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THE IMPORTANCE OF KNOWLEDGE CONCERNING RESISTANCE TO DRAUGHT FOR SOME TYPES OF SEEDS CULTIVATED ON SANDY SOILS

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Abstract

Climate changes that have taken place in recent years in our country have led to the desertification of arable land due to another phenomenon, namely the lack of irrigation systems, where the establishment of cereal crops has become an important issue to be debated. The smaller grain yields per unit area make them no longer profitable for farmers, and the land remains uncultivated and subjected to the aridity process. In the present paper it was presented the importance of knowing the germination period of some seeds grown in these dried areas, where the drying period after germination is induced by their resistance to drought and how many germinable grains remain viable. Experiences have been determined in the laboratory under natural conditions of temperature, humidity and brightness. The conclusion is that we must cultivate varieties or hybrids resistant to drought, diseases and pests.

Key words: *humidity, germination, hydric stress, biometric measurements*

INTRODUCTION

The study of plant response to climate change today characterizes the entire agricultural research, regardless of soil types. Maybe, however, sandy soils are of particular interest. Unfortunately, the lack of interest of decision-makers, perhaps of understanding, of Ministry of Agriculture and Rural Development (MARD), Ministry of Education and Research (MER), Ministry of Finance (MF) regarding the importance of such research, but especially the cost of such research, will cost us in the future much more! [7].

In order to better understand why the sandy soils are closely related to the drought, we start from the description given by S. Ciulache and Nicoleta Ionac, 2003 [4] that the drought is a complex meteorological phenomenon, characterized by the insufficient or total absence of precipitations corroborated with high air temperatures and high saturated saturation deficits extended over long periods of time, which is why many crops are compromised due to lack of water and irrigation systems.

The combined influence of the variety and the culture technology leads to changes in the main physiological characteristics that can influence the production of large quantities [5].

In 2017, Bonea Dorina presented in the paper "Effect of climatic conditions on corn yield and quality in the central part of Oltenia", an evaluation of the interaction of the x genotype in terms of yield and quality components of maize hybrids under different climatic conditions with reference to sandy soils [2]. The same author describes in his work in 2003 the influence of climatic conditions on grain yield and crude protein content in maize grains, with direct reference to the importance of knowing the accumulation of grain-based nutrients depending on the climatic conditions and the type of soil on which culture is established [3].

Since sandy soils are prone to longer periods of drought and lack of rainfall, the choice of varieties or hybrids to be taken into culture must be given special importance. On sunny areas, sunflower is also cultivated, but the yields are small.

Thus, in 2009, Bonciu Elena, author of the book: Aspects of genetics and sunflower amelioration comes with research on the behavior of some sunflower genotypes that are grown under different conditions in the central area of Oltenia, [1].

Because the sands are unstable soils and have special technologies for their cultivation and cultivation, it is of particular importance recently the preservation and preservation of the sands, and the "The result of poor agricultural practices regarding the quality of the sandy soil in southern Oltenia" by I. Saracin and his collaborators, 2013, came with clarifications and recommendations in this respect [6].

MATERIALS AND METHODS

Laboratory method

To verify what was proposed, I decided to determine germination in some sunflower seeds, wheat, corn, sweet corn, rye, and oats.

From each batch we took 100 seeds and separate the sample for the blank. Before we were germinated we calculated MMB (mass of 1,000 grains) for each batch [8].

After the germination period, the germinated seeds were subjected to the natural drying process by interrupting the water soaking in different time periods, namely: 3-6-9-12 days.

After the biometric measurements and interpretation of the results, the seeds were seeded in the soil characteristic of the study area under the same conditions of temperature and humidity and laboratory conditions.

Since different measurements were made depending on the size of the root and the time of induced hydric stress, measurements were made for each variant of the plants remaining viable compared to the control which was not subjected to the induced drying time [9].

An important role in the crops set up on these soils is the dry matter, which was determined in the laboratory by drying, being also influenced by the drying time after germination and the culture under experimentation.

RESULTS AND DISCUSSIONS

In order to highlight the results obtained, the plants were studied with biometric measurements.

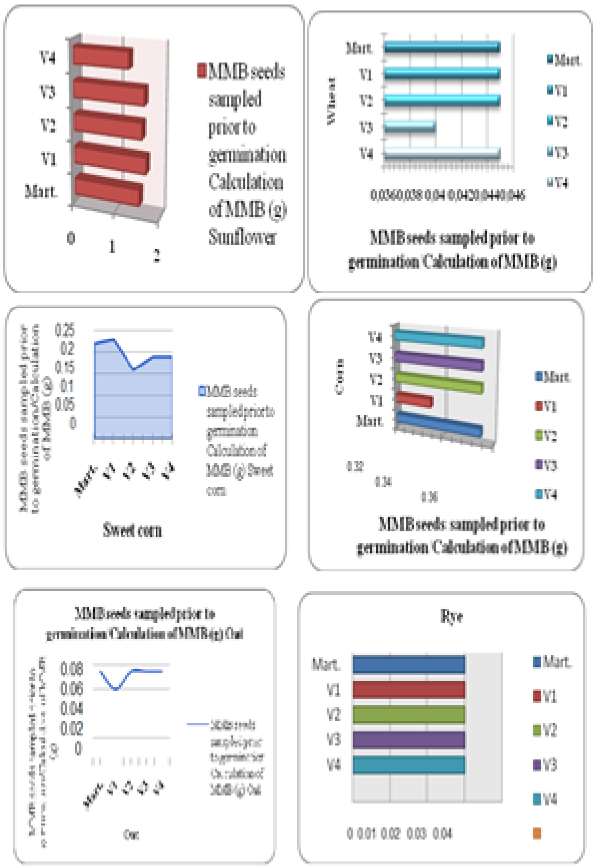

Fig.1. MMB seeds sampled prior to germination
Source: Authors' results.

The seeds were placed in Petri dishes on 05.02.2019, where they had substrate filter paper and wetted for germination. Room temperature was 21^0 C and air humidity 41%.

Photo 1. Sample preparation for determinations .
Source: Authors' experiment.

For proper germination analysis, the water content of each seed lot was determined at the beginning of the experiment, but also throughout the study period in order to establish the critical point of root penetration and measure it until germination was completed. During the germination period and until its completion, radicle measurements are made at each batch of seed where well-developed plants are selected and transferred to vessels containing the argiloiluvial soil collected from the farm. We say the hydric stress period according to the desired period: 3.6.9.12 days, during which biometric measurements are made.

The percentage of viable plants for each batch of seedlings is shown in the Figure 2 where it can be seen that the differences obtained for each crop are influenced by the different time allowed for drying, but also by the size of the radicle, respectively, of 0.4 and 3 cm.

For this reason, it can be noticed that the germ-seed sunflower starts from 97.5% for the size of the root of 0.4 cm and decreases to 73.8 for a 12-day break. The higher the root of 3 cm, the lowest the drying time is 56.2.

In Olt corn, at a 0.4 cm root, the viable plants decrease 87.5 for 3 days rest until 75.4 for 12 days rest. For a 3 cm radius, the smallest value is met at the 12-day rest of 58.3.

The maize is recorded for the 12-day rest but with a 0,4 cm radius the value of 70.1 viable plants in a slight decrease for the same period but with a 3 cm root of 57.8.

For Glosa wheat, viable plants decrease as the drying time increases, and for a 0.4 cm radius, the highest value has a 3-day break of 85.2 and 76.3 for a 3 cm radicle.

In the Matador grape variety, the differences in viable plants are smaller, being a variety suitable for this area and even if there are drought periods of over 12 days, the lowest number of viable plants is found at the 3 cm corner, 8 and the highest of 98.8 at the root of 0.4 cm.

Mureşana Oats, performed well with results of 81.5 viable plants for a root of 0.4 cm and 60.8 for a root of 3 cm but for 12 days of drought.

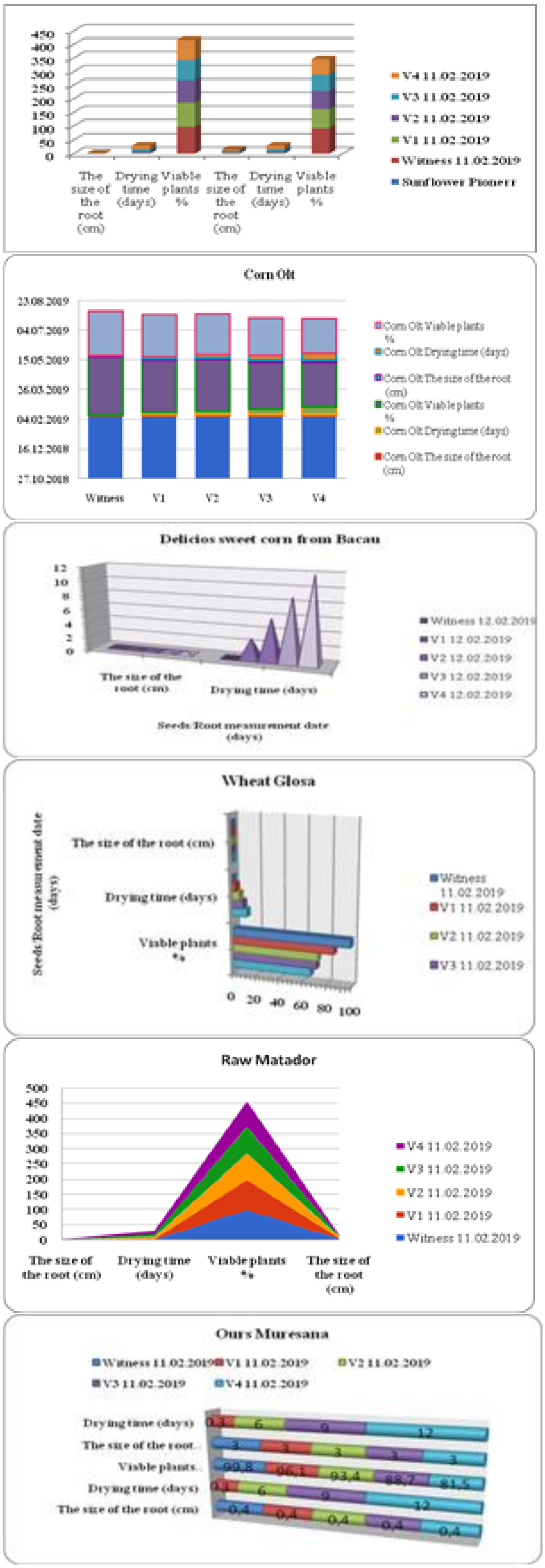

Fig.2. Radicle measurement and percentage of viable plants for the specified period
Source: Authors' results.

Photo 2. Measurement of the root in the studied seed
Source: Authors' results.

The need to demonstrate the importance of the varieties, hybrids or crops that are set up in these dried areas makes it necessary to know the determinants of the continuation of vegetative flow after germination.

Thus, it was determined: (i)Moisture of the sprouted grains before drying; (ii)Moisture of the grains germinated after drying; (iii) Concentration of root cell juice.

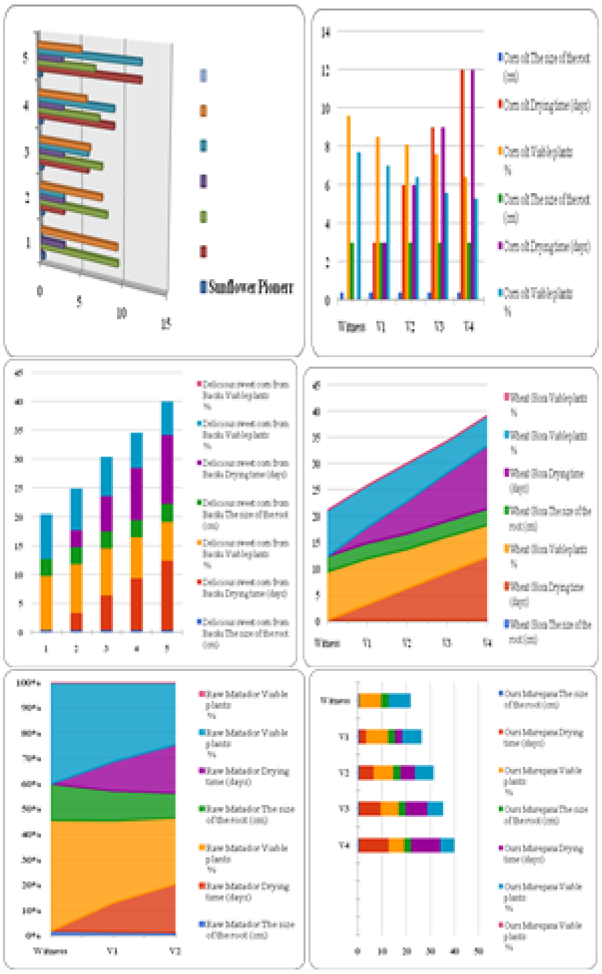

Fig.3. Determination of the humidity of the sprouted grains
Source: Authors' results.

Depending on the size of the radicle and the drying time that are influenced by the water absorption process, we determined the concentration of the existing cell juice in the embryonic roots.

Photo 3. Detremination of the humidity of the sprouted grains
Source: Authors' results.

From the graphs shown above, the humidity of the grains measured after drying is different depending on the size of the radicle and the drying time subjected to water stress.

Thus, humidity decreases in all the corn batch lots, where from 8.5 drops to 6.4 for a 0.4 cm root and 8.4 corn to 6.8.

But the sunflower behaves differently, so at a 0.4 cm radius, the maximum moisture value is 8.2 compared to the 3 cm radicle where the value is 5.2.

Rice, oats and wheat meet slightly descending values depending on the size of the root and the water-standstill.

The smallest values are found in all batches where the rest period is 12 days.

The seeds that resisted during this period are transferred to other Dabuleni soil pots and seeded at a depth of 2.5-3 cm in the same natural environment, not before establishing the main agrochemical elements existing in the soil.

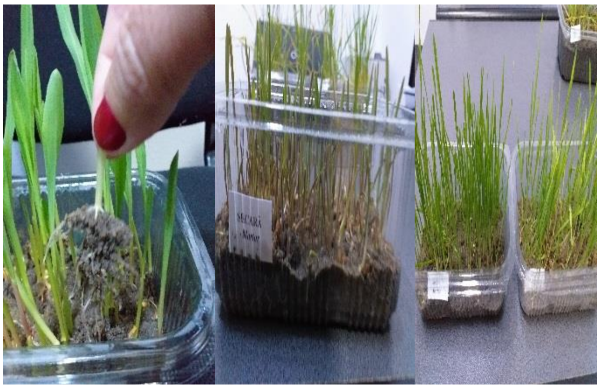

Photo 4. Transfer of seed germinated into sandy soil
Source: Authors' results.

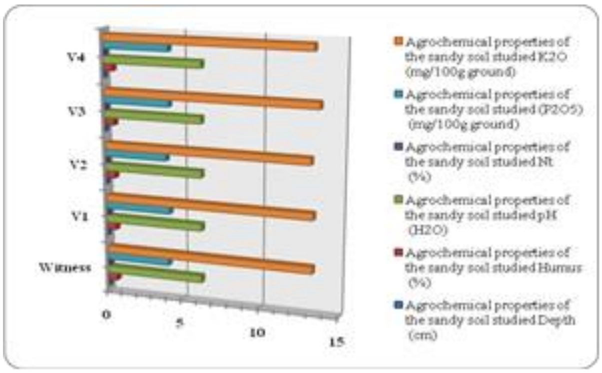

Fig.4. Agrochemical properties of the studied sandy soil

Source: Authors' results.

The results obtained from these measurements were strongly influenced by the vegetative continuity of the seeds after the drying period. Even if the size of the root is the same for each plant, some lose their properties while the sowing time passes.

The same phenomenon occurs during the growing season in the field, when the crops are water-free, which leads to compromised crops, which exhibit plant intakes on the surface unit, low and low quality crops.

CONCLUSIONS

After knowing the results obtained in the laboratory, we can formulate the following conclusions:

Drought resistance of crops depends very much on the germination period and after germination.

The well developed root system leads to viable, strong and resistant crops.

The soil-resistant species studied were:

Sandy soils through flawed exploitation and improper use of fertilizers can completely compromise crops when drought occurs.

It is necessary to cultivate varieties or hybrids that are resistant to drought, diseases and pests.

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