



THE EFFECTS OF STORING WHITE POPLAR (*POPULUS ALBA L.*) SEEDS AT -5°C ON THE GERMINATION ABILITY

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ABSTRACT

As a summary can be appointed, that the gentle drying and the following storing at -5°C for 2 planting periods decreases the germination ability of white poplar seeds only in a small compass. Nevertheless it has to be taken into consideration when sowing on the third spring that the seeds come up slower, than by the time of the first sowing.

KEY WORDS:

Populus alba L., seed storage, moisture content, germination ability

1. INTRODUCTION

White poplar (*Populus alba L.*) is an important constituent tree species of the stock in the Hungarian forests, particularly between the Danube and the Tisza. In consideration of being a native tree species in the Carpathian Basin, its use is being privileged at forest planting benefits.

KEFAG ZRt. grows yearly 3-4 million one year old white poplar seedlings, using 150-200 kg seeds. These saplings are used partly in their own afforestations, partly in private forest plantings. With this achievement the company is considered to be the greatest white poplar saplings grower and user in Hungary.

The above mentioned data have justified, that we should analyze the problem of storing white poplar seeds. It often occurs namely, that the late frosts damage the white poplar flowers, and as a consequence the expected seed yield fails. It is therefore expedient to gather more seeds than the actual necessity in the years with good yields, and to store the excess in appropriate circumstances.

We will report in the present writing, how the germination ability of white poplar seeds stored at -5°C has changed during storing for two years.

2. INSTRUMENTS

The instruments used for measurements:

SARTORIUS MA30 quick moisture analyzer

SARTORIUS LC4801P scale

Jacobsen germination table

Ice-room (with adjustable temperatures between $+5$ - -18°C)

MUNTERS drying unit with moisture alternation

designed and constructed by FITOKLÍMA Kft.

3. METHOD

We have examined the moisture content of the white poplar spike and seeds both before storing, and before germinations during storing.

We have taken monthly 1-1 g sample each time from the stored seeds and germinated them on the Jacobsen-table at a temperature of 22-23°C .

4. RESULTS

White poplar seeds belong to the cluster of *orthodox* seeds. Therefore after cleaning they can be dried by air at room temperature (20-22°C) and with low humidity to a water content of 8-10%, and can be stored at -5°C in a hermetically closed pot. In these circumstances the medium-term storage of the most orthodox seeds is trouble free (SUSZKA, B. et al 1994). In the literature the successful storage of poplar seeds at -10 - -20°C for 36 months can be found in more cases. Extremities: storage without harm in liquid nitrogen at -196°C for 6 month, or storage at -18°C for 156 month.

In our case was the moisture content of the fresh gathered white poplar spike 64.7%. The white poplar seeds got into the laboratory with different moisture contents. After taking over we immediately measured the moisture contents and started dehydrating. The starting moisture content of the sample taken in the year of 2005 was 14.76%, while the seeds brought in the year of 2006 had a water content of 34%. We portioned out the seeds for dehydrating into fruit crates padded by newspaper, in approx. 1 cm thick layers in each crate. We put the crates on top of each other into the drying unit, where we dried the seeds gently, blasting through by dry air of 22-25°C. We followed the variation of moisture content of the seeds by taking samples all the way (diagram 1. and 2.). Our purpose was to put down the moisture content to a value of around 8%, but by all means under 10%. This moisture content is necessary for storing at -5°C. The success of the further treatment and storage is namely basically influenced by the moisture content of the seeds and the storing temperature. As longer we intend to store the seeds, as lower storing temperature we have to use, and as much we have to dry the seeds at the same time. This is of course only possible in case of orthodox seeds.

For reaching the moisture content of approx. 8-10% was ca. one week needed (diagrams 1-2.).

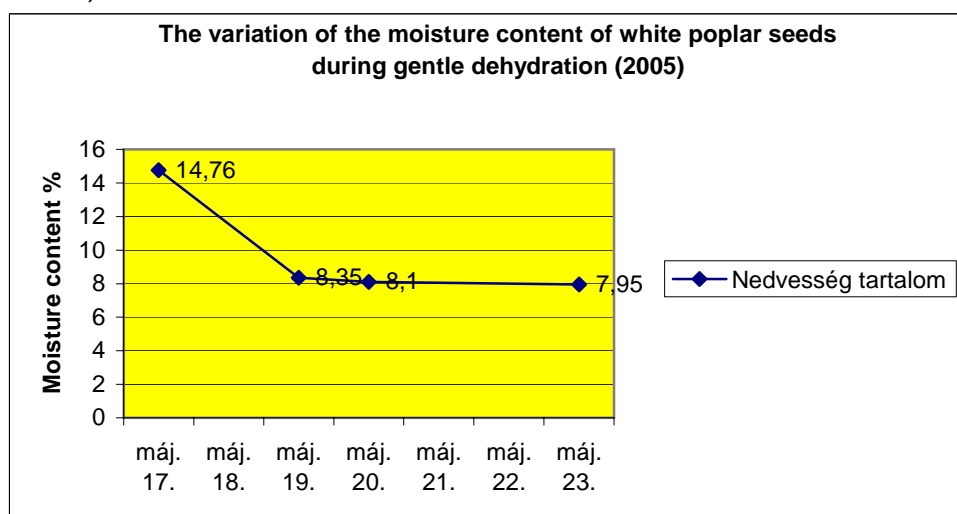


Diagram 1. Variation of the moisture content of white poplar (*Populus alba* L.) seeds during blasting through by dry air of 22-25°C in the year of 2005

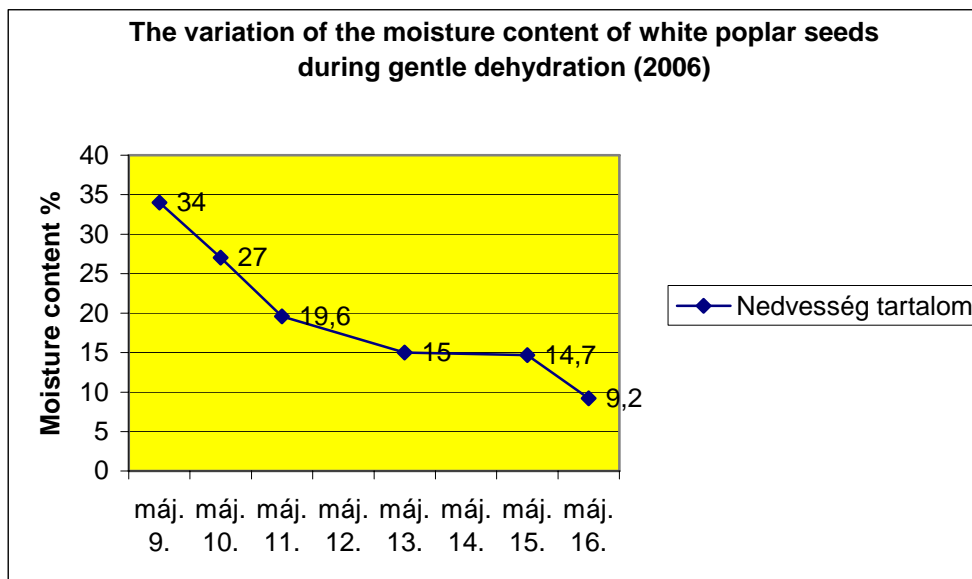


Diagram 2. Variation of the moisture content of white poplar (*Populus alba* L.) seeds during blasting through by dry air of 22-25°C in the year of 2006

We have taken monthly 1-1 g sample each time from the stored seeds and germinated them on the Jacobsen-table at a temperature of 22-23°C (table 1.; diagram 3.). Due to better transparency of the diagram, we will only show the results of some characteristically month.

Table 1. Germination of white poplar (*Populus alba* L.) seeds gathered in 2005 in the years 2005 and 2006

Day of germ counting	May 2005	July 2005	August 2005	September 2005	February 2006	June 2006	August 2006	November 2006
0.	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
3.	19,5	12,5	14,2	10,6	7,9	7,8	7,5	5,9
7.	26,7	20,3	24,6	21,2	22,2	29,0	26,1	19,4

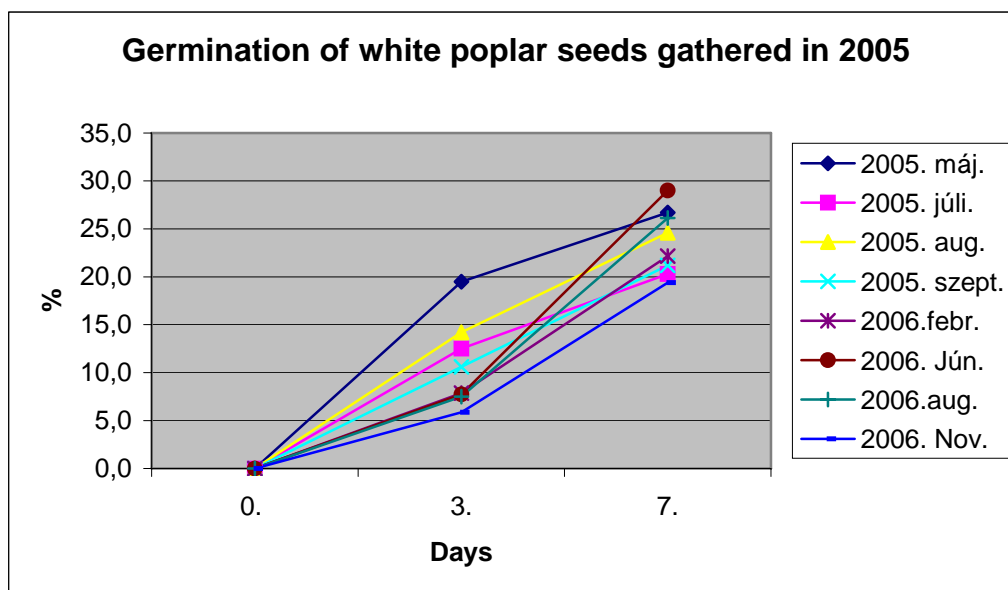


Diagram 3. Germination procession of white poplar (*Populus alba* L.) seeds gathered in 2005 in the years of 2005 and 2006

It can be observed, that during deep freezing the white poplar seeds have lost relative little on germination ability. In comparison with this the germination strength has decreased much more.

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