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

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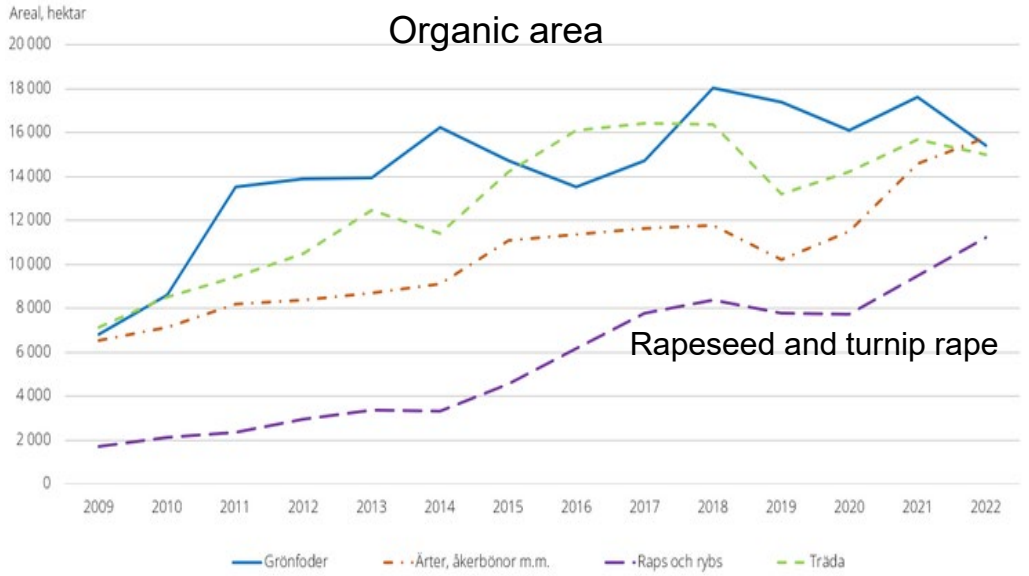
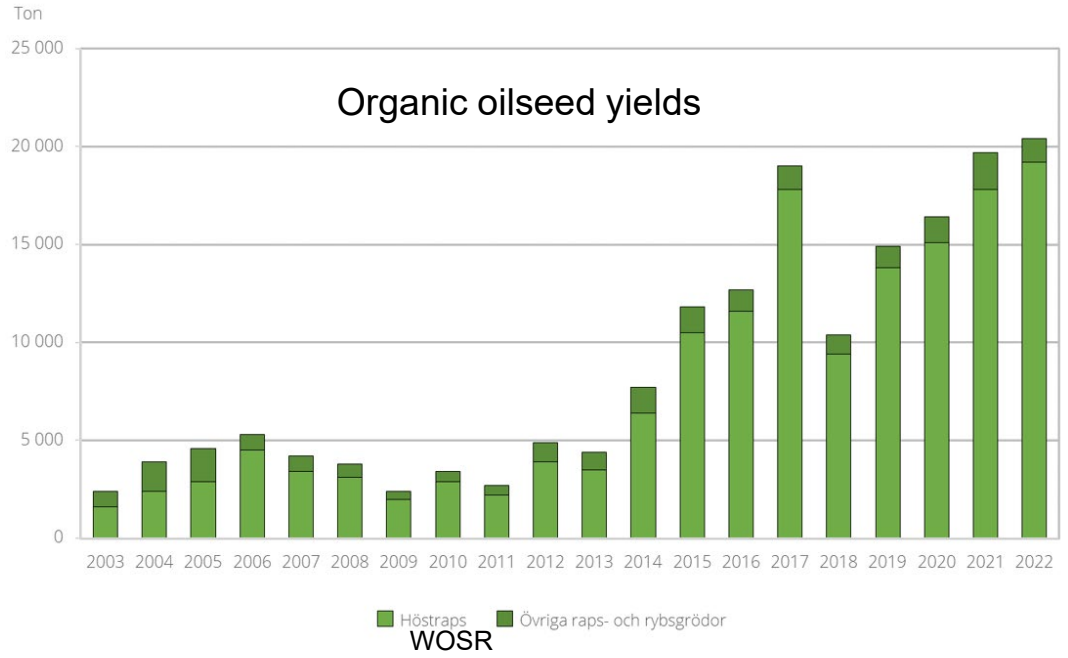
Introduction

- Total WOSR area in 2022: 110,320 ha. Area increased by 15% from last 5-years average.
- Country Yield: 3510 kg/ha
- Yield in Scania: 4030 kg/ha
- Organic area increased by 25% from 2021 and reached 9980 ha. Yield of 1920 kg/ha
- WOSR (*Brassica napus*) is an important crop in the Scanian crop rotation
- Sensitive to different pests and high N demand in addition to wintering damage, spring frost, drought …





Source: SJV, 2022

Context

- Sole crop WOSR: high dependence on external inputs (*e.g.* N, weed control …)
  - Economic challenges with increasing price of organic manures, fossil fuels

- Ecological intensification approaches such as intercropping with legumes, can deliver a range of ecosystem services (*e.g.* biological N_2 fixation, weed suppression, improved soil health, resource utilisation)

IC with legumes could facilitate growing in organic systems: add N, maintain/increase productivity, species diversity

- reduce use of external inputs

→ Biocontrol of pests, diseases and weeds

Pic: Raj C 2022

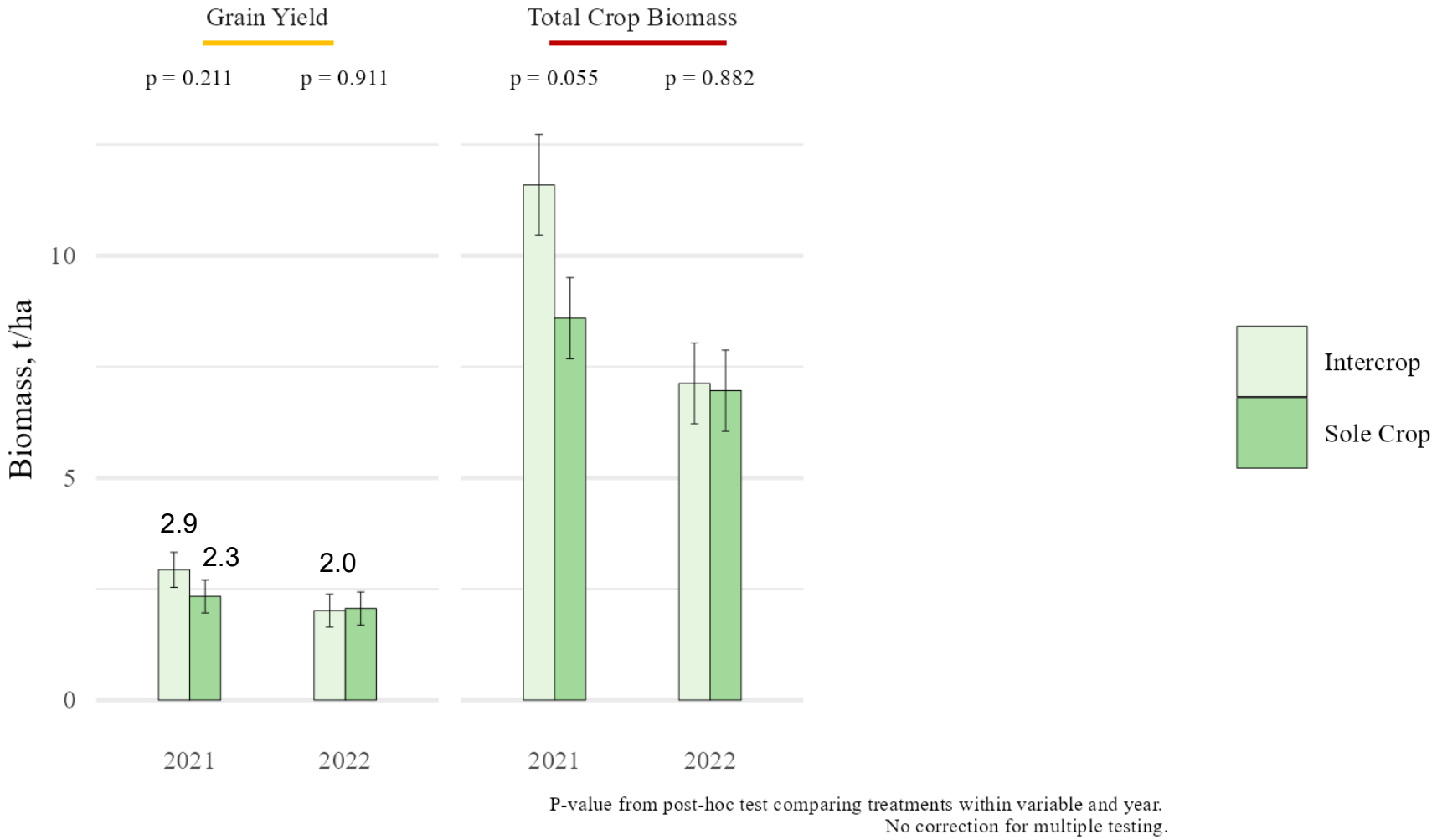
Study 1: Intercropping WOSR with frost-sensitive faba bean

- Sole crop WOSR: 60 seeds/m^2 : 600kg/ha Biofer (N:10%; P: 3%; K:1%)
- WOSR + Faba bean intercropping: 60 seeds/m^2 + 12 seeds/m^2 and 400kg/ha Biofer
- In IC: faba bean sown 2 weeks later
- Plots of 6 x 12 m in 4 replicates

WOSR + Frost sensitive faba bean

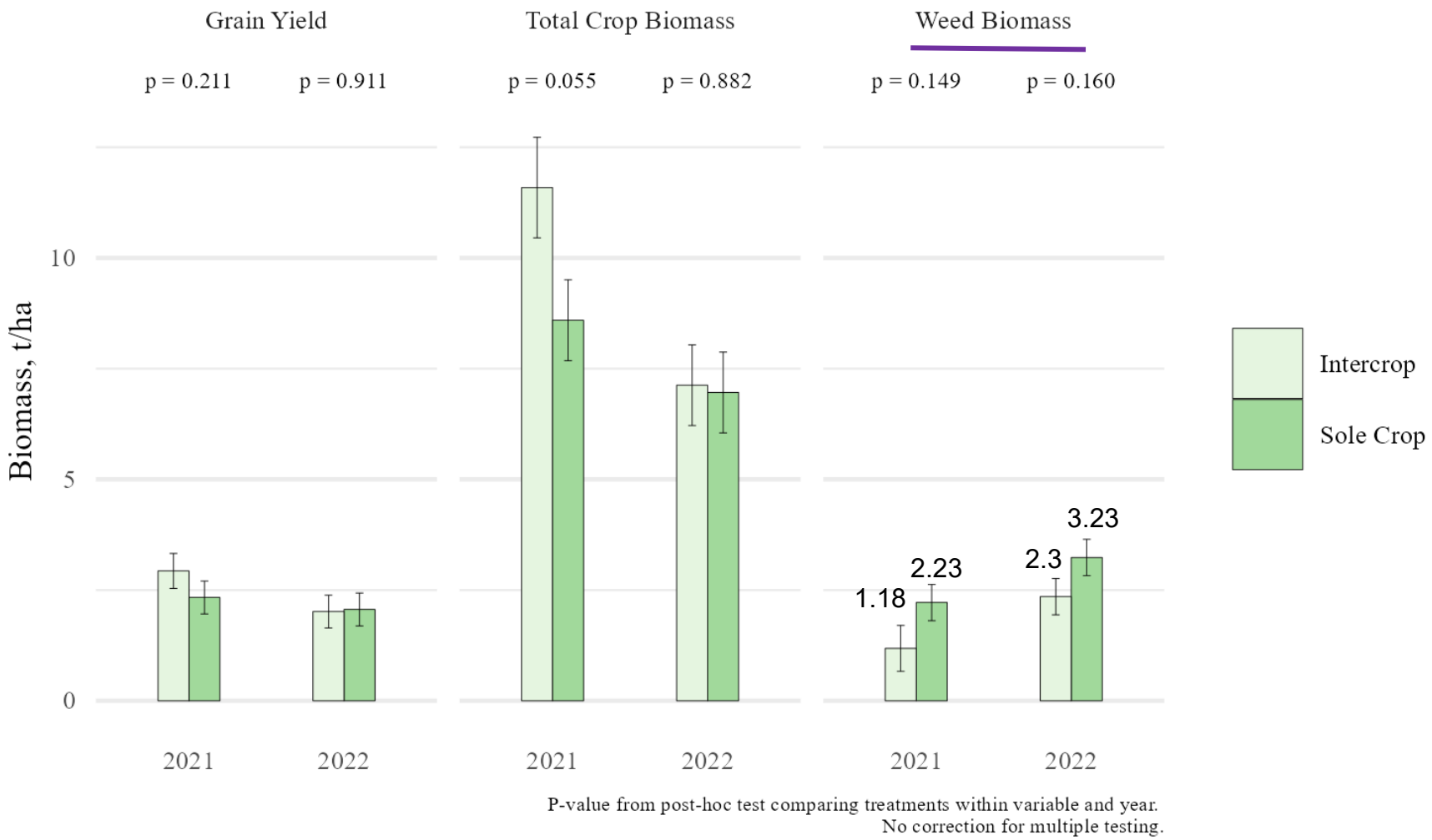
Pic: Carton N 2020

Dry matter at harvest (crop maturity)



Chongtham et al: Unpublished

Dry matter at harvest (crop maturity)



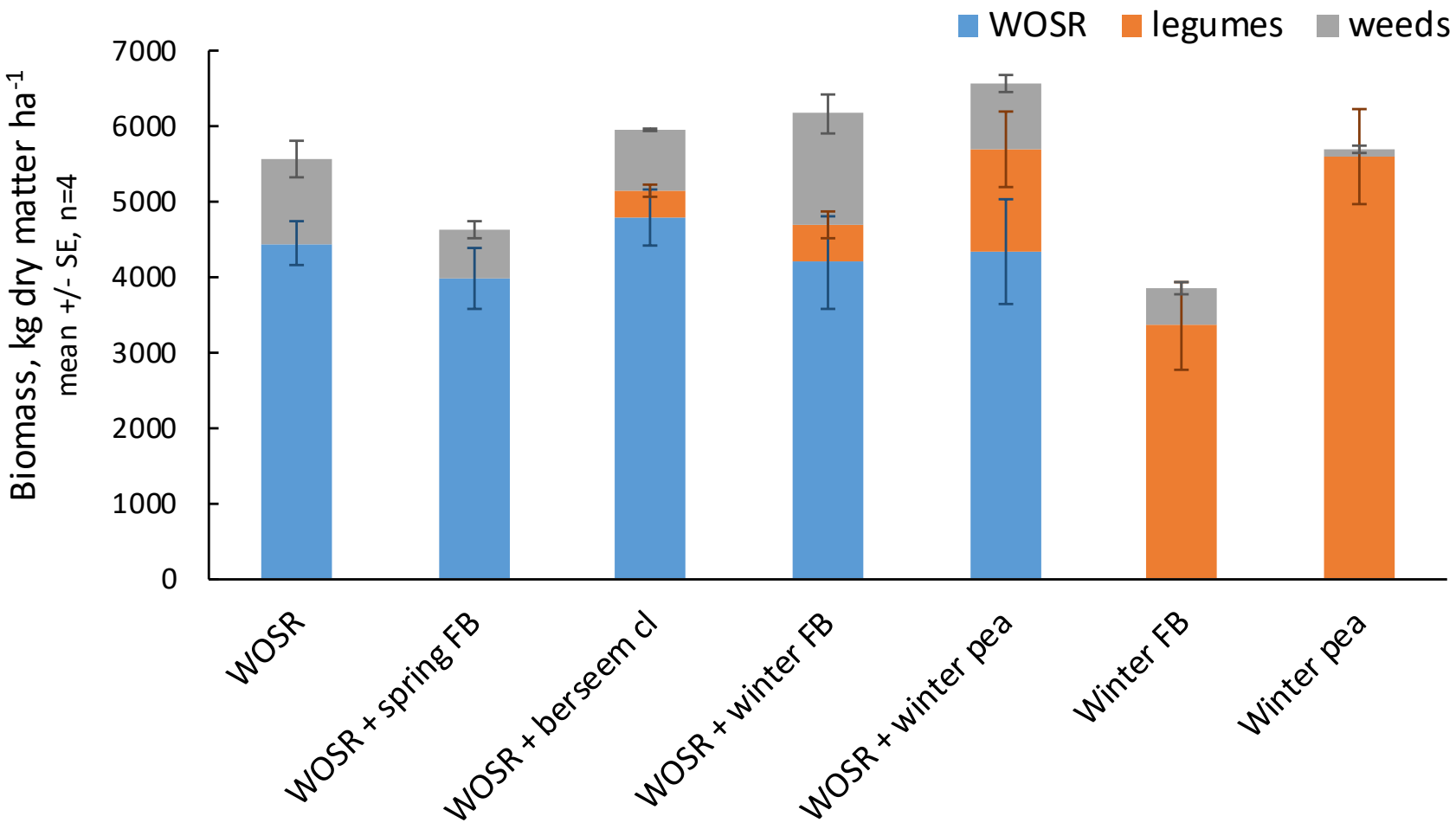
Chongtham et al: Unpublished

Study 2: test novel ways of crop diversification in winter oilseed rape and grain legumes

Experimental design.
Conventional land, mineral fertilizers but no pesticides on the experiment

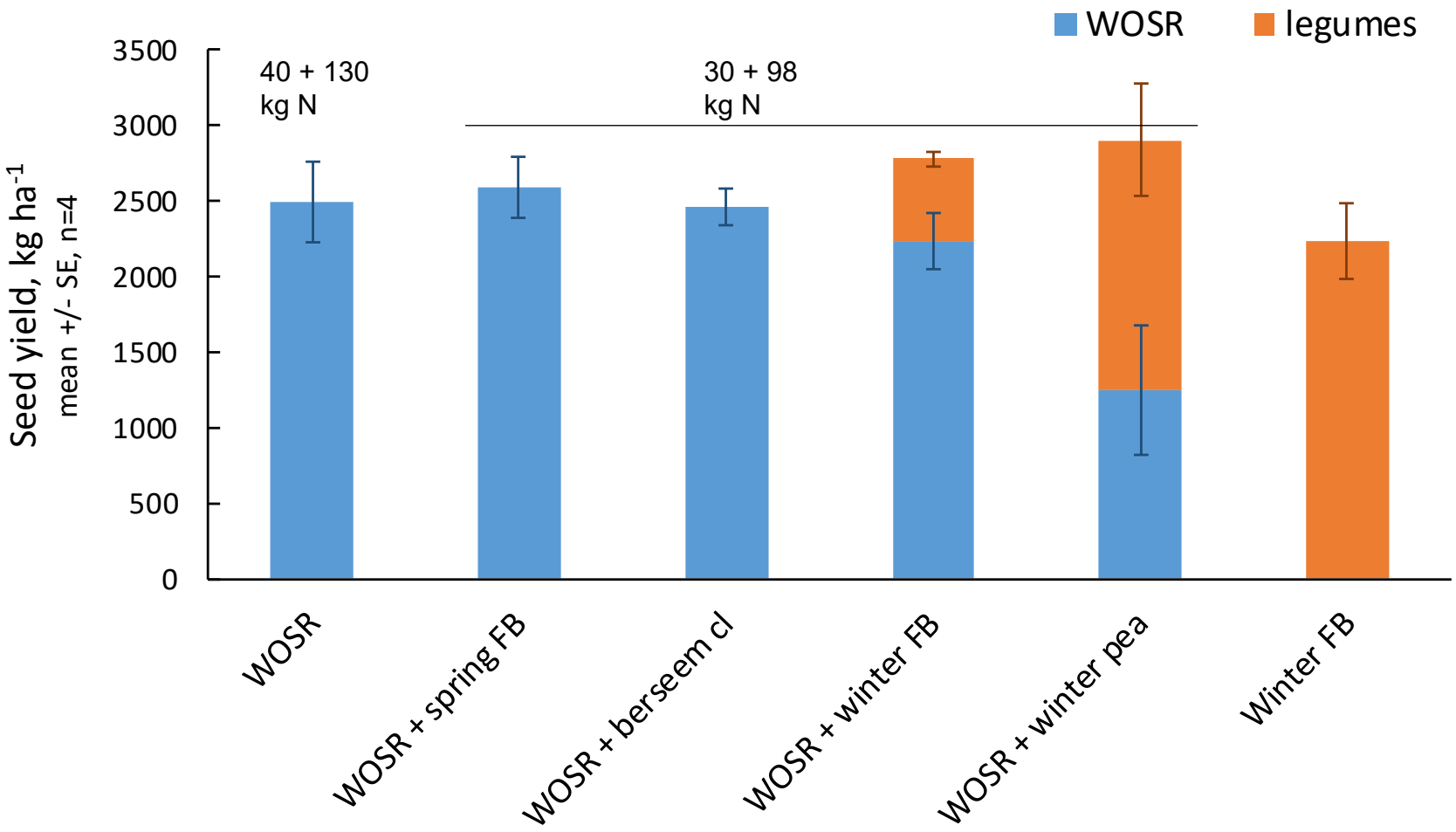
Crop / mixture	Establishment	N fertilization
WOSR sole	Early Sep, 50 cm row spacing	40 + 130 kg
WOSR + spring faba bean	One week later, between WOSR rows after inter-row hoeing	30 + 98 kg
WOSR + berseem clover	Broadcast sowing same day as WOSR	30 + 98 kg
WOSR + winter faba bean	One month later, between WOSR rows after inter-row hoeing	30 + 98 kg
WOSR + winter pea	One month later, between WOSR rows after inter-row hoeing	30 + 98 kg
Winter faba bean	One month later, 12 cm row spacing	0
Winter pea	One month later, 12 cm row spacing	0

Results on crop and weed biomass in spring (22 May)



Emery et al. 2021. *Front. Agron*.3

Results on seed yield (4 August). No harvest of winter pea sole crop due to severe lodging



Emery et al. 2021. *Front. Agron*.3

Conclusions

Promising results of intercropping WOSR with either frost-sensitive or overwintering legumes.

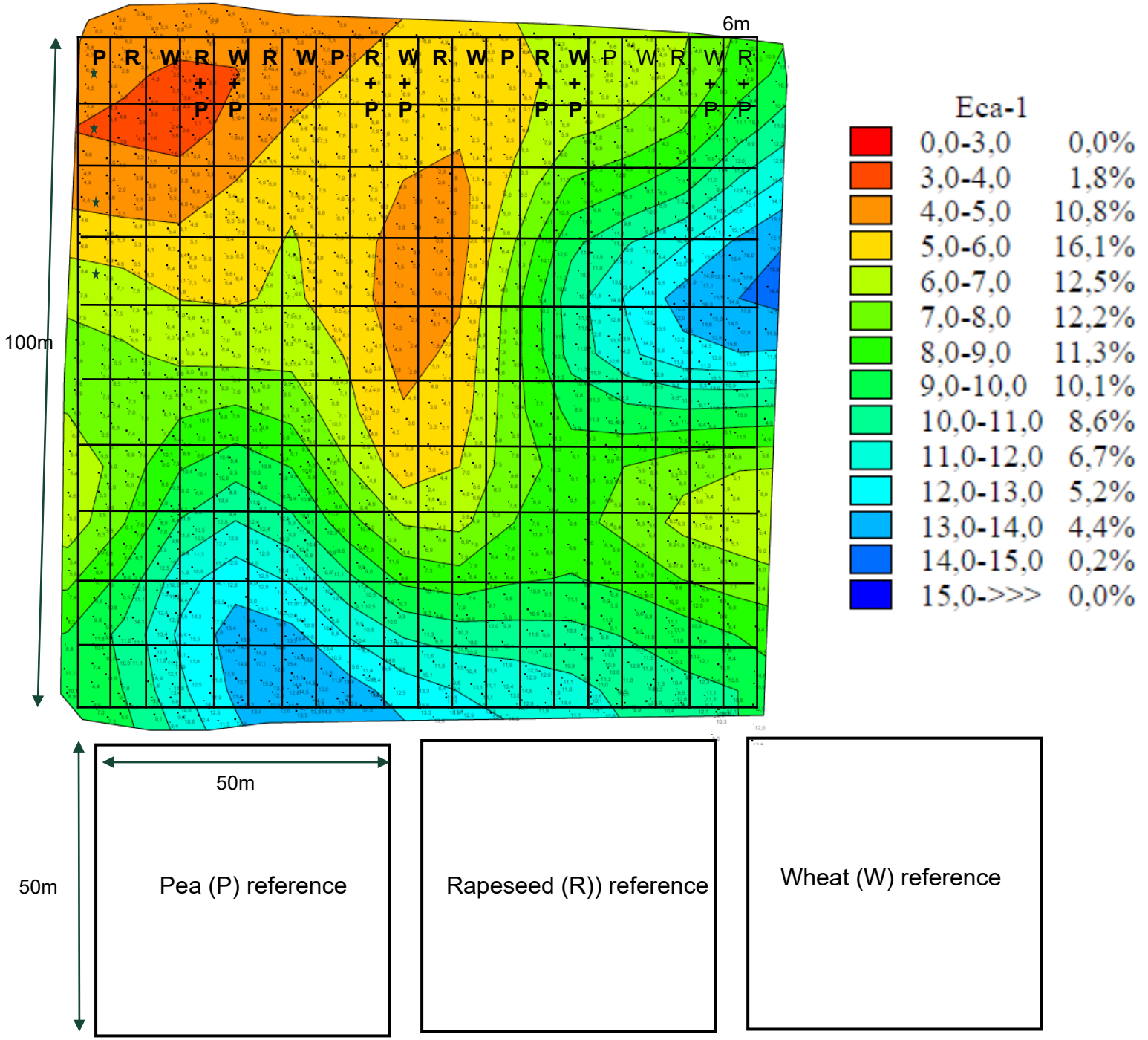
Benefits regarding: improved weed control; maintained WOSR seed yield with less N fertilization.

Can these results encourage organic farmers to test WOSR intercropping with frost-sensitive or overwintering legumes?

Actors visiting strip cropping experiment of WOSR + Pea

Ongoing Formas project: Intercropping of WOSR with overwintering field pea to understand the implication of both IC and strips on crop yields and suppression of weeds, pests and diseases.

Pic: Raj C. 2022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Pea (P) reference
Rapeseed (R)) reference
Wheat (W) reference

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Formas