RESEARCH ON APPLICATION OF FERTILISING RESOURCES ON SOME CEREAL AND OIL SEEDS CROPS

V.ȘURLEA. S.BĂTRÎNA , F. CRISTA, Isidora RADULOV

Banat University of Agricultural Sciences and Veterinary Medicine "KingMichael I of Romania" from Timișoara, Romania,surleavlad@yahoo.com

Abstract. *The purpose of this research was to observe germination, root system formation and development of wheat seeds, canola and soybeans treated with two liquid fertilizers, Bionat Plus and Bionax, experiences being developed in vegetation pots, petri dishes, in two repetitions. Research under the topic mentioned were conducted in the research laboratory of the Department of Soil Sciences in the Faculty of Agriculture, following fertilising efficiency of these resources in the concept of sustainable agriculture.*

Keywords: *wheat, canola, soy, experience, fertilizers, germination .*

INTRODUCTION

Thanks to the the quality of materials and manufacturing technology, liquid fertilizers have the advantage that they are not toxic, not polluting, not corrosive, easy handling and practical. Moreover, there is no danger of leaching or diminishing their effect. Many researches show that the absorption of nutrients from the application of liquid fertilizers is about 95% compared to 10% for solid mineral fertilization.

Moreover, in soils having a high pH or low pH, some nutrients become unavailable for absorption into the plant. Liquid fertilizers contain nutrients into readily soluble forms and available to plants.

After applying liquid fertilizer nutrients are delivered directly to the plant in limited quantities, therefore contributing in reducing the environmental impact associated with soil fertilization (Haytova Dimka, 2013).

The main objective is the changes or differences in germination, root growth and forming plantlets from the application of two liquid fertilizers on canola, soy and wheat, the basic idea is the use of these preparations in sustainable agriculture.

MATERIALS AND METHOD

Seeding material: For the wheat crop were used seeds of Alex variety, rapeseed and soybean cultivar variety Belana and Onix.The seeds were sown in pots and Petri dishes vegetation, on filter paper or cotton, in two repetitions.

Fertilisers: two products were used Bionex and Bionat Plus, the solutions that have been applied are 1%Bionat Plus and 1.5% Bionax (both products are liquid).

Bionat and Bionex are 100% natural products - herbal extract - concentrated, with foliar fertilizer and bio-stimulating role.

Their ingredients are:

A. Plant hormones and amino acids, craw protein, fat (7.5%). Positive effects on the activity of these compounds have elements: calcium (Ca), zinc (Zn), boron (B), copper (Cu), manganese (Mn), iron (Fe);Elemente nutritive principale: Azot (Nt) 0,042%, Fosfor (P2O5) 0,013%, Potasiu (K2O) 0,137%;

B. Secondary Nutrients: Magnesium (Mg) 0.02%, Calcium (Ca) 0.34% Sulphur (S);

C. Trace elements: boron (B) 0.002% Copper (Cu) 0.0003%, iron (Fe) 0.0004% Manganese (Mn) 0.0001% Zinc (Zn) 0.0001% sulfur (S), which stimulates the biosynthesis of these phytohormones, influencing the transport and accumulation of numerous ions.

Activities that converge to the achievement of the research topic were: Founding experimental treatment variants for canola, soy and wheat, sowing crops and their monitoring during the growing season.

Figure 1. Products used for the seeds treatment

The seeds were sown on July 28, 2016, prior to sowing they were treated with the two fertilizing solutions. The soil used in vegetation vessels was weak gleized, light decarbonated cambic chernozem soil. In soil were sown soybean seeds by 70, wheat by 220 and canola by 50 seeds.

In the Petri dishes were arranged seeds treated with 10 ml working solutions or water for to the witness.Germination was monitored after 4, 10, 15 and 21 days after sowing.

RESULTS AND DISCUSSIONS

The obtained results were expressed as the average of two repetitions and images during the experiments are shown in figures 2-4. Figure 2 shows the ability of germination in the ground of soy after 10 days of treatment. It is noted that when using the Bionat Plus solution, the differences in terms of germination of soy, in soil, is comparative with the witness, while the solution Bionex stimulate germination of seeds at the rate of 26%, which represents a germination 2.6 times more than in March and 2.16 times higher compared with the solution Bionat Plus.

Figure 2. Soybean seed germination in soil

With regard to the growing ability of soybean seedlings at 10 days after sowing it is noted that Bionew gives an uneven growth of shoots between 15-30 cm size, compared to the witness, while the application of Bionat Plus solution gives an uniform growth of 24 cm.

For canola seeds (Figure 3) maximum germination was also recorded using Bionex's (82.85%). In this case the ability of germination compared to the control was noted when using Bionat Plus solution (76.71% versus 36.71%).

Regarding the length of seedlings after germination we can notice that Bionex stimulates their growth, shoot length is approximately 15 cm and even growing, compared with the experiment in which has been used Bionat Plus, when the growth of seedlings was lower than in the same period time (about 10 cm). In the witness was recorded an uneven growing of the seedlings.

Figure 3. Canola seed germination

In the case of wheat seeds, the two nutrient solutions show similar effects in stimulating germination at same field value (70% Bionex, 71.36% Bionat Plus), the results are superior to the control (64%).

Bionex ensures an increased and uniform seedlings growth at 10 days after sowing compared with Bionat Plus and control (average seedlings length 20 cm compared to 15 cm in Bionat Plus and 14 cm to the witness).

Figure 4. Germination of wheat seeds in open system.

Germination of wheat seeds was lower in the case of seeds in open system, and filter paper compared to the ground. Also, in this case, there is a stimulation of the germination in Bionex case when compared to Bionat Plus and the control, both in terms of number of germinating seeds and uniformity of young green seedlings formed. (Figure 4).

Soybean germination in open system was not relevant because both the control, and application solutions, the seeds were distorted by mold.

Using the Bionex solution will increase the germination capacity and thethe length of the seedlings and in the case of the cotton-seed rape, 80% compared to 75% for the control.

Applying the solution Bionic Plus leads to a decrease in germination capacity compared to the control (50% germination). Rootlets length for rapeseed was Bionex> Control> Bionat Plus.

Liquid fertilizer application on seeds has a satisfying result, because the seeds assimilates fertilising substances from the applied solution without energy, guaranteeing a good root system development.

In fertilization variant with Bionex, wheat germination and root system were slightly more developed compared to the control, rapeseed root was reinforced, more branched and the plant had a smaller waist, that will form a rosette of leaves stronger and healthier, and for the soybeans have not seen differences from the witness, the three sown crops size was average, slightly higher compared to the control.

CONCLUSIONS:

The experimental results led to the following conclusions:

Bionex fertilization variant provides a higher germination that the untreated control in all experimental variants used.

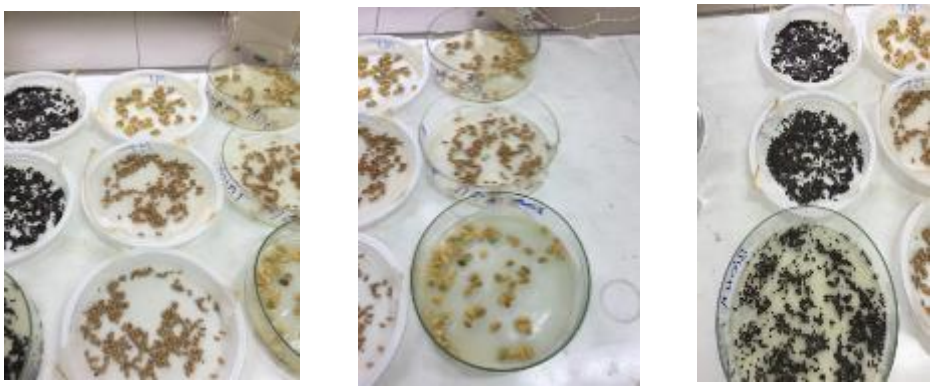
In fertilization variant with Bionat Plus, a major boost germination compared to the control was recorded for wheat seeds and less when applied to rapeseed and soy.

When applying fertilization with Bionex crops had an optimal development in laboratory conditions, germination and emergence having an starter effect, which will lead to a twinning better, a higher waist plant, and certainly better yield, and production quality will be improved.

We consider it is necessary to expand the experience also in the experimental field of the Didactic Station of USAMVB Timisoara to investigate rigorous scientific problems related to increased production and quality, soil fertility and decrease environmental pollution in the context of controlled use of fertilizers liquid in seeding, to obtain new data and information that serve to change the current concept of agriculture towards sustainable agriculture.

As a result of the conducted research is possible to optimize the composition of liquid fertilizers used (in macro and micro elements) in order to obtain optimum results in terms of quality and quantity of production of soy, wheat and rapeseed.

Images from the lab activity:



The initial application of fertilizers in the open system

Images 4 day after sowing

Image 10 days after sowing

Images 15 days after sowing

Images 21 days after sowing

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