

Use of intercropping systems to reduce the growth of weeds under Mediterranean pedoclimatic conditions

Andreas Michalitsis, Paschalis Papakaloudis, Georgios Manassis, Zoitsa Basdagianni, Ioannis Bossis, Christos Dordas

School of Agriculture, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece, email: chdordas@agro.auth.gr

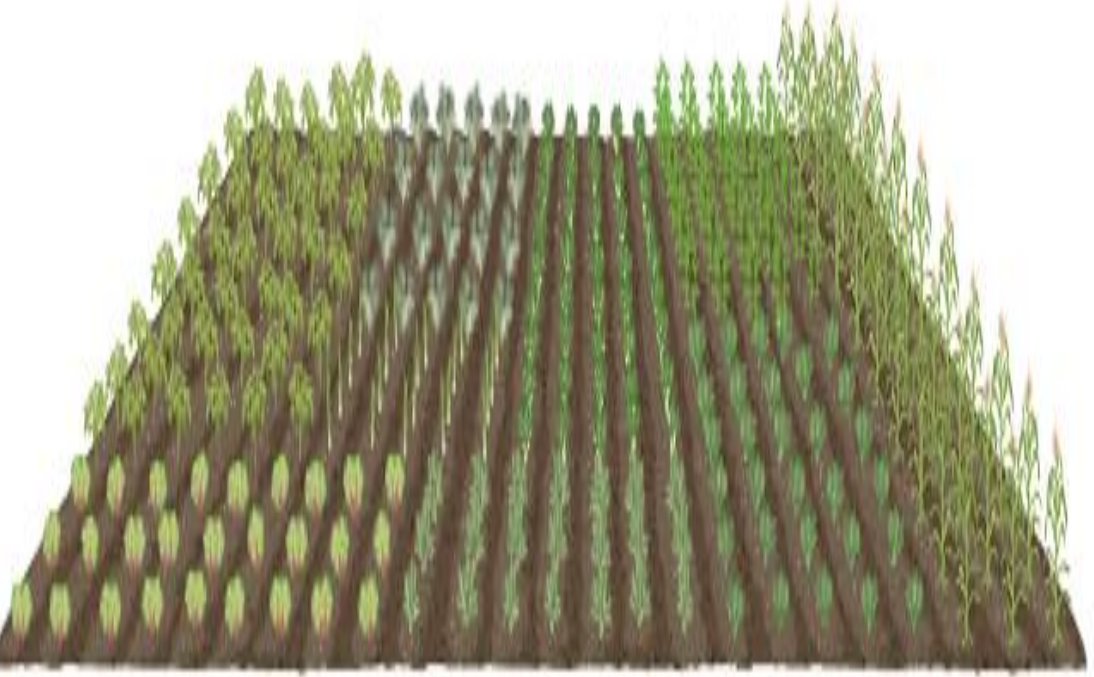
Introduction

Weed management depends on synthetic herbicides despite the widely accepted environmental & health impacts and the growing herbicide resistance. Agroecology seeks to transform food & agriculture systems, providing long-term solutions based on natural processes.



Agroecological practices aim to reduce or substitute inputs including herbicides, while maintaining or even improving crop productivity.

The objective of the present study was to determine the effect of intercropping as an agroecological intervention on the growth of weeds.



Materials and Methods

Experimental design

- Experimental Farm of Aristotle University of Thessaloniki (AUTH)
- Growing Season 2023-2024
- Randomized Complete Block Design (RCBD)

Plant material

- Soft wheat
- Field pea
- Faba bean
- Soft wheat-Field pea (25:75 Intercrop) (figure 1A)
- Soft wheat-Faba bean (25:75 Intercrop) (figure 1B)
- Commercial mixture 1 (20% soft wheat, 10% oat, 35% triticale, 15% field pea and 20% common vetch)
- Commercial mixture 2 (30% soft wheat, 10% oat, 20% triticale, 15% field pea and 25% common vetch)

Measurements

- Weed biomass percentage (figure 2)

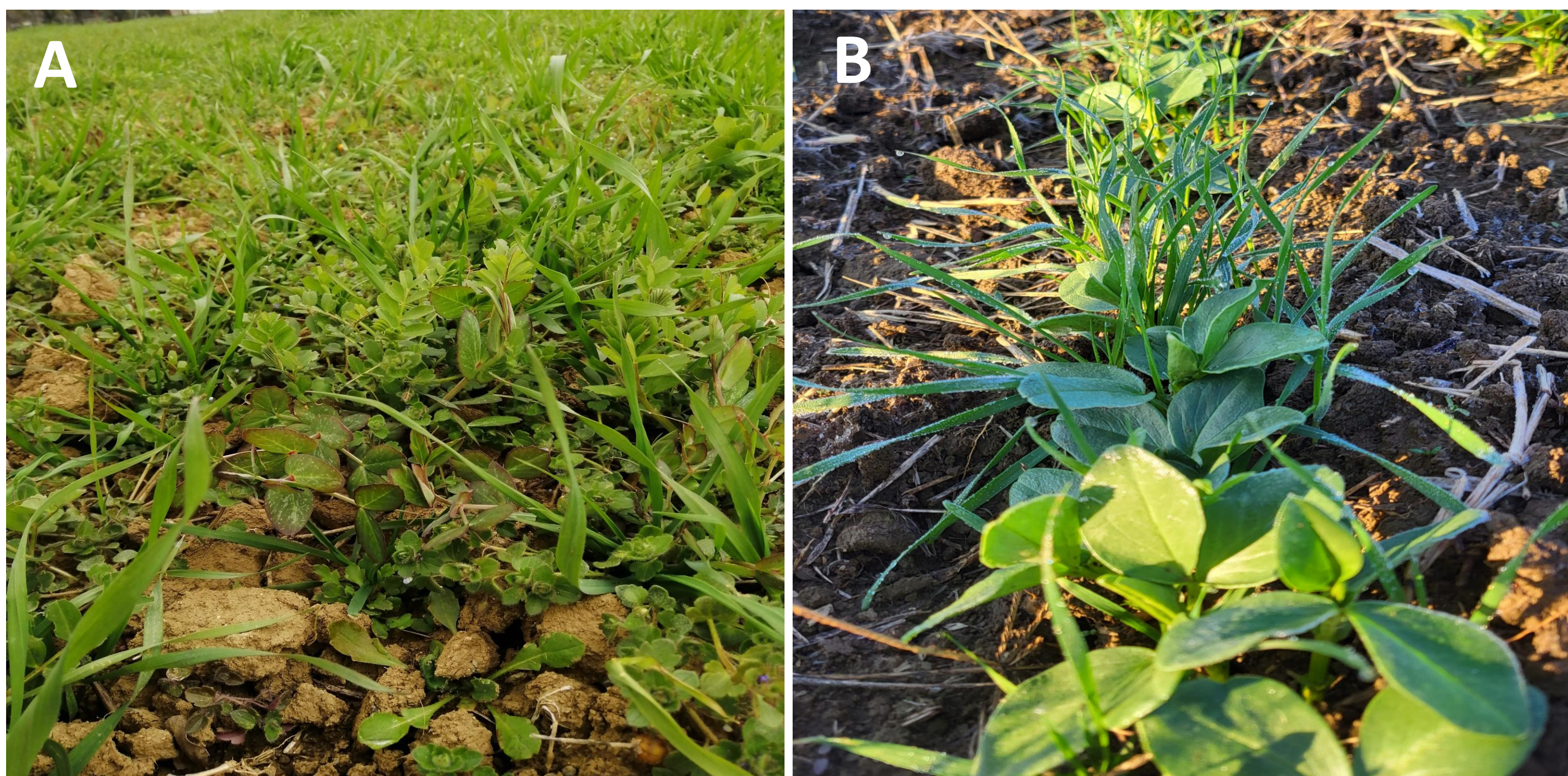


Figure 1. Soft wheat-Pea (A) and Soft wheat - Faba bean (B) intercropping.



Figure 2. Experimental field where the experiments took place.

Results & Discussion

Intercropping of wheat in the two commercial mixtures reduced growth of weeds (figure 3). Faba bean is a crop species that does not compete with weeds and therefore it showed the lowest ability to control weeds.

Weed growth is a critical parameter in agriculture as weeds compete with crops for light, water, and nutrients. To effectively control weeds, agrochemicals are extensively used, whereas mechanical weed control is used to a lesser degree when appropriate. Intercropping can potentially reduce weed pressure. However, proper intercropping schemes and sowing density are essential for effectively suppressing weed growth and to improve the sustainability of the cropping systems (Verret et al., 2017; Gu et al., 2021).

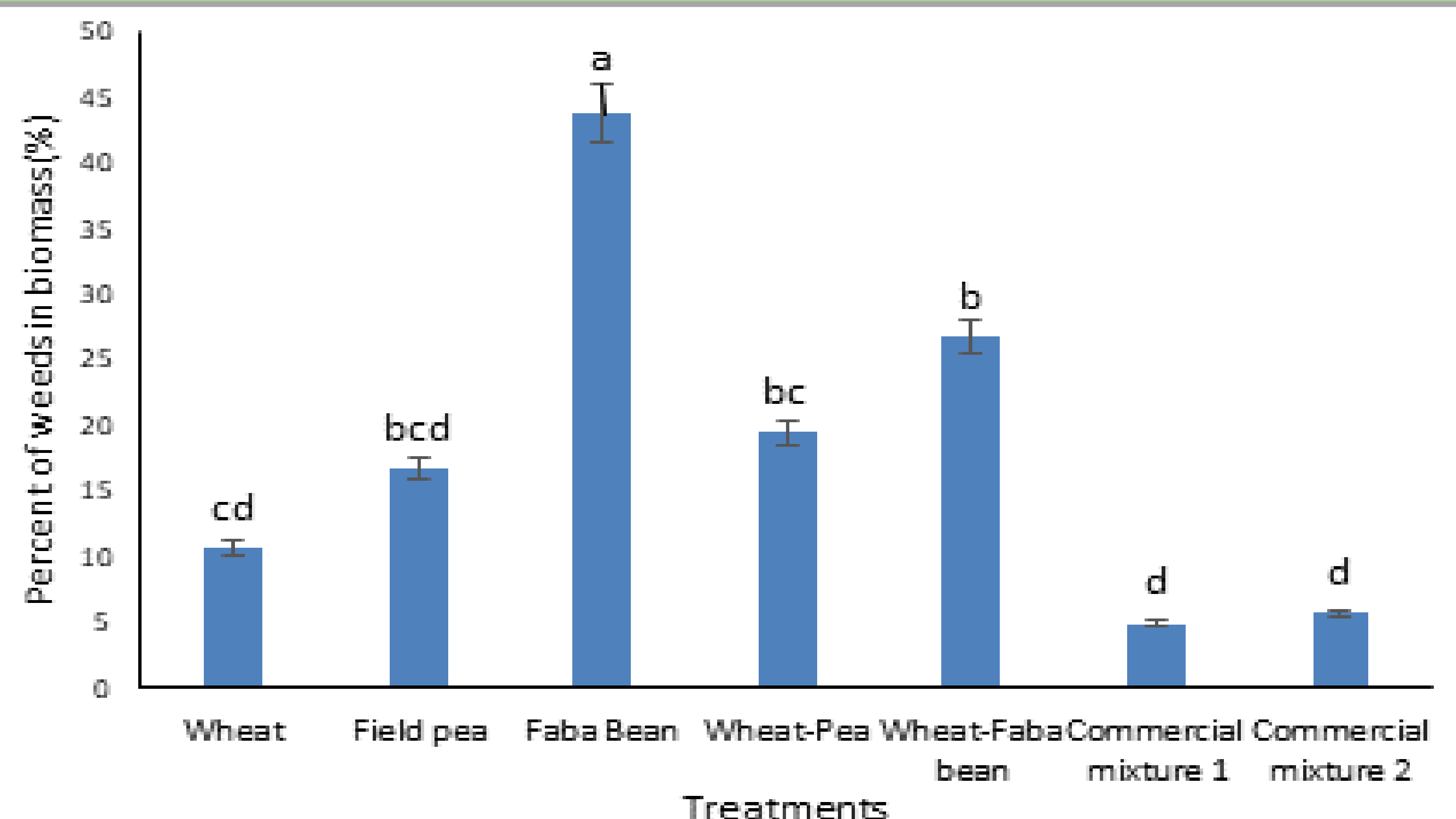


Figure 3. Effect of intercropping and increased biodiversity on reducing the weed pressure.

Conclusions

Although weed control by intercropping alone is a difficult task, ongoing experiments indicate that certain mixtures of oat, triticale, field pea, common vetch and bread wheat can suppress weed growth up to 95%.

Acknowledgement

The project has received funding from the European Union's Horizon Research and innovation programme Conserwa under grant agreement No 101081802