

INFLUENCE OF SALT STRESS ON *EX VITRO* GROWTH AND ANTIOXIDATIVE RESPONSE OF TWO *PAULOWNIA* CLONES

K. Miladinova*, K. Ivanova**, T. Georgieva*, M. Geneva***, Y. Markovska**

* Biotree, 8 Iliensko shoes str., 1220 Sofia, Bulgaria;

** Faculty of Biology, University of Sofia, 8 Dragan Tsankov Blvd., Sofia 1164, Bulgaria

*** Institute of Plant Physiology and Genetics, Bulgarian Academy of Sciences, Acad. Georgi Bonchev str., bl. 21, Sofia 1113, Bulgaria

High salinity - the most widespread abiotic stress

- Salinization can be caused by natural processes such as mineral weathering or the gradual withdrawal of an ocean. It can also be caused by artificial processes such as irrigation.
- Salinity is an important land degradation problem
- The consequences of salinity areas
- detrimental effects on plant growth and yield
- damage to infrastructure (roads, bricks, corrosion of pipes and cables)
- reduction of water quality for users, sedimentation problems
- soil erosion ultimately, when crops are too strongly affected by the amounts of salts.



Colorado - salt-affected soils are visible on the land. Salts dissolved from the soil accumulate at the soil surface and are deposited on the ground.

High salinity - the most widespread abiotic stress

Bulgaria

**35 500 ha
caused by
salinization**

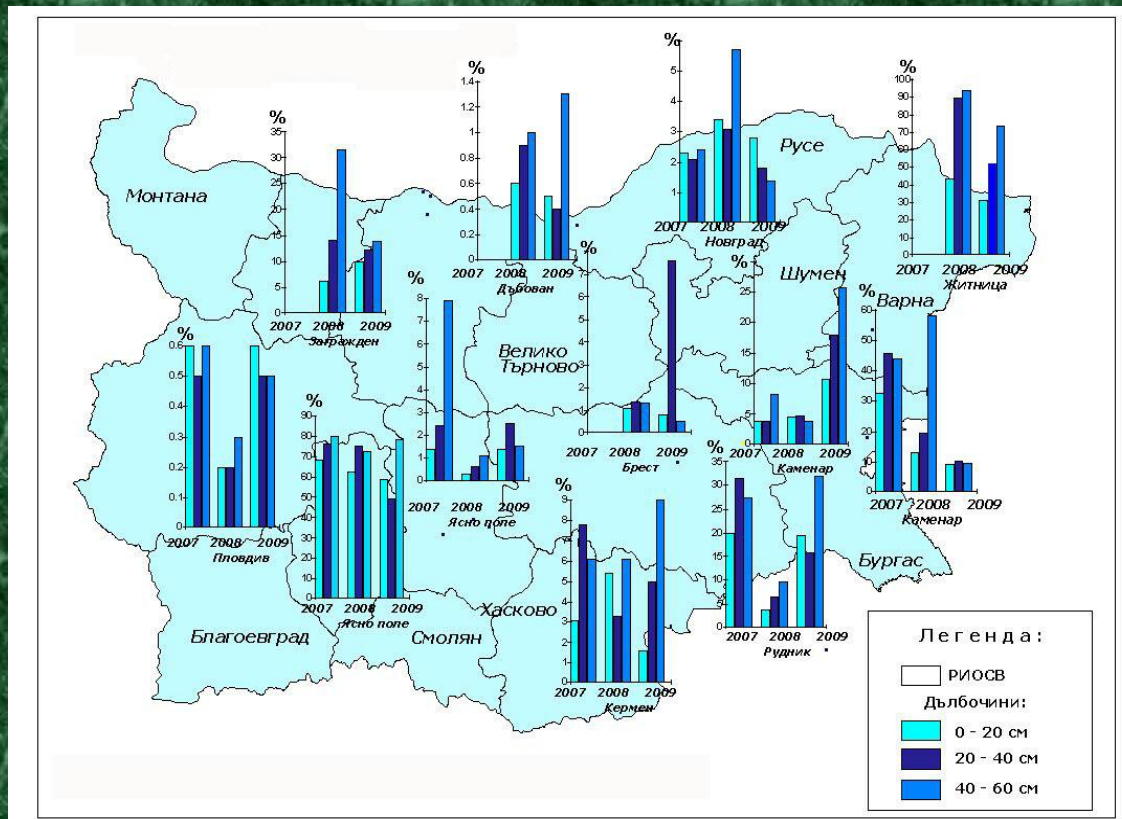
Bourgas

Varna

**Veliko Tarnovo
Pleven, Plovdiv**

**Stara Zagora
Sliven**

Yambol



- Executive Environment Agency (ExEA)

High salinity - the most widespread abiotic stress

- the most stringent factor in limiting plant distribution and productivity
- affects plant growth, metabolism and photosynthetic efficiency of crop plants
- survive - in a state of suspended metabolism.
- much efforts to be increased salt tolerance
- **PLANTS IN FUTURE**

Paulownia

- the plant of the future



- ability to uptake nitrates
- ability to uptake heavy metals
- production of energy
- paper pulp
- wooden building materials.
- high-yielding tree
- biofuels
- afforestation
- woody biomass production

Biotree Ltd., Bulgaria



"...Become a leading organization in the field of biotechnology and highly efficient technologies for "in vitro" propagation, providing the highest quality non-genetically modified planting material and satisfying in the best way the commercial and investment needs of our partners around the world."

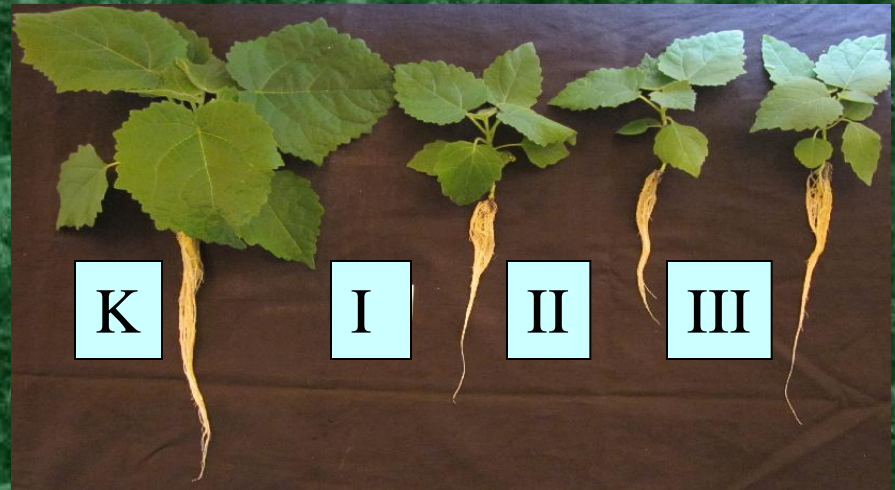
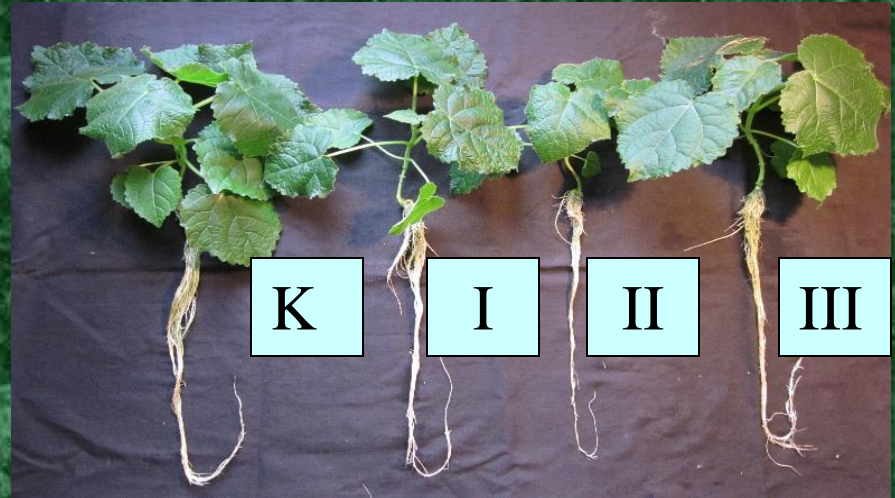
Bio Tree

**The morphological response of
Paulownia tomentosa x fortunei clone TF 01 and
Paulownia elongata x fortunei clone EF 02,
grown in hydroponic at three levels of salinity,
50 mmol/l , 100 mmol/l, 200 mmol/l NaCl was compared.**

- malondialdehyde (MDA)
- phenylalanine ammonia - lyase (PAL)
- phenolic and flavonoid contents
- secondary metabolites



Materials and methods



Results and discussion

Treatments	Root length [cm]	Stem length [cm]	Leaf number	Leaf area [cm ²]
<i>Paulownia tomentosax fortunei</i>				
Control	28.25±2.12b	8.57±0.91b	12±1.7b	429±16b
50mM/ NaCl	19.06±2.87a	6.13±0.71a	8±0.6a	126± 5a
100 mM/ NaCl	21.71±3.29a	6.53±0.64a	9±1.5a	109±22a
200 mM/ NaCl	18.31±3.56a	5.63±0.66a	11±1.5b	87± 4a
<i>Paulownia elongate x fortunei</i>				
Control	37.51±2.12b	10.51±0.51b	10±0.8a	502±39b
50mM/ NaCl	26.81±1.85a	8.41±0.33a	9±1.1a	300±40a
100 mM/ NaCl	26.71±1.61a	9.11±1.91a	8±1.2a	360±23a
200 mM/ NaCl	27.71±1.67a	10.11±1.51b	8±0.7a	321±67a

Effect of salt stress on plants growth

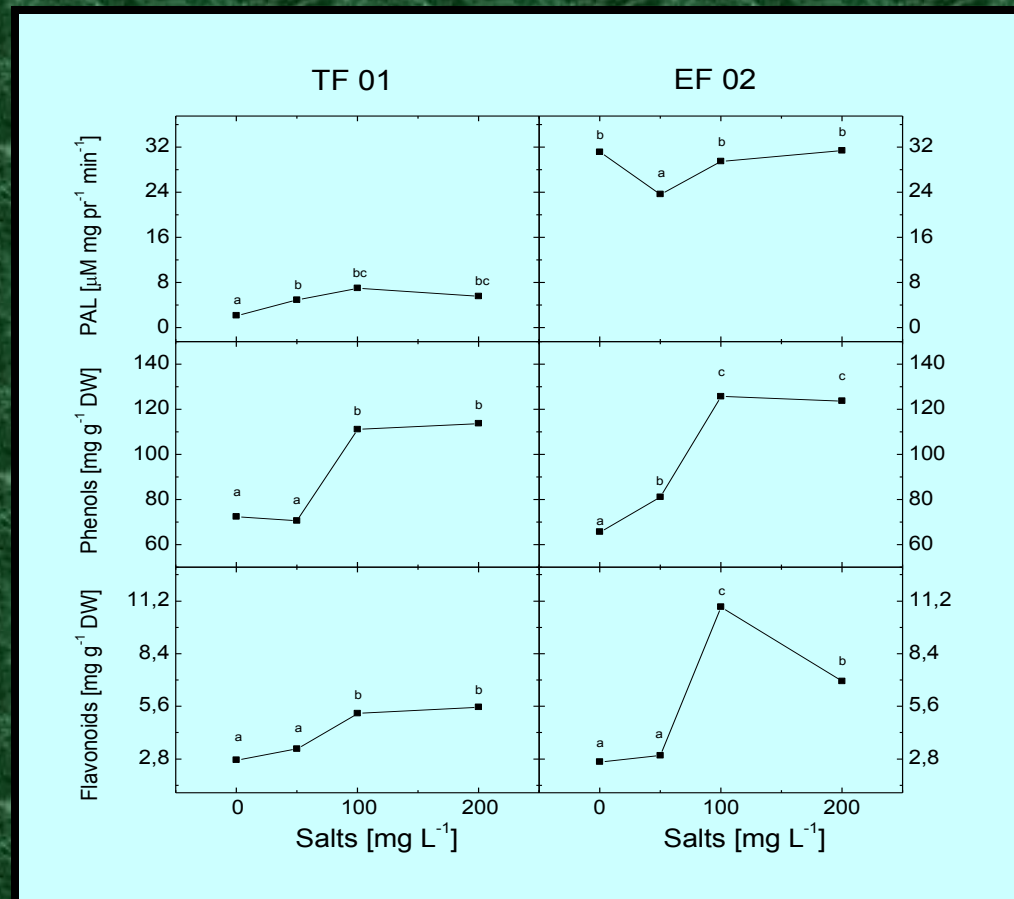
Results and discussion

Treatments	<i>Paulownia tomentosa x fortunei</i>	<i>Paulownia elongata x fortunei</i>
Control	0.017±0.000b	0.017±0.000b
50 mM/l NaCl	0.298±0.005a	0.146±0.021a
100 mM/l NaCl	0.281±0.034a	0.128±0.024a
200 mM/l NaCl	0.396±0.031c	0.191±0.013c

Effect of salt stress on plants
malondialdehyde

Results and discussion

Effect of salt stress on plants secondary metabolism.



THE TOLERANCE OF *PAULOWNIA ELONGATA X FORTUNEI* CLONE TF 01 FOR HIGH-SALINITY ENVIRONMENTS MAKES IT A POSSIBLE CANDIDATE FOR STUDYING THE MOLECULAR MECHANISMS BY WHICH PLANTS RESPOND TO SALINITY STRESS. CHANGES IN THE LEVELS OF SOME NONENZYMATIC ANTIOXIDANTS, SUCH AS PHENOLICS AND FLAVONOIDS MAY ESTIMATE FOR THEIR USE AS MARKERS OF SALT TOLERANCE IN GENETICALLY DIVERSE *PAULOWNIA* CLONES.

**THANK YOU
FOR
ATTENTION !**