

NRW B B 85.14 Annex 4

Briefing on information currently available for the risk of *P.ramorum* spreading to other species

Introduction

There have been a number of issues raised about the risk of *P ramorum* spreading to a wider range of species and causing significant damage to those species which in turn can have an important impact on habitats or commercial forestry crops. These concerns have been reiterated following the Welsh Governments announcement of a *P ramorum* Disease Management Strategy. The strategy allows for infected trees to remain unfelled for longer periods of time in some parts of Wales.

Background

The Welsh Government has produced the *P.ramorum* disease management strategy following extensive consultation. The strategy which recognises the disease cannot be stopped, has distinct zones with different management practices.

In the Disease Limitation Zone (DLZ), where there is currently very little disease and which covers most of Wales, the management is covered by Statutory Plant Health Notices (SPHN) and the landowner once notified is required to fell infected areas within a specified time period. This time limited felling is designed to slow the spread of the disease as much as possible.

In the rest of Wales, where the disease is widespread and strongly embedded in larch crops, Core Disease Zones (CDZ) will be defined. The objective here is to manage the disease over a longer timeframe and thus reduce the impacts of large scale, concentrated clearfell on communities, local businesses and the environment as well as mitigating the impact on timber processors and markets. Currently there is one CDZ in S. Wales. In the CDZ many infected sites are already identified but surveillance will continue to identify any new infections. When fresh infections are found a Movement Notice (SPHNm) will be served on the landowner to ensure that infected material goes to registered processors. Clearance of infected material in the CDZ does not have a statutory time limit for completion. It is therefore in the CDZ that there will be a longer time frame for clearing infected material.

Map of Core Disease Zone (July 2014)



P. ramorum is spread by spores. There are 2 types of spores, zoospores and chlamydospores. The most common spores are zoospores which spread in moist air and water. The chlamydospores, of which there are very few produced, are a “survival” spore that enables the disease to survive during times when there are adverse conditions. Chlamydospores can survive for long periods of time 5 years or more. The vast majority of spread is via zoospores. The intensity and extent of the spread is heavily influenced by the weather conditions with warm, wet and windy weather providing the optimum conditions. This in conjunction with a high spore load on tall trees has resulted in increased spread of the disease over wide areas in S. Wales especially.

P. ramorum was first found in Britain on rhododendron in 2002 and transferred to larch in the mid 2000's and was first identified on larch in 2009. It is unclear as to what were the conditions and precise mechanism that enabled the transfer to larch.

Spores are released from rhododendron throughout the year and can cause infection at any time if the weather conditions are right but generally low to the ground so therefore the spread is very limited.

There are currently 2 lineages of *P. ramorum* found in Britain EU1 and EU2. EU1 is the type found in Wales and is less aggressive in its impact on hosts. Both are the same mating type so that even when the 2 are present together the potential to modify is low however the profile of phytophthoras in general has been rising and where they come together there is potential for hybridisation.

There are a wide range of species both tree and shrub that can be affected by *P. ramorum*. This is illustrated by the *P. ramorum* host list held by FERA which has 168 species. The list is comprehensive and includes confirmed infection from around the world and infections both from nurseries and the wider environment. The number of species affected in the wider environment in the UK and Ireland reduces to 54 and quite a few of these are single records, others are relatively obscure and are deemed not epidemiologically significant. There are a small number of species which are being found infected on a number of sites across UK and Ireland these include Larch, Beech, Douglas fir, Western hemlock, Rhododendron and bilberry.

During the early autumn of 2013 FERA, in conjunction with WG and NRW, undertook a survey of 5 sites in S Wales where areas of bilberry heath were found adjacent to heavily infected larch. The survey was structured as a “transect” and started with bilberry adjacent to infected larch and progressed across open heathland. Samples of suspect bilberry were taken moving along the “transect”. This resulted in 45 suspect bilberry samples being taken for laboratory tests of which only 3 were found to be positive for *P. ramorum* and all of these were either under larch canopy or immediately adjacent (within 5m).

Discussion

There are a number of factors to consider in relation to the impact of the new WG *P. ramorum* Management Strategy, on species other than larch. The major differences from previous management strategies will be in the CDZ where there will be no time limit imposed on felling of infected stands. This could potentially lead to an increase of spores in the CDZ areas however if this occurs it should be relatively short lived as most of the stands in the CDZ will be infected and the infection will progress in those trees which will reduce the ability to sporulate. Management is likely to take place in many stands in the CDZ so that owners can maximise income from the larch and restock with alternative species which will also lead to reduced spore levels. Many of the sites in the S Wales CDZ are part of the WG estate and will be managed as part of long term contracts for larch timber supply set up by NRW.

During the development of the new WG strategy there was considerable debate about the evolution of the previous strategy, which involved a core infected area (CIA), to a position with disease zones. Much of the discussion which took place at the Wales Phytophthora Operational Response Team (PORT) centred on the potential impact of leaving infected trees to sporulate for longer than necessary.

Views were taken from both Forest Research (FR) and FERA as well as looking at the experience of managing the disease in Wales since 2010. It is important to take account of both the disease characteristics and the characteristics of the alternative host to understand the potential for movement into species other than larch. There are different levels of impact on different species e.g. catastrophic on larch, whereas Beech and Douglas fir can recover and on rhododendron the impact is generally limited to shoot death.

Little is understood about the precise mechanism associated with infection on any species although it appears broadly linked to 2 areas either **a)** the species being deciduous especially the timing and method of leaf loss and/ or **b)** the type of bark, its "thickness" and whether or not there is some damage. Timing is very important in terms of maximum spore production linked to weather conditions such that any alternate host needs to be susceptible during that time period. In species where infection appears to be through the bark the infection is often associated with previous damage like deer damage on young Douglas fir.

P ramorum is a very new disease and therefore we have to use the information we are constantly gathering to increase our knowledge which is limited. From what has been observed we can often find isolated infection on other species either under or immediately adjacent to infected larch with heavy spore loads but this does not necessarily result in rapid dying and in some cases e.g. infection on Beech in S W England where trees have recovered on sites. Some species do not appear to sporulate from foliage and so are not major problems for disease spread examples of this are Douglas fir and Beech.

Plant health specialists are regularly monitoring a wide range of sites and species across the UK to try and ensure that any change of disease behaviour is spotted early. Sitka spruce has been monitored since 2010 in Wales and a considerable number of suspect samples have been sent to the Forest Research laboratory with 1 providing a positive DNA sample and in the rest of UK further samples have been submitted to FR of which one has proved positive as a DNA test on needles. These 2 DNA positives have been thoroughly checked and it is unclear to what extent the bark of the Sitka spruce has been infected. In both instances the Sitka spruce trees were under stress and adjacent to larch. The symptoms shown are minor dieback at the branch tips. Both sites have had subsequent monitoring but there have not been any further positive results.

In a wider context pathologists are finding other phytophthora species have also become much more prominent in recent years with some of the species which have been around

for some time becoming a much bigger problem as well as new species to UK. This may well be linked to recent changes in weather patterns with warm wet summers which is obviously the crucial time of year for tree growth.

Conclusion

It is clear that *P ramorum* has the ability to infect species other than larch including some species that are very important culturally, environmentally and economically in Wales e.g. Sessile oak, Silver birch, Bilberry and Douglas fir. The impact of the disease seen to date on these species is very different to the impact we have seen on larch. It is impossible to be absolutely clear about future developments of a disease that we know a limited amount about. The huge number of variables from weather conditions to different species susceptibility and the possibility for modification and a combination of them within a specific timeframe makes predicting infection of other species with major consequences to those species very difficult.

During the Summer and Autumn of 2012 there were excellent weather conditions for the disease and this coupled with high spore loadings enabled major spread of the disease in S Wales as well as the development of a new centre of infection in N Wales that was not associated with a larch infection. In the Autumn of 2013 there were conditions conducive to the spread of the disease but very limited increase in disease has been identified in early 2014. This demonstrates the lack of predictability of the disease.

It is therefore crucial that we maintain our strong links across the woodland and tree management sector in Wales and through these links increase local knowledge and therefore the ability to undertake surveillance and monitoring of trees and woodland habitats such that any changes are recognised and acted on quickly. We will remain linked in to the scientists and researchers working both on the disease and the modelling of its impacts and ensure they get data as required.