

IMPORTANT DEVELOPMENTS FOR SHORT-ROTATION INTENSIVE CULTURE OF WILLOW IN DIFFERENT REGIONS OF EASTERN CANADA

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The first Canadian willow production systems for bioenergy and bioproducts were established in southern Quebec in the mid-1990s. At that time, research plots of large dimensions (>1 ha) were set up with a plantation design based on a single-row system and a plantation density of 18,000 cutting ha⁻¹. Only one willow clone (*Salix viminalis* 5027) was used in these plantations. Scientific follow-up conducted over several years demonstrates that high biomass yield can be maintained even after multiple, repeated coppicing. Annual yield has been measured at the end of each growing season over the course of this study. Cumulative results over 13 growing seasons show that performances vary according to soil fertility and fertilization level, but overall annual yields between 15 to 22 oven-dried tons (odt) ha⁻¹ have been recorded. Differences observed in biomass productivity seem to be largely influenced by climatic conditions. Low rainfall during growing seasons significantly limits willow yields. In each cycle, the biomass yield increment is generally higher between the second and third growing seasons. The encouraging production results from these early experimental trials, as well as the parallel development of diverse environmental applications for willows (sludge treatment, construction of living noise barriers, phytoremediation, etc.) have created enthusiasm and stimulated the deployment of willow biomass crops in many regions of Quebec over the last 5 years. More recently, and with the support of our scientific research group, willow plantations have been established on 11 different sites (total 52 ha) distributed in four climatic zones (from hardiness zone 5 in the south to zone 2 in the Abitibi region) of the province of Quebec. Initial observations of growth parameters reveal excellent performances by *S. miyabeana* (SX64 and SX67) in most of the regions where it has been planted. In some cases, very high yields have been measured (up to 20 odt 2 years following establishment). These results suggest a promising future for the development for SRIC of willows in eastern Canada.

KEY WORDS: willow crops, short rotation intensive culture, *Salix*, growth performances

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