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Figure 1. The geographic location and climate at 10 field sites. (A). The 10 sites across the latitudinal gradients from southern Texas to North Dakota. The experimental sites in this study span much of the natural range of switchgrass (the green layer with buffered points). (B). The mean temperature and annual rainfall of the 10 sites for the study year in 2016 (ordered from south to north).

Figure 2. The diagram depicting the panicle traits of switchgrass. PL is the panicle length (in mm), PBN is the primary branching number, and SBN is the secondary branching number. Photos show examples of panicles from the four grandparents WBC, AP13, VS16 and DAC.

Figure 3. The phenotypic distribution of the F_2 population, and the phenotypic means of the four grandparents (lowland AP13, WBC and upland DAC and VS16) for panicle length (PL in mm), primary branching number (PBN), and secondary branching number (SBN) across the 10 field sites (ordered from south to north).

Figure 4. The summary of QTL and significant QTL-by-environment interaction (marked as * in red) identified for panicle length (PL in mm), primary branching number (PBN), and secondary branching number (SBN), along with QTL from flowering (FL50), plant height (HT) and tiller count (TC) originally identified from Lowry et al. (2019).

Figure 5. The additive effects of each QTL identified for (a) panicle length (PL in mm), (b) primary branching number (PBN), and (c) secondary branching number (SBN) across geographic regions ordered by from south to north. Genstat reports all of the means as equal when there is not a significant effect of the environment in the model.

Figure 6. The evaluation of the multienvironment mixed model (Eq. 1) using independent datasets from the three sites (KBSM, CLMB, and PKLE) for panicle length (PL), number of primary branches (PBN), and number of secondary branches (SBN).

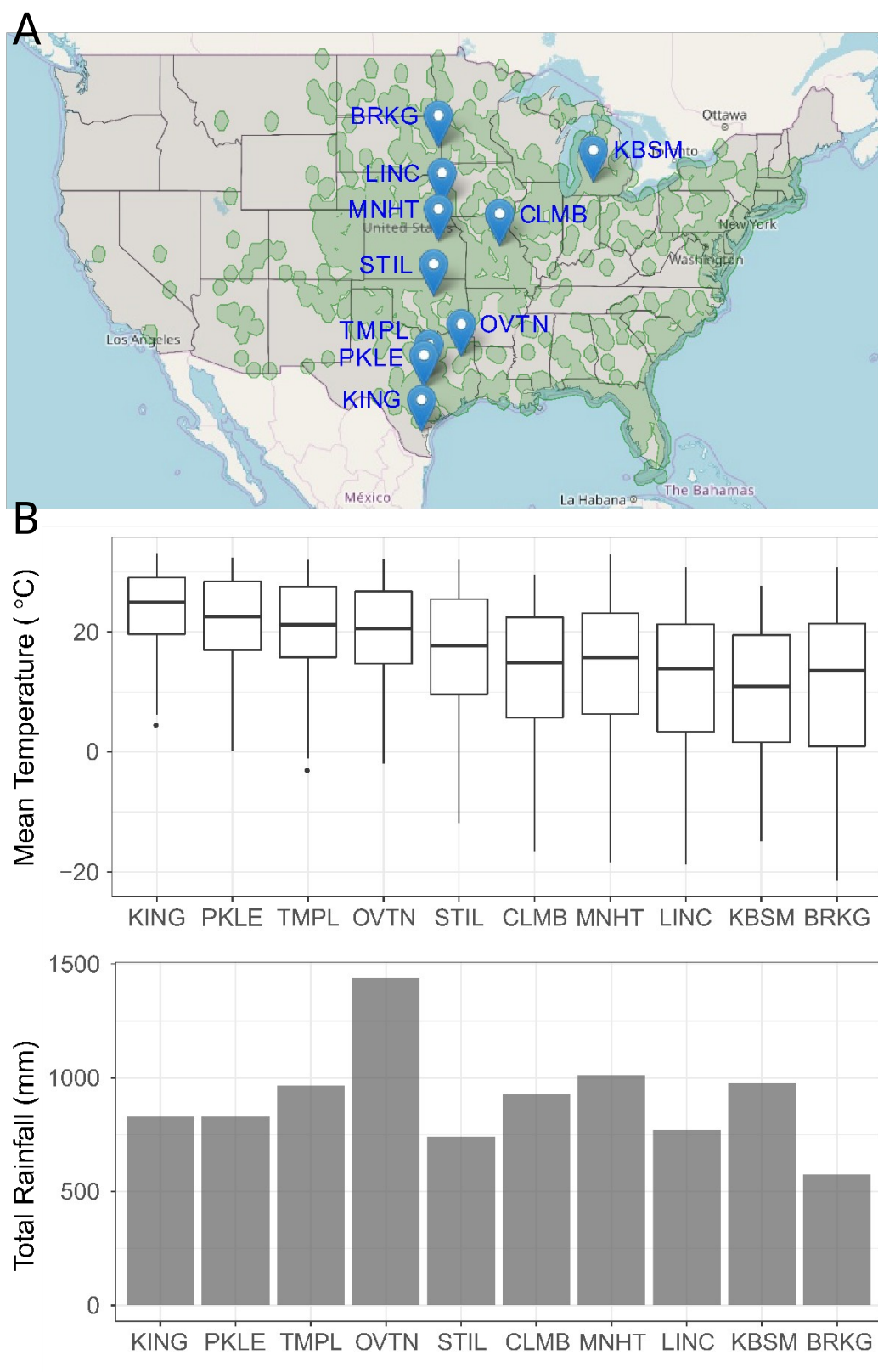


Figure 1

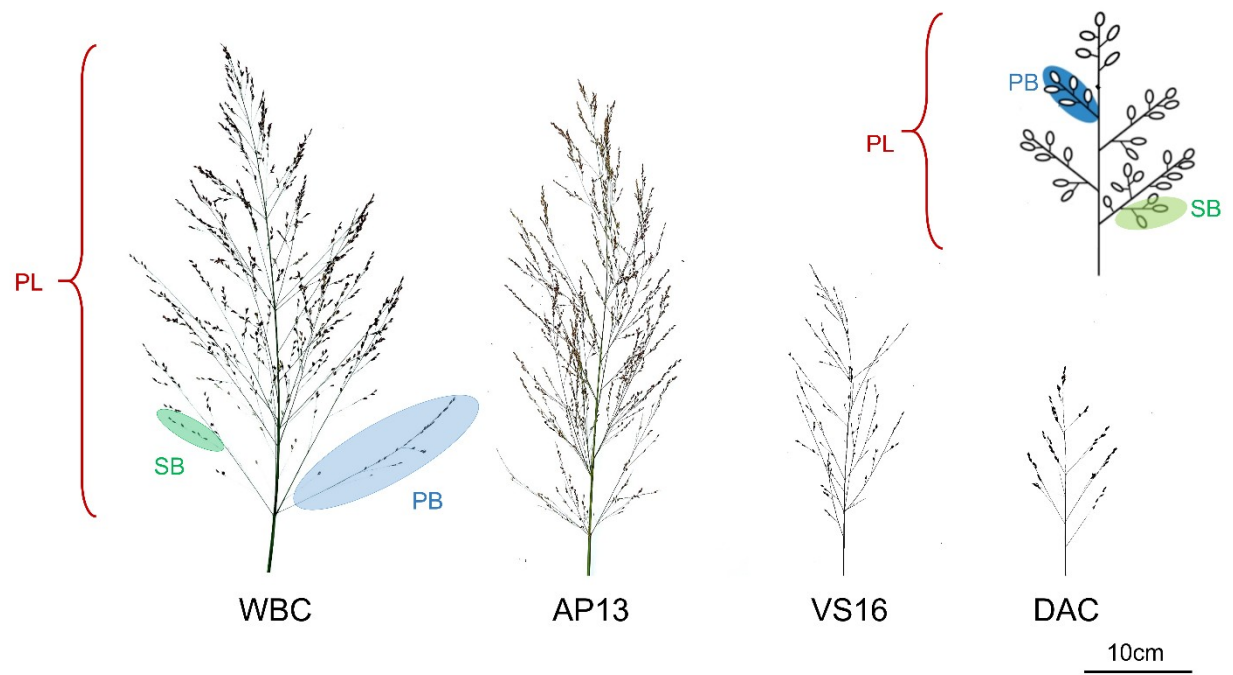


Figure 2

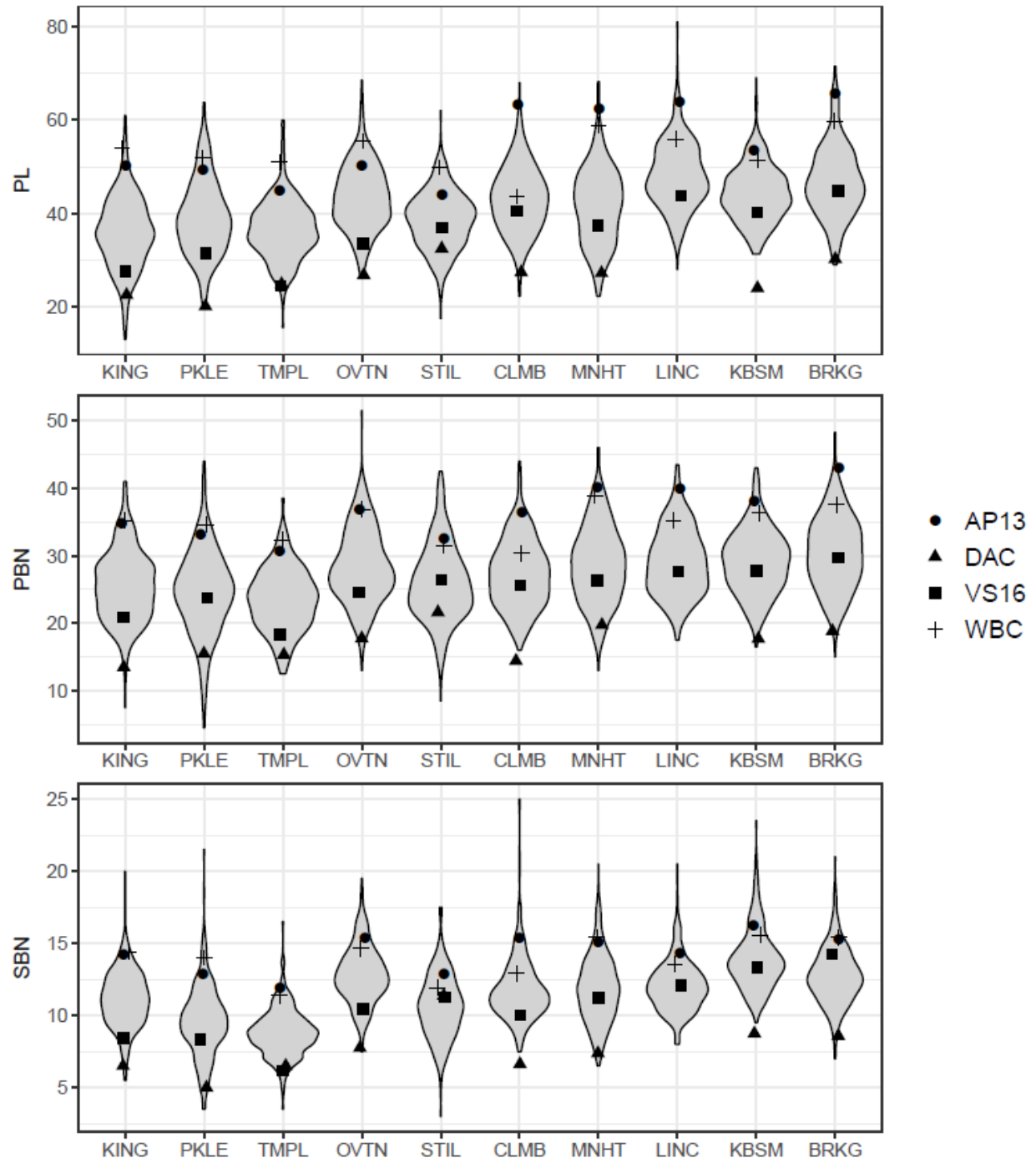


Figure 3

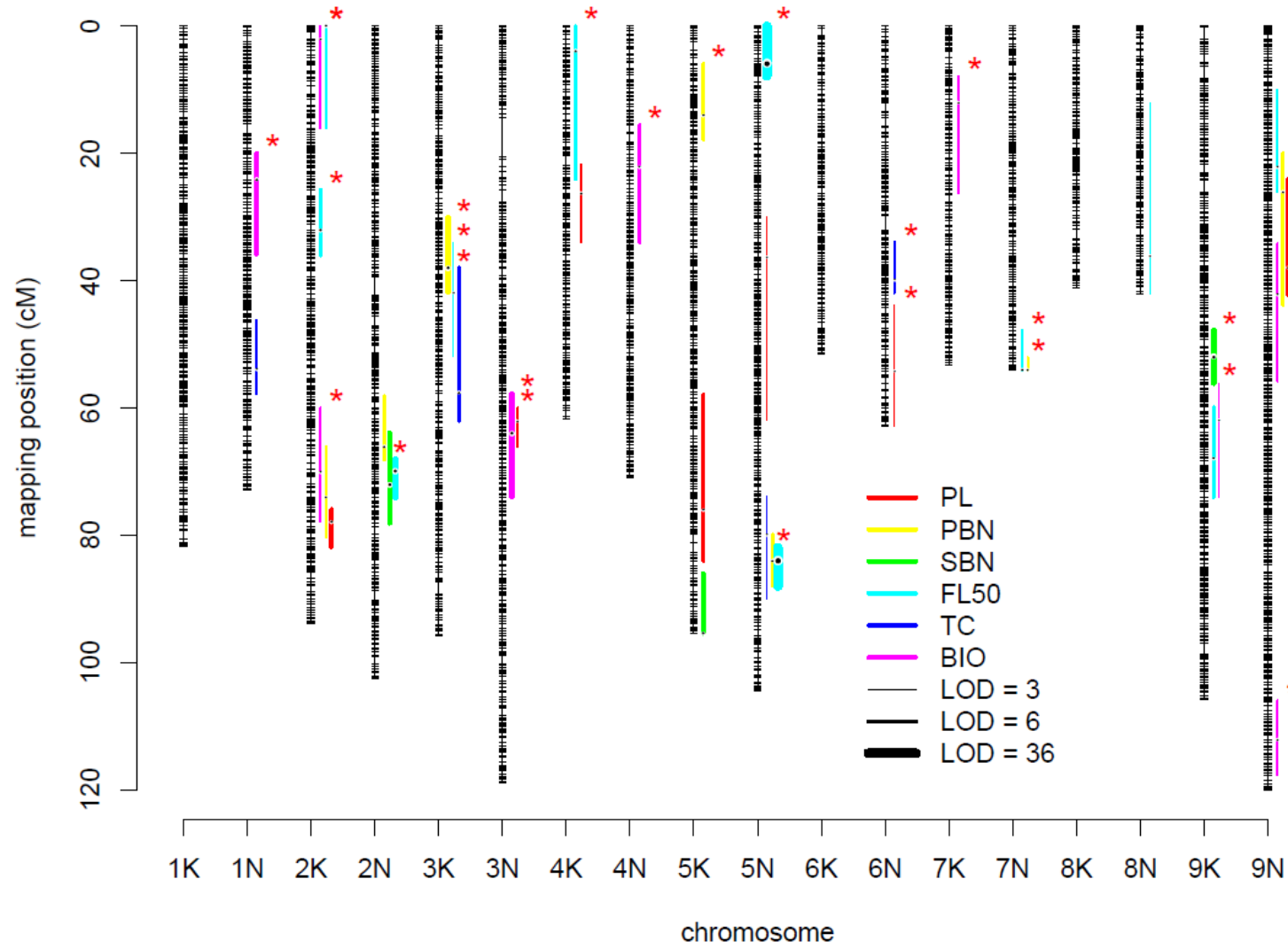


Figure 4

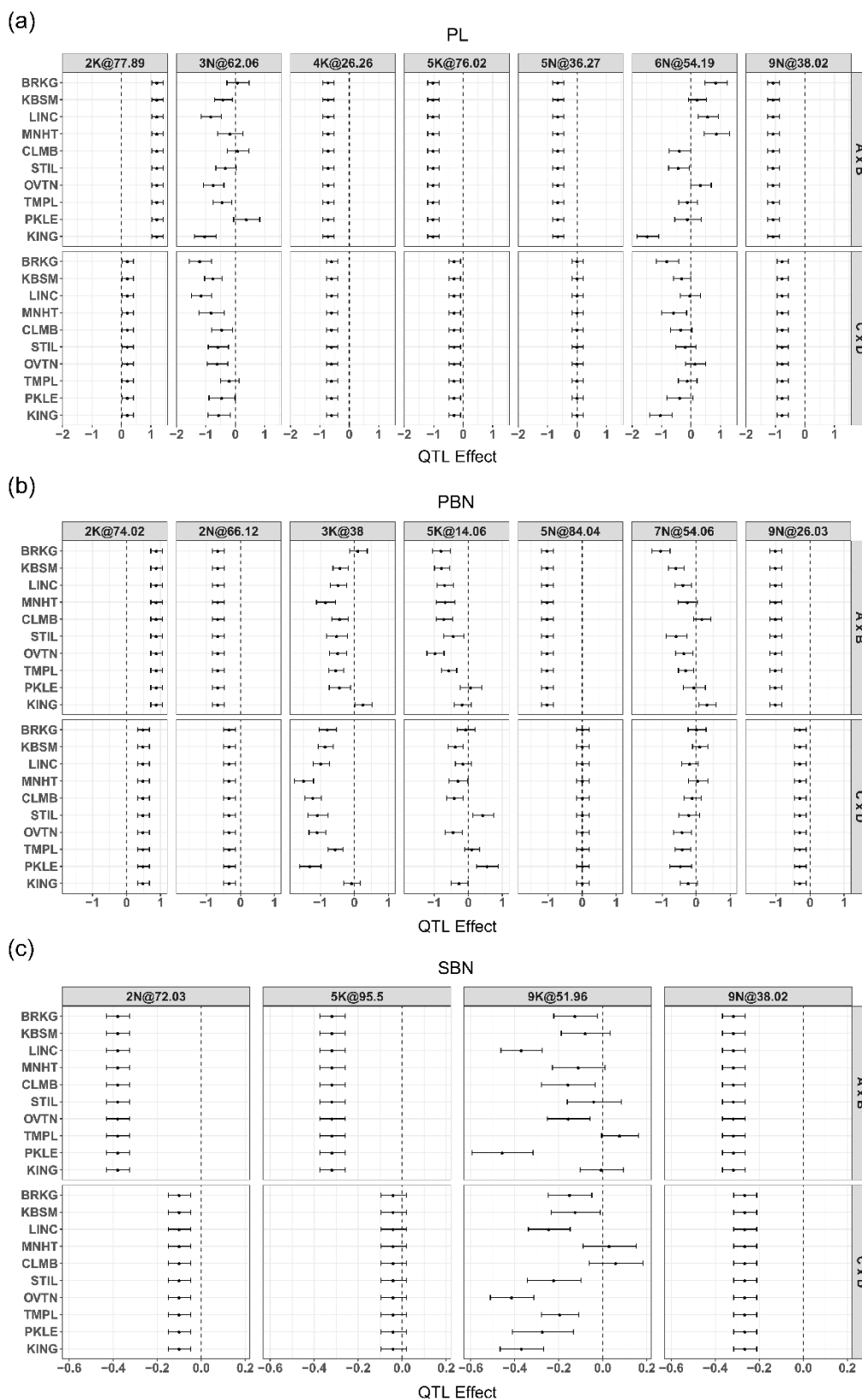


Figure 5

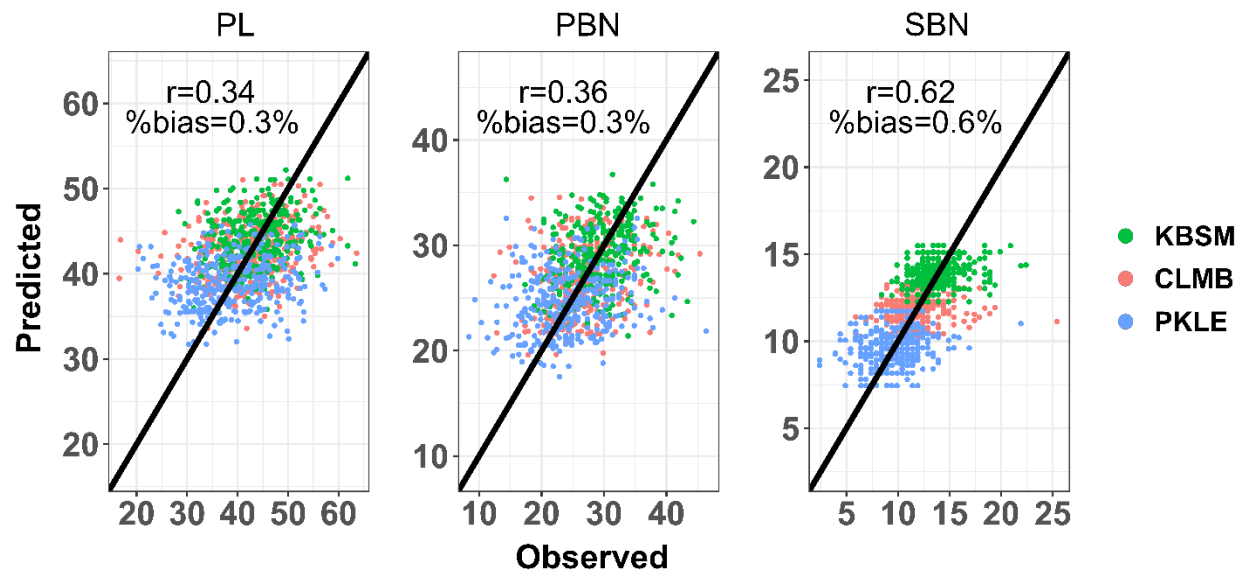


Figure 6