

Introduction

Weed infestation is a major constraint to soybean production world-wide and in organic farming in particular (Vollmann et al., 2010). To support breeding for weed tolerance a selection system using crop plants as 'artificial weeds' was developed in Central Germany.

Results

Competition was induced in early soybean growth stages by the winter crops rye and oil seed rape, in mid season by spring wheat, *Phacelia*, and buckwheat. The latter two can compete until late in the season (Fig. 2). *S. italica* was of no importance.

In 2012 seed yield was reduced to 82% or 48%, respectively (Fig. 1) by weed competition. Already in early developmental stages soybean dry matter was reduced. Generally, early development was much slower in 2013. Light interception of the soybean/weed canopy at 9/07/2013 was 89.2%, 84.6%, and 94.2% for weed free, weed I, and weed II, respectively. For all traits differences between treatments were significant at $p=0.01$.

Fig. 2

Top from left to right:

- Weed free control
- Weed II = winter oilseed rape + *Phacelia* + buckwheat
- Weed I = winter rye + spring wheat + *Setaria italica*

Bottom:
Reinshof experimental site 2013. One whole plot is marked in orange.



Materials and Methods

In a split plot design 6 soybean genotypes (whole plots; Merlin, Klaxon, Proteix, breeding lines 73, 78, 82) were grown with 2 (2012) or 4 (2013) replications with 3 treatments: Weed free control, weed I = winter rye + spring wheat + *Setaria italica*, and weed II = winter oilseed rape + *Phacelia* + buckwheat (Fig. 2). Plot size 5m², rows spaced 30cm apart, 70 seeds per m² were sown of both soybean and weeds (same number per species) at 2/05/2012 and 2/05/2013. Experimental site: Reinshof organic fields near Göttingen.

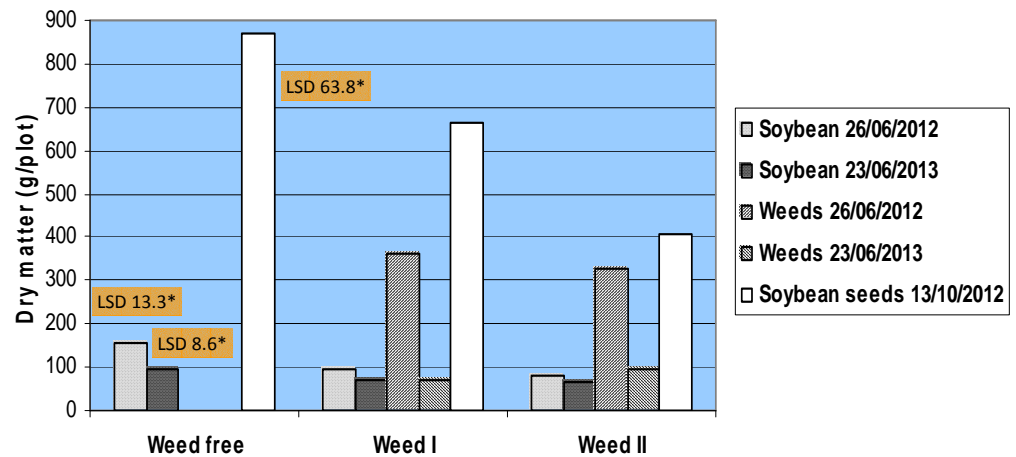


Fig. 1 Dry matter of soybean and 'artificial weeds' 2012 and 2013. Subplots early development 1m²; subplots soybean seeds 4m². Differences between weed treatments were significant at $p=0.01$ in ANOVA.

Acknowledgement

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Conclusion

A system has been developed to induce weed stress of different levels in small plots during early, mid, and late season growth of soybean.

Reference Vollmann, J., Wagentristsl, H. & Hartl, W. (2010) The effects of simulated weed pressure on early maturity soybeans. *Europ. J. Agronomy* 32: 243–248.

