Разница между исходным и сложившимся состояние после воздействия –0,2%. Согласно принятой классификации переход состояния экосистемы р. Самара во вторую категорию соответствует начальной стадии деградации экосистемы здесь нагрузка превышает базовый фон в 1,4-2,0 раза.

Переход реки Самары в районе поступления шахтных вод в категорию три соответствует стадии структурных перестроек в экосистеме. Воздействие превышает базовый фон в 2,3-4 раза.

Задача заключается в удержании экологического состояния р. Самара в таком состоянии, чтобы граница между уровнями интегрального показателя не выходила за установленные пределы. Экологические нормативы на предполагаемые воздействия, должны быть определены по области критического перехода 15-28%.

Литература

1. Бобылев Ю.П. Оцінка стану іхтіофауни р.Самара Дніпровська (1970-2010).Тр.Компл.експ.ДНУ, - Днепропетровск:ДНУ, 2011.- 8 с.
2. Вайнерт Э. и др. Биоиндикация загрязнений наземных экосистем. - М.: Мир, 1988. -350 с.
3. Воробейчик Ю.П., Садыков О.Ф., Фарафонтов Н.Г. Экологическое картирование техногенных загрязнений назеемных экосистем (локальный уровень). - Екатеринбург: Наука, 1994. -280 с.
4. Гриб И.В. Концептуальні положення екологічної оцінки та оздоровлення порушених річкових систем // Екологія та ноосферологія №1-2, 2001, Т. 10, С. 106-119.
5. Захаров В.Н. и др. Здоровье среды: методика оценки. -М.: Изд. центра экол. полит., 2000. -65 с.
6. Руководство по методам гидробиологического анализа поверхностных вод и донных отложений / Под ред. В.А. Абалумова. - Гидрометиоиздат, 1983. -239 с.

ECOLOGICAL AND PHYSIOLOGICAL SPECIFICITY OF *PORTULACA OLERACEAE L.* VEGETATIVE ORGANS IN CONDITIONS OF ZAPOROZHYE REGION

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Анотація. В роботі наведено еколого-фізіологічну специфічність вегетативних органів (корінь, стебло, листок) *Portulaca oleraceae L.* в умовах Запорізької області. Розкрито насіннєву продуктивність дослідної рослини, а також показано динаміку формування маси насіння *Portulaca oleraceae L.*

Introduction. Mesophyte plants struggle with overheating and salinization by means of specific morphological and anatomical alterations of individual organs, have a reduced level of metabolic processes, are characterized by increased viscosity of the cytoplasm, high content of bound water in the cell, etc. [1-13] Using this ability, especially at a young age, you can aim to change the nature of the plant and create high-yielding forms that are capable

of undergoing soil and air drought and bring in such conditions a greater yield that is of tremendous importance to humans [6-9].

The researches aim is to find out the ecological and physiological features of the vegetative organs of the mesophytic plants (*Portulaca oleraceae L.*).

The object of the study is the plants of *Portulaca oleraceae L.*, which were grown under different conditions (on saline soil and without salinization during ontogenesis).

Materials and methods of research

The material for research was going to be in the period 2016-2018. The artificial salinity level was created by the addition of a corresponding amount of NaCl (250 g per 12 kg of air-dry soil). The plants were grown in Wagner vegetative vessels at the Forest City Forestry Complex, which is located on the agrobiological complex of Melitopol State Pedagogical University named by Bogdan Khmelnytsky. Watering of plants was carried out according to the general methods [3-5]. Determination of the size of the vegetative organs of the experimental plant was carried out according to generally accepted morpho-anatomical methods [1,7], physiological characteristics were studied according to generally accepted physiological methods [1-9]. The average values obtained from at least 3 measurements are given. The average measurement error does not exceed 5%.

Results and discussion

Analysis of the data showed that the root of *Portulaca oleraceae L.* has the following structure: bark - 42.9%, peridermus - 15.25%, corneal parenchyma - 28.07%, cambium - 0.96%, wood - 3.13, xylem vessels 1 order - 2,46%, vessels xylem 2 orders of magnitude - 3,2%, vessels xylem 3rd order - 3,97%.

Our studies have shown that when salted in *Portulaca oleraceae*, the tips of the roots are damaged and drilled, and this leads to the intense appearance of lateral roots of the 2nd and 3rd orders. This changes the spatial structure of the root system, which on saline soils is located in the surface layers of the soil. NaCl salts greatly accelerate the ligation of the internal walls of the cells of the epidermis and cause their thickening. Regardless of the growth conditions of the root, the pace of their cell retention does not change. This process is a specific protective reaction aimed at creating a barrier that limits the flow of salt ions into a plant.

The study of the internal structure of the stem showed that after the action of NaCl, the plant *Portulaca oleraceae* acquired a characteristic morphological structure, and this correspond to anatomical features: the assimilation shoots sluggish, translucent, pale green; cells of the epidermis, parenchyma, parenchyma of the cortex and vascular-fibrous beams have decreased significantly in the sizes of 10-25%.

Of all organs of the plant, the leaf is most closely associated with the environment in the process of intensive metabolism - photosynthesis and transpiration, and therefore its structure is much more reflective of the influence of changing environmental conditions. Our studies have shown that the leaf is covered with a single-layer epidermis (25 mkm, that is, 1.6% of the total thickness of the leaf) on both sides, which is represented by large, thin-walled cells that are tightly pressed against each other. Compared with control of the epidermis, salinity decreased in size and was 1.2% or 23.3 mkm. Using the method Zakharevich S.F. [1] When studying the main cells of the covering tissue of the leaf, we have identified two types of cells that differ in size,

projection: I type - the projection of cells 5-6 angular, the outline of cells is straight, the corners - sharpened and stupid, the number of cells per 1 mm^2 - 240 pcs., the size of the cell along the long axis is 720 microns; S = 4800 mkm^2. Type II - the projection of cells 5-6 angles, angles - pointed and dull, the number of cells per 1 mm^2 - 150 pcs., The size of the cell on the long axis - 360 microns; S = 1200 mkm^2. Type of respiratory apparatus is anomocytic.

Under the influence of NaCl, the following abnormalities of the respiratory complexes occur: Type I - two stomata are in one polyclon cell. Outlines of the cell - straight, angles sharpened, stupid. Type II - stomata surrounded by two cells, on the one hand 6 - an angle cell, with another 5 - an angle cell. Cells with rectangular faces, with pointed and dull angles. Type III - stomata are accompanied by two cells, one of which is much larger than the other. Type IV - stomachs are surrounded by a pair of epidermal cells, whose joint walls are at right angles to the closure cells. This type of respiratory apparatus is diacitonal. It was shown that in the control plants of *Portulaca oleraceae L.* of the investigated type, the area of the periosteal holes is 7-10% higher than that of saline soils, which indicates the adaptive reactions of mesophytes to the high concentration of salts. Our studies have shown that the leaf under the action of NaCl salts became sluggish, pale green, nonliving, acquired a characteristic morphological structure, and this corresponds to anatomical features: cuticle, epidermis, photosynthetic parenchyma, aquifer spongiform parenchyma, the conductive bundle has significantly decreased in size, from ' friends appeared as a result of stress.

The seeds of *Portulaca oleraceae L.* are smooth, brilliant, black-and-brown, with a weakly marked mesh-dotted pattern. Analyzing the data on the mass of one seed and the number of seeds in plants can be traced to the pattern. In *Portulaca oleraceae L.*, in saline soils, the seeds are small, and in *Portulaca oleraceae L.* in the control are larger. And as a result of the study of real and potential seed productivity in the control and at saline. It was established that in plants *Portulaca oleraceae L*. seeds control 75% of the control, and 58% in saline plants.

We have found that the germination energy in the control is greatest when sprouting seeds in water, and the smallest - in 0.5% solution NaCl. In the saline soil, the germination energy is the smallest in water, and the largest one in 0.5% NaCl solution, because the plants have grown from such seeds, characterized by lower intensity of exchange, but are more resistant to salinity. As a result, the study of potential and real seed yields 75% of the seed; and salinity of 58%. The energy of seed germination in 0.5% NaCl solution in saline soils is the largest, as evidenced by the low intensity of exchange, but high resistance to salinity.

Conclusions

Adaptation of *Portulaca oleraceae L.* can be evaluated according to the level of variability of physiological and biochemical parameters and anatomical-morphologically adapted alterations at different levels of organization during ontogenesis, which characterize the «reliability» of a certain genotype. In this case, the productivity of the plant, as a final integral indicator, finally shows the degree of influence of the active factor on the plant, and analysis of the components of productivity, to some extent, allows you to find out the main directions and sizes of this effect. The extent of the implementation of the plant's genetic program depends to a large extent on the conditions of existence, namely the content of salts in the soil, sensitivity to the violation of which affects, as in the anatomical-morphological structure, and on the

physiological and functional features of *Portulaca oleraceae L.*

Literature

1. Захаревич С.Ф. К методике описания эпидермиса листа /С.Ф. Захаревич /Вестник Ленинградского университета. - 1954. — Серия биология, география, геология, №4. - С.65-75.
2. Злобін Ю.А. Курс фізіології та біохімії рослин /Ю.А. Злобін — Суми.: ВТД «Університетська книга», 2004.– С. 25-26.
3. Казаков Є.О. Методологічні основи постановки експерименту з фізіології рослин (монографія) /Є.О. Казаков. - К.: Фітосоціоцентр, 2000. — С. 239-251.
4. Казакова С.М. Практичний курс з ботаніки (анатомія і фізіологія рослин) / С.М. Казакова, О.Є. Пюрко, Т.Є. Христова, Є.О. Казаков, В.П. Коломійчук, Л.М. Намлієва — Мелітополь, 2006. — С. 25-62.
5. Мусієнко М.М. Екологія рослин /М.М. Мусієнко. — Київ: Либідь, 2006. — 432 с.
6. Пюрко О.Є., Мусієнко М.М., Христова Т.Є., Казаков Є.О. Екологічна диференція рослин в залежності від реалізації їх адаптивних потенціалів /О.Є. Пюрко, М.М. Мусієнко, Т.Є. Христова, Є.О. Казаков/ Науковий вісник Уманського державного педагогічного університету. - Серія «Біологія». - К: Науковий світ, 2000. - С. 87-92.
7. Castro-Diez P., Puyaravaud J.P., Comelissen J.H.C. Leaf structure snd anatomy as related to leaf mass per area variation in seedlings of a wide range of woody plant spe¬cies and types /P.Castro-Diez, J.P. Puyaravaud, J.H.C. Comelissen /Oecologia. - 2000. - V. 124. - P.476-486.
8. Ghassemi F., Kakeman A.J., Nix N.A. Salinization of land and water resources. — Wallingford, CT: CAB Intern., 1998. — 526 p.
9. Jeffree E.P., Jeffree C.E. Temperature and biogeographical distribution of species /E.P. Jeffree, C.E. Jeffree /Functional Ecology. — 1994. — Vol.8. — P. 640—647.
10. Jones H.G. Plants and microclimate: a quantitative approach to environmental plant physiology /H.G. Jones/ 2th Cambridge Univ. press. — 1992. — 296 p.
11. Pyankov V.I., Ivanovo L.A., Lambers H. Quantitative anatomy of photosynthetic tissues of plants species of different functional types in a boreal vegetation /V.I. Pyankov, L.A. Ivanovov, H. Lambers/Inherent variation in plant growth. Physiological mechanisms and ecological consequences /Eds. H. Lambers, H. Poorter, M.M.I.Van. — Leiden: Backhuys Publ., 1998. — P. 71—87.
12. Yeo A. Molecular biology of salt tolerance in the context of whole plant physiology /A.Yeo/ J. Exp. Bot. - 1998. — Vol. 49. — P. 915-929.
13. Zhu J.-K. Plant Salt tolerance/ J.-K. Zhu / TRENDS in Plant Science. — 2001. — Vol. 6, №2. — P. 66-71.