Brassica_napus_BnCS4 MVFFRSVAAF SRLRSRVGQ Brassica_rapa_BrCS4 MVFFRSVAAF Raphanus_sativus_RsCS4 MVFFRSLSAF Eutrema_salsugineum_EsCS4 MVFFRSVSAF Arabidopsis_lyrata_ACS4 MVFFRSVSAF abidopsis_thaliana_AtCS4 MVFFRSVSAF Capsella_rubella_CrCS4 MVFFRSVSAF Camelina_sativa_CsCS4 MVFFRSISAL Cucumis_sativis_CusCS4 MAFFKSLTAL Theobroma_cacao_TcCS4 MVFLRGVAAL Prunus_-_c__OSA MVFFRSVNAL SRLRSRVSQQ Prunus_sibirica_PsCS4 MVFFRSVTAL Ziziphus jujuba_ZjCS4 MVFFRSVSLL Secale_cereale_ScCS4 MAFFRGLAAN ricum_urartu_TuCS4 MAFFRGLAA Triticum_aestivum_TaCS4 MAFFRGLAA Aegilops_tauschii_AetCS4 MAFFRGLAA Brachypodium stacei BsCS4 MAFFRGISA Oryza_sativa_OsCS4 MAFFRGLTAV SRLRSVAQ Panicum_hallii_PhCS4 MAFFRGLTAV SRLSRVAQE Panicum_virgatum MAFFRGLTAV SRLRSRVAQE Setaria_italica_SitCS4 MAFFRGLTAV SRLRSRVTQE Setaria_viridis_SUCS4 MAFFRGLTAV SRLRSRVTQ Sorghum_bicolor_SbCS4 MAFFRGLTAV SRLRSRMAQE

Consensus onservatio MAFFRGLTAV SRLRSRVGQQ ATTLG-GVRW Conservatio MAFFRGLTAV SRLRSRVGQQ XXTLG-XVRW LQMQS XSDLD SS-LGSSVRW
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SS-FGSSVRW
SS-LSNSVRW
SS-LSNSVRW
SS-LNNSVRW
SS-LSNSVRW
SS-LSNSVRW
SN-LSNSVRW
SN-LSNSVRW
SS-LSNSVRW
SN-LRDSVRW
SN-LRDSVRW
SSSLRNSVRW
ATTLG-GVRW
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ATTLG-GVRW

QMQS
EQQDRLKKLK
SEHGKVQLGN ITVDMVIG

Brassica napus BnCS4 SLIDP
Brassica_napus_BnCS4 SLLDPEEG $\begin{aligned} & \text { Brassica_rapa_BrCS4 } \text { SLLDPEEGIR FRGLSIPECQ } \\ & \text { SLDEGIR }\end{aligned}$ massica_rapa_BrCS4 SLLDPEEGIR FRGLSIPECQ
$\qquad$ Arabidopsis_lyrata_ACS4 Arabidopsis_thaliana_AtCS4 Capsella_rubella_CrCS4 Camelina_sativa_CsCS4
Cucumis_melo_CumCS4 Cucumis_sativus_CusCS4 Theobroma_cacao_TcCS4 Prunus_persica_PpCS4
Prunus_sibirica_PsCS4 Prunus_sibirica_PsCS4
Ziziphus_jujuba_ZjCS4 Ziziphus_jujuba_ZjCS4 Secale_cereale_ScCS4
Triticum_urartu_TuCS4 Hordeum_vulgare_HVCS4
Triticum_aestivum_TaCS4 Aegilops_tauschii_AetCS4 Brachypodium_distachyon_BdCS4 Brachypodium_stacei_BsCS4
Oryza_brachyantha_ObCS4 Oryza_brachyantha_ObCS4
Oryza_sativa_OsCS4 Panicum_hallii_PhCS4 Panicum_virgatum
Setaria_italica_SitCS4 Setaria_viridis_SVCS
Sorghum_bicolor SbCS Sorghum_bicolor_SbCS4 4 SLLDPEEGIR FRGLSIPECQ
Zea mays_ZmCS4

Consensus
Conservation

TRLRSRVGQQ
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SKLRSRLGQQ
SKLRSRLGQQ
SKLRSHATQQ
SRLRSRMGQD
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IQMQSSTDVD LKSQLQELIP


IQMQSSTDVD LKSQLQELIP
IQMQSSTDMD LKSQLQELIP IQMQSSTELD IQMQSSTDLD LQMQSSTDMD
LQMQSSTDLD LQIQSSSDLD LQMQSSSDLD
LQTQSSSDLD LQTQTSTDLD LQTQTSTDLD LQIQTSSDLD
LQMQSASDLD LQMQSASDLD LQMQSASDLD LQMQSASDLD
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120 AIDALPSTA HPMTQFASG AIDALPSTA HPMTQFASGV NAIDALPSTA HPMTQFASG NAIDALPSTA HPMTQFASGV NAIDALPSTA HPMTQFASGV 179 NAIDALPSTA HPMTQFASGV 179 NAIDALPSTA HPMTQFASGV 179 KAIDALPITS HPMTQFATGV 179 AADALPITS HPMTQFATGV 179 KADALPVSA HPMTQFATGV 179 KAIDALP ITA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTSGV 180 KAIDALPVTA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTTGV 179 KA
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 KA|DALPVTA HPMTQFTTGV 179 \begin{tabular}{cc}
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\end{tabular} 179 KAIDALPVTA HPMTQFTTGV 179 KAIDALPVTA HPMTQFTTGV



 LLTGKVPTKE LLTGKVPXKE

QVEALSKDLA
QRAAVPDYVY
QVEALSKDLA N
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$\begin{array}{ll}\text { QVEALSKDLA } & \text { NRAAVPDYV } \\ \text { QVEALSKDLA } & \text { NRAAVPDYVY } \\ \text { QVEALSKDLA } & \\ \text { NRAAVPDYVY }\end{array}$ QVEALSKDLA SRAAVPDYVY QVEALSKDLA SRAAVPDYVY
QVEALSKDLA SRAAVPDYVY QVDALSRELQ SRASVPDYVY QVDALSQELR SRAVVPDYV
QVDALSEELR SRAAVPDYV
QVDALSEELR SRAIVPDYV QVDALSKELR TRATVPDYV $\begin{array}{ll}\text { QVDALSKELL } & \text { SRSTVPGYV } \\ \text { QVDALSKELL } & \text { SRSTVPGYV }\end{array}$ QVDALSKELL
QVDALSKELVPGYV
SRSTVPGYV QVDALSKELL ARSNVPDYV QVDALSKELL ARSNVPVYVY QVDTLSKELL ARSSVPAHVY
QVDALSKELL ARSSVPAHVY
$\qquad$
QVDSLSKELL ARSSVPAHV QVDALSKELI ARSTVPAHV

QVDALSKELL
$\frac{\square \|}{260}$

VVLPAAQSGG EPPLPEGLLWL
 EPLPEGLLW

Brassica_napus_BnCS4 MALQVQSEFQ KAYENGIHKS Brassica_olerace__BoCS4 MALQVQSEFQ KAYENGIQKS Brassica_rapa_BrCS4 MALQVQSEFQ KAYENGIHKS Raphanus_sativus_RsCS4
Eutrema_salsugineum_EsCS4
MALQVQSEFFQ Eutrema_salsugineum_EsCS4
Arabidopsis_lyrata ACS4 Arabidopsis_lyrata_ACS4
Arabidopsis thaliana_AtCS4 Arabidopsis_thaliana_AtCS4
Capsella_rubella_CrCS4 Capsella_rubella_CrCS4
Camelina_sativa_CsCS4 Camelina_sativa_CsCS4
Cucumis_melo_CumCS4 Cucumis_sativus_CusCS4 Theobroma_cacao_TcCS4
Prunus persica_PpCS4 Prunus_sibirica_PsCS4 Ziziphus_jujuba_ZjCS4
Secale_cereale_ScCS4 Triticum_urartu_TuCS4
Hordeum_vilgare_HvCS4
Triticum_aestivum_TaCS4 Triticum_aestivum_TaCS4
Aegilops_tauschii_AetCS4 rachypodium_distachyon_BdCS4 MAL Brachypodium_stacei_BsCS4 MALQVDSEFQ $\begin{array}{rlll}\text { Oryza_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativa_OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_halli_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_viridis_SuCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Sorghum_bicolor_SbCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFFQ } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ $\begin{array}{rlll}\text { yza_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativa_OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_halli_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_viridis_SvCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Sorghum_bicolor_SbCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFQ KA } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ $\begin{array}{rlll}\text { yza_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativa_OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_hallii_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESEFFQ } & \text { KA } \\ \text { Setaria_viridis_SvCS4 } & \text { MALQVESEFFQ } & \text { KA } \\ \text { Sorghum_bicolor_SbCS4 } & \text { MALQVESEFFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ $\begin{array}{rlll}\text { yza_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativa_OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_halli_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_viridis_SvCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Sorghum_bicolor_SbCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ $\begin{array}{rll}\text { Oryza_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativ__OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_hallii_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_viridis_SvCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Sorghum_bicolor_SbCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ $\begin{array}{rll}\text { a_brachyantha_ObCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Oryza_sativa_OsCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_hallii_PhCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Panicum_virgatum } & \text { MALQVESEFQ } & \text { KA } \\ \text { Setaria_italica_SitCS4 } & \text { MALQVESSEFQ } & \text { KA } \\ \text { Setaria_viridis_SVCS4 } & \text { MALQVESSEFQ } & \text { KA } \\ \text { rahum_bicolor_SbCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Zea_mays_ZmCS4 } & \text { MALQVESEFQ } & \text { KA } \\ \text { Consensus } & \text { MALQVQSEFQ } & \text { KA }\end{array}$ MALQVQSEFQ KAYENG HKS MALQVQSEFO KAYENGIHKS MALQVQSEFQ MALQVQSEFQ MGLQVQSEFQ MGLQVQSEFQ MALQVQSEFR MALQVQSEFQ MALQVQSEFQ MALQVESEFQ MALQVESEFEF MALQVESEFQ ALQVDSEFQ MALQVESEFQ LQVDSEFQ

KFWEPTYEDC LNLIARVPVV AAYVYRRMYK
KFWEPTYEDC LNLIARVPVV AAYVYRRMYK KFWEPTYEDC
KFWEPTYEDC FWEPTYEDC KFWEPTYEDC KFWEPTYEDC Consensus
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LNL ARVPVV AAYVYRRMYK LNL ARVPVV AAYVYRRMYK
LNLIARVPVV AAYIYRRMYK LNLIARVPVV AAYIYRRMY MNLIARVPLV
LNLIAQVPLV LNLIAQVPLV
LSLIARVPLV LSLIAQLPVV ASYVYRRIYK LSLIAQLPVV ASYVYRR IFK
LNLIARLPLV ASYVYRRIYK LNL ARLPLV ASYVYRRIYK
LNLIARLPQV ASYVYRRIFK LNLIARLPQV
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LNLIARLPQV $\frac{\text { LNLIARLPQV }}{\text { INLISRLPQV }}$ LNLISRLPQV
LNLIARLPQV LNLIARLPQV $\frac{\text { LNLIARLPQV }}{\text { LKFDSSPSTS }}$ LKFDSSPSTS LNLIARLPPV LNLIARLPPV LNLIARLPPV $\frac{\text { LNLIARLPPV }}{\text { LNLIARLPPV }}$ LNMIARLPPV

LNL IARLPVV ASYVYRRIFK \begin{tabular}{l}
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\hline ASYVYRR \& FK \\
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ASYVYRR \\
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ASYVYRR IFK \\
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 ASYVYRRIFK GSYVYRR IFK 

ASYVYRRIFK \\
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\hline ASYVYRR \& FK

 

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\end{tabular} ASYVYRRIFK

NGDSIPSDKS LDYGANFSHM




KE LMRIYITIHS 269 E LMRLYITIHS 269 LMRLYITIHS 269 | NGDSIPSDKS | LDYGANFSHM | LGFDDAKMKE | LMRLYITIHS 269 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| NGDSIIPSDKS | LDYGANFSHM | LGFDDAKMKE | LMRLYITIIHS 269 |
| NGDS IPSDKS | LDYGANFSHM | LGFDDEKMKE | LMRLYITIISS 269 | NGDSIPSSDKS LDYGANFSHM LGFDDEKMKE LMRLYITIHS 269 $\begin{array}{llllllll}\text { NGDSIPSDKS } & \text { LDYGANFSHM LGFDDEKVKE LMRLYITIHS } 269 \\ \text { NGDSIPSDKS } & \text { LDYGANFSHM LGFDDEKMKE } & \text { LMRLYITIIHS } 269\end{array}$ NGDSIPSDKS LDYGANFSHM LGFDDEKMKE LMRLYITTIHS 269 DGHIIPKDDS LDYGGNFHM LGFDSPQMQE LMRLYVTIHS 269 DGH IIPKED LDYGGNFSHM LGFKSPQMQE LMRLYVTIHS 269 DGKVIPVDDS LDYGANFSHL LGFDDPKMHE LMRLYVTIHS 269 DGKVIPVDDS LDGANFSHL LGFDDPKMHE LMRLYVTIHS 269 GGKVIPSDDS LDYGANFSQL LGFNDPKMLE LMRLYVTIHT 270

DGKAIAADNT LDYAANFSHM LGFDDPKMLE LMRLYITIHT 269 | LMRLYITIHT 269 |
| :--- |
| LMRLYITIIHT 269 | GGKSIETDNS LDYAANFSHM DDPKMLE


#### Abstract

Brassica_napus_BnCS4 DHEGGNVSAH TGH Brassica_oleracea_BoCS4 DHEGGNVSAH TGHLVGSALS Brassica_rapa_BrCS4 DHEGGNVSAH TGHLVGSALS Raphanus_sativus_RsCS4 DHEGGNVSAH TGHLVGSALS Eutrema_salsugineum_EsCS4 DHEGGNVSAH TGHLVGSALS Arabidopsis_lyrata_ACS4 DHEGGNVSAH TGHLVGSALS Arabidopsis_thaliana_AtCS4 DHEGGNVSAH TGHLVGSALS Capsella_rubella_CrCS4 DHEGGNVSAH TGHLVGSALS $\begin{array}{llll}\text { Camelina_sativa_CsCS4 } & \text { DHEGGNVSAH } & \text { TGHLVGSALS } \\ \text { Cucumis melo CumCS4 } & \text { DHEGGNVSAH } & \text { TGHLVASALS }\end{array}$ Cucumis_melo_CumCS4 DHEGGNVSAH TGHLVASALS Theobroma cacao TcCS4 DHEGGNVSAH TGHLVASALS Prunus_persica_PpCS4 DHEGGNVSAH TGHLVASALS Prunus_sibirica_PsCS4 DHEGGNVSAH TGHLVASALS Ziziphus_jujuba_ZjCS4 DHEGGNVSAH TGHLVASALS $\begin{array}{llll}\text { Secale_cereale_ScCS4 } & \text { DHEGGNVSAH } & \text { TGHLVGSALS } \\ \text { Triticum urartu_TuCS4 } \\ \text { DHEGGNVSAH }\end{array}$ Triticum_urartu_TuCS4 DHEGGNVSAH TGHLIVGALS Triticum_aestivum_TaCS4 DHEGGNVSAH TGHLVGSALS Aegilops_tauschii_AetCS4 DHEGGNVSAH TGHLVGSALS Brachypodium_distachyon_BdCS4 DHEGGNVSAH TGHLVGSALS Brachypodium_stacei_BsCS4 DHEGGNVSAH TGHLVGSALS Oryza_brachyantha_ObCS4 DHEGGNVSAH TGHLVGSALS Oryza_sativa_OsCS4 DHEGGNVSAH TGHLVGSALS Panicum_hallii_PhCS4 Panicum_virgatum DHEGGNVSAH TGHLVGSALS Setaria_italica_SitCS4 DHEGGNVSAH TGHLVGSALS Setaria_viridis_SvCS4 DHEGGNVSAH TGHLVGSALS $\begin{array}{llll}\text { Sorghum_bicolor_SbCS4 } & \text { DHEGGNVSAH } & \text { TGHLVGSALS } \\ \text { Zear_mays_ZmCS4 } & \text { DHEGGNVSAH } & \text { TGHLVGSALS }\end{array}$

Consensus Conservation

PPYLSFAAAL PPYLSFAAAL DPYLSFAAAL DPYLSFAAAL DPYLSFAAAL DPYLSFAAAL DPYLSFAAAL DPYLSFAAAL DPYLSFAAAI DPYLSFAAAL DPYLSFAAAL DPYLSFAAAI DPYLSFAAAL DPYLSFAAAL DPYLSFAAAL $\begin{array}{ll}\text { DPYLSFAAAL } & \text { NGLAGPLHGL } \\ \text { DPYLSFAAAL } & \text { NGLAGPLHGL } \\ \text { DPYLSFAAAL } & \text { NGLAGPLHGL } \\ \text { DPYLSFAAAL } & \text { NGLAGPLHGL } \\ \text { DPYLSFAAAL } & \text { NGLAGPLHGL }\end{array}$

Brassica_napus_BnCS4 Brassica_oleracea_BoCS4 DPRYVMCQREF Brassica_rapa_BrCS4 DPRYVCQREF ALKHLPDDPL Raphanus_sativis_RsCS4 Eutrema salsugineum_EsCS4 DPRYVCQREF Arabidopsis_lyrata_AICS4 DPRYVCQREF ALKHLPDDPL Arabidopsis_thaliana_AtCS4 DPRYVCQREF ALKHLPDDPL $\begin{array}{ll}\text { Capsella_rubella_CrCS4 DPRYVCQREF } \\ \text { Camelina_sativa_CsCS4 } & \text { ALKHLPDDPL } \\ \text { CPRYVQRE }\end{array}$ Cucumis_melo_CumCS4 DPRYTCQREF ALKHLPDDPL Cucumis_sativus_CusCS4 DPRYTCQREF ALKHLPDDPL Theobroma_cacao_TcCS4 DPRYTCQREF ALKHLPDDPL $\begin{array}{lll}\text { Prunus_persica_PpCS4 DPRYSCQREF } & \text { ALKKLPDDPL } \\ \text { Prunus_sibirica_PsCS4 DPRYSCQRVF ALKHLPDDPL }\end{array}$ Prunus_sibirica_PSCS4 Ziziphus_juba_ZjCS4 DPRYTCQREF ALKHLPDDPL Secale_cereale_ScCS4 DPRYSCQREF ALKYLPEDPL Secale_cereale_ScCS4 Triticum_urartu_TuCS4 DPRYSCQREF ALKYLPEDPL Hordeum_-ulgare_HvCS4 DPRYSCQREF ALKYLPEDPL Triticum_aestivum_TaCS4 DPRYSCQREF ALKYLPEDPL Aegilops tauschii_AetCS4 DPRYSCQREF ALKYLPEDPL Brachypodium_distachyon_BdCS4 DPRYSCQREF ALKYLPEDPL Brachypodium_stacei_BsCS4 DPRYSCQREF ALKYLPEDPL Oryza_brachyantha_ObCS4 DPRYTCQREF ALKYLPEDP Oryza_sativa_OsCS4 DPRYTCQREF ALKYLPEDPL Panicum_hallii_PhCS4 DPRYSCQREF ALKHLPEDPL Panicum_virgatum DPRYSCQRVF ALKHLPEDPL Setaria italica SitCS4 DPRYSCQREF ALKHLPEDP Setaria_viridis_SVCS4 DPRYSCQREF ALKHLPEDPL Sorghum_bicolor_SbCS4 DPRYSCQREF ALKHLPEDPL

Zea_mays_ZmCS4 DPRYSCQREF ALKHLPEDPL Consensus Conservation 

FQLVSKLYEV FQLVSKLYEV RQLVSKLYYEV $\frac{\text { QLVSKLYEV }}{\text { QLVSKLYEV }}$ FQLVSKLYEV $\frac{\text { FQLVSKLYEV }}{\text { FQLVSKLYEV }}$ FQLVSKLYEV FQLVSKLYEV FQLVSKIVEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSNLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV QLVSKLYEV QLVSKLYEV FQLVSKLYDV FQLVSKLYE FQLVSKLYE FQLVSKLYE FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV FQLVSKLYEV

NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL NGLAGPLHGL

ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQE VLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK ANQEVLLWIK

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VPPVLTELGK VKNPWPNVDA HSG VPPVLTELGK VPPVLTELGK VPPVLTELGK VPPVLTELGK VPPVLTELGK VPPVLTQLGK VPPVLTELGK VPPVLTELGK VPPVLTELGK $V P P$ VITELGK $V$ VPP | VPPILTELGK |
| :--- |
| $V P P$ LTELGK | VPPILTELGK VPPILTELGK VKNPWPNVDA VKNPWPNVDA VKNPWPNVDA VKNPWPNVDA VKNPWPN VDA VKNPWPNVDA KNPWPNVDA KNPWPNVDA VKNPWPN VDA VKNPWPNVDA VKNPWPN VDA VKNPWPN VDA VKNPWPNVDA VKNPWPNVDA VKNPWPN VDA VKNPWPNVDA VKNPWPNVDA VKNPWPNVDA VKNPWPNVDA

VPPILTELGK VPPILTELGK

KTLNSGKVVP TINGKVVP GYGHGVLRKT 359 SVVEECGENI SKDQLKEYV SVVEECGENI SKDQLKEYVW SVVEECGENI SKDQLKEYVW VVEECGENI SKDQLKEYVW VVEECGENI SKDQLKEYVW VVEECGENI SKDQLKEYVW VVEECGEDI SKEQLKEYVW VVEECGEDI SKEQLKEYVW SKEECGEDI SKEQLKEYVW SVVEECGEN S SKEQLKEYVW SVVEECGEN I TKEQLKEYVW SVVEECGEN SVVDECGEN TKDQLKDYVW TKEQLKDYVW SVVDEVGENV TTEQLKDYVW SVVDEVGENV TTEQLKDYVW SVVAEFGEN I TKDQLKDFVW SVVAEFGEN I TKDQLKDFVW SVMEETGSN I TTDQLKEYVW SVMEETGSN I TTDQLKEYVW SVMEETGSN I TTDQIKKYVW SVMEETGSN I TTDQLKEYVW SVMEETGSNI TTDQLKEYVW SVMEETGSN I TTDQLKEYVW TVMEETGSN I TDQLKEYVW TVMEETGSNI TTDQLKEYVW SVIGETGSDV TTDQLKEYVW SVIEETGSDV TTDQLKDYVW SVIEETGSGV TTDQLKDYVW SVIEETGSDV TTDQLKDYVW SVIEETGSDV TTDQLKDYVW SVIEETGSDV TTDQLKDYVW SVIEETGSDV TTDQLKDYVW KTLNSGKVVP $\begin{array}{llll}\text { GYGHGVLRK } \\ \text { GYGHGVLRKT } & 359 \\ \text { GYGHGVLRKT } & 359 \\ \text { GYGHGVLRKT } & 359 \\ \text { GYGHGVLRKT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRKT } & 359 \\ \text { GYGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 360 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GYGHGVLRNT } & 359 \\ \text { GFGHGVLRKT } & 358 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GFGHGVLRKT } & 359 \\ \text { GYGHGVLRKT }\end{array}$ 440

\section*{VKNPWPNVDA HSGVLLNHYG LTEARYYTVI}  VKNPWPNVDA HSGVLLNHYG LTEARYYTVL FGVSRSLGIC SQLIWDRALG  VKNPWPNVDA HSGVLLNHYG LTEARYYTVL FGVSRSLGIC SQLIWDRALG 4 $\begin{array}{llll}\text { VKNPWPNVDA } & \text { HSGVLLNHYG LTEARYYTVL } & \text { FGVSRSLGIC } & \text { SQLIWDRALG } 449 \\ \text { VKNPWPNVDA } & \text { HSGVLLNHYG LTEARYYTVL } & \text { FGVSRSLGIC } & \text { SQLIWDRALG } 449 \\ \text { VKNPWPNVDA } & \text { HSGVLLNHYG LTEARYYTVL } & \text { FGVSRSLGIC } & \text { SQLIWDRAIG } 449\end{array}$ 


MDWLEAYCKK AKASSP 475 Brassica_napus_BnCS4 LALERPKSVT MDWLEAYCK AKASSP 475 Brassica_rap_BoCS4 LALERPKSVT MDWL ACE AKASSP 475 Brassica_rapa_BrCS4 LALERPKSVT MDWLETYCEK AKASSP 475 Raphanus_sativis_RsCS4 LALERPKSVT MDWLEAHCKK Arabidopsis lyrata ACS4 LALERPKSVT MDWI EAHCKK Arabidopsis_lyrata_ACS4 LALERPKSVT MDWLEAHCKK Capsella_rubella_CrCS4 LALERPKSVT MDWL EAHCKK Capsella_rubella_CrCS4
Camelina_sativa_CsCS4 LALERPKSVT MDWLEAHCKK
LALERPKSVT MDWLEAHCKK Camelina_sativa_CsCS4 Cucumis_melo_CumCS4 Theobroma cacao TcCS4 Theobroma_cacao_TcCS4
Prunus persica_PpCS4 Prunus_persica_PpCS4
Prunus_sibirica PsCS4 Prunus_sibirica_PsCS4
Ziziphus jujuba_ZiCS4 Ziziphus jujuba_ZjCS4 Secale_cereale_ScCS4 Triticum_urartu_TuCS4 Hordeum_vulgare_HvCS4 Triticum_aestivum_TaCS4 LPLERPKSVT MEWL ENHCKK Aegilops_tauschii_AetCS4 LPLERPKSVT MEWL ENHCKK Brachypodium_distachyon_BdCS4 LPLERPKSVT MEWLENYCK Brachypodium_stacei_BsCS4 LPLERPKSVT MEWLENYCKK
Oryza_brachyantha_ObCS4 LPLERPKSVT MEWLENYCKK Oryza_sativa_OsCS4 LPLERPKSVT MEWLENHCKK Panicum_hallii_PhCS4 LPLERPKSVT MEWLENYCKN Panicum_virgatum
Setaria_italica_SitCS4 LPLERPKSVT MEWLEN YCKN Setaria_viridis_SVCS4 LPLERPKSVT MEWLENYCKN Sorghum_bicolor SbCS4 PLERPKSVT MEWLENYCKN

Zea_mays_ZmCS4 PLERPKSVT MEWL ENYCNN
Consensus
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