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Use of in vitro culture to obtain new source material and selection of stress-resistant interspecific *Populus* hybrids

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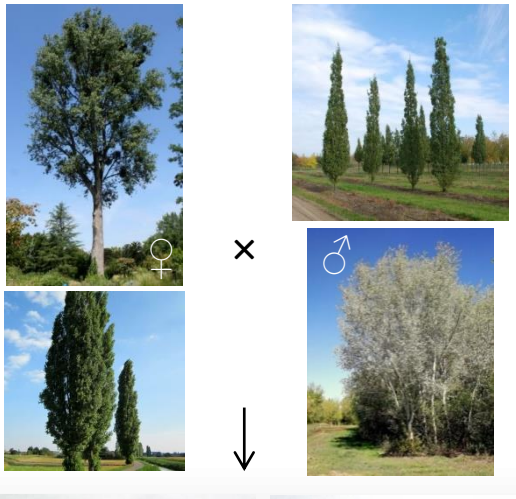
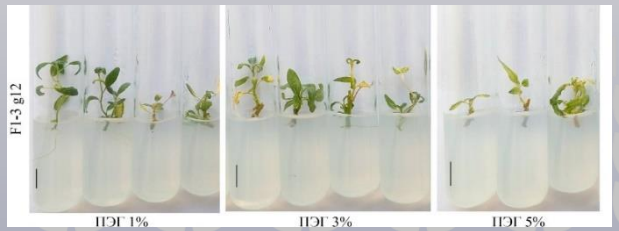
- The purpose of the study was to develop selective systems in vitro and obtain on their basis the initial breeding material of the interspecific *Populus* hybrids resistant to the modeling stress factor.

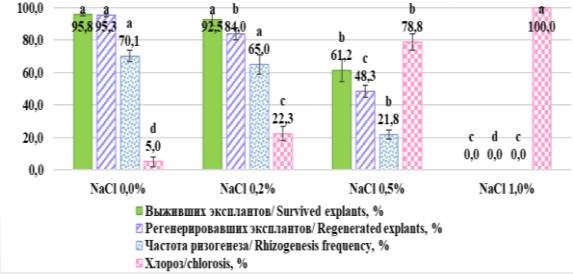
- As a selective agent for modeling osmotic stress, a polyethylene glycol with a molecular weight of 6000 (PEG) at concentrations from 1 to 7% was introduced into the medium according to the Murashige and Skoog protocol (MS). The conditions of salinization in the in vitro culture were modeled with NaCl at concentrations of 0.2; 0.5 and 1.0 %. The assessment of resistance to a selective factor was carried out after six weeks of cultivation by the number of survived and capable to regenerate explants.

- Controlled crossing the selected parental pairs (*P. bolleana* × *P. alba* (F1-2), *P. deltoides* × *P. alba* (F1-3), *P. nigra f. piramidalis* × *P. alba* (F1-5), *P. deltoides* × *P. bolleana* f. *piramidalis* (F1-7)). The obtained immature seeds were transferred to the Laboratory of Biotechnology. By the method of isolating immature embryos, the sterile culture of the *Populus* F1 genotypes received and multiplied in vitro.



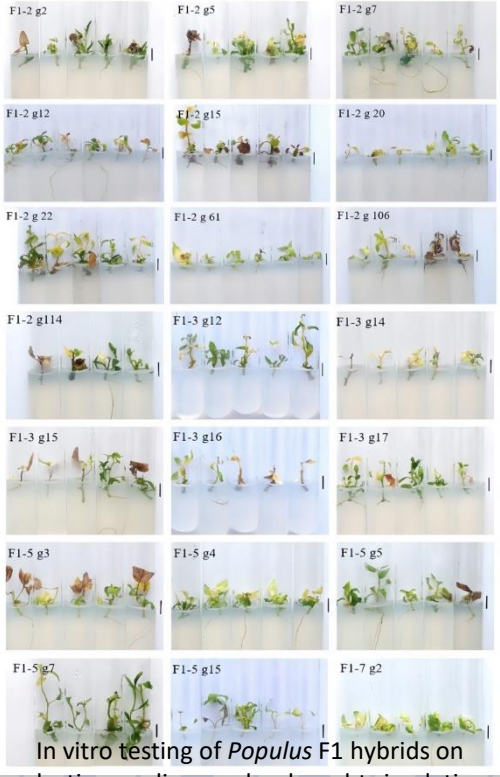


- The general patterns of the PEG and NaCl influence on *Populus* F1 hybrids' regenerants were determined, with an increase of its concentration in the media, there was an inhibit of morphogenesis processes, up to their complete stop, slowed the work of a photosynthetic apparatus and changes in the stomata cells. Adaptation reactions to the conditions of osmotic and salt stress were their ability to morphogenesis and regeneration. The selection of resistant to stress factors *Populus* F1 genotypes made it possible to determine seven potentially drought-resistant and four salt-resistant candidates for further testing in the greenhouse complex conditions and field tests.



Effect of chloride salinity on survival, regeneration and rhizogenesis rate of *Populus* F1 explants

Adapted plants in the greenhouse complex "Fitotron"



In vitro testing of *Populus* F1 hybrids on selective medium under drought simulation

Effect of sublethal concentration of PEG 3% on the viability of *Populus* F1 genotypes under simulated drought conditions in vitro

№	Genotype	Survived explants, %	Regenerated explants, %	Induction of rhizogenesis, %
1	F_1-2 g2	73,33±6,67 bcde	43,33±8,82 ef	33,33±3,33 efgh
2	F_1-2 g5	73,33±6,67 bcde	60,00±11,55 cde	53,33±6,67 cde
3	F_1-2 g7	93,33±6,67 ab	66,67±6,67 bcd	73,33±6,67 abc
4	F_1-2 g12	94,44±5,56 a	66,67±9,62 bcd	66,67±9,62 bcd
5	F_1-2 g15	16,67±0,00 g	16,67±0,00 h	83,33±0,00 ab
6	F_1-2 g20	55,56±5,56 def	33,33±9,62 fgh	44,44±5,56 ef
7	F_1-2 g22	83,33±0,00 ab	83,33±0,00 ab	16,67±9,62 hi
8	F_1-2 g61	83,33±0,00 ab	44,44±5,56 ef	5,56±5,56 i
9	F_1-2 g106	44,44±5,56 f	16,67±0,00 h	11,11±11,11 i
10	F_1-2 g114	75,00±0,00 abcd	41,67±8,33 efg	66,67±8,33 bcd
11	F_1-3 g12	87,50±7,22 ab	70,83±4,17 bc	25,00±7,22 fghi
12	F_1-3 g14	53,33±13,33 ef	46,67±6,67 def	20,00±0,00 ghi
13	F_1-3 g15	60,00±11,55 cdef	46,67±6,67 def	26,67±6,67 fghi
14	F_1-3 g16	62,50±7,22 cdef	37,50±7,22 fgh	33,33±4,17 efgh
15	F_1-3 g17	62,50±7,22 cdef	54,17±4,17 cdef	41,67±4,17 efg
16	F_1-5 g3	75,00±7,22 abcd	37,50±7,22 fgh	50,00±7,22 de
17	F_1-5 g4	93,33±6,67 ab	93,33±6,67 a	86,67±6,67 ab
18	F_1-5 g5	80,00±11,55 abc	66,67±6,67 bcd	93,33±6,67 a
19	F_1-5 g7	91,67±8,33 ab	75,00±14,43 abc	66,67±16,67 bcd
20	F_1-5 g6	92,59±3,70 ab	22,22±6,42 gh	44,44±6,42 ef
21	F_1-5 g15	53,33±6,67 ef	20,00±11,55 gh	40,00±11,55 efg
22	F_1-7 g2	73,33±6,67 bcde	43,33±8,82 ef	33,33±3,33 efgh

ACKNOWLEDGMENT

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