Occurrence of Ramularia leaf spot on winter barley in Hungary

K. MANNINGER, L. VAJNA and I. MURÁNYI

Introduction

In the middle of the nineties researchers revealed that abiotic and biotic factors are causing an intensified occurrence of the necrotic leaf spot diseases of cereals. Among abiotic factors the extreme temperature levels, the elevated ozone concentration and solar radiation are the main reasons of the so-called physiological leaf spot disease. The well-known biotic factors, such as Drechslera species, *Rhinchosporium secalis* and *Bipolaris sorokiniana*, causing leaf spot diseases on winter barley; can be controlled with resistant varieties or with fungicides. But recently more and more European countries reported on a new leaf spot pathogen, which occurred on winter barley, called *Ramularia collo-cygni*. The fungus *Ramularia collo-cygni* has been well known for a long time, but it is not clear why its importance emerged only last years.

Materials and Methods

Winter barley varieties were surveyed for leaf spot diseases in the vegetation periods in Hungary from 2005 to 2007. Infected leaves were collected, placed in Petri dishes, kept at natural room lighting at 18-20º C for two days. Two days after leaf spots were scrutinised with stereo- and light microscope.

Results

There was a dynamic increase in occurrence and spread leaf spot pathogens in vegetation period of years 2005/2006. Based on microscopic examinations we determined that *Drechslera* species were the dominant pathogens on winter barley. However, we observed a new infection picture in the vegetation period of years 2006/2007. In this period, well-known pathogens infected the winter barley, but the development of the diseases was much slower and weaker than the year before. Although it was expected, that the pathogens spread more rapidly, and plant diseases would be severe, but to the contrary, to all expectations there was no drastic spread of diseases, because of the drought in April. There were no leaf spots on the upper leaf of winter barley until flowering (middle of May) in several experimental plots.

During and after the florescence of winter barley there were little spotty marks on the upper leaves, which we determined as physiological leaf spots. A week later the infection was increased, the spotty marks become larger and darker. This time we collected the infected barley leaves to determine what might have caused the leaf spots. The microscopic test of leaves proved that the leaf spots caused by *Ramularia collo-cygni*. Identity of pathogen fungus was confirmed with the shape and size of conidiophores (34,4-50 x 2,5 µm) and conidia (10,1 x 4,9 µm). This is the first record of occurrence of Ramularia leaf spot on winter barley in Hungary.

Discussion and Conclusions

The occurrence and disperse of *Ramularia collo-cygni* lasted for 2-3 weeks. After the appearance of the pathogen, the leaves flagged and drained within 15 days. The fungus attacked the grains as well. The photosynthesis stopped, fewer nutrients got to seeds, and therefore they could not develop. Consequently, the seed production decreased.

The monitoring of leaf spot disease of barley in 2007 has shown that although classic pathogen infections stayed on a low level or did not appear (e.g. mildew), but the same time in favourable environment *Ramularia collo-cygni* can spread very fast, causing serious losses in yield. The appearance of this new barley disease in Hungary is a big challenge for Hungarian pathologists, biochemists, breeders and farmers. First, it is important to improve the knowledge on the physiological and biochemical background of the disease and on the various degree and mechanism of resistance of barley genotypes to Ramularia leaf spot. In addition to evaluating Hungarian barley lines and varieties, the significance of environmental factors in the development of the disease should be further clarified.

References

ANONYM, 2006: *Ramularia collo-cygni*. A New Disease and Challenge in Barley Production. First European Ramularia Workshop, 12-14th of March 2006, Göttingen. Book of Abstract, 1-49.

CAVARA, F., 1893: Über einige parasitische Pilze auf dem Getreide. Zeitschrift für Pflanzenkrankheiten, 3, 16-26 .

SUTTON, B.C., 1991: *Ramularia collo-cygni*. C.M.I. Descr. Pahog. Fungi Bact. 10039: 1-2.

Acknowledgement

The authors thank for the financial support, the investigation was supported by GAK 2005 (rezarpak, OMFB 0936/2005).

Autoren: Klára MANNINGER and L.VAJNA, Plant Protection Institute, Hungarian Academy of Sciences, BUDAPEST; I. MURÁNYI, Felischmann Rudolf Research Institute-Károly Róbert College, KOMPOLT, sman@nki.hu