWRQMRKLCVVKLFS	145
84A18_M.truncatula	VLQLHDSI	SNRPATVAIS	YLYT	NRADMAFAHYGPFWRQMRKLCVVKLFS	140
84A28_papaya	VLQAQDIV	SNRPANVAIS	YLYT	DRADMAFANYGPFWRQMRKICVVKVS	128
84A29_papaya	VLQVQDIV	SNRPANVAI	NYLSY	DRADMAFANYGPFWRQMRKICVVKLFS	142
84A12_poplar	VLQAQDIV	SNRPANVAI	VYLYT	DRADMAFANYGPFWRQTRKICVVKLFS	142
CYP84A30_gi 147799011 emb CAN7	VLQVQDSV	FANRPARVAI	KYLYT	DRADMAFAQYGPSWRQMRKICVVKLFS	142
84A30_vitis	VLQVQDSV	FANRPARVAI	KYLYT	DRADMAFAQYGPSWRQMRKICVVKLFS	142
84A32v1_vitis	VLQVQDSV	FANRPARVAI	KYLYT	DRADMAFAQYGPSWRQMRKICVVKLFS	142
84A4_Arab	VLQVQDHV	SNRPTTIAI	RYLYT	GGSDLAFCNYPFWRMRKLYVMMKLS	111
84A7_rice	IIHENDSV	S	HRPVTAA	MVYVSYDLADMAFAHYGPFWRQMRKLCVVKLFS	140

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84A5_rice	RRRAETWLA	VRDESAALV	RAVAASRGE	--AAVNLGELIFNLTKNVI	FRAA	192		
84A33_Zea_BT041447	RRRAETWA	AVRDECAALV	RAVAVGGSGGE	AVNLGELIFSLTKNVT	FRAA	197		
84A6_rice	RRRAQSW	RAVRDES	AKLVGAIARRAG	---EAVDLGELIFGLTKDVI	FRAA	184		
84A23_Brassica_	RKRAESW	ASVRDE	VDKMIRSVSSNVG	---KSINVGEQIFALTRNIT	YRAA	192		
84A24v1_Brassica	RKRAESW	ASVRDE	VDKMIRSVSSNVG	---KSINVGEQIFALTRNIT	YRAA	192		
84A25_Brassica	RKRAESW	ASVRDE	VDKMIRSVSSNVG	---KSINVGEQIFALTRNIT	YRAA	185		
84A1_Arab.	RKRAESW	ASVRDE	VDKMIRSVSSNVG	---KPINVGEQIFALTRNIT	YRAA	192		
84A26_papaya	RKRAESW	ASVREE	VDKMVRTVANTG	---KTVNVGELIFSLTRNII	YRAA	191		
84A27_papaya	RKRAESW	ASVREE	VDKMVRTVANTG	---KTVNVGELIFSLTRNII	YRAA	177		
84A2_tom	RKRAESW	SDSVRDE	VDSMVKI	VTTNAG---TSINL	GELVFCLTRNII	YRAA	193	
84A14v1_tobacco	RKRAESW	SDSVRDE	ADSMVRI	VTTNTG---TAVNL	GELVFLTRNII	YRAA	196	
84A9_Centaurium_	RKRAESW	SDSVRDE	VERMTHIVATNIG	---SPVNI	GEMVFLTKDVI	YRAA	193	
84A15_Camptotheca_	RKRAESW	ESVRDE	VDSMVVVVSH	TG---KSVNI	GELVFLTRDI	YRAA	190	
84A3_Liquidambar	RKRAESW	ESVRDE	VDSAVRVV	ASNIG---STVNI	GELVFALTKNIT	YRAA	190	
84A31_vitis	RKRAESW	ESVREE	VESTVTVASSIG	---SPVNI	GELVFLTKNII	YRAA	189	
84A10_poplar	RKRAESW	ESVRDE	VDSMVKTVESNIG	---KPVNI	GELIFLTMNIT	YRAA	190	
84A11_poplar	RKRAESW	ESVRDE	VDSMLKTVEANIG	---KPVNI	GELIFLTMNIT	YRAA	190	
84A16_Broussonetia_	RKRAESW	ESVRGE	EKTVLSVAGSTG	---TAVNI	GELVFKTMDI	YRAA	194	
84A17_M.truncatula	RKHAESW	QSVRDE	VDAVAVRTVSDNIG	---NPVNI	GELVFNLT	KNII	YRAA	196
84A20_M.sativa_	RKHAESW	QSVRDE	VDAVAVRTVSDNIG	---NPVNI	GELVFNLT	KNII	YRAA	196
84A19_M.sativa_	RKHAESW	QSVRDE	VDAVAVRTVSDNIG	---NPVNI	GELVFNLT	KNII	YRAA	196
84A21_soybean_	RKRAESW	QSVRDE	VDAVAVRASSVG	---KPVNI	GELVFNLT	KNII	YRAA	192
84A18_M.truncatula	RKRAESW	QSVKDE	VEVVITVNNNLG	---KSVNI	GELVFNLT	KNII	YRAA	187
84A28_papaya	RKRTE	SWASVREE	VDSMVRVKEKTG	---SAVNI	GEMIFALTRSIT	YRAA	175	
84A29_papaya	RKRAESW	ASVREE	VDSIVRALEKKTG	---SPVNI	GEMVFA	LTRSIT	YRAA	189
84A12_poplar	RKRAESW	ASVRDE	VEFTVRRVSEKTG	---EPVNI	GELVFALTRSIT	YKAA	189	
CYP84A30_gi 147799011 emb CAN7	RKRAESW	ASVREE	VDSVLQSI	AKRGG---SAVNI	GELALDLTKNIT	YRAA	189	
84A30_vitis	RKRAESW	ASVREE	VDSVLQSI	AKRGG---SAVNI	GELALDLTKNIT	YRAA	189	
84A32v1_vitis	RKRAESW	ASVREE	VDSVLQSI	AKRGG---SAVNI	GELALDLTKNIT	YRAA	189	
84A4_Arab	RKRAESW	SVDEE	VHKS	VRLVASNVG---KPLNI	CKLAFSLSRDIT	FRAA	158	
84A7_rice	PRRDV	SWRV	RGEVDALVRS	VAELRR---VAGSV	GDVLFK	FATNV	FRAA	187

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84A5_rice	LRCVIKETLRLHPPIPILLHETAADCLVAGYSVPRGSRVMNVNVAIARDR	424
84A33_Zea_BT041447	LRCVIKETLRLHPPIPILLHETADDCVVAGYSVPRGSRVMNVNVAIGRHR	426
84A6_rice	LRCVAMETLRLHPPIPILLHEAAADCVVGGYSVPRGARVVNVVSVGRDA	404
84A23_Brassica_	LKCTLKETLRLHPPIPILLHETAEDTEIDGYFVPKKSVMINAFVIGRDK	419
84A24v1_Brassica	LKCTLNETLRLHPPIPILLHETAEDTEIDGYFVPKKSVMINAFVIGRDK	419
84A25_Brassica	LKCTLKETLRLHPPIPILLHETAEDTEIDGYFVPKKSVMINAFVIGRDP	412
84A1_Arab.	LKCTLKETLRLHPPIPILLHETAEDTSIDGFFIPKKSVMINAFVIGRDP	419
84A26_papaya	LKCVIKETLRLHPPIPILLHETAEDAIEGGYVIPKKSVMINAWAINRDA	416
84A27_papaya	LKCVIKETLRLHPPIPILLHETAEDTDVAGYLIPKKSVMINAWAIGRDP	402
84A2_tom	LKCLKETLRLHPPIPILLHETAESTVSGYIPANSHVIINSFAIGRDK	419
84A14v1_tobacco	LRCLKETLRLHPPIPILLHETAESTVSGYHIPAKSHVIINSFAIGRDK	423
84A9_Centaurium_	FKCLKETLRLHPPIPILLHETAEEIAGYRIPAKSRVMINAWAIGRDK	417
84A15_Camptotheca_	LKCALKETLRLHPPIPILLHETAEDTEVAGYIPARSVMINAWAIGRDK	412
84A3_Liquidambar	LKCVLKEVLRHPPIPILLHETAEDAIEVGGYIPAKSRVMINACAIGRDK	409
84A31_vitis	LKCVLKETLRLHPPIPILLHETAEDAIEVAGYHIPARSVMINAWAIGRDK	412
84A10_poplar	FKCTLKETLRLHPPIPILLHETSEDAEVAGYVPPKTRVMINAYVIGRDK	412
84A11_poplar	LKCALKETLRLHPPIPILLHETSEDAEVAGYFIPKQTRVMINAYVIGRDK	413
84A16_Broussonetia_	LRCAIKETLRLHPPIPILLHETAEDAIVAGYHIPKGSVMINAWAIGRDK	413
84A17_M.truncatula	LKCALKETLRLHPPIPILLHETAEEATVNGYFIPKQARVMINAWAIGRDA	417
84A20_M.sativa_	LKCALKETLRLHPPIPILLHETAEEATVNGYFIPKQARVMINAWAIGRDA	417
84A19_M.sativa_	LKCALKETLRLHPPIPILLHETAEEATVNGYFIPKQARVMINAWAIGRDA	417
84A21_soybean_	LKCALKETLRLHPPIPILLHETAEDATVGGYFVPRKARVMINAWAIGRDK	418
84A18_M.truncatula	LKCAVKETLRLHPPIPILLHETAEDATVGGYFVPPKGSVMINNVWVIGRDK	409
84A28_papaya	LKCVLKETLRLHPPIPILLHETSKDSVSVGYKIPSGSRIMINWVIGRDK	402
84A29_papaya	LKCVIKETLRLHPPIPVLLHETAQDVTVSGYRIPSGSRVMINAWAVGRDR	412
84A12_poplar	LKCAKMETLRLHPPIPVLLHETAQDVTVNGYRIPARSVMINAWAIGRDP	418
CYP84A30_gi 147799011 emb CAN7	LKCCIKETLRLHPPIPVLLHETAEDSVVAGYSVPARSDVMINAWAINRDK	414
84A30_vitis	LKCCIKETLRLHPPIPVLLHETAEDSVVAGYSVPARSDVMINAWAINRDK	414
84A32v1_vitis	LKCCIKETLRLHPPIPVLLHETSEASVAGYSVPARSDVMINAWAINRDK	414
84A4_Arab	LKCILKETLRLHPPVPLLLHETVKDTEISGYFIPKGSVMVNTYALGRDP	382
84A7_rice	LRCVTKETLRLHPPVPLLLRESLHDCAIGGYTVPRGSRIWINNWAMCRDE	413

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84A5_rice	AAWG-PDADAFRPSRFAAGAAEGLDFRGGCFEFLPFGSGRRSCPGMALG	473
84A33_Zea_BT041447	ASWK-DADAFRPSRFAAPEGEAAGLDFKGGCFEFLPFGSGRRSCPGMALG	475
84A6_rice	GAWK-GDAGAFRPARFMAGGEAAGMDLRGGCFEFLPFGSGRRACPAIVLG	453
84A23_Brassica_	NSWV-DPETFRPSRFLFEP----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	464
84A24v1_Brassica	NSWV-DPETFRPSRFLFEP----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	464
84A25_Brassica	KSWP-DAETFRPSRFLFEP----GVADFKGSNFEFIPFGSGRSCPGMQLG	457
84A1_Arab.	TSWT-DPDTFRPSRFLFEP----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	464
84A26_papaya	KSWE-NPDSFKPSRFLNQ----GMPDFKGSNFEFIPFGSGRRSCPGMQLG	461
84A27_papaya	TSWD-EPDSFKPSRFLNQ----GMPDFKGSNFEFIPFGSGRRSCPGMQLG	447
84A2_tom	NSWE-DPDSFKPSRFLKE----GVADFKGGNFEFIPFGSGRRSCPGMQLG	464
84A14v1_tobacco	NSWE-DPETYKPSRFLKE----GVPDFKGGNFEFIPFGSGRRSCPGMQLG	468
84A9_Centaurium_	DSWK-DPDTFRPARFLEE----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	462
84A15_Camptotheca_	NSWD-EPETFKPSRFLKE----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	457
84A3_Liquidambar	NSWA-DPDTFRPSRFLKD----GVPDFKGNFEFIPFGSGRRSCPGMQLG	454
84A31_vitis	NSWD-EPETFKPSRFLKA----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	457
84A10_poplar	NSWE-DPDSFKPSRFLFEP----GVPDFKGNHFEFIPFGSGRRSCPGMQLG	457
84A11_poplar	NSWE-DPDAFKPSRFLK----GVPDFKGNHFEFIPFGSGRRSCPGMQLG	458
84A16_Broussonetia_	NSWA-DPDSFKPARFLRD----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	458
84A17_M.truncatula	NCWE-EPQSFKPSXVFET----RCARFQRK-----	442
84A20_M.sativa_	NCWE-EPESFKPSRFLK----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	462
84A19_M.sativa_	NCWD-EPESFKPSRFLK----GVPDFKGSNFEFIPFGSGRRSCPGMQLG	462
84A21_soybean_	NSWE-EPETFKPARFLK----GVPDFKGSNFEFIPFGSGRRSCPGMVLG	463
84A18_M.truncatula	DSWE-DPEEFRPSRFLDS----SAPDFKGSNFEFIPFGSGRRSCPGMQLG	454
84A28_papaya	SAWV-DPDDVFRPSRFLLEE----GAPDFKGSNFEFIPFGSGRRSCPGMQLG	447
84A29_papaya	SSWV-DPDDFRPTRFLEE----GAPDFKGTNFEFIPFGSGRRSCPGMQLG	457
84A12_poplar	NAWE-DPDKFNPSRFLDG----KAPDFRGMDFEFLPFGSGRRSCPGMQLG	463
CYP84A30_gi 147799011 emb CAN7	TAWE-DPETFKPERFLK----DAPDFKGSNFEFIPFGSGRRSCPGMQLG	458
84A30_vitis	TAWE-DPETFKPERFLK----DAPDFKGSNFEFIPFGSGRRSCPGMQLG	458
84A32v1_vitis	TAWE-DPETFKPERFLK----DAPDFKGSNFEFIPFGSGRRSCPGMQLG	459
84A4_Arab	NSWS-DPESFNPRFLNP----IAPDLKGNFEFVPPFGSGRRSCPGMQLG	427
84A7_rice	VLWGTDAAFRPSRFADES---ARVEFKGGDFQYLPFGSGRRSCPGMQLG	460

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84A5_rice	LYALELAVARLAHGFNWSLPDGMKPSELMSDI	FGLTAPRA	TRLSAVATP	523
84A33_Zea_BT041447	LYALELAVAQLAHAFNWSLPDGMKPSEMDMGDI	FGLTAPRA	TRLYAVPTP	525
84A6_rice	MYELELVVARLVHAFGWAPPGGVAPEELDMADG	FGLTAPRA	ARLRVPTP	503
84A23_Brassica_	LYALELAVAHILHCFTWKLPDGMKPSELMSDV	FGLTAPKA	TRLYAVPST	514
84A24v1_Brassica	LYALELAVAHILHCFTWKLPDGMKPSELMSDV	FGLTAPKA	TRLYAVPCT	514
84A25_Brassica	LYALELAVAHILHCFTWKLPDGMKASELDMND	VFGLTAPKA	TRLFVAVPST	507
84A1_Arab.	LYALDLVAHILHCFTWKLPDGMKPSELDMND	VFGLTAPKA	TRLFVAVPTT	514
84A26_papaya	LYALELGVAHLLHCFTWSLADGMKPSELDMND	VFGLTAPRA	TRLMVAVPSS	511
84A27_papaya	LYALELGVAHLLHCFSWSLPDGMKPSELMSD	VFGLTAPKA	TRLMVAVPSS	497
84A2_tom	LYALEMAVAHLLHCFTWELPDGMKPSELNMD	MFGLTAPRA	ANRLVAVPTP	514
84A14v1_tobacco	LYALEMAVAHLLHCFTWELPDGMKPSELKMD	IFGLTAPRA	ANRLVAVPTP	518
84A9_Centaurium_	LYALEVAVAHLLHCFTWELPDGMKPSELMD	GVFGLTAPRA	SRLVAVPSP	512
84A15_Camptotheca_	LYALEMAVAHLLHCFTWTLPDGMKPSELDT	DDVFGLTAPRA	TLFVAVPSP	507
84A3_Liquidambar	LYALETTVAHLLHCFTWELPDGMKPSELE	MNDVFGLTAPRA	IRLTAVPSP	504
84A31_vitis	LYALELAVVHLLHCFTWELPDGMKPSELMD	MGDVFGLTAPRA	TRLVAVPSP	507
84A10_poplar	LYALDLVAHLLHCFTWELPDGMKPSELMD	TDMFGLTAPRA	TRLVAVPRK	507
84A11_poplar	LYTLDLVAHLLHCFTWELPDGMKPSELMD	TDMFGLTAPRA	TRLVAVPSK	508
84A16_Broussonetia_	LYALELTVGHLLHCFTWNLPDGMKPSELMD	MNDVFGLTAPRA	TRLVAVIPTK	508
84A17_M.truncatula	-----			
84A20_M.sativa_	LYALDLVAHLLHCFTWELPDGMKPSEMD	MSDVFGLTAPRA	SRLIAIPTK	512
84A19_M.sativa_	LYALDLVAHLLHCFTWELPDGMKPSEMD	MSDVFGLTAPRA	SRLIAIPTK	512
84A21_soybean_	LYALELVAHLLHCFTWELPDGMKPSEMD	MGDVFGLTAPRA	STRLIAVPTK	513
84A18_M.truncatula	LYALDLALAHLLHCFTWELPNGMRASEMD	TSDVFGLTAPRA	SRLIAVPAK	504
84A28_papaya	LYALDLTVAHLLHCFNWELPDGQKPS	ELNMDDVFGLTAPRA	SQLVAVPSS	497
84A29_papaya	LYAVDLTVAHLLHCFNWELPDG	-----		479
84A12_poplar	LYALELVAHLLHCFNWELPHGMKPAEL	MNDVFGLTAPRA	VRLVAVPTY	513
CYP84A30_gi 147799011 emb CAN7	LYGLDLAVGHLVHCFSWELPDGMKASDL	MSDVFGLTAPRA	IQLIAVPTY	508
84A30_vitis	LYGLDLAVGHLVHCFSWELPDGMKASDL	MSDVFGLTAPRA	IQLIAVPTY	508
84A32v1_vitis	LYGLDLVAHLLVHCFSWELPDGMKASDL	MSDLFGLTAPRA	IQLVAVPTY	509
84A4_Arab	LYAFELVAHLLHCFTWSLPGMNP	GDVDVTEGPGLTVPKA	IPLVAVPTT	477
84A7_rice	MFAVELGLAELLHCFTDWSLPAGTEPLE	LDMDVFGLTAPKA	ERLCAVPSP	510

84A5_rice	RLTCPLY--	530
84A33_Zea_BT041447	RLNCPLY--	532
84A6_rice	RLTCPM---	509
84A23_Brassica_	RLICSV---	520
84A24v1_Brassica	RLICSV---	520
84A25_Brassica	RLICAV---	513
84A1_Arab.	RLICAL---	520
84A26_papaya	RLICPLH--	518
84A27_papaya	RLICPLY--	504
84A2_tom	RLLCEIY--	521
84A14v1_tobacco	RLLCPLY--	525
84A9_Centaurium_	RLLCPLY--	519
84A15_Camptotheca_	RLLCPLY--	514
84A3_Liquidambar	RLLCPLY--	511
84A31_vitis	RLECPLS--	514
84A10_poplar	RVVCPL---	513
84A11_poplar	RVLCPL---	514
84A16_Broussonetia_	RVVCTI---	514
84A17_M.truncatula	-----	
84A20_M.sativa_	RVLCPLD--	519
84A19_M.sativa_	RVLCPLD--	519
84A21_soybean_	RVVCPLF--	520
84A18_M.truncatula	RVVCPL---	510
84A28_papaya	RLSCP----	502
84A29_papaya	-----	
84A12_poplar	RLNCPL---	519
CYP84A30_gi 147799011 emb CAN7	RLQCILLE-	516
84A30_vitis	RLQCILLE-	516
84A32v1_vitis	RLQCPLLE-	517
84A4_Arab	RLLCPIVVS	486
84A7_rice	RLSCPLL--	517

1	Family	Ara	Pap	Gra	Pop	Rice	Moss	41	Family	Ara	Pap	Gra	Pop	Rice	Moss
2	51	1	1	2	2	10	1	42	707	4	5	5	7	3	0
3	71	52	12	24	25	84	0	43	708	4	0	0	0	0	0
4	72	9	9	22	6	13	0	44	709	3	0	1	1	9	0
5	73	1	2	3	3	3	4	45	710	4	1	1	1	4	2
6	74	2	2	7	6	4	3	46	711	1	1	1	2	5	0
7	75	1	2	11	3	3	0	47	712	2	2	2	9	0	0
8	76	8	3	24	13	29	0	48	714	2	1	6	6	5	0
9	77	5	2	2	3	2	0	49	715	1	1	1	2	1	0
10	78	6	3	7	10	8	3	50	716	2	1	15	17	0	1
11	79	7	3	9	4	4	0	51	718	1	1	0	1	0	0
12	80	0	3	6	6	0	0	52	720	1	1	1	1	0	0
13	81	18	12	21	28	12	0	53	721	1	1	5	6	2	0
14	82	5	2	34	10	0	0	54	722	1	2	1	1	1	0
15	83	1	1	0	5	0	0	55	723	0	0	0	0	2	0
16	84	2	4	3	3	3	0	56	724	1	2	2	2	1	0
17	85	2	2	2	3	1	0	57	727	0	1	1	2	1	0
18	86	11	5	6	8	5	2	58	728	0	2	6	7	11	0
19	87	1	2	7	12	11	0	59	729	0	5	0	1	2	0
20	88	2	6	2	2	1	0	60	733	0	1	1	1	1	0
21	89	7	1	14	10	14	0	61	734	1	1	2	2	4	0
22	90A	1	1	1	2	2	0	62	735	1	1	1	2	2	0
23	90B	1	1	1	2	1	0	63	736	0	3	8	6	0	0
24	90C	1	1	1	1	0	0	64	746	0	0	0	0	0	1
25	90D	1	1	1	2	2	0	65	749	0	0	0	9	0	0
26	92	0	1	6	8	9	0	66	751						1
27	93	1	4	4	4	3	0	67	752						1
28	94	6	5	9	13	18	2	68	753						2
29	96	13	2	5	9	12	0	69	754						2
30	97A	1	1	1	1	1	1	70	755						1
31	97B	1	1	1	1	1	1	71	756						2
32	97C	1	1	1	1	1	1	72	757						1
33	98	3	1	1	5	2	1	73	758						11
34	99	0	0	0	0	2	0	74	759						1
35	701	1	3	1	1	5	1	75	760						2
36	702	6	0	0	0	0	0	76	761						6
37	703	1	1	1	1	1	3	77	762						1
38	704	3	3	6	6	7	6	78	763						3
39	705	26	0	0	0	0	0	79	765						1
40	706	7	5	9	5	4	0	80	766						3
81	73 FAMILIES	245	142	315	310	332	71								

Supplementary Table 1. Numbers of Cytochrome P450 genes in six complete genomes sorted by family and in the cases of CYP90 and CYP97 by subfamily. This tally does not include pseudogenes. Line 81 provides the organism totals. Ara Arabidopsis, Pap papaya, Gra grape, Pop poplar.

Supplementary Table 2

All Cytochrome P450 genes and pseudogenes in, Arabidopsis, rice, poplar, papaya, grape and moss

Arabidopsis is shown in black, rice in red, poplar in blue, papaya in orange, grape in green and moss in purple

The pseudogenes end in several conventions:

-de for detritus exon near the parent gene,

-se for solo exon not associated with a parent gene.

-un for pseudogenes unassigned to a specific subfamily.

The capital P on the end of a gene indicates a more complete pseudogene, not just one or two exons.

There are 310 unique named cottonwood P450s. In addition to these there are 52 probable alleles with slightly different sequences to these 310. The alleles are marked as v1, v2, v3 etc. on the end of the names. Some of these might be due to sequence errors on duplicated contigs. 13 of the 310 sequences are incomplete, with part of the sequence in a sequence gap or split into non-overlapping contigs. [71D27, 71D44, 71D28, 76T4, 80C2, 81B10, 81S2, 82C8, 89A25, 98A26, 72D2, 714E2, 716C3]

13 poplar sequences have a duplicate seq on another contig that is 100% identical or has just one or two amino acid differences. These 13 are [71B40v1, 71B40v2, 71D22v1, 71D22v2, 71D29v1, 71D29v2, 71D38v1, 71D38v2, 71D40Pv1, 71D40Pv2, 74C6v1, 74C6v2, 74C7v1, 74C7v1, 85A1, 85A1P, 98A25v1, 98A25v2, 704A12, 704A12P, 705B4Pv1, 705B4Pv2, 711A7v1, 711A7v2, 715A2v1, 715A2v2] many of these have one partner on a high numbered scaffold. These scaffolds are less reliable and may be haplotypic to the genome assembly i.e. alleles.

CYP72D2 has two entries because one entry has exon 1 and the other has exons 2-5. We believe this is one gene, but cannot prove it yet.

The sum of 310 genes + 203 pseudogene sequences + 52 possible alleles + One extra entry for 72D2 = 566 P450 Sequences found in the Populus genome data.

Arabidopsis synonyms	ATG number	Rice	Populus	Papaya	Grape	Moss
CYP51G1 CYP51A2	At1g11680	CYP51G1	51G1	51G1	51G1	51G1
CYP51G2P CYP51A1	At2g17330	CYP51G3	51G5		51G6	
		CYP51G4P			51G7P	
		CYP51H1				
		CYP51H2P				
		CYP51H3				
		CYP51H4				
		CYP51H5				
		CYP51H6				
		CYP51H7				
		CYP51H8				
		CYP51H9				

CYP71A12	At2g30750		
CYP71A13	At2g30770		
CYP71A14	At5g24960		
CYP71A15	At5g24950		
CYP71A16	At5g42590		
CYP71A17P			
CYP71A18	At1g11610		
CYP71A19	At4g13290		
CYP71A20	At4g13310		
CYP71A21	At3g48320		
CYP71A22	At3g48310		
CYP71A23	At3g48300		
CYP71A24	At3g48290		
CYP71A25	At3g48280		
CYP71A26	At3g48270		
CYP71A27P	At4g20240a		
CYP71A28	At4g20240b		
CYP71B2	At1g13080		
CYP71B3	At3g26220		
CYP71B4	At3g26280		
CYP71B5	At3g53280	71B38	71B46
CYP71B6	At2g24180	71B39P	71B47
CYP71B7	At1g13110	71B40v1	71B48
CYP71B8	At5g35715	71B40v2	71B49
CYP71B9	At2g02580	71B41	71B50P
CYP71B10	At5g57260	71B41-delb	71B51P
CYP71B11	At5g25120	71B42P	71B52P
CYP71B12	At5g25130	71B43P	71B53P
CYP71B13	At5g25140	71B44P	71B54P
CYP71B14	At5g25180	71B45P	71B55
CYP71B15 PAD3	At3g26830		71B56P
CYP71B16	At3g26150		71B57
CYP71B17	At3g26160		71B58P
CYP71B18			71B59
CYP71B19	At3g26170		71B60P
CYP71B20	At3g26180		71B61P
CYP71B21	At3g26190		71B62P
CYP71B22	At3g26200		
CYP71B23	At3g26210		
CYP71B24	At3g26230		
CYP71B25	At3g26270		
CYP71B26	At3g26290		
CYP71B27	At1g13070		
CYP71B28	At1g13090		
CYP71B29	At1g13100		
CYP71B30P	At3g53290		
CYP71B31	At3g53300		

CYP71B32
CYP71B33
CYP71B34
CYP71B35
CYP71B36
CYP71B37
CYP71B38

At3g53305

At3g26300
At3g26310
At3g26320
At3g26330
At3g44250

CYP71C12
CYP71C13P
CYP71C14P
CYP71C15
CYP71C16
CYP71C17
CYP71C18P
CYP71C19
CYP71C20
CYP71C21
CYP71C22P
CYP71C23P
CYP71C32
CYP71C33

71D22
71D22P
71D23P
71D24P
71D25Pv1
71D25Pv2
71D26
71D27
71D28v1
71D28v2
71D29v1
71D29v2
71D29-se1[1]
71D29-se2[1]
71D29-se3[1]
71D30P
71D31P
71D32P
71D33P
71D34
71D35P
71D36Pv1
71D36Pv2
71D36Pv3
71D37P
71D38v1

71D38v2
71D38v2-de2b
71D38v2-de2c
71D39
71D40Pv1
71D40Pv2
71D41
71D42
71D43
71D44
71D45P
71D46P
71D53P

CYP71E4
CYP71E5
CYP71E6
CYP71K1
CYP71K2P
CYP71K3
CYP71K4
CYP71K5
CYP71K6
CYP71K7P
CYP71K8
CYP71K9
CYP71K10
CYP71K11
CYP71K12
CYP71K13P
CYP71P1
CYP71P2P
CYP71Q1
CYP71Q2
CYP71Q3P
CYP71Q4P
CYP71R1
CYP71R2P
CYP71R3
CYP71S1
CYP71S2
CYP71T1
CYP71T2
CYP71T3
CYP71T4
CYP71T5
CYP71T7
CYP71T10P

CYP71U1P
CYP71U2
CYP71U3
CYP71V1P
CYP71V2
CYP71V3
CYP71V4
CYP71V5
CYP71V6P
CYP71W1
CYP71W2P
CYP71W3
CYP71W4
CYP71W5P
CYP71W6P
CYP71X1P
CYP71X2
CYP71X3
CYP71X4
CYP71X5
CYP71X6P
CYP71X7
CYP71X8
CYP71X9P
CYP71X10
CYP71X11
CYP71X12
CYP71X13P
CYP71X14
CYP71X15
CYP71X16
CYP71Y1P
CYP71Y2P
CYP71Y3
CYP71Y4
CYP71Y5
CYP71Y6
CYP71Y7
CYP71Y8
CYP71Y9P
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CYP71Z4
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CYP71Z7

CYP71Z8
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CYP71AA5
CYP71AB1
CYP71AB2
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CYP71AC1
CYP71AC2
CYP71AC3P
CYP71AC5P
CYP71AC6P
CYP71AC7P
CYP71AD1
CYP71AF1
CYP71AG1
CYP71AG2P

CYP71AK1
CYP71AK2

CYP71AN1 71AN6
CYP71AN2v1 71AN7
CYP71AN2v2 71AN8P
CYP71AN3
CYP71AN4
CYP71AN5
CYP71AP1
CYP71AP2v1
CYP71AP2v2
CYP71AP3
CYP71AP4
CYP71AQ1
CYP71-un1
CYP71-un2
CYP71-un3
CYP71-un4
CYP71-un5

71AH4
71AH5P

71AP5

71AS3
71AS3-delb
71AS4
71AS5
71AS5-delb
71AS6v1

	71AS6v2
	71AS7v1
	71AS7v2
	71AS8P
	71AS9P
	71AS10P
	71AS11P
	71AS12P
	71AT3
	71AT4
	71AT5P
	71AT6P
	71AT7
	71AT8
	71AT9
	71AT10Pv1
	71AT10Pv2
	71AT11P
	71AU3
	71AU4
	71AU5
	71AU6P
	71BC1
	71BC1-de2b
	71BC2
	71BC2-de1b
	71BC2-de1c
	71BC2-de1d
	71BC2-de2b
71BE2	71BE1
71BE3P	71BE4P
	71BE5
	71BE6
	71BE6-de1b
	71BE7
	71BE8P
	71BE9Pv1
	71BE9pv2
	71BE10v1
	71BE10v2
	71BE11
	71BE11-de1b
	71BE12
	71BE13
	71BE13-de2b
	71BE14P
	71BE15P

					71BF1	71BE16P
					71BF2	
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CYP72A8	At3g14620	CYP72A18		CYP72A42v2	72A74	72A85
CYP72A9	At3g14630	CYP72A19		CYP72A42v3	72A75	72A86P
CYP72A10	At3g14640	CYP72A20		CYP72A42v4	72A76P	72A86P- <i>ie5b</i>
CYP72A11	At3g14650	CYP72A21		CYP72A42- <i>de5b</i>	72A77P	72A87
CYP72A12P		CYP72A22		CYP72A43	72A78P	72A87- <i>de1b</i>
CYP72A13	At3g14660	CYP72A23		CYP72A44	72A79	72A88
CYP72A14	At3g14680	CYP72A24		CYP72A44- <i>de5b</i>	72A80P	72A89
CYP72A15	At3g14690	CYP72A25		CYP72A44- <i>de5c</i>	72A81	72A90
		CYP72A31P		CYP72A44- <i>de5d</i>	72A82	72A91P
		CYP72A32		CYP72A45P1	72A83	72A92
		CYP72A33		CYP72A45P2		72A93
		CYP72A34		CYP72A46P1		72A94P
		CYP72A35		CYP72A46P2		72A95
		CYP72A36P		CYP72A47		72A96
		CYP72A37P		CYP72A48P		72A97P
		CYP72A38P		CYP72A49P		72A97P- <i>ie5b</i>
				CYP72A50P		72A98
						72A99
						72A100P
						72A101P
						72A102P
						72A103
						72A104P
						72A105
						72A106P
						72A107
						72A108
						72A109
						72A110
						72A111P
						72A112P
						72A113
						72A114P
						72A115P
						72A116P
						72A117P
						72A119P
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					72C3	
					72C4P	
				CYP72D1		72D3
				CYP72D2		72D4
						72D5

CYP73A5 C4H, CA4H	At2g30490	CYP73A35P CYP73A38 CYP73A39 CYP73A40	CYP73A42 CYP73A43 CYP73A44 CYP73A45P	73A79 73A80	72D6 72D7P 73A78 73A81 73A82	73A48 73A49 73A50 73A51 73A52P 73A53P 73A54P
CYP74A1 AOS	At5g42650	CYP74A4 CYP74A5 OsAOS	CYP74A1 CYP74A7	74A12	74A1 74A13 74A14 74A15 74A16 74A17 74B13	74A1 74A8
CYP74B2 HPL	At4g15440		CYP74B7 CYP74C6v1 CYP74C6v2 CYP74C6v3 CYP74C7v1 CYP74C7v2 CYP74C8	74B14		
		CYP74E1 CYP74E2 CYP74E3P CYP74F1 CYP75A11				74G1
			CYP75A12 CYP75A13	75A30	75A28 75A28-de2b 75A32P 75A33 75A34 75A35 75A36 75A37P 75A38v1 75A38v2 75A38v3 75A39Pv1 75A39Pv2 75A40P 75A41 75A42 75A43	
CYP75B1 TT7 F3'H	At5g07990	CYP75B3 CYP75B11	CYP75B12	75B37	75B32v1 75B32v2 75B38	

CYP76M1
CYP76M2
CYP76M3P
CYP76M4P
CYP76M5
CYP76M6
CYP76M7
CYP76M8
CYP76M9
CYP76M10
CYP76M11P
CYP76M12P
CYP76M13
CYP76M14
CYP76N1P
CYP76N2
CYP76N4P
CYP76P1
CYP76P2
CYP76P3
CYP76P4P
CYP76P6
CYP76Q1
CYP76Q2

CYP76T1
CYP76T2
CYP76T3
CYP76T4
CYP76T5
CYP76T6

76T7P
76T7P-de2b
76T8P
76T8P-de2b
76T8P-de2c
76T9P
76T10
76T11
76T12
76T12-de2b
76T12-de2c
76T12-de2d
76T13P
76T14P
76T15
76T15-de3b
76T16
76T17
76T17-de3b
76T18
76T19
76T20
76T20-de1b

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		CYP76U1 CYP76V1				
					76Y1 76Y2 76Y3 76Y4P 77A14	
CYP77A4 CYP77A5P CYP77A6 CYP77A7 CYP77A8P CYP77A9 CYP77B1	At5g04660 At3g10570 At3g10560 At5g04630 At1g11600	CYP77A9	CYP77A10 CYP77A11P	77A15		
		CYP77B2	CYP77B3 CYP77B4	77B7	77B6	
CYP78A5 CYP78A6 CYP78A7 CYP78A8 CYP78A9 CYP78A10	At1g13710 At2g46660 At5g09970 At1g01190 At3g61880 At1g74110	CYP78A11 PLA1	CYP78A18 CYP78A19 CYP78A20 CYP78A21v1 CYP78A21v2 CYP78A22 CYP78A23 CYP78A24 CYP78A25 CYP78A26P	78A33 78A34 78A35	78A36 78A37 78A38 78A39 78A40 78A41 78A42	78A27 78A28
		CYP78B4 CYP78B5 CYP78B6 CYP78C5 CYP78C6 CYP78C7 CYP78D1				
			CYP78D2 CYP78D3v1 CYP78D3v2 CYP78D-se1[2]			
CYP79A2 CYP79A3P CYP79A4P	At5g05260 At5g35917 At5g35920	CYP79A7 CYP79A9 CYP79A10 CYP79A11				78E1
					79A15 79A16P 79A17 79A18P 79A18P-delb 79A19 79A20P	

			79A21v1
			79A21v2
			79A22P
			79A23
			79A23-de2b
			79A24
			79A25
			79A26
			79A27
			79A27-delb
			79A28P
			79A29P
			79A30P
			79A31P
			79A-se1[3]
			79A-se2[3]
CYP79B2	At4g39950	79B6	
CYP79B3	At2g22330	79B7	
CYP79B4P		79B8	
CYP79C1	At1g73370		
CYP79C2	At1g58260		
CYP79C3P			
CYP79C4P			
CYP79C5P	At1g58265		
		CYP79D5	
		CYP79D6v1	
		CYP79D6v2	
		CYP79D7	
		CYP79D8	
		CYP79D9P	
CYP79F1	At1g16410		
CYP79F2	At1g16400		
		CYP80C1	
		CYP80C1-se[1]	
		CYP80C2	
		CYP80D1	
		CYP80D1-se[1]	
		CYP80D2	
		CYP80E1	80E3
		CYP80E2	80E4
			80E5
		80J1	
		80J2	
		80J3	
			80K1
			80K2
			80K3

CYP81A5
CYP81A6
CYP81A7
CYP81A8

CYP81B3v1 81B19 81B26
CYP81B3v2 81B20 81B27
CYP81B4 81B21 81B28P
CYP81B5 81B22 81B29
CYP81B6 81B23 81B30
CYP81B6P 81B24 81B31
CYP81B7 81B32
CYP81B8P1 81B33P
CYP81B8P2 81B34
CYP81B9P 81B35P
CYP81B10
CYP81B11
CYP81B12
CYP81B12-de2b
CYP81B13P
CYP81B-se1[2]
CYP81B-se2[1]
CYP81B-se3[1]
CYP81C3
CYP81C4
CYP81C5

CYP81D1 CYP91A1	At5g36220
CYP81D2	At4g37367
CYP81D3	At4g37340
CYP81D4	At4g37330
CYP81D5	At4g37320
CYP81D6	At2g23220
CYP81D7	At2g23190
CYP81D8	At4g37370
CYP81D10	At1g66540
CYP81D11	At3g28740
CYP81F1 CYP91A2	At4g37430
CYP81F2	At5g57220
CYP81F3	At4g37400
CYP81F4	At4g37410
CYP81G1	At5g67310
CYP81H1	At4g37310
CYP81K1	At5g10610
CYP81K2	At5g10600

81D14P
81D15P
81D16
81D17P
81D18
81D19
81D20
81D21

81K3

CYP81L2
CYP81L3
CYP81L4
CYP81L5

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CYP81S10P
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CYP728F1-se2[3:4]v1

CYP728F1-se2[3:4]v2

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CYP734A1 BAS1, CYP72B1	At2g26710	CYP733A1 CYP734A2 CYP734A3P CYP734A4 CYP734A5 CYP734A6 CYP735A3 CYP735A4	CYP733A1 CYP734A9 CYP734A10	729A17 729A17dup 733A1 734A14	733A1 734A13 734A15
CYP735A1 CYP709A1 CYP735A2 CYP709A2	At5g38450 At1g67110	CYP735A3 CYP735A4	CYP735A5 CYP735A6 CYP736A3v1 CYP736A3v2 CYP736A4v1 CYP736A4v2 CYP736A5v1 CYP736A5v2 CYP736A6P1 CYP736A6P2 CYP736A7P1 CYP736A7P1-de2b CYP736A7P2 CYP736A8v1 CYP736A8v2 CYP736A8v3 CYP736A8v4 CYP736A9 CYP736A10Pv1 CYP736A10Pv2 CYP736A11 CYP736A-se1[1] CYP736A-se2[1] CYP736A-se3[2] CYP736A-se4[1] CYP736A-se5[1] CYP736A-se6[1]	735A11 736A14 736A15 736A16	735A12 736A17 736A18P 736A19P 736A20P 736A21 736A21-delb 736A22 736A23 736A24P 736A25v1 736A25v2 736A25v3 736A26 736A27
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