

BIOMASS PRODUCTION OF SOME SWEDISH WILLOW HYBRIDS ON THE WEST OF ROMANIA. A CASE STUDY

Hernea Cornelia¹, Trava Ion-Danut², Borlea Gheorghe Florian¹

¹ Banat's University of Agricultural Sciences and Veterinary Medicine "Regele Mihai I al Romaniei" from Timisoara, Romania
² SC Rebina Agrar SRL, Ghilad, Romania

INTRODUCTION

The energetic willow, with short rotation cycle and vegetative regeneration, is a ligneous and shrubby plant, having a rapid growth. From this culture, it can be obtained at least 30-40 t of usable biomass as an energy source in the form of chips, briquettes, pellets. This short rotation coppice (SRC) plantation began to be more and more interesting in many countries. A great benefit of willow SRC is that this culture can be deployed in medium fertility areas and marginal lands production. Currently, there are numerous varieties and hybrids of great production, created especially in Sweden, with high plasticity and adaptation to different climatic and soil conditions. In Romania, there has been established culture with different Swedish genotypes like Gudrun, Inger, Klara, Olof, Stina, Sven, Tora, Tordis etc. The objective of this research is to test the biomass production of Swedish hybrid willow.

MATERIAL AND METHODS

In 2012, a field trial was established in Romanesti, Timis County Romania. The trial was organized on a meadow alluvial soil of Bega River and consisted of seven Swedish willow hybrids: Gudrun, Inger, Klara, Olof, Stina, Sven, Tora, Tordis.

The field was prepared for planting in the autumn 2011 by chemical weed control and ploughing and then in spring 2012 the soil was cultivated. The field were planted with 14 cuttings from each genotype in one replication (1.4m between double rows, 0.7m between rows, 0.7m between cuttings).

To assure good results of the crop in order of a strong radicular system, growth, pest and disease resistance and high biomass production, 200 kg/ha fertilizer (N.P.K.:10.30.0.) have been applied. Chemical weed control were conducted in 2012, manual and mechanical methods have been conducted in 2013 and 2014.

Biometric observation (shoot diameter and height) have been made in 2014.

Willow SRC was harvested in winter, in the third year after establishment. Harvesting was performed using scythe mower. Then the shoots were weighed and transported to BUASVM laboratory for all determinations required.

Biomass estimation was performed at the end of the growing seasons by drying material at 1050 C, until constant weight.

Statistical analyses have been done by STATISTICA 10 soft.



RESULTS AND DISCUSSIONS

Tab. 1. Survival rate for different willow in experimental trail Romanesti, Timis County

clone	Gudrun	Inger	Klara	Olof	Stina	Tora	Tordis
Survival rate (%)	0	29	86	93	79	64	0

Tab. 2. Shoots diameter and height for different willow hybrids (media+SE), in experimental trial Romanesti

clona	diameter (mm)		height (cm)	
Inger	1,404444 ± 0,073070	c	174,7778 ± 19,53542	d
Klara	2,213125 ± 0,171997	b	302,8750 ± 31,38164	c
Olof	3,606071 ± 0,208211	a	514,8571 ± 20,57717	a
Stina	3,448824 ± 0,309944	a	416,5294 ± 37,45646	b
Tora	2,102500 ± 0,322648	b	270,0833 ± 43,15765	c

Tab. 3. Willow within-Group Correlations

Characters	clona				
	Inger	Klara	Olof	Stina	Tora
Shoot diameter (mm) – shot height (cm)	0,810195	0,922837	0,876078	0,940886	0,977250

Tab. 4. Green biomass and dry biomass for different Swedish willow clones (mean+SE), in experimental trial Romanesti

clona	Fresh biomass (kg/plant)		DM(tonne/ha)	
Inger	0,296 ± 0,110	b	1,685 ± 0,580	b
Klara	0,878 ± 0,211	b	5,220 ± 1,206	b
Olof	4,177 ± 0,630	a	20,601 ± 3,125	a
Stina	2,938 ± 1,070	a	18,277 ± 6,954	a
Tora	0,729 ± 0,292	b	11,733 ± 2,079	b

CONCLUSIONS

Results obtained in willow SRC in the experimental trial in West of Romania was not as good as we expected. Two of the tested willow hybrids did not reach with sites and all the individuals died. For others clones, there have been established significant differences ($p < 0,05$) for the biometric characters shoot diameter and height. The both characters are not very high value so the biomass production was low but except clones Olof and Stina, for these clone both biometric characters and biomass production are satisfactory.

Research was established as a screening for future experiences according with culture of Swedish willow hybrids in our country site condition.

ACKNOWLEDGMENT

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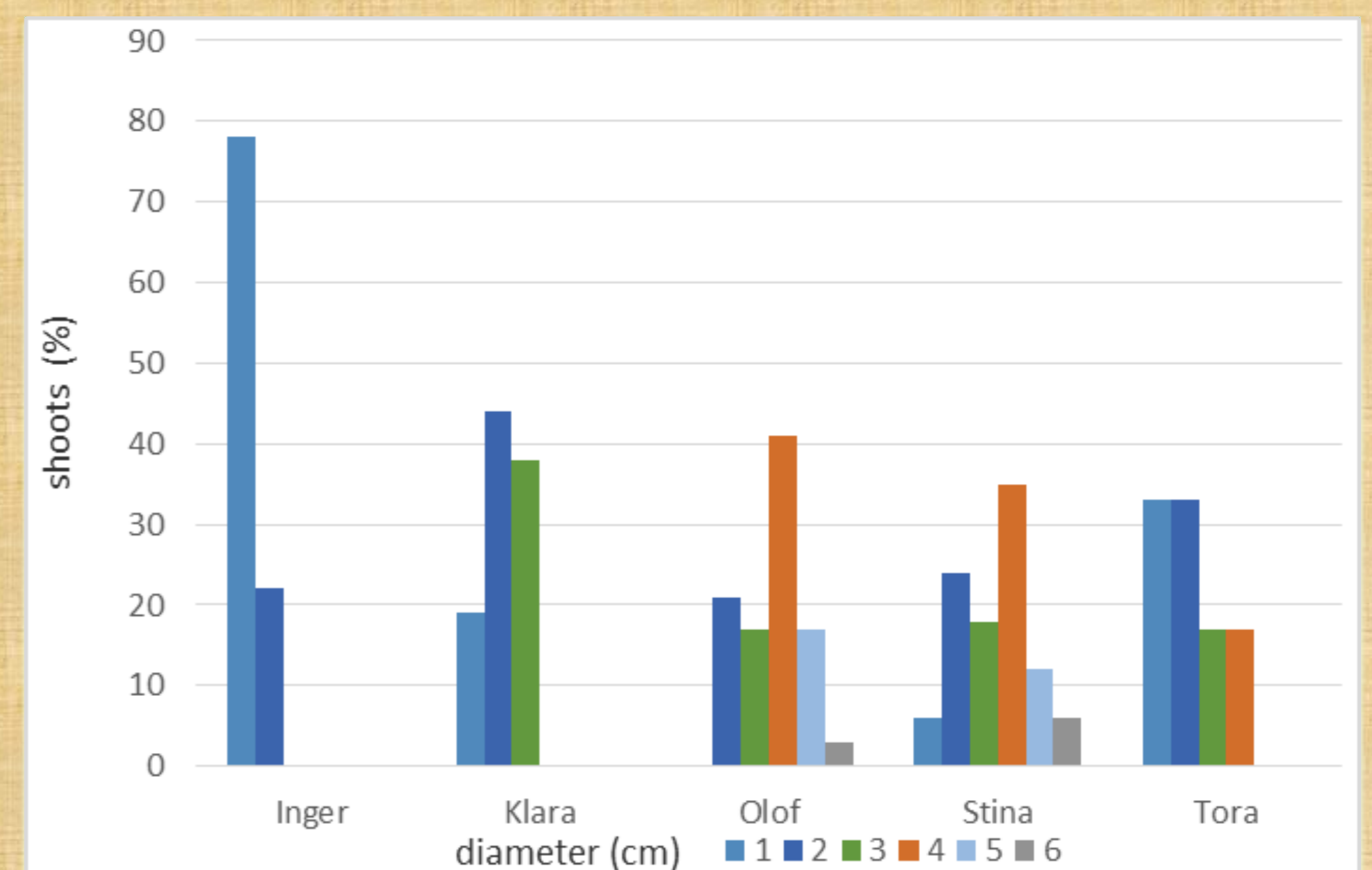


Fig. 1 Distribution of shoots per diameter classes (six diameter classes, from 1 to 6 cm, amplitude is 1 cm) for five willow Swedish clones, % from total number of shoots per clone

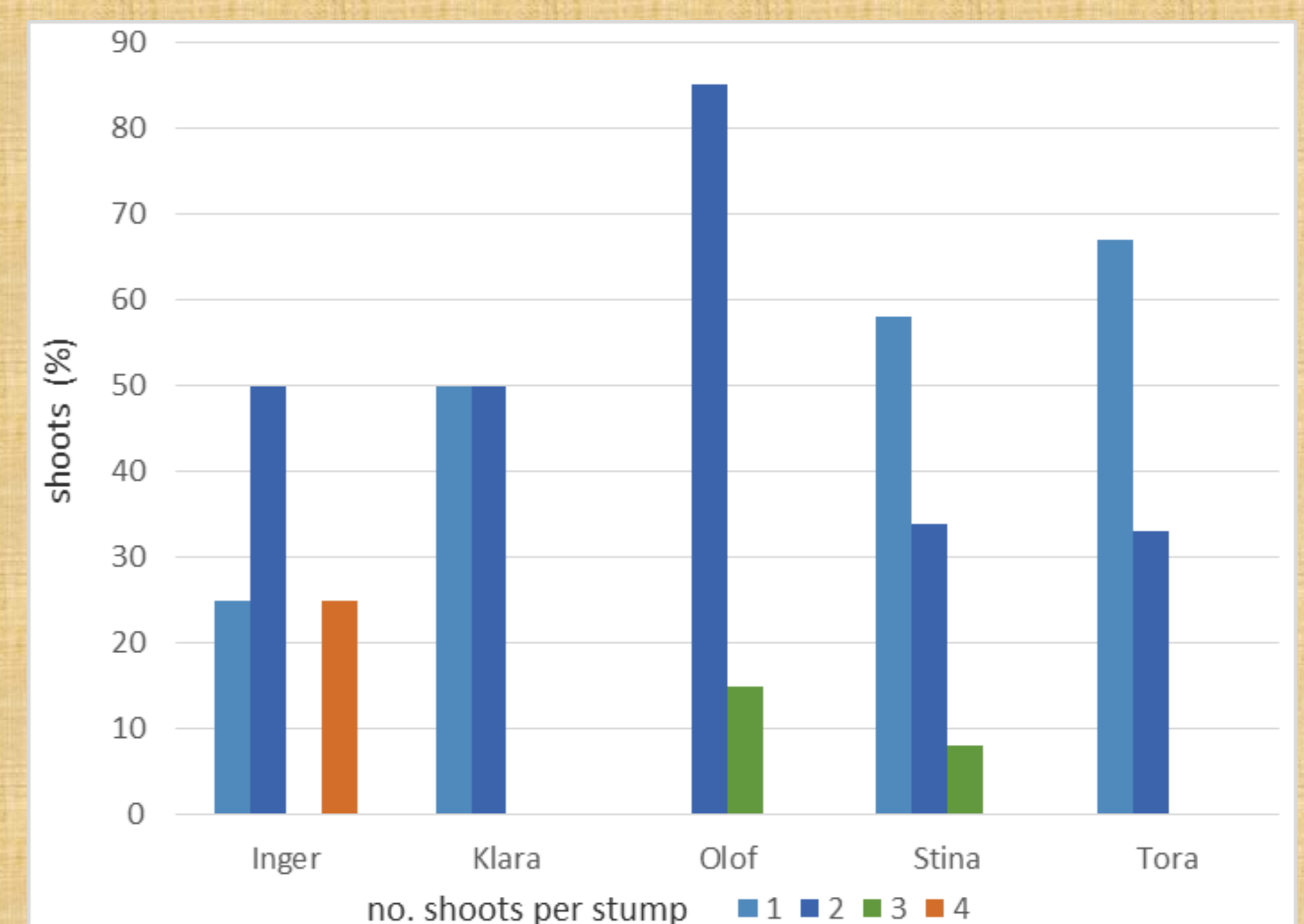


Fig. 2 Distribution of shoots per stump (four categories with 1, 2, 3 or 4 shoots per stump) for five willow Swedish clones, % from total number of shoots per clone