

# Field Experiments with Glufosinate Tolerant Transgenic Oil Seed Rape in Germany in 1995/1996

Dr. Juergen CREMER,

Hoechst Schering AgrEvo GmbH, Frankfurt/Main, Germany

AgrEvo Germany carried out 11 field trials (under part B of the EU directive 90/220) at 9 different locations throughout Germany in the season 1995/96 with Liberty © Herbicide in Liberty Link © Winter Oil Seed Rape. Two trials out of 11 were foreseen for a performance check of Liberty Link © varieties in cooperation with plant breeders.

The main other objectives of these field trials were :

- the registration of Liberty © (Glufosinate-Ammonium) as a selective broad cross spectrum post emergence herbicide in Liberty Link © Winter Oil Seed Rape and
- positioning trials for the market introduction of Liberty © in Liberty Link © Winter Oil Seed Rape.

These trials included tests with Liberty © in Liberty Link © Winter Oil Seed Rape compared to untreated plots and plots treated with different standard herbicides with respect to :

- broad spectrum efficacy and specific efficacy on important single weed species (including volunteer cereals)
- phytotoxic effects on Winter Oil Seed Rape
- yield performance and
- residue studies (N-acetyl-Glufosinate).

Some of these trials have been used also for biosafety studies such as :

- the outcrossing risk of the glufosinate tolerance to adjacent conventional oil seed rape (for example : the «non transgenic guard» around the transgenic test field) and to wild relatives (belonging to a monitoring program with respect to herbicide resistant crops)
- the proof of the substantial equivalence between the phenotype and the genotype with respect to several agronomic characteristics

- a study for measures for the control of volunteers (both transgenic and non transgenic oil seed rape) after the harvest and in rotational crops.

At 2 locations (out of 9) field trials were destroyed by a group of militant opponents. All field trial work was accompanied by very close and open contacts to the competent authorities and by comprehensive communication activities to the public.

In addition to this field trial program with Liberty Link © Winter Oil Seed Rape, AgrEvo Germany carried out 16 field trials with Liberty Link © Spring Oil Seed Rape (under part C of the EU directive 90/220) at 14 different locations throughout Germany in 1996.

The objective of spring seeded trials was primarily to support results from Liberty Link © Winter Oil Seed Rape and to become more familiar with this new weed control system.

In all these field trials we have checked different close rates of Liberty © at different timings of a post-emergence application and different sequential applications.

The range of tested dose rates reached from 300 to 800 g a.i. Glufosinate per ha per application. The tested timings for single applications were :

- 2 - 4 leaves of the weeds (and volunteer cereals) ;

- 4 - 8 leaves of the weeds (and volunteer cereals) and

- an application in early spring at the beginning of the shooting phase of winter oil seed rape. Two different sequential applications have been checked as well :

- 2 applications in the autumn and

- 1 application in the autumn followed by 1 application in early spring.

## Results :

### • Efficacy

Liberty © controlled all important weeds including volunteer cereals in Liberty Link © Oil Seed Rape. Key-weeds such as *Galium aparine*, volunteer barley, all annual grasses, *Matricaria* species, *Stellaria media*, *Lamium* species, *Viola arvensis*, *Veronica* species and *Polygonum* species - were controlled better than by all tested standard herbicides. *Agropyron repens* was controlled quite well too although regrowth from rhizoms may occur. However, a sufficient suppression will be achieved.

### • Phytotoxicity

Liberty © is highly selective in Liberty Link © Oil Seed Rape.

### • Yield

Liberty © plots outyielded both the standard herbicides plots and the weed free untreated plots as well by 5 % resp. 3 %.

The performance of the tested Liberty Link © varieties resp. hybrids was very good. A field trial program was initiated by the Bundessortenamt for the performance check of Liberty Link © varieties at 12 different locations throughout Germany in the season 1996/1997. The substantial equivalence between phenotypes and genotypes could be proven.

### • Biosafety

The studies with respect to the outcrossing risk of the glufosinate tolerance confirmed the present knowledge and have shown that the glufosinate tolerance was transferred to 1 % to 3 % into the adjacent non transgenic «guard» of oil seed rape (within a distance of 6 - 10 m).

Outcrossings to wild relatives could not be detected.

The field trial study for the control of volunteer oil seed rape has shown that Fenikan (Diflufenican + Isoproturon) with 2,5 l/ha and Tolkán Fox (Bifenox + Isoproturon) with 3,5 l/ha controlled both volunteer oil seed rape (Liberty Link © winter oil seed rape and conventional winter oil seed rape as well) by more than 99 %. Both herbicides were selected as widely used cereal herbicides (in the autumn). Further studies will be carried out with other herbicides in different spring crops. Other trials showed that the mechanical control of volunteer winter oil seed rape (before growing a rotational crop) gave also very good results without any differences between Liberty Link © Winter Oil Seed Rape and conventional Winter Oil Seed Rape.

## Summary

All results from these field trials in Germany with Liberty © in Liberty Link © Winter Oil Seed Rape confirmed the very good results from France and from Great Britain and showed the high performance of this new system for weed control.

Liberty © is a very broad spectrum herbicide and highly selective in Liberty Link © Winter Oil Seed Rape. It can be used very flexible in post emergence applications corresponding to the weed density and to the composition of the weed flora. With respect to biosafety issues, it could be proven that there is no difference between Liberty Link © Winter Oil Seed Rape and conventional Winter Oil Seed Rape.