ecobreed
IMPROVING CROPS

Increasing the efficiency and competitiveness of organic crop breeding

PRACTICE ABSTRACT No. 9

Wheat breeding for organic farming

PROBLEMS:

- The area under organic cultivation in Europe has been growing steadily.
- The choice of wheat varieties adapted to organic farming is more limited than for conventional farming.
- The demands made on an organic wheat variety differ in part from those of conventional varieties. There are a number of characteristics, mostly complex, that have a higher priority in organic farming.
- Rising input prices, the increasing impact of climate change and the need for sustainability are creating a large opportunity for breeding wheat varieties adapted to organic farming.

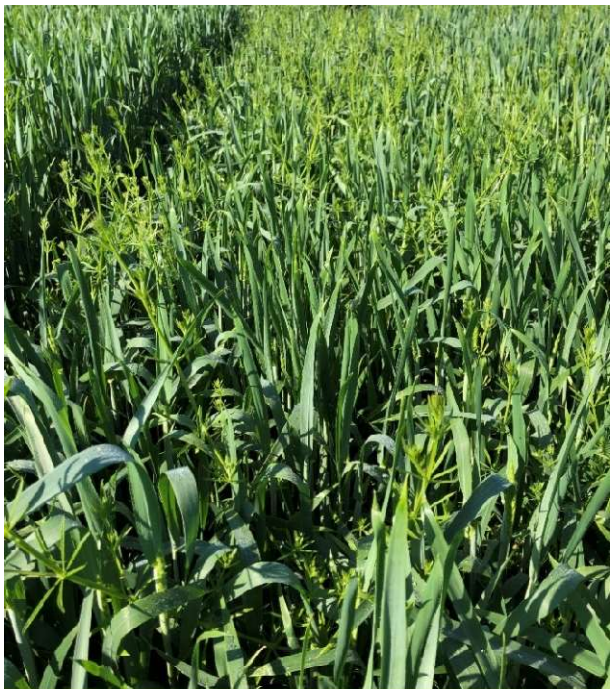

Fig. 1: High weed presure from Galium aparine in winter wheat with low weed suppression. Ecobreed trial 2021 Feldkirchen, Germany.

SOLUTIONS:

- Screening of parental and breeding lines for characteristics which are important for organic farming, like weed suppression, early and rapid seedling development, high soil coverage, disease resistance and high N use efficiency.
- Crossing of varieties with known traits which are important for organic farming.

PRACTICAL RECOMMENDATIONS:

- Direct selection of quantitative traits (e.g., yield, quality) influenced by Genotype x Environment interactions should be performed under organic conditions. For example, weed suppression, soil coverage, yield, end-use quality, N use efficiency.
- The use of marker assisted selection (MAS) can increase success in finding resistance genes to leaf, ear, and soil-borne diseases. Overall, promising applications of MAS in organic breeding will be to identify QTLs associated with complex traits, e.g., weed competition under different environmental conditions. Fortunately, methods are emerging that can improve the efficiency of selection for complex characters (Wolfe *et al.* 2008).

FURTHER INFORMATION

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ABOUT ECOBREED:

ECOBREED is a 5-year (2018-2023) project funded by European Union's Horizon 2020 research and innovation programme that will improve the availability of varieties and seed suitable for organic and low-input production. Activities will focus on four crop species i.e. wheat, potato, soybean and common buckwheat, selected for their potential contribution to increasing the competitiveness of the organic sector.

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