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ASPECTS REGARDING THE ADAPTABILITY OF CERTAIN SPECIES OF THE GENUS *Cuphea* TO COMBINED ABIOTIC STRESS

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The aim of the research is to determine the degree of resistance of certain species of the genus *Cuphea* to high temperatures and drought. The biological material studied was represented by the genotypes: *Cuphea lanceolata* Ait. (I), *Cuphea lutea* Rose (II), and *Cuphea viscosissima* Jacq. (III). Selection at the male gametophyte level was employed as the research method, involving *in vitro* pollen viability testing on a sucrose substrate (15%), while exposure of pollen samples to a temperature of +46°C for up to 2.5 hours served as the stress factor. To gain a deeper understanding of the heat tolerance of *Cuphea* species, we also employed the conductometric method, which allows for the estimation of leaf tissue cell membrane permeability under conditions of excessive temperature. Cellular electrolyte conductivity was measured following the exposure of leaf segments immersed in deionized water to temperatures of +48°C and 100°C, relative to the control [5]. The cell membrane stability index (MTS) and the cell relative membrane injury (RI) were determined.
Pollen resistance to temperature manifested as viability varies according to genotype and the duration of exposure to stress-inducing temperatures. For species I and III, this parameter decreased significantly within 1.5 hours, dropping to 64.0% and 67.0%, respectively. Extending the duration of the stress factor to 2.5 hours caused this index to fall to a minimum level (below 5%) in some samples of species I, whereas under control conditions, the value ranged from 87.3% to 98.0%. Sample MDI 02166 stood out for maintaining a pollen viability of 66.0% after 2.5 hours. The highest sensitivity to heat stress was observed in species II, where viability dropped to 6.8% after 10 minutes, compared to 91.0% for the control. The assessment of cellular heat stability in the leaves of *Cuphea* species revealed a wide range of MTS levels. This allowed the genotypes to be divided into three groups: group I includes samples with MTS values in the 60–80% range (MDI 02147, MDI 02158,

MDI 02159, MDI 02160, MDI 02162, MDI 02167, MDI 04084, MDI 04085, MDI 02234, MDI 02172). Group II comprises samples with MTS levels between 40.0% and 60.0% (MDI 02163, MDI 02164, MDI 02165, MDI 02166), while group III includes genotypes with MTS values below 40% (MDI 02145, MDI 02172). The degree of cell membrane damage also varied significantly; the lowest RI level was observed in sample MDI02147 (I) at 9.0%, while the most sensitive was sample MDI 02234 at 80.0% (III). Evaluating the heat tolerance of *Cuphea* species using the aforementioned methods enabled the identification of genotypes with enhanced resistance; however, the results revealed only a partial consistency in their response to stress conditions. The increased variety of evaluated indices offers the possibility of selecting samples with superior potential for adaptability to combined abiotic stress.

Keywords: pollen viability, membrane thermostability, relative membrane injury.

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