Effects of harrowing to organically cultivated oat varieties in Austria

Elisabeth Zechner, *Saatzucht Edelhof, Edelhof 1, 3910 Zwettl, Austria, e.zechner@saatzucht.edelhof.at*

Introduction

Within the Austrian project „Basic principles for breeding, multiplication and variety testing for organic agriculture" (financing body: Ministry of Agriculture and State Governments, 2004-2008) breeders researched for the development of new methods for the evaluation of suitable seeds and varieties for organic agriculture. So also research had been carried out in "Tolerance to harrowing of spring barley and oats". To combine the demands on powerful and healthy varieties for organic farming with high quality it makes sense to select lines out of the wide range of a conventional nursery garden.

Pict. 1: Typical weed in organic fields at Edelhof because of the livestock farming and the high N-supply are *Rumex obtusifolius*, *Cirsium arvense*, *Thlaspi arvense*, *Galeopsis tetrahit*, *Lalium pupureum, L. ablexicaule*, *Veronica spp*., *Stellaria media*, *Avena fatua*, *Gallium aparine*.

Material and methods

At the Austrian location Edelhof-Zwettl 11 varieties of spring oats (*Cavallo, Efesos, Effektiv, Ehostar, Espresso, Expander, Flämingsprofi, Monarch, Paddock, Triton, Typhon)* used in Austrian organic farming were grown to monitor their tolerance to harrowing in the years 2005, 2006 and 2007. The drilling was done with 400 seeds/m². The monitoring consisted of two trials. Within each, three replications, one trial with and one trial without harrowing. The Hatzenbichler 6 mm-spring tine harrow was used one or two times a year crosswise the sowing direction. Different criteria were noted e.g. growth rate, plant habit, plant length, reaction to the mechanical weed control, soil covering rate, ear emergence, diseases, yield and quality.

Pict. 2: Spring oats just after harrowing

Results

- Agronomical features: No significant differences between the same variety in harrowed and not-harrowed model in ear emergence, maturity, soil covering and diseases were found
- Yield for spring oats: the not-harrowed model yielded better in three years
- Quality: In most varieties the quality characters decreased when harrowed – except test weight
- Fewer weeds through harrowing – only optical advantage
- Mobilisation of nutrients cannot be utilized by spring oats
- Finally no monetary advantage for the harrowing farmer

Conclusions

Although in the harrowed model less weed emerged, the competition of these weeds had no strong negative effects to the varieties in the not-harrowed model. The mobilisation of nutrients through the use of the harrow could not be realised for most of the oat varieties. Harrowing could not generate higher monetary surpluses through higher yields or better qualities, respectively harrowing seems to be an unnecessary work and expense at first glance. So far no shared characters are found from the few positively reacting varieties useable as a general selection criteria. But as harrowing is necessary to keep the weed seed bank under control the breeder has to look for varieties resistant to harrowing and/or better in competing to weed by morphological features and reacting also positively with higher yields and better quality.