Forbes-
Laird
Arboricultural
Consultancy

TEXT OF TREE DAMAGE ALERT SENT TO AAIS FOR PUBLICATION

"NASTY ROTTER"

Introduction

This TDA has been prepared in response to the rising profile of the little known and poorly documented wood decay fungus *Perenniporia fraxinea*. This pathogen appears only as a photograph in the first edition of Research for Amenity Trees (RAT) 4, 'Diagnosis of Ill Health in Trees', with the synonym *Fomitopsis cytisina*. It is also referred to in RAT 7, 'Principles of Tree Hazard Assessment and Management', where Lonsdale describes it as 'rather rare in Great Britain'.

However, Lonsdale notes its wide host range among broadleaved trees, and says that the decay it causes is an intense white rot, leading to eventual failure by means of brittle fracture. The popular and otherwise fairly comprehensive fungi identification books by Phillips and Jordan omit this pathogen altogether, as do Butin ('Tree Diseases and Disorders'), Mannion ('Tree Disease Concepts'), Schwarze *et al* ('Fungal Strategies of Wood Decay in Trees'), and Weber & Mattheck ('Manual of Wood Decay in Trees'). In the second edition of RAT 4, the decay fungi data table lists *Perenniporia* as causing brown rot.

And that, as they say, is that. This very limited information, in particular the suggestion that *P. fraxinea* is rare, has allowed this organism to evade more intense scrutiny.

My concern here is twofold: firstly, is this fungus genuinely rare, or is it being missed? Secondly, what is the potential for this fungus to destabilize infected trees?

Identification

The photographs in RAT 4 & 7 show sporophores with certain features in common and which are, in combination, unique to *P. fraxinea*:

- They tend to turn upwards from underneath but flatten on the upper surface (similar, in this respect, to *Heterobasidion*)
- They have a pronounced lumpy or knobbly texture, appearing almost warty
- They develop a dark green or blackish colour on the upper surface (which appears to be an algal bloom)

Lonsdale suggests that the brackets can reach 400mm diameter, but this author has recorded specimens well in excess of double that figure. The fruitbodies develop a definite woody texture: one consultant recently had to resort to a chainsaw to take samples! At these sizes, identification is fairly unmistakable. However, the photographs in the two RAT publications show mature specimens, with a well-developed morphology that facilitates easy identification. Where the identification problem lies is with the juvenile fruitbodies, and it is at this stage that misidentification may be occurring, possibly on a widespread scale.

Based on numerous observations by the author, *P. fraxinea* fruitbodies take between two and seven years to develop the characteristic bracket shapes illustrated in the two RAT publications. In the meantime, they appear initially as a corky mass flattened against the stem, before becoming more globular, though remaining amorphous.

At this latter stage, they appear very similar to juvenile Ganoderma of the adspersum/applanatum group; this author is aware of a number of experienced tree surveyors who have confused *Perenniporia* with these fungi.

Happily, fruitbodies of *P. fraxinea* have one unique ident. feature which is present at any stage of their development: when cut open, the corky textured flesh is the same creamy fawn colour as the (fresh) exterior. This uniformity of colouration contrasts well with species of the Ganoderma genus and also helps to differentiate *P. fraxinea* with *Rigidoporus ulmarius*, another fungus that develops brackets of similar appearance (especially in relation to algal bloom).

Perenniporia spores are white and appear in profusion, with one female arb. consultant recently describing the adjacent dusting as looking like talcum powder!

Hosts

The host range is very wide, with records of infection covering many broadleaved species, and certainly not just *Fraxinus*, thus even its name is misleading. *Acer, Aesculus, Eucalyptus, Fagus, Laburnum, Platanus, Quercus*, *Robinia*, and *Ulmus* have all been recorded as hosts. Given this host range, and the fact that I see it on a very regular basis, one wonders how rare *Perenniporia* actually is.

Decay

So which is right, Lonsdale or the second edition of RAT4? From observations made by the author of the fracture surface of failed trees, it appears that perhaps neither has fully described the decay caused by this organism: once again, it seems that *P. fraxinea* is misunderstood. Lonsdale's reference dates from 1958 when scientific examination of wood decay was far less sophisticated than today. Indeed, our understanding of decay processes at the microscopic level has only recently begun to elucidate the true diversity of decay types.

The fracture resulting from *Perenniporia* decay appears to be brittle in nature, with the decayed regions predominantly white. On the face of it, this would suggest either simultaneous (rather than stringy) white rot, or a soft rot after the fashion of *Ustulina* or perhaps *Meripilus*. However, records of cavity formation occurring are inconclusive, which suggests that one of the components of wood may be being left largely in place. This evidence argues against a simultaneous white rot, pointing instead to a preferential degradation of cellulose by soft rot. This ties in with the absence of records of 'VTA' style symptoms associated with this fungus. Perhaps the safest thing is to admit that we don't really know (though brown rot can be ruled out).

Arboricultural significance

It is well known that the otherwise destructive decay organism *Inonotus hispidus* baulks at the heavily lignified timber of London plane. Not so our friend *Perenniporia*: it has been known to degrade the wood of tension root buttresses on a 30m plane to the point that they sheared across the grain.

This suggests a very high destructive potential. This potential resulted in permanent disabling injuries to a Leicestershire motorist and, most notoriously, in the death of three people in Birmingham in December 1999. The only other fungus that is documented as having this ability is *Meripilus* (which is also a soft rot originally identified in early literature as a white rot).

The typical (possibly exclusive) seat of decay is at or near ground level, extending into the stem-root interface as well as the lower stem. Trees infected with *P. fraxinea* should therefore be regarded as at risk of windthrow or lower stem breakage.

The author has undertaken confirmatory Resistograph investigations of two ash trees that showed indications of extensive decay by *Perenniporia*. In both cases, the results were inconclusive, though the trees were felled anyway due to their condition: both trees were indeed severely decayed. Once again, a comparison could be drawn with the decay caused by *Ustulina* and *Meripilus*. The former is known to leave degraded wood comparatively hard until it is well advanced, and the latter results a hard fracture surface that may also yield inconclusive results to drilling (assuming one can drill in the relevant area).

Conclusion

The confusion that surrounds *Perenniporia fraxinea* is likely to perpetuate the myth that it is of low arboricultural significance. This is not the case: it is far more common than most practitioners realise, it is a killer, and it deserves to be far better understood than currently.

This TDA should go some way towards highlighting the problems associated with this organism, and it is to be hoped that research will clarify some of the remaining uncertainties in the near future.

Until then, if a tree is infected with *Perenniporia* and if targets are present, intervention of some sort is very likely to be warranted.

JFL