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DISTRIBUTION OF POLYPORES IN YUGOSLAVIA
II. *GANODERMA*

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In the second paper of the series the distribution of six species of *Ganoderma* in Yugoslavia: *G. adspersum, G. applanatum, G. carnosum, G. lucidum, G. pfeifferi* and *G. resinaceum* is presented and discussed.

Introduction

The small family *Ganodermataceae* includes two genera, *Amauroderma* and *Ganoderma*, largely distributed in the tropics. In Europe only *Ganoderma* occurs with 7 species, some of them rare.

For Yugoslavia only the distribution of *G. adspersum* was published (Tortić 1971), but the number of known localities has doubled since then. Other species have occasionally been mentioned in older and newer literature, which will be cited at appropriate places. Jahn et al. (1980) have listed those Yugoslav localities of *G. carnosum* (as *G. atkinsonii*) from which they revised the herbarium specimens.

The distribution in Yugoslavia of six species of this genus is presented here. The seventh, *G. valesiacum*, growing on stumps of *Larix*, was not yet found but may be expected to occur in the north-western part of the country in autochthonous larch forests. This species is, however, imperfectly known as yet.

In addition to the results of the author's own investigations, she has used the data of some other collectors (in case she did not see the voucher specimen this is indicated by »n. v.«), and has also taken into account the data from the literature. Those are mostly not supported by voucher specimens and in some cases it is not certain which species was meant, since some were recognised as separate taxa only in recent times. The author's finds are deposited at the Department of Botany,

Faculty of Science, Zagreb (ZA); unfortunately, a number of specimens was later destroyed by larvae. Herbarium specimens from BEO (Museum of Natural History, Beograd) were revised by the author, and specimens in PRM (National Museum, Prague) by Dr. F. Kotlaba (Prague). If no name of the collector is given, the species was collected or noted by the author, usually together with her husband, prof. S. Tortić,

The altitudes of the localities are given wherever possible at least approximately. In published papers where only a mountain was named, without the indication of a particular locality, it was of course impossible to guess at which altitude the collection was made. Localities are listed according to the Yugoslav republics.

GANODERMA ADSPERSUM (S. Schulz.) Donk

In the previous paper (Tortić 1971) 18 localities of this species in Yugoslavia were listed. Here, 20 more added, a few quite near to the already published ones. The fungus was also collected again in several published localities, sometimes on new hosts. Only new localities are cited here, but all those known up to now are presented in the map.

Slovenia: Meja near Kranj, 360 m, leg. V. Hudoklin, VII 72, ZA — Rogatec, 250 m dead standing *Tilia* sp., X 75 — Maribor, town park, 270 m, living *Gleditschia triacanthos,* IX 72, ZA — Pekre near Maribor, 300 m, trunks of hardwoods. Wettstein (1886) as *Polyporus australis.* No voucher specimen seen; probably this species.

Croatia: Umag in Istria, sea-coast, stump of (probably) *Quercus* sp., leg. I. Velenik IV 71, ZA — Medulin near Pula, sea coast, living *Quercus pubescens* and diseased *Prunus amygdalus,* l. et d. F. Kotlaba, VIII 72, PRM — Opatija near Rijeka, sea-coast, living *Cercis siliquastrum* and *Tilia* sp., II 83, ZA — Crna Mlaka near Jastrebarsko, 150 m, stump and living tree of *Quercus robur,* VI 80, ZA — Stupnički lug near Zagreb, 140 m, living *Quercus robur,* V 83, ZA — Zagreb, 130 m. In addition to the hosts published it was noted also on living *Fagus sylvatica,* XII 79, and stumps of *Forsythia europaea,* V 81, *Prunus avium,* XII 71, *P. domestica,* autumn 75 — Prašnik near Okučani, ca 100 m, *Quercus robur* (living tree and stump), X 71, ZA (Jelić and Tortić 1973); found in the same locality on stumps of *Quercus robur* and *Ulmus* sp. also X 81 and IX 82 — Varaždinske toplice, 200—250 m, living *Aesculus hippocastanum,* VIII 74, ZA — Varaždin, 170 m, living *Tilia platyphyllos,* l. et d. F. Kotlaba, VIII 72, PRM — Koprivnica, 140 m, on *Acer* sp. (living?), leg. L. Göttl, XI 79, ZA — Otočac, 460 m, living *Tilia cordata,* VIII 74, ZA.

Bosna and Herzegovina: Bihać, town park, 230 m, living *Gleditschia triacanthos,* VIII 75. ZA — Sarajevo, Bot. garden, 550 m, *Quercus* sp., leg. I. Focht, VIII 70, ZA.

Montenegro: Cetinje, 700 m, living *Fagus sylvatica,* l. et d. F. Kotlaba, V 76, PRM — Kotor, at sea-coast, stump of *Celtis australis* and living *Morus alba,* l. et d. F. Kotlaba, V 76, PRM.

Macedonia: Skopje, town park, 330 m, hardwood stump, IX 83, ZA — Bogdanci near Đevđelija, about 150 m, living *Morus sp.,* 1. M. Karadelev, I 84, det. M. Tortić. (Fig. 1).

As stated by several authors, the species occurs mostly on planted trees in parks, along the streets or roads in smaller or larger towns, or at least near human habitations, and such is the case also of the above localities. It was now noted in the capitals of all Yugoslav republics except Montenegro. Only few localities lie in forests, e. g. Stupnički lug, Prašnik, and, published earlier, Kotar, Ivan Sedlo and Peručica.

G. adspersum is predominantly parasitic, surviving on stumps for some years, and attacks a large number of hosts. It has apparently no particular preference as to the substrate: still, it was noted most often in Yugoslavia on *Quercus* spp. (12 or 13 collections). On *Tilia* spp. it grew in 7 localities, on *Fagus* in 6, on other tree genera it was found from one to four times. In the previous paper (T o r t i ć 1971) the following were cited as hosts: *Acer* sp., *Aesculus hippocastanum, Betula verrucosa, Broussonetia papyrifera, Carpinus betulus, Cedrus* sp., *Fagus sylvatica, Fraxinus* sp. (not quite certain), *Laurus nobilis, Morus nigra,*

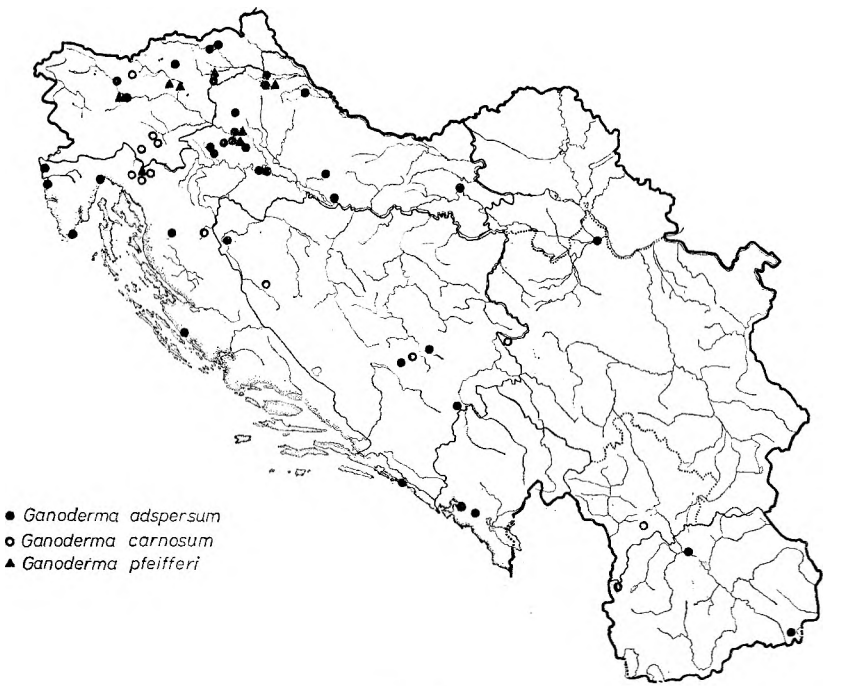

Fig. 1.

Platanus sp., *Prunus padus, Quercus robur, Q. petraea, Picea abies, Tilia* sp. It has now been established also on *Cercis siliquastrum, Celtis australis, Forsythia europaea, Gleditschia triacanthos, Morus alba, Prunus amygdalus, P. avium, P. domestica* and *Ulmus* sp. *Tilia* spp. were determined as *T. cordata* and *T. platyphyllos.* In Zagreb it was observed on 11 genera: *Acer, Aesculus, Broussonetia, Cedrus, Fagus, Forsythia, Fraxinus* (the substrate not quite certain), *Platanus, Quercus, Prunus* (three species) and *Tilia.*

Although the fungus can grow on a tree for years, it does not necessarily kill its host. An interesting instance of a tree outliving the parasite was noted in a park in Zagreb, where it was collected on a living *Broussonetia* already in 1962. The fruitbodies were observed till 1970; later the tree was not visited for a long time. When inspected again some years ago, it was found to be quite hollow, with only a thin cylinder of sapwood still standing, but alive and producing leaves. There was no trace of fruitbodies any more, nor were they observed in subsequent years.

G. adspersum apparently prefers lower altitudes. It was found several times at the sea-coast, almost at sea-level, and most of the other localities lie up to about 400 or 500 m. Only in few cases was it found at considerable altitude, the highest known being about 1200—1300 m in Sutjeska National Park, Peručica virgin forest.

GANODERMA APPLANATUM (Pers.) Pat.

This is the most frequent of all *Ganoderma* species in Europe. It is widely spread in Yugoslavia and was mentined by many older and recent authors in this country. The number of known localities is 94, which is still too little — in Czechoslovakia there are 842 known localities (Kotlaba 1984) — but many parts of Yugoslavia where the species might occur have never been visited by mycologists.

Slovenia: Triglav National Park in the Julian Alps, in several localities, rather distant from one another: Valley of Vrata, 1000 m, VIII 83, Crno Jezero, 1350 m, VIII 67, Uskovnica, 1300—1400 m, VIII 66, ZA, Krnica, 1200 m, VIII 83. All on dead wood of *Fagus* — Planica, 900 m, VII 08 (Keissler 1912) — Bled, 500 m, on *Quercus* or *Ostrya* VI 07 (Keissler 1912) — Bukov vrh near Idrija, 1300 m, dead wood of *Fagus*, VIII 69, VII 84 — Jezersko, about 1000 m, *Fagus* (Jaap 1908) — Meja near Kranj, 360 m, *Fagus*, leg. V. Hudoklin V 71, ZA — Šmarna gora near Ljubljana, leg. V. Lindtner IX 29, BEO — Ljubljana, 300 m, *Prunus domestica*, leg. I. Stanič, X 66; also Voss (1889—92) without indication of the substrate, and Rožnik at Ljubljana, *Fagus*, leg. F. Dolšak, LJU (Tortić 1976) — Karlovica near Vel. Lašče, ca 550 m (Voss 1889—92) —Strmec near Kočevje, virgin forest nature reserve, 790 m, *Fagus*, *Acer*, perhaps also *Abies*, V 67, VIII 82 — Kočevski rog Mt., in virgin forest nature reserves, alt. 800—900 m: Rajhenavski rog, several times on *Fagus* (e. g. XII 77, VI 78), Pečke, on *Fagus* and *Abies*, several times, VIII 76 in ZA, Prelesnikova koliševka (Hočevar et al. 1980 a) — Castle of Snežnik near Stari trg 600—700 m, *Fagus*, VII 79 — Grosuplje, 330 m, living planted trees of *Tilia* and *Aesculus* along the main street, VIII 74 — Radeče near Zidani most, 200 m, *Fagus*, 1. S. Hočevar, V 62, ZA — Gorjanci mountain range, virgin forest nature reserves Ravna gora, 850—950 m and Gorjanci, 1100 m, several times, e. g. V 75, VI 77 etc., on *Fagus*, once on *Salix* — Krakovski gozd near Kostanjevica 150 m, *Quercus robur*, IV 75 (Hočevar et al. 1980) — Nova vas at Bregana, 150 m, hardwood, IX 71 — Donačka gora Mt. virgin forest nature reserve, 800—880 m, *Fagus*, V and X 75 (Hočevar et. al. 1980) — Belinovec, virgin forest nature reserve, 700 m, *Fagus*, VIII 78, leg. S. Hočevar (Hočevar et al. 1980) — Celje, 240 m, living *Carpinus betulus* (Wettstein 1886). — Boč Mt. near Poljčane, on stumps (Wettstein 1888) — Pohorje Mt. near Maribor, Šumik, virgin forest nature reserve, 1100 m, *Fagus*, VII 75 — Žitkovci near Murska Sobota, 200 m, on *Alnus glutinosa*, leg. S. Hočevar IV 70, n. v.

Croatia: Košljun island near Punat on Krk, sea-coast, branch of *Quercus ilex*, 1. B. Barčić, XI 79, det. M. Tortić (Barčić 1982) — Nat. park Risnjak in Gorski kotar, frequent on wood of *Fagus* and *Abies* in several places, from ca 700—1000 m, observed many times, voucher specimen VI 69, ZA; Škorić (1928) cites it from there on *Fagus* as *Fomes applanatus* — Lokve in Gorski kotar, 720 m, *Abies*, leg. V. Vasić, IV 81, det. M. Tortić — Razloge at the source of the river Kupa, ca 400—500 m, *Fagus*, VII 80 — vicinity of Delnice in several places, ca

800-900 m, on *Fagus*, probably also *Abies*, in 66 and 67 — Zalesina, 800 m, *Abies*, VIII 72 — Kamačnik, 400 m, *Fagus*, VIII 72 — Bijele Stijene Mt. near Ogulin, probably 1100—1200 m, *Fagus*, VI 61 — Bjelolasica Mt. near Ogulin, 1100—1200 m. *Fagus*, VI 61 — Kapela near Ogulin, 880 m, *Fagus*, V 82 — Nat. park Plitvička jezera, 700—950 m, frequent on *Fagus*, occurring also on *Abies*, in various places many times since 1963, voucher specimen VI 76, ZA. Also cited by Blagaić (1921) from *Fagus* as *Polyporus applanatus* — Velebit Mt., in several localities: near Zavižan, ca 1500 m, *Fagus*, VII 73; Štirovača and Klepina duliba, 1100 m, *Fagus* VIII 73, VIII 74, VIII 75; Brušani, 600 m, *Abies*, VIII 72, ZA; Mali Alan, 950 m, *Fagus* VII 72. Moesz (1938) cites it under *Fomes applanatus* as occurring on Velebit on *Fagus* in forests between Medak and Starigrad — Medvednica Mt. near Zagreb, several times on *Fagus*, once each on *Abies* and *Carpinus betulus*, at alt. between 300 and 950 m, exsiccate IX 61, ZA. Cited from there also by Vouk and Pevalek (1915) as *Fomes applanatus* — Petrinja, ca 150 m, on *Morus* sp. (living?), IX 53, BEO -- Plješ in Žumberačko gorje mountain range, 800—900 m. *Fagus*, V 76 — Smerovišće in Samoborska gora Mt., 250 m, *Quercus* sp., IX 72 — Mursko Središće, timber in coal mine, deformed rod-like fruitbodies, 1962. ZA — Kalnik Mt. near Križevci, 500 m, *Fagus*, V 76 — Grede near Jasenovac, 95 m, *Quercus*, VI 79 — Prašnik near Okučani, 100 m, *Quercus roour*, X 72, XI 84, ZA (Jelić and Tortić 1973) — Vinkovci, ca 900 m, (Schulzer, Manuscript, Tortić 1981).

Bosnia and Herzegovina: Oštrelj Mt. near Bosanski Petrovac, between 1000—1400 m, *Abies*, leg. M. Usčuplić 1973, n. v. — Troglav near Livno, 900—1000 m, in beech forest, VIII 1896, PRC (Beck 1897 as *Polyporus applanatus*) — Jajce, ca 400 m, on half-dead *Populus* cf. *canadensis*, deformed fruitbody, rev. F. Kotlaba and Z. Pouzar, VIII 71 — Šatorsko jezero, 1000 m. on trunks (Handel-Mazetti et al. 1905 as *Polyporus applanatus*) — Bjelašnica Mt. near Sarajevo at several places, 850—1300 m, *Fagus*, VI 74, ZA, also noted on *Abies* — Ravna Romanija near Sarajevo 1250 m, *Abies*, VIII 77 — Vogošća at Sarajevo, 500—600 m, leg. Beck as *Polyporus applanatus*, PRC — Treskavica Mt. near Sarajevo, leg. Beck, rev. F. Kotlaba. PRC — Trnovo near Sarajevo, 900 m, *Fagus*, IX 82 — Borija near Kalinovik, 1100 m *Abies*, VII 80, ZA — Peručica virgin forest in Sutjeska Nat. park, 1200—1300 m, *Fagus*, noted several times, e.g. VII 69, VI 72, IX 77, VII 80 — Above Baković near Fojnica, 1000—1100 m, *Fagus*, VIII 70 — Matorac Mt. near Fojnica, 1100—1300 m. *Fagus*, VIII 70 — Stolac Mt. near Višegrad, ca 1000 m. *Fagus*, VIII 78 — Zelengora Mt., Lake Orlovac, 1450 m, *Fagus*, VI 72.

Serbia: Fruška gora Mt., 450 m, *Quercus* sp. (Ranković 1955 as *Fomes applanatus*) — Stari Zabran near Šabac, ca 100 m (Ranojević 1902 as *Fomes applanatus*) — Avala Mt, near Beograd, probably 200—300 m (Ranojević 1902 as *Fomes applanatus*) — Topčider in Beograd, ca 100 m (Simić 1894/95 as *Polyporus applanatus*) — Pančevo, 75 m (Pilát 1936—42) — Majdanpek: Debeli lug and Todorov potok, 300 m, *Fagus*, III and VII 46, VII 47, leg. V. Lindtner, BEO. Cited from the same locality by Lisiewska and Jelić (1971) and Petrović (1971) — Goč Mt., ca 1000 m, *Fagus* (Jelić 1967, also BEO VII 50 leg. Lindtner) *Abies* (Petrović 1971) — Stolovi Mt., *Abies*, *Fagus*, *Quercus petraea* (Marinković 1954) — Kosmovačko vrelo on Suva planina Mt., *Fagus* (Ranojević 1910) — Južni Kučaj Mt. 800—900 m, *Fagus*, leg. Lindtner X 48, BEO; cited also by Krstić (1959), Marinković and Šmit (1965) — Sjeverni Kučaj Mt., *Fagus* Marinković and

Šmit 1965) — Željin Mt., *Fagus* (Marinković 1953) — Tara Mt., 1000—1100 m, *Fagus* (Čolić 1968 as *Fomes applanatus*, Lisiewska and Jelić 1971, Tortić 1981), on *Alnus glutinosa* VIII 78, ZA (Tortić 1981) — Northern slopes of Šar Mt., near Gine vode, ca 1400—1500 m, *Fagus* X 78; also cited by Grujoska and Prljinčević (1972).

Montenegro: Biogradska gora Nat. park, near Lake Biograd 1800 m, *Fagus*, VIII 78 — Hercegnovi, at the sea-coast, *Quercus lanuginosa* (Jaap 1916 as *Polyporus applanatus*) — Drežnica near Nikšić, probably ca 700 m, *Fagus* (Bubák 1903 as *Polyporus applanatus*) — virgin forest at the base of Durmitor Mt., probably 1400 m, *Fagus* (Bubák 1903) — monastery Piva. ca 600 m, *Fagus* (Bubák 1903) — Komovi Mt., Preslo, 1500—1700 m, *Fagus*, VII 73, ZA.

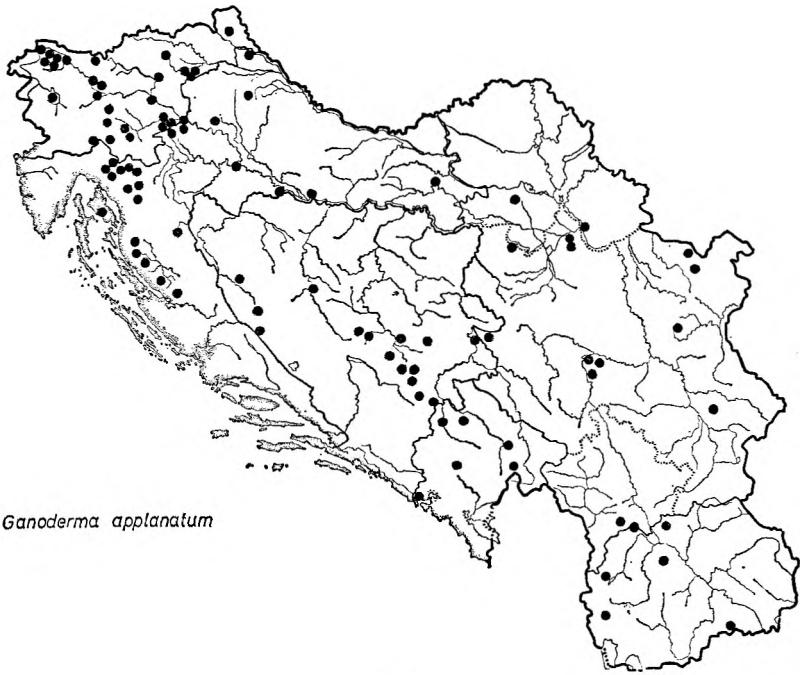

Fig. 2.

Macedonia: Šar planina, Ljuboten, 1500 m, *Fagus* (Pilát and Lindtner 1938) PRM, rev. F. Kotlaba — Dejanovec in Mavrovo Nat. park, *Fagus* (Grujoska 1970) — Skopska Crna gora Mt., 1500 m, *Fagus*, X 78, IX 83, ZA — Jakupica Mt., 1200—1600 m, *Fagus*, IX 75, X 78 — Karaorman Mt., 1200 m, *Fagus*, IX 75 — Kožuf Mt., 750 m, *Fagus*, X 83, ZA, *Abies*, ca 1000—1500 m, X 83, leg. M. Karadelev, n. v. (Fig. 2)

The localities are situated mostly in montane forests of beech as well as those of beech and fir, which are the most widely spread forest associations in Yugoslavia. *G. applanatum* grows there predominantly as a saprophyte, on prostrate or standing dead trunks, mostly of *Fagus sylvatica* and *F. moesiaca* (62 localities), but also on *Abies alba* (12 or 14

localities). In extensively exploited as well as virgin forests it produces many, sometimes very large, carpophores on a single tree trunk. However, it occurs also in other types of forests and on other substrates, and was noted in 8 localities on *Quercus* sp. (once on *Q. ilex*) and once or twice also on *Acer* sp., *Alnus glutinosa, Aesculus hippocastanum, Carpinus betulus, Morus* sp., *Populus* cf. *canadensis, Prunus domestica, Salix* sp., *Tilia* sp. As a parasite of living trees it was observed once each on *Aesculus, Populus* and *Tilia,* whilst Wettstein (1886) cites it from living *Carpinus betulus.*

The altitude range is from sea-coast up to about 1700 m. The hymenophore is often covered by galls produced by the larvae of *Agathomyia wankowiczii* (*Diptera*).

GANODERMA CARNOSUM Pat.

Several localities of this species in Yugoslavia were cited by Jahn et al. (1980) under the name of *G. atkinsonii* Jahn, Kotl. et Pouz. They are repeated here with others, unpublished, added.

Slovenia: Kamniška Bistrica near Kamnik, ca 600 m, stumps of *Abies,* leg. et det. S. Hočevar 1973; voucher specimen not seen but because of the substrate probably this species — Strmec near Kočevje, virgin forest nature reserve, 790 m, stumps of *Abies,* VII 82 — Kočevski rog Mt., virgin forest nature reserves Pečke (800—900 m) and Rajhenavski rog (900 m), stumps of *Abies* VIII 76, IX 77, VII 78, leg. S. Hočevar.

Croatia: Risnjak Nat. park, 700—800 m, stump of *Abies,* X 62. ZA (Tortić 1966 as *G. lucidum,* Jahn et al. 1980 as *G. atkinsonii*) — Zalesina, 800 m, *Abies* stump, X 62 — vicinity of Delnice, about 800—900 m, *Abies* stump, VII 66; cited from there by Škorić (1928) as *G. lucidum* on *Abies* — Plitvička jezera Nat. park; observed several times mostly in virgin forest Čorkova uvala, 800—950 m, on *Abies* stumps, voucher specimens VIII 75, PRM, IX 82, VIII, X 83, ZA (Jahn et al. 1980 as *G. atkinsonii.*)

Bosnia and Herzegovina: Bjelašnica Mt. near Sarajevo, Šavnici, ca 850 m, *Abies* stump, VIII 70 (Jahn et al. 1980 as *G. atkinsonii*) — Oštrelj near Bosanski Petrovac, 1000—1400 m, *Abies* stump, leg. M. Usčuplić, VII 72.

Serbia: Tara Mt., 1000—1100 m, in forests of *Picea omorika* (Čolić 1968 as *G. lucidum*). No voucher specimen seen but since *Abies* occurs also in this forest, the find is considered to probably represent *G. carnosum* rather than *G. lucidum* (Tortić 1981) — Ošljak Mt., 1600 m, stump of *Pinus leucodermis* (Jahn et al. 1980, Tortić and Sylejmani 1982, both as *G. atkinsonii*).

Macedonia: Korab Mt., 1400 m, on *Abies.* Pilát and Lindtner (1938) as *G. lucidum.* The specimen was not revised but because of the substrate, *G. carnosum* is more probable than *G. lucidum.* (Fig. 1).

The species is saprophytic and bound mainly to fir (only one find on *Pinus leucodermins* = *P. heldreichii*). The fruitbodies develop on stumps, at the sides or on the upper, cut surface. Although there are not many localities known in Yugoslavia as yet, it was noted several times, if not in great quantities, in those which were regularly visited, and is probably spread in our fir forests. Those forests, mostly mixed with beech, occur at the altitudes from 600 or 700 m higher up, and *G. carnosum* was indeed found between 600—1600 m altitude.

GANODERMA LUCIDUM (Leys.) Karst.

This species is mentioned several times in our older literature, but since there are no voucher specimens, *Ganoderma resinaceum* may have been meant in some cases, which was not distinguished as a separate species.

Slovenia: Boč Mt. near Studenica, on old trunks of *Quercus*. Wettstein 1888 — Gotna vas near Novo Mesto, 200 m, leg. A. Piskernik, det. F. Dolšak, LJU (Tortić 1976) — Krakovski gozd near Kostanjevica, 150 m. on stumps and at the base of standing dead tree of *Quercus robur*, VIII 72. IX 75, X 76, VII 79 (Hočevar et al. 1980)

Croatia: Coal mines Raša and Podlabin in Istria (Šarić 1957) — Verudela at Pula, sea-coast, on *Quercus ilex*, leg. I. Velenik, V 67 — Ližnjan near Pula. sea-coast. 60 m. stump of *Quercus pubescens*, VIII 72, l. et d. F. Kotlaba, PRM — Medulin near Pula, sea-coast, stump of *Ulmus campestris*, l. et d. F. Kotlaba. VIII 72. PRM — Košljun island near Punat on Krk. sea-coast, stump of *Quercus ilex* (Barčić 1982), n. v. — Rab island, Kalifront, 50 m, stump of *Q. ilex*, V 77 — Velebit mt. between Oštarije and Šugarska duliba, ca 1000 m, in beech forests (Moesz 1938) — Zagreb. park Maksimir, 130 m, several times on stumps of *Quercus* cf. *robur*, VII 62. IX 75, on *Salix* sp., VII 62, ZA. Cited from there also by Vouk and Pevalek (1916) as *Fomes lucidus* — Medvednica Mt. near Zagreb. at several places in oak forests on oak stumps, 300—400 m, X 60, IV 63, IV 64. IX 76 — Križevci, 150 m, at the base of living *Aesculus hippocastanum*. VIII 70, rev. F. Kotlaba and Z. Pouzar, PRM — Mursko Središće, coal mine, on mine timber, rod-like deformed fruitbodies, 1962, ZA — Stupnički lug near Zagreb, 140 m, stump of *Carpinus betulus*, VII 83 — Prašnik near Okučani, 100 m, at the base of living *Quercus robur*, IX 82, ZA — Đakovo, 110 m, and Vidor near Vinkovci, 90 m. On *Quercus, Carpinus, Tilia, Alnus*, on living trees, stumps and apparently on soil (Schulzer, Manuscript, Tortić 1981).

Bosnia and Herzegovina: Between Kralupi and Vareš, probably about 800 m, at the bases of hardwoods (Protić 1901) — Vučja luka and forest near Skakavac. (vicinity of Sarajevo). 1200 m. at the base of hardwoods (Protić 1904) — Igman Mt. near Sarajevo, on hardwoods (Protić 1904) — Nevesinje, 370 m, on *Quercus* stump, leg. Đ. Đuran III 74, ZA.

Serbia: Fruška gora, 450 m, on *Fagus* (Rankovi ć 1955), on *Quercus* sp. (Lisiewska and Jelić 1971) — Stari Zabran near Šabac, 100 m, on old trunks (Ranojević 1902) — Topčider and Rakovica at Beograd, about 100 m (Ranojević 1902). Both as *Fomes lucidus* — Avala Mt. near Beograd, probably 200—300 m, on *Quercus*, l. et d. V. Lindtner, V 34, X 35. BEO — Pančevo, 75 m, *Salix* sp., l. et. d. V. Lindtner XI 35. BEO — Stolovi Mt., on *Quercus cerris, Q. petraea*, at the base of living trees (Marinković 1954) — Surdulica, 470 m, on an old stump (Simić 1896 as *Polyporus lucidus*).

Montenegro: Donja Plavnica at Lake Skadar, 7 m, *Salix alba*, leg. Černjavski VIII 47, BEO.

Macedonia: Bogdanci near Đevđelija, 150—250 m, at the bases of living or dead trees of *Quercus coccifera, Carpinus orientalis* and *Pyrus amygdaliformis*, l. M. Karadelev, VII and IX 83, d. M. Tortić. (Fig. 3).

The species was mostly collected at lower altitudes, sometimes at the sea-coast and almost at sea-level. The highest altitude could not be established with certainty since in the published records from mountains this was not always recorded. The localities in Velebit and those near Sarajevo, at 1000 and more, in beech forests, are somewhat dubious,

because *Ganoderma lucidum* seems to be rather thermophilous, with several localities being in the submediterranean parts of Yugoslavia.

The substrates are various, mostly *Quercus* spp: *Q. cerris, Q. petraea, Q. pubescens, Q. robur* and the evergreen *Q. coccifera* and *Q. ilex,* in all 14 finds. Other hosts recorded are *Aesculus hippocastanum, Alnus glutinosa, Carpinus betulus, C. orientalis, Fagus sylvatica, Pyrus amygdaliformis, Salix alba, Ulmus campestris, Tilia sp.* In several cases the host was not determined.

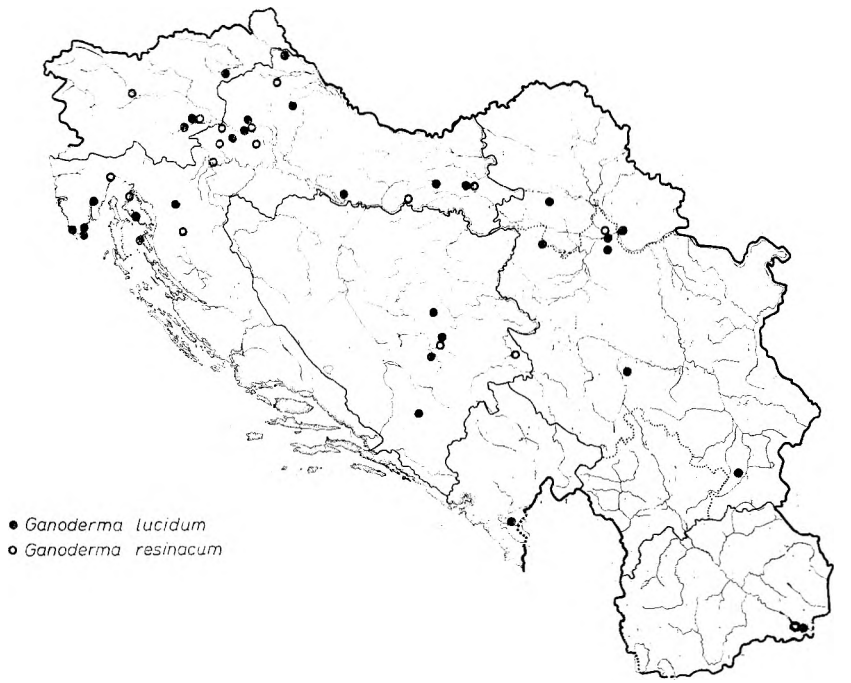

Fig. 3.

Ganoderma lucidum produces its fruitbodies often as a parasite at the base of living trees, but also at the base of dead standing ones, on stumps and sometimes apparently on soil.

GANODERMA PFEIFFERI Bres. in Pat.

A rare species, characterised by dark brown context and its crust covered by a thin, resinous film which is cracked and wrinkled and melts easily in a small flame. The structure of the crust is the main difference between this species and *G. adspersum* (Donk 1974).

Slovenia: Poljana in Ljubljana, 300 m, in a hollow of an old living *Carpinus betulus* — Boč Mt. near Poljčane — Mrzlica Mt. near Celje. All three published by Voss (1889—92) as *Polyporus laccatus* (see Tortić et al. 1975). There are no voucher specimens from the localities cited, but the description leaves no doubt about the identity of the species — Laško near Celje, 230 m, *Pyrus communis,* V 1887. Wettstein (1888) as *Polyporus laccatus.*

Croatia: Marija Trošt near Delnice, 500 m, on *Prunus avium.* Škorić (1928) as *Fomes laccatus.* — Zagreb, park Tuškanac, about 130—150

m, *Fagus* stump, leg. L. Göttl X 77, ZA. From the same park Vouk and Pevalek (1916) cite *Fomes vegetus* which may perhaps be this species — Brezovica park near Zagreb, 120 m, on living *Fagus sylvatica* and *Alnus glutinosa,* III 75, ZA. Observed on the same hosts also IV 76 and VII 79; the trees were later felled, but two or three specimens were observed on *Alnus* stump also VII 79 and VIII 80 — Varaždinske toplice, 200—250 m *Fagus* stump, IV, V and VII 69, ZA. Noted on the same stump also V 78 and IV 79. (Fig. 1).

According to Ryvarden (1976) *Quercus* seems to be the preferred host for this species in Europe, whilst Domański et al. (1973) state that it develops on *Fagus* sometimes on *Quercus.* In Czechoslovakia it has also been noted mostly on *Fagus,* and quite exceptionally on *Acer* and *Aesculus* (Kotlaba 1984). In Yugoslavia it has been found in three localities on *Fagus,* and in one each on *Alnus* and *Carpinus.* Unfortunately, for two localities by Voss (1889—92) no host was named whilst the finds by Wettstein (1888) on *Pyrus* and Škorić (1928) on *Prunus* cannot be proved since no description was given and no herbarium specimens were seen.

Ganoderma pfeifferi grows both as a parasite on living trees, where the fruitbodies appear at the base of the trunks but also higher up, to over 3 m, and as a saprophyte on stumps. The localities in Yugoslavia are apparently from lower altitudes, as far as could be established. The altitudes at Boč Mt. and Mrzlica Mt. are unknown.

GANODERMA RESINACEUM Boud. in Pat.

The crust is also covered by a thin film which is, however, smooth, and the context is pale brown. Earlier this species was not always distinguished from *G. lucidum* and the records by our older authors of *G. lucidum* (see there) may sometimes also include *G. resinaceum.* Cited here are only the localities from which voucher specimens exist, or the specimens (in one case description and drawing) were seen by the author.

Slovenia: Ljubljana, 300 m, living *Quercus robur,* 1. et d. M. Petkovšek, VIII 75, ZA — Krakovski gozd near Kostanjevica, 150 m, living *Quercus rubra,* VII 75, ZA. Observed on the same tree also IX 77 and on a stump of *Quercus* cf. *robur* IX 79.

Croatia: Lovran near Rijeka, sea-coast, living *Quercus cerris,* VIII 76, ZA. Observed there at the base of living *Quercus* sp. also II 83 — Njivice on island Krk, sea-coast, living *Populus alba,* leg. D. Vrščaj, XII 83, ZA — Otočac, 460 m, living *Aesculus hippocastanum,* VIII 75, ZA — Karlovac, 110 m, dead standing *Aesculus hippocastanum,* leg. et det. F. Kotlaba, VIII 72, PRM — Jastrebarsko near Zagreb, 150 m, living *Salix alba,* X 77, ZA — Zagreb and near vicinity, 120—200 m, in several parks including Maksimir, and along streets and roads on living planted trees of *Aesculus hippocastanum, Platanus* sp., *Populus italica, Quercus robur,* perhaps also other *Quercus spp.,* also on dead standing *Liquidambar styraciflua,* from 1962—1984. Herbarium specimens VII 62, VIII 63, X 65, X 66, VIII 83 at ZA. Some published as *G. lucidum* (Tortić 1964, 1968) — Vukovina near Zagreb, 100 m, living *Quercus robur,* VIII 76, ZA — Samobor near Zagreb, 170 m, living (?) *Carpinus betulus,* VII 68, PRM — Slavonski Brod, 95 m, living *Tilia tomentosa,* leg. et det. F. Kotlaba, VIII 66, PRM — Varaždinske toplice, 200—250 m, at the base of living *Quercus* cf. *petraea,* VIII 74, ZA — Kunjevci and Lug near Vinkovci, 90 m, on stumps of *Alnus glutinosa* and *Carpinus betulus* (Schulzer Manuscript, Tortić 1981).

Bosnia and Herzegovina: Sarajevo, 550 m, living (?) *Quercus* sp. in a park, leg. M. Usčuplić, IX 69, ZA — Višegrad, 360 m, at the base of living *Tilia* sp., VIII 78, ZA.

Serbia: Krnjača near Beograd, 70 m, stump of *Populus italica*, VIII 72, leg. et det. F. Kotlaba, PRM.

Macedonia: Bogdanci near Đevđelija, 150 m, living *Robinia pseudacacia*, VIII 84, leg. M. Karadelev, ZA (Fig. 3).

Ganoderma resinaceum grows most often as a parasite on living trees, but also as a saprophyte on stumps. The fruitbodies appear on trunks, mostly at the base, sometimes also at a height up to 1 or 1,5 m. The preferred host is apparently *Quercus* on which it was found here in 7 localities. Others were *Aesculus, Alnus, Carpinus, Liquidambar, Platanus, Populus, Robinia, Salix, Tilia.* It is found quite often in towns or near human habitations like *G. adspersum*, and prefers lower altitudes, ranging from sea-coast to 550 m.

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SAŽETAK

RASPROSTRANJENOST POLIPOROIDNIH GLJIVA U JUGOSLAVIJI
II. *GANODERMA*

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Prikazana je rasprostranjenost u Jugoslaviji šest vrsta roda *Ganoderma*. Lokaliteti su navedeni u engleskom tekstu i označeni na kartama.

Najčešća je od tih vrsta *G. applanatum*, koja raste u prvom redu u gorskim šumama na drvetu bukve, katkad i jele, no nađena je i u nižim položajima, čak i na jadranskoj obali, a ustanovljena na 11 rodova drveća. Većinom je saprofit; rijetko se susreće na živim stablima kao parasit.

Osobito je interesantna *G. adspersum* o kojoj je već pisano prije više godina (Tortić 1971), ali se broj poznatih lokaliteta od tada udvostručio. Najčešće uspijeva u većim ili manjim naseljima, u parkovima i alejama duž cesta i ulica, rijetko u šumama, obično kao parasit, no može nastaviti razvitak i na panjevima kao saprofit. U Jugoslaviji je ustanovljena na dvadeset rodova drveća, od toga na dvije četinjače.

Ostale su vrste poznate zasad s malo lokaliteta. *G. lucidum* raste kao parasit, ali i saprofit, naročito na drvu hrasta, i zbog karakterističnog oblika i boje lako se prepoznaje pa se češće spominje i u našoj starijoj literaturi. Međutim, prije se nije uvijek od nje razlikovala slična *G. resinaceum*, koja također raste najčešće kao parasit na hrastu, ali i drugim listačama, često u naseljima. Obje su te vrste, prema dosadašnjim podacima, raširene uglavnom u nižim položajima, pa i na jadranskoj obali. I *G. carnosum* tek je nedavno jasno odvojena od *G. lucidum*; vezana je manje-više za jelu, samo jednom je nađena u nas na muniki (*Pinus leucodermis*) i uspijeva u većim nadmorskim visinama kao saprofit na panjevima. Vrlo je rijetka *G. pfeifferi* koja raste kao parasit, a također i saprofit. U nas je nađena na tri lokaliteta na bukvi i po jednom na nekim drugim listačama.

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