

growing season oilseed that matures in 80 days. It produces about 35% oil containing high Omega 3 fatty acids (34 to 36%). Camelina seed is light to bright yellow and very small (about 345,000/lb). Camelina has good agronomic characteristics. It is easy to grow and is low in input requirements (water, nutrients and pesticides). It can be broadcasted. Its oil is more stable than most of the Omega 3 fatty acids producing crops as flax, hemp and perilla.



Camelina at full pod set (~70 days after planting).

Thirty eight commercial and experimental lines of camelina were planted in Othello. Trifluralin (Treflan) was incorporated on the top 4 inches at the rate of 1 qt/a during seed bed preparation. Fertilizers were added to the experimental plot to 100 lbs N and 50 lbs P₂O₅ per acre. Yields ranged from 1790 lbs/a (BS 74) to 2745 lbs/a (cv. Robbie). Camelina can germinate on saline soil (780 ppm Na or 1.2 mmho/cm) set blooms but most of the flowers were aborted. Camelina was not tolerated Stinger (clopyralid) using to control nightshade as for canola/rapeseed. Stinger aborted camelina flowers, pods were deformed and seeds were not developed.

There are few winter camelina lines that can tolerate cold weather like winter canola. There is no information available about winter camelina in Washington. Research needs to be done to obtain information about its adaptation to Washington.

Arundo donax for Biomass Ethanol, Fiber, Carbon Sequestration

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Arundo donax is one of the highest cellulosic biomass producing plant species known, clearly capable of producing more shoot biomass per acre under irrigation than forage grasses, switchgrass, cereal straws and hybrid poplar (Fig. 1). *Arundo* has a perennial growth habit, does not produce seed under temperate growing conditions, but reproduces vegetatively from apical internodes and root corms. *Arundo* is an invasive weed in many areas of the U.S. such as California and the Southern U.S., particularly where it was introduced to control erosion along stream banks. Nevertheless, it has been successfully cultivated and controlled on arable upland plantations for woodwind reed production. Available herbicides such as glyphosate can effectively control *Arundo*. *Arundo* is a unique C₃ plant that is capable of maintaining higher photosynthetic rates than some C₄ plants. *Arundo* forms an equally impressive below ground root biomass that can potentially increase soil C sequestration. Initial baseline data on cellulose, lignin, hemicelluloses and ash composition, and biomass yields in south Columbia Basin have been collected. Based on these results and initial papermaking pilots conducted at UW, *Arundo* is a very appealing pulp fiber source for the PNW paper industry.

Two stands of *Arundo donax* have been established at Prosser WA. The first stand of 63 ft x 81 ft was established in March 2003 with stems and rhizomes collected from California. It was observed that a much higher percentage of rhizomes sprouted compared to the stems. A second larger stand (160 ft x 160 ft) was established in May 2006 using all rhizomes from California. Incomplete stand establishment was due to the presence of non-viable rhizomes and the late planting date. Transplants were made into these areas in an attempt to fill in the stand. This second stand was set up to establish plots for examining planting density, water and nutrient variables, as well as herbicide control treatments. The 2006 planting was established with two in row spacings (18 and 36 inches). In 2007, two irrigation regimes were imposed with half of the plots receiving replacement irrigation at 100% and half receiving 66% of replacement. First year yields have ranged from 2 to 11 tons/acre, second year

yields have ranged 12 to 22 tons/acre, third year 15 to 25 tons/acre. *Arundo* stands remain intact through harsh winter conditions, and when harvested, will re-grow in the spring.

Future research will examine the physiological and genetic basis for its extraordinary biomass yields, and whether these traits are transferrable to other crop species. We will be watching for potential pathogens and insects in long term plantations. Thus far, we have observed little susceptibility in small plots of young plantations, increased pest pressures are likely in older and more widespread plantations. We will define proper agronomic management practices, and evaluate *Arundo* for potential carbon crediting for carbon sequestration.

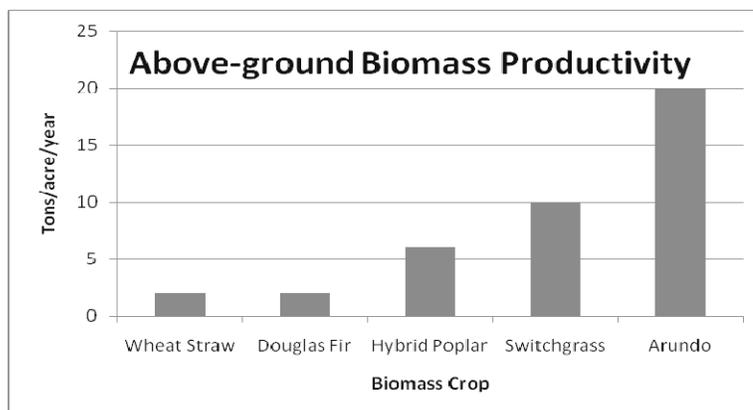


Figure 1. Above-ground biomass productivity of major cellulosic crops.

Part 2. Breeding, Genetic Improvement, and Variety Evaluation

Winter Wheat Breeding, Genetics and Cytology

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Xerpha (WA007973) SWW was approved for variety release in February of 2008. It is a selection from a cross of Eltan and Estica made in 1999. A greenhouse breeding technique called single-seed descent was used to rapidly advance this line in the greenhouse to its fifth generation in just two years. Subsequent field selection was based on yield, test weight, disease resistance, quality and general agronomics.

Xerpha is unique in that it has a very broad range of adaptation. It has been the top yielding variety in every precipitation zone for 2006 and 2007 in the WSU Extension Uniform Cereal Variety Testing Program where it was compared with 49 other varieties, breeding lines, and varietal blends from 10 other programs at 19 locations. It also performed extremely well in 2007 N. California, S. Idaho, and Oregon variety testing programs.

The 2007 WSU Variety Testing summarized HRW statewide yield results show WA007976, WA008023 and Bauermeister ranked as first, second and fourth, respectively. There were over 90,000 acres of Bauermeister produced in WA in its first year of commercial production.



'Xerpha' is named in honor of Xerpha Gaines, WSU botanist.