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Host preferences of wood-decaying fungi of the genus *Ganoderma* in the urban areas of Slovakia

Introduction

Ganoderma P. Karst. 1881 (Basidiomycota, Polyporales) is a cosmopolitan genus (Richter et al., 2015) with the greatest diversity in the tropical regions (Ryvarden, Melo, 2014). Fungi of this genus cause white rot of living or dead deciduous and coniferous trees of the wide range of species worldwide (Schwarze, Ferner, 2003; Bernicchia, 2005; Ryvarden, Melo, 2014). The species of *Ganoderma*, especially *Ganoderma lucidum* complex, are also known due to their various medicinal properties (Zhou et al., 2015).

The basidiocarps of these polypores grow annually or can be perennial, sessile, or stipitate, with matte or a laccate pileus surface, cream to dark purplish-brown-coloured context and creamed-coloured pore surface, brownish after touching (Ryvarden, Melo, 2014). The genus *Ganoderma* is characterised by ovoid, echinulate basidiospores with a truncate apex, two layered walls and interwall pillars between endosporium and exosporium (Ryvarden, 1991; Moncalvo, 2000; Ryvarden, Melo, 2014).

The *Ganoderma* species that occur in Europe are *G. adspersum* (Schulzer) Donk, *G. applanatum* (Pers.) Pat., *G. carnosum* Pat., *G. lucidum* (Curtis) P. Karst., *G. pfeifferi* Bres., *G. resinaceum* Boud., and *G. valesiacum* Boud. (Sokół, 2000; Bernicchia, 2005; Papp, Szabó 2013; Ryvarden, Melo, 2014). The presence of all these species was also recorded in Slovakia (Gáper, 1998; Gáperová, 2001; Gašparcová et al., 2017a). The inter-specific genetic diversity of *Ganoderma* species occurring in Slovakia was also studied by PCR-RFLP analysis of ITS nrDNA and with newly applied method MALDI-TOF MS (Pristaš, Gáperová, 2001; Gašparcová et al., 2017b; Pristaš et al., 2017).

Host preferences of European *Ganoderma* species were analysed by several authors. *G. adspersum* has synanthropic character of distribution (Kotlaba, 1984;

Gáper, 1998; Sokół, 2000; Gáperová, 2001; Kotlaba, Pouzar, 2009a; Papp, Szabó, 2013). In southern and warmer regions, it also occurs in forests (Kotlaba, Pouzar, 2009a). In Europe, it was recorded on 43 genera of trees (Breitenbach, Kränzlin, 1986; Ryvar den, Gilbertson, 1993; Bernicchia, 2005; Ryvar den, Melo, 2014).

G. applanatum is the most common European species known as the “artists fungus” (Sokół, 2000; Ryvar den, Melo, 2014). It grows mostly in forests (Kotlaba, 1984; Sokół, 2000; Papp, Szabó, 2013) and rarely in urban areas (Gáperová, 2001). In Europe, it was recorded on 35 genera of trees (Breitenbach, Kränzlin, 1986; Bernicchia, 2005; Ryvar den, Melo, 2014).

G. resinaceum often grows in urban areas such as parks and gardens, near roads, etc. (Kotlaba, 1984; Gáper, 1998; Sokół, 2000; Gáperová, 2001; Kotlaba, Pouzar, 2009b), but in warmer regions it also occurs in forest environment (Kotlaba, Pouzar, 2009a). It prefers hosts of the genus *Quercus*, but it is known from many other deciduous trees (Kotlaba, 1984; Breitenbach, Kränzlin, 1986; Bernicchia, 2005; Ryvar den, Melo, 2014).

G. pfeifferi is typical synanthropic species that prefers old beeches in parks, but in southern Europe, in Denmark (Sokół, 2000) and Hungary (Papp, Szabó, 2013) follows occurrence of old beech forests. However, it was also noted on *Acer*, *Aesculus*, *Fraxinus*, *Prunus*, *Quercus* and *Ulmus* (Bernicchia, 2005; Ryvar den, Melo, 2014).

G. lucidum is the type species of the genus (Richter et al., 2015) and it belongs to the *G. lucidum* complex (Zhou et al., 2015). It often colonises old deciduous trees in parks and botanical gardens, but it occurs mainly in forests (Sokół, 2000; Bernicchia, 2005). Basidiocarps of *G. lucidum* grow mostly on oaks, but also on other trees (Kotlaba, 1984; Tortić, 1985; Sokół, 2000; Karadelev et al., 2008; Papp, Szabó, 2013; Ryvar den, Melo, 2014). In Europe, it grows on 24 woody plants genera (Bernicchia, 2005; Ryvar den, Melo, 2014).

G. carnosum belongs together with *G. lucidum* to the ‘*G. lucidum* complex’ (Ryvar den, Melo, 2014). Similar to *G. lucidum*, it occurs mainly in forest environment, but it can also appear in parks or botanical gardens (Sokół, 2000; Gáperová, 2001). It grows usually on conifers (Ryvar den, Melo, 2014) mainly *Abies alba* Mill. (Kotlaba, 1984; Bernicchia, 2005). In Europe, it colonises trees of 10 genera (Breitenbach, Kränzlin, 1986; Bernicchia, 2005; Ryvar den, Melo, 2014).

G. valesiacum is central European species that occurs at higher altitudes in natural coniferous forests (Plank, Wolking, 1981; Kotlaba, 1984; Sokół, 2000; Bernicchia, 2005; Ryvar den, Melo, 2014). It is very rare European species and there are no data on the synanthropic character of this species (Sokół, 2000). It was recorded on *Larix* (Kotlaba, 1984; Sokół, 2000; Bernicchia, 2005; Ryvar den, Melo, 2014) and probably on *Picea abies* (L.) H.Karst. (Kotlaba, 1984; Sokół, 2000).

There are only few studies focusing on distribution of fungi of this genus in Slovakia and on their host preferences. Most of them confirm the presence of this genus in urban areas (Kotlaba, 1984; Gáper, 1998; Gáperová, 2001; Boleková, Sliacka, 2015). A more comprehensive analysis of *Ganoderma*'s host range in forests in Slovakia was presented by Gašparcová et al. (2017a). The aim of the present study was to identify the host preferences of the species of this genus occurring in the urban areas of Slovakia, and the analysis of the location of basidiocarps on the colonised trees.

Material and methods

Data on the occurrence, host preferences, and topology of *Ganoderma* basidiocarps on the colonised trees/wood were obtained by field research and from the information given for herbarium specimens located in Slovak National Museum – Natural History Museum in Bratislava and National Museum – Natural History Museum in Prague (Czechia). The field research of authors was carried out in the period of 1989–2017 in the urban areas of Slovakia. The basidiocarps obtained during field research were deposited in the Herbarium of the Department of Biology and Ecology of the Faculty of Natural Sciences, Matej Bel University, Banská Bystrica, Slovakia. All basidiocarps used in the present study were collected in the districts Bánovce nad Bebravou, Banská Bystrica, Banská Štiavnica, Bardejov, Bratislava, Čadca, Detva, Dunajská Streda, Galanta, Hlohovec, Kežmarok, Komárno, Košice, Krupina, Levice, Levoča, Liptovský Mikuláš, Lučenec, Malacky, Martin, Michalovce, Myjava, Nitra, Nové Mesto nad Váhom, Nové Zámky, Pezinok, Piešťany, Poltár, Poprad, Považská Bystrica, Prešov, Prievidza, Rožňava, Ružomberok, Senica, Spišská Nová Ves, Stará Lubovňa, Trebišov, Trenčín, Trnava, Veľký Krtíš, Vranov nad Topľou, Zlaté Moravce, Zvolen, Žiar nad Hronom and Žilina. All obtained data were recorded in a database (Gáperová, Krátka, 2002) that is currently based on a total of 34 input data divided into 5 categories: I – characteristics of tree, II – characteristics of localities, III – characteristics of fungus, IV – general data (in relation to a specific finding), V – vitality of tree. The database is connected with digital maps in the GIS environment (Gáperová, Krátka, 2002; 2003; Krátka et al., 2004).

Basidiocarps were determined using scientific mycological literature (Breitenbach, Kränzlin, 1984; Ryvarden, 1991; Sokół, 2000; Bernicchia, 2005; Antonín, 2006; Holec et al., 2012; Ryvarden, Melo, 2014). Microscopic studies were performed with the use of a MOTIC microscope (Motic Company, Germany), on preparations mounted in 5% KOH.

The topology of basidiocarps was evaluated for each recorded species separately. Places of the occurrence of basidiocarps on trees were divided into the following categories: stump, root swelling, dead trunk base, dead standing/lying trunk, living trunk

base, living trunk, others. The category ‘others’ includes some parts of host woody plants that do not belong to the previous categories (e.g., tree branch, dead wood) or in the case of herbarium specimens for which places of basidiocarps occurrence were not recorded.

For nomenclature of fungi, The Index Fungorum (Cooper, Kirk, 2018) database was followed. For nomenclature of woody plants, the checklist by Marhold and Hindák (1998) and The International Plant Names Index database (IPNI, 2012) were followed.

Results and discussion

A total of 263 collections of basidiocarps were analysed to detect host preferences of fungi of the genus *Ganoderma* in urban areas of Slovakia (Appendix 1 – Tab. 1). We confirmed the presence in urban areas of Slovakia all the species recorded in the country, namely *Ganoderma applanatum*, *G. adspersum*, *G. carnosum*, *G. lucidum*, *G. pfeifferi*, *G. resinaceum* and *G. valesiacum*.

We found out that *Ganoderma adspersum* is the most common species of the genus *Ganoderma* occurring in urban areas of Slovakia (Fig. 1). It was recorded on 24 species of host woody plants (Appendix 1 – Tab. 1). A wide range of hosts is associated with the synanthropic character of this species in our country. The basidiocarps most often occurred on *Aesculus hippocastanum* L. (18% of all findings) and *Tilia cordata* Mill. (17% of all findings). Similar to our results, Gáperová (2001) recorded *G. adspersum* mainly on the introduced tree *A. hippocastanum* and the native *T. cordata* in urban environments of Slovakia. Moreover, fungi also grew on other planted non-native trees, mainly *Gleditsia triacanthos* L. (8%), *Prunus serrulata* Lindl. (3%) and *Robinia pseu-*

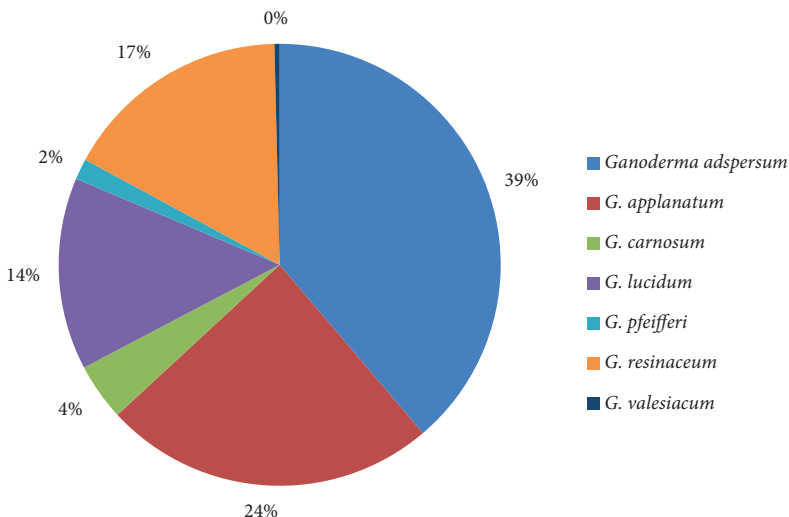


Fig. 1. Representation of species of the genus *Ganoderma* in urban areas of Slovakia

doacacia L. (3%). Our findings have not proved oaks as the most common substrate/host that was recorded by some authors (Kotlaba, 1984; Tortić, 1985; Gáper, 1998; Papp, Szabó, 2013). However, in the forest environments of Slovakia, *G. adspersum* was found to grow mainly on *Quercus robur* L. (Gašparcová et al., 2017a). According to Kotlaba and Pouzar (2009a), *G. adspersum* is a parasitic species often found on planted trees in urban areas, because inner parts of the forest complexes of northern and northwest European countries are too cold. However, in the southern warmer climatic regions of Europe, including Moravia (Czechia) and Slovakia, *G. adspersum* also colonises native trees in forests (Kotlaba, Pouzar, 2009a). Our research confirms its synanthropic character and frequent occurrence on non-native trees (39% of all findings) in urban areas, which was also realised by other authors (Kotlaba, 1984; Gáper, 1998; Sokół, 2000; Gáperová, 2001; Kotlaba, Pouzar, 2009a; Papp, Szabó, 2013). The basidiocarps of *G. adspersum* were found growing mainly on the base and along the living trunk, and also saprotrophically on stumps (Fig. 2). It corresponds well to the published data (Breitenbach, Kränzlin, 1986; Sokół, 2000; Bernicchia, 2005; Ryvar den, Melo, 2014). In the forests of Slovakia, it was recorded mainly on the trunk base of host trees (Gašparcová et al., 2017a).

G. applanatum is often misidentified as *G. adspersum* (Fig. 3), but *G. applanatum* has smaller basidiospores, paler context, tubes layers separated by thin layers of the context and often attacked by larvae of *Agathomya wankowici* Schnabl. (Sokół, 2000; Ryvar den, Melo, 2014). In urban areas of Slovakia, *G. applanatum* was recorded on 18 species of host trees, mostly deciduous (Appendix 1 – Tab. 1). Over 45% of records come from decomposing wood of different hosts. In our study, we found 9% of all records on European beech. Other studies confirm its frequent occurrence on *Fagus* spp. (Kotlaba, 1984; Tortić, 1985; Gáper, 1998; Sokół, 2000; Karadelev et al., 2008; Papp, Szabó, 2013). In the forests of Slovakia, *G. applanatum* was also found growing predominantly on *Fagus sylvatica* L. (38% off all findings). However, compared to urban areas, it was recorded only on 11 species of host trees in forests (Gašparcová et al., 2017). Although more records of this species are known from the forest environment (Gašparcová et al., 2017), *G. applanatum* is the second most widespread species in urban areas of Slovakia (Fig. 1). We cannot confirm that it grows rarely in urban environments, as reported by Gáperová (2001). However, according to Sokół (2000), *G. applanatum* occurs in towns more often than typical synanthropic species. In urban areas of Slovakia, *G. applanatum* was recorded mainly on stumps and the living trunks of host trees (Fig. 2). Some authors also reported that *G. applanatum* decomposes mainly stumps and dead trunks of deciduous trees, rarely of conifers. It can also colonise living trees, mostly the bases of the trunks (Sokół, 2000; Bernicchia, 2005; Ryvar den, Melo, 2014). In the forests of Slovakia, it was found to grow mainly on trunks and less often on stumps (Gašparcová et al., 2017).

Part of the woody plant

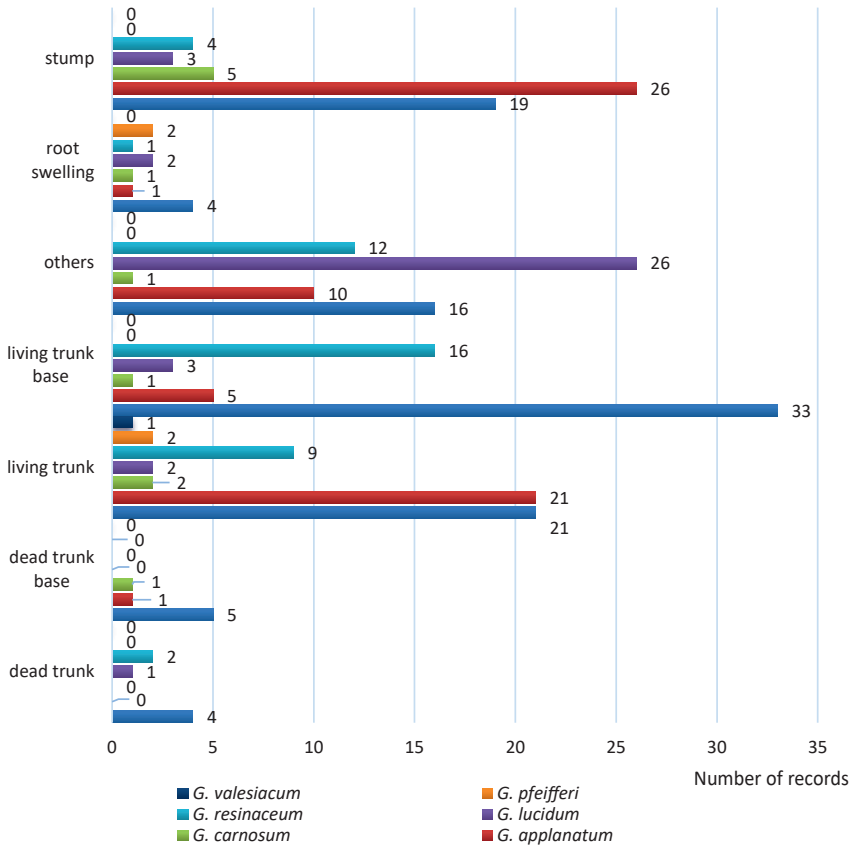


Fig. 2. Topology of the basidiocarps of *Ganoderma* spp. on host trees

The laccate species *G. carnosum* was recorded only on 5 genera of host trees (Appendix 1 – Tab. 1). It is a rare species (4% of all records) in the urban areas of Slovakia (Fig. 1). We found out that *G. carnosum* grew on a decomposing wood (mostly of unknown trees – more than half of all findings). Our results do not confirm published data that it colonises mainly *Abies alba* Mill. (Kotlaba, 1984; Tortić, 1985; Breitenbach, Kränzlin, 1986; Sokół, 2000; Bernicchia, 2005; Karadelev et al., 2008; Ryvarde, Melo, 2014); however, in the forest ecosystems of Slovakia, it was recorded predominantly on this tree species (Gašparcová et al., 2017). We recorded one new deciduous host tree, *Tilia*, that has not yet been mentioned in the literature. We found *G. carnosum* growing saprotrophically mainly on stumps (Fig. 2), which confirms the information found in the literature (Bernicchia, 2005).

The species of *G. lucidum* and *G. carnosum* are very similar and difficult to distinguish (Papp, Szabó, 2013), but *G. carnosum* has larger basidiocarps with darker to blackish pilear surface, and wider spores, and it prefers coniferous trees (Sokół, 2000;

Ryvarden, Melo, 2014). *G. lucidum* was recorded on 4 species of host woody plants (Appendix 1 – Tab. 1), although most data do not specify trees species (65% of all findings). Our results confirm the most common occurrence of this fungus on oaks (16% of all findings) as reported earlier by some authors (Kotlaba, 1984; Tortić, 1985; Sokół, 2000; Karadelev et al., 2008; Papp, Szabó, 2013; Ryvarden, Melo, 2014). We recorded 1 new species of the host tree – *Armeniaca vulgaris* Lam. The topology of *G. lucidum* basidiocarps was not recorded in most cases. In addition, it grew in approximately the same amount on stumps, living trunk bases, living trunks, and root swellings (Fig. 2), which partially confirms data presented by Sokół (2000), who stated that it grows on trunk and roots of hardwoods. However, our results do not confirm that *G. lucidum* grows predominantly saprotrophically, as some authors reported (Sokół, 2000; Bernicchia, 2005; Ryvarden, Melo, 2014). More data on the topology of basidiocarps are needed to draw more precise conclusions.

G. pfeifferi can be often confused with *G. adspersum* due to several similar features of basidiocarps (Sokół, 2000), but *G. pfeifferi* has the wrinkled and cracked resinous pilear layer and wider basidiospores (Sokół, 2000; Ryvarden, Melo, 2014). In the urban areas, we recorded *G. pfeifferi* only 4 times on 3 host species, mainly on *Fagus sylvatica* (Appendix 1 – Tab. 1). Other studies confirm the occurrence predominantly on beeches (Kotlaba, 1984; Tortić, 1985; Sokół, 2000; Papp, Szabó, 2013; Ryvarden, Melo, 2014). Our results do not show the occurrence of *G. pfeifferi* on conifers, although Szczepkowski and Konsenczjusz (2006) reported it was probably recorded on *Abies* sp. We also found 1 new host species for this fungus – *Tilia platyphyllos* Scop. In the forests of Slovakia, there are a few records of *G. pfeifferi* basidiocarps, mainly on *Fagus sylvatica* (Gašparcová et al., 2017a). *G. pfeifferi* was found to grow in the same number on stumps and parasitically on the base of trunks (Fig. 2). The occurrence on living trunk base confirms published data (Bernicchia, 2005; Ryvarden, Melo, 2014).

G. resinaceum can be confused with *G. lucidum* and *G. pfeifferi*, but *G. lucidum* has not resinous layer on the crust (Ryvarden, Melo, 2014), its basidiospores have a much coarser ornamentation, and it always forms a stem (Kotlaba, Pouzar, 2009b). *G. pfeifferi* has wider spores and a darker context (Ryvarden, Melo, 2014). *G. resinaceum* is the third most widespread *Ganoderma* species in the urban areas of Slovakia (Fig. 1). It was found growing on 15 species of host trees (Appendix 1 – Tab. 1), mainly on *Quercus cerris* L. (23% of all records), which confirms published data (Kotlaba, 1984; Tortić, 1985; Sokół, 2000; Bernicchia, 2005; Papp, Szabó, 2013; Ryvarden, Melo, 2014). Our data prove the synanthropic character of the distribution of *G. resinaceum* and its rare occurrence in forests (Kotlaba, 1984; Gáper, 1998; Sokół, 2000; Gáperová, 2001; Kotlaba, Pouzar, 2009b). We found that *G. resinaceum* has various topologies of basidiocarps, but its basidiocarps are formed mainly on the living trunk base (Fig. 2).



Fig. 3. *Ganoderma adpersum* (Schulzer) Donk on *Tilia cordata* Mill. in Trenčianske Teplice (northwestern Slovakia) – A (Photo. S. Gáperová), and *Ganoderma applanatum* (Pers.) Pat. on *Salix caprea* L. in Špania Dolina (central Slovakia) – B (Photo. M. Šebesta)

Our results confirm that *G. resinaceum* grows rather parasitically on the base of trunks (Breitenbach, Kränzlin, 1986; Bernicchia, 2005; Ryvarden, Melo, 2014) than saprotrophically on dead trunks or stumps (Sokół, 2000).

Ganoderma valesiacum can be misidentified as *G. lucidum* or *G. carnosum*. It differs from them with very short or rudimentary stipe and often cracked laccate crust exposing white context (Sokół, 2000; Ryvarden, Melo, 2014). However, the taxonomic status of *G. valesiacum* is uncertain (unclear relationships to *G. lucidum* and *G. carnosum*) and sequencing is needed to solve this problem (Ryvarden, Melo, 2014). In the urban areas of Slovakia, we recorded this species on *Larix* sp. (only 1 record – Fig. 1); although, Sokół (2000) reported that no data on the synanthropic character of this species exist. In the forests of Slovakia, it was also recorded on *Larix* (Gašparcová et al., 2017a). It confirms published data that *G. valesiacum* is a very rare European species known from *Larix* (Plank, Wolking, 1981; Kotlaba, 1984; Sokół, 2000; Bernicchia, 2005; Ryvarden, Melo, 2014). *G. valesiacum* basidiocarps were growing on the living trunk of host tree (Fig. 2), but, as some authors reported, it to grow saprotrophically on the stumps and logs of *Larix* (Kotlaba, 1984; Sokół, 2000; Bernicchia, 2005; Ryvarden, Melo, 2014), since it was found in the forests of Slovakia (Gašparcová et al., 2017a).

Conclusion

In the urban areas of Slovakia, we recorded all 7 European *Ganoderma* species. The most common species is *G. adspersum*. Most often, it colonised non-native *Aesculus hippocastanum* and native *Tilia cordata* (but not *Quercus*). It grows mostly at the base and along the living trunk and saprotrophically on stumps. *G. applanatum* is the second most widespread species in the urban areas of Slovakia. It was found mainly on a decomposing wood of unidentified trees and also on beeches. It grows mostly on the stumps, and on the living trunks of host trees. *G. resinaceum* is the third most widespread in the urban areas of Slovakia. It grows mainly on *Quercus*. It was recorded mainly on the living trunk base. *G. carnosum* was recorded only once on *Abies alba*. It grows saprotrophically, mainly on the stumps. *G. lucidum* was recorded on a total of 4 species of host woody plants and mostly on oaks. According to available data (in most cases have not been noticed), it grows on stumps, living trunk bases, living trunks, and root swellings. The rarest species of the genus *Ganoderma* are *G. pfeifferi* and *G. valesiacum*. *G. pfeifferi* grows mainly on *Fagus sylvatica*. It was recorded in the same numbers on the stumps and bases of living trunks. In the urban areas, surprisingly, we also recorded the typical forest species *G. valesiacum* on the living trunk of *Larix* sp.

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Tab. 1. Host preferences of species of the genus *Ganoderma*

Species of the genus <i>Ganoderma</i>	Total number of records	Woody plant taxa	Number of records
<i>Ganoderma adpersum</i>	102	<i>Abies</i> sp.	1
		<i>Acer platanoides</i> L.	1
		<i>A. pseudoplatanus</i> L.	3
		<i>Aesculus hippocastanum</i> L.	18
		<i>Armeniaca vulgaris</i> Lam.	1
		<i>Celtis occidentalis</i> L.	1
		<i>Cerasus avium</i> (L.) Moench	2
		<i>Crataegus laevigata</i> (Poir.) DC	1
		<i>Fagus sylvatica</i> L.	2
		<i>Fraxinus excelsior</i> L.	7
		<i>Gleditsia triacanthos</i> L.	8
		<i>Juglans regia</i> L.	2
		<i>Larix</i> sp.	1
		<i>Morus nigra</i> L.	2
		<i>Negundo aceroides</i> Moench	1
		<i>Picea abies</i> (L.) P. Karst.	3
		<i>Populus alba</i> L.	2
		<i>P. nigra</i> L.	3
		<i>Prunus serrulata</i> Lindl.	3
		<i>Quercus petraea</i> (Matt.) Liebl.	2
		<i>Quercus</i> sp.	2
		<i>Robinia pseudoacacia</i> L.	3
		<i>Salix caprea</i> L.	1
		<i>Sorbus aucuparia</i> L.	2
		<i>Spiraea veitschii</i> Hemsl.	1
		<i>Tilia cordata</i> Mill.	17
		<i>Tilia</i> sp.	1
<i>T. platyphyllos</i> Scop.	2		
unidentified	9		
<i>Ganoderma applanatum</i>	64	<i>Abies</i> sp.	1
		<i>Acer pseudoplatanus</i> L.	1
		<i>Alnus glutinosa</i> (L.) Gaertn.	1
		<i>Carpinus betulus</i> L.	2
		<i>Cerasus avium</i> (L.) Moench	3
		<i>Fagus</i> sp.	4
		<i>Fagus sylvatica</i> L.	2
		<i>Fraxinus excelsior</i> L.	1
		<i>Fraxinus</i> sp.	1
		<i>Negundo aceroides</i> L.	1

<i>Ganoderma applanatum</i>		<i>Picea abies</i> (L.) Karst.	1
		<i>Populus alba</i> L.	2
		<i>P. nigra</i> L.	1
		<i>Populus</i> sp.	1
		<i>P. tremula</i> L.	2
		<i>Prunus domestica</i> L.	1
		<i>Prunus</i> sp.	1
		<i>Quercus robur</i> L.	3
		<i>Quercus</i> sp.	2
		<i>Robinia pseudoacacia</i> L.	4
		<i>Salix caprea</i> L.	2
		<i>S. fragilis</i> L.	1
		<i>Salix</i> sp.	2
		<i>Tilia cordata</i> Mill.	1
<i>T. platyphyllos</i> Scop.	1		
<i>Tilia</i> sp.	2		
unidentified	20		
<i>Ganoderma carnosum</i>	11	<i>Abies alba</i> Mill.	1
		<i>Alnus glutinosa</i> (L.) Gaertn.	1
		<i>Larix</i> sp.	1
		<i>Quercus</i> sp.	1
		<i>Tilia</i> sp.	1
unidentified	6		
<i>Ganoderma lucidum</i>	37	<i>Alnus</i> sp.	1
		<i>A. glutinosa</i> (L.) Gaertn.	1
		<i>Armeniaca vulgaris</i> Lam.	1
		<i>Carpinus betulus</i> L.	2
		<i>Carpinus</i> sp.	1
		<i>Castanea sativa</i> Mill.	1
		<i>Quercus</i> sp.	6
unidentified	24		
<i>Ganoderma pfeifferi</i>	4	<i>Acer platanoides</i> L.	1
		<i>Fagus sylvatica</i> L.	2
		<i>Tillia platyphyllos</i> Scop	1

		<i>Acer campestre</i> L.	1
		<i>A. platanoides</i> L.	1
		<i>A. pseudoplatanus</i> L.	1
		<i>Aesculus hippocastanum</i> L.	4
		<i>Celtis occidentalis</i> L.	2
		<i>Fagus sylvatica</i> L.	1
		<i>Fraxinus excelsior</i> L.	2
		<i>Gleditsia triacanthos</i> L.	5
		<i>Juglans regia</i> L.	1
		<i>Negundo aceroides</i> Moench	1
		<i>Populus</i> sp.	1
		<i>Quercus cerris</i> L.	10
		<i>Q. robur</i> L.	4
		<i>Quercus</i> sp.	1
		<i>Robinia pseudoacacia</i> L.	5
		<i>Salix alba</i> L.	1
		<i>Sophora japonica</i> L.	1
		unidentified	2
<i>Ganoderma resinaceum</i>	44		
<i>Ganoderma valesiacum</i>	1	<i>Larix</i> sp.	1

Abstract

Ganoderma (Basidiomycota, Polyporales) is a cosmopolitan genus with the greatest diversity in the tropics. It causes white rot of a wide range of woody plants all over the world. In Europe, 7 species of the genus *Ganoderma* grow: *Ganoderma adpersum*, *G. applanatum*, *G. carnosum*, *G. lucidum*, *G. pfeifferi*, *G. resinaceum* and *G. valesiacum*. All of them also occur in Slovakia. The aim of the present study was to identify the presence of *Ganoderma* species in the urban areas of Slovakia and to find out their host preferences and the topology of the basidiocarps on the colonised trees. A total 263 findings of *Ganoderma* obtained by our own field research and the processing of records from herbarium items located in natural museums in Bratislava (Slovakia) and Prague (Czechia) were analysed to detect their ecological characteristics. The occurrence of all 7 *Ganoderma* species was recorded in the urban areas of Slovakia. The most common species is *G. adpersum* (39% of all records) with the widest range of host woody plants (24 species). *G. applanatum* is the second most widespread species in the urban areas of Slovakia growing mostly on a decomposing wood of unknown trees (31% of all findings) and also on beeches (9% of all findings). *G. resinaceum* is the third most widespread in the urban areas, and it grew mainly on *Quercus*. *G. lucidum* was most often found on unknown trees (65% of all findings) and also on oaks (16% of all findings). The rarest *Ganoderma* species are *G. valesiacum* (only 1 record on *Larix* sp.), *G. pfeifferi* (4 records, mainly on *Fagus sylvatica*), and *G. carnosum* (4% of all records, mainly on a decomposing wood of unknown trees).

Key words: *Ganoderma*, polyporoid fungi, basidiomata, host tree, wood-decaying fungi

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Żywicielskie preferencje grzybów z rodzaju *Ganoderma* rozkładających drewno w środowisku miejskim na Słowacji

Streszczenie

Lakownica – *Ganoderma* P. Karst. (Basidiomycota, Polyporales) to kosmopolityczny rodzaj o największej różnorodności w tropikach. Lakownice powodują białe zgnilizny wielu różnych drzewostanów na całym świecie. W Europie, w tym także na Słowacji, występuje siedem gatunków lakownicy: *Ganoderma adpersum* (l. europejska), *G. applanatum* (l. spłaszczona), *G. carnosum* (l. brązowoczarna), *G. lucidum* (l. złotawa), *G. pfeifferi* (l. czerwonawa), *G. resinaceum* (l. jasnomiąższowa) oraz *G. valesiacum* (l. walezyjska). Celem niniejszych badań było zidentyfikowanie obecności poszczególnych gatunków lakownicy w zurbanizowanym środowisku Słowacji oraz określenie ich preferencji żywicielskich, a także topologii bazydiokarpów na skolonizowanych drzewach. W badaniu wykorzystano 263 okazy lakownicy zebranych w trakcie badań terenowych oraz oznaczonych rekordów, pochodzących ze zbiorów zielnikowych z muzeów przyrodniczych w Bratysławie (Słowacja) oraz w Pradze (Czechy). W zurbanizowanym środowisku Słowacji odnotowano występowanie wszystkich 7 gatunków lakownicy. Najczęściej notowanym gatunkiem jest *G. adpersum* (39% wszystkich rekordów), z najszerszym spektrum drzew żywicielskich (24 gatunki). *G. applanatum* jest drugą najbardziej rozpowszechnioną lakownicą w zurbanizowanym środowisku na Słowacji. Rośnie głównie na rozkładającym się drewnie nieidentyfikowalnych gatunków drzew (31% wszystkich rekordów), a także na bukach (9% wszystkich rekordów). *G. resinaceum* jest trzecim najbardziej rozpowszechnionym gatunkiem i rośnie głównie na dębach. Natomiast *G. lucidum* zazwyczaj występowała na nieidentyfikowalnym drewnie (65% wszystkich rekordów) oraz na dębach (16% wszystkich rekordów). Najrzadsze lakownice to: *G. valesiacum* (tylko jedno znalezisko na *Larix* sp.), *G. pfeifferi* (4 rekordy, głównie na *Fagus sylvatica*) oraz *G. carnosum* (4% wszystkich rekordów, zwłaszcza na nieidentyfikowalnym gatunkowo rozkładającym się drewnie).

Słowa kluczowe: *Ganoderma*, grzyby polyporowe, basidiomaty, drewno żywicielskie, grzyby rozkładające drewno

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