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"Root and Butt Rot of Forest Trees"
IUFRO Working Party 7.02.01

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Edited by

Paolo Capretti, Cecilia Comparini, Matteo Garbelotto, Nicola La Porta, Alberto Santini.

Paolo Capretti

Università di Firenze

Dipartimento di Scienze delle Produzioni Agroalimentari e dell'Ambiente

Piazzale delle Cascine 28, 50144 Firenze, Italy

paolo.capretti@unifi.it

Cecilia Comparini

Università di Firenze

Dipartimento di Scienze delle Produzioni Agroalimentari e dell'Ambiente

Piazzale delle Cascine 28, 50144 Firenze, Italy

cecilia.comparini@unifi.it

Matteo Garbelotto

University of California, Berkeley

Department of Environmental Science, Policy and Management – Ecosystem Science

137 Mulford Hall, 3114, Berkeley, CA, USA, 94720

matteog@berkeley.edu

Nicola La Porta

IASMA Centro per la Ricerca e l'Innovazione, Fondazione Edmund Mach

Dipartimento Agrosistemi Sostenibili e Biorisorse

Via E. Mach 1, 38010, S. Michele all'Adige (TN), Italy

nicola.laporta@iasma.it

Alberto Santini

Consiglio Nazionale delle Ricerche – CNR – Istituto per la Protezione delle Piante

Via Madonna del Piano 10, 50019, Sesto Fiorentino (FI), Italy

a.santini@ipp.cnr.it

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Paolo Capretti

Università di Firenze
Dipartimento di Scienze delle Produzioni
Agroalimentari e dell’Ambiente
Piazzale delle Cascine 28, 50144 Firenze,
Italy
paolo.capretti@unifi.it

Cecilia Comparini

Università di Firenze
Dipartimento di Scienze delle Produzioni
Agroalimentari e dell’Ambiente
Piazzale delle Cascine 28, 50144 Firenze,
Italy
cecilia.comparini@unifi.it

Alberto Santini

Consiglio Nazionale delle Ricerche – CNR
Istituto per la Protezione delle Piante
Via Madonna del Piano 10, 50019, Sesto
Fiorentino (FI), Italy
a.santini@ipp.cnr.it

Nicola La Porta

IASMA Centro per la Ricerca e
l’Innovazione, Fondazione Edmund Mach
Dipartimento Agrosistemi Sostenibili e
Biorisorse
Via E. Mach 1, 38010, S. Michele all’Adige
(TN), Italy
nicola.laporta@fmach.it

Matteo Garbelotto

University of California, Berkeley
Department of Environmental Science,
Police and Management – Ecosystem
Science
137 Mulford Hall, 3114, Berkeley, CA,
USA, 94720
matteog@berkeley.edu

Scientific committee

Paolo Capretti
Matteo Garbelotto
Nicola La Porta
Alberto Santini

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Università di Firenze
Dipartimento di Scienze delle Produzioni Agroalimentari e dell’Ambiente
Piazzale delle Cascine 28, 50144, Firenze, Italy

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Spread of *Heterobasidion irregulare* in eastern Canada towards northern natural forests of *Pinus banksiana*

G. Laflamme

Laurentian Forestry Centre, 1 055 du P.E.P.S., Québec, QC, Canada G1V 4C7.

Corresponding author: gaston.laflamme@RNCAN-NRCAN.gc.ca

Abstract. In eastern Canada, the forest pathogen *Heterobasidion irregulare* was first detected in southern Ontario in 1955. It was then reported under the name *H. annosum*. In 1989, we have found *H. irregulare* in the province of Quebec, near the Ontario border. The disease was there since 1981. During the following years, the disease has been found in few plantations in the same area. It has recently progress to Drummondville, Qc, North-East of the previous infection centres, as well as in eastern township. It is also progressing towards north with two infection centres at Saint-Jean-de-Matha, Qc. This last locality is not far from the natural stands of *Pinus banksiana* which extend from eastern Canada up to Yukon. Trials are being conducted to find out if fresh *P. Banksiana*'s stumps can be affected by the disease.

In eastern Canada, the forest pathogen *Heterobasidion irregulare*, known until recently under the name *H. annosum*, was first detected in 1955 on red pine (*Pinus resinosa*) at St. Williams (Lat. 42°40'N; Long. 80°24'W) in southern Ontario (Jorgensen, 1956). It was reported under the name *Fomes annosus* and the diseased plantation had been thinned 26 years before. Further north in Rockland (Lat. 45°33'N; Long. 75°17'W), near Ottawa, one of the oldest plantations of red pine in Ontario (planted in 1914) was thinned in 1938, 1951, 1961 and 1971; until age 67, mortality was confined to small suppressed trees (von Althen and Stiell, 1990). Thus the disease caused by *H. irregulare* was not present in the Rockland area when it was first detected at St. Williams. *H. irregulare* was detected in several neighbouring localities near St. Williams after 1955. But in 1968, the root disease was found in the Rockland region for the first time in this part of Ontario, at Larose forest (Sippell *et al.*, 1968). As that location was near the Ontario-Quebec border, I selected thinned red pine plantations in 1983 for annual inspection. The disease was found in 1989 for the first time in the province of Quebec; the diseased plantation had been thinned for the second time in 1981 (Laflamme and Blais, 1995) and the root disease was not present at that time. During the following years, *H. irregulare* was found in a few red pine plantations in the same area. The disease has recently spread to Drummondville (Lat. 45°53'N; Long. 72°29'W), northeast of the previous infection centres, as well as to the nearby Eastern Townships. *H. irregulare* is also progressing northward, with two infection centres in red pine plantations at Saint-Jean-de-Matha (Lat. 46°14'N; Long. 73°32'W). This last locality is not far from large natural stands of *Pinus banksiana* which extend from eastern Canada up to Yukon. Preliminary data from inoculation trials with *H.*

irregulare show that fresh *P. banksiana* stumps can be colonized by *H. irregulare* (M. Dumas, personal comm.). This pathogen probably colonized red pine stumps at St. Williams after the thinning in 1929. Eighty years later, it was found at Saint-Jean-de-Matha, 800 km north of St. Williams. At this rate, the risk of seeing an extension of this root disease in natural *P. banksiana* stands is very high. This extension of *H. irregulare* is related to forest activities.

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A first generation *Heterobasidion* hybrid discovered in *Larix lyalli* in Montana.

B. Lockman¹, S. Mascheretti², M. Garbelotto²

¹USFS, State and Private Forestry-Forest Health Protection, Missoula, MT, USA.

²Department of ESPM, University of California, Berkeley, CA, USA.

Corresponding author e-mail address: mail: matteog@berkeley.edu

A sample was collected from heavily decayed roots of a downed but alive alpine larch (*Larix lyalli*) on September 25, 2010. The tree was among alpine larches that were either dead or were displaying thin and narrow crowns, indicating the possible presence of a root disease pocket. An older alpine larch root ball was also found with what appeared to be very old *Heterobasidion*-like fruiting bodies. Chips displaying a white rot with white pockets were placed from the decayed roots on 2% malt agar, and cultures displaying the typical *Heterobasidion* anamorph (*Spinickellus*) were visible after 7 days. The site (elev. 8,300 ft.) is along the shores of Gem Lake in the Bitterroot Mountains south of Darby, Montana. The stand is composed of alpine larch, whitebark pine and a few subalpine fir. DNA was extracted from two distinct cultures and the sequences of three loci, namely the Internal Transcribed Spacer, Elongation Factor alpha, and Glyceraldehyde 3-phosphate dehydrogenase were analyzed. Sequences of all three loci unequivocally indicated both isolates to be first generation hybrids between *H. irregulare* and *H. occidentale*. This is the second natural *Heterobasidion* hybrid ever discovered in North America, and indicates *L. lyalli* may be a host for both species, as described for pine stumps in California. In Europe, Interestingly, *Larix* is reported as a host for all three Eurasian *Heterobasidion* species.