

---

## Nutrient transport from different subsurface drainage systems on clay soil

---

**Pertti Vakkilainen<sup>1</sup>, Laura Alakukku<sup>2</sup>, Merja Myllys<sup>3</sup>, Jyrki Nurminen<sup>1</sup>, Maija Paasonen-Kivekäs<sup>4\*</sup>, Markku Puustinen<sup>5</sup>, Rauno Peltomaa<sup>1</sup>, Helena Äijö<sup>1</sup>**

<sup>1</sup>Field drainage research association, Simonkatu 12 A 11,00100 Helsinki, Finland

<sup>2</sup>University of Helsinki, Department of Agrotechnology, PO, Box 28, 00014 Helsingin yliopisto, Finland,

<sup>3</sup>MTT Agrifood Research Finland, 31600 Jokioinen, Finland,

<sup>4</sup>Sven Hallin Research Foundation, Simonkatu 12 A 11, 00100, Helsinki, Finland,

<sup>5</sup>Finnish Environment Institute, PO Box 140, 00251, Helsinki, Finland

\*maija.paasonen@hallin.fi

The aim of this study is to find out how filter material and drain spacing of improved subsurface drainage affect crop production and nutrient load in both drainage waters and surface runoff. In the method I gravel is used as an envelope and the drain spacing is 8 m. In the method II very thin textile (<1 mm) is used as an envelope and drain spacing is 6 m. The research is carried out on a field at Jokioinen in south-western Finland. The soil is heavy clay and the mean slope is 1%. The existing tile drainage pipes were laid in 1954 using 16 m spacing and an average depth of 1 m. The size of the field is 6 ha and it consists of 3 field sections each with a separate drainage system. In the summer of 2008, the additional drainage systems were built into two of the field sections using the methods I and II. The third one was left as a control plot.

Volume and quality of subsurface and surface waters from each field section were measured. Concentrations of total phosphorus, dissolved orthophosphate, total nitrogen, ammonium nitrate, nitrate nitrogen and solid substances were determined from the water samples. Furthermore, depth of groundwater table, soil moisture and crop yield were also measured on several points within each field section. Physical and chemical soil properties were also determined from each field section.

In the paper runoff, nutrient load and crop yield from the calibration and testing periods are presented. The feasibility of the two drainage methods is evaluated from the point of view of crop production and nutrient loading to surface waters.