

## Outlineoffungi.org – Note 1550 [Heterobasidion](#)

Web-links: [Index Fungorum](#), [Facesoffungi](#), [MycoBank](#)

### [Heterobasidion](#) Bref.

*Heterobasidion annosum* (Fries) Brefeld is the type species of *Heterobasidion* Brefeld (1888). It is characterized by annual to perennial, resupinate to pileate basidiomata that are usually imbricate, leathery when young and fresh, and woody and hard when dry. The pileus is semicircular to fan-shaped. Pore surfaces are white to light cream and the pores are round to angular. The context is white to cream. The hyphal system is dimitic with mostly simple septa on generative hyphae with clamp connections in the context. The dextrinoid or amyloid skeletal hyphae predominate in the basidiomata. Basidiospores are broadly ellipsoid to globose, hyaline, thin to slightly thick walled, asperulate and show no reaction in Melzer's reagent. Members of this genus cause a white rot (Gilbertson and Ryvarden 1986, Dai et al. 2007, Dai and Korhonen 2009, Tokuda et al. 2009, Otrósina and Garbelotto 2010, Chen et al. 2014, Ryvarden and Melo 2014).

*Heterobasidion* species are amongst the most intensively studied polypores because several species are aggressive white rot pathogens of managed coniferous forests mainly in Europe and North America (Yuan et al. 2021). The polypore genus *Heterobasidion*, which belongs to the family Bondarzewiaceae, is one of the most intensively studied basidiomycetous genera because some species of *Heterobasidion* are aggressive pathogens of managed coniferous forests in Europe and North America (Woodward et al. 1998, Yuan et al. 2021). Two morphological taxa, *H. annosum* (Fr.) Bref. and *H. insulare* (Murrill) Ryvarden, had generally been accepted in *Heterobasidion* (Murrill 1908, Gilbertson and Ryvarden 1986, Ryvarden and Gilbertson 1993, Núñez and Ryvarden 2001). However, mating studies have revealed that both *H. annosum* and *H. insulare* are in fact species complexes (Dai and Korhonen 1999, Dai et al. 2002, 2003).

Three species, *Heterobasidion abietinum* Niemelä and Korhonen (Eur F-group), *H. annosum* sensu stricto (Eur P-group) and *H. parviporum* Niemelä and Korhonen (Eur S-group), have been recognized in Europe (Niemelä and Korhonen 1998), and two species, *H. irregulare* Garbel. and Otrósina (NAm P-group) and *H. occidentale* Otrósina and Garbel. (NAm S-group), were described from North America (Otrósina and Garbelotto 2010). Based on mating studies, the East Asian taxon in the *H. annosum* species complex was considered as *H. parviporum* (Dai and Korhonen 1999, 2003, Dai et al. 2006, Dai 2012, Chen et al. 2015). Similarly, investigations based on mating tests, morphological characteristics and molecular analyses revealed several species also within the Asian *H. insulare* complex: *H. linzhiense* Y. C. Dai and Korhonen (Dai et al. 2007), *H. australe* Y. C. Dai and Korhonen (2009), *H. ecrustosum* Tokuda, T. Hatt. and Y. C. Dai, *H. orientale* Tokuda, T. Hatt. and Y. C. Dai (Tokuda et al. 2009), *H. amyloideum* Y. C. Dai, Jia J. Chen and Korhonen, *H. tibeticum* Y. C. Dai, Jia J. Chen and Korhonen (Chen et al. 2014) and *H. amyloideopsis* Saba, C. L. Zhao, Khalid and Pfister (Zhao et al. 2017). In addition, *H. araucariae* P. K. Buchanan from Australia and adjacent regions was confirmed to be a member of the *H. insulare* species complex (Chen et al. 2015). Recently, based on more species and samples of *Heterobasidion* and the fossil record, molecular dating suggested that ancestral *Heterobasidion* species originated in Eurasia occurred mainly during the Early Miocene (Chen et al. 2015, Zhao et al. 2017).

## References

- Brefeld O. 1888 – Basidiomyceten III. Autobasidiomyceten. Untersuchungen aus dem Gesamtgebiete der Mykologie 8, 1–184.
- Chen JJ, Cui BK, Zhou LW, Korhonen K et al. 2015 – Phylogeny, divergence time estimation, and biogeography of the genus *Heterobasidion* (Basidiomycota, Russulales). *Fungal Diversity* 71, 185–200.
- Chen JJ, Korhonen K, Li W, Dai YC. 2014 – Two new species of the *Heterobasidion insulare* complex based on morphology and molecular data. *Mycoscience* 55, 289–298.
- Dai YC. 2012 – Polypore diversity in China with an annotated checklist of Chinese polypores. *Mycoscience* 53, 49–80.
- Dai YC, Korhonen K. 1999 – *Heterobasidion annosum* group *S* identified in north-eastern China. *European journal of plant pathology* 29, 273–279.
- Dai YC, Korhonen K. 2003 – First report of *Heterobasidion parviporum* (*S* group of *H. annosum* sensu lato) on *Tsuga* spp. in Asia. *Plant Disease* 87, 1007.
- Dai YC, Korhonen K. 2009 – *Heterobasidion australe*, a new polypore derived from the *Heterobasidion insulare* complex. *Mycoscience* 50, 353–356.
- Dai YC, Vainio EJ, Hantula J, Niemelä T et al. 2002 – Sexuality and intersterility within the *Heterobasidion insulare* complex. *Mycological Research* 106, 1435–1448.
- Dai YC, Vainio EJ, Hantula J, Niemelä T et al. 2003 – Investigations on *Heterobasidion annosum* s.lat. in central and eastern Asia with the aid of mating tests and DNA fingerprinting. *Forest pathology* 33, 269–286.
- Dai YC, Yu CJ, Wang HC. 2007 – Polypores from eastern Xizang (Tibet), western China. *Annales Botanici Fennici* 44, 135–145.
- Dai YC, Yuan HS, Wei YL, Korhonen K. 2006 – New records of *Heterobasidion parviporum* in China. *Forest pathology* 36, 287–293.
- Gilbertson RL, Ryvarden L. 1986 – North American Polypores 1. Abortiporus - Lindtneria. Oslo: Fungiflora, 1–433.
- Murrill WA. 1908 – Additional philippine polyporaceae. *Bulletin of the torrey botanical club* 35, 391–416.
- Niemelä T, Korhonen K. 1998 – “Taxonomy of the genus *Heterobasidion*,” in *Heterobasidion annosum: Biology, Ecology, Impact and Control*, eds S. Woodward, J. Stenlid, R. Karjalainen, and A. Hüttermann (Oxon: CAB International), 27–33.
- Núñez M, Ryvarden L. 2001 – East Asian polypores 2. Polyporaceae s. lato. *Synopsis Fungum* 14, 469–522.
- Otrosina WJ, Garbelotto M. 2010 – *Heterobasidion occidentale* sp. nov. and *Heterobasidion irregulare* nom. nov.: a disposition of North American *Heterobasidion* biological species. *Fungal Biology* 114, 16–25.
- Ryvarden L, Gilbertson R. 1993 – European polypores 1. *Synopsis Fungum* 7, 1–387.
- Ryvarden L, Melo I. 2014 – Poroid fungi of Europe. *Synopsis Fungorum* 31, 1–455.
- Tokuda S, Hattori T, Dai YC, Ota Y et al. 2009 – Three species of *Heterobasidion* (Basidiomycota, Hericiales), *H. parviporum*, *H. orientale* sp. nov. and *H. ecrustosum* sp. nov. from East Asia. *Mycoscience* 50, 190–202..
- Woodward S, Stenlid J, Karjalainen R, Hüttermann A. 1998 – “Preface,” in *Heterobasidion annosum: Biology, Ecology, Impact and Control*, eds S. Woodward, J. Stenlid, R. Karjalainen, and A. Hüttermann (Oxon: CAB International), xi–xii.

[Yuan Y, Chen JJ, Korhonen K, Martin F et al. 2021 – An updated global species diversity and phylogeny in the forest pathogenic genus \*Heterobasidion\* \(Basidiomycota, Russulales\). \*Frontiers in Microbiology\* 7, 11, 596393](#)

[Zhao CL, Saba M, Khalid AN, Song J et al. 2017 – \*Heterobasidion amyloideopsis\* sp. nov. \(Basidiomycota, Russulales\) evidenced by morphological characteristics and phylogenetic analysis. \*Phytotaxa\* 137, 199–210.](#)

**Entry by X. Yang** College of Forestry, Southwest Forestry University, Kunming 650224, P.R. China,

**X.C. Zhang** College of Forestry, Southwest Forestry University, Kunming 650224, P.R. China,

**C.L. Zhao** College of Forestry, Southwest Forestry University, Kunming 650224, P.R. China

(Edited by **Kevin D. Hyde & Alireza Armand**)

Published online 20 September 2024