HUMBOLDT–UNIVERSITÄT ZU BERLIN
INSTITUTE OF CROP SCIENCE

Fertilising with human urine – Yields and soil biological effects

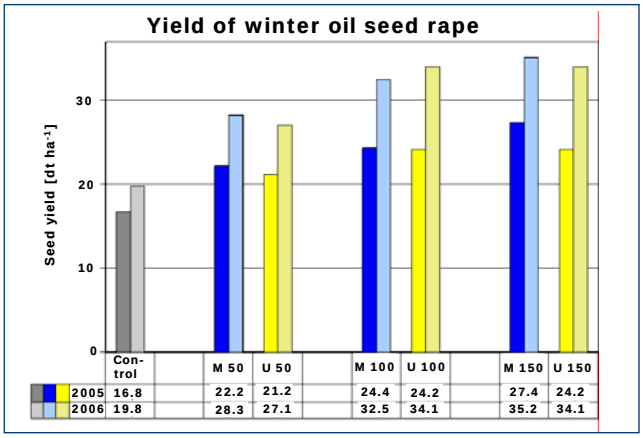
Andreas Muskolus & Frank Ellmer

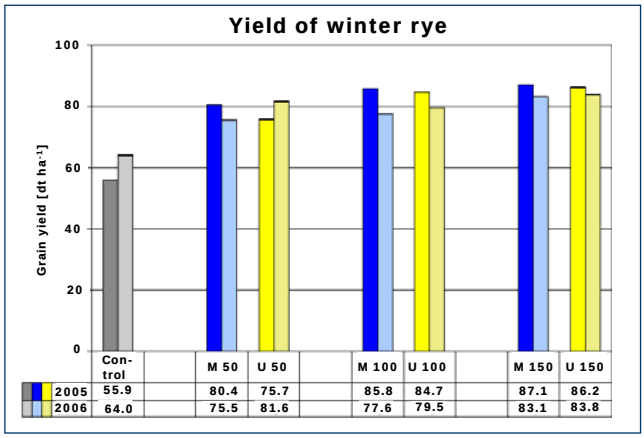
INTRODUCTION

Within the pilot–project SCST (Sanitation Concept of Separate Treatment) in Berlin the fertilising effects of urine as well as its effect to soil biological life were investigated. Urine collected in separation toilets was applied to experimental fields in order to establish the fertilising effects compared to conventional mineral fertiliser at local conditions. The abundance of earthworms as bio indicators was used to determine the impact to soil life.

YIELDS

Field experiments with winter oil seed rape and winter rye were carried out in 2005 and 2006 at Berlin/Dahlem. At this location a typical light sandy soil is found and the mean annual precipitation is 540 mm per year. The following treatments were included: Unfertilised control, 50, 100, 150 kg nitrogen per hectare from mineral fertiliser (M 50, M 100, M 150) und from urine (U 50, U 100, U 150). The mineral fertiliser Calcium Ammonium Nitrate (CAN) was used as it is the most commonly applied by farmers in the region.





In both experimental years no statistical difference in yield of winter oil seed rape and winter rye was found between the two fertiliser treatments.

SOIL BIOLOGICAL EFFECTS

Earthworms fulfil important ecological functions in the soil and are commonly used bio indicators. Their abundance was investigated in parcels of winter rye treated without fertiliser, with mineral fertiliser and with urine. The numbers were established by hand-sorting in May, two weeks after application, and in October after harvest. A total of 1 m² per treatment of soil, divided into eight replications, was searched for worms and cocoons up to a depth of 20 cm.

	May			October		
Species	Control	Urine	CAN	Control	Urine	CAN
A. caliginosa	10	1	7	31	18	16
A. chlorotica	14	2	6	14	18	20
A. icterica	2	2	1	1	0	0
A. species	1	6	1	2	6	5
A. longa	1	0	4	4	3	0
Total	28	11	19	53	45	42

Abundance of earthworms per m² of the species *Aporrectodea and Allolobophora* after application of mineral fertiliser (CAN) and human urine in 2005

The abundance after fertilisation was clearly differentiated. Most worms were found in the control, the smallest numbers in the urine treatment. Perished worms were also observed at the surface one day after urine application. Until October the populations recovered and balanced numbers were counted.

CONCLUSIONS

Equal yields of winter oil seed rape and winter rye can be reached at light sandy soils if human urine is used instead of conventional mineral fertiliser.

The application of urine has a negative impact to soil organisms. This effect is short term only if soil conditions allow populations to recover.

The financial support to the study, a research project of Kompetenzzentrum Wasser Berlin, was provided by Veolia Water and Berliner Wasserbetriebe. Furthermore it was supported by the LIFE financial instrument of the European Commission (Duration: 1 January 2003 – 31 December 2006, LIFE03 ENV/D/000025).

Humboldt-Universität zu Berlin
Institut für Pflanzenbauwissenschaften
Albrecht-Thaer-Weg 5
14195 Berlin
Email: a.muskolus@agrar.hu-berlin.de