



Breeding for integrated weed management

Unpicking the complexity of weed-crop interactions

AUTHOR

Ambrogio Costanzo

CONTACT

Ambrogio Costanzo

ORC ACKNOWLEDGEMENTS

Dominic Amos, Charlotte Bickler

YEAR

2017-present

FUNDING - PROJECT

EU Horizon 2020

- LIVESEED

DEFRA

- LiveWheat



How to effectively implement integrated weed management, i.e., to manage weeds without only relying on herbicides or intensive soil disturbance? A useful starting point is acknowledging that the main tool to regulate weeds is the crop itself¹, the way it is established and its traits. However, there have been very little developments in breeding for, and choice of, weed suppressive cultivars. This is mostly because crop-weed interactions depend on the abundance and composition of the weed community, climatic and environmental factors, and are therefore extremely complex².

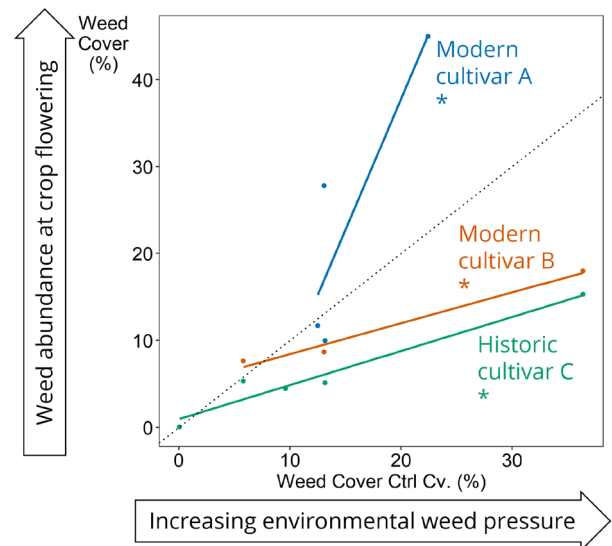
To unravel this complexity, with the ongoing experiment presented in [Factsheet no. 2](#), we have been observing and assessing weed communities in organic winter wheat fields where different cultivars were grown alongside one another, obtaining a few interesting results³:

- wheat cultivars do differ in terms of weed abundance at crop flowering
- these differences are especially apparent in environments with high weed pressure
- long-straw, historic cultivars allow lower weed abundance than modern, short-straw cultivars
- amongst modern cultivars, those who have higher vigour (estimate of above-ground biomass) at the onset of stem extension allow lower weed abundance than others
- more weed-suppressive cultivars seem to show better nitrogen-use efficiency.

Hence, although complex, cultivar choice and breeding for integrated weed management in wheat can be facilitated by considering, alongside yield and disease resistance, crop vigour in early stages. It is however important to observe and select cultivars in conditions as representative as possible of, or ideally directly into, the target environments and cropping systems.

FURTHER READING

1. Gaba et al. (2018) doi.org/10.1002/ecs2.2413
2. Nuijten et al. (2020) tinyurl.com/ykc3r7cc pp. 74-79
3. Costanzo et al. (2021) doi.org/10.1007/s13593-021-00706-y



Dynamic stability of weed cover in three wheat cultivars grown in several farms: as weed pressure increases, “Modern cultivar B” and “Historic cultivar C” allow lower weed cover than the control cultivar, whereas “Modern cultivar A” is overwhelmed by weeds. Interim results, Spring 2020