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OF PLANTS' SEED MASSES OF WILD AND NATURAL FLORA**

Стаття присвячена проблемам пророщування насіння за різних концентрацій солей як представників культурної, так і природної флори. Вивчення особливостей насінневих мас рослин дикої і культурної флори показало, що за сім днів проросло 56 % насінин, за 10 днів – 44 %, за 12 днів – 11 %. У *Beta vulgaris*, *Avena sativa* та *Valerian officinalis* найбільше насіння проросло у воді – 38 %. У *Secale cereale*, *Triticum durum*, *Hordeum vulgare*, *Phaseolus vulgaris* найбільша кількість насінин проросла у 0,1 % розчині (NaCl) – 62 %, і у жодної рослини, насіння якої пророщувалося у 0,2 % розчині солі (NaCl), показник не був вищим, ніж показники у зразках з водою та 0,1 % розчині (NaCl). За результатами можна констатувати, що 0,1 % розчин солі (NaCl) та вода впливає на швидкість проростання насіння, але не впливає на кількість і якість насіння.

Ключові слова: насіння, дика і культурна флора, засолення.

Problem statement. Seeds are the basic reproductive material both in the wild and cultural flora, characterized by a number of morphological, physiological, biological features, among which its physiological heterogeneity stands out [1-4]. A wide range of conditions, which are necessary for germination, promote the efficient use of the territory, survival and different species coexistence [5-8]. Lack of seeds makes it impossible to obtain agricultural products: grains, fruits, vegetative mass - even under fertilizers, land and machinery availability along with appropriate technology of manufacturing processes performance as agro ecosystems formation is always initiated with seed provision. But seed material availability does not always guarantee the realization of this aim, i.e. obtaining high yields.

Research aim - to determine the physiological characteristics of plants seed masses of cultural and wild flora. It is necessary to fulfill the following objectives for address this goal: to determine seed vigor test plants, find their similarities.

Material and methods. The research object is seeds of the following plants species: *Beta vulgaris*, *Secale cereale*, *Triticum durum*, *Avena sativa*, *Phaseolus vulgaris*, *Hordeum vulgare*, *Helianthus annuus*, *Valerian officinalis*, *Chamomilla recutita*. Physiological aspects of determining vigor test plants and their similarities were conducted by standard methods [4]. Laboratory experiments were conducted at the Melitopol state pedagogical university named by Bogdan Khmelnytsky and field - based on Novotroitsk farm "Niva".

Results and discussion. Our study showed that during germination of *Beta vulgaris* (fig. 1): for the third day in three cases, it is not growing a single seeds, for the fifth day in the water - to thirty seeds; in 0,1% solution (NaCl) - up to 20 and the smallest number - in a 0,2% solution (NaCl). On the seventh day the largest number of seeds is growing in water, and the lowest - in 0,2% solution (NaCl). On the tenth day the most seeds grows in water and forms 80%, in 0,2% solution - 35%. So, *Beta vulgaris* best germination occurs in water and in 0,2% solution (NaCl) is worse.

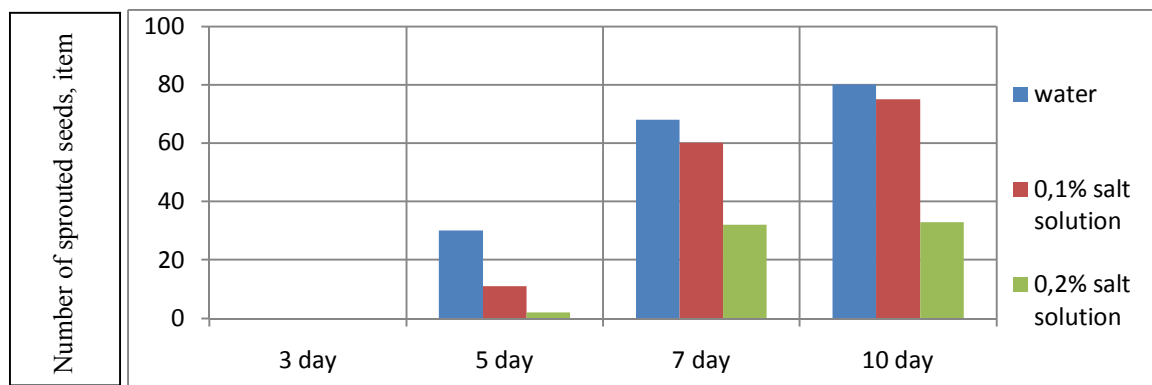


Figure 1. Germination of *Beta vulgaris* by ten-daily period (item).

The data showed that *Secale cereale* are growing on the third day (fig. 2). The largest number is grown in 0,2% solution (*NaCl*), the number is - more than 95 seeds, at least - at 0,1% solution (*NaCl*). On the fifth day in a 0,2% solution (*NaCl*) increased to 100 seeds. On the seventh day the growing seeds quantity is not changed. So, during the germination at grasses is a classic effect of gibberellins action which is associated with the release of seeds from dormancy. Gibberellins' "start" of amylase formation is essential condition for seed germination.

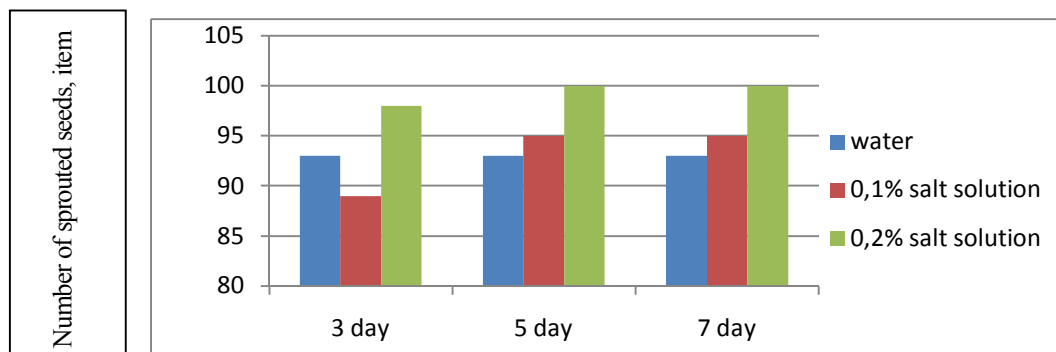


Figure 2. Germination *Secale cereale* by seven-day period (items).

Experimental data (fig. 3) showed that *Triticum durum* seeds grew well in 0,1% solution (*NaCl*) and 0,2% solution (*NaCl*). Caryopses are grown on the third day and are grown seven days. It is shown that in the water on the third day are grown 98 caryopsides, the fifth and seventh day the quantity is unchanged - 98 items. In 0,1% solution (*NaCl*) and 0,2% solution (*NaCl*) - 100 caryopsides have grown on the third day, which may be due to the activation of defense reactions under the lections action.

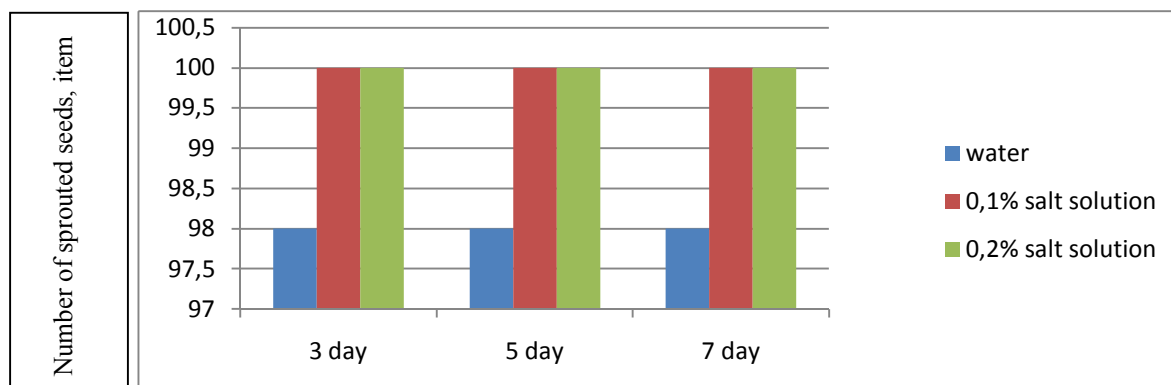


Figure 3. Germination of wheat for a seven-day period of *Triticum durum* (items).

Grain germination of *Avena sativa* (fig. 4) showed that on the third day the quantity of growing seeds in water was - 50 items, the fifth and seventh - is increased to 99 items. In 0,1% solution (*NaCl*) on the third day it is grown - 83 items, fifth and seventh - 90 items, and in 0,2% solution (*NaCl*) on the third day - 11 seeds, fifth and seventh - 95 items. Over the seven-day period, the largest number of seeds is grown in water, but on the third day the best conditions for caryopsides was in 0,1% solution (*NaCl*). More stable germination was conducted in 0,2% solution (*NaCl*).

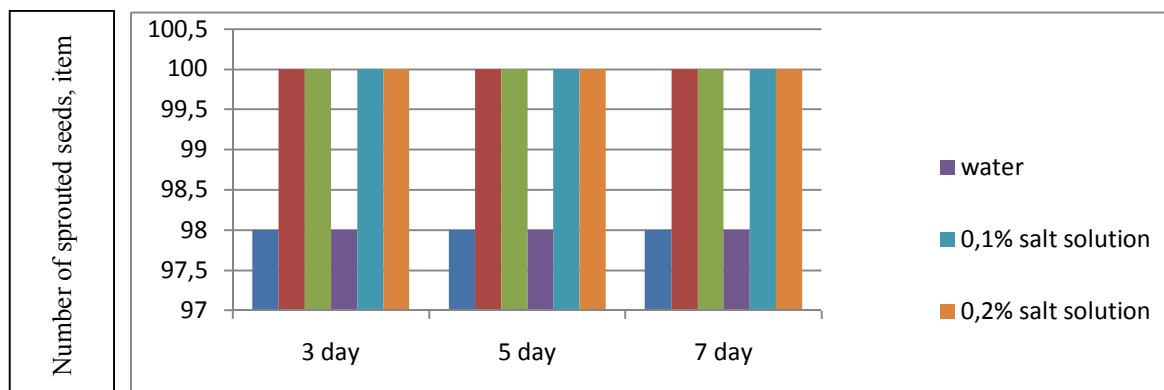


Figure 4. Germination of *Avena sativa* by seven-day period (items).

Our results showed that seeds of *Phaseolus vulgaris* are grown 10 days (fig. 5), seedlings began to appear on the third day in a sample of water and in 0,1% solution (*NaCl*). On the fifth day in water are grown to 50 seeds, in 0,1% solution (*NaCl*) - at least 40 seeds, in 0,2% solution (*NaCl*) - 20 seeds. On the seventh day, in all the samples, the number of germinated seeds increased: 60 seeds - in water, 65 items - in 0,1% solution (*NaCl*), 45 items - in 0,2% solution (*NaCl*). The best results for the number of germinate seeds beans were in the sample with 0,1% solution (*NaCl*).

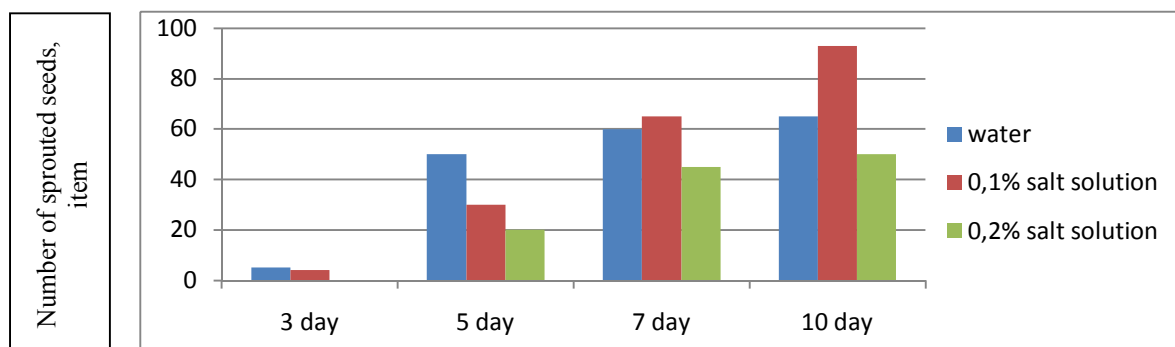


Figure 5. Germination of *Phaseolus vulgaris* by ten-daily (items).

The results showed that on the third day of *Hordeum vulgare* germination (fig. 6) are best grown seeds in 0,1% solution (*NaCl*) - 95 seeds. In water on the third day are grown 93 seeds, the same number was on the fifth and seventh day of the experiment. In 0,2% solution (*NaCl*) are grown the least caryopsides quantity: 23 items - on the third day, 88 items - on the fifth, 88 items - on the seventh. The salt solution on seeds germination is not significantly affected, but in 0,1% solution (*NaCl*) is acted positively. A fastest process of seeds germination h took place with the seeds, which are growing in the water, the longest germination took place in solutions. The largest quantity of germinated seeds was in the sample with 0,1% solution (*NaCl*).

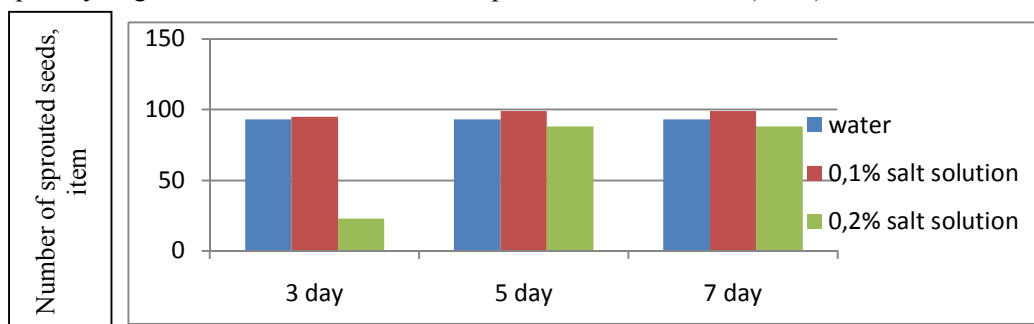


Figure 6. Germination of *Hordeum vulgare* by the seven-day period (items).

The results of *Helianthus annuus* germination: on the third day the most of seeds is grown in a sample with water, almost 100% (fig. 7), in 0,1% solution (*NaCl*) - 60%, 0,2% solution (*NaCl*) - over 20%. On the fifth and seventh day in all samples are grown the 100% seeds. Salt solutions only in the early stages of germination influenced the physiological, biochemical processes in seeds. The fastest germination of sunflower was observed in seeds, germination which took place in the water. Speed of germination is reversed- proportional salt concentration.

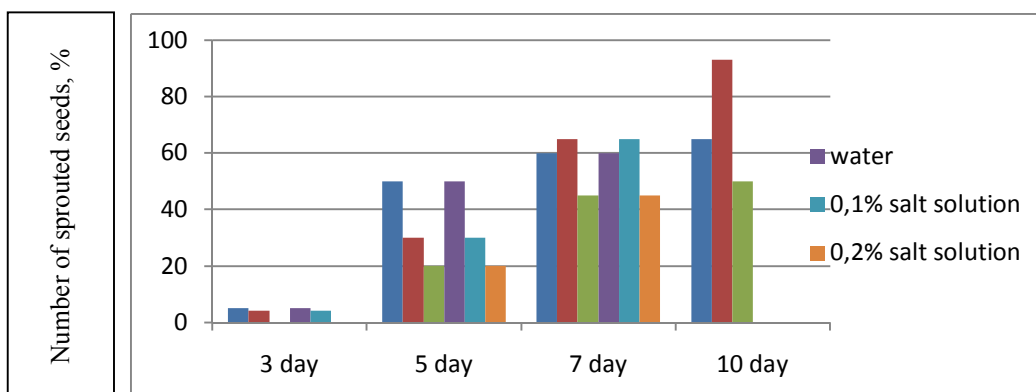


Figure 7. Germination of *Helianthus annuus* by seven-day period (%).

Analysis of the results of *Valerian officinalis* germination (fig. 8) showed that on the third day the largest number of seeds is grown in 0,2% salt solution (*NaCl*), the lowest - in water and 0,1% salt solution (*NaCl*), on the fifth day the seeds, which is soaked with water, left in the same condition, and in 0,1% salt solution began to grow rapidly, after which the quantity of germinated seeds did not change. For all twelve days of *Valerian officinalis* germination, growing is occurred rapidly in water, and worse - in 0,1% and 0,2% salt solution.

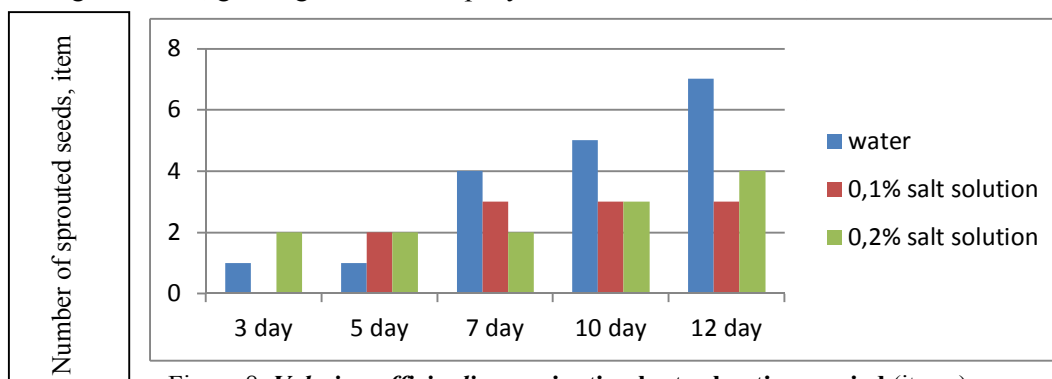


Figure 8. *Valerian officinalis* germination by twelve-time period (items).

Results from *Chamomilla recutita* germination in water, 0,1% salt solution (*NaCl*) and 0,2% salt solution (*NaCl*) at room temperature and with sufficient lighting are: on the third day seeds are intensive grown in water and was more than 90% of all seeds, are less intense growing is occurred in 0,1% salt solution - more than 80% of the germinated seed, the smallest number of germinated seeds was in 0,2% salt solution (*NaCl*) (fig. 9). On the fifth day in the water the percentage was over 95%; in 0,1% salt solution (*NaCl*) - over 85%, in 0,2% salt solution (*NaCl*) number of seeds increased by several percent. On the seventh day the quantity of growing seeds in water with 0,1% salt solution (*NaCl*) and water with 0,2% salt solution (*NaCl*) did not change. During the whole period of germination, which was the seven days, the best germination is occurred in water, less intense - in the 0,2% salt solution (*NaCl*) and the worst - in 0,1% salt solution (*NaCl*). It is explanted this, that during seeds germination in water and different solutions with varying concentrations, phytohormones gibberellins are not equally activated, it stimulate seed which is dormant and participate in the growth of different activity.

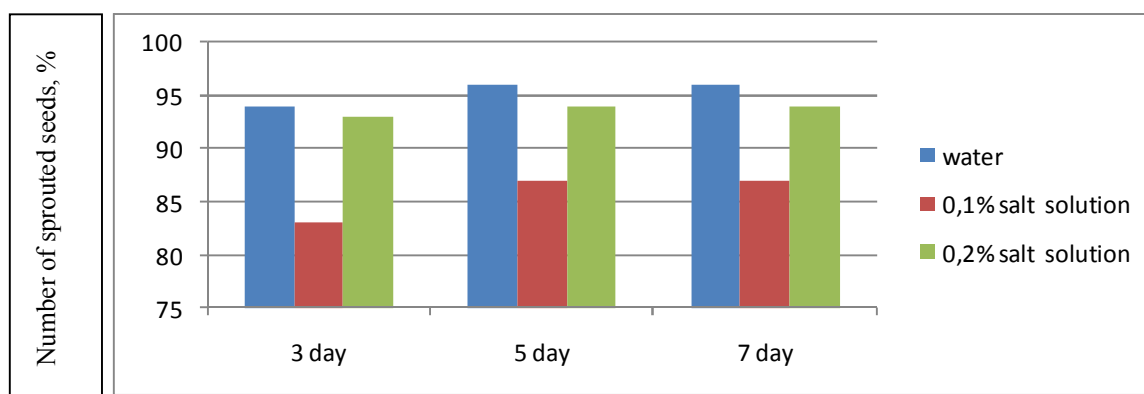


Figure 9. Germination of *Chamomilla recutita* for the seven-day period (%).

Conclusions. Study of seed masses of wild and cultural flora showed that seven days are grown seeds 56%, for 10 days - 44%, in 12 days - 11%. In *Beta vulgaris*, *Avena sativa* and *Valerian officinalis* the most seeds are grown in water - 38%. In *Secale cereale*, *Triticum durum*, *Hordeum vulgare*, *Phaseolus vulgaris* the largest number of seeds is grown in 0,1% solution (*NaCl*) - 62%, and in any plant seeds, which are growing in a 0,2% salt solution (*NaCl*), the index was not higher than rates in samples of water and 0,1% solution (*NaCl*). As a result we can say that the 0,1% salt solution (*NaCl*) and water influence on the rate of seed germination, but does not affect the quantity and quality of seed. Seeds of common bean, beet and grasses are grown well in all samples. Poor germination was observed in *Valerian*. So, cultivated plants better adapted to artificial germination than wild species.

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Физиолого-биологические особенности семенных масс растений дикой и природной флоры

О.Е. Пюрко, Л.Н. Намлиева, З.Г. Писанец

Статья посвящена проблемам прорастивания семян при различных концентрациях солей как представителей культурной, так и природной флоры. Изучение особенностей семенных масс растений дикой и культурной флоры показало, что за семь дней проросло 56 % семян, за 10 дней – 44 %, за 12 дней – 11 %. У *Beta vulgaris*, *Avena sativa* и *Valerian officinalis* больше всего семена проросли в воде – 38 %. У *Secale cereale*, *Triticum durum*, *Hordeum vulgare*, *Phaseolus vulgaris* наибольшее количество семян проросло в 0,1 % растворе (NaCl) – 62 %, и ни у одного растения, семена которых прорастивались в 0,2 % растворе соли (NaCl), показатель не был выше, чем показатели в образцах с водой и 0,1 % растворе (NaCl). По результатам можно констатировать, что 0,1 % раствор соли (NaCl) и вода влияют на скорость прорастания семян, но не влияют на количество и качество семян.

Ключевые слова: семена, дикая и культурная флора, засоление.

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