

S1 MNNHVMFGVSDGSTHLGQKV CNKYVIQSGTAATLEIMNRQLNEDDKTLRTYRRALAFSNVIEKDLIPIMLNCNDE  
 S2 MGDHVVFVGVEGSAVQLGHQIGSRMYIHDQTSAILLETMNRRLNEDDTNLWLYRRALAFSNVIEKDLIPILMNSNED

S1 PLVFSSLLKLFVNLTLPICEIFPAGE.NLSTSSKQTVILNNVLSKCKVLCSNGQFSWVLMGHSALCQGA..KE  
 S2 KVVFNNAVVKLLVNLSLQAESILPVHVMNNYPAGKQTIHEINSALAKTKALFTNSQFSVLVMKNLSLELSQKIDSQK

S1 SKESISIHNCLLLIRNVLHIPETVSSMKS GC.GQNQIIWNLFSSNLDKVMLELIGHKSASVWCSTIVHIIATLF  
 S2 HEHDIVSISNCLVLIRNLIHIPSKEGTSKSGAGGQNQMIWNLFVQNIIDKVLQLISHRSSSVWCTTIVQIIAVLY

S1 KDQYGENMAKLLNS...SLAESSTDGESNTSPNDGSPYRNPESDGNSDDIQPTPGQSDAGYPENFQPYPRSRSES  
 S2 KDQHVVLELERLVKVFLDNSLESGDDDESNTGGAD.....QSWPSSR.NS

S1 VSSLEVFPNASPAQSIISNDLDSDEKFGKD.....QEWGPA.GLPEGANKGPHSK  
 S2 ISSLEVFP.ASPSPTIRSRGDEDETQQWYPDEEIIITDDAEAREISVECPGIGTLVGGPCEGRPGEGGNEKSG

S1 EEGKARDLEKKETERAATTQIRWGDKPEWSSSGIESIGAW.DQ.....GRSSEGRSEVCAEEE.ARKKPC.....  
 S2 KVG.....A.....ERSCKGRSWSNSMDERSCKGRSRGNSMDERSDKCKSGSNSLDERSDKKGSGSNSL

S1 .....WSAYREAR.GAEDKET...KQRENGFG..VNS.....GESSEGEPEPKKSIHENTDRIT  
 S2 DERSDKGKSGSNSMDESFKTMTAKRIITDLVTYSGQGRSYVFKDMVSSSSSSDEQETTEPEPEKKLLEDRNQK

S1 LHVQFKRNP RP EMQLCHKDKRGPAGPKV.....SDMESVSDSSEETMGVPKKTLEDGSKFAVGFVSHISTIDNER  
 S2 KKIKFRRKVRRTATDLSRKVKCGPSSSIEQQCDNKS GWGSSQDSNENTGVPKKTNGIDCSTKPGFGP.GKQYDTDH

S1 QAALEDSTSSND DDMLKERYFKSRAHLIKPKPRPGVTLSLKAKSELRRMKLLKQVQENRIRCLSMQSI.IGDKEI  
 S2 QADIEDSVSSSETENN..YLHWAPRSHPVKPKPRPPALFTPEERMLHRRQKILKLSHENMVRVKALQNHSAKDKDI

S1 AELLKEFTVAFLITGYPKLVGDLK..DMLS EKHSNSLIDHSNLWLLSYFLQFASQIELGLDQIGSVLSVQTIAFL  
 S2 SELLREFTVTFLIAGYSKLVQDLLTKFMMAKEQGGRISMDKSHFLWLVTYFLKFA CPLEITGLHEIGSVLSVETIGYI

S1 TFEGVDVVEVLELAA.REPGTDISPHLRRIHLVVTAIREFLQTVNSYSAFKHLDSSEKAAQLEQVQVQIASMKCLR  
 S2 IYEGVEIVETLKLASTRLPRSDTSPELRRMHLVVTAIREYLQVLYNYININN.KTSNKKHLEQLKEQACQMKALR

S1 QLLLLLMRTYNPEIQSVQYLADVVCNHLVVSMMKADNNSSELT LKTHLTQFANTELMRQYGRLLVDYRTNSEVV  
 S2 QMLLLFIRSYNQETQSYQYLADLVVCNLSVLNNMES....STTELRNHTQFANKELMEQYGHLLLDHTQNSVQV

S1 NDCIFTMMHHVAGDLEAPHTLHIPSVLNTFSTIWEGLDICEWFDLIEYIIQMFLQAMRNTPHSCAANIVDNMD  
 S2 NDCVLTMLHHVSGDLEAPHTLYIPSILKTFVALSEEGGALYEDWVDLIHFTIQTFLQRMVGG.....

S1 STQVLDGCGMTGNQASQLFWVFSQVENMEDPVGSLIEVYRQTDHIVLSRLAVIQSLLSHGVITHAMYMNFYIMNS  
 S2 .....EVEADPPTE.....

S1 VMPHTHIDQVESLIAEVGSVHNTDGMNTDEETDAREINTESNQLDNHQVNHQLDNSLPEINLNTTPGNNSQKTNL  
 S2 .....HQTQV.....G...RTAGVEL.....DTLNN.....

S1 NAEIKTKMNANNPREISSQEMSSKGNPQEIEEINV LKECLIKQGQYCLISWVQEVLLDACRVKLNPETLIFEPD  
 S2 .....NEVHTLTNQTIKEGQGS LITWLQEFFIQQVARVKLHPDRIPAEAG

S1 SFTNESVPFYYNHAKQSIPLVPYNRSQYQGLQTESFIFLLHKLGFLLPADVGKAYPRIPYFWSAEQMHEVASKLG  
 S2 QIL.DPVVFFYNYSQQSIPLIPFSTLQSKGCQTELFNRLLLELGFLLPVDGKVVPRIPHCSAQHLYSVATQLG

S1 PIREGEMILNSSMKRKLPSVSSEQELNIKMKKESPDVNSTEESKNEPTQFMDTGLDGMIDITGET.DRQVGVVR.  
 S2 PLTDSQLTVADLTA.....LKEKTWYSSTSMQPLEESMDMDVGLTSLLELPNDRGQKQVARIQA

S1   ...ASW<sup>W</sup>L<sup>W</sup>QF<sup>A</sup>AK<sup>L</sup>LSV  
S2   GSGSA<sup>W</sup>W<sup>W</sup>MLL<sup>A</sup>AN<sup>L</sup>LSK





 non-conserved  
 similar  
 ≥ 50% conserved  
 ≥ 70% conserved

Figure 1: Centropages hamatus TIM  
S1 - TRINITY DN22370 c1 g1 i6.p1 ORFtype complete len 1277  
S2 - TRINITY DN9829 c0 g1 i8.p1 ORFtype complete len 1123