Accelerated Crop Rotation for Sustainable Production: Harnessing the Potential of Sphagnum Moss

Sphagnum moss stands out for its exceptional natural properties, making it a valuable raw material for a range of uses, including growing media, animal bedding, and insulation. Historically, its purity and antiseptic qualities even led to its use during wartime to treat wounds. What sets sphagnum apart is not only its functionality but also its ability to regenerate relatively quickly, offering a renewable resource that meets the needs of even the most demanding industries.

Abundant Resources, Evolving Challenges

Finland is uniquely positioned in this field, with millions of hectares of moss-rich peatlands. The availability of raw material is not a limiting factor. Instead, the main challenge is developing a harvesting method that balances economic viability with increasing environmental and biodiversity-related responsibilities.

Small Quantities, Big Impact

With global demand rising for peat-free growing media, sphagnum moss offers a compelling solution. This is particularly important in warm climates, where high evaporation requires substrates with strong water retention to conserve freshwater. While sphagnum is not intended to replace peat completely, even small quantities, just a few volume percent, can significantly improve the performance of a growing medium. It is often blended with other materials such as compost, wood fiber, or coir to enhance structure, aeration, and water-holding capacity.

Neova Group, with decades of experience in moss harvesting and applications, has played a key role in this development. The company focuses on providing high-quality growing media that remain pathogen-free, retain moisture, and allow for sufficient air and root space, even in compact containers.

From Natural Growth to Cultivation

While sphagnum moss can be harvested naturally, cultivation is also being explored. Trials are underway not only in Finland but also in the Netherlands, Germany, and China. When cultivated on former peat extraction fields, provided hydrological balance is maintained, moss can eventually be harvested. However, this approach requires patience, as the first harvest may take up to two decades. Neova’s 9-hectare test cultivation in Haukineva, Peräseinäjoki, is currently the world’s largest of its kind, showcasing both the potential and the early stages of large-scale moss farming.

Finland’s Strategic Advantage

Finland’s vast expanse of drained peatlands offers a strategic opportunity for developing sphagnum-based solutions for sustainable greenhouse agriculture. Many of these lands have already shown natural sphagnum regeneration. Peat trenches, fire basins, and even areas used for agriculture or forestry that were altered decades

ago now flourish with moss. In fact, sphagnum regeneration has often outpaced that of forests.

Navigating the Harvesting Challenge

Traditionally, moss has been harvested by hand or with simple tools, but moss collection presents unique logistical difficulties. Early mechanization efforts by Neova began in 2007, with winter harvesting trials using excavators and later summer harvesting innovations. By 2013, private Finnish companies were exploring scalable harvesting solutions capable of operating on soft ground, reducing moisture content before transportation, and delivering industrial volumes efficiently.

Since 2017, Neova has partnered with Ecomoss Oy and has also developed its own harvesting technology, including the SKK-1 harvester. The moss collection environment, characterized by soft, submersible terrain and high water content biomass, presents technical challenges that require specialized equipment. Development has focused on movement, processing, drying, and minimizing environmental disturbance.

Sustainability and Regrowth at the Core

Technical advancements alone are not enough. Neova has also prioritized environmental research in collaboration with Finland's Natural Resources Institute (LUKE) and projects like RahKoo. These studies show that sphagnum can regenerate surprisingly fast in some areas, though regrowth is slower in peatlands altered by drainage or hydrological shifts. Effective harvesting strategies must consider the local ecosystem, mirroring forestry principles whether to clear-cut or selectively harvest.

The goal is a system that ensures rapid regrowth and long-term sustainability. Older harvesting techniques removed up to 40 cm of moss, requiring 30 to 40 years for regrowth. New methods aim for collection cycles of just 5 to 10 years.

A New Model: Strip Harvesting and Continuous Cultivation

Neova’s vision involves a model of continuous cultivation, where biodiversity and sphagnum density increase after harvest. The latest method under testing involves strip harvesting, removing only narrow 10-centimeter-wide sections to a depth of 10 cm, covering roughly one-third of the area. This technique leaves the landscape visually and ecologically intact, ensuring that plant and animal life remain largely undisturbed.

Early results suggest that within 5 to 10 years, harvested areas can be reharvested due to accelerated regeneration. Suitable sites for this type of moss farming include former peat production areas and forest-drained peatlands where forestry has proven unsuccessful. These landscapes, when converted for moss growth, also provide climate benefits through enhanced carbon sequestration and biodiversity.

Next Steps: From Innovation to Implementation

As harvesting methods evolve, equipment and logistics must adapt as well. Early-stage moss biomass is water-heavy, so reducing fuel use, minimizing equipment weight, and limiting field passes are essential for keeping operations sustainable and cost-effective.

Neova's testing will continue into the next growing season with the aim of establishing a scalable, financially viable, and ecologically responsible model. The ultimate goal is to provide renewable raw materials to meet the rising demand for high-quality growing media.

The picture shows a method of removing sphagnum moss in continuous-cover silviculture with the help of a test device.