
Distribution of the fungus *Schizophyllum commune* Fr. in plantings of trees in the Kaunas city

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Infection of pruned trees growing close to the streets (*Tilia cordata* Mill., *T. europaea* L., *T. platyphyllos* Scop., *Aesculus hippocastanum* L., *Acer platanoides* L., *A. negundo* L.) and unpruned lindens (*Tilia cordata*) in the Draugystė Park by the wood-attacking fungus *Schizophyllum commune* Fr. and the spread of the pathogen during 6 years were examined. Most heavily injured were Norway maples, small-leaved lindens and common horse-chestnuts, while large-leaved lindens and European lindens were more resistant to the pathogen.

Key words: *Schizophyllum commune*, tree-pruning, disease spreading, crown recover

INTRODUCTION

Trees growing in Lithuania are pruned irregularly. Since 6–7 years trees growing close to the streets have been pruned more intensively. The trees of various age and species growing in the towns are pruned to the same extent.

During several years after the first pruning some problems connected with *Schizophyllum commune* occurred.

Few trees infected with this fungus were in other plantings (in public gardens and parks). However, the source of this fungus was noticed in the Draugystė park on small-leaved lindens growing poorly for bad growth conditions (they grow in flooded places).

Lithuanian [1] and foreign scientists [2, 3] characterised this fungus as a saprophyte – a destructor of dead timber of deciduous trees and conifers. This fungus however, like many saprophytes, can turn to parasitic lifestyle [4]. Therefore, it would be more correctly to ascribe it to saproparasites [5].

S. commune starts to develop as a saprophyte, but later the fungus gain entry to the living tree via broken twigs and wounds in the trunk and parasitised them. When the infection gets in the living tree, it not always develops into rot: the state of the timber must satisfy fungal requirements for growth and development. The susceptibility of living trees to *S. commune* depends on their ability to defend themselves actively and their general physiological state, which is determined by their growth conditions (soil, humidity, exposition, etc.) and various wounds [5]. Trees growing close to the street have much worse

growth conditions than natural ones. Some of those trees are damaged by cars and people. Soon in these wounds fungi able to deteriorate wood start to grow and develop. One of the most frequent fungi under urban conditions is *S. commune*. Trees infected by fruit-bodies of the fungus become a source of infection. Before the intensive pruning of the trees growing near the streets was started, these fungi had not been spread (disease spreading up to 5%) and had not caused serious damage. But when every tree was started to prune, very favourable conditions were created for *S. commune* to spread even in several ways: spores liberated from the fruit-bodies are blown off into cuts in the trees, as well as parts of mycelium get on the tools and are carried from injured onto healthy trees.

The aim of our work was to establish the distribution of *S. commune* in the Kaunas city plantings with special attention to pruned trees growing near the streets.

S. commune is not narrowly specialized, but it is spread mostly on lindens, as lindens are the main tree genus in the urban plantings of Lithuania [6].

MATERIALS AND METHODS

One street and a group of lindens growing in the park were chosen; 257 trees were growing in the Kudirkos street. Species composition: 92.6% small-leaved lindens (*Tilia cordata* Mill.); 2.72% common horse-chestnuts (*Aesculus hippocastanum* L.); 1.56% European lindens (*T. europea* L.), 1.56% Norway maples (*Acer platanoides* L.); 1.17% large-leaved linden

(*T. platyphyllos* Scop.) and 0.39% ashleaved maples (*A. negundo* L.). The growing conditions were typical of the most of Kaunas central streets [6]. The age of the trees was approximately 60 years.

The trees were pruned in January 1995, the degree of pruning – 4 (according to 4-degree scale). The recovering of tree crowns was evaluated on a 4-grade scale [6].

We observed 34 small-leaved lindens (*Tilia cordata*), 20-year-old, in the Draugystė park.

The intensity of the disease caused by the fungus *Schizophyllum commune* and other fungi deteriorating wood was evaluated by visual observation of the percentage of trunks and branches covered with fungal fruit-bodies and bark necrosis. The spreading of the disease was calculated according to Kovčev and Klesnina [7].

RESULTS AND DISCUSSION

Observations were made during 6 years (1995–2000) after trees had been pruned. After six years, there were gain the following data: general spreading of tree rots was 61.35%, and 37.13% of them was caused by the *S. commune*. The injure of particular species of trees is shown in Table. According to data obtained, most susceptible were Norway maples,

Before pruning, the fungal fruit-bodies were found on 9 small-leaved lindens out of all 257 trees. Even in the first year when trees had been pruned, there were noticed 4–6 trees newly infected. In the next years the number of infected trees increased. The dynamics of rot spreading in small-leaved lindens during 6 years is presented in Figure.

From 1998 the disease spreading stabilized; newly infected trees were almost absent. Nevertheless, the state of earlier infected trees became worse: parts of necrotic bark separated from wood, cracked and fell from some trees.

Lindens growing in the park were not injured mechanically. But all of them were weakened by improper growth conditions, and their state was poor: little year growth, early yellowing of leaves and defoliation. In 1995–1996, the southern part of trunks of all these trees was blackened as burnt, and after a year *S. commune* fruit-bodies were found on these parts. The temperature required for the development of these fungi is rather high (optimal 31 °C and maximal 40 °C) [5], thus fruit-bodies grow on the sothern part of trees [3, 9]. Two years later linden bark started to separate from wood, and in 2000 part of the bark from most heavily damaged trees fell down.

Observations and investigation will be continued in order to find out the extent of damage to the

Table. Spreading of tree rot

	Tress of all species	<i>Tilia cordata</i>	<i>Tilia platyph.</i>	<i>Tilia europea</i>	<i>Acer platan.</i>	<i>Acer negundo</i>	<i>Aesculus hippocast.</i>
Spreading of tree rot, %	62	46	0	0	75	0	43
Spreading of <i>S. comm.</i> (mixed infection)*, %	37(18)*	32(8)*	0	0	50(50)*	0	14(14)*
Other rots, %	25	14	0	0	25	0	29
Healthy trees, %	38	54	100	100	25	100	57

* *S. commune* with *Bjerkandera fumosa*, *Nectria cinnabarina*, *Polyporus squamosus*

small-leaved lindens and common horse-chestnuts. Despite the low number of Norway maples and common horse-chestnuts examined, the data are rather reliable, because the injury of such trees had earlier been found similar in other places observed [6]. Large-leaved and European lindens seem to be more resistant to many fungal diseases as well as to wood-decaying fungi. The activity of fungal enzymes decomposing cellulose and lignin depends on the chemical composition of wood and bark, pH, air and water in the wood [5, 8], therefore wood of different linden species could be not equally suitable for fungal nutrition.

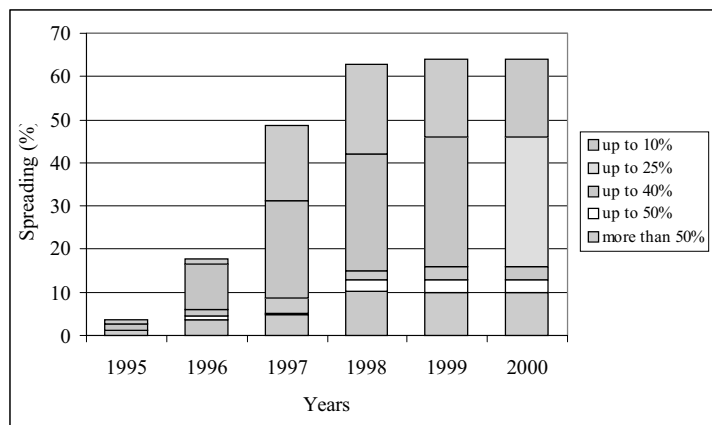


Figure. Dynamics of *Tilia cordata* wood rot spreading and intensity

town trees, caused by *S. commune* and other fungi deteriorating wood, as well as to search for means to decrease the damage.

Since trees in towns should be pruned, this work, according to recommendations of Iziumskij and Kliushnik [10], should be done in spring (March–April) when wound healing is best. After pruning it is necessary to disinfect the wounds and the tools. There is some information about the influence of microorganisms (*Bacillus* spp., *Micobacterium* spp.) development on *S. commune in vitro* [8]. The effect of these and some other microorganisms should be tested under natural conditions.

Perhaps our supposition that the large-leaved and European linden species which are less spread than small-leaved linden in urban plantings under conditions of Lithuania are more suitable in every respect, including disease resistance, will be confirmed [11].

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GRYBO *SCHIZOPHYLLUM COMMUNE* FR. IŠPLITIMAS KAUNO MIESTO ŽELDINIUOSE

Santrauka

Nuo 1995 m. stebėta prie gatvės augančių nugenėtų medžių (*Tilia cordata* Mill., *T. europaea* L., *T. platyphyllos* Scop., *Aesculus hippocastanum* L., *Acer platanoides* L., *A. negundo* L.) ir negenėtų liepų (*T. cordata*) Draugystės parke apsikrėtimas medieną ardančiais grybais *Schizophyllum commune* Fr. ir šių grybų išplitimas per 6 metus. Mūsų stebėjimų duomenimis, labiausiai pažeidžiami paprastieji klevai, mažalapės liepos ir paprastieji kaštonai. Didžialapės ir europinės liepos šiems grybams yra atsparesnės.