

Environmental applications of poplar and willow germplasm in Italy: experiences and trends.

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River restoration, rehabilitation of degraded sites, the re-establishment of forests in fluvial areas, the reversion of farmlands into natural forest areas through cereal-surplus reduction policies have all become common goals for central and regional government agencies at a European level. This has greatly increased the importance of poplar and willow in a field that is different from traditional intensive cultivation (i.e. poplar cultivation and short rotation forestry).

Over the last decade the Institute has promoted and gained relevant experience on environmental applications of poplar and willow biodiversity. In co-operation with Natural parks and local State-run organizations it has carried out several pilot trials on the Po river basin testing plant materials, planting methods and cultivation techniques. Up to now over than 100 hectares have been restored in different sites.

Many were at the basis of the restoration pilot trials: promoting the use of poplar and willow in river restoration, separating areas subject to frequent erosive events from intensive agricultural cultivations, reducing the pollution of waters by introducing buffer strips, restoring flood areas for recreational purposes, promoting economical land use integrated with river restoration. As conservation efforts for river forests is a high priority in the European Union, the main aim was to contribute actively to the conservation of native poplars genetic resources on restoring floodplain forests. The European Black poplar (*Populus nigra* L.) and White poplar (*Populus alba* L.), are two of the most representative and threatened forest tree species of the old natural floodplain forests in the temperate zone in Europe. *P. nigra*, in particular, is considered to be on the verge of extinction all over Europe so that many initiatives have been undertaken since 1994 to protect its germplasm and to implement conservation strategies (EUFORGEN programme). Since in Italy *P. nigra* is in serious decline, a dynamic evolutionary process in the gene conservation strategies is underway: artificial *in-situ* conservation units are established in the restored sites with a selected pool of unrelated genotypes.

The pilot trials set up showed that native poplars and willow can be successfully used in establishing plantations in fluvial ecosystems and, generally, in damp areas or agricultural flooded areas, as they are typical pioneer species and can grow in poor soil and start the natural evolution of forests. In order to succeed with rehabilitation and avoid phytosanitary problems it is necessary to resort to forest material appropriate for the site characteristics, of good quality and of reliable origin and to ensure appropriate cultural practices over the first five years to reduce infestation by invasive weed species.

In order to improve the *in-situ* dynamic conservation a network of artificial gene conservation units will be created in a short time, by means of new collaborations with rivers parks in river restoration activities and according to the conservation strategies defined within the EUFORGEN Programme. Further inventories, collection and characterization of the genotypes included in the *ex-situ* gene-banks is needed. The use of specific database and public awareness will allow to promote the environmental use of poplar and willow among the end users (riparian ecosystem managers, regional tree nurseries, farmers).

Key words: poplar, willow, *Populus nigra*, *Populus alba*, EUFORGEN, river restoration, conservation strategies, biodiversity