In 2007 we began to introduce winter canola into the winter wheat-salad fallow region of north central WA of the Pacific Northwest (PNW). When we initiated our research, <100 ha of winter canola had been planted and currently >4,800 ha of winter canola are being grown in this region. Our initial studies were to determine the optimum winter canola seeding rate and date. Current and future research include variety testing, feral rye management in winter canola, and the use of high residue cereal crops and the stripper header to allow no-till winter canola planting. Planting methods, and seeding date and rate studies have reduced the risk of planting winter canola. Fourteen winter canola varieties including conventional varieties, Roundup-resistant varieties, and SU and IMI tolerant varieties are being planted in 4 to 6 winter wheat-salad fallow locations. Feral rye is a major weed infesting the wheat-fallow region. Experiments have been concluded in Okanogan and Douglas Co. examining the efficacy of Select, Assure II, and Roundup on fall rye control in winter canola. In the summer of 2011 a 6-m stripper header was purchased for research at the Ralston no-till research site. This current phase of research is investigating planting tall grass varieties and harvesting with a stripper header to increase residue and seed zone moisture and reduce soil temperatures.

**Introducing Winter Canola to the Winter Wheat-Fallow Region of the PNW**

Growers in the low-rainfall, winter wheat-fallow region of the PNW need an alternative crop to diversify markets, manage pests, and increase wheat yields. Winter canola is a viable crop option for this region. However, agronomic research for winter canola in this region had not been conducted and growers were reluctant to produce winter canola because of poor stand establishment (Figure 1) and resulting high risk.

**Winter Canola Variety Study**

From 2007 to 2011, winter canola research examined methods to improve crop establishment and optimum seeding rate and date while introducing this crop to wheat-fallow producers. However, no winter canola variety trials to determine the best varieties to plant in this region had been conducted in the winter wheat-fallow region of the PNW. Our study parameters are:

- **Locations:** Okanogan, Bridgeport, Pomeroy, Ralston, and Asotin, WA. These locations are in the low-rainfall zone with elevations ranging from 580 m to >1220 m.

- **Varieties:** Fourteen varieties are being evaluated including conventional and herbicide resistant/tolerant varieties at each location. (Figure 3).

- **Seeding:** An array of drills is available to us depending on the conditions at seeding time and includes a deep-furrow HZ drill, and a no-till AGPRO drill.

- **Data:** Cold hardness/winter survival (Table 1) was determined by recording stand counts in the fall before freeze-up and in the spring after dormancy has broken. Yield and oil content and quality will be determined.

**Herbicide Efficacy for Feral Rye Management**

Feral rye continues to plague winter wheat growers even with the introduction of IMI-tolerant wheat. A study was conducted during the 2011-2012 (Bridgeport) and 2013-2014 (Okanogan) growing seasons to evaluate Assure II, Select and Roundup for control of feral rye in winter canola.

**High Residue Chemical Fallow Following Stripper Header Harvest**

At Ralston we are investigating how crop residue and soil moisture can be increased by growing tall clover cultivars rather than semi-dwarf cultivars and harvesting them with a stripper header instead of a conventional cutter bar header. Rather than cutting the stem and running the head and accompanying straw through the combine, the stripper header has a rotor that spins at 500 to 1,000 rpm, and strips the grain from the head, leaving tall standing stubble.

**Figure 1. Poor Stand Establishment**

This study evaluated various winter canola planting dates and rates on stand establishment and yield. Research indicated that winter canola in traditional fallow, low rainfall regions, needs to be planted between August 1 and August 25 with post-plant temperatures for 5 to 7 days of ≤29 C for successful stand establishment (Figure 2) and acceptable yield (>1680 kg ha⁻¹). Canola planted in September (or very late August), unless covered by snow, either did not survive freezing temperatures or yielded <1000 kg ha⁻¹. Optimum seeding rate was 4.5 kg ha⁻¹ compared to 9.0 kg ha⁻¹ and increasing seeding rate did not improve winter survival or yield.

**Figure 2. Result of successful stand establishment.**

**Figure 3. Variety trial at Okanogan, WA.**

**Figure 4. Feral rye control in the spring after a fall application of Roundup.**

Herbicides were applied in the fall, spring, and fall plus spring. Initial feral rye density in the fall in the first experiment was 65 plants m⁻² and 410 plants m⁻² in the second experiment. Winter canola yields (2011-2012) were low not only because of the feral rye competition but also because of the late planting (first week of September) of the canola. Winter canola yields (2013-2014) were also low because of lack of precipitation and feral rye competition. In general, best weed control and canola yield was with split-applications of Assure II and Roundup (Table 2). In the second experiment weed competition was so severe (Figure 4) that canola yield in the nontreated control was zero and when herbicides were applied only in the spring yield reduction ranged from 45% to 83% compared to their respective fall + spring treatments.

**Figure 5. Stripper header stubble following harvest of winter triticale in 2013. This crop produced about 8,960 kg ha⁻¹ of residue, which was left standing after stripper header harvest through the use of chemical fallow system.**

More uniform soil moisture due to stripper header stubble has allowed no-till winter canola to establish a stand better than the conservation tillage system in our study.

**Figure 6. The peak of wind speeds 16 cm (~6 in) above the soil surface in tilled fallow, just over 5 m/s (~11 mph), is noticeably higher than the maximum speeds measured in the stripper header stubble where speeds over 1 m/s (2.2 mph) were rarely reached.**

**Figure 7. Well-established winter canola that was direct-seeded into heavy cereal residue created by harvesting with a stripper header and managing fallow as no-till.**