

Records of Brown Spot Needle Blight Related to *Lecanosticta acicola* in the Czech Republic

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Abstract

JANKOVSKÝ L., PALOVČÍKOVÁ D., DVOŘÁK M., TOMŠOVSKÝ M. (2009): **Records of Brown spot needle blight related to *Lecanosticta acicola* in the Czech Republic.** Plant Protect. Sci., 45: 16–18.

There are two records of brown spot needle blight caused by *L. acicola* in the Czech Republic up to date. Disease was first reported on June 2007 in National Nature Reserve (NNR) Červená Blata, South Bohemia. A more recent discovery of *L. acicola* took place on August 2008 in the NNR Borkovická Blata. The disease was observed on 10-60 year old *Pinus rotundata*. Both locations with infected trees are situated inside nature conservation sites under strict protection regimes that are located approximately 50 km apart. In both sites, *L. acicola* occurred simultaneously with *Dothistroma septospora*, the red band needle blight causal agent on Scots pine (*Pinus sylvestris*), bog pine (*P. rotundata*) and their hybrid (*P. × digenea*). However, infections of both diseases on the same tree have not yet been observed.

Keywords: *Lecanosticta acicola*; brown spot needle blight; bog pine; *Pinus uncinata*

The *Lecanosticta acicola* (Thüm.) Syd. anamorph of *Mycosphaerella dearnessii* M.E. Barr is the causal agent of brown spot needle blight, which is listed as an A2 quarantine EPPO pest and as a II/A1 pest (under the synonym *Scirrhia acicola* (Dearn.) Sigg.) in the EU Annex designation. The disease is distributed throughout Central and North America, Asia, South Africa and Europe (EPPO 2005). In Europe, *L. acicola* has been reported in Bulgaria (KOVAČEVSKI 1938 ex HOLDENRIEDER & SIEBER 1995), Spain (MARTINEZ 1942 ex HOLDENRIEDER & SIEBER 1995), Austria (doubt PETRAK 1961; BRANDSTETTER & CECH 1999, 2003; KIRISITS & CECH 2006), France (CHANDELIER *et al.* 1994), Italy (LA PORTA & CAPRETTI 2000), Germany (BUTIN & RICHTER 1983; PEHL 1995), and Switzerland (HOLDENRIEDER & SIEBER 1995). In the

former Yugoslavia, it was identified in Croatia in 1979 (NOVAK-AGBABA & HALAMBEK 1997; EPPO 1997) and also observed in Monte Negro on *Pinus halapensis* (MILANOVIC & KARADZIC – personal communication). It has recently been reported also in Estonia (CECH 2008 – personal communication) and Slovenia (EPPO 2008a). The disease has not been reported in Hungary, even though it was identified by the Czech phytosanitary administration in Hungarian exports of Austrian pines (*Pinus nigra*) (JANKOVSKÝ *et al.* 2004).

The brown spot needle blight can cause harmful defoliation of pines. In Central Europe, infections occur during July and August. On the tops of green current-year needles, the characteristic brown spots surrounded by yellow margins start to appear, and they subsequently develop into brown bands.

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As those bands spread out, the diseased needles start to die back from the top down toward the base. Visible yellow belts are present in the area between the dead needle top tissues and green tissues. On dead needles, the fungus develops visible green acervuli (EPPO 2005).

The fungus's conidia are subhyaline, dark olive-green and thick-walled. They have one to five septae, a rounded apex and truncate base, and range from fusiform to cylindrical and straight to curved in shape. Their size is 3–5 μm \times 21–44 μm and the conidial surfaces include fine warty and spiny textures. Isolated strains on 3% malt extract agar (MEA) medium develop greyish olive-green to olive-black stromatic colonies, which produce a slime containing conidia. The teleomorphic stage of the fungus *M. dearnessii* has not been observed in a pure culture.

Brown spot needle blight was first reported in the Czech Republic on June 10, 2007 by the National Nature Reserve Červená Blata in South Bohemia, which is located close to the town of Třeboň (coord.: 48°51'37.06"N, 14°48'44.09"E). The disease was observed on 10–40 year old *Pinus rotundata* (JANKOVSKÝ *et al.* 2008). A more recent discovery of *L. acicola* took place on August 7, 2008 in the National Nature Reserve Borkovická Blata near the town of Soběslav (coord.: 49°14'16.3"N, 14°37'54.2"E). Here, the fungus was recorded on a group of 10 to 60 year old *P. rotundata*. Both locations with infected trees are situated inside nature conservation sites under strict protection regimes that are located approximately 50 km apart. In both sites, *L. acicola* occurred simultaneously with *Dothistroma septospora*, the red band needle blight causal agent on Scots pine (*Pinus sylvestris*), bog pine (*P. rotundata*) and their hybrid (*P. \times digenea*). However, infections of both diseases on the same tree have not yet been observed.

The observed symptoms of the disease were fully consistent with the *L. acicola* symptoms described above. Moreover, sequenced the internal transcribed spacer (ITS) regions of the mycelium from the isolated strain (GenBank Acc. No. EU117117) demonstrated sequence similarities of 99–100% with other species of *M. dearnessii* from the GenBank (JANKOVSKÝ *et al.* 2008). Dried specimens of infected needles are preserved in the BRNL herbarium, specimen No. 214 (Červená Blata) and No. 253 (Borkovická Blata). A pure culture of the fungus is deposited in the Culture Collection at the Department of Forest Protection and Wildlife

Management, strain No. 1010 (Červená Blata). The same strain is deposited in the CCF culture collection (strain No. 3743).

As in the Czech Republic, *L. acicola*-diseased trees are situated in national nature reserves. This makes the situation rather complicated. Both reserves are strictly protected peat bogs that have remained unaffected by forestry interventions for more than 40–50 years. Therefore, standard eradication procedures cannot be used, and the epidemic situation is currently under investigation. It should be noted that problems with the defoliation of bog pines have been observed in the both nature reserves during recent decades, although the causal agent was not identified. Consequently, the origin of the disease is unknown. However, tourism may play an important role in the spread of *L. acicola*, since the both records of the fungus were detected in the vicinity of popular tourist trails. The impact of tourism on *L. acicola*'s spread in these peat bogs has been discussed recently, because of the similarities of both infections.

However, the occurrence of *L. acicola* in natural peat bogs is in some ways novel. Previous Austrian records show that the disease was found in plantations of amenity trees located in towns (BRANDSTETTER & CECH 1999, 2003), and a similar situation has been observed in Switzerland (HOLDENRIEDER & SIEBER 1995), where the disease has only been found on *Pinus mugo* grown in parks and gardens and it has not reached forests (MEIER *et al.* 2008; EPPO 2008b). In Slovenia, the causal agent of brown spot needle blight have been observed on the crowns of Scots pine *Pinus sylvestris* and mountain pine *P. mugo* in a park in Bled (EPPO 2008a). It was reported on *Pinus halepensis* from coastal zone of Croatia (NOVAK-AGBABA & HALAMBEK 1997; EPPO 1997) and Monte Negro (MILANOVIĆ & KARADŽIĆ – personal communication). Italian records indicate origins in the mountain pine *Pinus mugo* of the Alps (LA PORTA & CAPRETTI 2000). Nevertheless, the threat of disease spread to Scots pines, which are frequently planted in the regions of Czech findings, remains unclear. While bog pines inside nature reserves display remarkable needle defoliation by brown spot needle blight, Scots pines in the surrounding managed areas are without visible symptoms. Further research is needed to investigate the possibility of the disease's potential to spread to a new host tree species and to other geographic areas.

References

- BRANDSTETTER M., CECH T. (1999): Neue Nadelkrankheiten Kiefer. Österreichische Forstzeitung, **99**(3): 35–36.
- BRANDSTETTER M., CECH T. (2003): Lecanosticta – Kiefernadelbäume (*Mycosphaerella dearnessii* Barr) in Niederösterreich. Centralblatt für das gesamte Forstwesen, **120**: 163–175.
- BUTIN H., RICHTER J. (1993): Dothistroma-Nadelbräune: Eine neue Kiefernkrankheit in der Bundesrepublik Deutschland. Nachrichtenblatt Deutsches Pflanzenschutzdienst (Braunschweig), **35**: 129–131.
- CHANDELIER P., LAFURIE C., MAUGARD F. (1994): Découverte en France de *Mycosphaerella dearnessii* sur *Pinus attenuata* × *radiata*. Comptes Rendus de l'Académie d'Agriculture de France, **80**: 103–108.
- EPPO (1997): Fungal diseases of forest trees in the coastal region of Croatia. EPPO Reporting Service. 1997/149.
- EPPO (2005): EPPO Standards. Diagnostic PM 7/46. OEPP/EPPO. EPPO Bulletin, **35**: 271–273.
- EPPO (2008a): First record of *Mycosphaerella dearnessii* in Slovenia. EPPO Reporting Service. 2008/140.
- EPPO (2008b): Forestry pests and diseases in Switzerland. EPPO Reporting Service. 2008/199.
- HOLDENRIEDER O., SIEBER T.N. (1995): First report of *Mycosphaerella dearnessii* in Switzerland. Forest Pathology, **25**: 293–295.
- JANKOVSKÝ L., BEDNÁŘOVÁ M., PALOVČÍKOVÁ D. (2004): Dothistroma needle blight *Mycosphaerella pini* E. Rosstrup, a new quarantine pathogen of pines in the CR. Journal of Forest Science, **50**: 319–326.
- JANKOVSKÝ L., PALOVČÍKOVÁ D., TOMŠOVSKÝ M. (2008): Brown spot needle blight associated with *Mycosphaerella dearnessii* occurs on *Pinus rotundata* in the Czech Republic. New Disease Reports, 18. Available at: <http://www.bspp.org.uk/ndr/volume18.asp>
- KIRISITS T., CECH T. (2006): Entwickelt sich die Dothistroma-Nadelbräune zu einem Forstschutzproblem in Österreich? Forstschutz Aktuell, **36**: 20–26.
- LA PORTA N., CAPRETTI P. (2000): *Mycosphaerella dearnessii*, a needle-cast pathogen on mountain pine (*Pinus mugo*) in Italy. Plant Disease, **84**: 922.
- MEIER F., ENGESSER R., FOERSTER B., ODERMATT O., ANGST A. (2008): Protection des forêts – Vue d'ensemble 2007. Institut fédéral de recherches WSL, Birmensdorf.
- NOVAK-AGBABA S., HALAMBEK M. (1997): The most important plant diseases on forest trees in the coastal region of Croatia. In: Proceedings of the 10th Congress of the Mediterranean Phytopathological Union, 1997-06-01/05, Montpellier: 67–73.
- PEHL L. (1995): Lecanosticta – Nadelbräune. Eine neue Kiefernkrankheit in der Bundesrepublik Deutschland. Nachrichtenblatt des Deutschen Pflanzenschutzdienstes, **47**: 305–309.
- PETRAK F. (1961): Die Lecanosticta Krankheit der Föhren in Österreich. Sydowia, **15**: 252–256.

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