

## Farmer/Rancher Annual Report

FW15-044

### Cover Crops for Hop Production in Semi-arid Yakima Valley, Washington

Results of the 2015 growing season lead us to remove mixtures of cover crop species from the study, after concluding that the sum of benefit from these mixes was significantly less than the sum of benefit from each of their monoculture treatments. Throughout the 2016 growing season, we continued to make weekly or biweekly measurements of percent ground cover and fraction of cover composed of weeds for monoculture treatments of barley, Siberian wheatgrass, sodar streambank wheatgrass, hard fescue, and control plots of unplanted, cultivated interrows in hops.

Barley plots achieved up to 95 and 80% ground cover in June of 2015 and 2016, respectively, with an average 7% of the cover composed of weeds. By Sept. of each year, and following plant senescence, barley plot ground cover decreased to an average 77%, with up to 58% of that cover composed of weeds. In 2016, the well-established Siberian wheatgrass and streambank wheatgrass plots consistently achieved over 70% ground cover, and over 80% ground cover including mowed debris, with less than 10% of the cover composed of weeds. By Sept. 2016, hard fescue achieved 50% ground cover following a positive trend since plant emergence, and weeds composed 10% of the cover. Alfalfa emerged minimally in 2015 and 2016 and measurements were not possible.

Soil samples were collected from each of the monoculture and mixed species plots in Oct. 2015. Soil samples were not collected in fall of 2016, but will be collected during Jan. 2017. With removal of the additional mixed-species cover crop plots from this study, we were able to re-allocate budget funds toward multi-depth soil samples of each plot for the winter of 2017. This will be especially beneficial to observe the effects of cover crop residue on top soil characteristics, particularly the level of organic matter over time.

These interim results suggest perennial grasses as the most profitable alternative to tillage for interrow weed control in semi-arid hop production. Barley seed was the least expensive seeding option, but ultimately provided the least benefit in weed competition after senescence. Barley also presented the possibility of becoming a weed by reseeding outside of the planted cover crop swath and into hop rows. Of the grasses in this study, Siberian wheatgrass seed was less expensive than both streambank wheatgrass and hard fescue. Further economic analyses will be performed following the completion of this study in fall of 2017, after all soil samples have been analyzed. We will consider gains related to soil conservation, weed control, and increases in organic matter and losses related to seed cost and management (mowing). At the conclusion of the study, gains and losses attributed to other factors such as pest/disease control, fuel savings, etc. may also be included in the economic analysis.

Results of this study were presented at the winter hop growers meeting in Yakima, WA on January 6<sup>th</sup>, 2017. More than 100 hop producers, researchers and other professionals attended the presentation of this project at the meeting. Of the attendees, 20% reported that the results of this study were likely to change their production practices. In Mar. 2017, the results of this study will also be presented at the Western Nutrient Management Conference in Reno, NV. The meeting is typically attended by various agricultural and university professionals.



Photo 1 Barley at fall post-senescence



Photo 2 Streambank (sodar) wheatgrass on July 8, 2016



Photo 3 Streambank (sodar) wheatgrass on July 18, 2016 while being mowed



Photo 4 Siberian wheatgrass on July 8, 2016



Photo 5 Siberian wheatgrass on September 30, 2016, continuing to control weeds



Photo 6 Hard Fescue on July 8, 2016



Photo 7 Hard fescue on Sept. 30, 2016, continuing to exhibit excellent weed control after positive trend since establishment in fall of 2014