57.1 Legumes as mix partner make a perfect organic crop

Intercropping systems with grain legumes and cereals have advantages in low input systems such as Organic Farming. They can be more stable in yield and realize higher yields. The reasons for these effects are complex: a better weed suppression, a reduced susceptibility to pests and diseases and a higher nutrient availability.

Materials and methods

All field experiments were carried out at the experimental station of the Thünen Institute of Organic Farming at Trenthorst in Northern Germany (53°46’N, 10°30’E, 43 m a.s.l.). The 30-year mean annual precipitation at the experimental site is 706 mm with a mean air temperature of 8.8°C. The soil type is classified according to WRB as a Stagnic Luvisol and the soil texture as loam with a pH between 6.2 and 6.8. The carbon content is in the range of 1.1 and 1.4%.

Tillage-intercropping experiment: In the years 2009 and 2010 we compared weed suppression and yield of two different tillage systems (deep ploughing vs reduced tillage (shallow ploughing)) in sole cropped peas and oat as well as intercropped winter peas after deep ploughing whereas it was significant higher after reduced tillage (Fig. 1). The results of Gronle et al. (2015a, b) showed that this effect is not only caused in an aboveground competition for light but also induced by a belowground crop-weed interaction. On the one hand a crop-weed competition for water and nitrogen and on the other hand oat root exudates inhibit the growth of weeds and contribute to weed suppression (Gronle 2015a).

Results and discussion

The weed coverage (WC) of intercropped pea and oat showed no significant difference between deep ploughing and the reduced tillage system (shallow ploughing). WC was on a similar level as sole cropped peas after deep ploughing whereas it was significant higher after reduced tillage (Fig. 1). The reasons for these effects are complex: a better weed suppression, a reduced susceptibility to pests and diseases and a higher nutrient availability.

Introduction

The positive effects of intercropping systems are well known. Based on this we tested if a pea-cereal intercropping under reduced tillage can compensate the higher weed growth compared to deep ploughing. Furthermore we studied the reasons for the better weed suppression. In Organic Farming we need regional produced protein-rich animal feedstuffs. Therefore we tested different seed ratios of common vetches in mixtures with oat harvested as a grain crop.

mixed crops - robust, competitive and high quality yields

References