

Distribution of Cucurbit Powdery Mildew Species in the Czech Republic

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Abstract

The occurrence of *Erysiphe cichoracearum* (Ec) and *Sphaerotheca fuliginea* (Sf), causal agents of cucurbit powdery mildew in the Czech Republic (CR) was studied in the period of 1995–2001. Nearly 800 leaf samples with disease symptoms were microscopically examined. Ec is the predominating species, detected on 98% of locations. It was accompanied by Sf on 24% of locations. The occurrence of Sf as the only powdery mildew species was proved on 2% of locations. Recent occurrence of Sf in the CR corresponds with data on Sf fast spreading and prevailing on cucurbits in West and South Europe. However, Ec is the strongly predominating powdery mildew species largely distributed throughout the country. The hyperparasitic fungus *Ampelomyces quisqualis* was detected on 30% of samples.

Keywords: *Sphaerotheca fuliginea*; *Erysiphe cichoracearum*; *Ampelomyces quisqualis*; *Cucurbitaceae*; anamorphs; conidia morphology; light microscopy

INTRODUCTION

Cucurbit powdery mildew is caused under climatic conditions of the Central Europe by two species of erysiphaceous fungi, *Erysiphe cichoracearum* DC. ex Mérat, resp. *E. orontii* Cast. emend. Braun and *Sphaerotheca fuliginea* (Schlecht ex. Fr.) Poll., resp. *S. fusca* (Fr.) Blumer emend. Braun (BRAUN 1995), resp. *Podosphaera xanthii* (SHISHKOFF 2000). Both species differ by host range (BRAUN 1995), ecological requirements (SITTERLY 1978), response to certain fungicides (MCGRATH 1996) and pathogenicity (BAR-DIN *et al.* 1997, 1999).

In general, *S. fuliginea* occurs in warmer regions and on protected crops, whilst *E. cichoracearum* is common in colder regions. During last 15 years, *S. fuliginea* is reported as frequent or even predominating causal agent of cucurbit powdery mildew in many parts of the world, including Europe (BERTRAND *et al.* 1992; MCGRATH 1994; VAKALOUNAKIS *et al.* 1994). In seventies *S. fuliginea* was not detected on

the territory of Bohemia and Moravia, i.e. in the recent Czech Republic (LEBEDA 1983). Knowledge of pathogen species spectrum is essential for an effective crop protection management.

The aim of this study was to identify current distribution of cucurbit powdery mildew species in the territory of the Czech Republic.

MATERIAL AND METHODS

During vegetation periods of 1995–2001 a total of 789 leaf samples were collected from cucurbitaceous vegetables showing symptoms of powdery mildew infection in 47 districts of Bohemia and Moravia. The majority of samples originated from field cultures of *Cucurbita pepo* L. and *C. maxima* Duch., samples taken in glasshouses and plastic tunnels were collected from *Cucumis sativus* L., *C. melo* L. and partly from *Cucurbita pepo* and *C. maxima*. In case of different host plant species on one field, separate samples were prepared. Several samples were collected from the same field

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Table 1. Occurrence of cucurbit powdery mildew species on cucurbitaceous vegetables in the Czech Republic in 1995–2001

	1995	1996	1997	1998	1999	2000	2001
Number of samples**							
Ec	115/3	84/4	95/0	47/1	29/2	16/4	93/0
Sf	0/1	11/3	3/5	0/2	0/0	0/2	2/4
Ec + Sf	47/6	36/2	38/1	32/1	3/0	1/5	5/0
Number of locations in the year							
Ec	28	48	42	21	27	10	53
Sf	0	1	2	0	0	0	2
Ec + Sf	10	17	24	14	3	3	4

* Ec – *Erysiphe cichoracearum*; Sf – *Sphaerotheca fuliginea*; Ec + Sf – *E. cichoracearum* + *S. fuliginea*; ** fields/under cover

several times during a vegetation period and selected locations were visited subsequently each years.

The identification of both pathogens was based on the examination of the morphological characters of dry conidia in a 3% KOH solution according to LEBEDA (1983).

RESULTS AND DISCUSSION

Powdery mildew conidia were found on 703 leaf samples and *Erysiphe cichoracearum* (Ec) and *Sphaerotheca fuliginea* (Sf) were identified (Table 1). Cleistothecia of Ec were found on two locations only, by Sf were not detected. Ec as single species was detected on 70% of samples in 74% of locations from both field and protected crops. It occurred in all regions investigated, including the South Moravia, the warmest region of the Czech Republic. The presence of both species (Ec and Sf) was recorded on 25% of samples from 24% of locations in all regions visited, covering also northern areas with colder climate (e.g. North and East Bohemia, North Moravia). The occurrence of Sf as the only powdery mildew species was limited to 5% of samples from 2% of locations. It was detected not only on plants under cover, but also on field crops. In 2001 Sf distribution was restricted to 6 locations only and it was not detected in areas of its previous occurrence.

The recent occurrence of Sf in the Czech Republic corresponds to data on its fast spreading and prevailing on cucurbits in West and South Europe. However Ec is a strongly predominating powdery mildew species largely distributed throughout the country.

The occurrence of a hyperparasitic fungus, probably *Ampelomyces quisqualis* Ces. (SUTTON 1980) was recorded mainly in Ec hyphae and basal cells of conidiophores on samples from 77 locations.

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