

Willows for environmental applications: new opportunities for regional development in Quebec, Canada

Michel Labrecque and Traian Ion Teodorescu

Institut de recherche en biologie végétale, Montreal Botanical Garden
4101, Sherbrooke East, Montreal, Quebec, Canada

Over the last ten years, the “Institut de recherche en biologie végétale” has initiated the establishment of several hectares of willow plantations in southern Quebec with successful results. Parallel to this, demonstration projects in which willows were used for environmental applications have also been undertaken by the IRBV. Projects were conducted in urban and rural areas addressing different environmental issues, such as the treatment of aquaculture effluents, the recycling of wastewater sludge, etc. Willows have been also tested on brownfields and revealed to be efficient tools for restoration and particularly well adapted to the poor, damaged, compacted and polluted soils which characterized these sites. In some experiments, willow performance was compared to various hyperaccumulators and/or other tree species and willows were found to establish and grow in such poor conditions relatively more efficiently. They have also shown a capacity to accumulate heavy metals, Zn and Cd in particular, in their aboveground parts. To assess the potential of willows to perform on brownfields, recent research has involved the use of arbuscular mycorrhizal (*Glomus intraradices*). In an experiment where willows (*Salix viminalis*, clone 5027) were compared to a hybrid poplar clone (*Populus × generosa* A. Henry ‘Unal’), it was shown that the willow clone presented higher metal contents in stems and foliage tissues than those of the poplar. The presence of the inoculum seemed to have increased metal content in willow leaves but not in the poplar tissues. The IRBV has also conducted studies on the use of willow branches to construct living noise barriers along highways in urban areas. These projects have been tremendously successful, as well as attracting a great deal of public attention and generating new projects and partnerships. This has had a catalyzing effect resulting in the establishment of an increasing number of willow plantations in several regions in the province of Quebec. It has also stimulated regional initiatives by private or governmental enterprises to develop new economic activities based on willows.