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Extended Abstract

Chalara fraxinea incidence in Hungarian ash (*Fraxinus excelsior*) forests

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Chalara fraxinea **was identified for the first time in Hungary in the first half of 2008, in western Hungary near Kapuvár and Sárvár, in 4 to 6 years old mixed (seed and coppice shoot) origin European ash (*Fraxinus excelsior*) stands (Szabó, 2008). In the same time in Budapest, under an older Turkey Oak – Sessile Oak – European ash stand we also detected the symptoms and the pathogen on the saplings of the natural regrowth. The local foresters first thought, that the wilting was caused by the frost, but in that period of time there were no frosty days. With the typical symptoms and the examinations of the collected samples, we were able to definitely identify the *Chalara fraxinea* as pathogen (Szabó, 2009). This pathogenous fungus was also identified on Narrow-leafed ash (*Fraxinus angustifolia*), from the samples of the western part of Hungary (Kirisits et al., 2009). In 2008-2009, we thoroughly researched the distribution of the pathogen in Hungary, and the volume of the caused damages. As a result, we confirmed that the pathogen spread to the whole area of Hungary (Figure 1). It appears both in young and older stands, but it causes damages more frequently in 2 to 10 years old forestations. Because of the characteristics of the symptoms and the measures of the dieback, we concluded that the pathogen appeared in Hungary 2 to 3 years before. The degree of the infections in the examined forest stands is significantly diverse. The most severe infestation was observed in Eastern-Hungary, near Debrecen, in the summer of 2009. This European ash stand was 10 years old, with 0.5 ha of area, and was planted with 2 years old saplings. Every single tree showed the symptoms of *C. fraxinea* infection (Figure 2). In the examined part of the forest-stand, the mortality reached 37%. Among the still living trees, the rate of the infected and died stem parts varied between 20 to 90%. From the symptoms of the dead trees we diagnosed, that the first infections in this area also occurred a few years ago. We do not know much about the environmental conditions assisting the infestation. The examinations of the infested forest-stands of Western-Hungary show that the infestation is more frequent on sites with frost-hollow, deep soil and plenty of water. In the same time we also noticed that the symptoms are also frequent on forest sites drier than average and exposed to extreme cold (Szabó et al., 2009). According to the surveys, the fungus is more common in younger stands, but this can be affected by the fact, that we have lesser amount of samples from older and bigger trees, for collecting samples and identifying them from large crowns is more difficult. After the survey in Bükk-mountains, North-eastern-Hungary, we found that the extent of the infection is at least the same on older or middle aged trees, than on the youngest ones. Contrarily, in the western part of the country in mixed species forest stands we experienced mass and severe infections of the natural ash regrowth, while older trees showed only small degree of typical symptoms in their crowns. The complete death of older trees takes more time, so major mortality occurs on young ones, 2 to 10 years old trees. In August, 2009 we surveyed the degree of *C. fraxinea* infestations in some forestry's of the Bakony-mountains, in different aged and in different tree-species composition forests. Based on this survey we pointed out that in the significant majority of the surveyed stands the rate of infected ash trees is under 5%, and in only 2 forest-parts are there 5 to 10% infestations (Table 1).**

Key words: *Chalara fraxinea*, ash dieback, *Fraxinus excelsior*, *Hymenoscyphus pseudoalbidus*.

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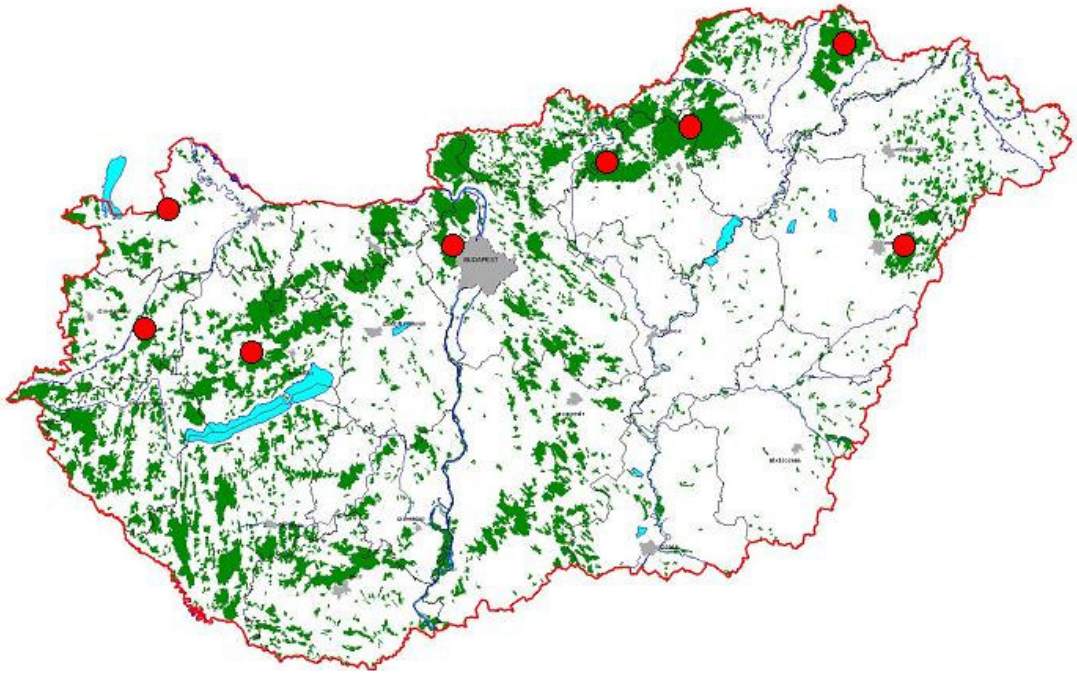

Figure 1. Proven occurrence of *C. fraxinea* in Hungary 2008 to 2009.

Table 1. The measure of *C. fraxinea* infection in Bakony mountain August, 2009.

Forest subcompartment	Measure of shoot dying			Area (ha)	Age	Tree species (%)
	1	2	3			
Tés 9H	X			6.3	76	*Fagus 80; Carpinus 15; Fraxinus 5*
Tés 9I	X			4.2	76	*Fagus 100; Fraxinus natural regrowth in spots*
Tés 10B	X			18.8	112/7	*Fagus 100; Fraxinus natural regrowth in spots*
Várpalota 55G		X		2.7	9	*Q. cerris 40; F. excelsior 30; F. ornus 30*
Várpalota 55F	X			4.7	110/9	*Q cerris 40; Fagus 30; F. excelsior 20; Carpinus 10*
Várpalota 56D	X			5.2	8	*Q. petrea 50; Fagus 10; F. excelsior 15; Q. cerris 15; Carpinus 10*
Várpalota 57A	X			11.2	127/6	*Q. cerris 100; Fraxinus natural regrowth in spots*
Iszimér 63H		X		2.5	9	*Q. cerris 60; F. excelsior 30; F. ornus 10*
Nagyvázsony 92B	X			19.0	20	*Q. cerris 80; F. excelsior 5; F. ornus 10; Carpinus 5*
Ajka 8G	X			0.6	19	*F. excelsior 100*
Lókút 11A	X			2.6	11	*Q. petrea 40; Q robur 15; F. excelsior 35; Fagus 10*
Eplény 47B	X			17.7	16	*Q. cerris 40; Q. petrea 10; Fagus 15; Carpinus 30; F. excelsior 5*
Porva 16C	X			2.5	30	*F. excelsior 50; Fagus 10; Carpinus 40*
Zirc 41A	X			10.3	36	*F. excelsior 35; Fagus 15; Q. cerris 15; Carpinus 35*
Zirc 41C	X			8.0	44	*F. excelsior 35; Fagus 5; Q. cerris 20; Carpinus 20; Q. petrea 10; Acer 10*

Measure of shoot dying - **1**: *Chalara fraxinea* infection under 5% on all of *Fraxinus excelsior* trees, **2**: *Chalara fraxinea* infection 5-20% on all of *Fraxinus excelsior* trees, and **3**: *Chalara fraxinea* higher than 20% on all of *Fraxinus excelsior* trees.

CONCLUSIONS

To summarize our researches so far, it seems that in Hungary the European and Narrow-leafed ash forests are seriously endangered by *C. fraxinea*, especially the young stands. The results of the extended life-cycle examinations of this pathogen are indicating that we are defenceless against the pathogens infestation; we cannot effectively control the pathogen or decrease the severity of infestations. In future presumably natural selection will

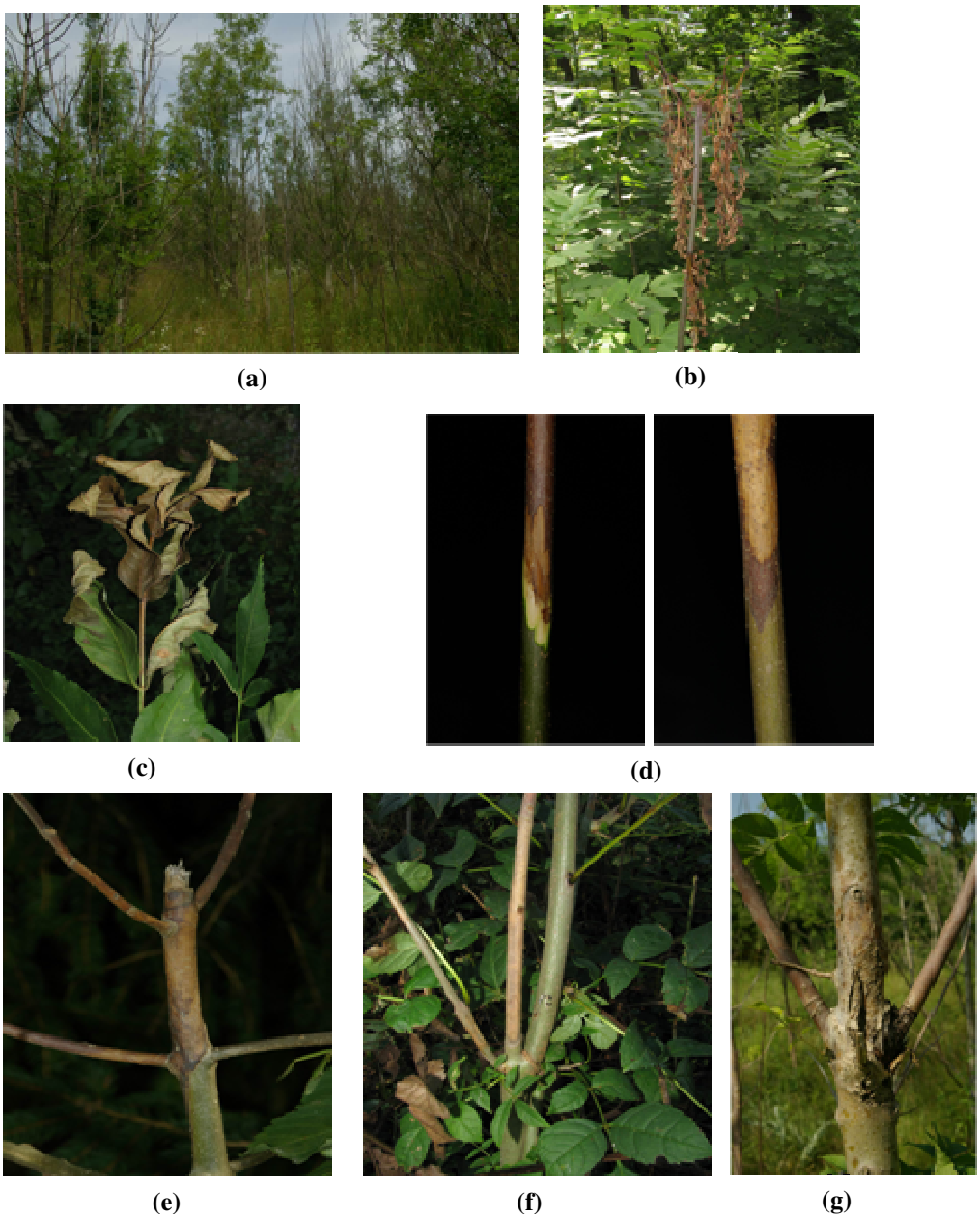

Figure 2. Symptoms of *C. fraxinea* infection (a) Heavy *C. fraxinea* infection in a young ash stand, (b) New infection on top of a young tree in spring time, (c) New infection on the leaves, (d) The infected tissue dies, (e) Infected tips of the branches are decaying, (f) Usually a new shot grows next to the infected branch and (g) Old *C. fraxinea* necrosis on the bark.

work among ashes which will seriously affect us with mass mortality of trees. In the same time it is our task to assist these processes with the selection of more resistant tree individuals, and with the mas propagation of these samples using them in forestry practice.

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