

## **THE INFLUENCE OF THE SEED'S TREATMENT UPON THE WINTER WHEAT'S QUALITY AND LEVEL OF PRODUCTION**

**Popovici Mariana\*, Iancu Carmen Violeta\***

\*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048, Oradea, Romania, e-mail: [mariana\\_mediu@yahoo.com](mailto:mariana_mediu@yahoo.com)

### **Abstract**

*In order to destroy diseases and pests from the wheat culture complex measures are to be applied starting with the compulsory treatment of the seed, then followed by the treatments necessary during the vegetation period. Weather conditions also determine the occurrence of certain diseases and pests which can definitely have a major influence upon the level of production and upon the quality of the production.*

*The protection of the autumn culture starts before sowing by treating the seeds with fungicides which have the role to protect the seed and the young seedlings up to 30 days from the actual sowing, period in which the plants are more vulnerable to the attack of pathogenic agents found on the surface of the seeds or in the soil. The most important diseases controlled by the treatment of the seeds are: Common smut (*Tilletia* sp.), *Fusarium* (*Fusarium* spp.), *Septoria* (*Septorium* spp.), *The flying blight* (*Ustilago tritici*).*

*In order to increase the efficiency of the seed treatment we recommend the use of fungicides that contain two active substances and the use of insect-fungicides with three or four active substances in case the sowing of the winter wheat is done after other grainy cereals.*

**Key words:** fungicides, insect-fungicides, pathogenic agents, pests

### **INTRODUCTION**

The seed has got an important contribution to obtaining high and superior quality harvests. The seed must be treated against diseases and pests in order to destroy the pathogenic agents existent at the surface of the grain and in order to protect the seed against the attack of mold or other parasitic fungi which live in the soil (Boeriu et al., 1973).

The treatment of the seeds before sowing is compulsory. The treatments can differ according to the pathogenic agent and according to the way of infestation. We recommend treatments based on carbendazim, methyl thiophanate-methylthiram, flutriafol, etc., both in the case of pathogenic agents which are transmitted through the seed as well as in the case of pathogenic agents with germs inside the wheat grain (Borza et al., 2010).

During the seed's soil germination process and during the growth of the seedling the infectious agents found on the seeds in a stand by stage move on to an active life and this process leads to the death of the young plants. Inside the soil, the wheat seedlings can be harmed by a series of pests from which the most frequent are the larvae of the hunchbacked cockroach. In order to prevent the attack of the pests and of the diseases, it

is absolutely compulsory to treat the wheat seeds, before sowing, with different fungicide or insect-fungicide substances (Bîlteanu, 2003).

Most pathogenic agents and pests are transmitted through the seeds and through the soil and their attack can take place immediately after sowing or between sowing and sprouting. This is the case of the *Fusarium* pathogenic agents, for example, which leads to important damage, sometimes leading to a total compromise of the wheat culture, that is why a complex system of measures is imposed which in many situations is based on treating the seeds (Paraschivu, 2014).

In order to decrease the attack of the pathogenic agents and that of the pests from the wheat cultures an integrated destruction system must be applied within which together with other agricultural and technical measures the chemical treatments applied to the seed represent the highest and utmost importance. When establishing the chemical product with which the seed is going to be treated with one must take into consideration the pathogenic agent and the pest which must be destroyed, differentially on the culture and on the precursory plant. In what the recommended chemical products are concerned for the treatment of the winter wheat seeds we have to mention that there is a diversified range of fungicides and mixtures of insect-fungicides (Sin et al.).

The place the wheat is sowed strongly influences the level of attack of the pathogenic agents through the seed (common smut, the flying blight and fusarium) and of the pests (the hunchbacked cockroach, the red worm of the straw, the wire worm). From this reason it is best to avoid sowing the wheat after precursory cereal plants which have presented a high degree of infestation and infections with the above mentioned pathogenic agents and pests (Oancea, 2005).

The treatment of the seeds before sowing has in view the following: destruction of the diseases which are transmitted through the seed; protecting the seeds and the germs against certain fungi existent in the soil which can lead to diseases or to the molding of the seeds during sprouting; destruction of certain pests which attack the seed or the seedlings during germination (Munteanu et al., 2001).

The chemical treatment of the seed with insecticides or with insect-fungicides presents advantages: a reduced consumption of active substance on a product unit, high efficiency, immediate effect, low consumption of energy on the surface unit and especially a decrease of the soil pollution and of the surrounding environment (water, air,) (Domuța et al., 2011).

## MATERIAL AND METHOD

For the study related to the influence of the seed's treatment upon the level and the quality of the winter wheat's production research has been performed in the year 2015 at the Leş farm, in Bihor county.

The analysis has been performed on 5 variants of treatments, from which 3 with fungicides and 2 with insect-fungicides:

1. **Vitavax 2000** contains two active substances (carboxin 200g/l+thiram200g/l), with different ways of action.This substance ensures a special protectionagainst diseases found on the soil and of those transmitted by the seed. The used dose is of 2,5 l/t of seed.
2. **Dividend M** is the fungicide for the treatment of grainy cereal seeds which belongs to the triazole fungicide group (difenoconazole 30g/l). It is used in a dose of 1,5 l/t of seed.
3. **Celest Star** is the fungicide used for the treatment of the grainy cereal seeds which contains two active substances (cyproconazole 6.3g/l+fludioxonil 18.8 g/l), and ensures the long term control of the diseases transmitted by the seed or through the soil. It is applied in doses of 1l/t of seed.
4. **Celest Top** is an insect-fungicide for the treatment of the wheat seeds, very efficient in protecting the cereals against soil and seed fungi and against insects which attack the plant during the first stages of vegetation.Celest Top is a mixture of three active substances: (thiamethoxan 262.5 g/l+fludioxonil 25g/l+difenoconazole 25g/l), with different spectrum of activity and different ways of action. The dose used is of 1.3 l/t of seed.
5. **Yunta Quattro** is a complete insect-fungicide for the treatment of cereal seeds and it has got four active substances in its composition: (Clothianidin 166,7 g/l + imidacloprid 166,7 g/l + protioconazole 33,3 g/l + tebuconazole 6,7g/l). Each one of the four active substances contributes to the exceptional performances of the product. The dose applied is of 1,6 l/t of seed.

Together with the treated variants we have also had a non treated variant of wheat seed which was considered the witness.

## RESULTS AND DISCUSSION

Research related to the influence of the winter wheat's seed treatment and performed in the year 2015 have been done by treating the winter wheat seeds with fungicides in 3 variants: Vitavax 2000, Dividend M and Celest Star, and with two variants of insect-fungicides: Celest Top and Yunta Quattro(Table 1).

The production increases obtained are statistically very significant in comparison with the non treated variant, the differences being between 27%(Vitavax 2000) and 42%(Celest Star) when the seeds were treated with fungicides and in case of using insect-fungicides to treat the seeds the differences are higher, being between 48%(Celest Top) and 53%(Yunta Quattro).

Table 1

The influence of the seed's treatment against diseases and pests upon the autumn wheat production, Leş 2015

Crt. no.	Variant	Dose l/t	Production		Difference		Significance
			t/ha	%	t/ha	%	
1.	Non treatedwitness	-	4,15	100	-	100	-
2.	Vitavax 2000	2.5	5,26	127	+1,11	27	x
3.	Dividend M	1.5	5,52	133	+1,37	33	xx
4.	Celest Star	1.0	5,89	142	+1,74	42	xxx
5.	Celest Top	1.3	6,13	148	+1,98	48	xxx
6.	Yunta Quattro	1.6	6,35	153	+2,20	53	xxx

DL 5%=0,83

DL 1%=1,17

DL 0,1%=1,66

The treatment of the wheat seeds with fungicides and with insecto-fungicides emphasizes the favorable effect and the absolutely necessary treatment of the wheat before sowing, in comparison with the non-treated variant of the seeds, in order to obtain high productions in conditions of economical efficiency. In this way, in what quantity is concerned, the production increases are between 1.11 -1.74 t/ha, when treating the autumn wheat seeds with fungicides and of 1.98-2.20t/ha when treating the seeds with insect-fungicides.

The influence of the wheat's seeds treatment against diseases and pests upon the quality of the winter wheat's production is represented by the content of wet gluten (Table 2).

Table 2

The influence of the seed's treatment against diseases and pests and upon the gluten content at the autumn wheat Leş 2015

Crt no.	Variant	Dose l/t	Wet gluten		Difference	
			%	%	%	%
1.	Non treatedwitness	-	20.4	100	-	-
2.	Vitavax 2000	2.5	26.5	130	6.1	30
3.	Dividend M	1.5	27.8	136	7.4	36
4.	Celest Star	1.0	28.2	138	7.8	38
5.	Celest Top	1.3	28.4	139	8.0	39
6.	Yunta Quattro	1.6	28.6	140	8.2	40

The gluten content of the variants treated with fungicides and insect-fungicides has statistically and significantly increased in comparison with the witness variant which has not been treated. The differences are between 30%(Vitavax 2000) and 40%(Yunta Quatro).

The content of wet gluten is a basic sign of the quality of the wheat used in the bakery industry. The low level of gluten existent in the case of the non treated witness variants is determined by the attack of the diseases and pests which are transmitted through the seed and which can no longer be treated during the vegetation period.

## CONCLUSIONS

Treating the seeds of the autumn wheat represents an important link in the culture technology in order to obtain big and high quality productions, free of diseases and pests. From the data analyzed we can notice the necessity that arises to treat the seeds with fungicide products and where a rotation of a grainy cereal is necessary after another type of grainy cereal the insecticide treatment of the seeds is a must.

In order to achieve these objectives one must choose such fungicides with a large spectrum of destruction like Celest Star which contains two complementary active substances (Fludioxolin and cyproconazole), which, through a systematic and fast translocation ensure a long term effect against *Fusarium spp.* and *Ustilago nuda*.

On pest infested soil or in the case of a rotation after a grainy cereal it is compulsory to use such insecticides and fungicides like Celest Top which has three active substances in its composition, one insecticide and two fungicides (tiamethoxam, fludioxonil, difenoconazole) or Yunta Quatro, which has got four active substances with systemic and contact properties (Clothianidin + imidacloprid + protioconazole + tebuconazole), which have got a long term protective effect manifested since the seeds' germination period and determining at the same time a more vigorous growth of the seedlings in their first stages of development.

These protect the plants against the aphids, of the wire worms, (*Agriotes spp.*, of the hunchbacked cockroach (*Zabrus tenebrioides*), of the common brand (*Tilletia caries*), of septoria (*Septoria nodorum*) and of the flying blast (*Ustilago tritici*).

## REFERENCES

1. Bîlteanu Gh., 2003, Fitotehnie, Vol. 1. Ed. Ceres, București, pp.146
2. Boeriu I., Eustațiu N., 1973, Cultura grâului. Ed. Ceres, București, pp.157,159
3. Borza I.M., Stanciu A.Ș., 2010, Fitotehnie. Ed. Universității din Oradea, pp.52

4. Domuța C. et al., 2011, Calitatea grâului în Câmpia Crișurilor. Ed. Universității din Oradea, pp.103
5. Munteanu S.M., I. Borcean, M. Axinte, Gh.V. Roman, 2001, Fitotehnie. Ed. Ion Ionescu de la Brad, Iași, pp.57
6. Oancea I., 2005, Tehnologii agricole performante. Ed. Ceres, București, pp.156
7. Paraschivu I. Aurelian M., 2014, Combaterea integrată a patogenilor și dăunătorilor la principalele culturi de câmp. Ed. Sitech, Craiova, pp.162
8. Sin Gh. et al., Tehnologii moderne pentru cultura plantelor de câmp. Ed. Ceres, București, pp.24,25
9. \*\*\*, Catalog Syngenta – De la sămânță la recoltă
10. \*\*\*, 2017, Ghid Arysta pentru recolte mai bune 2017
11. <https://www.verdon.ro/tratament-samanta/tratament-samanta-yunta-quattro>