

Species description

Hygrophorus penarioides Jacobsson & E. Larss. sp. nov.

MYCOBANK # MB510527

Misapplication: *Hygrophorus penarius* Fr. var. *penarius* ss Bon

Pileus 90-150 mm latus, primo cum umbone lato vel convexus et margine valde involuto, primo pure albus, sed dein in disco plus vel minus cremeopaleaceus, glaber, subviscidus vel siccus. *Lamellae* decurrentes, distantes vel distantissimae, primo albae, sed deinde cum colore cremeopaleaceo vel modice roseo. *Stipes* 60-100 x 15-35 mm, firmus et confertus, generatim deorsum valde attenuatus, albus, sed deorsum quidem cum colore cremeopaleaceo vel ochraceo, in summa parte tenuiter floccosus. *Sapor* mitis vel paene mitis. *Odor* levis et difficilis ad describendum (oleosus vel dulcidulus). *Sporae* late ellipsoides vel ovatae, (5-)5.5-6.5(-7) x 4-4.5 μm . *Q* = 1.3-1.6. *Basidia* graciliter clavata, 50-60 x 6-8 μm , quadrispora. *Pileipellis* crassa ixocutis ex 3-6 μm latis hyphis. *Habitatio*: sub *Quercus/Corylo* in terra calcarea. Certe mycorrhizam formans cum *Quercu*.

Holotypus—Sweden, Öland, Långlöt parish, N Ismantorp, 1 Oct. 1994.. SJ 94067: in herbarium GB conservatus est.

Etymology—Similar to *penarius*

Pileus 90-150 mm broad, when young with a broad umbo or convex with a strongly involute margin, pure white at first but with age becoming more or less cream in centre, smooth, subviscid to dry. **Lamellae** decurrent, distant to very distant, white at first but later with a cream or slightly pinkish flush. **Stipe** 60-100 x 15-35 mm, firm and compact, mostly strongly attenuated towards the base, white but at least in lower part with a cream or ochraceous flush, finely floccose in the uppermost part, taste mild or almost so. **Odour** present, but weak and difficult to describe (oily or sweetish). **Basidiospores** broadly ellipsoid to ovoid, (5-)5.5-6.5(-7) x 4-4.5 μm . *Q* = 1.3-1.6. **Basidia** slenderly clavate, 50-60 x 6-8 μm , 4-spored clamped. **Hyphae** with clamps. **Gill edge** fertile. **Pileipellis** a thick ixocutis of 3-6 μm broad hyphae.

with a Q value of 1.3-1.6 compared to 1.5-1.8 in *H. penarius*. There seems also to be a difference in odour but this is difficult to indicate as it is weak and may be differently perceived. Becker (1954) and Bon (1977) mention some other differences: *H. penarius* is said to be finely scaly towards the edge of the pileus (hence the name *barbatulus*) and to have a fully mild taste whilst *H. penarioides* is said to be smooth and to have a bitter taste. However, these characters do not seem to be constant. Only some of our collections of *H. penarius* are slightly appressed scaly while others look smooth and no bitter taste was perceived in the single collection of *H. penarioides* tested.

The North American species *Hygrophorus sordidus* is also similar to *H. penarioides*. *H. sordidus* also has very large basidiomes and the spores seem to be identical with those of *H. penarioides*. As *H. sordidus* is said to grow in oak/hickory woods (Hesler & Smith 1963) we first suspected it to be identical with the taxon connected with *Quercus* in Europe. Some collections of the species were borrowed from the Herbarum of University of Michigan (MICH). The only observed morphological difference between *H. penarioides* and *H. sordidus* is that the lamellae in *H. sordidus* seem to be closer, however we have not been able to study fresh material of the species. The large sequence divergence between them clearly indicates that they should be looked upon as distinct species.

Habitat under *Quercus/Corylus* on calcareous ground. Fruiting time (in Scandinavia) Sept. - Oct., forming ectomycorrhiza with *Quercus*.

Additional collections: Sweden: ÖL. Långlöt, Ismantorp, SO Vargmossen, 2 Oct. 1998, S. Jacobsson, SJ 98040; Vg., Österplana, 2 Oct. 1982, J. Jeppson 2158 ; Gtl., Lojsta, 21 Sep. 2000, HG. Thoresson .

Discussion

In the present study ITS sequence data confirm the occurrence of the two species *H. penarius* and *H. penarioides* in Europe. *Hygrophorus penarioides* is very similar to *H. penarius* in many aspects, e.g. the colours, the subviscid to dry pileus surface, the distant and decurrent lamellae and the robust habitus. Despite these facts it is not difficult to distinguish the two species. Apart from the different ecology there are clear morphological differences: *H. penarioides* has in average considerably larger basidiomes and the spores are slightly shorter

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Figure 2. Fruitbodies of *Hygrophorus penarioides*. Foto Leif Stridvall.

In addition to Fig. 2 good illustrations of *H. penarioides* are found in the literature, e.g. in Cetto (1978: pl. 659), Marchand (1973: pl. 155) and Michael et al. (1979), all under the name *H. penarius*.

In Sweden *H. penarioides* has been collected or observed at localities on the calcareous islands Öland and Gotland in the Baltic sea, always in *Quercus/Corylus* woods. It has also been collected on Kinnekulle in the province of Västergötland, where the same type of calcareous bed-rock and vegetation occurs. Two collections of *H. penarius* from *Quercus* forests in Norway are preserved in Herbarium O. Very likely these in fact represent *H. penarioides*. To our knowledge it has not been collected in the other Nordic countries. The Swedish and Norwegian localities are apparently northern outposts of a species widespread in central and southern Europe (e.g. southern Germany, France and Italy) and seemingly not rare. Bon (1977) states that it is common in Mediterranean oak woods.

Acknowledgements

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