

Poplar for Biofuels



Biofuels for the Pacific Northwest

As the fastest growing tree in the temperate region, poplar trees are a promising feedstock for transportation biofuels in the Pacific Northwest (PNW). Biofuels originate from recently living plants that can be converted into liquid fuels to power cars, trucks, and planes. When grown as a dedicated bioenergy crop, poplars will supply biomass to regionally located biorefineries producing renewable and sustainable transportation fuels that are chemically equivalent to the gasoline, diesel, and jet fuel currently in use.

Poplars are a deciduous hardwood tree, which include native black cottonwood and eastern cottonwood. Hybrid poplars are commonly found in nature and can also be created using time-tested methods of controlled pollination in a nursery. Hybrid poplar trees can be readily produced to yield desirable growth and coppicing traits and higher pest resistance for bioenergy farms.

Existing hybrid poplar varieties are being evaluated to determine which have the most desired traits for biofuel production. In addition, breeding trials are underway to create new poplar varieties for bioenergy applications.

Poplar: the ideal PNW feedstock

The fast-growing, high-yield nature of hybrid poplar trees makes them a promising feedstock for biofuels in the PNW. Poplars are highly adaptable to a wide range of sites, including those that are unsuitable for other types of crops. They resprout vigorously (coppice) after harvest, such that continuous replanting is not required. In addition, poplars require less water and fewer chemical inputs compared to other biofuel crops such as corn.



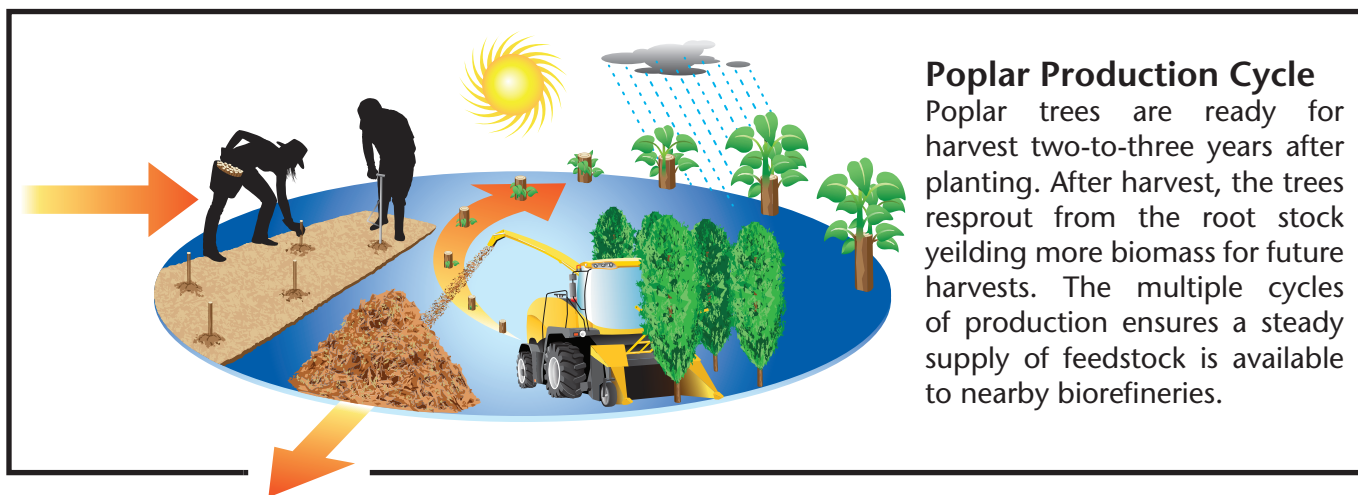
Poplars trees are a promising feedstock for biofuels in the Pacific Northwest.



After harvest, the tree sprouts multiple stems forming a coppice.



Hybrid poplar trees at a poplar demonstration site in Jefferson, OR.



Poplar Chemistry

The cellulose and lignin content of the biofuel feedstock is a crucial component for biofuel production. Cellulose is the main substance making up the cell walls and fibers of plants. The cellulose of the plant is degraded to simple sugars to make biofuels. Lignin provides the plant's structural strength and must be removed from the feedstock so that the plant's cellulose can be released. Poplars have a high cellulose and low lignin composition, making the biomass easier to convert to liquid fuels than other feedstocks.

Poplar cultivation

When establishing poplar bioenergy farms, selected poplar cuttings are planted in rows in the late winter. Growers can expect new growth to be visible a few weeks after planting. After two to three growing seasons, growers will harvest the trees using a modified-forage harvester that cuts

and chips the trees as it moves down the rows. After harvest, the poplar biomass will be sent directly to regionally located biorefineries where plant operators will convert the biomass into liquid biofuels. The remaining rootstock will be left in the field to resprout, yielding more biomass for subsequent harvests.



Looking Ahead

In the PNW, the hardwood biofuel industry is not yet at a commercial scale, so opportunities for landowners to sell hybrid poplar as a biofuel feedstock is currently limited. However, research is underway through the efforts of the Advanced Hardwood Biofuels Northwest (AHB) initiative to pull together a strong foundation for a hardwood biofuels industry, of which growers throughout the region will play an integral part. At the conclusion of the research and development process, biofuel producers will better understand where biorefineries will be sited and built, and where growers will be called upon to begin producing hybrid poplar for biofuels.

For more information contact **WSU Extension**
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hardwoodbiofuels.org

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