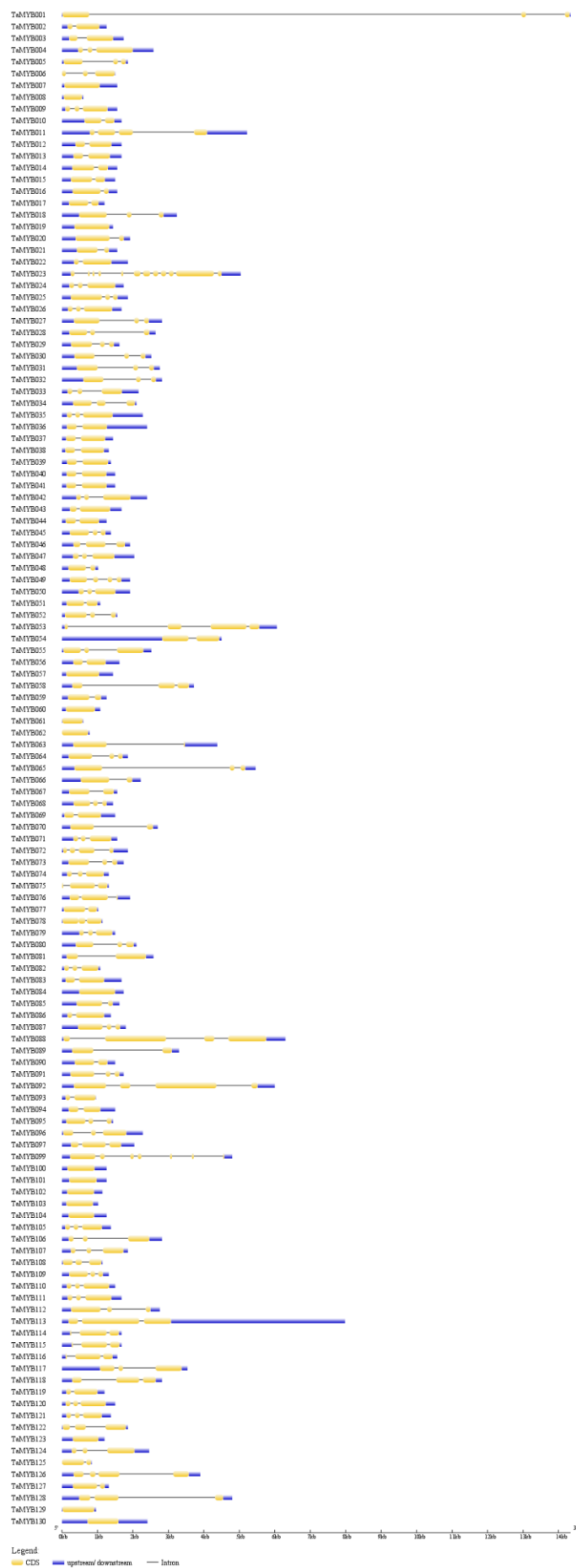
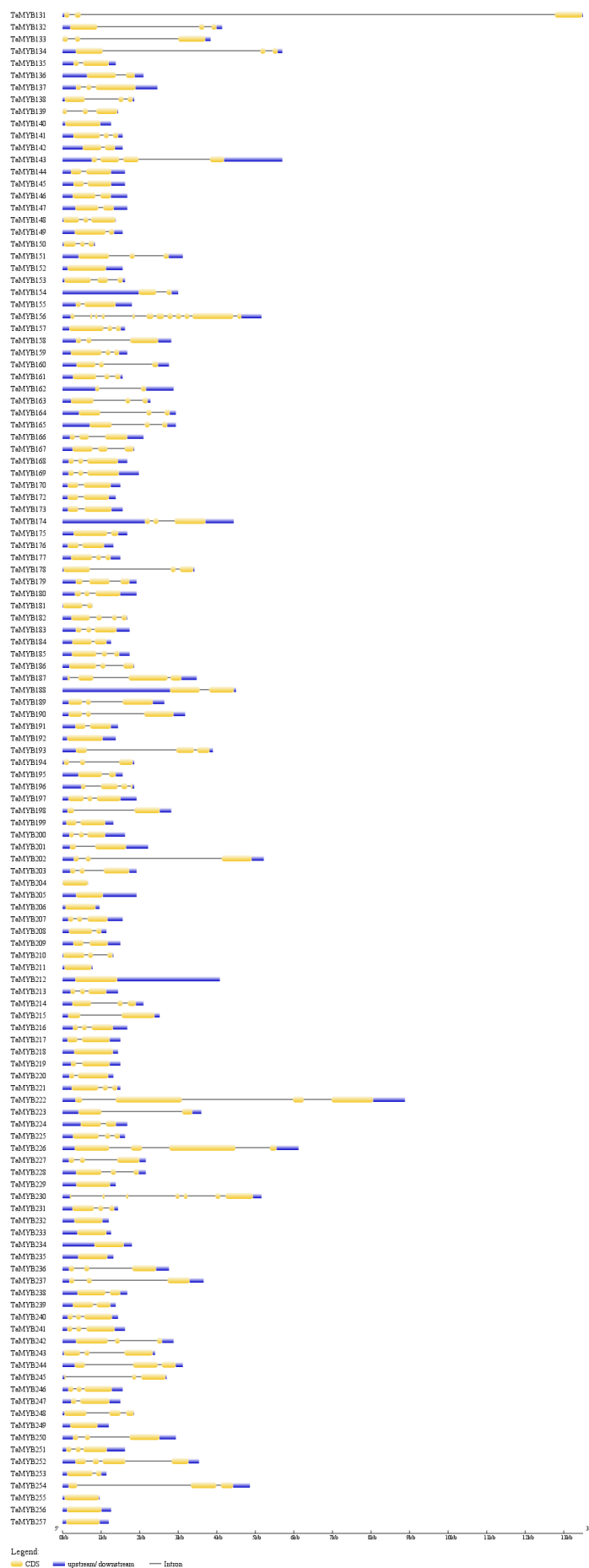
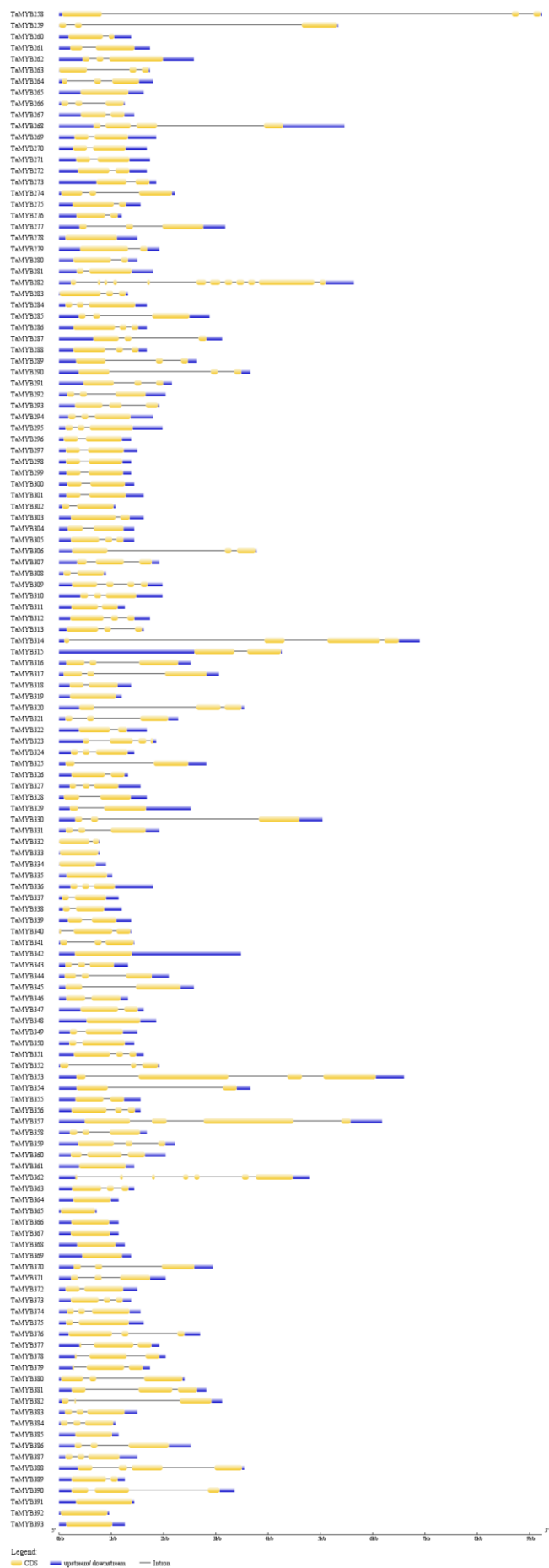








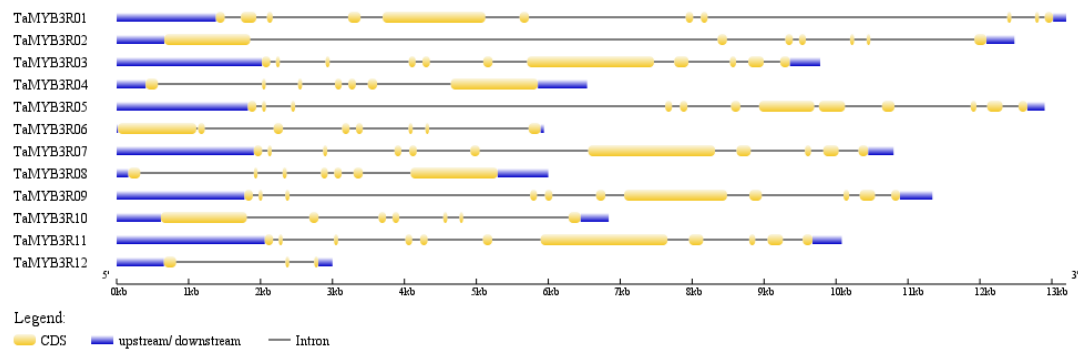


Figure.S1-4 The gene structure of *TaMYB* genes in wheat.

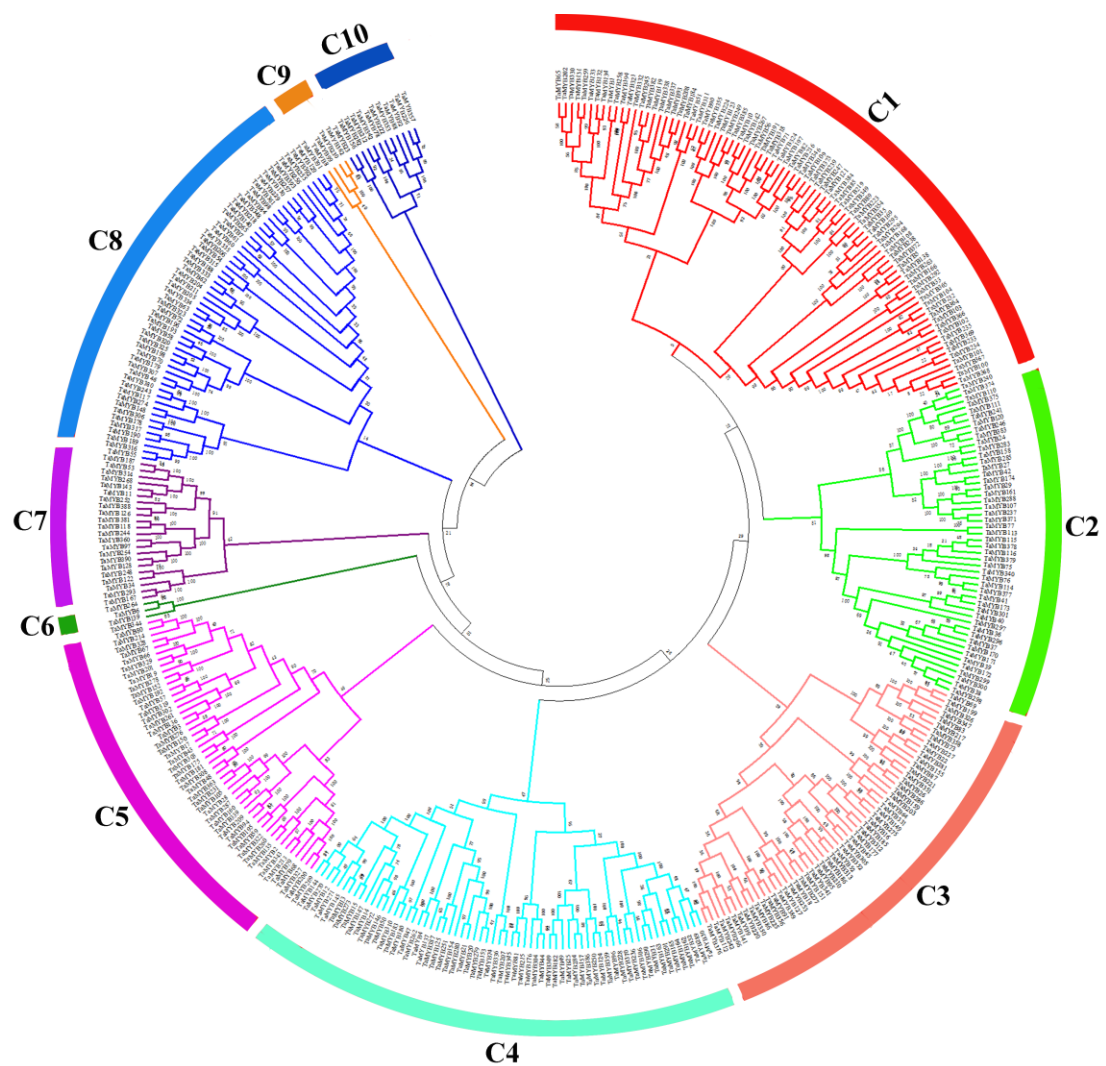


Figure.S5 Phylogenetic tree of 393 R2R3-MYBs in wheat. All R2R3-MYBs were divided into 10 clusters (C1-C10). The picture was generated by using MEGA 7 software coupled with Neighbor-Joining method with a bootstrap of 1000 replicates.

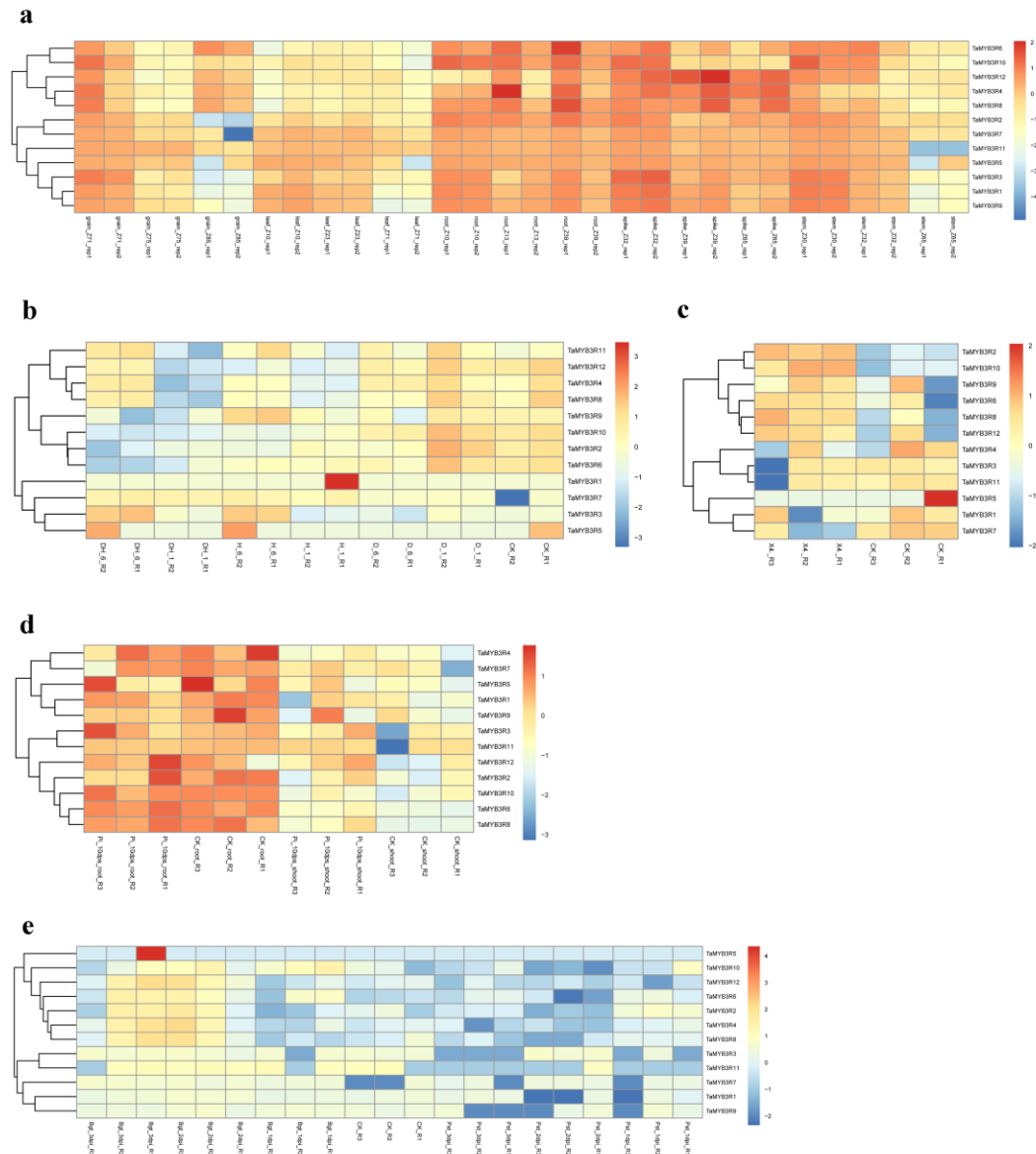


Figure.S6 The expression patterns of *R1R2R3-MYBs* in wheat. (a) The expression patterns of *R1R2R3-MYBs* in different tissues. Row coordinate meanings refer to Figure.4 caption. (b) The expression patterns of *R1R2R3-MYBs* under drought/heat. Row coordinate meanings refer to Figure.5 caption. (c) The expression patterns of *R1R2R3-MYBs* under cold stress. X4 means low temperature 4 °C; CK means room temperature 23°C. (d) The expression patterns of *R1R2R3-MYBs* under Pi-starvation environment. Pi_10dps_root: the root of wheat under 10 days post Pi-starvation stress; Pi_10dps_shoot: the shoot of wheat under 10 days post Pi-starvation stress. (e) The expression patterns of *R1R2R3-MYBs* under diseases. Bgt_1, _2, and _3dpi: 1, 2, and 3

days post Powdery mildew pathogen E09 infection, respectively; Pst_1, _2, and _3dpi: 1, 2, and 3 days post Stripe rust pathogen CYR31 infection, respectively. Heatmap was created by R program based on the data of the transcript per million (TPM) values which were normalized by Z-score method. The red and blue cells respectively represent highest and lowest expression level.

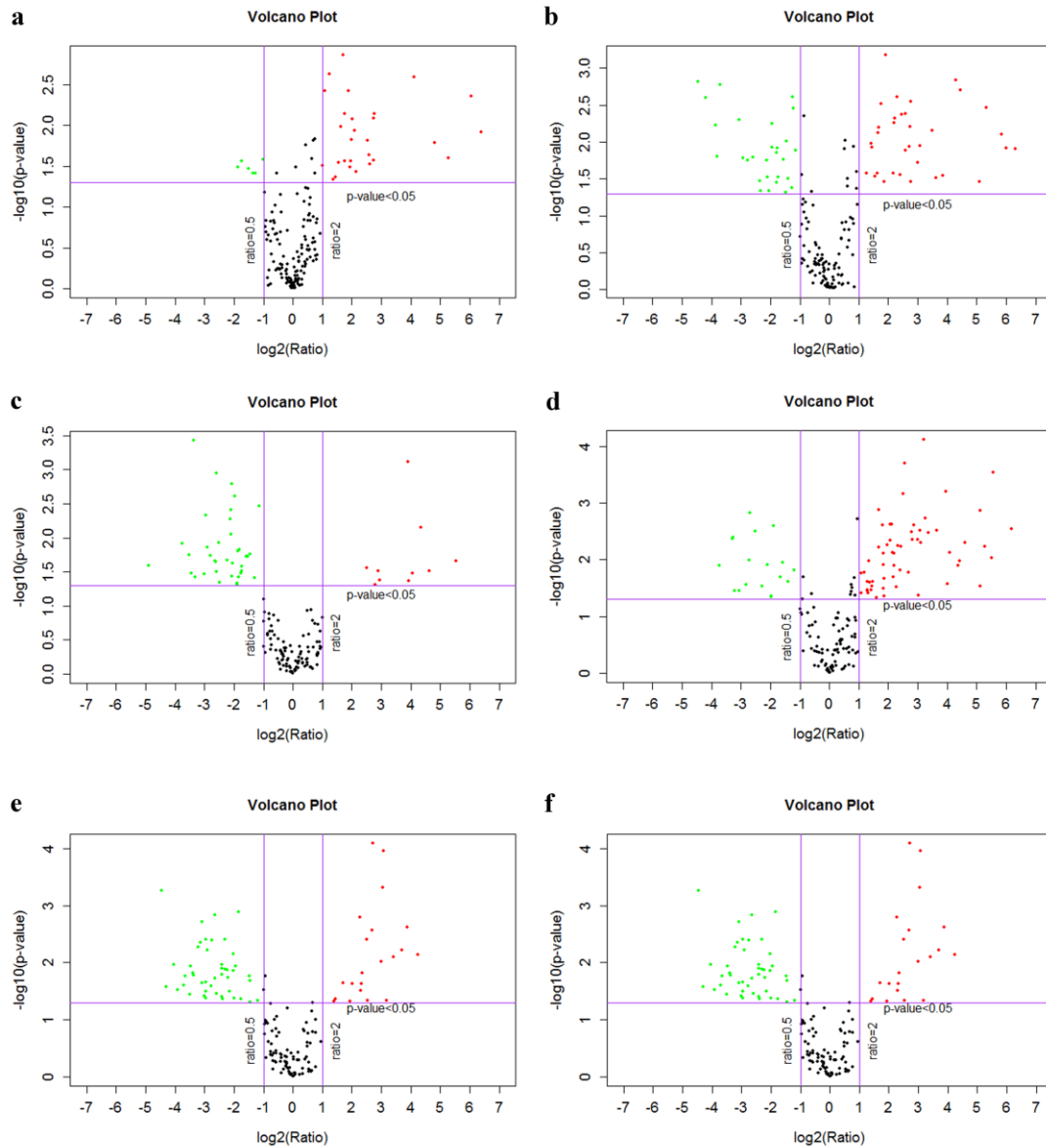


Figure.S7 The variance of expression level of *TaR2R3-MYBs*. (a, b) under drought stress after 1 and 6 hours. (c, d) under heat stress after 1 and 6 hours. (e, f) under drought and heat stress after 1 and 6 hours. The volcano plots were drawn by R program. The red, green, and black dots respectively show up-regulated, down-regulated, and no

change expression level of *R2R3-MYB* genes. Strict screening conditions as following:
 1) the expression levels were up or down 2-folds regulation, i.e. ratio (FC) < 0.5 or ratio (FC) > 2; 2) *P* value < 0.05.

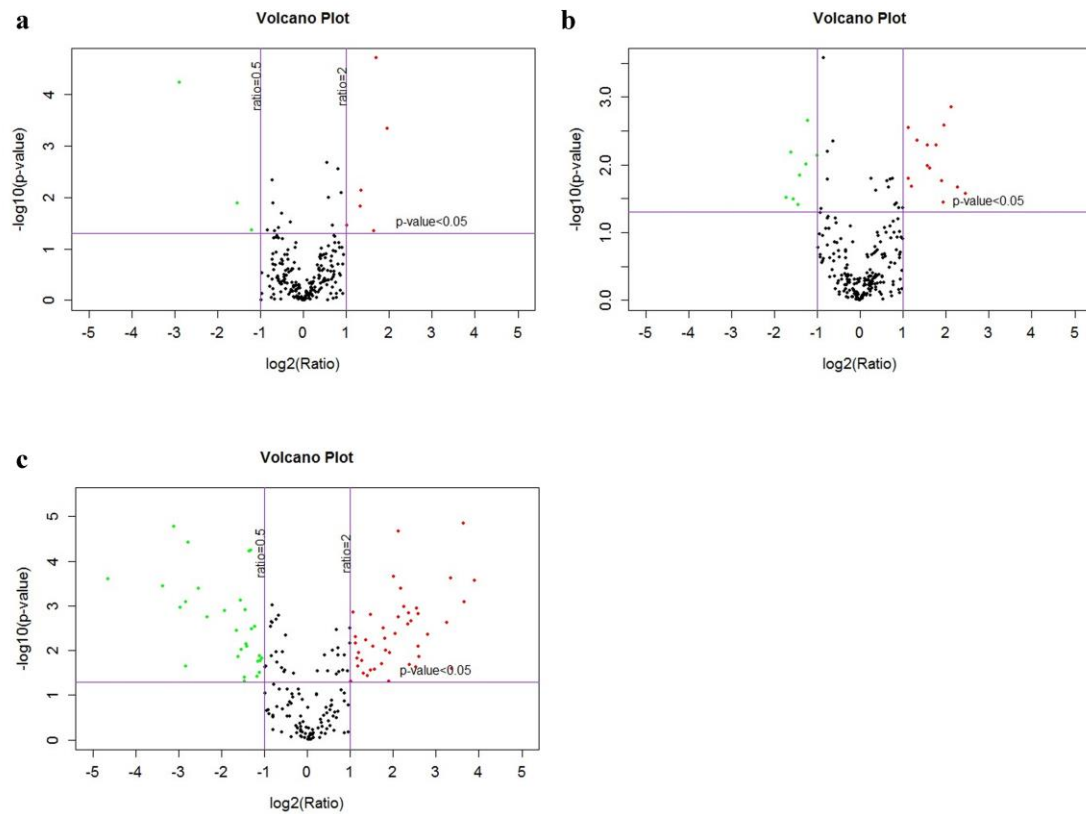


Figure.S8 The variance of expression level of *TaR2R3-MYBs*. (a, b) 10 days post Pi-starvation stress of root and shoot of wheat. (c) under cold (4 °C) treatment. The volcano plots were drawn by R program. The red, green, and black dots respectively show up-regulated, down-regulated, and no change expression level of *R2R3-MYB* genes. Strict screening conditions as following: 1) the expression levels were up or down 2-folds regulation, i.e. ratio (FC) < 0.5 or ratio (FC) > 2; 2) *P* value < 0.05.

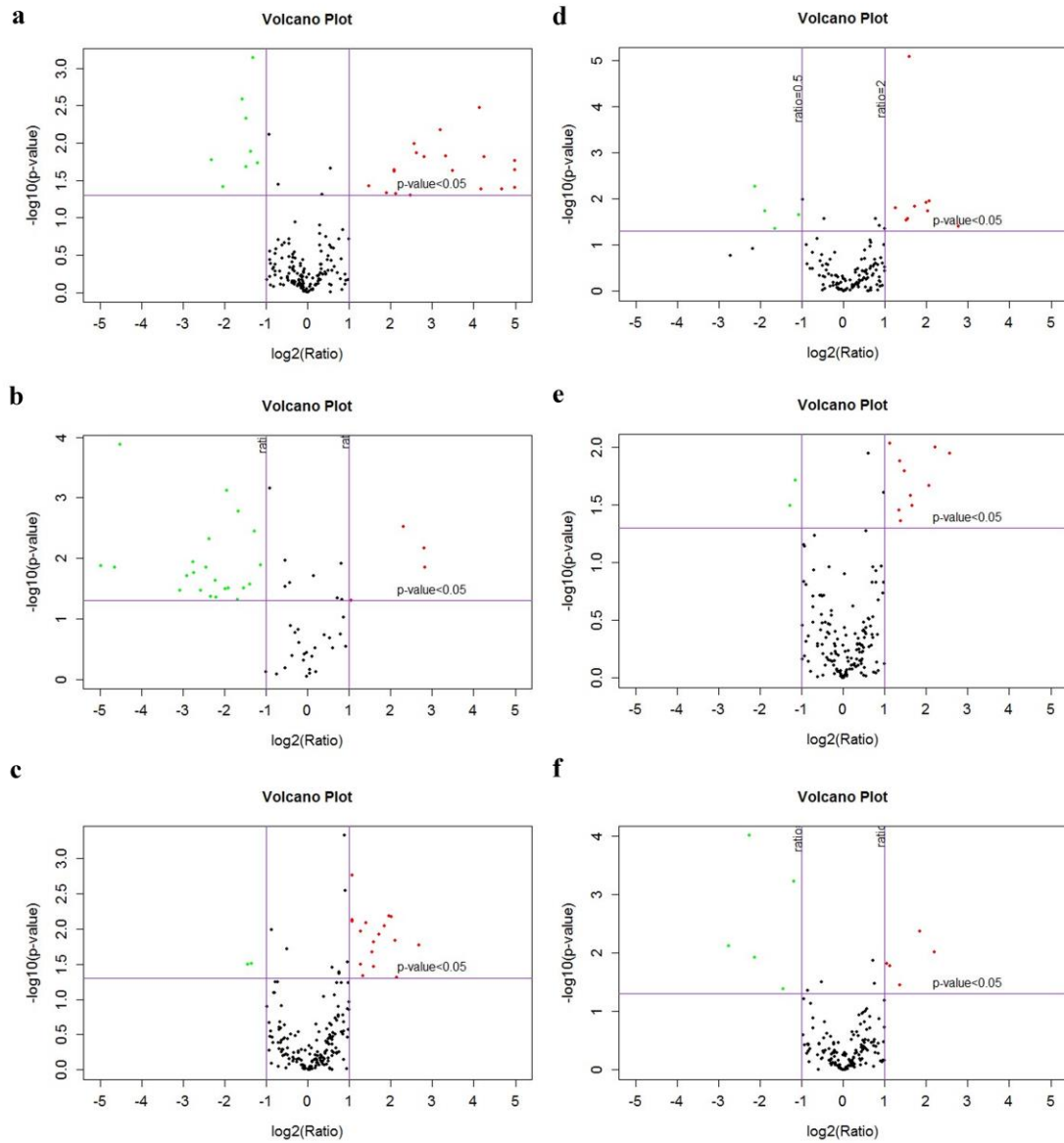


Figure.S9 The variance of expression level of *TaR2R3-MYBs*. (a, b, c) 1, 2, and 3 days post Powdery mildew pathogen E09 infection, respectively; (d, e, f) 1, 2, and 3 days post Stripe rust pathogen CYR31 infection, respectively. The volcano plots were drawn by R program. The red, green, and black dots respectively show up-regulated, down-regulated, and no change expression level of *R2R3-MYB* genes. Strict screening conditions as following: 1) the expression levels were up or down 2-folds regulation, i.e. ratio (FC) < 0.5 or ratio (FC) > 2; 2) *P* value < 0.05.

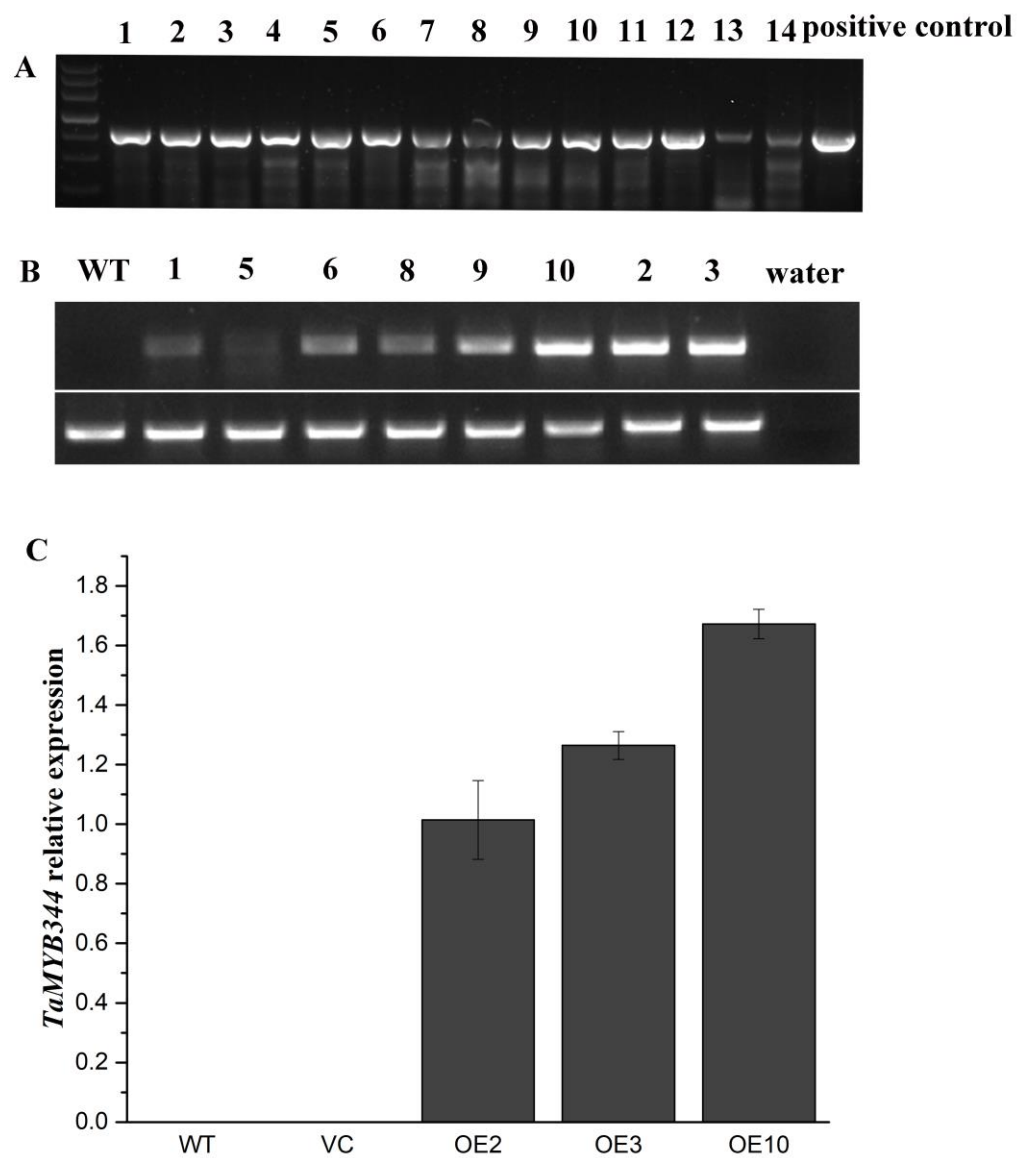


Figure.S10 The overexpressing transgenic lines of *TaMYB344*. (a) Identification of positive lines at DNA level by PCR. The relative expression level of *TaMYB344* in WT, VC, and transgenic lines determined by semi-quantitative PCR (b) and qRT-PCR (c).