

BOSNIA AND HERZEGOVINA

Poplar & Willow in Bosnia and Herzegovina

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Bosnia and Herzegovina

have placed at Northwest part of Balkan peninsula

between 42 26' and 45 15' of latitude
and between 15 44' and 19 41' longitude

is mostly mountainous country:

mountains 42%

hilly regions 24%

plains 5%

rocky terrain 29%

average height above sea level is 500 m

highest peak is at Maglić mountain with 2387 meters a.s.l.

**Whole territory of forestlands is 2. 501. 000 hectares
Approximately 50% of territory**

- commercial forests at 1.130.000 ha

- degraded forests at 841.000 ha

- bareland at 530.000 ha

natural poplar forests, estimate 4000 ha

and plantations 400 ha

natural willow forests, estimate 6000 ha

and plantations 80 ha



**length of rivers and creeks
is around 11.000 ha**



Poplar and willow in Bosnia and Herzegovina are growing at alluvial, sand soils, along rivers, plains and lower hilly regions



..habitats areas for poplars and willows are only in valleys of bigger rivers, as Drina, Bosna, Vrbas, Una, Sana, Sava and Neretva.

..with total length around 1200 km

Conservation of genetic resources

In 1997 and 1999 as a result of co-operation with colleagues from Faculty of Forestry, University of Zagreb, in areas of Sarajevo, Kakanj and Zenica, 70 black poplar trees were selected.

- all of selected trees are old, except six young trees from old coal mine in City of Kakanj



From those 65 trees more than 60 were successfully cloned (Krstinić and Kajba 1997)



In 2006, we create the first clonal archive, we used 26 natural populations of black poplar (*Populus nigra* L.) from Bosnia and Herzegovina, 11 hybrid poplars and three exotic species of poplars.



Archived populations: 1 Konjic, 2 Čapljina, 3 Sarajevo, 4 Ilići, 5 Visoko, 6 Kakanj, 7 Rudnik, 8 Bilješeva, 9 Babina Rijeka, 10 Zenica, 11 Maglaj, 12 Doboj, 13 Osanica, 14 Kopači, 15 Tegare, 16 Bratunac, 17 Lukavac, 18 Gračanica, 19 Velika briješnica, 20 Travnik, 21 Bugajno, 22 Jajce, 23 Podmilačje, 24 Krupa, 25 Toplica, 26 Banja Luka

The main aim of the project is:

- I) Preservation of the genetically diversity of the native black poplars from the area of Bosnia and Herzegovina through the archived *ex situ*.
- II) Creation of the archive *ex situ* with the purpose of reintroduction of the black native poplars in the time when they needed.



We planted a total of 6,885 cuttings: after one month 4,270, or 62.02%, were still alive, while after the second month there were 3,480 surviving cuttings (50.54%), and after the third month, 3,427 (49.77%).

The greatest mortality happened in the first and second months even though we applied every agro means to ensure survival. If, however, we exclude the hybrid poplars, the success is even lower, which can be explained by the age of the planting material and non-use of rooting stimulants. Nevertheless, the results are encouraging, and after the rooted plants grow beyond the juvenile stage, it will be possible to use them in the production of reproductive material.

From those 165 trees more than 163 were successfully Cloned.

Until we have the necessary results at the molecular-genetic level, or at the level of provenance testing, we will have to be satisfied with using the material only for local needs, without mixing it with other materials. Thus, the clones from Sarajevo will be used in the area of Sarajevo, and the clones from Banja Luka only in the Banja Luka region. We might eventually perform cautious mixing in the river basins, but with the greatest vigilance, and only in zones which are intermediate between the archived populations. We cannot even consider the possibility of random mixing until we obtain the molecular genetic results.

The material from the Rudnik population has a special position as it represents the pioneer population on the Vrtiliste mine waste deposits near Kakanj. This material should be used in the treatment of the mine waste deposit site in Kakanj, as it quickly stabilizes the soil and creates conditions suitable for the growth of native vegetation.





Situation in the field is such that one third of selected trees is destroyed or they died



Main threat to genepool of autochthonous poplars and willow is non-planned land use along rivers, regulation of river flows, sand mines, dumps and lack of Law regulation.

Systematic of poplars in Bosnia and Herzegovina

We have great diversity in forms within each of two genes (poplar & willow) and introduction of cultivates in Bosnia-Herzegovina



REVIEW OF TAXONOMY UNITS IN B&H (according Janjić):

POPLARS

Gen. *Populus* L.

Subgen. *Balsamifera* Bugala

(syn. Subgen. *Eupopulus* Dode)

Sect. 1. *Aigeiros* Duby

P. nigra L. – black poplar

- subsp. *nigra* – typical black poplar

(syn. *P. nigra* L. apud Jov. et Tuc. 1972)

- var. *nigra*

- f. *nigra*

- f. *vistulensis* (Dode) Janjić, stat. nov.

(syn. *P. vistulensis* Dode)

- f. *truncata* Jov. et Tuc.

- f. *maserica* (Jov. et Tuc.) Janjić stat. nov.

(syn. *P. nigra* var. *maserica* Jov. et Tuc.)

- subsp. *caudina* (Ten.) Bugala – hairy black poplar

(syn. *P. caudina* Ten.; *P. nigra* var. *pubescens* Parl.)

- var. *grandifolia* (Džekov) Janjić

(syn. *P. nigra* var. *pubescens* f. *grandifolia* Džekov)

- f. *grandifolia*

- f. *pseudocaudina* Janjić

- f. *torulosa* Janjić

(syn. *P. pubescens* var. *maserica* Jov. et Tuc.)

- f. *hispidula* (Bornm.) Janjić

(syn. *P. nigra* f. *hispidula* Bornm., *P. nigra* var. *calvescens* Džekov)

- var. *narentana* (Jov. et Tuc.) Janjić – hairy black poplar

- f. *Narentana* - hairy black poplar

P. nigra subsp. *nigra* x *P. cv. 'Italica'*

(syn. ? *P. parmonica* Kit.; *P. nigra* var. *media* Schur)

P. x neapolitana Ten. nm. *kakanjensis* Janjić – Kakanj poplar

(= *P. afghanica* cv. *Afghanica* x *P. nigra* subsp. *nigra*)

P. afghanica cv. *Afghanica* x *P. nigra* subsp. *nigra*

(syn. *P. x parmonica* Kit. nm. *ilidshensis* Janjić; = *P. x charkowiensis* Schroed. vel affine)

Gen. *Populus* L.
Subgen. *Populus*
(syn. **Sect.** *Leuce* Duby)
Sect. 1. *Populus*
(syn. **Sect.** *Albidae* Dode)
P. alba L. – **white poplar**
- f. *macrophylla* (Bugala) Janjić
(syn. *P. alba* var. *macrophylla* Bugala)
- f. *chenopodiifolia* Gombocz
- f. *insignis* Gombocz
- f. *gercifolia* Janjić
- f. *stenophylla* Janjić
- f. *brevifolia* Janjić
- f. *ovatifolia* Janjić
- f. *australis* Janjić

WILLOWS

Salix alba L.
var. *vitelina*
f. *pendulina*
Salix caprea
Salix cinerea
Salix elaeagnos
Salix fragilis
Salix glabra
Salix pentandra
Salix purpurea
Salix retusa
Salix viminalis

Further works in gene fond conservation

Researches on intra and interpopulation morphological variability (morphology of flower and leaf)

Researches on intra and interpopulation molecular variability (izo-enzymes and DNA)

***in situ* conservation**

***ex situ* conservation with founding second of National poplar's archive**

Establishment clonal experiments trials

Law regulations!