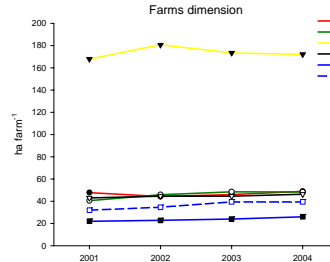
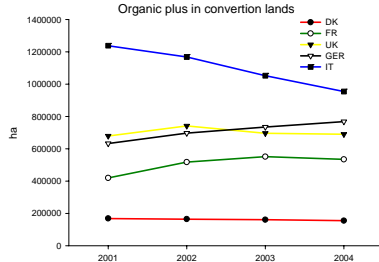
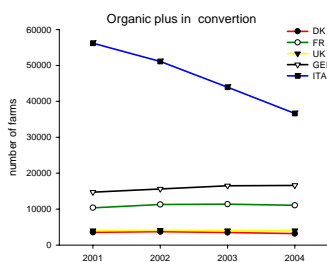


# Yield performance of Faba bean-Wheat intercropping on spring and winter sowing in European organic farming system.

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INTERCROP EU PROJECT studied Faba bean-Wheat intercropping at different growing condition on European organic farming systems. During 2003-2005 in spring and winter cropping season different intercropping series were evaluated in Denmark, Germany, Italy and United Kingdom.

## ORGANIC AGRICULTURE IN COUNTRY PARTNERS



With exception of IT (-30%), numbers of organic farms was relatively stable in the others 4 Countries during the period 2001-2004. The arable agriculture surface showed a considerable reduction in IT, and an increasing in GER and FR; UK and DK showed a relative stable trend. Farms dimension is lower in Italy (less than EU 25) and very high in UK (170 ha), probably due to the high diffusion of pasture in organic system (83%) in this Country. (See poster 7519).

Elaboration from EUROSTAT data

## MATERIALS AND METHODS

### Experimental sites:

DK (Tåstrup, 55°40'N, 12°18'E)  
GER (Kassel, 51°25'N, 9°25'E)  
IT (S. Marco Argentano 39°18'N, 21°12'E)  
UK (Reading, 51°45'N, 0°93'W).

### Cropping seasons:

DK 2003-2004 spring season  
UK 2003-2005 spring and winter season  
GER 2003-2005 spring season  
IT 2004-2005 winter season

### Crops and densities:

Faba bean (*Vicia faba L. sub. minor*) 40 plant m<sup>-2</sup>  
Spring wheat (*Triticum aestivum L.*) 400 plant m<sup>-2</sup>  
ITA: Winter wheat (*Triticum durum L.*) 400 plant m<sup>-2</sup>

### Layout:

Additive IC series (F100W100): Faba and Wheat 100% of sole crop (SC) densities  
Replacement IC series (F50W50): Faba and wheat 50% of SC densities

### Experimental design:

Randomized block design with four replicates



Seed drill  
Contemporary sowing of faba and wheat allowed by a double seed dispenser equipment.

## RESULTS

### Yield performance and IC advantage

Land Equivalent Ratio (LER) was calculated using the following equation:  $LER = Y_p/Y_{pp} + Y_b/Y_{bb}$ , where  $Y_p$  and  $Y_b$  are pea and barley yield in mixture,  $Y_{pp}$  and  $Y_{bb}$  the corresponding yields of the sole crops. GY data are showed as years mean  $\pm$  SE

Treat	Grain Yield (gm <sup>-2</sup> )		LER yield		
	Faba bean	Wheat	Faba bean	Wheat	Total
F100W100	186 $\pm$ 6	180 $\pm$ 22	0.47	0.73	1.20
F50W50	124 $\pm$ 12	163 $\pm$ 15	0.35	0.67	1.01
SC	359 $\pm$ 22	245 $\pm$ 19			

Denmark: Intercrop showed a good advantage only in additive series (LER=1.20), but considering an 50% density in replacement series facilitation in the cereal component occurred.

Treat	Grain Yield (gm <sup>-2</sup> )		LER yield		
	Faba bean	Wheat	Faba bean	Wheat	Total
F100W100	275 $\pm$ 33	217 $\pm$ 25	0.61	0.51	1.12
F50W50	254 $\pm$ 27	235 $\pm$ 27	0.56	0.55	1.11
SC	454 $\pm$ 33	430 $\pm$ 44			

Germany: high grain yield variability among years was observed. Despite this, LER showed a weak advantage of the two series. In additive, faba bean provided a large contribution.

Treat	Grain Yield (gm <sup>-2</sup> )		LER yield		
	Faba bean	Wheat	Faba bean	Wheat	Total
F100W100	184 $\pm$ 9	54 $\pm$ 6	0.56	0.36	0.92
F50W50	126 $\pm$ 10	63 $\pm$ 8	0.48	0.42	0.90
SC	264 $\pm$ 32	149 $\pm$ 29			

Italy: for the two series winter establishment of faba-wheat intercropping resulted in a slight disadvantage comparing SC. Positive contribution of faba occurred only in additive mixture.

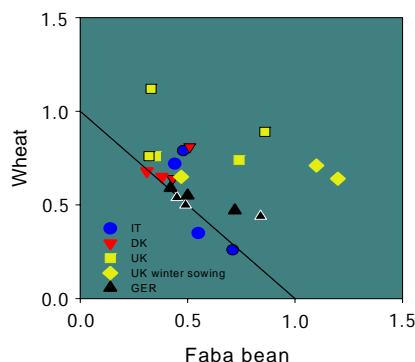
Treat	Grain Yield (gm <sup>-2</sup> )		LER yield		
	Faba bean	Wheat	Faba bean	Wheat	Total
Spring sowing					
F100W100	123 $\pm$ 37	179 $\pm$ 7	0.58	0.86	1.44
F50W50	98 $\pm$ 17	172 $\pm$ 10	0.46	0.83	1.29
SC	211 $\pm$ 13	208 $\pm$ 10			
Winter sowing					
F50W50	275 $\pm$ 67	96 $\pm$ 10	0.82	0.46	1.28
SC	336 $\pm$ 38	210 $\pm$ 38			

United Kingdom: In spring sowing faba bean intercropped at normal plant density (F100W100) suffered a competition effect by wheat, but total LER showed a considerable intercrop advantage (1.44). In the replacement series any differences in the IC advantage between spring and winter sowing was not found but the single contribute of the two components differed in the two cropping seasons.



Italian site 2004

Sowing  
The "row by row" sowing pattern was used with 16 cm apart.)



### Intercropping yield efficiency

Yield advantage of the additive (bordered) and replacement series (no-bordered) in the Faba bean wheat intercropping across different environments (site x year) during 2003-05. (–) Total LER =1

Plotting faba and wheat partial LER a large variability among sites and years was observed. Despite this, the adopted IC mixtures showed a land use advantage in the large number of experimental environments (site x year). Annual variability was higher in UK, and minimum in DK and GER.