

## **THE INFLUENCE OF THE STORAGE PERIOD AND STORAGE CONDITIONS ON THE GERMINATION OF *LOLIUM PERENNE* VARIETIES**

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### **Abstract**

*The value of the Lolium perenne seeds' germination is influenced by a large number of internal and external factors. The analyzed factors are: the variety, storage conditions and storage period of the varieties analyzed. Most of these factors can be influenced and controlled by humans. A great importance regarding maintaining the germination of the varieties of Lolium perenne seeds, during the storage period, is represented by the storage conditions. So, in proper conditions, the seed's germination is kept for a longer period than in inadequate conditions, when the loss of the germination happens in a short while, leading to speeded aging, and the value of the germination after 3 years decreases for most of the varieties, but differently from a variety to another.*

### **INTRODUCTION**

The germination of *Lolium perenne* seeds is represented by the totality of processes happening in the embryo while it passes from latent life to active life. It is known that only with a good quality seed, the result expected from this important forage plant can be obtained. In this project I have deepened the study of this quality parameter.

### **MATERIAL AND METHODS**

For the study, 8 varieties of *lolium perenne* were used: Mara, Calibra, Kaiser, Lorentz, Marta, Magura, Summit and Tove. The seed of all the varieties studied was obtained from the year's 2005 production and the samples used were extracted from certified biological category seed lots.

A material as homogeneous as possible regarding the quality indexes was used, so that the biological purity had values higher than 96%, the percentage of foreign seeds was situated between the legal limits (less than 1.5%), and the initial humidity of the lots was situated between 11.6%-12.8%.

The 8 varieties were considered 8 variants. In the year 2005, laboratory tests were made to determine the initial germination (energy and germination capacity). Both

the ensured conditions in the seeds growing period, and their evaluation were made according to the ISTA rules.

After making the tests in the vintage year, the samples were mixed and divided resulting two homogeneous sub-samples with the same weight, for each of the varieties studied. A set of sub-samples was kept in controlled environment (temperature under 10 degrees Celsius, and relative air humidity under 50%), and the other set of sub-samples was kept in uncontrolled environment, in a space in which the temperature and relative air humidity were changing depending on the season.

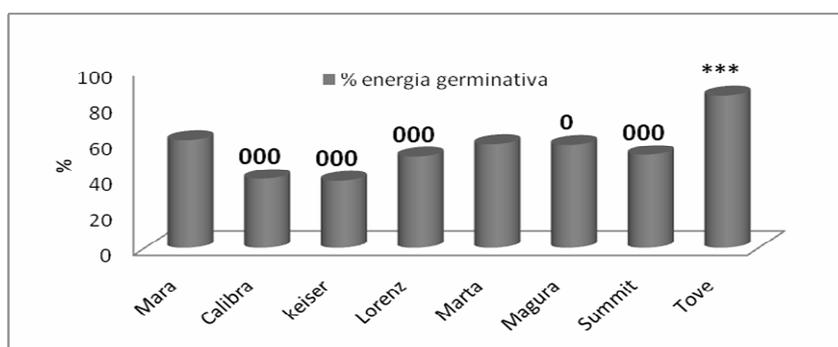
On both sets of sub-samples germination was determined (energy and germination capacity) for 3 years (2006, 2007, 2008).

When determining the germination for each variant, the laboratory test was made on 4 repeats of 100 seeds. The germination layer used was filter paper TP (paper layer), in temperature and light conditions of 20 degrees Celsius. The evaluation of the seeds was made in 5 days (germination energy) and 11 days (germination capacity).

## RESULTS AND DISCUSSION

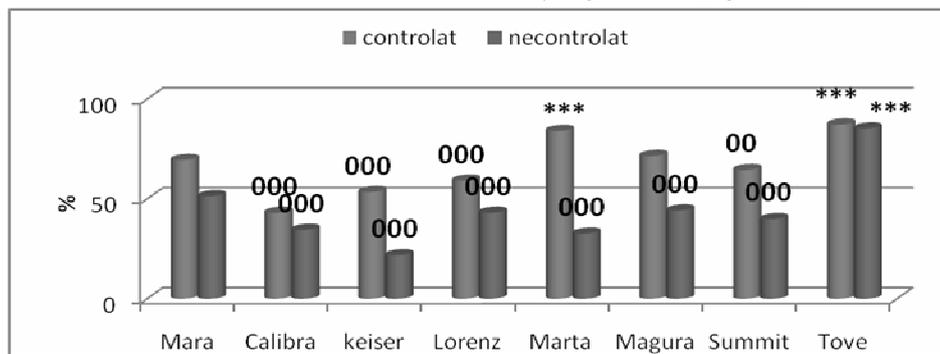
The germination energy had values between 37.63% (Kaiser variety) and 85.46% (Tove variety) irrespective of the keeping conditions and the number of keeping years. The report for Mara the control- variety, Kaizer, Calibra, Lorenz and Summit, has marked out very decreased values of the germination energy as following: 22.79%, 21.63%, 9.29% and 8.21%. For the Măgura variety, the decrease of the germination variety with the value of 2.54% was significant.

The Tove variety pointed out by increasing the germination energy of the control- variety with 25.04%, a very significant value. The Marta variety was the only one at the same level as the control- variety (figure 1).



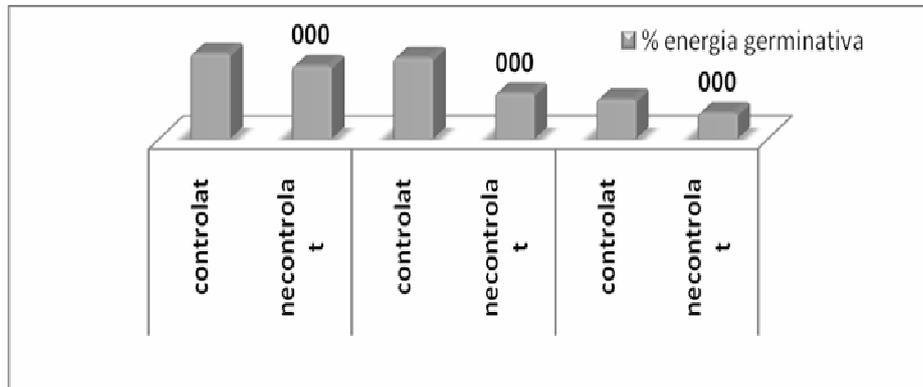
**Fig. 1. The germination energy depending on the variety, and not depending on the storage conditions and number of storage years**

Data interpretation from the interaction variety x storage conditions shows that Calibra, Keizer, Lorenz, Summit and Tove are the only varieties that keep the same report to the control-variety, both in controlled environment and uncontrolled environment (figure 2) with the observation that while the first 4 developed very decreased germination energy or distinctively significant (the Summit variety in controlled environment), at Tove variety the germination energy registered a very significant augmentation. The Marta variety is distinguished, with a pendulous behaviour (very significant increase in controlled environment referred to the control-variety, but a very significant decrease in uncontrolled environment) as a consequence of a very accentuated decrease of germination energy to 84% in controlled environment and 32.58% in uncontrolled environment. The same thing was observed in the case of Măgura variety, with the difference that in controlled environment the germination energy was at the control-variety's level and in uncontrolled environment the decrease was very significant (figure 2.)



**Fig. 2. The interaction variety x storage conditions**

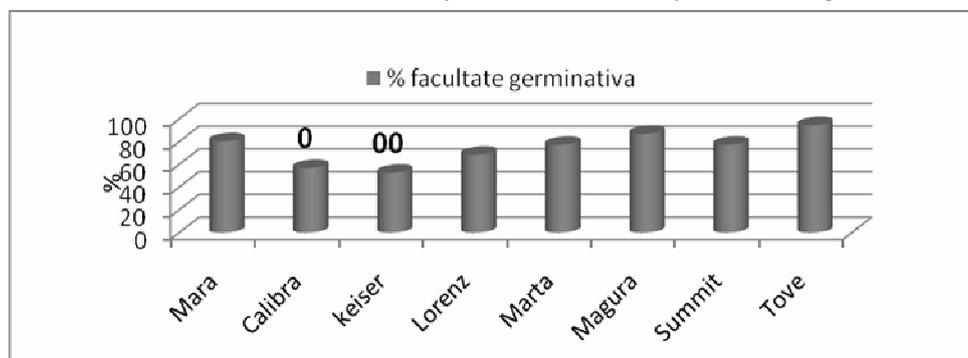
The interaction storage years x storage conditions shows that both in controlled environment and in uncontrolled environment the germination energy decreases very significant with the years passing. Yet, in uncontrolled conditions it decreases very significant compared to controlled conditions (figure 3).



**Fig. 3. The germination energy depending on the storage years and storage conditions**

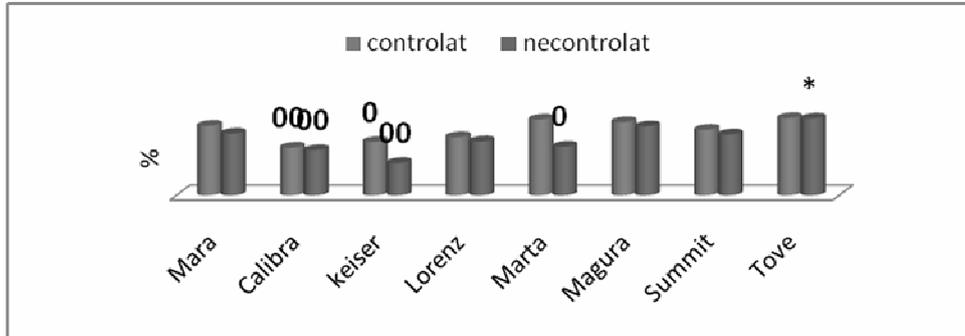
Whatever the storage conditions and storage years are, the germination capacity had values between 52.5% at Kaiser variety and 94.39% at Tove variety.

Reporting the values obtained for Marta variety, the control-variety, the Kaiser variety registered a distinctively significant decrease of the germination capacity of 22.75%, and the Calibra variety a 23.5% decrease. At the other varieties studied the differences towards the control-variety are not statistically ensured (figure 4).



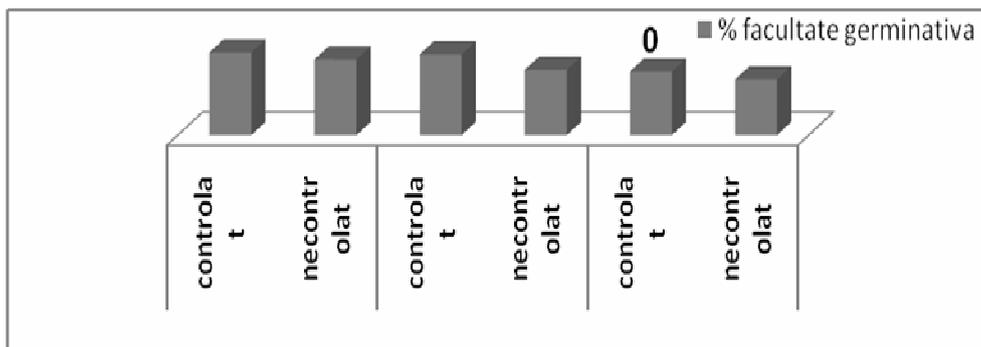
**Fig. 4. The germination capacity depending on the variety and not depending on the storage conditions and storage years**

The data from figure 5 shows that just Calibra and Kaiser varieties keep the same report towards the control-variety, registering distinctively significant decreases in controlled and uncontrolled environment. The Marta variety registers a significant decrease of the germination capacity in uncontrolled environment. The only variety that has unaffected germination capacity is Tove, in uncontrolled environment, having towards the control-variety, a significant increase (figure 5).



**Fig. 5. The interaction variety x storage conditions**

The interaction storage year x storage conditions show that both in controlled and uncontrolled environment the germination capacity decreases with the years passing. However, in uncontrolled conditions the germination capacity's value decrease significantly after 2 years of storage (figure 6).



**Fig. 6. The germination capacity depending on storage years and storage conditions**

## CONCLUSIONS

1. The germination energy and germination capacity have different values depending on the variety. If in the first year, not minding the storage conditions the values are close one to another, but in the next years they will be much more dispersed, the differences between varieties concerning germination energy and germination capacity accentuate in uncontrolled environment.
2. During the storage years, the germination energy and germination capacity decrease in most of the varieties independent of the storage conditions, a more accentuated decrease registering in uncontrolled storage conditions.
3. Decreasing the germination energy and germination capacity is more accentuated in the interval between the year 2 and 3, and after year 3.

4. The behavior of the varieties differ. The only variety that has the germination energy and germination capacity almost staid independent on the year and storage conditions is Tove. The Marta and Magura variety are pendulous having high values of germination energy and germination capacity in controlled environment and very low values in uncontrolled storage values. Some of the varieties have a constant decrease of germination energy no matter what are the conditions ensured during the storage years.

#### **REFERENCES**

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