

Výskyt druhového spektra padlí tykvovitých a jeho hyperparazitické houby *Ampelomyces quisqualis* v České republice v letech 2008 – 2009

Occurrence of species spectrum of cucurbit powdery mildew and their hyperparasitic fungus, *Ampelomyces quisqualis*, in the Czech Republic during the years 2008 – 2009



Markéta Vajdová, Božena Sedláková and Aleš Lebeda

Palacký University, Faculty of Science, Department of Botany, Šlechtitelů 11, 783 71, Olomouc-Holice, Czech Republic;
e-mail: marketa.vajdova@upol.cz; bozena.sedlakova@upol.cz; ales.lebeda@upol.cz

INTRODUCTION

Cucurbit powdery mildew (CPM) belongs to the most important economic diseases of Cucurbitaceae in the world (Jahn et al., 2002). In the temperate zone, this infection is caused by two obligate biotrophic parasites *G. cichoracearum* (Gc) and *P. xanthii* (Px). These fungi classified to Erysiphales attack the photosynthetic organs of plants. The infection reduces the plant growth and fruit quality (Křístková a Lebeda, 1997). Both pathogens are characterized by the same symptoms which can be distinguished from each other only by microscopic analysis of their anamorphic stage. *Ampelomyces quisqualis* Ces. (AQ) is naturally hyperparasitic fungus with wide host range (Sedláková a Lebeda, 2010). Hyperparasite AQ occurred on anamorphic and teleomorphic stage of CPM. The presence of AQ has a negative effect on sporulation and formation chasmothecias of CMP (Sedláková a Lebeda, 2010).

The results of a research of species spectrum of CPM are summarized in this paper during the period 2008 – 2009. The aim of this work was to found out occurrence of species spectrum of CPM and their hyperparasite AQ. It followed up on long-lasting research in progress since 2001.

MATERIAL AND METHODS

The presence of CPM was observed in the CR during growing season of the years 2008 – 2009. The samples of leaves with symptoms CPM were collected simultaneously. In total, it was obtained 229 samples (99/2008, 130/2009) leaves from field crops of Cucurbitaceae. In both years, same locations were visited repeatedly. All of collected samples were dried at room temperature (20-25 °C) and herbarized in laboratory at the Department of Botany, Palacký University in Olomouc.

Both pathogens, Gc and Px, have the same symptoms. Their reliable determination is necessary to use a light microscope. For microscopic analysis, the samples were taken mycelia and conidia from several parts of herbarized leaves. Identification of species was conducted by using solution 3% KOH for the visualization of fibrosin body, structures characteristic for conidia of the species Px (Křístková et al. 2009; Lebeda, 1983). All samples were examined for the presence of hyperparasite AQ.

RESULTS AND DISCUSSION

During the period 2008 – 2009, there were recorded differences of occurrence these pathogens. The mixed infections of both pathogens (Gc+Px) were the most frequent (53 samples, 54 % of the analyzed samples) in 2008. The mixed infection originated mainly from Moravian regions, e.g. South-Moravian (45 %), Moravian-Silesian (15 %) or Olomoucký region (21 %). In contrary, the samples with mixed infection were found out in Bohemia less frequent, it did not exceed the 20 % limit. Occurrence of Gc was less often (35 samples, 35 %) from the total samples. In contrast, Gc was detected more frequent in Bohemia, e.g. Královohradecký (20 %), Pardubický (23 %), Central Bohemia region (17 %). Px was detected only in the 11 samples (11 %) of total herbarized leaves of cucurbita plants. Species Px were detected mainly in Moravian regions. In Bohemia, the samples Px were detected only in the Královohradecký region.

In 2008, the occurrence of hyperparasite AQ was recorded sporadically. It was found out only in three locations in Moravia. In Bohemia, hyperparasite AQ was not appeared on CPM species.

In 2009, the occurrence of Gc was the most frequent (89 samples, 68 %). Species Gc significantly prevailed in most regions of the CR in 2009, e.g. South-Moravian (52 %), Olomoucký (16 %), Královohradecký (15 %). The samples from Central-Bohemia region were in contrast from other regions. There, in Central-Bohemia region, the mixed infections Gc+Px were the most frequent (27 %). The mixed infection was detected in 30 samples (23 %). Px was determined very rarely (11 samples, 9 %). Although, the samples had the highest frequency of an individual presence of Px (45 %) in Moravian-Silesian region. However, a separate occurrence of Px was not found in southern parts of CR with warmer climate, e.g. in South-Moravian or Zlínský region. There was only mixed infection (Gc+Px). Occurrence of Px as a separate pathogen was found out only in six locations which situated in the northern parts of the CR.

In 2009, hyperparasite AQ was detected more frequently than in 2008. AQ was found out in 27 locations of the CR. The majority of locations originated from the most southern areas of the CR, but AQ was appeared also in Bohemia (in Královohradecký and Central-Bohemia regions).

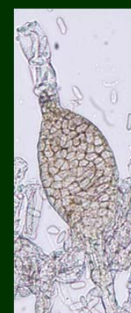
Results from the year 2008 are consistent with earlier researches when mixed infection substantially prevailed in analyzed samples (Křístková a Lebeda, 1999, 2000; Křístková et al., 2007, 2009; Lebeda et al., 2009; Sedláková a Lebeda, 2010). During some periods (1995 – 1998, 2001 – 2003, 2004 – 2007), mixed infection had been observed an increasing trend. These results also demonstrate the potential tendency of Px spread to Central Europe.



Beginning of CPM infection on leaves of *C. pepo*

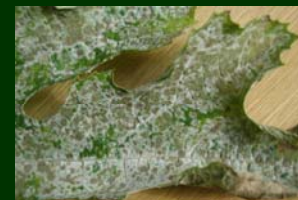


Serious CPM infection on leaves of *C. maxima*



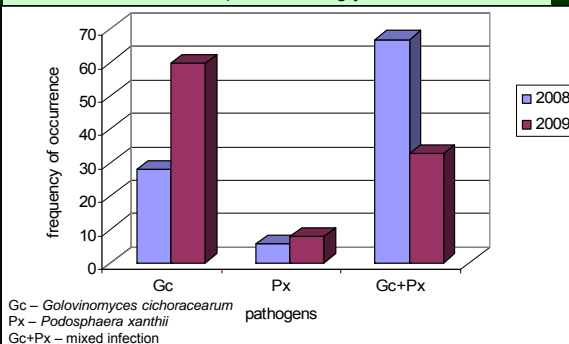
Pycnidia of *Ampelomyces quisqualis*

Distribution of hyperparasite *Ampelomyces quisqualis* in the CR during years 2008 – 2009



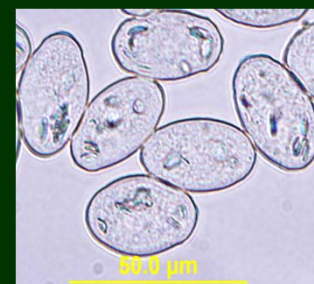
Symptoms of CPM and hyperparasite AQ

Figure 1. The comparison of CPM species (*G. cichoracearum*, *P. xanthii*) in CR during years 2008 – 2009



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Conidia of *Podosphaera xanthii*



Conidia of *Golovinomyces cichoracearum*

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