Molecular Investigations of the Soil, Rhizosphere and Transgenic Glufosinate-Resistant Rape and Maize Plants in Combination with Herbicide (Basta®) Application under Field Conditions

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A field study was conducted during 1994 to 1998 on the Experimental Farm Roggenstein, near Fürstenfeldbruck, Bavaria, Germany to determine the effect of transgenic glufosinate-resistant rape in combination with the herbicide Basta® [glufosinate-ammonium, phosphinothricin, ammonium (2*RS*)-2-amino-4-(methylphosphinato) butyric acid] application on soil microorganisms and the behaviour of the synthetic transgenic DNA in response to normal agricultural practice. No influence of Basta® on microbial biomass could be detected. The phospholipid fatty acid analysis of soil extracts showed no difference between Basta® application and mechanical weed control, whereas conventional herbicide application revealed a different pattern. Basta® application resulted in a changed population of weeds with a selective effect for *Viola arvensis*. During senescence, transgenic rape DNA was degraded similar to endogenous control DNA. After ploughing the chopped plant material in the soil, transgenic as well as endogenous control DNA sequences could be detected for up to 4 weeks for rape and up to 7 months for maize, whereas PCR analysis of composted transgenic maize revealed the presence of the transgene over a period of 22 months.

Key words: Brassica napus, Glufosinate Resistance, Phosphinothricin-*N*-acetyltransferase Gene, Weed Populations