

The tolerance of the SRC (short rotation coppice) willows to abiotic and biotic stress in field conditions

Project PNII 111/2014: Evaluation of the productive potential, the capacity of phytoremediation and adaptability to the hydric stress of some *Salix* genotypes, in improper stations for agricultural crops – SAROSWE (www.saroswe.ro)

Corneanu Mihaela¹, Hernea Cornelia¹, Hollerbach William², Soare Marin³, Nețoiu Constantin⁴

¹ Banat’s University of Agricultural Sciences and Veterinary Medicine “King Mihai I st of Romania” from Timisoara, Faculty of Horticulture and Forestry Timisoara, Romania, e-mail: micorneanu@yahoo.com; ²REBINA Agrar SRL; Timișoara, Romania; ³University of Craiova, Faculty of Agriculture and Horticulture, Craiova, Romania; ⁴ National Institute for Research and Development in Forestry ”Marin Drăcea”, Romania

Funding: 453,335 RON (national budget) by UEFISCDI Bucharest.;
Co- funding : 68,002 RON by REBINA Agrar SRL
2014: 109,779.00 RON 2015: 84,373.00 RON
Ongoing project: 01.07.2014 – 30.09.2017

PARTNERS

COORDINATOR: Banat’s University of Agricultural Sciences and Veterinary Medicine “King Mihai I st of Romania” from Timisoara

Partner 1: REBINA Agrar SRL
Partner 2: University of Craiova
Partner 3: National Institute for Research and Development in Forestry ”Marin Drăcea”

The early stages development and further evolution of the plants during the first year are determinant for a successful SRC willow culture. The Swedish hybrids used in this study recorded very good results in the North-West of Europe (cool and moist climate), but in Romania (dry and hot summer) they did not obtain the expected results. The characterization of the *Salix* sp hybrids and clones in order to highlights the productive potential, under specific environmental conditions, is one of the project objectives.

MATERIAL AND METHODS

Seven comparative willow plantations were established in March 2015 in two different counties, Timiș (3 plantations) and Dolj (4 plantations) (Fig.1). In each plantation, 7 Swedish genotype and 7 Romanian ones (Table 1) were established in agricultural marginal land: closed ash pits (2), sandy soil (2), salty soil (1) and control(2). At the same time, with the productive feature evaluation, injurious insects and diseases were also a monitoring subject.

PROJECT OBJECTIVES

- 1.The characterization of the *Salix* sp. hybrids and clones, for the maximum valorization of the productive potential, under specific environmental conditions.
2. The establishment of a genitors collection (living gene bank) of *Salix* sp, their phenotype and genotype characterization
3. The selection of *Salix* genotypes tolerant to hydric stress.
4. Selection of *Salix* sp. genotypes for the phytoremediation process.

Table 1. Biological material

No.	Swedish genotypes	Romanian genotypes
1	Inger	RO892
2	Jörr	RO1077
3	Olof	RO1082
4	Sven	Cozia
5	Tora	Fragisal
6	Tordis	Pesred
7	Torhild	Robisal

RESULTS 2015

WP1 Biometric obseervations and characterisation of 7 comparative *Salix* sp. crops established in Banat and Oltenia area (first year of culture).

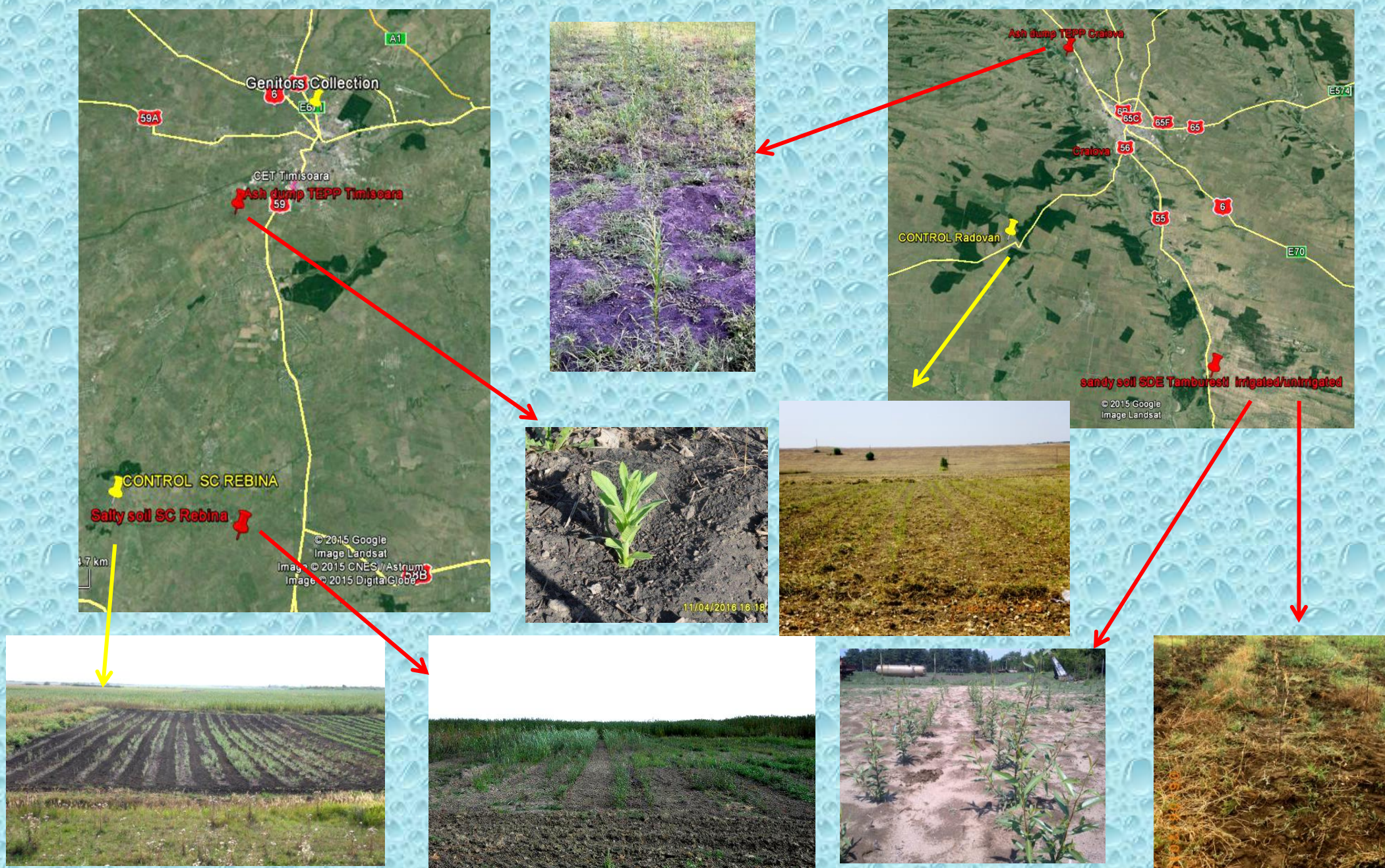


Fig.1 The locations of the 7 comparative cultures (left Banat, right Oltenia)

In the absence of irrigation, dry and hot weather in 2015 summer produced significant losses of plants, both on ash and sandy soils. The obtained results conducted to corrections in technology. Best survival percent and crop production were registered by RO892, followed by Inger. In the conditions of salinity stress best results were obtained by RO892, RO1077, RO1082, with 77 -92% survival percent and a good production, with significant positive differences in comparison with the average of the experiment. The location, as well as the genotype had significant effect on all analyzed characters (Table 2).

Table 2 Analysis of Variance. Marked effects are significant at $p < .05000$						
1 = Location 2 = Genotype						
Factori	1		2		1 x 2	
observations	F	p	F	p	F	p
%establishment	40,0902	0,000000	7,0078	0,000000	97,8945	0,000000
%survival	43,6687	0,000000	4,7093	0,000001	181,4126	0,000000
no steams/stool	7,9731	0,000355	5,4822	0,000000	4,7103	0,000000
root collar diameter(mm)	262,4348	0,000000	16,7672	0,000000	39,9357	0,000000
height (cm)	311,1439	0,000000	42,9705	0,000000	88,1116	0,000000

WP5 Pests and diseases evaluation in *Salix* sp.

Tolerance to pests and diseases was dependent on genotype, as well as by environment conditions. Diseases of shoots and leaves caused by *Marssonina salicicola*, *Pollaccia saliciperda*, *Uncinula salicis* and *Cercospora salicina* were registered. A negative impact on young shoots vitality had defoliator insects *Melasoma saliceti* L., *Orthosia stabilis* L., as well as sucking insects like different species of *Aphidae* or *Arachnida*, which frequently damage young leaves or twigs and xylophagous insects (*Scarabaeidae*, *Saperda populnea*) (Fig.2).



Fig.2 Diseases and pests observed in *Salix* sp. comparative cultures

Swedish genotypes are sensitive to *Uncinula salicis* (40-65%) and mites (15-40%). Romanian genotypes are more sensitive to *Cercospora* sp. and *Melasoma* sp. (5-45%).

WP 6 Results dissemination: 3 presented papers in national symposiums; 2 IDB publication; 1 workshop with partners, scientific comunitate and potential SRC cultivators

Final products to be obtained:

- >By selecting the most resistant and resilience genotypes (in yield trials conducted in unfavorable environmental conditions, subjected to water stress and soil pollution) there will be elaborated a **eco-technology for degraded lands**;
- >**Collection of local and European germplasm** which will be used in a breeding program, in order to obtain new hybrids, that incorporates indigenous genetic material, better adapted to environmental conditions and improved yield capacity;
- >Genetic and biochemical characterization of the genetic material from the local collection of ICAS and collected from nature, with two completions: **biomass energy and salicylic acid production**.