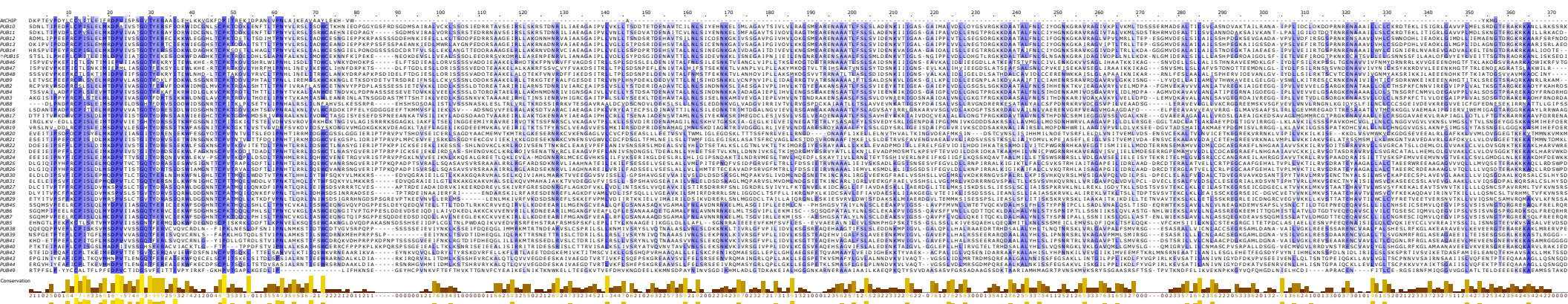


Genomic coordinates 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370

chr10 chr11 chr12 chr13 chr14 chr15 chr16 chr17 chr18 chr19 chr20 chr21 chr22 chr23 chr24 chr25 chr26 chr27 chr28 chr29 chr30 chr31 chr32 chr33 chr34 chr35 chr36 chr37 chr38 chr39 chr40 chr41 chr42 chr43 chr44 chr45 chr46 chr47 chr48 chr49 chr50 chr51 chr52 chr53 chr54 chr55 chr56 chr57 chr58 chr59 chr60 chr61 chr62 chr63 chr64 chr65 chr66 chr67 chr68 chr69 chr70 chr71 chr72 chr73 chr74 chr75 chr76 chr77 chr78 chr79 chr80 chr81 chr82 chr83 chr84 chr85 chr86 chr87 chr88 chr89 chr90 chr91 chr92 chr93 chr94 chr95 chr96 chr97 chr98 chr99 chr100

chr10 chr11 chr12 chr13 chr14 chr15 chr16 chr17 chr18 chr19 chr20 chr21 chr22 chr23 chr24 chr25 chr26 chr27 chr28 chr29 chr30 chr31 chr32 chr33 chr34 chr35 chr36 chr37 chr38 chr39 chr40 chr41 chr42 chr43 chr44 chr45 chr46 chr47 chr48 chr49 chr50 chr51 chr52 chr53 chr54 chr55 chr56 chr57 chr58 chr59 chr60 chr61 chr62 chr63 chr64 chr65 chr66 chr67 chr68 chr69 chr70 chr71 chr72 chr73 chr74 chr75 chr76 chr77 chr78 chr79 chr80 chr81 chr82 chr83 chr84 chr85 chr86 chr87 chr88 chr89 chr90 chr91 chr92 chr93 chr94 chr95 chr96 chr97 chr98 chr99 chr100



Genomic coordinates 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300 310 320 330 340 350 360 370

chr10 chr11 chr12 chr13 chr14 chr15 chr16 chr17 chr18 chr19 chr20 chr21 chr22 chr23 chr24 chr25 chr26 chr27 chr28 chr29 chr30 chr31 chr32 chr33 chr34 chr35 chr36 chr37 chr38 chr39 chr40 chr41 chr42 chr43 chr44 chr45 chr46 chr47 chr48 chr49 chr50 chr51 chr52 chr53 chr54 chr55 chr56 chr57 chr58 chr59 chr60 chr61 chr62 chr63 chr64 chr65 chr66 chr67 chr68 chr69 chr70 chr71 chr72 chr73 chr74 chr75 chr76 chr77 chr78 chr79 chr80 chr81 chr82 chr83 chr84 chr85 chr86 chr87 chr88 chr89 chr90 chr91 chr92 chr93 chr94 chr95 chr96 chr97 chr98 chr99 chr100

chr10 chr11 chr12 chr13 chr14 chr15 chr16 chr17 chr18 chr19 chr20 chr21 chr22 chr23 chr24 chr25 chr26 chr27 chr28 chr29 chr30 chr31 chr32 chr33 chr34 chr35 chr36 chr37 chr38 chr39 chr40 chr41 chr42 chr43 chr44 chr45 chr46 chr47 chr48 chr49 chr50 chr51 chr52 chr53 chr54 chr55 chr56 chr57 chr58 chr59 chr60 chr61 chr62 chr63 chr64 chr65 chr66 chr67 chr68 chr69 chr70 chr71 chr72 chr73 chr74 chr75 chr76 chr77 chr78 chr79 chr80 chr81 chr82 chr83 chr84 chr85 chr86 chr87 chr88 chr89 chr90 chr91 chr92 chr93 chr94 chr95 chr96 chr97 chr98 chr99 chr100

Multiple Sequence Alignment of Class II and III PUBs

Shown is the amino acid sequence alignment of 42 PUBs. Alignment was curated manually and gaps occurring in the alignment were deleted if more than 75% of the aligned sequences contained a gap in the same position. Highest residue conservation is indicated by dark blue, lighter shades indicate lower conservation. The phosphorylated residues Thr62 and Thr88 of PUB22 are highlighted in red.

Sequences used for the alignment:

>AtCHIP At3G07370 /180-262 (outgroup)

DKPTEVPDYLCNITLIFRDPVISPSGVTYERAAILEHLKKVGFDPITREKIDPANLVPNLAIKE
AVAAYLEKH-VW-----A-----

-----YKMG-----

>PUB10 AT1g71020/224-596

SDNLTIPEDFLCPISLELMKDPVIVSTGQTYERSFIQRWIDCGNLSKPKTQQKLENFTLTPNYVL
RSLISQWCTKHNIQPGGYGSRDSDMSAIRALVCKLSSQSIEDRRTAVSEIRSLSKRSTDN
RILIAEAGAIPLVKLLTSDDTETQENAVTCILNLSIYEHNKELIMLAGAVTSIVLVLRAGSMEARE
NAAATLFSLSLADENKIIIGAS-
GAIMALVDLLQYGSVRGKKDAATALFNLCIYQGNKGRAVRAGIVKPLVKMLTDSSSERMADEA
LTILSVLASNQVAKTAILRANA-
IPPLIDCLQKDQPRNRENAAILLCLCKRDTEKLISIGRLGAVVPLMELSRDGTERRAKRKANLLR
KSSRK

>PUB11 AT1g23030 /225-590

SDKLTIPVDFLCPVSELEMKDPVIVATGQTYERAYIQRWIDCGNLTCPKTQQKLENFTLTPNYV
LRSLISRWC AEHNIEQPAGY-----
SGDMSVIRALVQRLSSRSTEDRRNAVSEIRSLSKRSTDNRILIAEAGAIPLVNLLTSEDVATQE
NAITCVLNLSIYENKELIMFAGAVTSIVQVLRAGTMEARENAATLFSLSLADENKIIIGGS-
GAIPALVDLLENGTPRGKKDAATALFNLCIYHGKGRAVRAGIVTALVKMLSDSTRHRMVDEA
LTILSVLANNQDAKSAIVKANT-
LPALIGILQTDQTRNRENAAILLSLCKRDTEKLITIGRLGAVVPLMDLSKNGTERGKRKAILLRK
ACQ-

>PUB12 AT2g28830 /236-606

RDMLIPPEEFCRCPISLELMTDPVIVSSGQTYERECIKKWLEGGHLCPTQETLTSDIMTPNYV
LRSLIAQWCESNGIEPPKRPASSSSDDEHNKIEELLLKLTSSQPEDRRSAAGEIRLLAKQNNH
NRVAIAASGAIPLLVNLLTSDSRTQEHAVTSILNLSICQENKGVKIVSSGAVPGIVHVLQKGSME
ARENAATLFSLSVIDENKVTIGAA-
GAIPPLVTLLESGSQRGKKDAATALFNLCIFQGNKGVKAVRAGLVPVLMRLLTEP-
ESGMVDESLSILAILSSHPDGKSEVGAADA-
VPVLVDFIRSGSPRNKENSAAVLVHLCSWNQHLIEAQKLGIMDLLIEMAENGTDRGKRKAAR
FSRFNDQ

>PUB13 AT3g46510 /237-607

QKIPVIPDDFCRCPISLEMMRDPVIVSSGQTYERTCIEKWIEGGHSTCPKTQQALTSTTLTPNYV
LRSLIAQWCEANDIEPPKPPSSSFSSPAEANKIEDLMWRLAYGNPEDQRSAGEIRLLAKRNAD
NRVAIAEAGAIPLLVGLLSTPDSRIQEHSTALLNLSICENKGAIVSAGAIPGIVQVLKKGSM EA
RENAATLFSLSVIDENKVTIGAL-
GAIPPLVLLNEGTRGKKDAATALFNLCIYQGNKGVKAVRAGVIPTLTRLLEP-
GSGMVDEALAILAILSSHPDGKAIIGSSDA-
VPSLVEFIRTGSPRNRENAAVLVHLCSGDPQHLVEAQKLGIMGLIDLAGNGTDRGKRKAA
RISRLAEQ

>PUB14 AT3g54850 /229-598

HRSPVIPEYFRCPISLELMKDPVIVSTGQTYERSSIQKWL DAGHKTCPKSQETLLHAGLTPNYV
LKSLIALWCESNGIELPQNQGSSSSDCDRTFVLSLLEKLANGTTEQQRAAAGELRLLAKRNVD
NRVCIAEAGAIPLLVELLSSDPRTQEHSVTALLNLSINEGNKGAIVDAGAITDIVEVLKNGSME
ARENAATLFLSVIDENKVAIGAA-
GAIQALISLLEEGTRRGKKAATAIFNL CIYQGNKSRVAVKGGIVDPLTRLLKDA-
GGGMVDEALAILAILSTNQEGKTAIAEAS-
IPVLVEIIRTGSPRNRENAAILWYLCIGNIERLNVAREV GADVALKELTENGTDRAKRKAALIQ
QTE--

>PUB15 AT5g42340 /227-592

STSLILPHEFLCPITLIMLDPVIIATGQTYEKESIQKWFDAGHKTCPKTRQELDHL SLAPNFALK
NLIMQWCEKNNFKIPEKE-----
NEQKDEVSLLEALSSSQLEEQRRSVKQMRLLAREN PENRVLIANAGAIPLL VQLLSYPDSGIQ
ENAVTLLNLSIDEVNNKLISNEGAI PNII EILENGNREARENSAAALFSL SMLDENKVITIGLS-
NGIPPLVDLLQHGT LRGGKDAL TLFNLSLNSANKGRAIDAGIVQPLL NLLKDK-
NLGMIDEALSILLLLASHPEGRQAIGQLSF-
IETLVEFIRQGTPKNKECATSVLLELGSNNSSFILAALQFGVYEYLVEITTS GTNR
AQRKANLISKSEI

>PUB46 AT5g18320 /61-424

ISPVEVPKEFICTLSNTIMIEPVIIASGQTYEKRYITEWLKHE-
RTCPTKQVLSHRLWIPNHLISDLITQWCLV NKYDHQKPS-----
ELFTSDIEALLQRVSSSSVADQIEAAKELRHQTKKFPNVRVFFVAGDSITRLLSPLSDSSLELQE
NIVTALFNLSILES NKTIVIANCLVIPLLT KSLKQGTDETRRNAATLSSLSAIDSNKIIIGNS-
EAVKALIDLIEEGDLLATKEATSTVFNLCIVLENK GKVVSAGLIHAATKKIKAG---
SNVDELLSLLALISTHNR AVEEMDKLGF-
YDLFSILRKPSSTGENAVVIVFNMYDRNRRLKVV GEEENQHGTFTKLAKQGSVRAARKAQW
IKRFVTG

>PUB47 AT5g18330 /60-418

ISPVEVPKEFICTLSNKIMIEPMLIASGQTFEKSYLEWLKHE-
RTCPTKQVLYHRFMIPNHLINELIKEWCLIHNFDRPKTS-----
DLFTGDLESLLQRISSSSVEDQTEAAKELAL KAKRFSSVCVYFVAKDSITRLLTPLSDSNPEFLE
NIVTALHIFSTSEKNKTLVANPLVPLLAKYMKQGT VLTRIHSAA TVNSLSYTD SNKIIIGNS-
EVLKALIHVIEEGDSLATSEAFSALSNLCPVKEISEKAVSEGLIRAAIKKIKAG---
SNVSMLLSLLAFVSTQNQTTEEMDNLGL-
YDLFSILRNSNSVNDENAVVIVYNICKSYKKRDV VLEENKHGTFTRL ENQEAGRATSLAKWIL
R----

>PUB48 AT5g18340 /69-432

SSSVEVPKEFKCTLSKTIMIDPVII FSGQTYEKRYITEWLNHD-
LTCPTAKQVLYRVCLTPNHLINELITRWCLANKYDRPAPKPSDIDELFTD GIESLLQRISSSSVA
DQTEAAKELALQTEKFNVRDFFIKEDSITRLL TPLSDSNPELQENIVTALFNMSTFEKNKTVLA
NHQVIPLLAKSMKQGSVVTRRNATLTLASLSDIDS NKIIIGNS-
VALKALIDLIGELDLSATHDALCAVIDLCCEREN WKKAISLGLAPAAIKNIKAR---
RNLFESLAALALISPHERVIQEVANLGV-
YDLLSILRKTSCVTCENAVVIVGNMYAKSRIK KILAEENQHKTFTKIATQGSVVAVMKAQCIN
Y----

>PUB9 AT3g07360 /67-434

LETVSCPEEFRCPLSNELMRDPVVLASGQTYDKLFIQKW LSSGNRTCPKTQQVLPHTALTPNL
LIREMISKWCKKNGLETKSQYDET VTRSDREIFNSLLCKVSSSNLQDQKSAAKELRLLTRKGT
EFRALFGESDEITRLVNPLHNPDEKLQEDVTTLLNISI HDSNKKLVCNPNVIPLLDALRRGTVA
TRSNAAAIFTL SALSNDKVLIGS-
GILKPLIDLLEEGNPLAIKDVA AAIFTLCIAHENRSRAVRD GAVRVLGKKISNG---

LYVDELLAILAMLVTHWKAVEELGELGG-
VSWLLKITRESECRNKENAIVLHTICFSDRKWKEIKEEENAHGTITKLSREGTSRAQRKANRLR
KAM--

>PUB2 AT5g67340 /228-598
RCPVRVPSDFRCSLSLELMTDPVIVASGQTFERVFIQKWIDMGLMVC PKTRQALSHTTLTPNFI
VRAFLASWCETNNVYPPDPLASSSESSIEVKKLIDDLKSSSLDTQREATARIRILARNSTDN
RIVARCEAIPSLVSLLYSTDERIQADAVTCLLNL SINDNNKSLIAESGAIVPLIHVLKTGYEEAKA
NSAATLFSLSVIEEYKTEIGEA-
GAIEPLVDLLGSGSLSGKKDAATALFNLSIHENKTKVIEAGAVRYLVELMDPA--
FGMVEKAVVLANLATVREGKIAIGEEGG-
IPVLVEVELGSARGKENATAALLQLCTHSPKFCNNVIREGVIPPLVALTKSGTARGKEKAQYF
KAHRQS

>PUB4 AT2g23140 /224-594
TSSVAILADFFCPLSLEVMTDPVIVSSGQTYEKAFIKRWIDLGLKVC PKTRQTLTHHTLIPNYTV
KALIANWCETNDVKLPDPNASSSESEVETQVKKLVEELKSSSLDTQRQATAELRLLAKHNMD
NRVIGNSGAIVLLVELLYSTDSATQENAVTALLNLSINDNNKAIADAGAIPLIHVLENGSSEA
KNSAATLFSLSVIEENKIKIGQS-
GAIGPLVDLLGNGTPRGKDAATALFNLSIHQENKAMIVQSGAVRYLIDLMDPA--
AGMVDKAVAVLANLATIPEGRNAIGQEGG-
IPLLVEVELGSARGKENAAAALLQLSTNSGRFCNMVLQEGAVPPLVALSQSGTPRAREKAQ
YFRNQRHG

>PUB3 AT3g54790 /227-598
AKGISIPPYFRCPSTELMLDPVIVASGQTFDRTSIKKWLDNGLAVCP RTRQVLTHQELIPNYTV
KAMIASWLEANRINLATNSGGDASTMTTSHTIKLVEDLKSGSNKVKTAAAAEIRHLTINSIENRV
HIGRCGAIPTLLSLLYSEEKLTQEHAVTALLNLSISELNKAMIVEVGAIEPLVHVLNTGNDRAKE
NSAASLFSLSVLQVNRERIGQSNAAIQALVNLLGKGTFRGKKDAASALFNLSITHDNKARIVQA
KAVKYLVELLDPD--LEMVDKAVALLANLSAVGEGRQAIVREGG-
IPLLVETVDLGSQRGKENAASVLLQLCLNSPKFCTVLVQEGAIPLVALSQSGTQRAKEKAQH
RNQRDA

>PUB8 AT4g21350 /4-363

DLPNDFRCPISLEIMSDPVILQSGHTFDRVSIQQWIDSGNRTC PITKLPLSETYLIPNHALRSLIL
NFAHVSLKESSRPR-----
EHSQSQUALISTLVSSSNASKLESLTRLVRLTKRDSSIRKVTESGAVRAALDCV DSCNQVL
QEKSLSLLNLSLEDDNKVGLVADGVIRRVTVLRVGPDCCKAIAATLLTSLAVVEVNKATIGSY
PDAISALVSLLRVGNDRERKESATALYALCSFPDNRKRVVDCGSPILVEAADSG-----
LERAVEVLGLLVKCRGGREEMSKVSGFVEVLVNVLRNGNLKGIQYSLFILNCLCCCSGEIVDE
VKREGVVEICFGFEDNESEKIRRNATLLGIPSS

>PUB16 AT5g01830 /242-606
LSDANIPADFRCPITLLEMRDPVVVATGQTYDRESIDLWIQSGHNTCPKTGQVLKHTSLV PNR
ALKNLIVLWCRDQKIPFELYGDGGGEEFTKMMV SFLIEKLSV---
ADSNVVFELRALAKSDTVARACIAEAGAI PKLVRYLATECPSLQINAVTTILNLSILEQNKTRIM
TDGALNGVIEVLRSGAWAKANAAATLFSLAGVSAYRRRLGRKARVVSGLVDLAKQGPTSSK
RDALVAILNLVAERENVGRFVEAGVMGAAGDAFQ-----ELPEEAVAVVEAVVRRG-
GLMAVSAAFSLIRLLGEVMREGADTTRESAAATLVTMCRKGGLVAEMAAIPGIERVIWEMIGA
GTARGGRKAAYLRRWAAG

>PUB17 AT1g29340 /244-614
DTFITVPKDFVCPISLDLMTDPVIISTGQTYDRNSIARWIEEGHCTCPKTGQMLMDSRIVPNRAL
KNLIVQWCTASGISYESEFDPNNEEANKATVSILIKYLADGSQAAQTVAAREIRLLAKTGKENR
AYIAEAGAIPHLCRLLTSENIAQENSVTAMLNLSIYEKNKSRIMEGDCLESIVSVLVSGLVEAQ

ENAAATLFLSAVHEYKRIAIVDQCVEALALLQNGTPRGKDAVTALYNLSTHPDNC SRMIE
GGGVSSLVGALKNE---
GVAEEAAGALALLVRQSLGAE AIGKEDSAVAGLMGMMRCGTPRGKENAVAALLELCRSGGA
VAEKVLRAPIAGLLQTLTFTGTRARRKAAVFQRRENA

>PUB18 AT1g10560 /243-612

IRGLKV-
EDLLCPISLEIMTDPVVIETGHTYDRSSITKWFSGNITCPITGKILTSTELVDNVSVRQVIRKHC
KTNGIVLAGISRRRKSGAGKLIKFLTSELINGGEEMIIYRAVREIRVQTKTSSFNRSLVKAGAV
TPLLLKLLSSVDIRIQENAMAGILNLSKHVTGKSKIA-
GEGLKILVEILNEGATETRLYSASALFYLLSSVEDYSRLIGENPDAIPGLMNIVKGGDDSAKRSAL
LAVMGLMQSDNHWRVLAAGAVPILLDLRSGE-GGLTADCLATLAKLAEYPDGTIGVIRRGG-
LKLAVKILSSSSPAVKQHCVGLILNLCNNGGVVGLVKNSLVMGSLYTVLSNGEYGGSKKASMI
HEFQER

>PUB19 AT1g60190 /234-604

VRSLNV-
DDLRCPISEIMSDPVVLESHTYDRSSITKWFASGNITCPKTGKTLVSTVLVDNFSVKQVIQS
YSKQNGVVMGQKGGKKVDEAGKLTAEFLAGELIKGDEEEMVKALVEIRILTKTSTFYRSCLVE
AGVNESLMKILRSSDPRIQENAMAGIMNLSKDIAGKTRIVDGGGLRLIVEVLNDGARESRYAA
AALFYLLSSLDYSRLIGEISDAIPGLVRIVKSCDDSAKRNALIAIRSLLMQPDNHWRILAAGIVPV
LLDLVKSEE-DGVTADSMAILAKMAEYPDGMISVLRGG-
LKLAVKILGSSSPATKQHCVALLLNLCNNGGVVGLAKNPSIMGSLYASSNGELGGGKKASM
IHEFQER

>PUB20 AT1g66160 /19-382

EVEITIPSQFCPISYELMKDPVVIASGITYDRENIEKWFESGYQTCVPTNTVLTSLAQIPNHTIR
RMIQGWCGSSSLGGGIERIPTPRVPVTSHQVSEICERLSAGDYAACMEMVTMTRLGKESERN
RKCCKENGAGLVLCVCFDSEASLLLEETVSVLWMLIGLEGQSKLTTTSSFNRLVELLRNGD---
-QNA AFLIKELLELVNTHVALTKINGVQEA FMKSIN---
DSTCVNSLISIH MILNQETVSRFLELDLVNITVEMLVDS-
ENSVCEKALTVLNVICETKEGREKVRRLKLVIPILVKKILKISE--
KKDLVSVMWKVCKGDGSEVEEALRLGAFKLVVMLQVGGEGTKEKVTMMNKVMKM

>PUB21 AT5g37490 /19-391

ESEITIPPEFQCPISIDLMKDPVVIISTGITYDRVSIETWINSGNKTCVPTNTVLTTFDQIPNHTIRKM
IQGWCVEKGSPLIQRIPTPRVPLMPCEVYEISRKLSSGDYKCGVIEKIKKLGDESEKNRKC
NENSVGWVLCDFDGLTFMLNEILSLLTWMFIGLEGISKLASATSFRCVAGLLKSTDDSVRQ
NAAFIMKEILSLDETRVSVFAVENGVAEALVKLIRDSVSSSTKSSLIAIYQMVLPKPEIASEFLEIGLV
SITVEMIVDA-
ENSVCEKALAVLDAICETE HGREVRKNALVMPLLVKKIAKVSELATRSSMSMILKLWKGNTV
AVEDAVRLGAFQKVLVQLVQVGGEEETKEKATMMNTQMKL

>PUB22 AT3g52450 /2-374

DQEIEIPSFFLCPISLDIMKDPVIVSTGITYDRESIEKWLFGKNSCPVTKQVITETDLTPNHTLR
RLIQSWCTLNASYGIERIPTPKPPICKSEIEKLIKESSE-
SHLNQVKCLKRLRQIVSENTTNKRCLEAAEVPEFLANIVSNSSRSLMDEALSVLYHLDTSETAL
KSLGTLNVLKTLTKIMQRGIYESRAYAALLLKKLLEVADPMQIILLERELFGEVIQILHDQIHKATR
SAMQILVITCPWGRNRHKAVEGGTISMIE LLMDDTERRNSEMAMVVLDMLCQCAEGRAEFLN
HGAAIAVVSKILRVSQITSERAVRVLVSVGRCATSLLQEMQLQGVVAKLCLVLQVSGNKTEK
AKLHARVWRE

>PUB23 AT2g35930 /5-377

DEEIEIPPFLLCPISLEIMKDPVIVSTGITYDRDSIEKWLFGKNSCPVTKQDITDADLTPNHTLR
RLIQSWCTLNASYGVERIPTPRPPICKSEIEKLIRDSAS-
SHENQVKCLKRLRQIVSENATNKRCLEAAGVPEFLANIVSNDNGSLTDEALNLLYHLETSETVL

KNLLDNNIVKSLTKIMQRGMYESRVYATLLLKNILEVADPMQSM TLKPEVFTEVVQILDDRIQKA
TKAAMHILVNICPWGRNRHKAVEAGVISVIIELLMDESERRGPEMAMVVLDLLCQCAEGRAEF
LNHGAAIAVVCKILRVSQASDRAVRVLLSVGRCATALLHEMLQLGVVAKLCLVLQVSGGK
TKEKAKLHARVWKD

>PUB24 AT3g11840 /19-390

EEEIEIPNYFICPISLEIMKDPVTTVSGITYDRQNIVKWLEKV-
PSCPVTKQPLLDSDLTPNHMLRRLIQHWCVENETRGGVVRISTPRVPPGKLVVVEIKNLKKQE
ALGREETLQKLEVLA-
MDGNNRRLMCECGVHKSLILFVKSERIKGLDESLRLLHLIGIPSNDAKTLNDRVMESL TWVLH
QEDFLSKAYTIVLLRNLTEYTSSHIVERLNPEIFKGIIGFLKQSSKQAVTAALMILLETSSWSRNR
SLLVDLGAVSELIELEISYTEKRITELMLGVLSRLCCANGRAEILAHRGGIAVVTKRLLRVSPAA
DDRAISILTTVSKSPEMVVEEMVNVGTVEKLC SVLGMDGLNLKEKAKDHFDEWKK

>PUB25 AT3g19380 /9-381

DLGIQIPYHFRCPISELMQDPVTVCTGQTYDRASIESWVSIGNTTCPVTRAPLSDFTLIPNHTL
RRLIQEWCVANRSNGVERIPTPKQPADPTSVRALLSQASAVSVRSRAAALRRLRGFARDSDK
NRVLIAAHNATEILIKILFSESSELVSESLALLVMLPITEPNQFVSIDPGRVEFLTRLLFDSSIE TRV
NAAALIEIVSKSADLKGSIENSESVFEGVLDLLRNPIRRALKIGIKTLFALCSVKSTRHIAITAGAP
EILIDRLAAD-
DRC DTERALATVELLCRTPEGCAAFGEHALTVPLL VKTILRVSDRATEYAAGALLALCTAEER
WREEAAGAGVVVQLLLMVQSETERAKKKAQLLRDSWPD

>PUB26 AT1g49780 /9-381

DLGIQIPYHFRCPISELDLMSDPVTISTGQTYDRTSIDSWIAMGNTTTPVTRVALSDFTLIPNHTL
RRLIQEWCVANRSNGVERIPTPKQPADPISVRSLLSQASAVSVRSRAAAIRRLRGLARDSEKN
RVLIAGHNAREILVRILFADSELVSESLALLVLLHMTETECEAVADPSRVGFMTRLLFDSSIEIR
VNAALIEIEMVLKSM DLKLIISGSDSIFEGVLDLLKNPIRRALKIGIKAIFALCLVKQTRHLAISAGAP
GILIDRLAAD-
DRC DTERGLATVELLCRLPEGCAAFGEHALTVPLMVKTILRVSDRATEYAAGALLALCTAEER
CRDEAAAAGLVTQLLLLQSDTERAKRKAQLLRDSWPD

>PUB30 AT3g49810 /58-425

ELDL DIPS VFICPISLEPMQDPVTLCTGQTYERLNIHKWFNLGHLTCPTTMQELWDDTVTPNKT
LHHLIYTWFSQKYVLMKKRS-----
EDVQGRAIEILGTLKAKGQARVHALSELKQVIAHLMARKTVVEEGGVS VISSLL-
GPSHAVGSEVVAILVSLDLSDSKSGLMQPAKVS LIVDMLNDGSNETKINCARLIRGLVEEKGF
RAELVS
SHSLLVGLMRLVKDKRRNGVSPALRLLKPISVHKQVRSLMVSIGAVPQLVDILPSL-
DPECLELALFVLDALCTDVEGRVAVKDSANTIPYTVRVL MRVSENCTNYALSILWSVCKAPEE
CSPLAVEVGLAAKLLLVIQSGDAALKQRSALCSLHYS D

>PUB31 AT5g65920 /51-418

ELELEIPSVFICPISLEPMQDPVTLCTGQTYERSNLIKWFNIGHCTCPTTMQELWDDLVTNPKT
LHQLIYTWFSQKYVLMKKRS-----
EDVQGRAIEILGTLR KAKGKAKVHALSELKQVVM AHAI AKKT VVDEGGVFVISSLL-
SPSHAVGSEAIAILVNLELSDSKAGLMQPARVSLMVDMLNDGSIETKINCARLIGRLVEEKGF
RAELVSSHSLLVGLMRLVKDRRRNGVSPAL TLLKSVSVHKQVRNLLVRIGAVPQLVDVLPCL-
DVECLELALFVLDLSCLESEGRIALKDSVNTIPHTV RLLMKVSEKCTNYAISILWSVCKASEECS
SLAVEVGLAAKLLLVIQSGDPALKQRSALCSLHYS D

>PUB27 AT5g64660 /5-373

DLCITVPTFFRCPISELDVMKSPVSLCTGVTYDRASIQRWLDGGNNTCPATMQILQNKDFIPNRT
LQRLIEIWSDSVRRRTCVE S-----
APTRDEIADAIDRVKIKEERDDREVLSKIVRFGRESDDNRGFLAGKDFVKLLVDLINTSKSLVVQ
EAVKILSTIRSDRRRFSNLIGRDRLSVIVYLFK TGNVELKIDCAGLLEFIAVDAESKLLIAERDGLI

TELMKSISKDSLIESLSCLIAISSPKRVKLNLLREKLIGDVTKLLSDSTSVSVTEKCLKLLEILA
STKEGRSEICGDGECLKTVVKLMKVSTAATEHAVTVLWSVSYFKEKALEAVTSVNVTKILLLL
QSNCSPAVRRMLTVFKVNSRS

>PUB28 AT5g09800 /5-367

DLYITVPCFFKCPISLDVMKSPVSLSTGVTYDRVSIQRWLDDGNNTCPATMQILQNKEFVPNL
LHRLIDHWSDSINRRADSES-----TPTRDEINAAIERFRI-----
ENDARSKILRFARESDENREFLAGKDFVAMLVDLISFSQLLLVEAVKILSMIRFDRRRLSNLIG
GDCLTSFFLLIKRGNPKLKIDCSAVLEFIAVDAESKLIIAKGEGLVTEIIKLISSDSSSLIEANLSLLI
AIASSKRVKLALIREKLVTKLTSLLTDPTS SVSVTEKCLKLLEAISSCKEGRSEIC-
DGVCVETVVNKLKVSTAATEHAVTVLWSVCYFKEKAQDAVIRINVTKILLLLQSNCSLTVRHM
LTVFKVNSRS

>PUB29 AT3g18710 /7-374

ETYITVPSFFKCPISLDVMRSPVSLCTGVTYDRASIQRWLDGGNNTCPATMQLLTKDFVPNL
TLQRLINIWSDSIGRRHNGDSPSGREVPPTKEEVNLLERLMS-----
LENLMKIVRFVKDSNREFLSKKEFVPMMLVDIIRTKKIELVIMAIRILDSIKVDRERLSNLMGGD
CLTAILAIQRGNLESKIESVRVLDWISFDAKSKLMAERDGVLEMMKSISESSPSLIEASLSFLI
TISKSKRVRSKLIAAKAITKIKDILLTETNAVTEKSLKLETLSSKREGREICDNGRCVEGVK
KLLKVSTTATEHAVTILWCLCYFRETVEETVERSNVTKLLVVIQSNCSAMVRQMAKVLKFNS
A

>PUB45 AT1g27910 /227-596

SSQMSVPEELRCPIQLMYDPVIIASGQTYERICIEKWFSDGHNTCPKTHQQLSHLCLTPNYC
VKALISSWCEQNGVQVPDGPPELDEYQEDQVTELLTTLTDDTLRKKCRVVEQIRVLLKDDEE
ARILMGANGCVEALLQFLGSANASAKVGMALFNLAVDNRNKELMLASGIIPLEEMLCN--
PHSHGSVTAIYLNLSCLLEEAKPVISS-
LAVPFMVNLLWTETVQCKVDALHSLFHLSTYPPNIPCLLSADLVNALQSLTISD-
EQRWTEKSLAVLLNLVLNEAGKDEMVSAPSLVSNLCTILDGTGEPNEQEQAVALLLILCNHSEIC
SEMVLQEGVIPSLVSISVNGTQRGRERAQLFRELRQR

>PUB6 AT1g24330 /226-595

SGQMPIPEELRCPIQLMYDPVIIASGQTYERVICIEKWFSDGHNSCPKTQQQLPHLSLTPNY
CVKGLIASWCEQNGITVPTGPPESLDDEVDSEIQDILAIVDKEDLAKKCKVVENVRILLKDNEEA
RILMGANGFVEAFLQFLESANAAAQETGAMALFNLAVERNKRKELMLTSGVIPLEKMISS--
SQSQGPATALYLNLSCLLEKAKPVISS-
QAVSFFVNLLQDQCKLDALHALYNLSTYSPNIPTLLSSNIIKSLQVLASTG-
NHLWIEKSLAVLLNLASSREGKEEMITQGMISTLATVLDGTGDTVEQEQAVALSCLVILCTGSESCI
QMVLQEGVIPSLVSISVNGSPRGRDKSQLFREQRHR

>PUB7 AT1g67530 /226-595

SGQMPVPEELRCPIQLMCDPVIIASGQTYERVICIEKWFSDGHNTCPKTQQQLPHISLTPNN
CVKGLIASWCEQNGTQIPSGPPESQDDEEDSDIQDLLAVLNEEGLEKKCKVVEKIRLLLDKDE
EARIFMGANGFVEALLRFLGSANAAAQDSGAMALFNLAVERNKRKELMLTSGVIRLLEKMISS--
AESHGSATALYLNLSCLDEAKSVIGSS-
QAVPFLVQLLQKEITQCKLDALHALYNLSTYSPNIPALLSSNIIKSLQGLLAST-
ENLWIEKSLAVLLNLASSQEGKDEAVSSQGMISLATVLDMGDTTEQEQAVALSCLLILCNGRES
CIQMVLEQGVIPSLVSISVNGTPRGREKSQLFREERQR

>PUB5 AT4g36550 /209-574

EHNGTLPEKFKCTLSRTVMYDPVIISGNTFERMQIQKWFDEGNDSCPISKRKLDDFTLKPNV
ELKSQISEWCAKNGLDVQDPAKASNSDSSHSEIIDPLCGLTNLPWDAQIKVVEDVRSRFEHST
RAFRRMSPSKFLEPLITYLKNAAGEIIKGGLDLLLAFL--SGNRRRAIEEEEVFKMFSVFLES--
EVVAEEALNILEVLSNHPHGPKITSS-
GSLSSLLKIVESQAHLQEAMITLKNLSSMEICLEMVSLDFIQKLTSLQKQK---

VFCKHSIIILKNLCSTEKGRGCITETPDCLASIAELLESNVPEEQENAI SILLQLCVQKIEYCCLVV
REAIYSSLILISNNGTEEVKVSASALVEVDSD

>PUB38 AT5g65200 /28-389

QQEQQPPVEFLCPISKSVMSDPVVVSSGQTFERVCVQVCRDLN--
FIPKLNESLDFSNIIIPNLNMKSTIDTWCDTVGVSRPQP-----
SSSSSEIEVIYNKLSSEIFDQEQGLIMMRKMTRTND EARVSLCSPRILSLLKNMIVSRYSLVQT
NALASLVNLSLDKKNKL TIVRLGFVPILIDVLKSGSREAEHAAGTIFSLSLEDDNKMPIGVL-
GALQPLLHALRAAEDRTRHDSALALYHLTLNQTNRSKLVRLGAVPALFSMVRSG---
ESASRALLVICNLACCSEGRSAML DANA-
VAILVGKLR EESSARENCAALFALSHESLRFKGLAKEARAVEVLKEVEERGTERAREKAKL
MRERVPE

>PUB39 AT3g47820 /5-361

NSPGETPTEFLCPITGFLMSDPVVVASGQTFERISVQVCRNLS--
FAPKLHGTQDLSTVIPNLAMKSTILSWCDRNKMEHPRPPSLP-----
EEIYNKLTSDVTIDHEQGLIQLRKTTRSNETTRISLCTDRILSLLRSLIVSRYNIVQTNA AASIVNL
SLEKPNKLIKIVRS GFVPLLIDVLKSGSTEAQEHVIGALFSLAVEEENK MVIGVL-
GAVEPLLHALRSSEERARQDAALALYHLSLIPNNRSRLVKAGAVPMMLSMIRSG---
ESASRILLLLCNLAACSEGGKAMLDGNA-
VSILVGKLR ESSDAARENCAALFALSHESLRFKGLAKEARAVEVLKEVEERGTERAREKAKL
RGGG--

>PUB41 AT5g62560 /27-392

KHD-ETPPEFLCPITGFLMSDPVVVSSGQTFERLSVQVCRNLG--
YIPDLLGTRDLSTVIPNLAMKSTIFSWCDRQKVDHPRPPKDPNPTSSSSGV EEIFNKL RGTDIF
DHEQGLILLRKMTRSS EDLRVSLCTDRILSFLRSLLSRYNLVQTNA AASVVNLSLEKQNKVKI
VRSGFVPLLIDVLKSGTTEAQEHVAGALFSLALEDENK MVIGVL-
GAVEPLLHALRSSEERARQDAALALYHLSLIPSNRTRLVRAGAVPTLLSMVRSG---
DSTSRIILLVLCNLAACPDGKGAMLDGNA-
VAILVGKLR EVSEAARENCAAVLLTLCQGNLRFRLGLASEAGAEV LMEVEENGNERNVKEKAS
AMRGGGGG

>PUB40 AT5g40140 /49-412

PTKTEIPAELFCPIGSLMADPIIVSSGHSYERACVIACKTLG--FTP---
TPPDFSTVIPNLALKSAIHSWCERRCFPPP KPLKKPQRSPSSGEIEALLTKLKS NRRISEIEEALISI
RRITRIDESSRISLCTTRVISALKSLIVSR YATVQVNVTA VLVNLSLEKSNKVKIVRS GIVPPLIDV
LKCGSVEAQEHSAGVIFSLALEDENKTAIGVL-
GGLEPLLHLIRVGTETL RHDSALALYHLSLVQSNRGLVKLGAVQMLLGMVSLG---
QMIGRVLLILCNMASCVPVSRPALLDSGG-
VECMVGLR RDVNSTRESCVAVLYGLSHGGLRFKGLAMAANA VEELVKVERSGRERAKQKA
RVLRAKIED

>PUB42 AT1g68940 /186-551

STEIDIPQAFICPLTKEIMEDPVTTETGVT CERQAVIEWFDSFNINCPVTGQKL-
TTELSANVVLKTI IQEWKVRNEAARIKVA-----
EYNKVQVQLLD RYLTYSKDVRFELLKFLRTLAEETDDGKEMIVKTITMSCVIKLLGSSHQPVR
HAAQALLLELSKCPENIKQMAESGLLEPLLGH LAEGSEETQVAMAAYLVEIDIGHEKKT YVAEK
--
ACPALIGLVQSENIDARRAAFKALAHISLYHPNNKILVEVGIKIMVEEMFTKRLMNSRNEAATIL
ANILESGLEHETFE GSDYFVYNIHMLKNSSPDLNIDLIRILLSLSKSPRTIVSVIKETDASFAMIEL
EANQTEKHA VSAKLLMKTSSD

>PUB43 AT1g76390 /15-381

EPGINIYEAFICPLTKQVMHNPVTL ENGQTFEREAI EKWFQCELSCPITSKEL SITDLSPSIALR
NTIEEWRRANDALKLDIA-----

RKIRQRVRLITDMLKSSSHEVRCKALQTLQVVVEGDEESKAIVAEGDTVRTIVKFLSQEPSKGR
EAAVSVLFELSRSEENVQRMAINGRLQPLLAKLLEGSPETKVSMAYFLGVLALNNDVKVIVAQ
T--
VGSSLIDLMRTRDMSQREAAALGALNNISSFEKSAKLLINTGILPPLIKDLFYVGP IRLKEVSATIL
ANIVNIGYDFDKVPVSEEIVENLLQLTSNTGPEIQGKLLAVLVGLTSCPNNVVS AIRNSAAIISLV
QFENTPTEEQAAAAGLLQSN SQD

>PUB44 AT1g20780 /15-381

ERGVHIYEAFICPLTKEVMHDPVTLENGRTFEREAIEKWFKECDPSCPLTSQELTSTDVSASIA
LRNTIEEWRSRNDAAKLDIA-----
RSNRHGVHMIIDMLKSTSHRVRYKALQTLQVVVEGDDES KAIVAEGDTVRTL VKFLSHEPSKG
REAAVSLLFELSRSEEIVRQMASYGRLQPLL GKLLEGSPETKLSMASFLGELPLNNDVKV LVA
QT--
VGSSLVDLMRSGDMPQREAAALKALNKISSFEKSAKVLISKGILPPLIKDLFYVGP IRLKEVSATIL
ANIVNIGYDFDKATVSEN RVENLLHLISNTGPAIQCKLLEVLVGLTSCP KKVYAIKTSGAIISLV
QFEKTPTEEQAAAAGLLQSN GQD

>PUB49 AT5g67530 /31-372

RTPFSLP-YYCCALTF LPFEDPVCTIDGSVFEITTIVPYIRKF-GKHPVTGAPLKGEDLIP-----
---LIFHKNSE-----
GEYHCPVNKVFTEFTHVKT TGNVFCYEAIKELNIKTKNWKELLTEEGKVTVEFDHVKN GDEEL
KKMNSDPAYNINVSGDIK HMLADLGTDKAKEIALHGGGNKARNERAAAIAAILKAEQPKQ TYS
VDAASASVFGRSADAAGSSDKTAARIAMHMAGRTPVNSKMVKSRYSSGAASRSFTSS-
TPVTKNDFELIKVEKNPKKGYVQFQHGD LNIELHCDI----APRACEN----FITLCE-
RGSIRNFMIQGGVVGGLATLTELDEEEEEKEKAEAMSSTAKD