



BEETLES LIFE

A small step for man, a giant leap for the charismatic beetle!

Layman's Report
Project activities and results 2018–2023



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What is Beetles LIFE?

The Beetles LIFE project improved the habitats of eight threatened or near-threatened beetle species in nature reserves. During the nature project, we burned forests, filled in ditches in drained mires, increased the amount of dead wood and helped aspen saplings grow. These are all effective methods for the benefit of beetles and, at the same time, countless other forest inhabitants.

Beetles cannot speak for themselves or for their environment. That is why we used art to communicate. Beetles are beautiful, mysterious and special creatures – in other words, a wonderful source of inspiration.

Introducing Beetles LIFE target species

The target species of the Beetles LIFE project are seven beetles and one flat bug (Aradidae). They all need decaying wood to live, each slightly different types. The *Xyletinus tremulicola* and *Cucujus cinnaberinus* require aspen, whereas *Stephanopachys* beetles and *Aradus angularis* live exclusively in burned coniferous trees in forest fire areas. *Pytho kolwensis* is an inhabitant of the fallen spruce trees in old-growth bog woodlands. On the other hand, *Boros schneideri* and *Phryganophilus ruficollis* are slightly less picky: they like decaying trees in both forest fire areas and old-growth forests. The species have become threatened because there are far too few suitable habitats for them to live – that is, forest fire areas, large aspens, old-growth forests and old bog woodlands – in our nature today. For these exact same reasons, hundreds of other species in our country have become rare and threatened. Thus, by protecting the eight target species selected for the project, hundreds of other species can also be helped. In other words, the target species of the project are so-called **umbrella species!**



Pytho kolwensis.



Phryganophilus ruficollis.



Xyletinus tremulicola.



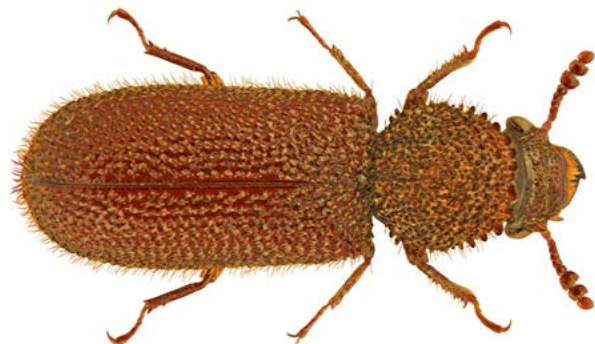
Boros scheideri.



Aradus angularis.



Cucujus cinnaberinus.



Stephanopachys substriatus.



Stephanopachys linearis.

More than 950 hectares of beetle habitats have been restored

Restoration of bog woodlands



Most of the mire area in Finland has been drained, especially in Southern Finland. 73% of mires in Southern Finland have been drained. Only 4.3 million hectares of undrained mires remain throughout the country. Peatland drainage for forestry and peat harvesting is a cause of threat for 82 % of threatened mire species.

The purpose of mire restoration is to start helping the mire recover to a natural-state ecosystem. Restoration is both fast and slow at the same time: the surface of mire water rises rapidly, but it may take decades for plants and natural trees to recover. Over time, decaying trees attract beetles and species of polypore fungi.



Bog woodland under restoration with ditches filled with an excavator. Photo: Maarit Similä.

295

The Beetles Life project restored a total of 295 hectares of mire at five different restoration sites.

The recovery of mires after restoration is a slow process and in the future, will benefit the target species *Pytho kolwensis* and, in pine mires, *Boros schneideri*.



The image shows a spruce-dominated bog woodland and a ditch filled in the middle of the image. Over time, this site will develop into an ideal habitat for the *Pytho kolwensis* as long as the spruces continue to age and more fallen spruces as shown in the image gradually start to accumulate in the area. Photo: Mervi Laaksonen.

Restoration burning



Fire has always shaped our forests and their species. These days, there is not enough forest fires from nature's perspective. Some of our species have adapted to forest fires so that they either benefit or are directly dependent on burned areas. The decrease in forest fires is the primary reason for the threatened status of 21 forest species, and it has deteriorated the status of 60 other threatened species and threatened our forest biotopes.



Photo: Tiina Laitinen.

345

The Beetles LIFE project restored commercial forests by burning. This helps bring the forest closer to its natural state. A total of 345 hectares of restoration burnings were carried out.



This is how the forest first looks after controlled burning when the fire has passed through it: the bottoms of the trees and the ground are completely black. Some of the blackened trees survive the fire and others die, creating a large amount of decaying wood vital to hundreds of species. Moreover, deciduous tree saplings, such as aspen, soon begin to grow from the soil. The range and structure of tree species in the forest become more diverse. Photo: Sampsa Malmberg.



A larva of *Boros scheideri* that grew up in a burnt pine of a Beetles LIFE burned site. Next, the larva becomes a pupa and hatches into an adult *Boros schneideri*. Photo: Sampsa Malmberg.



Stephanopachys linearis on charred wood. Photo: Sampsa Malmberg.

Target species of the project arrived at the burn sites as expected. During the course of the project, we witnessed how the controlled burning sites attracted the *Stephanopachys linearis* and *Stephanopachys substriatus* both living in the bark of burned coniferous trees, the *Aradus angularis* that hides in the cracks of the bark of burned coniferous trees and the *Boros schneideri* that likes living under the bark of dead pines. Once they have arrived, they can all reproduce in the burned areas for several years. Then they need a new place to live, such as a new restoration burning area.

Altogether, at least 30 species that live in burnt trees arrived at the project's burned sites already during the project. Among them were several threatened species on the red list. In addition, hundreds of other species living in dead wood arrived at the burned sites.

Phryganophilus ruficollis is expected to arrive at certain burned sites once the trees have decayed to the level of its liking - that is, soft enough. When aspen saplings that have emerged at burned sites grow into large trees, the *Xyletinus tremulicola* and other aspen species can also find a habitat.

The most common target species at the burned sites was the *Stephanopachys linearis* beetle.

Production of dead wood



Photo: Meri-Hilkka Mäkelä.

As many as 5,000 species live in dead and decaying wood, which is about a quarter of all forest species. The decaying trees provide the preferred habitat for many hole-nesting species, such as birds, bats and the flying squirrel.

The decline in decaying wood is the primary reason for 181 species becoming threatened. In addition, 154 species have been classified as near threatened for the same reason.

The forests in the northern coniferous forest zone in their natural state may contain up to 90 m³/ha of decaying wood. On average, only 3.5 m³/ha of deadwood is found in commercial forests in Southern Finland, and 5.2 m³/ha in Northern Finland.

Different species require different types of decaying wood to live: the tree species, tree thickness, softness of decaying wood and even the position of the tree trunk are important. Species dependent on decaying wood need it continuously in their habitats. If suitable decaying tree runs out even for a little while, the species will disappear. If there is not enough decaying wood in a forest, more can be produced.

The target species of the Beetles LIFE project require trees at different stages of decay. The *Phryganophilus ruficollis* needs highly decayed pine, spruce or birch, while *Boros schneideri* looks for a pine that has died standing up, is more than 15 cm thick, and has certain wood-decay fungi living under the bark. *Pytho kolwensis* is only happy with fallen, sufficiently thick-barked spruces which have been lying in the ground for a few years.

143

The Beetles LIFE project has increased the amount of decaying wood in 143 hectares. In areas inhabited by the *Pytho kolwensis*, we felled spruce trees and left them on the ground to create suitable habitats for the *Pytho kolwensis*. In some places, we also girdled pines and birches so that standing decaying trees were created as trees died.

During the project, it was not yet possible to see whether the *Pytho kolwensis* inhabited the trunks of the felled spruce, as the trunks must first lie on the ground for some time. However, most trunks already became home to the European spruce bark beetle (*Ips typographus*). This is unfortunately a bad sign for the *Pytho kolwensis* living under the bark, as the European spruce bark beetle may cause the bark to come off the trunk too quickly. In areas other than the project's target areas, it has been seen that the felled spruces became inhabited by the *Pytho kolwensis*. The creation of decaying wood is likely to be partially successful and partly fail for the *Pytho kolwensis* at the Beetles LIFE project sites.



Beetles LIFE project, mechanically produced spruce decaying wood that the *Pytho kolwensis* needs. Photo: Mervi Laaksonen.

Continuity of aspen generations



Photo: Maija Mikkola

168

In the Beetles LIFE project, we protected the aspen continuum in 168 hectares, i.e. the growth of aspen from seedlings to full-size trees and further into decaying wood, by various means. We simulated storm damage with machine-made storms: we used machines to mill the forest surface so that aspen roots could produce root suckers.

Aspen is one of the most important trees for forest species, but it is not valuable for the forest industry. Therefore, aspen is not particularly popular in managed forests.

Aspen has a difficult youth. Its saplings are delicious treats for grazers, such as elk. Aspen saplings require a lot of light and cannot grow in a closed forest. To start growing root suckers, the roots need an initial push, for example from trees felled by a storm or from the death of an old tree.

We made small holes where young aspen could grow without shade from other tree species. We kept elk teeth away from aspen saplings. We fenced young aspens with larger felled trees.

Cucujus cinnaberinus and *Xyletinus tremulicola* are beetles that are dependent on large aspen trees. The *Cucujus cinnaberinus* is critically endangered in Finland and lives under the bark of dead aspens. The *Xyletinus tremulicola*, on the other hand, lives inside the bark of damaged or dead aspens.

The aspen that the Beetles LIFE project focused on can grow sturdy to suit the target species. On the other hand, there is no certainty that aspen saplings will survive after the project. It is possible that the saplings will be eaten by hare or elk. It will take a long time for the saplings to grow into large trees suitable for the *Cucujus cinnaberinus*, *Xyletinus tremulicola* and numerous other species.

Comprehensive surveys provide plenty of new information

To protect and help species in general, a lot of information is needed on them. What species live and where? How rare are different species? Have they become rare over time or are they still thriving in the nature? Did the actions to protect a species succeed? This essential information can only be obtained by field surveys, i.e. by making observations in the terrain.

We carried out surveys on insects, such as beetles, Hemiptera, Diptera and Hymenoptera, as well as mosses and polypores. We carried out a total of 60 species surveys at 20 different Natura 2000 areas.

In the insect surveys, we recorded more than 2,500 different insect species in total. Previously, there were only few records of many of the species. We found dozens of completely new occurrences of threatened species. At the same time, more than 20 insect species new to Finland were found – some of which were new to science.

The surveys provided new and up-to-date information on the species living in Natura 2000 areas. The data ensured that the conservation measures of the project do not endanger species. In addition, the data will help to better plan how to help threatened species and what methods are ineffective.

At the same time, general knowledge of species living in Finland increased. We found 437 species whose red-list status has not been possible to assess due to lack of information.

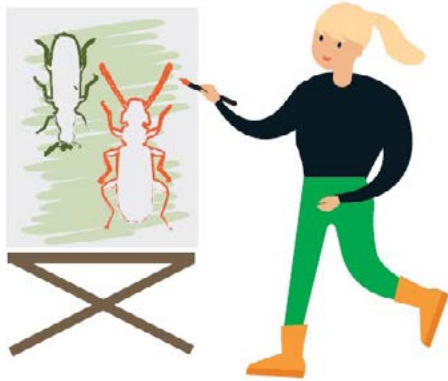


One of the pleasant surprises was the discovery of *Ips sexdentatus* which has not been observed in Finland for 20 years. The *Ips sexdentatus* is an endangered inhabitant of old-growth forests, which has disappeared from almost all of Finland. Photo: Sampsa Malmberg.



Insect trap used in the survey. Most insects are elusive which is why finding them without traps would be nearly impossible - like looking for a needle in a haystack. Photo: Sampsa Malmberg.

Art and education related to beetles



Beetles cannot speak for themselves or for their environment. That is why we used art to communicate. Beetles are beautiful, mysterious and special creatures - in other words, a wonderful source of inspiration.

Students at the Humak University of Applied Sciences did not run out of ideas. The life of beetles was presented at dozens of small and large events, such as Jukola's relay race and Finnjambore Kajo organized by Guides and Scouts of Finland. Here are a few examples.



Photo: Beetles LIFE.



Beetles activity course is a functional nature trail and an activity course suitable for people of all ages. Photo: Teemu Korhonen.



The beetle costumes designed by Tytti Marttila attracted visitors' attention to beetles in many events. Photos: Saara-Maija Nevalainen-Kiiskilä.





Worries of the *Pytho kolwensis*

Lyrics: Tiina Lappalainen

Beneath the spruce, the *Pytho kolwensis* alone
 Mood as dark as his shiny shell
 Meets a friend by a pinecone
 Shyly tells the *Phryganophilus ruficollis*
 that all's not well.

The rugged spruce is so large and great
 but surely here I cannot find a mate
 my homely rot and bark still await
 but to walk alone must be my fate.

Phryganophilus ruficollis gazes at his friend
 as he knows what it's like to have a lonely
 end

Please reproduce, nature begs
 but he also never gets to see his eggs
 No trolls or faerie nest under the spruce
 Like these fairytale figures, these beetles
 are going to lose

Alone, the beetles are weak
 For them, now the humans must speak

Find more poems in the
[Cucujus cinnaberinus's forest adventure](http://thinglink.com)
 (thinglink.com, in Finnish)



Photos: Minja Revonkorpi.



Antti Savolainen's book of fairytales [Where'd you go, *Pytho kolwensis*](#) (pdf, metsa.fi, in Finnish) is a fascinating story about the habitat and life of the threatened *Pytho kolwensis*.



The pattern, designed by Elina Kokkola, was created as a result of school cooperation of the Beetles LIFE project (Otaniemi high school).



The best of the My Nature photo competition, which was open to everyone, was presented at several nature centres. Photo: Joonas Ahlava.



Antti Tenez's 3D model brings the *Cucujus cinnaberinus* to the palm of your hand. Try it out! Photo: Joonas Ahlava.



CUCUJUS CINNABERINUS
TENETZ



Photo: Joonas Ahlava.

The artists held workshops for about 100 high school students, where they learned responsibility using creativity and research.

Two camps brought together researchers and artists for a dialogue on beetles. Cooperation between researchers and artists created art that can influence people's ways of thinking, values and choices. The themes of the works were explained and deepened with texts written by the researchers at the camp, which dealt with the significance of biodiversity and the important topics of the Beetles LIFE project.



Photo: Joonas Ahlava.

The artworks were presented at an exhibition organised at the Finnish Museum of Natural Sciences.



Photo: Metsähallitus.



Part of a work that discusses fragmentation. The patterns created using chromatography utilise ingredients from endangered beetle habitats, such as ground litter from the areas that were monitored after controlled burning in connection with the Beetles LIFE project. Photo: Silja Moberg.

Beetles LIFE in a nutshell

The budget for the project was EUR 2.69 million, of which 60% (EUR 1.6 million) was funding from the EU LIFE Programme.

The project period was 1 August 2018 to 31 July 2023.

The project was active in 26 target areas in eight regions of Finland: South Savo, Kanta-Häme, Kainuu, Central Finland, Lapland, North Karelia, North Ostrobothnia and North Savo.

Read more about the project www.metsa.fi/beetles-life-eng

Partners

The project is being coordinated by Metsähallitus, Parks & Wildlife Finland. Partners involved in the project were Metsähallitus Forestry Ltd, Centre for Economic Development, Transport and the Environment for Häme, Humak University of Applied Sciences ja University of Helsinki.



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