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NATURAL OCCURRENCE OF FUNGI IN FEEDING WHEAT IN THE AGRICULTURAL FARM FACILITIES

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Summary

During the whole period of storage, starting from harvest, quantity as well as taxonomic identification of isolated fungal genera (species) were determined in feeding wheat. Samples were collected from 7 farms. The objective of this experiment was to examine changes in isolated fungal populations during the wheat storage period. The highest fungal population densities were determined immediately after harvest (10^4-10^5 cfu.g^{-1} wheat grain). In the following assessments, the highest fungal density reached $1.09.10^4$ cfu.g^{-1} at one samples sites. 24 fungal genera were isolated from the samples tested. The most dangerous fungi be long to the genera *Aspergillus* and *Penicillium*, were determined in 67-100% and 50-88% of the samples tested, respectively. The above mentioned genera can strongly damage stored cereals by their capability of grain moulding as well producing mycotoxins and alergens. Species determined as *Aspergillus fumigatus*, *Aspergillus flavus* etc. can contaminate wheat used for feeding purposes.

Key words: microscopic fungi, wheat, storage.

Introduction

The colonisation of aerial plant parts by micro-organisms starts almost as soon as leaves of inflo-rescences are exposed to the air. Bacteria usually colonise first but they are soon followed by yeast and then by pathogenic and saprophytic filamentous fungi. Filamentous fungi continue to develop throughout the plant's growth but especially as the plant senesces and seed ripens. Harvest profoundly disturbs the ecosystem and marks the transition from the extremes of the field environment to the relatively stable conditions of storage (LACEY, 1989).
Many species of fungi mainly Fusarium, Aspergillus and Penicillium are not only recognised plant pathogens but are also sources of the important mycotoxins of concern in animal and human health (ABRAMSON, 1997; PLACINTA et al., 1999).

Material and methods

The experiment was carried out in seven agricultural farms. Five of them were located in the south-west part (A, B, C, F and G) and two ones (D and E) in the middle of Slovakia. All farms had not special storage buildings. The first samples of stored feeding wheat were collected immediately after harvest (end of July to beginning of August) from the storage facilities of the mentioned farms. The others samples of wheat were collected during storage (four to ten months) monthly. Malt agar and Czapek-Dox agar were used to isolate and identify individual genera and species. Incubation was carried out at 25 °C for 5-10 days. Taxonomic identification of all colonies considere different was achieved through macroscopic and microscopic studies.

Results and discussion

Fungi are the most important spoilage organisms in cereal grains. Mould growth leads to reduced nutritional and technical quality of cereals grains (SCHNÜRER & JONSSON, 1992, HASAN, 1999). Cereal grain and cereal meal inevitably lead to the contamination of the final mixed feed with moulds (CHELKOWSKI, 1991).
The highest mycological contamination of wheat was found out in the first samples after harvest, with high reduction already during followed month of storage. During next months of storage the mycological contamination was stabile and very low ranged from 10^2 to 10^3 cfu.g^{-1}. The moisture of stored wheat in all agricultural farms ranged from 8,8% to 12,8% dry matter. Under such low moisture conditions the moulds are not able to growth (WILLIAMS, 1991).
The mycological contamination after harvest in our five agricultural farms was similar as documented by SEILER (1986). The mycological contamination of wheat can be considered as a good when moulds cfu is in range from 10^3 to 10^5 per gram (SCHNÜRER & JONSSON, 1992).
In two farms the mycological contamination after harvest reached 10^6 cfu per gram. The high cfu of moulds (10^7) is observed under the poor harvest years (SEILER, 1986).
24 fungal genera were isolated from the samples tested . Their presence was not influenced by the time of storage except Cladosporium after harvest . The most frequently isolated genera were Aspergillus, Acremonium, Alternaria, Aureobasidium, Cladosporium, Penicillium, Rhizopus and Ulocladium. It is necessary to point out that the isolated genera Aspergillus,

Penicillium. Claviceps and Fusarium are considered as the most important producers of mycotoxins (DIEKMAN & GREEN, 1992).

We have found a high frequency of field fungi especially Alternaria. The frequency of Alternaria occurrence in the wheat samples of all farms was not influenced by time of storage. Though there is evidence in literature that with a time of storage the number of Alternaria in the wheat reduced even to a zero values after 14 weeks (ABRAMSON et al., 1980, cit. JESENSKÁ, 1987). At harvest there is a high occurrence of Alternaria in wheat what can persist during the whole storage if the grain moisture is lower. However when the grain moisture is higher the typical storage fungi (Aspergillus, Penicillium) start to grow up and consequently they have antagonistic effect on the vitality of Alternaria and this fungus soon dies (LACEY, 1989). Thus the Alternaria occurrence can serve as a indicator of recently harvested wheat or good storage conditions (CHRISTENSEN, 1987).

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