Hybrid poplar stem dieback the year of planting

Annie DesRochers, Ph. D., Chaire AFD

Chaire Industrielle CRSNG-UQAT-UQAM en Aménagement Forestier Durable, Université du Québec en Abitibi-Témiscamingue, 341 rue Principale Nord, Amos, Québec J9T 2L8, Canada,Tel: (819) 732-8809, Fax: (819) 732-8805, annie.desrochers@uqat.ca.

Each year, stem dieback is observed on newly planted bare-root hybrid poplars trees produced by the provincial tree nursery of Trecesson. Trees often loose more than half of their height and later develop multiple leaders, which greatly affects their quality and productivity. This study aimed at understanding the causes leading to stem dieback of newly planted poplar trees. We tested the 5 following hypotheses:

(1) Bare-root trees are lifted too early in the spring, before they are completely hardened
(2) Trees are planted too late in the spring
(3) Storage temperature is not cold enough
(4) Fertilization rate is too high, preventing them from hardening
(5) The root-to-shoot ratio of trees is too low at planting

In spring 2005, 2,430 stem cuttings from clone 915319 (clone which usually shows a lot of stem dieback) were stuck in 3 adjacent beds at the provincial tree nursery of Trecesson, Abitibi. The 3 beds were fertilized separately during the growing season (not fertilized, fertilized until July and fertilized until the end of August (the later corresponds to the usual practice of the nursery). At the end of the summer, each bed was lifted at three different times (2 weeks prior to the usual lift time, at the usual lift time, and 2 weeks after the usual lift time, under the snow). The stem of each bare-root tree was cut back according to three types of planting stock (rootstock (the entire stem removed), half-length stems, or full-length stems). The trees were then stored during the whole winter (usual storage: - 3° C warmed to +2° toward the end of spring, or stored outside in trenches). Finally, trees were planted at three different dates (as early as possible in May, in June and in July). A sub-sample of trees was destructively harvested at the end of July to measure leaf area and roots and stems biomass. Growth of trees and stem dieback were measured at the end of the first growing season. Results show that stem dieback increased with fertilization, and that the trees fertilized until July or August had to be lifted earlier in the fall to reduce it. Unfertilized trees, on the other hand, had little stem dieback, regardless of the lift or planting dates. The results suggest that fertilization in the nursery prevents the trees from hardening before winter storage.

Keywords: hybrid poplar, stem dieback, fertilization, fast-growing plantation