

Table 1 Suppl. The primer sequence of *ApCOL* genes for RT-qPCR.

Gene	Forward primer	Reverse primer
<i>ApCOL01</i>	GCTGCATCGACCAATAACAA	GAGATAATCGCCGAAACCAA
<i>ApCOL02</i>	TCAACCACGCCTAAGTTTCC	GGCATGCCGTTTCCTTAGTA
<i>ApCOL03</i>	TGCATTAGCAAATGCTCTT	GCAGAAGGGCAACCAGAGTA
<i>ApCOL04</i>	GCTCCATGTGCTGCTGTTTA	GGCAGAGTCTTGCTGAATCC
<i>ApCOL05</i>	GCGATTACTGCAACAAAGCA	TCATAATCGCAGTTGGAGCA
<i>ApCOL06</i>	AGACGATGCCTTCCTGTGTC	TTGAACTGCTGGCTTCACTG
<i>ApCOL07</i>	CGTGGCTTCTAGGTCTCCAC	CAGTACATGACGGCAGGAGA
<i>ApCOL08</i>	ACCATGCATGTAAACGCAAA	CGTAAACCCAGCAAAGCAAT
<i>ApCOL09</i>	TGCGTCTACCGATCATTTTG	ATCCTGCTCCATTACCCACA
<i>ApCOL10</i>	TCTAAGTGCTGCCTTGACCA	TGGGAACCTTCATTGGCATT
<i>ApCOL11</i>	CCTCCCTTCCTTCACCATTT	TTCCGTATGAGGCACCGTAT
<i>ApCOL12</i>	TTTCGAGGGGATCTTTGAGA	ATCAACACCAGGAAGCGATG
<i>ApCOL13</i>	GACACGACAGGGTTCGACTT	TGCTCCTCCTCTTCCTCAAA
<i>ApCOL14</i>	TCTTTCCTGTTCCATCTCC	CCATCAGACAGGCAATAGCA
<i>ApCOL15</i>	CTTATGATGCTTCCCTCATGC	CACCTTCAGCACCAAGATCA
<i>ApCOL16</i>	CCAATCCAGGCAGAGGATAA	TATTGCCAGACCCATTAGGG
<i>ApCOL17</i>	GCCTCGTAAATCGCTGAGAG	GCCCAGTCCCTGACAAAGTA

Table 2 Suppl. The *CONSTANS-like* genes published in other species.

Gene name	Gene ID	Species	Group	Function	Reference
<i>CO</i>	AT5G15840	<i>Arabidopsis</i>	I	accelerating flowering in response to long days	Suarez-Lopez <i>et al.</i> 2001
<i>COL1</i>	AT5G15850	<i>Arabidopsis</i>	I	accelerating the circadian clock	Ledger <i>et al.</i> 2001
<i>COL2</i>	AT3G02380	<i>Arabidopsis</i>	I	no influence on flowering time in overexpression plant	Ledger <i>et al.</i> 2001
<i>COL3</i>	AT2G24790	<i>Arabidopsis</i>	I	promoting lateral root development; daylength-sensitive regulator of shoot branching	Datta <i>et al.</i> 2006
<i>COL5</i>	AT5G57660	<i>Arabidopsis</i>	I	inducing flowering under short days condition	Hassidim <i>et al.</i> 2009
<i>COL7</i>	AT1G73870	<i>Arabidopsis</i>	III	regulating branching and shade avoidance response	Wang <i>et al.</i> 2013
<i>COL8</i>	AT1G49130	<i>Arabidopsis</i>	III	delaying flowering under long-day conditions	Takase <i>et al.</i> 2011
<i>COL9</i>	AT3G07650	<i>Arabidopsis</i>	II	delaying flowering	Cheng and Wang 2005
<i>Hd1</i>	Os06g0275000	rice	I	promotion of flowering under short-day conditions and inhibition under long-day conditions	Yano <i>et al.</i> 2000
<i>OsCCT19</i>	Os07g0261200	rice	II	delaying flowering under long day condition	Xue <i>et al.</i> 2008
<i>OsCO3</i>	AB001887	rice	I	delaying flowering under short day condition	Kim <i>et al.</i> 2008
<i>OsCOL4</i>	Os02g0610500	rice	I	delaying flowering	Lee <i>et al.</i> 2010
<i>DTH2</i>	JX202590	rice	II	promoting flowering under long day condition	Wu <i>et al.</i> 2013
<i>LpCO</i>	AY600919	ryegrass	I	accelerating flowering	Martin <i>et al.</i> 2004
<i>HvCO1</i>	AF490467	barley	I	accelerating flowering	Campoli <i>et al.</i> 2012
<i>HvCO9</i>	AB592332	barley	I	delaying flowering	Kikuchi <i>et al.</i> 2012

References

- Campoli, C., Drosse, B., Searle, I., Coupland, G., Von Korff, M.: Functional characterisation of HvCO1, the barley (*Hordeum vulgare*) flowering time ortholog of CONSTANS. - Plant J. **69**: 868-880, 2012.
- Cheng, X.F., Wang, Z.Y.: Overexpression of *COL9*, a *CONSTANS-LIKE* gene, delays flowering by reducing expression of CO and FT in *Arabidopsis thaliana*. - Plant J. **43**: 758-768, 2005.
- Datta, S., Hettiarachchi, G., Deng, X., Holm, M.: *Arabidopsis* CONSTANS-LIKE3 is a positive regulator of red light signaling and root growth. - Plant Cell **18**: 70-84, 2006.
- Hassidim, M., Harir, Y., Yakir, E., Kron, I., Green, R.M.: Overexpression of *CONSTANS-LIKE 5* can induce flowering in short-day grown *Arabidopsis*. - Planta **230**: 481-491, 2009.
- Kikuchi, R., Kawahigashi, H., Oshima, M., Ando, T., Handa, H.: The differential expression of *HvCO9*, a member of the *CONSTANS-like* gene family, contributes to the control of flowering under short-day conditions in barley. - J. exp. Bot. **63**: 773-784, 2012.
- Kim, S., Yun, C., Lee, J., Jang, Y., Park, H., Kim, J.: *OsCO3*, a *CONSTANS-LIKE* gene, controls flowering by negatively regulating the expression of *FT*-like genes under SD conditions in rice. - Planta **228**: 355-365.
- Ledger, S., Strayer, C., Ashton, F., Kay, S., Putterill, J.: Analysis of the function of two circadian-regulated *CONSTANS-LIKE* genes. - Plant J. **26**: 15-22, 2001.
- Lee, Y., Jeong, D., Lee, D., Yi, J., Ryu, C., Kim, S., Jeong, H., Choi, S., Jin, P., Yang, J., Cho, L., Choi, H., An, G.: *OsCOL4* is a constitutive flowering repressor upstream of *Ehd1* and downstream of *OsphyB*. - Plant J. **63**: 18-30, 2010.
- Martin, J., Storgaard, M., Andersen, C., Nielsen, K.: Photoperiodic regulation of flowering in perennial ryegrass involving a CONSTANS like homolog. - Plant mol. Biol. **56**: 159-169, 2004.
- Suarez-Lopez, P., Wheatley, K., Robson, F., Onouchi, H., Valverde, F., Coupland, G.: CONSTANS mediates between the circadian clock and the control of flowering in *Arabidopsis*. - Nature **40**: 1116-1120, 2001.
- Takase, T., Kakikubo, Y., Nakasone, A., Nishiyama, Y., Yasuhara, M., Kiyosue, Y.: Characterization and transgenic study of *CONSTANS-LIKE8 (COL8)* gene in *Arabidopsis thaliana* 35S:*COL8* delays flowering under long-day conditions. - Plant Biotechnol. **28**: 439-446, 2011.
- Wang, H., Zhang, Z., Li, H., Zhao, X., Liu, X., Ortiz, M., Lin, C., Liu, B.: CONSTANS-LIKE 7 regulates branching

- and shade avoidance response in *Arabidopsis*. - J. exp. Bot. **64**: 1017-1024, 2013.
- Wu, W., Zheng, X., Lu, G., Zhong, Z., Gao, H., Chen, L., Wu, C., Wang, H., Wang, Q., Zhou, K., Wang, J., Wu, F., Zhang, X., Guo, X., Cheng, Z., Lei, C., Lin, Q., Jiang, L., Wang, H., Ge, S., Wan, J.: Association of functional nucleotide polymorphisms at DTH2 with the northward expansion of rice cultivation in Asia. - Proc. nat. Acad. Sci. USA **110**: 2775-2780, 2013.
- Yano, M., Katayose, Y., Ashikari, M., Yamanouchi, U., Monna, L., Fuse, T., Baba, T., Yamamoto, K., Umehara, Y., Nagamura, Y., Sasaki, T.: *Hdl*, a major photoperiod sensitivity quantitative trait locus in rice, is closely related to the *Arabidopsis* flowering time gene *CONSTANS*. - Plant Cell **12**: 2473-2484, 2000.
- Zhang, L., Li, Q., Dong, H., He, Q., Liang, L., Tan, C., Han, Z., Yao, W., Li, G., Zhao, H., Xie, W., Xing, Y.: Three CCT domain-containing genes were identified to regulate heading date by candidate gene-based association mapping and transformation in rice. - Sci. Rep. **5**: 7663, 2015.

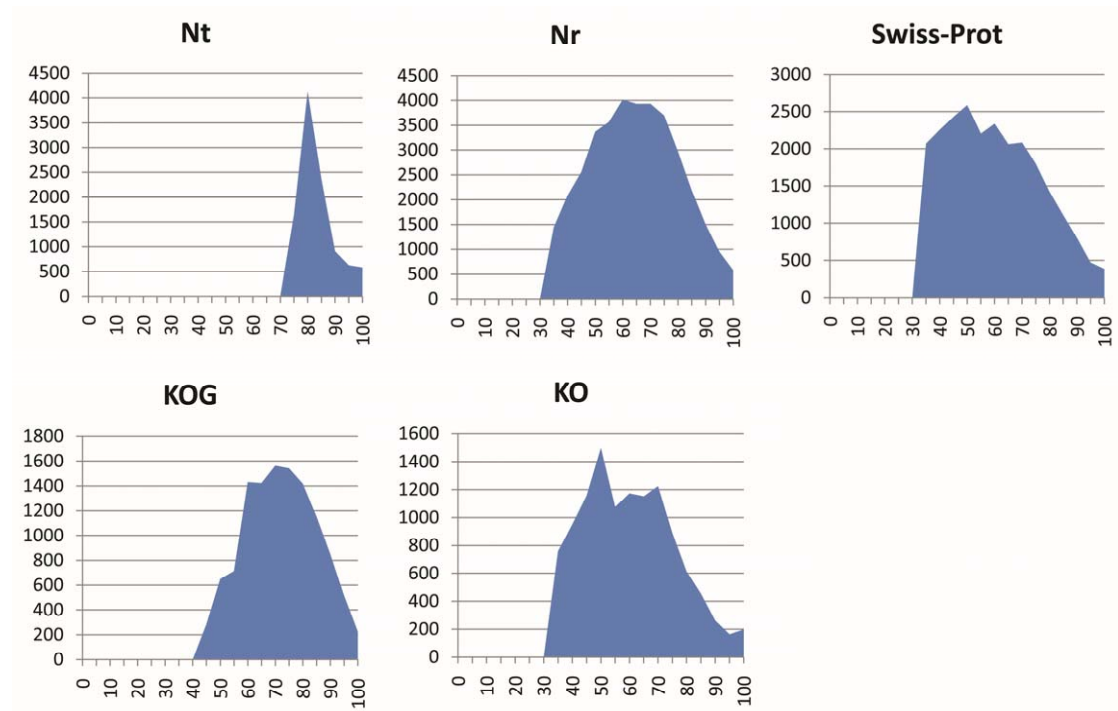


Fig. 1 Suppl. Similarity distribution of the top *BLAST* hits for each transcript identified by searching against the public databases (KO - Kyoto Encyclopedia of Genes and Genomes orthology database; KOG - eukaryotic orthologous groups database; NR - NCBI non-redundant protein sequence database; NT - NCBI nucleotide sequence database; Swiss-Prot - SwissProt protein database).

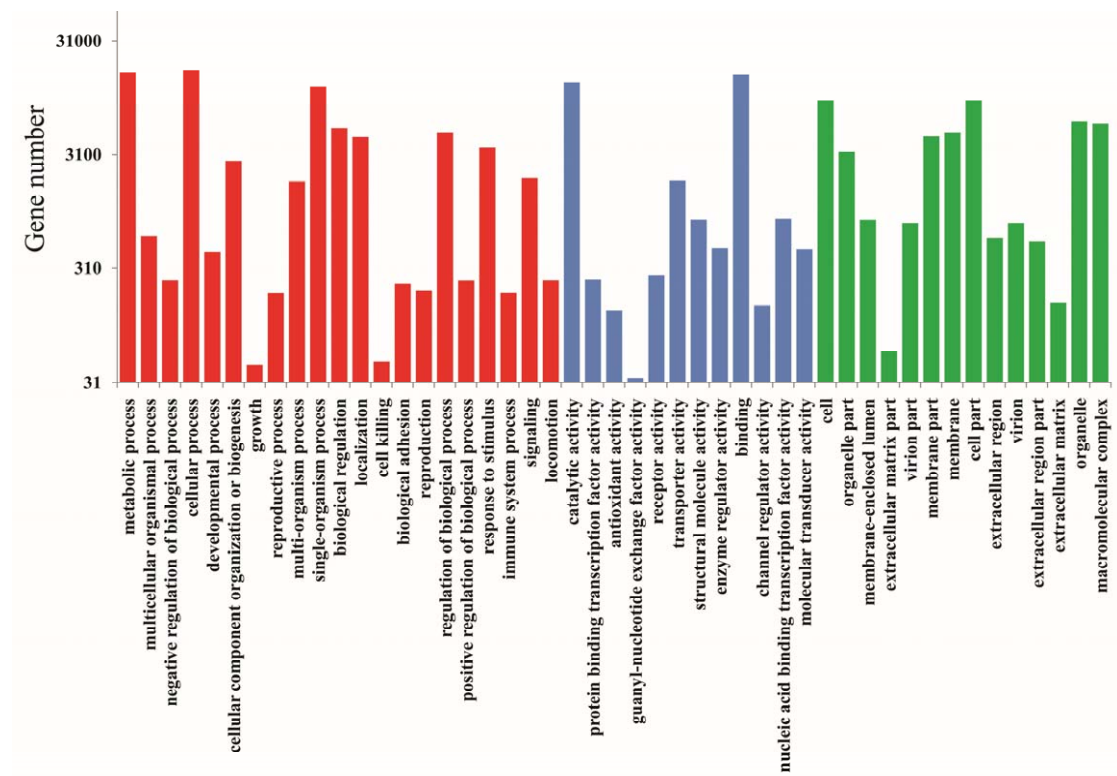


Fig. 2 Suppl. Gene ontology classifications of assembled transcripts. The red, blue, and green histogram bars represent the three main categories: biological process, molecular function, and cellular component.

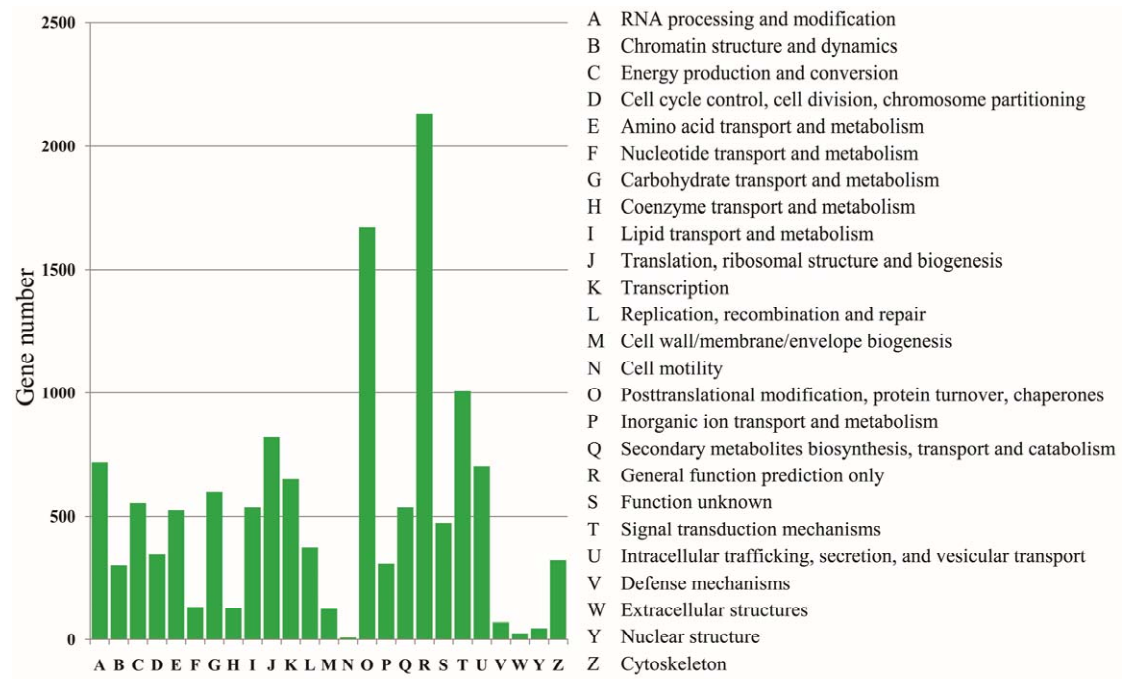


Fig. 3 Suppl. Histogram presentation of clusters of eukaryotic orthologous group (KOG) classification.

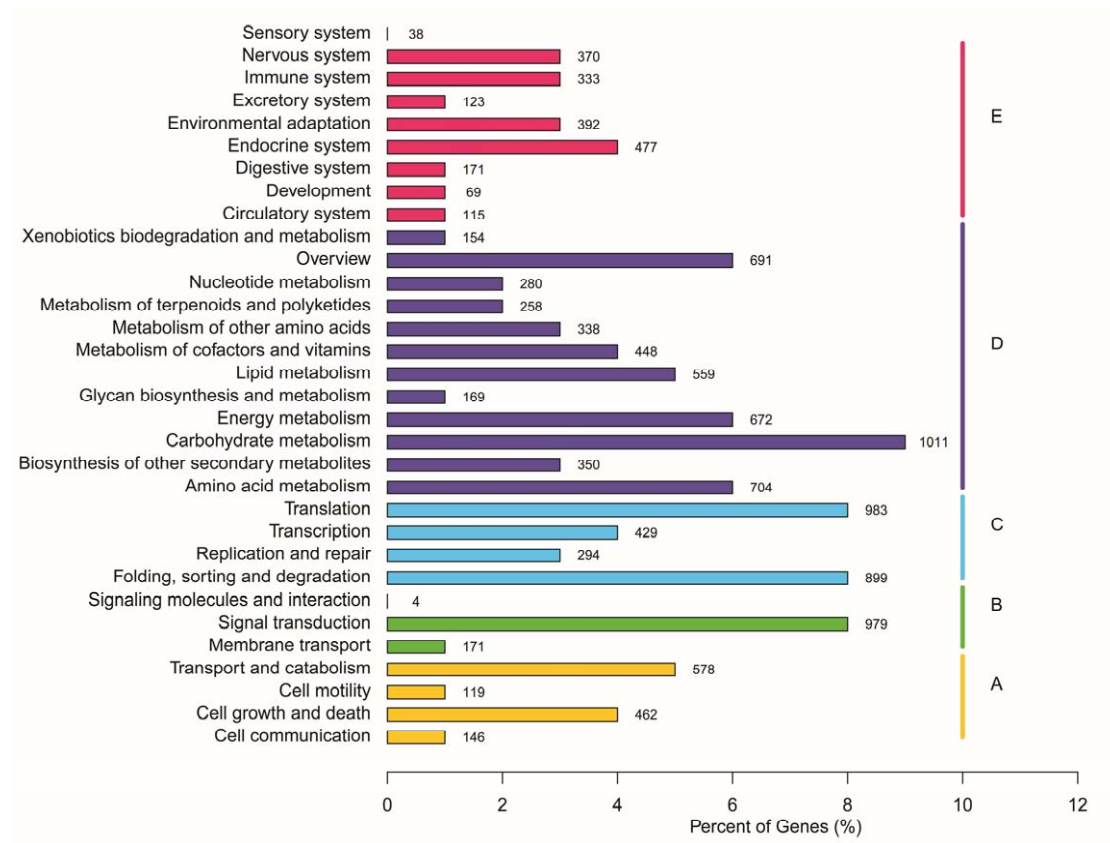


Fig. 4 Suppl. Classification of transcripts according to the matching Kyoto Encyclopedia of Genes and Genomes (KEGG) pathways; A, B, C, D, and E represent the five main categories: cellular processes, environmental information processing, genetic information processing, metabolism, and organismal systems, respectively.

>ApCOL01

MSSSKLCFNYCHSSNYNLNGYSCPHHNTIADLNAPLDFLDSSNPNTIYATTTAASTNNNNNNHNNNSVQEL
QEFQFLGNNEVDALAWLFNDNPPKEEERPEERACGPKRHDRHVVAPIGFGDYLEMDGFRHSCNNMGGR
LTFDVCPSGTSSADSMIRHSPPAPMEIPTTVVGNIMRAPLYNDASSCSYTKEQMGEIASNQPDNPNDREA
KVLRYKEKRKKRRYEKQIRYASRKAYAEMRPRIKGRFAKTPEVSNAPVNEVNNDNDNSNIISNYDQERF
DFGWYHQQS*

>ApCOL02

MSISENHVSTCWGAPGGNSNGEATMNDIDNAWTGSSSKSAENVPVLGESTTPKFPGSGTKDTEMCKGGF
FEDFKVDDVDLTFENYEELFGGHNEQSRQFFDDVGLDCFFDTKETACQGEFVGEASARNVKSMQRECSN
GASADSMNKAELSVSSLPARPARSSISLTFSGMTGESSAGEFTMSSMLLMGEPPWYAGGAECSSYAVAS
RDSAVLRYKEKKKIRKFDKKIRYASRKARADVRRRVKGRFVKAGEAYDYDPLCQTRSY*

>ApCOL03

MEPLCDFCGTQRSMIYCRSDAASLCLSCDRNVHSANALSKRHSRTLICDRSNSQPAIVRCIEENSSLCYSC
DWNGHNNLPTVSDHKRQKINCYSGCPSAAELSRISFVAEFPRIDDSNCEQGMGLMSISENHVSTCWGAP
GGSSNEEVSMHQMDETDKVNLGTGSSSLAVRNVRSSADPADSGESAAPKLCGSETKDTEMCEGSFFDD
FTTDDGNPTFEHYEKLFGGPDNQAGQFFDDAGFCSLFDNKEMSDANSNSQGELMAEASARNEKATQEQE
SNGASADSLDKPELSVSSLPTMPARSNLSLSFSSMPGGMGEPWSWYNSGECSSYHVGSRDSAVMRYKEKK
KARKFDKKIRYASRKARADVRKRVKGRFIKAGDAYDYDPLCQTRSY*

>ApCOL04

MCRTFIFSSVNISSYALLLQIWDFNLGRSRGHDEAQLHEGYGTNNAGFMKNYNDLLKENSFSSTMLEDI
YDPNIPSGKVNISGKWKNDANKSSSVTSSNNLPPIAVPSMCATNEPLSSSNINEICFGEQPPIVRNETLSIKV
DSEILAQNRGNAMLRYREKKKNRRYEKHIRYESRKARADTRKRVKGRFVKSTENHDEVGD*

>ApCOL05

MKEEEQLCDYCNKAKAVLHCRADTAKLCLPCDMHVHRANTVSSKHSRLLCNSCYSSSSSIFCPTHNEV
YCSNCDYEAHVSVNHHERRAVESFCGCPSAVELHLLLGFGGNKILKEENKDEVFNDESLLFWDAPPVV
RLNDLVVPADGDVAPRENQAFDVPPLPKDRNLACGKQKEEIMHQLRELLKSEGEQLSCYLEEDEPVSEFH
SHLPENVDQQGNLFFDSDGNANFTLTHELEASEIQWNSNDWQEATNPAIFPYDQQLENYSMETSSYQDK
DENVQANTYTPNAGNSDINMVSERVPSFTSKLGLEILCPDRNSVLTRYKEKRKARRYDKLIRYESRKARA
DSRVRIKGRFAKLNQDAKF*

>ApCOL06

NYEMNMNQTAHAVNGKTARACNGCLKRRARWYCAADDAFLCQSCDLSVHSANQLASRHERVRLKTAS
SCDDSLPSWHKGFKRKARTPRRHAKSFAAVKPAVQVPEMEAFAEESAVSDIMNEEGEESLLYQVPVFEP
IFDDVKLNDVRNNDIGGYDPTDIELAEFAADVEIMLGQGLDDIDAFGINALGLLEAEEDQSKAKVELMDG
TVDYYGKDATNFGLDMEMEFSGSLNVNFDCEVEEQKVEVEEERGMMSGIGLKIDYESVINACSYQGTS
PWTDGVRPQFSVDDCWLNIMGMWGTTPVGGEMQGASYGFGSGQVGNFDGGREARVSRYREKRRLFS
KRIRYEVRLNAEKRPRMKGRFVKRTAM*

>ApCOL07

KKMAVNYWGLTAKHCANCVSSPAVMYCRTDATYLCACEARSHSSHVRVWLCEVCEQAPAAVTCKAD
AATLCVTCDAADIHAANPLARRHERVPVVPVGNPTVQVKEDLFSGDGETWKGMMVDLNCFGGFGSEL
VDPYLDLDGNGDGLVPVQEKQVYGYGYGQEKGMMMPKGTGDVEFGAVGKGGDYGVGHGGYSVGQ
SMSSHSTTVSSSEAGVVPDNSTMAVADVSNPYSRPLPNPMDAMDREARVMRYREKRKNRKFEKTIRYAS
RKAYAETRPRIKGRFAKRVDSYVDPMHVSINASTAFMNDSGYGVVPSF*

>ApCOL08

MGKSHRHGWMVNGRSLDPMISPLIAWYVCFIFIWKFIHIDTCTCNLAMQEMWGEEGEMELGTAQSQMD

MFGRNSRSFDEGRKARVSRYSREKRRTRLFSKKIRYEVRLKNAEKPRPMKGRFVKRSSLLHASS*

>ApCOL09

MPKKSKKKKLLSQLSYQDSPDHDVITDMQVACLLQQSYNEPTESPTITDIFGSSSSSSVPPGPSVECDR
DGLARRALRGRERWVFCASDHFAGAGKALSLKLDHEEVLTAWSDKGSYIDGEGPQVVPELLES DVM
EPNMQIWVDVGNGAGWRVPEMCGRESMHSSNGCWDRKERV MRYREKRQSRLYAKRIRYEVRLNAE
KRPRIKGRFVKRTDGETHLVA*

>ApCOL10

MYAEPGFMYPFLPSYNNAEFSYDTHQMGNYAQNSTFDYDLGAEGDLFKAPETIMIEDEPLVTLDPLSAAL
TIISNGQDVM TDTFEVSDMIESLQNEQLNDVFNECRKELLAKYTINDGLNETAPNANEVPIQGC FISNAGH
LQKSVSSGCLNSMDWVSDGYSLGHNFLDFPSADFETAFLRRTCSEGD IQSLGNKGFASSMPTS FVRQLTI
SELKSEQRMQKLSRYRDKKNKRNFRGRIKIYACRKALADSQPRVKGRFAKTEDGEVSKQVK*

>ApCOL11

MYAETGLIYPLLQSYNQTEFSYTPHTEDFVQNYDFDFDLGAEGDLFKAPATHIEEPLLALDPLTTALTNIS
NGQDIMAETIKAADMESMQNDQLNDVLYDCRKELLAKYAIDEMISEVLTVELHANVEVPTLENLKS NME
GNLHKSMSSGCLRSMWVGNNSSGRPNFLEFQSVDFETVFGLRRAFSEGD IQALEYRGANNGKTSSLSGL
FDIQLTVGETKSDERMQQLMRYRSKKNKRNFRGRIKIYACRKALADSQPRVRGRFAKTGNGNVWKQA*

>ApCOL12

YFRSFW SARMEREIEEKEVVMIDEDEKESSCFGNSSKRRKRETGLKFDDFISRGSLRVLLIEGDDSTRQIIA
ALLRKCNKYKVA AVADGLKAWDILKKKARSIDVILMEVELPSLPGVDLLSLIMGHEICKHIPVIMISYND SV
NMVYKCM LKGAADFLVKPVRKNELRNLWQHVVRRHKLNDVQDTIENVKGDDTKRKLENQENNKEYS
EKRSYTESCCRSDMEAQSIFKQNKLP LSDTMLISENPLQNSRAQDHHDGIEQAIPQPLEEEHSCAEVENTA
NQDAKPTESSAEMEDRTCVDLIGGINNQQLCYGLTDSNEVPQSVNYRSKSDSPHLELSLKRYGHAGYN
MEEDKSDGHALNHSSSPFSLYSNKNQVSREGTCTQSDANEYNFAPSTNQTS HDTSIAASMLSNIATKCT
PIKAIPRQFPFGGTLMKPTLHPRS FQNLWSPNGTQSNSKSDYYGSKTERAYKELGDEGSGICNGSSTNGNN
TSANVSYNDRVEKKEVDLCRLTQREAA LNKFRLKRKERCFEKKVRYQSRKKLAEQRPRVKGQFVKHVQ
S*

>ApCOL13

HACHVCEKCNMVPQCQNQYNHTLDIGCITNMTVTKAATVEPQNLKKMDQTANAVSGKTARACDGCA
RRRARWYCAADDAFLCQSCDSSVHSANLLASRHDRVRLKTSSMRSPLAELVSELPTWHRGDRQVRTPR
HGKGSARSKPMILVPDVEAFNEFE EEEEEQQQLLYEVPVFD SIIEFCTPLDFEGADGSAEEVKPATRFDTTVD
DGDVGAGGFDPTDVELAEFAADVENMLGHGLDDVDSFCMEGLGLLEGKEGPGQVKHEHLDEHQDMNF
LVSIEDMEMEMSRGSLDFKLECDGSHMTGEEVHNQQNASMGIGLKMNYDSVINAWSCQGGSPWADGV
RPQLNADDFWSNIMVTLHFIALIYFLVY

>ApCOL14

MSPQLMSIISTGGRTYGFDLDIIKSPSPPSAIRSSSSSPSTISDSSNSPLAISTKRARAPRKRPNQTYTEAVAL
LSTIDPNLFSEKNLLHKLSKNTKFCSSFYTLSTFPLVYSNPTENIFLIEDTSSCFNYHQLSPRSELKPCSPNE
NSCIEYQEPNSPDYDVESILHEEAGEGIDSIMGSLTAEHSERSLSMSSYIKSFKGFGYGPWRSNGNNLHQAI
RKGNDGEWWRKTTLVPMKDIVQNFSAEPVSVEKKKKKKKKKKV EEEVTGELKVVVNKSTTKTIEAK
EATTSQPGTTATKAVSSLGGQSKSTGLGLKLNHQAVITAWSDHSFPFGSESGIQESSDILARLSGIELVPE
AEGGGIREAIVQRYKEKRRNRLFSKKIRYQVRKVNADQRPRMKASGRFVKRPDLIQEEIEADTGK*

>ApCOL15

MSFSVLQGTSTLCPDNMIQTSSILEYDLGAEGDLFKAPEPIIEEPTVTLDPMSAAMTIISNGQDVMNETIKV
ADMESI QNDHLQNVLYECKEELLAKYAISEPFPVMP ELKLPVFQTEEVPSLEKVQLNTEGQLQKSVSSGCL
NSMEWIGNCDLRPNFLDFQGVDFETAMGLRRAYSEGDIQALGNTIALNFANTSSFPSSFDRLTISELKSEE

RKQQLYRYRKKKSKRNFGRKIKYACRKALADSQPRVRGRFAKTDDYEVTksrnqvk*

>ApCOL16

MGKDLEIGVRRTSESHPKFYHTKTKSTKQVDMNV DYHSEIETTKKKKNEDAFVEDTKAA YLMFGITNNA
DTQPINDTDQPSKKDNLEGSTDLPSLR LSLKRSRLPSED TNPTHDERNILRRSDQS AFSRYRNSAASTQAQT
ACVGSCSPVDN SSDVLKSESRQDMVSNSNPVILKQGSNESSDNNDIGSTTNPATCKEKASSIVLMKGNHPS
AFHPVQIQTSQPITQENTNESDA AKIQYQVQH HHHHHYHHHHHHVHKTQNSSENDELA AKNMKASSAYV
SPVEGNGSNGSNGQNISGTIAENANGASEKGAGNVNGSGSGSASGVDQNRIAQREAA LIKFRQKRKERN
FEKKVRYYSRKKLAEQRPRVRGQFVRQPSVPESKGRGGS*

>ApCOL17

LHFAFKVTKKKMEGADESKSKEE AISGGDSSKQVMRWESILPRKSLRVLLVESDDATRHIVTALLRKCN Y
RVA AVADGMKAWEVMKEKKYIFDLVLTEVEVPTLSGTGLLTKIMEAKECKNIPVMMSSHDSVNVVLS
CMLKGAVDFLVKPV RKNELRNLWQH VWRRHCVSNSSLNASDNTTASNQISVNVGDRSKSDENNDEKCD
AQSSGNKQDENHESMQNPDQHSQSEGIHMDNVEVSRLTGK YLSLEKIAPSIANDYSVANKKEQSHSCTIS
HRREADIDL MREIGGTYDPRLCTENHSPNP DSSVPKMIVFVEPKSDGQRTFSMLKNDTVEGAYFGTAHSSF
ADEDSTVVTT PVLELSLRPESAGCGQLEIKRNIKPSVASAFSRYDDKRAQRSTVHVEMLNTREKNTSI
TYTDKRSSAQGNKIETIYFQVSSTNDEKSSLPQPKRNTNVNPIQYPQFGFLPIPFGLPYHNL CQGYGSL
MQPVLLNEQSPSMHAIDISGRDLSEL CYVNNENTYNND SYSHAFVKLNGIDDTKRTEDETRDFGVSVDSA
NGTTLQMPDRSRREAALLKFR LKRKNRCFEKKVRYHSRKQLAEQRPRVKGQFISQKVTKSSTTESNC*

>ApCOL01

ACAACATCCATTTCAAATAAAAACATAGGAGAGGAAACTTCCATCTCCTCCACAAACCCTAAATCCA
TCCCATGTCATCCTCCAAATTGTTTTGCAACTACTGCCACTCTTCCAACTACAACCTCAATGGCTACTC
CTGTCTCATCACAACTATTGCCGACCTCAACGCTCCTTTAGACTTCCTCGATTCTTCCAATCCCAA
CACTATTTACGCTACTACTACTGCTGCATCGACCAATAACAATAATAATCATAACAATAATAGCGTTC
AAGAGTTGCAGGAGTTCCAGTTTTTGGGGAACAATGAAGTCGACGCTCTGGCGTGTTGTTCAACGA
CAACCCGCCTAAGGAGGAGGAGCGACCGGAGGAGAGGGCCTGCGGCCCTAAACGCCACGACCGACA
CGTGGTCGCGCCGATTGGTTTCGGCGATTATCTCGAGATGGATGGATTTCGACATTCGTGCAATAATA
TGGGCGGCAGTTGACGTTTGATGTTTGCCGAGCGGTACGAGTTTCGGCCGATTTCGATGATTAGACA
CTCGCCTCCTGCGCCTATGGAGATCCCTACCACCGTCGTTGGTAACATTATGAGGGCTCCTCTGTACA
ACGACGCATCGAGCTGCAGTTACACCAAAGAGCAAATGGGCGAAGGCATTGCATCAAACCAACCCG
ACCCGAACCCAGATCGAGAAGCTAAAGTACTGCGCTACAAAGAGAAGAGAAAGAAAAGAAGATAC
GAGAAACAAATTCGATACGCTTCTAGAAAAGCTTATGCTGAAATGAGGCCGAGGATTAAAGGTAGG
TTTGCAAAGACGCCGGAAGTCAGTAATGCCCCGGTTAATGAAGTCAATAATGACAATGATAACAGTA
ATATTATTTCTAATTATGATCAGGAGAGGTTTGATTTTGGTTGGTACCATCAGCAATCTTGATTTGATT
AGTTGTCATTAATATTATTGTTGTTAATTTGTTGCTATTTATATTTATATTAATGATAGATTATATAGA
TAAGCTCCTCTAGTTCTGTGTTGGAAATGAATAATGCAGAGCTGATGATTTATGATTGTATGATGAAT
TATGTATATGCATTATTCTACATCGATTTGATTGGTAATATATATGTAGCTGCTTGCTATGATGCGAA
GCTTTGCTGCATAAATTTGCTTATTTTTTTTGGTTCATTGCTTAGATAGTCTTGTGATGTCCTGTTTCAG
GCTTTCAA

>ApCOL02

AATGAGCATTAGCGAGAATCATGTTAGCACGTGCTGGGGAGCTCCAGGTGGAAATAGTAATGGAGA
AGCAACTATGAATGACATTGATAATGCATGGACTGGTTCATCCTCTAAATCTGCTGAAAATGTTTCCTG
TCTTAGGAGAATCAACCACGCCTAAGTTTCCTGGCTCTGGAACAAAAGATACCGAAATGTGTAAAGG
CGGATTTTTTGAAGATTTCAAAGTGGACGATGTTGATCTGACATTTGAGAATTATGAAGAGTTATTTG

GTGGACACAACGAGCAGTCTAGGCAATTTTTTCGATGATGTAGGATTGGACTGCTTCTTTGATACTAAG
GAAACGGCATGCCAGGGAGAATTTGTGGGTGAGGCATCAGCGAGAAATGTGAAGTCAATGCAGCGA
GAATGCAGCAATGGCGCGTCTGCTGATTCCATGAACAAGGCAGAGCTTAGTGTATCATCTTTGCCAG
CAAGGCCAGCTCGATCGAGTATATCTCTTACATTTTCAGGAATGACTGGAGAAAGTAGCGCTGGCGA
ATTTACAGAAATGTCCTCCATGCTTCTCATGGGTGAACCGCCCTGGTATGCTGGTGGGGCTGAGTGTT
CTTCGTATGCTGTAGCTAGTAGGGATAGTGCCGTCTTGCGTTACAAGGAGAAGAAGAAAATTCGCAA
ATTCGACAAGAAAATAAGGTACGCTTCACGTAAGGCAAGGGCGGATGTTAGAAGGCGCGTGAAAGG
AAGATTTGTAAAAGCAGGCGAAGCATAACGATTATGATCCATTATGCCAGACGCGAAGCTACTGAAAA
CACATATTTAGTATGTATTTTTCTTTTTTCATAGTGAAACAATCCTGTAATGGAAATGATGCACGAT
AATGTGAAATGCAAAGGAAGCTGTTTCTTGTTGTCTTCGTGCTGGTTTCTTGACAACCTCTAGTTATGG
ATTCAAGTCATGAACTGATTTTTTCCCTTCAGGTCTATGGACACAGAATGTGCCCTAAAGTAGTT
TTAATGCTTTGTAAGCGTTTACAAGTATGTTTTCTTAAGGATCTAAAAGATGTTTTGCCTTCCAGTT
ATAGTTCACTTTAATTAGCACATTTTTTAGATCCTAAAGAAAGCTTTTTCTAAAAGATTCCAAAGTA
CGAAGATATGTTTGGGATGCACATGAGGTGTTTTTGAAAGAAACGTGTTACAGACTTGAAGGCTAA
TATTGTCTGCAGTTGTACTACATTTTGCTCCTTGCATGTCATGTTGTAGTGTCTATGTTCCGAAAGG
ATGAGTGGCTTGTATCATTATCAATTCATCATCCTACGACTCATTTTTGTCCCTATGAAGAAGTTTGTA
AATTATACGCTCTGGTTAGTTTAGTCGTTTGATTTTTATTTTACACAAGTGCAAGGATGTTTGTG
CTTGGTTAATAAGAAGACATGTAAAGGTACCATTTTTGTGCAGTTGTACTGATGCT

>ApCOL03

CGCACTTTTCTTTCCTTTTCCCTATCTTCAATTCGATCCAATCTCTTCTTTTGCTCTACTTTCCTCGTCTTC
CATTCCCATTGCTCTTTCTATAAGTCAGGAATGATACAGAAAGCCAAGTTATCAGCGGTTTGAAAGT
TTTGGTACGCATGTTATAGTTTTTGACACTGGATCTGAAATAAAAAGACATTCTTTGGAACAACGATG
GAGCCTCTCTGTGATTTTTGTGGCACACAAAGATCAATGATATATTGCAGATCAGATGCTGCATCATT
ATGTTTATCATGTGATCGAAATGTGCATTACAGCAAATGCTCTTTCAAAGCGCCATTCTCGAACGCTTA
TATGTGACAGATGCAATTCACAACCTGCCATAGTTAGATGCATAGAAGAAAACCTCATCATTATGCTA
CAGTTGTGATTGGAACGGTCATAACAACCTGCCTACAGTTTCAGATCATAAGAGACAGAAAATAAAC
TGTTACTCTGGTTGCCCTTCTGCTGCAGAACTTTCTAGAATATGGTCTTTTGTTGCAGAGTTTCTCTAGA
ATTGACGACTCGAATTGTGAACAAGGTATGGGATTAATGAGCATTAGCGAGAATCATGTGAGTACAT
GTTGGGGAGCGCCTGGTGGTAGTAGTAATGAAGAAGTAAGCATGCATCAGATGGATGAGACCGATA
AAGTTAATTTGGGAACGGGGTCTTCTTCTTTGGCTGTAAGAAATGTTTCGATCGAGCAGTGCAGATCCA
GCTGATTCGGGAGAGTCTGCAGCGCCTAAGTTATGTGGCTCTGAAACAAAAGATACTGAAATGTGTG
AAGGAAGCTTCTTTGATGATTTCACTGATGACGGCAATCCGACATTGAGCATTACGAAAAGCT
TTTTGGTGGACCTGATAACCAGGCAGGGCAATTTTTTGATGATGCTGGGTTCTGTAGCTTATTTGATA
ACAAGGAGATGTCAGATGCAAAATCTAATCCCAAGGAGAATTAATGGCTGAGGCATCAGCAAGAA
ACGAGAAGGCAACACAGCAAGAATGTAGCAATGGAGCATCTGCTGATTCCCTGGATAAACCAGAGC
TCAGTGTCTCATCTTTGCCTACAATGCCAGCAAGATCGAACTTATCTCTTTCCTTTTCGAGTATGCCCCG
GAGGAATGGGTGAGCCGTCTTGGTACAATAGCGGTGAATGTTCTTCATATCATGTAGGTAGTAGAGA
CAGTGCTGTTATGCGGTATAAGGAGAAGAAGAAAGCTCGCAAGTTTGATAAGAAAATAAGGTACGC
CTCACGTAAAGCCAGGGCTGATGTGAGAAAGCGCGTAAAGGGAAGATTATTAAAGCAGGCGATGC
ATATGATTACG
ATCCACTATGCCAAACCCGTAGTTACTAGTACCTTAAGTTCATATCTTCTTCACACATCAAATCAAAT
GTTGTCTGGACGATATACAAGAGTCTGACCTTGAACCTCTTTTTGGGTTGAAATTGTGCAATGAAAGG
AAGAAAAAAAAGATGGTGCTTATCGCATTGTTTCGTGATCATCTTGAGTAGCTGCGTTTTTCATTCTC
GGTGATGCGCCAGTTAAGATTCTGATGTGTTTTCGGACAATATTTGTACGTAGGATTAGCTGTACAT

ATATTCATGTGATTATTTTTGCTTGGTGTGAAGGAATTTGTAAAGCATGCAGTCCTATTCCGTTTCACC
TAATAATAAGAGCTGGTAATGTACTTTTTTAAAACTTACAAGTGTCAATTGGTACAAGTTCTCTAGT
AGGTATCTGAACTTATGAATGTCAAAGGTTTGCTATATTCTTGTGTTGTATTTCATGACATTGAGATA
TTGTGTATTATGGTG

>ApCOL04

ATTTTCATAGCATAGAACATAAGATTACGTA CTGCTACTTGTGCTGATTTACCCGCACAATTCTCAAA
TCATTACATCGGCATCTGATCTGTATCGTCGTGCTCCATGTGCTGCTGTTTACTGCTGTATAAAAAGGA
AGTCTTATCTTTTTCTTTAGATATTTTCAGAACGATATTTAACTAATTTCAACAAGAGGGAAGAAAAA
AAGAAATGAGAAGAGAATCGGAGAAGACGATTCCGTGCGACTACTGTACGAATTCGCCGGCTGTGA
TATACTGCAGAGCGGATTTCAGCAAGACTCTGCCTTTTCGTGCGACCGACACGTGCACTCAGCCAACGG
TCTTTCTGCCAAGCACGTCCGGTCTCAAATCTGCGCCAACTGCGGGTCTCAGCCGGCGACGGCCAGA
TGCAGCTCCGACTGTTTCTTGTCACTTTGTTCCGACTGTGATTTTCGATGCTCATGGGTCTTCTGGGTCTG
GATAAAGATGAAGGCAGGTTCGAGTCTTCATGCTCGGATAGCTGTTGAGAGTTTCACCGGGTGTCCGA
CTGCGTTTGAGTTGGCGGGTATTTGGGGGTTGGATCTTGCCGTTAAAGCTAAAGATGGGTTTGATGGG
CCAGGTTTTGGGTGCTTTGGATCTGGATCCGATTGGGGGAATTCCGATTCATTGTTGGCTGTGGATGC
TGACTTTCAAGACTTGTATGTTTCTTGTGTGGATATTAAGCAGCAAAAGAACAAATGCATTATTGGATC
AATTGATTGAACCTTGCTAATAAGGACTCATCAACATCAAATTATCAGTCAGAGGAAAAAGCCGAATC
ACCTCTTCCATCGAATCTAAGTCCCAGAACTCCATGTAGGGGAAACAGTGGCATGAAAGATCAAGAG
GAAACTAACATAGCAGCTGAACAAATACCAACGTTTACTGCATTGCTTAACATGGCAGCTCCTACAA
CTAAATGGGCTATCGAAGATGATGAGGATACTATGTGGAAAAATATTGGCCCTTCTAACGACCATTG
CACTCAGGTTTTGTATCAACTGTGAAAATTGGTTTCACTAATAAGTAATTATCTATGGTTCATCTGTTT
AATATTTCAAATTTTGTATTTACAGTGAAGTGAACCTCAAGCTTTTTGCACAGTTAATCAGTTAAGTG
GAATGTCCAGTAAAGAATGATGTTTATGTTAGTTGTTTAGGGGTTATTTCTTATAATTTGAGAGTGGT
CTCTGGAAAAATAGGGAGTGGGCTTATTTGTGAATGGAAATTAATATCCCTTTACTTTTCATCCTCATCG
TCTTGAGTCTAAAAATAACAAATAGCTTATAGGTGGTATGTAGTCTTCATGATGAAGACTGGTCTTTG
GATGTATCTAAGTTGTTAAGTAAAAAACACGTTTCTTTTTGTTGTTATGTTGTAGCTTGACGAATTTGC
AGGTAAAAGTTGCAATTTGCTGTCCCATAGCTCTTATCCATTGCTCTTGTTCATTAATTTCTTTGGTGC
AGGCTATGAAGAGTCCCATGCTCTTGTTCATTAATTCCTTGGTGTAGCCTAGGAAGAGTTTCGTTGC
TTTTTGGCACTGATATCCTTCAATTATGCTTTTTTCCATCCTTTTTTATCTTCTTGCTTGATTGATGATG
ATTTCTCAAATAACAACAGGGTGTATAGGCTATCTTGTCAAGATGTTTTGAGCATGCTTATGCATTCC
TACAATCCTCTTGAGTTTTGAACTCGAAGAAATGAAGAAATGTTGTGTAGAGCGACAACATTTTACA
ATGTTTTCTGACTAAATTATCTATCTTCTAAGCTTGTGAATTATTTGCCTTCCATGTACAAAAATATCT
TAATCCAGTCAAAGGTTTGTAGTTTGTATAGAAATATTAGTTTAACCATACCCCTGCCTGCATC
GCACGTAGTTGTATGCTTTCACAGCTTAGTTGCTTGTGAACCTGTGGTGTAGAGGTGTGTCAGAGAC
TCAGATGATGATAAATCATTTTCTTCAATGTGTTATTTATTTGCTTGTGATCTACACAAGAAGATGA
CACTAGATATGAAGCTGCGGAAAGTAACTTGAATTGCTAGCCTTGCATGTTTATTGGTTCTGTTTGAT
TCATGCATGTGCAGAACTTTATTTTTTCGTCGGTTAACATATCATCTTATGCTTTGTTACTTCAGATA
TGGGATTTCAATCTTGGAAGATCACGGGGTCACGACGAAGCTCAACTTGAACATGGATATGGTACCA
ACAATGCTGGTTTTATGATAAAGAACTATAATGATCTTCTCAAAGAGAATTCATTTTCAAGTACAATG
ATTCTAGAGGATATATATGACCCAAACATTCTTCGGGAAAAAGTAAACATTTCTGGGAAATGGAAGA
ATGATGCAAATAAGTCAAGCTCGGTAACATCTTCAAATAATTTACCAATCGCCGTTCCATCTATGTGT
GCCACAAATGAACCATTATCCAGCAGCAACATAAATGAAATTTGTTTTGGAGAGCAACCCCCAATAG
TGAGAAATGAACTTTGAAATCGATCAAGGTTGATAGTGAGATATTAGCCCAAAATCGTGGTAATGC
TATGTTACGATACAGAGAGAAGAAGAAAAATCGCAGGTATGAAAAGCATATACGCTACGAGTCAAG

AAAGGCAAGGGCGGACACCAGGAAGAGAGTAAAGGGCCGATTTGTTAAGTCTACAGAAAACCATGA
TGAAGTCGACGGCTGAATATATTCGTTTCTGGTTCAGATGATTATGCCGACATTTTGATGTACATACT
ATATTTTGGCATTGTGTTATAACTTCTAAGTTCATGTTATCAAGCTATTTGTATGAGTGTATATATCTT
CGGTTCTTTGGATTTTTGAATTTTGTCAACTAGTATGCATTGAGTCGTGCATTTGGTGTTTTTTCAGTA
TCCTATTAACATTTTAACAGTTTGTATTTTATGTAACCTTGGAGTCATTAATCTGGCTGTAAACCCA

>ApCOL05

AAACGATCCTTCTAGCATTCTGTCTTGACCCTCAAGCAACACCAACCAATTTATATCCTCACAATTCT
TCTAAACAGCCAAAAAATCACAAGCATCAAGGGAGAAAAAGAAGAGAGGAATAATGAAA
GAGGAGGAGCAGTTATGCGATTACTGCAACAAAGCAAAGGCAGTCCTGCACTGTAGAGCAGACACA
GCAAAGCTATGCCTACCATGTGACATGCACGTGCACAGGGCAAACACGGTCTCCTCGAAGCATTTCG
GCTCTTTGCTCTGCAACTCATGCTATTCTTCTTCTTCTTCGATATTCTGCCCTACCCATAACGAAGTTT
ACTGCTCCAACCTGCGATTATGAGGCACACGTTAGCGTTAACCACCACGAGAGAAGGGCAGTTGAATC
ATTTTGCGGCTGCCCAAGCGCTGTTGAGCTTCATTTGTTGCTGGGGTTTGGTGGGAATAAGAATATAC
TGAAGGAAGAGAATAAAGATGAGGTTTTTAACGACGAAAGTTTGTGTTTTGGGACGCACCGCCTGT
TGTTAGGTTGAATGATTTGGTTGTGCCAGCGGATGGTGATGCTGTTCCGCGTGAAAACCAAGCTTTCG
ATGTGCCTCCTTTGCCTAAGGATCGAAACCTGGCATGTGGAACACAGAAAGAAGAGATAATGCATCA
ACTGCGTGAACCTACTGAAATCTGAAGGTGAGCAGCTGAGTTGTTATCTTGAGGAAGACGAACCTGTT
TCAGAATTTCAATCCCATTTGCCGAAAAATGTTGATCAACAAGGCAACCTTTTCTTTGATTCTGATGG
GAATGCTAATTTTACTCTTACACATGAACTTGAGGCTAGTGAAATTCAATGGAACAGCAATGACTGG
CAAGAGGCAACAAATCCAGCAATATTTTCTTACGATCAACAGCTTGAAAACCTACTCTATGGAACAT
CTTCTTATCAAGATAAGGATGAAAATGTTCAAGCAAACACTTATACGCCTAATGCCGGCAACTCTGA
TATCAACATGGTTAGTGAAAGAGTACCTTCATTTACGTCGAAACTTGGAAGTAAATATTATGCCCA
GATCGTAACTCCGTCCTTACACGATACAAGGAGAAGAGAAAGGCAAGAAGATATGATAAGTTAATA
AGGTATGAATCTAGAAAAGCGCGGGCTGATAGCAGAGTGAGAATCAAGGGCAGATTTGCTAAGCTT
AACCAAGATGCAAAATTTTACCTTCTATTGTCTCGAGCCATTAAAGGTAGTGCATAGCCAGTATTTA
ACTGCTACTAGTCAGGGATTTTAATTCAAGCTGAAAATGGCTAGATTCAGATCAAGTTGTAAAGGAA
GAACGAAAGCTTTTCTGTAGAGCATGAATCTGTATTAGGCACAAATGGAGCCCATCATTGTTGATTC
ATCTTGCCGTTGTTTCTACGTTTAGTATTTTCAATATATCCGTTGTACTACCTTCATGTATCATTTC
GTTGCGGGATTACTGTGTTTGTATTTGTATATCCCTTCATGGTGAGAAAAAGCTATGCCTGTGTGAAC
TATTTACTGTATAAATGTTGAATAAAATTTCCCGCATTTTACGGTCA

>ApCOL06

GGTCCATAACTGCAATAAAAGAAAGCCAGACATGTATTATTATATAATTTGCATGACAGAAAAAAT
TCTAAACTACGAAATGAATATGAATCAGACTGCAAAAGCAGTAAATGGAAAGACTGCACGTGCCT
GCAATGGATGTTTGAAGAGACGTGCGAGGTGGTACTGTGCAGCAGACGATGCCTTCCTGTGTACGTC
TTGCGATCTGTCTGTCCACTCTGCTAACCAAGCTTGCAAGCAGGCATGAGAGAGTTAGGCTGAAGACA
GCATCGTCTTGTGATGATAGTTTGCCAAGCTGGCATAAGGGGTTTAAGAGAAAAGCACGGACACCAA
GACCCATGCAAAGAGTTTTGCTGCAGTGAAGCCAGCAGTTCAAGTGCCTGAAATGGAAGCGTTTCG
TGAAGAGGAGAGTGCAAGTGAATCATGAATGAGGAAGGAGAGAGCCTTTTGTACCAGGT
GCCTGTGTTTGAACCTATATTTGATGACGTGAAGTTGAACGATGTACGTAATAATGATATTGGAGGA
TACGATCCGACTGACATTGAACTAGCCGAGTTTGAGCTGATGTGGAGATTATGCTAGGTCAAGGAC
TTGATGATATTGATGCTTTTGGGATCAATGCTCTAGGGTACTGGAAGCAGAAGAAGATCAAAGTAA
AGCGAAGGTTGAACTCATGGATGGAAGTGTGACTACTACGGTAAAGATGCAACGAATTTTGGGTAA
GATATGGAATGGAGTTTTCGAGAGGGTCACTCAATGTTAATTTTGATTGTGAGGTTGAAGAGCAGA
AGGTGGAGGTAGAAGAGGAGAGAGGTATGTCAATGGGTATAGGTTTAAAGATTGACTATGAGTCGG

TAATCAATGCATGCTCATATCAAGGCACTTCACCATGGACTGATGGAGTTCGACCGCAATTCAGTGT
GGATGATTGCTGGTTAAACATAATGGGCATGTGGGGAACACCAGTGGGAGGAGAAATGCAAGGAGC
AAGTTATGGGTTTGGAAAGTGGGCAAGTAGGTAATTTTGATGGAGGACGAGAGGCTAGAGTTTCAAGA
TATCGAGAGAAGAGAAGGACAAGGCTATTTTCAAAGAGAATCAGGTACGAAGTGAGGAACTTAAT
GCAGAAAAGAGACCGAGGATGAAAGGGAGGTTTGTAAAAAGAACAGCAATGTAAGTCTGCTGGAT
CTATTGGGCTACCTTTTGTATGATCCATGGATCATAGATGATGTTTTTGACATGTCTGTCTGTTGTTA
CAGTTGTGTTTTTCAGTAGTAGTTAGTAGAAAAATAGGAATTGCAGCTGTCCAATTATCCTTTTTTGAAC
ATATGTTTTTTTGCTCATAAAAGAGCTTCAGCATATGCTCTTGGATAATGCTTGCATAGAGGCTTAGG
CCAAAATTTGTCGACTTTTCAATGTTTACTTGTGCAATGAAGTAAAATAAAAACTGAACTCTATTGT
TTGAATAGTACTAATGCA

>ApCOL07

TTTAATATTGTTTTATTTCTCTTCACCCAAGGCCGACCTCCAATCCCCAATCTTCTCCCTCCTCTAAT
CATAAACCGCCATCTGTCTCACAAAATCCAAATTTTCTATTTTAGAAATAAACCATTTATCCGTGG
CTTCTAGGTCTCCACGTACCCCTTTTCTGCTCCCGTCACCTCCATTAACCTCACCTCACTTCCCTCAAAT
AGAAGTCACAAACCAAAACCCAGCTACACAGCATAGCACTTTAAAAAAAATGGCGGTAAACTACTG
GGGGTTAACGGCGAAGCACTGCGCCAACCTGCGTCTCGTCTCCTGCCGTCATGTACTGCAGAACCGAC
GCCACCTACCTGTGCAGCGCGTGCGAAGCGCGATCCCACTCGTCGCACGTGCGCGTGTGGCTGTGCG
AGGTCTGCGAGCAGGCGCCGGCGCGCTCACGTGCAAGGCCGACGCGGCCACGCTGTGCGTGACGT
GCGACGCGGACATCCACGCCGGAACCCGTTGGCTAGGAGGCACGAGCGGGTGCCGGTGGTGCCGG
TTGGGAATCCGACGGTGCAGGTTAAAGAGGATCTGTTTAGCGAAGACGGAGACGGTGAGACGTGGA
AGGGGATGATGGTGGATTTGAACTGCTTTGGTGGATTTCGGCAGTGAATTGGTGGATCCGTATTTGGA
TTTGGATGGTAATGGGGATGGGTGGTGCCTGTGCAGGAGAAGCAGGTTTATGGGTACGGGTATGGG
CAGGAGAAAAGGGATGATGATGCCAAAAGGGACCGGTGATGTTGAATTTGGAGCTGTTGGGAAAGGG
GATGGCTATGGGGTTGGCCATGGTGGATATTCAGTTGGAGTTCAGTCCATGAGCCATAGTACTACTGT
ATCTTCATCAGAAGCTGGAGTGGTGCCAGACAACAGCACCTCCATGGCAGTAGCTGATGTATCCAAC
CCATACAGTAGACCTTTGCCAAATCCAATGGACGCAATGGACAGAGAAGCAAGAGTTATGCGGTAC
AGGGAGAAGCGAAAGAATAGAAAGTTTCGAGAAGACCATTGCTACGCTTCGAGAAAGGCCTACGCA
GAGACCCGACCCAGGATCAAAGGAAGGTTTCGCCAAACGGGTCGACAGTGATTCTTACGTGGATCCA
ATGCACTCGGTGATTAATGCCTCCACTGCCTTCATGAATGATAGCGGCTATGGGGTTGTCCCATCCTT
TTGATGCAGGATTCACCTTGGTGTATTATTTGTAAGATTTGTAAGATTTTATTTTGTCTGCAATTCG
GTGTATATGGGAAAATTACATACTTGCTTTTATTAAGATTTGCAAGATGATTATTATTTTCACTGCTTC
AGTTTATGTTTTACTGTTTCATGCATCTTGCTTGGTTTCTTTTGTGCATAAAAAACAAATGGTAATAGTT
ATATGTCCATTGAATTTGGTCAAGATTTTCAGAAGTGATGCATCCTTTCATCATAT

>ApCOL08

TGATGATACATCCACCATTTCACGATGCTTGTATGTATTCTTCAGATAAAATGTCAAGTTTGAAAAC
AACGCATATGCGTGCGTGCGACAACCTGCGTGAGGCGCAGAGCGCGGTGGTACTGTGCAGCTGATGAT
GCCTTTCTGTGCCAGAACTGCGACTCCTCCGTCCATGGTGCTAATCCACTTTCACGAAGACATGACCG
AGTCAGACTTCGTAATAACAGTTCGTTAAAGGAGGAAGGAAAGGTTGCAAGTACGTGGCCTGCATGG
CACCATGCATGTAAACGCAAAGCGCGTACTCCTAGAAAGGGTAAGAAGTTTAGGGGCACGGTTTCTT
CTTCGGTGGTGCCTGAATTGGAGACCGAGTCTTGTGAAGAGGAGAGACTGTTGTATTTGGTTCCGGT
ACTTGATGATGATGGTAAGAATTCTGACGGTGTTGATGGTGAGTATTGCTTTGCTGGGTTTACGCCAT
CGGAGAAGGAGCTTGAGGAGTTTTCGGCTGATATGGAGAGTTTGCTTTGGAGAGGAGTTGGTAATAG
CGAAACGTTTTTCGCTGGAGGAGTTGGGAATGGTAGATGATGAAAAGCACTGTTGTTCTGAACTGGT
GAAGTGAAGGAAGAAAATGATAATGATGATAAACTTATGCGGAAATTGACGCATGTGATGAGACG

ATCGACACGAATTTTCGAGTATGAGCATGAGCTTGAAACTTTGGTAGAGGAAGAGAACGAAGAGAAG
AGGAAGAGGATAGGACTGAGGCTGGATTATGAAGCGGTGACGGAAGAATGGTGTGCTAGTAACAAT
GGGGAAGAGTCATCGCCATGGATGGATGGTGAACGGCCGCAGTTTGGACCCGATGATTTCTCCATTG
ATTGCATGGTATGTATGTTTTATTTTTATTTGGAAATTCATTCATATTGATACATGCACTTGTAACCTC
GCTATGCAGGAAATGTGGGGAGAAGAAGGGGAGATGGAGTTAGGGACAGCACAGAGCCAAATGGA
CATGTTTGAAGAAATAGCCGGAGTTTGTATGAAGGAAGGAAAGCAAGAGTCAGCAGGTACAGGGGA
GAAGAGGAGAACGAGGCTGTTTTCAAAGAAAATAAGGTATGAAGTTAGAAAAGCTGAACGCGGAGAA
GCGGCCCAGGATGAAGGGCCGATTCGTTAAGAGATCTTCTTTATTACATGCTTCGTTCTTAGCTGCGTT
GATCGGTTACCGGTGACGAAGGCATTAGCTGGCTCGGTTTTTCTCTTGTTTATTTTCTGTCCAGGAGC
AATTTTTTCAGTTTCTCTTTTTGTTCGAAAAATGTGATGAGGTGTGTAGATAAAAGATTTCTGTGAAGC
ATGGTGGTTCGGTGAACCTAACCTTTTTGGGTCGCTTTGGTTGCGACATCAATTTTCATTTTTGAAATA
GATGATGATTCCAAATAAAAAAAAAAATATTTTTCTTTTTCTTTTTCTTTGATTGCTGAATGTATTT
CTTCTTCCGCAATCAGTGAATTTACTATTACATTTATCAGTACTTGGGCAAATAACAAACCCAACAC
CCATGTTGCTTTTAAATACAAATATTCCATCTCTATTTATTCTTCATAAGAATTTTAACTAGCGTATC
TACTAGTTTGTGCAAATGTGTTATCTAATCAGTCCGTAACAAAGGAAAAAAGAGAGAAAAAGAAA
AACTACATTGTTATTGTTGCAGTTAATTGTTATGTACAGAGAGGGTAATGTTGTTTGGCATGTTATGA
CTTGTTTCATGTGATTGAACATTTATTTGTTGAACCTGTAGAACGAGTGAACCTATAGAATAAGTGAAC
CACTATACGTAAAAATACTGGTAAATGATTAGTGAATATACAGAAATAAAACATAACTATTTTGGGC
CTGATAATGTCTCAATACAAAATGAAAATGAATGGTATTTACTGTTAGGTTACCTATAGAAATCAAA
GTCATCCCAAAATCTTTGAATGCAAATCCTGATGTTTCAGATACTGATTGGACAATAAGAGCCCAAT
CGAGTTAGCAGTCATCCCTGACTTTATTTTTGAACACTGCTTCATTGTTTGATTATATATTGTTTTACT
ATCTTTGGCAAAGTCATATTGATTTCAACCACTTGCACTTGTATACGGCTGTGATACCATTTTACTTGCT
GCCTCATCCATATTGAACCGTAGGGTCACCACTGAACTGCACTTGTATGTACATAGGTGGTGGCGAT
ATTGTATACACACACGCTTGTATTTGATACACTTATATATATATATATATAAAAGTGAGTTCATCT
GAATATGTATATTATAGCATACATGCCTGCTTTGGGAAATCTGGCACATATCTTAAATATATTTTGTA
TGAACCTTCATTAGATTAATATTTTATGCTTGTCACTAAATCTGTACCGTCTTATGTACCAATTTATGTG
GCCTTTATGTTTCTCCATGCCTTGTTTTATCCTATAATAATTCAGTTGCACACTCTGGCTCTATAGAAT
TGCCACATATTCATTTACTGCATATATTGATTACCTTGCCACATATGCAATTACTGCATATATTGATTT
CCTTGCCACAATTTCACTTACTGCAAACTATTAACCAAATTTGTATGGATGTTTCCTGCGCAGTCAA
ACCATATTGAAATGAATATGAATGTTAAAGGTGATGGAGCGCAAATACAAGTATACATTGGTCTTAA
CAATATATTGGCCACCTTTTCTTTTCTGTAATGTATATGGACTACGATATGCACTGTTAAATGCTGAT
TTGAAACTGTTTACCTGTATATATTATAGTAAGTGTATTAGTCTGGAAATAAAAGCAACAGAAGTGT
AAATATGTCCCCAACATATTGGCATTGGAATCTTCAAGAAAGAGTGTCTAAAAAATAAATTGATGA
TGATGATTTTACCCGTATAGTAACACAAAAAGGGAAGTGAATGGGTTTGATCACCTTCAACACATA
AGTGTGTATTTTGTGTCAACCTGGGATGGGTACTCTTAACTCATTGGAATGAATCAGATGTATAGA
TTCATTTTCATCCATGTCAACCCCTCATGTATGCACTGTCAACCCCTCATGTATGCTGCCTCTAGTGAAT
TAAATTGTATTAGATAGCATGCTGACAATGGGTTTTTGGCATTGGAATTCATTTAGTGTGCATTGTTTT
ATGCATTATTTTGGCATCTGAAACCACTTAGTATGCATTGTTTTATGCATTTTTTTTGGCATCTGAAA
CCATTCAGTATGCATTGTTTCATGTATTATTTTTGGCATTGGAACCAATTCAGTAATCGTTCAGTATGC
ATAAGTTTTGGCACTTTTAGCCTATAATTAATCTGATCATTATGAACAATATTTAATATGTTTCAGTATA
CGTAGCTTCCCTGAATCATCACATATGTTTCAGTATACACAATATATAGTTAGAAGATTTAACCCTTG
GCCACCCATGTGATTACTGCCATTGTTTCGAAATTGAAACCAATTTTTTTATGTGAAGAAGTCCCTGAA
CCAATTGTATTCAATTGTGAATGAAAAAAACTTTCTGAAAAATAAGGAGCTTATTGGTTTACATATG
AATTA

>ApCOL09

TCTTCCCCAGTTAAACAATGCCGAAAAAGTCGAAAAAGAAGAAGTTACTGAGCCAACTCTCCTACCA
AGACAGTCCTGACCACGATGTAATAACCGATATGCAGGTCGCGTGCCTGCTCCAGCAAAGCTACAAC
GAGCCAACGGAGAGCCCGACCATAACGGACATATTTGGATCGTCATGCTCGTCGTCCTCCGTTCCCTT
CCCAGGGTCACCATCCGTCGAGTGCGACAGGGATGGGCTGGCCAGGAGGGCCCTCAGAGGGAGGGA
GAGGTGGGTCTTTTGTGCGTCTACCGATCATTTTGGCGCAGGTAAAGGGGCTTTGTGCTTAAGTTGG
ATCACGAAGAGGTTTTGACCGCTTGGTCGGATAAGGGCTCCCTGTACATCGATGGAGAAGGGCCTCA
GGTCGTGCCCGAGCTTCTTGAAAGTGATGTTATGGAACCTAATATGCAGATATGGGTAGATGTGGGT
AATGGAGCAGGATGGAGAGTACCTGAAATGTGTGGAAGAGAGAGCATGCACAGCAGCAATGGCTGT
TGGGATAGGAAGGAGAGGGTGATGAGATACAGGGAAAAGAGGCCAAAGCAGGCTCTATGCTAAGAG
GATAAGGTATGAAGTTCGGAAGCTCAATGCTGAGAAACGGCCACGGATTAAGGGTCGTTTTGTAAAG
AGGACGGATGGTGAGACACATCTTGTAGCATGACTGATAAAAGGAAAAGTTAGTTCATCAGTGGCCAG
CTTGGTTCATCTTCTCTTCTTGTGCATTTATAAAACAGTATATTTAGCAAGCATTTGTCAAAGTGATT
TTGATTGTGTATTAATGAAGTAGAAGATGTGAAATGAAATCAGTTGTGTAGTGC

>ApCOL10

CTCCTTTCTCTCTTCACATTTGCATAAAAGCTCTTTGCAAATTCAGTATTACATTACAGAACAAAACG
TACGATTAGAGATATTTTATAGTAATTGTGGACAGAAGAAAAGAAAATATGTATGCTGAACCTGGA
TTCATGTATCCATTCCTTCCAAGCTACAATAATGCAGAGTTTTCTTATGATACCCATCAAATGGGAAA
TTATGCGCAAAATTCGACGTTGATTATGATCTAGGAGCAGAAGGAGACTTATTCAAAGCACCTGAA
ACAATTATGATCGAAGACGAACCTCTAGTCACATTAGATCCTCTAAGTGCTGCCTTGACCATTATATC
AAATGGACAAGATGTGATGACTGATACATTCGAAGTTTCTGACATGATAGAGTCACTGCAAAACGAG
CAGCTTAACGACGTGTTCAATGAGTGCAGGAAGGAGCTTTTAGCTAAGTACACAATCAATGATGGTT
TAAATGAAACAGCACCAAATGCCAATGAAGTTCCCATTCGAAGGATGCTTTATTTCCAACGCAGGGCA
TTTACAAAAAAGTGTGAGTTCTGGGTGCCTAAATTCTATGGATTGGGTTAGTGATGGTTATAGCCTTG
GACATAACTTTTTAGACTTTCCAAGTGCTGATTTCGAAACTGCATTTGGATTAAGAAGAACATGCAGC
GAAGGCGATATTCAGTCTCTAGGGAACAAAGGATTTGCAAGCAGCATGCCTACATCCTTTGTCAGAC
AACTGACCATCAGCGAACTGAAGTCTGAACAACGAATGCAGAACTTTCCAGATACAGAGATAAGA
AGAACAAGAGAAATTTGGAAGAAAAATCAAGTATGCATGTCGGAAGGCATTGGCAGATAGCCAGC
CTCGAGTGAAAGGAAGGTTTGCTAAAACTGAAGATGGGGAGGTCTCAAAACAAGTTAAGTGAAAAA
TGTACAGTATTTTCATGGGGAAAGTGCACCAACAACTAGCGGTGGTCAGGAATTAAGCATGTACAAT
AATCATATGTTGTTTATGTCCTTATGCGTTCCATACTTGCTAGGTGATATAGGATGACCTGAAAATGT
TCTCTGCTTTTGGGG

>ApCOL11

AATGAGACTCTAGAAAAATACAACAGAACGAAAAGCAGTGAAAAAGAAAGCAGCGTTTAATAATCA
GTTTGTTCCTTTTATATTGATGTTCACTTGTTTCAGCTACTCTCACATCATTTTCATTTCGGCGACTCCTT
CCTCCCTTCCTTCACCATTTGCAGTGACATCCGCCCCGAACGACACGCACACGACCACATAATCAAC
ATAAACTTTTCTCCATTCATCCTAATCAAGAGGGAAGTATGTATGCAGAGACTGGGCTCATCTATCC
ATTGCTTCAGAGCTACAATCAAACCGAGTTTTCTTATACGGTGCCTCATACGGAAGACTTCGTACAAA
ATTATGATTTTGATTTGATCTAGGTGCTGAAGGAGACCTATTCAAAGCACCTGCAACAATAATCGA
AGAACCATTGCTTGCTTAGACCCCCTAACAACTGCTTTGACTAATATATCAAATGGACAAGATATA
ATGGCTGAAACCATTAAGCTGCTGATATGGAATCAATGCAGAATGATCAGCTTAATGATGTCCTGT
ATGATTGCAGGAAAGAACTTTTGGCTAAATATGCAATTGATGAAATGATAAGTGAGGTACTGACGGT
AGAAGTTCATGCAAATGTGGAAGTTCCTACTCTAGAGAATCTCAAATCAAATATGGAAGGGAATTA
CATAAAAGCATGAGCAGTGGTTGTCTCAGATCGATGGAATGGGTTGGTAATAATAGCAGTGGTAGGC

CGAATTTTCTTGAATTTTCAGTCCGTTGATTTTCGAAACTGTATTTGGTCTAAGGAGAGCGTTCAGTGAA
GGGGATATTCAGGCCCTGGAATACAGGGGTGCAAACAATGGTAAAAACAAGCAGCTTAAGTGGACTC
TTTGATATACAGCTGACTGTTGGTGAGACGAAGTCCGATGAGCGAATGCAACAGCTTATGAGATACA
GAAGCAAGAAGAACAAAAGGAATTTCCGGAAGAAAGATTAAGTACGCATGTAGGAAGGCCTTAGCAG
ATAGTCAGCCCCGAGTTCGAGGAAGGTTTGCAAAGACTGGAAACGGCAATGTCTGGAAACAAGCCT
AGTCGAACGAAATTCCTTGTAAGTTACATGTAAAAAGCGTGGTATATTATTTCTCGGACACGTACGC
ATACCCTGAGCTTGCATGCTGCTCAGATGTTTCCAAAAGCTCTAAGGTAACCTTGGCAGTGTTTCAGTGT
TTGATATTTTACTATATCTTGTTATTATATATTAATCTCTATCCCATTGAAAAGGTTTGTGTAGAAATG
TATCATATGATGTTCAAGACTTTAGTGTCTAATGCTTGCTTAATAAATGGAGTAAAATGGTTATTTCT
T

>ApCOL12

ACCACTTGCTAAGCATTTCCAAATAAGATAAGTCAAGGAAAATTAGTTATTGATATTTTCAGATCTTTT
TGGTCGGCCAGAATGGAAAGAGAGATCGAAGAGAAGGAGGTTGTGATGATAGATGAAGATGAGAA
AGAGAGCAGCTGTTTTGGGAATAGCAGTAAAAGAAGAAAAAGAGAGACAGGGCTCAAATTTGATGA
TTTTATTTTCGAGGGGATCTTTGAGAGTTTTGCTGATTGAAGGAGATGATTCTACCAGACAGATTATTG
CTGCTTTGCTTCGAAAATGCAATTACAAAGTTGCTGCAGTAGCTGACGGACTAAAAGCATGGGACAT
ACTTAAGAAAAAGGCACGTAGTATTGATGTAATTCTCATGGAAGTCGAGTTGCCATCGCTTCCTGGT
GTTGATCTTCTTTCTTTGATCATGGGTCATGAGATTTGCAAACATATTCCTGTTATAATGATTTTCCTAC
AATGATTCTGTGAACATGGTTTACAAATGCATGTTAAAAGGAGCAGCCGATTTCCCTGTCAAACCTGT
TCGGAAAAACGAGTTGAGGAACTTGTGGCAACATGTTTGGAGAAGACACAAGTTAAATGATGTCCA
GGATACGATAGAAAATGTTAAAGGCGATGATACCAAGAGAAAAGCTCGAGAACCAGGAGAACAAATAA
GGAATACAGCGAGAAAAAGGAGTTATACTGAGAGTTGTTGTAGAAGTTCGGATATGGAAGCTCAGAG
CATCTTCAAACAAAATAAGCTACCACTTAGTGATACTATGCTTATTTCCGAAAATCCACTTCAAACCT
CCAGAGCACAAGATCATCATGATGGTATAGAGCAAGCAATACCACAACCACTCGAAGAAGAGCACT
CTTGTGCAGAAGTAGAAAACACTGCAATCAGGATGCAAAACCTACAGAATCTAGTGCTGAAATGG
AGGACCGTACTTGTGTCGATTTGATTGGCGGTATAAATAATCAACAACAATTGTGTTATGGGCTAAC
AGATTCAAATGAGGTTCCCCAGAGTGTAATTACAGGAGCAAATCAGATTCTCCACCACATTTGGAA
CTATCGTTGAAGAGATACGGACATGCCGTTTATAACATGGAGGAAGACAAAATCAGATGGTCATGCTC
TAAACCACTCCAGTTCCTCCCCCTTTTCACTGTATTCTAACAGTAAAAACCAAGTGTCAAGAGAAGGA
ACATGCACACAAAGTGATGCCAATGAATATAATTTTGCTCCTTCTACAAACCAGACGTCACATGATA
CAAGCATTGCTGCCTCTATGCTGAGTAACATTGCAACTAAATGCACTCCTATCAAAGCTATTCCACGA
CAATTTCCATTTGGCGGTACGCTAATGAAACCCACGTTGCATCCAAGGTCTTTTCAGAATTTGTGGAG
TCCAAACGGAACCTCAGTCTAATTCAAATCAGATTACTATGGTTCGAAAACCTGAACGTGCGTACAAG
GAGCTTGAGATGAAGGCAGTGGAATATGCAATGGGAGTAGCACAAATGGCAATAACACCTCGGCA
AATGTATCATACAACGATCGTGTGGAGAAAAAAGAAGTAGATTTGTGCCGCTTGACTCAGAGAGAA
GCAGCATTGAATAAGTTCAGATTGAAGAGAAAGGAGAGGTGCTTTGAGAAAAAGGTTAGATACCAA
AGCAGGAAAAAACTTGAGAGCAGCGGCCTCGAGTAAAAGGACAGTTTGTGAAACATGTTTCAGTCC
TGATGCTCCAACGAGACACACTCATCAACCATGACTAACTTTAACTGGAGAAAAGTACATTCTTG
AAGTTAGACATCTTATGTTTTGACCGAAGGTGTAGAGCTACAGCGGAGCAAGAGCTTGTGATAGTTA
ATGCGAGTTTGTGTACATTCTGTGTGTTTTGTATGTCTTACTAACTTTAGACAAAACCTGTAGACTGT
TCGTTTGTGTTGTTGTTGTGCTGTCTAGTGACCGCATAATGTACTGCTAATGGTTGCTTATTAGCTTT
CTAAGCATATTATATTGCCTGTGAAGCATTATTCATATTCCAAGCATGTTTGGCTTTCCTTCTTTCA

>ApCOL13

CCATGCATGCCACGTCTGCGAAAAGTGCAATTCAATGGTCCCTCCCTGTCAAAAATCAGTACAATCAT

ACATTAGACATCGGCTGCATAACAAACATGACAGTAACAAAAGCAGCAACAGTAGAACCCCAAAAC
TAAAAAAAATGGATCAGACTGCAAACGCCGTAAGCGGGAAAACTGCCCCGTCCTGCGATGGGTGT
GCTCGCAGACGAGCTCGCTGGTACTGCGCAGCGGACGATGCCTTTCTGTGTCACTTTCGACTCCTC
CGTTCACTCCGCTAACCTTCTGGCGAGCAGACACGACAGGGTTCGACTTAAGACTTCATCGATGAGG
TCTCCGCTCGCTGAGCTGGTCTCCGAACTGCCAACGTGGCACAGGGGGGACAGGCAGCGGGTCCGGA
CCCCGCGTCATGGAAAGGGTTCGGCCAGGTCCAAGCCAATGATTCTGGTCCCTGATGTGGAAGCGTT
TAATGAGTTTGAGGAAGAGGAGGAGCAGCAGCAGCTTTTGTATGAGGTGCCGGTGTTCGATTCCATC
ATAGAGTTCTGCACGCCGTTGGATTTCGAGGGTGC GGATGGATCGGCCGAGGAGGTGAAGCCAGCA
ACACGGTTTGATACAACGGTGGACGATGGAGATGTAGGTGCAGGAGGGTTCGATCCTACGGACGTG
GAGTTGGCGGAGTTCGCTGCTGATGTGGAGAATATGCTAGGACATGGACTGGATGATGTGGACTCTT
TCTGTATGGAAGGGTTAGGGTGTCTGGAAGGGAAAGAAGGTCCGGGACAGGTGAAGCATGAGCACT
TAGATGAACACCAAGATATGAACTTTCTGGTTAGTATTGAAGATATGGAAATGGAGATGTCTAGAGG
GTCGCTCGACTTCAAATTGGAGTGC GATGGGTGCGACATGACAGGAGAGGAGGTGCATAATCAGCA
AAATGCGTCGATGGGTATAGGATTGAAAATGAACTACGATTCAGTGATCAACGCATGGTCATGCCAA
GGCGGCTCGCCTTGGGCTGATGGGGTCAGGCCACAGCTCAATGCAGATGACTTTTGGTCAAACATCA
TGGTAACTTTACATTTTATAGCACTTATTTATTTTTTAGTTTATTAGAAAAATTCTTAGTGAATCAAGT
TTACTGCTGTAACTCTAAGTAAGCTAGTTATGTGCTCTACCTACTGTGACACCATACATGAATATTA
ACACTAACCTTTTATAGCGAAGGCTTTTATAGCGTTATTGTTTATAGTGAAGGCTTTTATAGCATTTGC
ATTATGCATATCTTTCTTGACATTTAGGGAACATGGGAAGCACCAATTGGGGAGATGCAAGGAACATA
GTTACGGGTTAGCGATAGGGCAAGTCGGCAATTCGATGGAGGGAGAGAGGCTAGGGTTTCAAGGT
ACCGAGAGAAGAGAAGGACAAGGCTGTTTTCAAAGAAAATCAGGTATGAAGTGAGGAAGCTTAACG
CCGAGAAGAGACCAAGGATGAAAGGGCGATTTGTCAAAAGGACTTCTTTGCCAACTGTTGCTAATGC
AGCAGCCGGATCTAATGGCTTGCTTATGCATGACAGAGCCACTGTTTCATATATTATGTTTTGCAGCT
GTAGGAGGACAGGTTTTGCAGCTGTTCTTTCTTTCTTTTAAGCATATGGTTTTTTTAGCTCGAAGTT
GAGTTTCACCGTATGTACTTGAATTAGCTGCACAGGGACTCAGTCCTAAATTCGCCGACTTTTCGATG
TTTTAAATCGGATGTAAATTTAGTTATGATTTGTAGATTGTTGTATGCTTAGTACCATAGCATATGTGC
TACTTGGTATTAGGAATGTATCTAGTAGACAGAGAGAACTGCTATCATATTG

>ApCOL14

AGAAAAGATGAAGAAATAAAATAAAAAACAAGAGAATGGGAGAGATAACAGGAAAATAAAAGAAG
CCTGCGGTGGTCTGGTTGTGGTTCACACAGCAAAGCAAGCTGATGAAAGCTTAGGTTGTCTCTTTCCC
TGTTCCATCTCCTCTAAAACCCCTCCCTCCCTCTTCTTCTTAATCCTCCACTTCTTGTTCAGTAACAA
ATTTCTCAAGTCCCATAGACAACACTCAGTTTCCCATTTACGCATCGTCCACGGTATCGAGCCTTCTC
TTCTTCTTGCTCTCTTCGGTTCTCTTGTAAGCCATTGCTATTGCCTGTCTGATGGTTAGCTCTGGGTTTA
GGGTTTAACAACACTAGTTCATCACCTGTTTTAACTCTTTTCAGCTTCTTCATTCTACTCACCTCATAACA
GTGTTTAGTTTCAAATAAATATGAGTCCTCAGTTAATGTCAATTATCAGCACTGGTGGTAGAACCTAC
GGATTCGATCTTGACATTATAAAATCTCCCTCGCCGCCCTTCGGCGATAAGGTCTTCATCTTCTTCTCCG
TCATCCACCATTTCCGATTCTTCAAATTCACCACTTGCAATATCCACAAAGAGAGCGCGTGCTCCACG
TAAAGACCAAATCAGACATACACCGAAGCCGTGGCTCTTCTCTCAACGATAGACCCCAATCTATTT
TCGGAGAAGAATCTCCTTCATAAACTGTCGAAAAACACGAAATTCTGCTCTTCTTTTCAGTACACATT
ATCCACTTTTCCATTGGTTTACAGCAATCCTACAGAAAATATTTTCTTATAGAAGATACATCTAGCT
GTTTTAACTACCACCAACTTTACCTAGATCTGAATTGAAGCCATGTAGTCCAAATGAGAATTCCTGC
ATTGAGTACCAGGAGCCAAACTCACCTGACTATGACGTTGAGTCTATTCTTCATGAGGAAGCAGGAG
AAGGAATAGATAGCATTATGGGAAGTTTGACTGCGGAGCACAGTGAGAGAAGTTTAAGTATGAGTTCT
TTATATTAAGGCTTTAAAGGGTTTGGTTATGGGCCATGGAGAAGCAATGGTAATAATCTGCATCAA

GCAATTCGTAAAGGGAACGATGGCGAGTGGTGGAGGAAGACGACGCTAGTGCCAATGAAGGATATA
GTACAAAATTTTAGTGCTGAACCAGTTTCGGTGGAGAAGAAGAAAAAGCATAAGAAGAAAAAGAAA
AAGAAGGTAGAGGAGGAAGTAACAGGGGAGCTTAAAGTAGTAGTGAATAAAAGCACCACAAAAAC
AATAGAAGCAAAAGAAGCTACGACTTCACAACCAGGCACAACCTGCTACAAAAGCAGTTAGTTCATT
AGGTGGGCAATCGAAGTCTACTGGTCTGGGGCTTAAATTAAACCATCAAGCTGTTATTACTGCTTGGT
CAGACCATAGCTTTCCATTTGGCAGTGAATCTGGAATTCAAGAATCTTCTTCTGATATTCTCGCTAGG
CTCTCAGGCATTGAATTGGTTCAGAGGCTGAAGGCGGGGGAATTAGAGAAGCTATAGTGCAAAGAT
ACAAAGAAAAACGAAGAAACCGGCTCTTTTCTAAGAAAATTCGTTACCAAGTTCGAAAAGGTGAATGC
TGATCAAAGACCTCGGATGAAGGCAAGTGGTAGATTTGTGAAACGACCTGATCTTATCCAGGAAGAA
ATCGAAGCAGATACGGGCAAATGATGAGTATTTAGATAAAGCTGCCTTTAATTATTTGGAAGAATGA
AGGTATAGACCAGCAACATGAGACTCGTTTTTCATATTAGTAAACGAGGATGATGTTGGGTTCAAGA
GGACTGCGCTGAACTTCAGAGGTTCCAATCTAGCCTGTTATCAGTTTTTAACTTTTATAGTAATGT
TGTTACAGTAAACGATTTTGACAAGTCTTTTTTAAACAGAAGAGATAGGAGATTGTATTTTGGGTGA
GATTAGTAACAATAATAATTGTAGCCATTTTGCAAGCAATGTAGATGCATATTGATTTGGTTAAGTTG
TTTGAAGAGCTAAAGCTCCTCTGAATTCACATATTTATGGAGATACGTTGTAAAATAAAATGAATGTT
TATGGGAAAATTTGAG

>ApCOL15

CGCTTCTTTCCATGCCACAATCCACTACACCCAATTGACCCTGTTTTGCAGTAACAGAGATATCTAA
TAATATATTAAGAGAAATATGTATGCCGAGCCCAGGCTCTTATTCCCACTGTTCCAGACCTATCCTCA
TCAATTCGCACATAACAATGATGAACAGCTATGCAATTTTCGACAATGGACTCACTTATGATGCTTCCC
TCATGCTAGATTCTGAGGGCCACCCCTTGGCTGTCATGAACATGAAGGGACACATCTGCCTTGGCTA
ATCATAACAGAGGTCGGTGATATGTCCTTCAGTGTACTTCAGGGCACATCTACCCCTGTGTCCGGATAAC
ATGATTCAGACATCCAGTATACTAGAATATGATCTTGGTGCTGAAGGTGATCTATTCAAAGCTCCCGA
GCCAATTATTGAAGAACCGACGGTTACATTGGATCCTATGAGTGCTGCCATGACAATTATATCTAATG
GACAAGATGTAATGAACGAAACAATCAAAGTTGCTGACATGGAATCAATCCAAAATGATCATCTACA
AAATGTTTTATACGAGTGCAAGGAAGAGCTTCTGGCTAAATATGCAATAAGCGAACCATTTCCAGTT
ATGCCCCAACTTAACTTCCAGTATTTCAAAGTGAAGAAGTTCCAGTTTGGAAAAGGTACAATTAA
ACACAGAGGGACAGTTACAGAAAAGTGTAAGCTCTGGCTGTCTGAATTCAATGGAATGGATTGGAA
ATTGCGATTTGAGACCAAATTTTTTAGATTTTCAGGGTGTGGATTTTGAACTGCCATGGGGTTGAGG
AGGGCATAACAGTGAAGGGGACATTCAGGCCCTTGGAAATACCATTGCTTTGAATTTTGCAAATACAA
GCAGCTTCCCTTCTTCATTTGACAGACAGCTAACCATTAGCGAGCTGAAGTCTGAAGAGCGAAAGCA
ACAACTTTACCGGTACAGAAAAAGAAAAGCAAAAGAACTTTGGAAGAAAAATCAAGTATGCATG
CAGGAAAGCATTAGCAGACAGCCAACCTAGAGTTCGAGGAAGGTTTGCAAAAACCGACGATTATGA
AGTCACAAAATCACGAAATCAAGTAAAAATAATGTGCTAAAAATGAATTAAGAAGTTAGTAGCAGTG
GTTAGCTGAAGTGGTACTATGCTAATGATGGTGATGATGCTGATCTGCCCTTTTGGTATAATTTGCTT
CTTTGTGTATTATTCTACTTTTTTGTAAATAAATGTTGTATGTATATTTCTGAGCTGCGTAAACCTTGT
GTACATTGTATTTTAAGATTGAATAAGTATGCAGCTTTTGAGAAACATCAGTTATTTGATGGGTCAGT
TGCTTGTAGGCTAAATTGCTTCTGTTTCATCTAGATTGTTTTATCGGTG

>ApCOL16

GATTTTTCTATTCTCTCATTATTTATATCCTTGGATATCTTTTGCAACGCCCATAGACACCTCCTATTTT
ATCTCCATCCGGTCTAAATAAAACCCTCGACTTACAAAATATCTGAATTTGCTAGATCTACTCTGTTC
TTCGTTTTTTCTTCATCGAAGAGGATTTTGAACCTTGACTAATTCTGCAGAAGCTAGACTGTGGAGA
AGGTATATAATTCTTACTTGGGTTTTGAGACCGATCTGAGCTATTGTTTGTGTTTGTACCAATCCAG
GCAGAGGATAAGTAATCAAGCTTTGGTTTTCTGGAGGCAACATAATGCGCGACACTGCAAGTTGG

ATTTATGCAAGACTATCGCCATCAGCTGTGTTTCTCATTGTTGTCTTTTTGAATCAGGTTGATGGGAG
GTAGTAATTCTCCATATCAGTCGGGGCCCTAATGGGTCTGGCAATAATGATATCCTAAACAAGCTTACT
GAAGTTAGAGATGTTATGTCAAATGAAGATGCTTCTAAGATTAATGGGCTGAGTTTGGGTATAAACG
ATAGTCAAAATGGAGCGATCACGACTTTGGCTCCTCAAGTTAGTTTACAACGCAGCAACAGCACTT
ACCGCCTGGTCCGGTAGTGCGTTGGGATAGAATACTCCCTGTTGGAACAATCAAGGTTTTGTTAGTAG
AAAGCGATGATTCAACACGTCAAGTGGTTAGTGCCTTGCTTCGCAACTGCAGTTATGAAGTTTCTGCT
GCTGCTGATGGTTTACAAGCTTGAAAAATCTTGAAAAATCCCACAAATCATGTTGACCTTGTATTGAC
TGAGGTAAACCATGCCAAGCTTGAATGGAATTGGACTTTTATCCAAGATCAAGAGCAATGATGCATGC
AAGAATATCCCTGTGATCATGATGTCATCAAATGATTCTATGGGCACAGTTTTCAAGTGTTTATCTAA
AGGTGCTGTTGACTTTCTAGTCAAACCCATTCTGTAAGAACGAGCTTAAAAACCTATGGCAGCATGTTT
GGAGAAGATCTCACAGTTCTAGTGGCAGTGTGAGTGAAAGTGGCATTTCATATTCAGAAATCTGAAAA
ATCAAGGAGTGTCAATGAATGCGACAATGTTAGTAGTAGTGACGATGAAGACGATGTAGCAAGTAT
GGGGTTAAATGCAAGGGATGGCAGTGATAATGGAAGTGGAACTCAGAGCTCATGGACAAAACATGC
AGTTGAAATTGACAGTCCACAACCTATGTCTCCTATGGATCAGTTAGCAGATCCACACGATAGCACA
TGTGCACAAGTCATTTAGATACAGAAGCATTTCCGAACAAACGTGTCCATATGACCGATATCAAGC
ATGGCCAAAAGCAGAAGGAACATTCTGGTATGACAAAATCAATTGCCCTTGTCCTCTTTATCTTTC
CCATCATAATTGGACTAACGCATAGGACATTGCTTCAAGGAAATTCCTATTATAATTTTAACTACAA
AAAATTTCCGTTCCAAAAAAGTATCACCATTAATAAATTGTACTATAAAATTCCTGAACTTCACATCG
TACCTGTACGTGTGTGCATAAGCACTCACATGTAAGTGTGTATATTAGTTATAAAACCTGGATTTCGA
CGAAATTAGTATTTAGATGCAATTGGAAAAAATGTATTTCATAAACGATCATATGTTTAAAGTTGTATT
GTATGGGTTTTTTTTTTTCCACAAACTTACTTTGAACAAAAACATCAATAAAAAAATAAACCTGGGT
CGCTCACATTATCATTTATAAGTGTGCCGCATCAAGTGAAATTTTTACTCACAGAGTATTTATTGGAC
AAATATATAATTAGCTGCGAATATTAATTAGGCCTATATCAAAATATGATCATTAAATAACTAGCT
ACATCAATAGTAATCTATTTTATACAACCTGTTGCGACTCATCTAGATTAGCTGGAGCATGATGATG
TGCTTCAGCTAACACATACACACAAGTCGAACCTACAATCTTTGAAACACTTTCCAACATCATGACA
ATATTACCGATAACCAATGGGCTGAGTGGCATTAGAAAAAGAGCAACAAATTAATTTTGGGTTAGG
GCAACCCATGCCGTTGGGTTGCCCCAATATATATGTATGTTTGTGTGTGTGTGTGCACACATGCGCAC
GTCCATGCGTGATGCGTAGCTACACCCTCGTCTGGTGTATTCCTTCAACTATAATATGGTAAACTC
TAGAATTTAGACTGATGTTACAAAATACTCACAGACAGAGGGATGCGTGTGTTTGTGTGTTTACGCTG
TTGCCCTAGTGCTGGAGGCCACCTAACCACTATGGAATAATAGCATGATCAAACGAAAAATAAAGC
GCCTGTGATGTCTGGAACCTAAGACAGATTATACCTTTGCAAATAATGACAGTATACTTATTATTCTTC
CAGTACAGCATTGCTTTTATATTATTCTGTCTGCAGATGAACTCATGGGAAAAGATTTGGAGATAG
GAGTGCGAAGAACAAGTGAATCACATCCAAAATTCTATCACACGAAGACGAAGTCTACCAAACAAG
TAGACATGAATGTGGATTACCATTCTGAAATTGAAACTACCAAAAAGAAGAAGATGAAGATGCATT
TGTTGAAGACACCAAAGCTGCTTATTTAATGTTTGGAATTACTAATAACGCTGATACACAGCCGATTA
ATGATACTGATCAACCAAGTAAAAAAGATAACTTAGAGGGCTCTACTGATCTGCCATCACTTCGGCT
GAGTTTAAAGAGATCAAGATTACCTAGTGAGGACACAAACCCTACACATGATGAGCGCAATATTTTG
AGACGCTCTGATCAATCAGCATTCTCAAGGTACCGTAACTCTGCAGCATCAACTCAAGCACAAACAG
CGTGTGTGGGAAGTTGTTACCAGTTGACAATAGTTCTGATGTGCTAAAAATCAGAGTCTAGGCAAGA
CATGGTTTCAAATTCAAACCTGTTATTTTAAAGCAAGGTTCAAATGAGAGCAGTGATAACAACGAT
ATAGGTTCCACCACCAATCCAGCTACATGTAAAGAAAAGGCGTCATCCATAGTGTTAATGAAAGGTA
ATCACCCCTCTGCTTTTCATCCTGTCCAAATTCAGACGTCACCTCAGCCAATTACTCAAGAAAATACC
AATGAGTCCGATGCTGCCAAAATCAATACCAAGTGCAGCATCACCATCACCATTACCACCATCACC
ATCATCATGTTTCATAAAACGCAGAATTCATCAGAAAACGATGAATTAGCAGCTAAGAACATGAAAGC

CTCCTCTGCCTATGTGAGTCCAGTTGAAGGAAATGGGAGCAATTCTGGAAGTAATGGGCAGAATATA
AGTGGGACAATTGCTGAAAATGCTAATGGTGCTTCTGAAAAAGGTGCTGGGAATGTAAATGGAAGTG
GCAGTGGAAGTGCTAGTGGCGTAGATCAGAATAGAATTGCACAGCGAGAGGCAGCTTTGATCAAGTT
TCGACAAAAAAGGAAAGAAAAGGAATTTTGAGAAAAAGGTTTCGCTATTACAGCAGGAAAAAACTTGC
AGAGCAGAGACCTCGTGTGCGTGGGCAGTTTGTTAGGCAACCTTCTGTCCCAGAATCGAAAGGCCGA
GGAGGCAATAGTTGACAATCAATATTTAGGCGGCTGATACTTTATGAACATGTATGTTCTGTAACTT
TAGGGTGTCTAAAAATCTTGAGCAAGGAAGGTCTTTGTTATTACTGGATTGCCAGAATCGTTTGCTT
TGGCGTACTTTAGCATTTTTAATTTACATGGTTTGCTGCTTCAAATTGTTAATGACTATTTTATGTGTA
TGATTGTCTGCATAAGATATTGTTTCATCATCCGCTTCTAATAGAAATAAGTTCATCGCTTTCTTCGCCT
TTGGTTTTGTTTGATCTTGACTCCATCTGTTCACTTGGTAATTACGATGCTTGCTTATCGTCTCTGCTT
TGTTTGCA

>ApCOL17

CTCCATTTTGCATTTAAAGTAACGAAAAAAAAAATGGAGGGAGCAGATGAATCCAAGAGCAAAGAA
GAGGCGATTAGCGGTGGAGATTCTTCTAAGCAGGTGATGAGATGGGAAAGCATCTTGCCCTGTAAAT
CGCTGAGAGTACTGCTTGTGAGAGCGACGATGCCACGCGGCATATCGTCACCGCTTTGCTCAGGAA
GTGCAATTACCGCGTTGCGGCTGTTGCGGATGGAATGAAAGCATGGGAAGTGATGAAGGAAAAGAA
ATATATATTTGATCTAGTTTTAACTGAAGTCGAGGTGCCTACTTTGTCAGGGACTGGGCTTTTGACAA
AGATTATGGAAGCCAAAGAATGCAAGAATATACCTGTTGTCATGATGTCCTCTCATGACTCTGTGAA
CGTTGTTCTTAGCTGCATGCTTAAAGGTGCCGTTGATTTTCTTGTGAAGCCTGTTAGAAAAAATGAGC
TGCGAAACCTCTGGCAACATGTTTGGAGGAGACATTGTGTATCAAACAGCTCTTTAAATGCATCAGA
TAATACTACTGCGAGTAATCAAATTAGTGTGAACGTTGGTGATAGATCTAAGAGTGATGAAAACAAT
GATGAAAAATGCGATGCTCAGAGTTCTGGTAATAAGCAAGATGAAAATCACGAGAGCATGCAAAAT
CCTGACCAGCATTTCTCAATCTGAAGGTATACATATGGATAATGTGGAAGTAAGCCGACTAACTGGTA
AATATCTCAGTTTATAGAGAAAATAGCACCAAGTATAGCTAATGATTATTCTGTGGCTAACAAAAAGA
ACAAAGCCATTCATGCACTATTTACATCGTAGGGAAGCGGACATTGATCTTATGAGAGAAATTGGT
GGAACATATGATCCTAGGTTGTGTACTGAAAACCACTCTCCAAACCCTGATAGTTCCGTACCAAAGA
TGATTGTGTTTGTGAGCCCAAGTCTGACGGAACGACCTTTTCTATGTTAAAAAATGATACTGTT
GAGGGTGCATATTTTGAACTGCACATTCATCTTTTGAGATGAAGACTCGACTGTGGTTACTACACC
AGTATTAGAACTTTCTTTGAATAGACCAGAGTCTGCTGGTTGTGGGCAGCTTGAGATTAAAAAAGG
AATATCATTAACCATCAGTTGCCCTCAGCCTTTTCAAGGTATGATGATAAAAGGGCTCAGCGTTCAAC
CGTACATGTTGAAATGTTAAATACTCGCGAAAAGAACACATCCATCACATATACAGATAAAAGATCA
TCAGCGCAGGGAAACAAAATTGAACTACAATTTATTTCAAGTCTCTTCTACCAACGATGAGAAAT
CCAGTTTACCTCCGCAACCTAAAAGAAATACTAATGTTAATCCTATTACGTACCCTCAATTTGGTTTC
CTTCCTATTCTTTTCGGATCATTACCTTACCATAACTTATGCCAAGGATACGGATCTTAAATGCAACCT
GTGCTTCTAAATGAACAGAGTCCTTCTATGCATGCAATTGATATATCCGGATCAAGAGATCTGAGTG
AGCTATGTTATGTTAATGAAAATACATACAATAACGATAGCTATAGCCATGCATTTGTTAAATTAAAT
GGAATTGATGATACCAAAGGACTGAAGATGAAACAAGAGATTTTGAGATTCTGTTGATAGTGCGA
ATGGGACTACTCTACAAATGCCGATCGGTACGACGCGAAGCTGCATTGCTTAAATTCGATTAAA
ACGAAAGAATCGGTGCTTTGAAAAGAAGGTAAGATATCATAGTCGGAACAACCTCGCTGAGCAGCG
CCCAGAGTAAAAGGTCAGTTTATAAGTCAGAAAGTTACAAAGAGCTCAACGACAGAATCAAATTG
CTGACACTGAGCAATGCACATATGTCGTACAGCAATCTTTCAAATTTGCTGCTTACTGTAAGGGTAGT
GCATTATATTGGAATAGGTACTTACTCAGTTAGCGGTTATTAGATTCAACCAATTGTATTCGGCATGG
GTAACCTTCAATAATAATAGAAAATAATTATAATATGTATGTTTCTTACACCTAATATGATTTATAT
TCGCGGTTAAGTTCTATTTTGAGATACATGCTGGGAGATTAGGTGTTGAAATCGGTGCTTTTCAAGAG

CTTTCATACCGCTGATTTATTTTTCTCGGAGAAGCACATTAAGGTAATGTCATCTAACAATCAATTTT
 GTAGGTCAACAAATAACAAGTGTACTTCTGATTATTCTGTGTTTTTCATCTGCATGTTAGTCTTTTGTG
 GTGAACATGTTGTGCACAGGTGTAAAACCATGTACATGTTTTTGGGGGTGGACATGCCTTTTACTGG
 AACATATGCATGTTTGAAGACATTTTCTAACATTACTTCCGTGGTTTGTGCTATTTTTATTTTGCATT
 GTTGCCTTGATGGTAATGACTAGTTTTTCAATAAATTGATTAATTTTTATATGGAACACCAACTTACA
 TTTAGTAGTGATTTTCCATATTAGATATTGTTTACCATAAAAAACGTGAGTAACTTCAACCGTGCAA
 TTTGGGTTTATGTTACTACGAAATCGTATCTCGTTTTGATTTGAGACACGCCTTGTTAACCAGCGGCA
 ATTATCAACAAGCTGTTATAGATTAGTTCAAATCCTTTATGTCCAAGCTTCTGTCTCATATGCGAAC
 TGTTTATCAATCAATCATTTTTATATTACTATCATCAACTTTGATGGGTTTACACGTTAATTAGTT
 TGATTCGGTGCAGAGGACCAAAAAGACAATACAATTATTTGTCTTTTTAGTTTAATATAGAATACTTA
 TGGCAATGGTTTGAATTAGGCTCGGAATTTTCGATATTGAAATGTTTCAAAGATTTGGAGACATGCTT
 GGAATGAGAGGGGAAGAGATTTAGAAATTTACTGTGCAAGGTATTTCTGAAAGTTGTAGTACAAGA
 TGCATAAGGAGAGATTGATACTGAACGTTATTTAGGTTGGTACCGACATGTCTTGTTGGCACAGCAGA
 GTGACTTTGAAATTTGGTTGAGTAGCAATTGGTAAAATGGCTGTCTTGAAATCGATTTTGTAGTAAAT
 AGTTGAAGGTCTCCGAAAACCTCAGCAAAAAGGGATAAGTACTACTGGAAGCGTTAAACTTCCTTG
 TAACGGCCTCTCATTTTAAAGTTGAAAGTGCTTGGAGCTTCGTGGACTGATGTTAGAAGACAAGCTAT
 AAGAGATACAGAGGGATTTACACGAGCAAATTCGATCGGCACCAACATAACTCATGTTTGTACCGAC
 AGTGGCAGAGCTAGAGCCTAGAAGCAATAGGATATAATATATGCATATTAGCTCAGCTAGGGCCAAT
 ATAGTAAGCTTAGCAGCGCTAACATCAAGAAAAGCGGTGTTATAGAAGAAAAAGTAAAATTCAGA
 TGGGGCCTTGCGCTTAGCTGAGGTGTGCTTAGCTCTGCCCTTGGGTACCGACATGATTCATTTTGATA
 CCGATATGATCCGGGTGGTATTTTAAAGAAAAACGTTAGGTAGTAAAATTAAAGTGGATGTAGGGTG
 GAAAATTTGCTGAACCAGTGTATGACTCATCTTCATTCCTTTGTTTATTTGATATATCTTTATTGCTT
 AGCATTCGTCTGATATTCGGGTACTATGTCAATTTGTTGTGTGGATTTTTTTGTGGTTTACCAAGAAA
 TTGTTGGATTTGAGAGTTTAAAGCTTGGGAAGTGAAGGGATGAAGACGTGCTACCAAAGCAACTAGA
 GCATGGAGCAGACAAGGGGTGTCATCAAGTTCAAATCTAACAGTTTAAAGTGAGGGCAGAAGAAATT
 GACTTATGCTGTACAGCCACATTTCAAGTTCGGCATAGACAAGTTTCAATAATAATTGAAGTTTATTT
 CAGTATGTGTGTTTCTTCCACGATTCATATTCAGGGTTGGTTTTTGTCTGTTTC

Fig. 5 Suppl. The cDNA sequences of the 17 *ApCOL* genes and their predicted proteins.