

Characterization of 25 full-length *S-RNase* alleles, including flanking regions, from a pool of resequenced apple cultivars

Plant Molecular Biology

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Online resource 8 Alignment of 3' flanking regions from 25 *S-RNase* alleles; positions 1-3 in all sequences correspond to the stop codon. Conserved positions are highlighted in black background (threshold: 90%).

S1 CAAT--AAAAAGGGGTTT-----TAT----- 314
S2 CAAA--GCGATGAACATTT-----CGTCGCACAAAGATTGTG----- 245
S3 CAAT--ACAAAAAGAGTTT-----TATCATAATTGGTCTTTG----- 255
S4 ----- 47
S5 -----AGTGAACCTTCCTTTCAAGTGAACCTACATGTTGATACAACCCGTCCTTCAA 290
S6 ----- 365
S7 CAAT----AAAACGGTTTT-----TATCTTGGTTGGTCTCTG----- 216
S8 CAAT--AAAAA-TGATTTT-----TATCATCGTTGGTCCTTG----- 273
S9 ----- 88
S10 CAAT--ACAAAAAGGGTTT-----TATCATAATTAGTCTCTG----- 251
S11 TAATGAAAAAAAAGGTTTT-----TATCATGGTTGGTCCCTA----- 197
S16b GGAG-----ACGCA-----TATGCAAGCAGCTCCT----- 186
S17 ----- 32
S20 -----ACTAATTGGTTTTATGATGGAACCTCTAACTTCTTCTTTGTATCAGAGCAGGTTATTC----- 379
S23 -----TTTTATTATTATTATT----- 201
S24 CAAT--AAAAAGGGGTTTT-----TATCATGTTGGTCCCTG----- 291
S25 ----- 254
S26 CAAT--AGAAAAAGTGTTT-----CTTT-----TGTCATGGTTGGTCCCTA----- 279
S28 -----ATAAACCCTTTT-----TATCAAGGTTGGTTTCGG----- 166
S32 ----- 15
S33 ----- 71
S39 -----TTTTGCTCTTGGTGTCTT-----GA 220
S46 ----- 45
S50 CAAT--AAAAAAGGAATT-----TATCGGGTTAGTCCATA----- 331
S58 ----- 177

S1 -----AATTTGACCTTTCATCAAAATGGTCT----- 342
S2 -----AAAAAAGACCT----- 256
S3 -----AATTTGACATTTCAATTGACATGGTCCC----- 283
S4 ----- 47
S5 ATAATATATTCTATTCTGGAGAATTGTCAAATGATAATTTGACCCTAAGTGGGTGTC----- 348
S6 ----- 365
S7 ----- 216
S8 -----AAATTAGACATCTCAATCAAAATGGTCCC----- 302
S9 ----- 88
S10 -----AAATTAGACATTTCAATTGACATAATCCC----- 280
S11 -----GGCCTTTCATCAAAATGATCCT----- 220
S16b -----AATTATTGCTTTCTATTGATTTGACACT-----CTTGGGGAAAAAAGAACGCGCTCCACGCG----- 243
S17 ----- 32
S20 -----TACCTGTGAAGCCCAACGGCCACATATGCTCCACGTCATCCAAATTGTGTCGCCAGTGTAGAC 445
S23 ----- 201
S24 -----AAATTGGACCTTTCATCAAAATGGTCT----- 320
S25 ----- 254
S26 -----AAAACGGAACC----- 290
S28 -----AAATTGGGCATTTCAATCAAAATGGTGCC----- 195
S32 ----- 15
S33 ----- 71
S39 GTAAT----- 225
S46 ----- 45
S50 -----AAATTAGACATTTCAATCAAAATGATTCC----- 360
S58 ----- 177

S1 -----TGAAATAGAATA-----TTCATCAATTTTCGTCC----- 370
S2 -----TGCACGACGGAC-----TATACAGGTTTGTCCG----- 284
S3 -----TGAAATAGAATG-----TTCTTCAATTTGGTCC----- 311
S4 ----- 47
S5 -----TTGAGTAATTTGAGC----- 364
S6 ----- 365
S7 -----ATATTG-----ATCATTACTTTAGTTT--TA 240
S8 -----TGAAATCGAATA-----TTTATAAATTTGGTCT----- 330
S9 ----- 88
S10 -----TGAAATAGAATA-----TTCTTCAATTTGGTGC----- 308
S11 -----TGAATTAGAATA-----TCTATCAATTTGATCC----- 248
S16b -----CGAGATAGGAGAGAACGCAAAATACCAATCCACGACCTAGGTTCTCTAGTGGTGCCGAGACTCTATCAGTGCAGAAC-GGA 325
S17 ----- 32
S20 TTGAAACTCGACACATGTGAGGGGGCATG-----TTGATCAATGAATCCC----- 490
S23 ----- 201
S24 -----TGAAATAGAATA-----TTCATCAATTTTCGTCC----- 348
S25 ----- 254
S26 -----CA-----TAAATCAATTTGGTACTGCG 312
S28 -----TAAAAGCGAATA-----TGCATCAATTTGGTCC----- 223
S32 ----- 15
S33 ----- 71
S39 -----TTTCGAGC----- 233
S46 ----- 45
S50 -----TGAAATATAATA-----TTCATCAATTTGGTTT----- 388
S58 ----- 177

S1 -----CTAAAAATAGAA-CCCGCAAATCAATTTGGCATTTCGGTTGCCACTGTTAGCTTTTCTATTAGTGTGTTGATGTTGGCACCTGAGTGGAT----- 459
S2 -----GTAGATAATGGA-----CGCGCGACCATT----- 309
S3 -----CTAAAAATGGGC-----CAACCTATTTCGAT----- 336
S4 ----- 47
S5 -----CTCGACTCGATA----- 376
S6 ----- 365
S7 AT--CTAAAGAAAGGA-----TTG-----CAATTGACACTGT-----T 271
S8 -----CACAAAATGGAATCCCGCAAATTAATTTGGTTCCTCCATTGTCTTTCCTTTAAATTTGAGAGTTTAATATAAAGGCTTCT----- 412
S9 ----- 88
S10 -----CTAAAAATGGAC-----CAACTTATCCGAT----- 333
S11 -----CTAAAAGTGGA-----ATCTAAT----- 266
S16b GG--CAAGCAAAGCA-AAGTGGTGGCGACTTAGGATTTTTGGTGGCGTGAGATTGCTCTGTGCGCAAGGATCGGTGCC--GTTCTGGTCCAAT----- 414
S17 ----- 32
S20 -----ACATTGATGAAA-----TGATGGATCTTGCATGTG 520
S23 ----- 201
S24 -----CTAAAAATAGAA-CCCGCAAATGAATTTGGCATTTCGGTTGCCACTGTTAGCTTTTCTATTAGTGTGTTGATGTTGGCACCTGAGTGGAT----- 437
S25 ----- 254
S26 GTTCACTTAACATTAAA-----TTTTTTGTTAGTATGTTTATGCCGGCACCTGAGTGGAT----- 367
S28 -----CTAAACTGGAA-CTGGCAAATCAATTTGGTTTT----- 256
S32 ----- 15
S33 ----- 71
S39 -----CTTGACTCGAAA----- 245
S46 ----- 45
S50 -----AGGAAAATGGAA-TCTGCAAATCAATTTGATCATTTTATCTCTTATTATAAATTTTCTGTTAGTTACTGATGTGGCACTAAGTGGGT-CTAT 481
S58 ----- 177

S1 -----GCAAAT-TATATGGTGCCACATGAATTAATTGTGACAA-----AAA---CCCTAAAAAAT-AGTAAAC 517
S2 -----TAGACCTCGTTGTACCAAATTTTGGGAACG-----AAGGTCTCGTTGCAAG-----AAA 360
S3 -----TA---GTGCCACGTGGATTAATTTGTAA-----AAAGCCTTTTGAATAAA--GTAAAA 386
S4 ----- 47
S5 -----TCCAATTTCTTATGCTTTTGTTCCTTAACATA----- 407
S6 ----- 365
S7 CAAATGAA-----CAGTGTGTTGTACCCGGGTTTGTAGTGAATTA--CAACTATGC-----CATTGCT 326
S8 -----CCAAACTTTTTATTAACAA-----GAAATCATCTAATAACT--TTATTTA 455
S9 ----- 88
S10 -----CATATGACGCTAAATGGATTAATTTGTAA-----AAAGCCATAAAAAAAAAAAGTAAAA 389
S11 -----CATATAGTGCCACGTGGATTAGTTGTGATAA-----AAA-----TTAAAAAATAGTAAAA 317
S16b -----TTGTTGTTGCTGGTCCAATTTAGGGAATTAT-----TCCT-----GCTGGTT 456
S17 ----- 32
S20 CTTATAAGAGGTTGGCTACTACCTATATTGCCAAATGGTTTTATAGTGAACCTCAACTTTCTTCAACTTCTTTTCAAGCTATTTCG-----GTATGA 612
S23 ----- 201
S24 -----GCAAAT-TATATGGTGCCACGTGAATTAATTGTGACAA-----AAAAACCTAAAAAAT--GGTAAAA 498
S25 ----- 254
S26 CCAACATA-----TCCAAT-CATATGGCACCACGTGGATTAATCGTGATGA-----AAAGCCTAAAAATAAAA--AATAAAA 436
S28 -----TCTGTTCCCTTACTGTAATTTTCTGTTAG----- 287
S32 ----- 15
S33 ----- 71
S39 -----TCTAATTTCTTATGCTTTTTTTTTT----- 270
S46 ----- 45
S50 CCCATCCA-----ATAAAATGGCGACATGGATTAATTGTGATTA-----AAAC-----CCTAAAA 531
S58 ----- 177

S1 TTTGAGAATACGATCCTCCATAAAGCCCGAAACTGACTGA-----ATCGCCCCCCCCCTTTTTTTA----- 580
S2 TGCTAGGGTGTGTTGTCGTCATGATGCATACCTAGGGACGA-----CTAT-----GCGTCGTCTCGAATAAATTTGTG 427
S3 TTTGAGCGTATGATCTCCATAAAACTAGAACTGACTGA-----ATTG-----CCCCGTGTTGTTTTTTTTTTTT 453
S4 ----- 47
S5 ----- 407
S6 ----- 365
S7 TTAATGAGTGGGCTTTGTGGATGGTTTGGGTTCCGGCTGG-----G--GTATTTGTTTTTGGGTTTGGGTG 390
S8 ATAGATAACTTAACTTTAAT-----GAAAATGACTTA-----AACT-----TCCAT----- 497
S9 ----- 88
S10 TTTGAGCGTATGATCCTCAATAAAACTAGAAATTGACTGA-----ATTG-----CCCCGTGTTTCTT----- 446
S11 TTTGAAGGTATGATCCTCCATAAA----- 341
S16b GTACAGATTGTGATATGGTATGTAATTAGGGATTAGCTAC--AATTAAGGGTT--TTAATCAGGGATT-ATTA-----GGCTAATCTTGTTTTTTAGTA 547
S17 ----- 32
S20 CTTGACACTAGTAGACGCAATGAAACTTTACACGATGCAACACGTAATGGCAATTGAGCAGCGAAACAAGG-----ATCCCGTCCACAAAAATGTGTT 707
S23 ----- 201
S24 TTTGAGAATATGATCCTCCATAAAATCCGAAACTGATTGA-----ATCG-----CCCCTTTTTTTTTT----- 556
S25 ----- 254
S26 CTTGGGCATGTGATCCTCCTTAAACTCGAAGCGAACTAT-----ATTG-----CTCCGTGTTTCTT----- 493
S28 ----- 287
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 CTTATCGGGCTCTACGTCGGAATC-----CCCCCTCCCTCGCCATCTCTGTG 581
S58 ----- 177

S1 CTCTGGCTTCTTCCTTCTTTGATTCTCTATTTTCTCTTTTATTTTGGATGGTCTCCATTGGGGA-----TGCTTATGAAGAAAGCCTTGAAT--- 740
S2 -----TAATTTTGTCTGGTTTA---AGTTTTAATAAAAAATAAATAAATAAG-----TATTTAGTTAAATTGTA--- 628
S3 CACCAGCTTCTTCCTTATCTCAATCTCTATTTTC---CTTATTTCTGGGTATGTTTCATTTGGGGA-----TGCTTCTTTGAAGCTATTAAGT--- 708
S4 ----- 47
S5 GCTCTGTAGCCTATTTCTGTGTCTCTCTCCCATGGCCTAAGACTTGGCCTCTCCTAATGAGGAGAGTGATGAGTTCTTTATAGGAGAAGAGCT--- 685
S6 ----- 365
S7 -----CTCATCCACAGGCTTCTGCAACTTGCAGA-----AGGCAGAGAGAAGAGGAGAGAT--- 523
S8 -----TTTCTTCTCCTCTCCATTTTC-ATACATTGCCAACAATTTCTGGCTCTC----- 620
S9 ----- 88
S10 --CTGGCTTCTCATTATTTCAATCTCTATTTTC---TCTATTTTATGGGTATCTTCATTTCCGGA-----TGCTTCTTTCAAGCTATTTAGC--- 624
S11 ----- 341
S16b CTCTGCCTTCTCCTTCCCTTCTTCTCTA-TC-CTTCTATGCTACTTGTAGATTGAATATGGA-----CTTGGAAATTTGGATCCTATCAAT-G- 783
S17 ----- 32
S20 -----TCATTGTGCGACGTAGTTTT---TGTTGCACAAAGTATTCTGAAATAGTTGG-----TGACCCCATTTAAGGCCAAAGATT--- 964
S23 ----- 201
S24 CTCTGGCTTCTTCCTTCTTTCATTCTCTATTTTT-CTCCTTCTTTTTGGATTGTCTTCACTTGGAGA-----TGCTTATGAAGAAAGCCTTGAATTGA 736
S25 ----- 254
S26 -----ACAGGAAGAAAGATTGATGAACACAGAAGA-----AGAATCGATGAAGATTGCAGAGA--- 632
S28 CTGTGGCTTCTTCCTTAT-TCATTCTCTATTTTT-----TTTTCCAGGTATTCTTCATTTGGGGA-----TGCTTCTTTCAAGTTATTTAGT--- 437
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 -----TCCGTCTTCCAGAACTTCGCCATCAACTAC-----GACGCCAAGAGGATCGATTCTGTT--- 698
S58 ----- 177

S1 --ATGCTTATAAGATGTTGAGCTACTCCTCATATTGCCAATTGGTTTTATGATGGAAGCTCTAACTTTCTTCATTGTATCAGAACAGGTTGTCTCATGTGT 838
S2 -----AACAAAAACTAATGAAAGAAAAATAATTTATTTT-----CT- 664
S3 -----ATGACAGGTATGTTTCTGTCCACTAGTTTTTTTTTTTCCCTAACT- 751
S4 ----- 47
S5 ----- 685
S6 ----- 365
S7 -----GGAAGAGTCGTGGGTGAGAGAAGAGG----- 549
S8 -----ATTTTTACATTTGTC-ATCAATTTCTCTCTCCACTCT---CCTCTCTTCTCATTTCACATCAACTT----- 686
S9 ----- 88
S10 -----ATGACAGGAATGTTTATGTCCACTAATTTATTTTTTCCAGCT- 667
S11 ----- 341
S16b -----GTACCATCCTTCTGAACTCTGATTTCCCTCCCGTGCATGCC-A--CCCGCCTCCCTTCCCTGCCATGGTTGCTGTGTAAG 862
S17 ----- 32
S20 -----AATGCAATTTTTGTGCGACGAACCAC-----TT- 992
S23 ----- 201
S24 ATGTGCTTATAAGATGTTGAGCTACTCCTCATATTGCCAATTGGTTTTATGATGAACTTT---TTCTTCATTGTATCAGAGCAAGTTGTTCCC----- 826
S25 ----- 254
S26 --GAAACTA-----GAGAGAAGTCAGTAGAGAAAGTAAC-----AAACTGAATAGA--- 677
S28 -----GTGACAGGAATGTTTAAAGTATGCCATTTTTTTTTTCCCCCATA-GC-ATGGTTTATAGATTATAGAA--- 502
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 --GGGCCGTG-----GTGGCTGAGTTGATGGATCCAATTGA-----AAAGTCAATCTT- 744
S58 ----- 177

S1 GAAGCCCAATGGCCACATATGCTCCACGTCCTCGAGTTGTGTTGTCACATGTTAAGGCTTGAAGCTCATCACATGTGAGGGGGCATGTTTGATCAATG 938
S2 -----ATATATAATAAGTGA-----GAGCCTTAGTTT-----TGGTGAA--G 699
S3 -----TTTTATCCAAAATGAACTTGAGATTGCATAACTCCTCATT- 804
S4 ----- 47
S5 -----CCTCACTTATTACATATTTGCCCTTCATTTATTACATAATTA----- 728
S6 ----- 365
S7 AGAGAGGGAAG-AGTCGTGCGTTGCAAATGGGATGGGAGGAAAGACGGGAGGAGA-----GAGGGATGGG-TAGGATGAGC 623
S8 -----CCTCTCTCTCTCACCTCTTCCACTCTCTCATGGCTGGGTTT-GGTTCAAACGGTTCGATATTTTTCGGTTTGAT-TTTTTTTTTT 772
S9 ----- 88
S10 -----TTTTATTCAAAATGGTCAATGAGATTTGCATAACTCCTCATT- 720
S11 ----- 341
S16b TCCTAGTGAAT-GACAATGAGTTCTAGTTGATATTACTTGGATAACGGCTAACTT-GATTCTTGAGTTATTTGTGATACAAG-----TGGTATAGTT 952
S17 ----- 32
S20 -----ATTCGCATAAGATAAAAAGTAAGAAA-----AAATT-----TCATCACACA 1033
S23 ----- 201
S24 -----ACTGTATGCTCCACGTCACCTGAGTTGTGTTGTCACGTATT-AGGCTTGAAACTCACCACATGTGAGGGGGTGTG-TTGATCAATG 912
S25 ----- 254
S26 -----TTTCATTAAGGCGCATAATGCCAAACCAACGTACTTATATA----- 720
S28 -----TTTCAGTCAAACTCAACAGCCAAATTAACATCACAAAACC-ATTTTAAT-----AGGTTTTTTA 563
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 -----ATTGCTAGATTGACTGGTATGGATGTGTTGGATGCTGATTT-GTTTTGTAGATATTAATGGTTG-----TTGGTTGTCC 820
S58 ----- 177

S1 AATCCCACATTGATGAGAGGATGGACTTTACATGTGCTTATAAGAGGTTGGCTACTACCTA-----TATTGCCAAAT 1010
S2 CATTCTAAAATGCCAAGA-----ATGACCCTTTGTTTCCTTCACAATCAA-----AATCCAAAAAAAT---GGAAAAATGAG 769
S3 TATTTGAAATCAATAGAA-----TTGGTCCTTGAGTTTGCCACTATCAATTATTTAGTCCTTCTATGAAAATTCCTCATTAAATAAG 888
S4 ----- 47
S5 ----- 728
S6 ----- 365
S7 GAATCAAGGTAAGGGGTGCCGAAAGT-----TTGGTTTGTATTGTCGACAACGG-----GTGCGCAGAGA 688
S8 TCTTCTTCTCAGCTATAAAAAGGAAAAGCAC-TGGACAACATCACCTCCCCACTGCCCA-----CCCTTCCCCAT 843
S9 ----- 88
S10 GATTTGAAATGATAGAA-----TTGGTCTTAATTTTGCCACCATCAATTATTTAGTCATTTTATGAAAAATCTCCATTAAATAAG 804
S11 -----AACTCGATGAAA-----TT-----ATCTTGCAACTATGA---GGTTTAGTTGCCCTCGCAAAAAAT-----TAAA 398
S16b AATCTCTACTTCGTAAGG-----AC-TATGGAGCCTTAATTCATGCAGCTAA--CTTAAAGAAATCCTATTAAGGATT--GAATGCGAAGA 1034
S17 ----- 32
S20 AATTTGTAATTGACGAAC-----TT-----TTCACAATTA--AATAAAGTTATAATTAATTAATTTTGTGTCATAAAT 1100
S23 ----- 201
S24 AATCCCACATTGATGAAAGGATGAACTTTGCATGTGCTTATAAGAGGTTGGCTACTACCTA-----TATTGCCAAAT 984
S25 ----- 254
S26 ---GTAATCTAATTAAC-----TTGCCTATGTGGCATAATCCAGTACAAC-----CAAC 766
S28 TGTTGTAATCTGTAAAAAAAC-----ATTTTATCCTCTGCCCTTACAAGAAAATAAGAAATTAATAATCTGACCGAATTTCTATTGTTAAGT 651
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 TTGGTTAGTTCAAAGAGAGAGAGGGAGAG-----TCTTGGAGAAG 860
S58 ----- 177

S1 GTTTTATGGTGA--AACC-----CTAACTTTCTTTAGCTTCTTTTCAAGCACT-----GCTA----- 1061
S2 GATAAATTAGTAA--AAAC-----ACATAACTGAACAAAAAACTGTTTTGAAAAAGAAAGAAAACAAA----- 831
S3 AATGAAATAACAA--AAAT-----ACTCTCAATTTTGTCAAATCATTTTGACTTATTGTTTATTAAT----- 950
S4 ----- 47
S5 ----- 728
S6 ----- 365
S7 GACGACGAGGCAG--GGAG-GGAGGGC-----CCACCCCTACCAGCGTCCCAAGATCTCT-----CTATTGAAGAATTGGATTG- 912
S8 CGCCACTCCGTCGTCGACA----- 88
S9 ----- 88
S10 AATGAAATAACAA--AAAT-----ACCCTCAATTTTGTAAATCATTTTGACCTATTGTTTATTAAT----- 866
S11 GTTTGCTCGACGA--AAAT-----ACTCATCAA---GCTAAACTATTTT---TTTTTTTAAATTCATT----- 453
S16b TATTGAATCATAA-----TAGGACTCATTCAATTAATTAAGGTGATTAGG-----ATACACGACTGTTA- 1091
S17 ----- 32
S20 GTTTACTCGACGA--AGACCATAGCTACACAATGTATTTACGAACAAGGTTTGTGCGTTGCCATGAATACAACATGACGACATTGTTGCGTACCCTTGTT 1198
S23 ----- 201
S24 GGTTTCATGGTGA--AACT-----CCAACCTTCTTCAACTTCTTTTCAAGCTAT-----TTGGTATGACAGGACACTAGT 1052
S25 ----- 254
S26 ACTATTGTAACAA-----CCTTACCTCTTTATATGAACCTATAACTGT-TGA----- 813
S28 TGTAAGATGGTGG--AAAT-GGTGAA--ATTATACTGTTGTAATTTGTGTCCTTGATTTTCTTATAATTCTA--A--ATTTTGATACATGCATGTT-- 739
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 GGTTGGGCGGTGG-----TGAATTTGCGTGGGTACGTGGGTGAGATGG--GG----- 905
S58 ----- 177

S1 ----A--GAATAACATCTTG-----GGCGAT 1081
S2 -----AAGTAAATACGTT-----TCCTCT 850
S3 -----TAAAGGTAGTTTT-----TTCATT 969
S4 ----- 47
S5 -----CATTTGAGTCCCCCGAGTATTTATACGAG----- 757
S6 ----- 365
S7 -----TAGGGGTAGGGTT-----CCTTTC 731
S8 ----G--TAATTTGAATTTG-----GTTGGT 932
S9 ----- 88
S10 -----TGAGGGTAGTTTT-----GCCATT 885
S11 -----TTAGAACAGGTAT-----TTAAAT 472
S16b -----ATAGGCTAGTTGTGTAACGTTCGGGCAGGAAATCTCGCGGGGAGGGTCTTGGCTCGAGCACACAGCTCCCCGGGAGTTGGCACTTTGAT 1184
S17 ----- 32
S20 GTCTGCGTGATGACAGGCTT-----CGTTTC 1224
S23 ----- 201
S24 AGACG--CAATGAACTTTA-----TGCAT 1076
S25 ----- 254
S26 -----CACCTATTATTAC-----TCCCCC 832
S28 -----TAGACTCAGTTGT-----ATATAT 758
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 -----TTTGGTTGGTGT-----CTTGTG 924
S58 ----- 177

S1 GTAGGGGAAAGCATCATGCAAAGGCCAATATCA-----TCGCTGGAACATTGGTGGTGAAGAGAGCGTCAC-----ACAAAGCTTGTGG 1161
S2 GCAAGATTCC-----CACAATCTGG-----ATTGAGTTTATGT 883
S3 TTAATATTTA-----TTAACATAACTCTTCATGGAATAACCAAAATTATTGATGGTAGATAAATCTCAGTAA-----ATTGATTTCAAAT 1048
S4 ----- 47
S5 ----- 757
S6 ----- 365
S7 GGAATTTTGG-----T-TCCAGCTGGA-----AG-CCATTTCGCAACAATTAATGGGGAAGGCACTGT-TGT-----GTGCAGTTTGTGG 804
S8 TCATTGCCTA-----ACCAAC-----ACTGCC-----ACTCCACTCTCGA 968
S9 ----- 88
S10 TTAATAGTTA-----TTAACATAA-----GGAATGACAAAATAATTGATGGTGGACAATCTCAGTGACCAAAGGTATTGATTTCAAAT 964
S11 TAAATATTTA-----TTAGTTCTA----- 492
S16b TGATTGTGCGA--GCTTTGGCTT-GCCGAGATGC-TGCAAG-AGGAAGACAAAGTTAGTTCTAAAAGATGCCTTTG----TGGGGC-CTTAGGTGTAGGC 1273
S17 ----- 32
S20 ACAATATTTA-----TGCGACAAAGATCTGTTTCATCGCTCTAAGTTACCTGTGGGATGAAGTCC-----ATTCGTTCTGTCG 1297
S23 ----- 201
S24 GCAACACGTA-----ATGGGCAATT-----GAGCGCAAAAATTTGTTGACCAAAAATAAATAATT-----AAAAACCTTATGC 1143
S25 ----- 254
S26 TCAATCTCAG--CTGGGATTT-CCTAGCCTGA-----GATTGTGACAGTGCTTGATGAACAGAGGACTAT-----GCAATCCCTAGGT 907
S28 ACAATCTTCG-AGATATG--ATTGATAATT-----GTGGAGACAAAATAATTCCAAAAATTA-----TGGAG--ATGACATGTGACT 831
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 GCAGTTGTAA-----AGGATGAGAAGATGAGAATAAGATGAGAAGTTG-----TGGATTTTGGTAT 981
S58 ----- 177

S1 CATTGAACGACGAAGGAAAAC-----CTTCGTCGTGCAA-----ATTGATGAATCTG 1209
S2 TT--GGGCCAAAATAATAGTT-----TGGGCCGAGGGTA----- 916
S3 CTCAAGAACCATTGTGAGAAGT-----TATGCTAATCTCA----- 1083
S4 ----- 47
S5 ----- 757
S6 ----- 365
S7 GGTGGCCGGTCAGGAATGGGT---TACTAAGGGAGGTAGGGGA-----GAGGTTGATTCT----- 858
S8 TATGCAACTTTTAATCCCAAT-----TCAACTTCTACAC-----CCCATACTCCAG 1015
S9 ----- 88
S10 CTTAAGAACCAAAGTGAGGAGT-----TATGCTAATCTCA----- 999
S11 -----AT-----TATATTAATTTAA----- 507
S16b CTTAAGACTCGCGATCAAAACTAAGTGCTAAGGCGTGCCACTGCCATCTCTGTATGGCAGTTGTAGAACAAGTGTATTTAA-----GCCGATTACTTAC 1367
S17 ----- 32
S20 CACAAAATCATTTTTCATGAAT-----CTTGTGCATGATG----- 1332
S23 ----- 201
S24 GACGAGATGATTAGTCACACAA-----TAGGACTTTGTACGACGACACCAATATTTTCAT 1197
S25 ----- 254
S26 AAGTATATCAGCAACCTGTGGT-----TTTGTGGCACAT----- 942
S28 TTGTTTTCAAAGAAGATAAAAAT-----TTCCCTCATTAATA----- 866
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 TAATTTTCTTTTATAAAAATT-----TTTCCTTTTTC----- 1016
S58 ----- 177

S1 CAACA-----AACTGGTGGTCGTTGTGTACTGAGCAAAGAACTAGGGTTCAACCCCAAACTCTTGT--GCGACGGACGTAGATGTTTA 1295
S2 -----GGATCACTCTC 927
S3 -----TAGACTATTTT 1094
S4 ----- 47
S5 ----- 757
S6 ----- 365
S7 ----- 858
S8 CCGCC-----CCCTTCACTCCACCTTCGCCTCCCCACTAGATC-----AACCTAGTCGCTCG 1068
S9 ----- 88
S10 -----GAGACTATTTT 1010
S11 -----TG----- 509
S16b GCCCC-AAGTTATTC--TAACTTCTGTTATCAAAGG-----ATTGTCGTAGATGGGTTAAGTCTACATTAAGTTC--TT-----TCTATGCCTTG 1449
S17 ----- 32
S20 -----ATTATAGTTGT 1343
S23 ----- 201
S24 CACCAAAGGTTGAGAAAAACGCAGGTAGATATTTGGTGCCAACATTTTCGACGACGAACATTTTCCCACTAAAAGTTTGCGGAACACGGTGTTCATTG 1297
S25 ----- 254
S26 -----AATGCACTG-----TTATATCTTTC 962
S28 -----AAGGTATGG--CAAACAAATATTTCCACGCGCAGC--AAATTCTATCTTTGGATGGATTCCTAATTTGAGA-----TCAATTCAAAC 944
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 -----GGATCTAAC--TAATTT----- 1031
S58 ----- 177

S1 ACCCCAGACTCTTGCATGACGAACATA----- 1322
S2 AGTCCAGGAGGCCGGCGGCAAAAGGACCATGGATCGGTCAACCCGTGGGAGTCCAAAC-----CTAGGGCGGTTAGGACGAATCCTAGTGAATGGG 1020
S3 GGCTAAAAAACCCTTT----- 1111
S4 ----- 47
S5 ----- 757
S6 ----- 365
S7 -----C----- 859
S8 CACTCCCACCCCGCGTTGCACCCAGC----- 1095
S9 ----- 88
S10 GGCTAAAAAGCCTTTTTGCCTAAGCATGGTTTTTAGATTATAGAATGACAGTCAAAACTCAACAGCCAAATTAACATAACAGAACTATTTAATAGG 1110
S11 ----- 509
S16b AGATCAAGGACTTTTAGTCTTTTATC--TTGTATGCTTAAAGGGTAGAGATCTAGAT-----CTGATCAAGTCATCAGTTTTAATCT 1530
S17 ----- 32
S20 AAATATGAAAATCCTGTGACAAA-----TAACAAGAGAAAAGGAATAC-----AGAGAATATTTGTATTAATGTAATTA 1413
S23 ----- 201
S24 AGCGACATAGTGTTTGTTGTGCAAAGT----- 1324
S25 ----- 254
S26 TTTTGGACCCTTTCTTTGACAAAATGA-----TAATCAATGTCAAGAT-----GCTTGATGCAAGAGTGAAACACTAGATTGGAGGA 1039
S28 AAGTAAGGAATCCTCATCGTGATCAAT-----CAAGCATGCACTACTACAAAAGG 994
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 ----- 1031
S58 ----- 177

S1 -----GAGGTCGTC-----TAGTAAGATTTTAAAT----- 1349
S2 G-----AGTCTCGACG-----GGATCGGATATCCAGGAACTAATC-- 1056
S3 ----- 1111
S4 ----- 47
S5 ----- 757
S6 ----- 365
S7 -----TGTTTCGTCC----- 869
S8 -----CATCCAAGC----- 1105
S9 ----- 88
S10 TTTTTATTGTTGTAATT---CAGTAAAAAAAATGAAAAAATAT 1155
S11 ----- 509
S16b TCT----TATGACGATA---AAAACCACTAATTGAACCA----- 1562
S17 ----- 32
S20 G-----GGTTACAATC---TCTTTACAACTTGAA----- 1440
S23 ----- 201
S24 -----GATTCTGAAATGGTTGGTGACCCCATATAAGGAGAAGTT- 1364
S25 ----- 254
S26 G-----AGTGCCAAAG---TAGACAAAT----- 1060
S28 GCCTTAT-AGTGTCAGTA---GGT----- 1014
S32 ----- 15
S33 ----- 71
S39 ----- 270
S46 ----- 45
S50 ----- 1031
S58 ----- 177