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Method for Pre-Sowing Treatment of Seeds of Sporious Capers (Capparis Spinosa L.)

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Introduction. Prickly capers (Capparis spinosa L.) are a valuable medicinal raw material and partly a fodder plant. An obstructive condition for accelerated reproduction is the extremely low germination of its seeds, which have hard seeds and are in deep physiological rest. Spiny caper (*Capparis spinosa* L.) is a herbaceous plant belonging to the family type species of the genus Caper (*Capparis*) of the Caper family. Vegetable culture: unblown flower buds are pickled, which contain proteins, oil, vitamins. Fruits of prickly capers are berry-like multi-seeded capsules, green outside, bright red inside, with brown seeds. Fruit ripening is extended from June to October. Pollinated by insects. Propagated by seeds. Animals play a major role in seed dispersal. Fruiting occurs in the fifth year. The life expectancy of an individual is more than 50 years. Flower buds, plucked to full bloom, marinated in vinegar, are the *capers* for which this plant is grown in culture. Pickled buds are used as a spicy seasoning. They contain 21-29% proteins, 3.8-4.6% fat, 0.32% rutin, 150 mg% ascorbic acid, essential oil, pectin and other compounds useful for the body. In the Caucasus, buds are harvested both for local consumption and for the production of canned food. The fruits are eaten fresh; they used to be dried and consumed in winter instead of sugar. Their pulp is very sweet (up to 12% sugars), similar in taste to watermelon. The seeds contain up to 18% protein and 25-36% semi-drying fatty oil suitable for food use. Capers are also used in folk medicine. Fresh parts of capers have diuretic, antiseptic and analgesic properties. The fruits are used for thyroid diseases, hemorrhoids, gum disease and toothache. Non-healing wounds are treated with caper juice, and diabetes mellitus is treated with infusion and decoction of young leaves and shoots of caper. The bark of the fresh roots of the plant is chewed for diseases of the oral cavity and toothache. A decoction of the bark of the roots is used for hypochondria, paralysis, diseases of the spleen, and for colds and rheumatic pain. The composition of capers includes rutin, so they are used for high blood pressure. A decoction of flowers, bark and roots of caper is used to improve cardiac activity, with pain of a different nature and neurosis.

Material and research methods. The material of the research was the seeds of prickly caper collected in natural populations common in the Ishtikhan district of the Samarkad region of Uzbekistan. The studies used various methods of scarification and stratification of seeds.

Results and discussion. Repeated attempts to propagate prickly capers by direct sowing of seeds were unsuccessful, the seeds practically did not grow.

Known methods of seed treatment to increase their germination:

mechanical scarification - damage to the seed coat by rubbing the seeds with sandpaper;

a known method of pre-sowing treatment of seeds of legumes by treating seeds by maceration (destruction) of the upper layer of cells of the seed coat with sulfuric acid with a specific gravity of 1.8...1.83 for 10-...25 min;

a method is known for pre-sowing treatment of seeds of plants of the legume family (Oriental Goat's Rue (Galega orientalis lam.) by treatment with concentrated sulfuric acid - 15 min, 35 min, 60 min and 90 min. Seeds after treatment with concentrated sulfuric acid are washed with water and dried. seeds with sulfuric acid for 15-90 minutes, laboratory germination was in the range of 83-92% (Dovnar, 2013);

cold stratification methods are known in which hard seeds are stored for a long time on wet sand, at low temperatures (5-10 ° C) from 2.5 to 5 months. Especially for forest seeds, the cooling period lasts from 7 days (soft pine) to 12 months (hawthorn) at a temperature of 5-10 ° C. (Borodina et al., 1969; Firsova, 1969); There is a known method of seed stratification (in botany) (from Latin *stratum* - flooring, *facere* - to do) - the process of simulating the influence of natural winter conditions on plant seeds to make it easier for seeds to germinate, as well as measures to accelerate seed germination and increase their germination, applied before boarding. This method often includes artificial long-term storage of seeds at a certain low temperature. The seeds of many plants must go through a state of dormancy (sleep) of the embryo, otherwise they will not sprout. The time of rest (sleep) is different for different plants and conditions. In some plants, the seeds after ripening are in a state of deep dormancy, and after sowing, only a part of them germinates. As a result of stratification, an increase in seed germination can occur due to the preliminary (for example, before planting) removal of seeds from dormancy, or rather, its passage under artificial conditions in a shorter time. Treated seeds are stored in a cold (from 1 to 3 °C; no frost) and humid atmosphere and the period of time required for this type of seed. This period for different plants is from one to three months. To stratify the seeds, it is enough to put them in a hermetically sealed bag with wet vermiculite, sand or a damp cloth and leave in the refrigerator. The substrate should be three times more than the seeds, and it is

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important to slightly wet it, as too much moisture can provoke seed germination and subsequent mold. After the recommended stratification period, the seeds are ready for planting in specially prepared soil with top dressing.

The problem to be solved is to increase the laboratory germination of seeds of prickly capers (Capparis spinosa L.), to reduce the duration of stratification, by accelerating the removal of seeds from dormancy.

The problem to be solved is achieved by the fact that in the method of presowing treatment of seeds of prickly capers (Capparis spinosa L.), including the stratification of the seeds of the specified plant by mixing them with wet river sand, placing the resulting mixture in a hermetically sealed bag, instilling the mixture in a hermetically sealed bag into open ground to a depth of 25-30 cm in January-February and exposure for 50-55 days at a temperature of 1-2 ° C, according to the invention, before stratification, the seeds of this plant are soaked in a 5% solution of acid fuchsin for 2.0-2.5 hours, during stratification, the seeds of this plant are mixed with wet river sand in a volume ratio of 1:4, respectively, after stratification, the seeds of this plant are washed with water and soaked in a 5% solution of acid fuchsin for 30-40 minutes. The essence of the proposed method lies in the fact that before stratification, the seeds of prickly capers (Capparis spinosa L.) are soaked in a 5% solution of acid fuchsin, then the soaked seeds of prickly capers are stratified by mixing them with wet sand, the seeds mixed with sand are packed in hermetically sealed bags and buried in open ground in the external environment in January-February, after the stratified seeds are washed with water, then soaked in a 5% solution of acid fuchsin. The biological features of the seeds of prickly capers (Capparis spinosa L.) are as follows: they are hard and their shell prevents the rapid germination of these seeds, as well as the presence of primary and secondary dormancy in these seeds, the presence of various inhibitors in the seed coats and the embryos themselves.

Therefore, cold stratification helps to destroy this hard shell in caper seeds and germinate faster, and pre-stratification treatment with 5% acid fuchsin and after stratification soaking in a 5% solution of acid fuchsin, which is a bactericide, leads to avoiding seed diseases, mold and rot and stimulate vitality and subsequent accelerated seed growth. Consequently, the method exhibits a new property, which consists in stimulating (increasing) the germination of prickly caper seeds.

The mechanism of action of treatment by cold stratification is that the hard shell of the seeds is destroyed (stratified), physiological processes occur that bring the seeds out of a state of deep dormancy, as a result of which the germination of these seeds increases. The seeds are buried in the ground to a depth of 25-30 cm in the local ecological conditions of Uzbekistan so that they do not freeze. The mechanism of action of soaking in a 5% solution of acid fuchsin is that it has antifungal and antibacterial properties that do not allow the development of harmful microflora in hermetically sealed bags with sand and prickly caper seeds, create favorable conditions for post-stratification stimulation of the vital activity of seeds, increase energy of germination and the appearance of friendly shoots.

Non-obviousness for any specialist in this field and a new property lies in the fact that for the first time it is for the seeds of prickly capers that the optimal period has been established (the duration of stratification, which makes it possible to sharply increase their germination), i.e. before stratification, the seeds of prickly capers (Capparis spinosa L.) are soaked in a 5% solution of acid fuchsin for 2.0-2.5 hours, then the seeds are stratified by mixing them with wet river sand in a volume ratio of 1:4, accordingly, the mixture is hermetically packed in bags and buried in the soil in the external environment to a depth of 25-30 cm in January-February for a period of 50-55 days at a temperature of 1-2 ° C, then the stratified seeds are washed with water and soaked in 5% - nom solution of acid fuchsin for 30-40 minutes. Therefore, this criterion, that it is for the seeds of prickly capers that the optimal period is established (the duration of stratification, the depth in the soil, which makes it possible to sharply increase their germination), may have an unexpected effect and correspond to the condition of patentability "inventive step". First, the quality indicators of untreated seeds of prickly capers were determined. Not all collected seeds are always complete. Incomplete seeds should not be used for sowing in the laboratory, and even more so in the field, since they do not have high field germination. Therefore, the usefulness of the untreated seeds was first determined, they were rubbed with sandpaper and 100 pieces in 3 repetitions were soaked in water for 3 days in paper bags, and then, to determine the laboratory germination, the untreated seeds of prickly capers (control), 100 pieces were sown on a small dune sand in Petri dishes in three repetitions.

The results of determining the quality of the collected seeds of prickly capers are presented in table 1.

Table 1. Qualitative indicators of untreated prickly caper seeds (Capparis spinosa L.)

Plant	Indicators			
	completeness, %	germinating energy, %	Laboratory germination, %	Weight of 1000 seeds, g
capers prickly	90,2± 1,2	10,8±+1,7	8 ,6±1,7	7,1± 0,7

The results shown in Table 1 showed that the untreated seeds of prickly capers had a high usefulness (90.2%) and low laboratory germination (8.6%). These hard seeds were complete and suitable for determining laboratory germination after their stratification by the proposed method.

The dormant caper seeds were stratified as follows:

We prepared the 1st batch of seeds, for this we took the seeds of prickly capers by volume (10 cm^3). Similarly prepared 2 more samples of caper seeds. All 3 samples were soaked together in 5 ml of a 5% solution of acid fuchsin for 2 hours for disinfection from harmful pathogens (fungi, harmful microflora, rot and mold). Acid fuchsin solution was poured into a

separate container for reuse and stored in a dark place. Then, soaked seeds of prickly capers were taken in the amount of 1 volume (10 cm^3) and mixed with 4 volumes (40 cm^3) of wet clean river sand, respectively, and placed in a plastic bag. We received 3 packages, which were hermetically sealed and buried in the ground in an open area of Samarkand (in the external environment) to a depth of 25 cm from January 25 to March 15 for a period (for 50 days) at a low temperature of up to 2 ° C. Then the bags were dug out, all stratified seeds were washed with water and soaked together in 100 ml of a 5% acid fuchsin solution for 30 min for disinfection and accelerated germination. Further, to determine the laboratory germination, treated caper seeds were taken in 100 pieces and sown on fine dune sand in Petri dishes in three repetitions.

The results of experiments to determine the laboratory germination are given in table.2.

Table 2. Laboratory germination of seeds stratified according to the proposed method and processed according to analogues and NBA, capers in the amount of 50 pieces.

Processing method	processing exposure, min/days	Number of caper seeds	repetition	Laboratory seed germination, %	
		50	3	Capers prickly	Oriental goat's rue (Galega orientalis lam.)
Control (untreated seeds)	-	50	3	8,6	
sulfuric acid -98 %	10 mins	50	3	7,2	
sulfuric acid -98 %	40 mins	50	3	12,0	
sulfuric acid -98 %	90 mins	50	3	7,2	
NBA - with cold stratification of seeds (5^0 C)	2 months	50	3	7,9	
-«-«-«	5months	50	3	10,0	
Analog	15mins	-	-		83-92
According to the proposed method	50 days			72,0	

As can be seen from the results of table 2, the best laboratory germination by the proposed method: prickly capers - 72% at 50 days of exposure.

Stratification of dormant caper seeds was carried out as in example 1.

Prepared 3 samples of prickly caper seeds by volume (10 cm^3) in each. All 3 samples were soaked together in 5 ml of a 5% solution of acid fuchsin for 2.5 hours to decontaminate harmful pathogens. Acid fuchsin solution was poured into a separate container for reuse and stored in a dark place. Then, soaked seeds of prickly capers were taken in the amount of 1 volume (10 cm^3) and mixed with 4 volumes (40 cm^3) of wet clean river sand, respectively, and placed in a plastic bag. The received 3 packages were hermetically sealed and buried in the ground in an open area in Samarkand (in the external environment) to a depth of 30 cm from January 25 to March 20 for a period (for 55 days) at a low temperature of -2 ° C. Then the bags were dug out, all stratified seeds were washed with water and soaked together in 100 ml of a 5% acid fuchsin solution for 40 min for disinfection and accelerated germination.

Table 3 presents a comparative analysis of the proposed method with the prototype.

Table 3. Comparison of the proposed method with analogue and NBA

Indicators	Suggested method	NBA
1.laboratory germination, %:	72,0%	10,0
2. field germination, %:	65,0	2,6
3. Processing time (stratification)	50-55 days	up to 12 months
3. Productivity of marketable products, t/ha:	Burgeons- 8-12	0,5-0,8
4. Efficiency per 1 ha, sum for 2018	14, 4 mln.sums	-
5. The cost of seeds per 1 ha, sum for 2018	50000	500000
6. Availability	available	available

Conclusions. Comparison of the results of the proposed method indicates an increase in the stimulation of seed germination and increase their laboratory and field germination due to stratification by the proposed method. With an increase in the amount of acid fuchsin, the drug is overused. With a decrease in the amount of acid fuchsin, the seed coat is not destroyed (not scarified) and the germination of seeds decreases. With an increase in the processing time of

stratification, a decrease in germination occurs. With a decrease in processing time, the positive effect on metabolic processes in seeds decreases. The stratification method can be used to increase laboratory and field germination of prickly caper seeds. Economic efficiency lies in the fact that: 10 kg of untreated seeds are required per 1 ha at the seeding rate, with the cost of 1 kg of these seeds being 50 thousand soums at prices in 2018, i.e. 500 thousand soums are required per 1 ha for sowing untreated caper seeds. The proposed method requires lower costs: for example, 1 kg of treated seeds per 1 ha is required for sowing and 50 thousand soums are spent. Thus, 1 hectare when using the proposed method costs 10 times less compared to the prototype and when sown with untreated seeds. With the industrial application of the method in desert areas, it is possible to achieve an increase in the yield of commercial products - buds from 1 ha 8-12 tons and seed productivity by 60% in relation to the yield of untreated seeds.

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