

Reviewer Report

Title: Chromosome-level reference genome of tetraploid *Isoetes sinensis* provides insights into evolution and adaptation of lycophytes

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Reviewer Comments to Author:

The authors have reported a high-quality genome of *Isoetes sinensis*, which represents an important lineage. They have also revealed the polyploidy history and whole-genome duplications (WGDs) of lycophytes. The presence and absence of key genes have provided insights into the environmental adaptation of lycophytes. This genomic resource is significant and will attract researchers focused on plant evolution, phylogeny, adaptation, and related areas. I have a few questions and suggestions regarding the manuscript. Major comments: 1. Throughout the entire manuscript, the authors did not perform any analyses related to conservation. Therefore, I suggest that they either delete the related description of conservation in the abstract or conduct some relevant analyses (such as PSMC, genetic diversity, or others). 2. As a data note article, the quality of the genome assembly should be thoroughly evaluated. However, this aspect was poorly analyzed in this work. For example, metrics such as QV score (using Merqury), LAI (using LTR_retriever), read mapping rate, and coverage should be added. Additionally, tools like `purge_dups` could help identify uncollapsed duplications, and this aspect also requires evaluation. Minor comments: 3. Figure S2 is important as it shows the phylogenetic position and helps readers understand its significance. Hence, I suggest moving this figure into the main text as a separate figure or combining it with others. 4. The different colors in Figure 4 should be explained within the figure itself. It may be more suitable to move this figure to the supplementary section since it only reports gene presence and absence.

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