

OCCURRENCE OF *Phellinus pini* (BROT.) BONDARSTSER ET SINGER IN SELECTED SCOTS PINE STANDS OF NAROL FOREST DISTRICT

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Abstract. Red ring rot caused by the fungus *Phellinus pini* is a serious problem from the point of view of forest economy in Poland, as well as in other countries. The rot attacks the hard part of trunk, it develops unnoticed for several decades of years, frequently, it is not detected before the felling of the tree and it causes enormous economic losses. One can suppose that about 8% of gained pine felling product consists of rotten wood. The main objective of the presented studies was the determination of the occurrence of Scots pine stands threatened by red ring rot on the basis of the presence of fruit bodies of *Ph. pini* and of red ring rot developed in result of a hollow in the trunk which was settled by *Ph. pini* mycelium. During observation of disease symptoms on the ten separated areas (2490 trees), sings were detected on 61 trees. A great number of fruit bodies and their locality exert a high influence on the development of rot foci and thereby they cause great economic losses.

Key words: *Phellinus pini*, red ring rot, Scots pine

INTRODUCTION

Red ring rot caused by the fungus *Phellinus pini* is a serious problem from the point of view of forest economy in Poland, as well as in other countries. The rot attacks the hard part of trunk, it develops unnoticed for several decades of years, frequently, it is not detected before the felling of the tree and it causes enormous economic losses. One can suppose that about 8% of gained pine felling product consists of rotten wood [Mańka 2005]. There are only few actual data referring to the area where red ring rot occurs in Polish forests. The only information in reference to this diseases is contained in the prognoses for the successive year published by Forest Research Institute. The prognoses refer to the important forest pests and diseases which may occur in Poland. However, these data refer only to the general occurrence of diseases in logs and trunks. In the report of 2006, only two Regional Directorate of State Forest reported about the

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area threatened by red ring rot, the Regional Directorate (3055 ha) and Regional Directorate Olsztyn (4825 ha). This situation originates primarily from the difficulties to recognize the presence of rot. The disease develops for a very long time unrecognized (there are no external symptoms). The only signs of this disease are rot fruit bodies which most frequently develop in trunk wounds where earlier branches were cut off. Other external symptoms include pockets in the tree trunk, where earlier a fruit body, or a blank fruit body was growing [Mańka 2005].

The main objective of the presented studies was the determination of the occurrence of Scots pine stands threatened by red ring rot on the basis of the presence of fruit bodies of *Ph. pini* and of red ring rot developed in result of a hollow in the trunk which was settled by *Ph. pini* mycelium.

MATERIAL AND METHODS

Ten compartment in the age of 65-126 years, localized on the area of Narol Forest District (23°21'E, 30°21'N) were selected. In each compartment, plots of 1 ha area were demarcated, where each tree received a number. Then, on the particular trees, the fruit bodies or hollows, as well as the height on which they occur, were recorded.

RESULTS

During observation of disease symptoms on the ten separated areas (2490 trees), signs were detected on 61 trees. The greatest number of affected trees was found in the 54f compartment, where on the observed area as many as 39 Scots pine with fruit bodies and hollows were found (Fig. 1). In the remaining compartments, the number of trees

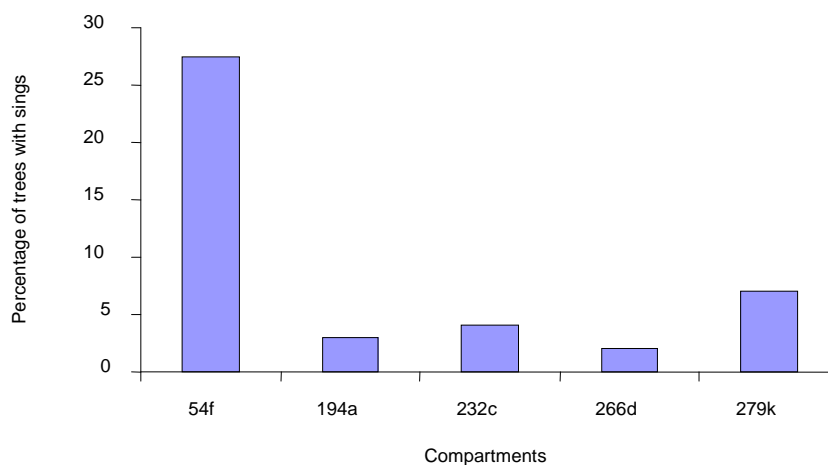


Fig. 1. Participation of trees with external symptoms of red ring rot
Rys. 1. Udział drzew z objawami zewnętrznymi wystąpienia huby sosny

with disease symptoms was significantly smaller 93-10 trees). In the compartment: 75k, 184a, 222b, 224a and 237a, no disease symptoms were found. Fruit bodies occurred at the height of 0.2-12 m (compartment 57f), most frequently at the height of 2 and 8 m (Fig. 2). Symptoms in the form of hollows occurred only in two compartment, i.e. in 54f and in 279k. On the observation area, in compartment 54f, the presence of four hollows was detected at the height of 3-4 m, on the other hand, in compartment 279k, 12 hollows were identified at the height of 1.5-12 m. The maximal number included five fruit bodies on trunk (tree no. 138, in compartment 279k) on the same tree, there were also three hollows. The greatest number of hollows was found on trees nos. 46 and 52 in compartment 279k (four pieces on each tree).

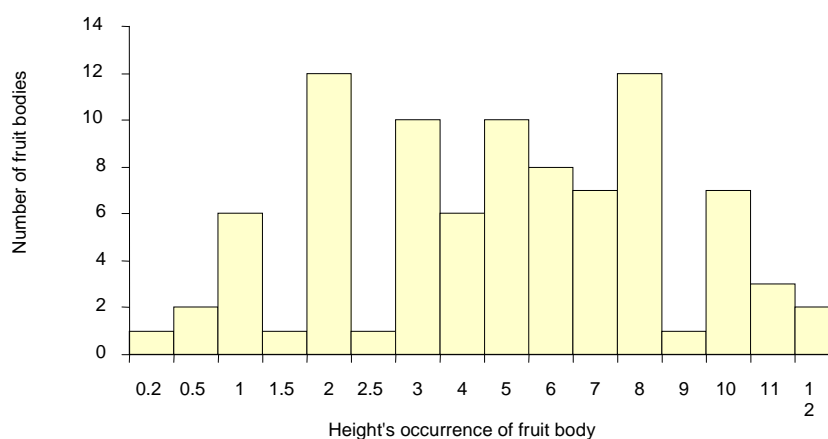


Fig. 2. Occurrence of fruit bodies in the particular sections of trunk

Rys. 2. Występowanie owocników na poszczególnych odcinkach strzały

DISCUSSION

In result of observations, one can state that over 70% of Scots pine stands exceeding the III age class were affected by red ring rot. The greatest number of fruit bodies on the same infected tree were found in compartment 54f. This is certainly connected with the age of that stand (126 years) being the oldest one among the observed stands. The number of infected trees in this stand (27%) was within the range reported by Mańka [2005], who argues that after 100 years of infection, the stand reaches a significant percentage of infection in the range of 15-35%. An influence on such situation because it is a protected stand. In the compartment 279k and 194f, also with an over 100 years old stand, the number of trees infected by *Ph. pini* was significantly below the quoted standard. However, it must be noted that the fruit body appears when the rot of the heart part of tree reaches a highly advanced degree of development. It may also happen that the fruit body had already fallen off which usually takes place after about 50 years, or it has not yet developed. In the studies carried out by Mańka and Łakomy [1991], in the Experimental Forest District Zielonka, 13% of pines in the age of 110 years had fruit bodies of *Ph. pini*. The above mentioned authors had also found that fruit bodies occurred most

frequently on the north-western side of the tree. In our observed stands, the infection dominated on the northern side of the trunks.

Fruit bodies usually appear on the trunk in places where is the oldest and most developed rot center [Mańka 2005]. Red ring rot, in a typical case, extends about 4 m upwards the trunk from the localized fruit body. On the trunk surface, the fruit bodies occurred most frequently at the height of 2 and 8 m. This results from the fact that red ring rot developed at the height of 6 and 12 m, which means that it had dominated the most valuable part of the trunk. According to Mańka [2005], the greatest number of rot is found in the lower part of trunk, i.e. in the section extending up to 5 m height. In the observed objects, the rot dominated in the central part of the trunk (at 5-10 m height).

A great number of fruit bodies and their locality exert a high influence on the development of rot foci and thereby they cause great economic losses. That is why efforts must be made in order to rebuild the stands by creating mixed stands to limit in the possibly highest degree the spread of *Ph. pini* fruit bodies and to decrease thereby the threat that pine stands which exceed the second age class will get infected by red ring rot.

In pine stands, where tree infection by red ring rot reaches 30-40%, rot develops very quickly; in the older age classes, the annual increment of rot volume frequently exceeds the annual increment of timber volume [Mańka and Mańka 1993]. Such tree stands become more sensitive to strong winds and wind storms creating significant losses in the stands [Mańka and Chwaliński 1961]. The gaps in stands are very difficult to replace by the proper tree species and they may constitute a high impediment in their building of the natural stand composition adjusted to the habitat.

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WYSTĘPOWANIE HUBY SOSNY [*Phellinus pini* (BROT.) BONDARSTSER ET SINGER] W WYBRANYCH DRZEWOSTANACH SOSNOWYCH NADLEŚNICTWA NAROL

Streszczenie. Zgnilizna biała jamkowata sosny, wywoływana przez grzyb *Phellinus pini*, jest w Polsce oraz w innych krajach poważnym problemem z punktu widzenia gospodarki le-

szej. Zgnilizna dotyka twardzielowej części strzały, rozwija się niepostrzeżenie przez dziesiątki lat i często jest stwierdzana dopiero po ścięciu drzewa. Dlatego wywołuje ogromne straty gospodarcze. Można przypuszczać, że drewno hubiaste stanowi około 8% corocznie pozyskiwanych sosnowych użytków rębnych. Głównym celem badań było określenie występowania zagrożenia drzewostanów sosnowych zgnilizną białą jamkową sosny na podstawie obecności owocników *Phellinus pini* oraz dziupli powstałych w wyniku zasiedlenia strzały przez grzybnię w Nadleśnictwie Narol. W czasie obserwacji występowania objawów chorobowych na dziesięciu powierzchniach obserwacyjnych oceniono 2490 drzew. Objawy chorobowe odnotowano na 61 drzewach. Znaczna liczba owocników i ich położenie ma duży wpływ na powstawanie nowych ognisk zgnilizny, a przez to jest przyczyną strat gospodarczych.

Słowa kluczowe: *Phellinus pini*, biała zgnilizna jamkowa sosny, sosna

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