PATHOGENE AND SAPROFITIC FUNGUS PRESENT IN THE WHEAT KERNELS SPERMOSPHERE, AS POTENTIAL PRODUCER OF MYCOTOXICOSIS ON MAN AND DOMESTIC ANIMALS

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Abstract: *Storing wheat seed is one of the most important technological phases, both for agriculture and animal husbandry and food industry. From Phytopathology point of view, many of fungi and bacteria found on seeds when they are placed in silos but mostly in farmers family granary, storage under the optimal technical level of control and ventilation could have as result a temperature and humidity increase in seed mass. This may lead to compromise of that stored seeds amount. On the other hand it should be noted that the microorganisms whichcan cause potential problems are placed in storage warehouses together with seeds because those seeds containon the seminal skin or seeds inside those phytopathogenic agents.Infections in this case have as point of origin directly from the field pathogens dissemination, or from indirect infections produced by transport or even handling the mass of seeds before storing. Wheat biggest trouble can be caused by fungi of the genera Aspergillus, Penicillium,Fusarium, and also Ustilago tritici or Tilletia sp. Even in small amounts some of these fungi spores when are placed in the good conditions of temperature and humidity forinfection, will lead to the development of "molds" that emit dangerous mycotoxins such as aflatoxins, tenuazonic acid and other metabolites dangerous. Or if the seeds are used to make concenrtateforage for animal husbadry and this forage are kept in poor conditions, toxicosiscaused by this fungi toxins are unavoidable and even products made from these animals are also toxic. In present paper we propose to show results of our research concerning the amount of potentially toxigenic fungi species in seed parties harvested in 2012,from several wheat varieties. Working method we used to determine the spores of these pathogens was extended Wageningen method with method of E.Rădulecu and A. Negru. Results clearly indicates the presence on the seeds coat of fungal spores from genera Aspergillus, Fusarium and Alternariatogether f with Ustilago tritici which can cause trouble when using these seed farmers.*

Key words:*wheat seeds, storage grains, pathogen spores*

INTRODUCTION

It is known that wheat seed treated before sowing in order to protect seedlings against pathogens during emergence, and during the first phenological phases and to destroy some pathogens which are inside kernels at the beginning and in the seedlings later, such as common bunt(*Tilletia sp.*) and loose smut(*Ustilago tritici*) (1,2,3,4,5,10). If in terms of seeds for sowing problems are solved, not the same can be said about the seed mass consumption. These parties of seeds, before moving in the food industry undergoing a long period of time in storage, this period is critical in terms of some pathogens that can produce well known "molds"(2,7,9). A subsequent problem of this fungi attack is the occurrence of fungal toxins known to be hazardous to both human and animals health, and even can be transmitted from animals, which have consumed some quantity of feed concentrates infested with fungi and fungal toxins, to humans through food such as meat, milk and its derivatives, and even eggs. And this danger is especially real with how some toxins are hard to break even by some methods of pasteurization, and even cooking(2,6,7).

All this made interesting the idea of keeping under surveillance the infestation ofharvested seed parties with fungal spores, because this spores in improper deposit climate

condition can germinate on the seed mass and produce severe infestations with toxins. The idea is very provocative especially since, due to climate change, some pathogens have in some years the over-spore dissemination. This paper contains data on the infestation degree of seeds with fungal spores. Tested seeds are from certain wheat varieties some of the most cultivated varieties from Western Plain of Romania. We also tested samples of seeds of certain wheat species from didactic field of Phytotechny discipline Didactic Research Station of U.S.A.M.V.B. Timisoara.

MATERIAL AND METHODS

The biological material used for this experiment consisted of seed samples from four of the mostcultivated Romanianvarieties on the Western Plain, respectively Delia, Alex, Ciprian and Dropia. We also had available a seed samples of four wheatspecies(*Triticumaestivumsspcompactum, Triticum durum, Triticumcarthlicum*and*Triticumpolonicum),* harvested in the field of Phytotechny discipline. Processing samples for detection and counting of the spores was carried out as follows: from the samples were randomly numbered 50 kernels in 3 repeats. The kernels were placed into 250 ml Erlenmeyer flasks in which they were washed with distilled water by stirring for 10 minutes. After washing, a seed were eliminated and from washing fluid was distributed in Eppendorf tubes and was centrifuged.After centrifugation, the liquid in the upper third of the tube was removed, the remainder being used for identification and enumeration of the spores of fungi that were originally on wheat kernels.Thus, this liquid was pipetted in cell counter room type Burker– Turk in order to have a standard of the liquid volume used to perform the spore count. Data resulted from counting spores were thesubject to statistical analysis, the results are in the present paper.

RESULTS AND DISCUSSIONS

Table 1 illustrates the results on the number of spores of *Fusarium roseum*counted on samples of wheat varieties. A first remark is that there were repetitions in which there was no spore of the fungus, as it was in the case of first repeat from Alex variety and the second repeats from Delia and Ciprian varieties.The figures indicate, close differences of averages between samples and even between repetitions, as reflected also by statistic differences.However statistics analysis indicates that the largest number of spores of *Fusarium roseum* wasregistred by Alex variety, with a significant difference from the control, and the lowest number of spores wasregistred at the variety Ciprian with a negative significant difference compared to the control.

Table 1.

Results concerning the contamination of some wheat varieties seeds with spores of *Fusarium roseum.*

Variety	R1	R2	R3	Average	Difference	Significance
Delia	5,00	0,00	7,00	4,00	0,58	-
Alex	0,00	5,00	9,00	4,67	1,25	*
Ciprian	4,00	0,00	2,00	2,00	-1,42	0
Dropia	3,00	5,00	1,00	3,00	-0,42	-
Average	3,00	2,50	4,75	3,42	Control	-

DL 5%= 1,1DL 1%= 1,8 DL 0,1%= 3,4

Results on the number of spores of the fungus *Alternaria sp.* counted in samples of wheat varieties are shown in table 2. It may be noted that this number is not very high, the highest average on the repetitions was below 5. As a first consideration, it may be noted that the variety Delia had the highest average number of spores of Alternaria sp.In statistical terms, the lowest number of spores was recorded at variety Ciprian, with a negative significant differences and the biggest difference was registered, as anticipated, at variety Delia, with a significant difference compared to the control average.

Table 2.

Results concerning the contamination of some wheat varieties seeds with spores of *Alternaria sp.*

Variety	R1	R2	R3	Average	Difference	Significance
Delia	4,00	7,00	3,00	4,67	0,50	-
Alex	1,00	2,00	2,00	1,67	-2,50	00
Ciprian	6,00	5,00	3,00	4,67	0,50	-
Dropia	4,00	4,00	9,00	5,67	1,50	*
Average	3,75	4,50	4,25	4,17	Control	-

DL 5%= 1,2 DL 1%= 1,8 DL 0,1%= 3,2

More interesting was the results obtained from counting the sporesof the two pathogensfrom samples of wheat species seeds. This is because such an analysis can help in assessing the strength of these two pathogens varieties and their use as a source of germplasm for breeding.

Thenumber of spores of Fusarium sp. counted on wheat species, as it isshown in table 3, it can be empirically appreciated that it is greater than that of the varieties, discussed above. Also, in this case there were some repeats in which there were found no spores at all. growth was geese. It may, however, be appreciated that the presence of the spores at all species indicates that there are no sources of resistance, butthere are only tolerant wheat species to the pathogen. Statistical analysis shows that the largest number of spores was recorded at*Triticumcarthlicum*with significant differences from the control. Thelowest number of spores was recorded *Triticum durum*semnifictiv a negative difference compared to control.

Table 3.

Results concerning the contamination of some wheat species seeds with spores of *Fusarium roseum.*

Species	R1	R2	R3	Average	Difference	Significance
Triticumaestivumsspc ompactum	6,00	0,00	9,00	5,00	0,25	-
Triticum durum	3,00	2,00	5,00	3,33	-1,42	0
Triticumcarthlicum	11,00	6,00	3,00	6,67	1,92	**
Triticumpolonicum	0,00	5,00	7,00	4,00	-0,75	-
Average	5,00	3,25	6,00	4,75	Control	-

DL 5%= 1,1 DL 1%= 1,7 DL 0,1%= 3,4

In table 4 are shown the number of Alteranria sp. spores counted on wheat species kernels. Compared with data from wheat varieties analyzed and presented in table 2, it can be said that there are large differences in the data coming from the wheat species analyzed. The first thing revealed by the data, is that the average of*Triticumaestivumsspcompactum*repetitions is equal to the control.Actually, this mean that the average of spores of *Triticumaestivumsspcompactum*is identical with absolute average data from all species samples analyzed.The highest average of*Alternaria sp.*conidia have been found atTriticum durum, it's average being placed from statistic point of view,at asignificant difference of control. The lowest number of *Alternaria sp.*conidia was registered at*Triticumcarthlicum*, the average of this species was at a negative significant difference compared to control.

Table 4.

Results concerning the contamination of some wheat varieties seeds with spores of *Alternaria sp.*

Species	R1	R2	R3	Average	Difference	Significance
Triticumaestivumsspcompactum	3,00	4,00	2,00	3,00	0,00	-
Triticum durum	1,00	5,00	7,00	4,33	1,33	*
Triticumcarthlicum	0,00	3,00	1,00	1,33	-1,67	0
Triticumpolonicum	6,00	2,00	2,00	3,33	0,33	-
Average	2,50	3,50	3,00	3,00	Control	

DL 5%= 1,1 DL 1%= 1,8 DL 0,1%= 3,4

CONCLUSIONS

1. There is no species or varieties of wheat where can't be found conidia of *Fusariumsp*. or *Alternaria sp*. which means that none of them are resistant to both pathogens but tolerant to them.
2. Improving protection is compulsory for tolerant varieties, by treatment of at least at fulfill economic damage threshold of each pathogen, because any attack on final stages of plant maturationbring a rise of the conidia amount on the ears and kernels and the introduction of large quantities of spores in silos or warehouses leads to an increased risk of impairment of the quality of stored seeds by developing saprophytic growth of these fungi and mycotoxins contamination risk.

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