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Making a difference at Bedgebury National Pinetum

Image credit: David Jenner

Despite being tough cookies (the oldest, largest and tallest living species are all conifers) one third of conifer species are threatened in the wild, largely as a result of climate change and destructive human activity.

Collections Manager, Dan, alongside a bristlecone pine – the oldest living tree species – in Western USA.

Conifers have been around in one shape or form since the time of the dinosaurs, but many conifer species are now also threatened with extinction. But there is still hope.

At Bedgebury, our team work tirelessly to raise awareness of the plight of conifers, to protect them in their natural habitat and to find safe spaces for them to grow in collections such as ours.

Follow our trail to find out more about our work around the world and what we are doing to protect this magnificent group of plants.

Did you know?

We are the largest pinetum in the world, with over 320 different types of conifer in our collection, including many threatened and endangered species.

Our mission is to be a world-leading centre for conifer conservation and a place that connects people with trees.

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Going... going... gone?

We need to identify trees that are at risk, before it's too late to save them.

The International Union for the Conservation of Nature (IUCN) has made a 'red list' of animals and plants at risk of extinction – rated from 'least concern' to 'extinct'. The research done by our tree team helps to inform the IUCN about which conifers need to be listed, and which category they fall into, so we can target our efforts towards trees that really need our help. And by helping conifers, we are helping the whole community of plants & animals that they support.

As well as keeping an eye on conifers in the wild, we have to make regular checks on our pinetum trees too. Here, tree team member, Brian, works with Mario from Forest Research to check the health of our fir collection.

Find it in the **Asian section** of the Bedgebury Conifer Conservation Project

What's that tree?

Koyama's spruce
Picea koyamae

The Koyama spruce has a wild population of fewer than 1000 individual trees, which can be found on just two mountains in Japan. These numbers, along with its isolated location, make it critically endangered and officially recognised as the rarest spruce tree.

Threats

Historic logging, forest fires, typhoons, landslides

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Growing the next generation

Keeping seed in a seed bank is a good insurance policy for the future, but this is not always possible.

Some trees, such as the monkey puzzle, have seed that can't be frozen or stored. We are growing large numbers of monkey puzzles as part of the Bedgebury Conifer Conservation Project. The hope is that these plantings will act as a living gene bank, producing seed that can be harvested and grown into the next generation of trees.

Mature monkey puzzles, planted in 1939, growing in the Bedgebury Conifer Conservation Project area.

Find it in the **South American section** of the Bedgebury Conifer Conservation Project

What's that tree?

Monkey puzzle
Araucaria araucana

The monkey puzzle has been around since the time of the dinosaurs. It is a true survivor, adapting to the challenges of the last 200 million years. Our large collection of monkey puzzle trees of all ages will help the specise to survive into the future.

Threats

Illegal logging, wildfires, overgrazing, lack of natural regeneration

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Helping others to help themselves

Bedgebury tree team and our Vietnamese partners explore a *Xanthocyparis* planting site.

Sharing our knowledge and skills is a key part of our conservation work.

Bedgebury nursery was the first to successfully grow the Vietnamese golden cypress, using a small quantity of seed collected in partnership with nurseries in Vietnam. As part of that partnership, we've shared what we've learned with those nurseries, and seed brought back to the UK has been propagated and shared with other botanic gardens.

Find it in the **Asian section** of the Bedgebury Conifer Conservation Project

What's that tree?

Vietnamese golden cypress
Xanthocyparis vietnamensis

The Vietnamese golden cypress is something of a wonder. First discovered in 1999, and quite different from any other conifer species, its discovery caused great excitement amongst botanists! Found only on a few isolated spots on mountain ridges, this newly discovered tree now faces the challenge of coping with a warming climate.

Threats

Logging, deforestation for agricultural land, climate change

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Skilful manoeuvres

Julian, from Bedgebury tree team, collecting cones from a Serbian spruce alongside colleagues from RBGE. In all of our work, we work closely with other conservation organisations and botanic gardens.

Our conservation work often begins with the collection of wild seed.

Seed collecting can be a challenge, as our team discovered when they visited Bosnia in 2010. With the constant threat of left-behind land mines from the Yugoslav wars, and the difficulty of climbing such a slender tree, our team resorted to abseiling down steep cliffs to lasso the tree tops from above!

Find it in the **European section** of the Bedgebury Conifer Conservation Project

What's that tree?

Serbian spruce
Picea omorika

The Serbian spruce is well adapted to living in snowy conditions. Millions of years of evolution on the steep hillsides of Bosnia & Herzegovina and Serbia have created an ultra-slender shape and pendulous branches that are perfect at shedding the heavy snowfall of the Dinaric Alps.

Threats

Wildfires, clearance for agriculture, limited natural regeneration

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Celebrating differences

It is important to collect seed that reflects the small differences between individual trees.

Like people, no two trees of the same species are exactly the same. We try to collect seed from right across a tree's natural range, as was the case with the Greek fir, which means that we capture the subtle differences between individual trees. This helps to build resilience within our tree populations, which is important to help fight disease and adapt to a changing world.

The nursery, in front of you, is the heart of our conservation work. Here, nursery manager, Emma, is explaining her work to colleagues from other FE sites.

Find it in the **European section** of the Bedgebury Conifer Conservation Project

What's that tree?

Greek fir
Abies cephalonica

If you're visiting Greece, be sure to look out for fir tree honey. Aphids living in cracks under the bark of the Greek fir consume sap and excrete honeydew, which is collected by bees. The thick, reddish-coloured fir tree honey is apparently less sweet than blossom honey.

Threats

Wildfires, *Neonectria* disease, frost

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A hard nut to crack

If we can't work out how to get seed to grow, all of our collecting will be in vain.

Some conifer seed is notoriously tricky to germinate. Our nursery team work alongside colleagues in other organisations to figure out how make this happen.
For the Chilean plum yew, this involved 'cracking the nut' of the seed then discovering just the right mix of washing, incubating and mixing with different soils.
The results of this work can be seen growing across the pinetum and as part of our Conifer Conservation Project.

Fruits of the Chilean plum yew resemble small plums or olives.

Find it in the **South American section** of the Bedgebury Conifer Conservation Project

What's that tree?

Chilean plum yew
Prumnopitys andina

This tree is dioecious, meaning trees can be male or female. So when we plant a seed, we never know what we're going to get! The tree in front of you is a female tree. It bears fleshy cones that are enjoyed by native Americans, who call them 'grapes of the mountain'. Take a look up close and see if you can spot them!

Threats

Historical logging, artificial flooding for HEP, lack of regeneration due to livestock grazing

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A home from home

Growing endangered trees in more than one location acts as an insurance policy for the future.

We hope that planting wild-sourced trees in as many safe locations as possible will help to ensure the survival of trees like the stinking cedar. Atlanta Botanic Gardens have taken the lead in trying to find safe spaces for it to grow in the USA, and Bedgebury have been able to help take the effort global. We have given a home to cuttings taken from wild trees, keeping them safe from the pests and diseases of their native range.

Cuttings from wild *Torreya taxifolia* are propagated at the Atlanta botanic garden.

Image credit: C Barlow

Find it in the **North American section** of the Bedgebury Conifer Conservation Project

What's that tree?

Stinking cedar
Torreya taxifolia

The stinking cedar is one of the rarest trees in the world. A glacial relict, it migrated south during the last ice age, but became trapped as the ice retreated. It is now threatened by the pests and diseases of the warm Florida climate.

Threats

Warming climate, pests and diseases

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The world can be a dangerous place

Forest craftsperson, Sarah, plants out trees in the Bedgebury Conifer Conservation Project area, where we are trying to create geographically-themed “mini-forests” with large numbers of each species.

Climate change, habitat loss and the spread of pests & diseases are the biggest threats to conifers across the globe.

It would be great to be able to remove these threats from the wild, but that’s not an easy thing to do. That’s why collections, like ours here at Bedgebury, are so important to the survival of so many conifer species. And by making small lifestyle changes to tackle global challenges like climate change, you can play a part too.

Find it in the **Australasian section** of the Bedgebury Conifer Conservation Project

What’s that tree?

Tasmanian cypress pine
Callitris oblonga

The cones of the Tasmanian cypress pine only release their seed once the cone-bearing branch dies. So the trees need to be ‘roughed up’ a bit before this can happen. Wildfires and floods are essential for this process, but it’s a delicate balance. Too much of a good thing can kill the tree, and the increasing severity of floods and fires is a threat to their future survival.

Threats

Clearance for agriculture, competition from non-native species, climate change

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Stepping up to the challenge

Despite having survived for millions of years, in the present-day conifers face their greatest threat.

The impact of humans and increasing demands on our world's finite resources are likely to force some trees into extinction. Over 400 conifer species are under threat, with only a handful of some of the most critically endangered still growing in the wild. But it's not all doom and gloom – our work at Bedgebury represents a better future for conifers and the wild communities that they are part of, working for the hope of gain instead of fearing for what could be lost.

And by visiting us today, you're part of it. Thank you!

Spreading the word about the importance of conifers is a big part of what we do. Here, learning team member, Kerry, hopes to inspire schoolchildren to be the forest curators of the future.

All this effort to protect a few trees, but why does it matter?

By protecting conifers, we protect not just the trees, but the whole community of plants and animals that they are a part of. And that includes us. We use conifers for food, timber, medicines and much more. By protecting the trees, we ensure that we will continue to have access to this valuable resource in the future.

We hope that you have enjoyed this trail. Please tell us what you think by scanning the QR code.

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Bedgebury Conifer Conservation Project

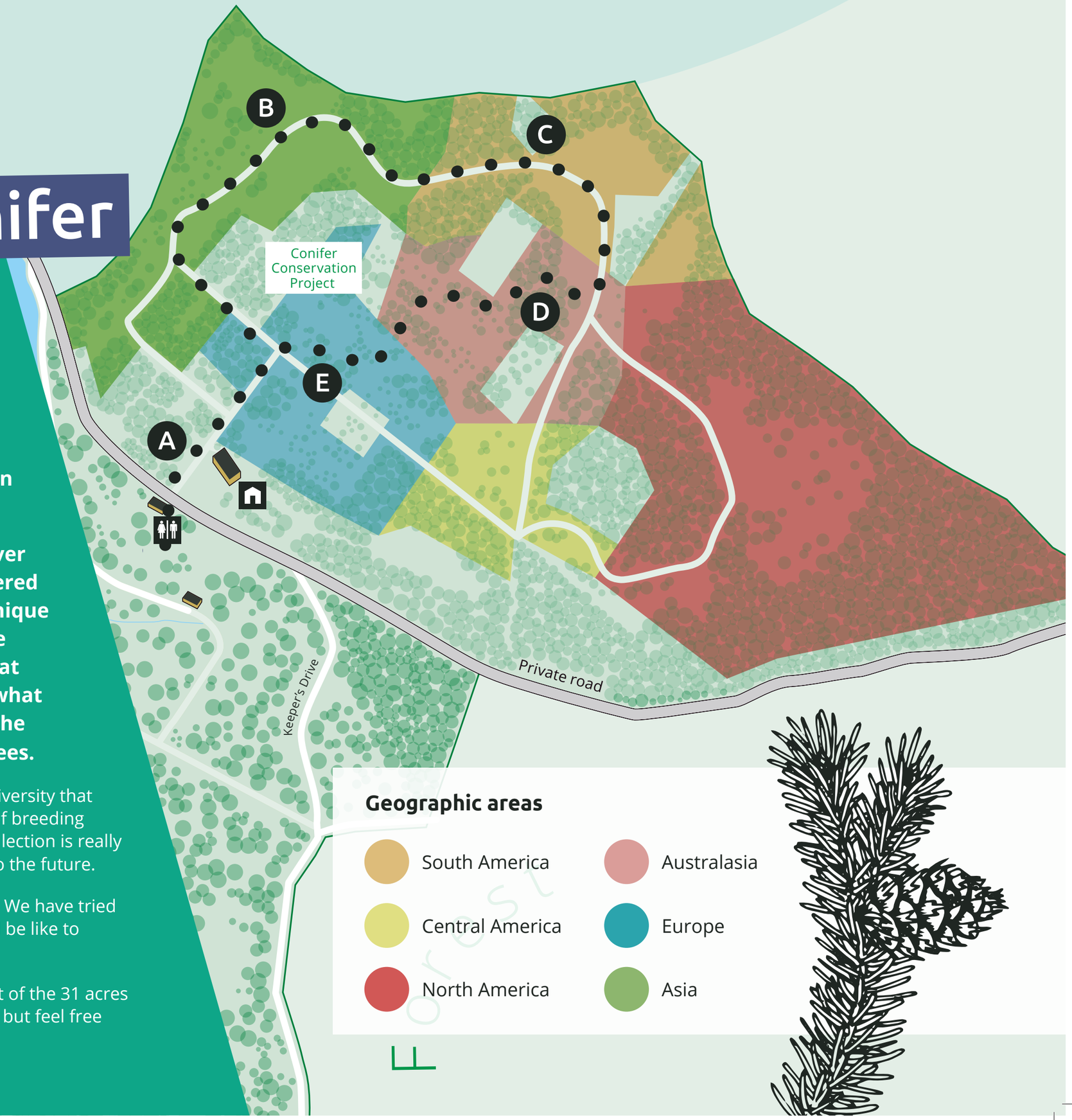
Welcome to the Bedgebury Conifer Conservation Project area.

As you wander through this area you will discover representations of some of the world's endangered forests, arranged by geographical area. In an unique approach to conservation, we are planting large numbers of selected species, alongside trees that they would be found with in the wild, which is what makes this project so special. Nowhere else in the world is creating such large plantings of rare trees.

These large-scale plantings allow us to really capture the diversity that exists within a tree species, rather like having many pairs of breeding tigers in a zoo rather than just one. Because of this, our collection is really important in understanding and protecting these trees into the future.

We also want to give our visitors an immersive experience. We have tried to create naturalistic plantings with a feel for what it would be like to walk through a forest in Vietnam, Australia or Serbia.

The marked route takes you on a loop through a small part of the 31 acres of the conservation area, returning back through this gate, but feel free to explore further if you would like to.



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Asia

Asia is a huge continent, with massive variations in climate and landscape.

This area tries to showcase just some of the many conifers found across the continent, including Taiwan black pine (*Pinus taiwanensis*) and the endangered Vietnamese golden cypress (*Xanthocyparis vietnamensis*).

To really give the feel of an authentic forest, we have tried to plant trees that would naturally grow together in the wild, like the Japanese cedar (*Cryptomeria japonica*), Japanese umbrella pine (*Sciadopitys verticillata*) and the critically endangered Koyama spruce (*Picea koyame*).

As you walk through this area, keep an eye out for the labels along the fence line to help you to identify the different trees. Or you could try using Pinetum Explorer via our website to find out more about which trees are in this area.

Native forest in Saitama Prefecture, Japan.

Scan here to access Bedgebury Pinetum Explorer

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South America

The stand-out trees in this area have got to be the mature monkey puzzles to your right (*Araucaria araucana*).

But you will also find more recent plantings of this tree, alongside the Chilean plum yew (*Prumnopitys andina*). Notice how different the young monkey puzzles look from the adult trees!

The mature monkey puzzles found here were planted back in 1939 as part of a number of forest plots, where trees were grown in quarter-acre square blocks for research purposes. Although we are no longer planting in this style, and our focus has evolved from research to conservation, the large numbers and genetic diversity within each tree species here means that our trees continue to be an important resource for both conservation and research.

Araucaria araucana growing on mountainsides in China Muerta National Reserve, Chile.

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Australasia

On a hot summer's day, this area really feels like you are in Australian bush!

Under the shade of the iconic eucalyptus trees in this section, we have planted King William pine (*Athrotaxis selaginoides*), pencil pine (*Athrotaxis cupressoides*) and Tasmanian cypress pine (*Callitris oblonga*), all classified by the IUCN (International Union for the Conservation of Nature) as vulnerable.

Although our main focus is on conifer conservation, you will notice that our plantings also include a number of broadleaved trees, like the eucalyptus found here, in the same way that conifers and broadleaf trees would grow alongside each other in the wild.

Athrotaxis selaginoides with Cradle Mountain, Tasmania, in the background.

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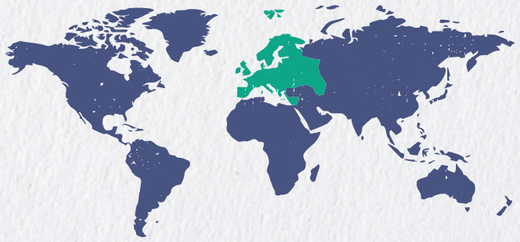

Europe

As you walk through this section, look out for the Serbian spruce *(Picea omorika)* with their slender shape that evolved to shed snow.

Ironically, you will see some of these trees are twisted and deformed as a result of the snowfall from the 2018 'Beast from the East', showing that these adaptations are not always effective!

Just like in our Asian section, we have a wide variety variety of different European conifers in this area, but have also tried to plant large numbers of each species. By doing this, we are able to capture the individual characteristics of each tree, creating a living gene bank for the future, which is what makes this project so unique.

It's still early days for this project, and you will see that many of the trees are still very young. But with space for them to grow, and for more new planting, these mini-forests will get bigger and better as the years go by!

Picea omorika in the Drina Valley, Bosnia.