



Virocontrol of *Heterobasidion* root rot

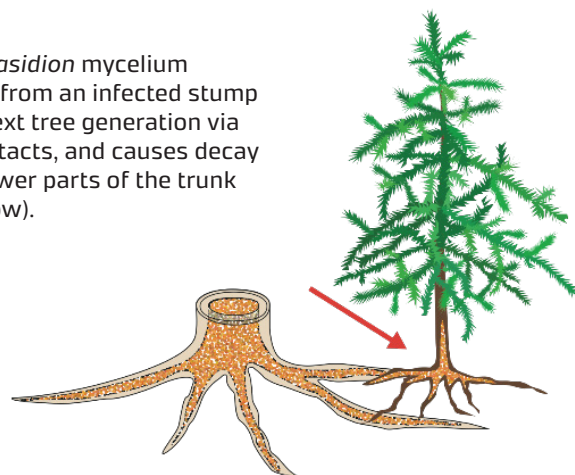
Challenge

The fungal genus *Heterobasidion* includes a number of destructive forest pathogens that affect coniferous forests worldwide. In Finland, *H. annosum* causes mortality of pines and *H. parviporum* decays the most valuable parts of spruce trees. Current stump treatment methods prevent new infections but do not affect *Heterobasidion* that already resides in the root systems, where the spread of *Heterobasidion* continues despite of the control efforts. Consequently, curing infected forests turns out to be extremely difficult, which results in increasing economic losses exceeding annually 50 and 800 million euros in Finland and Europe, respectively.

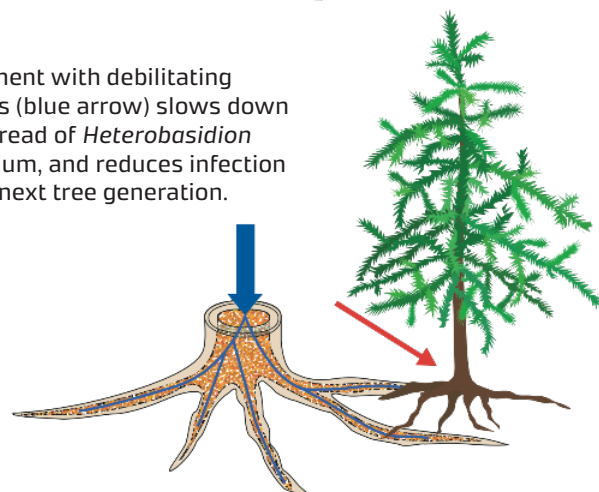
Solution

Luke has developed a biological virocontrol method, where selected fungal viruses are used to induce hypovirulence in pathogenic fungi. Our solution is based on a carrier *Heterobasidion* host infected with two mycoviruses reducing the growth of the pathogen in a tree. Mycelia hosting the viruses are inoculated on stumps with symptoms of *Heterobasidion* root and butt rot, where the viruses infect

Heterobasidion mycelium spreads from an infected stump to the next tree generation via root contacts, and causes decay in the lower parts of the trunk (red arrow).



Treatment with debilitating viruses (blue arrow) slows down the spread of *Heterobasidion* mycelium, and reduces infection in the next tree generation.



and spread in the mycelia causing detrimental effects on the pathogen. As a result, the ability of the pathogen to cause disease is reduced, and the next generation trees stay healthy. Control measures can be done flexibly during the rotation cycle including both thinnings and the final cutting.

Benefits

Luke's solution cures the forest sites from prevailing *Heterobasidion* disease by stopping the spread of prevailing *Heterobasidion* infection centers and preventing the new tree generation of getting the disease. Our virocontrol has long-term preventing effect as virus infections may remain decades in *Heterobasidion* mycelia in roots, slowing the spread of *Heterobasidion* in the current tree generation. Also the health of the next generations of trees will be increased.

Luke's solution is the only method for the prevention of root-mediated infections at heavily infected forest sites that allows the forest owner to continue with the same tree species.

IPR status

Patent, Method for Preventing Wood Decay, Related Biocontrol Agent and Uses, filed 9/2018, accepted in Finland 2021. Continuation of PCT application filed in Europe and Russia 2021.

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