

RESTORATION OF EUROPE'S WOODS

‘We need to act now’

In amongst the dark pines of the Kronenberg woods near Venlo, you will come across clearings with clusters of young deciduous trees. This is where foresters and scientists are working on the ‘prestoration’ of the wood: preparing it for the future.

TEXT PAULINE VAN SCHAYCK PHOTOGRAPHY ARJAN BROEKMANS

This is a chestnut, which can cope with dry conditions,’ says Maaïke de Graaf, an ecologist with the South Netherlands Forestry Group, as we wander through the Kronenberg woods near Venlo. The chestnut was planted last year among a group of young trees in a clearing surrounded by tall pines, letting them catch the early spring sunlight. Together with forestry scientist Sara Filipek of Wageningen Environmental Research, De Graaf explains how they hope this will help make the 400-hectare wood future-proof. Diversity will make the woodland less vulnerable and therefore better able to withstand climate change and natural dangers such as storms, diseases and pests. Ten metres away is another group of decidu-

ous trees. A little later, we step into a larger clearing full of these clusters of small trees. ‘This spot doesn’t stay so open and unobstructed automatically. Sometimes we need to remove young firs that appear amongst the trees, otherwise the clearing will be full of conifers again in no time,’ says De Graaf. Planting the trees in groups of five seems to work well, as the competition for light encourages them to shoot up. De Graaf: ‘Most of the trees will be felled in the end because we need the timber. But not all at once: some of the trees may still be standing 100 years from now.’ However, that depends on the trees surviving their youth. She points to a bud that has been chewed off. ‘A roe deer has been at it. That’s a risk, but we

don’t want to wrap them in plastic tubes to protect them either.’ The bamboo poles currently standing next to the 1.5-metre trees will degrade naturally. The figures for the first year are promising: 83 per cent of the trees are still alive.

SOIL ACIDIFICATION

The woods in this part of Limburg have long been monocultures of fir trees intended for timber production. You can still see in some places that the trees were planted in rows. The substrate is acidic and poor in nutrients. ‘That makes the woods vulnerable to climate change,’ explains Filipek as she walks through the loose sand. ‘Nitrogen deposition is making the soil even more acidic. And

minerals are leaching out as a result, which is having a dramatic impact on soil life. The soil is the cornerstone of the ecosystem.’ Planting deciduous trees enriches the soil because the leaves that are shed produce enriched plant litter and humus. Filipek: ‘That is good for the biodiversity and for the wood’s resilience.’ Healthy woodlands also increase the sequestration of CO₂. According to Filipek, the measures they are taking here go further than merely restoring the woodland to its former state. ‘We call our approach “prestoration”: preparing the wood for the future. The firs are suffering from the acidification and impoverishment of the soil, and they are also susceptible to pests and extreme weather events such as ➤



Restoration of the Kronenberg woods in Horst aan de Maas, near Venlo.



A mix of deciduous trees has been planted to make the woods future-proof.



‘Every wood is different and yet they all face the same challenges’

drought, wildfires and storms. That’s becoming more and more of a problem.’ The wood near Venlo is one of the demonstration sites of SUPERB, an international research project for which Wageningen is one of the coordinators. The aim is to restore thousands of hectares of forest across Europe by linking science and practice. The project received funding of 20 million euros from the Horizon 2020 programme plus contributions from dozens of partner organizations.

DOWNY OAK

De Graaf spreads out a map of the demonstration site in Limburg on which 31 tree species are drawn in. They were carefully selected by the South Netherlands Forest Group to form a mix of trees with varying properties. The selection includes unfamiliar names like the Turkish hazel and downy oak, which are not indigenous species. ‘Some species come from central or southern Europe,’ explains De Graaf. ‘We expect them to do well here as temperatures in-

crease. Other trees have different advantages. For example, lime trees bring minerals up from deeper layers of soil. We’re planting lots of different species to make sure the wood is well prepared for the future.’ ‘We also talked to each of the wood’s owners,’ says De Graaf. The Kronenberg woods are partly owned by the municipality. The rest is in the hands of more than 100 private owners. Many plots seem no bigger than postage stamps on the map because they have been handed down through the generations, getting divided up between more heirs each time. ‘Fortunately, many of the owners responded positively to the changes.’ In January 2024, 600 tons of finely ground stone known as rock dust was spread over the area. The powder, which is a residual product from the Norwegian mining industry, adds minerals to the soil that have leached out due to the acidification. The South Netherlands Forestry Group has acquired experience with rock dust in other woods in recent years. They found it does indeed enrich the soil, but studies in the

Netherlands also indicate rock dust can have a negative effect on some soil creatures. To investigate that further, the rock dust has only been applied in some areas. De Graaf plays a video on her phone in which a helicopter sprays grey clouds of dust over the wood. ‘That drew a lot of attention. Even the Dutch news broadcaster NOS reported on the event,’ she says. ‘Fortunately, we could explain why we were doing this.’

DEVASTATING EFFECT

The 12 SUPERB demonstration sites are located in different European countries. Filipek: ‘Every wood is different and yet they all face the same challenges due to climate change. Bark beetles are having a devastating effect on spruces in a demonstration site in Germany and Czechia, while forest fires are increasingly common at a site in the south of France. Both woods used to be monocultures of conifers grown for timber. The lack of structure makes these woods particularly vulnerable when there is a storm. In addition, extreme conditions such as droughts and floods are becoming ever more frequent. The problems are accumulating, so we need to act now.’ To obtain a picture of the future for Europe’s forests, assuming various management strategies and climate scenarios, Filipek and her colleagues have been working for the

past 15 years on a model that shows the development of various European forests over time. This European Forest Information SCENario Model (EFISCEN-Space) mainly uses data from national forest surveys, such as the size of the trees, the rate of growth of each tree species, when trees are felled and how many trees are planted. The model predicts how woodlands will develop over the coming decades under different conditions. On the other side of the woodland path, Filipek and De Graaf show how the model is linked to actual practice. The deciduous trees in this clearing have been growing here somewhat longer. They include a serviceberry, oak and birch, all about five metres tall. Restoration of the woodland started earlier here, after a group of firs were felled, and further intervention is not necessary. De Graaf: ‘But if yet more firs go, for example because they die off due to drought, that will mean an end to the microclimate that is maintained by the larger trees. The principle is known, but what does that imply for the future of a wood like this?’ Filipek: ‘Woods can certainly recover but you have to wait a long time before very young trees can take over those roles. The young trees here are already somewhat bigger and it won’t be so long before they are fully grown. We use our model to assess scenarios with a big chance of success and doom scenarios, for example

where all the fir trees die off within a year due to extreme drought. That helps us figure out which measures we should opt for.’

EUROPEAN COOPERATION

For the model to work well, it is important to have data on a variety of European forests. That is easier said than done, admits Filipek. ‘Some countries treat their datasets as confidential information and are afraid of external interference. But that is precisely why closer cooperation is needed between the countries. A joint research project like this helps achieve that.’ The collaboration in Europe has another advantage, adds Filipek. ‘Other countries facing the same challenges can see how the Netherlands uses stakeholder processes. The trick is to get backing from everyone for the plans for forest restoration.’ In that respect, she sees the Kronenberg woods as a successful example. New tree species have been planted on the plots owned by private individuals too. ‘There is often resistance to the idea of felling the existing trees. It helped to talk in person with the individual owners of the plots. In addition, local residents could read an explanation in the newspaper of what was going on and they were invited to meetings. In the end, most of them acknowledged the benefits of the restoration measures.’ Filipek

will be sharing the lesson learned from this with the European partners. Long-term monitoring is required for the restoration of woods like the one near Venlo, says Filipek and De Graaf. ‘You should really monitor this wood for decades to see how the newly planted trees grow to maturity and how that changes the woodland,’ says Filipek. ‘That isn’t possible within SUPERB, which is a four-year project, but we also have data on similar woods where deciduous trees were planted previously. That data covers not only the trees but also other aspects such as the minerals, soil life, microbes and the fauna above ground. That gives us an idea of what will happen to this wood.’ Anyone going on a walk here in 2075 will probably see a wood with a mix of species, mainly oak and birch, with tall lime trees and maples with their deep roots in places, and only the occasional fir. Under their cover will be smaller trees such as rowans – possibly full of black woodpeckers and nuthatches – while there will be far more woodlice, snails and ants in the litter on the forest floor. It will be a biodiverse wood with so many saplings that deer gnawing on them will no longer form a serious risk. ■

<https://forest-restoration.eu>

