

Spring cereal variety mixtures and their relevance for weed suppression in agroecological conditions of Latvia



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Introduction

Good weed suppression ability is required characteristic for crops grown in organic conditions. Some authors report that crop variety mixtures can be more effective in weed suppression than the varieties in pure sowings (Didon and Rodriguez, 2006). Some other studies show that variety mixtures do not suppress weeds better than their pure components (Kaut *et al.*, 2008).

The aim of the present study was to evaluate spring cereal (barley and oat) variety mixtures for their weed suppression ability in agroecological conditions of Latvia.

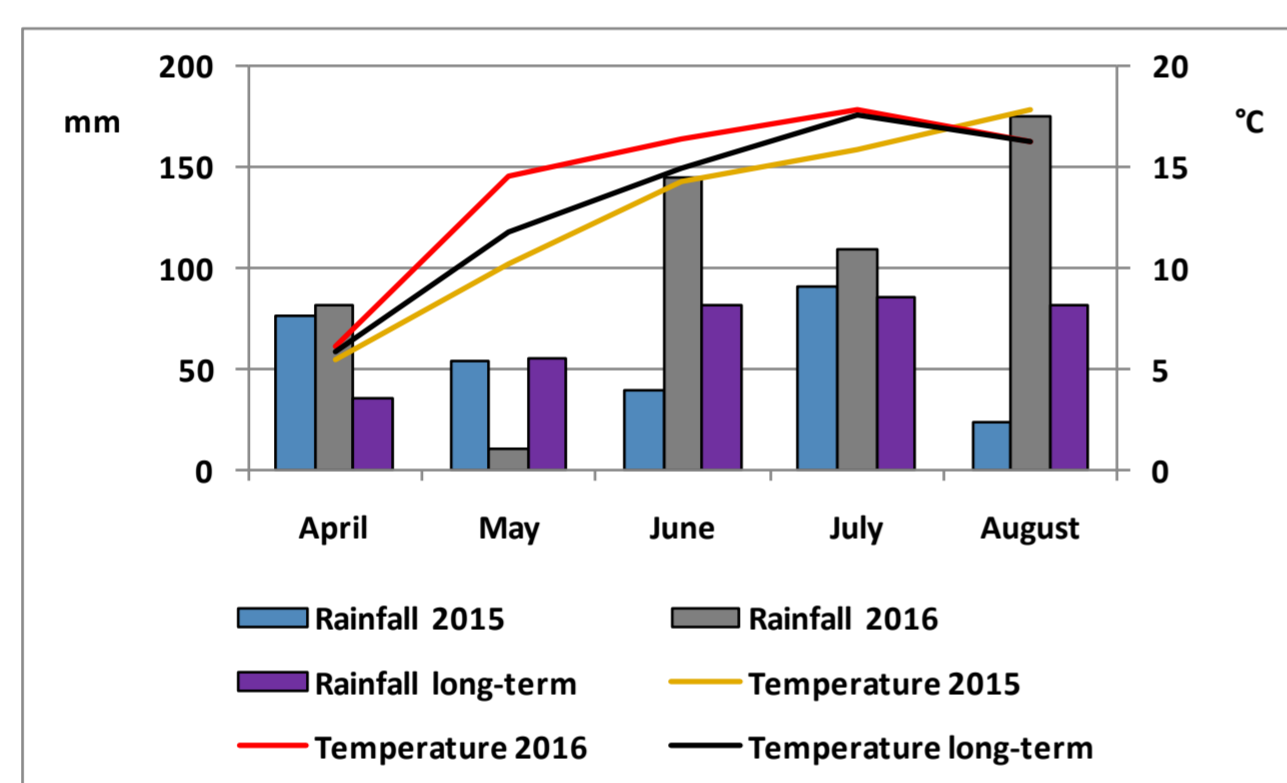
This report includes some results from the ERA-NET Core Organic PLUS project "Crop Diversification and Weeds (PRODIVA)".

Material and Methods

To compare the performance of spring cereal variety mixtures with their components in pure stands in agroecological conditions of Latvia, field experiments were established with four spring barley and three spring oat varieties in organic crop rotation in Priekuli.

Site conditions

Weather conditions



Soil – Luvisol

	2015	2016
pH	6.5	5.6
Organic matter, %	1.9	1.9
P ₂ O ₅ , mg kg ⁻¹	153	139
K ₂ O, mg kg ⁻¹	100	135

Crop management

	2015	2016
Pre-crop	legumes	potatoes
Sowing date	April 28	May 2
Harrowing date	May 15	May 26
Harvesting date	August 18 (barley) August 27 (oats)	August 24

Measurements

Crop plant height was measured at several crop growing stages. A number of crop plants and a number of crop productive stems were counted once per growing season. Green biomass of weeds was weighted at crop harvesting.

Literature

- Didon UME and Rodríguez EE (2006). Designed mixtures of barley cultivars – influence on weeds. Proceedings of the COST SUSVAR workshop on Cereal crop diversity: implications for production and products, 13-14 June 2006, La Besse, France, 42-43.
- Kaut AHEE, Mason HE, Navabi A, O'Donovan JT, Spaner D (2008). Performance and stability of performance of spring wheat variety mixtures in organic and conventional management systems in western Canada. *Journal of Agricultural Science*, 147(2), 141-153.
- Ločmele I, Legzdiņa L, Gaile Z, Kronberga A (2016). Cereal variety mixtures and populations for sustainable agriculture: a review. Proceedings of 22nd Annual International Scientific Conference "Research for Rural Development 2016" 18 - 20 May, 2016, Vol. 1, 7-14.

Results and Discussion

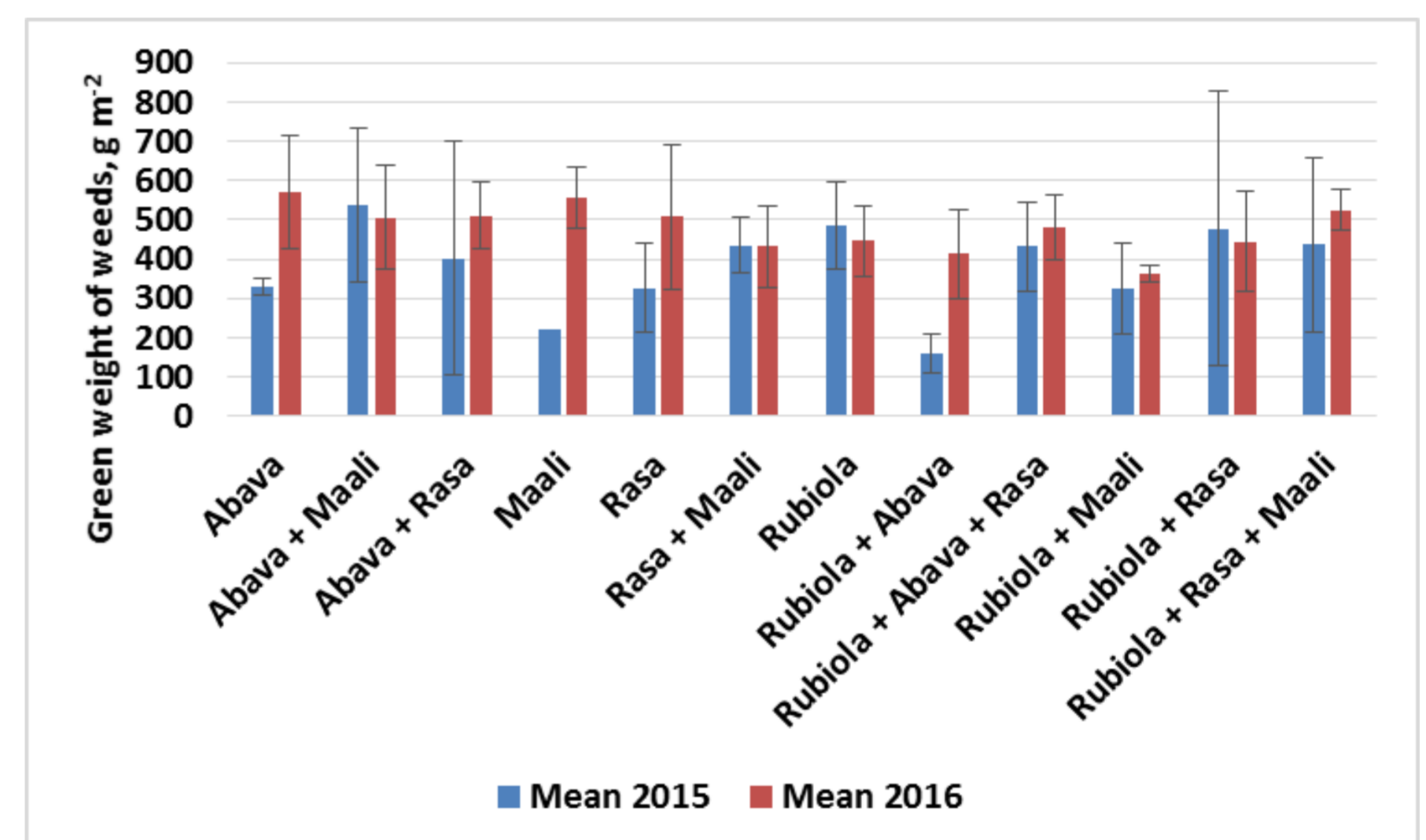
Results of two-year study showed, that green biomass of weeds was statistically significantly affected by crop plant height, but not by number of crop plants or number of crop productive stems.

	Green weight of weeds in barley	Green weight of weeds in oats
Plant height at GS 25-29	-,317**	-,536**
Plant height at GS 33-39	-,288**	-,321*
Plant height at GS 55-57	.091	,492**
Plant height at GS 75	-,216*	.020
Plant height at GS 85	-,179	-,118
Number of plants	-,048	-,283
Number of productive stems	.159	.241
Grain yield	-,339**	-,615**

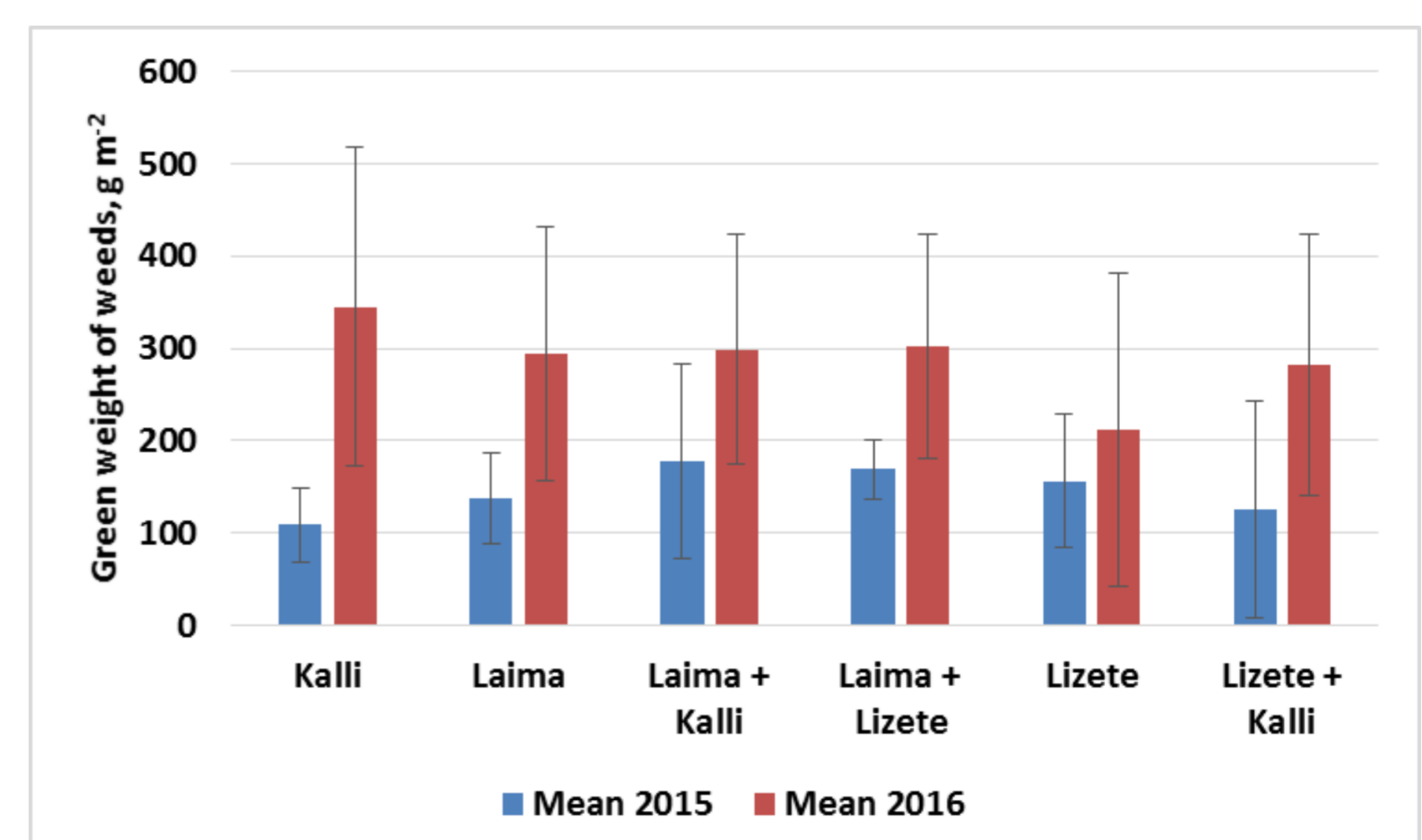
** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

However, nor spring barley, neither spring oat variety mixtures had statistically significantly better ability to suppress weeds than had their pure components. In variety mixtures interaction among plants is related not only to competitiveness with weeds but also among the crop plants that can reduce the ability to suppress weeds (Ločmele *et al.*, 2016). The effect depends on the composition of the mixture.



Green weight of weeds in spring barley varieties and their mixtures



Green weight of weeds in spring oat varieties and their mixtures

Conclusions

- In two-year study, investigated spring cereal variety mixtures did not show better ability to suppress weeds if compared to their pure components.
- Additional studies would be necessary to evaluate root development and allelopathic activity of crop and weed plants.