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The Somatic Incompatibility in *Trametes versicolor* (L.) Lyod.

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Abstract
The somatic incompatibility in *Trametes versicolor* (L.) Lyod. was studied using ten wild strains. The samples were collected at Black Sea Region especially Ordu, Giresun Samsun locations. Two different types of somatic incompatible interactions were observed lightly or heavily pigmented lines developing between the two isolates. All isolates were examined with help of both light microscopy and scanning electron microscopy (SEM). The width of the compatible hyphae is 2.25 mμ and incompatible hyphae are 1.08-1.20mμ.; 960nm-1.36 mμ.
Key Words: *Trametes versicolor*, Somatic Incompatibility, Mycelium interactions

INTRODUCTION

At the fungi are defined sexual differences called heterotallizm and homotallizm [1]. *Schizophylum commune* [2], *Stereum hirsutum* [3], *Agaricus bitorquis* [4] shows heterotallizm; *Gibberella zeae* [5] and *Agaricus bisporus* [6] shows homotallizm. Dyer and Paoletti [7] have stated sexual and asexual reproduction of filamentous fungi depends on the environmental conditions. There are two types of sexual reproduction in fungi; homotallizm and heterotallizm [8]. Pal et al. [9] have examined heterokaryon incompatibility in the Aspergilli and their roles in the between the species gene flow. In Ascomycetes, Basidiomycetes and Zygomycetes class are common in the vegetative incompatibility [10], [11] and [12]. Vegetative incompatibility reactions provides to hyphal fusion and event of heterokaryon formation. In this way, in the joint cytoplasm is a located different nucleus genetically. Heterokaryon incompatibility is a process genetically regulated [13]. Many studies have been about somatic incompatibility of *Trametes versicolor*. Rayner [14] made somatic incompatibility studies in mycelium of *Trametes versicolor*. Rayner and Tood [15] studied fungal antagonism, and the polymorphism. Raynor and Tood [16] studied *Coriolus versicolor*'s genetic structure on natural populations and the distribution. Williams et al. [17] studied distribution of the population using the *Coriolus versicolor* 'somatic incompatibility test.

In this study; we were examined between the mycelium of *Trametes versicolor* compatibility-incompatibility mechanisms.

MATERIAL AND METHODS

Used Organisms

In the study, *Trametes versicolor* fructifications were used from Basidiomycetes. Dry samples were obtained from Nevsehir University, Faculty of Arts and Sciences. The examples were collected from different localities of the Black Sea region (Giresun, Ordu and Samsun). The collected samples were designated as A, B, C, D ... . . The localities of examples of were given at Table 1.

Mycelium obtained from spores

Spores were collected from the dry samples and were inoculated to the center of potato dextrose agar (PDA) medium with multiple spores method separately (18). They were incubated in the dark, 27 ºC [19], [20] at incubator and the spores were germinated.

Obtained Main Culture

At the end of incubation period-6 day- from the best spore germination groups were received mycelial agar discs -8 mm diameter- and they were inoculated to the PDA media center individually. They were incubated at dark and 27 ºC. At the end of this period; mycelium which healthy developing and covering to the Petri dish were separated the eight groups (A, C, D, E, F, G, I, K) as main culture. B and H were excluded from the study because of is not healthy for mycelial growth.

Table 1. The localities of *Trametes versicolor*

City	Localities		Name at study
Giresun	Over Keşap Highway	Road side	A
Giresun	Piraziz, Bülbüllü, Road side	Above Tree Logs	B
Giresun	Bulancak, Küçüklü	Over nuts	C
Giresun	Keşap, Çakırlı	Over nuts	D
Ordu	Ünye, Sahilköy	Over nuts	E
Ordu	Ünye, Akçay	Above Tree Logs	F
Ordu	Ünye, Akçay	Above Tree Logs	G
Samsun	Çarşamba- Ordu Highway, 3.Km, Road side	Over nuts	H
Samsun	Çarşamba, Köklük Village	Hazelnut garden	I
Samsun	Çarşamba, Demircili Village	Hazelnut garden	K

Primer mycelium transfers

The mycelial agar discs (8 mm) for breeding studies and mycelium interactions taken from stock plates and placed 2.0 cm apart in the centre of petri dishes (90 mm diameter) and they were inoculated as binary combinations [21], [22], [23] and [24] were incubated in the dark, 27ºC for 7 days. The pairings between heterokaryons of *Trametes versicolor* strains were given at Table 2.

Table 2. The pairings between heterokaryons of *Trametes versicolor* strains

A	C	D	E	F	G	I	K
AA	AC	AD	AE	AF	AG	AI	AK
	CC	CD	CE	CF	CG	CI	CK
		DD	DF	DF	DG	DI	DK
			EE	EF	EG	EI	EK
				FF	FG	FI	FK
					GG	GI	GK
						II	IK
							KK

Scanning Electron Microscopy (Scanning Electron Microscope SEM) Studies

For SEM examination, the samples was passed at 10 minute intervals by 50%, 60%, 70%, 80%, 90%, 95%, 99% ethyl alcohol series, after dehydration, samples were placed in Petri dishes and they were dried at 66°C' in the incubator for 10 day. Fragments obtained from the dry sample coated with carbon and is coated with gold for 10 minutes with Polaron Sc 500 device.

RESULTS

Mycelial interactions results of most well-developed from the main culture A, C, D, E, F, G, I and K strains are given at Table 3

Table 3. Specifications of the heterokaryotic sequence in the working groups [4], [25]

Grading heterokaryotic line	Specifications
0	There wasn't heterokaryotic line between two combinations. There wasn't interactions
1	There was heterokaryotic line between two combinations. (There was mycelial interactions). Ther was light line between heterokaryons.
2	There was heterokaryotic clear line between two combinations. (There was mycelial interactions).
3	There was very intense heterokaryotic line between two combinations. (There was mycelial interactions). There was intense pigmentation and puffy.

At the interactions resulting, heterokaryotic line evaluation were shown at Table 4.

Table 4. Heterokaryotic line evaluation between strains

	A	C	D	E	F	G	I	K
A	0	3	3	0	3	0	3	0
C		0	1	1	0	3	2	1
D			0	1	0	2	0	1
E				0	3	2	0	0
F					0	0	0	0
G						0	2	0
I							0	2
K								0

According to the schedule;

AxA, AxE, AxG, AxK, CxC, CxF, DxD, DxF, DxI, ExE, ExI, ExK, FxF, FxG, FxI, FxK, GxG, GxK, IxI between KxK strains mycelial interaction does not appear in "0" are evaluated (Figure 1 A).

CxD, CxE, CxK, DxE between DxK crossing strains heterokaryotic very light chain was seen as "1" is evaluated (Figure 1-B).

CxI, DxG, ExG, GxI between IxK cross strains seen a significant development is the line "2" is evaluated (Figure. 1-C)

AxC, AxD, AxF, AxI, CxG between ExF strains upgrade has occurred. The resulting yellow pigmentation even been identified and "3" were evaluated (Figure 1-D).

Mycelial hyphae widths were measured at the compatible hyphae as 2.25 mμ; at the incompatible hyphae as 1.08 mμ-1.20mμ; 960nm-1.36 mμ.

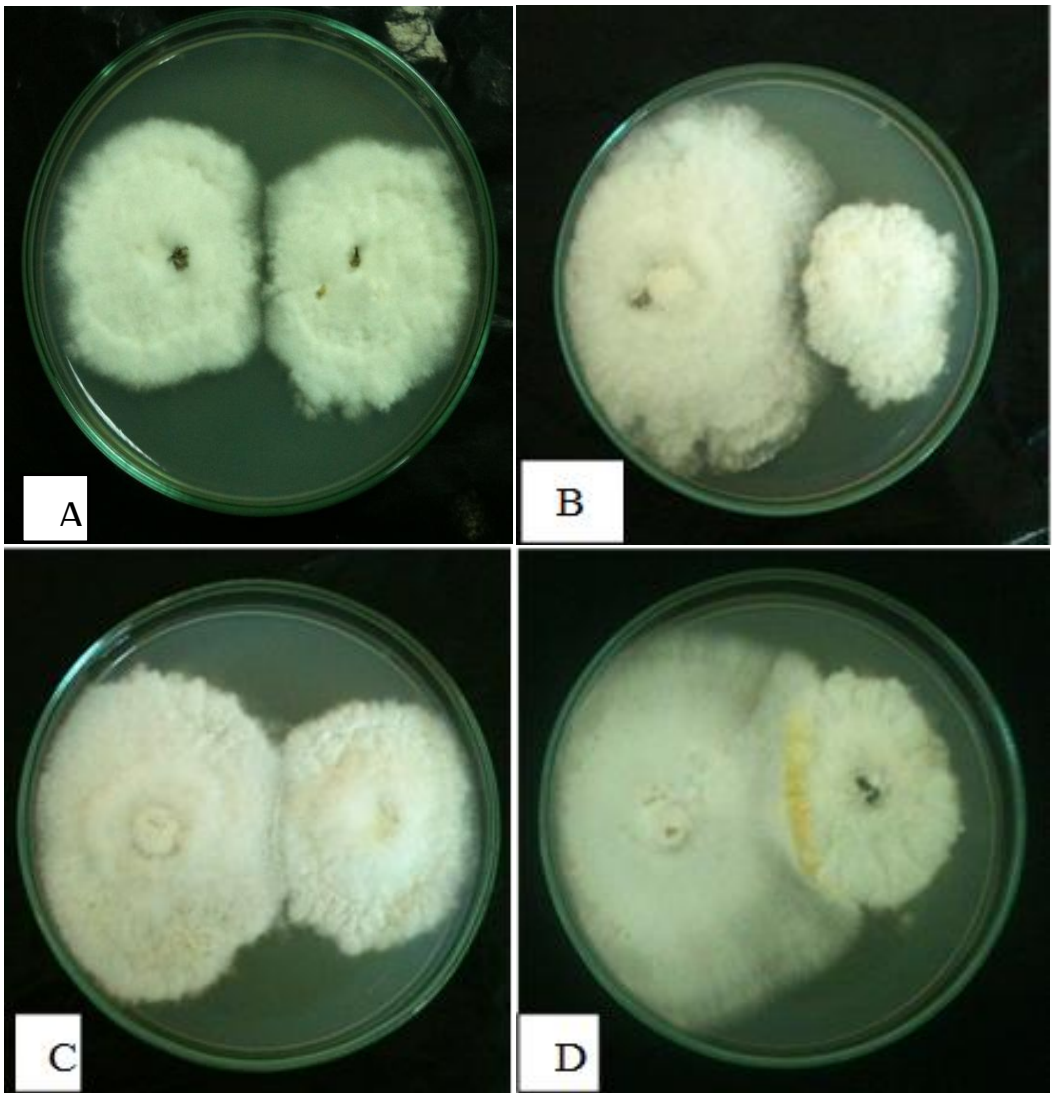

Figure 1. Heterokaryotic line evaluation between strains A) 0 –IxI B) 1- CxD C) 2- CxI D) 3-AxD

DISCUSSION

At the *Trametes versicolor* strains interactions with each other; at the AxC, axd, AXF, AX, CxG between EXF strains heterokaryotic lineage is quite apparent. At the mycelium facing region was observed upward elevation. The yellow pigmentation has occurred in the dam line. Therefore, at the mycelial interactions, grading are expressed as 3. Somatic compatibility are between the mycelium. At the CxI, DxG, ExG, GxI, FxG, FxK and IxK hybridization of strains heterokaryotic line was significant.

Therefore, at the mycelial interactions, grading are expressed as 2 and somatic compatibility are between mycelium. In the CxD, CxE, CxK, DxE and DxK mycelium interaction zone was determined light threshold line. Therefore, mycelial interaction grading is expressed as 1 and between the mycelium is somatic compatibility.

In the AxA, AxE, AxG, AxK, CxC, CxF, DxD, DxF, DxI, ExE, ExI, ExK, FxF, FxI, GxG, GxK, IxI and KxK strains interaction zone don't line formation. Therefore mycelium interactions grading are expressed as 0 and between mycelium doesn't somatic compatibility.

Interactions between the sibling species (AA, CC. DDR ... etc) there is no mycelial interaction reactions. The results indicated that 0.58 pairs of the groups were somatically incompatible and 0.42 of pairs between strains were compatible. Rayner and Tood [16] in their study with *Coriolus versicolor*, between the mycelium which obtained from dikaryotik isolates of different basidiokarp morphologically and spores were made mappings. The results of interactions stated the symbols (O, antagonism, Δ antagonism with the production of pigmentation O isolates fully). Coates and Rayner [26] mycelium of *Bjerkander adusta*, *Coriolus versicolor* and *Stereum hirsutum* were placed on beech trees and collect basidiokarp two years later. They have made mappings between isolated *Bjerkander adusta*, *Coriolus versicolor* and *Stereum hirsutum* mycelium. Dahlberg and Stenlid [27] in their studies, in *Suillus bovinus* samples collected from five regions have done mappings. Hansen et al. [25] have made the crossing with twenty-seven *Heterobasidi annosum* heterokaryons. Incompatibility reactions were observed after 6 weeks of incubation. Mahmoud et al. [28] have done hybridization experiments with twelve samples of *Rhizoctonia solani* and was evaluated as the compatibility-incompatibility after three days. They expressed to the rating as + (compatible) and - (incompatible). Eyre et al. [29] examined the mappings between mycelium of *Trametes versicolor*, *Hypholoma fasciculare* , *Stereum gausapatum* and *Bjerkander adusta*. Hiscox et al. [30] have done hybridization to determine the differences between dikaryon and monokaryon of *Trametes verscicolor* and did not find changes. Menkis and Buroki [31] have made mappings between the strains of *Neonectri macrodidyma*. As a result of their experiments they consider spread local genotypes of the fungus as asexual.

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