

ORC - Organic Residues in Circulation

Crop trial with compost and digested residues



ORC

Biological treatment of source-separated organic waste will become of greater importance in Sweden within the near future. As a result, increasing volumes of compost and digested residues will be produced. The developmental trends are similar throughout the European Union.

Compost and digested residues contain numerous valuable humus and nutrient elements. However, the material may also contain environmental pollutants of different kinds.

In order to study the long-term effects on arable land when using these materials as fertilisers, a field trial was started in late 1998.

This trial is called ORC (Organic Residues in Circulation) and is being conducted in cooperation with Vafab, MDH, SLU and HS-U. The trial is a comparative field experiment.

The following organic residues/manures are included:

- Compost from source-separated domestic

waste.

- Digested residues from biogas production fed with source-separated domestic waste.
- Digested sludge from processing of municipal sewage water.

The effects of the organic residues are compared with pig slurry, solid cattle manure and mineral fertiliser (containing nitrogen, phosphorus and sulphur). A treatment with no manure or fertiliser is used as control.

The objective of the reference treatments is to show whether fertilising with compost, digested residues and sewage sludge diverges in any decisive manner from traditional manure treatments.

Particular emphasis is placed on whether changes in the fertility status can be detected in soils by use of microbial methods. Soil microorganisms are of decisive importance for making bound plant nutrients available for plant roots. In addition, these microorganisms are probably extremely sensitive to environmental pollution because they are always in direct contact with the soil's chemical environment.

Vafab – The Solid Waste Company of Västmanland
SLU – Swedish University of Agricultural Sciences
HS-U – Västmanland Rural Economy and Agricultural Society
MDH –Mälardalen University.



Goals

The overall goal of the trial is to evaluate the effect of the influence of compost and digested residues on the crop yield and soil properties.

Specific goals for the trial are:

- To determine harvest volumes and quality.
- To evaluate the fertilising effect of the different organic residual products, as well as their contribution to an improved soil structure.
- To study the changes with regard to the soil's microbiological, chemical and physical properties.
- To study any negative environmental effects or specific toxic effects of the organic residual products both before and after spreading on soil.

Accomplishment

The field trial is being conducted at Brunnby Farm, an experimental farm located near Västerås and run by the local Rural Economy and Agricultural Society.

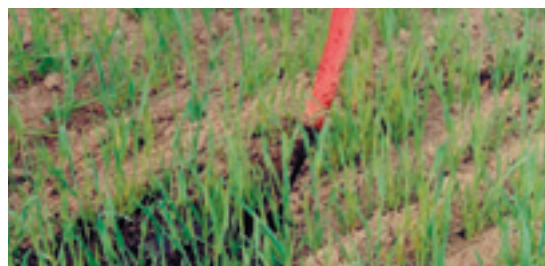
Great care has been taken to find an area with soil conditions that are as uniform as possible. A uniform area is of great importance to detect changes caused by the various treatments as soon as possible. The total experimental area covers 3 200 m² divided among 36 small plots.

The trial is conducted in accordance with a specifically established experimental plan. Conventional tillage measures such as autumn ploughing are used, and plant protection measures are applied as required. The only difference to conventional tillage is in

the spreading of the manure, which is done manually. The compost, cattle manure and digested sludge (solid manures) are spread in the autumn and the digested residues and pig slurry (liquid manures) in the spring. The mineral fertiliser (NPS) is spread in the spring in connection with sowing.

Oats and barley are grown in the trial in a simple rotation. During the growing season several samples are taken for a comprehensive programme of manure, crop and soil analyses.

Large amounts of data are already being processed and will form the basis of the evaluation. The results and conclusions will be reported in both popular as well as scientific journals.



Responsibility

Vafab

Vafab has the overall responsibility for the trial and is also responsible for the coordination of the trial. Vafab also provides the compost, digested residues and digested sludge required for spreading on the field.

Västmanland Rural Economy and Agricultural Society (HS-U)

The society is responsible for the establishment and management of the trial, as well as for the gradings, precipitation measurements and sampling of crops and topsoil. It is also responsible for obtaining the yield data and for providing the pig slurry, cattle manure and mineral fertiliser required for accomplishment of the trial.

SLU and MDH

At these two seats of higher education two researchers and a Ph-D student are working with the administration of the project and processing of the large amounts of data generated. They also perform the soil microbial analyses designed to assess the development of soil fertility.



Project organisation

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A reference group will also be associated with

the project, consisting of authorities and organisations involved in waste handling and agriculture.

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