

Fatehi et al. 2023. Characterization of Iflavirus in the Red Flour Beetle, *Tribolium Castaneum* (Tenebrionidae; Coleoptera).

Supplementary data S4. Sequence alignment iflaviruses, TcIV, DWV, SBPV, and DsLJV

AUE23905 TcIV	1	-MESLSSNVSVFQVEVKALFKKQKLVINLAAENAEMKSLRETRKI-YASCD
ATG71380 DWV	1	-MAFSCGTLSSY-----SAVAQAPSVAHAPRT-WEVDE
YP_003622540 SBPV	1	-MEHTPLLSF-----PITLLDHC GGNRKIHWTRCY
QVD33034 DsLJV	1	MQSFVEGIHNMEQ-----LDNGRIKRSKHIPKGFKPICN
AUE23905 TcIV	49	DDLLQSI LRFPSRKAALDHVDLEILKLRFKINAKLHSCSSKIDKVLWYFF
ATG71380 DWV	31	A-----RRRRVIKRLALEQERMNVLDADVY-----
YP_003622540 SBPV	31	E-----
QVD33034 DsLJV	35	R-----
AUE23905 TcIV	99	VNDKLDQLDLFKHPVTRNNLPYCQFRVKQFLA---IRKKYCKKTYDISEQ
ATG71380 DWV	56	-----YQATWEQEDARDNEFLM---EQLNNLYTIYSIAER
YP_003622540 SBPV	31	-----QKYWLPFSCCKVASRLPCVNVRSSYMWYSKKQSKW
QVD33034 DsLJV	35	-----QYETCKDES-----GRGYINISFKPLDN
AUE23905 TcIV	146	YLYNQEMNARKYSKKQKSFVPTKQYYTRVPLSSVS--SSINRFEVLEENIE
ATG71380 DWV	88	-----CTRRPIKECSPISVSNRFAPLESK
YP_003622540 SBPV	66	-----IYLSSEDFRACK-AGIYKRREEQEKEK
QVD33034 DsLJV	58	-----TDSRETLACALERFARLRLKRKSNR
AUE23905 TcIV	194	LPEPQQDSIIEDDPMYRFHAALFRNGQEISVQLGRHRLDYSNVSYDVQRP
ATG71380 DWV	114	VEVGQEAS-----ECMFKKPKYTRVCKKVKRVTTFRVREKVVRP
YP_003622540 SBPV	93	L-----WSELCDICSWECEYYKFRDQR-
QVD33034 DsLJV	84	VNRPNLTALFND-----WVCGVITILEKQTSRAQERHNNQQG
AUE23905 TcIV	244	YQPTVIPRPVDLWGRLLRERLALRELRLPTVFSPFKMFKNWFMPRDNYFE
ATG71380 DWV	152	----MCSRSPMLLFKLLKKIYDLHLRYLRKQIRLLR-----
YP_003622540 SBPV	115	-----LLLLLRKKIADKAQCRCRTNCKLVTIKHGYVR-----
QVD33034 DsLJV	119	DRTRYVERNTYVLQFMDGML-----RVNCSFKSFK-----FR-----
AUE23905 TcIV	294	AWIKFHIKEGHQE-YEMFVI-----DPCVEALPEMDT--ADAHGEGTL
ATG71380 DWV	184	-----RQKQRE-YELECVT SRLQLSDPVQAK-PEMDNPNPGPDGEV
YP_003622540 SBPV	147	-----RVKTIEPCAEIELTNAETFGSNL DFAQPEMDR--PEGSEERTV
QVD33034 DsLJV	150	-----NLQEII-YEAIIM-----ELLSIPQPQMED--DGGQGD TTQ
		(LP-VP2 cleavage site)
AUE23905 TcIV	334	QTSQASNNVLTENREDSREVTADFQVTTWKDLCSSFAANYDVNVDRWIL
ATG71380 DWV	226	ELEKDSNNVLT TQRDPST SIPAPVSV-KWSRWTSNDVDDYATITSRWYQ
YP_003622540 SBPV	189	QT---SNVVLGETNIESQDIASKEYSPTWDRLASSEVSDEY PMLTDRWLF
QVD33034 DsLJV	184	DSDKAGNTIITRDADQSVAKEEGIAIPQLISICSTEPMHQFESITNRWMA
AUE23905 TcIV	384	INLFEWTTAS-TQGALLKSYLP---LHMVKKEVVT--CRMPNTLPFTI
ATG71380 DWV	275	IAEFVWSKDD-PFDKELARLILPRALLSSIEANSDAI--CDVPNTIPFKV
YP_003622540 SBPV	236	WKSVKWEVNDSAFGKMLVQEKFPQSWVQMDVNVNNIPRYTNIPNFIPFNI
QVD33034 DsLJV	234	LPSIEVKTSD-AFNITLQTYNLP----SFLYSENTAP-----NMMPFEN
AUE23905 TcIV	428	HRYWRGDLEIKIHINANKFQIGSLQCSWYSPNLDAKIDKRLNLWTQSOA
ATG71380 DWV	322	HAYWRGDMEVRVQINSNKFQVQQLQATWYSDHENLNISSKRSVYGFSSQM
YP_003622540 SBPV	286	HQYMRADFVKIYVNPND FVSGWLIMAFLYQGSEMFYKLRNPAALMQM
QVD33034 DsLJV	273	FMFGKYDIWFKFVVNANKFHVGVKVLASVKYDSYQID--TLRNSLPALVSR
AUE23905 TcIV	478	HHVIINASTSNEVTMVVPYKYHLPYLHTK--PRGDM----PSPPLNLGTL
ATG71380 DWV	372	DHALISASASNEAKLVIPFKHVYPFLPTRIV--DW----TTGILDMGAL
YP_003622540 SBPV	336	PHVLVNVGAANEATLKIPYRYVRPFMRCKDILRGDNLITGVTEPLNMGVL
QVD33034 DsLJV	321	PHVMDLAANNEGMLCVPFKYHRTFVRNASLANSQY----GSKAAQYASV
AUE23905 TcIV	522	YIRVLNPLTTSV--NGPTRANVSFVRSFNNEFTGMLSGDIDKI-EDMPY
ATG71380 DWV	416	NIRVIAPLRMSA--TGPTTCNVVVFIKLNNSEFTGTSSGKFYAS-QIRAK
YP_003622540 SBPV	386	FVEVLIPFRTSAASSAPKSLDVSLFVKMTNAKFTGMV DGSIALLSKPIAL

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QVD33034	DsLJV	367	VLSIMSPLAAAV--GAPSNMYIRPFAIAKKASFTGMSY-KIPVW-QMETA
AUE23905	TcIV	569	PEMDRILDVTAGVLNMLHPDNNRDNPNNRPPQMLVPTASHWSVGTGMA
ATG71380	DWV	463	PEMDRILNLAEGLLNNTIGGNNMDNPSYQQSPRHFVPTGMHSLALGTNLV
YP_003622540	SBPV	436	PEMDRILDNGLGVVSKLLKDVNCDNPPDPTPAKFFVPIPSHSHWAGTNTS
QVD33034	DsLJV	413	GAVVSMLDKGLKICGAI---KNMDKPYDDQRVQQVILRPRMNFQTGVGAS
			(VP2-VP4 cleavage site) (VP4-VP3 cleavage site)
AUE23905	TcIV	619	EPIHPLRLDGRGQTPHPPGIE-VNNEIERTISRVFGLLETITWTNNHL-
ATG71380	DWV	513	EPLHALRLDAAGTTQHPVGCA-PDEDMTVSSIASRYGLIRQVQWKKDHA-
YP_003622540	SBPV	486	EPTNTLRLDG-GVVGVRSDDIGTSDTAISGIIGVYGLLKPFOWNANDTG
QVD33034	DsLJV	460	DSV-PLRLDPLAQTTYLPDHEYPDDPTTVLDIAKIWGFAGAFWTKASST-
AUE23905	TcIV	666	---QQQVIWSADASFPRKNCHYTQPESDTSLGTYAIPPVGVLSMIFYGW
ATG71380	DWV	560	---KGSLLQLDADPFVQQRIEGTNPIS-----LYWFAPGVGVSSMFMQW
YP_003622540	SBPV	535	RNVGHHLLWSMPVHPQV-DKDQVIQVMTQSKLTQYVLPPIVSVSSLYAYT
QVD33034	DsLJV	507	---EGSELFNPIEPETWRNRDSWAGVPT-----PLEYISSMYQFW
AUE23905	TcIV	714	RGTIEFRFDVVASQFHTGRLIIAYIPGVTSTTP--ISFAQLRASTNMVFS
ATG71380	DWV	603	RGSLEYRFDIIASQFHTGRLIVGYVPGLTASLRQQMDYMKLKSSSYVFD
YP_003622540	SBPV	584	RGSIKYKFLFGNNPRHNARLLVAYIPGISDNR--LTLEARNSAHVFS
QVD33034	DsLJV	545	SGPLEVRLDFVSNAFHTGSIMLSAEFGRAST-----NVEQSGSTYTKVFH
AUE23905	TcIV	762	LQETDQFTFKVPFICNKPYWPREFAGDY--DRQNSAAPSR-----
ATG71380	DWV	653	LQESNSFTFEVPPVSYRPPWVRKYGGNY--LPSSTDAPST-----
YP_003622540	SBPV	632	LNEVSEFVFTVPYITDTMWWPRKYGGPQ--AAGEFVAPSY-----
QVD33034	DsLJV	590	LGNQKTVSFVIPYIYDTV-WRRTSTVPFVSVLRTNLDAARSQGISTMRAN
AUE23905	TcIV	799	---IYIAVLNQLIPMESVSQVYINVMYMRAGDDFELIVPVQPSIGLPYNT
ATG71380	DWV	690	---LFMYVQVPLIPMEAVSDTIDINVMYVRGGSSFVCPVPQPSLGLNWNT
YP_003622540	SBPV	669	---ICMFIINPLVAMESVPSIVTIVPMIAAGDDFEVAVPAQPAVGLSRNI
QVD33034	DsLJV	639	SSAFKVRVINKLVVQSVVQDIQVLVFIRAADTFTLHSPIMSNM---LNS
AUE23905	TcIV	847	KYLVTNNIKTQIVALSQYYPYSGTFEDFTEAQ--VFRWGTAHQIAH-F
ATG71380	DWV	738	DFILRND--EEYRAKTGYAPYYAGVWHSFNNSNSLVFRWGSASDQIAQ-W
YP_003622540	SBPV	717	DVIYPKD--SIISFKSGYFPVYVGSWHSFFDSTKAILRYGAVSDHIAQ--
QVD33034	DsLJV	686	EQVYA-----LQDFPGNYPLENVSELISKISLTDSVREPGAV--QVSHKW
AUE23905	TcIV	894	DDYNHSDTV-RATICTTTDSLKYTDDK-GTQQTITWAV-----FF
ATG71380	DWV	785	PTISVP----RGELAF-----LRIRDGKQAAVGTQPWRT-----MV
YP_003622540	SBPV	762	-LGNIPANVNRKAFWIVVGDITKFKT-KLDKINGTEWFIPEGEYTLGYGV
QVD33034	DsLJV	728	MKGQTPDQI-QNAILVTNEGTLSSNPDPHPLIDPKNVSTAPDSKIESGII
AUE23905	TcIV	933	NLPQ--LGYPVFGIP-CRSQAAATQLAINCQLKKKALNDPENTPYVLSNKKW
ATG71380	DWV	817	VWPSG-HGYNIGIP-TYNAERARQLAQHLYGGGSLTDEKAKQLFVPANQ-
YP_003622540	SBPV	811	VWRDGAYAYMVYPPLTPLGEEKIAQYTASLLASNTAISQ--IRPYIPDYI-
QVD33034	DsLJV	777	AAPNPASKYFWV---NSQGSRIT-----YNPSILPPDDYQHVVLPDFE-
AUE23905	TcIV	980	STSSNTYCTGNPVWTVYAVQPNTL-----AYAEGERG
ATG71380	DWV	863	-QGPGKVSNGNPVWEVMRAPLATQRAHVQDFE-----FID--AIPEGEES
YP_003622540	SBPV	857	--VDSAASKDNILWSPIEDRLRAQTE-----WVM--AEPEMERT
QVD33034	DsLJV	816	-----AKKDAYYWNRTARTTRYRYNRTYRTFDIGGGVWMDQPAFAQMDDG
			(VP3-VP1 cleavage site)
AUE23905	TcIV	1012	QAADLINIGSV-ASTMQGLSIYGENFFSLKDLRRYQLY--GVYNVTFTT
ATG71380	DWV	906	RNTTLDTTTILQSSGFGRAFFGEAFNDLKTLMRRYQLY--GQLLSVTT
YP_003622540	SBPV	893	FTPNVMQPTPLLPNTNDGRVTFGEAFNDLKDLPARRYQLYWEGTILEGNLR
QVD33034	DsLJV	861	VKEDTPTETFQIGTNRNNIQTVESHIRIKDILRR-PVCIVSHFNIPAYR
AUE23905	TcIV	1059	TSTQEYVK----IRFPAVPQGLALNIGTSANINEIFN--RCREGHIPIIA
ATG71380	DWV	954	DKNIDHCM----FTFPCLPQGLALDIGSAGSPHEIFN--RCRDGIIPLIA
YP_003622540	SBPV	943	AIRRNAL----VQLPLYPHGLRIQPDVN--NPIWN--IMRDGHIPVIS

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QVD33034 DsLJV	910	NVAAGATLSVNPFFV	PCLP	PPSHMITYG	TSA--NRIF	TPLIGR	SAH	THLLD				
AUE23905 TcIV	1103	SGYRFYRGSIR	FRLICDPKIASMI	VVQHRPDRRL	RYLNIQSQDKTDI	--D						
ATG71380 DWV	998	SGYRFYRGDLRYK	IVFPSNVNSNI	WVQHRPDRRL	LEGWSAAKIINCDAVST							
YP_003622540 SBPV	984	SGFRYFRGGLRLR	IVVEG-LNSCVW	VQHPDRPSIF	---SRPIIGRYIAA							
QVD33034 DsLJV	958	L-FRFRGRGSQRYSI	ISHRITGAPIY	AVYVPHSGAMNC	GTVTFLTVDLLDT							
AUE23905 TcIV	1151	GDSVMNHTYASYI	QLTRINGVIE	FVPPYYQLGMYGL	LQYPNVNEASDVGN							
ATG71380 DWV	1048	GQGVYNHGYASHIQ	ITRVNNVIELE	VPFYNATCYTYL	QAFNASSAAS--S							
YP_003622540 SBPV	1030	KDAYRNHAYAAAY	VQNMSVNRTIE	EVPPFYQPGLYG	MLNASDNNTANSFDR							
QVD33034 DsLJV	1007	NCPPSSFGLATE	VMIPSVNPTMSI	EVPYETENNWT	LMQCENWER----	N						
AUE23905 TcIV	1201	Y-YS-LGEIAVS	SMTMNTADIKS	FKNSLLSIYY	CMADDMSFSTF	QGFPPMI						
ATG71380 DWV	1096	YAVS-LGEISVG	FQATSDDIAT	IVNKPVTIYY	SIGDGMQFSQWVG	YQPPM						
YP_003622540 SBPV	1080	LRFTGLGDL	LIGIEGEQIPKE	GIE--ISVYYSI	ADDFSNIFCGF	PPMV						
QVD33034 DsLJV	1052	FSWRDHGDYN	VGHIVLWSEE	AFTCD---IFW	SAGDDFEIKNFL	GGPPV						
AUE23905 TcIV	1248	-----LTSEL	PLGTL-----	PSTLED	FILPEMEYANP---	EGLLDG						
ATG71380 DWV	1144	-----ILD	QLPAPVV-----	R-----	AVP-----	EGPIAK						
YP_003622540 SBPV	1127	-----YCD	ETYSAA-----	PD-LA	QYFEDEV	TIAQP---	EMMSM					
QVD33034 DsLJV	1098	APFSKFALSD	NHPSSQMED	FSPRERPS	LARSIYDRIST	PLACAGAAQIPV						
AUE23905 TcIV	1282	VKNGVRSIVS	-----	ESVQTTVKQ	AISEEM----	AKLD	DPYKKQ					
ATG71380 DWV	1165	IKNFF	-----	HQTAD	EVREVQAAK	MREDMGIVVQ	DVIGE					
YP_003622540 SBPV	1160	CQGFV	GS	LIGHHLQRAT	TYGIESAKES	IRDVVKDEF	KTQIKPELDNLNKV					
QVD33034 DsLJV	1148	IGTAV	ATGIGAYKL	GTTIANIE	DKVGETT	NNVNNLI----	HNADDLVSM					
AUE23905 TcIV	1316	IIEKL	-----	EVNVNES	IFKIV----	IECLHLSQ	SRSIQTICLVVIQ					
ATG71380 DWV	1199	LSQAIPDLQ	---	QPEVQANV	FSLV---	SQLVHAI	IGTSLKTVAWAIVS					
YP_003622540 SBPV	1210	IGEAANS	SIGASFGDIL	PQQLINAM	---	GQLMQV	FSNPSVALAIAIVT					
QVD33034 DsLJV	1193	IKQKIST	-----	GLNITNNI	YTA	VNGIIDL	LTNMGRWDFKAISLSILR					
AUE23905 TcIV	1354	VLLELKFI	IVDNLIGIQ	VLRAVTN-WLS	RSTSGE	VEDVADVP	VVVSPEA					
ATG71380 DWV	1241	IFVT	LGLIGREMMH	SVITVVKRLLEK-Y	HLATQPQES	ASSGTVISAV	PEA					
YP_003622540 SBPV	1256	FIGSIV	TLSMELVSTL	SDSLRIFLEK	VWY-RYFH	QATEQQA	AGASAMPEG					
QVD33034 DsLJV	1237	LIINTIN	VPLTSIASYI	PEFQNL	FRR-----	SPSAQ	AEDSIEQISES					
(VP1-Non-structural proteins cleavage site)												
AUE23905 TcIV	1403	LYTNFEV	KDWGPFV	GMLFTGV	TTALSLA	VAPPKSF	DT--FSKFLSKQI-P					
ATG71380 DWV	1289	--PNAE	AEESA	WWSIIYNG	VCNMLN	VAAQPKQ	FKD--WVKLATVDF-S					
YP_003622540 SBPV	1305	FWDEAD	DKSLHGIL	GMI	FSATCVSL	GLSMAPPK	QFPS--VMKGVKESL-N					
QVD33034 DsLJV	1279	FWNEQ	NIKDA---	FKLIC	SI	VGTAIG	AVLIAPSNLPTDIIKSILTAPFRT					
AUE23905 TcIV	1450	TVAKNF	VFISTF	VNSIVDLAKRM	MIRWIMHKVYP	QEA	WIDMRDDAGELKD					
ATG71380 DWV	1335	NNCRGS	NQVFVFF	FKNTFEVLK	KMWGYIFCQ	SNPAARLLK	AVNDEPEILKA					
YP_003622540 SBPV	1352	TA----	NASVTF	FRNVVDAIK	YMYTYCMG	ASDEEMRARI	IEEYPNLKH					
QVD33034 DsLJV	1326	TTVVL	ANGILRF	ADITFNI	IKQACLW	VASYFDP	PRVRIVQELRLQSPVIND					
AUE23905 TcIV	1500	WVDEV	LYLCS	LDMDTRLDE	DGYLYDRV	YACLLY	GREMAARYCG--NSDPK					
ATG71380 DWV	1385	WVKE	CLYLD	DPKFRM	RRAHDQ	EYIERVFAA	HSYGQILLHDLTAEMNQSRN					
YP_003622540 SBPV	1398	WCEE	VIQLD	PRSRNIVE	HDARQASRV	FDACIY	GAILQENLD--KSMPG					
QVD33034 DsLJV	1376	FMKE	SQILT	N	INRSAM	QLPA	FRL-RYWNVV	KAYEIQRRVIDLPRNAVS				
AUE23905 TcIV	1548	IHLFM	KVYDK	INDLYWK	MTAAGRHP	FVRKEP	FCIWMYGQPGIGKSFLTEH					
ATG71380 DWV	1435	LSVF	TRVYDQ	ISK	LKTDLMEMGS	NPYIRRE	CFTICMCGASGIGKSYLTDS					
YP_003622540 SBPV	1446	GKVI	YDLY	TRIVKL	RDDLIELGN	HPDVRFEAF	PVWIVGSAGIGKSYNTTE					
QVD33034 DsLJV	1425	PVLVR	MCADVI	KHGKEN	MADLRCS	P-VKY	E	PYVLVIHGPAGIGKSNLVTH				
AUE23905 TcIV	1598	ISSQL	LQHIK	-YK	VMVGP	KIFTV	MPACEFWTGCKNQ	PVLC	MDDAFSVSTGN			
ATG71380 DWV	1485	LCSE	LLRAS	R-TP	VTTGI	KCVVN	PLSDYWDQ	CD	FQ	PVLC	VDDMWSVETST	
YP_003622540 SBPV	1496	LCKR	ALQ	SIN-Y	RTKES	MIYWL	ALGQ	KYWN	GIRN	PPV	VAR	DEAYAV-SGO

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QVD33034 DsLJV	1474	LAKEMLAALGLTRFQSDPVHIRSAGSKHWNTYSDQPVVVVDDWLNITSPE
AUE23905 TcIV	1647	TMERQLNTMYMVKS PVT LNPPMADLKDKHLRYNPEIFYINSNIAFLN---
ATG71380 DWV	1534	TLDKQLNMLFQVHSPIVLSPPKADLEGKKMRYNPEIFYINTNKPFP---
YP_003622540 SBPV	1544	FTEEEISVHLAMCSSCILNPPMAALSEKNKRINPLIYYMNANCAFPS---
QVD33034 DsLJV	1524	LVASTLNELYQLKSCATFVPEQAIEDKKIKATPRLVILLCNNAYPDSVL
AUE23905 TcIV	1694	VPGLD-AAATHRRRDILIEAAIRDEGKQ-----PRDYPREVVKVF
ATG71380 DWV	1581	FDRIA-MEAIYRRRNVLIECRASEKKRGCKHCENDIPIAECSPKMLKDF
YP_003622540 SBPV	1591	IPEARHIGAIYRRRKILAEFDFTEETKR---TYPNVLDASELPPNARINN
QVD33034 DsLJV	1574	TNMVSCCKDAVYRRRELTVHCARKPEYEN-----RNLREMSDEESLSM
AUE23905 TcIV	1733	GHLKFRTHKDP RVPSTEDNMWSEWMSYEELITIMKTQYRTFYDQEKENYD
ATG71380 DWV	1630	HHIKFRYAHVC---NSETTWSEWMTYNEFLEWITPVYMANRRKANESFK
YP_003622540 SBPV	1638	NHLRIRVAHDPK---NVNTTWSEWMSFDEF SNHFCRKQEHMEAE RVNFR
QVD33034 DsLJV	1616	AHLLFRQDKGF---DSMNLSKKAVGYPEFKKFAIESFKEYDNQERRNVR
AUE23905 TcIV	1783	DRLATYHVIEDGQSEDQQRDDNNHIYSIGEISRRNHQRAID--EYTRAYN
ATG71380 DWV	1677	MRVDEMQLRMDEP-----LEGDNILNKYVE-----VN
YP_003622540 SBPV	1685	RRMDAAYAL---DPDYVPGSNLNYVDYELPLQTLHERYIYERELAREYL
QVD33034 DsLJV	1662	QRLDKLMGYFSTTPCDIRDPFVAFYEGCAFATQDDMPLRSEMLEHEIRQV
AUE23905 TcIV	1831	ECLYVKMRGSFERMYE----WMSDLN--MCQRIANYVNP MIVRVNT---
ATG71380 DWV	1705	QRLVEEMKAFKERTL-----WSDLHR--VGAEISASVKKA-----
YP_003622540 SBPV	1732	ANIENPVNEIEEDGGF----WSNVKR--L-----
QVD33034 DsLJV	1712	AGVIETARSDNEALNLSVHNPWSEEVRAQMIAEAACLLSVGTAAIGGLY
AUE23905 TcIV	1870	-IANAGVPEDMLEDEQPCGIST--TLSASYPELRPHPVNSQSSSSTGRRSS
ATG71380 DWV	1737	-LPTISITEKLPHWTVQCGIAKPEMDHAYEVMSSYAAGMNAEIE-AHEQV
YP_003622540 SBPV	1754	-YENLTGGAADTEMDVP-GPSTPSEPPSKRVLRQFLVDHCKFKEDAAALL
QVD33034 DsLJV	1762	CLRKLGSYNASEGLEAQCNCLETTKIHYVCGASYSMLQTRSLEGVHKFC
AUE23905 TcIV	1918	THGSYSVNSSQPKSFREMQDTVSSEDQYFSIAPPKF--TTYFSDFKDGE
ATG71380 DWV	1786	RXSSVECQYAE PQGLRRLDDEGPTIDEELMGDTEFA--SQAIERLVDE--
YP_003622540 SBPV	1803	TRGLGVCSEQDVRTFALPPEYQFMKDREFVSAASIY--CDTMSCLPNSVC
QVD33034 DsLJV	1812	RTCVNRVQSVGPWSCAVCRNNA---EPVLVMSQSMYESINVL SRLHKASN
AUE23905 TcIV	1966	IVNETQENRLHIFETS-----LECILKDRKIGQKDIDE-----I
ATG71380 DWV	1831	-----GYITGEQKKY--IATW-----CSKRREHIADFDLVWTDNLRVL
YP_003622540 SBPV	1851	CSYRRIGSAMNPRSKI--GSNW-----FVLPKNYEDLGKDAIRSYCYWWI
QVD33034 DsLJV	1859	WATNVIGNFINEFDRIVGVKNWGMFLLGCSYISSINTRVRLNGGDNYPYL
AUE23905 TcIV	2000	LKY-----VQRGF GDIVLSEKE-----NLGIFYHTR
ATG71380 DWV	1868	SAY-----VHERSSSTRLSTDDVKLYK-----TISMLHQKY
YP_003622540 SBPV	1895	RCY-----QLRSFKKI-LKKENYVEWA-----DRMLHLIGC
QVD33034 DsLJV	1909	MIYNASTAILSSVCFPQLYRF SRLTPATRTYIDLARTKLIDNIPSF SPEA
AUE23905 TcIV	2026	RAA-----ERNPREFWRRPW NFWKCVYYGL-----KMGD
ATG71380 DWV	1899	DTT-----ECTKCQHWYAPLT-----DI-----YVDD
YP_003622540 SBPV	1925	EPV-----NNYEVELRRQLWKIRGASESEIDMLKELDAEARAHNMSD
QVD33034 DsLJV	1959	EAILARILEYNNSVSTNRFVPEATRTALERDITELVRHRLGDNFTRYIKP
AUE23905 TcIV	2055	TSGTQAIYTLREDWR----DCVHMVSVDTPKNMSYDLFK-----
ATG71380 DWV	1921	K-----KLFWN-----QKEKKTLDVRKLSKEDVTV-----
YP_003622540 SBPV	1968	LMAGKELPRITLMWLLTDLTDNDTSVFCDHCKVFATYM-----
QVD33034 DsLJV	2009	I---KGLFFTEEIATLSANIEQYNVALLANPNEWNEELYN SLIARIPPTA
AUE23905 TcIV	2089	---EEGHHNWYMN---GIKVPH-----CRGGKC-----
ATG71380 DWV	1946	---QSKLINLSVP-----C-GEVC-----
YP_003622540 SBPV	2005	---RDL SVLEYVPRYGIIRYPGNFGCMKTIPAECCQCEDS-----

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QVD33034 DsLJV	2056	QNDSEEDDWSMPLRIGARRVNHFSVGLQNAQDYYPYTCDVTKWTGVAEF
AUE23905 TcIV	2111	---IMDAPFFKALWHWAWLNNHTDQLWQYRKNELRYLPAFFNFDPDSGRE-
ATG71380 DWV	1961	---VLHSKYFNLYLFHKAWL--LENPTWRLIYNG--SKKGMPEYFMNCVD-
YP_003622540 SBPV	2041	---IFNNVLFKNAMRILWDHHDHVGPEFTEFQDS-----QTNPFVMQEHNN
QVD33034 DsLJV	2106	NTICPHKHFEVHEKEHILYD--KGNFYWNSVQGEVPIKDGWCSNYPECPMA
AUE23905 TcIV	2158	LKKELDYFYSFTGRIVMWCKNTLGPMAVKVLKYVA-----
ATG71380 DWV	2003	-EISLDSKFGKVKWQLQAIIDKYLTRPVKMIRDFLFKW----WPQVAYV
YP_003622540 SBPV	2084	LRNETRSLLSRIWDWAKDWKTTVPFVGAILTFLYEHE----WAK----
QVD33034 DsLJV	2154	PGNREPHLLAYFEQHKNLWFGIFINKPPHVQKRFIEQLVPRFAWPQWIMT
AUE23905 TcIV	2193	----VAGVCVGVACSMMW-GIKTLARLFGFNICDDAAVLLTAAATPKLHL
ATG71380 DWV	2048	LS--LLGIT-----GITAYEMRNPKPSTSEELADHYVNRHCSP-DF
YP_003622540 SBPV	2124	----ILSILG--CVVL--YATFTSAKSPTDACMAAAKVSVPVMAGAVGT
QVD33034 DsLJV	2204	EQNDIENPILE--TSSWWDYLVNHPMLVNILKVAAGTVTIGILAGSYSL
AUE23905 TcIV	2239	KAGDFCIAEGA-YNIPSKIVKRPDVKV--MSKMPMAPQQYSNIMAAINR
ATG71380 DWV	2085	WSPGMATPQGLKYSEAVTA-RAPRIHRLPVTTKQGSTQOQDAAVNKILQ
YP_003622540 SBPV	2167	WS----SPEGSVYQAGERV---FKASNAPKANRESVSDQMHITEQKVIN
QVD33034 DsLJV	2252	FRWLFPTPEsqIIPSGDSVIRHFRARAQQITRVPASQSEFMDVIVDKINN
AUE23905 TcIV	2286	NTVITAEYFNEKGS-LCSMKARALGLEANRVIMIRHYHDEFTAMPSTR
ATG71380 DWV	2134	NMVYIGVVFVKVPGSKWRDINFRCMLHNRQCLMLRHYLESTAAFPPEGTK
YP_003622540 SBPV	2210	NTCFIICKW--QDGKDTKFLRARCLAIKGRDIIVIKHYLQEFKSRNPITY
QVD33034 DsLJV	2302	NYFVIIVV--ENQGNERHLIGC---GVKQRLGIMPKHYYEYICKKKKEEG
AUE23905 TcIV	2335	YYVSLVTNNQLRPRVEINYRECRG----DAFYCK---DPKYGTNFFMLYM
ATG71380 DWV	2184	YYFKYIHNQETRMSSGDISGIEIDLNLRLYYGGLAGEESFDSNIVLVTM
YP_003622540 SBPV	2258	MFSYKINNSMANTYIDSSIIDNAY-----IYKIN---NSSAFSNIALIKL
QVD33034 DsLJV	2347	VQFFLAKPHLIKQRVQLAIDEADF-----TYSATADICLYQL
AUE23905 TcIV	2378	PPHIPLFRNINKNLIPTAESH----QYCGRLG-----HLYAFGDATYADLA
ATG71380 DWV	2234	PNRIPECKSIKFIASHNEHMRA-QNDGVLVTGDHTQLLAFENNNKTPIS
YP_003622540 SBPV	2300	PKHVPFMFKDISKSIVTQGDHANVGHFCSIVS-----QQYDEHPVVRSQVP
QVD33034 DsLJV	2384	PASWNMFRDITKYMSLDADLQKKMANNGVIV-----KPPLKSNNYTSVIP
AUE23905 TcIV	2419	FNFEGEYRIQW--GNAPGMVCMNAYTYSKHKPGLCGSVLISEGL--PSTP
ATG71380 DWV	2283	INADGLY-----EVILQGVYTYPHYGDGVCGSILLSRNL---QRP
YP_003622540 SBPV	2345	VTWKQHLVIAGD-RHVEQIIMDKCYEYNVRGFGMCGSALVSPGVCCGNGG
QVD33034 DsLJV	2429	VDIKGVYKNQFIMGENGGFNSQHCLKYTFSQKGACGSMVLKDQS---QRP
AUE23905 TcIV	2466	LIGHVHAG-ANGK---GYAEPLFREMF-----DMLSPLEIVDVAP-LDV
ATG71380 DWV	2320	IIGHVHAG-TEGLHGFGVAEPLVHEMFTGKAIESEREPLYDRVYELP-LRE
YP_003622540 SBPV	2394	VIGLHVAG-EKGS---GFSEPIFREMF-----EPVIEKSDPVVSLPNLRS
QVD33034 DsLJV	2476	IVAMHIAGIGEGVSGIGYGVILTDEMF-AEFQCEVSGKCAHEEPPVVEE
AUE23905 TcIV	2505	AEAKPEVSL--ETVFEETGCHPKMKHVETGKTAYIPSEIAG-VFPITYE
ATG71380 DWV	2368	LD-ESDIGL--DTDLYPIGRVDAKLAHAQSPSTGIKKTLIHG-TFDVRTE
YP_003622540 SBPV	2435	VS-ESNVQL--DHNILYGCVDEKMSHKESGKSKIIPSLVHGIEIYPVATE
QVD33034 DsLJV	2525	ID-TAKMHLPEDAVVGyVGLPNNLKPFSPFKSKIKPSLIQD-LLPWTTT
AUE23905 TcIV	2552	PNP--LSPKDPRLPKGSNPIKDGCEKHGM-PVRPFPARMLERASYDLVQK
ATG71380 DWV	2414	PNP--MSSRDPRIAP-HDPLKLGCEKHGM-PCSPFNRKHLELATNHLKEK
YP_003622540 SBPV	2482	PNP--LRPGDPRQPPGSHPLRDGCAKHGLGMVHPFPQEDLEQVNNDAARNV
QVD33034 DsLJV	2573	KAPAILSQKDERYTHTISPLVAGCAKHGY-LTANFTTSQLHKVR-DLRFE
AUE23905 TcIV	2599	FKACVVPVRKVGVLSEQDAICGNVNVPHFESLEWNSSPGYGYADLKRS
ATG71380 DWV	2460	LVSVPK-INGCKIRSLQDAVCGVPGLDGFDSSISWNTSAGFPLSSLKPP-
YP_003622540 SBPV	2530	LLNEVKNPLCEMRLTLQEQVCGSTSIPHCESVNWNSSSEGFLCNRRPA-

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QVD33034 DsLJV	2621	QLRRMKPGISPCNR	LTVEEAII	GFAGIEFYDPLHLDTSAGWPLCTSKKT-
AUE23905 TcIV	2649	GNPSGKKFLFDLDETPDG-	YVLKGKHDRLTQIMNEKHEQRKKGIVPATVF	
ATG71380 DWV	2507	-GTSGKRWLFDIELQDSGCYLLRGM	RPELEIQLSTTQLMRKKGIKPHTIF	
YP_003622540 SBPV	2578	-GVTGKKWLFDMDETAEG-	YVLKNIDPQLALMLKTNKDLRNRNIVCPPIY	
QVD33034 DsLJV	2669	---LKKDWC-	DIERDESGVLISCKLHPEVANQIESEMNR	RRRGIVPFTVF
AUE23905 TcIV	2698	VDCLKDTTIPKEKCSVRGKTRIFSISP	VDFTIQFKQYCGDFLAAYTKARF	
ATG71380 DWV	2557	TDCLKDTCLPVEKCRIPGKTRIFSISP	VQFTIPFRQYYLDFMASYRAARL	
YP_003622540 SBPV	2627	IDCLKDYRLPPEKCCIPGKTRIFSIAPI	QTTLEIREYMGLFLSGYKSATV	
QVD33034 DsLJV	2716	VDTLKDEKKPLAKIHKLGGRVFCAS	PFAYTVAMRQNFLLHMCAYSTYRW	
AUE23905 TcIV	2748	RAEHAIGINVDSEEW	TGLYNHVTKGYNFITGDYSNFGPGLSLEVANA	AAF
ATG71380 DWV	2607	NAEHGIGIDVNSLEW	TNLATSLSKYGTHTIVTGDYKNFGPGLDSDVA	ASAF
YP_003622540 SBPV	2677	MGQHIGIGINPDSYD	WTRLANYLHEVGDNI	VTGDYANFGPCVSSQIVYSCI
QVD33034 DsLJV	2766	ELKHAVGINLQGPQCTEL	VSRLLRVGHNI	VTIDYSNFGPGYNAGVAEQAA
AUE23905 TcIV	2798	EITVEW--YRYHGASEEHLRIL-	RVMKCEILCARHLC	LNVFYSVCCGIPS
ATG71380 DWV	2657	EIIIDVWLHYTEEDNKDEM	KRVMWTMAQEILAPSHLC	RDLYVRVPCGIPS
YP_003622540 SBPV	2727	DDIIYW--HKINGATEDHCRH	LELLKYSILLPLHLC	DNVCVYQSLNGIAS
QVD33034 DsLJV	2816	QNFKKWTL	SNVAGVNEAELDCL----	LEEGLNSLHCMNNVLYRQGGGSPS
AUE23905 TcIV	2845	GSPITITPLNSIVNSLYLRV	MMRMFNNHPDYFSLESFNAHVNI	VTYGDV
ATG71380 DWV	2707	GSPITDILNTISNGLLIRL	AWLGITD-----LPLSEFSQNV	VLVCYGDDL
YP_003622540 SBPV	2775	GSPITAE	LNSEVGKKYIKLAFLGICRQL	NYKYSLNDFNKHCRV
QVD33034 DsLJV	2862	GSPITVIINSEVNIMYIML	AWDALVKGEKW--RD	FEEQVCMYVYGDDL
AUE23905 TcIV	2895	IGCVSDEV	RDLYNIASLSENFADFNI	TFTDARKTG
ATG71380 DWV	2752	IMNVSDNMIDKFNAVTIGKFF	SQYKMEFTDQDKSGNT	VKWRT-LQTATFL
YP_003622540 SBPV	2825	ILSVSDAFVSWFNLQSISEY	LDNYGIRLTDVTKDGTIVKYRP-	LADSSFL
QVD33034 DsLJV	2909	IMSVSDNYIEHFN	AVTITEFFKKHKIVATNADK	STEIKPYET-IETATFL
AUE23905 TcIV	2945	SRCFIPHPTRPMIWL	AGLKKDSIQNAANWIKKK-FCKRDSSL	INSRMAIE
ATG71380 DWV	2801	KHGF	LKHPTRP-VFLANLDKVS	VEGTTNWT
YP_003622540 SBPV	2874	KRSFKPHPSRSGIYL	APIEPSYQECTNWCHKQ-NDEIEAT	VEVLRASCV
QVD33034 DsLJV	2958	KCNFVPHPYRSGEWL	AKLDIESVNDTPMWI	KEP-IAFKEATELNAEAGVR
AUE23905 TcIV	2994	LSFGWGPEYYREVCETVRK	AWVAKNEVLYVKTWEERDKEIFDFK	CESSIS
ATG71380 DWV	2850	LAFGWGPEYFN	YVRSTIKMAFDKLG	IYEDLITWEEMDVRCYASA-----
YP_003622540 SBPV	2923	LAYGRGPDEYNNHVNKIR	RVKALKGLRFDPLTWAALDKENFG-----	
QVD33034 DsLJV	3007	AAFGHGKEFFNNYRTNINIAL	NQIKSDPILLD	WHIDIDDSFYGEGSSYNVG
AUE23905 TcIV	3044	FFPVIEF		
ATG71380 DWV	2893	-----		
YP_003622540 SBPV	2964	-----		
QVD33034 DsLJV	3057	Q-----		