

# Computer controlled High Gradient Extractor for soil organisms

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## Introduction

Soil micro-arthropods, such as Acari and Collembola, are essential components of the soil decomposer system and valuable indicators of soil quality and soil biodiversity. Evaluating the impact of agrochemicals or assessing the risks posed by genetically modified plants (GMOs) on micro-soil organisms is likely to gain more importance in the future. RIFCON GmbH conducts tailor-made field studies regarding these objectives. For this purpose it is essential to extract micro-arthropods from soil samples. The high-gradient extraction according to Macfayden (1961) is a well established and standardized method (ISO 23611), also employed by RIFCON GmbH. For this purpose RIFCON GmbH constructed a highly sophisticated computer-controlled 'High Gradient Extractor', specifically designed for the efficient extraction of soil micro-arthropods (Figure 3).

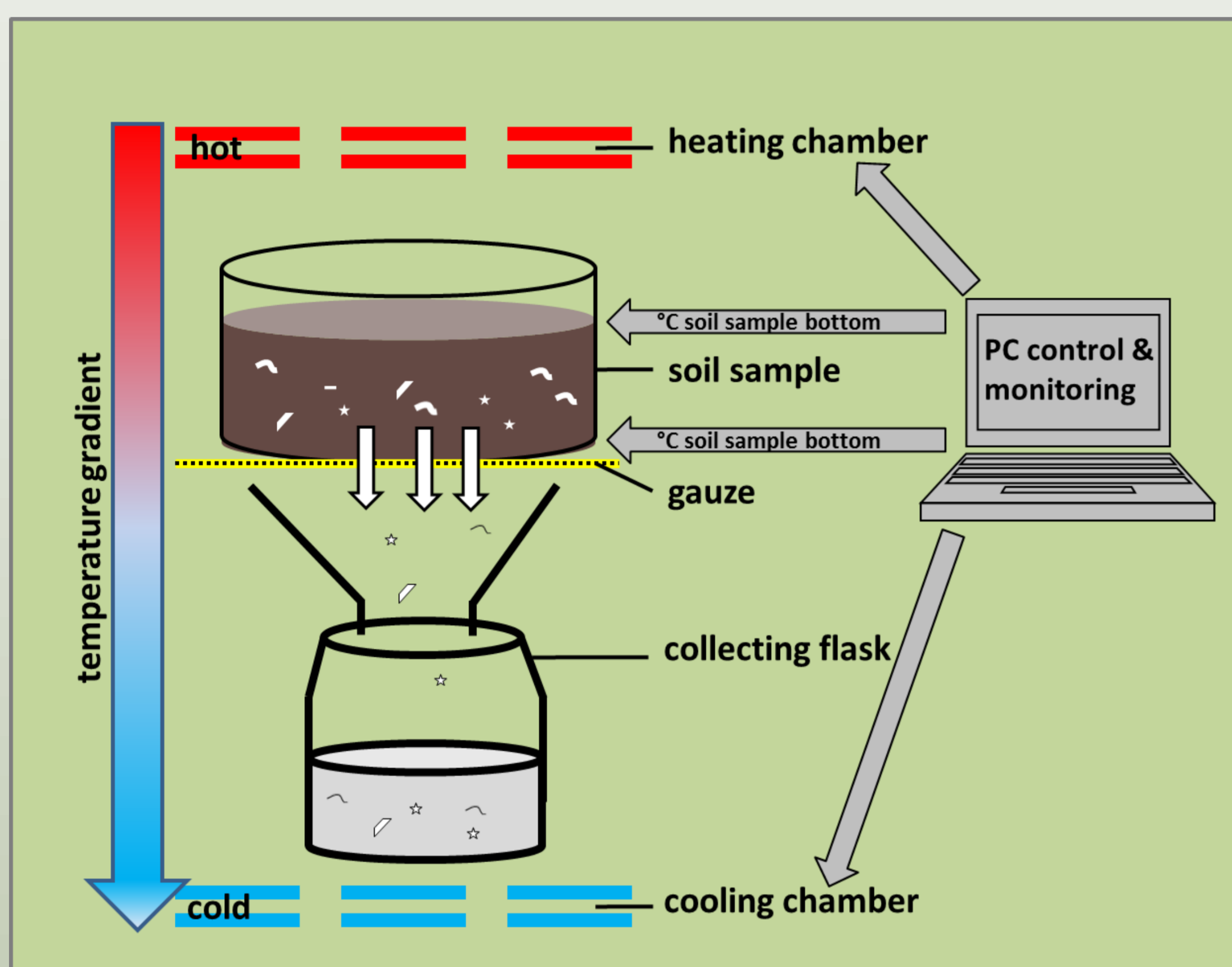


Figure 1: Schematic demonstration of high gradient extraction

## Method

The principle of this extraction method is to create an artificial temperature gradient between the canister, in which the samples have been placed (hot), and the collecting device below (cold; Figure 1). This temperature gradient induces negative thermo-taxis in micro-arthropods driving them to move towards the cold to leave the soil sample through a gauze (mesh size 1-2 mm) and to drop into a collecting flask. The collecting flask contains a mixture of diethylene glycol and water (1:1) as a fixative.

Extraction procedure runs for a period of about 7-10 days. Over the course of the extraction the temperature of the soil samples is increased steplessly and regulated by a PC control unit. Extraction starts at room temperature (approx. 25°C) and is increased gradually to approx. 50°C (see Figure 2).

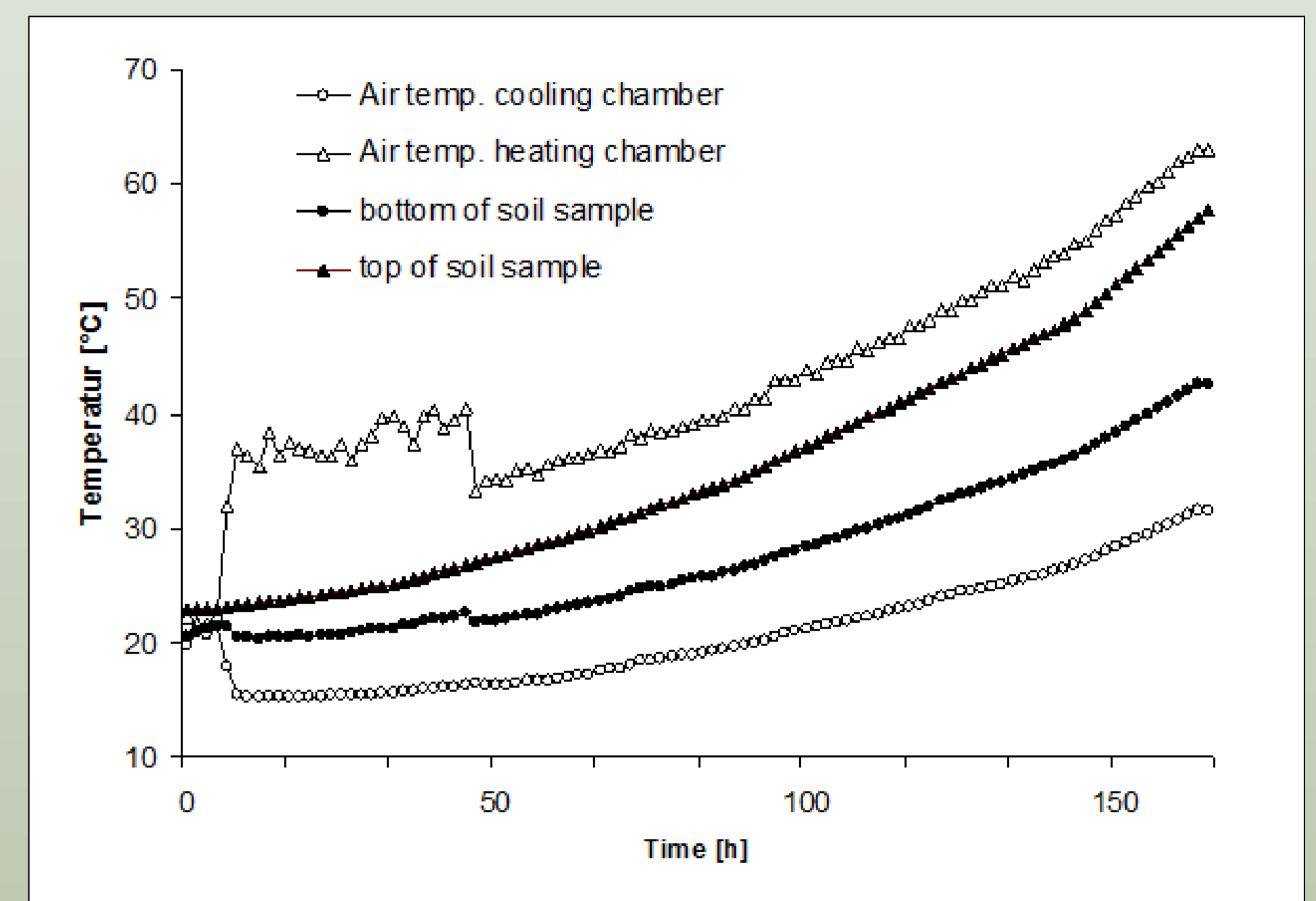


Figure 2: Typical temperature regime during extraction

## Efficiency

The efficiency of the extractor was verified with two Collembola species (*Folsomia candida* and *Heteromurus nitidus*) in different soil types and soil humidity regimes. At least 80% of *F. candida* and 96% of *H. nitidus* were recovered from soil cores (Figure 4).

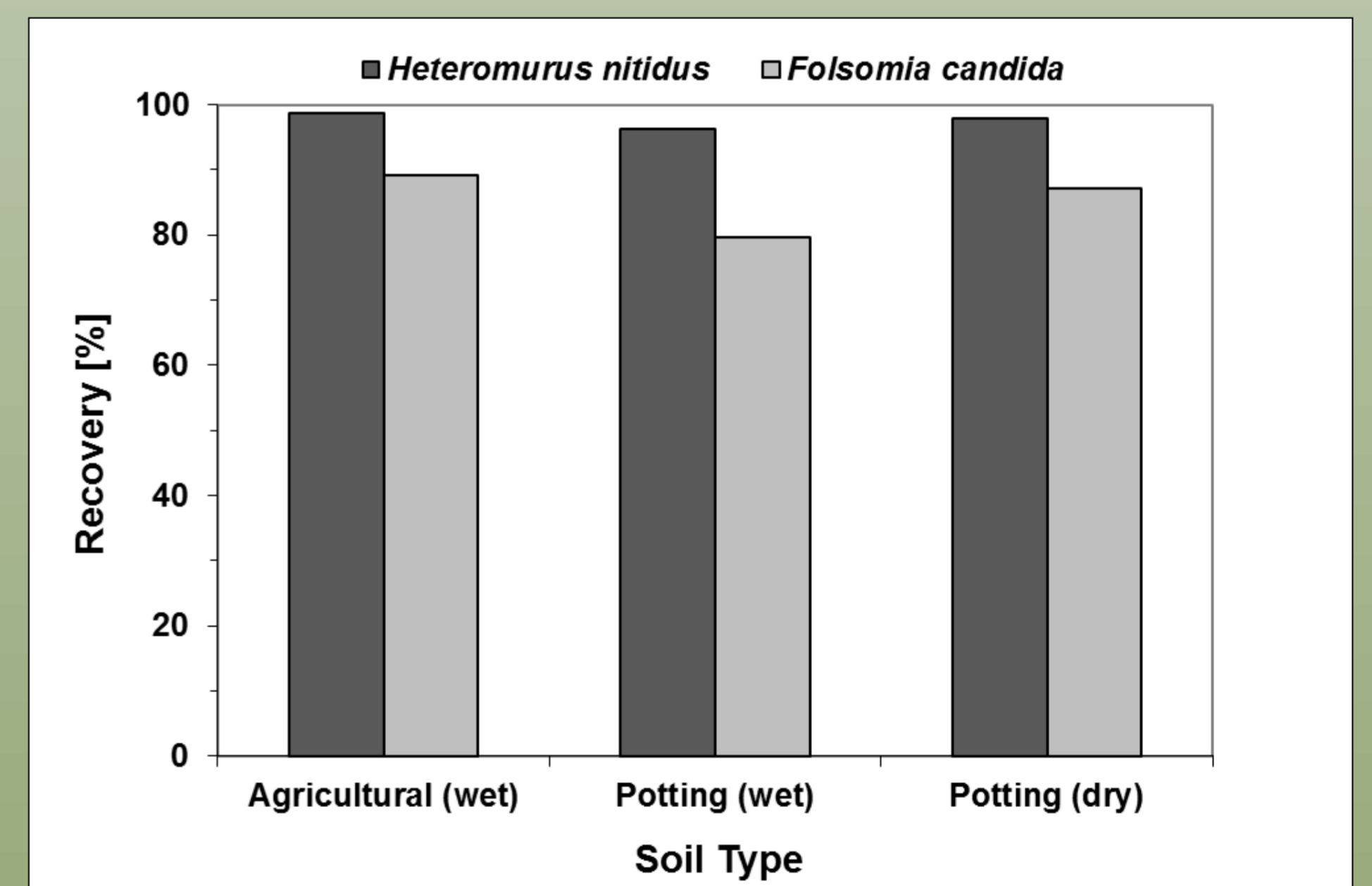


Figure 4: Results of efficiency test

## Special features of the computer-controlled 'High Gradient Extractor'

- PC controlled stepless temperature regulation and temperature monitoring allows repeatable and adaptable extraction of soil micro-arthropods
- Efficient extraction of soil micro-arthropods
- Extraction of a large number of samples simultaneously

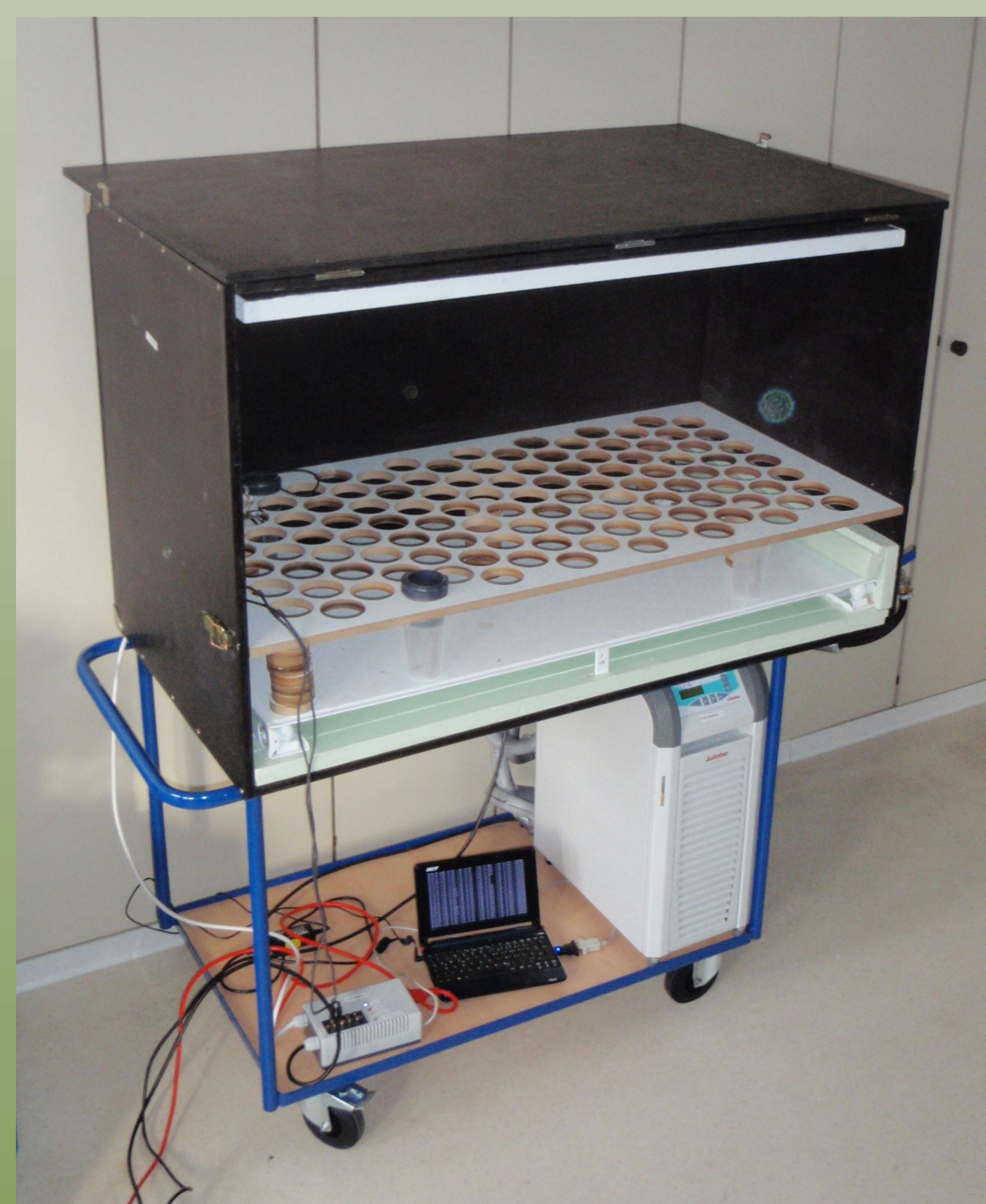


Figure 3: High Gradient Extractor with PC control unit

Macfayden, A. 1961. Improved funnel-type extractors for soil arthropods. Journal of Animal Ecology 30, 171-184

