

Pp\_F2\_p\_1 -----MNQCCYWFIFVLISAIYIQVN-----  
Pp\_F2\_p\_5 -----MNQCCYWFIFVLISAVYIQVN-----  
Pp\_F2\_p\_6 -----MKPLSFCSIFLLFC TFSIQRN-----  
Pp\_trans\_132 -----M---CYFIVLLFLGNLVFAHTK-FI-----  
Pp\_F2\_p\_2 -----MRTACVPLLLLALLFVVP CSQT--L-----KLVG-----  
Pp\_F2\_p\_7 -----MDGRTFYLWAIISLWVGCSNSF-----KVG-----  
Pp\_trans\_63 -----MCNSLFCVIFLSLLAGIFGRITV-----  
Pp\_F2\_p\_3 -----MAVLWKLSALVAVLMAL-----  
Pp\_trans\_109 -----MAYSWKFGVLVLFVGVLLY-----  
Pp\_F2\_p\_4 -----MVK---ALILLGAFYFLSSEAA--I-----  
Ld\_F2\_p\_1 -----MAK-GMWLLFLACLVTGLAEYV-----  
Ld\_F2\_p\_4 -----MAK-ILCLLFVCF AAAALADSYV-----  
Ld\_F2\_p\_5 -----MTKFFLFALLMGLVA AVL GDFV-----  
Ld\_F2\_p\_2 -----MTKFWLSAVLVAVLVMGGSRSRSE-----  
Bee\_XP\_00370227 M---AVKIVCILLLLVALQSLCHA-----  
Ld\_F2\_p\_13 -----MARTEAGLVLLAVLLVTVTGFQ--I-----  
Ld\_F2\_p\_11 -----MNSLFAFCLLLIFA AVGFQEAN-----  
Ld\_F2\_p\_15 -----MNTLVVFGLLLIFA AVGFQEVN-----  
Ld\_F2\_p\_10 MA-SKCRVWFICYLMMSTLALS AVPTR-ALTDQEVDEVARELFESYLKELEQ-----  
Ld\_F2\_p\_3 MG YQKAKTWFLCYLMMSGMVFSMAAEEQIITPSEAEQLTRESLKEYEAEIQD-----  
Ld\_F2\_p\_9 MAVKNLKLAFVCYLMVSTLVFSMAKDA--ISDEEAQKVAADLLSDFEKELDQ-----  
Ld\_F2\_p\_14 -----MKISRNYIFLLAFVALARVSEG-----HPAPQED-----  
Ld\_F2\_p\_7 -----MKA VSIFLFGLVVVAVFSRACD-----GHPVPEEVEEEE-----  
Ld\_F2\_p\_8 -----MRVLLLALLLSSLAVLNASPL-----PEDEDEW-----  
Ld\_F2\_p\_12 M---RGLLPWVLLLLAVVAMTARADD--LNDQELEQMSDKVFRALDRQVDR-----  
Ld\_F2\_p\_6 -----MRLLVLLAFGLAVAVHAETVPE-----  
Pp\_red\_p\_1 -----MSKLWLLLLLVAAAFQAVRSFPA-----EVDYP---EERSW-  
Pp\_red\_p\_7 -----MSKLWLLLLLAVAAAFQAVHSYPA-----HETDYLED AEQSTWS  
Pp\_red\_p\_5 -----MSKLWLVLLLVA AFQAVHSYPA-----YETDYL-----  
Pp\_red\_p\_2a -----MSKIWLIVLLVAAAQVAHSFPT-----DEYELD-----  
Pp\_red\_p\_8 -----MSKIWLIVLLVAAAQVAHSFPT-----DEYELD-----  
ADN29791.1 -----MSKFWLLLLLVAAAFQFAHSYAA-----VEYEAV-----  
AAL82381.1 -----MSKFWLLLLLVAAAFQFAHSYPA-----AEYEL-----  
Pp\_red\_p\_3 -----MSKVWLLLLLVGVFQLVQSFPFA-----LE-----  
Pp\_red\_p\_6 -----MSKIWLLLLLVGVFQLVQSFPFA-----LE-----  
Pp\_red\_p\_4a -----MSKIWLLLLLVGAIQLVRAFPA-----LE-----  
BAV31386.1 -----MNFLLAFCLAVCQLAYAEKS-----  
BAV31387.1 -----MNFLLAFLCVAICQVAYGESS-----  
:

Pp\_F2\_p\_1 -----  
Pp\_F2\_p\_5 -----  
Pp\_F2\_p\_6 -----  
Pp\_trans\_132 -----  
Pp\_F2\_p\_2 -----  
Pp\_F2\_p\_7 -----  
Pp\_trans\_63 -----  
Pp\_F2\_p\_3 -----  
Pp\_trans\_109 -----  
Pp\_F2\_p\_4 -----  
Ld\_F2\_p\_1 -----  
Ld\_F2\_p\_4 -----  
Ld\_F2\_p\_5 -----  
Ld\_F2\_p\_2 -----  
Bee\_XP\_00370227 -----  
Ld\_F2\_p\_13 -----  
Ld\_F2\_p\_11 -----  
Ld\_F2\_p\_15 -----  
Ld\_F2\_p\_10 --AERDA-----PEN-----  
Ld\_F2\_p\_3 --LIDLA-----PEE-----  
Ld\_F2\_p\_9 --SESTA-----LED-----  
Ld\_F2\_p\_14 -----  
Ld\_F2\_p\_7 -----  
Ld\_F2\_p\_8 -----  
Ld\_F2\_p\_12 -----LG-----  
Ld\_F2\_p\_6 -----  
Pp\_red\_p\_1 -----LEDF-----  
Pp\_red\_p\_7 ILKDTFGKLDLYTEKGQALEKLTEKLKEKLCNQDLED FDFEEDEEPSLQIQVVQKLR  
Pp\_red\_p\_5 -----  
Pp\_red\_p\_2a -----  
Pp\_red\_p\_8 -----  
ADN29791.1 -----  
AAL82381.1 -----  
Pp\_red\_p\_3 -----  
Pp\_red\_p\_6 -----  
Pp\_red\_p\_4a -----  
BAV31386.1 -----  
BAV31387.1 -----

Pp\_F2\_p\_1 -----NGAD-----  
Pp\_F2\_p\_5 -----NGAD-----  
Pp\_F2\_p\_6 -----NAAE-----  
Pp\_trans\_132 -----  
Pp\_F2\_p\_2 -----VTQE-----  
Pp\_F2\_p\_7 -----YGPPYFDKEPP-----  
Pp\_trans\_63 -----  
Pp\_F2\_p\_3 -----SAE-----  
Pp\_trans\_109 -----YVDGAT-----  
Pp\_F2\_p\_4 -----  
Ld\_F2\_p\_1 -----DYDDET-----  
Ld\_F2\_p\_4 -----DYSTSE-----  
Ld\_F2\_p\_5 -----EYDEDM-----  
Ld\_F2\_p\_2 -----GDDLTESE-----  
Bee\_XP\_00370227 -----ANSE-----  
Ld\_F2\_p\_13 -----SDTET-----  
Ld\_F2\_p\_11 -----SDEFDDWD-----  
Ld\_F2\_p\_15 -----SDEFDDWD-----  
Ld\_F2\_p\_10 -----PGNEMDGDEAPRLWAF-----  
Ld\_F2\_p\_3 -----PNNDLDDPEKPRFLFFL-----  
Ld\_F2\_p\_9 -----PDNDLDNEERPRFLFF-----  
Ld\_F2\_p\_14 -----GDDGDNDESARWG-----  
Ld\_F2\_p\_7 -----DDGDDDESARAG-----  
Ld\_F2\_p\_8 -----DEEYSDEAPRFG-----  
Ld\_F2\_p\_12 -----EDDEQVRSKGSK-----  
Ld\_F2\_p\_6 -----PQADDGEE-----  
Pp\_red\_p\_1 -----TSMEEKVDSTATIIKDTWGKLLKLLW  
Pp\_red\_p\_7 ELLKKLQAAKDAEKARIQRQINALRTKICDKLNQQDFEEDKADTTAAIIKDTWSKLLKDLW  
Pp\_red\_p\_5 -----EDAGQSTWGILKDTFGKLLKDLY  
Pp\_red\_p\_2a -----DEYMEDTES-TIGILKDAWGKLLKDRW  
Pp\_red\_p\_8 -----DEYMEDTES-TIGILKDAWGKLLKDRW  
ADN29791.1 -----EDES-----  
AAL82381.1 -----DET-----  
Pp\_red\_p\_3 -----EDEY-----  
Pp\_red\_p\_6 -----EDEY-----  
Pp\_red\_p\_4a -----EDEEH-----  
BAV31386.1 -----WDEE-----  
BAV31387.1 -----WDED-----

Pp\_F2\_p\_1 -----FDKNQLK-GLDKE-----  
Pp\_F2\_p\_5 -----FDKNQLK-GLDKE-----  
Pp\_F2\_p\_6 -----FDQSLLK-DFNKE-----  
Pp\_trans\_132 -----QID-QLTPO-----  
Pp\_F2\_p\_2 -----FTLDKDKYDLR-DYTPE-----  
Pp\_F2\_p\_7 -----PMPVDDKYNDLR-DFSPL-----  
Pp\_trans\_63 -----PSEDEYMLQ-----  
Pp\_F2\_p\_3 -----IKSGPVEPQYNEV-----  
Pp\_trans\_109 -----IQQPPV-KYNEL-----  
Pp\_F2\_p\_4 -----LSERELK-QLRDA-----  
Ld\_F2\_p\_1 -----LDEEMVR-ALQEE-----  
Ld\_F2\_p\_4 -----LDEDMIR-SLDID-----  
Ld\_F2\_p\_5 -----LDEEMVK-MLSND-----  
Ld\_F2\_p\_2 -----VEEILAA-TIENE-----  
Bee\_XP\_00370227 -----IEEYKQA-YYDRK-----  
Ld\_F2\_p\_13 -----RPMRGLFDKLVH-AVDKV-----  
Ld\_F2\_p\_11 -----TDYAIID-DITDP-----  
Ld\_F2\_p\_15 -----TDFAIIE-DITDP-----  
Ld\_F2\_p\_10 -----LAWIPKAVMAVVH-AVAKV-----GPFIA---KGIGLI  
Ld\_F2\_p\_3 -----FALLPKLALMLVH-VLVKA-----VPIIV---KAVAVV  
Ld\_F2\_p\_9 -----LPFLPKLAILLVK-IAIKA-----VPLII---KAAAVV  
Ld\_F2\_p\_14 -----KLITTVGVK-ETMKEGAK-----KGIKTGVAEV---ELGMKK  
Ld\_F2\_p\_7 -----FMSLARIGLT-OTVKQ-----  
Ld\_F2\_p\_8 -----IGSIKFSIS-QLAKE-----GAKQTVKESI---KQAGKL  
Ld\_F2\_p\_12 -----IAFGKKLSELVVK-IWSKI-----PKDKI---KNA---  
Ld\_F2\_p\_6 -----WAQDDTLVAEELNTI-----  
Pp\_red\_p\_1 KSKKDELKGGKDKLD-QIIAKLKDMLCK-QKDF---LDLDYEEDAASDSV---QAKLMQ  
Pp\_red\_p\_7 KSKGEQVKGKAKDALQ-KLIAKLDLCK-QKDF---IELDYEEDAKDPV---KVKLMQ  
Pp\_red\_p\_5 TE-----KGKEALA-KLTSKLKEKLCN-EKDF---EEDFEEDDQGESI---QLQILQ  
Pp\_red\_p\_2a TQ-----VTQDKLK-KLIKQLNEQFCSDQSDFEEDMEEDMEEDDVKDTVIAQYKQLIQ  
Pp\_red\_p\_8 TQ-----VTQDKLK-KLIKQLNEQFCSDQSDFEEDMEEDMEEDDVKETVIAQYKQLIQ  
ADN29791.1 -----TNDEAR-QFIGD-----  
AAL82381.1 -----TNDEVV-RFIGD-----  
Pp\_red\_p\_3 -----  
Pp\_red\_p\_6 -----  
Pp\_red\_p\_4a -----DFFEL-----  
BAV31386.1 -----  
BAV31387.1 -----

Pp\_F2\_p\_1 -----ELN-VLED  
 Pp\_F2\_p\_5 -----ELN-VLED  
 Pp\_F2\_p\_6 -----ELD-VLED  
 Pp\_trans\_132 -----ELE-ILGK  
 Pp\_F2\_p\_2 -----ELQ-ALKE  
 Pp\_F2\_p\_7 -----EIQ-VIRE  
 Pp\_trans\_63 -----AIEE  
 Pp\_F2\_p\_3 -----ERM-VLED  
 Pp\_trans\_109 -----ELK-VLED  
 Pp\_F2\_p\_4 -----PMV-PIQS  
 Ld\_F2\_p\_1 -----VAEAKDELA-TVEA  
 Ld\_F2\_p\_4 -----IRRAKEEMS-TIQD  
 Ld\_F2\_p\_5 -----VNETRKECT-TLEQ  
 Ld\_F2\_p\_2 -----LFITAKELD-FLEH  
 Bee\_XP\_00370227 -----TNKPSQIGISE  
 Ld\_F2\_p\_13 -----AHDADKDVSGAVHE  
 Ld\_F2\_p\_11 -----YGDSMDNSAKT  
 Ld\_F2\_p\_15 -----YGDSADSEMAR  
 Ld\_F2\_p\_10 -----KGKVVAVGG-----KYISKEAVKQTLGN  
 Ld\_F2\_p\_3 KVKAMAVA-----ATVAAAAKAKAAAVAAA--TAAKFATPAAIKATVVAGVKT  
 Ld\_F2\_p\_9 -----KAKVAAVAAT--SLTKAALATAAKKAAVFFVKE  
 Ld\_F2\_p\_14 GIKVGISS-----GIKTGFKSATKGLKVVGKKA VSS--KTAKMISTGAIKVGKSKVVKS  
 Ld\_F2\_p\_7 -----GMRVVGORLLSS--TVTKLITSGAVKLAKSAVVKS  
 Ld\_F2\_p\_8 TIKEGFKQ-----GIKEGAKQAG-KLLIKSTVQLTK--QGLRVIKSGAIKLAQSIVKQ  
 Ld\_F2\_p\_12 -----VKSTIREVKN TIKE  
 Ld\_F2\_p\_6 -----FGDDFD--YDEE  
 Pp\_red\_p\_1 KIKELQNKIKQVTEEKKLALLQRIEELRAKICDKLSD-----AEDTEDGDDEE  
 Pp\_red\_p\_7 KIKELQQKIKKVTEEKKLELLQRIEELRAKLCDKLSD-----AEDTDDGDDEE  
 Pp\_red\_p\_5 KLRELLKKLQEVKDAEKAKIQSQIEELKAKICDKLDDIEEEMQFAESDLEEDSNMGDEE  
 Pp\_red\_p\_2a KVKDLISDAKQKYGENKEKLKEEMKVKVCAQVCAQLKK-----AAEEDDEEEDDGDDE  
 Pp\_red\_p\_8 KVKDLISDAKKYKADKEKLKEEMKVKVCAQVCAQLKK-----AAEEDDEEEDDGDDE  
 ADN29791.1 -----GYFEDEGDDGDEE  
 AAL82381.1 -----GYFEDEGDDGDEE  
 Pp\_red\_p\_3 -----ELDGSDEE  
 Pp\_red\_p\_6 -----ELDRSDEE  
 Pp\_red\_p\_4a -----SSFESDDSDDEE  
 BAV31386.1 -----DVEEDDES  
 BAV31387.1 -----DGQ--DES

Pp\_F2\_p\_1 AIKK-----NEAKKL-----  
 Pp\_F2\_p\_5 AIKK-----NEAKKL-----  
 Pp\_F2\_p\_6 AVKR-----QKRFLL-----  
 Pp\_trans\_132 ISNRG-----KKSSFL-----  
 Pp\_F2\_p\_2 LKEIK-----KRSRFI-----  
 Pp\_F2\_p\_7 LKEMQ-----KRSRFI-----  
 Pp\_trans\_63 LRHMS-----SSRLL-----  
 Pp\_F2\_p\_3 IRAQQ-----QSRGMF-----  
 Pp\_trans\_109 LKAQS-----ESRGI-----  
 Pp\_F2\_p\_4 IGN GP-----AMARSL-----  
 Ld\_F2\_p\_1 MTTGE-----SARALKDKF-----  
 Ld\_F2\_p\_4 MTSDD-----EAPRTNFF-----  
 Ld\_F2\_p\_5 ISVGP-----GTK-----  
 Ld\_F2\_p\_2 ISTRS-----EDIDVEEYET-----VYEEDEEDDEGARSSFKDKL-----  
 Bee\_XP\_00370227 ISG-----GQVORI-----  
 Ld\_F2\_p\_13 VTGTV-----DKVAHDAKDKVTGVV-----  
 Ld\_F2\_p\_11 RGTNEFDWDTDYAIEDITD-----P-----YGDSMEDSVMTKMDKDKL-----  
 Ld\_F2\_p\_15 SAK-----KSIL-----  
 Ld\_F2\_p\_10 AAKEG-----LETLVVDTIGSKIKQAIMNLLGMGG  
 Ld\_F2\_p\_3 AAKFV-----AEELVVEGIQMGITAI-----  
 Ld\_F2\_p\_9 VAIDT-----AFNYVVVDKVKVKA-----  
 Ld\_F2\_p\_14 GKKFV-----IK-----LGKEVASSALEAAGELATEAAL-----  
 Ld\_F2\_p\_7 GKKYM-----IK-----LGKELAQEAAMAAGEAAVESAI-----  
 Ld\_F2\_p\_8 GKKFV-----IK-----VGKEALKEAVTVGSELAVNSAI-----  
 Ld\_F2\_p\_12 KGKEK-----LHDMKVKLKVEGKKQAK-----  
 Ld\_F2\_p\_6 SPRIY-----LKGLIG-----V-----GDDNEEKGEEENTV-----  
 Pp\_red\_p\_1 RIKWG-----KIGKNIMKGAKKAW-----  
 Pp\_red\_p\_7 RINWG-----KIGKGIKGA KAW-----  
 Pp\_red\_p\_5 RFSWG-----NV---IGKFVKKAW-----  
 Pp\_red\_p\_2a ERGMK-----FKNPFKKPKVPKAPKVPKAPKLPKAPKPKPKGSMKDRLE-----  
 Pp\_red\_p\_8 ERGMK-----IKNPF-----KKPKQPKLPKPKPKPKPKGSSFKDKM-----  
 ADN29791.1 RLKIK-----PGKVFDFKFGK-LVGKVVVKQL-----  
 AAL82381.1 RFKIK-----PGKVLDFKFGK-IVSKVLKQL-----  
 Pp\_red\_p\_3 RGFKD-----WNNQVASAKNKF-----  
 Pp\_red\_p\_6 RSFSE-----WAKHQWDGAKNOY-----  
 Pp\_red\_p\_4a RIKWI-----KNAWASMSKSM-----  
 BAV31386.1 RAFWD-----KLFNFF-----  
 BAV31387.1 RAFWD-----KAFNLL-----

Cys number 1 2 3 4 5

Pp\_F2\_p\_1 --SAL-----TSS-----LSCEN--VDCTGCVGFEF-

Pp\_F2\_p\_5 --SAL-----TSS-----LSCEN--VDCTGCVGFEF-

Pp\_F2\_p\_6 --SEF-----EAS-----VDCEE--LQCNMCLGFEL-

Pp\_trans\_132 --SNFQ-----TPE-----CSCED--YTCVCCCLKFSL-

Pp\_F2\_p\_2 --SEVL-----PPK-----CDFPS-WTEGSCCISFKW-

Pp\_F2\_p\_7 --SDFK-----LPT-----CTFKK--WNRGRCCLSFKL-

Pp\_trans\_63 --SELS-----EPK-----CTDQKENSIECCMSLKW-

Pp\_F2\_p\_3 --DALE-----RPK-----CWFED--FTAACCICKMYR

Pp\_trans\_109 --GFE-----KPE-----CWFED--FTAACCIVTKYR

Pp\_F2\_p\_4 --EDTVLTI---KKK-----CTCHG--KTGCCTDIEV-

Ld\_F2\_p\_1 --KSLKEKI---KES-----CKCEN--HKTCAACMSKDFK

Ld\_F2\_p\_4 --NNMKDKI---RDK-----CKCDT--HKECACCVDRNIK

Ld\_F2\_p\_5 --AGIKDKL---QKM-----CSCQS--HKECQCCAEKTVK

Ld\_F2\_p\_2 --KNFKQAL---KKK-----CSCES--DKVGCCKIKKSVK

Bee\_XP\_00370227 ---SFK-----GGS-----CGCRN--AACSCCIGINLK

Ld\_F2\_p\_13 --DKVSEKL---MAE-----AEHLVERFKA-MDICSCSK--LQCKCCADPHN-

Ld\_F2\_p\_11 --KALK-----VKKK-----CDCSG--KVCGCCLLLEFE

Ld\_F2\_p\_15 --KALK-----VKKK-----CDCTV--PKVCGCCVLLQFE

Ld\_F2\_p\_10 DDDESGGSS---AGNKPIDLD----SYNIYDYNN-NEACDCMS--NVQCGCCIV----

Ld\_F2\_p\_3 ---DAVKQKS---EETPVVDEDKPGVVSNDIFDYDN-DDVCNCTK--PTFCSCCYT----

Ld\_F2\_p\_9 ---DQPQQPQ---APDPA-----KIHAYYEQGSEVCRWK--KFKCSCCVQ----

Ld\_F2\_p\_14 --EALKGAT---ESE---RE-----IDIMEYLDA-ADICGED--NQHCACCAE----

Ld\_F2\_p\_7 --EALNSTP---DTE---RE-----VDLFEYLDE-ADICSCST--NSLCSCCA-----

Ld\_F2\_p\_8 --GAIKNAIEG--NGEPVEDQE---IDIMDYLAH-ADICSCSS--NHLCSCCA-----

Ld\_F2\_p\_12 --SFLKHEILKFIKKK---AE-----KTFCSPN--KYKGCSCMH----

Ld\_F2\_p\_6 ---NRIPAKV---TNG-----CIDCS--TAHCECCVTGVV-

Pp\_red\_p\_1 --KKMKPALKNAVKKG-----GNLLRRNSVKVTPLECD--KTCKTCINLVF-

Pp\_red\_p\_7 --KKMKPALKSAVKKG-----AKLLKKNAIKVTPFECE--KSCKTCINLVF-

Pp\_red\_p\_5 --KKLKPALKKAVKKG-----ADILKKNAVKVTPFECD--KTCKTCINLVF-

Pp\_red\_p\_2a --KKLKEQMKEMKKA-----AEMLKNMGVKINMMECEE--KTCRTCISFSL-

Pp\_red\_p\_8 --KKLKDMMKEKMKKA-----AEMLKNMGVKINMMECEE--KTCRTCISFSL-

ADN29791.1 --KKVSLAAKAIMKKG-----AKLLKNLGVKISPLKCEE--KTCKSCVIFKL-

AAL82381.1 --KKVSAVAKVAMKKG-----AALLKKMGVKISPLKCEE--NTCKSCVIFKI-

Pp\_red\_p\_3 --KKVKAIVDTIKKG-----KKYLKEKGVMTDPIVCEG--GKQCKTCLVF----

Pp\_red\_p\_6 --KKVKAIVATIKKG-----KQYLKEKGVQMDPLVCEG--GNQCKTCLSF----

Pp\_red\_p\_4a --KKVGKKCKEFFFKG-----KEILKKKGKIDPLSCTG--NTCKSCIDFTM-

BAV31386.1 ---KKT-----LSVEPLNCQG--ANCRCTCV-----

BAV31387.1 ---KKV-----LHVSPLTCNG--ANCKTCLS-----

\*

Cys number 6

Pp\_F2\_p\_1 -----SNPHEVCLNTGLNIE---QLGVHVALIFD--KKEIFRYNM-----N

Pp\_F2\_p\_5 -----SNPHEVCLNTGLNIE---QLGVHVALIFD--KKEIFKKDI-----N

Pp\_F2\_p\_6 -----AKVPHEVCLNFGIIRD---KLGAFIEFTYD--ADEIWREEV-----K

Pp\_trans\_132 -----SDVQREICLDAGFNKG---DMKANVELTFD--REEIFTYSL-----R

Pp\_F2\_p\_2 -----VGAKKVACLTAELLLK---QLLLRIGLLWN--DDVLFQHDI-----A

Pp\_F2\_p\_7 -----LEKKKKFCLKASIRLK---KLIIYFALIMN--RMPLYEHEI-----A

Pp\_trans\_63 -----MKQRTICLELGFNTT---RLQVEMALYFD--GELIIDHAL-----T

Pp\_F2\_p\_3 TGQKDKKGGKDIYGKHRACVEAGIDFH---ALKAFVRSVYD--GKILGKEL-----AYK

Pp\_trans\_109 SGEKDSKGKEIKKHRTCEAGIEFT---ALKAFRAHHD--GKILGKEL-----AYR

Pp\_F2\_p\_4 -----SFFTQVQCVNITIIPE---AKAFEVFLAVA--DNSVFKQORVS-----AHQ

Ld\_F2\_p\_1 IPII-----GSYSLGVCSTIAIDPP---NKALNFKLELG--PLKLLDKTVS-----YHK

Ld\_F2\_p\_4 IPIV-----GTYKFQICSTISIEPE---NKLLKFKIHLG--PLNLMQKKVS-----YVK

Ld\_F2\_p\_5 IPII-----GTYTFSICSIFGINPA---AKTVSFKIKVG--PIKVMKEKVS-----FSK

Ld\_F2\_p\_2 IPKTD---KVFKPKLCANVTLPFE---EKKLGLKLYIG--SLSLFFKRMS-----LER

Bee\_XP\_00370227 K-----KFFNQEGCAKINYNPQ---ASATASLTLN--NKAVVSSNIP-----INT

Ld\_F2\_p\_13 -----SSPDGGTCFAVNLVPA---KLGVEYSLTLN--GKKLLSGTAS-----PRQ

Ld\_F2\_p\_11 -----MKTYHKACFNITEMTE---LKSIELSLVLD--SNKLFAPKI-----L

Ld\_F2\_p\_15 -----NKPTHKACFNMTTEEPGC---MRSIQLSMLLD--NMKLYSKSI-----I

Ld\_F2\_p\_10 -----PPDMDAGCFNITIEGTLWQKSTKLLKLVNYA--GVNILSRRLP-----AIN

Ld\_F2\_p\_3 -----PKGYSKACLDIRPSSNLWDNDCILKISAFYG--GKNITRMRP-----VKK

Ld\_F2\_p\_9 -----PEGLEAGCFNMTMRESLWNKDSKIKIGVFG--GKMIVTRRIK-----VHR

Ld\_F2\_p\_14 -----IGDYPKACVDILLRSLWNSNSKVDVKATYG--PTTVLEDKFP-----VDK

Ld\_F2\_p\_7 -----LGDFPSACIHFQPLVDLWTKKSKIIVTGLYG--NDTVYEEKFA-----IGR

Ld\_F2\_p\_8 -----IADYPKGCLTMKLEESLWAPKSNVIVQGDYD--DTRVIRNRF-----VNG

Ld\_F2\_p\_12 -----LPGLDRGCFNMTALPA---EMKFRVNLNYG--GETIAARKIA-----GTK

Ld\_F2\_p\_6 -----NNKNFTGCVHIDIAQR---MGLLDVMFLFN--GLOVSONQFS-----VRR

Pp\_red\_p\_1 -----LGLSACLKATISRE---DKVTYFTIAGDVN--GSPQFQEKI-----KLG

Pp\_red\_p\_7 -----LGLSACLKATITRT---NKNTYFTISGEVN--GNTQFEEKI-----RLG

Pp\_red\_p\_5 -----LGM SACMRATISRE---DKITYFTIAGEVN--DSPQFEEKI-----KLG

Pp\_red\_p\_2a -----PGFERTYCISMRFMRT---NKNTYVIFGMGLK--DKPSKEIKL-----TLG

Pp\_red\_p\_8 -----PGFERTYCISMRFMRT---NKNTYVIFGMGLK--DKPSKEIKL-----TLG

ADN29791.1 -----PVENTFCLTIRFMKT---NIATYLVVAGEMN--RKSKEEKL-----KLG

AAL82381.1 -----PTENSFCLTIRFMKT---NIATYLVVAGEIN--RKSKEEKL-----KLG

Pp\_red\_p\_3 -----LKMKKKFCMELKFFSK---DKVKYINVKLIRE--RDDKEPKELLPIDIPIS

Pp\_red\_p\_6 -----LKMKKKFCMEVKKFFSK---GELRFANVKLIRE--RDDKEPKELFKPLDIPMG

Pp\_red\_p\_4a -----KRRKFCIEALFQSS-----AIQVSLTKQ--KAEQEPKAIIGPFSINIG

BAV31386.1 -----VLKGGCIGIGYNKQGG--ANAIIQVSVQSGSRNIWNGNIN-----AGR

BAV31387.1 -----AFGKGGCVTVNYNKQAG--ANAIIQVNVQSNISGRNIWNGSIN-----AGR

\*

Cys number 7 8 9 10

Pp\_F2\_p\_1 FNEICYGLPKP-LNRTDICLEAYRISVLN--LPNEATICLRAKLTLILP-LLSIDFNCLK

Pp\_F2\_p\_5 FNEICYGLPKP-LNRTDICLEAYRISVLN--LPNDAAICLRAELKLIFS-LLSIDFNCLK

Pp\_F2\_p\_6 FDTLCTGLPKP-LNKVGCILEAYNVSLLG--LPKEAAVCLRTELTLIFP-LLSIDFNCLK

Pp\_trans\_132 VTKVCANLPAP-LSKVEICIDAYKVDVKE--MPSSGMFCMKAELSLFIP-FLSIDFNVCV

Pp\_F2\_p\_2 LAKFCIGVPY--LNKINVCLQVYHLDIDLTVTPKFFRICGQILIASIF----ELRLNCMT

Pp\_F2\_p\_7 LSEFCAGLPY--LKKISACIHFYHLDIRFK-PKFKFKTCAQLTIASIF----SLQFNCLII

Pp\_trans\_63 VGELCAPLPGL-LKKINICIHAYVQVDTKPPGISFDSFCVFIKLGFF----HFRVNCIR

Pp\_F2\_p\_3 FGEFCWPLPEP-LSQLNVCVWLWHVDISI--KNKVAEACFLFSFTKLV----HVKIDCLR

Pp\_trans\_109 FGKLCWPLPTP-LENLQACVWIWHVKVSI--SNKLAEACFLFSLTDFP----HVRFDICIR

Pp\_F2\_p\_4 LEKVCGGISK--LKESEICLYTTLDED----KPDELLSCMALDMSYHEIPLVNIINFECLK

Ld\_F2\_p\_1 AEEVCKKIEK--FKQLEFCLKTSVKES----DEKGLSACLIFQANIMDIFNKPLYLPCVN

Ld\_F2\_p\_4 VEEVCKKIEK--FKRVEFCMKMNVEES----EEKLGTGCLSIQVNIILKIFNKPFYLPVNI

Ld\_F2\_p\_5 IEQVCKKIEK--FKHVEFCTKMEVSES----QKKGLTGCLTIQVNIIMDIFNKPFYLPVNI

Ld\_F2\_p\_2 TEYACKTVPH--MENVEMCFMKMKNL----SDKGMQTCMKAKMKLMGMFSKSAKFPFCFN

Bee\_XP\_00370227 TBSICGTVP-Q-LSSVKFCLRLSKLSV----ESNKLNACVDLETHVPLIPTLVLHFFCIK

Ld\_F2\_p\_13 IPAICVPPY--VPGLOVCLOPYDLQF----NSSLHGCFRVEIKMATKTLISLALNCIN

Ld\_F2\_p\_11 EKERCAKVPYT-GKIAKVCLDMYNMKV----DQMGFHVCSKIYLRFLFSKQAVNDFQCLL

Ld\_F2\_p\_15 EKERCAKVPYT-AKVAKVCMNVNITM----DENGHFVCAKINLKLSSKEAVNDFQCLL

Ld\_F2\_p\_10 PSQRCKMLAPP-FHTTKLCFSTHGRTQ----VGNRMIOCFSIFFNSKGT-----TKCLV

Ld\_F2\_p\_3 PKQKCVEMSAP-FDATKMCIAVHGRTM----VGNRIIQCLSLHFNRQV----VFCLV

Ld\_F2\_p\_9 PRQRCAYLPKP-FDKTNLCISSYRSQ----LRKEVTQCFSVYFNNGRI-----SKCIV

Ld\_F2\_p\_14 IYEKCTEFVFA-GTKVEFCIMSRRTNR----VNSVQVKCFEMSFNDKTL-----EKCFQ

Ld\_F2\_p\_7 AFDKCSSLRFQDDTKLKLCVITVGTDD----HEGNKEKCFDLRFNDQLL-----RKCIO

Ld\_F2\_p\_8 AKRKCVTLDMQSGDKFTFCVSSFGRDK----DGDQYMCDFLEFNQGTI-----RKCIO

Ld\_F2\_p\_12 EMMTCTHLPTP-LNLVEICIVTQGIQE--IDESNFKGCFRIVSHGLEA-----AKCIL

Ld\_F2\_p\_6 HEENCKDMT--SEIMTLCVNSRTVQ----PLGVAVTCLKTVFKTFKS-AVELKFKCIR

Pp\_red\_p\_1 DVPRCLNAGSV-IG--KICVKGVEGKGSQGANVNFCLGFLAEKHNQV----KVCAT

Pp\_red\_p\_7 DLPRCVNAGSV-IG--KLCLKGMEGKGSQGANVNFCLGFLAEKHNQV----KVCAT

Pp\_red\_p\_5 DVPRCVNAGSV-IG--KLCKGVEGKGSQGANVNFCLGFLAEKHNQV----KVCAT

Pp\_red\_p\_2a NLPSCLSLGEL-LG--KVCVKVEGRAKTSQGGQGNVNFCLGFLAEKFSIGA----KFCAT

Pp\_red\_p\_8 NLPSCLSLGEL-LG--KVCVKVEGRAKTSQGGQGNVNFCLGFLAEKFSIGA----KFCAT

ADN29791.1 NMPRCLNVGGF-LG--KVCCLKAIEGHAKSSSGQANVNFCLGVVAEKYGVGA----KFCGV

AAL82381.1 NMPRCVNVEGF-IG--KVCMKGIEGHAKSSSGQANVNFCLGLVAEKYGVGA----KLCGI

Pp\_red\_p\_3 KASTCVKLGSW-FG--KCCLOGVEGKI----TPKSVNFCIAAVLKS YGVGA----KLCLT

Pp\_red\_p\_6 KESNCIKLGSW-FG--KCCIQGVETI----KANNINFCVAAVLKEYGVGA----KICLN

Pp\_red\_p\_4a DIPKCKNLGKV-LG--DICLOGVEGRAKSSKGPINFCVAALLKTYGVGA----KLCIG

BAV31386.1 PVPSCVNLPKP-IK--EVCIQNFVWTVGQ--NGQNGDVCFTINFKSYSTGI----KFCAG

BAV31387.1 PVPSCVNLPKP-IK--EVCIQDVVVSVGQ--NGPNGDVCFTINFKSYSLGA----KFCAG

\* \* \* \*

Pp\_F2\_p\_1 Y-NKGRGLY-----YDTT-ESAEEK---ALIDINLRGGHPKVTFNN-PLPMELIKSIMY

Pp\_F2\_p\_5 Y-NKGRGLY-----YDTT-ESESEK---ALIDINLRGGNPKITFNN-PIPMELIQIMD

Pp\_F2\_p\_6 Y-EKGKGF-----FDWN-IESESEK---ALIDINLRGGKPIVSFNS-PIPELVKPVLN

Pp\_trans\_132 W-EHQKLTLLPNDNDNDNE-EENNTDGKTAMVNVVDVNGGRMELTYDT-PIPELVQQIKD

Pp\_F2\_p\_2 I-EGGKVTF-----DAA-VEPEEV---GIFALNFKDGRVVFVFN--PIPPEVMKVLKE

Pp\_F2\_p\_7 I-QNGEVKF-----DHS-VEPENP---GIFVLSFKDGMVFEFNN-PIPEIMEAIKN

Pp\_trans\_63 LDKSGKFYQ-----HAE-FGPESK---GILMLSLEEGNVKFDANN-PIPKEVMDKIEQ

Pp\_F2\_p\_3 W-ENGNFKL-----HNR-ILPKKDQ--AIFTLYMGVEGVKIEIKN-NYLVKIWKTLQK

Pp\_trans\_109 W-EDGKFSL-----HNK-VLPKNDQ--ALLTVYVGAEGIKFEVKNAKFFKKLWKNIKD

Pp\_F2\_p\_4 Y-ADKKLTF-----VPN-EKTHKDD--ALVNFVKVKNP-----

Ld\_F2\_p\_1 F-KNQKLTV-----DDD-VE-MVD--EGIKVNLKAM-----

Ld\_F2\_p\_4 F-KNERLTM-----DQT-MDDYKD--DGVVNLKAL-----

Ld\_F2\_p\_5 F-KDQKLTM-----DEN-MDDYKD--DGVVNLKAL-----

Ld\_F2\_p\_2 F-KDKKLSI-----DDTYMEDGEE--DDMHFDYHTA-----

Bee\_XP\_00370227 V-----

Ld\_F2\_p\_13 I-NKGLVI-----EPP-TEGPLKKVVPNIKVPLTKH-----

Ld\_F2\_p\_11 L-NKRLTV-----EKP-SEDPNT--ALLNFNIGKNL-----TVPHVTLG----

Ld\_F2\_p\_15 V-ANHSIKV-----EKP-SGDPNT--ALLNFNIGKNI-----TVPHVTIG----

Ld\_F2\_p\_10 QNRNRIWFR-----D-----

Ld\_F2\_p\_3 QNRKNKLWFR-----T-----

Ld\_F2\_p\_9 QDRDLKLHF-----EEE-----

Ld\_F2\_p\_14 QNKDMELEF-----YEE-----

Ld\_F2\_p\_7 QTKDLKLSMR-----YYTY-----

Ld\_F2\_p\_8 QSKDLTLSMKTD-----

Ld\_F2\_p\_12 F-ENGITSLV-----

Ld\_F2\_p\_6 H-QNGQLSVA-----

Pp\_red\_p\_1 Y-ENKKFKVK-----LSPQLFAGGLDDSGDIVGNEKDES-----

Pp\_red\_p\_7 Y-ENKKFKIK-----VSPQLFAGGLDDSGDIVGNDKDES-----

Pp\_red\_p\_5 Y-ENKKFKIK-----LSPQLFAGGLDDSGDIVGNEKNAS-----

Pp\_red\_p\_2a Y-QDKKLIKIR-----FEPATFAGSLDDNGDIVVLDSEGD-----

Pp\_red\_p\_8 Y-QDKKLIKIR-----FEPATFAGSLDDNGDIVVLDSEGD-----

ADN29791.1 Y-ANKKVRVK-----ISPQLFAGATSLDGDIVKLDNNGE-----

AAL82381.1 Y-ANKKVRVK-----ISPQLFAGATSLDGDIVKLDNNGE-----

Pp\_red\_p\_3 H-EDGKTKVR-----LRPKMFAGDDDD-GAVLEASPKVDD-----

Pp\_red\_p\_6 H-ENGKLVKVR-----LRPKMFAGDDDD-GAVLEAGEKDD-----

Pp\_red\_p\_4a V-EDGKFKMR-----FAPKLFAGDEEN-NTIMEAGDKED-----

BAV31386.1 YTAQGGFAPH-----VHPQIVRT-----

BAV31387.1 FNAASGFVQP-----VHPQIIKT-----

Pp_F2_p_1	SIAEQRR----	ALDEMQLEIANQVDESIKE-----	G-----	NWWTALWKSFGFLA
Pp_F2_p_5	SIAEQRK----	ALDQVQADILQOVDESP-----		NWWTALWTSGLGLAA
Pp_F2_p_6	AIQAQRQ----	KLVELQHELTQKMKEDIKQ-----	G-----	NWWDALIGSIA-AG
Pp_trans_132	LSQRVAA----	TIASNKQYAELVKKEPKYGEAYKWNLLM----		NIWKN---SIA---
Pp_F2_p_2	IGNVIKK----	TFVDLGKKIVETAKNVWNSIKSW-FS-----		WW-----
Pp_F2_p_7	FAEVVKQ----	KVVVFVRGVVDTAKKVWDKIKSF-FSC-----		LFWSC-----
Pp_trans_63	GWNIVEKETGKFVDNAGKEISDAAKKVENELSNAAEKAKEAVVGEFVNKVTAAIGGLG-GK			
Pp_F2_p_3	VWEKITG----	LFGKSKDMAAWVKKTYPK-----		
Pp_trans_109	GWKKLKG----	LFGKSKEMKNFIEKSS-----		
Pp_F2_p_4	-FHLLIAK----	LLKALVKKLDVN-----		
Ld_F2_p_1	-WTKFKG----	LFSKKPK-----		
Ld_F2_p_4	-WKRVKV-----	LRKKEKKE-----		
Ld_F2_p_5	-WKKFKG----	LFGKKN-----		
Ld_F2_p_2	-WDWIKG----	KVFHWGDKHPSTTPMPDDEF-----		
Bee_XP_00370227	-----			
Ld_F2_p_13	-----			
Ld_F2_p_11	-----			
Ld_F2_p_15	-----			
Ld_F2_p_10	-----			
Ld_F2_p_3	-----			
Ld_F2_p_9	-----			
Ld_F2_p_14	-----			
Ld_F2_p_7	-----			
Ld_F2_p_8	-----			
Ld_F2_p_12	-----			
Ld_F2_p_6	-----			
Pp_red_p_1	-----	QGVSLDADEFEID-----		
Pp_red_p_7	-----	QGVSLAADEFEIE-----		
Pp_red_p_5	-----	QGVVLDAADEFEID-----		
Pp_red_p_2a	-----	GGVTLDADEFEVDE-----		
Pp_red_p_8	-----	GGVTLDADEFEVDE-----		
ADN29791.1	-----	DATTVEVEVEID-----		
AAL82381.1	-----	DATTLDVDEVEID-----		
Pp_red_p_3	-----	EAKMVDAEEE-----		
Pp_red_p_6	-----	EAKMVDAEE-----		
Pp_red_p_4a	-----	EGRPLDAVPDE-----		
BAV31386.1	-----			
BAV31387.1	-----			

Pp_F2_p_1	VDYGVF
Pp_F2_p_5	LDYGAY
Pp_F2_p_6	GTMGMG
Pp_trans_132	-----
Pp_F2_p_2	-----
Pp_F2_p_7	-----
Pp_trans_63	ISGWLG
Pp_F2_p_3	-----
Pp_trans_109	-----
Pp_F2_p_4	-----
Ld_F2_p_1	-----
Ld_F2_p_4	-----
Ld_F2_p_5	-----
Ld_F2_p_2	-----
Bee_XP_00370227	-----
Ld_F2_p_13	-----
Ld_F2_p_11	-----
Ld_F2_p_15	-----
Ld_F2_p_10	-----
Ld_F2_p_3	-----
Ld_F2_p_9	-----
Ld_F2_p_14	-----
Ld_F2_p_7	-----
Ld_F2_p_8	-----
Ld_F2_p_12	-----
Ld_F2_p_6	-----
Pp_red_p_1	-----
Pp_red_p_7	-----
Pp_red_p_5	-----
Pp_red_p_2a	-----
Pp_red_p_8	-----
ADN29791.1	-----
AAL82381.1	-----
Pp_red_p_3	-----
Pp_red_p_6	-----
Pp_red_p_4a	-----
BAV31386.1	-----
BAV31387.1	-----