

Our forests are changing due to climate change and we need to plan ahead to help them adapt

④ What does climate change mean for forestry?

Our changing climate means increased uncertainty for the future, and hence increased risk. We must plan ahead to help our forests adapt.

Potential impacts: a summary

Change expected	Beneficial effects	Negative effects
Increased carbon dioxide	Enhanced growth rates. Water loss is reduced due to closure of leaf pores.	Reduced timber quality unless different species are used to those that we use currently. Possible nutrient imbalances.
Reduced summer rainfall		Drought conditions become more severe and frequent – some tree species no longer suitable for commercial forestry. Stress caused by drought makes trees more susceptible to pests and diseases. Increased tree mortality – particularly street trees. 'Drought crack' reducing timber quality.
Increased winter rainfall		Waterlogging and reduced access for forest machinery. Increased mortality of fine roots. In turn this can worsen the effects of summer drought. Infection by soil-borne diseases is increased by fluctuating water tables. Reduced stability and more wind throw.
Increased storm frequency		Greater storm damage.
Warmer temperatures	Longer growing season. Increased potential productivity. Lower risk of winter cold damage. Potential for use of tree species that are not hardy enough to thrive in Britain at present.	Leaves appearing earlier due to warmer temperatures can leave trees vulnerable to frost damage. Pests able to survive through winter. Potential for exotic pests to spread to the UK. Species that rely on the timing of each others life cycles could become out of synchronisation with each other – e.g. flowers and their pollinators.



Green spruce aphid

Species suitability

Our changing climate is likely to result in some tree species becoming less suited to the areas in which they currently live, and some becoming more suitable. Woodland flora is also likely to suffer.

Some non native species may benefit from climate change and could become invasive in the future by out-competing native species. Monitoring and record keeping are essential to follow the impacts of climate change and decide what actions to take.

We must plan ahead to help our woodlands adapt. See sheet 10 for more information on adaptation.

Pests and diseases

Climate change will mean that:

- 1 Stressed trees are more susceptible to insect pests and diseases
 - 2 More pests will be able to survive over winter and summer activity is likely to increase – leading to increased tree disease and damage
- Some insect pests that are currently at low levels, or are not currently considered a threat are likely to become more prevalent.
 - The effective range of existing pests or pathogens may change, including a northward expansion of those with a southern distribution and the likely appearance of some from continental Europe
 - The changing climate may be increasingly favourable to a new range of pests that are inadvertently introduced through global trade.

Focus on:

Green spruce aphid (*Elatobium abietinum*)

This aphid defoliates Sitka spruce and Norway spruce in the UK. At present, its populations appear to be limited primarily by cold winter temperatures below -7°C and sudden frosts. Higher temperatures will lead to higher reproduction and growth rates, and will allow more aphids to survive during the winter.

Phytophthoras

Phytophthoras are a group of fungal pathogens responsible for major plant diseases in many parts of the world. Phytophthora diseases can be expected to become more prevalent due to drier summers and wetter winters. At the same time climatic stress on trees such as oaks could also make them more susceptible. Phytophthoras are linked to Sudden Oak Death and 'oak decline'.

Red band needle blight

This is an economically important disease affecting a number of coniferous trees, particularly pine species. Since the late 1990s incidence of the disease has increased dramatically in Britain, particularly in Corsican pine (*Pinus nigra* ssp. *laricio*). Due to the extent and severity of the disease on this species, there is now a five-year ban on the planting of it on the Forestry Commission estate. It is thought that the increase could be due in part to warm, wet springs in recent years.



Damage to Corsican pine caused by red band needle blight

Horse chestnut leaf miner (*Cameraria ohridella*)

This moth causes severe damage to the appearance of horse chestnut trees, and benefits from hot dry conditions when the tree is already suffering drought stress. It is thought that climate might also have a role to play in increased incidence of bleeding canker of horse chestnut, but this is currently under investigation.

Appearance of exotic pest species

Exotic pests such as the southern pine beetle could establish populations in Europe, and climatic warming could make UK forests susceptible to damage.



Exotic pests like this Asian longhorn beetle might become more common. Park and street trees are particularly at risk from this species

Increased global movement of timber and wood products

The combined effects of increased global movement of timber and wood products, and climate change, are likely to result in exotic pests such as Asian longhorn beetle becoming more prevalent.

The impact of our changing climate on pests and diseases means that we must remain vigilant in reporting new pests and altered patterns of damage. When looking at the design and species composition of our forests, we must think about how pests and diseases might affect the tree species that we use and how this might change in the future.

Summary

- Climate change will affect our trees and woodlands and we must help our forests to adapt.
- Many pests and diseases are likely to benefit from climate

change. We must continue to be vigilant in their monitoring and think about changes that we might have to make to the species composition of our forests.