

## Supplemental Figure 4. Multiple sequence alignment of plant MDL proteins highlighting the distribution of cysteine residues.

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H._vulgare_BAJ88384      MPQLSLSTNVP-VDAVVAADILRDCSRALARIIGKPESYVTVSIDGVSPT
B._distachyon_XP_003577817  MPQLSISTNVP-VDAIVAADILKDCSRALAKIIGKPESYVMVVSINGCVPT
O._sativa_NP_001058472    MPQLSLTNTNVP-VDAVVAADIIKDCSKALARIIGKPESYVMVVSISGVSVM
S._bicolor_XP_002438947   MPTLNLRNTNVP-VDAVVAADILKDCSKAVARIIGKPESYVMVVSINGSVPM
Z._mays_NP_001150913     MPTLNLSSTNVP-VDAVVAADILRDCSKAVARIIGKPESYVMVSVNGSVPM
S._lycopersicum_XP_004242799 MPTLNLFNTNLP-VDAVIASDILKDATKAVAKIIGKPESYVMILLNNGVPI
A._thaliana_AtMDL1       MPTLNLFNTNIP-VDAVTCSDILKDATKAVAKIIGKPESYVMILLNSGVPI
P._persica_XP_007225890   MPTLNLFNTNLP-VDAVVASDILKDATKAVSKIIGKPESYVMILLNGSVPM
G._max_NP_001238163      MPTLDLFTNVP-VDTVVASDILRDKATKAVAKIIGKPESYVMILLNNGVPI
L._japonicus_AFK37854    MPTLNLFNTNIP-VDAVVASDILRDKATKAVAKIIGKPESYVMILLNNGVPI
V._vinifera_XP_002264373 MPTLNLFNTNVP-VDAVVASDILKDC TKAVAKIIGKPESYVMILLNNGVPI
P._sitchensis_ABK23267   MPTLNLSSTNVP-VDSVSSDILKDAKSVARIIGKPESYVMVLLKGGVPM
S._moellendorffii_XP_002961952 MPTLNLSSTNVP-ADSI VSSDILKDAKSVARIIGKPESYVMVLLKGGVPM
C._reinhardtii_XP_001691775 MPTLNLIITNVA-GDRVTTSDVLKALS KAVASSVGKPEQWVMASVTTDKPM
V._carteri_XP_002955179  MPTLNIVITNVP-CDRVTTSDVLKALS KAVSSVGKPEQWVMCSLT TTDKPM
P._patens_XP_001768921   MPTLNLIQTNVP-LDGVVTSDILKDAKAVAQILSKPESYVLIISLRGGIPM
S._moellendorffii_XP_002966661 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
S._moellendorffii_XP_002964007 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
S._moellendorffii_XP_002983015 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
S._lycopersicum_XP_004249062 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
A._thaliana_AtMDL2       MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
G._max_NP_001236304      MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
V._vinifera_XP_002263560 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
P._persica_XP_007207497  MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
G._max_NP_001237629      MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
L._japonicus_AFK37368    MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
H._vulgare_BAJ92045      MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
B._distachyon_XP_003579042 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
O._sativa_ABG22330       MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
S._bicolor_XP_002441679  MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
Z._mays_XP_008677331     MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
P._sitchensis_ABK23881   MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
S._lycopersicum_XP_004249685 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
V._vinifera_XP_002264120 MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
G._max_ACU19241          MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
L._japonicus_AFK35159    MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
A._thaliana_AtMDL3       MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
P._persica_XP_007207503  MPTLNLISTNVP-LDGVVTSDILKDAKAVAVLGLKPEYVMI IINGAVPI
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H.\_vulgare\_BAJ88384  
B.\_distachyon\_XP\_003577817  
O.\_sativa\_NP\_001058472  
S.\_bicolor\_XP\_002438947  
Z.\_mays\_NP\_001150913  
S.\_lycopersicum\_XP\_004242799  
A.\_thaliana\_AtMDL1  
P.\_persica\_XP\_007225890  
G.\_max\_NP\_001238163  
L.\_japonicus\_AFK37854  
V.\_vinifera\_XP\_002264373  
P.\_sitchensis\_ABK23267  
S.\_moellendorffii\_XP\_002961952  
C.\_reinhardtii\_XP\_001691775  
V.\_carteri\_XP\_002955179  
P.\_patens\_XP\_001768921  
S.\_moellendorffii\_XP\_002966661  
S.\_moellendorffii\_XP\_002964007  
S.\_moellendorffii\_XP\_002983015  
S.\_lycopersicum\_XP\_004249062  
A.\_thaliana\_AtMDL2  
G.\_max\_NP\_001236304  
V.\_vinifera\_XP\_002263560  
P.\_persica\_XP\_007207497  
G.\_max\_NP\_001237629  
L.\_japonicus\_AFK37368  
H.\_vulgare\_BAJ92045  
B.\_distachyon\_XP\_003579042  
O.\_sativa\_ABG22330  
S.\_bicolor\_XP\_002441679  
Z.\_mays\_XP\_008677331  
P.\_sitchensis\_ABK23881  
S.\_lycopersicum\_XP\_004249685  
V.\_vinifera\_XP\_002264120  
G.\_max\_ACU19241  
L.\_japonicus\_AFK35159  
A.\_thaliana\_AtMDL3  
P.\_persica\_XP\_007207503

SFA-GSEE-PAAYGEIMSIGGLGPGVN----GKLSAALADILEAKLSISP  
SFA-GSEE-PAAYGEIMSIGGLGPGVN----GKLSAALAEILETKLSISR  
SFA-ASEE-PAAYGELMSIGGIGPGVN----GKLSAALAEILETKLSVSR  
SFA-GSEE-PAAYGELVSIIGGIGPGVN----GKLSAAVAEVLTKLSVSR  
SFA-ASEE-PAAYGELVSIIGGIGPGVN----GKLSAAVAEVLAKLSVSR  
AFA-GTEA-PAAYGELISIGGLGPSVN----GKLSSTIAEILQTKLSIDS  
AFA-GTEE-PAAYGELISIGGLGPGVN----GKLSSTIAEILETKLSIDS  
AFA-GTEE-PAAYGELISIGGIGPSVN----GKLSSTIAEILETKLSIDS  
AFA-GTEE-PAAYGELISIGGLGPSVN----GKLSSTIAEILETKLYIDS  
AFG-GTEE-PAAYGELISIGGLGPSVN----GKLSSTIAEILQTKLYIDG  
EFA-GTEE-PAAYGELISIGGLGPSVN----GKLSSTIAEIIQTKLSIDS  
LFG-GSEE-PAAYGEVVISIGGLGPGVN----GKLSAAIADILESKLSVDK  
SFG-GTEE-PAAYGEVISIGGLGPSVN----KELSEALSEILESKLSVPP  
IYG-GTEE-PCAFGYLMSIGSIGGDKN----KKISAAIC EVLTKLGVPA  
IYG-GSEE-PCAFGYFMSIGAIGDQPNIRQISAAIC EVLSTHLGVPA  
SFG-GTEE-PAAYGELISIGGVGPDNTN----KRLSAAISDILKTKLSVPS  
SFG-GSEE-PAAYGELVSIIGGIGPSDN----KLSKALIAELLQSKLAVPP  
LFG-GSRE-AAAYGELVSIIGGIGPSDN----KLSKALIAELLQSKLAVPP  
AFQ-GSHE-SAAAYGELVSIIGGLSPGVN----QDLCKAIARVLEEEELKVPK  
AFG-GTEQ-PAAYGELVSIIGGLNADV----KLSAAIADILETKLSIPK  
SFG-GTED-PAAYGELVSIIGGLNADV----KLSAAVSAILETKLSVPK  
AFG-GNEQ-PAAYGELVSIIGGLNPSVN----KLSAAIASILETKLSVPK  
AFG-GTEQ-PAAYGELVSIIGGLNPGTN----KLSAAIASILETKLSVPK  
AFG-GTEQ-PAAYGELVSIIGGLNPDVN----KLSAAIAAILETKLSVPK  
SHG-GSEQ-PAAYGELVSIIGGLSPDVN----KLSAGIASILENKLSVPK  
SFG-GTEQ-PAAYGELVSIIGGLNPDVN----KLSAAIASILETKLSVPK  
AFG-GTQE-PAAYGELVSIIGGLNPDVN----KLSAGIASILESKLSISK  
AFG-GTQE-PAAYGELVSIIGGLSPDVN----KLSAGIAAILESKLSIPK  
AFG-GTQE-PAAYGELVSIIGGLNPDVN----KLSAGIASILESKLSIPK  
AFG-GTQE-PAAYGELVSIIGGLNPDVN----KLSAGIASILESKLSVPK  
AFG-GTQE-PAAYGELVSIIGGLNPDVN----KLSAGIASILESKLSVPK  
SFG-GTEE-PAAYGELVSIIGGLGSDTN----KLSAAIATILDTKLKVPK  
SFG-GNKE-PAAFAEIVSMGGINSVDK----RKLIIATLGGICQNRFSIPR  
SFE-GNKE-PAAFAEIVSMGGINSEVK----RKLIIATIGTILQTKLSIPR  
SFE-GNKE-PAAYAEIVSMGGISTEVK----RKLIIATIGTILQSNLSIPR  
SFE-CNKE-PAAYAEIVSMGGINSEVK----KLIYITIGTILQSKLSIPR  
VFG-GNKE-PAAYAEIVSMGGITKQVK----RELIIATVGSILHTHFSIHP  
SFG-RSTSE-PAAYGELVAMGGINKPVK----RQLIIATLGTIMEAKLSIPK

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<i>H. vulgare</i> _BAJ88384	SRFYVKFDDVQGYNVGFNGTTF-----
<i>B. distachyon</i> _XP_003577817	SRFYVKFDDVQGYNLGFNGSTF-----
<i>O. sativa</i> _NP_001058472	SRFYVKFDDVKGFNLGFNGSTF-----
<i>S. bicolor</i> _XP_002438947	SRFYIKFDDVQRSNFGFNGSTF-----
<i>Z. mays</i> _NP_001150913	SRFYIKFDDVRGHNFGFNGSTF-----
<i>S. lycopersicum</i> _XP_004242799	DRFYIKFYDSPRPFFGFNGSTF-----
<i>A. thaliana</i> _AtMDL1	SRFYIKFYDSPRPFFGYNGSTF-----
<i>P. persica</i> _XP_007225890	SRFYIKFYDVERPFFGFNGSTF-----
<i>G. max</i> _NP_001238163	SRFYIKFYDVQRSFFGFNGSTF-----
<i>L. japonicus</i> _AFK37854	SRFYIKFYDVQRSFFGFNGSTF-----
<i>V. vinifera</i> _XP_002264373	ARFYVKFYDVERSFFGFNGSTF-----
<i>P. sitchensis</i> _ABK23267	SRFYIKFYDVEGSYFGFRGSTF-----
<i>S. moellendorffii</i> _XP_002961952	SRFYIKFYDVQRSFFGWNGSTF-----
<i>C. reinhardtii</i> _XP_001691775	NRVYIQFSDAKASDVGWGDTFA-----
<i>V. carteri</i> _XP_002955179	ARVYIEFSVDNASDVGWNGSTFV-----
<i>P. patens</i> _XP_001768921	NRFYIKFFDVKRSDMGWNGSTF-----
<i>S. moellendorffii</i> _XP_002966661	NRFYIKFYDVKGSNFGWNGSTF-----
<i>S. moellendorffii</i> _XP_002964007	SRFYIKFYDVKGSNFGYNGSTY-----
<i>S. moellendorffii</i> _XP_002983015	SRFYIKFYDVEQACVLRIVSVSLFLFDEILSF
<i>S. lycopersicum</i> _XP_004249062	SRFFLKFYDTKGSFFGWNGSTF-----
<i>A. thaliana</i> _AtMDL2	SRFFLKFYDTKGSFFGWNGATL-----
<i>G. max</i> _NP_001236304	SRFFLKFYDTKGSNFGWNGSTF-----
<i>V. vinifera</i> _XP_002263560	SRFFLKFYDSKGSNFGWNGSTF-----
<i>P. persica</i> _XP_007207497	SRFFLKFYDTKGSNFGWNGSTF-----
<i>G. max</i> _NP_001237629	SRFYLKFYDTKGSNFGWNGSTF-----
<i>L. japonicus</i> _AFK37368	SRFFLKFYDTKGSNFGWNGSTF-----
<i>H. vulgare</i> _BAJ92045	SRFYLKFHDSKRSDFGWNGTTF-----
<i>B. distachyon</i> _XP_003579042	SRFYLKFHDSKRSDFGWNGTTF-----
<i>O. sativa</i> _ABG22330	GRFYLKFYDSKRSDFGWNGTTF-----
<i>S. bicolor</i> _XP_002441679	SRFYLKFYDSKRSDFGWNGSTF-----
<i>Z. mays</i> _XP_008677331	SRFYLKFYDSKRSDFGWNGSTF-----
<i>P. sitchensis</i> _ABK23881	SRFYIKFYDVKRSDFGWNGTTF-----
<i>S. lycopersicum</i> _XP_004249685	TRFFLKVYDIT---MATKFSKL-----
<i>V. vinifera</i> _XP_002264120	TRFFLKVYDIT---MAHKIAKL-----
<i>G. max</i> _ACU19241	TRFFLKVFVDS---AFRTNSKM-----
<i>L. japonicus</i> _AFK35159	TRFFLKVFDTT---LFRNKSKL-----
<i>A. thaliana</i> _AtMDL3	TRFIFKVFDTT---SLPLPSKL-----
<i>P. persica</i> _XP_007207503	TRFFLKVVDIS---TATG-SKL-----
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