

Cost-effective strategies for eternity trees in production forests of spruce – biodiversity, silviculture, and economy

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The Fennoscandian production forests are heavily dominated by young monocultures of spruce (*Picea abies*) and pine (*Pinus sylvestris*). In contrast, many forest species, and in particular threatened species, are associated with old trees of temperate species, such as beech (*Fagus sylvatica*) or oak (*Quercus robur/petraea*) in open conditions. In order to increase the old growth elements in the production forests, green tree retention have become common practice.

In this newly started PhD-project, the aim is to find cost-effective strategies for conservation of the flora and fauna on retained trees in production forests of spruce. In a first study, 33 oaks (age 90-130 years) in a production stand of young spruce (age 34 years) are chosen for an experiment. The aim is to study the effect of changes in light condition on the flora and fauna on the oaks. These oaks have recently been given three different treatments: a. removal of all spruces from the stem to two meters outside the crown range; b. removal of all spruces from the stem to the crown range; c. no removal of spruce (control treatment). In order to test the effect of the different treatments, window traps are used to collect saproxylic beetles before the spruce removal and for at least two years after. The effect on the lichens will be studied by direct sampling on the stem. The cost of the retained broadleaved trees in the different treatments, both regarding the removed spruce trees and loss in past and future growth of the spruces, will be calculated. In order to find cost-effective solutions the cost will be compared with the benefit in terms of the diversity among the saproxylic beetles.