INFLUENCE OF SEEDS TREATMENT ON THE CEREALES PRODUCTION

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Abstract: *Researches show that crops may be affected when using untreated seeds and the production may decrease by 15-20 % and can be compromised by association with other factors. The necessity of treating seeds with fungicides and insecticide as appropriate, especially in monoculture. The protection of winter crops starts with seeds treatment that will protect seeds and seedlings until 30 days after sowing, the period when plants are sensitive at the attack by pathogens. Thus, the aim of this study was to investigate the influence of seeds treatment with products certified on the cereals production based on planting data and varieties. The seed treatments have determined the increasing of production with the 10-55% and quality indices by 3-5%, with variations depending on the type of treatment.*

Key words: *seeds treatment, yield, wheat, triticale, barley*

INTRODUCTION

In the south of Romania the appearance of pests and diseases in cereal crops represents a risk factor for stability and products quality, production loss ranging from 10-30%, plus decrease in quality levels (NAGY ŞI KADAR, 2004). Together with agrophytotechnical methods, where crop rotation, sowing time, fertilization and cultivation of resistant varieties are essential (SIN ET AL., 1982; VILAU ET AL., 1989, POPOV ET AL., 2006), chemical treatment of seeds represents an important technological link, contributing decisively to reduce production loss. In this direction it is worth mentioning the positive influence of complex products, insecticides and fungicides to limit the occurrence of diseases and pests in cereal crops (CANĂ ET AL., 2010; SMILEY AND PATTERSON, 2013).

In addition to achieving targeted protection against a wide range of pests, thus ensuring optimum plant a head start, technological aspects, economic and environmental are equally important (SIN ET AL., 2005; LIMA ET AL., 2006). In this paper we present the effect of treatment on the yield and seed production parameters of three cereal crops: wheat, triticale, barley.

MATERIAL AND METHODS

The experiment was located on cambic chernozem at Fundulea and observations and measurements were made in the period 2010- 2011. Experimental researches concerning the sowing time variants comprised three periods (September 20 - October 5 - October 20) in non-irrigated crop and cultivated varieties were: Boema and Glosa to the culture of wheat, Haiduc for the culture of triticale and Orizont for the culture of barley. Experience was placed after the randomized blocks method in three repetitions and the harvested area was 25 m2 for each plot. Seed treatment was performed with insectofungicid Yunta 246 FS. The temperatures and rainfall were recorded for the entire vegetation period and the determinations on the production and some

of its parameters for each variety were made this experiment. In the experience were followed all the other technological links and experimental data were statistically processed.

CLIMATIC CONDITIONS

The climatic conditions during the experiments reveal variations in temperature and precipitation, with direct implications for plant growth and development and implicit on the production and quality. Thus, agricultural years included in to the study were characterized by extreme temperatures associated with small amounts of rainfall distributed fairly irregular throughout the growing season (figure 1).

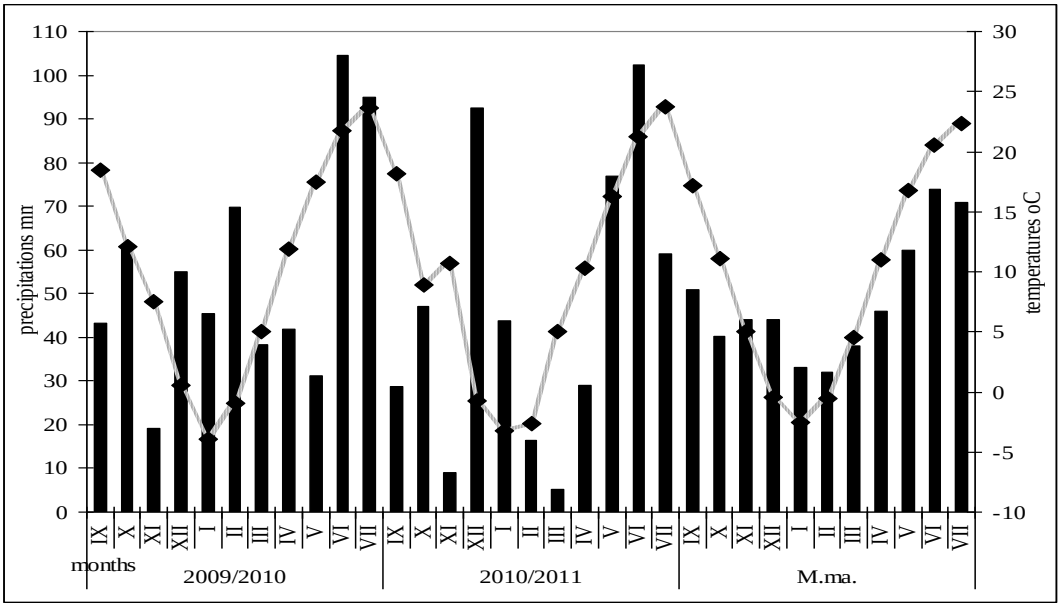

Figure 1. Climatic conditions during the experiment

In the first year of experimentation, the average temperature was about 1^{o} Celsius above normal, except in January and February temperatures was colder (-1.5 and -0.6 respectively ºC under the normal values). Maximum deviations from normal were recorded (+ 3.4 ºC) in August. Thermal values than the annual average fall in warming trend manifested in recent years. Regarding the precipitations, maximum positive difference (47 mm) was recorded in July, while the largest decrease to normal was recorded in summer months.

For the second year, monthly average temperatures were above the multiannual average (in 6 months), the largest positive anomalies were registered, in November 2010 (+5.7 ° C) followed by March and the summer of 2011. The winter months have been colder than the multiannual average with 0.3 to 0.8 º C. Snow cover reduced the impact of the frost, so that the damage was reduced. In terms of rainfall, the autumn of 2010 was drier than normal,the rainfall in November have been with -34 mm below the multiannual average. The water balance improved during the winter months (rainfall in these

months was on average 36 mm above average multiannual). In March - April, they were under the multiannual average rainfall, with a difference of -12 mm per month.

Analysis of the annual variations in rainfall indicates a significant decrease, but higher values of standard deviation for the period 1985/2009 compared with the standard deviation for the period 1960/1984 indicates an increase in probability of occurrence the years with extreme drought or humidity.

RESULTS AND DISCUSSION

To reduce the possibilities of attack of pathogens and pests is required compliance strictly of the specific technological sequences , especially those of plant protection.

From the graphs shown in figures 2 and 3 it is noticed that barley and triticale yields are obtained in experimental variants with seed treatment, significantly exceeding the production of untreated variants, with differences ranging from 10-55% for wheat to 10-80 % for barley and 20-60% for triticale depending on sowing time, variety and climatic conditions of each crop year.

In terms of the agricultural year 2009/2010, when the temperatures exceeded multiannual average and soil moisture was favorable for plant emergence, the early sowing favored the very strong development of vegetation and foliar diseases as: powdery mildew, septoria and even the phenomenon of yellow dwarf virus transmitted by aphids, cicadas and flies cereals.

The most significant loss was recorded in early sowing, at barley and triticale, especially untreated variant, the difference being of 2000 kg / ha respectively 2100 kg / ha, compared with seed treated with insectofungicides variant (Figure 2).

At sowing in optimal time, with untreated seed were recorded difference of 700 kg / ha for barley and 1700 kg / ha at triticale compared to variants treated with insectofungicides. The highest yields were obtained at wheat crop sown in optimal time with seed treated with insectofungicides and recorded 6000 kg / ha at Boema variety and 5500 kg / ha at Glosa variety.

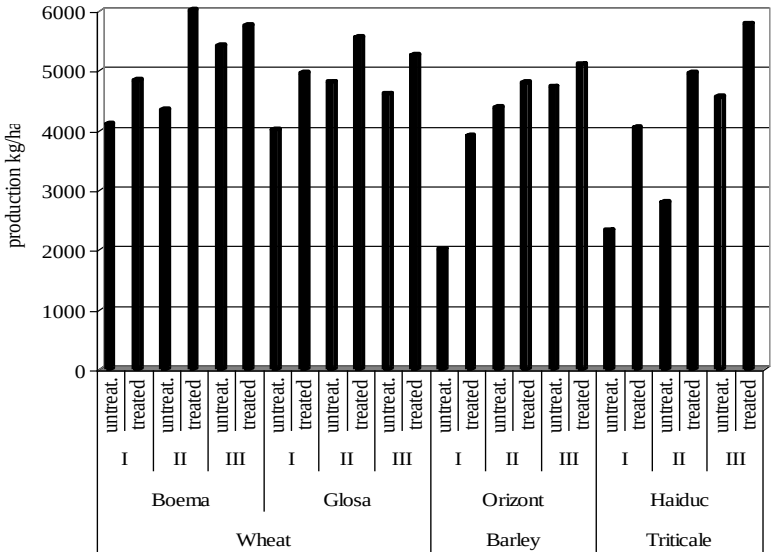

Figure 2. Influence of seed treatment with insecto-fungicides on the production of wheat, barley and triticale - 2010

In terms of the agricultural year 2010/2011, recorded productions registered in satisfactory limits of variation compared to the previous year (Figure 3). Although, in autumn the soil moisture was under the multiannual average and higher temperatures, the phases of emergence and vegetation at cereals showed a good evolution. The highest yields at wheat crop were obtained at sowing in optimum time with seeds treated with insecticides / fungicide, and recorded 6830 kg / ha for Boema variety, and 7900 kg / ha for Glosa variety. The highest loss was recorded at early sowing at barley, especially in untreated variant, the difference being of 2080 kg / ha compared to variant seed treated with fungicides. The triticale culture recorded a maximum yield of 6690 kg / ha in the variant treated and 4500 kg / ha in untreated variant, at sowing in optimal time.

In conditions of applying all technology links, including seed treatment with appropriate products there were created conditions to obtain satisfactory yields, both aim quantitative and qualitative point of view.

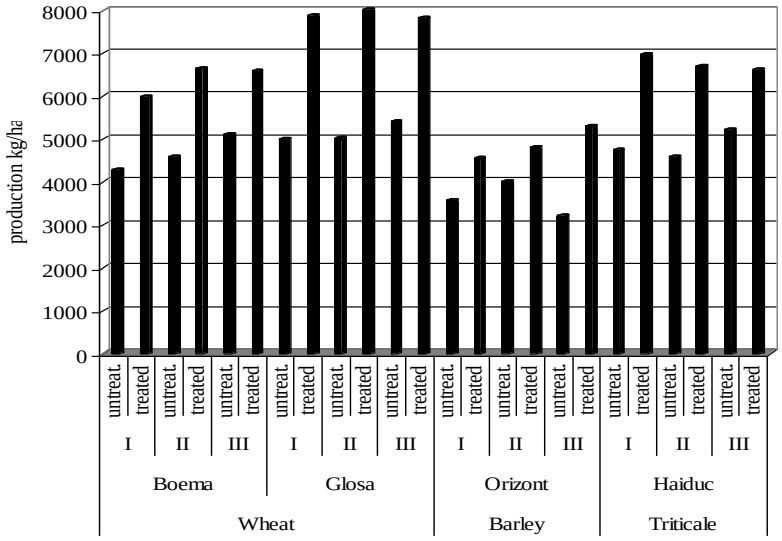

Figure 3. Influence of seed treatment with insecto-fungicides on the production of wheat, barley and triticale in - 2011

The analysis of the influence of seed treatment on production parameters show a clear increase for TGW at all variants tested (Figure 4). The highest values of TGW (Thousand Grains Weight), were obtained in the year 2011. Thus, for the variants treated with insecto-fungicide and sown in optimal time, TGW was between 46-47.7 g for wheat, 41.5-42.5 g for barley and 44.9-45.9 g for triticale. These increases vary in the range of 3-5% compared to untreated variants and time sown in early or late.

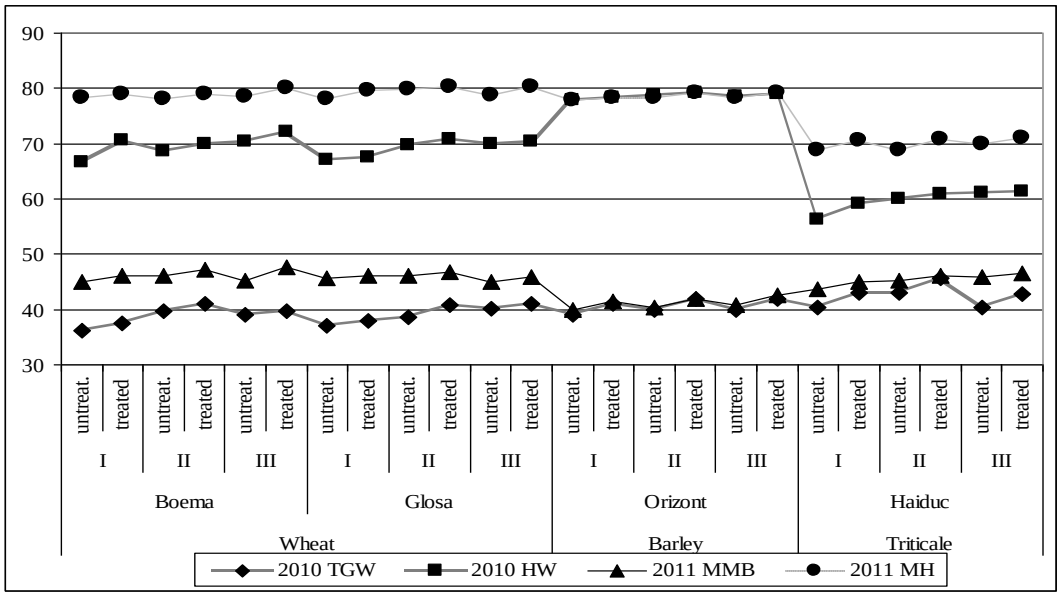

Figure 4. Influence of seed treatment with insecto-fungicides on grain production indicators

Determinations regarding on the hectoliter weight do not reveal significant differences between variants. Qualitative aspects of production obtained are influenced by the technological and climatic factors.

CONCLUSIONS

- The chemical treatment of wheat, barley and triticale seeds is a technological sequence with the highest efficacy against diseases and pests attack and at the same time economic and non-polluting, thus establishing the premises to obtain satisfactory yields, both quantitatively and qualitatively.
- Agrophytotechnical measures are important in preventing the occurrence and development of diseases and pests for cereal grains. It demands the compliance of optimal period for sowing grain, avoiding early sowing periods due to BYDV(barley yellow dwarf virus) phenomena on barley or WDV (wheat dwarf virus) on wheat that can sometimes lead to the compromise of the crop.
- The attack of pests and diseases occur with higher frequency in barley and triticale crop compared to wheat. The level of attack is influenced by the changing climatic conditions which affects the growth of plants.
- The treatment of seeds with insecto-fungicides determined a reduction of the degree of pathogens attack transmitted by seed and soil for crops of wheat, barley and triticale, with the positive benefits in achieving yields of 20% to 80% higher, depending on the technological links applied and the climatic evolution of the year.

- Using the insecto-fungicides - Yunta 246 FS - for seeds treatment has determined the obtaining of higher values up to 5% of the TGW index.

BIBLIOGRAPHY

1.CANĂ, LIDIA, NAGY E., GOGA N., STOICA V., POPOV, C., 2010 - Cercetari privind perfecţionarea tehnologiei de protecţie a cerealelor păioase impotriva agenţilor patogeni transmişi prin sămânţă şi sol. An. INCDA Fundulea, Vol. LXXVIII, Nr. L.

2.LIMA, L.B.; SILVA, P.A.; GUIMARÃES, R.M.; OLIVEIRA, J.A,. – 2006. Peliculização E Tratamento De Sementes De Algodão. Ciência Agrotecnologia, V.30, N.6, P.1091-1098.

3.NAGY, E., AND KADAR, R., 2004 – Protecţia plantelor de grâu împotriva principalelor boli în condiţiile din Transilvania. Protectia plantelor, nr. 53: 9-14

4.POPOV, C., GURAN, M., RARANCIUC, S., ROTĂRESCU-MINCU, M., SPIRIDON, C., VASILESCU, S., GOGU, F., 2006a – Starea fitosanitară a culturilor de cereale, leguminoase pentru boabe, plante tehnice şi furajere din România, în anul 2005. Probl. Prot. Pl., XXXIV (1-2): 15-38.

5.SMILEY RICHARD W. AND LISA-MARIE PATTERSON, 2013 - Winter Wheat Yield and Profitability from Dividend and Vitavax Seed Treatments. Journal of Production Agriculture, Vol. 8, No. 3, p. 350-354

6.SIN, G., MICLĂUŞ, D., TUŞA, C., ILIESCU, H., BONDAREV, I., POPOV, C., 1982 – Efectul asolamentului asupra reducerii atacului bolilor şi dăunătorilor. Producţia vegetală. Cereale şi plante tehnice, 34, 12: 15-19, Bucureşti.

7.SIN, G., PICU, I., POPESCU, A., POPOV, C., MOGA, I., TABĂRĂ, V., ALIONTE, G., CHIRU, S., TIANU, A., GHERMAN, I., MARUŞCA, T., BORUGA, I., NISTOR, D., GHEORGHE, D., CANARACHE, A., COŞOVEANU, R., BULARDA, M., PETCU, G., 2005 – Managementul tehnologic al culturilor de câmp; Editura Ceres, Bucureşti.

8.VILĂU, F., POPOV, C., PETCU, L., 1989 – Rolul unor factori agrofitotehnici în reducerea atacului diferiţilor dăunători ai cerealelor păioase. Probl. Protectia Plantelor, XVII (2):175-187.