Genotype and environment interaction on field pea cultivars in organic cropping system

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**Implications**

Globally, grain legumes like the field pea are important sources of plant proteins for both food and feed (De Ron, 2015). In addition, their cultivation have also a positive effect on soil fertility (Stagnari et al, 2017). However, there are some challenges in their production such as pests, diseases and unstable yields. Species diversity and the selection of appropriate cultivars are important factors for the stability of agricultural systems, especially in organic farming. When growing legumes as the field pea in mixture with cereals, choosing the appropriate pea genotype can enhance stable yields through environment changes.

**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. As sub-objective was to introduce the new genotype- Estonian cv ’Kirke’ in local cropping systems.

**Key results and discussion**

The pea genotype cv ‘Kirke’ showed stable yields in all three experimental years. However, for one year (2015) a significant difference in the yields between cv ‘Kirke’ and the genotype cv ‘Bruno’ was observed. In 2015 it was very hot and dry weather conditions in the period of forming of the seedpots and cv ‘Kirke’ was more successful than the other, indicating cv ‘Kirke’ to be more adapted to changing conditions. However, for both genotypes there were no correlation between total rainfall during the growing season (473, 613, 842 mm) and the mean yields (3.9, 4.0, 4.4 t ha-1 for cv ‘Kirke’ and 3.4, 3.4, 4.5 t ha-1 for cv ‘Bruno’). For both genotypes cv ‘Kirke’ and cv ‘Bruno’ mean yields were higher in pure sowings compared to the yield levels in mixtures with cereals oat, barley or wheat. Among the mixtures highest yield was obtained when the field pea was sown with wheat.

**How work was carried out?**

Three years field experiment with field pea-spring cereals mixtures were carried out in Latvia. Cv ‘Bruno’ and cv ‘Kirke’ were sown alone 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 at biological maturity, pods per plant at biological maturity, and harvesting date), grain yield potential (seed yield, number and weight of pods and grains per m2), resistance to local diseases and pests.

References

1. De Ron, A. (2015). Grain legumes. Series: Handbook of Plant Breeding, Vol.10.
2. Stagnari, F. Maggio, A., Galieni, A., Pisante, M. (2017). Multiple benefits of legumes for agriculture sustainability: an overview. *Chemical and Biological Technologies in Agriculture,* 2017, 4:2. *https://chembioagro.springeropen.com/articles/10.1186/s40538-016-0085-1*