79th Forest Industry Lecture

Poplar, a fast growing wood resource – are we maximizing its use?

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Abstract

Two major international organisations provide outreach on poplar topics. The Food and Agriculture Organization of the United Nations (FAO) International Poplar Commission (IPC - http://www.fao.org/forestry/ipc/en/) and the International Union of Forest Research Organizations (IUFRO) International Poplar Symposium (IPS - https://www.iufro.org/science/divisions/division-2/20000/20800/20804/) both provide this platform. The 25th Session of the International Poplar Commission (IPC) was held in Berlin, Germany, 12 - 16 September 2016 while the IPS will have its Seventh Annual International Poplar Symposium in Buenos Aires, Argentina, 28 October – 4 November 2018. Additonally there was a 2nd conference on engineered wood products based on poplar/willow wood held in León, Spain, 8 -10 September 2016 specifically focused on innovation and increased attention for engineered wood products, in particular related to poplar, aspen and willow. In relation to this trend the European based organisation Pro-Populus was founded in 2008 and is considered the "European poplar association", as it is unique in the sense that, for the first time, it gathers growers, promoters and industrial users of poplar for the variety of uses it offers (panels, packaging, energy, etc.).

The potential of forest production in both volume and quality is key for the future of the forest-based sector. Additionaly, there is a growing impact of socio-economic parameters with a general concerned about the adequate and sustainable supply of resources. Timber, wood, lignocellulosic biomass or whatever name we give the material coming from forestry and related sectors, is an eminent renewable resource with high potential for sustainability and surely providing excellent ecosystem services for our modern society. The balance between wood material use and bioenergy use will inevitably lead to higher competition for the same resource and could evolve into a critical shortage. Vertical integration alongside a better tree and wood quality concept should lead to a more structured approach dealing with whether some wood products need to be prioritized and how we could deal with substitution of man-made (building) materials requiring more energy to be produced. This should be combined with the important option to produce green energy based on woody biomass.

The wood resource obtained from the fast growing tree species of the genera Populus and Salix is considered important to enable higher production in the future and hence selection and breeding of these deciduous trees has long since been a major part of sylvicultural and even agricultural frameworks. Furthermore, in many ways, poplar trees can be considered having the potential as the best alternative for softwood species when considering engineered wood products. The applications related to biomass for energy and other less tree quality dependent end uses should be part of an integrated approach.

For traditional products like plywood, but also structural timber, poplar or aspen are readily available. Aspen-OSB (oriented strand board) has been an established product for decades in North-America. Specific strength and stiffness are surely interesting characteristics, but the ability to select quality trees with a major impact on production yield are definitely also an asset. Today researchers are reassessing the potential of solid timber products using poplar wood. Dimensional stability and biological durability are improved using modern wood modification methods in addition to traditional treatments. In this respect both glulam and CLT (cross laminated timber) show major potential in combination with e.g. thermal modification.

Plywood and laminated veneer lumber (LVL) are still important examples of engineered products. Engineered wood product (EWP) are in general in higher demand due to many factors including diminishing old growth forests, new transformation technology and performance based building codes. Both structural and non-structural products can be envisaged. The increased use of wood based panels (WBP) is having a major impact and focuses on residuals or smaller trees with profits being realized from this lightweight hardwood resource. Alongside chips or particle based products, pulping allows for an important additional output from both WBP and paper products. In addition to softwoods, the wood from poplar trees has proven to be a good alternative for packaging based on paper, veneer or plywood products and is even more important when in contact with food. In recent years, the increased interest in bioenergy and even biorefineries has been the basis for assessing other silvicultural methodologies like short rotation coppice (SRC). Hence, selection and breeding of new poplar/willow clones should be focussed on enhanced quality for energy uses, material uses or both. Different engineered products might have a different focus based on certain properties but it remains critical that an integrated wood industry can rely on this broad spectrurm, flexible wood fibre resource.