

# Main crop effect on biodiversity expression in spontaneous flora and C input from cover crop mixtures

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## INTRO

Cover crops (CC) provides a range of ecosystem services in agroecosystems, including increased biodiversity and carbon (C) inputs via CC biomass and phyllo- and rhizodeposition. However, little information exists about the C input capacity of CC mixtures compared to pure stands, and how this C input is affected by the preceding main crop. Further we lack knowledge on how CC mixtures affects biomass and diversity of the spontaneous flora (SF).

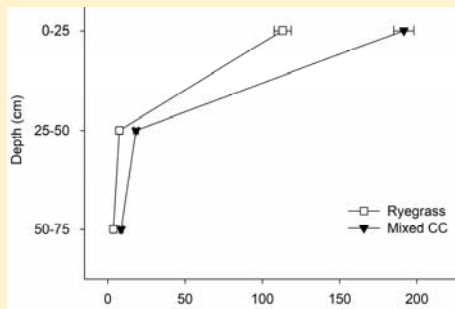
## M&M

A field experiment using isotopic labelling ( $^{13}\text{CO}_2$ ) examined the effect of two CC treatments (pure stand vs a grass-plantain-chicory mixture) and four preceding main crops (Barley, Pea, Pea-Barley, and Faba bean) on the C input to 75 cm depth, and on SF biomass and diversity.

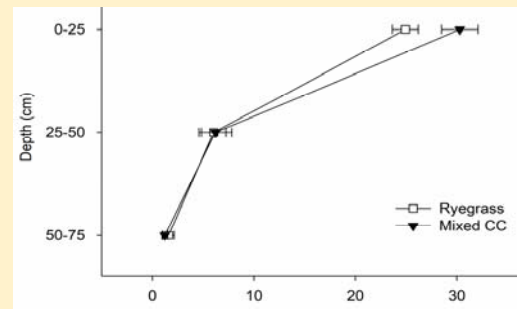
## RESULTS

**Table 1:** CC and SF dry matter yield ( $\text{g DM m}^{-2}$ ). Mixed CC had highest biomass of sown species and lowest SF biomass. CC biomass highest after faba bean and lowest after pea-barley probably due to high intercrop resource utilization.

	Barley			Pea			Pea-barley			Faba bean		
	No CC	Pure	Mix	No CC	Pure	Mix	No CC	Pure	Mix	No CC	Pure	Mix
Sown CC		72	161		115	129		80	97		111	198
SF	106	26	23	152	28	28	102	60	28	189	63	15



**Figure 1:** Root C ( $\text{g C m}^{-2}$ ) higher with mixed CC in the whole soil profile. Faba bean tended to support higher CC root growth (not shown).



**Figure 2:** Net phyllo- and rhizodeposition ( $\text{g C m}^{-2}$ ) higher with mixed CC in topsoil. Relative deposition increased with depth (not shown).

## KEY POINTS

- Mixed CC outperformed pure stand in biomass production and below ground C inputs
- Residual N from faba beans enhanced CC growth and belowground C inputs
- Net phyllo- and rhizodeposition was higher for pure stand CC, but quantity lower than mixed
- Mixed CC reduced SF biomass and diversity compared to pure stand CC and no CC
- Leguminous main crops supported higher SF growth due to residual N
- Both pure stand and mixed CC reduced soil mineral N in the soil profile to 1 meter depth



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