

## Reviewer Report

**Title: Association Mapping Across a Multitude of Traits Collected in Diverse Environments in Maize**

**Version: Original Submission**    **Date: 5/3/2022**

**Reviewer name: Yingjie Xiao, Ph.D.**

### Reviewer Comments to Author:

The authors described a study of integrating multiple published datasets for reanalysis. They combined previously community panel data and newly collected data in the present study, finally assembling 1014 accessions with 18M SNP markers and 162 traits at different environments. They used a resample-based GWAS method to reanalyze this assemble dataset, and identified 2154 suggestive associations and 697 confident associations. They found genetic loci were pleiotropic to multiple traits. As the authors mentioned, I acknowledge their efforts for collecting and assembling different sources of previously datasets, which should be useful for the maize community. However, to the manuscript per se, I feel the paper seems not to be sufficiently quantified regarding the novelty and significance of reported findings. If the authors could present several novel results because the previous studies had the limitations on population size, diversity, trait dimensions and environments. In this study, the authors seemed trying to present like this, but it may be improved further and more. It's hard to let me understand there are some novel things which was found due to the merged large dataset. On the other hand, using this assembled dataset, I'm not very clear what's the scientific questions that the authors want to address. In technical sense, I'm wondering how did authors deal with the batch effects when merging datasets phenotype from different environments? It's not comparable for the phenotypes from different accessions collected in different environments. It's hard to figure out the phenotypic difference is caused by genotype, environment, or their interaction. The introduction section lacked the proper review for the project background, related progress and publications and findings.

### Methods

Are the methods appropriate to the aims of the study, are they well described, and are necessary controls included? Choose an item.

### Conclusions

Are the conclusions adequately supported by the data shown? Choose an item.

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Are you able to assess all statistics in the manuscript, including the appropriateness of statistical tests used? Choose an item.

### **Quality of Written English**

Please indicate the quality of language in the manuscript: Choose an item.

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