

Impact of Climate on Oak Powdery Mildew

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Abstract – Oak mildew, *Microsphaera alphitoides*, is a widespread exotic oak pathogen that arrived in Europe at the beginning of 20th century. The disease has long been considered by foresters as having limiting impact on trees because it arrives late in the vegetation period and does not infect significantly the first oak leaf flush. The Département de la Santé des Forêts (DSF) however has been mentioning those last years that the disease might have an important impact on mature trees in some situations, with a possible role as inciting decline factor. Limiting information exists on this very common oak pathogen and a work was initiated to better understand its possible role in oak decline.

To identify the situations where oak mildew might be a threat to tree, we analysed the DSF database. This database is a compilation of reports of forest health problems those last 17 years done by a network of foresters trained for diagnostic. The data analysis was done by using methods developed in human epidemiology, i.e. by comparing the distribution of oak mildew reports in time and regions with the distribution of other forest health problems of oaks (root rot, decline and insects defoliators) that are used for standardisation. The analysis shows that many reports concern seedlings or oak previously defoliated by insects or frost. However, about 25% of the reports concern mature trees that were not previously defoliated, which is unexpected. We analysed more specifically those reports concerning non-defoliated mature oaks. The results show that they occur mostly in southwest France in some specific years. The reports correspond to a very early arrival of oak mildew in those years, with a massive infection of the first oak leaf flush. The analysis shows that the year with an early arrival of oak mildew in the vegetation season are years with especially mild winters. Years with such a climate were very infrequent during most of the 20th century and became more frequent those 17 last years.

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