

# #080

## Intercropping winter oilseed rape with frost-sensitive faba bean have the potential to reduce fertilisation rate and weed pressure

Iman Raj Chongtham<sup>1</sup>

Georg Carlsson<sup>1</sup>

<sup>1</sup> Swedish University of Agricultural Sciences, Lomma, Sweden

### Background:

Difficulties in managing plant nutrients, pests and weed regulation makes it challenging to grow winter oilseed rape (WOSR) in organic systems. Ecological intensification approaches such as intercropping with legumes, to deliver a range of ecosystem services (e.g. biological N<sub>2</sub> fixation, weed suppression, improved soil health) have the potential to maintain productivity and reduce external inputs.

### Objective:

This study evaluates the impact of intercropping of frost-sensitive faba bean with WOSR on WOSR yield and weed suppression in an organic cropping system where the intercrop received less fertilisation than the sole crop WOSR.

### Methods:

The sole crop (SC) WOSR (*B. napus* var. Mentor) was fertilised with 600 kg/ha of organic meat and bone meal fertiliser (N:10%; P: 3%; K:1%). In the intercrop (IC) treatment, 400 kg of the same organic fertiliser as in SC was applied, and frost-sensitive faba bean (*V. faba* var. Boxer) was sown (12 plants/ m<sup>2</sup>) two weeks after WOSR. The sowing rate of WOSR was 60 viable seeds/m<sup>2</sup> in both the treatments, and each treatment was replicated four times in a randomised block design with each experimental plot measuring 6x12 m. Above-ground dry matter yield was estimated at crop maturity in 2021 and 2022, by manual cuts of biomass from 0.75 m<sup>2</sup> area within each plot.

### Results:

Although no statistically significant differences were found between SC and IC, we recorded higher WOSR grain yield of  $2.93 \pm 0.39$  t/ha (mean  $\pm$  SE) in IC as against  $2.33 \pm 0.37$  t/ha in SC in 2021, despite receiving 33% less fertiliser than the SC. In 2022, due to poor winter establishment and damage by pests (mainly pollen beetles), grain yields were considerably lower, yielding only 2.01 and 2.06 t/ha in IC and SC, respectively. In both the years, weed biomass tended to be lower in IC (1.18 and 2.3 t/ha) compared to SC treatment (2.23 and 3.23 t/ha), though not statistically significant. Total aboveground crop biomass followed similar trend as weed in both the years.

### Conclusions:

The results indicate the possible provisioning of nutrients via nitrogen fixation by faba beans before it dies in winter and also from the decomposed plant materials to the oilseed rape plant. In addition, faba bean competes with weeds to cover the ground in between the wide rows of WOSR resulting in lower weeds in IC. The reduction in weeds perhaps also increased the availability of resources (sunlight, nutrients, water, etc.) to rapeseed crop. An ongoing experiment of WOSR intercropped with winter-hardy field pea in a strip-cropping set-up further aims to understand the implication of both IC and strip cropping on crop yields and suppression of weeds, pests and diseases. We conclude that there is potential for reducing nutrient inputs and weed pressure in organic systems when WOSR is IC with frost sensitive legumes.