

# *Ips cembrae* Heer. (Col.: Curculionidae, Scolytinae) in Young Larch Stands – a New Problem in Poland

WOJCIECH GRODZKI

## Abstract

The mortality of young larch trees due to infestation by *Ips cembrae* was recorded in two regions of southern Poland: in the Sudeten mountains at altitudes between 700 and 1100 m a.s.l. and in the Silesia (~200 m a.s.l.), in the areas reforested 15-20 years ago. The main cause of the dramatic increase of the bark beetle population level was the abundance of breeding material due to wind/snow damage and thinning with no tree removal. Facing the gaps in knowledge on biology and control, additional research is needed to propose effective forest protection strategies.

Keywords: *Ips cembrae*, larch, young stands, reforestation

## Kurzfassung

### *Ips cembrae* Heer. (Col.: Curculionidae, Scolytinae) in jungen Lärchenbeständen – Ein neues Problem in Polen

In zwei Regionen im südlichen Polen wurde das Absterben junger Lärchen wegen Borkenkäferbefalls durch *Ips cembrae* verzeichnet: In den Sudeten in 700-1100 m Seehöhe und in Schlesien (~200 m Seehöhe) und zwar in Gebieten, in denen vor 15 bis 20 Jahren aufgeforstet worden ist. Als Hauptursache für den Anstieg der Borkenkäfer-Population ist die Fülle an Brutmaterial, das nach Wind/Schnees Schäden und bei Durchforstungen ohne Holzabfuhr angefallen war, anzusehen. Offene Fragen zur Biologie und Bekämpfung erfordern zusätzliche Forschungsarbeiten, um effektive Forstschutzstrategien anbieten zu können.

Schlüsselworte: *Ips cembrae*, Lärche, junge Bestände, Aufforstung

*Ips cembrae* Heer. is a bark beetle living on larches (*Larix* spp.) and occasionally on stone pine (*Pinus cembra* L.). Larch is quite widely distributed in Poland, both in lowlands and mountains, reaching in the Tatras altitudes up to 1900 m a.s.l. In the Sudeten it is present only due to planting (Boratyński 1986). *I. cembrae* is known as the species living under the bark of mature trees, especially wind-felled (Michalski & Mazur 1999); not abundant in Poland, however known from quite many localities within the country (Burakowski et al. 1992).

Larch is one of the pioneer tree species, usually introduced on deforested areas as a cover crop. This case happened in two large areas in southern Poland and appeared due to natural disasters, which had to be

reforested. The first one resulted from the forest decline in the Western Sudeten, where after the outbreaks of *Zeiraphera griseana* Hb. (1977-83) and *Ips typographus* (L.) (1983-87) about 13000 ha of Norway spruce stands died and had to be felled (Capecki & Grodzki 1998). The second one appeared in Silesia as a consequence of large forest fires in 1992, which destroyed about 9000 ha of stands in the forest districts of Kędzierzyn, Rudy Raciborskie and Rudziniec (Szabla 1994). In both areas larch was used to a large extent for the establishment of new forest. The total area of young larch stands potentially threatened by *I. cembrae* in the Sudeten is about 22000 ha, while the Silesian outbreak focuses about 1000 ha.

According to the documentation from the State Forests' Forest Protection Unit in Wrocław, responsible for the Sudeten area, first information on the infestation and killing of young (8-12 years) larches was recorded during the drought period in 1993-1994 in Kaczawskie Mts., on relatively low altitudes. After the drought in 2002, the increasing occurrence of this insect on young larch trees (~11 years old) was recorded in 2003 in the Izerskie Mts. at altitudes between 700 and 900 m a.s.l. (clustered damage) and above 1100 m a.s.l. (individually infested trees dispersed in the stands).

The increased occurrence in Silesia began in 1998, after the infestation of larches felled by wind in 1997; repeated mass infestation of standing trees occurred in 2004, after the thinning made in young larch stands in 2003 (Hutka 2006). In both areas, local outbreaks



Figure 1: Larch mortality due to *Ips cembrae* infestations in the Sudeten, summer 2007

Abbildung 1: Durch den Befall von *Ips cembrae* abgestorbene Lärchen in den Sudeten (Sommer 2007)

centers were still active in 2007 (Figure 1). Similar local problems occurred in the Czech Republic, including the areas not far from the attacked stands in Poland, mainly on warmer localities (Knížek & Holuša 2007).

There is a common trait concerning the increase in bark beetle occurrence in both areas: sudden enhancement of breeding conditions in quite large areas. In the Sudeten it resulted primarily from the wind/snow damage in the winter 2005/2006 and later thinning without removal of felled trees and in the Silesia – wind damage in 1997 and similar thinning in 2003. The populations, primarily developed on broken, fallen and/or cut trees, attacked standing trees in the surrounding parts of stands. The important factor stimulating the infestations was water deficiency starting in 2002 and lasting till 2007.

The biology is not well recognized in *I. cembrae*. Also, information from literature on some details is either missing, sometimes outdated or contradictory. It concerns mainly the question of voltinism (number of generations related to the altitude) and hibernation – sites, stages and survival. There is no experience on its occurrence and control on higher altitudes.

Available data were collected mainly in lowland stands, under conditions which were completely different from those in the mountains. This species was already considered as an important pest of larch in the Western Sudeten, however the known data do neither indicate the occurrence in higher mountain zone, nor the damage in the mountains at all (Konca et al. 1994). There is also a change in species biology – switching from lying to standing larches and from mature trees with thick bark to young trees with fine bark, where development is completed (Figure 2).

The research project on *I. cembrae* started in the autumn 2007 by the Forest Research Institute in Kraków, in cooperation with State Forest Protection Services in Opole and Wrocław. The main questions to be answered based on field observations include:

- missing data on the biology, mainly on the stages and sites of overwintering,
- attractiveness of trees felled in autumn as the breeding material for the generation developing in the next spring,
- number of generations per year and its dependency on the site characteristics (especially – resulting from the altitude and thermal conditions),
- usefulness of pheromones for monitoring and control,
- influence of mechanical/abiotic injuries as predisposing factor for infestation,
- definition of selected stand characteristics related to the vulnerability or resistance to insect attacks,
- possible control methods acceptable for mountain areas under water protection restrictions.



Figure 2: *Ips cembrae* – entrance holes on young larch trees

Abbildung 2: *Ips cembrae* – Einbohrlöcher an jungen Lärchen

Based on the outcome of this survey, recommendations for forest management (including silviculture) will be developed, in order to avoid or reduce local damage caused in young larch stands by this bark beetle.

## References

- Boratyński, A. 1986: Systematyka i geograficzne rozmieszczenie. [Systematics and geographical distribution]. In: Białobok, S. (ed.) *Modrzewie Larix Mill.* PWN Warszawa: 61-106.
- Burakowski, B., Mroczkowski, M., Stefańska, J. 1992: *Catalogus faunae Poloniae*. Part 23, vol. 18: Curculionioidea excl. Curculionidae. Muzeum i Instytut Zoologii PAN, Warszawa.
- Capecki, Z., Grodzki, W. 1998: Owady jako przyczyny, wskaźniki i następstwa zmian w ekosystemach leśnych Sudetów Zachodnich. [Insects as causes, indicators and effects of changes in the forest ecosystems of Western Sudety]. In: Sarosiek, J., Śtursa, J. (eds.): *Geoekologiczne problemy Karkonoszy*, vol. II. Acarus, Poznań: 85-92.
- Hutka, D. 2006: Nowe oblicze kornika modrzewiowca. [New face of the larch bark beetle]. *Tryb. Leśn.* 4: 10-11.
- Knížek, M., Holuša, J. 2007: Podkorní hmyz. [Bark beetles]. In: Knížek M. (ed.) *Výskyt lešních škodlivých činitelů v roce 2006 a jejich očekávaný stav v roce 2007. Zprávođaj ochrany leša, Supplementum 2007*: 21-32.
- Konca, B., Zimny, J., Michalski, J. 1994: Ochrona lasu w Sudetach – czynniki abiotyczne i biotyczne oraz stan obecny i prognozy. [Forest protection in the Sudeten – abiotic and biotic factors, current state and forecast]. In: Paschalis, P., Zajączkowski, S. (eds.) *Protection of Forest Ecosystems. Selected Problems of Forestry in Sudety Mountains.* Fundacja „Rozwój SGGW“, Warszawa: 217-272.
- Michalski, J., Mazur, A. 1999: Korniki. Praktyczny przewodnik dla lešników. [Bark beetles. Practical guide for foresters]. Oficyna Edytorska “Wydawnictwo Świat”, Warszawa, 188 pp.
- Szabla, K. 1994: Warunki powstawania i rozwoju pożarów, niektóre działania organizacyjne oraz aktualne zagadnienia hodowlane i ochronne na pożarzysku w Nadlešnictwie Rudy Raciborskie. [Preconditions for outbreak and evolving of fires, some organizational activities, current silvicultural and protection problems of the burnt area in the Rudy Raciborskie Forest District]. *Sylwan* 6: 75-83.

Wojciech Grodzki, Forest Research Institute, Department of Forest Management in Mountain Regions, ul. Fredry 39, 30-605 Kraków, Poland, phone: +48-12-2528212, email: W.Grodzki@ibles.waw.pl