

EFFECT OF IRRIGATION ON FRUITBODY PRODUCTION OF MUSHROOMS IN A FINNISH SCOTS PINE FOREST

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INTRODUCTION

It is known that several climatic factors such as precipitation and temperature during the growing season affect mushroom production. In this study we monitored the yield of fruitbodies in a Scots pine forest during three growing seasons in order to clarify the effects of irrigation on the above and below ground growth of fungal biomass.

MATERIALS AND METHODS

- 🍄 Eight experimental plots (four irrigated, four control, size 20x20m) in a homogenous Scots pine forest in western Finland.
- 🍄 Irrigation, twice a week in 2002, 2003 and 2004. Target amount of water (precipitation plus irrigation) was 400 mm from the beginning of June to the end of August.
- 🍄 Fruitbody collection once or twice per week.
- 🍄 Fungal biomass from the humus layer was measured as ergosterol with HPLC.
- 🍄 For measurement of growth of mycorrhizal fungal mycelium in the soil Nylon mesh bags (mesh size 50 µm) filled with quartz sand were buried in soil in June and picked up in September in 2004.
- 🍄 Dissolved nitrogen (NH₄⁺, NO₃⁻; dissolved organic N) was determined with flow injection analyser.
- 🍄 Fungal community structure in the mesh bags will be studied in near future with PCR-DGGE method.



Figure 1. Experimental plots in Scots pine forest in Finland.

RESULTS

- 🍄 Irrigation increased the total biomass of fruitbodies of *Cortinarius* sp. in 2002 ($p=0.042$, t-test) and *Lactarius* sp. in 2003 ($p=0.042$, ANOVA), whereas no effect was found for example in the total number of *Suillus variegates*, *Leccinum* sp. or *Rozites caperata*.
- 🍄 Irrigation did not affect significantly the total number of the fruitbodies, fungal biomass in the humus or dissolved N-compounds (NH₄⁺, NO₃⁻; dissolved organic N).
- 🍄 Precipitation in the growing season 2004 was higher than in 2003, which may explain the smaller effect of the irrigation treatment in 2004.

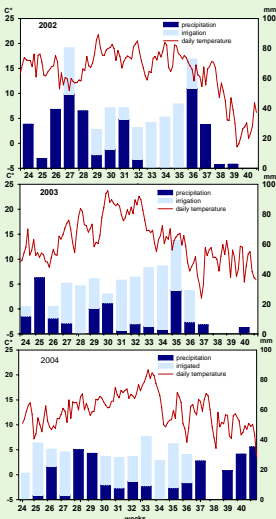


Figure 2. Air temperature (°C) in the experimental area and precipitation plus sprinkler irrigation (mm) on irrigated and non-irrigated plots in 2002, 2003 and 2004.

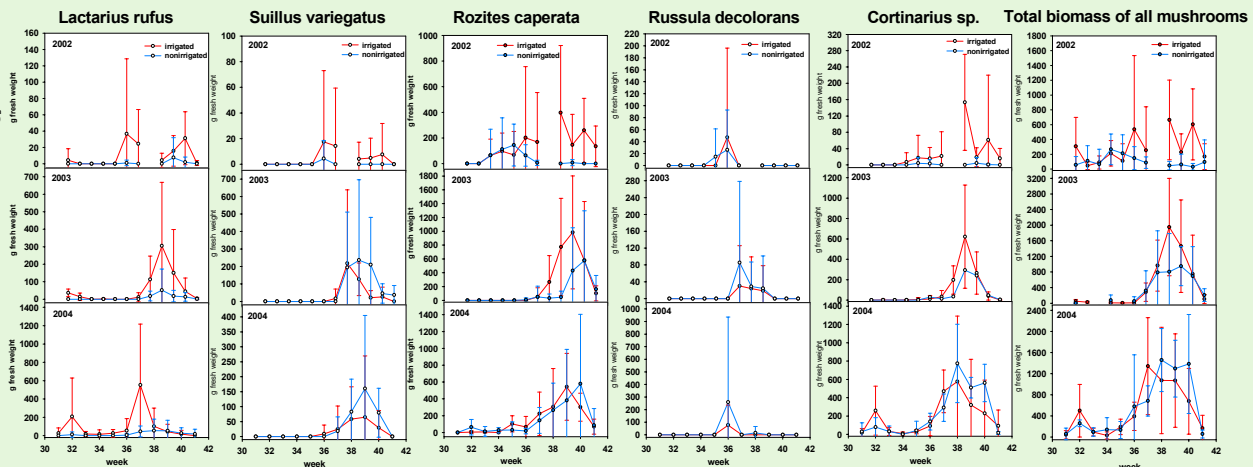


Figure 3. Fresh weight of fruitbodies in 2002, 2003 and 2004 on irrigated and non-irrigated plots. Error bars indicate 95 % confidence interval for means.

CONCLUSIONS

As a conclusion, irrigation affected significantly the fruitbody production of some fungal species (*Lactarius rufus*, *Cortinarius* sp.), but did not affect significantly the total number of the fruitbodies or the fungal biomass in the soil.

Growth of fungal mycelium into the mesh bags did not correlate with the biomass production of fruitbodies.

Acknowledgement

This study has been funded by Metla and EU Leonardo da Vinci project "MYKOS, Fungi as a Resource of Employment, Sustainable Development and Economic Diversification within the Rural Realm".