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RESEARCHES ON WOOD-DESTROYING FUNGI DIVISION *ASCOMYCOTA, CLASSIS ASCOMYCETES**

ABSTRACT: Orchards aging and agrotechnical cares reduction have led to suitable development conditions of a large number of wood-destroying fungi that had never been a problem for the intensive fruit growing. This caused the necessity of their study in the main orchard regions of our country. The research was conducted from 2003 to 2005 on the basis of expeditionary-geographical method. Twelve species of wood destroying *Ascomycota* fungi have been identified. Both their parasitic activity degree and phylogenetic and ontogenetic specialization level have been defined. Species with mutual hosts — fruit or forest trees have been found. That fact makes possible the infection accumulation and transfer from forest to agricultural ecosystems which is of considerable importance for the mountain fruit growing.

KEY WORDS: division *Ascomycota*, wood-destroying fungi, fruit growing, forest plantations

Orchards aging and agrotechnical cares reduction have led to suitable development conditions of a large number of wood-destroying fungi that had never been a problem for the intensive fruit growing. This caused the necessity of their study in the main orchard regions of our country.

A great part of the phytopathogenic fungi including the parasitic ones relates to *Ascomycota* division. The most characteristic features of this division are the asci — generated after the mating. They are positioned either directly on mycelium or gathered in special fruit bodies.

MATERIALS AND METHODS

The research has been conducted during the period 2003—2005 by following the expeditionary-geographical method. The study was into orchards

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and the situated next to them forest-tree species and bushes located in woods or parks. The research was carried out in several regions in Bulgaria — Sofia, Plovdiv, Pazardzik, Lovech etc., as well as in Greece — Thessaloniki, Ioanina, Serres, Kozani, Veria etc.

Special attention was paid to trees in bad physiological condition. The found fruit bodies were identified on the spot or in laboratory conditions. The identification guides of Laessoe (2000), Lincoff (2000), Κωνσταντίνιδης (2002), Garnweidner (1996), Dermek (1979), Svrček, Vančura (1983), were used.

In this research the following indexes which indicate the host-tree healthy condition have been registered: species, physiological condition, infected plant organ, age.

The following biologic and parasitic characteristics of the wood-destroying fungi: phylogenetic, organotropic and age specialization have been analyzed as indicators of their parasitic activity degree.

Spore prints for spores microscopic analysis have been taken for the fresh found fruit bodies.

RESULTS AND DISCUSSION

In the research process, on the basis of 24 samples, 12 fungi species of *Ascomycota* division have been identified which had damaged 10 different hosts — 4 fruit-trees and 6 forest-trees. Those twelve fungi cause infections or saprophytic wood rot on of fruit or forest trees and belong to 4 orders (Table 1).

Table 1. Classification of wood-destroying *Ascomycota* fungi

	Order <i>Hypocreales</i>
	<i>Nectria cinnabarina</i> Fr. (Tode) Wint
	Order <i>Leotiales</i>
	<i>Ascocoryne sarcoides</i> Groves & Wilson
	<i>Bisporella citrina</i> Korf & Karpenter
	<i>Dasyscyphus niveus</i> (Hedw. ex. Fr.) Sacc
Division <i>ASCOMYCOTA</i>	Order <i>Pezizales</i>
	<i>Distinct perlata</i> (Fr.) Fries
	<i>Scutellinia scutellata</i> (Fr.) Lambotte
Classis <i>ASCOMYCETES</i>	Order <i>Xylariales</i>
	<i>Hypoxylon fragiforme</i> (Pers. ex. Fr.) Kickx
	<i>Hypoxylon nummularia</i> (Bull. ex. Fr)
	<i>Physalospora obtusa</i> (Schweitz) Cooke
	<i>Ustulina deusta</i> (Fr.) Petrak
	<i>Xylaria hypoxylon</i> (L. ex. Hook.) Grev
	<i>Xylaria polymorpha</i> (Pers. ex. Mer.) Grev

The most frequent wood-destroying *Ascomycota* fungi among the identified ones are: *Nectria cinnabarina* (20.8%), *Hypoxylon fragiforme* (20.8%), *Ascocoryne sarcoides* (16.8%).

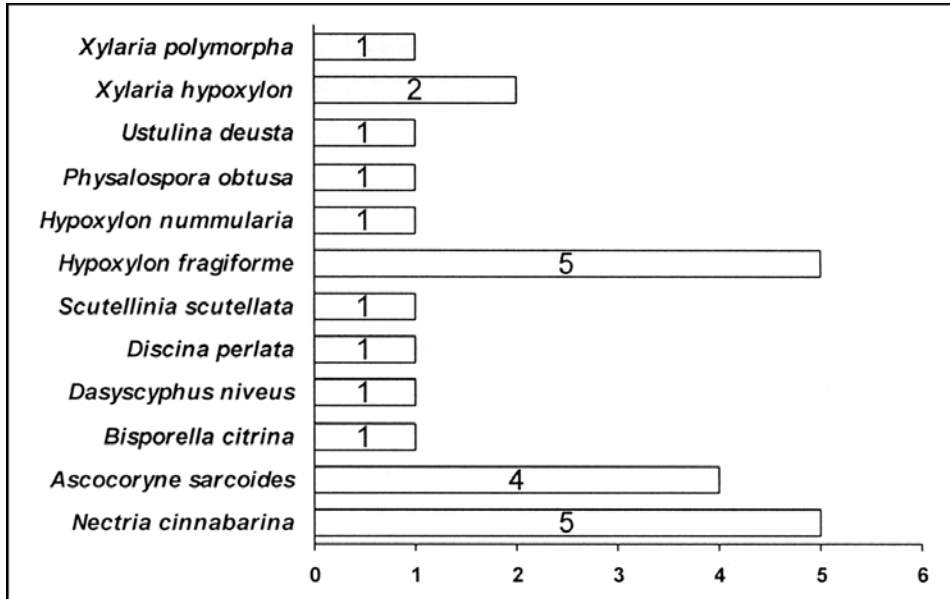


Fig. 1 Quantity of the identified species of wood-destroying *Ascomycota* fungi

In dependence with their parasitic activity level (the ability to attack living or dead organic matter) the identified wood-destroying fungi belong to three groups:

— Parasitic species which attack living trees (16,7%). The following fungi are with the highest parasitic activity level: *Nectria cinnabarina* and *Physalospora obtusa*.

— Fungi with mixed type of parasitic activity (25%). They are capable of causing pathological changes in host-trees that are weak or in bad physiologic condition, as well as saprotrophic dead wood rot. The species: *Hypoxylon fragiforme*, *Hypoxylon nummularia* and *Ustulina deusta* show mixed type of parasitic activity.

— Saprotrophic fungi which mineralize dead wood and take part in the biological energy and matter rotation (58.3%). The species: *Ascocoryne sarcoides*, *Bisporella citrina*, *Dasyscyphus niveus*, *Piscina perlata*, *Scutellinia scutellata*, *Xylaria hypoxylon* and *Xylaria polymorpha* are saprotrophic fungi (Fig. 2).

The most frequent host-fruit-trees of *Ascomycota* wood-destroying fungi are: apple (33%), walnut (33%), cherry (17%) and morello (17%). That can be explained by their higher sensibility towards wood-destroying fungi and with the fact that they are cultivated in large numbers in Bulgaria (fig. 3).

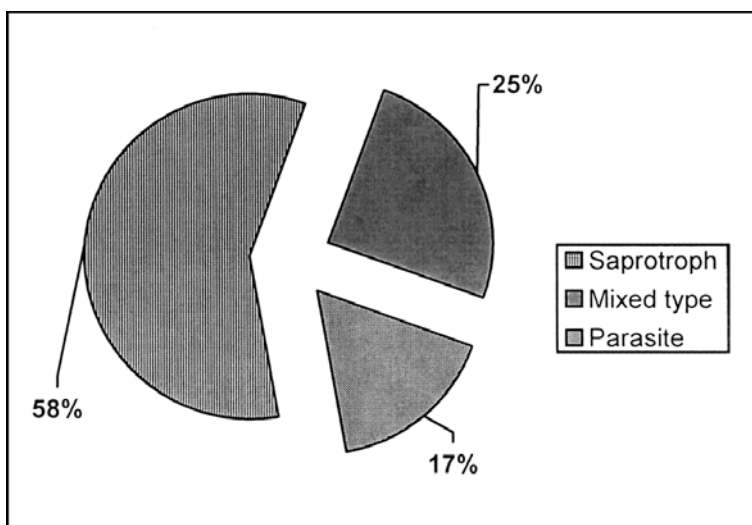


Fig. 2. Valuation of the parasitic activity of wood-destroying *Ascomycota* fungi

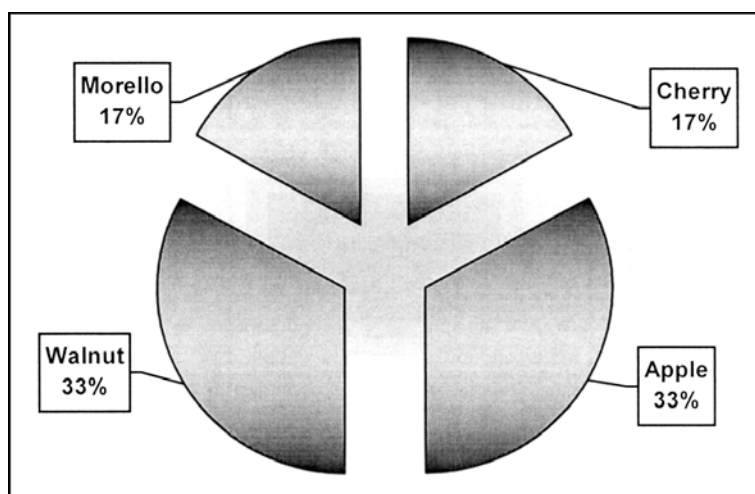


Fig. 3 Fruit cultures-hosts of wood-destroying *Ascomycota* fungi

The most frequent hosts of wood-destroying fungi among forest trees are: oak (22%), hornbeam (22%), beech (11%), fir (11%), aspen (6%), alder (6%) and other species (22%) (Fig. 4).

The identified wood-destroying fungi are able to develop on a large range of host-trees, both on deciduous and coniferous trees.

Almost perfect match is observed when comparing the literature data about the phylogenetic specialization of wood-destroying fungi and the data from our research. Species with the lowest level of phylogenetic specialization are: *Nectria cinnabarina* and *Physalospora obtusa*.

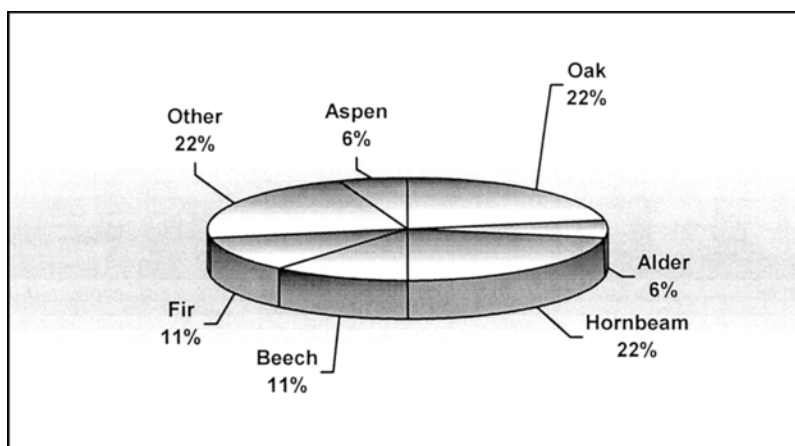


Fig. 4. Host-forest-tree species — hosts of wood-destroying *Ascomycota* fungi

Wood-destroying fungi which are capable of colonizing fruit and forest trees at the same time are dangerous for the mountain fruit-growing (Tab. 2).

Table. 2. Wood-destroying fungi which infest fruit and forest trees simultaneously

Name of wood-destroying fungi	Hosts-trees of wood-destroying fungi according to literature data	Hosts-trees of wood-destroying fungi according to the present research
<i>Ustulina deusta</i>	beech	beech
<i>Bisporella citrina</i>	oak and beech	oak
<i>Hypoxylon nummularia</i>	oak and beech	oak
<i>Nectria cinnabarina</i>	apple, pear	walnut, cherry, apple, alder
<i>Physalospora obtusa</i>	all fruit trees	walnut
<i>Hypoxylon fragiforme</i>	beech and hornbeam	beech, hornbeam, aspen and morello
<i>Discina perlata</i>	fir	fir

It is possible large quantity of infection to be accumulated in the forest ecosystems and transferred to the agricultural ones thus causing a massive scale attack and damage, provided the fungi development conditions are favorable.

CONCLUSION

As a result of the conducted research into wood-destroying fungi of *Ascomycota* division, the following inferences could be drawn:

1. The species: *Nectria cinnabarina*, *Hypoxylon fragiforme* and *Ascocoryne sarcoides* are the most spread ones.

2. The species: *Nectria cinnabarina* and *Physalospora obtusa* show the highest parasitic activity level. *Hypoxylon fragiforme*, *Hypoxylon nummularia* and *Ustulina deusta* shown mixed parasitic activity type. Saprotrophic species

are: *Ascocoryne sarcoides*, *Bisporella citrina*, *Dasyscyphus niveus*, *Discina perlata*, *Scutellinia scutellata*, *Xylaria hypoxylon* and *Xylaria polymorpha*.

3. The species: *Ustulina deusta*, *Bisporella citrina*, *Hypoxylon nummularia*, *Hypoxylon fragiforme* and *Discina perlata* show phylogenetic specialization level. Wood-destroying fungi which can be found on large number of hosts-trees are: *Nectria cinnabarina* and *Physalospora obtusa*.

The widespread wood-destroying fungi of *Ascomycota* division represent a constant infection danger among fruit trees. The limitation measures of damage caused by wood-destroying fungi should work on in changes of the fruit trees cultivation technology.

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ИСПИТИВАЊЕ ГЉИВА КОЈЕ УНИШТАВАЈУ ДРВО, РАЗРЕД ASCOMYCOTA, КЛАСА ASCOMYCETES

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Резиме

Старење воћњака и смањење агротехничких мера довело је до погодних услова за развој великог броја гљива које уништавају дрво, а које никада нису представљале проблем за интензивно воћарство. То је изазвало потребу за њиховим проучавањем у главним воћарским регионима у нашој земљи. Истраживање је спроведено у периоду од 2003. до 2005. године на основу експедицијско-географског метода. Идентификовано је дванаест врста гљива *Ascomycota* које уништавају дрво. Дефинисан је и њихов степен паразитске активности, као и ниво филогенетске и онтогенетске специјализације. Пронађене су врсте које имају заједничке домаћине — воћке или шумско дрвеће. Та чињеница омогућује акумулирање инфекције и преношење из шума у пољопривредне екосистеме, што је од великог значаја за воћарство.