

# Survey of winter barley fields for leaf spot diseases: epidemic spread of *Ramularia* leaf spot in Hungary in 2008

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## Summary

Winter barley fields were surveyed for leaf spot diseases in Hungary in the vegetation periods 2005 to 2008. Based on microscopic examination, *Pyrenophora* species were the dominant pathogens on winter barley in 2006. There were no necrotic spots on the upper leaf of winter barley in experimental plots until flowering, in the middle of May 2007. However, little spotty marks appeared on the upper leaves in Röjtökmuzsaj (West-Hungary) after the florescence of winter barley. The microscopic test of infected leaves proved the leaf spots were caused by *Ramularia collo-cygni* (SUTTON et WALLER). *Ramularia* leaf spot disease was recorded for the first time on winter barley in Hungary. Spread of *Ramularia collo-cygni* was confirmed in different geographical areas of Hungary in 2008. Occurrence of the pathogen was sporadic in East-Hungary, while a heavy attack on winter and spring barley was seen in West-Hungary. An epidemic spread of *Ramularia* leaf spot disease was noticed on irrigated field in Székkutas (South-Hungary).

The examined Hungarian winter barley varieties in Székkutas showed a wide range of *Ramularia* leaf spot disease reaction, from nearly resistant to very susceptible. Some genotypes used for breeding were with high resistance.

*Keywords:* winter barley, *Pyrenophora* species, *Ramularia collo-cygni*, *Ramularia* leaf spot, epidemic

## Introduction

Barley is an intensively cultivated cereal grown worldwide. Fungal pathogens causing leaf spot on barley such as *Pyrenophora* species, *Rhynchosporium secalis*, and *Bipolaris sorokiniana* are important pathogens wherever barley is grown. Since the early 1990's another emerging leaf spot pathogen *Ramularia collo-cygni* has spread on barley, too. *Ramularia* leaf spot has become one of the most important diseases of barley in Central and Northern Europe. Still now *Ramularia* leaf spot disease was not known in Hungary. Objectives of our research were:

- 1) Survey of barley fields for leaf spot diseases in Hungary during 2005-2008.
- 2) Recording of the occurrence and distribution of *Ramularia* leaf spot disease in Hungarian barley growing areas.

- 3) Determination of the level of resistance to *Ramularia* leaf spot in cultivated Hungarian barley varieties and in genotypes used for breeding.

## Materials and Methods

Leaf samples with necrotic spot symptoms were collected from various barley varieties during 2005-2008 at six locations in Hungary (Debrecen, Kompolt, Mosonmagyaróvár, Röjtökmuzsaj, Székkutas, and Szombathely/Táplánszentkereszt). Infected leaves were placed in Petri dishes and kept at natural room lighting at 18-20 °C for two days. Leaf spots were scrutinised with stereo and light microscope. Determination of disease severity was based on examination of samples collected after flowering. Barley varieties were grouped on the basis of disease severity (leaf area covered with necrotic spots): weak (1-10 %), medium (10%-30 %) and severe (30 % or more).

## Results and Discussion

A progressive increase in the occurrence and spread of leaf spot pathogens was detected in Hungary in 2006. *Pyrenophora* species were the predominant pathogens on winter barley. However, a new infection episode was defined in 2007. It was expected that *Pyrenophora* species can cause again severe leaf spot diseases, but the drought limited the spread of these pathogens in April. In this year, we detected little necrotic spots on the upper leaves after the flowering of winter barley. The microscopic examination of the spotted leaves suggested that these leaf spots were caused by *Ramularia collo-cygni*. The shape and size of conidiophores and conidia demonstrated the presence of this pathogen.

This new disease, *Ramularia* leaf spot was recorded for the first time on winter barley in Hungary in 2007. Spread of *Ramularia collo-cygni* was confirmed in different geographical areas of Hungary in 2008. Occurrence of the pathogen was sporadic in Kompolt and Debrecen (East-Hungary), while a heavy attack on winter and spring barley was in Röjtökmuzsaj and Szombathely (West-Hungary). An epidemic spread of *Ramularia* leaf spot disease was noticed on irrigated research field in Székkutas (South-Hungary).

The resistance of Hungarian varieties and genotypes used for breeding to *Ramularia* leaf spot was characterised. All examined Hungarian winter barley varieties were susceptible. Severity of disease on winter barley varieties showed

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a wide range: from nearly resistant to very susceptible. A number of winter genotypes were resistant.

## Conclusions

Our survey results justify the necessity of a strategy to control the new dangerous disease, *Ramularia* leaf spot of barley, which widespread in Hungary. A close collaboration of scientists from neighbouring countries is especially required.

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