International Poplar Commission
Environmental Applications of Poplar and Willow Working Party Workshop meeting
June 5th - 8th, 2007, Montreal, Quebec, Canada

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

Lorenzo Vietto, Pier Mario Chiarabaglio, Giuseppe Nervo
CRA – Istituto di Sperimentazione per la Pioppicoltura
Strada Frassineto 35, I-15033 Casale Monferrato (AL), Italy
Phone: +39 0142 330 900; Fax: +39 0142 55580
e-mail: lorenzo.vietto@entecra.it; web pages: www.populus.it

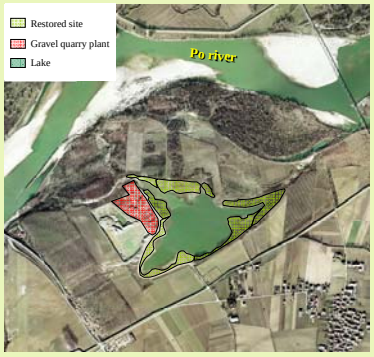
Introduction

The Poplar Research Institute in the past collected and characterized a great number of *Salicaceae;* at present it maintains about 700 genotypes of *Populus nigra*, 300 of *P.alba*, 800 of *Salix spp*. and other species, up to a total amount of 2.500 genotypes of *Salicaceae*. Using these collections the Institute has promoted and gained relevant experience on the use of poplar and willow germplasm for environmental applications. 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 material, planting methods and cultivation techniques. Up to now over 100 hectares have been restored in different sites. Some of the most relevant pilot trials are synthetically described.

The Isola Sant'Antonio case study

Site description: Private property agricultural area close to the Po river. Total surface area: 80 hectares; afforested area: 12 hectares

Causes of land degradation: Gravel quarry activities



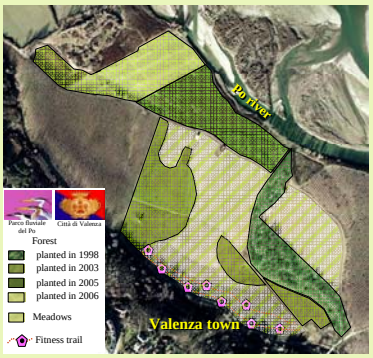
Purposes

- **to realize an example of "sustainable development" where the extractive activity is a means for funding a restoration project**
- to create a wet area for local and migratory wild bird populations
- to improve the landscape
- to promote the use of poplar and willow in the restoration of degraded sites

The Bosco di Musolino case study

Site description: Public property flood plain area, included in the Po River Park Area, close to the town Valenza; Total surface area: 43 hectares; afforested area: 18 hectares

Causes of land degradation: occasional flooding; pollution of groundwater by nitrates and residual pesticide products deriving from the surrounding areas which are intensively cultivated



Purposes

- **to create an open parkland for recreational activities and touristic exploitation**
- to improve the environmental value of a densely populated area subject to flooding
- to re-introduce *Populus nigra* and create an artificial gene conservation unit for this species
- to restore tree and shrub species no longer present because of intensive agriculture
- to raise public awareness on gene resources conservation

The Isola Colonia case study

Site description: Public property floodplain area, included in the Po River Park area. Total surface area: 30 hectares; afforested area: 19 hectares.

Causes of land degradation: flooding and pollution of ground-water by nitrates and residual pesticide products deriving from intensively cultivated rice fields.

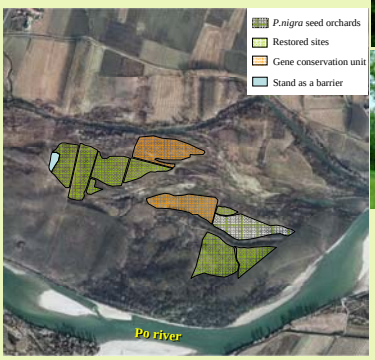
Purposes

- **to establish seed orchards of *Populus nigra* and *Populus alba* with a selected pool of unrelated genotypes**
- to test the use of poplars and willows as barriers to minimize the negative consequences of flooding on restored sites
- to separate the area from intensive agricultural cultivation introducing buffer strips
- river restoration

The Isola S. Maria case study

Site description: Public property flood plain area included in the Po River Park Area. Total surface area: 100 hectares; afforested area: 25 hectares

Causes of land degradation: continuous changes due to fluvial forces which cause erosion and sedimentation; agricultural exploitation



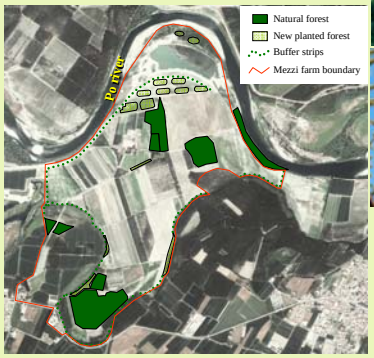
Purposes

- **to re-introduce tree and shrub species disappeared as a result of conversion to intensive agriculture**
- to defend a territory ruined by frequent erosive events
- to test sustainable sylvicultural techniques and models for inter-cropping forest tree species
- to test *P. nigra* and *P. alba* genotypes and create an artificial gene conservation unit for *P. nigra*

The Mezzi farm case study

Site description: Public property experimental area included in the Po River Park Area. Total surface area: 180 hectares; afforested area: 5 hectares forest and 4 km linear plantation

Causes of land degradation: Occasional flooding and intensive agricultural use; sandy soil with little organic matter, structureless and rich in gravel.



Purposes

- **to create buffer strips**
- to restore ancient hedgerows which support the greatest biodiversity of plants and animals
- to increase biodiversity

The Lanca di Rivarossa case study

Site description: Public/private property area included in the Po River Park Area. Total afforested surface area: 2,5 hectares.

Causes of land degradation: water pollution by nitrates and chemicals from agriculture, urban and industrial activities

Purposes

- **to create a conservation buffer strip in an agricultural landscape**
- to create ecological corridors for wildlife through dense vegetation
- to promote the environmental use of poplar and willow
- river bank stabilization

TRENDS

The results of the experience carried out show that native poplars and willows can be successfully used in establishing plantations in fluvial ecosystems and, generally, in damp areas or agricultural flooded areas. This could further increase the importance of these species in fields that are different from traditional intensive cultivation which bring about environmental benefit.

A River Ecology Centre (opening soon) will be a tool for the environmental conservation and for research on the characterization, assessment and management of river ecosystems. The Poplar Research Institute, the Po River Park and the Italian National Agency for New Technologies, Energy and Environment (ENEA) will join their efforts for the implementation of the Centre.

New inventories are necessary to collect poplar and willow native germplasm to be included in an *ex-situ* gene-bank after molecular and morphological characterization.

A specific database of native poplar and willow germplasm is under construction (FAO-Government project) which will contribute to provide valuable information to end users (riparian ecosystem managers, regional tree nurseries, farmers) on the characteristics of these species for environmental purposes.

Further river restoration activities on the Po river are planned; the aim is to improve the dynamic conservation efforts of an endangered species such as *Populus nigra* creating a network of artificial *in-situ* conservation units according to the conservation strategies defined within the EUFORGEN Programme.