

THE FIRST VALIDLY PUBLISHED LACCATE *GANODERMA* SPECIES FROM EAST ASIA: *G. DIMIDIATUM* COMB. NOV., THE CORRECT NAME FOR *G. JAPONICUM*

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Abstract: The taxonomic interpretations of *Ganoderma japonicum* (\equiv *Polyporus japonicus*) was controversial in mycological studies and formerly proposed to be dropped for consideration, because of the lack of type specimen. However, according to the International Code for Nomenclature for algae, fungi and plants, *P. japonicus* is a superfluous name for *Boletus dimidiatus* published validly by Thunberg in 1784. The original material of *B. dimidiatus* is available at the Museum of Evolution at Uppsala University (UPS). Therefore the new combination *Ganoderma dimidiatum* is proposed hereby.

Key words: Japan, new combination, nomenclature, polypore

INTRODUCTION

The genus *Ganoderma* (Ganodermataceae, Polyporales) was established by Petter Adolf Karsten based on a single species, *Boletus lucidus* Leyss. (\equiv *Ganoderma lucidum* (Curtis) P. Karst.), described originally from Europe (KARSTEN 1881, STEYAERT 1961). According to the literature, *G. lucidum* is generally considered to be identical with the familiar, traditional Asian medicine, namely “Ling-zhi” in China and “Mannentake” or “Reishi” in Japan (e.g. PATERSON 2006, WASSER 2005). Nevertheless, it has long been recognised that the name *G. lucidum* was erroneously applied to the morphologically somewhat similar East Asian *Ganoderma* collections (MONCALVO *et al.* 1995, PEGLER and YAO 1996) and the most often incorrectly used binomial within the genus (SEO and KIRK 2000).

Boletus dimidiatus Thunb. was described from Japan (THUNBERG 1784: 348) and based on the original description it is characterised by the laterally stipitate basidiocarp with usually undulate, ferruginous and shiny upper surface, yellow margin and white pore surface (THUNBERG 1784, Fig. 1). FRIES (1821) in *Systema Mycologicum* discussed this species and reduced to the synonymy of *Polyporus lucidus* Fr. (\equiv *Ganoderma lucidum*); however, in a later work (Epicrisis

Systematis Mycologici), FRIES (1838) gave a new epithet (“*japonicus*”) for *B. dimidiatus* and accepted it as a separate taxon (Fig. 1). Nevertheless, Fries did not number this taxon as he did for *Polyporus lucidus* and *P. amboinensis* (Lam.) Fr. (\equiv *Ganoderma amboinense* (Lam.) Pat.) in the same page. Therefore, the taxonomic concept of Fries can be interpreted in two different ways: *P. japonicus* Fr. or *P. lucidus* var. *japonicus* Fr.

BRESADOLA (1912) combined *Polyporus japonicus* to the genus *Ganoderma* and discussed it as a variety of *G. lucidum*. He reported that *G. lucidum* var. *japonicum* (Fr.) Bres. differs from *G. lucidum* s. str. by having larger spores ($11\text{--}14 \times 9\text{--}10\ \mu\text{m}$). SAWADA (1931) accepted the taxonomic concept that *Polyporus japonicus* is a darker form of *G. lucidum*, which interpretation may originated from Lloyd (MONCALVO and RYVARDEN 1997). Sawada stated that *Polyporus japonicus* is a separate species and combined to the genus *Ganoderma* as *G. japonicum* (Fr.) Sawada. According to the opinion that *G. japonicum* is a blackish, laccate, and stipitate *Ganoderma* in the Orient, this name is generally synonymised with the common traditional Chinese medicinal mushroom *G. sinense* J. D. Zhao, L. W. Hsu et X. Q. Zhang (ZHAO 1989). In contrast, according to IMAZEKI (1939), *Polyporus japonicus* sensu Fries is a synonym of *Ganoderma lucidum* and Sawada misinterpreted the Friesian species.

However, based on phylogenetic studies, it should be considered that the distribution range of *G. lucidum* s. str. is limited to Europe and northern and southwestern China (YANG and FENG 2013, ZHOU *et al.* 2015). Several recent molecular studies proved that the specimens originated from Japan, Korea or Eastern China, and previously identified as *G. lucidum* are identical with the recently described *G. lingzhi* S. H. Wu, Y. Cao et Y. C. Dai or *G. sichuanense* J. D. Zhao et X. Q. Zhang sensu Wang *et al.* (CAO *et al.* 2012, KWON *et al.* 2016, WANG *et al.* 2012, YANG and FENG 2013, YAO *et al.* 2013, ZHOU *et al.* 2015).

According to MONCALVO and RYVARDEN (1997) *Ganoderma japonicum* is a nomen ambiguum, because the specimen examined by Fries has probably been lost. However, it is concluded that *Polyporus japonicus* Fr. is based on the type of *Boletus dimidiatus*, which was cited by FRIES (1838) (Fig. 1). The type of *B. dimidiatus* (UPS-THUNB 27230, Fig. 2) is available at the Museum of Evolution at Uppsala University (UPS) in Sweden and can be viewed in the herbarium and image database of Thunberg’s Japanese Plants (EBIHARA *et al.* 2015).

Nomenclature

Regarding that the names published in *Epicrisis Systematis Mycologici* (FRIES 1838) are not sanctioned according to the International Code for Nomenclature for algae, fungi and plants (ICN) Article 13.1(d) (MCNEILL

et al. 2012), the binomial *Polyporus japonicus* is illegitimate, being a superfluous name for *Boletus dimidiatus* (ICN Art. 52.2). Therefore, the following new combination is proposed to reinstate the prior specific epithet published by THUNBERG (1784) in his *Flora Japonica*.

Ganoderma dimidiatum (Thunb.) V. Papp, *comb. nov.*

MycoBank no.: MB 818577.

≡ *Boletus dimidiatus* Thunb., *Fl. japonica*: 348, t. 39, 1784 (basionym).
– Lectotype (designated here): Japan. C. P. Thunberg, UPS-THUNB 27230 (Fig. 2).

≡ *Polyporus japonicus* Fr., *Epicr. syst. mycol.* (Upsaliae): 442, 1838, *nom. illeg.* (ICN Art. 52.2). – *Fomes japonicus* (Fr.) Sacc., *Syll. fung.* (Abellini) 6: 156, 1888. – *Scindalma japonicum* (Fr.) Kuntze, *Revis. gen. pl.* (Leipzig) 3(2): 518, 1898. – *Ganoderma japonicum* (Fr.) Sawada, *Rep. Govt Res. Inst. Dep. Agric., Formosa* 51: 76, 1931.

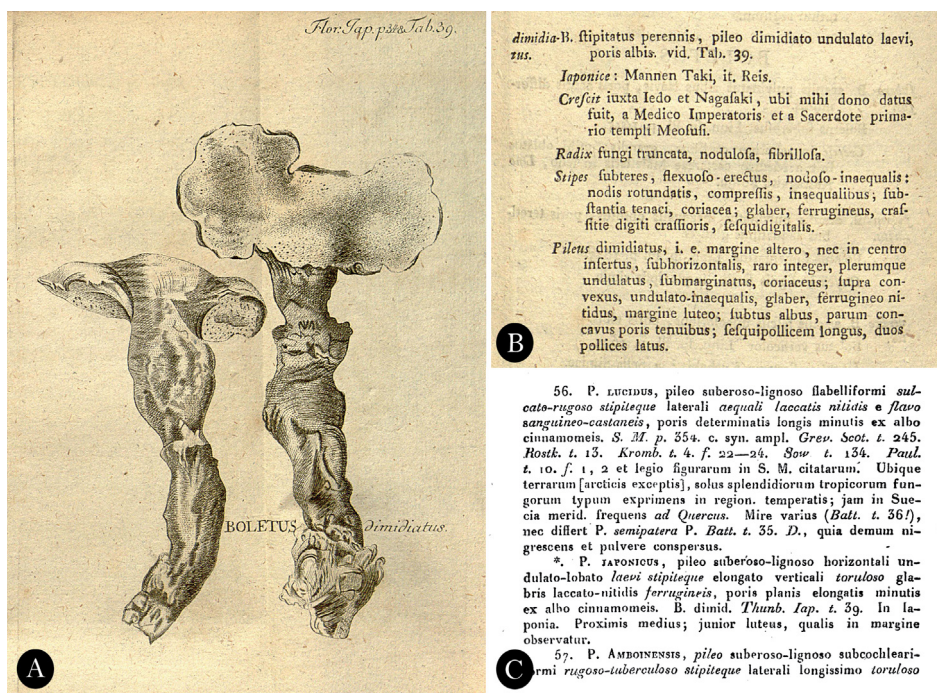


Fig. 1. A) illustration of *Boletus dimidiatus* in *Flora Japonica* (THUNBERG 1784, p. 349); B) original description of *B. dimidiatus* (THUNBERG 1784, p. 348); C) original description of *Polyporus japonicus* (FRIES 1838, p. 442).



Fig. 2. Lectotype specimen (UPS-THUNB 27230) of *Ganoderma dimidiatum* (\equiv *Boletus dimidiatus*). (The original photo can be viewed in the herbarium and image database of Thunberg's Japanese Plants: <http://cpthunberg.ebc.uu.se/>).

≡ *Polyporus lucidus* var. *japonicus* Fr., *Epicrisis Systematis Mycologici*: 442, 1838, *nom. illeg.* (ICN Art. 52.2). – *Ganoderma lucidum* var. *japonicum* (Fr.) Bres., *Annls Mycol.* 10: 500, 1912.

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Összefoglaló: A *Ganoderma japonicum* (≡ *Polyporus japonicus*) taxonómiai helyzetének megítélése eltérő a különböző mikológiai munkákban és korábban a típusanyag hiánya miatt felmerült a név elvetése is. Azonban a Fries által 1838-ban publikált *P. japonicus*, az 1784-ben leírt *Boletus dimidiatus* bazionimonon alapszik, amelyet Thunberg a *Flora Japonica* című művében érvényesen közölt; továbbá a *B. dimidiatus* típusanyaga elérhető a svédországi Uppsalai Egyetemen található Evolúció Múzeum gyűjteményében. Tekintettel arra, hogy Thunberg bazionimja a legkorábban közölt binom, ami kelet-ázsiai *Ganoderma* fajt takar, jelen munkában létrehozuk a *Ganoderma dimidiatum* kombinációt, amely nomenklatúrai szempontból prioritást élvez a *G. japonicum* névvel szemben.

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