Supplementary Material

# Supplementary Figures and Tables

**Supplementary Table 1|** **Foreground Primers used in the study**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No.** | **Primer** | **Sequence** | **References** |
| 1. | **HYDB 65F-3’TE** | ACACCACATGGACAAGTTCG | (Yan et al., 2010) |
| 2. | **HYDB 62R-3’TE** | ACACTCTGGCCCATGAACAC |
| 3. | **HYDB 66R-3’TE** | ACAGAATACAGGGGACCAG |

**Supplementary Table 2|** **List of polymorphic SSR primers used in back ground selection**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **SlNo** | **Bin** | **SSR Name** | **Primer\_F** | **Primer\_R** | **PIC** |
| 1 | 1.00 | **umc1353** | AGACAGGATCATCGAAAACACACA | ACCTCAGCCTCCTCGTCAACTACT |  |
| 2 | 1.02 | **bnlg1178** | ACTACAGTTGAACGCCCCTG | GCTCATGTGCAAATGCAAGT | 0.579 |
| 3 | 1.01 | **umc1948** | TGTTGAAATAATGGAACACCTCCC | ATCTATCTGGTTTCACGATCTCGC | 0.297 |
| 4 | 1.01 | **umc1160** | CGTTTGATATGATGTGGAGATTCG | AAGCTTGTGAATGTTCTGGATGTC | 0.261 |
| 5 | 1.01 | **umc1484** | GCGTACAGAACAGAGCAGTTACGA | ACTGAAGCTGCCTGCCTTCTATTT | 0.211 |
| 6 | 1.03 | **umc 1866** | CCCAGCGCATGTCAACTCT | CCCCGGTAATTCAGTGGATA | 0.087 |
| 7 | 1.05 | **umc1321** | GATTTAAATTAGTAGCCGCCGTCC | CCACCTGCAGATGTACAGAACAGT | 0.239 |
| 8 | 1.05 | **umc1611** | TACTACCAGCAGCTTGCTTCAACA | CTTCTTGTTCTTCACGCAGTTGTC | 0.28 |
| 9 | 1.05 | **umc1395** | TGAATGAGTGGCATTCAAAATCTG | CAGATTGCATGTGTGAGTGTGTGT |  |
| 10 | 1.05 | **umc1076** | TTGGAAATCACCAATTGATATAGTTTG | TCTATTGCAAACGCCAAAAGTAGC |  |
| 11 | 1.06 | **umc2235** | GAACCCTCTAGGCTCCGGTTC | TCGTCCCAGTACCATGCCTC | 0.36 |
| 12 | 1.08 | **umc1998** | GCCTCCCAAGTGCAATATTAAATAGA | AGAGCACAAGAACCACAACAACAA | 0.213 |
| 13 | 1.09 | **umc1082** | CCGACCATGCATAAGGTCTAGG | GCCTGCATAGAGAGGTGGTATGAT | 0.239 |
|  | **Bin** | **SSR Name** | **Primer\_F** | **Primer\_R** | **PIC** |
| 14 | 1.1 | **umc2189** | CGTAAGTACAGTACACCAATGGGC | ACACCGACTACAAGCCTCTCAACT | 0.239 |
| 15 | 1.12 | **umc2100** | AAAGGCATTATGCTCACGTTGATT | TGACGTGCAAACAACCTTCATTAC | 0.340 |
| 16 | 2.01 | **phi96100** | AGGAGGACCCCAACTCCTG | TTGCACGAGCCATCGTAT | 0.245 |
| 17 | 2.02 | **umc1518** | TAGCTCCTTTGCGCTATTCAGTCT | GGCAGTGTTTTCTTTTGAAGTGCT | 0.188 |
| 18 | 2.04 | **umc1026** | TCGTCGTCTCCAATCATACGTG | GCTACACGATACCATGGCGTTT | 0.124 |
| 19 | 2.04 | **bnlg1613** | GGGGATGATTCCGATAGGC | GCGCTCTCTTTTCCCTCTCT | 0.215 |
| 20 | 2.05 | **umc1635** | GCTGAGCAGATCTTTCCTTGTTTC | AAGGAGCAGAACTCGGAGACG | 0.188 |
| 21 | 2.05 | **umc1535** | CAAGGCACCCACACACATACATA | GGCAGAGAGATGAAAAAGAATGGA |  |
| 22 | 2.06 | **bnlg1396** | CGCATTTCTCCTGCAGTACA | TGCTTGAGTCGTCGAATCTG | 0.239 |
| 23 | 2.08 | **phi127** | ATATGCATTGCCTGGAACTGGAAGGA | AATTCAAACACGCCTCCCGAGTGT | 0.239 |
| 24 | 2.08 | **umc1704** | TTCACCGGGTAGTCCTTCTTACTG | AGTACGCTGTACGCAGGCAG | 0.297 |
| 25 | 2.09 | **bnlg1520** | TCCTCTTGCTCTCCATGTCC | ACAGCTGCGTAGCTTCTTCC | 0.239 |
| 26 | 3 | **umc2101** | CCCGGCTAGAGCTATAAAGCAAGT | CTAGCTAGTTTGGTGCGTGGTGAT | 0.261 |
| 27 | 3.01 | **umc2257** | AAAAAGGCAAACTCGACCCC | GTCGTCATCTGCAAACCCTAGC | 0.188 |
| 28 | 3.02 | **umc1458** | CCAATAAACAAATCATCTCCCCCT | TGCTATGCTATGTACAGGGACAGG | 0.261 |
| 29 | 3.04 | **umc2158** | ACACAGCACAACACAACACAACAC | AATAATTGTACCGAGATGTTGGCG | 0.261 |
| 30 | 3.04 | **umc1030** | TCCAGAGAATGAGATGACAAGACG | CAGAATAACAGGAGATGAGACGCA | 0.239 |
| 31 | 3.04 | **umc2263** | CGTGCTTATATGGGTTCTTGGGT | GTTTGGTTGCTGCGACCTCTT | 0.216 |
| 32 | 3.04 | **bnlg1904** | AGGAGCATGCACTTGGTTCT | ACTCAACTGATGGCCGATCT |  |
| 33 | 3.05 | **umc1973** | CAGGCAGAAAAGGAACGGAAC | GTGCGAGAGAAGATGGATGATTG | 0.215 |
| 34 | 3.06 | **bnlg197** | GCGAGAAGAAAGCGAGCAGA | CGCCAAGAAGAAACACATCACA | 0.239 |
| 35 | 3.08 | **umc2174** | GTACGTACGCAGCCACTTGTCAG | ACATAAATAAAACGTGTGCCGCAG | 0.215 |
| 36 | 3.06 | **phi102228** | ATTCCGACGCAATCAACA | TTCATCTCCTCCAGGAGCCTT |  |
|  | **Bin** | **SSR Name** | **Primer\_F** | **Primer\_R** | **PIC** |
| 37 | 3.09 | **umc1578** | AAGCACTTCCAGTGGTACATGAGC | CGAGCAGCTAAGGTAGAGCAGCTA | 0.239 |
| 38 | 3.1 | **umc1136** | CTCTCGTCTCATCACCTTTCCCT | CTGCATACAGACATCCAACCAAAG | 0.239 |
| 39 | 4.01 | **phi295450** | CCTTTTCATGTTGCTTTCCC | GCCCAATCCTTCCTTCCT | 0.239 |
| 40 | 4.01 | **phi213984** | GTGACCTAAACTTGGCAGACCC | CAAGAGGTACCTGCATGGC | 0.215 |
| 41 | 4.04 | **umc1963** | CTCGTTCGAGGGGATGTACAAG | CTTGCACTGGCACAGAGACG | 0.239 |
| 42 | 4.05 | **umc1511** | CAGACAGATCCATCCAGCACATAC | GTTTGTAGGCTTCGTTTTCCTTCA | 0.239 |
| 43 | 4.08 | **umc1313** | GCTGTCTGTGACCAAGTTTCCTCT | TGAAGAACAGGGACGTGATGATAA | 0.211 |
| 44 | 4.08 | **umc1476** | CTCTGCCTCAGTCTGGTCGC | CGAGGAAAGGAAGGAGAGCG | 0.239 |
| 45 | 4.09 | **umc1328** | TACAAGGAGGAGGCCGCTGT | ATCCAGTCTCCGGACTTCCAAC | 0.239 |
| 46 | 4.1 | **bnlg589** | GGGTCGTTTAGGGAGGCACCTTTGGT | GCGACAGACAGACAGACAAGCGCATTGT | 0.215 |
| 47 | 4.11 | **umc1707** | GTCGAGAAGCGATCGATCATAGTAG | GCACGACAGGGAGTACGGTC | 0.239 |
| 48 | 4.11 | **umc1649** | GTGAAGCTCGATTTCTCCTCACAT | GTGAAGCTCGATTTCTCCTCACAT | 0.157 |
| 49 | 5 | **umc1325** | ATATTGTACAGGAGCAGCTGGGAC | GGAGGTCATGCGTGTAAATAGGTC | 0.184 |
| 50 | 5.01 | **umc1523** | TTTTAACTGTAAACCGGCCACATT | AGAGTTAGATGACTGCAGTGGCTG | 0.34 |
| 51 | 5.03 | **umc2296** | TGCAGTGACTTGAGACCATACACA | GCTATACGCGTGCCAAGCTAAATA | 0.239 |
| 52 | 5.03 | **umc1564** | AAGAAGAAAGAGAAGAAGCACGGG | GGACAGCTCGTATTATAACCTGCG | 0.215 |
| 53 | 5.03 | **phi113** | GCTCCAGGTCGGAGATGTGA | CACAACACATCCAGTGACCAGAGT | 0.311 |
| 54 | 5.03 | **umc2295** | CTGCTTCCAACTTCCGTTGC | CACCTTGAAGACGTAGTCCACCTT | 0.365 |
| 55 | 5.04 | **umc2373** | ACCCAAGTGAGGTGAAGTGAAGC | TATGGTACAGGCACAGCAGCAGTA | 0.215 |
| 56 | 5.04 | **umc2300** | ACAAGTTAACAGAACCATACGGGG | TTTGTCTTGAGTGCCAATTTGAGA | 0.239 |
| 57 | 5.05 | **mmc0381** | TGAAATAATTCACAGCACTCC | TGATAGCACAACACAGCTATG |  |
| 58 | 5.06 | **phi085** | AGCAGAACGGCAAGGGCTACT | TTTGGCACACCACGACGA | 0.215 |
|  | **Bin** | **SSR Name** | **Primer\_F** | **Primer\_R** | **PIC** |
| 59 | 5.06 | **umc2306** | CCTTGTGCAGTGGAGTTAATGAAA | GCTACCCATTGCTATGGTTTTCTG | 0.215 |
| 60 | 5.08 | **umc2143** | ACACACAACAGAGCCTTTTGTTCA | AAGAAAAGGACACCAAACCAAACA | 0.239 |
| 61 | 6 | **umc2309** | CTGTGTTTTGTGTATTAGCGCCAG | GTCGAAATTCCTGACACAAAAAGG | 0.239 |
| 62 | 6.01 | **umc2313** | CCTCTAGTCACGGTTCAAAGGACA | AAGGAGGATGCAGTCTCGGTTT | 0.239 |
| 63 | 6.04 | **umc1857** | TTCCTTGCCAACAAATACAAGGAT | GTTCATTGCTTCATCTTGGAACCT | 0.239 |
| 64 | 6.04 | **umc1014** | GAAAGTCGATCGAGAGACCCTG | CCCTCTCTTCACCCCTTCCTT | 0.184 |
| 65 | 6.05 | **nc012** | TAATTTAAACACCACACCACCG | ACACACGCCAAAGAAAAACC | 0.215 |
| 66 | 6.05 | **bnlg1154** | GGGTGATCACATGGGTTAGG | AAATCAATGCTCCAAATCGC | 0.239 |
| 67 | 6.05 | **phi025** | GCAACATCCTGGAGAGCCACTACAAGG | ACAGCCTGTTTTCCTGGACAGTGAACTC | 0.188 |
| 68 | 6.07 | **umc2059** | GGAAAAGGAGGAACAGTGTAAGCA | AGCGTGATCAGACGTACAATGCTA | 0.215 |
| 69 | 6.07 | **phi122** | GGAGACGAGGTGCTACTTCTTCAA | TGTGGCTGAGGCTAGGAATCTC | 0.215 |
| 70 | 6.08 | **umc2324** | GATCCTCTGTCGCCAAACACTAAG | AGATGGTGACGATGAGTGATGAAC | 0.185 |
| 71 | 7.01 | **umc2325** | CCTAGGAACTCTGATGGCTATGGA | CTACGATATCCACCTCTACCACCG | 0.239 |
| 72 | 7.01 | **umc1066** | ATGGAGCACGTCATCTCAATGG | AGCAGCAGCAACGTCTATGACACT | 0.215 |
| 73 | 7.02 | **bnlg1094** | GTGAAGAACGATGACGCAGA | CAGCAACGCTCTCACATTGT | 0.239 |
| 74 | 7.03 | **phi091** | ATCTTGCTTCCATAAGATGCACTGCTCT | CTCAGCTTCGGTTCCTACACAGT | 0.215 |
| 75 | 7.03 | **bnlg434** | GTGCAAAGGGGAGAGAGGAA | TCGCCGTTCTTCGCCTTAG |  |
| 76 | 7.03 | **umc1324** | ATCCATCATCATCATCATTGCTTG | ATGTCATCATGTACCAGGTGTTGG |  |
| 77 | 7.03 | **umc1408** | GATCCGTCTCTTGCCGTGGTA | ATGAGCTTGCGGTCCTCCTC | 0.184 |
| 78 | 7.04 | **umc1412** | GCATCTGTAGCCTTTTTGTGTGTG | CTCAGCTTGCAGGTTATCGCTT | 0.239 |
| 79 | 7.04 | **bnlg1666** | GCTGGTAGCTTTCAGATGGC | TGTCCCTCCTCCAGTTTCAC | 0.215 |
| 80 | 7.04 | **umc1710** | ACTTTGCAACTACCGTACATGGGT | TTCGACTGCACGTGAAAATCTATC | 0.087 |
| 81 | 8.03 | **phi125** | ACCGCCGGTGCGAGTTGAAG | CTTGGGATTGCCCTCATCCAC | 0.157 |
|  | **Bin** | **SSR Name** | **Primer\_F** | **Primer\_R** | **PIC** |
| 82 | 8.05 | **umc1130** | TTGGGACTCATTACTTCCGGACT | GCTAGGGGAAAGCTCGTACTATGG | 0.261 |
| 83 | 8.05 | **umc1777** | GACAGCACCTGAAACTGAAACTGA | GTCTTTCTCCACATCCCTGTTTGT | 0.297 |
| 84 | 8.08 | **umc2357** | GAGCAAGAAGCAGAGCAGCAAG | AGCTCCCTCAGGTAGTTGTCCTG | 0.28 |
| 85 | 8.08 | **phi080** | CACCCGATGCAACTTGCGTAGA | TCGTCACGTTCCACGACATCAC | 0.124 |
| 86 | 9.03 | **umc1743** | TGGACTTCGAAAATTCTCTTCAGC | GAGAGGAGGAGCTTCACGAGC | 0.087 |
| 87 | 9.03 | **umc1586** | GAGGATGAGGAGGATGGTAATGGT | TAGGAGATGAGCTCGTCGGATAAG | 0.124 |
| 88 | 9.03 | **umc2337** | GAGTACCTCCGCCCACTCATC | CTAACGTACACACATCTTGGCTGG | 0.157 |
| 89 | 9.04 | **bnlg1209** | GTCCCGGGCAGAATAATACC | TTCCTCCTTGAAGTGCTCGT | 0.215 |
| 90 | 9.05 | **umc1231** | CTGTAGGGCTGAGAAAAGAGAGGG | CGACAACTTAGGAGAACCATGGAG | 0.188 |
| 91 | 9.05 | **umc2134** | TAGTCTAGCGTCGACGAAAAATGC | CAGGCGACGAAGATGAATTGAA | 0.124 |
| 92 | 9.05 | **umc2133** | TTCAGGTGTGCACTGACTCTGACT | ATGCTCAAGCTCAACAGCACTTC | 0.124 |
| 93 | 9.05 | **umc1417** | GAATCCTGGTTGGCCTTTCC | ACAGCTGAGAACGCATTAGCAAG | 0.124 |
| 94 | 9.06 | **umc2346** | GTACATGATCTCGAGAAAGCCGAT | CTTTCTGCAGTTCTGCTAGCTGTG | 0.157 |
| 95 | 9.07 | **umc2099** | AGGTCATCAAGATGCAGAGGGAG | TCAAGGTACGAAGCCTGACGAC | 0.157 |
| 96 | 9.08 | **umc1137** | ATCAGTCACTCTTCTGCCTCCACT | GGCTGGATAATGTTGTAGCTGGTC | 0.212 |
| 97 | 10.03 | **bnlg1712** | CTCAGGCTTCACGTGGGTTT | GTTACACTCCCCTGCCAAAA | 0.157 |
| 98 | 10.04 | **umc1506** | AAAAGAAACATGTTCAGTCGAGCG | ATAAAGGTTGGCAAAACGTAGCCT | 0.188 |
| 99 | 10.04 | **bnlg1250** | CCATATATTGCCGTGGAAGG | TTCTTCATGCACACAGTTGC | 0.368 |
| 100 | 10.04 | **umc2163** | AAGCGGGAATCTGAATCTTTGTTC | GAAATTGCTGGGGTTCTCATTTCT | 0.157 |
| 101 | 10.04 | **umc1827** | GCAAGTCAGGGAGTCCAAGAGAG | CCACCTCACAGGTGTTCTACGAC | 0.184 |
| 102 | 10.06 | **bnlg1028** | AGGAAACGAACACAGCAGCT | TGCATAGACAAAACCGACGT | 0.366 |
| 103 | 10.07 | **umc2126** | CAGTTCTGCACTTCTGCTTGCTC | AGGACTGTGAAGAGCGCGAG | 0.184 |

**Note.,** Bin number is the position of the SSR marker on the chromosome. The primer name and the sequences were retrieved from the maize https://www.maizegdb.org/. **Primer\_F** Forward Primer Sequence; **Primer R** Reverse Primer Sequence; **PIC** Polymorphic Information Content.

## 2. Supplementary Figures



**Supplementary Figure 1a.** Background selection using SSR marker for selected improved lines from BC2F3 generation of SC11-2 × UMI 1230β1+. **Note;** (100bp), (P1) UMI 1230β1+, (P2) SC11-2, (1) DBT 17-1-1-1-35-1, (2) DBT 17-1-1-1-35-2, (3) DBT 17-1-1-1-35-3, (4) DBT 17-1-1-1-35-4 (L) Ladder