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CROP DIVERSITY & AGRONOMY

Diversifying wheat in organic farming

Opportunities to include underutilised wheat species in organic crop rotations

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Many types of wheat, now forgotten, may prove well suited to organic and low-input agriculture today. We explored three 'forgotten' relatives of wheat: einkorn, emmer and rivet. Various accessions, including landraces, old and, where available, modern varieties of each species were grown and observed under organic conditions in the UK.

- Einkorn (*Triticum monococcum*) is the first type of wheat ever domesticated. Its hulled grains are known for their high nutritional value. A tiny plant in its early stages, it grows vigorously to produce a high number of tiny ears. Quasi-immune to diseases, can grow very tall and be subject to lodging. However, modern, short varieties, were not as competitive and productive as old, longer-strawed landraces.
- Emmer (*Triticum turgidum ssp. dicoccum*) is another ancient relative of wheat with hulled grains, recently rediscovered in Europe thanks to its nutritional value and flavour. A vigorous plant from the early stages of development, it showed the highest incidence of foliar diseases in our trials, although with important differences across accessions.
- Rivet (*Triticum turgidum ssp. turgidum*) is a close relative of durum wheat, but well adapted to cool climates, and was in fact widely used in the British Isles in the past. Quasi-immune to diseases, and very vigorous and competitive throughout the whole cycle, it is very tall, thus subject to lodging. However, it showed the highest productivity in our trials, mostly linked to its big ears and large grains.

Left to right: miracle rivet, emmer, einkorn, rivet, bread wheat

All three species thrived in environments where modern wheat varieties failed. Selected accessions were further tested in different rotational position and tillage systems. We found that these minor cereals can be sown as second cereal and/or under reduced tillage and grow shorter, i.e., less prone to lodging, without yield penalties.

FURTHER READING

1. Costanzo *et al.* (2019) doi.org/10.3390/su11226304
2. DIVERSIFOOD database: tinyurl.com/yybbthvx
3. Friedrich *et al.* (2016) doi.org/10.1016/j.tplants.2016.05.005
4. ORC Bulletin 128, pp. 9-12 tinyurl.com/yy7jzbwc

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