

Comparison of two breeding strategies for soft wheat populations

Problems

For many years, French farmers have developed diversified soft wheat farm cultivars for organic farming, by using mass selection, mixtures (called dynamic populations) or manual crosses (CCP). How do we determine which method is best between manual crosses and mixtures? What is the influence of the breeding strategy on the agronomical behavior of populations and their phenotypical diversity?

Solutions

Two populations have been created in 2015 : the first one results from the manual two by two crossings of six parents from different populations, whereas for the second one, the six parents were mixed without crossings. The populations were cultivated and observed on two sites for several years and were compared by observing several characteristics, such as phenotypical diversity or agronomical traits. The first results seem to show that after five years of evolution, in different location and under natural and farmer selection, the breeding method had a smaller effect on the agronomical behavior and the phenotypical diversity of a population, than location adaptation and human selection.

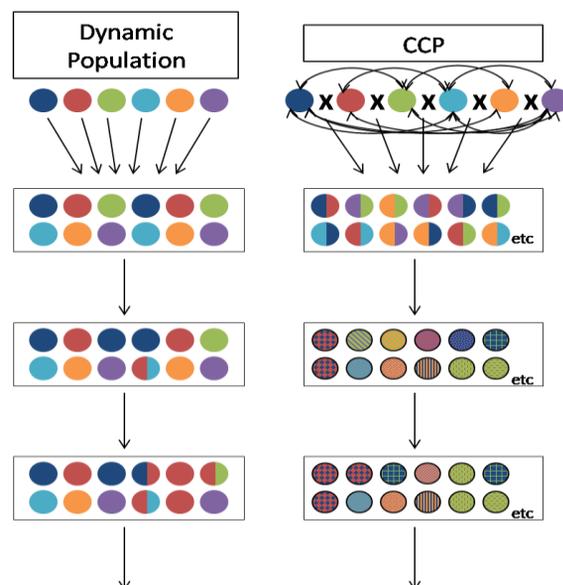


Figure: Representation of the two methods to build the populations

Practical recommendations

- Manual crossings do not seem to create more diversity than mixtures in the case of wheat
- The breeding method chosen to create populations does not seem to have an influence on the agronomical behavior of the populations
- Manual crosses can be challenging for farmers and practitioners. Therefore, it is easier and more interesting to start creating diversified population by mixing cultivars, rather than crossing them with one-another.

Further information

1. Comparison of two strategies for creating diversified populations of soft wheat, adapted to organic farming (in French): <https://orgprints.org/37983/>
2. PA#56 How to create diversified variety mixtures based on gene bank resources
3. PA#58 Influence of location and human selection on two soft wheat populations
4. Comparative analysis of performance and stability among CCPs, variety mixtures and pure lines of winter wheat in organic and conventional (Doering T.F. et al. 2015 dx.doi.org/10.1016/j.fcr.2015.08.009)

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