

## Survey of spring barley for leaf diseases in Hungary in 2010

Klára Manninger<sup>1\*</sup> József Fodor<sup>1</sup> and István Murányi<sup>2</sup>

### Abstract

Leaf diseases have the most significant deleterious effect on spring barley. A disease survey was carried out on spring barley in Hungary in 2010. A set of barley genotypes were investigated in East and West Hungary. Disease incidences varied significantly by region and cultivar. Leaf rust, brown leaf spot, Ramularia leaf spot were important in West Hungary, whereas net blotch and barley leaf stripe were predominant in East Hungary. All genotypes were susceptible to both net blotch and barley leaf stripe at Kompolt. One genotype was resistant to brown rust; and another genotype was resistant to both brown leaf spot and Ramularia leaf spot in all surveyed areas.

### Keywords

Barley leaf stripe, brown leaf spot, brown rust, *Hordeum vulgare*, net blotch, Ramularia leaf spot

### Introduction

Barley is an intensively cultivated cereal grown worldwide. Fungal pathogens causing leaf spot on barley such as *Pyrenophora* (*Drechslera*) species, *Rhynchosporium secalis* and *Cochliobolus sativus* (*Bipolaris sorokiniana*) are important pathogens (MERCER and RUDDOCK 2004). Since the early 1990s another leaf spot pathogen, *Ramularia collo-cygni*, has spread on barley, too (OXLEY et al. 2009). *Ramularia* leaf spot was recorded for the first time on winter barley in Hungary in 2007 and its incidence was confirmed in recent years in different areas (MANNINGER et al. 2008, 2009).

The objectives of our research in 2010 were:

- (1) to survey leaf spot diseases of spring barley in different regions of Hungary and
- (2) to determine the level of resistance to these diseases.

### Materials and Methods

Leaf samples with necrotic spot symptoms were collected from the top two leaves (flag leaf and second leaf) of spring barley genotypes in East Hungary at Kompolt and in West Hungary at Röjtökmuzsaj and Szombathely. The incidence of leaf diseases was assessed on 16 barley genotypes. Infected leaves were placed in Petri dishes and incubated at 18-20 °C for 2-3 days. Leaf spots were scrutinised under

stereo and light microscope. The resistance of genotypes was characterised.

The resistance of spring barley genotypes to leaf diseases was characterised.

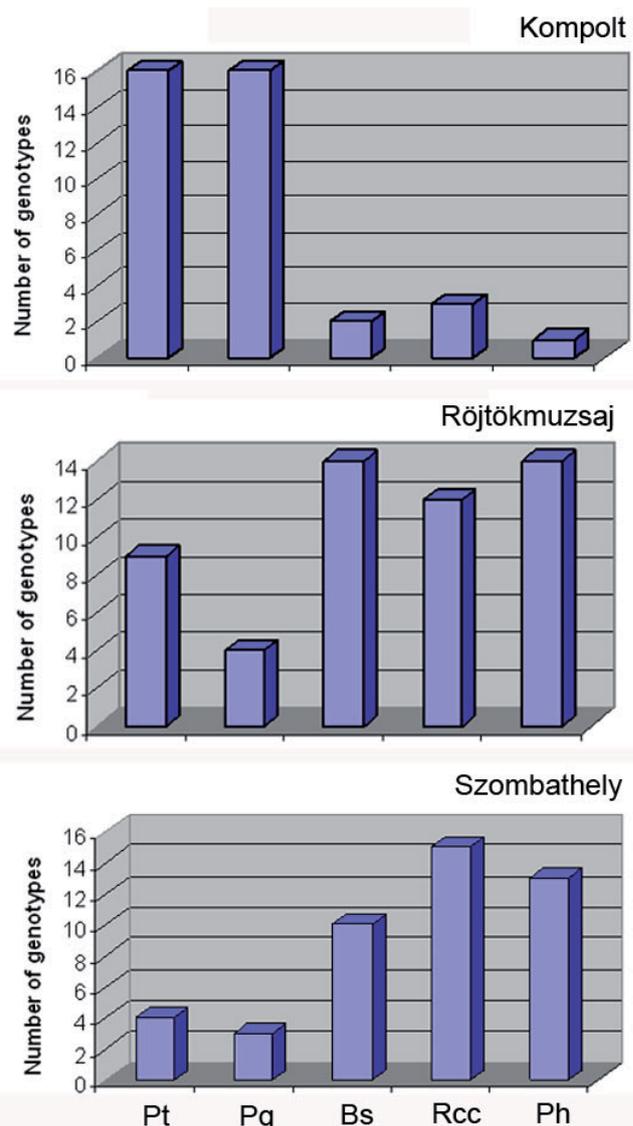


Figure 1: Occurrence of pathogens causing leaf diseases on spring barley at Kompolt (East Hungary), Röjtökmuzsaj and Szombathely (West Hungary). Pt, *Pyrenophora teres*; Pg, *P. graminea*; Bs, *Bipolaris sorokiniana*; Rcc, *Ramularia collo-cygni*; Ph, *Puccinia hordei*

<sup>1</sup> Plant Protection Institute Hungarian Academy of Sciences, BUDAPEST, Hungary

<sup>2</sup> Rudolf Fleischmann Research Institute, Károly Róbert University, KOMPOLT, Hungary

\* Correspondence: Klára MANNINGER, sman@nki.hu

## Results

### *East Hungary*

A progressive increase in the occurrence and spread of leaf spot pathogens was detected. Disease incidence varied by areas and genotypes. Net blotch and barley leaf stripe caused by *Pyrenophora teres* and *P. graminea*, respectively, were severe. Less important diseases were brown leaf spot, Ramularia leaf spot and brown rust. Their pathogens *Bipolaris sorokiniana*, *Ramularia collo-cygni* and *Puccinia hordei* occurred only sporadically (Figure 1).

### *West Hungary*

It was expected that *Pyrenophora* species cause severe leaf spots in West Hungary too. However, it was found that the main diseases of spring barley genotypes were leaf rust (*Puccinia hordei*) and brown leaf spot. Pathogens of Ramularia leaf spot, net blotch and barley leaf stripe appeared, but the level of diseases were low (Figure 1).

### *Resistance*

All barley genotypes tested were infected by *Pyrenophora teres* and *P. graminea* at Kompolt. Two genotypes were resistant to brown rust; and one genotype was resistant to both brown leaf spot and Ramularia leaf spot in all surveyed areas.

## Conclusions

Occurrence of leaf diseases depends not only on barley genotype but also on environmental factors (precipitation, temperature, solar radiation, agricultural technology) of cultivated areas. Our survey results justify the necessity of a strategy to control the dangerous leaf spot diseases. Common effort is necessary to develop innovative solutions for controlling leaf spot diseases. Especially a close collaboration of scientists from neighbouring countries is required.

## References

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