
Mycological state of imported sick plants of the family *Agavaceae*

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Recently the assortment of flowers has expanded, as a huge amount of various plant species are imported from abroad. When pot-plants growing in peat substrata are brought from Holland into unfavorable conditions, disease symptoms begin to occur. Species of micromycetes functioning in a substrate and overground part of some plants belonging to the family *Agavaceae* (8 taxa) were found. There were isolated and identified 63 species ascribed to 28 genera, 4 families, 2 ranges, 2 classes and 2 divisions as well as to mitosporic fungi. Prevailing fungal species pathogenic to *Agavaceae* plants were determined to belong to the genera from *Fusarium*, *Pythium*, *Verticillium* and *Thielaviopsis* genera.

Key words: introduced, weak and sick plants, micromycetes, pathogenic species of micromycetes

INTRODUCTION

Recently many plants of the family *Agavaceae* are being brought from Holland and other countries. Some ornamental plants are very susceptible to environmental factors [1]. Micromycetes functioning in substrata and excreting secondary metabolites into the surrounding often determine the development and growth of these plants. The influence of micromycetes is especially evident on plants weakened for various reasons [2, 3]. Under those conditions, propagules of pathogenic fungi that have occurred in the substratum start to dominate and inhibit other microorganisms [4]. The effect of the pathogens on the plants is unfavourable – they injure roots, stems, and leaves. A real danger for plants can occur due to spreading and intensive development of pathogens brought from other countries [5]. Therefore, it is important to find out species of micromycetes functioning on the overground part of *Agavaceae* plants and in their root zone, to identify species able to cause root rots and to assess means limiting their spreading.

MATERIALS AND METHODS

In 1996–1999, *Agavaceae* plants of 8 taxa were investigated one month following their import from Holland. A mycological investigation was carried out with plants growing in peat substrate. Roots and overground parts of some plants were damaged.

From them, micromycetes were isolated and identified. Fungal identification was performed according to their cultural and rot peculiarities following various handbooks [6–8] and ascribed to taxa after Hawksworth et al. [9]. The index of spreading occurrence frequency was used for determination of typical genera and species of micromycetes [10]. The state of plants was evaluated by observing them and determining lesion intensity (in grades) as well as calculating the distribution of a disease (%) following G. Koev & L. Kleshnina [11].

RESULTS AND DISCUSSION

When after a month or a longer time *Agavaceae* plants were returned from trade network to a supply source, it was noticed that some of plants were damaged: leaves were spotty, slightly dried, yellowed, tended to fall and infected with intensively developing fungi – agents of root rots.

The data in Table 1 show that all plants of some species and sorts (*Agava americana*, *Dracaena fragrans* ‘Yellow Stripe’, *D. reflexa* ‘Song of India’) were injured by fungi. The extent of injury of other plants was lower. Under these conditions, *Agavaceae* plants were mostly infected by fungi of the genera *Septoria*, *Pythium*, *Verticillium* and *Colletotrichum*.

From the root zone of investigated *Agavaceae* plants, 63 species belonging to 29 genera, 4 families, 2 ranges, 2 classes and 2 divisions, as well as to mitosporic fungi were isolated and identified.

Plant	Lesion symptoms	Disease agent	Distribution of damage %	Intensity of damage, grades
<i>Agava americana</i>	lower leaves starting to yellow	<i>Colletotrichum agaves</i>	100	0.5
<i>Cordyline fruticosa</i> 'Lord Robertson'	spotted leaves	<i>Septoria</i> sp.	30	1
<i>C. fruticosa</i> 'White Edge'	spotted leaves	<i>Septoria</i> sp.	100	0.5
<i>D. deremensis</i> 'Compacta'	root-neck rot	<i>Botrytis cinerea</i> , <i>Pythium diclinum</i> , <i>Verticillium album</i>	30	0.5
<i>D. deremensis</i> 'Lemon and Lime'	spotted leaves	<i>Phyllosticta dracaenae</i>	35	1
<i>D. fragrans</i> 'Yellow Stripe'	lower leaves yellowed	<i>Pythium</i> sp., <i>Pythium acanthicum</i>	100	0.5
<i>Dracaena reflexa</i> 'Song of India'	shed leaves	<i>Doratomyces stemonitis</i> , <i>Verticillium alboatrum</i>	100	1–6
<i>Yucca elephantipes</i>	clear root rot	<i>Fusarium culmorum</i> , <i>Pythium irregulare</i>	100	2

Distribution of micromycetes of various genera and species in the rhizosphere of *Agavaceae* plants was different (Table 2).

From the root zone of *Agava americana*, among the isolated species only *Fusarium equiseti* whose occurrence frequency was 39% (A – 39%), and *Pythium irregulare* (A – 30%) are considered to be opportunistic pathogens.

The micromycetes *Thielaviopsis basicola* (A – 9%) and *Fusarium oxysporum* (A – 20%) were isolated from the root zone of *Cordyline fruticosa* 'White Edge'. Roots and the overground part of the plants were injured significantly.

From all the investigated plants (except *Dracaena deremensis* 'Lemon Lime'), micromycetes of the genus *Pythium* (*P. aristosporum*, *P. irregulare*, *P. flevoense*) and *Fusarium* – (*F. oxysporum*, *F. sambucinum*, *F. equiseti*, *F. semitectum*) (A – 25–58%) were isolated. Roots of the plants *Dracaena deremensis* 'Compacta' were infected by the agent of the black dry-rot *Thielaviopsis basicola* (A – 75%). *Rhizoctonia solani* (A – 18%) functioned in the root zone of *D. fragrans* 'Yellow Stripe'. This fungus, as W. Branderburger [12] has indicated, is an active causative agent of rots of the genus *Dracaena* plants. *Verticillium alboatrum* (A – 75%) was found rather

Plant	Dominant genus (number of isolated species)
<i>Agava americana</i>	<i>Fusarium</i> (1) <i>Pythium</i> (1); <i>Aspergillus</i> (1), <i>Penicillium</i> (5)
<i>Cordyline fruticosa</i> 'Lord Robertson'	<i>Metarhizium</i> (1), <i>Penicillium</i> (7), <i>Aspergillus</i> (2)
<i>C. fruticosa</i> 'White Edge'	<i>Mortierella</i> (2), <i>Metarhizium</i> (1), <i>Penicillium</i> (5), <i>Fusarium</i> (1), <i>Thielaviopsis</i> (1)
<i>Dracaena deremensis</i> 'Compacta'	<i>Pythium</i> (1), <i>Mucor</i> (1), <i>Aspergillus</i> (1), <i>Chrysosporium</i> (1), <i>Penicillium</i> (9), <i>Thielaviopsis</i> (1); <i>Trichoderma</i> (1)
<i>D. deremensis</i> 'Lemon Lime'	<i>Mortierella</i> (1), <i>Mucor</i> (1), <i>Aspergillus</i> (1), <i>Aureobasidium</i> (1), <i>Cladosporium</i> (1), <i>Fusarium</i> (1), <i>Phaeoisaria</i> (1), <i>Trichoderma</i> (1); <i>Trichosporiella</i> (1)
<i>Dracaena fragrans</i> 'Yellow Stripe'	<i>Fusarium</i> (2), <i>Mortierella</i> (2), <i>Acremonium</i> (2), <i>Aspergillus</i> (1), <i>Cunninghamella</i> (1), <i>Geotrichum</i> (1) <i>Gliocladium</i> (3) <i>Penicillium</i> (4), <i>Rhinotrichum</i> (1) <i>Rhizoctonia</i> (1), <i>Pythium</i> (1), <i>Mucor</i> (1)
<i>Dracaena reflexa</i> 'Song of India'	<i>Verticillium</i> (1), <i>Mortierella</i> (1) <i>Penicillium</i> (3) <i>Acremonium</i> (2), <i>Arthrotrichum</i> (1), <i>Aspergillus</i> (1), <i>Aureobasidium</i> (1), <i>Gliocladium</i> (1), <i>Penicillium</i> (9), <i>Pythium</i> (1), <i>Rhinotrichum</i> (1), <i>Sporobolomyces</i> (1).
<i>Yucca elephantipes</i>	<i>Fusarium</i> (1), <i>Aspergillus</i> (1), <i>Gliocladium</i> (1), <i>Hormiactis</i> (1), <i>Mortierella</i> (2), <i>Mucor</i> (1), <i>Penicillium</i> (5), <i>Pythium</i> (1)

frequently in the root zone of *Dracaena reflexa* 'Song of India'. From the root zone of *Dracaena deremensis* 'Lemon Lime' a very rare species *Phaeoisaria clematidis* (A – 0.9%) was isolated

Fusarium culmorum (A – 38%) was isolated from the root zone of *Yucca elephantipes* plants severely damaged by root and root neck rot. This fungus in complexes with other micromycetes can seriously damage roots [2]. *Pythium irregulare* dominated too (A – 21%).

However, along with the usual species, there were found new species mostly considered as cosmopolitans (Table 2).

The dominant genera of micromycetes isolated from the overground parts and roots of sick *Agavaceae* plants were as follows: *Penicillium* – 100%, *Mortierella* – 63%, *Fusarium* – 59%, *Aspergillus* – 46%, *Pythium* – 42%, *Gliocladium* – 30%, *Mucor* – 29%, *Verticillium* – 22%, *Acremonium* – 22%, *Trichoderma* – 20%, *Thielaviopsis* – 17%.

To avoid rapid spreading of micromycetes-pathogens on *Agavaceae* plants and in their growth surroundings, it is necessary to improve their maintenance conditions in trade and store premises and to separate sick plants from healthy ones.

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IMPORTUOTŲ SERGANČIŲ AGAVINIŲ ŠEIMOS AUGALŲ MIKOLOGINĖ BŪKLĖ

S a n t r a u k a

Pastaruoju metu intensyviai plečiamas auginamų gėlių sortimentas, daugybė įvairių augalų rūšių įvežama iš kitų kraštų. Įvežti iš Olandijos durpių substrate vazonuose augantys augalai, patekę į jiems nepalankias sąlygas (parduotuves, sandėliavimo patalpas), nusilpsta. Dažniausiai nusilpusi augalų dar „lydi“ patogeninis mikromicetas. Nustatytos kai kurių agavinių šeimos (8 taksonų) augalų antžeminėje dalyje ir substrate funkcionuojančios mikromicetų rūšys. Išskirtos ir identifikuotos 63 grybų rūšys, priklausančios 28 gentims, 4 šeimoms, 2 eilėms, 2 klasėms bei 2 skyriams (sistemizuota pagal D. L. Hawksworth et al) [9]. Šalia plačiai paplitusių, kosmopolitinėmis vadinamų mikromicetų tūšių išskirtos vyraujančios patogeninės rūšys iš *Fusarium*, *Pythium*, *Verticillium*, *Thielaviopsis* genčių.