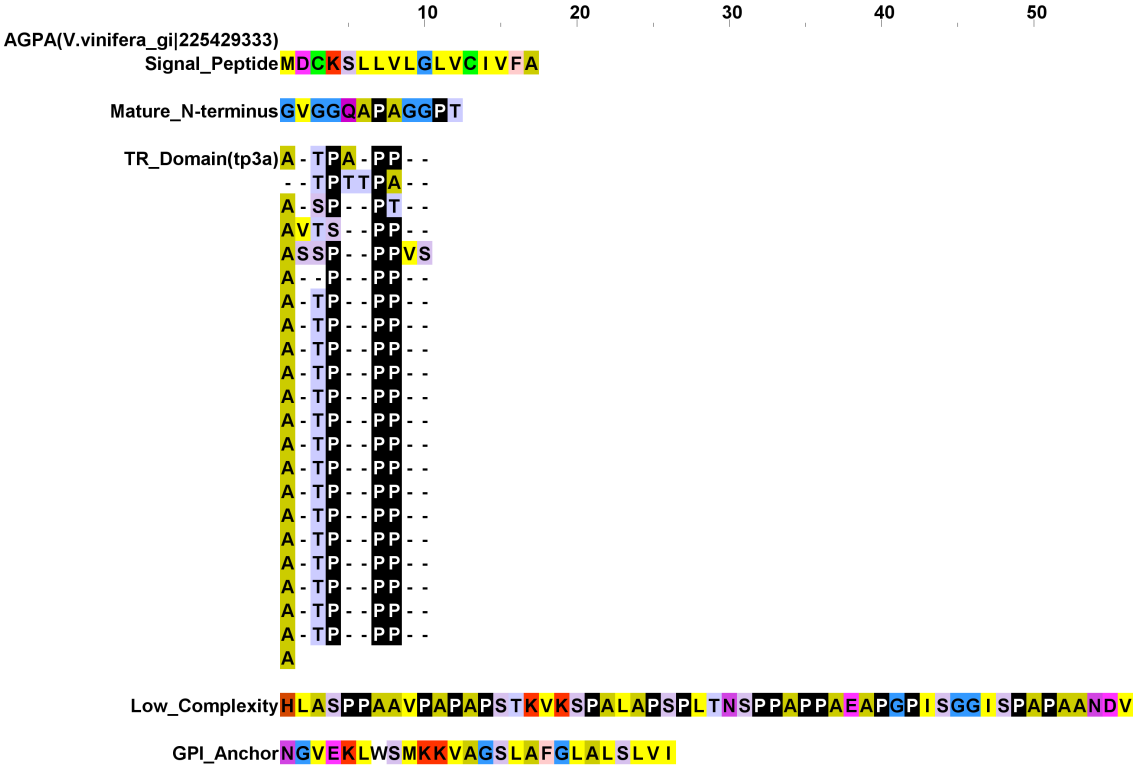
Dataset S1. TR architectures of representative proteins from 31 Pro-rich TRP classes.

A AGPA – TR-AGP type alpha.



B AGPB – TR-AGP type beta.

```
                                        10        20        30        40
AGPB(B.napus_TC77477)
          Signal_Peptide MASSSQAFLLLTLSMVLVHFSLA

      Mature_N-terminus QSPMMAPSGSMSMPPMPSGGS

       TR_Domain(mtp3) PMPMMTPP
                       PMPMMTPP
                       PMPMMTPP
                       PM-AMAPP
                       PMP-MTPP
                       PMP-M--A
                       PMPM-TP

     Low_Complexity SSSPMSPPTTMAPSPETVPDMASPPMMPGMDSSPSPGPMPPAMASPD

         GPI_Anchor SGAFNVRNDVVAISFLVAAHLLLV
```

C AGPC – TR-AGP type gamma.

```
                                        10        20        30        40        50
AGPC(T.aestivum_gi|62861391)
          Signal_Peptide MASPRGLAGLLCFALAAAAASA

Cu_bind_like_domain(PF02298) AQYRVGEQRGWSVPAAGAEPLNTWSARMRFIIGDQLLFVYPKDTDSVLLVDQAAYNACNT
                             TTYVSKFQGGSTVFTLDRSGPFFFISGNEASCKAEQKLIVVVLSVDHTPPGLLPPPP

     TR_Domain1(mtp2) PPSM-PPSSAPPMPSPMS
                      PPSMTPP-SAAPMPSPMS
                      PPSMTPP-SAAPMPSPMS
                      PPSMTPP-SAAPMPSPMS
                      PPSMTPP-SAAPMPSPMS
                      PPSMAPP-SSEPMPSPMT
                      P

                      AAAPGTTPVSPASPAGPAP

        TR_Domain2 SPGTPGGGS
                   SPGTPGSDT
                   S

                   SPPAPAADGANSTTPG

       GPI_Anchor SAAAPVTAGLIGTLAAGIGYAMLAI
```

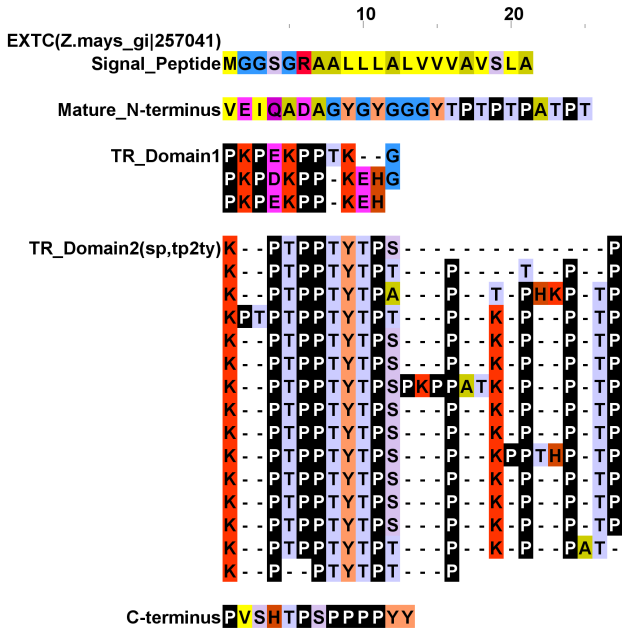
D EXTA – Extensin type alpha.

```
                                        10        20
EXTA(AtEXT6)
Signal_Peptide          MGIENCIVYVVVLSAIAATVTS

Mature_N-terminus       YPYSSPQTPSYNSPSYEHKGPKYAPHPK

TR_Domain(sp4+,yxy)     PYVKSSPPPQYYTPSPKVNYKSPPP
                        PYVYSSPPPPYYSPSPKVDYKSPPP
                        PYVYSSPPPPYYSPSPKVDYKSPPP
                        PYVYSSPPPPYYSPSPKVDYKSPPP
                        PYVYNSPPPPYYSPSPKVDYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYNSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVYYKSPPP
                        SYVYSSPPPPYYSPSPKVYYKSPPP
                        SYVYSSPPPPYYSPSPKVYYKSPPP
                        PYVYSSPPPPYYSPSPKVTYKSPPP
                        PYVY

C-terminus              KTPYY
```

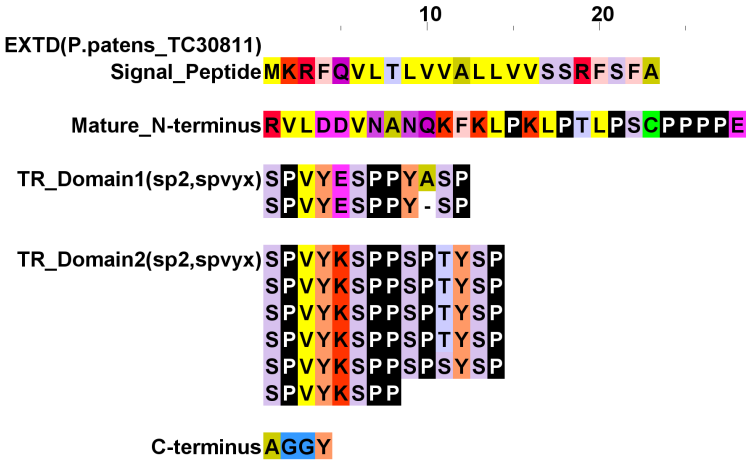
E EXTB – Extensin type beta.

```
                                        10        20        30        40        50
EXTB(S.tuberosum_gi|296401)
Signal_Peptide          MGKMASLVATLLVVLVSLSLA

Mature_N-terminus       SESSANYQYSSPPPPVHVYPSPPHHPVYKSPPPHHHHPVYKSPPPSEKPHYPPHTPVYKS
                        PPPHHHHPVYKSPPPPT

TR_Domain1(sp4+,vyk)    PVYKSPPPPKTPHY--PPHTPVYKSPPP-HHH-H
                        PVYKFPPPP-TPVYKSPP-PP--KD--PHYPPHT
                        PVYKSPPPP-TPVYKS---PP------P---P-T
                        PVYKSPPPP-TPVYKSPP-PPV-K---P-YHP-A
                        PVYKSPPPP-TPVYKS---PPV-K---P-YHP-A
                        PVYKSPPPP-TPIYKSPP-PPV-K---P-YHP

                        SPTPYHPK

TR_Domain2(sp4+,vyk)    PVYKSPPPPT-
                        PVYKS-PPPTH
                        YVYSSPPPP

C-terminus              YHY
```

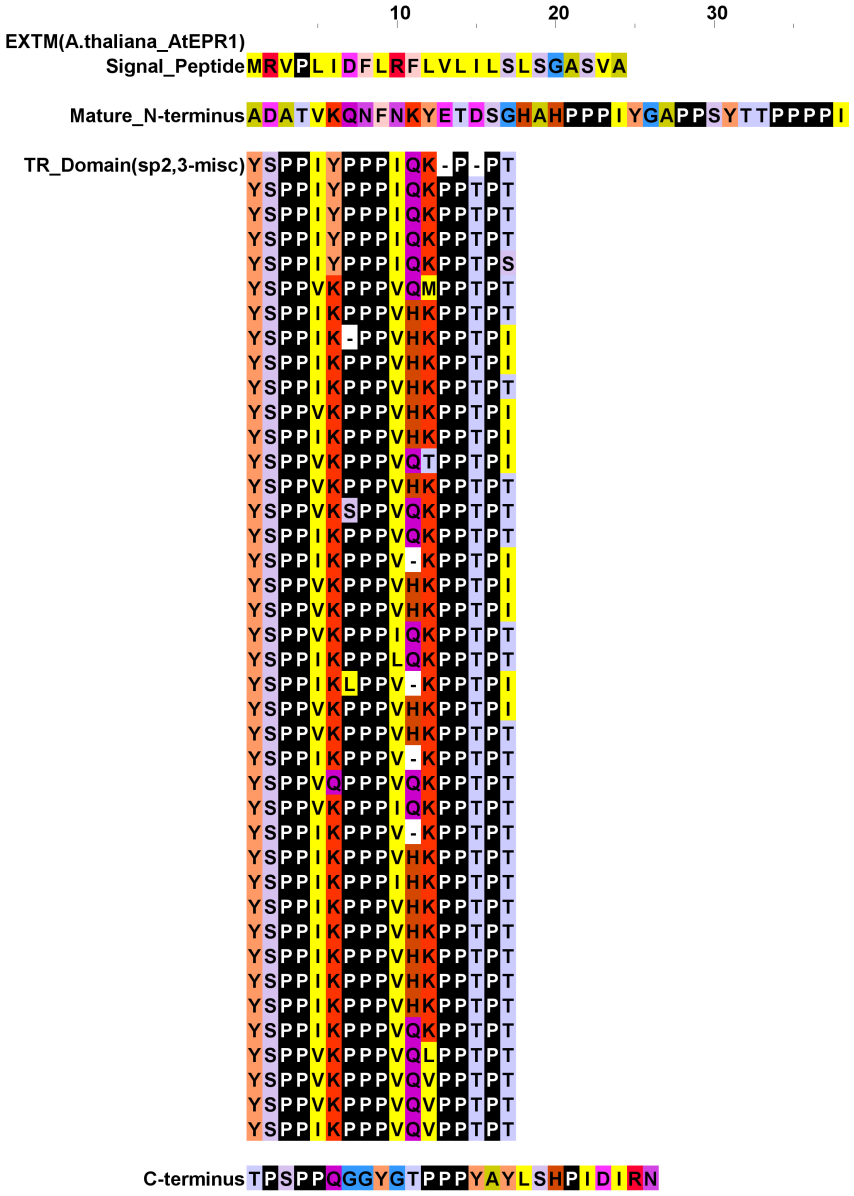
F EXTC – Extensin type gamma.



G EXTD – Extensin type delta.



H EXTM – Extensin type miscellaneous (S/T)$P_{2,3}$.



I HEXA – Hybrid Extensin type alpha.

```
                                   10        20        30        40        50
HEX(AtPEX4)
Signal_Peptide MPFYKQPWVFSKVFVLAMAKPPSFGCCFFLLFFSFLSSSFVSFA

LRR_Domain     LTDTEAAFIVQRQLLTLPDNGELPDDIEYEVDLKATFANTRLKRAYIALQAWKKAIFSDP
               FNTTGNWHGPHVCGYTGVVCAPALDDSDVTVVAGVDLNGADIAGHLPAELGLMTDVAMFH
               LNSNRFCGIIPKSFEKLKLMHEFDVSNNRFVGPFPNVVLSWPDVKYFDLRFNDFEGQVPP
               ELFKKELDAIFLNDNRFTSVIPESLGESPASVVTFANNKFTGCIPKSIGNMKNLNEIVFM
               DNDLGGCFPSEIGKLSNVTVFDASKNSFIGRLPTSFVGLTSVEEIDISGNKLTGLVPHNI
               CQLPNLVNLTYSYNYFSGQGGSCVPGGSRKEIALDDTRNCLASRPEQRSAQECAVVINRP
               VDCSKDKCAGGSSTPSKPS

TR_Domain1     PVHKPTPVPTT
               PVHKPTPVPTT
               PVQKPSPVPTT
               PVQKPSPVPTT
               PVHEPSPV

               LATPVDKPSPVPSRPVQKPQPPKESPQPDDPYDQSPVTKRR

TR_Domain2(sp4vh) S---PPPAPVN
               S---PPP-PVY
               SPPPPPP-PVH
               S---PPP-PVH
               SP--PPP-PVY
               SPPPPPP-PVH
               S---PPP-PVF
               S---PPP-PVY
               S---PPP-PVH
               S---PPP-PVH
               SP--PPPAPVH
               S---PPP-PVH
               SPP-PPP-PVY
               S---PPP-PVF
               S---PPP

               SQSPPVVYSPPPRPPKINSPPVQSPPPAPVEKKETPPAHAPAPSDDEFIIPPFIGHQ

C-terminus     YASPPPPMFAGY
```

J HLTA – Hybrid PRP/Lipid Transfer Protein type alpha.

```
                                        10        20        30        40        50
HLTA(L.tulipifera_TA1304_3415)
            Signal_Peptide MDSSKISALLLIFMLFVSSA

     Mature_Signal_Peptide SPILACTYCKNPPKHKSPK

          TR_Domain(p2vtl) GKPPKGPINLPPVI
                           VK-P--PITRPPVV
                           GK-P--PITLPPVI
                           GK-P--PVTLPPVI
                           GK-P--PITLPPVI
                           GK-P--PVTLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPVI
                           GK-P--AMTLPPVI
                           GK-P--PITLPPVI
                           GK-P--PWTLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPVI
                           GK-P--PITLPPV

            LTP_Domain IGTPPTTKPPGCGCSPPPKEETCPIDTLKLGACVDLLGGLVHIGLGDPVVNTCCPLLQGL
                       VEIEAAVCLCTTIKLKLLNLKIFVPIALQLLATCGKTPPPGFTCSL
```

K HLTB – Hybrid PRP/Lipid Transfer Protein type beta.

```
                                        10        20        30        40        50
HLTB(M.sativa_PRP2)
            Signal_Peptide MANYALANVFILLLNLSTLLIVLA

      Mature_N-terminus CPYCPYPSPKPPTHHPPIVKPPVHKRRKYSPTPKPPVHKPPRYPPKPSPCPPPSST

            TR_Domain1 PKPPHV
                       PKPPHH
                       PKPP-V
                       VHPPHV
                       PKP

TR_Domain2(p2yxpkp2) P-VHPPYVPKPPIVKP-
                     PIVHPPYVPKPP-V-VK
                     P---PPYVPKPP---V-
                     --VRPPYVPKPP-V-V-
                     P-VTPPYVPKPP---V-
                     --VRPPYVPKPP-V-V-
                     P-VTPPYVPKPP-I-V

            TR_Domain3 KPPIVFPPHVPLPPVVPSPPPYV-PSPPIV
                       KPPIVFPPHVPLPPVVPVTPPYVQP-PPIV
                       TPP

            LTP_Domain TPTPPIVTPPVVSPPTPPSETPCPPPPLVPYPPTPPAQQTCSIDALKLGACVDVLGGLIH
                       IGIGGSAKQTCCPLLQGLVDLDAAICLCTTIRLKLLNINLVIPLALQVLIDCGKTPPEGF
                       KCPAY
```

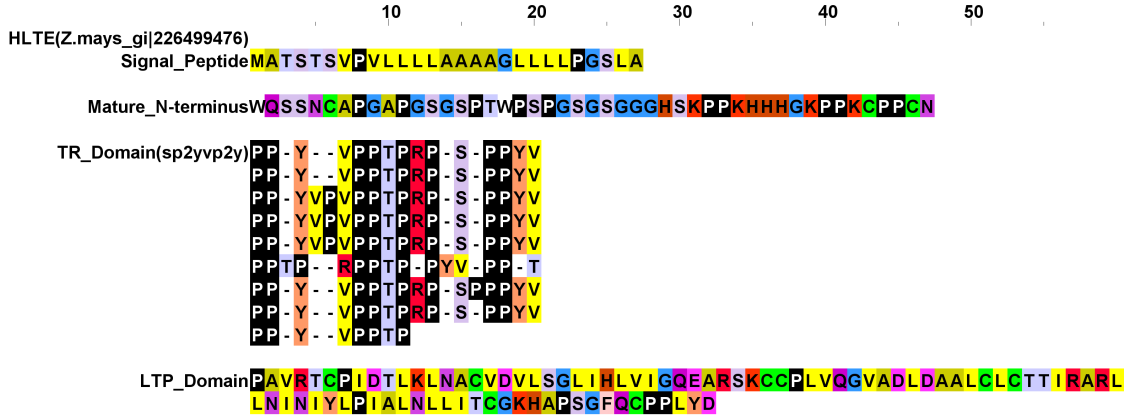
L HLTC – Hybrid PRP/Lipid Transfer Protein type gamma.

```
                                        10        20        30        40        50
HLTC(A.thaliana_gi|18396941)
            Signal_Peptide MDSSKLSSLSLCLFLICIIYLPQHSLA

        Mature_N-terminus CGSCNPRKGGKHSPKA

         TR_Domain(p2vtv) PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTI
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLPVPPVTV
                          PKLP

            LTP_Domain    LPPISGLPIPPVVGPNLPLPPLPIVGPILPPGTTPPATGGKDCPPPPGSVKPPSGGGKAT
                          CPIDTLKLGACVDLLGGLVKIGLGDPAVNKCCPLLKGLVEVEAAACLCTTLKLKALDLNL
                          YVPVALQLLLTCGKNPPPGYTCSI
```

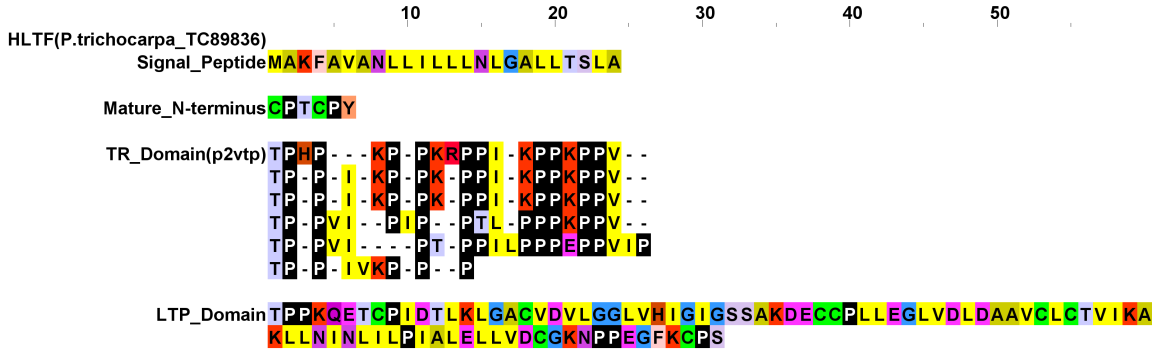
M HLTD – Hybrid PRP/Lipid Transfer Protein type delta.

```
                                        10        20        30        40        50
HLTD(A.thaliana_gi|42565109)
            Signal_Peptide MGSRSQNLSFLVLLLLGFVAVSYA

        Mature_N-terminus CDCTPPKPSPAPH

     TR_Domain1(p2tvk)    K--P-P-K-HP--V
                          K--P-P-K-PP-AV
                          K--P-P-K-PP-AV
                          KP-PTP-K-PP-TV
                          K--PHP-K-PP-TV
                          K--PHP-K-PP-TV
                          K--PHP-K-PP-TV
                          KP-PHP-K-PP-T-
                          KPHPHP-K-PP-IV
                          K

            TR_Domain2    PPTKPPPSTPK-
                          PPTKPPPSTPKP
                          PTTKPPPSTPKP
                          PHHKPPP-TPCP
                          PPT

            TR_Domain3    PTPTPPVVTP
                          PTPTPPVITP
                          PTPTPPVVTP
                          PTPTPPVITP
                          PTPTPPVITP
                          PTPTPPVVTP
                          PTPTPPVVTP
                          PTPTPP--TP

            LTP_Domain    IPETCPIDTLKLGACVDVLGGLIHIGLGKSHAKAECCPVLGGLLDLDAAVCLCTTIKLKL
                          LNIDLVLPIALELLLDCGKTPPSDFKCPA
```

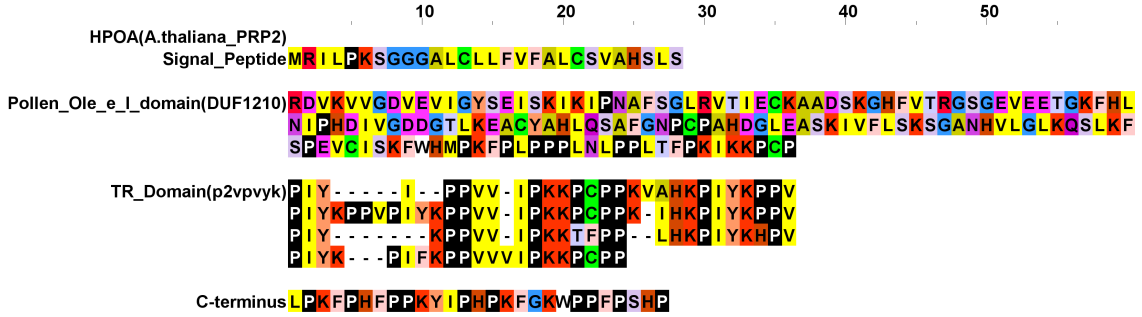
N HLTE – Hybrid PRP/Lipid Transfer Protein type epsilon.



O HLTF – Hybrid PRP/Lipid Transfer Protein type phi.



P HPOA – Hybrid PRP/Pollen Ole e I type alpha.



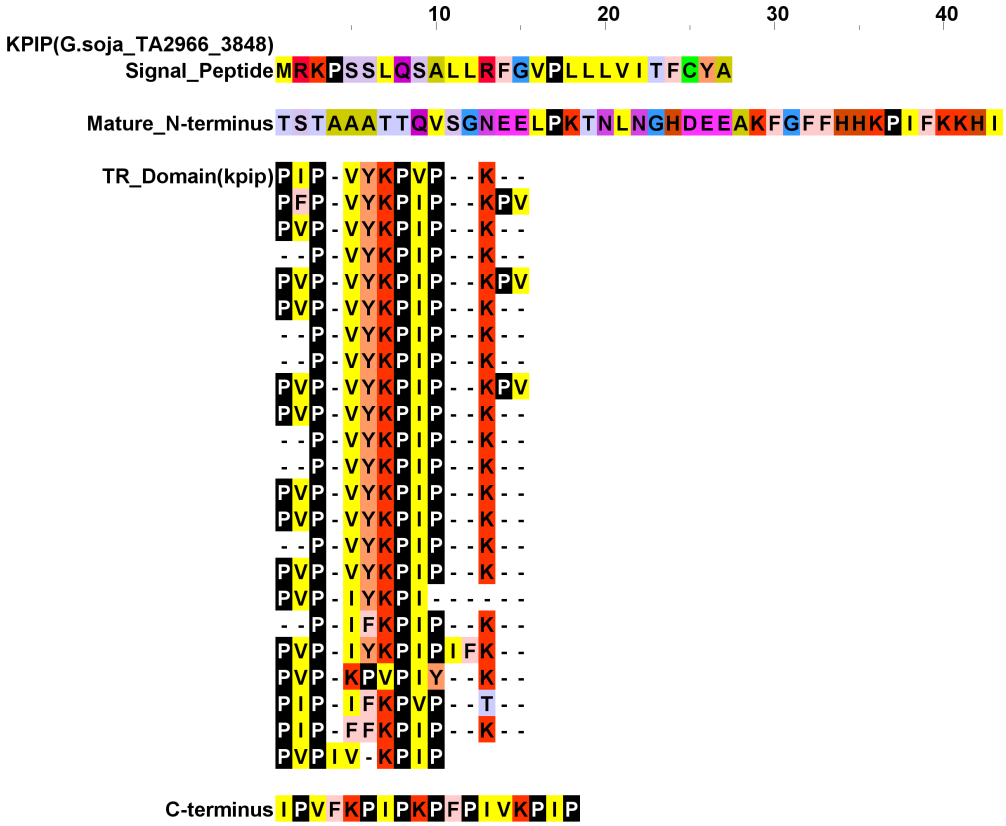
Q HPOB – Hybrid PRP/Pollen Ole e I type beta.

```
                                        10        20        30        40        50        60        70
HPOB(Z.mays_gi|162461641)
          Signal_Peptide MAADALRGLLPGVYAVLMVIAVTSA

Pollen_Ole_e_I_domain(DUF1210) ASSDASSVVVGLAKCADCTRKNLKAEAAFKGLEVAIKCKNSKGEYESKAMGKLDGFGAFS
                               IPLSTDLHGADCVAQLHSAAGNPCPGQEPSRIVPQSSKGNFVVVPGKTDYPSKECASATL
                               CGSIKKHLLDHFHKKPVPPKPKPE

TR_Domain(pepk-embed1) PKPE--LEPKPEPKPEPENHPPTPTYGSSTPIYHPP--SRQLFDKKHMF-DNFHKHHDYHHFFDHFHKKPVPPK
                       PKPEPKPEPKPKPQ--PEYHSPTPTYGSPTPIYHPPA--RHLFDKKP-LLDHFHKDHDYHHFLDHFHKKPVPQK
                       PK----LE--PKPQPKPEYHPPTPTYVSPTPIYHPPAETEMKYDKKH-F-DHFHKDHDYHHFFDHFHKKPVPPK
                       PKPE--PEPKPKPQPKPEYKPPMPTYGSPTPIYHPPAKKEVAFDKKH-FLDHFHKDHDYHHFFDHFHKKPVPPK
                       PKPE--PKPEPKPQPEPEYHPPTP

C-terminus TYGSPTPIYHPPAKH
```

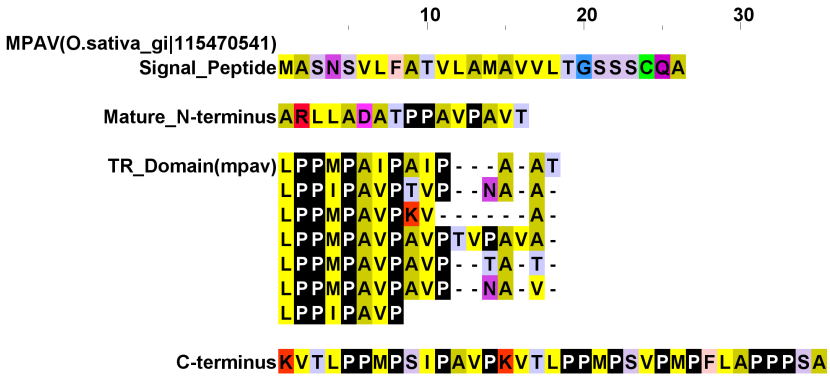
R HPOC – Hybrid PRP/Pollen Ole e I type gamma (AGP).

```
                                        10        20        30        40        50
HPOC(A.thaliana_AGP31)
          Signal_Peptide MGFIGKSVLVSLVALWCFTSSVFT

Mature_N-terminus EEVNHKTQTPSLAPAPAPYHHG

TR_Domain1 HHHPHP-P
           HHH-HPHP
           HPHPHP-P

           AKS

TR_Domain2(p2vk) PVKPPVKAPVSPPAKPPVKP
                 PVYPPTKAPVKPPTKPPVKP
                 PVSPPAKPPVKPPVYPPTKA
                 PVKPPTKPPVKPPVYPPTKA
                 PVKPPTKPPVKPPVYPPTKA
                 PVK

TR_Domain3(p2vk) PPTKPPVKPPVS
                 PPAKPPVKPPVY
                 PPTKAPVKPPVS
                 PPTKPPVTPPVY
                 PP

Pollen_Ole_e_I_domain(DUF1210) KFNRSLVAVRGTVYCKSCKYAAFNTLLGAKPIEGATVKLVCKSKKNITAETTTDKNGYFL
                               LLAPKTVTNFGFRGCRVYLVKSKDYKCSKVSKLFGGDVGAELKPEKKLGKSTVVVNKLVY
                               GLFNVGPFAFNPSCPK
```

S KPIP – KPIP domain protein.



T MPAV – MPAV domain protein.



U PEHK – PHEK domain protein.

```
                                        10        20        30        40        50
PEHK(V.vinifera_gi|225433073)
            Signal_Peptide MSPTYLLVVLLGLVVLTAPSLA

         Mature_N-terminus DYPTHPPF

       TR_Domain(p3ehk1) EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPLHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHKPPV
                         EKPPPEHK---
                         EKPLPEHKPP

            C-terminus TPVGKPPKGEKPPHCGHNPGHPPAENAEDSYKPPRKIKPPSTPAEKQPGPGKKLPTPPHK
                         PPHKPPTPTHPN
```

V PELPK – PELPK domain protein.

```
                                        10        20
PELPK(O.sativa_gi|115473185)
            Signal_Peptide MVFKKNAMSSSVLFLAALLLLSSSSMSSA

         Mature_N-terminus ARWLEEEY

       TR_Domain(pelpk2) PPHPT-VPELPKPEV
                         PPHPA-VPELPKHEE
                         PPHPV-VPELPKHEE
                         PPHPV-VPELPKPEL
                         PPHPV-VPELPKHEE
                         PPHPAVVPELPKHEE
                         PPHPAVVPEFPKHEE
                         PPHPA-VPELP-H--
                         ---PA-V---P---E
                         IPHPA-VPELPKHEE
                         PPHPV-VPELPK-PE
                         VPHAA-VPELPKPEL
                         PPHPA-VPELPKHEE
                         PPHPV-VPELPKHEE
                         PPHPV-VPELPKPEE
                         PHHPE-VPE

            C-terminus HEQPPKPESHYPEVPMAKP
```

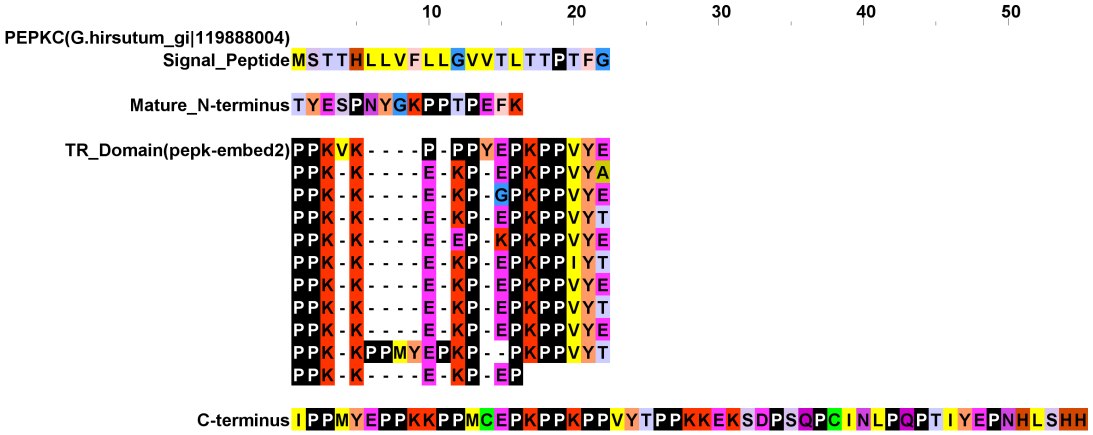
W PEPKA – PEPK type alpha.

```
                                        10        20
PEPKA(H.vulgare_TC165053)
          Signal_Peptide MARHSLLAVLLVGLLAASGFSLAAGAGRGLA

   Mature_N-terminus EKLPEPEPKPTPY

     TR_Domain(pepk) PE--PKPM--P-KPE--PMPK
                     PE--PTPM--P-KPE--PMPK
                     PE--PKPM--P-KPE--PMPK
                     PE--PKPE--P-KPE--PM--
                     ----PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-MPK--PEPK
                     PE--PKPE--PMKPEPKPMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPY--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PMPK
                     PE--PKPE--P-KPE--PM-K
                     PE--PKPM--P-KPEPKPEPK
                     PEPMPKPE--P-KPE--PMPK
                     PE--PKPEPMP-KPE--PKPY
                     PM--PKPE--P-KPQ--PMPK
                     PE--PKPE--P-EPK--PEP

      C-terminus PPKGKPPMTDN
```

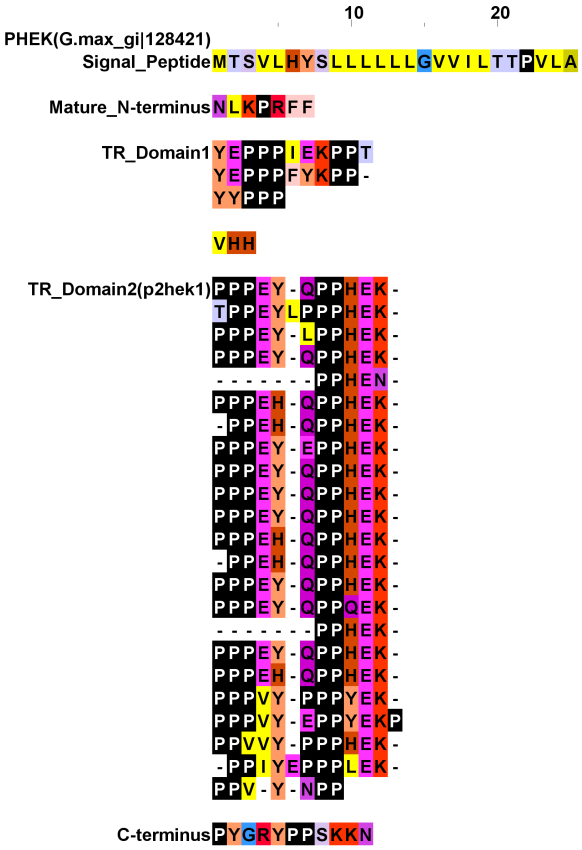
X PEPKB – PEPK type beta.

```
                                        10        20        30
PEPKB(O.sativa_gi|115471749)
          Signal_Peptide MRRSILSLCFHLALVIALAANVPDIANG

   Mature_N-terminus RVIEAKSDPKPADPKPKPDPTPKPQPETKPS

     TR_Domain1(pdpk) P-QPNPQPNPQPDPKPSP-QPD
                      P-KPTPQPEPKQDPQPNP-QPD
                      PKQ-SPQPDPKPTPQPNPKQ-D
                      P-QPNPQPDPKPTLQPNPKQ-D
                      P-QPNPQPNPKPTPQLDPKQ-D
                      P-QPNPQP

                      SPKAD

     TR_Domain2(pdpk) PKPNPKPKPQPEPSPNPKPEPKPEPKP-EP-SPN
                      PKPNPNPK--PEPQPDPKPEPKPQPEPSQPKLPP

      C-terminus LSPAIAIIVPGN
```

Y PEPKC – PEPK type gamma



Z PHEK – PHEK domain protein.



AA PRPA – Proline-Rich Protein type alpha.

```
                                        10        20
PRP(M.truncatula_gi|410107)
          Signal_Peptide MASSNFLVLLLFALFAIPRGLA

     Mature_N-terminus NYD

     TR_Domain(p2vyk) KPPVYQPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
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                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVEKPPVY
                      KPPVYKPPVY
                      KPPVEKPPVY
                      KPPVYKPPVE
                      KPPVYKPPVY
                      KPPVEKPPVY

          C-terminus GPPHHP
```
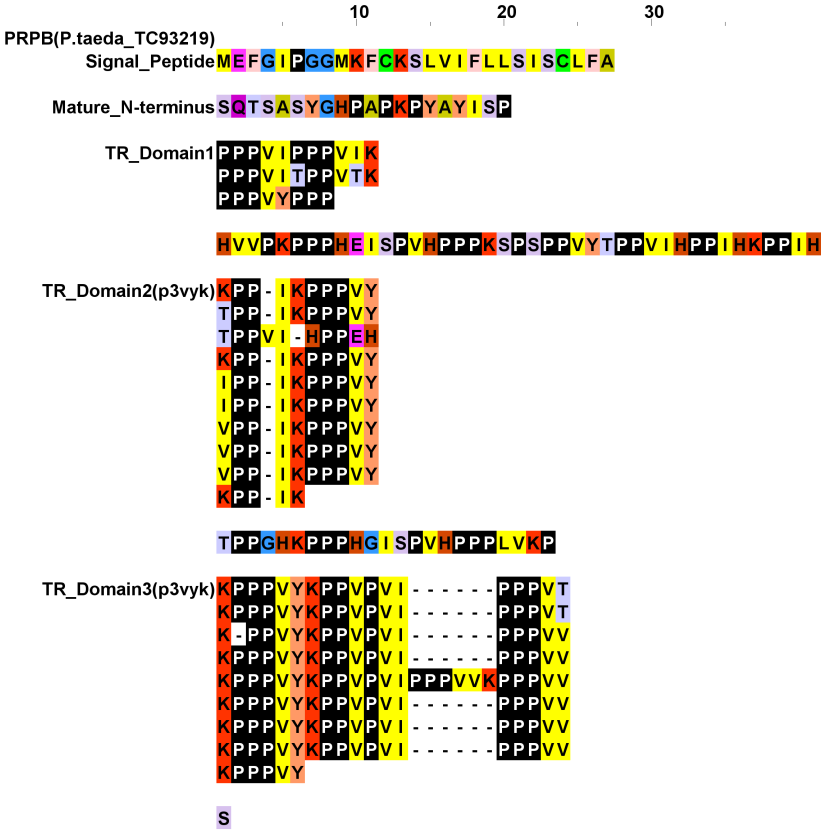
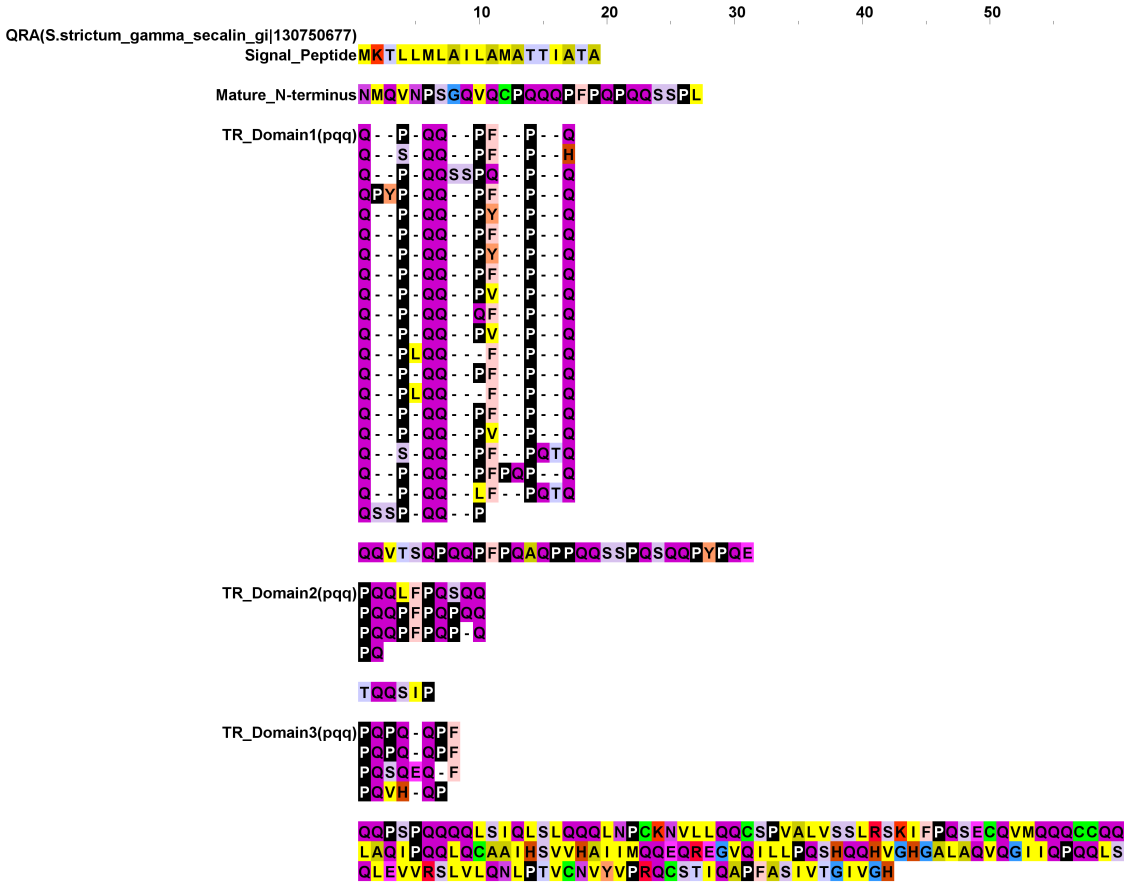
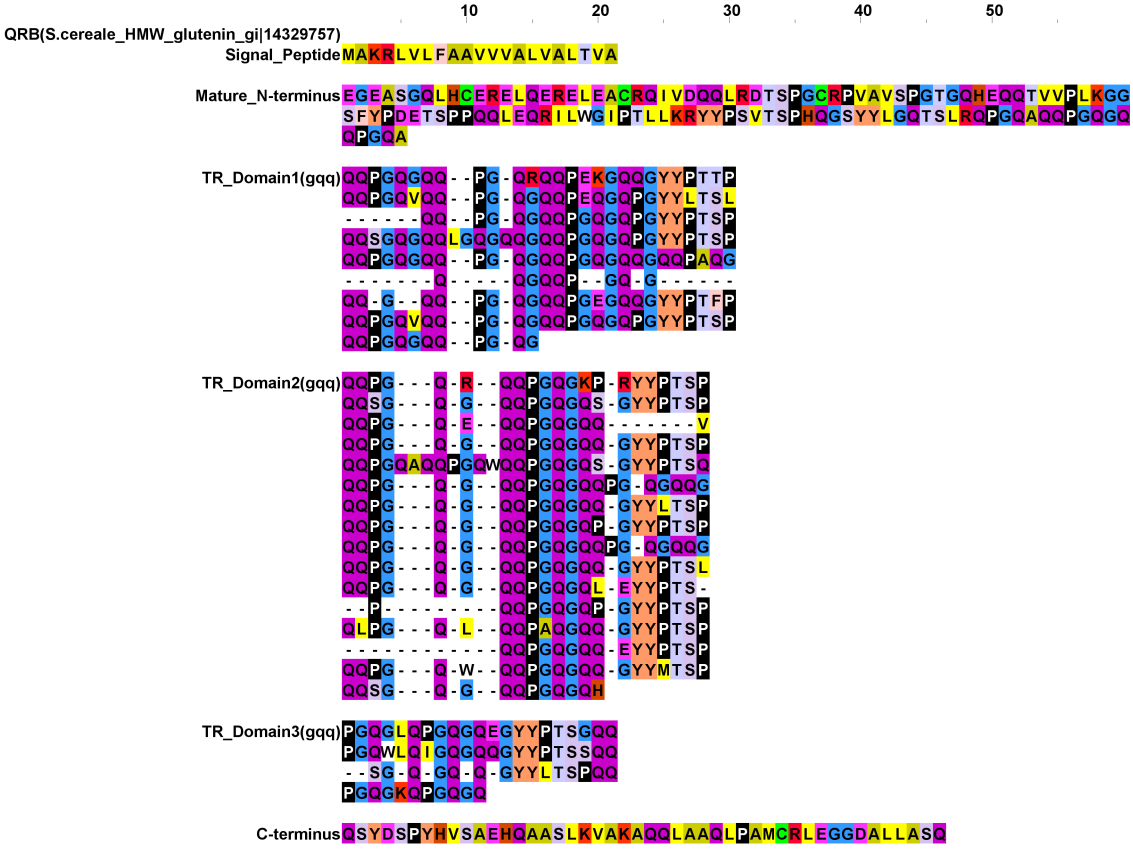
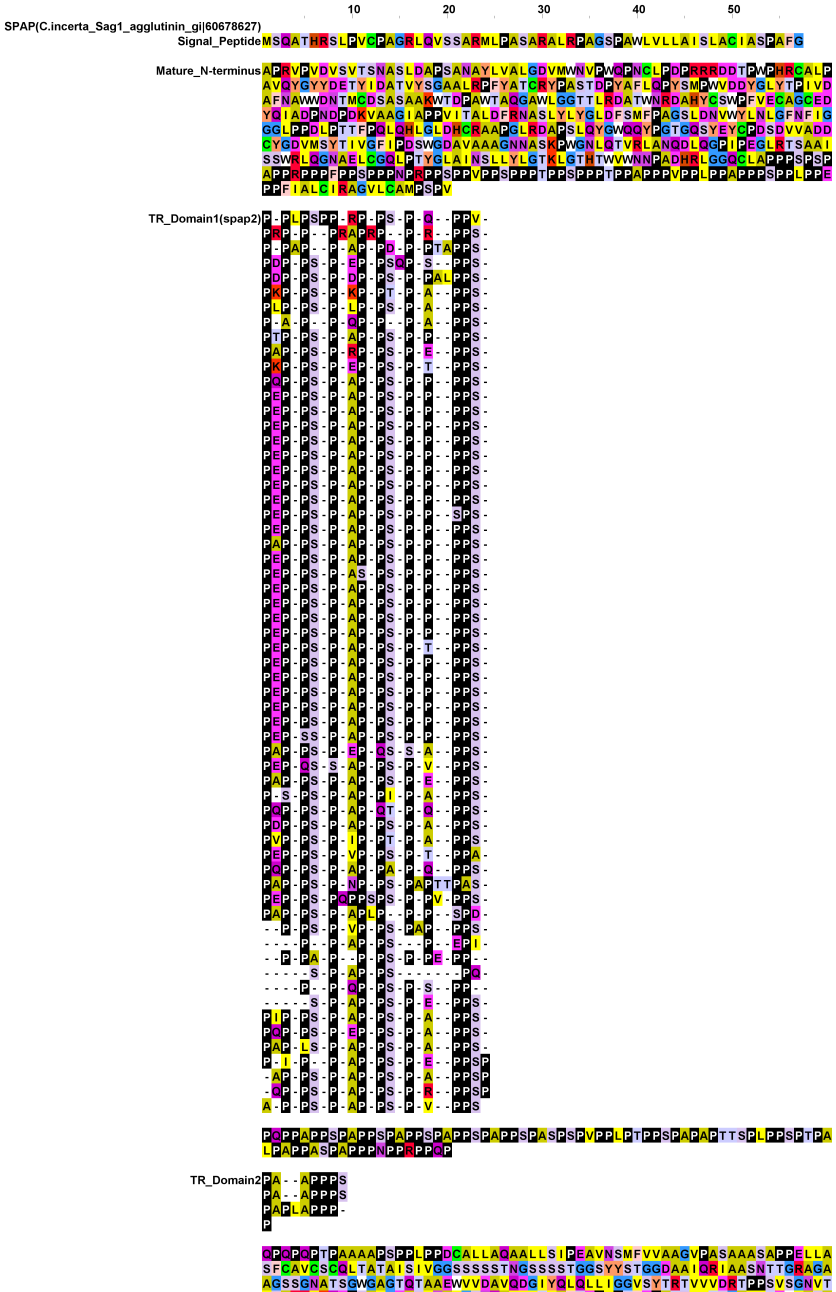

AB PRPB – Proline-Rich Protein type beta.



AC QRA – Gln-rich type alpha.



AD QRB – Gln-rich type beta.



AE SPAP – SPAP domain protein.