The efficacy of *Chondrostereum purpureum* in the sprout control in mechanized pre-commercial thinnings

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Efficiency of young stand management can be improved by preventing sprouting and minimizing the number of repeated cuttings. Mechanized pre-commercial thinning combined with the white-rot fungal treatment resulted higher mortality compared to the control (cutting only). However, stump mortalities were lower than in previous studies.

Towards biocontrol

Pioneering deciduous species cause a need for pre-commercial thinning (PCT) to ensure better growing conditions for more valuable coniferous trees. However, cutting is quite ineffective method since vigorous regrowth of deciduous stump sprouts causes a need of later PCT. Since the use of chemical herbicides in young stand management is restricted, the use of a white-rot fungus, *Chondrostereum purpureum* (Pers. Ex Fr.) Pouzar, as a biocontrol agent against sprouting, has been studied with good results. Mechanized PCT combined with the *C. purpureum* treatment could improve the efficiency of young stand management, since there have been difficulties in motor-manual application with a brush saw.

Mechanized fungal treatment

The efficacy of mechanized PCT done by Usewood Tehojätkä and Mense (Figure 1), to spread an inoculum of *C. purpureum* as a biocontrol agent on freshly cut stumps (the fungal treatment) and compare that to the control (cutting only), was studied for three years in two different studies. Efficacy was defined as high stump mortality, low number of sprouts in a stump, and short length of sprouts. In both studies, the mortality of stumps was higher for the fungal treatment compared to the control (cutting only) (Figure 2). However, the fungal treatment did not have as clear effect on the number of sprouts or the maximum height of stump sprouts.

Figure 1. Tehojätkä (left) and Mense (right) in operation. Pictures: Veli-Matti Saarinen and Usewood Ltd.

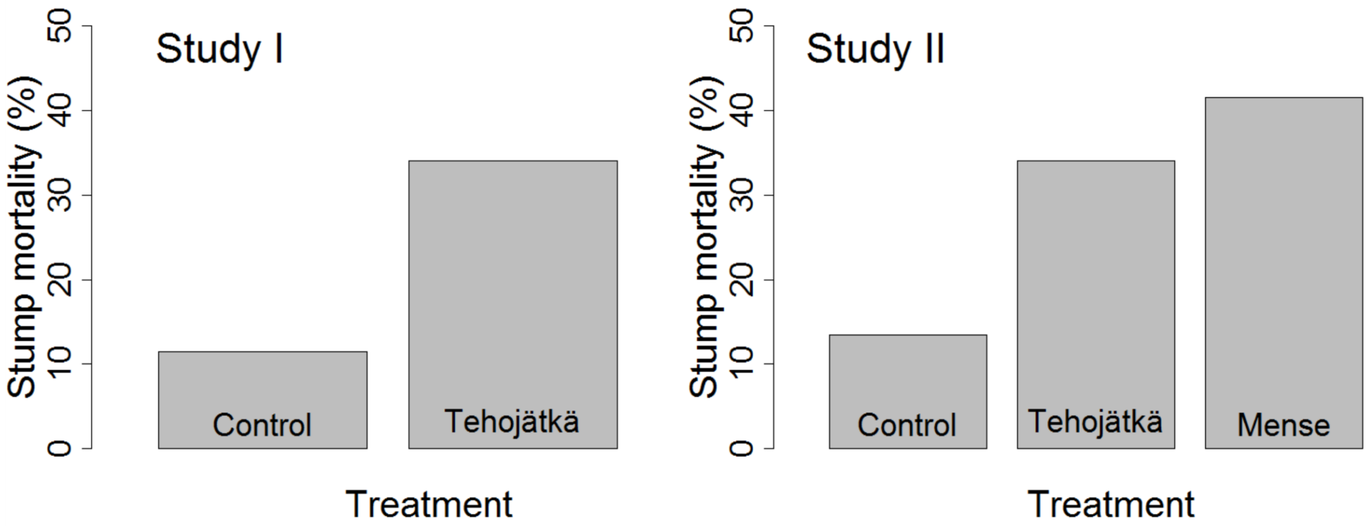

Figure 2. The effects of the control and the fungal treatments done by Tehojätkä and Mense on mortality of birch stumps three years after pre-commercial thinning in two different studies. Figures have been drawn based on the predicted values of the generalized linear mixed models.

Conclusions

The fungal treatment was more effective compared to the control in terms of higher stump mortality. However, mortalities were lower than in earlier studies. These machines can easily carry *C. purpureum* inoculum, and spread it on stump surfaces immediately after cutting, and therefore it is worth continuing the development of mechanized applications.

In the future, mechanized fungal treatment may provide a promising alternative in sprout control if the spreading mechanisms, the accuracy of the treatment, and consequently the efficacy could be improved.

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