

Development of *Camelina* as a Northwest Oilseed Crop

Camelina sativa

- A small-seeded oilseed crop in the Mustard family.
- Relatively new, commercially, in North America.
- Water requirements are relatively low.
- Oil has good properties for biodiesel and advanced biofuels.
- Meal is high in protein and low in glucosinolates (with varietal differences).
- Residual oil in meal is high in Omega 3 fatty acids.
- Is currently a non-food crop, which is attractive to some potential oil-buyers and from a genetic engineering standpoint.
- Is closely related to *Arabidopsis* and easily transformed.



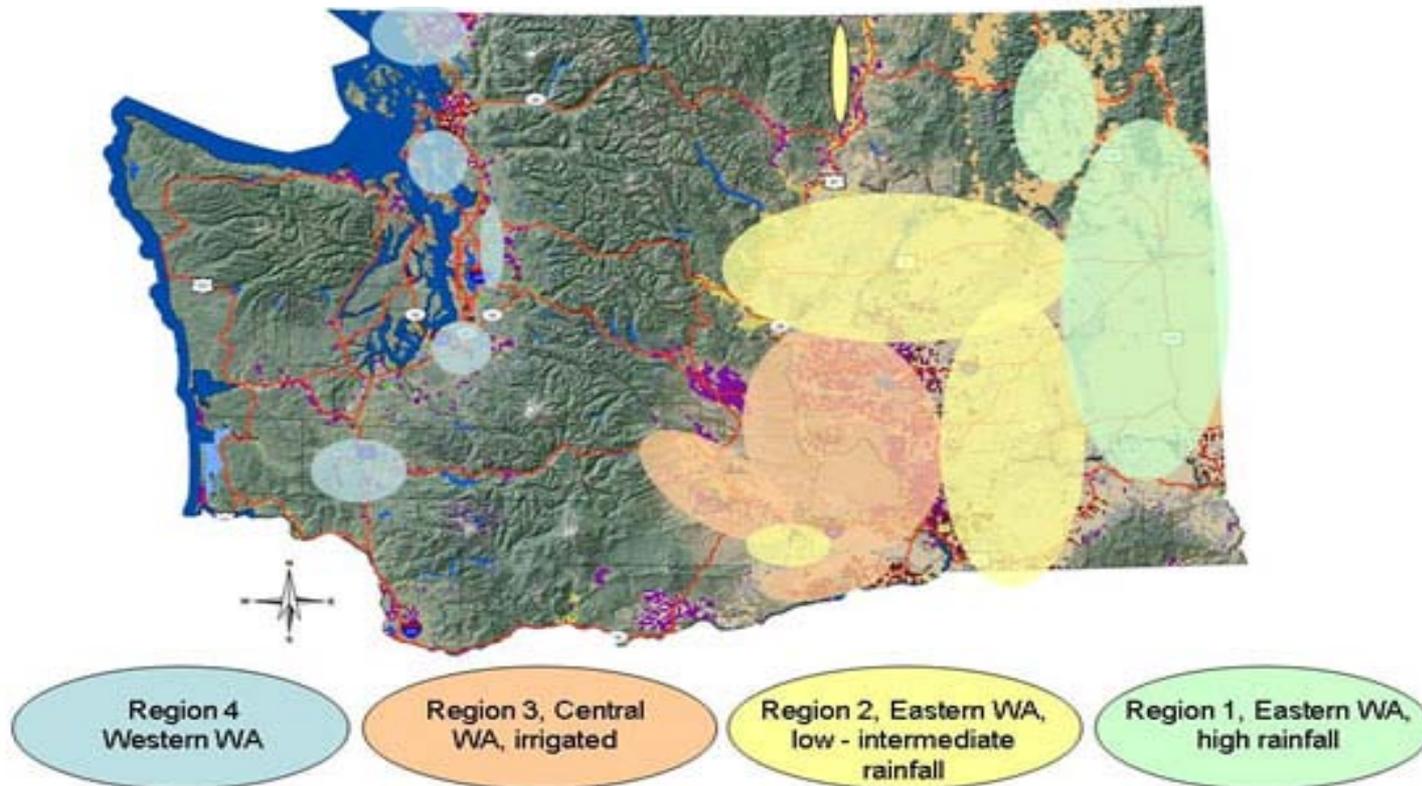
Camelina yields from 2008 to 2011 at PNW research sites

Location	Annual precipitation (in)	Number of trials or years	Yield Range (lbs/acre)	Average yield (lbs/acre)
Lind, WA	9.5	5	115-1030	600
Ralston, WA	11.0	2	760-1580	1230
LaCrosse, WA	15.5	4	1740-2000	1800
Pendleton, OR	16.5	5	1549-1756	1647
Moscow/Pullman	21.0	6	1610-3070	2300
Corvallis, OR	39.0	4	700-2200	1700



Camelina trial at Ralston

Target regions for camelina production: Eastern Washington regions 1 and 2



Camelina could make low rainfall area cropping systems more sustainable by replacing some fallow years



Most of the low rainfall region is farmed in a wheat fallow rotation

Tillage in fallow to manage weeds and seed zone moisture

Wind erosion



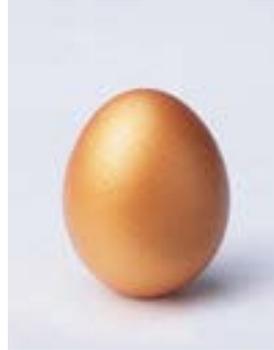
Camelina is easy to plant without tillage

Current acreage of camelina in the Northwest is very small

- Markets for oil have been few
- Markets for meal have just started
- Few farmers have experience growing Camelina



or



But demand for oil is ramping up quickly: e.g. Altair refinery, 100 MGY

Biomass Crop Assistance Program (BCAP) tried to kick-start production but got few sign-ups in WA, MT or CA (2300 acres total)

- Program was very rushed
- Crop delivery locations were not well defined
- Economics (\$45-\$100/acre/year and the \$0.115/pound) were not great
- Crop to be crushed and refined in Southern CA

Advances are needed in Genetics, Production, Marketing, etc.

E.g. Camelina is very sensitive to residual amounts of commonly used herbicides



Selection of a mutant that is less sensitive to various group 2 herbicides

Best mutation is being bred into adapted varieties and is more tolerant to imazethapyr (*Pursuit*) imazamox (*Beyond*) sulfosulfuron (*Maverick*) and flucarbazine (*Sierra*).



Sustainable Aviation Fuels Northwest (SAFN) report

ACTION “FLIGHT PATH” (some key recommendations)

- **Fund research** on oilseeds at land grant universities and ARS.
- Research **environmental, and agronomic** factors to optimize production across a diversity of Northwest climatic zones.
- **Develop improved plant cultivars** through conventional and molecular breeding techniques.
- Build practical knowledge on **optimization of rotations and production systems**.
- Develop and **gain approval for post-emergent herbicides** that can be used with camelina, possibly using current registrations among other crucifers as a guide.
- Develop low glucosinolate cultivars to **reduce barriers to a Food and Drug Administration approval** for camelina feed use for dairy cattle and aquaculture, and in higher proportions for feedlot cattle, broiler and laying chickens.
- Support **development of coproducts** including glucosinolates, biopesticides, enzymes, gums and mucilages.
- **Educate growers, industry members and a future work force**, on best practices for profitable and sustainable oilseed production.

Summary:

- Demand for vegetable oil in Northwest is growing rapidly
- Progress is being made on camelina agronomics, coproduct utilization, genetics...
- More research and extension is necessary to make camelina a major oilseed/protein crop

Funding support:

- WSDA biofuels program
- SunGrant Initiative

