

Materials and Methods

Per 4 F3- and 3 F4-families 16 progenies, an unselected bulk and the checks Funke and Merlin were sown in single rows with 22 plants at 12/04/2012. After minimum temperatures of -2.2°C frost damage was scored (Fig. 2). In 2013 per family 1 progeny with low frost damage, 1 with high frost damage, the unselected bulk, and the 2 checks were sown in a split plot design (whole plot=family) with 2 replicates in 4m^2 plots at 17/04/2013. After minimum temperatures of -2.1°C frost damage was scored. The experimental site were organic fields at Deppoldshausen near Göttingen, 300 m above sea level.

Introduction

Within the project “Expansion of soybean cultivation in Germany through adaptation by breeding as well as optimization of crop production and processing technology” the selection for cold tolerance is explored. Here we concentrate on frost tolerance in early development.

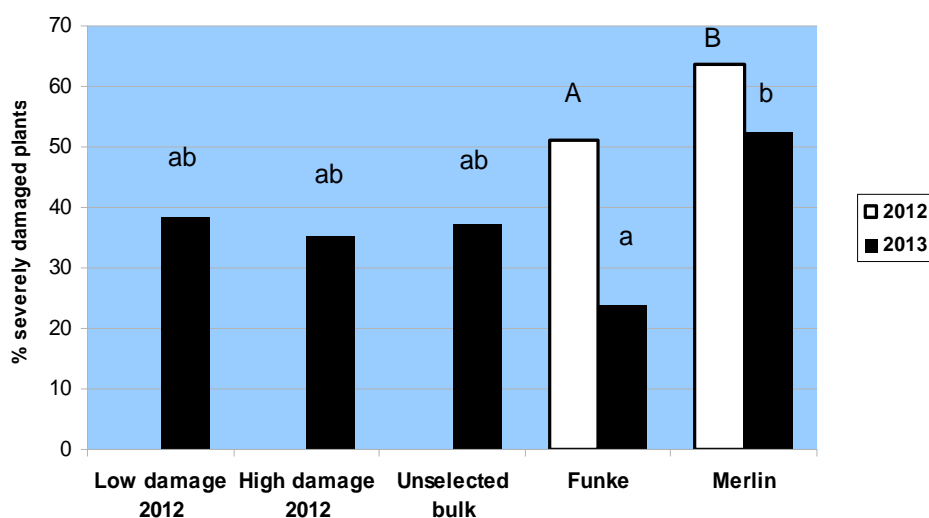


Fig. 1 Percentage of severely damaged plants in selections and check varieties. Different letters indicate differences significant at $p=0.05$ in Tukey's test.

Results

No significant difference was observed between the selection for low damage, high damage, and unselected bulk (Fig. 1). Significant differences between the check varieties in both years, however, indicate genotypic variation.

As a preliminary result we suggest i) to improve the selection of parents and ii) to increase the number of replications and/or locations to deal with the large experimental error of the trait frost tolerance. The limited number of seeds per plant is a severe restriction to testing early generation breeding lines.

Fig. 2

Top row from left to right:

- No frost damage
- Severe damage; main shoot dead
- Plant dead.

Bottom: Deppoldshausen experimental site.



Acknowledgement

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Conclusion Genetic variation for frost tolerance in early developmental stages of soybean was observed. The experimental error is large; a high number of replications or locations is required.

