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INFLUENCE OF EXOGENOUS Mg-PROTOPORPHYRIN IX AND ITS MONOMETYL ESTER ON THE STATE AND CONTENT OF PROTOCHLOROPHYLLIDE IN GREENING LEAVES OF BARLEY

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The kinetics of the protochlorophyllide (Pchlide) long-wavelength fluorescence at 653 nm and its content as well as that of Mg-protoporphyrin IX and its monometyl ester (MgPP(E)) were investigated during the greening of etiolated leaves of barley. It is shown that the intensity of Pchlide fluorescence, the content of MgPP(E) and the total Pchlide pass through transient maximum at 2, 3-4 and 6-7 h of greening, respectively. We foud that the maximumal content of Pchlde was reached when the rate of the chlorophyll (Chl) biosynthesis was maximal. The earlier passing through a maximum of the long-wavelength Pchlide fluorescence than the content of Pchlide is explained by the energy transfer from Pchlide to Chl. It is known, that the maximum rate of the Chl synthesis correlates with the light-harvesting complexes (LHC) formation. The maximal content of MgPP(E) was reached essentially earlier when the reaction centers were formed. These results coincided with the data on the regulator role of MgPP(E) and assume the idea that the course of these curves reflects different stages of the photosynthetic apparatus development.

The feeding of exogenous MgPP(E) to etiolated plant leaves greening under dim light (1.5 Wm^{-2}) does not affect the Chl accumulation in the onset of greening. However, after 5 h of greening the Chl accumulation in plants treated with MgPP(E) becomes somewhat slower. Coincidentally, the ratio of Chl *b/a* decreases under the assumption that Chl *b* accumulates slower than Chl *a* does. Seemingly, this is related to the suppression of the LHC synthesis by MgPP(E). This is not observed during the first 5 h of greening when the formation of core complexes occurs. At the same time, the treatment of leaves with MgPP(E) leads in that period to 2-fold increase of the intensity of the long-wavelength Pchlide fluorescence. The increasing of Pchlide fluorescence can be related to the promotion of the formation of new core complexes. The above-presented results give an additional evidence in favor of the regulatory role of MgPP(E) in the process of the chloroplast formation.

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THE EFFECT OF ORGANO-MINERAL NUTRITION ON SOME PHYSIOLOGICAL PROCESSES AND PRODUCTIVITY OF SUGAR BEET

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The effect of organic and mineral fertilization of the sugar beet sowings on the content of photosynthesizing pigments in the leaves, the development of assimilating surface of crops in dynamics, the yield and sugar content of root plants were studied. It has been found that leaf chlorophyll content on fertilized plots considerably exceeds the control one, the difference among these indices is slight, and it is within the range of authenticity of the experimental material obtained. It has also been shown that leaf chlorophyll content in sugar beet on fertilized plots exceeds the control one in both studied terms, but the difference

among the plots studied does not go beyond the accuracy of the experiment. A preliminary conclusion is made, that leaf chlorophyll content in the plants in plots does not depend on fertilization. Due to a high level of sun insolation in the years of investigations, leaf chlorophyll content in sugar beets during vegetative period was somewhat lower compared with average long-term data. It is due to the fact, that required amount of light energy under a high level of insolation, biosynthesis of photosynthetic pigments, namely chlorophylls, lowers and remains at the level of optimal parameters of light regime. We also studied the effect of sugar beet mineral nutrition conditions on the process of assimilating surface forming as the basis of photosynthetic potential of sown areas, which ensures the assimilation of carbon dioxide and photosynthetically active sun radiation by plants. The formation of the assimilating surface of sugar beet during the growing season is due to the level of organic and mineral nutrition. Thus, the development of a larger assimilating surface of the species was noticed at the third levels of mineral and organic system of fertilization. It has been suggested that combination of organic and mineral fertilizers had a considerable effect on yield and quality of plant roots. Analyzing yielding capacity data, one may say that the highest yields of sugar beet roots were harvested when organic and mineral fertilization system was used. Concerning the content of sugar in the sugar beet roots it was found some contradiction with yielding capacity, and it is quite natural, because during the ontogenesis even under favorable weather-climatic conditions and mineral nutrition regimes the plants cannot produce high yields and sugar content simultaneously; mostly it occurs because of insufficient photosynthetic activities of the plants and transportation of photoassimilates under field conditions, that are not always optimal for sugar beet.

EFFICIENCY OF THE USE OF CONTAINER HERBICIDE MIXTURES UNDER SPRING BARLEY AND THEIR EFFECT ON PHOTOSYNTHETIC PRODUCTIVITY OF SOWN AREAS

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Considerable infestation of fields in Ukraine requires further efficient methods to control their number, particularly for resistant species. One of the ways to overcome resistance is to use container herbicide mixtures.

The aim of our studies was to investigate the effect of herbicide mixtures (granstar at dozes of 10, 15, 20 and 25 g/ha with 2.4–D l/ha) on infestation of spring barley fields and, in particular, those of resistant species to auxin-like active herbicides, and on physiological-biochemical processes in spring barley – photochemical activity of isolated chloroplasts, net photosynthesis productivity, chlorophyll accumulation, as well as on the yield and its quality.

We have found that a combination of herbicides of two different kinds (its site of effect is enzyme of acetolactat syntaza) and 2,4–D (auxin-like herbicide) have a positive effect on controlling weeds in the fields of spring barley. The efficiency of their controlling (eliminating), and in particular for resistant species, increased as the doze of granstar in container mixtures with 2,4–D (l/ha) increased, however, it considerably influenced physiological processes in the spring barley.

Thus, with the increase of container mixtures of granstar to 20 and 25 g/ha the total green pigment content in the leaves decreases (20-30% compared with control, no herbicides applied) as phytochemical activity of isolated chloroplasts does. In general, it causes a decrease in net photosynthetic productivity and yielding capacity of the crop.

The highest indices of net photosynthesis productivity are found when container mixtures with 2,4–D of granstar at doze of 10-15 g/ha are applied. Hence, according to the