

The viability of beech seedlings of different geographic proveniences (*Fagus sylvatica* L.) in the conditions of the "Plaiul Fagului" scientific reserve

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This study aimed to investigate the response of the three years old beech seedlings leaves to the action of heat shock (HS), as considered an abiotic stress for plant growth. Under the influence of high temperatures in plants reactive oxygen species and damage to cellular structures are induced. The effectiveness of these processes depends on the genetic specificity, the physiological state of the plants, and the dose of the stress factor. Given the complexity of the processes involved in the response and adaptation of plants to thermal stress, this poses a serious threat to plants, especially in the light of the threat from global climate change. In order to determine the response of forest species to the action of high temperatures and to monitor the state of forest health, it is important to use methods quick and precise analysis. In this sense, the electrolyte leakage, PAM – fluorimetry and chlorophyll index methods are promising, because it allows the assessment of the change in the physiological state of some tissues and organs of the plant grown in different climatic conditions. In our research, we used three years old leaves of beech collected from plants growing in the experimental plantation created in the "Plaiul Fagului" scientific reserve, Republic of Moldova. These plants represent two different geographical origins as follows: "Plaiul Fagului" scientific reserve, compartment 26C (Republic of Moldova), Strâmbu Băiuţ Forest District, UP II, compartment 76C (România). The leaf samples were treated at a temperature of 60°C for 20 minutes. Overall, the data demonstrate that the thermal tolerance of beech leaves from the local provenance Plaiul Fagului is higher compared to that from Băiuţ. The obtained results indicate that exposure to HS at a temperature of 51°C during 5 minutes on the leaves of beech seedlings leads to an immediate reaction of the photosynthetic apparatus (PA) of the leaf. Relative value of PS-2 activity after heat stress at 51°C during 5 minutes, indicate that the depth of induced damage to photosystem 2 (PS-2) depends on the HS temperature. At 24 hours after the action of HS, the difference between the reactions of leaves of different origins becomes noticeable. Before exposure to heat shock, beech leaves from different growing zones had the same yield value. After exposure to HS, the yield values fall sharply, reaching a minimum after 24 hours, and then gradually restored. The chlorophyll index made it possible to identify variant with the best integrity of the leaf apparatus the Plaiul Fagului has a chlorophyll index of 11,52 CCI and Băiuţ has 10,51 CCI.

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