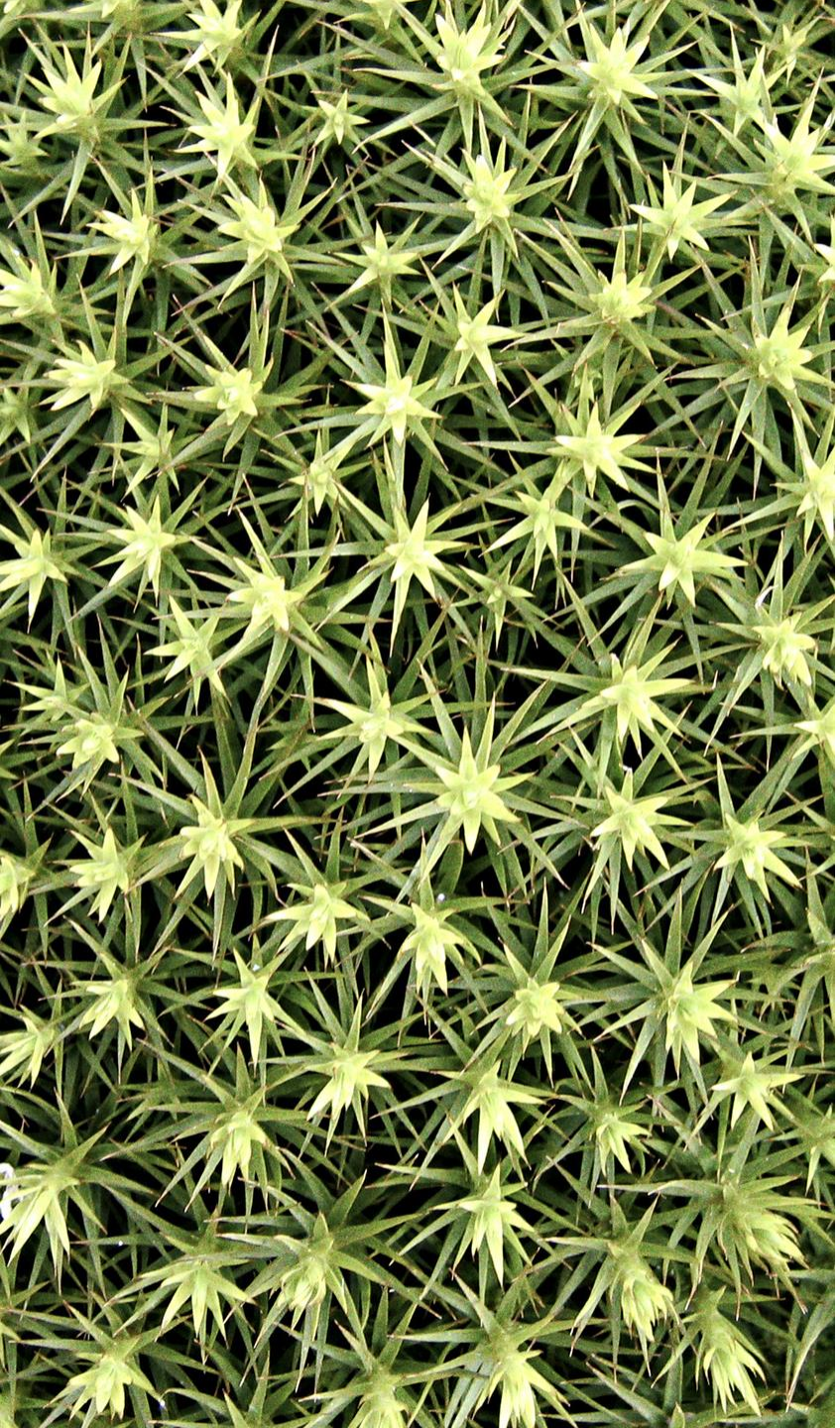


Where microbes and forest industry meet

Katariina Kemppainen, SVP Group R&D, Metsä Group

17.9.2024 KCL Biohub seminar Microbiology for forest industry

* 2023, internal sales excluded
** Shares listed on the Nasdaq Helsinki

Metsä Group | Sales* EUR 6.1 billion | Personnel 9,500 | Renewable energy 26,9 TWh

Metsäliitto Cooperative | The Group's parent company | Owned by over 90,000 Finnish forest owners

METSÄ FOREST

Wood supply and forest services

Sales:
EUR 2.2 billion

Personnel:
700

METSÄ WOOD

Wood products

Sales:
EUR 0.6 billion

Personnel:
1,550

METSÄ FIBRE

Pulp and sawn timber

Sales:
EUR 2.5 billion

Personnel:
1,600

METSÄ BOARD**

Paperboard

Sales:
EUR 1.9 billion

Personnel:
2,250

METSÄ TISSUE

Tissue and grease-proof papers

Sales:
EUR 1.3 billion

Personnel:
2,500

METSÄ SPRING | Innovation company

Well where do they meet?

In the forest

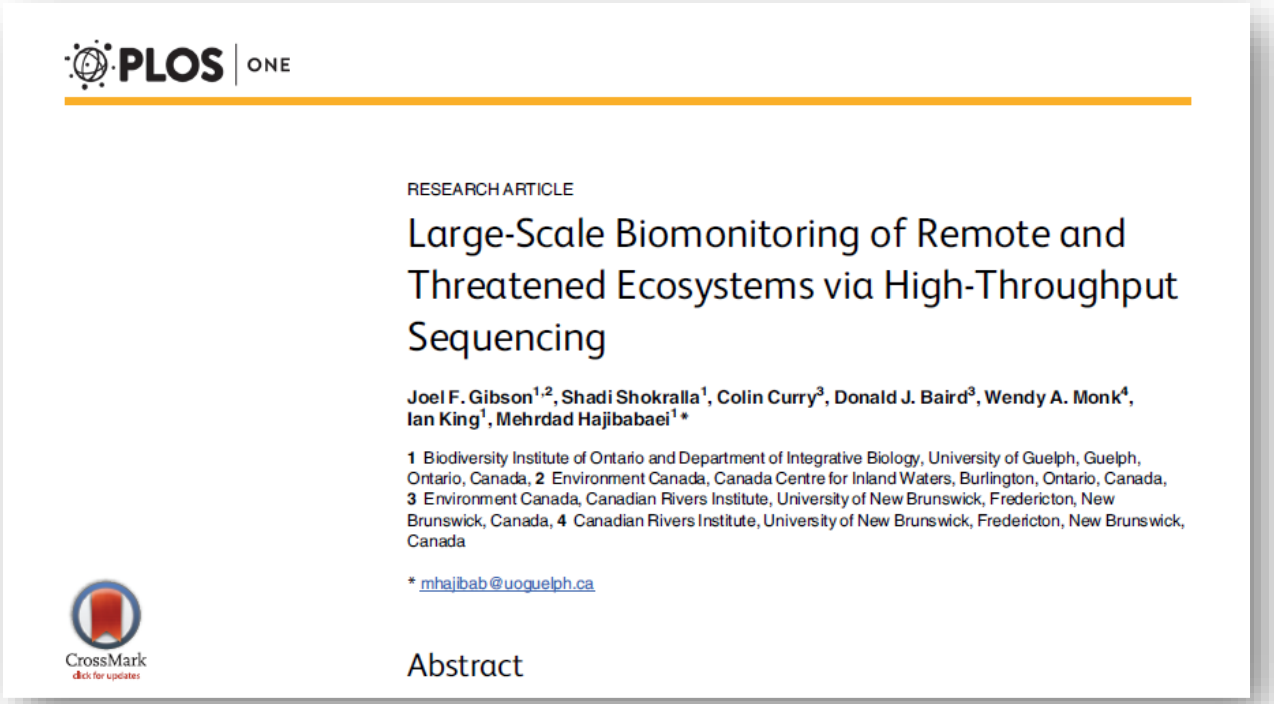
At the mill

During the use of the product

In the forest

Microbes are important part of the biodiversity of the forests

- High-throughput DNA sequencing for determining new biodiversity metrics



PLOS ONE

RESEARCH ARTICLE

Large-Scale Biomonitoring of Remote and Threatened Ecosystems via High-Throughput Sequencing

Joel F. Gibson[1,2], Shadi Shokralla[1], Colin Curry[3], Donald J. Baird[3], Wendy A. Monk[4], Ian King[1], Mehrdad Hajibabaei[1]*

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CrossMark click for updates

Abstract

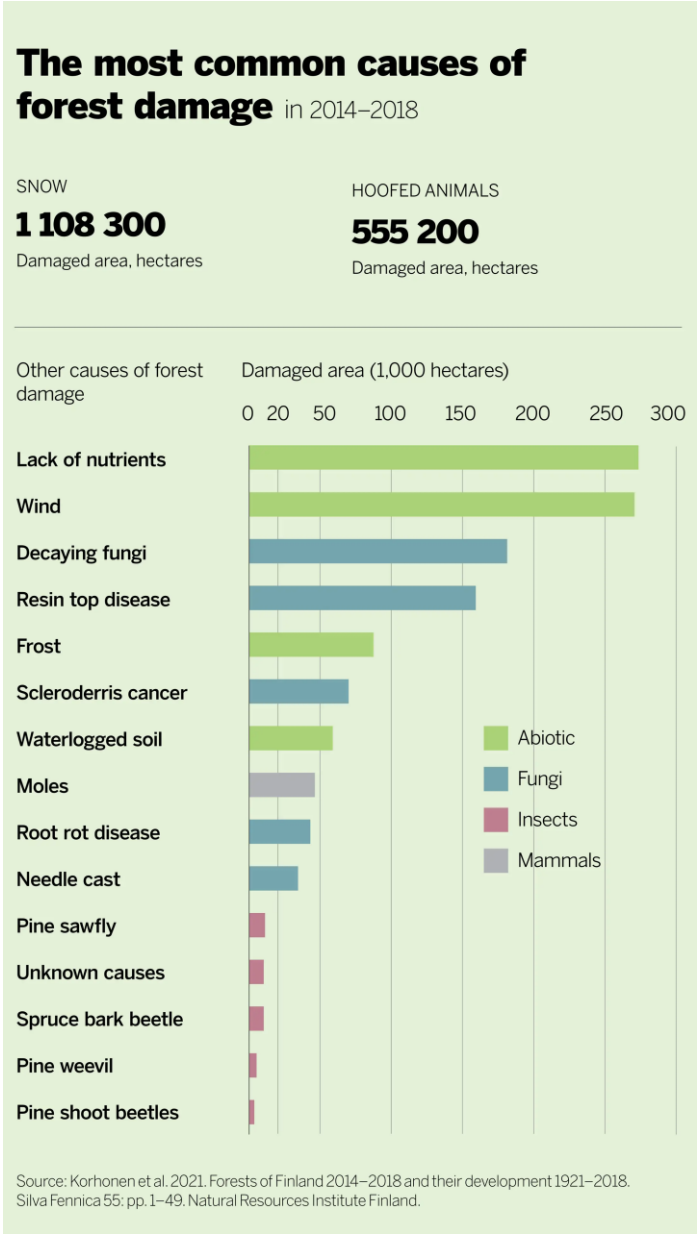
In the forest

Fungi are a major cause of forest damages

- *Heterobasidion parviporum* and *Heterobasidion annosum* in Root rot disease
- *Peridermium pini* in Resin top disease.

Fungi can also be used to prevent diseases

- *Phlebiopsis gigantea* replacing urea in stump treatment



At the mill

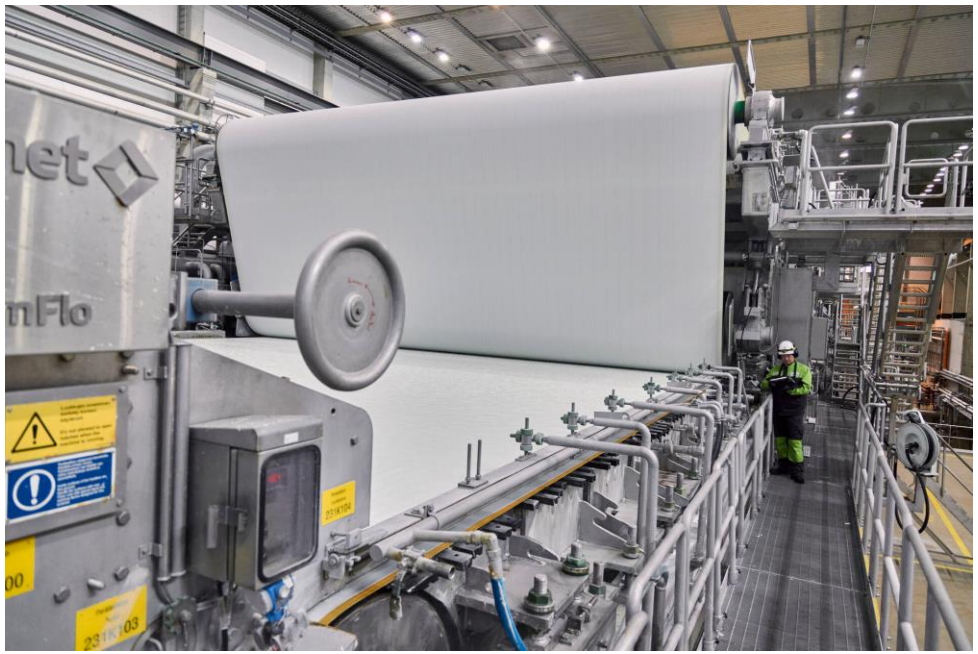
Microbiological stability during the storage of biomass needs to be considered

- This aspect becomes important especially when planning new uses for woody side streams

At the mill

Microbiological control in process waters becomes increasingly important when water consumption is reduced and processes closed

- Biofilms, biocides, early detection, AI supporting process control



At the mill

Waste water treatment is based on microbes!

- Microbes are critical in keeping our emissions under control.
- What is the aerobic stage 2.0 of the future?

At the mill

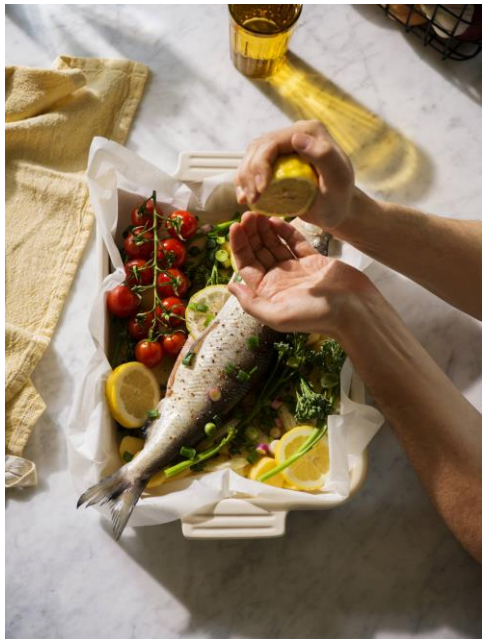
Enzymes have current use and further potential!

- Role as processing aids in parallel with chemicals
- One way to produce new functionalities to fibres

During use of the product

Product safety is central in food service and packaging

- Microbiology affecting through raw materials, processes and storage/shelf-life



During use of the product

Hygiene products have high requirements regarding microbiology

- How do fresh fibres and recycled fibres compare?

During use of the product

Microbes and wood may meet in built environment

- Indoor air quality
- Perceived user experience

Multiple meeting opportunities for microbes and forest industry!