PRACTICE ABSTRACT No. 20

Target audience: farmers, researchers, seed networks

Assessment of locally adapted wheat variety mixtures

Problems

A growing number of organic farmers cultivate **variety mixtures** for their ease of use and their ability to buffer stress and environmental heterogeneity. Farmers have to **choose the varieties for designing their mixtures**, but few guidelines have been proposed so far.

In the case of **winter wheat**, mixtures are usually assembled primarily based on yield. It is advised to mix varieties with **complementary levels and sources of** foliar disease **resistances** and to maintain homogeneity of **maturity** to ensure good quality. **Other varietal characteristics** might be considered, but very little is known about plant interactions within mixtures.

Furthermore, variety mixtures could also offer the possibility to finely tune the varietal choice to **local context**.

Solutions

Co-design of assembly rules

To guide farmers with optimised composition mixtures, the approach is to identify **assembly rules** for combining mixtures components[1]. A **participatory approach** based on workshops is particularly suitable for designing locally adapted mixtures. (→ see Practice Abstract #19)

Co-design and on-farm evaluation of farmers' mixtures

The assembly rules are then mobilised for **co-designing farmers' mixtures**, in accordance with farmers' practices and local environmental conditions. To test for adequacy with farmers' needs, the mixtures are assessed in **on-farm trials**.

Practical recommendations

Stripe design allows for comparisons with the corresponding varieties in pure stand (Fig.1) and this type of trial is easy to manage on farm by farmers. Stripes can be divided into three or four to provide replicates.

Figure: *Strip experimental design*

Further information

1. The assembly rules are currently being validated and integrated in a **multi-criteria assessment tool** to help farmers designing mixtures tailored to their terroirs: http://moulon.inra.fr/optimix/
2. Barot et al 2017. Designing mixtures of varieties for multifunctional agriculture with the help of ecology. *Agron. Sust. Dev.* 37: 13.
3. Wheatamix project: https://www6.inra.fr/wheatamix_eng/
4. CASABio project: https://www6.inra.fr/basc_eng/Research/Innovation-in-partnership/CASABio
5. Emma Forst 2018 (PhD thesis): https://tel.archives-ouvertes.fr/tel-02114929

Authors: Emma Forst & Isabelle Goldringer (INRAE)
Contact: forstemma@gmail.com, isabelle.goldringer@inra.fr
Publisher: ÖMKi Hungarian Research Institute of Organic Agriculture
Date: May 2020
LIVESEED: Boosting organic seed and plant breeding across Europe. LIVESEED is based on the concept that cultivars adapted to organic systems are key for realising the full potential of organic agriculture in Europe. Research project 2017-2021.
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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727230 and by the Swiss State Secretariat for Education, Research and Innovation under contract number 17.00090. The information contained in this communication only reflects the author's view. REA or SERI are not responsible for any use that may be made of the information it contains.