

Occurrence of *Peronospora dianthicola* on Carnations in the Czech Republic

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Abstract

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A downy mildew disease was observed on leaves of *Dianthus chinensis* L. cv. Scarlet in Brno in June 2011. Characteristics of visual symptoms and microscopic features are described. The morphology of the fungus was typical of *Peronospora dianthicola*, conforming to the published description by FRANCIS (1983). *P. dianthicola* causing leaf spots on *Dianthus* has been recorded for the first time in the Czech Republic.

Keywords: downy mildew; visual symptoms; *Dianthus chinensis*

Most of the nearly 300 species of carnation (*Dianthus* L.) are perennial, but in our climate they are mainly grown as annuals. Two species of downy mildew, *P. dianthi* de Bary and *P. dianthicola* Barthelet, which are difficult to distinguish, have been described in *Dianthus*. Conidia and conidiophores are very similar, the main distinguishing feature is the outer wall of the oospore. The wall of *P. dianthi* is smooth, that of *P. dianthicola* is thick-warted. Downy mildew of carnation caused by *P. dianthicola* has been reported from Colombia (ARBELÁEZ 1979), France (FRANCIS 1983), Italy (AMBRICO *et al.* 2003), Israel (BEN-ZE'EV *et al.* 2004) and China (DUAN *et al.* 2010).

MATERIAL AND METHODS

Seedlings of *Dianthus chinensis* Aristo F1 cv. Scarlet with symptoms of the leaf spots were sent in order to identify the causal agent of the disease. The downy mildew (conidiophores, conidia) was taken from the lower side of leaf blades which showed yellowish spots and was examined microscopically (200–500× magnification) in lactophenol and lactic acid (10%). Oospores were detected in

samples of the infected tissues of living or dry leaves (in KOH 3%, lactic acid 10%).

RESULTS AND DISCUSSION

In the greenhouses in Brno in June 2011 inconspicuous yellow-green, later purple spots were observed on the upper surface of leaves of seedlings of *Dianthus chinensis* Aristo F1 cv. Scarlet. On the lower side of leaves showing these spots, sporulation of the downy mildew (conidiophores with conidia) was observed. The infected plants lagged behind in the growth of individual leaves and the shoots finally died. In the infected leaf tissue numerous oospores were formed.

The description of the pathogen isolated from samples of *Dianthus chinensis* Aristo F1 cv. Scarlet is as follows: the conidiophores were straight, 260–367 × 8–12 μm, the unbranched part being of about 1/2–2/3 of the total length, 4–6× dichotomously branched, branch ends 10–14 μm, straight or slightly curved, with a right angle or less (Figure 1). Conidia 13–17 × 19–25 μm, ellipsoid, pale brown to violet. Oospores were abundantly produced in the leaf section, 34–55 × 37–60 μm (ø 53.5 × 56.6 μm),



Figure 1. Conidiophore ($\times 200$) and conidium ($\times 200$ detail) of *P. dianthicola*

with the yellow-brown wall, heavily and regularly verrucose or warty (Figure 2). The morphology of the downy mildew was typical of *Peronospora dianthicola*, conforming to the published description in FRANCIS (1983).

Pathogenicity tests were performed by inoculation of 8-week-old healthy carnation plants with conidiophores and conidia collected from naturally infected carnation plants. The plants were incubated at 21°C and 95% relative humidity (12 h photoperiod). After 3-week incubation, typical downy mildew symptoms were observed. Control plants were symptomless.

On the basis of the first recorded incidence of *P. dianthicola* on young seedlings of *Dianthus chinensis* Aristo F1 cv. Scarlet in the Czech Republic, it can be assumed that for the time being it is not necessary to consider suitable methods of control. It is necessary, however, to devote more attention to young *Dianthus* seedlings, particularly those imported from countries where the downy mildew has been reported. Infected seedlings can be treated with fungicides registered against downy mildew on ornamental plants.

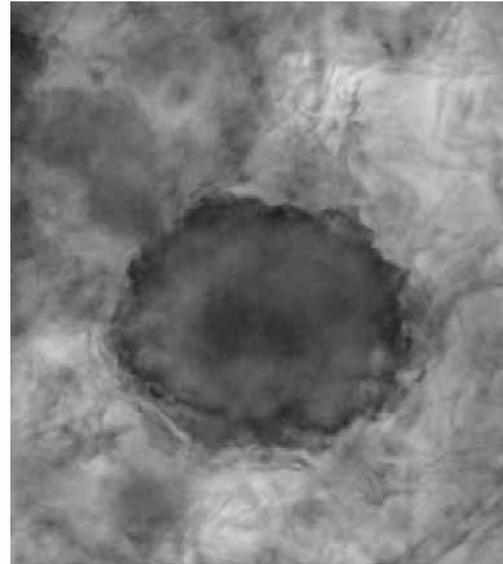


Figure 2. Oospore ($\times 400$) of *P. dianthicola*

To the best of my knowledge, this is the first recorded occurrence of *Peronospora dianthicola* in the Czech Republic.

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