Reishi Cultivation

The mushroom of immortality

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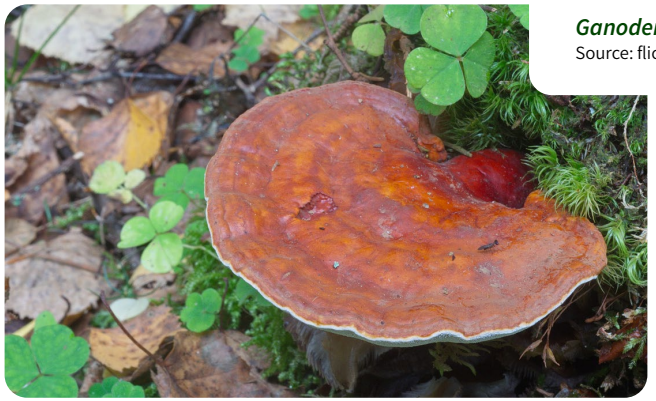

***Ganoderma lucidum* growing on *Picea abies* by Urmas Ojango.**
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Reishi mushrooms *Ganoderma lucidum* (also called lingzhi) have been used in Asian countries as a medicinal mushroom for thousands of years due to its perceived health benefits. This species grows naturally in Finland but it can also be cultivated in forests by inoculating tree trunks or stumps. Reishi is called "the mushroom of immortality" and has been widely used as a tonic and to treat various diseases, including chronic hepatopathy, hypertension, neurasthenia, insomnia, bronchitis, gastric ulcer, diabetes, and cancer in China, Japan, Korea, and other Asian countries for more than 2000 years (Sanodiya et al. 2009). Because of its presumed health benefits and apparent absence of side effects, reishi has attained a reputation in the east as one of the most powerful medicinal fungi and its medicinal value has been described in 2000 year-old Chinese medical texts (Sanodiya et al. 2009 and references therein). Currently, ancient traditional Chinese medicine remedies are reinvestigated using modern scientific methods to assure their efficacy and safety and develop them as dietary supplements as well as new medicines (Lee et al. 2012). Some Finnish companies offer services to private forest owners to cultivate this mushroom species in Finnish forests. There would be opportunities for Finnish forest owners to increase production of reishi mushrooms, as well as for small and medium sized companies for developing new products and export of high value mushrooms and mushroom products.

How to cultivate reishi mushrooms?

Reishi is a wood-decaying fungi that occurs in both northern temperate and tropical regions. It can be found on coniferous and deciduous trees. It has a large annual fruiting body. Unlike chaga it doesn't live on living trees but generally occurs on old stumps and wind thrown trees. In particular, it can be found on birch and spruce stumps on wet peat soils.

It is possible to cultivate reishi. Reishi fruiting bodies are generally found on fallen tree trunks, decaying branches and stumps in more advanced stages of decomposition, but often only a small proportion of the tree may be colonized. This suggests that only under suitable conditions, reishi is able to take over decaying wood effectively. Inoculation should be carried out on fresh tree trunks or stumps with a large number of inoculations, giving the mycelium a head start over other wood-decaying fungi present in the environment and ready to colonize decomposing wood cells. Relatively moist growth sites have a higher success rate for

producing reishi fruiting bodies; for example, stumps resulting from the thinning of a spruce stand on peat soil can be considered a favourable habitat. Suitable tree species include birch, spruce, oak and alder.

In forest management, suitable growing habitats are created by adding decaying wood, or by leaving retention trees and stumps in forests. Ensuring a mixed tree species composition may also benefit reishi mushroom. Suitable substrates can also be created by conserving the common alder's typical habitat such as riparian forests.

Advantages and disadvantages

Reishi mushrooms can bring added value for forest owners. Reishi can be cultivated and has a growing market. The main global market is in Asian countries, especially China, Japan and South Korea.

Reishi mushrooms are very rare in nature and the amounts collected are not sufficient for commercial exploitation (Sanodiya et al. 2009). Therefore, cultivation of reishi has become an essential aspect to meet the increasing demands in the international market. Some Finnish companies offer services to private forest owners to cultivate this mushroom species in Finnish forests. There would be opportunities for Finnish forest owners to increase production of reishi mushrooms.

Mushrooms are bio-accumulators. If there are heavy metals or toxins present in the environment, they will accumulate in mushrooms. A clean forest environment would give Finnish mushrooms a competitive advantage. In addition, most companies are able to trace the origin of their mushrooms and these are regularly tested for heavy metals.

Reishi grows on deadwood. This gives opportunities for increasing deadwood in forests which will have positive impacts on biodiversity. Reishi cultivation would also create an added value of leaving retention trees, which is a common conservation measure for enhancing biodiversity in boreal and temperate forests.

Currently there is insufficient scientific research evidence demonstrating the efficacy of medicinal mushrooms and it is difficult to explain the Traditional Chinese Medicine theory. Nevertheless, there is a lot of ongoing research focussing on reinvestigating these traditional methods as well as the bio-active components of these mushrooms.

Most cultivated reishi is grown indoors because the yield is higher under a controlled environment. Even though the yield of reishi cultivation in forests is lower, major advantages are that it brings added value for private forest owners, and creates additional value for maintaining deadwood and retention trees which will have positive effects on biodiversity as well as for increasing carbon storage in Finnish forests.

Reishi cultivation can bring added value for forest owners.

Possibilities for entrepreneurial activities and export to Asia.

Mushrooms are bio-accumulators. The clean environment of Finnish forests would give Finnish reishi a competitive advantage.

Possibilities for increasing deadwood in forests with positive impacts on biodiversity and carbon storage.

Further information

Kääpä Forest – Forest service provider cooperating with forest owners running a network of chaga cultivation sites. This company can also assist in reishi cultivation **https://www.kaapaforest.fi/**

Lee, K.-H., Morris-Natschke, S.L., Yang, X., Huang, R., Zhou, T., Wu, S.-F., Shi, Q., Itokawa, H., 2012. Recent progress of research on medicinal mushrooms, foods, and other herbal products used in traditional Chinese medicine. J Tradit Complement Med 2, 84–95.

Nyyrikki Metsäpalvelut – Forest service provider based in Rääkkyla in North Karelia providing equipment for chaga and reishi cultivation as well as other species and offers full cultivation services **https://www.nyyrikinmetsa.fi/**

Sanodiya, B.S., Thakur, G.S., Baghel, R.K., Prasad, G.B., Bisen, P.S. 2009. Ganoderma lucidum: a potent pharmacological macrofungus. Curr Pharm Biotechnol 10, 717-742