BIOSOLIDS IN CONSERVATION TILLAGE: TRIALS FOR WASHINGTON'S WINTER WHEAT-SUMMER FALLOW REGION

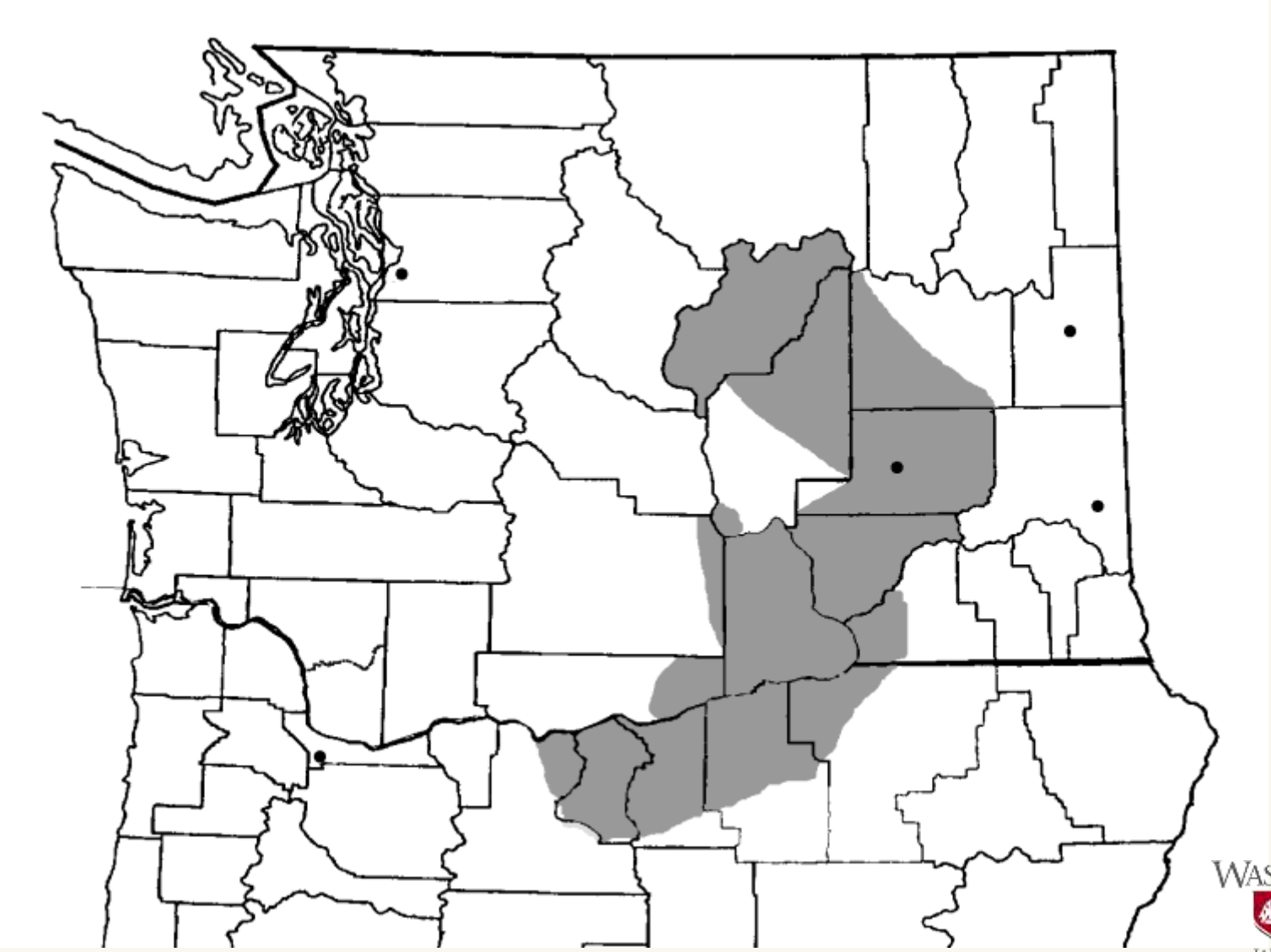
William Schillinger[1], Craig Cogger[1], Andy Bary[1], and Brenton Sharratt[2]

[1]Department of Crop and Soil Sciences, Washington State University and [2]USDA-ARS

Washington State University
World Class. Face to Face.

USDA Agricultural Research Service

Low precipitation (6 to 12 inch annual) dryland cropping region



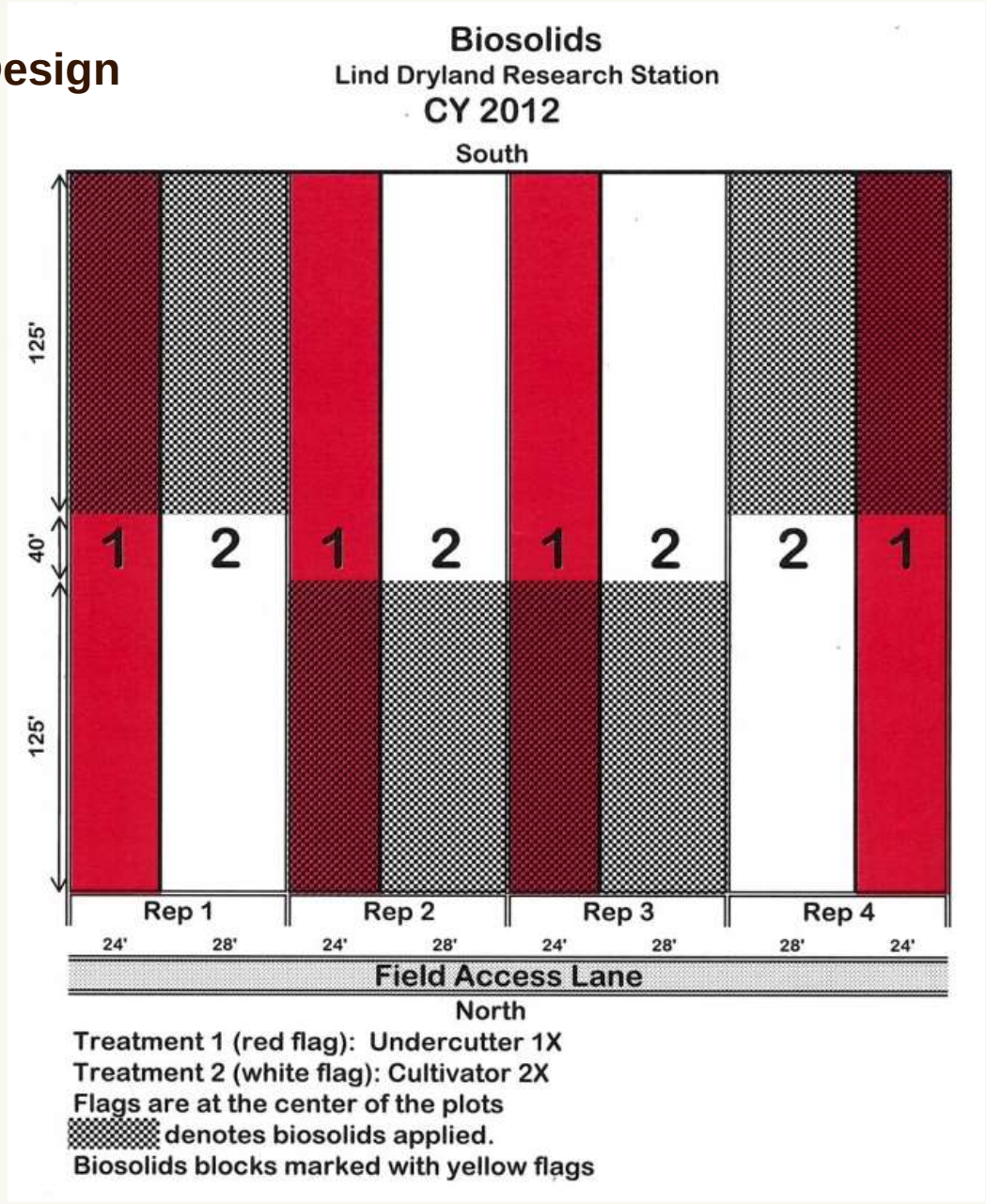

No-till summer fallow
2003 6 5


CATERPILLAR

Excessively tilled summer fallow


JOHN DEERE
JOHN DEERE

Split Block Design




05/02/2012


07/25/2012

Soil test data from east-side biosolids plots in April 2014 prior to application of nitrogen and sulfur fertilizer in control plots. This for the second year of wheat production (2015 crop) after biosolids applied in April 2012.

	Nitrate (lbs/ac/4 ft)	Phosphorus (ppm)	Sulfate (lbs/ac/4 ft)	Soil Water (in./4 ft)	SOM (%)
Application					
Control	39	13.0	38	4.16	1.05
Biosolids	87	19.1	48	4.43	1.09
Significance (≤ 0.05)	0.02	0.05	0.02	ns	ns
Tillage					
Undercutter	66	16.0	44	4.40	1.08
Tandem disk	60	16.1	42	4.19	1.06
Significance (≤ 0.05)	ns	ns	ns	ns	ns

Soil test data from west-side biosolids plots in April 2015 prior to application of nitrogen and sulfur fertilizer in control plots. This is just prior to the application of the second round of biosolids (i.e., after two winter wheat crops had already been produced from the first round of biosolids applied in April 2011).

	Nitrate (lbs/ac/4 ft)	Phosphorus (ppm)	Sulfate (lbs/ac/4 ft)	Water (in./4 ft)	SOM (%)
Application					
Control	46	11.6	57	4.30	0.90
Biosolids	57	14.6	56	4.49	1.01
Significance (≤ 0.05)	ns	ns	ns	ns	ns (0.06)
Tillage					
Undercutter	51	15.8	56	4.40	1.03
Tandem disk	52	10.5	57	4.19	0.89
Significance (≤ 0.05)	ns	0.002	ns	ns	ns

Winter wheat grain yield (bushels/acre) in Lind biosolids experiment for the first four years.

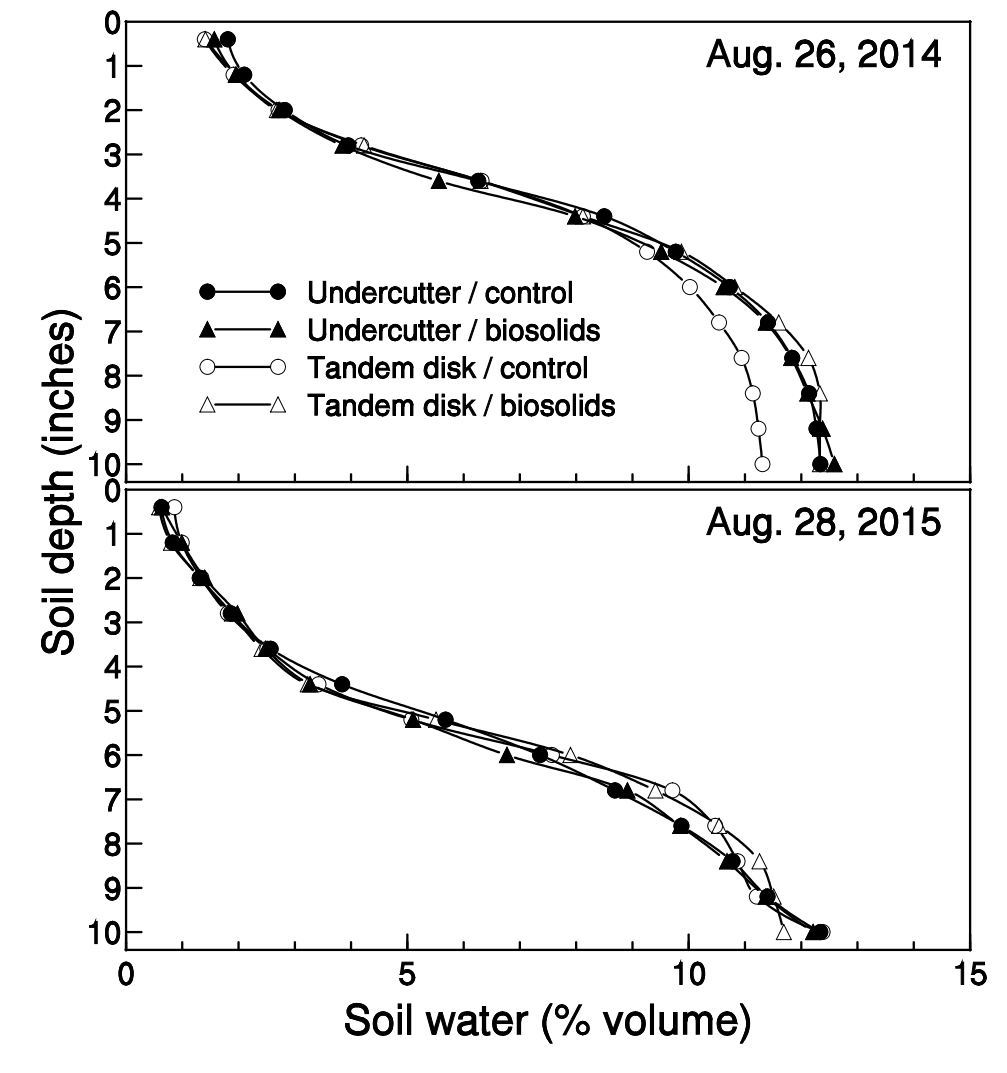
	2012	2013	2014	2015	4-yr avg.
Application					
Control	50.1	42.4	31.7	21.4	36.4
Biosolids	53.7	44.3	31.1	23.4	38.1
Significance (≤ 0.05)	ns	ns	ns	ns	ns
Tillage					
Undercutter	52.1	43.4	33.0	22.2	37.7
Tandem disk	51.7	43.3	29.9	22.6	36.9
Significance (≤ 0.05)	ns	ns	ns	ns	ns
Crop-year precipitation	11.09	10.87	7.69	7.61	9.32

Grain yield components and surface residue remaining on soil surface averaged over the first three years in the Lind biosolids experiment.

	Surface Residue (%)*	Spikes (m^2)	Kernels / Spike	1000 Grain Wt. (g)
Application				
Control	29.9	225	34.4	40.7
Biosolids	29.9	255	34.2	39.8
Significance (≤ 0.05)	ns	0.04	ns	ns
Tillage				
Undercutter	31.8	240	33.6	40.0
Tandem disk	24.3	240	35.0	40.5
Significance (≤ 0.05)	0.01	ns	ns	ns

* Percent surface residue cover remaining after planting with deep-furrow drills.

Seed-zone moisture content



Biosolids Experiment
2013 Lind Field Day

Funding provided by King County Biosolids Management Program