Wilbur, WA is $205 per ton versus $6.40 per bushel for soft white wheat. Therefore a 75 bushel crop of wheat is worth $480 per acre whereas 6230 lbs of triticale is worth $639 per acre. Inputs for both crops were identical. The late-planted winter triticale produced 3570 lbs/acre (Fig. 1) for a value of $366 per acre. Recrop soft white spring wheat produced 46 bushels/acre.

In early September 2011 we again had adequate seed-zone moisture in no-till fallow, so winter triticale was once more planted both early and late. Winter triticale can be grown in the same manner and with the same inputs and equipment used for winter wheat. For example, in-crop grass weed herbicides such as Maverick™ and Olympus™ can be used on triticale. Winter triticale grows taller and produces more residue than wheat (Fig. 2), thus it is a good choice for soils prone to wind erosion. If the price for feed grain remains high, we recommend that growers consider planting winter triticale on some of their acreage.

Fig. 2. Early-planted (right side) and late-planted (left side) winter triticale in 2011 near Ritzville, WA.

Critical Water Potentials for Germination of Wheat

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Low soil water potential limits or prevents germination and emergence of rainfed winter wheat. This phenomenon is particularly pronounced in the winter wheat-summer fallow region of the Inland Pacific Northwest where wheat is routinely sown deep to reach moisture with 4 to 6 inches of soil covering the seed. Wide differences in seedling emergence among winter wheat varieties have been reported, but no previous experiments have examined germination differences among varieties as a function of water potential.

The objective of our laboratory study was to quantify seed germination of five commonly-sown winter wheat varieties (Moro, Xerpha, Eltan, Buchanan, and Finley) at seven water potentials ranging from 0 to −1.5 MPa. Germination was measured as a function of time for a period of 30 days. At higher water potentials (0 to −0.5 MPa), all varieties had germination of more than 90%. At the lowest water potentials (−1.0 to −1.25 MPa), however, Moro consistently exceeded the other entries for speed and extent of germination with total germination of 74% at -1.0 MPa and 43% at -1.25 MPa. Since its release in 1966, Moro is sown by growers when seed-zone water conditions are marginal. Scientists have long known that coleoptile length is an important factor controlling winter wheat seedling emergence from deep sowing depths. In addition to having a long coleoptile, our data suggest that Moro's known excellent emergence ability to germinate from deep sowing depths in dry soils may also be attributed to the ability to germinate at lower water potentials than other varieties.

Evaluation of New Deep-Furrow Drill Prototypes for Conservation Wheat-Fallow Farming

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We have completed the first year of a 3-year field experiment to evaluate the performance of several deep-furrow drill prototypes to determine their suitability for planting winter wheat into tilled summer fallow under high surface residue conditions. Six deep-furrow drill prototype configurations (four from WSU Lind, one from the McGregor Co., and one from Blake Strohmaier) were evaluated on Sept. 1, 2011 at the Ross Heimbigner farm near Ritzville, WA. The stubble from the 2010 winter wheat crop, ranging from 14 to 19 inches in height, was left standing and undisturbed over the winter and averaged 5400 lbs/acre. After a spring glyphosate herbicide application, we conducted primary spring tillage at a depth of five and a half inches on May 14 with a Haybuster Undercutter sweep with 60 lb N and 10 lb S per acre injected with the undercutter implement. Only one rodweeding was required to control weeds during the summer. Seed-zone moisture conditions at time of planting were excellent. The experiment was set up in a randomized complete block design with four replications of each of the six drill treatments. All the drill prototypes planted Bruehl club wheat in 300-ft-long strips.

There have already been several lessons learned from this project, including: (i) an HZ-type drill with 20-inch row spacing and a 150-type drill (i.e., staggered shank openers) with large packer wheels easily passed through heavy, loose residue, (ii) HZ-type drills with 16-inch row spacing and large packer wheels require some type of residue clearance mechanism in front of each boot, such as the offset spider wheel on the McGregor prototype, to avoid plugging, and (iii) there appears to be no advantage of having wide packer wheels (4-inch and 6-inch wide packer wheels halves) compared to narrower versions.

The 2012 experiment site is located on the Eric Maier farm northwest of Ritzville. The site produced 65 bu/acre Bruehl winter wheat in 2011. We cut the wheat in half of the experiment area at 14 inch height and the other at 22 inch height. We will undercut + fertilize at 5.5 inches depth in the spring, just like last year, and rodweed (only as needed to control weeds) at 4 inch depth. Therefore, we expect to have an even more challenging planting situation this year.

Fig. 1. Clockwise from left: (1) the WSU HZ-type drill with adjustable row spacing (seen here at 20-inch spacing); (2) the McGregor HZ-type type drill on 16-inch row spacing with offset spider-wheel row cleaners in front of each opener and; (3) the WSU 150-type staggered-shank hoe-opener drill on 16-inch row spacing. These drills were equipped with 36-inch-diameter packer wheels and all three were successful planting through a deep tillage mulch with heavy residue in the 2011 experiment. Substantial modifications to the WSU drills have been carried out for the 2012 experiment.

Evaporation from High Residue No-till versus Tilled Fallow in a Dry Summer Climate

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Farmers in the low-precipitation (< 12 inch annual) region of the Inland Pacific Northwest practice summer fallow to produce winter wheat in a 2-year rotation. No-till fallow (NTF) is ideal for control of wind erosion but is not widely practiced because of seed-zone soil drying during the summer, whereas adequate seed-zone water for germination and emergence of deep-sown winter wheat can generally be retained with tilled fallow (TF). Successful establishment of winter wheat from late August – early September planting is critical for optimum grain yield potential. A 6-year field study was conducted to determine if accumulations of surface residue under long-term NTF might eventually be enough to substitute for TF in preserving seed-zone water over summer. Averaged over the six years, residue rates of 1300, 5400, and 9400 lbs/acre (1x, 4x, and 7x rates, respectively) on NTF produced incrementally greater seed-zone water but were not capable of retaining as much as TF (Fig. 1). Total root zone (0-to 6-ft) over-summer water loss was greatest in the 1x NTF whereas there were no significant differences in the 4x and 7x NTF versus TF. Average precipitation