мінімізація розмірів підземних пагонів. Висхідна гілка одновершинної кривої розвитку довжин міжвузлів у дослідних рослин була коротшою, ніж низхідна. У контрольних рослин навпаки – висхідна довга, а низхідна коротка. Це свідчить про те, що морфогенез кореневища дослідних рослин був пришвидшеним. Кореневища з чистого ґрунту у перший рік росту галузились до 2-3 порядків, але не міняли свого напрямку росту – з підземного га надземний. Кореневища рослин *C. hirta*, які росли на нафтозабрудненому ґрунті навпаки галузились до 1 порядку, але їх плагітропний ріст продовжувався недовго і скоро міняв свій ріст на ортотропний. Під впливом нафти зменшувалась довжина горизонтальних пагонів, які завершили свій діагеотропний ріст і пагонів, які продовжували рости, за рахунок зменшення довжини міжвузлів.

Нафтове забруднення ґрунту стимулювало ріст коренів у довжину, збільшувався об'єм кореневої системи. У дослідних рослин переважали втягуючі корені, а в контрольних, навпаки, всмоктуючі корені. Утворення додаткових коренів сприяє інтенсивному тривалому кущінню, забезпечує самостійність кожного пагона, створює кращі умови вегетативного відновлення і розмноження рослин.

Таким чином встановлено, що у рослин *C. hirta*, які ростуть на нафтозабрудненому ґрунті відбуваються зміни у морфогенезі підземних органів: збільшується довжина та об'єм кореневої системи, зменшується довжина кореневищ, змінюється кількість вузлів на них, формуються вкорочені міжвузля. Це є результатуючий ефект скорочення періоду активного росту рослин і пришвидшення елементарних етапів морфогенезу.

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THE IMPACT OF SALT STRESS ON THE INITIAL STAGES OF GROWTH OF SEEDS *PISUM SATIVUM* L.

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At present, the problem of the resistance of cultivated plants to osmotic stress caused by the high content of salts in the soil is topical for the Republic of Crimea, in connection with the increasing anthropogenic impact. Peas (*Pisum sativum* L.) are the main leguminous culture in our country. Due to the fact that the peas are rather demanding for the water regime, its yield largely depends on the conditions of water supply. Low productivity of culture is due mainly to physiological reasons: high sensitivity to moisture deficiency during seed swelling and germination, slow initial growth. The first critical period in the life cycle of plants is the development from sowing to shoots. The further vegetative and reproductive development depends on that process, that ultimately influences the formation of the crop.

The purpose of our work was to study the influence of salts on the processes of pea seeds (*Pisum sativum* L., variety Arpha) swelling

To simulate osmotic stress, 15 ml of a solution with various concentrations of NaCl salts (50 mM, 100 mM, 150 mM, 200 mM) were poured into Petri dishes.

The seeds, sampled on average size and pickled in a weak solution of potassium permanganate, were soaked in aqueous solutions of NaCl with various concentrations, laid on a filter paper in cuvettes for germination. For comparison we used seeds soaked

in tap water. The cuvettes were in a TS-80M-2 thermostat. The temperature was maintained at +20° C.

The germination energy and laboratory sprouting were determined according to the requirements of National Standard GOST 12038-84. The degree of swelling was determined according to U. Ruge in the presentation of O.A. Walter et al. [2].

Morphometric parameters were assessed according to standard methods in plant physiology. The statistical processing of the results was carried out using the Student's coefficient.

As a result of studying the influence of salts on the degree of swelling of *Pisum sativum* L. seeds, the Arpha variety, we found that the processes of water supply to pea seeds were slowed down. Swelling rate in variants of 50 mM NaCl as compared with the control was reduced by 5.5%, and at a concentration of 200 mM NaCl – by 12.1%, respectively.

With increasing osmotic stress, the swelling intensity of pea seeds also decreased. If in the control the intensity of swelling reached 150.7%, then at a concentration of 200 mM NaCl this figure reached only 132.7%.

It was found that under the conditions of osmotic stress, the most intensive swelling was noted in the first 4-8 hours of seed soaking; 12 hours after soaking (the second stage of germination – preparation for cell stretching) a lag-period was observed, during which the rate of water absorption, ATP in all studied variants was not changed. In this case, the difference in the decrease in the index between the control and trial variants persisted throughout the experiment.

[1]Derkach I., [2]Bachmann G., [2]Fragner L., [1]Romanyuk N., [2]Weckwerth W.

CATIONIC AND METABOLOMIC CHANGES IN BUCKWHEAT (FAGOPYRUM ESCULENTUM MOENCH) PLANTS UNDER THE NACL INFLUENCE

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Soil salinity adversely affect the growth and development of many agricultural crops, and most importantly – their productivity. It is known that metabolic imbalances caused by soil salinity include direct ion toxicity, osmotic stress, nutritional deficiency and oxidative stress. Buckwheat as one of important alternative crops with the huge developmental potential is classified as a salt-sensitive glycophyte plant. Revealing of salt tolerance as well a salt sensitivity mechanisms would be useful for development of salt resistant varieties for important cultures and solve the worldwide problem of food security. Therefore the aim of presented work was identify molecular-biochemical changes of buckwheat plants on the cations and polar metabolites levels under NaCl impact.

Plants F. esculenthum (var.Ukrainka) were grown in the greenhouse as a sand culture with addition of ½ Hoagland-Arnone nutrient solution. After ten days (period were biomass accumulated) plants were exposed to the 100 mM of NaCl. The control variant was without NaCl. The plant material was analyzed on the 48th and 72nd hours (salt shock) and on the 7th day (salt stress) of salt influence. Identifying and quantifying polar metabolites was performed using GC- MS method, cationic contend – by ion-exchange chromatography.