UNIVERSITY OF LIFE SCIENCES
"KING MIHAI I" FROM TIMIȘOARA

"MULTIDISCIPLINARY CONFERENCE
ON SUSTAINABLE DEVELOPMENT"
25 - 26 May 2023

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ON SUSTAINABLE DEVELOPMENT"

HYDROPONIC SCREENING OF SALIX ACCESSIONS WITH POTENTIAL FOR HEAVY METALS PHYTOREMEDIATION

BUZATU-GOANȚĂ (nee HERNEA) Cornelia[1], CORNEANU Mihaela[1*], BABEANU Cristina[2], SOARE Rodica[2], IANCU Paula[2]

[1]*University of Life Sciences "King Michael I" from Timisoara,, 109 Calea Aradului, Timisoara; Romania*
[2]*University of Craiova, Romania,, 13 A.I, Cuza Street, Craiova; Romania*
*micorneanu@yahoo.com, mihaela.corneanu@usab-tm.ro

Keyword: willow, heavy metals, hydroponic experiment, phytoremediation

• Introduction

The ability of plants to accumulate heavy metals differs according to species
Willows are fast-growing species with a large capacity for sprouting and easy breeding, high transpiration rate, and a high potential for land reclamation. Native species of *Salix* were considered valuable sources of resistance genes in many breeding programs. Many researches investigated the growth performance of willow and their capability for phytoremediation. The aim of this study was to evaluate the potential of willow accessions to be used in land reclamation or as genitors in a breeding program.

Sf_P	*S. fragilis*
Sf_B	*S. fragilis*
Sp_P	*S. pentandra*
St_P	*S. triandra*

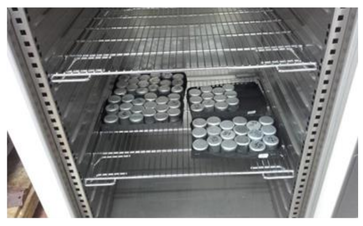
Cd_1	5 mg/l
Cd_2	10 mg/l
Cu_1	250 mg/l
Cu_2	500 mg/l
Ni_1	200 mg/l
Ni_2	500 mg/l
Pb_1	250 mg/l
Pb_2	1000 mgl
Control	

• Material and method

Plants metabolic changes were evaluated by guaiacol-peroxidase and catalase activities

Vitality classes :
1. all necrotic;
2. leaves necrotic and shoots partial necrotic;
3. low, leaves more than 50% necrotic and green shoots;
4. medium, leaves up to 50% necrotic and green shoots;
5. high, leaves and green shoots.

Biomass estimation



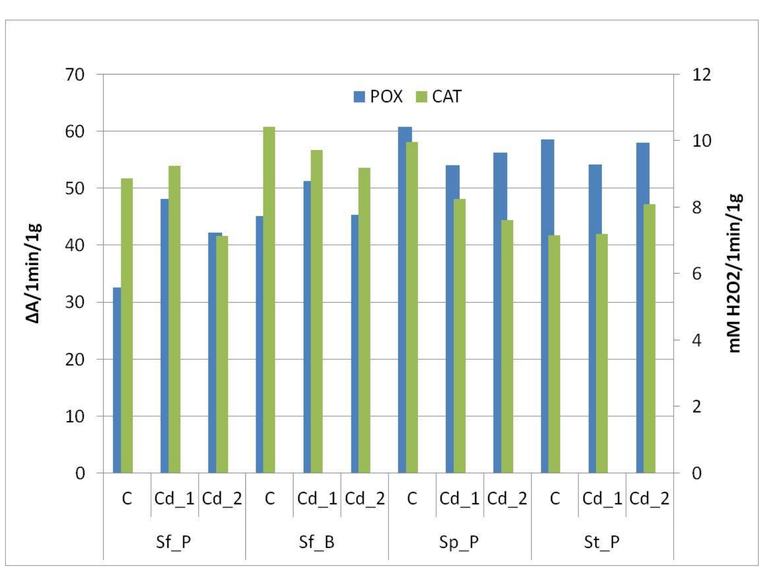
• Results and discussions

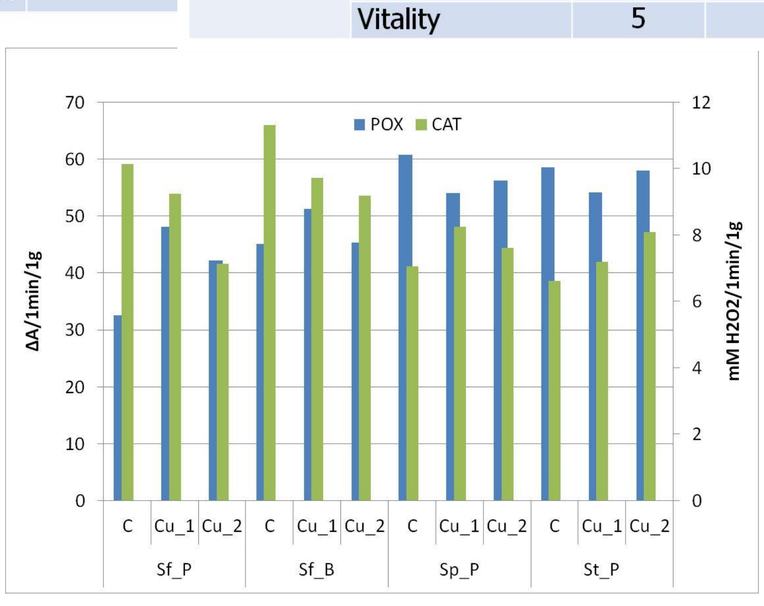
The effect of genotype and experimental variant on stool main characteristics in *Salix* sp. (Fisher Test)

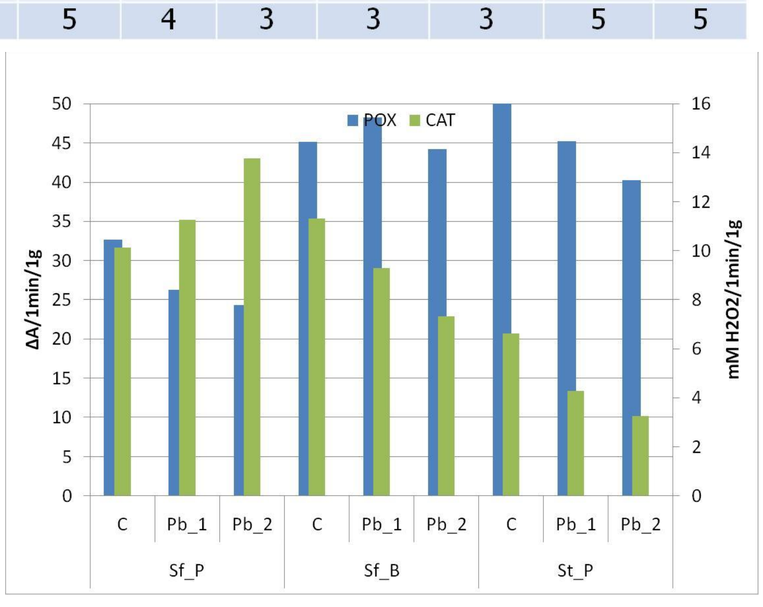
Variabile	Factor	Analysis of Variance 1- genotype; 2- experimental variant (Marked effects are significant at p < .05000		
		F	p	Significance
The percentage increase in the number of shoots	1	1.422930	0.235982	
	2	1.332255	0.226590	
	1 x 2	1.282691	0.140198	
The percentage increase in the lenght of the shoots	1	21.947560	0.000000	***
	2	9.528862	0.000000	***
	1 x 2	6.137076	0.000000	***
The percentage increase in the number of roots	1	4.268380	0.005652	**
	2	3.284458	0.001291	**
	1 x 2	4.556421	0.000000	***
The percentage increase in the lenght of the roots	1	2.702220	0.045638	*
	2	5.681693	0.000001	***
	1 x 2	4.556421	0.000000	***

SDMI (shoot dry mass index), RDMI (root dry mass index) and vitality in hydroponic heavy metal experiment

Genotype	Characteristic	Control	Cd		Cu		Ni		Pb	
			1	2	1	2	1	2	1	2
Sf_P	SDMI	2.80	2.26	2.29	1.33	1.47	1.59	1.91	2.47	2.09
	RDMI	1.08	0.50	0.41	0.74	0.78	0.47	0.44	0.86	0.53
	Ratio S/R	6.00	5.00	5.70	1.83	1.90	3.80	4.53	2.93	3.97
	Vitality	5	5	5	3	2	4	3	5	5
Sf_B	SDMI	3.63	3.20	3.01	1.58	1.97	2.03	1.60	3.65	2.51
	RDMI	0.39	0.33	0.41	0.74	1.01	0.32	0.33	0,97	0.51
	Ratio S/R	9.33	9.87	7.83	2.13	2.27	6.67	5.00	4,13	5.00
	Vitality	5	5	5	4	3	3	2	5	5
Sp_P	SDMI	4.22	1.97	2.12	1.42	1.61	1.19	1.32	2.36	1.21
	RDMI	0.65	0.30	0.50	0.50	0.64	0.16	0.16	0.70	0.21
	Ratio S/R	6.50	6.83	6.53	2.97	2.67	7.67	8.67	3.37	7.00
	Vitality	5	4	4	1	1	3	1	4	3
St_P	SDMI	2.18	3.28	3.59	2.41	1.99	1.90	2.98	4.63	4.54
	RDMI	0.15	0.53	0.59	1.02	0.93	0.46	0.40	1.17	1.23
	Ratio S/R	15.17	6.27	6.13	2.63	2.13	4.40	7.77	4.13	4.40
	Vitality	5	5	5	4	3	3	3	5	5







The variation of enzymatic activity, catalase (CAT) and peroxidase (POX) in cadmium, copper and lead

• Conclusions

- The biometric characters varied significantly with genotype and experimental variants.
- The behavior of willow cuttings varied according to heavy metal (cadmium, copper, nickel ad lead) level.
- The enzymatic activity varied according to with stress abiotic factor and also with genotype

Acknowledgement

The financial assistance from MEN UEFISCDI, Programme PN II 2014- 2017 (project no. 111 SAROSWE) is gratefully acknowledged