Biomass yield and fuel properties of different poplar SRC clones

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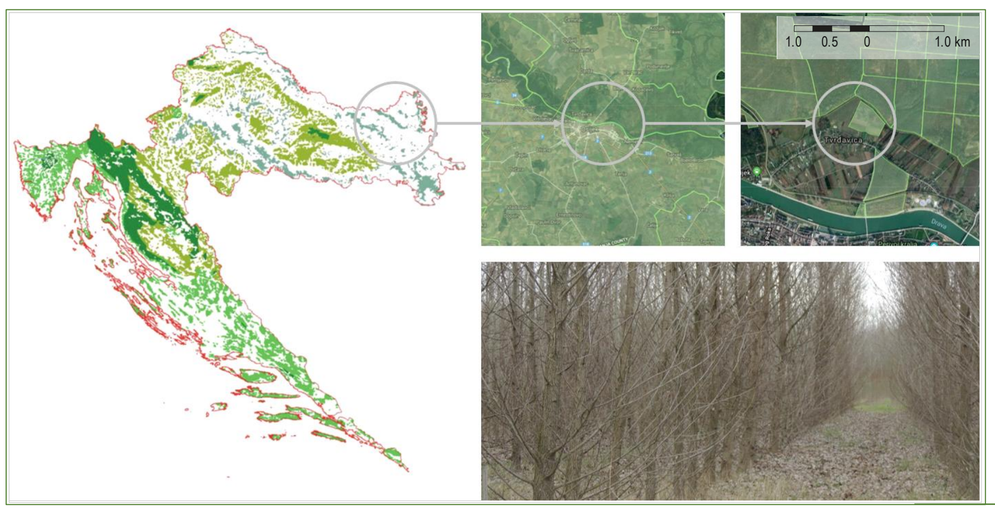


Experimental plot

- established by unrooted cuttings in the spring of 2014 in Forest administration Osijek, Forest office Darda, Forest nursery Tvrđavica (45°34'32"N (18°41'10"E)
- layout of the plot consisted of three repetitions per clone with 40 plants (4 rows x 10 plants) per repetition in spacing 3 x 1 m
- neither irrigation nor fertilization was applied
- 10 different clones

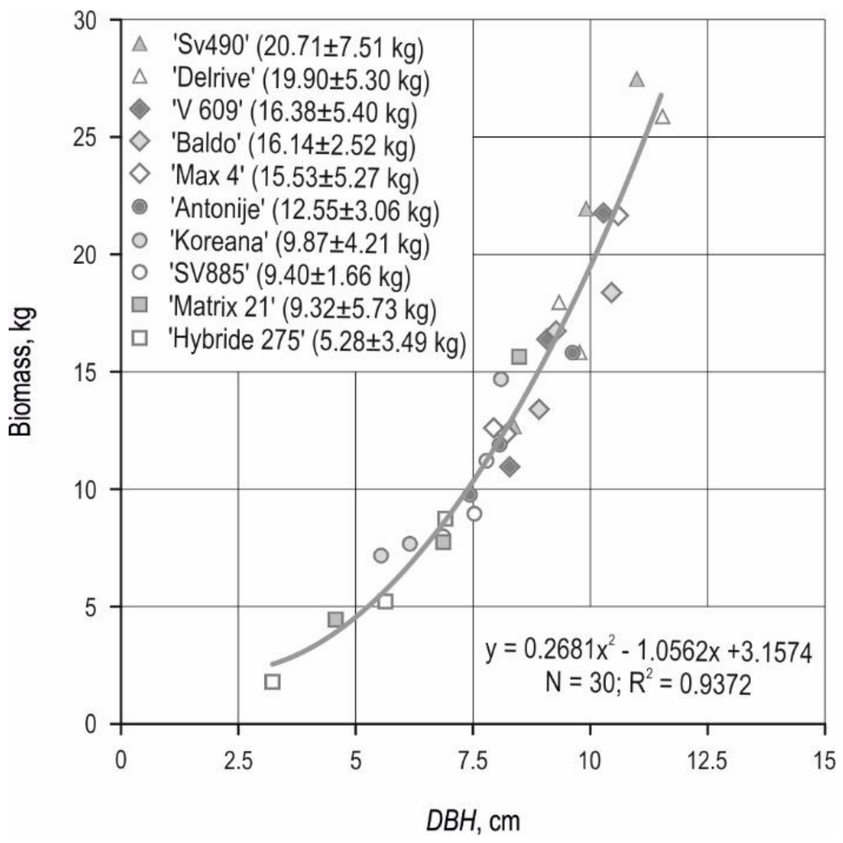
Clone	Taxon	Place of origin
'Antonije'	*P. deltoides* × *P. nigra* × *P. deltoides*	Serbia
'Baldo'	*P. deltoides* × *P. deltoides*	Italy
'Delrive'	*P. deltoides*	France
'Hybride 275'	*P. nigra* × *P. maximowiczii*	Germany
'Koreana'	*P. trichocarpa* × *P. koreana* × *P. maximowiczii*	Germany
'Matrix 21'	*P. trichocarpa* × *P. maximowiczii*	Germany
'Max 4'	*P. nigra* × *P. maximowiczii*	Germany
'SV490'	*P. trichocarpa* × *P. deltoides*	Hungary
'SV885'	*P. trichocarpa* × *P. deltoides*	Hungary
'V 609'	*P. deltoides* × *P. nigra*	Croatia

Methods

- survival rate was determined and DBH of the remaining trees was measured in the early spring of 2018
- based on the DBH distribution, one sample tree of an average DBH per repetition was selected (N = 30)
- each sample tree was felled and mass in the fresh state, root collar diameter, DBH and height was measured
- sample discs were taken from the root collar up every 1.30 m till the 3 cm minimum diameter with bark (N = 176)
- volume and mass of the sample discs in the fresh state were determined; bark was peeled from the sample discs and gravimetric analyses were performed according to the standard HRN EN ISO 18134-2:2015
- ash content was determined for bark and wood samples following the standard HRN EN ISO 18122:2015

Results

Clone	Moisture content, %	Nominal density, kg/m³	Ash content, %		Bark content, %	Average ash content, %	Survival rate, %	Biomass yield, kg/ha/year
	Average ± s.d.		Wood	Bark				
'Antonije'	54.36±0.47	373.76±9.58	0.63	6.57	20.76	1.87	77.08	8061
'Baldo'	55.81±1.80	357.85±21.92	0.74	7.88	15.39	1.84	81.25	10 927
'Delrive'	52.64±1.70	380.54±47.83	0.74	6.93	17.07	1.80	77.08	12 782
'Hybride 275'	51.59±1.96	365.07±39.43	0.68	6.58	16.92	1.68	64.58	2841
'Koreana'	52.08±0.10	386.71±56.79	0.52	6.05	19.21	1.58	52.08	4283
'Matrix 21'	52.97±3.51	389.57±35.55	0.60	6.19	16.43	1.52	53.75	4174
'Max 4'	53.44±1.20	378.44±7.29	0.59	6.75	19.83	1.82	75.00	9705
'SV490'	54.32±0.88	382.95±11.62	0.67	5.76	16.79	1.52	91.67	15 819
'SV885'	55.93±1.44	433.42±59.06	0.68	5.87	21.06	1.77	91.67	7180
'V 609'	51.90±1.26	402.29±28.99	0.56	5.83	20.16	1.62	81.25	11 090



Conclusions

- high inter-clonal productivity variation stresses the importance of selection work to find the most appropriate clones with the highest productivity potential for the given area
- clone 'SV490' had the highest biomass yield potential per tree, as well as the highest biomass yield potential per hectare
- as a consequence of high bark and ash content, wood chips produced in poplar SRC established with selected clones are designated for direct transformation to energy, i.e production of densified high quality/high value solid biofuels is limited

FORMEC Hungary / Austria 2019
Exceeding the Vision: Forest Mechanisation of the Future
52 International Symposium on Forestry Mechanization, 06 - 10 October 2019
Sopron | Forchtenstein (Hungary | Austria)