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BIODIVERSITY OF GREEK FIR (*ABIES CEPHALONICA* LOUDON) EXPERIMENTAL STANDS IN ROGÓW ARBORETUM (POLAND)

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Abstract. The paper gives a survey of biodiversity of Greek fir (*Abies cephalonica*) stands in Rogów Arboretum on the background of environmental data. Greek fir is native to the southern and central Greece to the areas of the Mediterranean-montane climate. The data concerning differentiation and species composition of natural stands are not complete as well as those on Greek fir plantations in Europe. The study conducted in Rogów Arboretum has shown the presence of 62 taxa of vascular plants and mosses, 58 taxa of macrofungi and 132 of invertebrates.

Key words: *Abies cephalonica*, Greek fir, biodiversity, vascular plants, macrofungi, nematodes, mites, insects

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INTRODUCTION

Greek fir (*Abies cephalonica* Loudon) is endemic to the mountains of central and southern Greece and indigenous to islands of Cephalonia (Ionian Sea), Euboea in the Aegean Sea, Sterea Hellas, and in the far south of Peloponnesos [Farjon 2010]. From central Greece northwards, Greek fir is progressively replaced by *Abies ×borisii-regis* [Fady and Conkle 1993]. Individual trees with genuine characters of Greek fir occur mixed with intermediate forms well into Macedonia [Farjon 2010]. It grows under a wide range of ecological conditions contributing to isolation, hybridization and introgression phenomena [Fady and Conkle 1993].

Greek firs reach 30-35 m of height and 1.5-2 m of diameter at breast height. It is a montane tree species, occurring from 800 (600) to 2000 (2100) m a.s.l. in the high mountains of Greece. Soils are usually well drained and calcareous, but in the northern part of its natural range, where introgression with *Abies alba* seems to have occurred, it grows also on siliceous soils, which may be slightly acid [Eckenwalder 2009, Farjon 2010]. Greek fir may be found growing on soils derived from a variety of parent materials, for example limestone, dolomites, shale, serpentine and sandstone, with pH ranged from 5 to 8 [Panetsos 1975]. The climate has relatively dry summers and wet winters, with annual precipitation from 700 to 1500 mm. At lower elevations *A. cephalonica* mixes with *Fagus orientalis*, *Quercus* spp., *Castanea sativa* and also *Pinus nigra*, whereas higher in the mountains it usually forms pure forests with *Juniperus oxycedrus* [Dimopoulos et al. 1996, Eckenwalder 2009, Farjon 2010]. However, the optimum altitudinal distribution is considered to be from 800 to 1200 m a.s.l. [Panetsos 1975].

The surface area covered by *Abies cephalonica* in the Mediterranean region equals ca. 200 000 ha. It can develop in a sub-humid climate characterized by a relatively low annual precipitation of between 700 and 800 mm, but Greek firs are located mainly in humid bioclimates characterized by an annual precipitation of 1000 mm or more. It occupies geographical zones with mean annual temperature ranges from ca. 7.5 to 16°C. *Abies cephalonica* is considered one of the most sensitive to frost Mediterranean fir species and suffers at temperature below –15°C. The other firs are resistant to very low temperatures of about –30°C [Aussenac 2002].

Abies cephalonica has the status of withstanding dry habitat conditions but its relative ecological and competitive position is unsatisfactorily known [Bergmeier 2002]. Greek fir is able to regenerate on very low light levels and seedlings may live under deep shade for 60 years or more [Panetsos 1975, Fyllas et al. 2008, Politi et al. 2009]. According to Politi et al. [2007] seed production in the Mt. Aenos National Park appears to begin when trees have reached the age of 25-30 years (>5 m height and >9 cm diameter at breast height). Greek fir seedlings require 4 to 5 years to reach 20 cm of height and 10 years to reach 50-60 cm of height [Panetsos 1975]. The regeneration of *A. cephalonica* on Mount Parnitha (mainland Greece) reaches a maximum in areas with an organic horizon ranging between 1.5 and 2.5 cm in depth. It was also shown that the rooting system of *A. cephalonica* is not very developed at the seedling stage, thus seedlings that germinated on microsites with a thinner organic horizon grow better [Politi et al. 2009]. According to Politi et al. [2009] *A. cephalonica* presents the typical behaviour of a masting species and the survivorship of seedlings was positively influenced among others by: closed ground cover, higher elevation a.s.l. (1600 m), shallow soil and closed canopy. Moreover, seedling survival was higher in years of low seedling production.

Greek fir was an important tree species in the past but nowadays it is too rare to be of economic significance. Moreover, during the last 5 decades a visible decrease in Greek fir populations has been reported for Greece [Raftoyannis and Radoglou 2001, Tsopelas et al. 2001, Politi et al. 2009]. The most visible symptoms include crown die-back, needle discoloration and loss, death of twigs and branches and finally – tree death [Raftoyannis et al. 2008]. It was hypothesized that the Greek fir forest is showing signs of stress and dieback commonly attributed to past mismanagement, periodic drought, and to disease. For example Heliotis et al. [1988] suggested that air pollution could be contributing to the decline of the Greek fir forest.

MATERIAL AND METHODS

The study was conducted in two Greek fir (*Abies cephalonica* Loudon) 61-year old stands, situated in the Rogów Arboretum of the Warsaw University of Life Sciences (SGGW), Poland (51°49'N, 19°53'E). The study plots (site A and B) were located in the central part of the Arboretum. The detailed information for both stands is shown in Table 1.

Table 1. Characteristics of *Abies cephalonica* experimental plots (2009) [Hotała 2010]
Tabela 1. Charakterystyka powierzchni doświadczalnych z *Abies cephalonica* (2009) [Hotała 2010]

Characteristics Charakterystyka	Study site A Powierzchnia doświadczalna A	Study site B Powierzchnia doświadczalna B
Year of stand establishment Rok założenia drzewostanu	1954	1954
Year of seed sprouting Rok skiełkowania nasion	1949	1949
Area of experimental plot Powierzchnia poletek badawczych	0.043 ha	0.0369 ha
Seed origin Pochodzenie nasion	Wirty Arboretum, Poland, 53°54'N, 18°23'E	Wirty Arboretum, Poland, 53°54'N, 18°23'E
Stand density, trees·ha^{-1} Zagęszczenie, drzewa·ha^{-1}	674	783
Stand age Wiek drzewostanu	61	61

According to the long-term meteorological observations (55 years) from the closest meteorological station in Strzelna, mean annual temperature is 7.2°C (January: –3.2°C, July: 17.3°C), mean annual precipitation is 596 mm (404-832 mm, ca. 70% of annual precipitation is in the growing season), and mean growing season length (calculated as the number of days with mean temperature ≥5°C) is 212 days [Bednarek 1993, Jagodziński and Banaszczak 2010].

The study plots are located on a flat terrain ca. 189 m a.s.l. The soils were developed on a postglacial formation, in the region of a ground moraine. The soils are rich, mesic,

with the groundwater level beyond the reach of tree roots [Czępińska-Kamińska et al. 1991, Jagodziński and Banaszczak 2010]. Soil unit is haplic luvisol. Soil texture in the A horizon was sandy silt. The content of sand fraction was 47%, silt fraction 48.5%, clay fraction 4.5%. Soil reaction was strongly acidic, pH measured in M KCl in particular horizons was as followed: Oll 4.09, Ol 4.82, Ofh 4.19 and A 3.28. Total acidity was respectively: Oll 47.14 cmol(+)/kg, Ol 32.91 cmol(+)/kg, Ofh 52.89 cmol(+)/kg and A 11.44 cmol(+)/kg.

During three-year study (2007-2010), vascular plants, mosses, and soil invertebrates (nematodes, mites and insects) were recorded and determined in the experimental plots. Observations of macrofungi (mycorrhizal, saprotrophic and parasitic species; corticioid taxa not included) were carried out in 2008-2010. Identification of sporocarps was based on standard methods used in mycological studies. The nomenclature follows Index Fungorum (indexfungorum.org/Names/Names.asp). Vouchers of dried fungal materials have been deposited in the Herbarium Universitatis Lodziensis (LOD).

The list of the taxa found in *Abies cephalonica* plots was compared with the list of taxa found in the subcontinental oak-hornbeam forest *Tilio-Carpinetum* Traczyk 1962 *calamagrostietosum*, situated in the western part of the Arboretum. The oak-hornbeam forest was dominated by native tree species. The upper stand layer is formed by *Quercus petraea* and *Pinus sylvestris* as well as *Populus tremula*. The lower tree layer and undergrowth were dominated by *Carpinus betulus*.

RESULTS

During the study 252 taxa of plants, fungi and invertebrates were found in *Abies cephalonica* stands. There are 62 taxa of vascular plants and mosses, 58 taxa of fungi and 132 taxa of invertebrates. In the control sites (*Tilio-Carpinetum*) 281 taxa of the organisms studied were found. There are 52 taxa of vascular plants and mosses, 67 taxa of fungi and 162 taxa of invertebrates (Fig. 1). Below is the list of the organisms recorded in the *Abies cephalonica* plots examined.

Vascular plants cultivated in the Arboretum, spontaneous in the investigated plots

Abies cephalonica Loudon, *Acer caudatum* ssp. *ukurunduense* (Trautv. & C.A. Mey.) A.E. Murray, *Acer rubrum* L., *Acer rufinerve* Siebold & Zucc., *Acer tataricum* L., *Amelanchier spicata* (Lam.) K. Koch, *Castanea sativa* Mill., *Chamaecyparis pisifera* (Siebold & Zucc.) Endl., *Kalopanax septemlobus* (Thunb.) Koidz., *Quercus rubra* L., *Smilax sieboldii* Miq., *Carya* sp., *Cornus* sp., *Crataegus* sp.

Spontaneous vascular plants

Acer campestre L., *Acer platanoides* L., *Acer pseudoplatanus* L., *Anemone nemorosa* L., *Arrhenatherum elatius* (L.) P. Beauv. ex J. Presl & C. Presl, *Carex digitata* L., *Carex ovalis* Gooden., *Carex pilulifera* L., *Carpinus betulus* L., *Cerasus avium* (L.) Moench, *Corylus avellana* L., *Dryopteris carthusiana* (Vill.) H. P. Fuchs, *Euonymus europaea* L., *Fagus sylvatica* L., *Frangula alnus* Mill., *Galeopsis pubescens* Besser, *Galium schultesii* Vest, *Hedera helix* L., *Hieracium laevigatum* Willd., *Hieracium mu-*

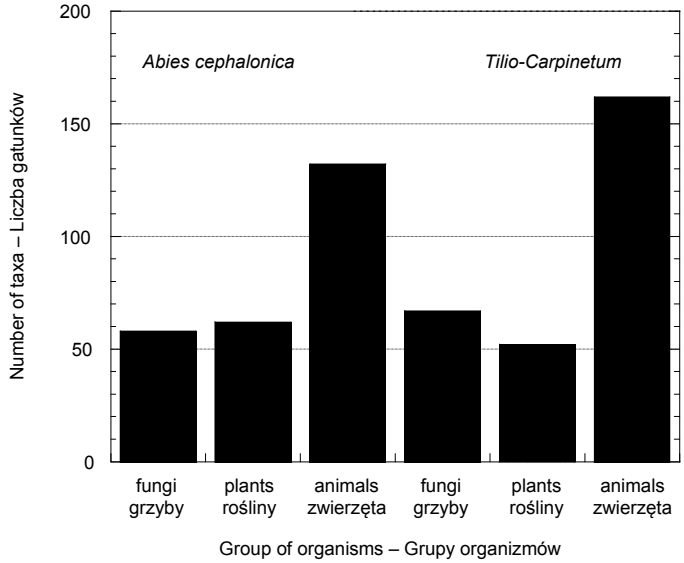

Fig. 1. Number of fungi, plants and animals taxa found in *Abies cephalonica* stands and *Tilio-Carpinetum* sites (control)
Rys. 1. Liczba gatunków grzybów, roślin i zwierząt stwierdzonych w drzewostanach *Abies cephalonica* i na powierzchni kontrolnej *Tilio-Carpinetum*

rorum L., *Lonicera xylosteum* L., *Luzula pilosa* (L.) Willd., *Maianthemum bifolium* (L.) F. W. Schmidt, *Melica nutans* L., *Milium effusum* L., *Moehringia trinervia* (L.) Clairv., *Mycelis muralis* (L.) Dumort., *Oxalis acetosella* L., *Padus serotina* (Ehrh.) Borkh., *Picea abies* (L.) H. Karst., *Quercus petraea* (Matt.) Liebl., *Quercus robur* L., *Rosa canina* L., *Rubus corylifolius* Sm. Agg., *Rubus hirtus* Waldst. & Kit. Agg., *Rubus idaeus* L., *Sambucus nigra* L., *Sambucus racemosa* L., *Sorbus aucuparia* L., *Taraxacum officinale* F. H. Wigg., *Vaccinium myrtillus* L., *Veronica officinalis* L., *Viola riviniana* Rchb.

Mosses

Brachythecium rutabulum (Hedw.) B., S. & G., *Brachythecium salebrosum* (Web. & Mohr) B., S. & G., *Dicranella heteromalla* (Hedw.) Schimp., *Plagiomnium affine* (Funck) T. Kop., *Pohlia nutans* (Hedw.) Lindb.

Mycorrhizal fungi

Amanita citrina (Schaeff.) Pers., *Amanita gemmata* (Fr.) Bertill., *Amanita muscaria* (L.) Lam., *Amanita pantherina* (DC.) Krombh., *Amanita porphyria* Alb. & Schwein., *Amanita rubescens* Pers., *Cortinarius* cf. *cinnamomeus* (L.) Fr., *Cortinarius* sp. 1, *Lactarius aurantiacus* (Pers.) Gray, *Lactarius camphoratus* (Bull.) Fr., *Paxillus involutus* (Batsch) Fr., *Russula aeruginea* Fr., *Russula* cf. *brunneoviolacea* Crawshay, *Russula cremeoavellanea* Singer, *Russula cyanoxantha* (Schaeff.) Fr., *Russula lilacea*

Quél., *Russula nigricans* Fr., *Russula ochroleuca* (Pers.) Fr., *Russula puellaris* Fr., *Russula vesca* Fr., *Tricholoma saponaceum* (Fr.) P. Kumm., *Xerocomus badius* (Fr.) E.-J. Gilbert, *Xerocomus chrysenteron* (Bull.) Quél.

Saprotrophic and parasitic fungi

Agaricus sp. 1, *Ampulloclitocybe clavipes* (Pers.) Redhead, Lutzoni, Moncalvo & Vilgalys, *Armillaria* sp., *Calocera viscosa* (Pers.) Fr., *Ceratiomyxa fruticulosa* (O.F. Müll.) T. Macbr., *Chlorophyllum rhacodes* (Vittad.) Vellinga, *Clavulina coralloides* (L.) J. Schröt., *Clavulina* sp. 1, *Clitocybe* spp., *Conocybe* sp., *Cystodermella granulosa* (Batsch) Harmaja, *Dacrymyces stillatus* Nees, *Entoloma* spp., *Fuligo septica* (L.) F.H. Wigg., *Gymnopilus penetrans* (Fr.) Murrill, *Gymnopus dryophilus* (Bull.) Murrill, *Gymnopus peronatus* (Bolton) Antonín, Halling & Noordel., *Heterobasidion annosum* (Fr.) Bref., *Hygrophoropsis aurantiaca* (Wulfen) Maire, *Hypholoma fasciculare* (Huds.) P. Kumm., *Lepista flaccida* (Sowerby) Pat., *Lycogala epidendrum* (J.C. Buxb. ex L.) Fr., *Lycoperdon nigrescens* Wahlenb., *Lyophyllum connatum* (Schumach.) Singer, *Macrolepiota procera* (Scop.) Singer, *Mycena pura* (Pers.) P. Kumm., *Mycena zephirus* (Fr.) P. Kumm., *Mycena* spp., *Nectria cinnabarina* (Tode) Fr., *Pluteus cervinus* (Schaeff.) P. Kumm., *Postia caesia* (Schrad.) P. Karst., *Pseudohydnum gelatinosum* (Scop.) P. Karst., *Ramaria* sp., *Rhodocollybia butyracea* f. *asema* (Fr.) Antonín Halling & Noordel., *Tricholomopsis rutilans* (Schaeff.) Singer.

Nematodes

Alaimina sp., *Aphelenchoides* spp., *Cephalenchus hexalineatus* (Geraert) Geraert et Goodey, *Criconema annuliferum* (de Man) Micoletzky, *Ditylenchus* spp., Dorylamida spp., Enoplida sp., *Filenchus discrepans* (Andrásssy) Raski et Geraert, *Filenchus misellus* (Andrássy) Raski et Geraert, *Filenchus* sp., *Malenchus bryophilus* (Steiner) Andrássy, *Paratylenchus projectus* Jenkins, *Paratylenchus straeleni* (de Coninck) Oostenbrink, Rhabditida spp., *Xenocrinonemella macrodora* (Taylor) De Grisse et Loof.

Acari (Oribatida)

Achipteria coleoptrata (L.), *Achipteria quadridentata* (Willmann), *Acrotritia duplicata* (Grandjean), *Adoristes ovatus* (C.L. Koch), *Autogneta longilamellata* (Michael), *Berniniella silvatica* (Vasiliu et Călugăr), *Carabodes coriaceus* C.L. Koch, *Carabodes labyrinthicus* (Michael), *Carabodes ornatus* Štorkán, *Chamobates voigtsi* (Oudemans), *Damaeus auritus* C.L. Koch, *Damaeus verticillipes* (Nicolet), *Eueremaeus oblongus* (C.L. Koch), *Eupelops torulosus* (C.L. Koch), *Galumna lanceata* (Oudemans), *Hafenrefferia gilvipes* (C.L. Koch), *Liacarus coracinus* (C.L. Koch), *Liochthonius plumosus* Mahunka, *Liochthonius tuxeni* (Forsslund), *Metabelba pulverulenta* (C.L. Koch), *Micreremus gracilior* Willmann, *Microppia minus* (Paoli), *Microtritia minima* (Berlese), *Moritzoppia keilbachi* (Moritz), *Mycobates tridactylus* Willmann, *Nothrus silvestris* Nicolet, *Oppiella nova* (Oudemans), *Oribatella quadricornuta* (Michael), *Oribatula tibialis* (Nicolet), *Phauloppia rauschenensis* (Sellnick), *Phthiracarus boresetosus* Jacot, *Phthiracarus longulus* (C.L. Koch), *Porobelba spinosa* (Sellnick), *Poroliodes farinosus* (C.L. Koch), *Quadroppia quadricarinata* (Michael), *Ramusella*

insculpta (Paoli), *Scheloribates latipes* (C.L. Koch), *Sellnickochthonius cricoides* (Weis-Fogh), *Steganacarus carinatus* (C.L. Koch), *Suctobelbella sarekensis* (Forsslund), *Suctobelbella subcornigera* (Forsslund), *Suctobelbella subtrigona* (Oudemans), *Tectocepheus velatus* (Michael), *Trichoribates berlesei* (Jacot), *Xenillus tegeocranus* (Hermann).

Acari (Mesostigmata)

Amblyseius sp., *Hypoaspis aculeifer* (Canestrini), *Eviphis ostrinus* (C.L. Koch), *Leptogamasus cuneoliger* Athias-Henriot, *Leptogamasus suecicus* Trägårdh, *Pachylaelaps suecicus* Sellnick, *Pachylaelaps furcifer* Oudemans, *Pachylaelaps magnus* Halbert, *Pachylaelaps vysotskaje* Koroleva, *Paragamasus conus* (Karg), *Paragamasus puerilis* Karg, *Paragamasus vagabundus* (Karg), *Pergamasus barbarus* (Berlese), *Prozercon kochi* Sellnick, *Rhodacarus coronatus* Berlese, *Veigaia nemorensis* (C.L. Koch), *Zercon peltatus* C.L. Koch, *Zercon* sp. 1, *Zercon triangularis* C.L. Koch.

Insects (Collembola)

Allacma fusca (L.), *Anurida granulata* Agrell, *Arrhopalites spinosus* Rusek, *Ceratophysella denticulata* (Bagnall), *Ceratophysella* sp., *Desoria* sp. juv., *Entomobrya muscorum* (Nicolet), Entomobyidae spp. juv., *Folsomia lawrencei* Rusek, *Folsomia quadrioculata* (Tullberg), *Friesea truncata* Cassagnau, *Isotomiella minor* (Schaffer), *Lepidocyrtus lanuginosus* (Gmelin), *Lepidocyrtus lignorum* (Fabricius), *Lepidocyrtus lignorum* gr juv., *Lipotrix lubbocki* (Tullberg), *Mesaphorura hylophila* Rusek, *Mesaphorura macrochaeta* Rusek, *Micraphorura absoloni* (Borner), *Onychiuroides granulosus* (Stach), *Onychiuroides* sp. juv., *Parisotoma notabilis* (Schaffer), *Pogonognatellus flavescens* (Tullberg), *Proisotoma minima* (Tullberg), *Protaphorura aurantiaca* (Ridley), *Protaphorura* sp., *Pseudachorutes* sp. juv., *Pseudosinella alba* (Packard), *Pseudosinella horaki* Rusek, *Sminthurinus aureus* (Lubbock), *Sminthurinus* sp. juv., *Sphaeridia pumilis* (Krausbauer), Symphypleona spp. juv., Tomoceridae sp. juv., *Tomocerus minor* (Lubbock), *Willemia anopthalma* Borner, *Willemia denisi* Mills s. Fjellberg, *Xenylla brevicauda* Tullberg, *Xenylla* sp. juv.

Insects (Coleoptera)

Agonum fuliginosum (Panz.), *Calathus erratus* (Sahlb.), *Calathus melanocephalus* (L.), *Cantharis fusca* L., *Carabus cancellatus* Ill., *Chilocorus* sp., *Coccinella septempunctata* L., *Harpalus tardus* (Panz.), *Pterostichus niger* (Schall.), *Selatosomus affinis* Payk., Staphylinidae spp., Scarabaeidae spp.

Other insects

Heteroptera spp., Homoptera spp.

DISCUSSION

There are not many papers concerning biodiversity of Greek fir stands. The natural Greek fir forests are differentiated in more xerophilous type with numerous Mediterranean elements represented by *Helictotricho convoluti-Abietetum cephalonicae* Barbero Quézel 1976 and a more mesic confined to higher elevations *Lilio chalcedonicae-Abietetum cephalonicae* Barbero Quézel 1976 *nom. mut. propos*. All Greek fir forests are included in *Abietion cephalonicae* Horvat et al. 1974 alliance within sub-Mediterranean order of *Quercetalia pubescenti-petraeae* Klika 1933 [Bergmeier 2002].

In its natural range, Greek fir is accompanied by a rich mycobiota comprising both cosmopolitan and Mediterranean species [Zervakis et al. 1998]. None of the latter was found in the Greek fir plots examined in the present study. Most of the fungal species recorded are typical of mixed and coniferous forests and are rather widespread in Poland and Central Europe [Ławrynowicz et al. 2004]. However, only 10 out of 23 ectomycorrhizal species found in the plots are also known to accompany Greek fir in Greece: *Amanita citrina*, *A. gemmata*, *A. muscaria*, *A. pantherina*, *A. rubescens*, *Cortinarius cinnamomeus*, *Russula cyanoxantha*, *R. ochroleuca*, *Tricholoma saponaceum* and *Xerocomus chrysenteron* [Pantidou 1980, 1990, Diamandis and Minter 1981, Diamandis 1992, Zervakis et al. 1998, 2002, Dimou et al. 2008]. It seems that *Abies cephalonica*, a tree species alien in the study area, was able to form a symbiotic relationship with a variety of native ectomycorrhizal fungal species.

Among ectomycorrhizal fungi, two species deserve a special attention: *Russula lilacea* and *R. cremeoavellanea*. Both are rare in Poland – the former grows in deciduous and mixed forests (so far found in 5 localities in the country), the latter prefers pine forests (so far found in 2 localities in the country) [Wojewoda 2003]. For the presence of other ectomycorrhizal tree species in the plots and in their vicinity, mycorrhizal association of these species with *Abies cephalonica* is not certain.

Great majority of saprotrophic fungi found in the present study on Greek fir litter, woody debris and humus can grow on the same substrata formed by other coniferous trees. Over a half of them were also recorded in stands of *Abies cephalonica* in Greece [Pantidou 1980, 1990, Diamandis and Minter 1981, 1983, Diamandis 1992, Diamandis and Perlerou 1994, Zervakis et al. 1998, 2002, Athanassiou and Theochari 1999, Dimou et al. 2008]. Again, native fungi seem to be effective in inhabiting and utilizing plant material of non-native origin.

Two serious fungal parasites – *Heterobasidion annosum* and *Armillaria* sp. were recorded in the Greek fir plots, however, with low abundance. Both taxa occur on *Abies cephalonica* within its natural range, too [Pantidou 1980, Diamandis and Minter 1981, Diamandis 1992, Zervakis et al. 2002, Dimou et al. 2008].

In the monograph of insects infesting Greek fir and other trees from the genus *Abies*, 65 species were listed, and most of them were classified as root-feeders, sucking insects, xylem- and phloem-feeders, shoot-borers and cone- and seed-feeders [Kalidis and Georgevitis 1971]. Some information about ectoparasitic nematodes of *Abies cephalonica* plots in forest nurseries was published by Peneva and Choleva [1987]. But usually the information about Greek fir is only as a host of some insects or place of unique faunistic or taxonomic observations [Bordoni 1983, Drosopoulus and Asche 1984, Johnson 1975, Liberto and Gigli 2003, Muhle and Daffner 1979, Stathas and Kozar 2010]. On the other hand, Sanatas [1988] described the role of *Abies cephalonica* for

apiculture in Greece, with information on secreting honeydew *Physokermes hemicryphus* living on the fir.

The results from Rogów Arboretum seem to be the first attempt to wider description of a complex of organisms in a forest ecosystem created by this tree species, out of its natural range.

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RÓŻNORODNOŚĆ GATUNKOWA NA POWIERZCHNIACH DOŚWIADCZALNYCH Z JODŁĄ GRECKĄ (*ABIES CEPHALONICA* LOUDON) W ARBORETUM SGGW W ROGOWIE (POLSKA)

Streszczenie. W pracy przedstawiono różnorodność gatunkową stwierdzoną na powierzchniach doświadczalnych jodły greckiej (*Abies cephalonica*), założonych na terenie Arboretum SGGW w Rogowie. Jodła grecka jest gatunkiem rodzimym dla obszarów południowej i centralnej Grecji, występuje w warunkach górskich klimatu śródziemnomorskiego. Wyjątkowo skąpe są dotychczasowe dane dotyczące zróżnicowania i bogactwa gatunkowego w lasach jodły greckiej leżących w obrębie jej naturalnego zasięgu występowania oraz w sztucznych nasadzeniach na obszarze Europy poza naturalnym zasięgiem. W wyniku badań wykonanych w Arboretum SGGW w Rogowie wykazano na powierzchniach doświadczalnych z jodłą grecką obecność 62 gatunków roślin naczyniowych i mchów, 58 gatunków grzybów wielkoowocnikowych oraz 132 gatunki bezkręgowców. Dane te zostały porównane z bogactwem gatunkowym stwierdzonym w rodzimym zbiorowisku leśnym (*Tilio-Carpinetum*), występującym w bliskim sąsiedztwie powierzchni doświadczalnych.

Słowa kluczowe: *Abies cephalonica*, jodła grecka, różnorodność biologiczna, rośliny naczyniowe, grzyby wielkoowocnikowe, nicienie, roztocze, owady

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