Figure 1—source data 1. Molecular lesions of alleles listed in Figure 1 and Table 1.

Single knock-out lines

```
                                          gRNA1        PAM                                                    gRNA2        PAM
wt MpKNOX1      5′- - GACACCACTTCAGAACACAGCTGATGGTAAACAGGATGTGACCCT NNNN AAGCAGAGCGAAAGTGATTCGGTCAGTGGTGGGCAAAGTGAG - - 3′
Mpknox1-6       5′- - CAGACTTGGAGACACCACTTCAGAACACAGCTGATGGTA- - - - - - - - - - - - - - - - - - - - TGGTGGGCAAAGTGAG - - 3′ -2359 bp female


                                      gRNA1        PAM
wt MpBELL2      5′- - CAATGGATTATGAAGCTCGTCACTCAC AAGAGGTGCTTTCGCCTGTTCCA - - 3′
Mpbell2-1       5′- - CAATGGATTATGAAGCTCGTCACTCACcAAGAGGTGCTTTCGCCTGTTCCA - - 3′       +1 bp female
Mpbell2-2       5′- - CAATGGATTATGAAGCTCGTCACT - - - - - GCTTTCGCCTGTTCCA - - 3′      -10 bp male
Mpbell2-11      5′- - CAATGGATTATGAAGCTCGTCACTCA- AAGAGGTGCTTTCGCCTGTTCCA - - 3′       -1 bp male


                                      gRNA1        PAM                                                    gRNA2        PAM
wt MpBELL3      5′- - TATCCTAAAGGAGACGAGTGGGGGCCACTTGTGGCTTCCACAGG NNNN ACAACGAGCGCCCATTCCCCCAGGCTGAACAGTACGGGGTCACC - - 3′
Mpbell3-4       5′- - TATCCTAAAGGAGACGAGTGGGGGCCAC - - - - - - - - - - - - - - - - - - - - - - - - - - - - - AGTACGGGGTCACC - - 3′ -2217 bp male
Mpbell3-10      5′- - TATCCTAAAGGAGACGAGTGGGGGCCAC - - - - - - - - - - - - - - - - - - - - - - - - - - - - - GTACGGGGTCACC - - 3′ -2218 bp male


                                PAM        gRNA1                                                    gRNA2        PAM
wt MpBELL4      5′- - AGAACGAATTGCACCACGACAGCCTCCTTGGGTTCAGGAAGTTGGAACT NNNN TTTCTCGTAATCGGAGGAACAACAATGGGAATCGTAATA - - 3′
Mpbell4-5       5′- - AGAACGAATTGCACCACGACA - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - AATGGGAATCGTAATA - - 3′ -1135 bp male
Mpbell4-24      5′- - AGAACGAATTGCACCACGACA - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - AATGGGAATCGTAATA - - 3′ -1135 bp male
```

Multiple gene knock-out lines

Mpbell34-4 (Mpbell3-1 Mpbell4-1)male

```
                                      gRNA1              PAM
wt MpBELL3      5′- - TATCCTAAAGGAGACGAGTGGGGGCCA       CTTGTGGCTTCCACAGGAATGCAAAACAA - - 3′
Mpbell3-1       5′- - TATCCTAAAGGAGACGAGTGGGGGCCAtctcct-TTGTGGCTTCCACAGGAATGCAAAACAA - - 3′ +6 bp/-1 bp

                                      gRNA2              PAM
wt MpBELL3      5′- - TGACAACGAGCGCCCATTCCCCCAGGCTGAACA GTACGGGGTCACC - - 3′
Mpbell3-1       5′- - TGACAACGAGCGCCCATTCCCCCAGGCTGAACAaGTACGGGGTCACC - - 3′  +1 bp


                                PAM        gRNA1
wt MpBELL4      5′- - AGAACGAATTGCACCACGACAGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′
Mpbell4-1       5′- - AGAACGAATTGCACCACGA-AGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′  -1 bp
```

Mpbell234-15 (Mpbell2-15 Mpbell3-15 Mpbell4-15)male

```
                                              gRNA1                    PAM
wt MpBELL2      5′- -  CAATGGATTATGAAGCTCGTCA                          CTCACAAGAGGTGCTTTCGCCTGTTCCA - - 3′
Mpbell2-15      5′- -  CAATGGATTATGAAGCTCGTCAagagcaagcacctctttgcttgc - - - - -GTGCTTTCGCCTGTTCCA - - 3′ +23 bp/-10 bp



                                                                  gRNA1                                    PAM
wt MpBELL3      5′- - TATCCTAAAGGAGACGAGTGGGGGCCA                                                        CTTGTGGCTTCCACAGGAATGCAAAACAA - - 3′
Mpbell3-15      5′- - TATCCTAAAGGAGACGAGTGGGGGCCAaaacaatgagtaagtgttcaaatacctgattgttttggagtggagacga-TTGTGGCTTCCACAGGAATGCAAAACAA - - 3′ +49bp/-1bp

                                      gRNA2              PAM
wt MpBELL3      5′- - TGACAACGAGCGCCCATTCCCCCAGGCTGAACA GTACGGGGTCACC - - 3′
Mpbell3-15      5′- - TGACAACGAGCGCCCATTCCCCCAGGCTGAACAaGTACGGGGTCACC - - 3′ +1 bp

                                PAM        gRNA1
wt MpBELL4      5′- - AGAACGAATTGCACCACGACAGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′
Mpbell4-15      5′- - AGAACGAATTGCACCACGA-AGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′ -1 bp
```

Mpbell234-83 (Mpbell2-83 Mpbell3-83 Mpbell4-83)male

```
                                                  gRNA ATG      PAM                                    gRNA2      PAM
wt MpBELL2      5′- - AACTTCTCGTCGAAGATGTATTT NN GGATTATGAAGCTCGTCACTCACAAGAGGTGCTTTC NN GCAAAGGGAAGATTTAGCAAAGGAATCTGGAGTTACCTATGT - - 3′
Mpbell2-83      5′- - AACTTCTCGTCGAAGATGTATTT- - - - - - - - - - - - - ggaggc-110bp-atatac- - - - - - - - - - - - - -ATCTGGAGTTACCTATGT - - 3′ +110
bp/-1401 bp

                                      gRNA1        PAM                                                    gRNA2        PAM
wt MpBELL3      5′- - TATCCTAAAGGAGACGAGTGGGGGCCACTTGTGGCTTCCACAGG NNNN ACAACGAGCGCCCATTCCCCCAGGCTGAACAGTACGGGGTCACC - - 3′
Mpbell3-83      5′- - TATCCTAAAGGAGACGAGTGGGGGCCAC - - - - - - - - - - - - - - - - - - - - - - - - - - - - - AGTACGGGGTCACC - - 3′ -2217 bp

                                PAM        gRNA1                                                    gRNA2        PAM
wt MpBELL4      5′- - AGAACGAATTGCACCACGACAGCCTCCTTGGGTTCAGGAAGTTGGAACT NNNN TTTCTCGTAATCGGAGGAACAACAATGGGAATCGTAATA - - 3′
Mpbell4-83      5′- - AGAACGAATTGCACCACGA - - - - - - - - - - - - - - - attgcac - - - - - - - - - - - - AATGGGAATCGTAATA - - 3′ +7 bp/-1135 bp
```

Mpbell234-7 (Mpbell2-7 Mpbell3-7 Mpbell4-7)female

```
                                          gRNA1              PAM
wt MpBELL2      5′- - CAATGGATTATGAAGCTCGTCACTCAC                AAGAGGTGCTTTCGCCTGTTCCA - - 3′
Mpbell2-7       5′- - CAATGGATTATGAAGCTCGTCACTCAC - - gacggtgaaagcacct - - - CTTTCGCCTGTTCCA - - 3′ +16 bp/-8 bp

                                      gRNA1        PAM                                                    gRNA2        PAM
wt MpBELL3      5′- - TATCCTAAAGGAGACGAGTGGGGCCACTTGTGGCTTCCACAGGAATGCAAAACAATCA NNNN CGAGCGCCCATTCCCCCAGGCTGAACAGTACGGGGTCACC - - 3′
Mpbell3-7       5′- - TATCCTAAAGGAGACGAGTGGG - - - - - - - t - - - - - - -ACAATCA NNNN CGAGCGCCCATTCCCCCAGGCTGAACAGTACGGGGTCACC - - 3′ +1
bp/-30bp ; wt

                                PAM                        gRNA1
wt MpBELL4      5′- - AGAACGAATTGCACCACGA                                CAGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′
Mpbell4-7       5′- - AGAACGAATTGCACCACGAcgaattcgttatacacataaaaaaaattatgttattcgaatacaCAGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′  +44 bp
```

Mp*bell234-18* **(Mp*bell2-18* Mp*bell3-18* Mp*bell4-18*) female**

gRNA1 PAM

wt Mp*BELL2* 5′- - CAATGGATTATGAAGCTCGT CACTCACAAGAGGTGCTTTCGCCTGTTCCA - - 3′

Mp*bell2-18* 5′- - CAATGGATTATGAAGCTCGT - - gagtgacgaggtg - - - - AAGAGGTGCTTTCGCCTGTTCCA - - 3′ +13 bp/-6 bp

gRNA1 PAM gRNA2 PAM

wt Mp*BELL3* 5′- - TATCCTAAAGGAGACGAGTGGGGGCCACTTGTGGCTTCCACAGGAATGC NN GTAAATCGAAT NN CGAGCGCCCATTCCCCCAGGCTGAACA GTACGGGGTCACC - - 3′

Mp*bell3-18* 5′- - TATCCTAAAGGAGACGAGTGGG- - - - atccaa-97bp-cgatcc - - TAAATCGAAT NN CGAGCGCCCATTCCCCCAGGCTGAACAtGTACGGGGTCACC - - 3′ +97 bp/-304; +1 bp

PAM gRNA1

wt Mp*BELL4* 5′- - AGAACGAATTGCACCACGACAGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′

Mp*bell4-18* 5′- - AGAACGAATTGCACCACGA-AGCCTCCTTGGGTTCAGGAAGTTGGAACT - - 3′ -1 bp