**Descriptions of supplementary figures, tables and files**

Figure S1. Linkage map of the NH80-A × TA95 population.

Description: This figure shows the 10 linkage groups constructed with the F2 progenies derived from NH80-A × TA95.

Figure S2. Linkage map of the NH80-A × WH606 population.

Description: This figure shows the 10 linkage groups constructed with the BC1 progenies derived from NH80-A × WH606.

Table S1. Predicted genotypes of two different inheritance models.

Description: This table lists the predicted genotypes of each line under multi-allelic model and two-gene model, respectively.

Table S2. Segregation ratio of male sterility in Progeny test A.

Description: This table contains theoretical segregation ratios and deduced test result of progeny test A for all possible genotypic combinations by crossing male sterile individuals with restorer lines.

Table S3. Segregation ratio of male sterility in Progeny test B.

Description: This table contains theoretical segregation ratios and deduced test result of progeny test B for all possible genotypic combinations by crossing male sterile individuals with restorer lines.

Table S4. Segregation ratio of male sterility in Progeny test C.

Description: This table contains theoretical segregation ratios and deduced test result of progeny test C for all possible genotypic combinations by crossing maintainer lines with restorer lines.

File S1. Polymorphic tags and individual genotypes of F2 population derived from NH80-A × TA95.

Description: This file contains the physical positions of polymorphic tags and individual genotypes of F2 population derived from NH80-A × TA95.

File S2. Polymorphic tags and individual genotypes of BC1 population derived from NH80-A × WH606.

Description: This file contains the physical positions of polymorphic tags and individual genotypes of BC1 population derived from NH80-A × WH606.

File S3. DNA sequences of *BnRf* orthologs.

Description: This file contains four DNA sequences of *BnRf* orthologs, including two alleles in *B*. *napus* (NCBI accession No. KT818624 and KT818625) and two orthologs in *B*. *rapa* ssp. *chinensis* (lines NH80-A and TA95).