

Development and Characterization of New Single Nucleotide Polymorphism Markers from Expressed Sequence Tags in Common Carp (*Cyprinus carpio*)

Supplementary Material 1

Location of new-found SNPs (regions with red characters are introns).

1.

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1 1111111112 222222223 333333334 444444445 555555556 666666667 777777778
1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
7873-1-3 gtggcaacag tgctaaagt atgcttaaag actgtattgc tgactgtcca agtggatcca tcaacctcgg cattgcaaaa
7873-1-5 gtggcaacag tgctaaagt atgcttaaag actgtattgc tgactgtcca agtggatcca tcaacctcgg cattgcaaaa
7873-1-4 gtggcaacag tgctaaagt atgcttaaag actgtattgc tgactgtcca agtggatcca tgaacctcgg cattgcaaaa
7873-1-1 gtggcaacag tgctaaagt aagcttaaag actgtgctgc tgactgtgca agtggatcca tgaacttcgg ctatgcaaag
7873-1-2 gtggcaacag tgctaaagt aagcttaaag actgtgctgc tgactgtgca agtggatcca tgaacttcgg ctatgcaaag
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1 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111
8888888889 9999999990 0000000001 1111111112 222222223 333333334 444444445 555555556
1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
7873-1-3 acatcttttg cgtgctgtaa cacagaccag tgtaacgtcc aagacgtcc aggtatcata ctctactgac ca-aatgcaa
7873-1-5 acatcttttg cgtgctgtaa cacagaccag tgtaacgtcc aagacgtcc aggtatcata ctctactgac ca-aatgcaa
7873-1-4 acatcttttg cgtgctgtaa cacagaccag tgtaacgtcc aagacgtcc aggtatcata ctctactgac ca-aatgcaa
7873-1-1 acatctttta cgtgctgtat cacagaccgg tgtaacgtcc aagacactcc aggtatcagg ctttattgac cataaaataa
7873-1-2 acatctttta cgtgctgtaa cacagaccgg tgtaacgtcc aagacactcc aggtatcagg ctttattgac cataaaataa
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1111111111 1111111111 1111111111 1111111112 222222222 222222222 222222222 222222222
6666666667 7777777778 8888888889 9999999990 0000000001 1111111112 222222223 333333334
1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
7873-1-3 ataactatct ttaaggtcaa ctcagatttt tcttccaaag gacattc--- -attcaggaa atacaatata ggggtcggct
7873-1-5 ataactatct ttaaggtcaa ctcagatttt tcttccaaag gacattc--- -attcaggaa atacaatata ggggtcggct
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 7873-1-2 ataa--atct ttaaggtcaa tactcatTTT acttccaaag gagatcagga aatacaaatt atacaataca gagtgcagct

222222222 222222222 222222222 222222222 222222222 222222223 333333333 333333333
 444444445 555555556 666666667 777777778 888888889 999999990 000000001 111111112
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333333333 333333333 333333333 333333333 333333333 333333333 333333333 3
 222222223 333333334 444444445 555555556 666666667 777777778 888888889 9
 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1
 7873-1-3 taatacatTT gttttatcct gtagatcctt ctaatgtccc caacggaaag acgtgttact cttgtgatgg a
 7873-1-5 taatacatTT gttttatcct gtagatcctt ctaatgtccc caacggaaag acgtgttact cttgtgatgg a
 7873-1-4 taatacatTT gttttatcct gtagatcctt ctaatgtccc caacggaaag acgtgttact cttgtgatgg a
 7873-1-1 caatgc-ttg tttttgtcct gtagatcctt ctattgtccc caatggaaag acgtgttact cttgtgatgg a
 7873-1-2 caatgc-ttg tttttgtcct gtagatcctt ctaatgttcc caatggaaag acgtgttact cttgtgatgg a

SNP LOCATIONS: 22A/T, 36A/G, 37T/C, 48C/G, 62C/G, 66C/T, 72A/T, 73A/T, 80A/G, 89A/T, 90A/G, 109A/G, 126A/G, 139A/G, 140T/G, 143C/T, 146C/T,
 156A/T, 157A/G, 158C/T, 181C/T, 182A/T, 184A/T, 185C/G, 191A/T, 203C/G, 220A/T, 232A/G, 237A/G, 254C/T, 256G/T, 260A/G,
 262G/T, 266A/T, 267A/G, 293C/G, 314A/G, 321C/T, 325A/G, 330T/G, 331T/G, 336A/G, 364C/T

2.

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1 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
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7873-2-3 tccttctaata gtcaccaacg g-aaagacgt gttactcttg tgatggacag agctgctcaa acatattgag ctgtacaggg aatgaagacc gctgcttgaa
7873-2-1 tccttctaata gtcaccaacg g-aaagacgt gttactcttg tgatggacag agctgctcaa acatattgag ctgtacaggg aatgaagacc gctgcttgaa
7873-2-4 tccttctaata gtcaccaacg g-aaagacgt gttactcttg tgatggacag agctgctcaa acatattgag ctgtacaggg aatgaagacc gctgcttgaa
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1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111112
0000000001 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
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7873-2-2 agcaacaggc agggactttc ggtggccagt caatggttgt aaaaggctgt gtctctaaat ctatctgtga tgctgaaaca tcggttcagg atgttcaggg
7873-2-3 agcaacaggc agggactttc ggtggccagt caatggttgt aaaaggctgt gtctctaaat ctatctgtga tgctgaaaca tcggttcagg atgttcaggg
7873-2-1 agcaacaggc agggactttc ggtggccagt caatggttgt aaaaggctgt gtctctaaat ctatctgtga tgccggatca tcggttcagg atgttcaggg
7873-2-4 agcaacagg- -gggactttc ggtggccagt cattagttgt aaaaggctgt atctctaaat ctttctgtga tgctggatca tcggttcagg atgttcaggg
7873-2-0 agcaacagg- ---gcgtttc ggtggccagt caatggttat aaaaggctgt atctctaaat ctttctgtga tgctggatca tcggttcagg atgttcaggg

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SNP LOCATIONS: 151G/A, 163A/T, 176G/A, 178T/A

3.

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1 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
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7877-1 taacccacc agcaaggcag agtgcactgc tgagcagtgc tacacactca ctgaggtgca tttg--agga gtcacatgtg tacatttgtg tgagaaagtg
7877-3 taacccacc agcaaggcag agtgcactgc tgagcagtgc tacacactca ctgaggtgca tttg--agga gtcacatgtg tacatttgtg tgagagagtg
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7877-4 taacccacc agcaaggcag agtgtaccgc tgagcagtgc tacacactca ctgaggtgct tttggaagga gtagcatgtg tacattcatg tgagagagtg
7877-0 taacccacc agcaaggcag agtgcactgc tgagcagtgc tacacactca ctgag----- -----

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1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111112
0000000001 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
7877-1 aaacatttgg tttcatattat gactc-tttg t----gtttt atattacagg gacgggggat atttgcaagt ggaagtcctt ttgatgtgat aacccttccc
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7877-5 aagcatttgg tttcatattat atttcattta tatttggtttt atattacagg gacgggggat atttgcaagt ggaagtcctt ttgatgtgat aacccttccc
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2222222222 2222222222 2222222222 2222222222 2222222222 2222222
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7877-3 gatgggcgga agttctaccc tggtcagggc aacaacgctt atgtgttccc tggagtg
7877-2 gatgggcgga agttctaccc tggtcagggc aacaacgctt atgtgttccc tggagtg
7877-5 gatgggcgga agttctaccc tggtcagggc aacaacgctt atgtgttccc tggagtg
7877-4 gatgggcgaa agttctaccc tggtcagggc aacaacgctt atgtgttccc tggagtg
7877-0 gatgggcgaa agttctaccc tggtcagggc aacaacgctt atgtgttccc tggagtg

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SNP LOCATIONS: 209G/A

4.

1 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
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 7885-5 gtatgctgcc cgccaactat gtggaagcca tctgaataca cctactgtcc tctcaagcac cctttggatg agggagttcg agatccactc aaatggataa
 7885-2 gtatgctgcc cgccaactat gtggaagcca tctgaataca cctactgtcc tctcaaacac cctttggatg agggagtttg agatccactc aaatggaaaa
 7885-3 gtatgctgcc cgccaactat gtggaagcca tctgaataca cctactgtcc tctcaaacac cctt-ggatg agggagtttg agatccactc aaatggaaaa
 7885-0 gtatgctgcc cgccaactat gtggaagcca tctgaataca cctagtgtcc tctcaaacac cctttggatg agggagcttg agatccactc aaatggaaaa
 7885-4 gtatgctgcc cgccaactat gtggaagcca tctaaataca actactgcgc tctcaaactc cctgtggatg acggagtttg atatccactc aga-----ac

1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111112
 0000000001 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
 7885-1 aaacgattta atgtgtact- --gttggta aagtagttat gcttctgttt tatectcatt actcttagga aatttccttt gtgcccattgt cacaaagtct
 7885-5 aa-ctattta atgtgta--- --gttagtca aagtagttat gcttctgttt tatectcatt actcttagga aatttccttt gtgcccattgt cacaaagtct
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 7885-0 aa-cgattta atgtgtacta atgttagtca aagtagttat gcttctgttt tatectcatt actcttagga aatttccttt gtgcccattgt cacaaagtct
 7885-4 aagctatttt atgtgtacta atgttagtca a-gtagttcc gctactgttt -gtcctcatt actgttggga aatttatattt gtgcccattgt cacaaagtct

2222222222 222222

0000000001 111111

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7885-5 attgtggttg tggcat

7885-2 attgtggttg tggcat

7885-3 attgtggttg tggcat

7885-0 attgtggttg tggcat

7885-4 attgtggttg tggcat

SNP LOCATIONS: 105G/T

5.

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1 1111111112 222222223 333333334 444444445 555555556 666666667 777777778 888888889 999999990
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1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111112
0000000001 1111111112 222222223 333333334 444444445 555555556 666666667 777777778 888888889 999999990
1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890 1234567890
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7889-1 ctgctcaaaa gtgcatgaa ggagggtttg ggcacagatg aagatacgct tgtcgagatt ttggcctcca ggaccaataa agagatccaa gagattaaac
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7889-3 ctgctcaaaa gtgcatgaa ggagggtttg ggcacagatg aagatacgct tgtcgagatt ttggcctcca ggaccaataa agagatccaa gagattaaac
7889-4 ctgctcaaaa gtgcatgaa ggagggtttg ggcacagatg aagatacgct tgtcgagatt ttggcctcca ggaccaataa agagatccaa gaggttaaac
7889-2 ctgctcaaaa gtgcatgaa ggagggtttg ggcacagatg aagatacgct tgtcgagatt ttggcctcca agaccaataa agagatccaa gagattaaac

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2222222222 2222222222 2222222222 2222222222 2222222222 2222222222 2222222222 2222222222 2222222222 2222222223
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7889-1 aggttttcaa acaagggaat ataagaagga tctagaggcg gagatcaagt ctgagacaag tggagatttc aggaatgccc tgctttctct ctgcaagggtt
7889-5 aggttttcaa acaagggaat ataagaagga tctagaggcg gagatcaagt ctgagacaag tggagatttc aggaatgccc tgctttctct ctgcaagggtt

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7889-3 aggttttcaa acaagggaat ataagaagga tctagaggcg gagatcaagt ctgagacaag tggagatttc aggaatgccc tgctttctct ctgcaaggtt
7889-4 aggttttcaa acaagggaat ataagaagga tctagaggcg gagatcaagt ctgagacaag tggagatttc aggaatgccc tgctttctct ctgcaaggtt
7889-2 aggttttcaa acaagggaat ataagaagga tctagaggcg gagatcaagt ctgagacaag tggagatttc aggaatgccc tgctttctct ctgcaaggtt

3333333333 3333333333 3333333333

0000000001 1111111112 222222222

1234567890 1234567890 123456789

7889-0 ---ctaccag aagtgaagac agttttgtg

7889-1 aggctaccag aagtgaagac agttttgtg

7889-5 aggctaccag aagtgaagac agttttgtg

7889-3 aggctaccag aagtgaagac agttttgtg

7889-4 aggctaccag aagtgaagac agttttgtg

7889-2 aggctaccag aagtgaagac agttttgtg

SNP LOCATIONS: NULL

6.

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1 1111111112 2222222223 3333333334 4444444445 5555555556 6666666667 7777777778 8888888889 9999999990
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7892-3 tggaggaaga agcagtcgga cgtgatgagg tttctgctgc gcgtgcggtg ctggcagtag cgtcagctgc cggcccttca ccgggccccg agaccacca
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1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111111 1111111112
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7892-0 gacccgataa agcccgaga ctgggataca aggccaagca gggc----ta cgtcatctac cgcatacgtg tgcgccgtgg aggccgcaag cgccccgtgc
7892-1 gacccgataa agcccgaga ctgggataca aggccaagca gggcaggcta cgtcatctac cgcatacgtg tgcgccgtgg aggccgcaag cgccccgtgc

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2222222222 2222222222 2222222222 2222222222 2222222222 22222222
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7892-3 cttaaaggtgc cacctacggc aaacccgtgc accacggcgt caaccagatc aagtttg
7892-4 cttaaaggtgc cacctacggc aaacccgtgc accacggcgt caaccagatc aagtttg
7892-5 cttaaaggtgc cacctacggc aaacccgtgc accacggcgt caaccagatc aagtttg
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7892-0 cttaaaggtgc cacctacggc aaacccgtgc accacggcgt caaccagatc aagtttg
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SNP LOCATIONS: 120G/A

7.

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SNP LOCATIONS: 96A/G, 10T/C, 138A/G, 140A/T, 157T/C, 166G/C, 287T/A, 301A/G, 359T/A, 418T/C, 429T/C, 468T/A, 481T/C

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SNP LOCATIONS: 175C/T, 198C/A

12.

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SNP LOCATIONS: 86A/G, 125G/C, 257C/T

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SNP LOCATIONS: 134A/G, 282C/T

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SNP LOCATIONS: 58C/T, 64C/T, 78G/A, 82T/A, 85C/T, 116A/C, 118A/T, 123C/A, 144C/T, 159G/T, 185T/A, 186G/C, 188T/C, 197C/A, 200T/A, 225C/A, 249A/T, 251T/C, 261C/A, 271G/A, 288G/C, 290C/A, 295C/G, 301A/C, 311A/C, 313C/T, 323A/C, 357C/T, 374A/T, 381G/T, 382A/T, 383A/T, 384A/T, 385C/T, 387C/T, 389A/C, 392C/T, 396C/A, 402G/C, 408G/A, 423G/A, 429T/G, 430G/A, 444A/T, 451T/C, 456G/T, 468G/T, 470G/C, 471G/A, 472A/G, 480G/T, 486T/G, 500T/C, 508A/T, 511T/C, 541C/T, 552A/G, 561A/C, 571A/C, 596T/A, 608C/T, 962T/C, 964C/T, 966A/G, 969G/A, 972A/T, 978T/C, 998T/G, 1020A/G, 1039A/G

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SNP LOCATIONS: 332A/G

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SNP LOCATIONS: 82T/C, 106G/A, 193C/T, 263T/C, 268T/C

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SNP LOCATIONS: 47G/A, 102G/A, 116T/C, 192T/G, 244A/C, 290G/A/T

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26.

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SNP LOCATIONS: 68G/A, 144A/T, 145A/T, 400T/C, 753A/G, 798A/T, 831T/C

32.

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SNP LOCATIONS: 125C/G

33.

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SNP LOCATIONS: 25C/T, 45A/G, 89C/T, 212G/A, 265C/T, 276G/T

34.

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8011-3 gac

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8011-5 gac

8011-0 gac

SNP LOCATIONS: 177G/T, 178A/T

35.

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8012-7 cttc

8012-5 cttc

SNP LOCATIONS: 44A/G

36.

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SNP LOCATIONS: 151T/C, 293G/A, 296G/A, 299G/T, 336A/G, 338G/A, 732A/C

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SNP LOCATIONS: 130C/G, 155T/C

42.

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SNP LOCATIONS: 136A/T

43.

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SNP LOCATIONS: 35T/C, 74C/G, 82C/T, 99C/T, 129A/G, 154C/A

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SNP LOCATIONS: 148A/G, 275C/T, 386A/G

46.

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SNP LOCATIONS: 208C/T, 248C/T, 327C/G, 337T/C, 345C/T, 372G/C, 390G/A, 528C/T, 529A/G

47.

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SNP LOCATIONS: 50C/T, 224T/C, 243G/T, 293T/C, 302C/A

Table S1. Information of primers used in this study.

	Primers	Size(bp)	T_m(°C)
7873-1	F: GTGGCAACAGTGCTAAAGT R: TCCATCACAAGAGTAACACG	180	51
7873-2	F: TCCTTCTAATGTCCCCAACG R: CCCTGAACATCCTGAACCG	190	53
7877	F: TAACCCCAACCAGCAAGGCAG R: CACTCCAGGGAACACATAAGCGT	163	56
7885	F: GTATGCTGCCCCGCAACT R: ATGCCACAACCACAATAGACTT	215	51
7889	F: TGGCAAGCCTCTGGATGTAG R: CACAAAAGTGTCTTCACTTCTGGT	319	53
7892	F: TGGAGGAAGAAGCAGTCGG R: CAAACTTGATCTGGTTGACGC	253	58
7895-2	F: TCCCCGTTCTCATGGACATC R: GGGTTGACACGCTGGTTC	157	55
7896	F: TCAGCATCATTACTCCAGTC R: GTCACCAACAGGTCAAGC	448	49
7898	F: TGGTGGTGTGTTCGACATCT R: GGGTGGAGTGTCTCTTGAA	238	52
7909	F: TCGCTTTAGTCTCCACCAT R: CCGAGACCACCTCTTCAG	533	49
7918	F: CAAGAAGAAGATTGAGCACC R: TGACAGACTCCAGACAGCC	278	51
7921	F: CTGGCTTCTGCTCACGCT R: CTGGTTTGCTTGGAGTTTCAC	164	53
7927	F: AAGCCGTGGGACAAATCT R: AACAGTCATACAACACTTCAGG	322	52
7929	F: ACCAGGCTCTTCATGTCAACACT R: CTTTATGCTTGCCGTCCTCTATC	222	52
7933	F: TGCCTTTGGTGGAAATAGAC R: GCTGGAGGAACTTGCTGAT	429	52
7943	F: GCAGCACACGCTTTATCAGT R: CTATCACGGCGAAAGTCATC	402	49
7944	F: TGGTGACACTGGCTCTGGGT R: GGATGCTGTGATGGAGGAAAC	298	56
7947	F: GGGTGGAGAAATACAAGAAC R: GCCAATGAGTATCTCTGTAGC	236	52
7953	F: TGCCAGAGTATCAGTCCAAG R: CGTGTTGATTTTATCCAGTG	347	52
7955	F: TAAAAGAACACAACGGGCAC R: CAGACTCAAAGTAGCAAACGG	240	53

Table S1. Cont.

	Primers	Size(bp)	T _m (°C)
7957	F: CTTCCACGAGACCCTTTAC R: GTCCCCATCAGGTAGAATC	354	53
7961	F: ACTTTCCAGAAGACGAGCAC R: CTGATAGACCTTATACCCAGC	222	50
7969	F: TGGATTTAGAGAACGAAACAG R: TAACTTTGCTGGTTTGCTTC	217	49
7974	F: GAGCGTCCATCAGAAAGAAT R: CAGTTTGTTGCTGGTGTCC	215	50
7980-2	F: GTTGTCATCCCTGCTGGTGTCC R: CTCTGTTGGGGTTGTAGACGCC	211	56
7986-2	F: TGAAAGCATTGTGTTGAAGCG R: CTGTCTGATAGAAGCCACCTGT	191	53
7988	F: CCCAGGAAGTATTGGTTAGAAG R: GTAGTGCGGTGGTTGGTATC	184	52
7990	F: CATTACAGTCACCGACAGGG R: GTGCCAAATCATTCAAGTCC	273	53
7992	F: GAACATCATAGTGCTGGGGA R: TGTATCTCTCTGTGAGGTCGTG	139	52
8000	F: CCATTACAAAGATGCCCAAG R: AGAAGAGCGTCCAAAGTGAAC	419	53
8001	F: ACCATCAGTGCCGCCCTCT R: CATCCGTCACAGCCTCCTCTC	376	56
8008	F: GCTGAGCCAAGTGGGAGAT R: GTCGCCTCTGCTTTGTTTCT	233	55
8009-2	F: AGGTGATGTTCTGTCTGG R: ATGTACTTCCTGTTGCGTGT	213	52
8011	F: TGGTTTGGAGGGCGGTTAGC R: GTCGGACCCCAGTCTTCGTATC	303	54
8012	F: CAGAGTCCACGGCAAGTATGA R: GAAGTGTCCCCAACTAAGCAAG	203	55
8013	F: ACACCTTCCCCAGTAAACC R: GTGGCATCTTCTTGTTGAGTTG	260	54
8017	F: CATTTCTGAGACCTTCAACCAT R: TTGTCATTTTCTGCTTGCTTC	313	54
8021	F: TCTGTCACCTTAGATCCTGGTGTAG R: TGTTACCCACTAATCCTGTTTCG	447	53
8025	F: CAGGAACTTGTCCTGTGTCT R: CAGGAAACCATTCAAGTGCCA	318	54
8034	F: CTGTGTTTGGTGGGTTTCG R: TTCATTCAGACGCCAGGTG	327	54

Table S1. Cont.

	Primers	Size(bp)	T _m (°C)
8040	F: CCTCAGGAAGAAGGGCATC R: TGGTTTATCAGCGTACACAGC	348	55
8041	F: CTTTCCTTCTACAAACCGTCTC R: TCCTCTGTCCTGATGGTGTCT	173	52
8048	F: TAGGCAGTGAATGTGGGAT R: GGGAAGTAGGAGTAAGAGGTG	256	52
8050-1	F: TCAAGGAAGGCAACGGGAAG R: CAGCGGGAGAAGTACCGAGTC	179	56
8052cg2	F: ACCCTCATTGTGGTGTCC R: AGTTCTCGCTGTCTTTATCTG	286	54
8123	F: ACCACTAAATGTAGGAGGAC R: GTAATGTGAGGAGGAAGAG	428	55
8142	F: AGGGAGTGGGAACTTGAA R: TCATCACCTGGTCCTCTTT	420	57
8184	F: GCTCAACCCAATAACCCGA R: AAGCAGGCAACCGCAAAG	413	57
GT7892	F1: ACTTACGATAAAGCCCGCAGA F2: ACGGTTGTAATAACGATAAAGCCCGCAGG R: GACGAAAGCACAGAGGTAAG	160 168	60
GT7953	F1: ACTTAAACCAAAGAGCAGCTTCTCAG F2: ACGGTTGTAATAAAACCAAAGAGCAGCTTCTCAC R: GCATATAGAGCACTGCCGAC	149 157	62