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Evaluation of the germination of seeds of Capparis spinosa L in laboratory conditions

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Abstract. *Fertilization of Capparis spinosa L. seeds was studied in laboratory conditions due to low natural fertility.*
Keywords: *Seeds, germination, drought resistance, medicines.*

Introduction

Several studies have been conducted by the Karaj Institute of Medicinal Plants (ACECR) and the Medicinal Plants Research Center in Iran to improve the germination of fenugreek seeds [1]. Scientists believe that seeds have two types of dormancy due to different mechanisms. These are the embryonic dormancy and the dormancy caused by the characteristics of the seed coat. A significant increase in germination has been observed when the shell of fenugreek seeds is cut, cut, or punctured [2]. Freshly harvested fenugreek seeds germinate quickly, but their germination is very low (1-2%), and after drying the seeds quickly enter a deep dormancy period, and it is very difficult to increase their germination naturally. According to the above researchers, the dormancy period of yam seeds occurs due to the fact that they are covered with a hard shell and the mucus that forms on the seed coat when the seeds are exposed to water prevents oxygen and water from entering the seed coat. Several methods have been proposed by foreign scientists to increase the germination of yam seeds. These methods include: treatment with gibberellic acid and KNO3 [3]. and treatment with H2SO4 acid and gibberellic acid (GA3), such as boiling water storage and rapid cooling. Scientists from the Institute of Medicinal Plants of Iran (ACECR) Tavakoli [4,5,6]. In studies conducted by the Department of Agriculture, 75% germination was achieved by soaking yam seeds in H2SO4 acid for 15 minutes, treating them with gibberellic acid (GA3) at a dose of 2000 ppm, and growing them at variable temperatures of 20 and 30 °C.

We studied the germination of seeds from several populations of sedge in laboratory conditions. 100 seeds from each population were germinated in eight replicates in Petri dishes using sterilized river sand as a substrate for 30 days in a thermostat (germination temperature was kept at 26°C). After 16 days from the start of the experiments, it was observed that the shell of some seeds cracked and gradually began to germinate. However, this was not observed in some seed samples. For example, germination was not observed at all in seeds collected from the vicinity of the Sepki village of Nurabad district. The reason for this, in our opinion, is that this population of sedge grows in a relatively arid environment, since this area is located in Karnabchul, where the average annual rainfall is 167 mm. Other populations of yam, for example, seeds imported from Ishtikhan, Kattakurgan, Samarkand districts of Samarkand region and Kibray district of Tashkent region, and Zamin district of Jizzakh region, had very low germination rates for 30 days, but germination was observed. As can be seen from the data obtained, the laboratory germination rates of seeds of different populations varied from 2.7±0.50% to 5.6±1.10%, and the seeds of the population imported from Nurabad district of Samarkand region did not germinate at all. Thus, agreeing with the opinions of the above-mentioned foreign scientists, it can be said that the germination rates of yam seeds are very low, and increasing seed germination is one of the urgent problems, and it is extremely necessary to conduct research in this direction and develop effective methods for increasing seed germination (Table 1)

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Table 1

Germination of cabbage seeds in laboratory conditions, %, n=100 (germination temperature +26°C, duration of the experiment - 30 days, .(2024).

№	Qibray district of Tashkent region	Zomin District, Jizzakh Region	Ishtikhon district, Samarkand region	Kattakorgan district, Samarkand region	Nurabad district, Samarkand region	Payariq District, Samarkand Region	Samarkand district of Samarkand region
1	4,1	4,3	2,5	3,7	0,5	5,6	2,3
2	6,9	3,7	3,7	4,3	0,3	3,5	3,6
3	5,3	5,3	4,9	3,4		4,9	2,7
4	5,4	3,5	3,4	4,1		3,2	2,5
5	7,1	4,2	3,4	4,3	0,1	2,5	3,1
6	4,7	4,2	3,1	3,5	0,2	3,1	2,2
7	4,8	3,4	2,3	5,3		3,2	3,1
8	6,4	5,3	3	5,3	0,2	3,4	2,3
∑	44,7	33,9	26,3	33,9		29,4	21,8
lim	4,1-7,1	3,4-5,3	2,3-4,9	3,4-5,3	0,1-0,5	2,5-5,6	2,2-3,6
M	5,6	4,2	3,3	4,2	0,0	3,7	2,7
m	1,10	0,74	0,80	0,74		1,03	0,50
V,%	19,62	17,38	24,41	17,43		28,12	18,27

There is information that the viability of yam seeds lasts up to 2 years. Considering the important practical importance of studying this problem, the germination of seeds collected from different populations and stored for different periods was studied. The biology of seed germination includes multifactorial processes, the main components of which are exogenous (temperature, humidity, light, storage conditions) and endogenous (the structure of the seed coat, the physiological state during germination) factors. Based on these components, exogenous, endogenous and combined dormancy states are distinguished in seeds.The results of our research show that the seeds of the yam did not lose their germination even when stored in paper bags at home for 6 years.

The lowest germination rate of the seeds of the yam stored in paper bags at home for 6 years was recorded in the populations of the Ishtikhan district of the Samarkand region, which was 2.2-3.3, an average of 2.8±0.40%, and a variation coefficient of 14.28%, while the highest rate was observed in the population of the Zamin district of the Jizzakh region, and the indicators were 3.4-5.1; 4.1±0.63 and 15.40%, respectively. It should be noted that when the germination rate of the seeds stored for this period was studied in laboratory conditions, a similar situation was observed as in previous experiments, that is, the germination of the seeds was very slow and low.

However, contrary to the opinion of foreign scientists, it can be said that fenugreek seeds do not lose their germination even when stored at room temperature for 6 years. Therefore, fenugreek seeds can also be included in the list of macrobiotic seeds. The property of fenugreek seeds not to lose their germination for a long time allows the creation of seed reserves (Table 2).

Table 2

Fertility of yam seeds stored for 6 years, % (2024)

№	Qibray district of Tashkent region	Zomin District, Jizzakh Region	Ishtikhon district, Samarkand region	Kattakorgan district, Samarkand region

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1	3,2	4,2	2,2	2,7
2	3,1	3,6	2,7	3,3
3	3,7	4,7	3,3	3,4
4	3,4	3,4	3,1	3,1
5	4,2	4,2	3,2	3,3
6	2,7	4,1	2,8	3,5
7	3,8	3,3	2,3	2,5
8	4,4	5,1	2,9	5,3
∑	28,5	32,6	22,5	27,1
Lim	2,7-4,4	3,4-5,1	2,2-3,3	2,5-5,3
M	3,6	4,1	2,8	3,4
M	0,57	0,63	0,40	0,85
V,%	16,09	15,40	14,28	25,02

Conclusion

Thus, yam seeds are a hardy seed with a dormancy period, and their germination rate in laboratory and field conditions is very low.

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