



## ORGANIC LENTIL PRODUCTION – THE DEVELOPMENT OF AN INTERESTING NICHE IN SWITZERLAND

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### Introduction

Lentil (*Lens culinaris* Medikus) belongs to the legume family and is grown as seeds for the human diet, and the straw can be used for animal feed. Lentil is considered one of the oldest grain legume crops, domesticated in ancient times (Cubero *et al.*, 2009). Although its main cropping areas are outside of Europe (India, Canada), lentil is grown in some European countries on more than 10 000 ha (Turkey, Spain, France; FAO, 2016). The area in Switzerland cropped with lentil is estimated to be less than 50 ha. To meet the increasing demand of consumers, importation of lentil seeds increased from 2004 (1300 t) by 600 t in the year 2014 in Switzerland (FCA, 2016).

Due to the comparatively low need for nutrients, lentil is suitable for extensive cropping systems and marginal soils, but as a consequence of its poor early vigor, competition with weeds is a major handicap for successful production in organic farming. Additionally, poor resistance to lodging can lead to problems at the harvest, causing additional efforts for eliminating stones and soil particles before selling. In order to deal with both challenges, lentils often are grown in mixtures.

The aim of this project is to establish an organic lentil production in Switzerland by conducting various trials in several regions with different objectives.

### Materials and Methods

The project was initiated in 2011 and has continued since then with various small plot experiments and strip trials in three different provinces of Switzerland. At the beginning, different companion plants (spring oat, spring wheat, buckwheat, and camelina) were investigated, and since 2013 different cultivars have been compared. Since 2014 fallseeded cultivars are compared with spring-seeded cultivars. In order to transfer knowledge and encourage farmers to share competences, field days and trips to other producers, also in neighboring countries, are organized. Collaboration with a farmers' cooperative allows slowly to develop competences in the processing of the harvested material and to market the product in common in organic stores.

### Results and Discussion

Depending strongly from year and companion plant, yield varied between 800 and 1500 kg ha<sup>-1</sup> and differences among cultivars were observed (Figure 1). Most of the tested companion plants helped considerably to suppress weeds and decrease lodging, and as a consequence to facilitate harvest. At the moment, however, no single species can be recommended as the best companion plants for all conditions. Among other factors, available machinery or soil properties are important for successful establishment of

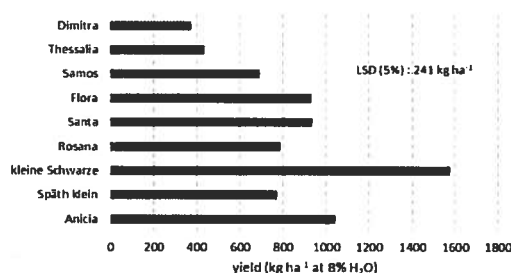


Figure 1: Yield (kg ha<sup>-1</sup>) of fall seeded lentil varieties grown at conditions of organic farming (Zurich, 2015).

mixtures with lentils. Oat may compete well with weeds and due to its short plant length is well suited for growing with lentils, though it causes additional efforts in the cleaning process. In most cases, land equivalent ratios were > 1. Most of the fall-sown cultivars survived winter. Flowering of fall-seeded cultivars started 27 days earlier than spring-seeded cultivars, but yield was lower and variability increased (Table 1).



Table 1. Beginning of flowering (day), yield (kg ha<sup>-1</sup> at 8% H<sub>2</sub>O) and thousand seed weight (g) of nine lentil cultivars seeded in fall or in spring and managed according to organic farming practice (Zurich, 2015)

	Beginning Flowering (Day)			Yield (kg ha <sup>-1</sup> at 8% H <sub>2</sub> O)			Thousand Seed Weight (g)		
	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max
Fall Seeded	130.6	123.7	137.3	840	380	1580	29.7	18.5	50.6
Spring Seeded	157.1	155.0	161.3	1190	770	1470	32.4	20.8	51.6

## Conclusions

Lentil production in conditions of organic farming in Switzerland is possible. In line with Gruber *et al.* (2012), no single strategy for controlling weeds can be recommended. Whether fall seeding of lentil is a possibility to bypass water shortage in summer has to be verified in subsequent trials. Increasing area planted with lentils shows the interest of farmers and necessity to increase knowledge for lentil growing.

## Acknowledgements

Funding by BioSuisse and Fondation Sur-La-Croix, breeders for providing seeds, as well as inspiring discussions with various persons and the cooperativeness of the farmers where the trials were carried out, is gratefully acknowledged.

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