

Frost tolerance of black cottonwood (*Populus trichocarpa*)

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In the spring trees become sensitive to frost damage and they do not gain resistance again until the autumn. To maximize the reliability of cultivation, it is necessary to select for materials that do not give bud burst too early, i.e. they maintain the previous year frost resistance until the risk of spring frost is minimized. They must also prepare for the autumn frost through the hardening process and acquire frost resistance before the first frost of the autumn. If these conditions are not met with, it is very likely that trees get frost injuries. That is exactly what happened to many of the first cottonwood trees that were imported to Iceland in the first decades of the 20th century. Many of them were killed in a hard frost in April 1963. After that period the cottonwood clones were imported from locations with similar environment as in Iceland. Nevertheless, they have only partially experienced difficult weathers, mainly that occurred in the autumn of 1997 and spring 2003. These are the madrigals that we have chosen for this study. Twigs were collected in March 2005 from 40 trees grown in various places and were allowed to root and grow in trays during the summer of 2005. Frost tolerance was evaluated in half of these materials in the following autumn, whereas the other half is now examined in the spring 2006. Furthermore, frost tolerance tests were performed in the spring 2004 on twigs of 37 different clones from the field collection of the Forestry Service. The preliminary results indicate that there are different mechanisms the plant can use for building up and maintain its frost tolerance.