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Protein Metabolism in the Shadow of Environmental Pollution

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Abstract

In our time, environmental pollution has become large-scale and negatively affects the development of living organisms. Climate change and significant warming, rising average annual temperatures together with the widespread use of herbicides in modern agriculture have a significant impact on the metabolic processes in cultivated plants. Therefore, the study of herbicides and their compositions together with increasing temperature for growth, development, key processes of protein-amino acid metabolism in seedlings of cereals in the early stages of ontogenesis is relevant and necessary to reduce their negative impact on crops and produce environmentally friendly products.

Keywords:

produce, nvironment, development, growth.

Introduction

The effect of soil herbicide trophy of different concentrations (1.25 - 10 mg / l), elevated temperature (+ 42ºC) of different duration (5, 9, 24 hours) and their combined effect on the growth and development of seedlings of maize hybrid Lyubava in the early stages of ontogenesis (6 - 13 days of development) in model experiments. Biological experiments were performed in triplicate, experimental data were statistically processed according to Dospekhov [1] , sampling error for each statistical series did not exceed 5% of the average. Determination of protein content in plant samples was performed according to [2] , the content of free amino acids was performed according to [3] .

Inhibition of root growth was revealed, both under the action of the herbicide alone and under its complex effect together with elevated temperature,

largely under the influence of higher concentrations of trophic herbicide (5 - 10 mg / l) and prolonged temperature stress (24 hours). The growth of shoots showed some stimulation under the complex influence of both factors and their separate action, especially at low trophy concentrations (1.25 - 2.5 mg / l) and short-term temperature action (5 - 9 hours).

The effect of soil trophic herbicide (90% acetochlor) in the range of concentrations (1.25 - 10 mg / l), elevated temperature (+ 42 ° C) and their combined effect on protein and amino acid metabolism in 6 - 13-day-old hybrid seedlings was studied. Love.

In maize grain and shoots during germination, the increase in the content of water-soluble proteins under the action of the trophic herbicide was found in most of the studied variants, to a greater extent at high concentrations (5 - 10 mg / l) and in the early stages of plant development. At later stages (8 - 13 days of development) the content of water-soluble proteins in grains and shoots was slightly reduced, especially under the action of lower concentrations of herbicide (1.25 - 2.5 mg / l) (shoots). In the roots there was a decrease in the content of water-soluble proteins under the action of the herbicide (1.25; 10 mg / l), but the concentration of the herbicide 2.5; 5 mg / l led to the accumulation of water-soluble proteins in the roots.

High temperature stress (+ 42 ° C) led to a decrease in the content of water-soluble proteins in grains and roots and to some extent in the shoots of corn seedlings, especially in the later stages of plant development. But in most shoots, the increase in temperature caused an increase in the content of water-soluble proteins.

The combined effect of temperature (+ 42 ° C) and herbicide led to an increase in water-soluble proteins in grains, roots and shoots of plants, especially in the early stages (6-7 days of development) and to a greater extent under short-term temperature stress) and higher concentrations of herbicide (5 - 10 mg / l). However, in the shoots, grains and roots of corn seedlings there was also a decrease in the content of water-soluble proteins with prolonged exposure to temperature (9, 24 hours) on a herbicidal background and at later stages (8 - 10 days of germination), which could indicate both a delay in their biosynthesis due to

negative factors, and the acceleration of their decomposition processes. Changes in the content of water-soluble proteins in various organs of maize seedlings have been revealed, which may indicate a negative effect of both factors on protein metabolism in maize plants.

An increase in the content of free amino acids in the roots and germinating grains of corn was found due to the action of the herbicide alone , elevated temperature and their complex effect, especially under the action of higher trophy concentrations (5 - 10 mg / l) and longer-term temperature stress). However, the effect of the herbicide as a separate factor and its complex action with temperature stress (5 hours) led to a decrease in the content of free amino acids in the grain and in some cases under the action of the herbicide and the temperature in the roots corn seedlings hybrid Lyubava. The decrease in the content of free amino acids in the grain is consistent with the increase in the content of water-soluble proteins in the grain during germination under the action of the trophic herbicide and its combined action with elevated temperature, ie protein breakdown slows down.

Thus, it was found that prolonged exposure to elevated temperatures in combination with higher concentrations of trophic herbicide inhibits the growth, development and adaptive responses of maize seedlings in the early stages of development, which can lead to negative consequences for growing maize in the field.

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