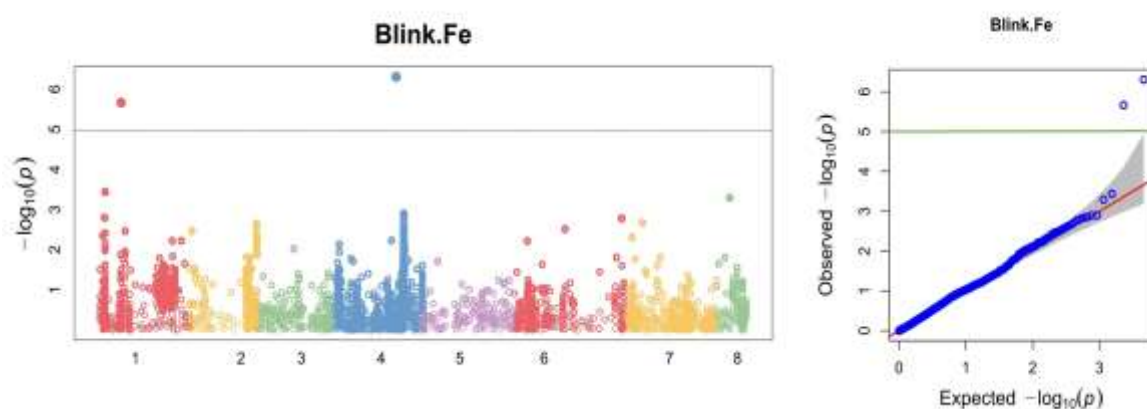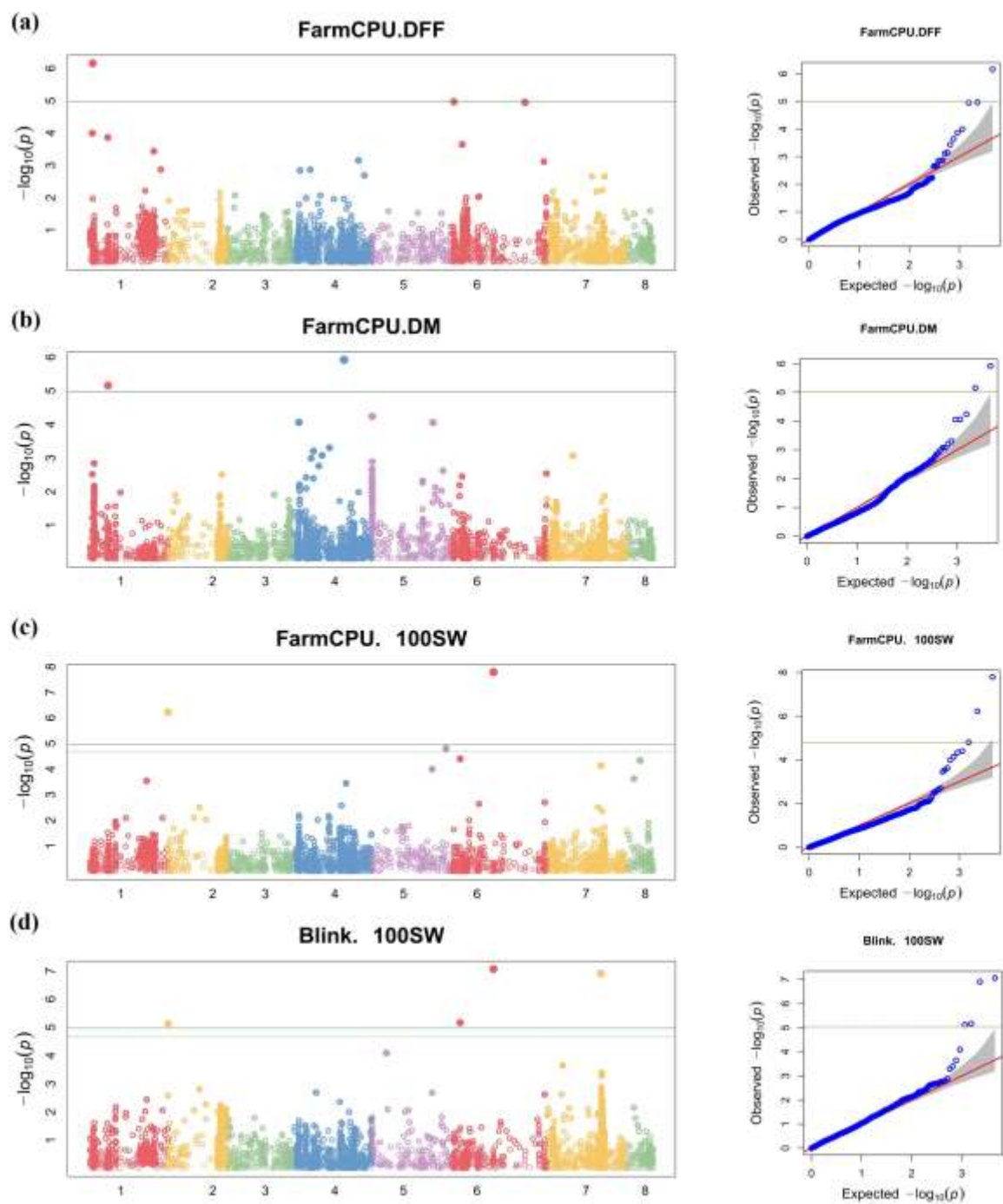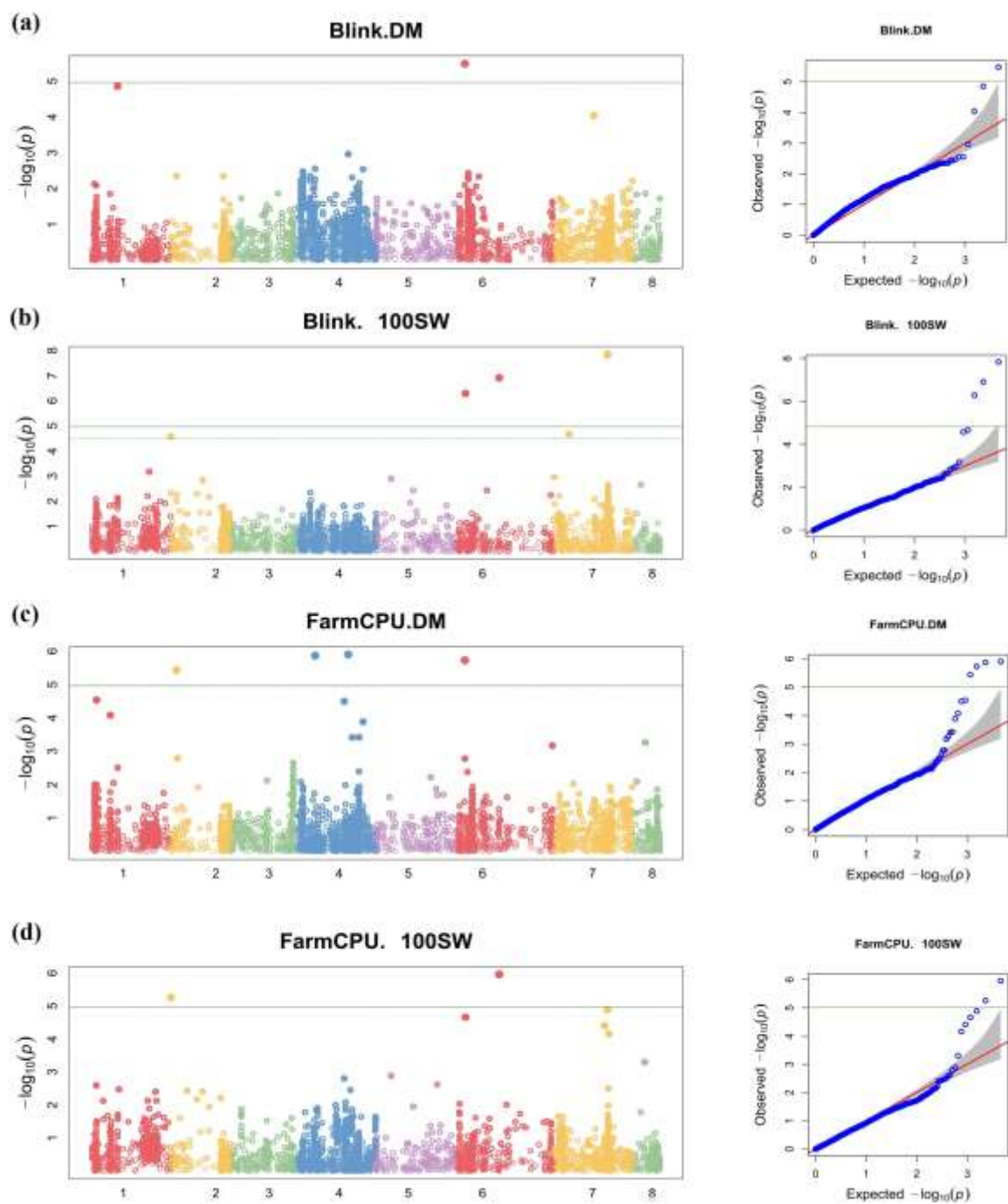**Supplementary Figure S1**. Manhattan plots illustrated significant P-value associated with grain protein content in chickpea under NSI.
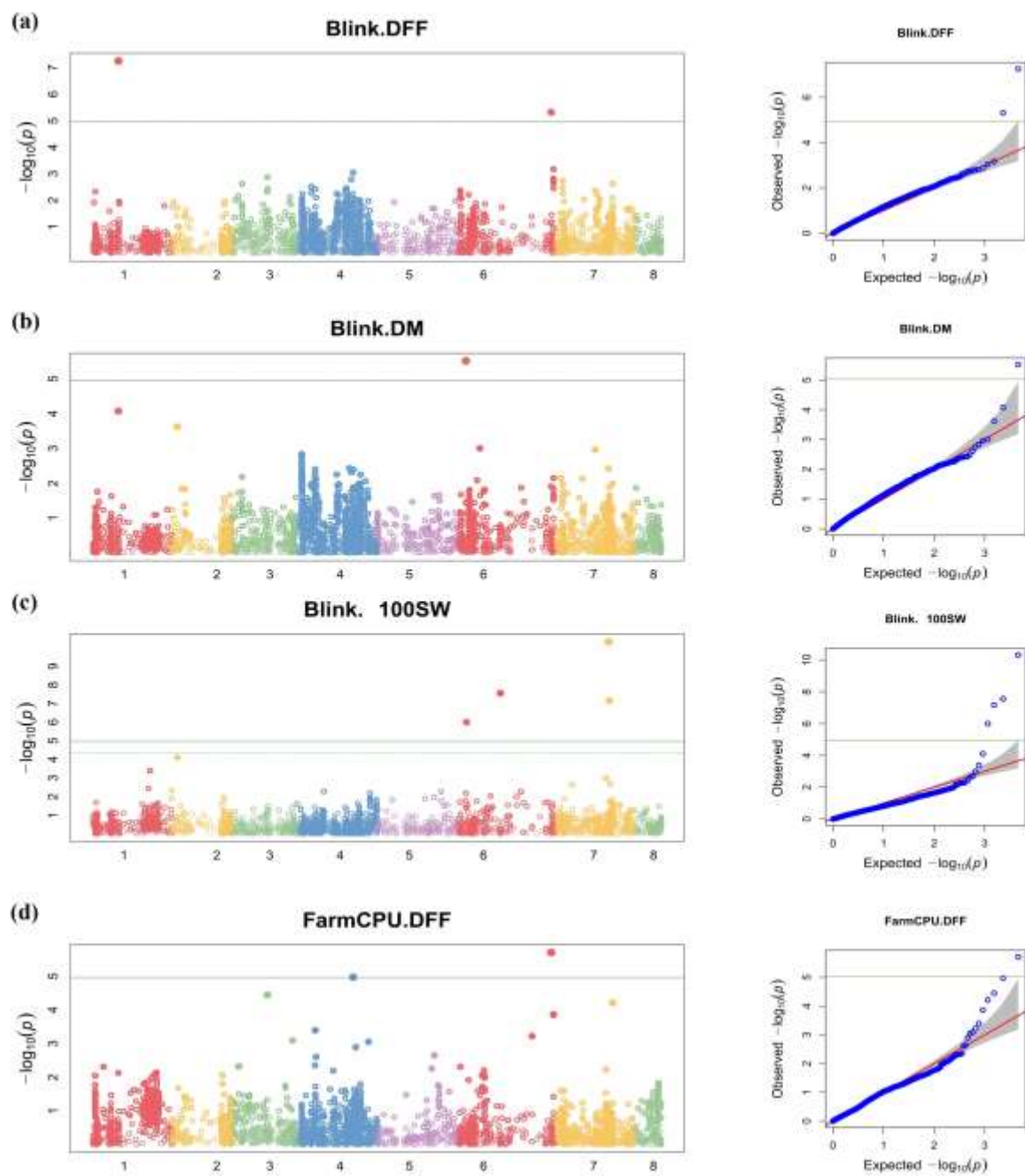

Supplementary Figure S2. Manhattan plots illustrated significant P-value associated with grain Fe content in chickpea under NSII.
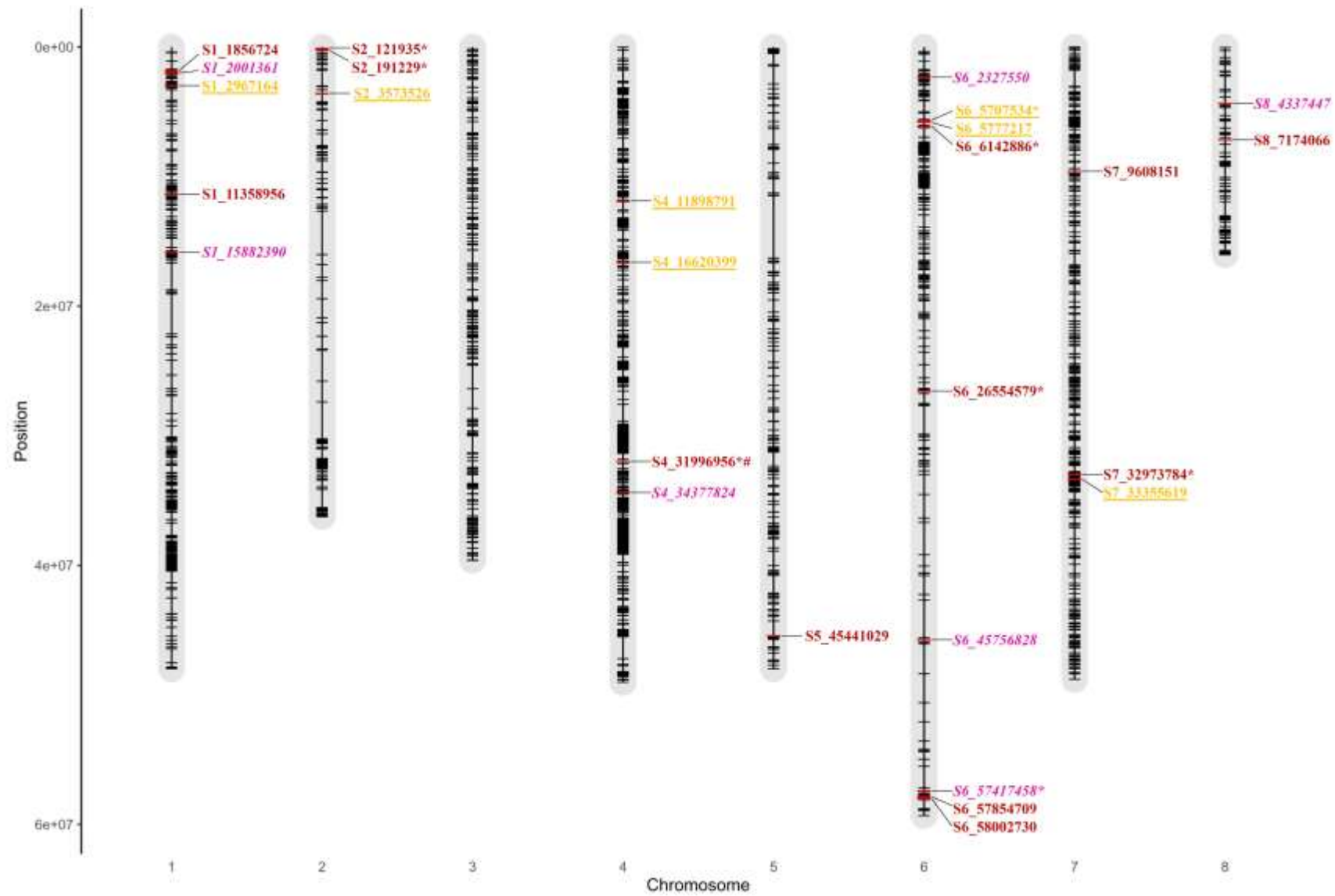
Supplementary Figure S3. Manhattan plots illustrated significant P-value associated with, DFF (a), DM (b), 100 SW (c and d) in chickpea under NSI. Dotted line-suggestive MTAs at FDR cutoff P<0.05.

Supplementary Figure S4. Manhattan plots illustrated significant P-value associated with DM (a and c), 100 SW (b and d) in chickpea under pooled seasons. Dotted line-suggestive MTAs at FDR cutoff P<0.05.

Supplementary Figure S5. Manhattan plots illustrated significant P-value associated with DFF (a and d), DM (b), 100 SW (c) in chickpea under NSII. Dotted line-suggestive MTAs at FDR cutoff P<0.05.

Supplementary Figure S6. Visualization of significantly associated SNPs (MTAs) along with co-associated SNPs (*) over the seasons on chickpea chromosomes for DFF (Pink- **Bold** *Italic*), DM (Yellow-**Bold** <u>underline</u>), 100 SW (Maroon- **Bold**).