



Legume-cereals mixtures for the economical overall benefit



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Introduction

Locally produced crop protein is of actual need in Europa. Pea is a good protein source and it is well adapted to northern conditions. Growing pea as a sole crop is a challenge since its stem is prone to lodging thereby resulting negatively in harvest, reduced yield and decreased profit (1). Growing peas in mixtures with spring cereals could minimise listed problem. However, to reach highest profit there is limited knowledges of most effective selection of cultivars of both- pea and support crop.

Background and objectives

This work was done in the frame of EU FP7 project EUROLEGUME (Enhancing of legumes growing in Europe through sustainable protein supply for food and feed). The objective of this study was to contribute to improvement of sustainability of field pea crops in terms of yield parameters through efficient cultivation systems.

Materials and methods

Cv 'Bruno' and cv 'Kirke' were sown as sole crop (pure) and in mixtures with oat 'Laima', spring barley 'Rubiola' and spring wheat 'Uffo'. Pea crops were evaluated on plant morphology (beginning of emergence, flowering initiation, duration of growing period, plant height, pods per plant, grain yield potential (seed yield, number and weight of pods and grains per m²), resistance to local diseases and pests.

Experimental design in trials

Plot size (m ²)	10.53
Plants spacing (cm)	12.5
Replicates	4
Cultivars: field pea	'Kirke' and 'Bruno'
cereals	Oat-'Laima', wheat-'Uffo', barley-'Rubiola'
Sowing rate: field pea	Pure 120, MIX-60 seeds m ²
cereals	Barley, oat- 300, wheat- 250 seeds m ²
Cropping system	Organic



Replicate 1	Replicate 2	Replicate 3	Replicate 4
6	5	1	7
5	2	6	4
3	6	3	8
2	8	5	1
4	1	7	2
1	3	8	5
8	7	4	3
7	4	2	6

1-'Kirke' (K), sole; 2- K+oat; 3- K+wheat; 4-K+barley
5-'Bruno'(B), sole; 6-B+oat; 7-B+wheat; 8-B+barley

References:

1 . Kontturi, M., Laine, A.Niskanen, M., Humer, T.,Hvovela, M.& Peltonen, P (2011). Pea-oat intercrops to sustain lodging resistance and yield formation in northern European conditions . *Acra-Agriculture Scandinavica*, Section B- Soil&Plant Science. Volume 61, 2011 – Issue 7, pp.611-621.
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cv 'Bruno'



cv 'Kirke'



cv 'Rubiola'



cv 'Uffo'

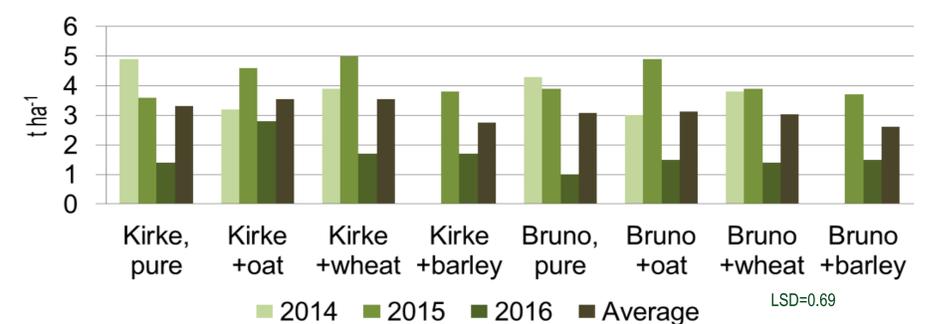


cv 'Laima'

Results

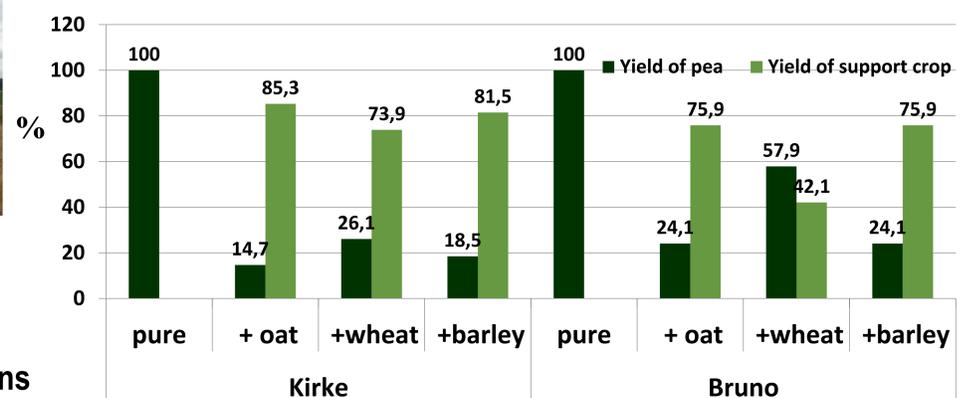
Grain yield, t ha⁻¹

For both genotypes cv 'Kirke' and cv 'Bruno' mean yields were higher in sole sowings compared to the yield levels in mixtures with cereals oat, barley or wheat. However, among the mixtures highest yield was obtained when the field pea was sown with wheat.



The largest proportion of peas in the harvest structure was in the mixture with wheat. The effect of the variety on the yield structure was observed: nearly two times more pea grains in the harvest provided cv 'Bruno'.

Yield structure



Conclusions

For both genotypes, cv 'Kirke' and cv 'Bruno' higher mean yield provides pure sowings compared to the yield levels in mixtures with cereals- oat, barley or wheat. However, among the mixtures most profitable result (more pea in the harvest, more protein) was obtained when the field pea was sown in mixture with spring wheat.