Training genomic selection model across multiple breeding cycles increases genetic gain in oil palm

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Background
Reciprocal recurrent genomic selection (GS) schemes can increase annual genetic gain in oil palm. These schemes could be further improved by aggregating data of multiple breeding cycles to train the GS model.

Objectives
- Measure the prediction accuracy in parental populations and the genetic gain for hybrid bunch production with 2 approaches to train the GS model (Fig. A):
  - Tr2Gen = training on the 2 most recent breeding cycles
  - Tr1Gen = training on the last breeding cycle
  - and 2 RRGS schemes, over 4 cycles:
    - 2PT-2noPT = 2 cycles with progeny-tests, 2 with only GS
    - PT-noPT = progeny-tests every 2 cycles

Material and methods
A simulation was implemented with R, using the HaploSim and ASReml packages. GS used 2500 SNPs. The breeding schemes were simulated with 270 replicates.

Results and conclusion
Tr2Gen increased the selection accuracy in all cycles and breeding schemes compared to Tr1Gen, with an average increase of +6.6 % (Fig. B). This resulted in an higher genetic gain per cycle, on average +12.9 % (Fig. C), with PT-noPT performing slightly better than 2PT-2noPT.

Tr2Gen with PT-noPT was the best breeding scheme