The properties of black cherry tree wood (Prunus serotina Ehrh.) and its susceptibility to fungal decomposition in areas where it is secondary and invasive: a case study in the Kampinos National Park (Poland)

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Abstract

1 Introduction

Chondrostereum purpureum

Prunus serotina

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2 Materials and Methods

2.1 Research plots, collection and initial preparation of research material

Betula pendula *Robinia pseudoacacia* *Acer platanoides* *Pinus sylvestris* *Qercus robur* *Q. rubra.*

2.2 Research on the structural, physical and mechanical properties of wood

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-
- 3
- 3
- 3
-
-
- maxL
- maxR
- maxT
- maxV
- βL,
- βR,
- βT,
- βV,
- β,
- 12
- 12
- 12
- 12
- 12
- 12

2.3 Anatomical studies of wood fibers

2 2 2

2 2

2.4 Determination of chemical composition and pH of wood

P. serotina

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2.5 Study of wood fungal decay

Coniophora puteana

Armillaria borealis *Trametes versicolor*

Heterobasidion annosum

$p = {}^{m}/_{V}$

3

$$m_i = \frac{100 \times m_1}{100 \times MC}$$

i

1

$$U_m = \frac{m_i - m_3}{m_i} \times 100$$

m

3

i

Fagus sylvatica

2.6 Calculations and statistical analysis

3 Results and discussion

3.1 Biometrics of sample trees

	16.50±	15.40±	±	46.33
	16.5±	17.68±		40.33±

3.2 Wood grain morphology

Prunus

Structural, physical and mechanical properties of the wood

3

3

3 3

Prunus serotina

3

Prunus avium

3

3

Prunus serotina

Prunus avium

3

Prunus avium

Prunus padus

Prunus serotina

Average ring width	3.26
	2.84
Wood density at 12% ^{3}	662.71
	634.80
Wood density at 12% ^{3}	661.13
	638.41
Dry wood density at 0% ^{3}	619.97
	606.10
Wood conventional density ^{3}	522.43
	507.47
maxR	
Total tangential shrinkage $ß_{maxT}$	10.83
	11.51

maxL		
maxV		
ßR		
Coefficient of tangential shrinkage $K_{ßT}$	**0.36**	
	0.38	
ßL		
ßV		
Shrinkage anisotropy index $A_ß$	**2.16**	
	2.31	
12		
12		

12	
12	
Eg_{12}	**10706.87**
	11177.91
JEg_{12}	**1623.67**
	1752.64

3.3 Anatomical properties of wood fibers

Prunus padus

Prunus serotina

Fiber lenght	1.01	
	0.95	
Fiber diameter	0.0207	
	0.0191	
Fiber lumen	0.0109	
	0.0092	
Runkel ratio	0.96	
	1.17	
Coefficient of rigidity	23.83	
	26.14	
Mühlsteph ratio	0.720	
	0.765	
Flexibility coefficient	0.523	
	0.477	

3.4 Chemical composition and pH of wood

P. serotina *Prunus padus*

P. serotina *P. padus*
P. serotina
P. serotina

P. padus

Catechol		13.83
Hydroquinone	3.19	0.72
Caproic acid	4.07	36.04
Phytol		0.42
2-Cyclopenten-1-one, 5-hydroxy-2,3-dimethyl-		11.05

Squalene	**1.42**	**0.87**

3.5 Natural resistance of wood to fungal decay

3.5.1 The wood density of the samples used in the decay test

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3

3 *C. puteana* 3 *H. annosum* .

3 *H. annosum* 3 *A. borealis*

Prunus serotina

	3	
Armillaria borealis	**650**	**634**
Coniophora puteana	**645**	**631**
Heterobasidion annosum	**648**	**630**
Trametes versicolor	**648**	**631**
	648	**632**

P. serotina

3 3

3 *P. serotina*

3 *P. serotina*

Prunus avium

3 *P. serotina*

3

3.5.2 Moisture content of wood samples after the decay test

A. borealis *C. puteana* *H. annosum* *T. versicolor.*

Armilaria borealis	**50**	**60**
Coniophora puteana	**64**	**65**
Heterobasidion annosum	**90**	**92**
Trametes versicolor	**109**	**119**

3.5.3 Loss of wood mass after the decay test

H. annosum *C. puteana* *A. borealis* *T. versicolor* *A. borealis* *H. annosum* *C. puteana*

H. annosum

T. versicolor

Armillaria borealis	
Coniophora puteana	
Heterobasidion annosum	
Trametes versicolor	

T.

versicolor *H. annosum*

	3
Armilaria borealis	
Coniophora puteana	
Heterobasidion annosum	
Trametes versicolor	

P. serotina

P. serotina

P. serotina *T. versicolor*

P. serotina,

Fagus sylvatica

P. serotina

P. serotina

T. versicolor

P. serotina

T. versicolor

Cyclocybe aegerita *Agrocybe aegerita*

Chondrostereum purpureum *P. serotina* *T. versicolor*

P. serotina

T. versicolor

F. sylvatica *Quercus robur*

T. versicolor

P. serotina

A. borealis

Armillaria

Prunus

P. serotina

A. borealis

A. borealis *Armillaria ostoyae*

A. borealis

A. borealis *Picea abies*

Coniophora puteana *P. serotina*

P. serotina

C. puteana

C. puteana *C. puteana*

C. puteana

Heterobasidion annosum *P. serotina*

H. annosum *Betula pendula*

P. serotina

H. annosum

H. annosum

C. puteana, T. versicolor *Laetiporus sulphureus*

4 Conclusions

Prunus serotina

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-
- *serotina*

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-
-

versicolor

Declarations

Acknowledgments

References

Quercus petraea

Quercus robur *Coriolus versicolor*

Heterobasidiomycetes

Aphyllophorales *Gasteromycetes*

Prunus serotina

Armillaria

Chondrostereum purpureum

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Armillaria

Prunus serotina

Prunus serotina

Prunus serotina

Prunus serotina

Prunus serotina

Prunus serotina

(Prunus serotina

Prunus serotina

Heterobasidion annosum

Padus serotina *Padus serotina*

Prunus serotina

Portulaca oleracea

Prunus avium

Prunus avium

Prunus
avium *Prunus*
avium

(

Prunus serotina

Fagus sylvatica

Fagus sylvatica

Quercus robur

Quercus robur

Heterobasidion parviporum

Inonotus obliquus

Inonotus obliquus

Prunus padus *Prunus serotina*

Fraxinus excelsior

Prunus padus

Heterobasidion annosum

Vernonia amygdalina *Botrytis cinerea*

Armillaria

Armillaria

Figures

Figure 1

Figure 2

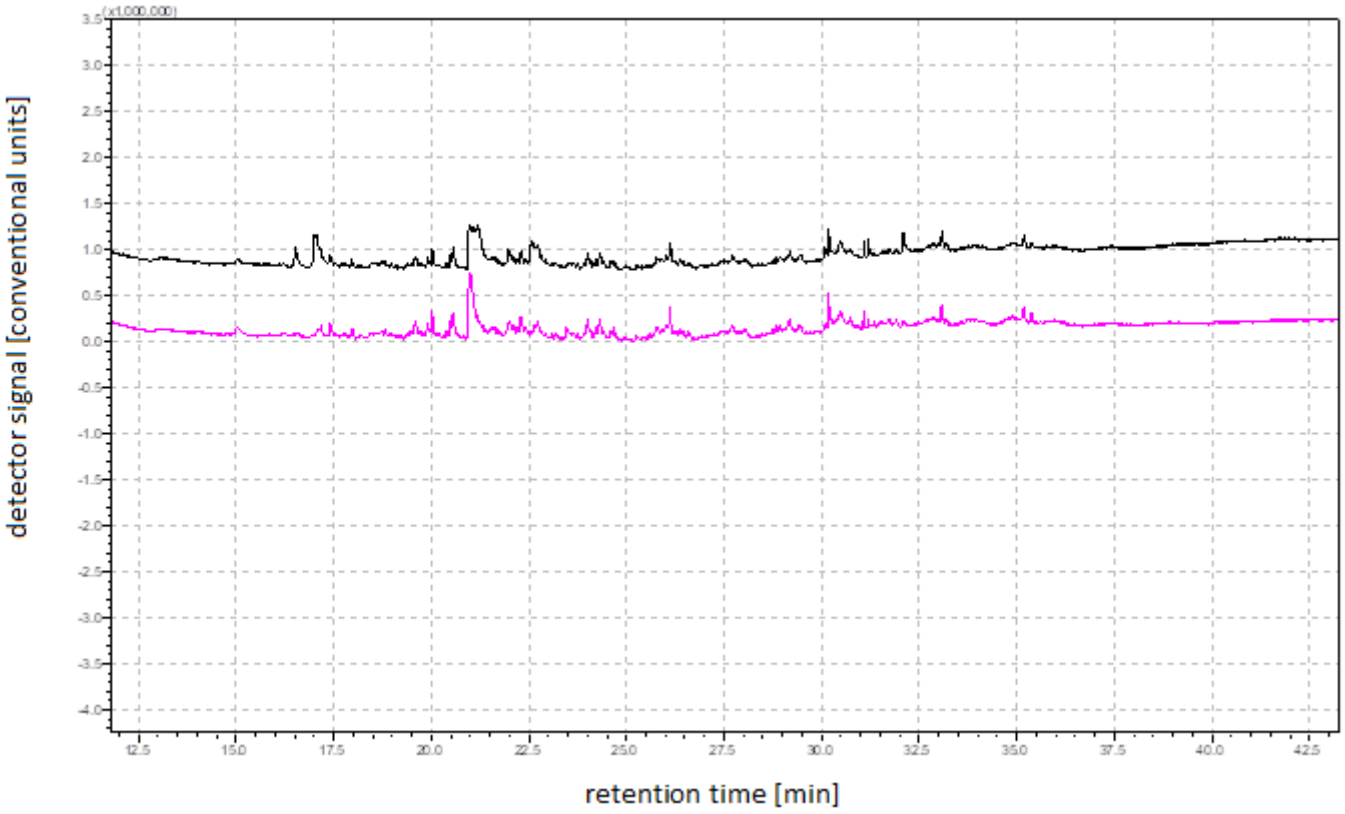
(x1,000,000)
detector signal [conventional units]
retention time [min]

Figure 3