



Root and Butt Rot (*Heterobasidion irregulare*)



Introduction

Heterobasidion irregulare (formerly known as *Heterobasidion annosum* P ISG) is a highly infectious pathogenic fungus that causes root and butt rot in coniferous and some deciduous trees.

The disease was first documented in the Americas, with confirmed records from the USA, Canada, Mexico, Cuba, and the Dominican Republic, but has since spread to Italy [[see distribution](#)]. The introduction to continental Europe likely occurred during World War II through infected wood materials from the Americas. Although not yet detected in other parts of Europe, the suitable climate and presence of susceptible host species throughout the European and Mediterranean region present a considerable risk of introduction and proliferation.

While this fungus shares a similar life cycle with *H. annosum*, it poses a comparatively greater threat of spread and damage due to higher fruiting rates, enhanced saprobic ability, increased spore production, and higher transmission potential. Additionally, hybridisation between both species raises concerns about increases in virulence and shifts in host range over time.

Host

Its main hosts are in the pine (*Pinaceae*) and cypress families (*Cupressaceae*), particularly the *Pinus* (pine) and *Juniperus* (juniper) genera. Confirmed coniferous hosts include ponderosa pine (*Pinus ponderosa*), shortleaf pine (*Pinus echinata*), red pine (*Pinus resinosa*), incense-cedar (*Calocedrus decurrens*), western juniper (*Juniperus occidentalis*), and Manzanita (*Arctostaphylos* spp.). Deciduous non-conifer hosts include *Quercus* (oak) and *Prunus* (plums, cherries, etc.).

Biology

H. irregulare produces large quantities of airborne spores from late summer to winter, which can infest freshly cut stumps or fresh wounds. After infection, these spores germinate and produce mycelia that colonise the wood by decomposing lignin and cellulose.

The fungus spreads in two ways:

- Sexual dispersal: Via spores, which can be dispersed by wind currents. Most spores (about 99%) deposit within 100 m, though long-distance dispersal is possible.
- Asexual dispersal: Through mycelia, which can persist for many years in infested trees and spread to living trees through root-to-root contact.

In Italy, an area of low host density, the fungus spreads approximately 1.3 km per year, while in regions with high-density coniferous forests, like the UK, it could spread faster (up to 10–20 km per year).

Symptoms

For details of the symptoms, scan or [click](#) on the QR code to access the accompanying poster.



More information

- DEFRA: <https://planthealthportal.defra.gov.uk/assets/Heterobasidion-irregulare-consultation-doc.pdf>
- iNaturalist: <https://www.inaturalist.org/taxa/803784-Heterobasidion-irregulare>
- UK Plant Health Risk Register: <https://planthealthportal.defra.gov.uk/pests-and-diseases/uk-plant-health-risk-register/viewPestRisks.cfm?cslref=27270>
- Eppo Global Database: <https://gd.eppo.int/taxon/HETEIR>
- U.S. Department of Agriculture Forest Service: <https://www.govinfo.gov/content/pkg/GOVPUB-A13-PURL-gp0113917/pdf/GOVPUB-A13-PURL-gp0113917.pdf>

Acknowledgements

This factsheet was written by Eva Morisot (BGCI) and Charles Lane (Fera). Edited and produced by IPSN, March 2026.