Major Forest Damaging Agents in Slovakia

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Abstract

In the first half of the 1990s, after the breakdown of the communist regime in Slovakia in 1989, the State forests enterprise began to return forests to previous owners; so they cut less, even incidental felling was reduced (1.5 mil. m^3 – 50 %). There were major wind calamities (2002, 2004 and 2007) and new restricting law on nature protection in 2002. All these three factors significantly contributed to the present enormous bark beetle calamity (mostly *Ips typographus*) in Norway spruce forests over whole Slovakia. The major fungal damaging agent in Slovakia is *Armillaria* sp. Ash dieback caused by *Chalara fraxinea* has been causing damage in large areas since 2004.

Keywords | pest agents, bark beetles, ash dieback, wind calamity

Kurzfassung

Die wichtigsten Faktoren für Forstschaden in der Slowakei

In er ersten Hälfte der 1990er Jahre, nach dem Zusammenbruch des kommunistischen Regimes in der Slowakei (1989), begann der Staatsforstbetrieb, Wälder an die früheren Besitzer zurückzugeben. Die Folge war ein geringerer Einschlag, auch die Zufallsnutzungen gingen zurück (1 – 5 Mio. m^3 – 50%). Es gab große Windwurfkalamitäten (2002, 2004 und 2007) und ein neues einschränkendes Naturschutzgesetz im Jahr 2002. Diese drei Faktoren trugen hauptsächlich zu den enormen Borkenkäferkalamitäten (in erster Linie *Ips typographus*) in Fichtenwäldern, verteilt über die ganze Slowakei, bei. Der wichtigste pilzliche Schaderreger ist *Armillaria* sp. Das Eschentriebsterben durch *Chalara fraxinea* verursacht seit 2004 Schäden auf großer Fläche.

Schlüsselwörter | Forstschädlinge, Borkenkäfer, Eschentriebsterben, Windwurfschäden

Introduction

Forest coverage of Slovakia is 1.9 mil. ha and that is 40 % of the total area of the Slovak republic. The most common tree species is European beech (*Fagus sylvatica,* 31 %), followed by Norway spruce (*Picea abies,* 26 %), oak (*Quercus* spp., 13 %), pine (*Pinus* spp., 7 %), and other tree species (23 %). Slovakia is situated in Central Europe and has five neighboring countries: Ukraine, Poland, the Czech Republic, Austria and Hungary.

Incidental felling

Looking back to the 1980s, averaged annual incidental felling was about 2 mil. m^3 (35 % of total felling). In the first half of the 1990s, after the breakdown of the communist regime in Slovakia in 1989, the State forests enterprise began to return forests to previous owners; cut less, even incidental felling was reduced (1.5 mil. m^3 – 50 %). There were major wind calamities in November 2002 (0.5 mil. m^3), on November 19, 2004 (named Alžbeta, 5.3 mil. m^3; Kunca and Zúbrik 2006) and on August 23, 2007 (named Filip, 1.2 mil. m^3). Another important factor influencing incidental felling was a new law on nature protection that came into force in 2002. So all three major wind calamities mentioned above (from 2002 through 2007) were not processed completely due to a long administration process to get exceptions from large restrictions. As a result the cumulative bark beetle calamity has been rising till now. Incidental felling has increased from 2 mil. m^3 in 2002 to 5 mil. m^3 in 2008 (Figure 1). The only responsible pest agent is bark beetle (Kunca et al. 2009a, b).

But the bark beetle calamity arose not only in protected areas (national parks, NATURA 2000) but also in production forests. There were several reasons for this situation, such as insufficient network of forest roads and lack of money to process all calamity wood. State as well as non state owners processed only the wood they were able to sell immediately. If this was not possible, damaged or infested wood was left in the stands.

Reasons for bark beetle calamity

One of the major historical mistakes was abandoning the practice of debarking Norway spruce logs. This took place in the late 1970s in order to lower expenses on wood production. This idea was strengthened by a new bark beetle control attempt with massive use of pheromone traps. Later researchers proved that pheromone traps can decrease population of bark beetles by not more than 30 %. Industrial emissions, global climate change (climate warming), economical depression, personal restructure of State forests enterprise (decreasing employment from approx. 9,000 in 1999

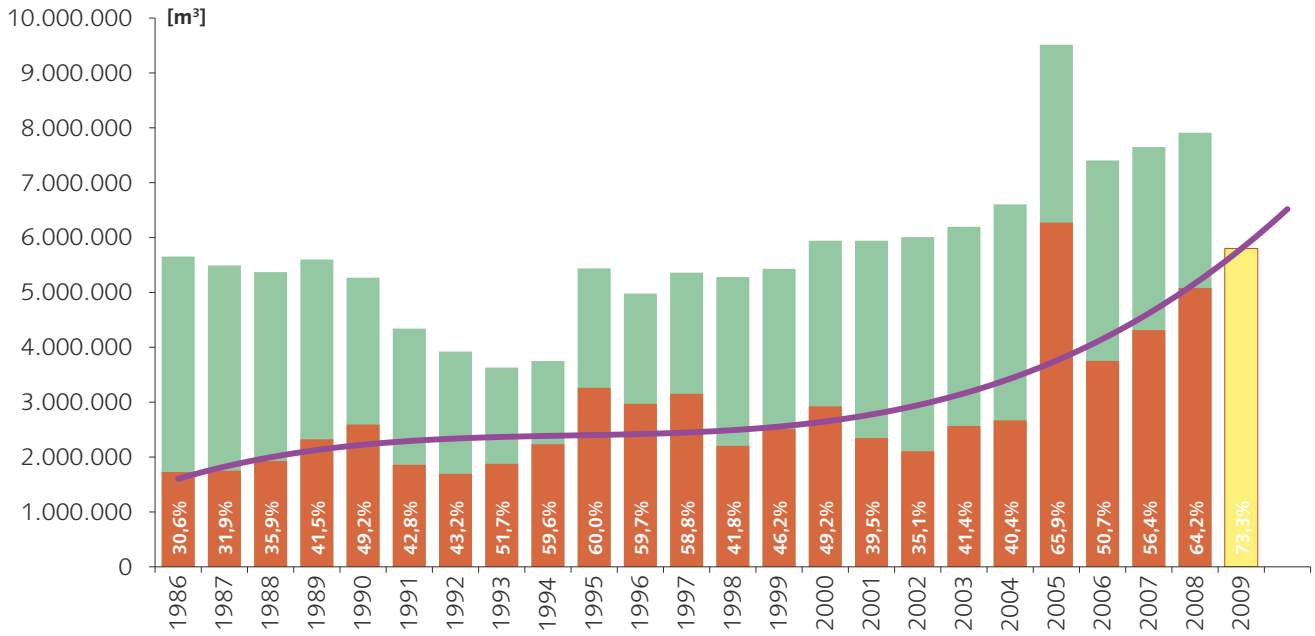

Figure 1: Development of total and incidental (red) felling (yellow; extrapolation for 2009).

Abbildung 1: Entwicklung der Gesamtnutzung und der zufälligen Nutzungen (rote Anteile) in der Slowakei (gelb: Hochrechnung für 2009).

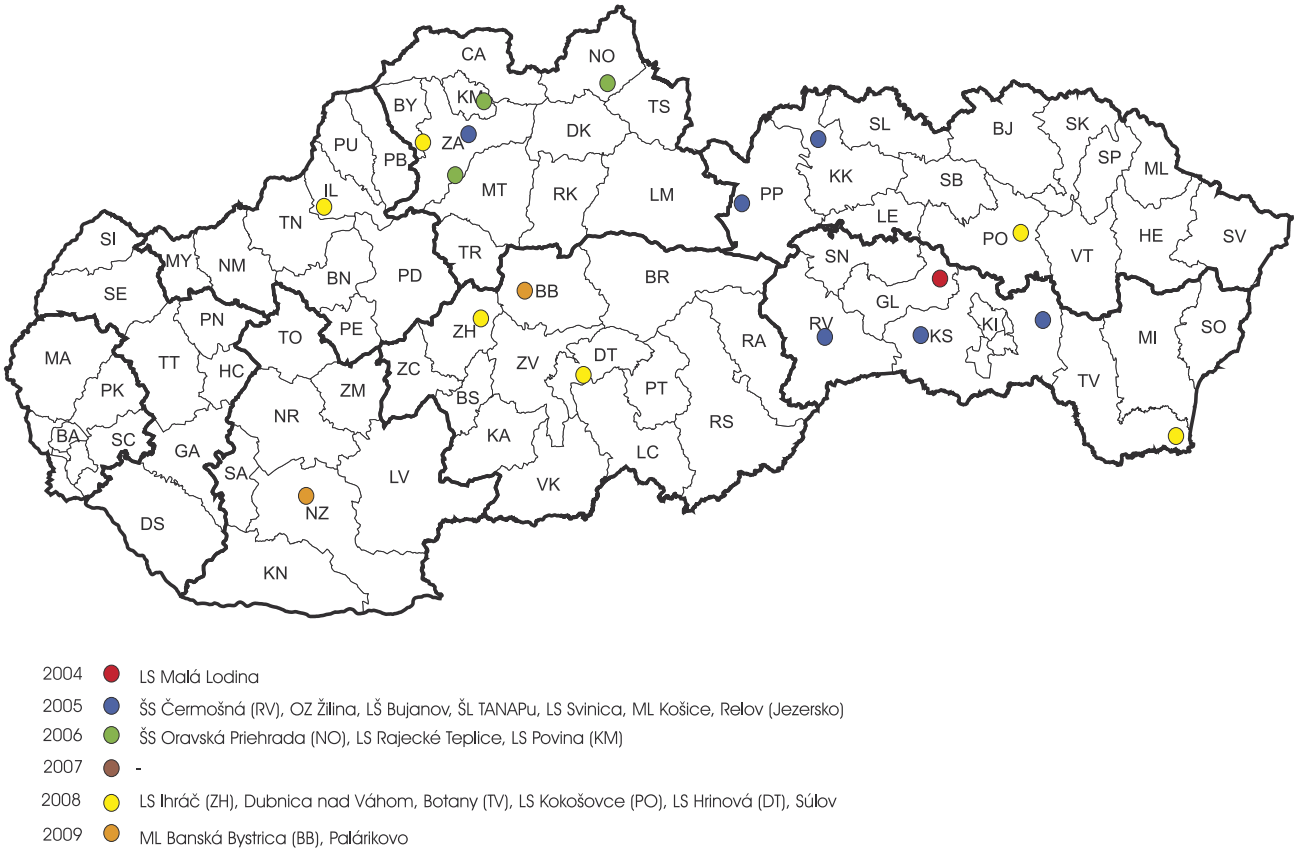

Figure 2: Occurrence of ash dieback from 2004-2009. Colors indicate year of first record.

Abbildung 2: Auftreten des Eschentriebsterbens zwischen 2004 und 2009. Die Farben kennzeichnen das Jahr des Erstnachweises.

to 3,000 in 2008) added to bad forest management. As there are still less people employed in forest enterprises, core activities like silviculture, forest protection management, felling etc. are carried out by external companies that have different relation to proper forest work. As a result infected wood is not debarked or properly treated with insecticides; wood debris after felling is not fired or chipped in time and the main motive of work is the amount of wood stated in the agreement not the amount of calamity wood still standing in the forest (Kunca et al. 2007).

The most dangerous bark beetle is the Spruce bark beetle *Ips typographus*. Then there are *Pityogenes chalcographus*, *Ips duplicatus* and *Ips amitinus* (Kunca and Zúbrik 2008; Vakula et al. 2008; Zúbrik et al. 2008). Forest research specialists set up a monitoring of these species (*I. duplicatus* monitoring since 2001) and inform foresters about the results by "Signal reports" every one to two months on up to ten pages distributed by email to more than 200 foresters.

Fungal diseases

The main fungal pest agent is *Armillaria* sp. It mostly occurrs on Norway spruce (*Picea abies*) in mountains. Many times it is accompanied by *Heterobasidion annosum*. We have some localities with *Phytophthora alni* ssp. *multiformis* such as Malužina (proved in 2005). Oak dieback is connected with *Ophiostoma* and *Ceratocystis* spp. as well as with *Phytophthora* sp. and climatic stress. The new dieback of ash (*Fraxinus excelsior*) has been devastating large areas since 2004 (Figure 2). The fungus *Chalara fraxinea* is the main reason and is follwowed by bark beetle *Leperisinus fraxini*.

Abiotic pest agents

Wind is the most dangerous abiotic damaging agent. The largest wind calamity happened on November 19, 2004 (5.3 mil. m^3), smaller wind calamities were in October and November 2002 (0.5 mil. m^3) and on August 23, 2007 (1.2 mil. m^3). Smaller calamities are caused by snow (winter 2005/2006) or ice (1999). Drought is the most important physiological abiotic pest agents. It occurred in 2000 and 2003.

Other pest agents

The volume of wood damaged by emissions is decreasing. There are some fires but not as important as in southern Europe. Game damage is located in areas where they have enough food.

Conclusions

Bark beetles and wind are the most important pest agents in Slovakia. The control of bark beetles is influenced by a strict law on protected areas and a bad forest management – that is cheaper but not functioning. We expect to have more bark beetle calamity till the coverage of Norway spruce will decrease from 26 % (515,000 ha) in 2000 to 10 % (200,000 ha) in 2030.

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