

Basidiomycetes growing on sleepers reused in small garden architecture

BOGUSŁAW ANDRES

Department of Wood Science and Wood Protection, Warsaw University of Life Science-SGGW

Abstract: *Basidiomycetes growing on sleepers reused in small garden architecture.* Paper describes results of five-year observations of Basidiomycetes growing on sleepers reused to build garden architecture. Apart from fruit bodies of fungi with already known for capabilities of decomposing creosote-protected wood, some species have been found, not described in the literature so far.

Keywords: sleepers, Basidiomycetes

INTRODUCTION

In specialized gardening magazines, handbooks and on Web pages some years ago idea of reusing sleepers for home garden arrangement was commonly proposed. Their natural and original looks and durability caused willing usage as a decorative and constructional elements in the gardens [Skórkowska 2003].

In Poland, sleepers are made of pine, beech or oak wood. In aim to extend lifetime of sleepers in railway subgrades, they are being impregnated with oil [PN-D-95014:1997]. Premature fungi decay of sleepers is usually caused by insufficient or inaccurate saturation with oil. Decay of pine and oak sleepers starts from heartwood [Cartwright, Findlay 1951], because this part is hard or very hard to impregnate [PN-EN 350-2:2000].

Numerous works from the beginning of 20-th century deals with sleepers biodegradation caused by fungi. As most recognized basidiomycetes growing in Poland on sleepers were described such as [Wątek-Czarnecka 1933]: *Armillaria mellea* (Vahl.) Quél., *Coniophora cerebella* Pers., *Coriolus versicolor* (L.) Quél., *Corticium* sp., *Daedalea quercina* Pers., *Hymenochaete rubiginosa* (Dicks.) Lév., *Leptoporus destructor* (Schrad.) Fr., *Lentinus squamosus* Schaeff., *Lenzites septaria* (Wulff.) Fr., *Leptoporus erubescens* Fr., *Irpex fusco-violaceus* Fr., *Merulius sclerotiorum* Falck., *Paxillus acheruntus* Humb., *Peniophora* sp., *Poria mucida* Pers., *Poria sinusa* Fr., *Poria Vaillantii* (De Cand.) Fr., *Schizophyllum commune* Fr., *Stereum hirsutum* (Willd.) Pers., *Trametes serialis* Fr., *Trametes squalens* Karst. and *Trametes trabea* Pers. Skupieński [1934] found following fungi species growing on used sleepers: *Armillaria mellea* (Vahr.) Quél., *Coriolus versicolor* (L.) Quél., *Daedalea quercina* Pers., *Lentinus squamosus* Schaeff., *Lenzites sepiaria* (Wolf.) Fr., *Ungulina marginata* (Fr.) Pat., *Paxillus panuoides* Humb., *Phellinus robustus* Karst., *Phellinus igniarius* (L., Fr.) Pat., *Poria vaporaria* Fr. and *Xanthochrous pini* (Brot.) Pat. Worldwide literature contains many publications about fungi decaying sleepers impregnated with creosote oil: Tuszon [1905], Spraulding [1911], Schorstein [1911], Malvasin [1924] i Liese [1925] [cit. after Wątek-Czarnecka 1933]. None of the following works does not however deal with problematic of fungi growing on reused sleepers.

Aim of the following work was to develop inventory of Basidiomycetes class fungi, growing on sleepers reused for garden arrangements.

MATERIAL AND METHODS

Field tests were performed in CZRB PAN botanical garden in Powsin. Presented area was selected for research because of numerous elements of garden architecture made of sleepers. Building of mentioned botanical garden was made in several stages, so it is hard to precisely determine usage time of sleepers, but this time is roughly estimated at 20 years minimum.

Four object types made of sleepers were found in botanical garden:

- Pathways of around 800 m total length,
- Footbridges, being extension of pathways, of 5 m total length,
- Slope and flower-bed protection of 70 m total length,
- Stairs of 90 m total length.

Research in CZRB PAN botanical garden in Powsin was made between 2006 and 2010. Observations were performed between August and November, in few weeks intervals. Field tests consisted of description, photographical documentation and collection of fungi fruit bodies growing on reused sleepers.

RESULTS AND DISCUSSION

Table 1 shows checklist of fungi species of basidiomycetes family growing on sleepers reused for garden architecture in CZRB PAN botanical garden in Powsin.

Table 1. List of fungi affecting reused sleepers in the Botanical Garden - Center for Biological Diversity Conservation in Powsin.

Fungus	Year				
	2006	2007	2008	2009	2010
<i>Daedalea quercina</i> (L.: Fr.) Pers.			+		
<i>Gloeophyllum sepiarium</i> (Wulf.: Fr) P. Karst.				+	
<i>Gymnopilus penetrans</i> (Fr.: Fr) Murrill	+	+	+	+	+
<i>Hymenochaete rubiginosa</i> (Schad.: Fr.) Lév.				+	+
<i>Inonotus triqueter</i> (Fr.) P. Karst.	+				
<i>Lentinus lepideus</i> (Fr.: Fr) Fr.	+				+
<i>Leatiporus sulphureum</i> (Bull.: Fr) Murrill	+				
<i>Mycena galericulata</i> (Scop.: Fr) Gray	+	+	+	+	+
<i>Paxillus panuoides</i> (Fr.: Fr.) Fr.		+	+		
<i>Phlebia tramellosa</i> (Schrad.: Fr) Nakasone & Burd.					+
<i>Psilocybe fascicularis</i> (Huds.: Fr.) Noordel.	+	+	+	+	+
<i>Schizophyllum commune</i> Fr.: Fr.				+	
<i>Stereum hirsutum</i> (Willd.: Fr) Gray				+	+
<i>Trametes versicolor</i> (L.: Fr.) Pilát					+

Amongst fungi noticed on sleepers, seven species were described in previous works [Wałek-Czarnecka 1933, Skupieński 1934, Skupieński 1937, Orłoś 1950, Cartwright, Findlay 1951, Ważny 1963, Domański, Orłoś, Skirgiełło 1967, Krajewski, Monder 2006]. Mentioned species were as follows: *Daedalea quercina* (L.: Fr) Pers., *Gloeophyllum sepiarium* (Wulf.: Fr) P. Karst., *Lentinus lepideus* (Fr.: Fr) Fr., *Paxillus panuoides* (Fr.: Fr.) Fr., *Schizophyllum commune* Fr.: Fr., *Stereum hirsutum* (Willd.: Fr) Gray and *Trametes versicolor* (L.: Fr.) Pilát.

Except fungi species of previously stated ability of decaying of wood protected with creosote oil, on the sleepers in botanical garden following species were also found: *Gymnopilus penetrans* (Fr.: Fr) Murrill., *Hymenochaete rubiginosa* (Schad.: Fr.) Lév., *Inonotus triqueter* (Fr.) P. Karst., *Leatiporus sulphureum* (Bull.: Fr) Murrill, *Mycena galericulata* (Scop.: Fr) Gray, *Phlebia tramellosa* (Schrad.: Fr) Nakasone & Burd. i *Psilocybe fascicularis* (Huds.: Fr.) Noordel. Mentioned species belong to saprotrophs, decomposing dead organic matter, During literature study, presented species were not found amongst described basidiomycetes growing on sleepers, so these found species do not belong to typical fungi decaying wood protected with creosote oil. One may suppose, that occurrence of mentioned fungi is connected with significant lowering of fungistatic substances in analyzed sleepers. Cause of that is probably continuous washing out of treatment by rain and contact with the ground.

CONCLUSIONS

1. On the sleepers reused for garden architecture following known for decaying creosote protected wood fungi species were found: *Daedalea quercina* (L.: Fr) Pers., *Gloeophyllum sepiarium* (Wulf.: Fr) P. Karst., *Lentinus lepideus* (Fr.: Fr) Fr., *Paxillus panuoides* (Fr.: Fr.) Fr., *Schizophyllum commune* Fr.: Fr., *Stereum hirsutum* (Willd.: Fr) Gray and *Trametes versicolor* (L.: Fr.) Pilát.
2. On the reused sleepers also not previously found saprotrophic fungi species were noticed: *Gymnopilus penetrans* (Fr.: Fr) Murrill., *Hymenochaete rubiginosa* (Schad.: Fr.) Lév., *Inonotus triqueter* (Fr.) P. Karst., *Leatiporus sulphureum* (Bull.: Fr) Murrill, *Mycena galericulata* (Scop.: Fr) Gray, *Phlebia tramellosa* (Schrad.: Fr) Nakasone & Burd. and *Psilocybe fascicularis* (Huds.: Fr.) Noordel.

REFERENCES

1. CARTWRIGHT K.ST.G., FINDLAY W.P.K. 1951: Rozkład i konserwacja drewna. PWRiL. Warszawa.
2. DOMAŃSKI S., ORŁOŚ H., SKIRGIEŁŁO A. 1967: Grzyby t. III. PWN.
3. KRAJEWSKI A., MONDER S. 2006: Grzyby na torowiskach. *Wszechświat*, 107 (4-6): 104-106.
4. ORŁOŚ H. 1950: Grzyby szkodliwe w budynkach i na składach drewna. Wyd. IBL. Warszawa
5. SKÓRKOWSKA A. 2003: Stare, zużyte, ale ładne i praktyczne, czyli podkłady kolejowe w ogrodzie. [Murator 3](#): 138.
6. SKUPIEŃSKI F. 1934: Album ważniejszych grzybów spotykanych na podkładach kolejowych. Wyd. Ministerstwa Komunikacji. Warszawa.
7. SKUPIEŃSKI F. 1937: Czynniki mikrobiologiczne niszczące drewno użytkowe. In: Skupieński F. (red.) Grzyby domowe i inne szkodniki budulca oraz metody i środki walki. Wyd. Polskie Towarzystwo Higieniczne. Warszawa. 49-102.
8. WAŁEK - CZARNECKA A. 1933: Grzyby niszczące podkłady kolejowe w Polsce. *Acta Soc. Bot. Pol.*, vol. X (2): 1-297.
9. WAŻNY J. 1963: Oznaczanie grzybów domowych. Arkady.
10. PN-D-95014:1997 Nawierzchnia kolejowa. Sosnowe, dębowe i bukowe materiały drzewne nawierzchni kolejowej nasycane olejem impregnacynym.
11. PN-EN 350-2:2000 Trwałość drewna i materiałów drewnopochodnych. Naturalna trwałość drewna litego. Wytyczne dotyczące naturalnej trwałości i podatności na nasycanie wybranych gatunków drewna mających znaczenie w Europie.

Streszczenie: *Basidiomycetes growing on sleepers reused in small garden architecture.* W pracy przedstawiono wyniki pięcioletnich obserwacji grzybów należących do podstawczaków występujących na użytkowych podkładach kolejowych wykorzystanych do aranżacji ogrodu. Oprócz owocników grzybów o uznanych możliwościach rozkładu drewna zabezpieczonego olejem impregnacynym stwierdzono również gatunki nie opisane dotychczas w literaturze.

Corresponding author:

Bogusław Andres,
 Department of Wood Science and Wood Protection,
 Warsaw University of Life Science-SGGW,
 Nowoursynowska 159,
 02-776 Warsaw,
 boguslaw_andres@sggw.pl