STUDIES REGARDING THE INFLUENCE OF SOME SULFUR FERTILIZERS UPON SOME PHYSIOLOGICAL INDEX, CROP QUALITY AND QUANTITY OF SUNFLOWER

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Abstract: *The purpose of this experiment was to test the influence of some sulfur based fertilizers on some physiological, production and quality characteristics in maize. A sunflower cultivar (Performer) was used and two fertilizing variants were applied: N-P-K 15-15-15 – 60 kg/ha –netto K (400 kg fertilizer/ha-brutto), V1 - 7-0-20-6-2 + 40 (N-P-K – MgO – Na – SO3) – 60 kg/ha-netto K (300 kg fertilizer/ha-brutto). The main physiological indexes followed were the chlorophyll content, the foliar surface, the substance percent, but the productivity and some quality characteristics of the grain were determined: protein, lipid and starch content. The experiment has shown that in both fertilization variants for sunflower, the recorded production level was satisfying, taking into account the specific climatic conditions.*

***Key words*:** sunflower, sulf fertilizer, crop quantity, quality

INTRODUCTION

Sunflower (*Helianthus annus*) is a food crop of worldwide importance, as well as a good cutflower and a plant that's fun to grow in the vegetable or flower garden. The large flowers turn to face the sun when the plant is young; once the stem becomes woody, the flowers stop turning. Sunflowers are native to North America, and were cultivated for food by native people for thousands of years before the arrival of European settlers. The seeds of sunflower are also a preferred food of birds and small mammals, so many people grow them to feed wildlife over the winter.
(http://www.extension.umn.edu/yardandgarden/ygbriefs/h118sunflowers.html).

Sulfur is an essential element for vegetable organisms, as it has several structural and functional purposes. It can be found in plants in quantities of between 0, 02 and 1, 8% of the dry matter, depending on the species, the metabolic activity of the tissue, accumulating mostly in the seeds and leaves and less in the roots. (3,4,2)

MATERIAL AND METHODS

Field trials were established at agricultural fields of the University. 504 m^2 plots were used in 3 replicates. The same cultivar (Performer) was used, in densities of 50.000 plants/ha. Sawing took place on 3rd May 2012 and plant emergence on 9th May 2012.

The experimental variants consisted in treatments with two fertilizers applied at sawing incorporated in soil at 3 cm deep under seeds:

- Control N-P-K 15-15-15 – 60 kg/ha –netto K (400 kg fertilizer/ha-brutto),
- V1 - T122 7-0-20-6-2 + 40 (N-P-K – MgO – Na – SO_3) – 60 kg/ha-netto K (300 kg fertilizer/ha-brutto).The second application of fertilization was realized in phenophase BBCH 4.7, to complete the nitrogen application to 150 kg of active substance per hectare, with 270

kg/ha NH_4NO_3 at control plots and 385 kg/ha NH_4NO_3 in V_1 plots.Measurements of plant physiological features were realized in three different development stages: Stage of 7-10 leaves. BBCH 4.7 Flowering stage, BBCH 6.5 Seeds on middle third of anthocarp dark and hard, BBCH 8.5.In these stages we measured the leaf area of plants, the dry matter and chlorophyll content of leaves, also the quantity and quality (1000 grain weight, protein, lipid and humidity content - OMEGA ANALYZER G BRUINS INSTRUMENTS) of crop was assessed.

RESULTS AND DISCUSSIONS

Chlorophyll content of leaves

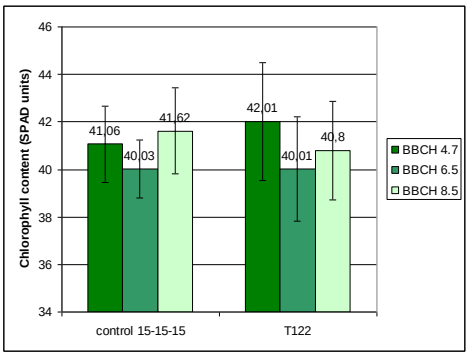

Figure 1. Chlorophyll content

After analysing the data regarding the chlorophyll content between the variants, it was concluded that the diferences were insignificant. The fact that the chlorophyll amount is reduced as plants go through the generative stages of life cycle, the chlorophyll content from the studied variants is uniformly (Fig.1) can be noticed in dynamics.

Leaf area

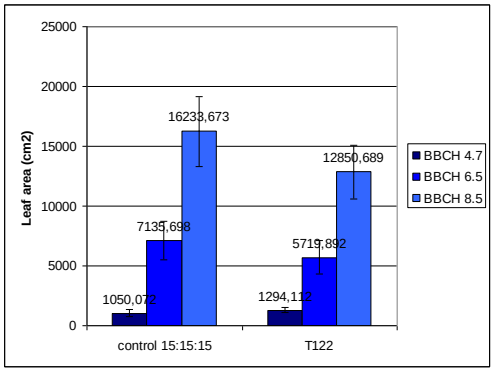

Figure 2. Leaf area

The leaf area, along with the chlorophyll content at leaf area unit, represents an important physiological index, which characterize the photosynthetical capacity of sunflower. At flowering and ripening stages, values of leaf area were significantly lower at T122 variant compared to control (16 233.67 cm^2/plant at control and 12.850,68 cm^2/ plant at T122).

Dry matter content.

Dry matter content (%) does not differ significantly between the variants. This uniformity of values was probably determined also by the strong water deficit and heat, which limited the accessibility to water for sunflower plants.

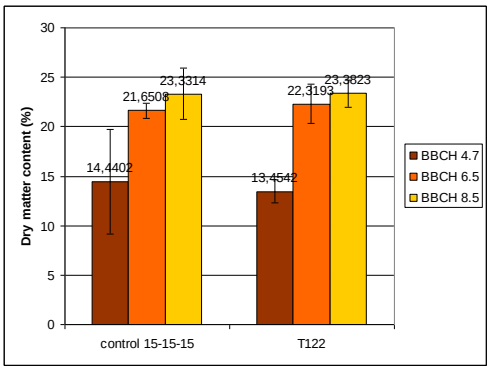

Figure 3. Dry matter content.

When dry matter content had been given in absolute values (g/plant), there were no statistically significant differences between the variants, even if there was a tendency of control for plants for accumulating more quantities of dry matter.

Crop quantity and quality.

The productivity of sunflower has suffered slight differences from the point of view of the quality, scheme and type of fertilization applied. As it can be seen from the chart, T122 has determined the increase of the mass of 1000 seeds and a higher level of humidity in the seeds, but the accumulated protein level is lower, compensated by the high content of lipids, caused by an excess of sulphates, which has determined an enhanced synthesis of the oils.

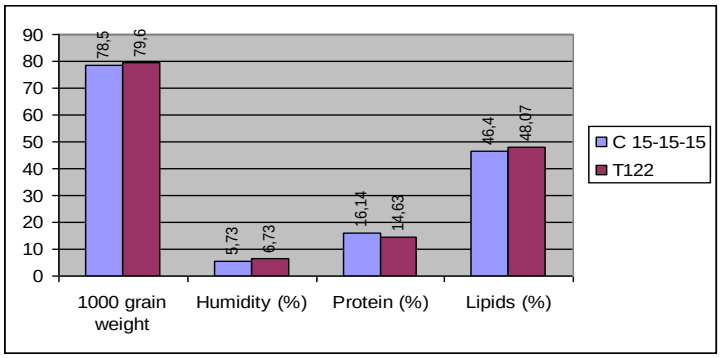

Figure 5. Crop quality.

The level of medium productions calculated based on samples taken from the three repetitions of each variant was different in favor of the control variant (fig 18). These differences are most certainly caused by an overflow of phosphorus (60 kg/ha) existent in the

control variant (NPK 15:15:15), in comparison to T122 which had no phosphorus. It is well-known that soils from Romania generally contain high levels of soluble phosphorous (accessible) and total phosphorus (over 90% of this being inaccessible to plants).

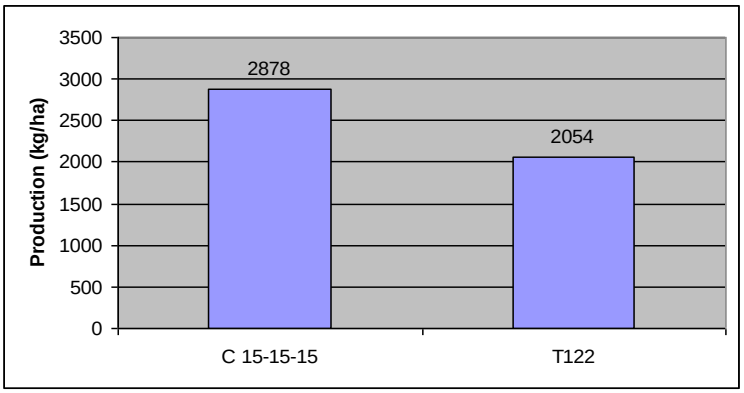

Figure 6. Crop production.

CONCLUSIONS

The year 2012 was atypical, extremely dry and hot, which determined a low solubilization rate of minerals.

In both fertilization variants for sunflower, the recorded production level was satisfying, taking into account the specific climatic conditions.

The sulfur fertilizers have an important role in the realization of bioproductivity for the species of plants studied and especially for the oleaginous plants, but the manifestation of all the beneficial effects takes place along with the other elements of nutrition, including phosphorus.

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