

GANODERMA ADSPERSUM (S. SCHULZ.) DONK  
(= GANODERMA EUROPAEUM STEYAERT) AND  
ITS DISTRIBUTION IN JUGOSLAVIA

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A characteristic species of *Ganoderma* in Europe has been for a long time either confused with *G. applanatum* or called *Polyporus australis*, *Ganoderma australe* and sometimes also *Polyporus vegetus*. In 1961, Steyaert clearly separated this fungus from *G. applanatum* and redescribed it under the name of *G. europaeum*. Further investigations in various European countries showed that the fungus is not very rare, at least in some of them. It is found more often on trees growing near human habitations in gardens, parks etc. than in forests. In contradistinction to *G. applanatum*, which is mainly saprophytic, its mode of life is chiefly parasitic. Its host range is, as yet, imperfectly known but is rather wide, and it grows very often on planted, not autochthonous trees. It has so far been found on the following tree genera: *Acer*, *Aesculus*, *Betula*, *Carpinus*, *Fagus*, *Fraxinus*, *Gleditschia*, *Laurus*, *Morus*, *Platanus*, *Populus*, *Prunus*, *Pyrus*, *Quercus*, *Rhus*, *Tilia* and *Ulmus* (Dománski et al. 1967, Jahn 1963, Igmándy 1968, Kotlaba and Pouzar 1971).

The species, however, was previously published by Schulzer in 1878 as *Polyporus adpersus*. In this particular paper, he was primarily interested in the origin of the spores forming a conspicuous layer on the upper surface of the fruitbody — a frequent phenomenon in the genus *Ganoderma*. The description of the fungus is very short but accords well with *Ganoderma europaeum*. The original specimens, collected in 1877 near Vinkovci do not appear to be extant, but material collected in 1882 in the same locality exists in Linhart, *Fungi hungarici* No 55. In the same exsiccati this species was distributed in 1884 under No 252 as *Polyporus linhartii* Kalchbr.

On the basis that Kalchbrenner had in 1868 already described, as *Polyporus australis* Fr., a species which seems to be his later *P. linhartii*, Igmándy (1968) considered that Kalchbrenner's name has priority (Schulzer's diagnosis being incomplete) and named the fungus *Ganoderma linhartii* (Kalchbr.) Igmándy. Donk (1969), however, holds a contrary opinion and considers that Kalchbrenner's description of *P. australis* recalls not only *G. adspersum*, but even more *G. pfeifferi*. Having studied a microfilm of the full description and drawing of *Polyporus adspersus* from Schulzer's manuscript preserved in the University library, Zagreb, and, also, both Schulzer's and Kalchbrenner's specimens from Linhart's collection, he concluded that *Ganoderma adspersum* (S. Schulz.) Donk is the correct name. It is, of course, always possible that there is a still older name (Kotlaba and Pouzar 1971).

As Schulzer's description from the manuscript was never published, it is given here in part.

»No. 725. *Polyporus (Placoderma) adspersus* Schlzr. Mitte Juli an Eichen- und Weissbuchenstöcken, im Walde Vidor bei Vinkovce, im zwar zur Hutform bereits ausgebildeten, jedoch sichtlich noch jungem, in demselben Jahre entstandenem Zustande . . . angetroffen. Abgenommen . . . in der ersten Dekade des August.

. . . als ich ihn fand, besaßen alle Exemplare noch einen über 1 cm breiten weissen Saum am Rande, der beim Abnehmen nur noch etwas über 3 mm Breite hatte . . .

Der halbkreisförmige, hinten etwas, mitunter auch fast stielförmig verengte Hut bleibt nur ausnahmsweise 3,5 cm breit, in der Regel beträgt die Breite 8—12 cm und darüber. Die Oberfläche ist . . . höckerig mit auffallend erhöhtem Grundstücke oder auch nicht, zuweilen unregelmässig verdickte, unterbrochene Falten oder Rinnen darstellend u.s.w. Ihr gefärbter Theil ist umber-purpurbraun, aber durch die dicke Bedeckung mit Conidien staubig zimmetbraun. Unterschieden gefärbte Zonen, mit Ausnahme der Randbinde, gibt es nicht, wohl aber sieht man mitunter durch plastische Bildung entstanden, eine oder auch zwei oft tiefe concentrische Furchen. Der Hutrand ist stumpf; die Rinde dünn und nicht sehr hart wie etwa beim *Pol. fomentarius*, sondern mehr zerbrechlich.

Das an der Basis 0,5 bis über 4 cm dicke, harte Fleisch ist dunkel purpur-zimmetbraun . . . Nach dem was ich sah, scheint es zwar grösstentheils durch Urbildung, mitunter aber auch aus ältern Röhrenchichten zu entstehen.

Die Länge der braunen Röhrenchen steht in keinem bestimmten Verhältnisse zur Dicke des Fleisches, denn sie sind bald dreimal, bald nur ein Viertel so lang wie dies, und um die angegebene Zeit, so wie auch an vorjährigen, bereits abgestorbenen Individuen, zwei bis dreischichtig. Die relative Länge derselben, alle Schichten zusammengenommen, fand ich in der Mitte 1,5 bis etwa über 2 cm.

Die unbewaffneten Augen eben noch ausnehmbaren, offenen Löcher sind ganzrandig, in jungem Zustande weiss (junge Schicht), am Ende umber-purpurbran, welche Farbe nach dem Absterben der ganze Schwamm hat.

. . . die Sporen, welche purpurbraun, unter Wasser durchscheinend, erst kuglig, am Ende verkehrt-eiförmig, 0,009—0,011 mm lang und

durchschnittlich 0,006 mm dick sind, übrigens so beschaffen, wie die Mikroconidien, und von diesen nicht zu unterschieden sind.«

(Schulzer was thoroughly convinced that the spores on the upper surface originate there and therefore represented canidia.)

»... farbigen Hyphen... aus welchen die innere Substanz des Hutfleisches und der Röhrrchen geformt ist...

... Conidien wie Sporen besitzen ein Exosporium welches an das Episporium oben und seitlich fest angeschlossen ist, am unteren Theile aber dagegen weit getrennt ist, weshalb dieser hyalin sich darstellt und später abfällt. Der von Episporium begrenzte, gefärbte Theil der Sporen erscheint anfänglich mit abgestutztem unterm Ende... rundet sich indessen später ab. In der Mitte befindet sich ein grosser, durchsichtiger, kugliger Raum.

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Die Lebensdauer dieses Schwammes übersteigt wohl kaum ein Jahr, denn angetroffene vorjährige Individuen waren absolut todt.

Fast dasselbe beobachtete ich am *P. applanatus*...

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Quélet findet einerseits mit *P. ignarius* Linné, andererseits mit *P. applanatus* P. Verwandtschaft, was ganz richtig ist, aber er kann zu keinem von beiden mit vollem Rechte zugestellt werden.

Bresadola nennt den Pilz eine gute neue Spezies.«

In collecting specimens of *Ganoderma applanatum* in Jugoslavia, I had noticed that some were different, but, owing to the lack of literature, there was no possibility to separate them. In 1966, however, Dr. F. K o t l a b a from Prague showed me some specimens of *Ganoderma europaeum* which he had collected during a visit to our country. They were identical with my »suspect« specimens, and I then started to pay particular attention to this species.

Some records of *G. applanatum* mentioned in our literature could well represent *G. adspersum*, but this is now impossible to ascertain. *G. applanatum*, whilst a frequent species, was usually only noted and rarely collected, so there exist very few specimens from our country. Of those which were available for examination, only one, collected by V. Lindtner on *Fagus* in the Botanical garden of Beograd (Belgrade) proved, in reality, to be *G. adspersum*. The distribution of this species in Jugoslavia, presented here, is therefore the result of the most recent investigations, excepting, of course, those by Schulzer from his original locality (Fig. 1).

Our specimens are rather variable in shape. Some, young and relatively small (4—8 cm), were already distinctly unguulate and almost as high as broad, while others, at least in the first year, were more or less applanate and over 10 cm broad (Photo 1). One small specimen had a distinct stipe (Photo 1), while others growing on the same oak stump were unguulate. The context was in some (ungulate) specimens several times as thick as the tubes, but usually it is only somewhat thicker (Photo 2), although in some rare instances it is thinner. The tubes are also of variable length; in some unguulate specimens they were only 3—5 mm long, while in others the length of one layer measured up to 1,5 cm. In old specimens, there may be many layers of tubes, and the original context may be almost inexistant (Photo 3). In this particular fruitbody

all the old part was dead and only the lowest layers still appeared to be growing. One old specimen growing at the base of an old living *Quercus robur* in the Zoological garden, Zagreb, had a triangular form with a base about 45 cm broad and was about 35 cm high. The specimen appeared to have experienced damage, probably by human agencies, during growth, so it has grown more or less adpressed to the tree trunk. The upper parts are dead. Such old specimens are rarely found.

The characteristic thick crust was developed in most cases, but in some ungulate young specimens it was rather thin. Schulzer expressly states that the crust is thin and »zerbrechlich«. Even when thick the crust is, in fact, rather brittle. The whitish margin was broad or narrow, sometimes inexistant.

The context was always dark brown, but occasionally with one or two white pockets, particularly at the place where it was attached to the tree. The pores, when young, were mostly white, but in some specimens they were yellow and the colour did not disappear on drying. The spores measured 9—11(12) × (6)6,5—7,5 μ.

In the following list of localities, if not stated otherwise, the specimens were collected and identified by the author.

Poreč in Istra (Istria), on a *Cedrus* stump (the wood was identified by dr. E. Opravil, Opava), alt. about 10—30 m, 22 VII 1968, leg. I. Velenik, det. M. Tortić. ZA. — Petrovac near Poreč, at the base of a dried *Quercus* sp., alt. 90, October 1970, leg. I. Velenik, det. M. Tortić.

Ljubljana, Tivoli park, on living *Aesculus hippocastanum*, alt. 300 m. 21 VII 1967. ZA, PR 647016.

Velenje, on timber in a coal mine, about 100 m or more underground. Alt. of Velenje is 450 m. IV 1957, leg. A. Šarić, det. Z. Pouzar. PR 647017.

Jastrebarsko near Zagreb, in a park on *Fagus sylvatica* (living tree and stump), alt. 150 m. 20 X 1962, 27 VII 1969. ZA, BEO.

Stubičke toplice in Hrv. Zagorje, near Zagreb, in a park on a stump of *Picea excelsa*, alt. 200 m. 24 XI 1968, revid. F. Kotlaba and Z. Pouzar. ZA, PR 709933. The wood revised by E. Opravil, Opava.

Zagreb, in several parks, alt. 120—250 m. — On living *Broussonetia papyrifera*, 26 VIII 1962 (fruitbodies were still developing in 1970), revid. F. Kotlaba, ZA. — On living *Aesculus hippocastanum*, 4 XII 1966, revid. Z. Pouzar. ZA, PR 709931. — On *Prunus padus*, first on living tree and later on the stump after felling. Collected 18 XII 1966 (still growing in 1970). ZA. — On living *Quercus robur*, 9 X 1969. ZA. — On living *Platanus* tree, 1 X 1969. ZA. — On a stump of *Acer dasycarpum*, August 1970. — On a stump of (probably) *Fraxinus*, September 1970. — At the base of a living *Cedrus libani*, 22 II 1971.

Brezovica near Zagreb, in the park, on living *Tilia cordata*, alt. 120 m. 19 X 1969. ZA.

Turopolje near Zagreb, oak forest, on a stump of *Quercus robur*, alt. 100 m. 10 IX 1969, leg. J. T. Palmer and M. Tortić, det. M. Tortić. ZA.

Petrinja, alt. 100—180 m. — In the town park, on a living *Acer dasycarpum*. 20 VIII 1966 (still growing there in 1970). ZA. — On a living *Tilia* sp. in a churchyard near the town, 30 IV 1967. ZA.

Kotar near Petrinja, oak forest, on *Quercus* stump, alt. ca 100—150 m. 21 IX 1963. revid. F. Kotlaba. ZA.

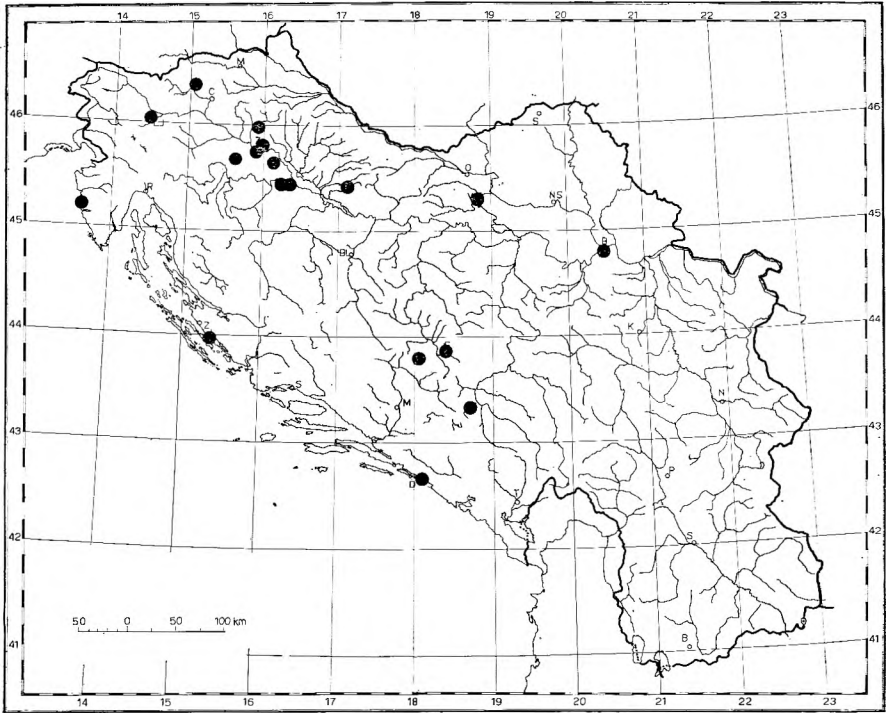
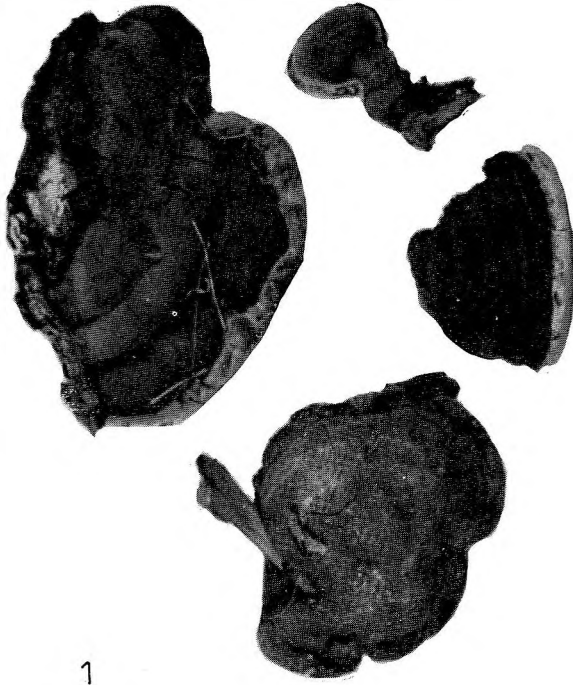
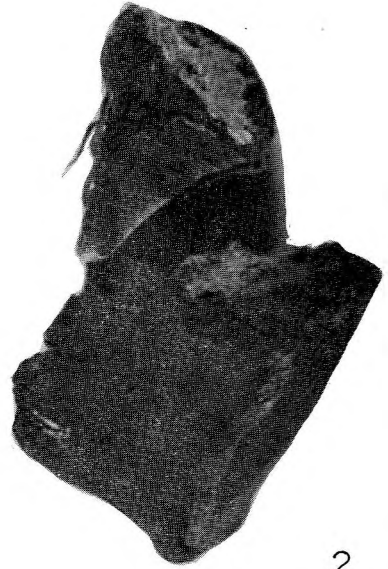


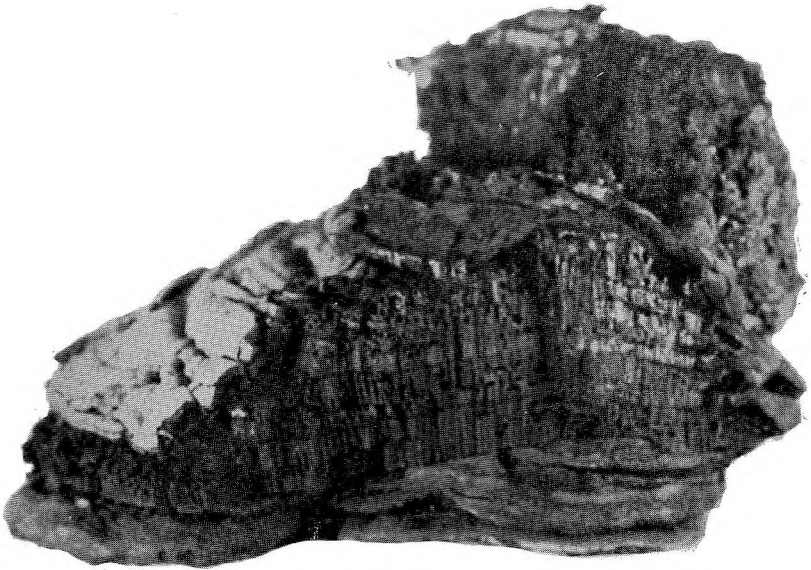
Fig. 1. Localities of *Ganoderma adspersum* in Jugoslavia  
 Sl. 1. Lokaliteti *Ganoderma adspersum* u Jugoslaviji



1



2



3

Filip-Jakov near Biograd na moru, at the base of living *Laurus nobilis*, alt. ca 10—20 m. 26 VII 1966, leg. et det. F. Kotlaba. PR 709930.

Ivan Sedlo, between Sarajevo and Konjic, beech forest (Luzulo-Fagetum), at the base of living *Fagus sylvatica*, alt. 800 m. 21 VIII 1970, leg. M. Tortić and M. Lisiewska, det. M. Tortić, revid. F. Kotlaba and Z. Pouzar. ZA.

Sarajevo, Botanical garden of the National Museum (Zemaljski Muzej), on *Quercus* sp., alt. ca 550 m. August 1970, leg. I. Focht, det. M. Tortić, ZA.

Dragoš Sedlo in Peručica, on the slopes of m. Maglić, Abieti-Fagetum, on *Fagus*, alt. 1300 m. End of September 1970, leg. M. Usčuplić, det. M. Tortić, revid. Kotlaba and Z. Pouzar. ZA.

Komolac near Dubrovnik, on a trunk of *Quercus* cf. *petraea*, alt. about 10—20 m. 14 VII 1968, leg. et. det. F. Kotlaba. PR 709929.

Lipik near Pakrac, in the park, on a stump of an unidentified hardwood, alt. about 150 m. 3 VIII 1966, leg. et. det. F. Kotlaba. PR 709932.

Vinkovci, alt. about 90 m. — On oak and hornbeam, July 1877. Schulzer, Pilze aus Slavonien, nr. 725, as *Polyporus adspersus*. — In the churchyard at the base of *Betula verrucosa* (PR 709934) and the trunk of *Morus nigra* (PR, coll. spec. no 520) (living trees). 4. VIII 1966, leg. et det. F. Kotlaba. The birch grew on Schulzer's tomb!

Beograd (Belgrade), alt. about 100 m. — Botanical garden, on living *Fagus*. IV 1933, VIII 1935, leg. V. Lindtner, det. M. Tortić. BEO. — On living *Broussonetia papyrifera* in centre of city (Terazije). 18 VII 1968, leg. et det. F. Kotlaba. PR 709928. — Botanical garden, on living *Broussonetia papyrifera*, October 1968, leg. M. Jelić, det. M. Tortić. ZA.

*Ganoderma adspersum* has been found in Yugoslavia on *Acer*, *Aesculus*, *Betula*, *Broussonetia*, *Carpinus*, *Fagus*, *Fraxinus* (probably), *Laurus*, *Morus*, *Platanus*, *Prunus*, *Quercus*, *Tilia* and, for the first time, also on conifers: *Cedrus* and *Picea*. *Broussonetia* and *Laurus* are also new hosts. In the majority of cases, it grew on living trees and, when found on stumps, it was highly probable that the living tree had been parasitized, as was established in the case of *Prunus padus* in Zagreb.

Most of the localities are from the lowlands, up to about 300 m. The recent collections in Bosnia, however, showed that the fungus can grow at much higher altitudes. The find in the primeval forest Peručica, at 1300 m, was especially surprising, since, according to the investigations in other countries, the fungus is supposed to be thermophilic. As most of our country has not yet been investigated for this species, further finds will very likely be quite numerous, and we can expect interesting results, particularly regarding its vertical distribution.

The author wishes to express her thanks to Dr. F. Kotlaba (Praha) for some of the localities of *G. adspersum* from Yugoslavia, who, together with Dr. Z. Pouzar, revised some of her specimens, and Mr. J. T. Palmer (Woodley, Chesh.) for correcting the English text.

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Photo 1. Different forms of fruitbodies from several localities

Foto 1. Raznoliki oblici plodišta s nekoliko lokaliteta

Photo 2. Variable length of tubes

Foto 2. Različita dužina cjevčica

Photo 3. Old fruitbody from Ivan Sedlo, with many layers of tubes

Foto 3. Staro plodište s Ivan Sedla, s mnogo slojeva cjevčica

## Summary

*Ganoderma adpersum* (S. Schulz.) Donk is considered to be the correct name for *G. europaeum* Steyaert, provided no older epithet is found. The original description in Schulzer's manuscript is presented in part, whilst pertinent characters of the specimens are discussed and the currently known localities in Yugoslavia are given. The host genera, not found up to now in other countries, are *Broussonetia* and *Laurus*, and, for the first time, two conifers: *Cedrus* and *Picea*.

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## SADRŽAJ

GANODERMA ADSPERSUM (S. SCHULZ.) DONK(= GANODERMA EUROPAEUM STEYAERT) I NJENO RASPROSTRANJENJE U JUGOSLAVIJI

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Prikazano je rasprostranjenje vrste *Ganoderma adpersum* u Jugoslaviji, a dodan je izvadak iz originalnog Schulzerova opisa, koji nije dosad bio publiciran. Kao domaćini, koji nisu dosad bili poznati iz drugih zemalja, zabilježeni su *Broussonetia* i *Laurus*, a prvi put i četinjače (*Cedrus* i *Picea*).

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