

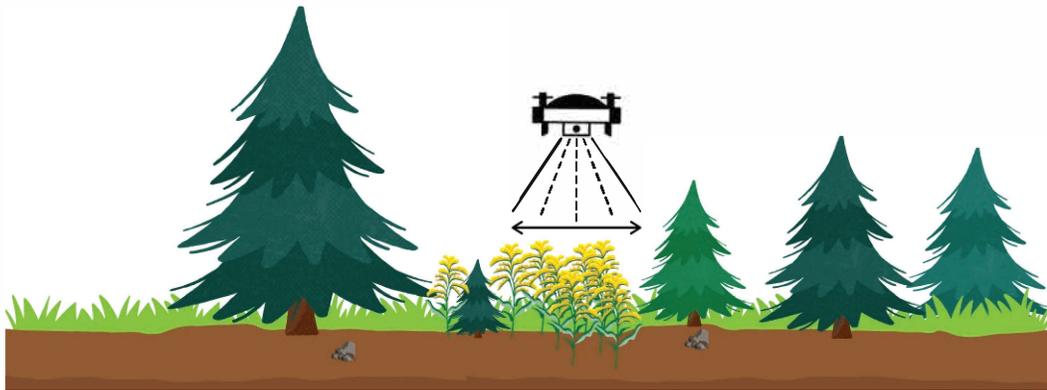


## CTCNS Research Round-up

The CTCNS's Research Round-up offers A look at innovative research tackling issues and driving innovation within the Christmas tree industry. Within our region, throughout Canada, and around the world during the 2024 year.

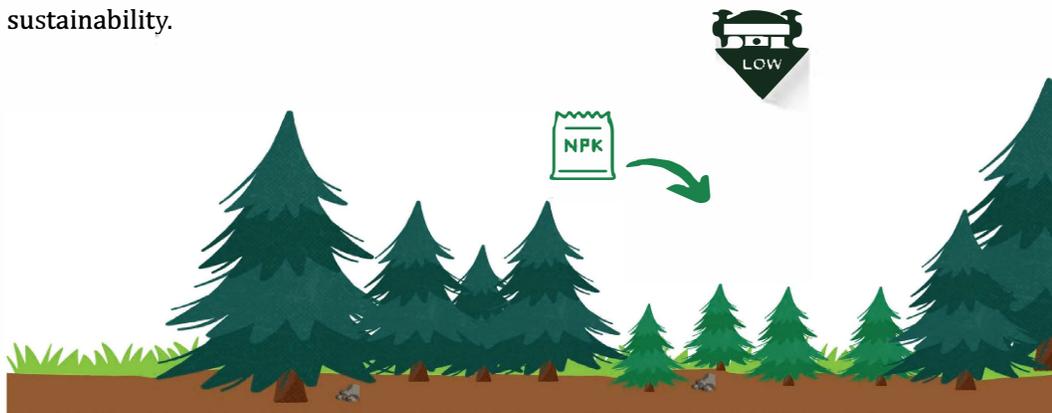
### 1. New heights and new horizons in weed control

Recent research presented at the Society of Photo-Optical Instrumentation Engineers (SPIE) this summer in France demonstrated an approach for weed control in Christmas tree lots using tree crown detection via remote sensing and deep learning. Combining unmanned aerial vehicles (UAV) and artificial intelligence, scientists were able to lay the groundwork for transforming and optimizing vegetation management within Christmas tree production systems. Achieving an average precision above thresholds needed to see real world applications of the technology.



### 2. Nutrient management modelling nears meaningful impacts

Researchers at Dalhousie's Faculty of Agriculture have recently published a pre-print reporting findings on preliminary research exploring remote sensing with unmanned aerial vehicles (UAV) to determine nutritional status of individual trees. A normalized difference vegetation index (NDVI) was used to correlate the nutritional status of a tree in combination with soil and needle tissue samples over the 2021 and 2022 field seasons. Finding that NDVI could be used to predict nutritional status of mature trees, particularly N content of tissues. Laying the groundwork for future technologies that can be used by producers to optimize fertilizer inputs, reduce costs, and increase sustainability.



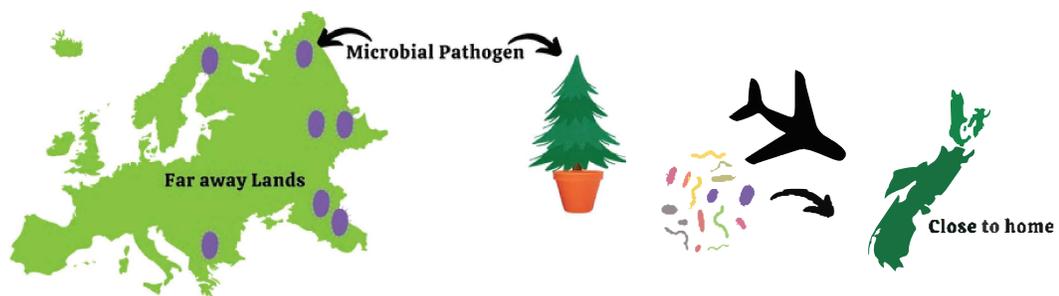


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### 3. Farm management strategies and their microbial implications

Agriculture and Agrifood affiliated research from Quebec recently employed environmental DNA (eDNA) approaches to investigate and characterize the diversity of common fungal pathogens attributed to root rot incidences within the province. Two clusters of *Phytophthora* spp. that include species previously unreported or regulated, within Canada were identified. Trees with symptoms of root rot infections were most commonly associated with the *Pythium europeae* cluster (29.9%). The species diversity of oomycetes was found to be highest in soils collected under trees displaying symptoms of *Pythium* root rot, while trees in natural forest had a lower diversity.

The findings from the study offer a look at how activities like movement of nursery stock, particularly at the international level, can greatly influence the pathogen diversity of farmed lots. Emphasizing the importance of sound cultural practices in obtaining nursery and container stock for preventing the introduction of pathogens to an ecosystem.



### References

1. Harders, L., Ufer, T., Wrede, A., Hussmann, S., & Hartung, E. (2024). A weed control approach in Christmas tree production based on tree crown detection using remote sensing and deep learning. *SPIE*, 625, 51. <https://doi.org/10.1117/12.3016507>
2. MacDonald, M. T., Esau, T. J., & Bilodeau, M. F. (2024). Mapping Balsam Fir (*Abies balsamea*) Christmas Tree Nutrition Requirements Using Uncrewed Aerial Vehicles and Multispectral Sensing. *Preprints*. <https://doi.org/10.20944/preprints202403.1296.v1>
3. MVan Der Heyden, H., Duceppe, M., Charron, G., Tanguay, P., & Bilodeau, G. J. (2024). Oomycete communities are influenced by land use and disease status in Christmas tree production in Southern Québec, Canada. *Environmental DNA*, 6(2). <https://doi.org/10.1002/edn3.529>