

Reduction of genotyping marker density for genomic selection is not an affordable approach to long-term breeding in cross-pollinated crops

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The Manuscript Microscope Sentence Audit is a research paper introspection system that parses the text of your manuscript into minimal sentence components for faster, more accurate, enhanced proofreading.

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Manuscript Source: <https://www.biorxiv.org/content/10.1101/2021.03.05.434084v1>

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The combined approaches ensure easier, faster, more effective proofreading.

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- Depending on the source of the input text, the Sentence Audit may contain occasional html artefacts that are parsed as sentences (E.g. "Download figure. Open in new tab").
- Always consult the original research paper as the true reference source for the text.

Contact Information:

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All queries, feedback or suggestions are also very welcome.

Research Paper Sections:

The sections of the research paper input text parsed in this audit.

[illegible]

Title **Reduction of genotyping marker density for genomic selection is not an affordable approach to long-term breeding in cross-pollinated crops**

S1 [001] ABSTRACT

S1 [002] The selection of informative markers has been studied massively as an alternative to reduce genotyping costs for the genomic selection (GS) application.

The selection ...
... of informative markers has been studied massively ...
... as an alternative ...
... to reduce genotyping costs ...
... for the genomic selection ...
... (GS) ...
... application.

S1 [003] Low-density marker panels are attractive for GS because they decrease computational time-consuming and multicollinearity beyond more individuals can be genotyped with the same cost.

Low-density marker panels are attractive ...
... for GS ...
... because they decrease computational time-consuming ...
... and multicollinearity ...
... beyond more individuals can be genotyped ...
... with the same cost.

S1 [004] Nevertheless, these inferences are usually made empirically using “static” training sets and populations, which are adequate only to predict a breeding program’s initial cycles but might not for long-term cycles.

Nevertheless, ...
... these inferences are usually made empirically ...
... using “static” ...
... training sets ...
... and populations, ...
... which are adequate ...
... only to predict a breeding program’s initial cycles ...
... but ...
... might not ...
... for long-term cycles.

S1 [005] Moreover, to the best of our knowledge, none of these inferences considered the inclusion of dominance into the GS models, which is particularly important to predict cross-pollinated crops.

Moreover, ...
... to the best ...

... of our knowledge, ...
... none ...
... of these inferences considered the inclusion ...
... of dominance ...
... into the GS models, ...
... which is particularly important ...
... to predict cross-pollinated crops.

S1 [006] Therefore, that reveals an important and unexplored topic for allogamous long-term breeding.

Therefore, ...
... that reveals an important ...
... and unexplored topic ...
... for allogamous long-term breeding.

S1 [007] To achieve this goal, we employed two approaches: the former used empirical maize datasets, and the latter simulations of long-term breeding cycles of phenotypic and genomic recurrent selection (intrapopulation and reciprocal).

To achieve this goal, ...
... we employed two approaches: ...
... the former used empirical maize datasets, ...
... and the latter simulations ...
... of long-term breeding cycles ...
... of phenotypic ...
... and genomic recurrent selection ...
... (intrapopulation ...
... and reciprocal).

S1 [008] Then, we observed the reducing marker density effect on populations (mean, the best genotypes performance, accuracy, additive variance) over cycles and models (additive, additive-dominance, specific combining ability (SCA)).

Then, ...
... we observed the reducing marker density effect ...
... on populations ...
... (mean, ...
... the best genotypes performance, ...
... accuracy, ...
... additive variance) ...
... over cycles ...
... and models ...
... (additive, ...
... additive-dominance, ...
... specific combining ability ...
... (SCA)).

S1 [009] Our results indicate that the markers reduction based on different linkage disequilibrium (LD) levels is viable only within a cycle and brings a significant decrease in predictive ability over generations.

Our results indicate ...
... that the markers reduction based ...

... on different linkage disequilibrium ...
... (LD) ...
... levels is viable ...
... only ...
... within a cycle ...
... and brings a significant decrease ...
... in predictive ability ...
... over generations.

S1 [010] Furthermore, in the long-term, regardless of the selection scheme adopted, the more makers, the better because they buffer LD losses caused by recombination over breeding cycles.

Furthermore, ...
... in the long-term, ...
... regardless ...
... of the selection scheme adopted, ...
... the more makers, ...
... the better ...
... because they buffer LD losses caused ...
... by recombination ...
... over breeding cycles.

S1 [011] Finally, regarding the accuracy, the additive-dominant models tend to outperform the additive ones and perform similar to the SCA.

Finally, ...
... regarding the accuracy, ...
... the additive-dominant models tend ...
... to outperform the additive ones ...
... and perform similar to the SCA.

S2 [012] INTRODUCTION

S2 [013] Genomic selection (GS), using high-density single-nucleotide polymorphisms (SNPs) chips, has been widely adopted to improve prediction ability and response to selection (Hayes et al., 2009; Crossa et al., 2010).

Genomic selection ...
... (GS), ...
... using high-density single-nucleotide polymorphisms ...
... (SNPs) ...
... chips, ...
... has been widely adopted ...
... to improve prediction ability ...
... and response ...
... to selection ...
... (Hayes et al., 2009; ...
... Crossa et al., 2010).

S2 [014] However, these chips' genotyping cost is currently prohibitive, especially for low profitability species (Hou et al., 2020), and programs in poor regions, such as those in Latin America, Africa, and Southwest Asia.

However, ...
... these chips' genotyping cost is currently prohibitive, ...
... especially ...
... for low profitability species ...
... (Hou et al., 2020), ...
... and programs ...
... in poor regions, ...
... such as those ...
... in Latin America, ...
... Africa, ...
... and Southwest Asia.

S2 [015] In this context, density reduction of markers has been evaluated massively as an alternative to reduce genotyping costs for GS applications.

In this context, ...
... density reduction ...
... of markers has been evaluated massively ...
... as an alternative ...
... to reduce genotyping costs ...
... for GS applications.

S2 [016] This purpose can be achieved based on different criteria, for instance, marker effects of effect (Sousa et al., 2019), positions (Zhang et al., 2015), preselection based on haplotype block analysis (Ma et al., 2016); genome-wide association studies (GWAS) approach in which significant markers are selected to fit a prediction model (Subedi et al., 2013), and by linkage disequilibrium (LD), where highly correlated markers are eliminated by redundancy.

This purpose can be achieved based ...
... on different criteria, ...
... for instance, ...
... marker effects ...
... of effect ...
... (Sousa et al., 2019), ...
... positions ...
... (Zhang et al., 2015), ...
... preselection based ...
... on haplotype block analysis ...
... (Ma et al., 2016); ...
... genome-wide association studies ...
... (GWAS) ...
... approach ...
... in which significant markers are selected ...
... to fit a prediction model ...
... (Subedi et al., 2013), ...
... and by linkage disequilibrium ...
... (LD), ...
... where highly correlated markers are eliminated ...
... by redundancy.

End of Sample Audit

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