

Fallow Systems Comparison Study in Intermediate Rainfall Zones, 2005-2009

M. Corp, S. Wuest, D. Ball, D. Riar, L. Bennett, & N. Sirovatka

Water storage efficiency is a critical component of wheat-fallow production systems used in the Columbia Plateau region of the Pacific Northwest. This research examines the impact of different fallow systems on soil moisture both in the seed zone and the overall soil profile.

BACKGROUND -The study, located in Juniper Canyon in northern Umatilla County, compared water storage effectiveness using the following systems: chemical fallow (CF), reduced tillage fallow (RTF) using a V-sweep undercutter followed by herbicides, reduced tillage fallow using a V-sweep undercutter followed by rodweeding (UR) and traditional mulch tillage fallow (TF) in an intermediate rainfall (12-14 inch) production zone. The study site's average rainfall was at the lower end of the range (10-12 inches) during the study period on 2005-2009.

Mulch tillage is a traditional fallow method that has been practiced in the Juniper Canyon area for many years. Chemical fallow followed by direct seeding is being utilized by some growers but has not been widely adopted. The use of wide blade V-sweep undercutter has been used for weed control



following harvest for many years but has not been used widely for primary tillage.

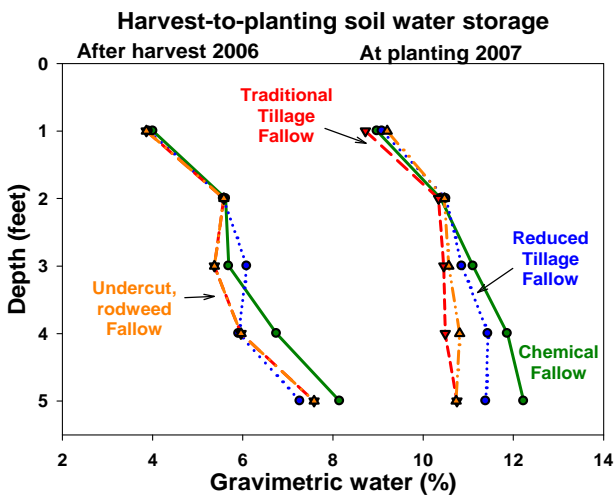
Two variations of undercutter fallow using a wide-blade V-sweep for primary spring tillage were studied in the 3rd and 4th years of the study. Reduced tillage fallow (RTF) used the undercutter with coil packer followed by herbicides as needed for weed control. The second undercutter (UR) method had no packer and used rodweeding to “set the moisture line” and for summer weed control.

The study examined seed-zone moisture conditions and overall impact to soil moisture storage by the four fallow systems. Crop residue levels were taken following planting. Plot were reseeded as needed to achieve an adequate stand. Yield data was collected.



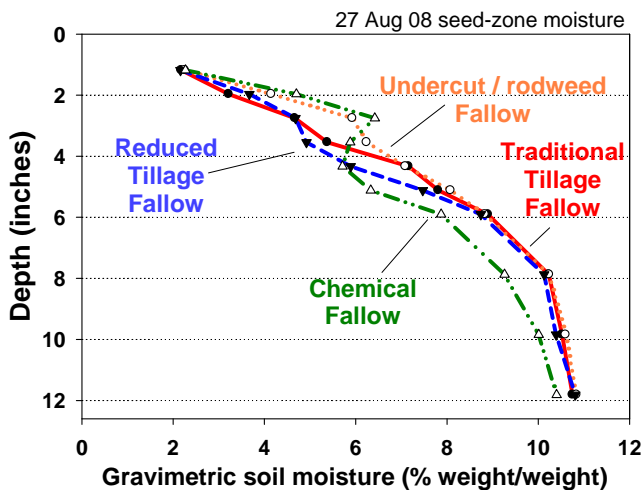
RESULTS- Four years of soil water data showed chemical fallow averaging less water in the top 1 foot and more at 3-5 ft. than the other three treatments. Total water in the 5 ft. profile showed

Figure 1. Soil profile water storage



no significant differences (Figure 1). Seed-zone moisture data demonstrated differences between treatments (Figure 2). In general, chemical fallow had drier soil in the seed zone, but responded better to fall rain. The tilled treatments often produced nearly identical seed-zone moisture profiles, and stand establishment will depend mostly on drill performance under the different soil and residue conditions.

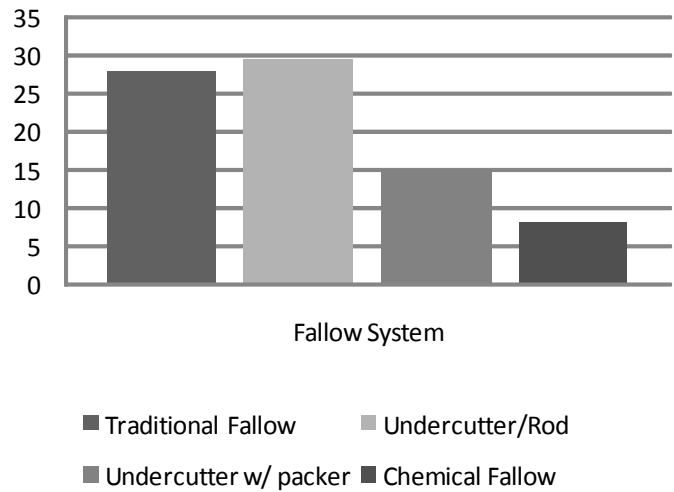
Figure 2. Seed zone moisture following early fall rains.



Crop residue levels were found to be significantly different with chemical fallow being the highest,

Figure 3. Plant stand counts from early seeding

Early seeding plant stands



followed by reduced tillage fallow and traditional fallow.

The establishment of adequate stands of wheat in an early seeding window was consistently higher in the traditional fallow. The undercutter without coil packer* also shows improved stands over the other two fallow systems.

Traditional fallow, averaging 62 bu over three years is the highest yielding fallow, but not significantly different than the undercutter without the packer followed by rod weeding (59 bu*). The chemical fallow (55 bu) had a similar yield to the undercutter rod with packer followed by chemicals (56 bu).

In summary, amount of soil water and its placement in the profile appeared to be the most critical factor leading to improved early plant establishment and higher yields. The study will be completed this summer with harvest of the final set of treatments. Additional analysis will be completed this fall and an Extension bulletin on the study will published in the coming months.

*one year data.

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