

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 3 Coverage and allele confirmation for three genotypes in disagreement with previous reports; the reads coverage on selected alleles and alignment of the contig on the reference sequences are shown for: A. cv Borowitzky, allele S28; B. cv Priscilla, allele S7; C. cv Priscilla, allele S10; D. cv Worcester Pearmain, allele S25. Coding sequences are highlighted in yellow in each alignment. See Table 1 in the paper for accession numbers of sequences used as reference.

A. 'Borowitski' allele S28 (contig of 124 reads, 1058bp)



S28-Borowitski	AATTAATCTGCCTCGCTCTGAACAAATTAATATTATTCATGGGAATTACGGGGATGAT
S28-Reference	tattgatctgcctcgtcttgaacaaattaatattattcaatgggaattacggggatgat *** *****
S28-Borowitski	ATATATGTTTACAATGGTATTTTCATTAATAGTATTAATATTGTCTTCGCCACGGTGGG
S28-Reference	atatatgtttacaatggtattttcattaatagtagtaataattgtcttcgccacggtggg *****
S28-Borowitski	ATACGATTATTTTCAATTTACGCAGCAATATCAGCCGGCCGTATGCAACTCTAATCCTAC
S28-Reference	atacgattattttcaatttacgcagcaatatcagccggccgtatgcaactcctaacctac *****
S28-Borowitski	TCCTTGTAACGATCCTCCTGAAAAATTGTTACGGTTCACGGTTTGTGGCCTTCAAACAA
S28-Reference	tccttgtaacgatcctcctgaaaaattgtttacggttcacggtttgtggccttcaaacaa *****
S28-Borowitski	GAATGGACCTGACCCAGAAAAATGCAAGAATATACAAATGAATTCTCAGAAGGTAATATT
S28-Reference	gaatggacctgaccagaaaaatgcaagaatatacaaatgaattctcagaagtaatt *****
S28-Borowitski	ATTAATAATGAGATAGTCAATATTGTTTATTTTCATTTATGTACTTGTGTATAAAATATAT
S28-Reference	attaataatgagatagtcaatattgtttatttcatttatgtacttgtgtataaaatatat *****
S28-Borowitski	TACATATACTCAACATAGATTTTCATGCACGCCTGTGGAAATATTACAATTAATTTAAAA
S28-Reference	tacatatactcaacatagattttcatgcacgcctgtggaaatattacaattaatttaaaa *****
S28-Borowitski	TTTAATCATGAATTGTTTCTATTATATAATTATATTGTCAGATAGGAAATATGGCAGCCC
S28-Reference	tttaatcatgaattgtttctattatataattatattgtcagataggaaatattggcagccc *****
S28-Borowitski	AGTTGGAAATATTTGGCCGAACGTACTCAATCGAACTGATCATGTAGGCTTCTGGGAAA
S28-Reference	agttggaaatatttggccgaacgtaactcaatcgaaactgatcatgtaggcttctgggaaa *****
S28-Borowitski	GAGAGTGGCTCAAACATGGCACCTGCGGGTATCCACAATAAGGGACGACATGCATTACT
S28-Reference	gagagtggctcaaacatggcacctgcggtatccacaataagggacgacatgcattact *****
S28-Borowitski	TAAAAACAGTAATCAAATGTACATAACCCAGAAACAAAACGTCTCTGCAATTCTCGCAA
S28-Reference	taaaaacagtaatacaaatgtacataaccagaacaaaacgtctctgcaattctcgcaa *****
S28-Borowitski	AGGCGATGATTCAACCGAACGGGCAAAACAGGTCATTGGTGGATATTGAAAATGCCATAC
S28-Reference	aggcgatgattcaaccgaacgggcaaaacaggtcattggtggatattgaaaatgccatag *****
S28-Borowitski	GCAGTGGTACCAACAATATGAAACAAAATTC AAGTGTCAAAGAATACTAGGACAACGA
S28-Reference	gcagtggtagcaacaataatgaaacaaaattcaagtggtcaaagaatactaggacaacga *****

S28-Borowitski CGGAATTGGTTGAGGTCACCTCTTTGCCGTGATAGAGACTTAACGAAGTTCATAAATTGCC
S28-Reference cgg aattggttgaggctactctttgccgtgatagagacttaacgaagttcataaattgcc

S28-Borowitski CCAACCACCACAAGGATCACGATATCTCTGCCCGCCGATGTTTCAGTATTAA TTAAGAG
S28-Reference ccaaccaccacaaggatcacgatatctctgccccgcgatgttcagtattaa ttaagag

S28-Borowitski CGCGGCTAGCCACAATTACACACACACACACATATATATATATATAGTTGGCTTAT
S28-Reference cgcggctagccacaattacacacacacacacacacacatatatatatagttggcttat

S28-Borowitski ATACGGATGATGATTCCATATATAGGACGAGATGAAGACACTTATGTGATTGTATTCT
S28-Reference atacggatgatgattccatatataggacgagatgaagacacttatgtgattgtattct

S28-Borowitski AATGCATAAAACCTTTTTATCAAGGTTGGTTTCGGA
S28-Reference aatgcataaaacctttttatcaaggttggtttcgg-

B. 'Priscilla' allele S7 (contig of 116 reads, 932bp)



S7-Priscilla -----ATCGATCAAATTAGTAATTAATCTGCCTCGCTCTTCGACTAATAT
S7-Reference ccaccaccacttccaatcgatcaaattagtaattaatctgcctcgctcttcgactaatat

S7-Priscilla TATTCATGGGGATTACGGGGATGATATATATGGTTACGATAGTATTTTCATTAATTGTT
S7-Reference tattcaatggggattacggggatgatataatggttacgatagtattttcattaattgtt

S7-Priscilla TTA CTATTGTCTTCGTCGCGGGCAGATACGATTATTTCAATTTACGCAGCAGTATCAG
S7-Reference ttactattgtcttcgctccggcgagatagcattatttcaattacgcagcagtatcag

S7-Priscilla TTGGCTGCCTGCAACTCTAACTTATCCTTGTAAAGATCCTCCTGACAAGTTGTTACG
S7-Reference ttggctgcctgcaactctaaactattccttgaaggatcctcctgacaagttgttacg

S7-Priscilla GTTACGGTTTGTGGCCTTCAGACTCGAATGGACATGACCCAGTAAATTCAGTAAATCA
S7-Reference gtacacggtttgtggccttcagactcgaatggacatgaccagtaaatgcagtaaatca

S7-Priscilla ACCGTGGATGCTCAGAAGGTAATCTTATCAATAATCTAATACTCAACATATATGTTATA
S7-Reference accgtggatgctcagaaggtaatcttatcaataatctaatactcaacatatatgttcata

S7-Priscilla CAAGTGCAATATTACAATTAATTTCAATTTAATCATAAATGTTTCTATTATATATTT
S7-Reference caagtgcaatattacaattaattcaatttaataataatgtttctatttatatatt

S7-Priscilla TTATTATATTGGCAGTTAGGAACTCGACAACCTCAGTTGGAAATAATTTGGCCGAACGT
S7-Reference ttatttatattggcagttaggaaactcgacaacctcagttggaaataatttggccgaacgt

S7-Priscilla ATACAATCGAACCGATCATATAAGCTTCTGGGATAAACAGTGGAAACAACATGGCACCTG
S7-Reference atacaatcgaacgatcatataagcttctgggataaacagtggaacaacatggcacctg

S7-Priscilla TGGACATCCACAATAATGAACGACATTCATTACTTTCAAACAGTAATCAAATGTACAT
S7-Reference tggacatccacaataatgaacgacattcattactttcaaacagtaatacaaatgtacat

S7-Priscilla AACCCAGAAACAAAACGTCTCTAAAATCCTCTCAAGGGCAGAGATTGAACCGGAGGGGAA
S7-Reference aaccagaaacaaaacgtctctaaaatcctctcaaggcgaagattgaaccggaggggaa

S7-Priscilla ACCCAGGAAACAGGTAGATATTGTAATGCCATACGCAAAGGTACAAACGATAAGGAACC
S7-Reference acccaggaacaggtagatattgtaaatgccatgcaaaggtacaacgataaggaacc

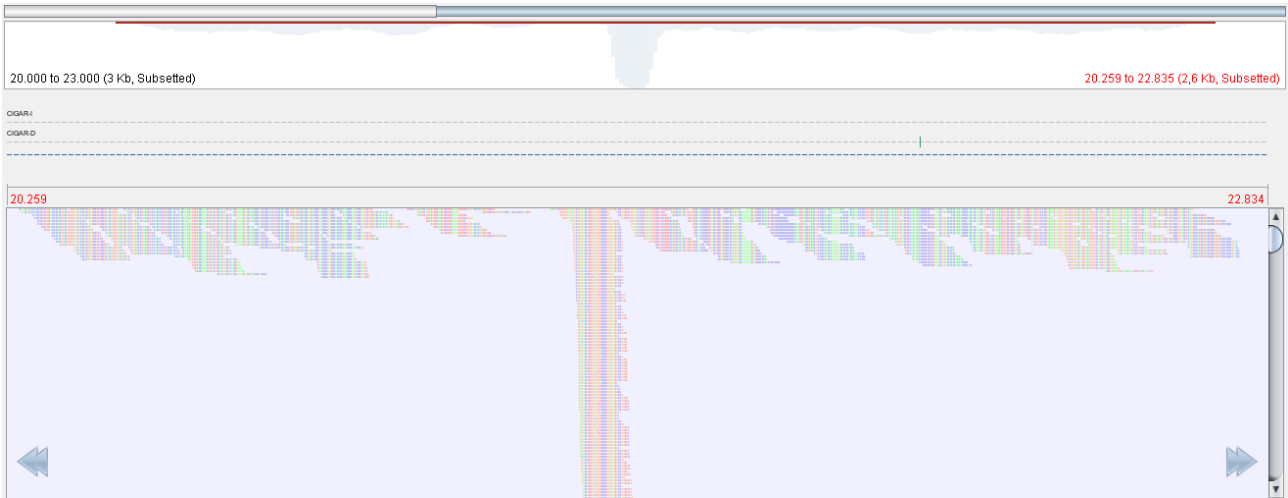
S7-Priscilla AAAACTCAAGTGCCAAAAGAATAACCCAGGTGACTGAATTGGTTGAGGTCACTCTTTGCAG
S7-Reference aaaactcaagtgccaaaagaataaccagggtgactgaattggttgaggtcactctttgcag

S7-Priscilla TAATCGCAACCTAACGGGGTTCATAAATTGCCCCCGCCATATTCCAAATGGATCACGATA
S7-Reference taatcgcaacctaacggggttcataaattgccccgccatattccaaatggatcacgata

S7-Priscilla TTCCTGCCCACCAAAAATATTCTGTATTAA GAGCGCTGCTAGCTATATATATAGACGGG
S7-Reference ttctgccccaccaaaaatattctgtattaa gagcgctgctagctatatatatagacggg

S7-Priscilla TGACCATTCCATATAATGAATAACTTGGCTTAATTAATTAACTCA-----
S7-Reference tgaccattccatataatgaataacttggcttaattaattaactcatgtgaatg

C. 'Priscilla' allele S10 (contig of 413 reads, 2435bp)



S10-Priscilla	-----GGATGATATATGGTTACAATGGTATTTTCATTAATTGTATTAATG
S10-Reference	atggggattacagggatgatatatatggttacatggtattttcattaattgtatfaatg *****
S10-Priscilla	TTGTCTTCGTCGGCGGTGAAATTCGATTATTTTCAATTTACGCAGCAATATCAGCCGGCT
S10-Reference	ttgtcttcgtcggtgaaatcgcattatttcaatttacgcagcaatatcagccggct *****
S10-Priscilla	GTCTGCAACTCTAATCCTACTCCTTGTAAAGGATCCTCCGGACAAGTTGTTTACGGTTCAT
S10-Reference	gtctgcaactcctaatcctactccttgaaggatcctccggacaagttgtttacggttcat *****
S10-Priscilla	GGTTTGTGGCCTTCAAATGTTAATGGAAGTGACCCCAAGAAATGCAAAGCTACAATCTTA
S10-Reference	ggtttgtggccttcaaatgttaatggaagtgaccccaagaatgcaaagctacaatctta *****
S10-Priscilla	AATCCTCAAACGGTAATATTATCCAGAAAAATTAATATCCGGTCCTTAGTGATAATGTT
S10-Reference	aatcctcaaacggtaatattattccagaaaaattaatccggtccttagtgataatggt *****
S10-Priscilla	AATTAATTGAGACCTTATTAGTTTTTAGATTTTAAAGTCCCTAACATTATTGTATAAATGA
S10-Reference	aattaattgagaccttattagtttttagatTTTAAAGTCCCTAACATTATTGTATAAATGA *****
S10-Priscilla	ATTCAAATGTCAGTTACATAATTTTTTCAAATAAAAATTAGTAATTGAAACTTACACCCCT
S10-Reference	atTCAAATGTCAGTTACATAATTTTTTCAAATAAAAATTAGTAATTGAAACTTACACCCCT *****
S10-Priscilla	TATTAACCTCTAACTAATTTTCAATTCAAACATTTCCAAAAATAAAAATTAGAATAA
S10-Reference	tattaaactcctaactaatTTTCAATTCAAACATTTCCAAAAATAAAAATTAGAATAA *****
S10-Priscilla	GTTTGTACCCATTAATTTTTTATAAAAAGATTTTCATTTGTTTAAATCTTAAATGCAGCCA
S10-Reference	gTTTGTACCCATTAATTTTTTATAAAAAGATTTTCATTTGTTTAAATCTTAAATGCAGCCA *****
S10-Priscilla	TTCATATAATTTTTCAATTTTTTCTAATCTTACATTAACCCATTCTTAAATATACCATT
S10-Reference	tTCATATAATTTTTCAATTTTTTCTAATCTTACATTAACCCATTCTTAAATATACCATT *****
S10-Priscilla	TCTAAATCCGTTCAAATTTTTTTTTCTAAACATTTTTTTTTCTAAACATTTATTTT
S10-Reference	tCTAAATCCGTTCAAATTTTTTTTTCTAAACATTTTTTTTTCTAAACATTTATTTT *****
S10-Priscilla	AAATTATCCATTTAATGTAACCATTTTTTATATTAATCCATTCAATTTTTGCAACATCC
S10-Reference	aaATTATCCATTTAATGTAACCATTTTTTATATTAATCCATTCAATTTTTGCAACATCC *****
S10-Priscilla	CACATTGTCTAGGGGAGTGGATCCTCTAAGCCTTATATGTATATTCACATCTCTTCTAG
S10-Reference	caCATTGTCTAGGGGAGTGGATCCTCTAAGCCTTATATGTATATTCACATCTCTTCTAG *****

S10-Priscilla CACGAGGCATTTTGGGAGCTCACTGGCTTCGGRITCCATCGGAACCTCTGAAGTTAAGCGA
S10-Reference cagcaggcatTTTTGGGagctcactggcttcggttccatcggaaactctgaagttaagcga

S10-Priscilla GTTCACGCGAGAGCAATCCCATGATGGGTGACCCACTAGGAAGTTCTCGTGTGAGTTCCC
S10-Reference gttcacgcgagagcaatcccatgatgggtgaccactaggaagtctcgtgtgagttccc

S10-Priscilla AGAAACAAAACAGTGAGGGCGTGGTCCGGGCCCAAAGCAGACAATATCATGTACGCTGG
S10-Reference agaacaacaaacagtgagggcggtgctggggcccaaagcagacaatatcatgtacgctgg

S10-Priscilla AGTCGAGCCCGGATGTGGTGGGGCCCGGGCAGGGATGTGACAATTTGGTATCAGAGCC
S10-Reference agtcgagcccggatgtggtggggcccgggcagggatgtgacaatttggatcagagcc

S10-Priscilla AATCCATGGCCGGATGTGTGCMGACGAGAACGTCGGGCC -----
S10-Reference aatccatggccggatgtgtgcagacgagaactcgggccccctaaggggtggatgtaact

S10-Priscilla -----CCGGCCCGGGCCCCACCACAT
S10-Reference ctaggggagtgcatcatgtaaccctaatatgtcacatccggcccgggccccaccacat

S10-Priscilla CCCGAACCTCGACTCCGCGTAGCACGATATTGTCCGCTTTGGGCCCGACCACGCCCTCA
S10-Reference cccgaactcgactccgctgtagcacgatattgtccgctttgggccccgaccagccctca

S10-Priscilla CGTTTTGTTTCTGGAACTCACACGAGAACTCCAGTGGGTACCCAYCATGGGATTG
S10-Reference cggttttgtttctgggaactcacacgagaacttccagtggtcaccacatgggattg

S10-Priscilla CTCTCGCCGAACCTCGTTAACTTCGTAGTTTCGATGGAACCCGAAGTCAGTGAGCTCTT
S10-Reference ctctcgcggaaactcgcttaacttcgtagtttcgatggaacccgaagtcagtgagctctt

S10-Priscilla GAAAGGCCTCGTGCTAGGTAGAGATGGGAATAGGCATATAAGGCTTACATGATGCACTCC
S10-Reference gaaagccctcgtgctaggtagagatgggaataggcatataaggcttacatgatgactcc

S10-Priscilla CCTAGGCGATGTGGGATGTTACATAAATCTCTTTTTTTTTTTGTTTCAAAAATGTACCCA
S10-Reference cctaggcgatgtgggatgttacataaactctttttttttgtttcaaaaatgtacca

S10-Priscilla TGTTTGGTACAATAGTTTTTTGTTAGTTTAAATGAACGTACCCATGTTTTCATATATAT
S10-Reference tgtttggtacaatagttttttgtagtttaaatgaacgtacccatgttttcatatataat

S10-Priscilla ATATATATATTGGTACAATAGTTTTTTGTTAGTTTTAATGAACGTACCCATGTTTTCATA
S10-Reference atatatatattggtacaatagttttttgtagtttaaatgaacgtacccatgttttcata

S10-Priscilla TATATATATGTATGTATGTATGTATGTATGTATAAATAATATATTGGAGAGCATAA
S10-Reference tatatatatgtatgtatgtatgtatgtatgtatgtataaataatattggagagcataa

S10-Priscilla TTTATTCTTAATTATTTTAAATCCATAAATGGATTTTATTTAAATCTCATTAAATATA
S10-Reference tttattctttaattatTTTAAATCCATAAATGGATTTTATTTAAATCTCATTAAATATA

S10-Priscilla ACAACCACAAATTTAAATTTTCATTTAAATATAACTTACATAAAATACATTATTATA
S10-Reference acaaccacaaatTTTAAATTTTCATTTAAATATAACTTACATAAAATACATTATTATA

S10-Priscilla TAATGTCAGAAACTTCGATCAAAAACCTGCAAAATCAGTAAAATTCAGTTAAAAACATTA
S10-Reference taatgtcagaaacttcgatcaaaaactgcaaaatcagtaaaatTCAGTTAAAAACATTA

S10-Priscilla ATAATTAGGACCACGTCCAAAATCTCCATATTATTAATAATTAGATAGTCAATAT - TGTT
S10-Reference ataattaggaccacgtccaaaatctccatattattaataattagatagtcaatattggt

S10-Priscilla TATCTTTTCATATATACATATGCTCGACATAGATTTTCATCCATGAAAAATATTACTATT
S10-Reference tatcttttcataatatacatatgctcgcacatagatTTTCATCCATGAAAAATATTACTATT

S10-Priscilla AATTTAAAATTTAATCATAATTTTTTCTATTATAATATTATATTGTCAGATAACAAATC
S10-Reference aatttaaatttaatacataatTTTTTCTATTATAATATTATATTGTCAGATAACAAATC

S10-Priscilla TTAAAGCCAGCTGAAATTTTGGCCAAACGTAACAATCGAAGGGCTCATGTACGCT
S10-Reference ttaaagcccagctgaaatTTTggccaaacgtactcaatcgaaggctcatgtacgct

S10-Priscilla TCTGGCGTAACAGTGGCGTAAACATGGCGCCTGTGGGTACCCACAATAGCGGACGACA
S10-Reference tctggcgtaaacagtgggcgtaaacatggcgctgtgggtaccccacaatagcggacgaca

S10-Priscilla TGCACTACTTTAGCACAGTAATCGAAATGTACATAACCAAGAAACAAAACGTCTCTGAAA
S10-Reference tgcattacttttagcacagtaatcgaatgtacataaccaagaaacaaaacgtctctgaaa

S10-Priscilla TCCTCTCAAAGGCGAAGATTAACCGGAGGGGAGATTCAGGACACGGGACGACATTGTAA
S10-Reference tcctctcaaaggcgaagattaaccggaggggagattcaggacacgggacgacattgtaa

S10-Priscilla ATGCCATAAGCCAAAGTATCGACTATAAGAAACAAAACCTCAAGTGCAAGATCAATAATC
S10-Reference atgccataagccaaagtatcgactataagaaacaaaactcaagtgcagatcaataatc

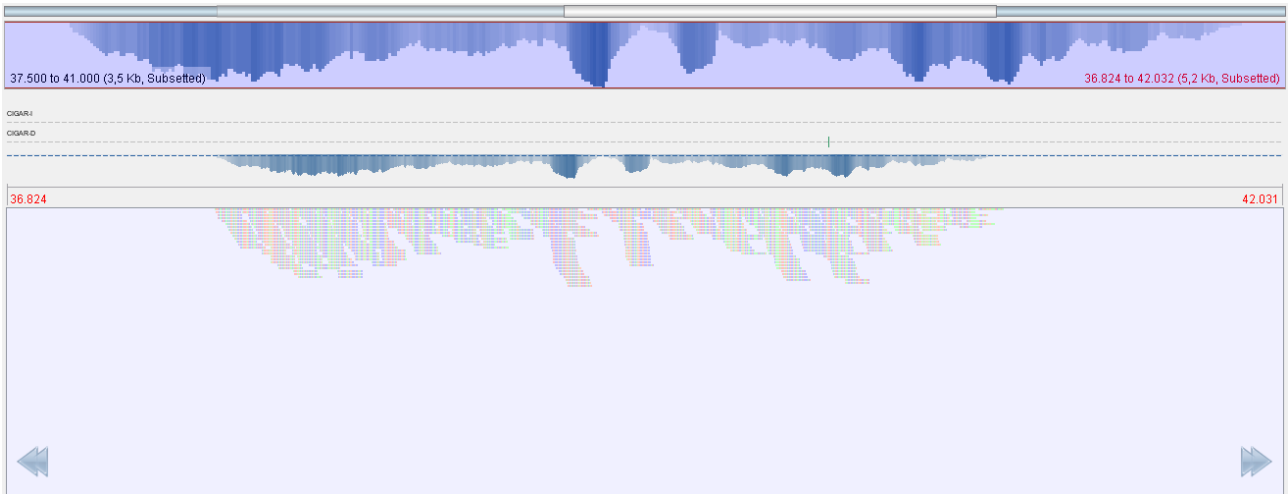
S10-Priscilla AGACAACCTGAATTGGTTGAGGTCGGTCTTTCAGCGATAACAACCTAACGCAGTTCATAA
S10-Reference agacaactgaattggttgaggtcggcttttcagcgataacaacttaacgcagttcataa

S10-Priscilla ATTGCCCAACCCATTTCTCAAGGATCACCATATTTCTGCCCCACCAATAATTCAGT
S10-Reference attgccccaacccatttctcaaggatcaccatatTTCTGCCCCACCAATAATTCAGT

S10-Priscilla ATTAAGAGCGCAGCTAGATAGTATTGCATATACGGATGATGATTCCATATATAGGACGA
S10-Reference attaagagcgcagctagatagTATTGCATATACGGATGATGATTCCATATATAGGACGA

S10-Priscilla GAGGAATGCAGTTATGTGATTGATTTCTAATGAATAAATTGTCTTA-----
S10-Reference gaggaatgcagttatgtgattgattttctaatgaataaattgtcttaattaatt

D. 'Worcester Pearmain' allele S25 (contig of 411 reads, 3206bp)



S25-Worcester_Pearmain	AATGGGGATCATGGGGATGATATATAGTTATGATGGTATTTTCATTAATTGTATTAAT
S25-Reference	-atggggatcatggggatgatatatatggttatgatggatatttcattaattgtattaat *****
S25-Worcester_Pearmain	ATTGCTTCGTCCACTGTGGGATTCGATTATTTTCAATTACGCATCAATATCAGCCGGC
S25-Reference	attgtcttcgtccaactgtgggattcgattattttcaatttacgcatcaatatcagccggc *****
S25-Worcester_Pearmain	TGTCTGCAACTCTAATCGTACTCCTTGTAAAGGATCCTCCTGACAAATTGTTACGGTTCA
S25-Reference	tgctctgcaactcctaactgtactccttgaaggatcctcctgacaaattgttacggttca *****
S25-Worcester_Pearmain	CGGTTTGTGGCCTTCAAACAGGAATGGACCTGACCCAGAGTATTGCAAGAACACAACCTT
S25-Reference	cggtttgtggccttcaaacaggaatggacctgaccagagtattgcaagaacacaacctt *****
S25-Worcester_Pearmain	GGATGTTACCAAGTAATATTATTAGTAATTAGACAATATTGTTTATTTTCATATATACAT
S25-Reference	ggatgttaccaagtaatatattattagtaattagacaatattgtttatttcatatatacat *****
S25-Worcester_Pearmain	ATACTCAACATAGATTTTCATACACGTGTGTGAGAATATTACAATAAATTTAAAATTTAG
S25-Reference	atactcaacatagattttcatacacgtgtgtgagaatattacaataaattaaaatttag *****
S25-Worcester_Pearmain	TCATAATTTTTTCTATTGAAAATATGACTATACCCCTTGAATTC AATTATTTTTAATT
S25-Reference	tcataatTTTTTctattgaaaatagactatacccttgaattcaattatTTTTtaatt *****
S25-Worcester_Pearmain	AAGAAAATTTAACGAAAACCTTCTGATATTGTTCACTTTAACGAAAACACATTTTTTA
S25-Reference	aagaaaatTTTaaCGAAAacttctgatattgttcactttAACGAAAaccacattTTta *****
S25-Worcester_Pearmain	CACTAAATAGTCAATCCTAGTATTATATACTTTACCCCTTATTTTGTCTTTTTGTAAA
S25-Reference	cactaaatagTcaatCctagTattatatactttacccttattttgtctTTTTgttaa *****
S25-Worcester_Pearmain	ACTCAAAGTTTTTTCAGCCATTTTCATTAGTTTTCCTTTTAATTAACCCCACTATGATAA
S25-Reference	actcaaagTTTTTcagccattttcattagTTTcctTTtaattAACCCCActatGataa *****
S25-Worcester_Pearmain	ATTTACCTGACAAATACCAAATGACTAGGCTCCAAC TAAGCAATATCCATAATTAAGTTT
S25-Reference	atTTacctgacaaatacCAAatgactaggctccaactaagcaatATccataatTAagttt *****
S25-Worcester_Pearmain	GACTTGGCAAATTTGTTGGATTCTAAATTACCCCACTGACATTGACCTTGGGCTGTGT
S25-Reference	gactTggcaaaatTTgtTggatttctaaattacCCCActgacattGacctTgggctgtgt *****
S25-Worcester_Pearmain	ACTTGTTTTGTCTACACTAAAGGAGAGCATGTAGACTTAGTCTCACAATGCACTAGCAAT
S25-Reference	actTgTTTTgtctAcactAAaggagacatgtagacttagTctCacaatGcactagcaat *****

S25-Worcester_Pearmain AATATGGTTCAAATTTGCCTTTTGCAGAACTGAACCTAAGTCTCTCTTACAAGTGAA
S25-Reference aatatggttcaaatttgccttttgcagaaactgaacctaatgctctcttacaagtga

S25-Worcester_Pearmain AAGGAATATCACTAGACTGGAGTACTAAGTGGTGCCTCGTACTTGTATCTACATTC
S25-Reference aaggaatatcactagactggagactaagtggtgctccttactgttatctacattc

S25-Worcester_Pearmain TTTTACATTATTTCAATCAATTAATGTTTTTCAAACAACCTATGAGGATTAGAAAGAA
S25-Reference ttttacattatttcaatcaatataatgTTTTTCAAACAACCTATGAGGATTAGAAAGAA

S25-Worcester_Pearmain AAAAAATTAATGCCATGATTCTATGCATTAATAACAAAAATTACATGATATTAGAG
S25-Reference aaaaaatataatgccatgatttctatgcattataataacaaaaattacatgatattagag

S25-Worcester_Pearmain TTTTATTCATCATATAGTTGTTTTTACATTTGCGTCAAATTGAGCATTTTTTGTTCTTT
S25-Reference ttttattcatcatatagttgTTTTTACATTTGCGTCAAATTGAGCATTTTTTGTTCTTT

S25-Worcester_Pearmain TCAGATGATGGTAACATGTAATTAGTAGATTCTAAAAATATAACAATGTTATTTTATTC
S25-Reference tcagatgatggtaacatgtaattagtagattctaaaaatataacaatgttattttattc

S25-Worcester_Pearmain AAAATACCAATATTTTACATATAAATATAGATAAATTATCTTGACAACATATATATA
S25-Reference aaaaaccaatatttttcatataaataatagataaattatcttgtaacaacatataatata

S25-Worcester_Pearmain TATATAATAATAATAATAAACAATATAAGTTCCTAGTAAATTATGTAATAACATGC
S25-Reference tatataataataataataaacaataatagttcctagtaattatgtaataacatgc

S25-Worcester_Pearmain CAAAATAATTTACATACTATTTAAATAAAAAATTGTTTTATTCAAATAAATTAGTACCTA
S25-Reference caaaaataattacatactatttaataaaaattgTTTTATTCAAATAAATTAGTACCTA

S25-Worcester_Pearmain TATTTTGCAAAAAAAGAGGGTAAATTGTAACATCTCACATTGTCAGGGGAGTGGATCT
S25-Reference tattttgcaaaaaaagagggtaaattgtaacatctcacattgtcaggggagtgatct

S25-Worcester_Pearmain TGTAAGCCTTATATGTATATTCTCATCTCTACCTAACACGAGGCCTTTTGRGAGCTCACT
S25-Reference tghtaaccttatatgtatattctcatctctacctaacacaggccttttgrgagctcact

S25-Worcester_Pearmain GGCTTCGGGTTCCATCGGAACCCGAAGTTAAGCGAGTTCGCGCAAGCAATCTCATGA
S25-Reference ggcttcgggttccatcggaacccgaagttaagcgagttcgcgcaagcaatctcatga

S25-Worcester_Pearmain TGGGTGACCTACTGGGAAGTTCTCCTGTGAGTCCAGAAACAAAACCGTGGGGCGTGG
S25-Reference tgggtgacctactgggaagtctcctgtgagttccagaaacaaaaccgtggggcggtgg

S25-Worcester_Pearmain TCATGCCnnnnnnnnnnATATCGTCTACGGTGGAGTTCGAGCTTAGGATGTGGTGGGG
S25-Reference tcatgcccaagcagacaatatcgtgctacgggtggagtcgagcttaggatggtggggg

S25-Worcester_Pearmain CTCGAGCCAGGATGTGACAATTTAGTATCATAGCCAATCCCTGACCGGAAGTGTGCCGAC
S25-Reference ctcgagccaggatgtgacaatTTAGTATCATAGCCAATCCCTGACCGGAAGTGTGCCGAC

S25-Worcester_Pearmain GAGGACGTCGGGCCCTAAGGGGGTGGATTGTAACATCCACATCGCCAAGGGAGTGG
S25-Reference gaggacgtcgggccctaaaggggggtgattgtaacatccacatcgccaagggagtg

S25-Worcester_Pearmain ATCTTGTAAGCCTTATATGTATATTCTCATCTCTACCTACCACGAGGCTTTTTGGGAGCT
S25-Reference atcttgtaagccttatatgtatattctcatctctacctaccacaggcTTTTTTGGGAGCT

S25-Worcester_Pearmain CATTGCTTCGAGTTCATCGGAACCTCTAAAGTTAAGCGAGTTCGCGCTAGAGCAATCCC
S25-Reference cattgcttcgagttcatcggaaactctaaagttAAGCGAGTTCGCGCTAGAGCAATCCC

S25-Worcester_Pearmain ATGATGGGTGACCACTGTGAAGTTCTGTTGTGAGTTCCTATAACAAAACCGTGAAGGC
S25-Reference atgatgggtgaccactgtgaagttctgTTGTGAGTTCCTATAACAAAACCGTGAAGGC

S25-Worcester_Pearmain ATGGTCAGGCCCCAAAGCGACAATATTATGCTACGGCGGAGTCGAGCCCGGATGTGGT
S25-Reference atggtcagggcccaaagtggacaatattatgctacggcggagtgcagcccggtatgtgt

S25-Worcester_Pearmain GGGGTCTGGGTCGAGATGTGACATAAATTATTGCACAAGCATATACATATATATTA
S25-Reference ggggtctgggtcgagatgtgacataaattatttgcacaagcatatatacatatatta

S25-Worcester_Pearmain ATAATATTAATGTGCCTAACATATGTAATAATACATGCAAAATAAATAAGTGTGATT
S25-Reference ataataataaatgtgctaacatattgtaataatcatgcaaaataaataagtgctgatt

S25-Worcester_Pearmain GATTCCACACACCATATTATAATAACACAATGCGCCTGGTATATGTAATAATACATGCAA
S25-Reference gattccacaccatattataataacacaatgcgctggtatattgtaataatcatgcaa

S25-Worcester_Pearmain AACAAATTACCTATAAAAATAAATAATGTTTTAGCCATTTGATTCAAAAAATAATTATT
S25-Reference aacaatttacctataaaaataaataatgtttttagccatttgattcaaaaaataattatt

S25-Worcester_Pearmain AGCTATAATAATAAACAAAATGTCATAATATGTACATGCAAAATAATTTATCTCCAAT
S25-Reference agctataataataaacaaaatgtcataatattgacatgcaaaataatttatctccaat

S25-Worcester_Pearmain GGTTATCAACAAATAAAGAAATCGAACATATGATGGTAAGACAAATAGACACTTATGT
S25-Reference gttatcaacaaataaagaatcgacaatattggttaagcaaatagacacttatgt

S25-Worcester_Pearmain AATAGTAGGCACCTATTTTCCATAATTATTGTGGTAAGTAAATTCATTAACATAATTA
S25-Reference aatagtaggcacttattttccataattattggttaagtaaatcattaacataatta

S25-Worcester_Pearmain GGGTGTGTGCATGTGTGAAAATATTTGAAAATAATAAGTATTAATTTGTTTACATGG
S25-Reference ggtgtgtgtcatgtgtgaaaatattttgaaaataataagtattaatttgtttacatgg

S25-Worcester_Pearmain CAATCTATTTCAAATTTTGGTCTATTTGGATATTTAAAATCATAGAGG-CTTTTGTAT
S25-Reference caatctatttcaaatTTTGGTCTATTTGGATATTTAAAATCATAGAGG-CTTTTGTAT

S25-Worcester_Pearmain GAAAATAATAGTTGTACGGCTTACATCTAAAGATTTTTTGAATATTTTGTCAAAAA
S25-Reference gaaaataatagttgtacggcttacatctaaagatTTTTTGAATATTTTGTCAAAAA

S25-Worcester_Pearmain AAGATTTTTTTTTCTAATATATAATATTGTCAGATAGGAAATCTCCAAGCACAGTTGGAC
S25-Reference aagatTTTTTTTTCTAATATATAATATTGTCAGATAGGAAATCTCCAAGCACAGTTGGAC

S25-Worcester_Pearmain ATTATTTGGCCGAACGTATACGATCGAACTAATAATGTAGGCTTTTGGAGTAAACAGTGG
S25-Reference attatTTGGCCGAACGTATACGATCGAACTAATAATGTAGGCTTTTGGAGTAAACAGTGG

S25-Worcester_Pearmain GCAAAACATGGCATCTGTGGTCTCCACAATACAGGACGACGTGAATTACCTTGAACA
S25-Reference gcaaaacatggcatctgtggctctccacaatacaggacgactgaattaccttgaaca

S25-Worcester_Pearmain GTAATCAACTTGTACATAATCAAGAAACAAAACGCTTTGAAATCCTGTCAATGCCAAG
S25-Reference gtaatcaacttgtacataatcaagaacaaaacgctttgaaatcctgtcaatgccaaag

S25-Worcester_Pearmain ATCGAGCCGGAGGAAAAACAGGACACGAAAGGACATTGTAAGCCATACGCGATGGC
S25-Reference atcagccggaggaaaaaacaggacacgaaaggacattgtaagccatacgcagtggc

S25-Worcester_Pearmain ACCAAAGGTAAAGAGACAAAACCTAAGTGCCAGAAGAATAATAGGACGACTGAATTGGTT
S25-Reference accaaaggtaaagagacaaaacCTAAGTGCCAGAAGAATAATAGGACGACTGAATTGGTT

S25-Worcester_Pearmain GAGGTCACTCTTTCAGCGATAGAACTTAACGCAGTTAATAAATGCCCCAACCTAATT
S25-Reference gaggtcactctTTCAGCGATAGAACTTAACGCAGTTAATAAATGCCCCAACCTAATT

S25-Worcester_Pearmain AAACCAAAATCACCATATTTCTGTCCCTTGAAGATTCAGTATTAAAGAGCGGCTAG
S25-Reference aaaccaaATCACCATATTTCTGTCCCTTGAAGATTCAGTATTAAAGAGCGGCTAG

S25-Worcester_Pearmain CTATTGTGTGCTCGTAAATGAAATATATATATATATATATATATATATATATATATATA
S25-Reference ctattgtgtgctcgtaaatgaaatataatataatataatataatataatataatataatata

S25-Worcester_Pearmain TGAAGTAGTTGGCCTATATAGGGATGACGATTCCATATATCGGACGAAAGGAATGCAAT
S25-Reference tgaagtagttggcctataataggatgacgattccatataatcgacgaaggaatgcaat

S25-Worcester_Pearmain TATGTGATTGTTTTCTAATGAATAAATTGGCTTAGTTA--
S25-Reference tatgtgattgttttctaataaattggcttagttaatt
