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The Germination and Growth-Energy of Saint Mary's Thistle (Silybum Marianum L. (Gaertn) Varieties

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Abstract. Currently, special attention is paid to the cultivation and reproduction of medicinal plants on a large scale in the saline soils of Khorezm region. As a newly introduced plant in Khorezm, the Saint Mary's Thistle *Silybum marianum L.(Gaertn)* and the indicators of sprout, growth energy, seed growth rate, length of young seedlings, root length and seed germination rate its varieties as well as have been studied in laboratory experiments among the medicinal plants.

Keywords: Medicinal plants, milk thistle, seed quality, germination, growth energy, seed growth power, sprout rate.

Introduction

It is known that the main indicators that the germination and growth energy allow to determine the suitability of seeds for sowing. On the other hand, the seed quality is a set of traits and characteristics that characterize the validity of seeds for sowing [1].

The study of seed germination biology is one of the main directions in the study of the latent period of plants. The scientific results obtained in these areas are useful both for practical purposes, to preserve the gene pool of medicinal plants and to create seed reserves, as well as to determine the theoretical issues of the species - systematic and phylogenetic directions that determine the evolutionary and adaptive potential [2].

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Based on this, in current research we studied the changes in the biometric characteristics, germination and growth energy of seeds, the seed growth rate, height of young seedlings, root height, seed germination rate of St. Mary's Thistle *S.marianum L.(Gaertn)* in the laboratory conditions.

Material and methods

Despite the fact that this medicinal plant has been studied in other parts of the world, there is not enough information about its cultivation in Uzbekistan, especially in Khorezm region. The experiments were conducted in the laboratory "Grain crops and products analysis" in Khorezm Mamun Academy. The laboratory experiments, biometric measurements were carried out on the basis of research methods of samples and analysis of plants, phenological observations of medicinal plants (VILAR, 2000) [5]. In particular, the sowing qualities of seeds (the germination energy and sprout) were determined in accordance with current GOST 12038-84 [6]. The method of morph-physiological determination has been implemented to identify the sprouting power of young seedlings [7]. Seed germination in laboratory experiments are implemented according to S. Lischuk method.[8]. The analysis of germination was conducted in 3 recurrences with 100 seeds in each [9]. Statistical processing of the obtained data was carried out on the basis of VILAR recommendations for the analysis of dispersion and correlation-regression [10].

Results and discussion

In our previous studies, we have introduced the experiment results on the growth and development of Panatseya, Debut and Samarianka varieties of the St. Mary's Thistle *S.marianum L. (Gaertn)* in photosynthetic potentials of the varieties, physiological properties such as biomass accumulation [3] and quantitative dynamics of chemical composition, the seed oil content, oil quality and amount of output of it, the amount of vitamins, proteins, and amino acid composition [4].

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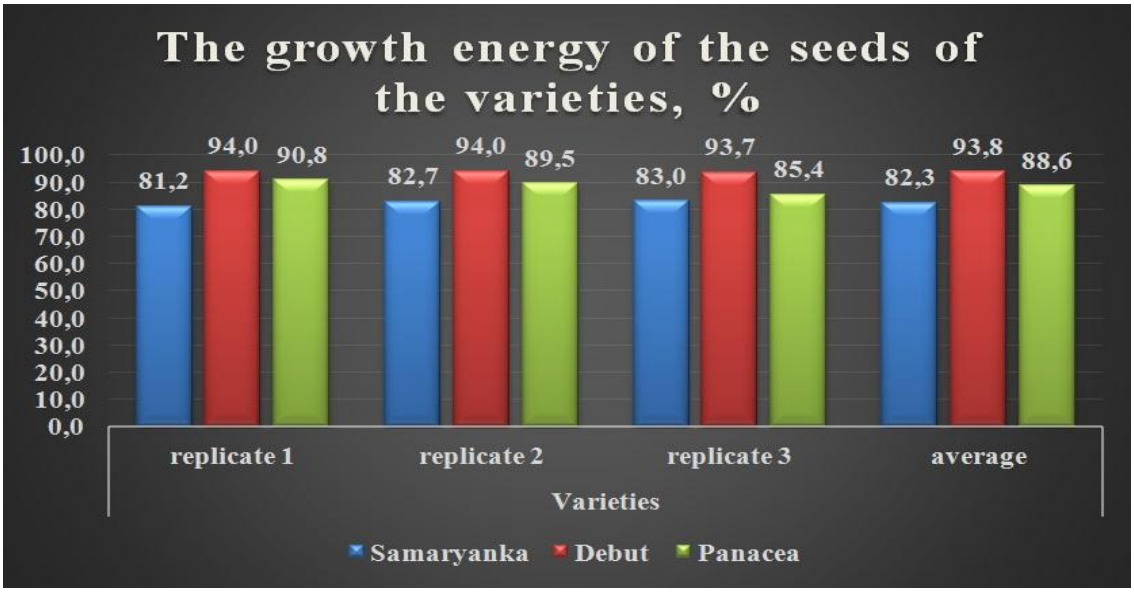
As a continuation of previous studies, 100 seeds have been sown and analyzed on the basis of 3 recurrences in order to study the germination of seeds of Debut, Panatseya and Samarianka varieties of the St. Mary's Thistle *S.marianum L. (Gaertn.)*. The initial germination of sown seeds of the milk-thistle varieties is observed after 3–4 days.

According to the results of 3 recurrence analyzes the seed germination of the varieties averaged 85.5% in the Samarianka variety while this figure was found to be 94.3% in the Debut variety and 90.8% in the Panacea variety.

As a result of the analysis of the growth energy of seeds of the St. Mary's Thistle varieties it was found that in Samarianka variety the average was 82.3%, while in Debut variety it was 93.8%. It is noted that the growth energy of Panatseya seeds was 88.6%.

When the growth rate of seeds of the St. Mary's Thistle varieties was determined, it was the highest in the Debut variety, averaging 91.2%, while the lowest rate was observed in the Samarianka variety and was found out to be 74.5%. Accordingly, the Panacea variety accounted for 85.6% (Picture 1).



Picture 1. The growth energy of the seeds of the varieties, %

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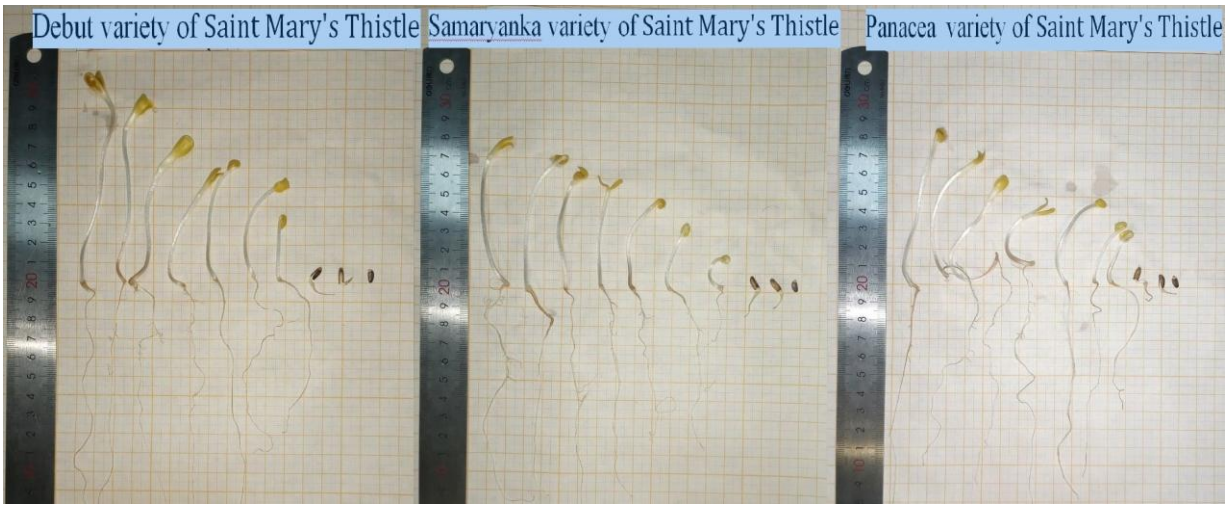
The experiments also determined the length of seedlings of the St. Mary's Thistle varieties in the juvenile period (Picture 2). It was observed that the differences in the length of seedlings of varieties were determined based on the genetic varietal characteristics of the St. Mary's Thistle. In particular, the length of seedlings in the Debut variety was high, averaging 88.1 mm. The lowest rate was observed in the Samarianka variety (64.1 mm) and the length of seedlings of the Panatseya variety was 73.6 mm.



Picture 2. Variety seedlings and root length (from seed to 9-day seedlings)

While the Samarianka variety showed low indicators in terms of germination, growth energy, growth vigor, and seedling length, it had the highest indicator on root length. According to the results of an average of 3 recurrences, the root length of young seedlings of the Samarianka variety of the St. Mary's Thistle ranged from 123.9 to 131.9 mm and averaged 128.5 mm, while this figure ranged from 99.3 to 106.2 mm in the Debut variety and averaged 102, 3 mm.. It was observed that the root length of the Panacea variety is in the range of 77.2–83.7 mm, with an average of 81.1 mm.

It is known that one of the main indicators of best quality seed is the rapid germination of these seeds. This significantly affects the number of seedlings of plants during the growing season. Unfortunately, the germination rate of seeds

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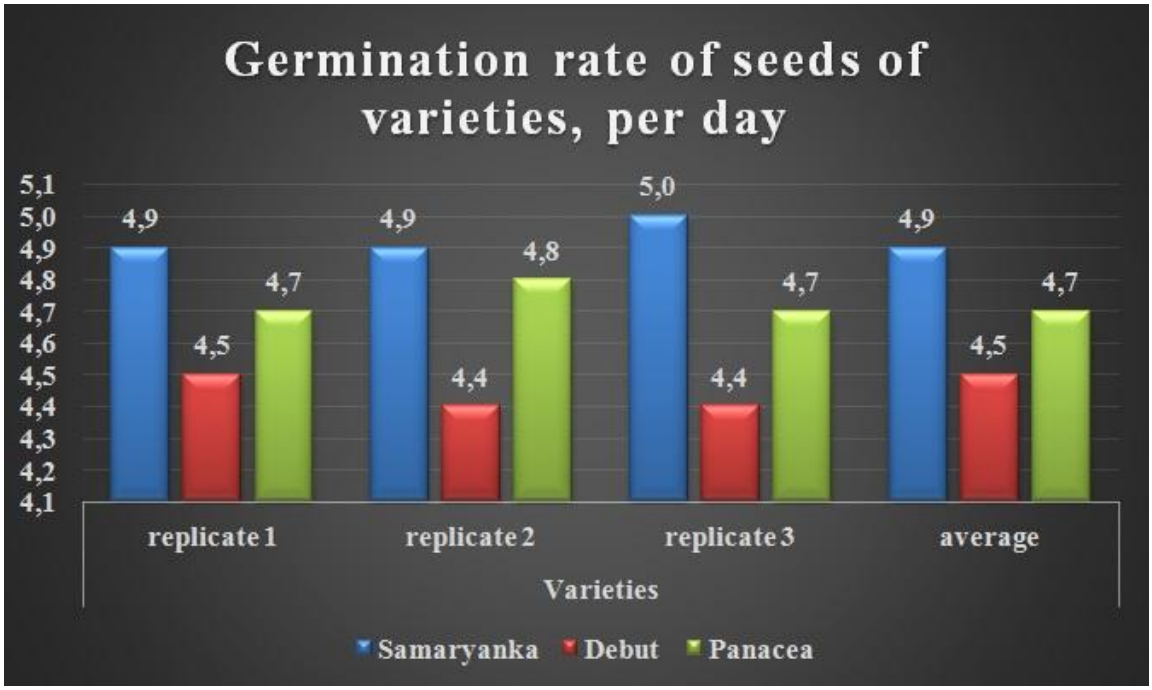
can be very low or not germinate at all. In the process of growing cultivated plants it is necessary to check the quality and characteristics of sowing seeds in the laboratory. As, it is possible to get high yields from the best quality seeds [11].

Based on the above, we studied the germination rate of seeds of the St. Mary's Thistle plant varieties in our study (Picture 3). The variation differences in the St. Mary's Thistle plant were found to affect both physiological and biological characteristics, i.e., it should be noted that the germination rate of the Debut variety was very high, averaging 4.49 days. The lowest rate of germination was observed in the Samarianka variety, which averaged 4.93 days. The average germination rate of Panatseya was 4.74 days which showed an intermediate result.



Picture 3. Germination rate of seeds of varieties, per day

The average sprout rate of seeds of the St. Mary's Thistle Samarianka variety was 4.93 days, while in Debut variety it was 4.49 days and in the variety of Panacea, the average germination rate was 4.74 days.

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Conclusions

The following inferences have been drawn from experimental studies on the biology, physiology, and seed quality characteristics of the medicinal plant of St. Mary's Thistle:

- The study of seed quality of the St. Mary's Thistle *S.marianum L.* varieties (as well as its germination and growth energy, seed sproutrate, length of young seedlings, seed germination rate) indicated that the Debut variety was characterized by higher seed quality than other varieties;
- The root length of the Samarianka variety was the highest at 128.5 mm, while the Panatseya variety was intermediate in most respects.

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