Supplementary Tables

Supplementary Table 1. Oligonucleotide primer pairs and DNA templates used for construction of *Mlo* variants using splicing by overlap extension (SOE) [a]

Construct in pBluescript	PCR Primers	PCR Template	Description of resulting *Mlo* variant
C86A	CE4+PSL508	*HvMlo*	*HvMlo* cDNA with Cys-86 changed to Ala
	PSL507+CE23	*HvMlo*	
C98A	CE4+CE54	*HvMlo*	*HvMlo* cDNA with Cys-98 changed to Ala
	CE53+CE23	*HvMlo*	
C114A	CE4+CE56	*HvMlo*	*HvMlo* cDNA with Cys-114 changed to
	CE55+CE23	*HvMlo*	Ala
C367A	PSL373+CE58	*HvMlo*	*HvMlo* cDNA with Cys-367 changed to
	CE57+CE6	*HvMlo*	Ala
P287G	Mlo P287G-1+ADDOWN6	*HvMlo*	*HvMlo* cDNA with Pro-287 changed to Gly
	Mlo P287G-1+ADUP7	*HvMlo*	
P395G	Mlo P395G-1+ADDOWN6	*HvMlo*	*HvMlo* cDNA with Pro-395 changed to Gly
	Mlo P395G-1+ADUP7	*HvMlo*	
TaMLOA1 CT	PSL373+CE42	*HvMlo*	*HvMlo* cDNA with *TaMlo*-A1 C-terminus
	CE43+CE44	*TaMlo*-A1	
TaMLOB1 CT	PSL373+CE47	*HvMlo*	*HvMlo* cDNA with *TaMlo*-B1 C-terminus
	CE43+CE44	*TaMlo*-B1	
OsMLO1 CT	PSL373+CE47	*HvMlo*	*HvMlo* cDNA with *OsMlo1* C-terminus
	CE48+CE28	*OsMlo1*	
ATMLO11 CT	PSL373+PSL510	*HvMlo*	*HvMlo* cDNA with *AtMlo11* C-terminus

	PSL509+PSL511	*AtMlo11*	
CT swap A417S	KS727+KS739	CT swap	*HvMlo* cDNA with distal half of *TaMlo*-
	KS738+CE44	CT swap	B1 C-terminus and Ala-417 changed to Ser
CT swap A453S	KS727+KS741	CT swap	*HvMlo* cDNA with distal half of *TaMlo*-
	KS740+CE44	CT swap	B1 C-terminus and Ala-453 changed to Ser
RDM (Δ40)	PSL373+CE37	*HvMlo*	*HvMlo* cDNA -40 amino acids at C-terminus
VHL (Δ67)	PSL373+CE35	*HvMlo*	*HvMlo* cDNA –67 amino acids at C-terminus
SPM (Δ77)	PSL373+CE34	*HvMlo*	*HvMlo* cDNA –77 amino acids at C-terminus
QMI (Δ89)	PSL373+CE33	*HvMlo*	*HvMlo* cDNA –89 amino acids at C-terminus
KVR (Δ99)	PSL373+CE32	*HvMlo*	*HvMlo* cDNA –99 amino acids at C-terminus
NWR (Δ109)	PSL373+CE25	*HvMlo*	*HvMlo* cDNA –109 amino acids at C-terminus
DEQ (Δ118)	PSL373+CE26	*HvMlo*	*HvMlo* cDNA –118 amino acids at C-terminus
MLO IC2+CT	PSL373+PSL123	*HvMlo*	*HvMlo* cDNA with IC2 and C-terminus of
	PSL122+PSL124	*TaMlo*-B1	*TaMlo*-B1
	39+CE23	*HvMlo*	
MLO IC2	PSL373+PSL123	*HvMlo*	*HvMlo* cDNA with IC2 of *TaMlo*-B1
	PSL122+PSL124	*TaMlo*-B1	
	39+CE23	*HvMlo*	
MLO	CE4+KS730	*HvMlo*	*HvMlo* cDNA with IC1, IC2, and C-
IC1+IC2+CT	KS728+KS729	*TaMlo*-B1	terminus of *TaMlo*-B1

[a] plasmid constructs MLO IC1, MLO IC1+IC2, and MLO IC1+CT were generated by replacement of suitable restriction fragments

Supplementary Table 2. Sequences of PCR oligonucleotide primers used in this study

Primer name	Primer sequence
39	5′-TCGACTTCCACAAGTACA-3′
ADDOWN6	5′-CTAGAATTCTCATCCCTGGCTGAAGG-3′
ADUP7	5′ CTCAAGCTTGCCACCATGTCGGACAAAAAAGGGG 3′
CE4	5′-TCACACAGGAAACAGCTATGAC-3′
CE6	5′-CGCCAGGGTTTTCCCAGTCACGAC-3′
CE23	5′-CATATAGCTGCAGAGGAA-3′
CE25	5′-GCGAATTCACCGCCAGTTGGTGAGCG-3′
CE26	5′-GCGAATTCACTGCTCGTCGAAGATGG-3′
CE28	5′-GCGAATTCTCACCGTTGTGCGCTGAA-3′
CE32	5′-GCGAATTCATCGGACTTTCTTCTTCTCCT-3′
CE33	5′-GCGAATTCAGATCATCTGAGCCATCAGCA-3′
CE34	5′-GCGAATTCACATCGGCGACGAGCCTCGGC-3′
CE35	5′-GCGAATTCACAGGTGCACGGGTGATGAGC-3′
CE37	5′-GCGAATTCACATGTCCCTAGCCTCCTGCT-3′
CE42	5′-TTTGATCCCATCTGTGTGACGAGCGCGTAGAG-3′
CE43	5′-TCACACAGATGGGATCAAACATGAAGAG-3′
CE44	5′-GCGAATTCATCCCTGGCTGAAGGA-3′
CE47	5′-CGATCCCATCTGTGTGACGAGCGCGTAGAG-3′
CE48	5′-GCACACAGATGGGATCGAACATGAAGAA-3′
CE53	5′-TGGCCCGCCAAGCGCGGCACCGAGG-3′
CE54	5′-GCGCTTGGCGGGCCACATGACGTCGG-3′
CE55	5′-GTTGACTACGCCCCGGAGGGC-3′
CE56	5′-GCCCTCCGGGGCGTAGTCAAC-3′
CE57	5′-AAGAAAGCCTACCACACGCAGATCG-3′

CE58	5′-GTGTGGTAGGCTTTCTTCAAGCCGGGC-3′
KS727	5′-CAGTTCCTCTGCAGCTATA-3′
KS728	5′-CAGCATGAGCTCCGCCT-3′
KS729	5′-TCCGTCCTCCTGGAGCACGCGCTCC-3′
KS730	5′-GTGCTCCAGGAGGACGGACACGAGC-3′
KS738	5′-GCAGACGTCCAAGGCGCTAACAAAC-3′
KS739	5′-CGCCTTGGACGTCTGCTCGTCGAAG-3′
KS740	5′-GCCCGAGGGTCGTCGCCCATGCCTAGC-3′
KS741	5′-GCGACGACCCTCGGCTGGGCGT-3′
Mlo P287G-1	5′-ATTTCTTTCATCGGTCTCGTGATCCTC-3′
Mlo P287G-2	5′-GAGGATCACGAGACCGATGAAAGAAAT-3′
Mlo P395G-1	5′-TATATGACCTTCGGCCTCTACGCGCTC-3′
Mlo P395G-2	5′-GAGCGCGTCGAGGCCGAAGGTCATATA-3′
PSL122	5′-GCTCTAAGCCGTCTCAA-3′
PSL123	5′-TTGAGACGGCTTAGAGC-3′
PSL124	5′-TGTACTTGTGGAAGTCGA-3′
PSL373	5′-GGCGGAGCTCATGCTG-3′
PSL507	5′-CAAGATAGCCATCTCCGAGGATGCCG-3′
PSL508	5′-TCGGAGATGGCTATCTTGGCGATGATGGGG-3′
PSL509	5′-TCACACAGATGGGAACGAACTATAAA-3′
PSL510	5′-CGTTCCCATCTGTGTGACGAGCGCGTAG-3′
PSL511	5′-GCGAATTCAGACTCTCTTCTCACT-3′

Supplement 3. CLUSTALW (http://www.ebi.ac.uk/clustalw/) amino acid alignment of 38 full-size MLO sequences. For origin of protein sequences see Materials and methods. Please note that two invariant cysteine residues corresponding to Cys 86 and Cys114 in barley MLO were not correctly aligned by the CLUSTALW algorithm. In addition, the tryptophane corresponding to W330 in barley MLO is not recognized as an invariant residue due to an ambiguous amino acid in OsMLO6 (here shown as X).

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MLO             ----------------------------MSDKKGVP--------ARELPETPSWAVAVVF 24
TaMLO2-B1       ----------------------------MADDDEYPP-------ARTLPETPSWAVALVF 25
HvMLO2          ----------------------------MAGP---AG-------GRELSDTPTWAVAVVC 22
OsMLO1          ----------------------------MAGGR--SG-------SRELPETPTWAVAVVC 23
OsMLO2          ----------------------------MAGG---GG-------GRALPETPTWAVAVVC 22
ZmMLO1          ----------------------------MAGG---GG-------GRDLPSTPTWAVALVC 22
AtMLO2          ----------------------------MADQVK----------ERTLEETSTWAVAVVC 22
AtMLO6          ----------------------------MADQVK----------EKTLEETSTWAVAVVC 22
AtMLO12         -----------------------------MAIK----------ERSLEETPTWAVAVVC 20
AtMLO5          -------------------MAGGGGGSTSGEGPRE-----------LDQTPTWAVSTVC 29
AtMLO9          -------------------MAGGGGGG-GGEGPRQ-----------LDQTPTWAVSTVC 28
AtMLO7          --MITRS-RCRRSLLWFLVFHGGATATGAPSGGKE-----------LSQTPTWAVAVVC 45
AtMLO10         --MATRCFWCWTTLLFCSQLLTGFARASSAGGAKEKG----------LSQTPTWAVALVC 48
AtMLO8          MGIIDGSLLRRLICLCLWCLLGGGVTVVTAEDEKKVV-------HKQLNQTPTWAVAAVC 53
ZmMLO6          -------------------MGGGGGGGNSRE----------------LDQTPTWAVASVC 25
OsMLO4          ----------------MSGSGGGGGGGAGGDGARA-----------LDQTPTWAVAAVC 32
ZmMLO2          ---------------------------MGGDGTRA-----------LDQTPTWAVAAVC 21
AtMLO3          ----------------------MTDKEESNHSSEVGA-------VRSLQETPTWALATVC 31
OsMLO7          -----------------------------MEESS-------------ITHTPTWVVAVVC 18
ZmMLO7          ----------------------------MGKEAT-------------LAFTPTWVVAIVC 19
OsMLO9          ----------------------MGAGEGGEEQS-------------LALTPTWVVAGVC 24
AtMLO13         -------------------------MAEARSGS-------------LEYTPTWVVAFIC 21
HvMLO3          ----------------------------MAGGGGKAKP---------LEFTPTWIVALVC 23
OsMLO10         ----------------------------MAGGGGKAAAGGGEAPAITLEHTPTWIVSAVC 32
OsMLO3          ---------------------------MAATEATT-------------IEDTPTWIVAAVC 21
ZmMLO3          ---------------------------MSEEAT-------------LEDTPTWIVASVC 19
OsMLO8          ---------------------------MAAE-----------AATLEFTPTWIVAAVC 20
ZmMLO8          ---------------------------MAAEGE----------AAALEFTPTWIVAAVC 22
OsMLO5          ---------------------------MARAEA----------AAALEFTPTWIVAAIC 22
AtMLO1          ---------------------------MGHGGE----------GMSLEFTPTWVVAGVC 22
AtMLO15         ---------------------------MAGG-----------GTTLEYTPTWVVALVC 20
PpMLO1          ---------------------------MAGGED----------EKSLEATPTWAVAAVC 22
OsMLO11         ---------------------------MVEEG-----------RSLAETPTWSVATVT 20
ZmMLO4          -------------------------MAAEQG-----------RSLAETPTWSVATVT 21
AtMLO4          ------------------------MEHMMKEG-----------RSLAETPTYSVASVV 23
AtMLO11         ----------------MGEGEENGNEADSNE------------RSLALSPTWSVAIVL 30
AtMLO14         ----------------------MREETEPSE------------RTLGLTPTWSVATVL 24
OsMLO6          ----------------MAGGXGGGAAAVPEEG-----------RSLALTPTWSVAIVL 31
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MLO             AAMVLVSVLMEHGLHKLGHWFQHRHKKALWEALEKMKAELMLVGFISLLLIVTQDPIIAK 84
TaMLO2-B1       AVMIIVSVLLEHALHKLGHWFHKRHKNALAEALEKIKAELMLVGFISLLLAVTQDPISG- 84
HvMLO2          AVMILVSVAMEHALHKLGHWFHKWRKKALGEALEKMKAELMLVGFISLLLIVTQDPVSR- 81
OsMLO1          AVLVLVSAAMEHGLHNLSHWFRRRQKKAMGDALDKIKAELMLLGFISLLLTVAQAPISK- 82
OsMLO2          AVIVLVSVAMEHGLHKLGHWFHKREKKAMGEALEKIKAELMLLGFISLLLTVAQTPISK- 81
ZmMLO1          AVIVLVSVAMEHGLHKLGHWFHTRQKKAMREALEKIKAELMLMGFISLLLAVGQTPISK- 81
AtMLO2          FVLLFISIVLEHSIHKIGTWFKKKHKQALFEALEKVKAELMLLGFISLLLTIGQTPISN- 81
AtMLO6          FVLLLISIVIEKLIHKIGSGFKKKNKKALYEALEKVKAELMLMGFISLLLTIGQGYISN- 81
AtMLO12         FVLLFISIMIEYFLHFIGHWFKKKHKKALSEALEKVKAELMLLGFISLLLVVLQTPVSE- 79
AtMLO5          GVIILISIVLELMIHKIGEVFTERRKKALYEALQKIKNELMVLGFISLLLTFGQNYIAS- 88
AtMLO9          GVIILISIILELIIHKVGEVFERKKKKALFEALEKIKNELMVLGFISLLLTFGQNYIAS- 87
AtMLO7          TFLILISHLLEKGLQRLANWLWKKHKNSLLEALEKIKAELMILGFISLLLTFGEPYILK- 104
AtMLO10         TFFILVSVLLEKALHRVATWLWEKHKNSLLEALEKIKAELMILGFISLLLTFGEQYILK- 107
AtMLO8          TFFIVVSVLLEKLLHKVGKVLWDRHKTALLDALEKIKAELMVLGFISLLLTFGQTYILD- 112
ZmMLO6          GVIVLISILLEKGLHHVGEFFSHRKKKAMVEALEKVKAELMVLGFISLLLVFGQNYIIK- 84
OsMLO4          AVIVAASILLEGLLHHLGQWFSKRRKKALFDALEKVKSELMTLGFISLLLSVTGRYISR- 91
ZmMLO2          AVIVAASILLEGFLHHLGQLLNKKRKKALFDALEKVKSELMTLGFISLLLTVTGRYIAR- 80
AtMLO3          FFFIAVSICLERLINLLSTRLKKNRKTSLLEAVEKLKSVLMVLGFMSLMLNVTEGEVSK- 90
OsMLO7          FAIVSVSLAAERLLHHLGKFLKHKDQKALYSALERLKEELMLLGFISFVLSLSEGFIVG- 77
ZmMLO7          LVIVSISLAAERSLHYLGKYLECKKQKALFSALQRLKEELMLLGFISFVLSLSQGFIVS- 78
OsMLO9          FIIVAISLAAERLLH-LHQVLKFNGQEALFSALQRVKEELMLLGFISFLLSVFQKFINH- 82
AtMLO13         FIIVLLSLLAERGLHHLGKCLKRRQQDALFEALQKLKEELMLLGFISLMLTVSQAAIRH- 80
HvMLO3          SVMVIISLLFERLLHRLGKRLIRSRKKPLYEALLKVKEELMLLGFISLLLTVFQGPMGK- 82
OsMLO10         FVIVIISLLFERLLHRLGKRLKKSRKKPLYEGLLKVKEELMLLGFISLLLNVFQGLTQK- 91
OsMLO3          SAIVLISFAFERSLHYLGKALER-RRRTLYEALLKLKEELMLLGFISLLLVVFQEPIQR- 79
ZmMLO3          SVIVLISFVFERALHHLGKALER-RRKTLYEALLKLKEELMLLGFVSLLLVVSQDLIQK- 77
OsMLO8          SLMVLISLVAERCLHYLGK-LKRKNQKPLYEALLKVKEELMLLGFISLLLTVFQGLIQR- 78
ZmMLO8          SLIVLLSLVAERCLHYLGKTLKRKNQKPLFEALLKVKEELMLLGFISLLLTVFQGMIRR- 81
OsMLO5          SLIVLISLAAERCLHYLGKTLKRKNQKALFEALLKVKEELMLLGFISLLLTVSQGILQK- 81
AtMLO1          TVIVAISLAVERLLHYFGTVLKKKKQKPLYEALQKVKEELMLLGFISLLLTVFQGLISK- 81
AtMLO15         SVIVSISFAVERLIHRAGKHFKNNDQKQLFGALQKIKEELMLVGFISLLLSVGQSKIAK- 79
PpMLO1          AVFVVASLVVERGLEHLGHQLKKKKRKQLLHTLGKIKDELMLLGFISLSLTVFQSKIAS- 81
OsMLO11         TLMVAACFLVERGISRFAKWLRKTKRKAMLAALEKIREELMLLGVISLLLSQTARWISEI 80
ZmMLO4          TLMVAACFLVERSLSRFAKWLRKTKRKAMLAALEKIREELMLLGVISLLLSQTARFISEI 81
AtMLO4          TVLVFVCFLVERAIYRFGKWLKKTRRKALFTSLEKMKEELMLLGLISLLLSQSARWISEI 83
AtMLO11         TVFVVVSLIVERSIYRLSTWLRKTKRKPMFAALEKMKEELMLLGFISLLLTATSSTIANI 90
AtMLO14         TIFVFVSLIVERSIHRLSNWLQKTKRKPLFAALEKMKEELMLLGFISLLLTATSSTIANI 84
OsMLO6          TLLVAGSLLIERSIHRLSYWLKKTHRNPLHKAMEKMKEEMMLLGFISLLLAATSRIISGI 91
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MLO             ICISEDAADVMWPCK-------------------------------------------R 100
TaMLO2-B1       ICISEKAASIMRPCK-------------------------------------------L 100
HvMLO2          ICISKEAGEKMLPCKPYDGAGGG---KGKDNHR---------------------RLLWL 116
OsMLO1          ICIPKSAANILLPCKAGQDAIE------------------------------------ 104
OsMLO2          ICIPESAANIMLPCKAGQDIVKGLK-GKKDHRR---------------------RLLWY 118
ZmMLO1          ICIPAKAGSIMLPCKPPKGAAAAADDDKSDGRR---------------------RLLWY 119
AtMLO2          ICISQKVASTMHPCSAAEEAKKYGKKDAGKKDDGDG----------------DKPGRRL 124
AtMLO6          ICIPKNIAASMHPCSASEEARKYGKKDVPKEDE--------------------EENLRRK 121
AtMLO12         ICIPRNIAATWHPCSNHQEIAKYGKDYID-------------------------DGRKI 113
AtMLO5          LCVASRYGHAMSFCGPYDGPS-GESKKPKTTEH--------------------------- 120
AtMLO9          ICVPSRYGHAMSFCGPYDGPSEDDRKKLKKTDHAMR------------------------ 123
AtMLO7          ICVPRKAALSMLPCLSEDTVLFQ------KLAPSS------------------------ 133
AtMLO10         ICIPEKAAASMLPCPAPSTHDQD------KTH---------------------------- 133
AtMLO8          ICIPSHVARTMLPCPAPNLKKEDDDNGESHRRLLS------------------------ 147
ZmMLO6          VCISNHAANTMLPCKLEAAAVEGKDGHGKEAAAVVAGKKKVAVAVPGKKKKKAAAAADHL 144
OsMLO4          ICIPVGAADTMLPCSLRRSSSEQE-----VPGGGG------------------------ 121
ZmMLO2          ICIPEGAANTMLPCRLSGHSVAEE-----PKG--------------------------- 107
AtMLO3          ICIPIKYANRMLPCRKTIKSHNDVSED-------------------------------- 117
OsMLO7          ICVSENAMHLMLPCK-------------------------------------------- 92
ZmMLO7          ICIPETSTDFMLPCN-------------------------------------------- 93
OsMLO9          ICIPESAAHLMLPCIT------------------------------------------- 98
AtMLO13         ICVPPALVNNMFPCKKPLE--------------EHH------------------------ 102
HvMLO3          VCVSPITMLHLQPCK-----------PPPDETDHLG------------------------ 107
OsMLO10         ICVKASVMDHLQPCK-----------LDFSGAKTAK------------------------ 116
OsMLO3          ICIAESLMGHWLPCR-SDG-------KASSHHGVAA------------------------ 107
ZmMLO3          ICIDDSLMEHWMPCRGASA-------TASAHYGVSS------------------------ 106
OsMLO8          TCIPPRWTVHMLPCQR-----------EAVGPAKEH------------------------ 103
ZmMLO8          TCIPERWTFHMLPCEKPD---------EKAGEAATM------------------------ 108
OsMLO5          TCVPPKWTNYLLPCRKMED------QSKQRGPSEAH------------------------ 111
AtMLO1          FCVKENVLMHMLPCSLDSRREAGASEHKNVTAKEHF------------------------ 117
AtMLO15         ICISKELSEKFLPCTKPAG-------AEKSLKDSSH------------------------ 108
PpMLO1          ICMPERLNKFMLPCP------------------YK------------------------ 98
OsMLO11         CVPSSLFTSRFYICSETDYEDLVVGGKRSTMEMNQT------------------------ 116
ZmMLO4          CVPSSLFTSRFYICSESDYQDLLRN-----TDANQT------------------------ 112
AtMLO4          CVNSSLFNSKFYICSEEDYGIHKKVLLEHTSSTNQS------------------------ 119
AtMLO11         CVPSSFYNDRFLPCTRSEIQEELES----GSTVKRN------------------------ 122
AtMLO14         CVSSSFHNDRFVPCTPSEINEELEST---ISTVKRT------------------------ 117
OsMLO6          CIDSKYYNSNFSPCTREEVEESIKIKH--AVSSARK------------------------ 125
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MLO             G-----TEGRKPSKYVD-------YCP-----EGKVALMSTGSLHQLHVFIFVLAVFHVT 143
TaMLO2-B1       P-----P-GSVKSKYKDY------YCAK----QGKVSLMSTGSLHQLHIFIFVLAVFHVT 144
HvMLO2          Q-----GESETHRRFLAAPAGVD-VCAK----QGKVALMSAGSMHQLHIFIFVLAVFHVL 166
OsMLO1          ------EEAASGRRSLAGAGGGD-YCSKF---DGKVALMSAKSMHQLHIFIFVLAVFHVT 154
OsMLO2          T-----GEEESHRRSLAGAAGED-YCAQ----SGKVALMSSGGMHQLHIFIFVLAVFHVT 168
ZmMLO1          PPYPGYDEPGHHRRFLAGAAPDDNYCSD----QGKVSLISSAGVHQLHIFIFVLAVFHIV 175
AtMLO2          LLELAES--YIHRRSLATKGYDK--CAE----KGKVAFVSAYGIHQLHIFIFVLAVVHVV 176
AtMLO6          LLQLVDS--LIPRRSLATKGYDK--CAE----KGKVAFVSAYGMHQLHIFIFVLAVCHVI 173
AtMLO12         LEDFDSNDFYSPRRNLATKGYDK--CAE----KGKVALVSAYGIHQLHIFIFVLAVFHVL 167
AtMLO5          ------------LERRVLADAAPAQCK-----KGYVPLISLNALHQVHIFIFFLAVFHVI 163
AtMLO9          --------ILYSVQRRSLADAPPVNCK-----KDYVALISLNALHQVHIFIFFLAVFHVI 170
AtMLO7          ----------LSRHLLAAGDTS-INCK-----QGSEPLITLKGLHQLHILLFFLAIFHIV 177
AtMLO10         ------------RRRLAAATTS-SRCD-----EGHEPLIPATGLHQLHILLFFMAAFHIL 175
AtMLO8          ----------FEHRFLSGGEASPTKCTK----EGYVELISAEALHQLHILIFFLAIFHVL 193
ZmMLO6          GGVVDWPPPYYAHNARMLAEASMATKCP----EGKVPLISINALHQLHIFIFFLAVFHVS 200
OsMLO4          ----------HGRRHLSGDPTN-FKCA-----KGMVSLVSADGLHQLHIFVFFLAVFHVA 165
ZmMLO2          ----------HGRRHLSEDPTNLFSCR-----KGMVSLVSADGMHQLHIFVFFLAVFHVT 152
AtMLO3          ---------DDDDDGDNHDNSFFHQCSS----KGKTSLISEEGLTQLSYFFFVLACMHIL 164
OsMLO7          --KETYQ----------LSEG-VKLCKKK----GEVPLLSVEALHQLHIFIFILGLVHVV 135
ZmMLO7          --RGNSR----------VAEEGAKICNKK----GDVPLLSLEALHQLHIFIFVLGLVHVV 137
OsMLO9          --RETSE----------TTEDASKLCKRK----GEVPMLSEEALHQLHIFIFVLGIVHVV 142
AtMLO13         -APKSSHSIINNARHLLSTGESPDHCAAK----GQVPLVSVEALHQLHIFIFVLAVFHVI 157
HvMLO3          -DAVFAGVLGGGRRLLAGGASSDEYCLKK----DKVPLLSSEAIHQLHIFIFVLAVTHFL 162
OsMLO10         -TTAHLAAAG-VRRLLAGGGAKSDYCEKKVLVVGLVPILSVEAIHQLHIFIFVLAVSHVV 174
OsMLO3          -ASAAVVSGAGARRLLGEGTAGSGHCSSK----GKVPLLSLHAIEQIHIFIFVLAITHVV 162
ZmMLO3          -SSSSSAVGGG-RRMLKGGGAAFGHCSSK----GKVPLLSLHALEQVHIFIFVLAITQVV 160
OsMLO8          -VAAAQIVGRIGRRLLSEGGAGAELCQKK----GKVPLLSLEAIHQLHIFIFVLAITHVI 158
ZmMLO8          -EHFVGTLGRIGRRLLQEGTAGAEQCQKK----GKVPLLSLEAIHQLHIFIFVLAITHVI 163
OsMLO5          -FVAAGVLGHLGRRLLADGGTGADHCQNK----GKVPLLSLEALHQLHIFIFVLAITHVI 166
AtMLO1          -QTFLPIVGTTRRLLAEHAAVQVGYCSEK----GKVPLLSLEALHHLHIFIFVLAISHVT 172
AtMLO15         -FQFS----FTGRHLLAGDAPAGDYCSLK----GKVPIMSLSALHELHIFIFVLAVAHII 159
PpMLO1          -AGAVVDATAAAGHRRLLATSSPVTCPSG-----QVQVISVSGLHQLHIFIFVMAIVHVI 152
OsMLO11         -VVPNGLFGIQSQ----------NVCSEVG----HEPFVSYEGLEQLHRFLFILGITHVL 161
ZmMLO4          -ALDKNMFGGQRL----------HVCGEG-----HEPFVSYEGLEQLHRFLFILGITHVL 156
AtMLO4          -SLPHHGIHEAS-----------HQCGHG-----REPFVSYEGLEQLLRFLFVLGITHVL 162
AtMLO11         -LLTKSLFFNIFRRRLDV--IKRTTCSEG-----HEPFVSYEGLEQLHRFIFIMAVTHVT 174
AtMLO14         -QLTRSLFLHTLRRRLSG--IGEDTCSEG-----HEPFLSYEGMEQLHRFIFIMAVTHVT 169
OsMLO6          -HLIEVILHHAARRNLKARYHHNQSCAEG-----YESFVSHEGLEQLHRFIFVMAVTHVT 179
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MLO             YSVITIALSRLKMRTWKKWETETTSLEYQFAN----------DPARFRFTHQTSFVKRH 192
TaMLO2-B1       YSVIIMALSRLKMRTWKKWETETASLEYQFAN----------DPARFRFTHQTSFVKRH 193
HvMLO2          YSVVTMTLSRLKMKQWKKWESETASLEYQFAN----------DPSRCRFTHQTTLVRRH 215
OsMLO1          YCIITMGLGRLKMKKWKKWESQTNSLEYQFAI----------DPSRFRFTHQTSFVKRH 203
OsMLO2          YCVITMALGRLKMKKWKKWELETNSLEYQFAN----------DPSRFRFTHQTSFVKRH 217
ZmMLO1          YSVATMALGRLKMRKWKKWESETNSLEYQYAN----------DPSRFRFTHQTSFVKRH 224
AtMLO2          YCIVTYAFGKIKMRTWKSWEEETKTIEYQYSN----------DPERFRFARDTSFGRRH 225
AtMLO6          YCIVTYALGKTKMRRWKKWEEETKTIEYQYSH----------DPERFRFARDTSFGRRH 222
AtMLO12         YCIITYALGKTKMKKWKSWERETKTIEYQYAN----------DPERFRFARDTSFGRRH 216
AtMLO5          YSAITMMLGRAKIRGWKVWEEEVIN-DHEMMN----------DPSRFRLTHETSFVREH 211
AtMLO9          YSAITMMLGRAKIRGWKVWEQEVIH-EQEMMN----------DPSRFRLTHETSFVREH 218
AtMLO7          YSLITMMLSRLKIRGWKKWEQETLSNDYEFSI----------DHSRLRLTHETSFVREH 226
AtMLO10         YSFITMMLGRLKIRGWKKWEQETCSHDYEFSI----------DPSRFRLTHETSFVRQH 224
AtMLO8          YSFLTMMLGRLKIRGWKHWENETSSHNYEFST----------DTSRFRLTHETSFVRAH 242
ZmMLO6          YSAITMALGRAKIRAWKEWEKEAAGQDYEFSH----------DPTRFRFTHETSFVRQH 249
OsMLO4          FSAITMSLGRAKTRIWKEWEKETCSLTYEFSY----------DPSKFRLTHQTSFVRQH 214
ZmMLO2          FSFFTMSLGRAKTRIWKVWEKETCSPQYNYLN----------DPSKFRLTHQTSFVRQH 201
AtMLO3          CNLAILLLGMAKMRKWNSWEKETQTVEYLAAN----------DPNRFRITRDTTFARRH 213
OsMLO7          FCATTILLGGAKIRKWKLWETEIQQEMQQKCKLVVVQKRDATPGRIAHN--QQGEFVSER 193
ZmMLO7          FCATTISFSGAKMRKWKHWETEIHREVHEKLQQEKNEGQGSSLSIVVLHREHQDEFVHKR 197
OsMLO9          FCVTTLLLGGAKMKKWEKWEKEIQQGRTKER-------------------------PKR 176
AtMLO13         FCASTMVLGGARIQQWKHWEDWFKKRPSQKGTTRRGHHAHAHELFSANH-----EFFEMH 212
HvMLO3          LSAITVLLGMAQTRNWRHWETKIQEKDDS--------------APQMIKHVREFKFIQDH 208
OsMLO10         LSAVTVLLGIAQTRKWQHWENKIQASDEN--------------GPQMIKHVQEFPFIKNH 220
OsMLO3          LSAVTVLLGLLQMRRWRHWENAIKADGDF--------------ERSNSSSSR------DR 202
ZmMLO3          LSVATVLLGLLQMRIWMHWENTIQQEGSS--------------APKMIARVQKIRFIQDR 206
OsMLO8          FSVSTMLLGGAKIHQWKQWEVEIQKDAVG-------------SGPAKVTHVHQFEFINDH 205
ZmMLO8          FSVTTMLLGGAQIHQWKQWENGIKKDAPG-------------NGP-KVTNVHHHEFIKKR 209
OsMLO5          FSALTMLLGGAKIHQWKHWENDIQKDVAQ-------------NAPKKVTHVHQFEFIRER 213
AtMLO1          FCVLTVIFGSTRIHQWKKWEDSIADEKFDPET---------ALRKRRVTHVHNHAFIKEH 223
AtMLO15         FCLLTIVFGTMKIKQWKKWEDKVLEKDFDT-----------DQSIKKFTHVQEHEFIRSR 208
PpMLO1          YSAATVLLGLWQVHEWKSWETQSVQQYDICFEKALG-------KKPNAEVALEGRMRYKF 205
OsMLO11         YTFVTVVLSMIKIYSWRKFETQACQLPTEQLQ----------ARR-TKVMQRQSTFVFHH 210
ZmMLO4          YSFVTVVLSMIKIYSWRKWETLAGPIAAEELK----------ARR-TKVMRRQSTFVFNN 205
AtMLO4          YSGIAIGLAMSKIYSWRKWEAQAIIMAESDIH----------AKK-TKVMKRQSTFVFHH 211
AtMLO11         YSCLTMLLAIVKIHSWRIWEDVARLDRHDCLT----------AVAREKIFRRQTTFVQYH 224
AtMLO14         YSCLTMLLAIVKIHRWRIWEDEVHMDRNDCLT----------VVAREKIFRRQTTFVQYH 219
OsMLO6          YSCLTMLLAILKIHSWRKWEDEAFRDNHESFS----------QIAYISATRRQPALGRSY 229
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MLO             LG-LSSTP-GIRWVVAFFRQFFRSVTKVDYLTLRAGFINAHLSQNS--KFDFHKYIKRSM 248
TaMLO2-B1       LG-LSSTP-GVRWVVAFFRQFFRSVTKVDYFTLRAGFINAHLSHNS--KFDFHKYIKRSM 249
HvMLO2          LG-LSSTP-GVRWVVAFFRQFFTSVTKVDYLTLRQGFINAHLSQGN--RFDFHKYIKRSL 271
OsMLO1          LGSFSSTP-GLRWIVAFFRQFFGSVTKVDYLTMRQGFINAHLSQNS--KFDFHKYIKRSL 260
OsMLO2          LG-LSSTP-GLRWIVAFFRQFFGSVTKVDYLTMRQGFINAHLSQNS--KFDFHKYIKRSL 273
ZmMLO1          LG-LSSTP-GVRWVVAFFRQFFASVTKVDYLTMRQGFINYHLSPST--KFNFQQYIKRSL 280
AtMLO2          LNFWSKTR-VTLWIVCFFRQFFGSVTKVDYLALRHGFIMAHFAPGNESRFDFRKYIQRSL 284
AtMLO6          LSFWSKST-ITLWIVCFFRQFFRSVTKVDYLTLRHGFIMAHLAPGSDARFDFRKYIQRSL 281
AtMLO12         LNIWSKST-FTLWITCFFRQFFGSVTKVDYLTLRHGFIMAHLPAGSAARFDFQKYIERSL 275
AtMLO5          VNPWAKNR-FSFYVMCFFRQMLRSVRKSDYLTMRHGFISVHLAPGM--KFNFQKYIKRSL 268
AtMLO9          VNSWASNK-FFFYVMCFFRQILRSVRKSDYLTMRHGFISVHLAPGM--KFDFQKYIKRSL 275
AtMLO7          TSFWTTTP-FFFYVGCFFRQFFVSVERTDYLTLRHGFISAHLAPGR--KFNFQRYIKRSL 283
AtMLO10         SSFWTKIP-FFFYAGCFLQQFFRSVGRTDYLTLRHGFIAAHLAPGR--KFDFQKYIKRSL 281
AtMLO8          TSFWTRIP-FFFYVGCFFRQFFRSVGRTDYLTLRNGFIAVHLAPGS--QFNFQKYIKRSL 299
ZmMLO6          MNVLNKFP-ASFYISNFFRQFFRSVRQADYCALRHSFVNVHLAPGS--KFDFQKYIKRSL 306
OsMLO4          ASCWSKST-ILLYFVSFFRQFFRSVRRTDYLTLRHGFIAAHLSLGT--RFNFRKYIKRSL 271
ZmMLO2          ASCWSKST-ITLYFVSFFRQFFRSVRKTDYFTLRHGFISAHLSPGT--RFNFRKYIKRSL 258
AtMLO3          LSSWTETS-FQLWIKCFFRQFYNSVAKVDYLTLRHGFIFAHVSSNN--AFNFQNYIQRSL 270
OsMLO7          TKGLWMKLAVVSWIIAFFKQFHDSVSKSDYKALRSAFGLKHFPSHP--SFNFYKYLIRAL 251
ZmMLO7          TKGFWMKLAVASWITAFLKQFQDSVSKSDYEALRSAFVVEHYPEKP--DIDFHKYMTRAV 255
OsMLO9          PG--WMKFIVVRCAISFLKQFYDSVGKPDYQVLRSAF--RHYPNRP--DFDFHKYMVRAL 230
AtMLO13         AGGFWRRSVVISWVRSFFKQFYGSVTKSEYIALRQAFIMSHCRTNP--SFDFHKYMLRTL 270
HvMLO3          FKDHRKRSRIFAWMRSFFKQFYGSITEEDYTTMRLGFIMKHCKGTP--KFNFYSYMIRAL 266
OsMLO10         FKGHGKRWKTFGWLRSFLKQFYGSVTEEDYVTMRLGFIMKHCRGNP--KFNFYKYMIRAL 278
OsMLO3          YKGFDKVTMVIIWMRSFFKQFYGSVTKDDYTAMRLGFVMEHFRGHP--KFNFYDYMIKAL 260
ZmMLO3          CKGYEKAAWVIIWLRSFFKQFYGSVSNDDYIAMRLGFVMEHFRGHP--KFNFYDYMIKAL 264
OsMLO8          FKGMGKDSKILSWLHSFVKQFYGSVSKSDYTTMRLGFIMTHCRGNP--KFDFHKYMMRVL 263
ZmMLO8          FKGIGKDSIILSWLHSFGKQFYRSVSKSDYTTMRLGFIMTHCPGNP--KFDFHRYMVRVL 267
OsMLO5          FKGIGKDSIILSWLHSFVKQFSGSVTKSDYITMRLGFIQTHCRANP--KFDFHRYMVRAL 271
AtMLO1          FLGIGKDSVILGWTQSFLKQFYDSVTKSDYVTLRLGFIMTHCKGNP--KLNFHKYMMRAL 281
AtMLO15         FLGVGKADASLGWVQSFMKQFLASVNESDYITMRLGFVTTHCKTNP--KFNFHKYLMRAL 266
PpMLO1          LQSTRTGYNISRYIYSFFKQFGKPISKQDYWCLRYGFITFHNLD-P--KFDFHGYIKRSI 262
OsMLO11         TSHPWS--------LCFLRQFRRSIKKSDYMALRLGFITVRTYHKLPHSYNFHKYMVRSM 262
ZmMLO4          ASHPWSKNKILIWMLCFLRQFKGSIIRSDYLALRLGFVT---YHKLPHSYDFHKYMVRSM 262
AtMLO4          ASHPWSNNRFLIWMLCFLRQFRGSIRKSDYFALRLGFLT---KHNLPFTYNFHMYMVRTM 268
AtMLO11         TSAPLAKNRILIWVTCFFRQFGRSVDRSDYLTLRKGFIVN---HHLTLKYDFHSYMIRSM 281
AtMLO14         TSAPLVKNRLLIWVICFFRQFGHSVVRSDYLTLRKGFIMN---HHLTLTYDFHSYMIRSM 276
OsMLO6          SFRSWSENNAIKCVFCFLAQFGQSVVRADYLILRKGFIMT---HNLAPTYDFHDYMVRSM 286
                                *  *:  .: . :*  :* .*            :*  *: : :
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MLO             EDDFKVVVGIS-LPLWGVAILTLFLDINGVGTLIWISFIPLVILLCVGTKLEMIIMEMAL 307
TaMLO2-B1       EDDFKVVVGIS-LPLWCVAILTLFLDIDGIGTLTWISFIPLVILLCVGTKLEMIIMEMAL 308
HvMLO2          EDDFKVVVRIS-LKLWFVAVLILFLDFDGIGTLLWMSVVPLVILLWVGTKLEMVIMEMAQ 330
OsMLO1          EDDFKVVVGIS-LPLWFVGILVLFLDIHGLGTLIWISFVPLIIVLLVGTKLEMVIMEMAQ 319
OsMLO2          EDDFKVVVGIS-LPLWFVAILVLFLDIQGFGTLIWISFVPLVILMLVGTKLEMVIMEMAQ 332
ZmMLO1          EDDFKVVVGIS-LPLWFVAIFTLLIDIKGFGTLVWISFVPLVILLLVGAKLEVVIMEMAK 339
AtMLO2          EKDFKTVVEIS-PVIWFVAVLFLLTNSYGLRSYLWLPFIPLVVILIVGTKLEVIITKLGL 343
AtMLO6          EEDFKTIVEIN-PVIWFIAVLFLLTNTNGLNSYLWLPFIPFIVILIVGTKLQVIITKLGL 340
AtMLO12         EQDFTVVVGIS-PLIWCIAVLFILTNTHGWDSYLWLPFLPLIVILIVGAKLQMIISKLGL 334
AtMLO5          EDDFKVVVGIS-PELWAFVMLFLLFDVHGWYVTAVITMIPPLLTLAIGTKLQAIISDMAL 327
AtMLO9          EDDFKVVVGIR-PELWAFVMLFLLFDVHGWYVTAVITMIPPLLTLAIGTKLQAIISYMAL 334
AtMLO7          EDDFKLVVGIS-PVLWASFVIFLLFNVNGWRTLFWASIPPLLIILAVGTKLQAIMATMAL 342
AtMLO10         EDDFKVVVGIS-PLLWASFVIFLLLNVNGWEALFWASILPVLIILAVSTKLQAILTRMAL 340
AtMLO8          EDDFKVVVGVS-PVLWGSFVLFLLLNIDGFKMMFIGTAIPVIIILAVGTKLQAIMTRMAL 358
ZmMLO6          EDDFKVIVGIS-PPLWASALIFLFLNVNGWHTMLWISIMPVVIILSVGTKLQGIICRMAI 365
OsMLO4          EDDFKTVVGIS-APLWASALAIMLFNVHGWHNLFWFSTIPLVVTLAVGTKLQAIIAMMAV 330
ZmMLO2          EDDFKTVVGIS-PPLWASALAVMLFNVHGWHNLFWFSAIPLVVILAVGTKLQAIIAMMAI 317
AtMLO3          HEDFKTVVGIS-PLMWLTVVIFMLLDVSGWRVYFYMSFVPLIIVLVIGTKLEMIVAKMAV 329
OsMLO7          EHDFKRVVGIS-WYMWLFVILFLLLNINGWHTYFWLAFLPLFLLLVVGAKLEHIITRLAQ 310
ZmMLO7          EYEFKRVVGIS-WYLWLFVILFLLLNINGWHTYFWLAFLPLFLLLIVGAKLEHIITRLAQ 314
OsMLO9          EHDFKEVVGIS-WYLWLFVIVFLLLNINGWHTYFWLSFLPLILLLIVGTKLELISTRLAQ 289
AtMLO13         EIDFKKVVSIS-WYLWLFVVVFLLLNVGGWNTYFWLSFLPLILLLMVGAKLEYIISSLAL 329
HvMLO3          EVDFKKVVGIS-WYLWAMLMIFLLLNVEGWYVYIWITLVPFIMLLVVASKMEHIITELAY 325
OsMLO10         EDDFKKVVGIS-WYLWAMLIIFLLLNVQGWYVYIWISAVPFVMLLVVGTKLEHIITELAH 337
OsMLO3          EKDYKRVVGIK-WYLWIFVMIFLLLNITGWHSYFWISLIPLVLLLLIGTKLEHIITQLAY 319
ZmMLO3          EKDFKRVVSIK-WYYWIFVMIFLLLNVTGWHSYFWISLVPLALLLLIGTKLEHIINRLAY 323
OsMLO8          ESDFKKVVGIS-WYLWVFVVIFLLLNVNGWHTYFWIAFLP--LIVTVGTKLEHVIAQLAH 320
ZmMLO8          EADFKKVVGIS-WYLWVFVVIFLLLNVNGWHTYFWIAFLPLILLLAIGTKLEHVIAQLAH 326
OsMLO5          EADFKKVVGIS-WYLWIFVMIFLLLNVNGWHTYFWISFVPLLLLAVGTKLEHVITQLAH 330
AtMLO1          EDDFKQVVGIS-WYLWIFVVIFLLLNVNGWHTYFWIAFIPFALLLAVGTKLEHVIAQLAH 340
AtMLO15         NSDFKKVVGIS-WYLWVFVVLFLLLNIVAWHVYFWLAFIPLILLLAVGTKLEHIITDLAH 325
PpMLO1          EIDFQHVVGIS-YYLWAFVCIYLLVDIHGWYSYFWLAFIPLAMILFVGAKLQLIVTALVV 321
OsMLO11         EDDYNGSVGISSWPLWAYAIICIFVNIHGLNIYFWISFAPAILVLLVGTELQHVIAQLAL 322
ZmMLO4          EDDYNGTIGIS-WPLWAYAIVCILINVHGINIYFWLSFVPVILVLLVGTELQHVIAQLAL 321
AtMLO4          EDEFHGIVGIS-WPLWVYAIVCICINVHGLNMYFWISFVPAILVMLVGTKLEHVVSKLAL 327
AtMLO11         EEEFQRIVGVS-GPLWGFVVAFMLFNIKGSNLYFWIAIIPVTLVLLVGAKLQHVIATLAL 340
AtMLO14         EEEFQKIVGVS-GPLWGFVVGFMLFNIKGSNLYFWLAIIPITLVLLVGAKLQHVIATLAL 335
OsMLO6          EEEFEKIVGVS-GLLWGFVVAFMLFNINGSNLYFWIAILPVTLVLLVGAKLQYVIATLTA 345
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MLO             EIQD-RASVIKG--------------APVVEPSNKFFWFHRPDWVLFFIHLTLFQNAFQM 352
TaMLO2-B1       EIQD-RASVIKG--------------APVVEPSNKFFWFHRPDWVLFFIHLTLFQNAFQM 353
HvMLO2          EIHD-RESVVKG--------------APAVEPSNKYFWFNRPDWVLFLMHLTLFQNAFQM 375
OsMLO1          EIQD-RATVIQG--------------APMVEPSNKYFWFNRPDWVLFFIHLTLFHNAFQM 364
OsMLO2          EIQD-RATVIKG--------------APVVEPSNKYFWFNRPDWVLFFIHLILFQNAFQM 377
ZmMLO1          EIQD-KATVIKG--------------APVVEPSDRFFWFNRPGWVLFLIHLTLFQNAFQM 384
AtMLO2          RIQE-KGDVVRG--------------APVVQPGDDLFWFGKPRFILFLIHLVLFTNAFQL 388
AtMLO6          RIQE-KGDVVKG--------------TPLVQPGDHFFWFGRPRFILFLIHLVLFTNAFQL 385
AtMLO12         RIQE-KGDVVKG--------------APVVEPGDDLFWFGRPRFILFLIHLVLFTNAFQL 379
AtMLO5          EIQE-RHAVIQG--------------MPLVNVSDRHFWFSRPALVLHIIHFILFQNAFEI 372
AtMLO9          EIQE-RHAVIQG--------------MPVVNVSDQHFWFEKPDLVLHMIHFVLFQNAFEI 379
AtMLO7          EIVE-THAVVQG--------------MPLVQGSDRYFWFDCPQLLLHLIHFALFQNAFQI 387
AtMLO10         GITE-RHAVVQG--------------IPLVHGSDKYFWFNRPQLLLHLLHFALFQNAFQL 385
AtMLO8          GITD-RHAVVQG--------------MPLVQGNDEYFWFGRPHLILHLMHFALFQNAFQI 403
ZmMLO6          DITE-RHAVIQG--------------IPMVQVSDSYFWFARPTFVLFLIHFTLFQNGFQI 410
OsMLO4          EIKE-RHTVIQG--------------MPVVKLSDEHFWFGKPRLVLHLIHFASFQNAFEI 375
ZmMLO2          EIAE-RHTVIQG--------------MPVVKLSDDHFWFGKPRLVLHLIHFASFQNAFEI 362
AtMLO3          TIKE-NNSVIRG--------------TPLVESNDTHFWFSNPRFLLSILHYTLFLNTFEM 374
OsMLO7          EAAAVASLSHGTE------------RTPYVKPSKEHFWFGRPEIVLNLIHFILFQNSFEI 358
ZmMLO7          EAA--ISLSNNTE------------EVPKIKPCKDHFWFHKPELVLHLIHFILFQNSFEI 360
OsMLO9          EAA---DCPDEAT------------GNPWTKPCKEHFWFSKPRIVLHLIHFILFQNSFEM 334
AtMLO13         DVS----EKRSRA------------EEAVITPSDELFWFHRPGIVLQLIHFILFQNSFEI 373
HvMLO3          EVAH-KHTAIRG--------------DLVVAPSDDFFWFHRPKLVLLLIHIVLFQNAFQI 370
OsMLO10         QVAE-KHTAIEG--------------ELVVSPSDELFWFHRPKIVLLLIHIVLFQNAFEI 382
OsMLO3          EVAT-KHTAVEG--------------DIAVSPSDNLFWFHSPRLVLALLRFILFQNAFEF 364
ZmMLO3          EVAS-KHAAGQGE------------GGIVVSPSDELFWFRSPRLVLVLIHFILFQNAFEF 370
OsMLO8          DVAE-KNSAIEG--------------DLVVKPSDDHFWLGRPRIILYLIHFILFQNAFEI 365
ZmMLO8          DVAE-KHTAVEG--------------DVIVKPSDEHFWFGKPRVILYLIHFILFQNAFEI 371
OsMLO5          EVAE-KHSAIEG--------------DLVVNPSDEHFWFGRPKVILYLIHFILFQNAFEI 375
AtMLO1          EVAE-KHVAIEG--------------DLVVKPSDEHFWFSKPQIVLYLIHFILFQNAFEI 385
AtMLO15         EVAE-KHIAVEG--------------DLVVRPSDDLFWFQSPRLVLFLIHFILFQNSFEI 370
PpMLO1          GARR-KAKDNDMRGECVLSKITGIKTCPAISPRDELFWFRSPRLLLFLLHFILFQNAFEL 380
OsMLO11         EVVG-ATAPYVG--------------TQLKLRDDLFWFGKPRVLWWLIQFISFQNAFEM 366
ZmMLO4          EVAE-ATAPYVG--------------SQLKLRDDLFWFGKPRVLWWLIQFISFQNAFEL 365
AtMLO4          EVKEQQTGTSNG--------------AQVKPRDGLFWFGKPEILLRLIQFIIFQNAFEM 372
AtMLO11         ENAG-LTEYPSG--------------VKLRPRDELFWFNKPELLLSLIHFILFQNSFEL 384
AtMLO14         ENAS-ITEYASG--------------IKLRPRDELFWFKKPELLLSLIHFIQFQNAFEL 379
OsMLO6          EGAK-MNAYGP----------------RIKPRDDLFXFKKPEFLLWLIHFILFQNSFEL 387
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MLO             AHFVWTVATPGLKKCYHTQIGLSIMKVVVGLALQFLCSYMTFPLYALVTQMGSNMKRSIF 412
TaMLO2-B1        AHFVWTVATPGLKKCFHMHIGLSIMKVVLGLALQFLCSYITFPLYALVTQMGSNMKRSIF 413
HvMLO2          AHFVWTVATPGLKKCYHEKMAMSIAKVVLGVAAQILCSYITFPLYALVTQMGSHMKRSIF 435
OsMLO1          AHFVWTMATPGLKKCFHENIWLSIVEVIVGISLQVLCSYITFPLYALVTQMGSNMKKTIF 424
OsMLO2          AHFVWTLATPGLKKCFHENMGLSIMKVVVGIFIQFLCSYSTFPLYALVTQMGSNMKKTIF 437
ZmMLO1          AHFVWTLLTPDLKKCYHERLGLSIIKVAVGLVLQVLCSYITFPLYALVTQMGSHMKKTIF 444
AtMLO2          AFFAWSTYEFNLNNCFHESTADVVIRLVVGAVVQILCSYVTLPLYALVTQMGSKMKPTVF 448
AtMLO6          AFFVWSTYEFGLKNCFHESRVDVIIRISIGLLVQILCSYVTLPLYALVTQMGSKMKPTVF 445
AtMLO12         AFFVWSTYEFTLKNCFHHKTEDIAIRITMGVLIQVLCSYITLPLYALVTQMGTSMRPTIF 439
AtMLO5          TYFFWIWYEFGLRSCFHHHFALIIIRVALGVGVQFLCSYITLPLYALVTQMGSTMKRSVF 432
AtMLO9          TYFFWIWYEFGLRSCFHHHFGLIIIRVCLGVGVQFLCSYITLPLYALVTQMGSTMKRSVF 439
AtMLO7          THFFWIWYSFGLKSCFHKDFNLVVSKLFLCLGALILCSYITLPLYALVTQMGSHMKKAVF 447
AtMLO10         TYFFWVWYSFGLKSCFHTDFKLVIVKLSLGVGALILCSYITLPLYALVTQMGSNMKKAVF 445
AtMLO8          TYFFWIWYSFGSDSCYHPNFKIALVKVAIALGVLCLCSYITLPLYALVTQMGSRMKKSVF 463
ZmMLO6          IYFLWILYEYGMDSCFNDSEEFVFARLCLGVVVQVLCSYVTLPLYALVSQMGSTMKQSIF 470
OsMLO4          TYFFWIWYEFGLRSCFHDNFELIIARVCLGVVVQFMCSYITLPLYALVSQMGSQMKRTIF 435
ZmMLO2          TYFFWIWYEFGLRSCFHDNFEFIIARVCLGAIVQFMCSYITLPLYALVSQMGSEMKRTIF 422
AtMLO3          AFIVWITWQFGINSCYHDNQGIIITRLVLAVTVQFLSSYITLPLYAIVTQMGSSYKRAIL 434
OsMLO7          GFFIWVLVTFGFDSCIMEKKVYAISRLVIGVLIQMICSYVTLPLYAIVTHMDGGIKLQGI 418
ZmMLO7          SFFFWILVSEGFGSCMMERKPYVISRLVIGVIIEVICSYITLPLYAIVTHMTGQIKLHGF 420
OsMLO9          GFFFWVLATYGFDSCIMENKIYALPRLAIGIIVQVLCSYSTLPLYAIVTHMGGDIKLQAF 394
AtMLO13         AFFFWILFTYGIHSCIMEKLGYLIPRLVMGVLVQVLCSYSTLPLYALVTQMGSKFKKGIF 433
HvMLO3          AFFFWLLVTYGFKSCIMGKPAYVITRVVISVICQILCGYSTLPLYAIVSHMGNSFKKTIF 430
OsMLO10         AFFFWLLVTYGFKSCIMGNKGYVIARLVV--ISQLLCGYSTLPLYAIVSHMGTSFKKVIF 440
OsMLO3          AYFIWTMATFGFNSCIMDRLPYRVSRISCSVVVQVLCSYSTLPLYAIVSHMGSSFKSAVF 424
ZmMLO3          AYFFWTLAMFGANSCIMDSLGYSVSRIIICVVVQVLCSYSTLPLYAIVSHMGSSFKSAVF 430
OsMLO8          AFFFWILTTYGFYSCIMGQVGFIVPRLVIGVTIQLLCSYSTMPLYAVVTQMGSFYKKEIF 425
ZmMLO8          AFFFWILSTYGFDSCIMGQVRFIVPRLVIGVVIQLLCSYSTLPLYAIVTQMGSCYKKEIF 431
OsMLO5          AFFFWILTTYGFNSCIMDHVPFILTRLIIGAIVQILCSYSTLPIYAIVTQMGSFFKKEIF 435
AtMLO1          AFFFWIWVTYGFDSCIMGQVRYIVPRLVIGVFIQVLCSYSTLPLYAIVSQMGSSFKKAIF 445
AtMLO15         AYFFFILFQFGWDSCIMDHVKFVIPRLVIGVIIQLLCSYSTLPLYALVTQMGSSFKGAIF 430
PpMLO1          AFFFWTMFTYGYSSCLVGKTWMVVVRILVGLFLQILCSVSTLPLYALVTQLGSKMKLTVF 440
OsMLO11         ATFVWSLNEMAPVLCN-----IFLISMFSAILVQFWCSYNTLPLNVIITQMGSKFKKSLV 421
ZmMLO4          ATFLWSLWELSAQTCFMKHYYMVAIRLISGLLVQFWCSYSTLPLNVIISQMGSKFKKSLV 425
AtMLO4          ATFIWFLWGIKERSCFMKNHVMISSRLISGVLVQFWCSYGTVPLNVIVTQMGSRHKKAVI 432
AtMLO11         ASFFWFWWQFGYSSCFLKNHYLVYFRLLLGFAGQFLCSYSTLPLYALVTQMGTNYKAALI 444
AtMLO14         ASFFWFWWQFGYNSCFLRNHLLVYLRLILGFSGQFLCSYSTLPLYALVTQMGTNYKAALL 439
OsMLO6          ASFFWFWWQFGYDSCFIKNHLIVYCRLILGFAGQFLCSYSTLPVYALVTQMGSKYKAALI 447
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MLO             D-EQTSKALTNWRN--TAKEKKKVRDTDMLMAQMI-GDATPSRGSSPMP-----SRGSSP 463
TaMLO2-B1       D-EQTAKALTNWRN--TAKEKKKVRDTDMLMAQMI-GDATPSRGASPMP-----SRGSSP 464
HvMLO2          D-EQTAKALTNWRK--MAKEKKKARDAAMLMAQMG-GGATPSVG------------SSP 478
OsMLO1          E-EQTMKALMNWRK--KAMEKKKVRDADAFLAQMS-VDFATPAS----------SRSASP 470
OsMLO2          E-EQTMKALMNWRK--TAREKKKLRDADEFLAQMS-GDTTP------------SRGSSP 480
ZmMLO1          E-EQTAKAVMKWRK--TAKDKVRQREAAGFLDVLTSADTTPSHSRATSP-----SRGNSP 496
AtMLO2          N-DRVATALKKWHH--TAKNETKHGRHSGSNTPFSSRPTTPTHG------------SSP 492
AtMLO6          N-ERVATALKSWHH--TAKKNIKHGRTSESTTPFSSRPTTPTHG------------SSP 489
AtMLO12         N-DRVANALKKWHH--TAKKQTKHG-HSGSNTPHSSRPTTPTHG------------MSP 482
AtMLO5          D-DQTSKALKNWHK--NAKKKSE---------------TPGQTPPL---------PNLR 464
AtMLO9          D-EQTSKALEQWHK--KARKKNE---------------K-------------------- 460
AtMLO7          D-EQMAKALKKWHK--DIKLKKGKARKLPSKTLG--VSESFSLSSS-----------SS 490
AtMLO10         D-EQMAKALKKWHM--TVKKKKGKARKPPTETLG--VSDTVSTSTSS---------FHAS 491
AtMLO8          D-EQTSKALKKWRM--AVKKKKG--VKATTKRLGGDGSASPTASTVR---------STSS 509
ZmMLO6          D-EQTSKALKNWRA--GAKKKAP----------------------------------- 490
OsMLO4          D-EQTAKALKKWHKAAVVKKKQQKGSSHEPGSETPGTETTTTTATATEESQRERDAAAMP 494
ZmMLO2          D-EQTAKALKKWHK-AVVKKKHHKDSSHNS-SETP---STDTTGPAGEAGEWQR-LHEVP 475
AtMLO3          E-EQLANVLRHWQG--MVRDKKKTIQTPDTDNNSNNNNGDIDSG------------ESP 478
OsMLO7          G-SGLHESVAGWALDARRKKEEQ-------------------------------QSSH 444
ZmMLO7          G-SRVHESVHGWIG--LRKKPFS-------------------------------FWKI 444
OsMLO9          G-ETVHVSVHSWATDVRKKKAAPPPHSHLRIPF---------------------LMKR 430
AtMLO13         D-NVVQSTLEGWLEDTRNRGEST----------------------------------- 455
HvMLO3          D-ENVTEGLVNWAEKARRGTRTPN--------------------------------KIT 456
OsMLO10         D-ENVVEGLANWAQNARR-RNARA--------------------------------ART 465
OsMLO3          S-DDVADNLRKWADEARRRTGRAA--------------------------------AGV 450
ZmMLO3          V-DDVADNLRGWADGARRRVRRSA--------------------------------TGV 456
OsMLO8          N-DHVQQGVLGWAQKVKMRKGLK---------------------------------- 447
ZmMLO8          N-EHVQQGVLGWAQKVKMKKGLKG--------------------------------AAS 457
OsMLO5          D-EHVQQGLVGWAQKAKKRKGLKE--------------------------------SNG 461
AtMLO1          E-ENVQVGLVGWAQKVKQKRDLKA--------------------------------AAS 471
AtMLO15         N-EQTQEHLVGWAKMAK--RGVKK--------------------------------G-- 452
PpMLO1          RSESTGVALKGWAKSAKKRHSHPDHVHVPISPN----------------------SSIS 477
OsMLO11         S-ESVRESLHSWCKRVKDKNRHN-------------------------------LASRS 448
ZmMLO4          S-ENVRESLHSWCKRVKDRSRHNPLFSRNGT----------------------LTTRS 460
AtMLO4          A-ESVRDSLHSWCKRVKERSKHT---------------------------------RS 456
AtMLO11         P-QRIRETIRGWGKATRRKRRHGLYGDDSTVR----------------------TETST 480
AtMLO14         P-QRVRETINGWGKATRRKRRHGLYGDDSTIR----------------------TETST 475
OsMLO6          P-RRIRETMHGWGKDPRRRRKKHRGGDDSTIR----------------------TETST 483
                       :  *
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MLO             VHLLHKGMGR----SDDPQSAPTS-----------PRTQQEARDMYPVVVAHPVH----- 503
TaMLO2-B1       VHLLHKGMGR----SDDPQSTPTS-----------PRAMEEARDMYPVVVAHPVH----- 504
HvMLO2          VHLLHKAGAR----SDDPQSVPAS-----------PRAEKEGGG-----VQHPAR----- 513
OsMLO1          VHLLQDHRAR----SDDPPSPITV-----------ASPPAPEEDMYPVPAAAASR--Q-- 511
OsMLO2          VHLLHKQRVR----SEDPPSAPAS-----------PGFAGEARDMYPVPVAPVVRPHG-- 523
ZmMLO1          VHLLHKYRGR----SEEPQSGPAS-----------PGR--ELGDMYPVADQHRLH----- 534
AtMLO2          IHLLHNFNNR---SVENYPSSPSP---------RYSGHGHHEHQFWDPESQHQEAETS-- 538
AtMLO6          IHLLRNAPHK---RSRSVDESFAN---------SFSPR-NSDFDSWDPESQHETAETSNS 536
AtMLO12         VHLLHNYNNRSLDQQTSFTASPSPP-----RFSDYSGQGHGHQHFFDPESQNHSYQRE-- 535
AtMLO5          PKTGGDIESA---SPANITASVDV-----------KESDQSQSR----DLLSGP------ 500
AtMLO9          ------------------------------------------------------------
AtMLO7          ATTLHRSKTT---GHSSNIIYYKQ-----------EDEEDEMS-----DLEAG--AEDAI 529
AtMLO10         GATLLRSKTT---GHST--ASYMS-----------NFEDQSMS-----DLEAEPLSPEPI 530
AtMLO8          VRSLQRYKTT---PHSMRYEGLDP-----------ETSDLDTDN----EALTPPKSPPSF 551
ZmMLO6          ---TGGSKHG---GGGSPTAGGSP-----------TKADGDA------------------ 515
OsMLO4          VRHLHRYKTI---AHVG-ATGTLS-----------DSDCSDTDT--PFASPTRLLIPPTK 537
ZmMLO2          VRHLHRYKTI---AHVGGVRSPLS-----------DPDYSDTDDTEPLSLQTRHLIPPAK 521
AtMLO3          VQTEVASEFR----FSGRQSPILQ-----------EIQIQEKTER-------------- 508
OsMLO7          GGATTGATEGSNLQERPTSGPRRAA-----PWRRRHHLPPTWSRSSPSPPPTTTATTAAT 499
ZmMLO7          PGGDPNADSG-----READVTRRVA-----KERSGSSRSMPMAPADEIVTVDDVAVAAAA 494
OsMLO9          RHSTRGADDAADDAGGDVDHHHHHH-----GHHHHGHHHHEGSSAAAAAPDLEEIVATTS 485
AtMLO13         ----------------------------------------SEAHRIEMQPTTPESYNV 473
HvMLO3          TDASSSPIDE-------ANGG--------------IVQMTNTRANSSVDQGTARLI---- 491
OsMLO10         QNVGDSPVDE-------SNVG--------------EVQMTSP-PTKSVQQGTARLI---- 499
OsMLO3          G--CLGAAAG-------SSR------------------------REGIHIQNM------ 470
ZmMLO3          DASCLGTPAA-------AGRGWE---------GAAGWRLIAGRPSRPTQQPRSISF---- 496
OsMLO8          ---EGSAGGG-------DTAGPS-----------VKIEMMRRAAREGNDEAGVSIE---- 482
ZmMLO8          ASKDESITNA-------DSAGPS-----------VKIEMAK--AGEDVEIVGNTG----- 492
OsMLO5          AMAGAGSTNG-------SSQPSS-----------ILQMVRRAAASEEGSSNGGDMRTNQ- 502
AtMLO1          NGDEGSSQAGPGPDSGSGSAPAAGP-----GAGFAGIQLSRVTRNNAGDTNNEITPDHNN 526
AtMLO15         ATQVGTSHDA-------TSPRPS---------IQLNSLLGKGSSQQNQNPKEKSEIAHHD 496
PpMLO1          NEEPHVTKKEHHLHVLGLDKQVDAG-----GHVVDIVPGTTQHLGQKHQHNDHNHLNGDD 532
OsMLO11         VCSLDTTYEETDHETATVGTLSRT------------VSATSLDEELTVATVEDND----- 491
ZmMLO4          VCSLDTTY-ETDHETNTVCTLSRT------------ASATSLDDQLTVVTVDD------- 500
AtMLO4          VCSLDTAT-IDERDEMTVGTLSRS------------SSMTSLN-QITINSIDQAESIFGA 502
AtMLO11         IASLEEYD--HQVLDVTETSFEQQRKQQEQGTTELELQPIQPRNDCVPNDTSSRVGTPLL 538
AtMLO14         IASVDEYN--DQVLDVSETSPVQD--------NELELQLIRG-----ACGNSSSVETPIL 520
OsMLO6          VCSLDDDDGDDEHGQFVETTPSRP-------YLKIQLQPLRSGGXSARPGTPCHPGVVGL 536
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MLO             --RLNPNDRRRSASSSALEADIPS----------------ADFSFSQG------------ 533
TaMLO2-B1       --RLNPADRRRSVSSSALDVDIPS----------------ADFSFSQG------------ 534
HvMLO2          --KVPPCDGWRSASSPALDAHIPG----------------ADFGFSTQR----------- 544
OsMLO1          -LLDDPPDRRWMASSS---ADIAD----------------SDFSFSAQR----------- 540
OsMLO2          -FNRTDPDKRRAASSSAIQVDIAD----------------SDFSFSVQR----------- 555
ZmMLO1          --RLDP-ERMRPASSTAVNIDIAD----------------ADFSFSMR------------ 563
AtMLO2          THHS-LAHESSEP--VLASVELPP----IR-----TSKSLRDFSFKK------------- 573
AtMLO6          NHRSRFGEEESEKKFVSSSVELPPGPGQIRTQHEISTISLRDFSFKR------------- 583
AtMLO12         ITDSEFSNSHHPQVDMASPVREEK---EIVEH---VKVDLSEFTFKK------------- 576
AtMLO5          ------------------------------------------------------------
AtMLO9          ------------------------------------------------------------
AtMLO7          D-----RIQQQ--EMQFHNS-------------------------------------- 542
AtMLO10         EGHTLVRVGDQNTEIEYTGDISPG----------------NQFSFVKNVPANDID----- 569
AtMLO8          ELVVKVEPNKTNTGETSRDTETDS----------------KEFSFVKPAPSNESSQDR-- 593
ZmMLO6          ------------------------------------------------------------
OsMLO4          QRSLDAGRAEVRVDVDSTPTPTPPE------------RHDSFSFPR-LPAHNLQQK--- 580
ZmMLO2          QRSLDTERAEVRVNVVETAAAPSDV------------LQDSFSFPRLLPPRHVPDK--- 565
AtMLO3          ------------------------------------------------------------
OsMLO7          VGDD------------------------------------------------------ 503
ZmMLO7          VGQGP----------------------------------------------------- 499
OsMLO9          GGEDGHPPAPPPPPQGPRP--------------------------------------- 504
AtMLO13         QSENP----------------------------------------------------- 478
HvMLO3          ------------------------------------------------------------
OsMLO10         ------------------------------------------------------------
OsMLO3          ------------------------------------------------------------
ZmMLO3          ------------------------------------------------------------
OsMLO8          ------------------------------------------------------------
ZmMLO8          ------------------------------------------------------------
OsMLO5          ------------------------------------------------------------
AtMLO1          ------------------------------------------------------------
AtMLO15         ------------------------------------------------------------
PpMLO1          HHQNPKPVHVHAQGDSHTTEVAEDPGTIVNESQVRVGDRVPGNEENKS------------ 580
OsMLO11         -------DDEEMSRIEQEIDRSL----------------------------------- 507
ZmMLO4          ----------EPSCIEKDV--------------------------------------- 509
AtMLO4          AASSSSPQDGYTSRVEEYLSETYNNIGSIPPLNDEIEIEIEGEEDNGGRGSGSDENNGDA 562
AtMLO11         RPWLSISSPTTTIELRSEPMETLSRSSSLP-----SEKRV------------------- 573
AtMLO14         RPCASISS-TTFSRLQTETTDSLSRSSSLP-----MRREC------------------- 554
OsMLO6          PPLHSVSTQGSSHPMLQRQASSLSAPSSPSPRGGGMTRSMSMPGFASLTRTPGGSCPGTG 596
```

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MLO             ------------
TaMLO2-B1       ------------
HvMLO2          ------------
OsMLO1          ------------
OsMLO2          ------------
ZmMLO1          ------------
AtMLO2          ------------
AtMLO6          ------------
AtMLO12         ------------
AtMLO5          ------------
AtMLO9          ------------
AtMLO7          ------------
AtMLO10         ------------
AtMLO8          ------------
ZmMLO6          ------------
OsMLO4          ------------
ZmMLO2          ------------
AtMLO3          ------------
OsMLO7          ------------
ZmMLO7          ------------
OsMLO9          ------------
AtMLO13         ------------
HvMLO3          ------------
OsMLO10         ------------
OsMLO3          ------------
ZmMLO3          ------------
OsMLO8          ------------
ZmMLO8          ------------
OsMLO5          ------------
AtMLO1          ------------
AtMLO15         ------------
PpMLO1          ------------
OsMLO11         ------------
ZmMLO4          ------------
AtMLO4          GETLLELFRRT- 573
AtMLO11         ------------
AtMLO14         ------------
OsMLO6          AGTPTRLSDARN 608
```