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# Modified two-part strategy to rapidly improve target traits



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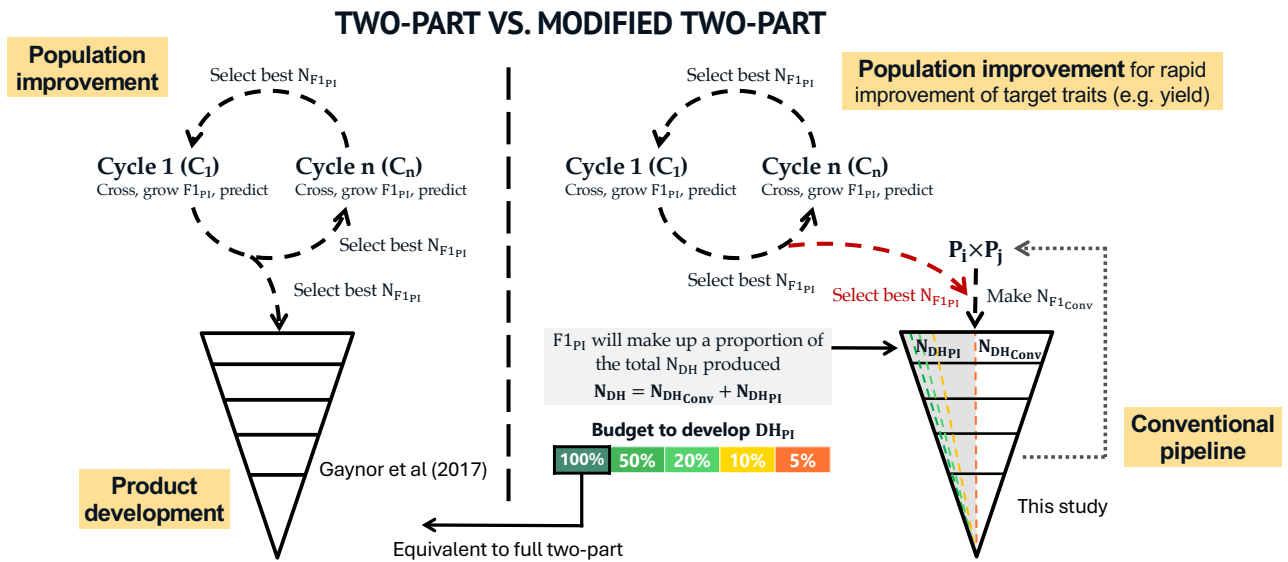
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\* where work was conducted † currently working

**OBJECTIVE** Propose a modified two-part strategy by combining the benefits of population improvement and the conventional pipeline to rapidly improve target traits while reducing the risks of a full two-part transition.



## MATERIALS AND METHODS

• Five variations of a hybrid breeding program simulated with AlphaSimR

• Three traits:

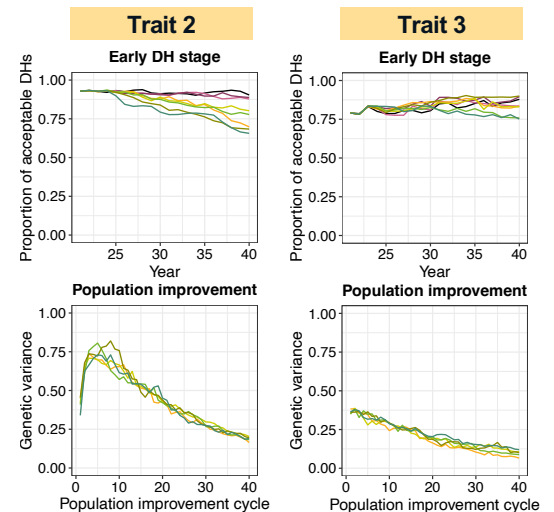
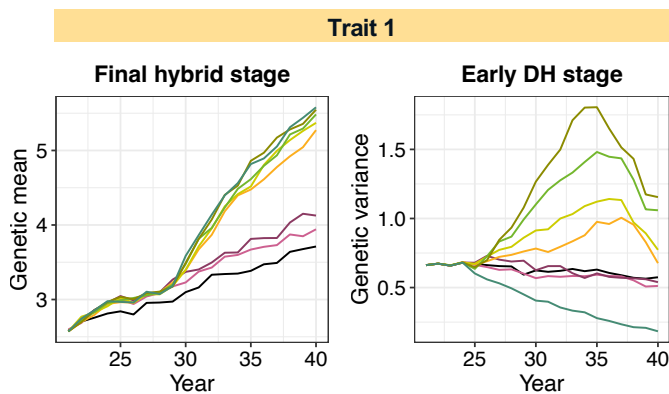
Trait 1: Target quantitative trait influenced by *realistic* GxE with GS in population improvement (e.g. yield)

Trait 2: Stable quantitative *correlated* (-0.3) trait with GS in population improvement (e.g. protein)

Trait 3: Simple *uncorrelated* quantitative trait with no GS or MAS in population improvement (e.g. disease)

• Desired gains index used for traits 1 and 2 in population improvement with  $d = (1, 0)$

## STUDY HIGHLIGHTS



## CONCLUSIONS

- Modified two-part strategy rapidly improves target quantitative traits such as yield and achieves gains comparable to the equally-sized full two-part strategy (regardless of GxE level) while maintaining the conventional pipeline.
- Managing correlated and unpredictable traits in rapid recurrent GS programs is important to keep aligned with breeding objectives.
- Managing genetic variation in rapid recurrent GS programs is important for both target and non-target traits.



Further information on this work is available from: Jon Bančić, email: jbančić@ed.ac.uk