Introduction
The Washington Oilseeds Cropping Systems (WOCS) Research and Extension project was initiated in 2007 with funding from the state legislature to evaluate alternative crops with the goal of dramatically increasing biofuels crop production. The breadth and scope of what the WOCS project team has accomplished in just seven years is demonstrated through both research and extension results and the impacts on oilseed production in WA state.

The Team
• 15 state faculty
• 7 USDA-ARS scientists
• 12 technicians.
• 11 graduate students
• 5 post graduate research and extension associates

Current Oilseed Research Focus
• Fertilizer timing and rates
• Fertilizer recommendations
• Benefits of multi-year rotations including oilseeds
• Canola variety performance trials
• Herbicide efficacy studies
• Residue management in dryland and irrigated canola
• Group 2 herbicide resistant camelina
• Increasing seed size of canola
• Utilizing canola as a biennial crop
• Canola as a forage and silage source
• Disease and weed control in canola and camelina
• Enterprise budgets developed for rotations including canola.

Canola Acreage - WA State 2010-2014

Key Oilseed Research Findings
Fertility
• Nitrogen (N) and sulfur requirements per unit yield are higher than wheat in eastern WA.
• Oilseed uptake efficiencies and residual N recovery efficiencies are also higher, reducing fertilizer N requirements when rotational N carryover is high.
• Root scans revealed urea fertilizer bands below canola seed can cause damage to root hairs, dieback of root apices and blackening of conductive tissues, which will be incorporated into canola N fertilizer recommendations for eastern WA.

Stand Establishment
• Stand establishment of canola in stripper header treatments was 95% compared to 50-60% in tilled fallow.
• There are multiple ways to create dominant negative mutations in the AHL gene family, all of which lead to increased seed size and longer hypocotyl length for improved stand establishment.

Genetics
• Group 2 herbicide resistant camelina lines were isolated by non-GMO methods, and will lead to a variety release in 2015.
• Oilseeds tend to have lower harvest and N harvest indices than wheat; more straw and root biomass, nutrient returns to soil per unit of grain, greater carbon and N cycling, and erosion control.

Weed control
• Alternating GM with conventional canola varieties may be necessary to avoid development of herbicide resistant weeds.

Water Management
• High water use efficiency of canola reduces irrigation water requirements.

Biennial canola
• Early seeded winter canola coupled with a legume such as peas can produce a dual forage-grain biennial canola crop.

Research & Extension Impacts
- Canola acreage has increased from 5,600 acres in 2010 to 43,500 acres in 2014 (see graph above).
- Canola production has increased from 19.4M pounds in 2011 to 76.5M pounds in 2014.
- Group 2 herbicide resistant camelina is scheduled for release in 2015.
- Revised nitrogen fertilizer recommendations specific to canola production in eastern Washington are in preparation.
- The WOCS website has been accessed in 2014 by visitors from 41 countries, 43 states and 61 cities in WA compared to 9 countries, 11 states, and 19 cities in WA in 2010.
- The WOCS team has acquired approximately $4.6 million from industry and competitive federal grant programs, WA Oilseed Commission, WA Grain Commission endowment, NSF (NSPIRE IGERT), USDA NIFA (REACCH, Sun Grant, Biofuels, Plant Health and Production).
- Since 2008, the WOCS team has produced 22 refereed journal publications, 1 patent, 10 extension publications, and 149 abstracts.
- Annual oilseed crop production workshops have evolved to a collaborative conference with the Pacific Northwest Direct Seed Association, attracting nearly 500 attendees in 2014.
- Yield data from producers and WOCS research plots were provided to USDA-RMA for establishing crop insurance for canola producers in north central WA.
- An extensive stakeholder network has been established with producers, industry, university, and agency personnel in the PNW, U.S., Canada, and Australia.

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