block with four replications. Individual plots are 30 ft wide x 250 ft long. All phases of both crop rotations are present every year (total of 20 plots). Camelina is broadcast directly into winter wheat stubble in October with an air drill and lightly pressed into the soil with an attached coil packer (Fig. 1). Of critical concern is whether we can maintain adequate surface residue during fallow after camelina to protect the soil from wind erosion. Therefore, the undercutter conservation tillage method for non-inversion primary spring tillage plus aqua nitrogen fertilizer delivery is used to optimize surface residue retention. Measurements include soil water use, weed ecology, surface residue, grain yield and, ultimately, farm economics. The WSU Biofuels Initiative provided funding to start this project.

Fig. 1. An air drill is used to broadcast camelina seed on the soil surface followed by a coil packer to press the seed into the soil.

Developing Weed Control Methods for Biofuel Crops

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Increased interest in biofuel production in the state of Washington has lead to state funding for the development of biofuel crops. However, adaptability of these crops to eastern Washington is somewhat lacking. The most common oil seed crops grown in the U.S. in 2005 included soybean (72 million acres) cottonseed (14 million), sunflower (2.7 million), peanut (1.6 million) canola (1.2 million), flax (1 million), and safflower (169,000). Unfortunately, the oilseed crops with the greatest potential for adaptability to eastern Washington production are those with the fewest acres nationally. Not surprisingly, these minor crops have few to no pesticides labeled for use in their production. Current and previous WSU research into minor oilseed crops has focused on the development of herbicides and other weed management practices for their production. Recent research on weed control for oilseed crops has included work on meadow foam, safflower, yellow mustard, canola, and sunflower. Specific studies in eastern Washington are:

Safflower: Since 1998, herbicide evaluation was done at Ritzville and Lind WA. Efficacy and crop safety studies identified the value of labeled herbicides and potentially labeled herbicides as candidates for InterRegional-4 or other labeling programs. These include herbicides which are effective in controlling grass species or particularly troublesome broadleaf weeds such as Russian thistle.

Yellow Mustard and Canola: Also since 1998, herbicides have been evaluated for potential labeling in these commodities. Generally, yellow mustard appears to be agronomically the best suited crop in eastern Washington. Research on weed management programs in winter and spring canola has included both single component and systems work. Currently, canola has a greater number of labeled pesticides than other brassica crops. Moreover, herbicide resistant (Roundup Ready, LibertyLink, and Clearfield) varieties of canola are available. Herbicide-resistant varieties have been an important part of much of the systems research currently underway.

Canola and Camelina Fertility: Review of Literature and Initiation of New Studies

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A review of existing literature reveals that canola generally requires more nitrogen, phosphorus, potassium, and sulfur per unit of yield than cereals such as wheat or barley. Due in part to a low harvest index (proportion of aboveground plant dry matter that is seed) and high nutrient concentration in the residue, canola also leaves more nutrients in the field after harvest than comparable yields of cereals. Cycling of nutrients in this residue to subsequent crops is one important rotational benefit of canola. Fertilizer rates for canola are a function of residual soil nutrient levels and the yield potential of the site. For optimum yields, canola requires approximately 6 to 8