Aphids transform and detoxify the mycotoxin deoxynivalenol via a type II biotransformation mechanism yet unknown in animals

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Supplementary Figure 1 Alignment of ribosomal protein L3 (RPL3) sequences from different aphid species and yeast. RPL3 sequences of *Sitobion avenae*, predicted 60S RPL3 *Acyrthosiphon pisum* (NCBI Reference Sequence: XP_001951042.1), predicted 60S RPL3 *Diuraphis noxia* (NCBI Reference Sequence: XP_015366271.1), 60S RPL3 *Aphis gossypii* (GenBank: AGT79995.1) and RPL3 *Saccharomyces cerevisiae* (GenBank: AAA88732.1) were aligned using BioEdit Sequence Alignment Editor (ClustalW Multiple alignment). Amino acid changes (S2P, P9L, W255R, W255C, H256Y) identified from *S. cerevisiae* conferring deoxynivalenol resistance are given below the sequences

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SaRPL3      MSHRKFSAPR HGSMGFYPKK RARRHRGRVK SFPKDDPSKP IHLTAFIAYK AGMTHVVREA DRPGSKLNKK :70
ApRPL3      MSHRKFSAPR HGSMGFYPKK RARRHRGRVK SFPKDDPSKP IHLTAFIAYK AGMTHVVREA DRPGSKLNKK
DnRPL3      MSHRKFSAPR HGSMGFYPKK RARRHRGRVK SFPKDDPSKP IHLTAFIAYK AGMTHVVREA DRPGSKLNKK
AgRPL3      MSHRKFSAPR HGSMGFYPKK RARRHRGRVK SFPKDDPSKP IHLTAFIAYK AGMTHVVREA DRPGSKLNKK
ScRPL3      MSHRKYEAPR HGHLGFLPRK RAASIRARVK AFPKDDRSKP VALTSFLGYK AGMTTIVRDL DRPGSKFHKR
             P      L

SaRPL3      EIVEPVTILE APPMIIVGVV GYVETPYGLK PLKTVFAEHL SEDCRRRFYK NWYKSKKKAF VKYSRKWQDE :140
ApRPL3      EIVEPVTILE APPMIIVGVV GYVETPYGLK PLKTVFAEHL SEDCRRRFYK NWYKSKKKAF VKYSRKWQDE
DnRPL3      EIVEPVTILE APPMIIVGVV GYVETXYGLK PLKTVFAEHL SEDCRRRFYK NWYKSKKKAF VKYSRKWQDE
AgRPL3      EIVEPVTILE APPMIIVGVV GYVETPYGLK PLKTVFAEHL SEDCRRRFYK NWYKSKKKAF VKYSRKWQDE
ScRPL3      EVVEAVTVVD TPPVVVVGVV GYVETPRGLR SLTTVWAEHL SDEVKRRFYK NWYKSKKKAF TKYSAKYAQD

SaRPL3      NGKRQIAKDL GKIAKYSKVI RVVAHTQMKL LKKRQKKAHI MEIQVNGGTI AEKVQWAKEH FEKPVPVSHV :210
ApRPL3      NGKRQIAKDL GKIAKYSKVI RVVAHTQMKL LKKRQKKAHI MEIQVNGGTV AEKVQWAKEH FEKPVPVSHV
DnRPL3      NGKRQIAKDL GKIAKYSKVI RVIAHTQMKL LKKRQKKAHI MEIQVNGGTV AEKVQWAKEH FEKPVPVSHV
AgRPL3      NGKRQIAKDL GKIAKYSKVI RVVAHTQMKL LKKRQKKAHI MEIQVNGGTV AEKVQWAKEH FEKPVPVSHV
ScRPL3      GAG--IEREL ARIKKYASVV RVLVHTQIRK TPLAQKKAHL AEIQLNGGSI SEKVDWAREH FEKTVAVDSV

SaRPL3      FAPDEMIDCI GVTKGRGYKG VTSRWHTKKL PRKTHKGLRK VACIGAWHPS RVQFTVARAG QKGYHHRTEI :280
ApRPL3      FAPDEMIDCI GVTKGRGYKG VTSRWHTKKL PRKTHKGLRK VACIGAWHPS RVQFTVARAG QKGYHHRTEI
DnRPL3      FAPDEMIDCI GVTKGRGYKG VTSRWHTKKL PRKTHKGLRK VACIGAWHPS RVQFTVARAG QKGYHHRTEI
AgRPL3      FAPDEMIDCI GVTKGRGYKG VTSRWHTKKL PRKTHKGLRK VACIGAWHPS RVQFTVARAG QKGYHHRTEI
ScRPL3      FEQNEMIDAI AVTKGHGFEG VTHRWGTKKL PRKTHRGLRK VACIGACHPA HVMWSVARAG QRGYHSRTSI
                                                          RY
                                                          C

SaRPL3      NKKIYRIGLG IHTKDGKVIK NNASTEYDLT EKTITPMGGF PHYGEVNNDF LMIKGCCVGP KKRVITLRKS :350
ApRPL3      NKKIYRIGLG IHTKDGKVIK NNASTEYDLT EKTITPMGGF PHYGEVNNDF LMIKGCCVGP KKRVITLRKS
DnRPL3      NKKIYRIGLG IHTKDGKVIK NNASTEYDLT EKTITPMGGF PHYGEVNNDF LMIKGCCVGP KKRVITLRKS
AgRPL3      NKKIYRIGLG IHTKDGKVIK NNASTEYDLT EKTITPMGGF PHYGEVNNDF LMIKGCCVGP KKRVITLRKS
ScRPL3      NHKIYRVGKG DDEANG---- ---ATSFDRT KKTITPMGGF VHYGEIKNDF IMVKGCIPGN RKRIVTLRKS

SaRPL3      LLVHTKRAAL ESINLKFIDT SSKFGHGRFQ TIADKAAFMG PLKKDRIREE E------- :410
ApRPL3      LLVHTKRAAL ESINLKFIDT SSKFGHGRFQ TVADKAAFMG PLKKDRIREE EKATAAAK
DnRPL3      LLVHTKRAAL ESINLKFIDT SSKFGHGRFQ TVADKAAFMG PLKKDRIREE EKATAAAK
AgRPL3      LLVHTKRAAL ESINLKFIDT SSKFGHGRFQ TVADKAAFMG PLKKDRIREE EKATAAAK
ScRPL3      LYTNTSRKAL EEVSLKWIDT ASKFGKGRFQ TPAEKHAFMG TLKKDL---- --------
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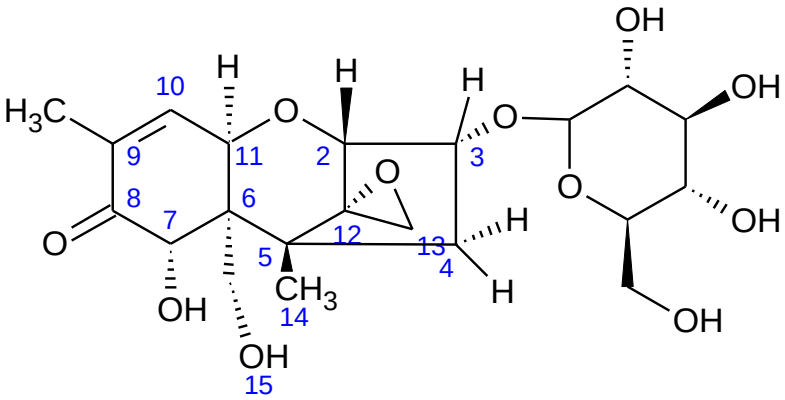
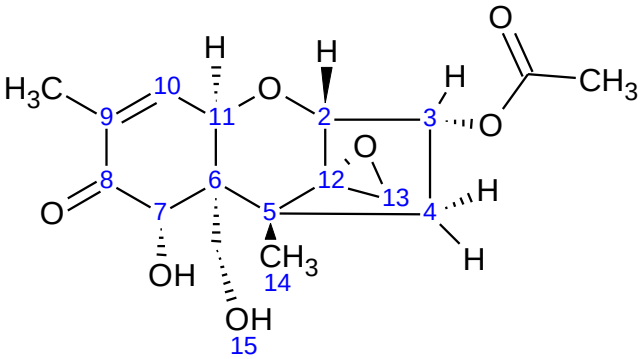
Supplementary Figure 2 Chemical structure of the DON derivatives DON-3G (A), 3-ADON (B) and 15-ADON (C)

A



B



C