

Microfungi of Forest Ecosystems in Bartın Province. I.

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Abstract

In this research the microfungi of Bartın forest ecosystems has been investigated. After revaluation of more than one hundred plant samples collected from the research area in September 16-17, 2012, 30 species belonging to 19 families and 26 genera of Ascomycota and Basidiomycota are determined. 26 species are belonging to Ascomycota and 4 species are belonging to Basidiomycota. 7 species of Ascomycota belonging to Sordariomycetes, 4 species belonging to Leotiomycetes while 15 are belonging to Dothideomycetes. All species belong to Xylotrophical and Phyllostrophical groups. 21 of 30 species are pathogens or parasites. 9 species are saprobiont. The genera *Cheiriomyces* and *Neosetophoma*, *C. stellatus*, *N. samararum*, *Phyllosticta ruscicola*, *Physalospora eriostega*, *Mycosphaerella winteri*, *Metasphaeria errabunda* and *Nectria wiridescens* species are recorded for the first time for the Turkish Mycota.

Keywords: Microfungi, forest ecosystem, Bartın, Turkey

Bartın yöresi Orman Ekosisteminin Mikrofungusları. I.

Özet

Bartın il merkezi orman ekosistemindeki bitki örtüsü hakkında birçok çalışma olmasına rağmen, mikrofunguslarla ilgili yeterince bilgi bulunmamaktadır. Arazi çalışmalarımız boyunca, yüzden fazla bitki örneği toplandı. Bu örnekler arasında otuz adet mikrofungus türü teşhis edildi. Bu mikrofungusların taksonları ve konukçu bitkileri bu makalede verildi.

Anahtar Kelimeler: Mikrofungus, orman ekosistemi, Bartın, Türkiye

Introduction

Bartın province, which is located at the northwest coast of the Black Sea region between 41°53' north and 32°45' east, is characterized by its temperate marine climate (Black Sea climate) with hot summers and cool winters (Akman 1990). Tree and shrub formations are dominated by two vegetation types as follows: around Bartın (Karabuk-Zonguldak, Bartın) Euro-Siberian elements are common and dominant, but mixed with a considerable amount of Mediterranean species. Furthermore, Mediterranean maquis communities, composed of various species such as: *Carpinus betulus* L., *Fagus orientalis* Lipsky, *Castanea sativa* Miller etc., consist of near Bartın river, although they are generally spread throughout the coastal region. Vegetation and humid climate create favourable conditions for development of fungi.

The vegetation of the Bartın forest ecosystems has been sufficiently examined (Demirörs & Kurt 2005; Kaya & Başaran

2006; Ekici 2010), but microfungi of this region have been insufficiently studied. The current study aims to identify of microfungi associated with trees and shrubs in forest ecosystems in Bartın. During a recent field study, we collected more than one hundred plant samples with symptoms of microfungi. Among these given samples, 30 species from 26 genera of Ascomycota and Basidiomycota were identified.

Materials and Methods

The material required for this study was collected from forest ecosystems in Pelikan area of Bartın province in September 16-17, 2012. Specimens of the fungi microscopically examined using a Leica DM-750 compound microscope. Hand cut sections were made using a razor blade. The fungi were identified using the relevant literature (Saccardo 1882 – 1905; Jazcevsy 1913, 1917; Grove 1935, 1937; Vassiljevsky & Karakulin 1950; Popushoj 1971; Tomilin 1979; Byzova, Vasyagina 1981; Smitskaja et al. 1986; Huhndorf, Harris 1996;

Ignatavičiūtė, Traigienė 1998; Mel'nik 2000; Azbukina 2005; Gruyter et al. 2010; Braun and Cook 2012). Host plants were identified using the "Flora of Turkey and East Aegean Islands" (Davis 1965-1985). Taxa, family, and author citations were listed according to Cannon and Kirk (2007), Kirk et al. (2008), and fungal names according to Index Fungorum (www.indexfungorum.org, accessed 2013). The systematic status of taxa is listed in alphabetical order in the text. All specimens are deposited in the Herbarium of Bartın University (HBU), Bartın, Turkey.

Abbreviations

ASB: Collection number of Ali Savas Bulbul.

Results

The identified species with their host plants are given below

Fungi

Ascomycota

Dothideomycetes

Botryosphaeriales

Botryosphaeriaceae

Phyllosticta haynaldii Sacc. & Roum. [as 'haynaldi'], *Michelia* 2 (no. 7): 342 (1881). [Anamorphic *Guignardia*]

On living leaves of *Ilex aquifolium* L. (Aquifoliaceae). ASB 5.

P. ruscicola Durieu & Mont., *Flora Algérie* 1: 611 (1849) [1846-49] [Anamorphic *Guignardia*]

On living leaves of *Ruscus hypoglossum* L. (Liliaceae). ASB 19.

Capnodiales

Mycosphaerellaceae

Mycosphaerella confusa F.A. Wolf, *Mycologia* 28(1): 85 (1936). (Anamorph *Pseudocercospora rubi* (Sacc.) Deighton)

On living leaves of *Rubus canescens* DC. (Rosaceae). ASB 11.

M. winteri (Pass.) Tomilin, *Nov. sist. Niz. Rast.* 5: 168 (1968)

On living leaves of *Rubus sanctus* Schreber (Rosaceae). ASB 22.

Stigmina carpophila (Lév.) M.B. Ellis, *Mycol. Pap.* 72: 56 (1959). [Anamorphic *Mycosphaerella*]

On living leaves of *Cerasus avium* (L.) Moench (Rosaceae). ASB 13.

S. platani (Fuckel) Sacc., *Michelia* 2(no. 6): 22 (1880). [Anamorphic *Mycosphaerella*]

On living leaves of *Platanus orientalis* L. (Platanaceae). ASB 24.

Dothideales

Dothioraceae

Metasphaeria errabunda Feltgen, *Vorstud Pilzfl. Luxemb., Nachtr.* III: 235 (1903)

On dead thin branches of *Ilex aquifolium* L. (Aquifoliaceae). ASB 29.

Incertae sedis

Englerulaceae

Sarcinella heterospora Sacc. *Fungi italica autogr. del.* 1-4: tab. 126 (1877). [Anamorphic *Schiffnerula*].

On living leaves of *Cornus sanguinea* L. (Cornaceae). ASB 16.

Strigulaceae

Oletheriostrigula papulosa (Durieu & Mont.) Huhndorf & R.C. Harris, *Brittonia* 48(4): 551 (1996).

On dead tissue of living leaves of *Rhododendron ponticum* L. (Ericaceae). ASB 14.

Incertae sedis

Incertae sedis,

Incertae sedis

Cheiromyces stellatus Berk. & M.A. Curtis, in Berkeley, *Grevillea* 3(no. 27): 97 (1875). [Anamorphic ***Pezizomycotina***]

On thin dead branches of *Ilex aquifolium* L. (Aquifoliaceae). ASB 28.

Hirudinaria mespili Ces., *Hedwigia* 1: 104 (1854). [Anamorphic ***Pezizomycotina***]

On living leaves of *Mespilus germanica* L. (Rosaceae). ASB 17.

Neomarssoniella juglandis (Lib.) U. Braun, *Nova Hedwigia* 53(3-4): 304 (1991). [Anamorphic ***Pezizomycotina***]

On living leaves of *Juglans regia* L. (Juglandaceae). ASB 15.

Naemospora microspora Desm. var. ***carpineae*** D. Sacc., *Mycotheca ital.*: no. 1567 (1898) [Anamorphic ***Pezizomycotina***]

On living bark of *Carpinus betulus* L. (Betulaceae). ASB 18.

Pleosporales

Leptosphaeriaceae

Neosetophoma samararum (Desm.) Gruyter, Avescamp & Verkley, [as '*samarorum*'], in de Gruyter, Woudenberg, Aveskamp, Verkley, Groenewald & Crous, *Mycologia* 102(5): 1075 (2010). [Anamorphic ***Didymella***].

On samara fruit of *Acer campestre* L. (Aceraceae). ASB 27.

Leptosphaeria rusci (Fr.) Sacc., *Syll. fung.* (Abellini) 2: 74 (1883)

On semi-dry leaves of *Ruscus aculeatus* L. (Liliaceae). ASB 6.

Leotiomycetes

Helotiales

Dermateaceae

Gloeosporium carpinicola Ellis & Dearn. Saccardo's *Syll. fung.* XIV: 1011 (1899). [Anamorphic ***Dermateaceae***].

On living leaves of *Carpinus betulus* L. (Betulaceae). ASB 8.

Erysiphales

Erysiphaceae

Erysiphe platani (Howe) U. Braun & S. Takam., *Schlechtendalia* 4: 12 (2000).

On young leaves and green shoots of *Platanus orientalis* L. (Platanaceae). ASB 25.

Helotiales

Incertae Sedis

Cylindrosporium castaneae (Lév.) Krenner. [Anamorphic ***Pyrenopeziza***].

On living leaves of *Castanea sativa* Miller (Fagaceae). ASB 20.

Monostichella robergei (Desm.) Höhn., *Sber. Akad. Wiss. Wien, Math.-naturw. Kl., Abt. 1* 125(1-2): 95 (1916) [Anamorphic ***Drepanopeziza***].

On living leaves of *Carpinus betulus* L. (Betulaceae). ASB 7.

Sordariomycetes

Diaporthales

Gnomoniaceae

Discula campestris (Pass.) Arx, *Verh. K. ned. Akad. Wet., tweede sect.* 51(3): 67 (1957) [Anamorphic ***Apiognomonina***].

On living leaves of *Acer campestre* L. (Aceraceae). ASB 21.

Melanconidaceae,

Melanconium stromaticum Corda, *Icon. fung.* (Prague) 1: 3 (1837). [Anamorphic ***Melanconis***].

On thin dead branches of *Carpinus betulus* L. (Betulaceae). ASB 1.

Hypocreales

Nectriaceae

Cosmospora viridescens (C. Booth)
Gräfenhan & Seifert, in Gräfenhan, Schroers,
Nirenberg & Seifert, *Stud. Mycol.* **68**: 96
(2011) (= *Nectria viridescens* Booth).

On falled dead branches of *Carpinus betulus*
L. (Betulaceae). ASB 3.

Incertae sedis

Glomerellaceae

Colletotrichum trichellum (Fr.) Duke,
Trans. Br. mycol. Soc. **13**(3-4): 173 (1928).
[Anamorphic ***Glomerella***].

On living leaves of *Hedera colchica*
(K.Koch) K.Koch (Araliaceae). ASB 9.

Xylariales

Diatrypaceae

Diatrype stigma (Hoffm.) Fr., *Summa veg.*
Scand., Section Post. (Stockholm): 385
(1849)

On dead branches of *Quercus petraea*
(Mattuschka) Liebl. (Fagaceae). ASB 4.

Hyponectriaceae

Physalospora eriostega (Cooke & Ellis)
Sacc., Saccardo P.A. *Sylloge Fungorum* I:
443 (1882).

On dead branches of *Laurus nobilis* L.
(Lauraceae). ASB 32.

Xylariaceae

Biscogniauxia nummularia (Bull.) Kuntze,
Revis. gen. pl. (Leipzig) **2**: 398 (1891)

On thick dead branches of *Fagus orientalis*
Lipsky (Fagaceae). ASB 2.

Basidiomycota

Melampsoraceae

Melampsora populnea (Pers.) P. Karst.,
Bidr. Känn. Finl. Nat. Folk **31**: 53 (1879).

On living leaves of *Populus nigra* L.
(Salicaceae). ASB 26.

Pucciniaceae

Gymnosporangium clavariiforme (Walfen)
DC., in Lamarck & de Candolle, *Fl. franç.*,
Edn 3 (Paris) **2**: 217 (1805).

On living leaves of *Crataegus monogyna*
Jacq. (Rosaceae). ASB 29.

G. confusum Plowr., *Monograph Brit.*
Ured.: 232 (1889).

On living leaves of *Mespilus germanica* L.
(Rosaceae). ASB 10.

Puccinia smilacis (Schwein.) Syd., *Annl.*
mycol. **20**(3/4): 118 (1922).

On living leaves of *Smilax excelsa* L.
(Liliaceae). ASB 12.

Discussion

Ascomycota stands out in terms of the number of species (86.7 %) and others are the members of Basidiomycota (13.3 %). 7 species of Ascomycota belonging to Sordariomycetes, 4 species belonging to Leotiomycetes while 15 are belonging to Dothideomycetes. The identified species are analyzed in terms of trophic structures which are often seen in Xylotroph and Phyllostroph. 21 of 30 species are found to be pathogens or parasites. These fungi are narrowly specialized to their hosts plants, and caused different necrose type, rust, leaf spots and other diseases on trees and shrubs. The remaining 9 species are saprobiont. They develop on different host plants and they play a part in the process of the cycle of matter and energy in biocoenose. In addition to genera *Cheiromyces* and *Neosetophoma*, *C. stellatus*, *N. samararum*, *Phyllosticta ruscicola*, *Physalospora eriostega*, *Mycosphaerella winteri*, *Metasphaeria errabunda* and *Nectria viridescens* species are considered to be new records for the Turkish Mycota. *Puccinia smilacis* have been recorded by us secondly, it was registered by Hüseyin & Karahan formerly (2005). Similar studies were studied in Black sea coastal region forest ecosystem except Bartın provinces and identified species such as *Phyllosticta haynaldii*, *P. ruscicola*, *Gloeosporium carpnicola*, *Hirudinaria*

mespili, *Diatrype stigma*, *Discula campestris* etc. (Hüseyinov & Selçuk 2001a, 2001b; Mel'nik et al. 2004; Selçuk & Hüseyin 2005) The identified species of microfungi are different consortive relations with 21 host plant species in 18 genera of 19 families.

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