



Fig. 4. *Picea abies* seedlings growing with and without *Cladonia alpestris* in Suonenjoki Nursery.



Fig. 5. Circle of fast growing *Pinus silvestris* seedlings around a tree to which a reindeer was tethered 20 years ago. Note dwarf seedlings in foreground of the same age as those around the tree. Other trees in the background to which reindeer were not tethered have no circle of seedlings. Kätkäsuvanto, Muonio.

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Seloste:

JÄKÄLIEN VAIKUTUKSESTA PUIDEN MYKORITSOIHIN JA TAIMIEN KASVUUN

BROWN (1967) oli todennut alustavissa kokeissa, että muutamilla *Cladonia*-suvun jäkälillä on selvästi haitallinen vaikutus niiden seurassa kasvien männyntaimien kehitykseen. Koska vanhaan tiedettiin monien kasviuutteiden estävän puiden mykoritsasienien kasvua (MELIN 1946), katsottiin aiheelliseksi tutkia, mikä vaikutus nimenomaan jäkäläluotteilla on mykoritsasieniin ja sitä kautta myös puuntaimien kasvuun.

Asetettuun kysymykseen pyrittiin löytämään vastausta kolmea eri tietä. Ensin tutkittiin eri jäkäläluotteiden vaikutusta sieniin puhtasviljelmänä (Koe 1). Toisessa kokeessa kasvatettiin eri mykoritsasienillä ympärtyjä männyntaimia aseptisissa oloissa agar-alustalla, johon oli lisätty jäkäläluotetta, sekä tutkittiin taimien fosforin ottoa radioaktiivista isotooppia ^{32}P käyttäen (Koe 2). Rinnan näiden laboratoriokokeiden kanssa järjestettiin kenttäkoe kasvattamalla männyn, kuusen ja rauduskoivun taimia taimitarhassa ja peittämällä maa luonnon olosuhteita vastaavalla jäkäläpeitteellä (Koe 3). Kokeita täydennettiin maastohavainnoilla, joita tehtiin männyn taimien kehityksestä luonnollisissa jäkäläkasvustoissa Lapissa.

Kokeissa käytetyt jäkälät olivat *Cladonia alpestris*, *C. arbuscula*, *C. rangiferina*, *Cetraria islandica* ja *Stereocaulon paschale*.

Kaikki eri menetelmin suoritettut kokeet osoittivat jokseenkin yhtäpitävästi, että jäkälillä ylei-

sesti on mykoritsasienille ja sitä tietä myös puiden taimille haitallinen vaikutus. Selvästi voimakkain tämä vaikutus on *Cladonia alpestriksella*; lievempi estävä vaikutus on *C. arbusculalla* ja *C. rangiferinalla*, ja *Cetraria islandica* ja *Stereocaulon paschale* osoittautuivat vähiten haitallisiksi. Eri mykoritsasienilajit suhtautuivat jäkäläluotteisiin hyvin eri tavoin. *Paxillus involutus* on erityisen herkkä jäkälien haittavaikutukselle. Kokeillut metsämaan saprofyyttiset kantasienet suhtautuivat jäkäläluotteisiin jokseenkin samalla tavalla kuin mykoritsasienet.

Tulokset antavat aihetta jo eräisiin metsänhoidollisiin päätelmiin. Erityisesti merkille pantava on havainto, että jäkäläkankaiden pioneerilaji (*Stereocaulon paschale*) on jokseenkin haitaton, kun taas voimakkain haitallinen vaikutus todettiin tyypillisellä kliimaks-lajilla (*Cladonia alpestris*). Vastaavanlaista haitallisten tekijän lisääntymistä sukkession edetessä kliimaksia kohti on todettu muuallakin (esim. SIRÉN 1955). Ilmeisesti edullista on voimakkaasti laiduntaa jäkäläkankaiden vanhoja männiköitä välittömästi ennen uudistushakkuuta. Tällöin uudistuminen tapahtuu herkästi, jäkälän haittavaikutus poistuu ja porojen tuhotkin jäävät uudessa taimistossa vähäisiksi, koska voimakkaan laiduntamisen jälkeen uudistusalalla on varsin vähän poroja houkuttelevaa ravintoa.

BROWN, ROBERT T. and MIKOLA, PEITSA O.D.C. 181.351
1974. The Influence of Fruticose Soil Lichens Upon the Mycorrhizae
and Seedling Growth of Forest Trees. ACTA FORESTALIA FEN-
NICA 141. 23 p. Helsinki.

Water extracts of six common soil lichens, *Cladonia alpestris*, *C. rangiferina*, *C. arbuscula (sylvatica)*, *C. pleurota*, *Cetraria islandica*, *Stereocaulon paschale*, inhibited growth of ectomycorrhizae of *Pinus silvestris*. Of 17 fungi (12 mycorrhizal) tested, many were inhibited while others were scarcely influenced or even occasionally stimulated by extracts. *Cladonia alpestris* extract inhibited most fungi while *C. rangiferina* showed much less influence. In pure culture synthesis experiments, 32P uptake of *Pinus silvestris* was significantly reduced by *C. alpestris* extract. Different species of fungi showed widely variant abilities to pick up 32P. In nursery experiments, much more vigorous growth of *P. silvestris* and *Picea abies* was obtained on plots without *C. alpestris* than on paired plots covered with it. *Betula verrucosa* showed no difference. Under natural forest conditions, *P. silvestris* seedlings grew much more rapidly where *C. alpestris* had been eliminated by road building or reindeer grazing than do similar seedlings only one meter distant under undisturbed *C. alpestris* cover. It is suggested that by properly controlled reindeer grazing, establishment and early growth of *P. silvestris* on *Cladonia* sites can be much enhanced. By the time that *C. alpestris* could become re-established the pine seedlings would have grown large enough to suffer little from reindeer grazing. This study shows the continuity of the major components of the forest tundra biome — the dependence of pines, mycorrhizae, lichens, and reindeer and their predators (human or otherwise) upon each other for a healthy existence.

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KANNATAJAJÄSENET — UNDERSTÖDANDE MEDLEMMAR

**CENTRALSKOGSNÄMNDEN SKOGSKULTUR
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