

Phylogenetic tree of DrybCSPs

>OR797794 DrybCSP1 chemosensory protein 1, complete cds [Diorhabda rybakowi Weise]

ATGAAATTTCTCTTCTCGTTTGTGTTGTATTAGTGATAGTAGTGGTTTCGCCAGACCCGAAGACACATATAC
AACAAATATGATAATATTGATATTGACGAAATTATTCACAACGATAGATTATTGAGGAGTTACGTGGATTGTC
TGATAGGAACCTAAGCCTTGTTCAAAGATGGAGAGGAGCTGAAAAAGGTTTTCAGGGAAGCGTTGAAAC
TAAATGTTCTAAATGTAGTGAACCACAAAAAGAAGCTTCGAAGAAAATAGGCAAATACCTGATAGAGAACAA
GAGATCATGGTTTGTAGAGCTTGTAGAAGTTTTTCGATCCAGACCACTCAAATTGGAACCTTATAGAGAAAA
TCTTAAAGCTGAAGGAATTGAATTAA

>DrybCSP1

MKFSLLVCVVLVIVVVSARPEDTYTTKYDNIDIDEIHNDRLLRSYVDCLIGTKPCSKDGEELKKVFREALETKSKC
SEPQKEASKKIGKYLIENKRSWFDELVEVDFDPHDKLELYRENKAEIGEL

>OR797795 DrybCSP2 chemosensory protein 2, complete cds [Diorhabda rybakowi Weise]

ATGAAACTAGCAATTGTAGTTGTTTGTGTTTCACTAGTGATAGTGGCAGTTTCTGCAGACCATTCTGATGAAA
AATATACCTCAAAGTATGATAATGTTAATTAGATGACATTATCAAAAGTGATAGATTACTAAGGAATTATATTG
ATTGCTTCTGGAACCAAGAAATGTACTAAAGATGGCGAAGAATTGAAAAGGGTTCTACCGGACGCATTG
AAAACCAATGTGCTAAATGTACTGACACTCAAAAAGAAGGAGCTAAAAGATTTAAGACATTTATTGAAA
AATAACGACAATGGTTCGACGAACTTGAAGCTTATTACGATTCCGACCACGTTTATCTGAAAAGCTACGAA
AAAGAGCTTAAAGAAGAAGGAATAGAAGTGTA

>DrybCSP2

MKLAIVVVCVSLVIVAVSAAPSDEKYTSKYDNVNLDDIIKSDRLLRNYIDCLLGTKKCTKDGEELKRVLPDALKTC
AKCTDTQKEGAKILRHLLKNKRQWFDELEAYYDSHVYLSYEKELKEEGIEV

>OR797796 DrybCSP3 chemosensory protein 3, complete cds [Diorhabda rybakowi Weise]

ATGAATCGTTGGTGCATATCGGTCGTAATCATGGTATTGATTGTGGTAGCAGCAGTGCCTGTGCTCCGAAGA
GTTATGATGAGAATTTGAAGATTATTAAGAAAATAGATATCGATCAAGTGTGAACAATGATAGAATTATCAGA
AATTACGTCGATTGTGTCTTAGGAAAGAAACGTTGTACTAATGAAGGAAATGCTTTGAAAGAAAGCTGGAA
AGACGGTTTAGACAAAGGATGTGATAATTGCGATGAAGAAGACAAGAGGAAAGTGAAAAAATCTTAAAA
CACATATACCAAACACCGAGATTATACGATGAATTGGCTGCCACCTTGACAAAGATGGTAAATACCGTG
AAAAATACCAAGCTCAAATCGATGAAATTCTCAAGGATCAAACCTCTATGA

>DrybCSP3

MNRWCISVVLMLIVVAHVHCAPKSYDENLKIKKIDIDQVLNNDRIIRNYVDCVLGKKRCTNEGNALKESWKD
GLDKGCDNCDEEDKRKVKKILKHIYTKHRDLDELAHLDKDKYREKYQAQIDEILKDQTL

>OR797797 DrybCSP4 chemosensory protein 4, complete cds [Diorhabda rybakowi Weise]

ATGGGGTTAATACGATTATTTGTTTATTGGCGTTGGTATCTTGTAGTTTAGCTCAAACCTACAATACTAGATAT
GATAACATCGACATTGACCGAATTTAGCTAGTAAAAGATTGTTAGATAATTATATACAGTGTCTTTAGAAGA
GAACGTTAAAAGGTGTTCAACGAGAAGGACGGGAATTTAAAAAATACATACCTGAAGCAATTCAAACCAACT
GTGCTAAATGTTGATTTCCAAAAAAGAATTGTGAAAAAACTGCCAAACATATAATAACCAATAGACCAC
AAGATTGGGAGAAAATTAACAGAAGTTTGATCCTCAAGGAACATATCATCAAAGTTTCAATAATTTCTTAAA
TAGTCCATA

>DrybCSP4

MGLIRLFVLLALVSCSLAQTYNTRYDNIDIDRILASKRLLDNVYIQCLEENVKRCSPGREGFKYIPEAIQTNCAKCS
DSQKRIVKKTAKHIITNRPQDWEKIKQKFDPPQGTYHQSNNFLNSP

>OR797802 DrybCSP5 chemosensory protein 5, complete cds [Diorhabda rybakowi Weise]

ATGCAGATATTTAGTTTGGTGTAAATTTTTGATCTTCTGGTATCAATACTACCGTAGCAGCGGCTGTTAC
AGAAAAATCTACGACTCTAAGACCTTCCATCTCAGATGAAGCTTTAGAAGCCTCCCTAAAAGACAAAAGATA

TCTACATAGGCAACTGAAATGTGCTATAGGAGAAGCCCCGTGTGATGCAGTAGGTCGTAGATTGAAAAGTTT
GGCTCCGTTGGTTTTGCAAGGTTTCATGTTCTCAATGTACACCTCAGGAGCAACAACAAATTAGGAAAAGTTT
GGCATATATGCAAGTTAATTTCCGAAAAGATGGAATAAGATATTGAAACAATATTCCGGATAA

>DrybCSP5

MQIFQFGVIFLFLVSITTVAHAVTEKSTTLRPSISDEALEASLKDKRYLHRQLKCAIGEAPCDAVGRRRLKSLAPLVL
QGSCSQCTPQEQQIRKVLAYMQVNFPEWNNKILKQYSG

>OR797798 DrybCSP6 chemosensory protein 6, complete cds [Diorhabda rybakowi Weise]

ATGGTACCGTTAATCTGCATACTAGTTGCAGGGTTAAGTGGGTTAGTAGATTCCGGCTCCAGTTTCTGATCAAA
ATCAACAATACTACACCACGAAATATGATCATGTTCGATATAGAAATGATATTAAAGAATAGGAGATTGATTTTTT
ATTACACGGCGTGTATGCTCAATAAAGGACCATGTTTACCTGAAGGACTAGAATTTAAAAAACTTATACCAGA
TGCCATACGAACTAATTGCAAAAGATGTACCGACAAACAAAAAGTTACGACTGTTTCGAGCAATACAAGGTTT
GATGAAAGAATACGAAAAAATATGGGAACAACTCAAAACCGAATGGGATCCCGACGATATATATGTGAAAAA
ATTCCTCGAAACGCACGGTAACGTTCCCAATCCGAATATAATTTAAACAGATTCGATGGTGGTGAAGAATCT
GACGATACGTCCACAGAATCGTCTTCTACTACGTCTACTAAATCCCCTTACAATACTCTCCAGTTATATTTTCA
GGTCCGGTACCAACTTTAAACCCAGAACTATCCCTATAGCTAATGCAATTGGACAAAGTATAAAAGCTACGA
TTTATGGAATTTCTCAATTCTGTCATACGTTTAAAGTAAGTCTCATTGTTCTATTGCATCAAATTACATCAACTGT
GACTGAGGCCTCTGTCAAATCTTCTAAGACCTTAG

>DrybCSP6

MVPLICILVAGLSGLVDSAPVSDQNQQYYTTKYDHVDIEMILKNRRLIFYTACMLNKGPCSPGLEFKKLIPDAI
RTNCKRCTDKQKVTVRAIQGLMKEYEKIWEQLKTEWDPDDIYVKKFLETHGNVPNPNIILNRFDDGGEESDDT
STESSSTSTKSPYNTPPVIFSGPVPTLNPETIPIANAIGQSIKATYIGISQFCHTFKVSILVLLHQITSTVTEASVKFFL
RP

Phylogenetic tree of Coleopteran CSP sequences

>AXG21598.1 AmalCSP5 chemosensory protein 5 [Agrilus mali]

MGNRNWIFLSIFLTVLVTTLAQRHIIIGRLQSVNLEQVLNNDRLFNNFYKCLADEGKCSNDAKSIKNLLPEVVTK
CGQCTADERSQIKKSLNLVRKNKPEQFNSLAAKYDEGVWVKELVR

>ALR72526.1 CbowCSP12 chemosensory protein 12 [Colaphellus bowringi]

MKEGKARKLSQCYSFHGHEQCKYISLKMFLPFVLSCLITLSISAVPEKSRYTTKYDNINLEEIIHNDRLLNKYVDCL
LDKGRCTPDGLELKKNPDAIETDCSKCSDKQKEGSEIMMRYLIDNKPEYWNPLQEKYDPSGSYKKRYLDAKK
TEVSVEPIVKS

>ALR72519.1 CbowCSP5 chemosensory protein 5 [Colaphellus bowringi]

MKASALFFVAFFAVVATKPAEKYTTKYDNVDLDTILKSDRLLKNYVNCCLDKGNCTPDGAELKKVLPDALQTDCS
KCSDVQKRGSKKIIRYLIDNKAEWYKELEAKYDKNGVYKKKYDKELEDAKV

>AXF53965.1 DarmCSP2 chemosensory protein 2 [Dendroctonus armandi]

MKFCVVLVLVLQISICLCQTYSSRFDNINIDEILSNKRVLNMYVRCVLDEGPCTAEGRELRTHIPEALRTNCAKCTP
SQQKFVRKGASFLIKNDPDQWKRTKKFDPEGKFASQFHQFLNA

>QPZ89236.1 DadjCSP2 chemosensory protein 2 [Dendroctonus adjunctus]

MKFCGVLVLLLQIAVCLCQTYTSRFDNINIDEILSNKRVLNMYVRCVLDEGPCTAEGRELRTHIPEALRTNCAKCTP
SQQKFVRKGANFLIKNDPNQWSRITKKFDPEGKFAAQFHQFLNA

>AIX97072.1 DhelCSP4 chemosensory protein 4 [Dastarcus helophoroides]

MKFDIPLILIVTVASVKVPVEYYATKYDHLDIRILNRRMVNYASCLLNKGPCPPQGTEFKRILPEALETNCAR
CTEKQKFVYHTIKRLKKEYPKIWWQLEAQWDPNHTFIPLFEASFIASSTSPSTTSTTVVPDLGNRFGENKNETET
FPYPAEAVASGATLLPNLQQTTAFSSSIQSTHSTNTQHTTPPYLSYSTTKRYNVKQQQNTVSYGFNIVGDVIKNIG
IFSVRVAETGKQLANVLISLHI

>ARM20140.1 GdauCSP4 chemosensory protein4 [Galeruca daurica]

MGLIRLIFLFAVVVSCSLAQTYNTRYDNIDIRILGSKRLLDNYLQCLLDENVKRCSPGREGFKRYIPEAISTNCAKCS
DSQKRIVKKTAKYIITNRPQDWEKIKQRFDPQGKYHQSFNDFLNSP

>ARM20141.1 GdauCSP5 chemosensory protein 5 [Galeruca daurica]

MFSLVVVLCAGLSSAAVTEKAKYTTKYDNVNLEEIVHSDRLLKSYVDCLEKKGKCTPDGLELKKNMPDAIATDCS
KCSEKQREGSEYMMRFLIDNKPDYWNPLQEKYDPSGAYKQRYLESKKQEVKVEPITKT

>ARM20145.1 GdauCSP9 chemosensory protein 9 [Galeruca daurica]

MNFFCVSILIGFLMVVAVSGAPKTFEENVATLKKVDLKAFLQNTRIMRAYVDCVVHNTHTCTPESTALKESWKEG
LDQGCADPCDEEAKKRVQIIAKYVYTEQPEWYKEIEALDKDKKI

>ARM20143.1 GdauCSP7 chemosensory protein 7 [Galeruca daurica]

MKTFLILFIAATGSYVFAEKYTTKYDNVDIDTIKSDRLLLNYNVCLLDRGKCTPDGLELKKVLPDALLTDCSKCSET
QKKGSKKIIRHLIDNKPWNWYKELEEKYDKNGTYKIKYEKEIRA

>ARM20139.1 GdauCSP3 chemosensory protein 3 [Galeruca daurica]

MNRWCISVVLMLVAVVAAVHCAPKSFENLKVLLKIDINQVLNNDRIIRNYVDCVLGKKRCTNEGNALKESWK
DGLDKGCDDCDEEDKRKVKILKHMYTKHRDLYDELAHLDKDGKYRDKYQAQIDEILKDPTL

>ARM20138.1 GdauCSP2 chemosensory protein 2 [Galeruca daurica]

MNILRNARMLKRYVECLLDVPTCTKDGDYLYKQVLPFAIKTNCAECDAKQDDTAVRVMAYLMKYHDDWWKK
IDARYQASTSEFLARKAKIEEYKNTL

>ARM20137.1 GdauCSP1 chemosensory protein 1 [Galeruca daurica]

MKLSLVVCVILAVVVVSAKPEEKYTTKYDNINIDEIINNDRLRSYVDCLLGTPCTKDGEELEKVFKEALDSKCSK
CSDAQKEAAKKIGIYLIKNNRPWFDELVEVFPDHTKLEQYKDELKAEGIEL

>ARM20144.1 GdauCSP8 chemosensory protein 8 [Galeruca daurica]

MKLAIVVCVSLVIVAVAAAPADEKYTSKYDNINLDDIISDRLLRNYIDCLLGTKKCTKDAEELKRVLPDALKTKCAK
CTEAQKNGAKKILRHLLKNKREWFNELEAVYDPEHVYVKSYEKELKEEGIEL

>ADX96028.1 HoblCSP1 chemosensory protein CSP1 [Holotrichia obliata]

MRLIFYSFLIYLAIDERYTTKYDNIDIDAVISTERLLQNYIKCLLDLVVCTEEGSELKKNMPDAIQNDCSKCSDKQK
EGSDKLILYLINNKPEYWQLLEEKYDPTGENTKKFIEFKRMMTERTAMYATVSK

>AIX97045.1 MaltCSP5 chemosensory protein 5 [Monochamus alternatus]

MKLVVFLFFVALCGITYGRPDDKYTTKYDNIDLDEILKNDRLLRAYVDCLLGTTKCTNDGEELKKVLPEAIDNECA
KCSEKQKDGAKKVHLYIDNKSDWWKELEVVDPTGKYRKKYEEQAKKEGLKI

>AIX97040.1 MaltCSP8 chemosensory protein 8 [Monochamus alternatus]

MLKMIIYFLVAIGLITYATSTVTERTKYTTKYDNIDLDEIHNERRLLKNYVDCLEKGRCTPDGLELKKNMPDAIETD
CSKCEKQKQEGSEIIRYLIDNKPEYWNPLQDKYDPTGSYKKRYLDAKKTENVVEPIVKS

>AIX97041.1 MaltCSP1 chemosensory protein 1 [Monochamus alternatus]

MHFKCQIALLLCIAVMTIVTEAFPQADTERSEVSDEALESTLKDRLMRQLKALGEAPCDPVGRRKSLAPLVL
QGSCSQCSPELNQIRKVLSYMQINFPKEWNRVLKQYSR

>AIX97046.1 MaltCSP6 chemosensory protein 6 [Monochamus alternatus]

MVCLLPVLVTGTLLGLIDGANAQYASKYDHIDVDAILNNRRIVNYAACLLTGKPCPEGIEFKRILPEALRTNC
QRCTEKQKTVTLRAIRRLKKEYPKVWAQLEKQWDPDGSYISKFESTFGAKSTESIPESVQIVNRYASPEDNKTIE
NALSQIFTTPLPTSTSTSTSTTTATTSTTTAKTTTTSKATTVSTKAAPVTKTTHRVSTINIKNINTISSSTKPT
KRPRPSIGQSIQATVSGTNIIVGLVRGLEAIGNRVVETGAEIAGVVLKNIARPL

>AIX97085.1 MaltCSP10 chemosensory protein 10, partial [Monochamus alternatus]

MLYLSSLICLVCISSVIGQKYSNKYDHIDIRILSSKRVLLNNYIKILDQGPCTPDGREFRDHIPEAITTNCVKCTDA
QVKIIRKTSAHIMNNRPEDWEKIKNKFDPPEEKYKDSFMKFIDG

>UMT69261.1 OcomCSP9 chemosensory protein 9 [*Ophraella communa*]

MGFARLIFLLAVVSYSFAQTYNTRYDNIDIDRILASKRLLDSYIHCLLDNFKKCSPEGREFKKYIPEAIHTNCGKCS
DSQKRIVKKAACHIIQNRPDWDKIRKKYDPERKYQQSFNTFLNSP

>UMT69263.1 OcomCSP11 chemosensory protein 11 [*Ophraella communa*]

MQTFQPLILLIVFVSVIVVKAATEKSSSTERPSISDEALEASLKDKRYLLRQLKCAIGEAACDSVGRRLKSLAPLVL
QGSCSQCTPQEQRQIRKVLGYMQVNFPEWNNKILKQYSG

>APC94216.1 PmacCSP3 chemosensory protein 3 [*Pyrrhalta maculicollis*]

MVPLICAIVVGLSGLVVPAPVLEDGEQYYTTYDHDVEMILNNRRLVNYAACMLNKGPCPEGLEFKRILPDA
IQTNCKTEKQKATTLRAIKRLMKEYKKIWDQLKAEWDPDDVFVKKFLETYNKPTSTVSNIFSNRFDDEEVSEQ
TQTPLNKPKPEMKSSSTAPSTSTTTSTTSATLGVFSPKTTTRAPAPNAVNPLANTLGQTIKATVSFGNNIARQVI
KDIETIGNTVISTGVEIGNRVIQTGTQIAGALTGIPRPVNRFN

>APC94294.1 PaenCSP1 chemosensory protein 1 [*Pyrrhalta aenescens*]

MKFVLVFFVLGVIAVTARPEDDKYTTYDNNIDELIQNDRLLRNYVDCLLGTGPCNKDGEELKKVLKDGLRTKC
AKCNDTQKEAAKKLAIHLIKNKKPWDELTPVYDPDHTIVELYREDLKAEGIEL

>APC94212.1 PmacCSP1 chemosensory protein 1 [*Pyrrhalta maculicollis*]

MKFVLVFFVLGVIAVTARPEDEKYTTYDNNIDEIINRLLRNYVDCLLGTSCNKDGEELKKVLKDGLRTKCA
KCNDTQKEAAKKLAIHLIKNKKPWDELTPVYDPDHTIVELYREDLKAEGIEL

>APC94213.1 PmacCSP8 chemosensory protein 8, partial [*Pyrrhalta maculicollis*]

KYDNNIDEIINRLLRNYVDCLLGTGPCSKDGEELKKVFKEGVDSKCAKCNKQKEAAKKIAVHLIKNKRQW
FDELSAVFDPDHKIEEYREDLKAEGI

>EFA07417.1 TcasCSP3 chemosensory protein 3 [*Tribolium castaneum*]

MLFTVFLVLTCAHVVFLEEYVIPDNIDIDILSNERLLKNYVNCLLDKGRCTPEGKKLKSTIPEALSTDCAKCNEKVK
ANVRKVLHHLIDNKPDMWKQLEAKYDPSGEYRSKYKDELEKNGIHV

>EFA07418.1 TcasCSP4 chemosensory protein 4 [*Tribolium castaneum*]

MFKVLVFFVACVQAYVYAEETVPQNDIDEILKNDRLTKNYLDCILEKGKCTPEGEELKKDIPDALQNECAKCNE
KHKEGVRKVIRHLIKNKPWWQELQEKYDPKGEYKSRYNHFLEEGLN

>EFA07419.1 TcasCSP5 chemosensory protein 5 [*Tribolium castaneum*]

MTAIVFLLALACLTYVSSQEYLVQNDVDEILKNDRLTRNYLDCVLGKGKCTPEGEELKKDIPEALQNGCAKCN
EKHKEGVRKVIHHLIENKPNWWQELESKFDPQGEYKKKYDELLKKEGLAN

>EFA07420.1 TcasCSP2 chemosensory protein 2 [*Tribolium castaneum*]

MFATSALFACIQGLVSAEYLVQNDLDEILKNDRLTRNYIDCILGKGKCTPEGEELKRDIPALQNECAKCNEK
HKEGVRKVLHHLIKNKPWWQELEAKFDPKGEYKQKYNKLEKEGLQA

>EFA07421.1 TcasCSP6 chemosensory protein 6 [*Tribolium castaneum*]

MFLAIVLVVCACTNVLSEETNQYNDELDAALKSERLMKSYFECLLGTGKCTPSGEELKKDIPDALKNECAKCND
KHKEGIRKVIHYLVKQKPEWWEQLQKKFDPQGIYKKRYQNYLDKEGLKA

>EFA07640.1 TcasCSP8 chemosensory protein 8 [*Tribolium castaneum*]

MIFKIHFLVFGALLTYVSSVEYLILREIDTILKNDQMTRNYLDCVLGKGKCTKEAEKLGKITETMKNKGCVKCEQK
QKEDVHKVFQHLMIHRPNWWHELETGFNPHEIKLQHLHQSKFNPHEEVKLQHLHQFPHHDFLE
REGFIR

>KYB26756.1 TcasCSP13 chemosensory protein 13 [*Tribolium castaneum*]

MIPLIAIAGILAVSAAPAEFYESRYDHLDESILNNRRMVNYAACLLSKGPCPPQGVDLKRVLPEALQTNCAKCT
EKQRTAAYRSIKRLKKEYPKIWEQLRAVWDPDDVFIRKFETSFESGKPSGVISTNTSPSPILSNRFGENEEADAAS
NVISSTPLPPTSTTTTTLTKFTTKPSTKPTNKPVVVTKPPQAPPFATVGANLQATVSFGTNLVGGIVRSLGLTG
SRVVESGTKLANMVISAAIRP

>[NP_001039283.1 TcasCSP9 chemosensory protein 9 precursor \[Tribolium castaneum\]](#)

MTAIVFLLALACKTYVSSQEYLVQNIDVDEILKNDRLTRNYLDCVLGKGKCTPEGEELKKDIPEALQNGCAKCN
EKHKEGVRKVIHHLIENKPNWWQELESKFDPQGEYKKKYDELLKKEGLAN