

Bark beetle outbreak on weakened ash trees and applied control measures¹

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Ash dieback symptoms were noticed for the first time in 2004 in Slovakia. Information suggests that symptoms occurred before this, but not on such a large scale. The pathogen was isolated from necrotic wounds in 2007 and tests confirmed the pathogenicity of the isolate. From February 2009, a forest enterprise from Eastern Slovakia applied control measures in the field against a secondary pest, the bark beetle *Hylesinus fraxini* Panzer. A total of 527 trap trees were prepared on a site of approximately 200 ha. Trap trees were densely infested, and the authors judged the method as very effective against *H. fraxini*.

Ash distribution in Slovakia

Ash (*Fraxinus* spp.) is not one of the main forest tree species in Slovakia, but it is quite common in parks and small landscape forests. It prefers wet, stony soils and is widely distributed throughout Slovakia. Trees form small forest stands, usually up to 1 ha, at the bottom of slopes or by rivers. There are two species: *Fraxinus excelsior* L. and the much less common *Fraxinus ornus* L. They cover 1.5% of forest land, equivalent to approximately 30 000 ha.

Ash dieback

Ash dieback was recorded for the first time in 2004 from the eastern part of Slovakia (Kunca, 2006). Later, symptoms were observed in other localities (Kunca, 2007, 2008; Leontovyč & Kunca, 2009), and now ash dieback has spread throughout Slovakia without any natural limits (Fig. 1). The most susceptible age of ash trees ranges up to 30 years. *Fraxinus ornus* is a less common ash and so far dieback has not been found on this species, whereas it is common on *F. excelsior*.

Typical *Chalara fraxinea* symptoms are orange, brown to black, lenticular or flame-like diffused bark necrosis. Infection occurs first in the youngest part of the shoots at the top or approximately 10 cm below the top of shoots; later, thicker parts may also be infected. This symptom resembles frost damage, for which it has been mistaken many times. Later, the small necrotic areas merge into a larger one and may girdle the shoot. The part of the shoot above girdled part soon dies. Some bark necroses are sunken and therefore more distinguishable. Roots remain intact during infections by *C. fraxinea*.

Trees infected by *C. fraxinea* are under stress and thus are susceptible to other secondary biotic pest agents. The main stem is

usually attacked by bark beetles: *Hylesinus fraxini* Panzer on young stems or thin twigs, and *Hylesinus crenatus* Fabricius on older stems or thick twigs. Roots may be infected by *Armillaria* sp., but its infection is initiated by previous damage of above-ground ash parts. In some regions, browsing animals damage young ash trees, particularly deer browsing on bark. There is some concern that secondary biotic pest agents may increase in abundance on weakened trees and become primary pest agents. *Hylesinus fraxini* is considered the most dangerous secondary biotic pest agent threatening healthy ash stands.

Control

As *C. fraxinea* does not infect other tree species, the pathogen does not cause serious economic loss to the Slovakian forestry industry. However, infected trees are found throughout Slovakia, so this pest significantly influences the ecology of forests and landscape.

There is no control method for use against the pathogen *C. fraxinea*. As trees infected by *C. fraxinea* are under stress, they are more susceptible to other, secondary biotic pest agents.

One forest enterprise in Eastern Slovakia applied control measures in an area of approximately 200 ha (LS Kokošovce) against bark beetles from the beginning of 2009 (end of winter season 2008–09). *Fraxinus excelsior* covers 75% of the locality, with *Tilia cordata*, *Acer pseudoplatanus* and *Fagus sylvatica* also present. The age of all trees is up to 20 years.

In February, the foresters prepared 527 pieces of approximately 1–2-m-long branches or young ash stems up to 10 cm thick (called 'trap-trees'), and made about 50 piles each containing 10–15 trap trees (Fig. 2).

The trap trees were naturally infested at the beginning of March. Larval development finishes in May, and swarming of a new beetle generation takes place in June–July, so the trap trees had to be processed by the end of May 2009. In April and May, 593 m³ of *F. excelsior* were processed by felling and then

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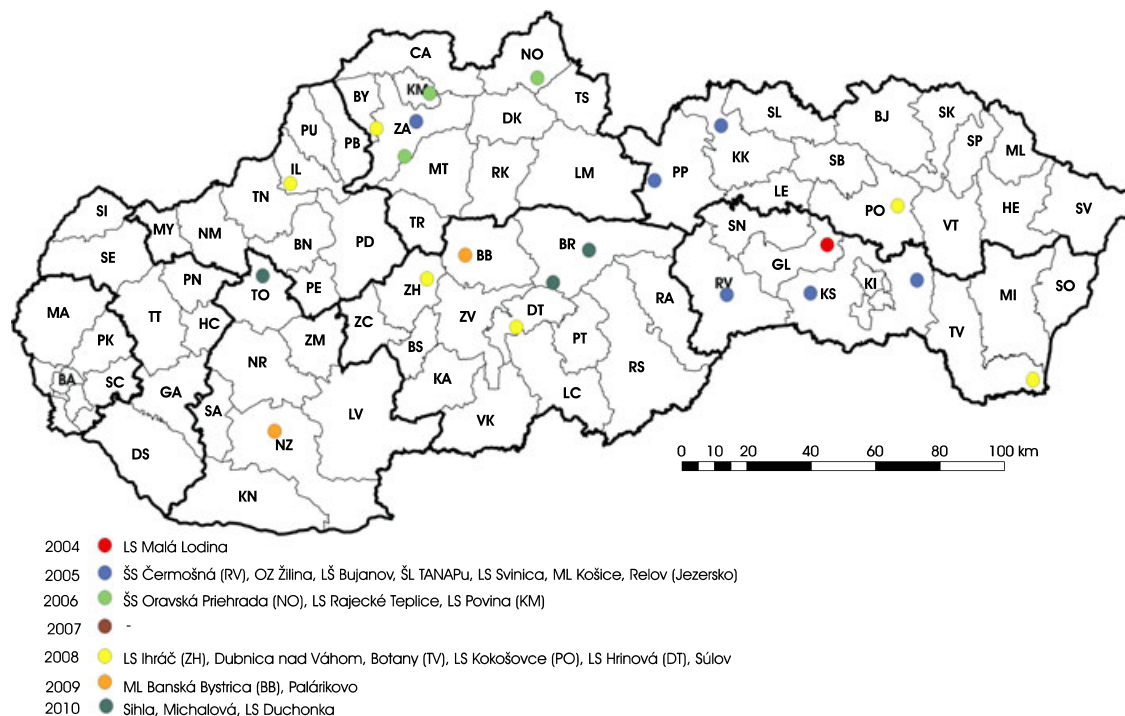


Fig. 1 Distribution and spread of ash dieback in Slovakia since 2004. Figs 1 and 2 are available in colour online at wileyonlinelibrary.com.



Fig. 2 Several trap trees in a pile.

burning or chipping: approximately 100 m³ of trap trees (527 pieces) and up to 500 m³ of standing trees in forest stands (up to 200 ha) showing *C. fraxinea* symptoms. At this locality, only healthy trees were left. These healthy trees are scattered over 200 ha of mixed forest and probably cover a quarter of the ground area (i.e. an equivalent number of trees to a stand of 50 ha). Infestation of trap trees was assessed by number of holes per 1 dm². Approximately 50% of trap trees had 0.5–1 hole per 1 dm², which was considered a strong infestation. The remaining 50% had weaker infestation, < 0.5 holes per 1 dm². Thus this control method is regarded as very effective against *H. fraxini*.

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Foyers de scolytes sur des frênes affaiblis et mesures de lutte appliquées

Les symptômes du dépérissement du frêne ont été notés pour la première fois en 2004 en Slovaquie. Des informations suggèrent que les symptômes étaient présents avant cette date mais pas à si grande échelle. L'agent pathogène a été isolé à partir de blessures nécrotiques en 2007 et des tests ont confirmé le pouvoir pathogène de cet isolat. Depuis février 2009 une entreprise forestière de l'est de la Slovaquie applique des mesures de lutte sur le terrain contre un ravageur secondaire, le scolyte *Hylesinus fraxini*

Panzer. 527 arbres pièges ont été préparés sur un site d'environ 200 ha. Les arbres pièges étaient densément infestés et les auteurs jugent la méthode très efficace contre *H. fraxini*.

Вспышки размножения жуков-короедов на ослабленных ясенях и применяемые меры борьбы

Симптомы усыхания ясеня были впервые отмечены в Словакии в 2004 г. Согласно некоторым данным, симптомы появлялись и ранее, но не в таком крупном масштабе. В 2007 г. патоген был выделен из некротических язв, причем патогенность изолята была подтверждена аналитически. С февраля 2009 г. одно лесное хозяйство в Восточной Словакии применяло полевые меры борьбы против вторичного вредителя, жука-короеда *Hylesinus fraxini*. На площади, составлявшей около 200 га, было подготовлено 527 ловчих деревьев. Ловчие деревья оказались плотно зараженными, поэтому для борьбы с жуком-короедом *Hylesinus fraxini* авторы считают этот метод весьма эффективным.

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