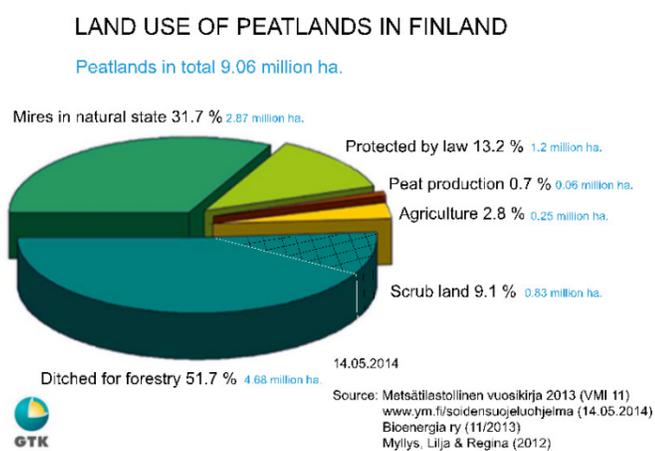


PRODUCTION AND USE OF SPHAGNUM BIOMASS AS A PLANT SUBSTRATE IN GREENHOUSE

Risto Tahvonen¹, Juha Näkkilä¹, Niko Silvan² & Olli Reinikainen³

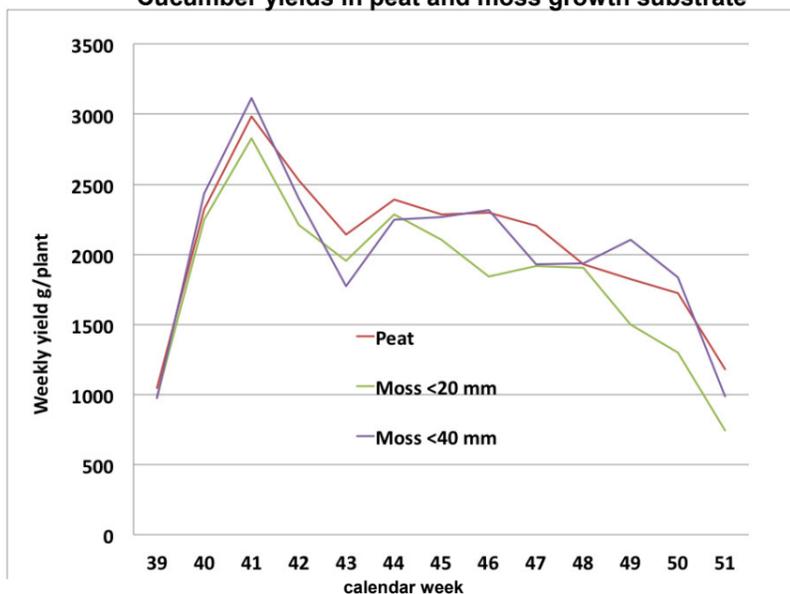
The total peatland area in Finland is 9,1 million hectares. Of this area, 280 000 ha are suitable for *Sphagnum* moss production. *Sphagnum* moss collected from the top layer of the mire was dried to 20-40 % moisture content, crushed and sieved. The water content in peat media was higher than in *Sphagnum* media, but the amount of easily available water in *Sphagnum* media was at least at the same level as in peat media. Suppressive properties against moulds and diseases were recorded for *Sphagnum*. Cucumber seedlings grew remarkably better in *Sphagnum* substrate than in rockwool. The cucumber yields were the same as in peat when the coarse *Sphagnum* fraction (< 40mm) was used. In other projects, harvesting technologies for *Sphagnum* harvest both under summer and in winter conditions have been developed.



Keisarinneva, harvested in 2006 (left up), six years later in 2012 (right down) "hollows" can be seen somewhere, but elsewhere (right up) harvesting can hardly be seen



Cucumber yields in peat and moss growth substrate



The crucial growing medium characteristics were determined for three *Sphagnum* moss species and a natural mixture of different species. The pH of different *Sphagnum* species varied from 4,3 to 6,4. The nutrient content and CEC of *Sphagnum* were lower than those of peat. The water content in peat media was higher than in *Sphagnum* media, but the amount of easily available water in *Sphagnum* media was at least at the same level as in peat media. Suppressive properties against moulds and diseases were recorded for *Sphagnum*. Greenhouse cucumber seedlings grew remarkably better in *Sphagnum* substrate than in rockwool. The cucumber yields were the same as in peat when the coarse *Sphagnum* fraction (< 40mm) was used. Weekly yields in peat were 5,8 kg/m², in coarse *Sphagnum* 5,7 kg/m².



Growth substrate tests were done in modern research greenhouses. Carbon dioxide, humidity and temperature were maintained favourable for the plant in cooled greenhouses, even in bright sunlight. Artificial light was used during the dark hours to replace the natural light. The cucumber crop produced yield 4-7 kg/m² per week under these conditions. The best farmers use the same technology in Finland.



In other projects, harvesting technologies for *Sphagnum* harvest both under summer and winter conditions have been developed. The environmental consequences of *Sphagnum* harvesting are minor compared to peat production due to operating on areas without ditches. Harvesting of 20-30 cm layer of *Sphagnum* moss causes small emissions to the atmosphere and strain on the water system, but effects are temporary and last less than 10 years. Repeated moss harvest is possible after 20-30 years.