N timing. Davis observed that broadcast tilling all urea and ammonium phosphate fertilizer at planting of winter canola reduced yields and winter survival compared to 25% at planting with the remainder applied later as split fall: spring topdress applications. Mechanisms could include seedling damage or too lush of growth. Similarly, Wysocki also found that applying all 140 lb N/acre at winter canola planting as urea resulted in yields similar to the 0 N control, while 0 to 25% of the total N fertilizer applied at planting resulted in higher yields. Esser showed a reduction in final grain yield by placing up to 30 lb urea-N/A near the seed. Collectively, these field studies align with root studies that caution against the application of high ammonia-based fertilizers at canola planting, particularly when placed with and below the seed. Unless there is sufficient spacing between the seedling and fertilizer row, ammonia based fertilizers should be applied preplant during fallow, or as fall- and spring post-plant topdressing. Ongoing studies conducted by Dr. H. Tao will verify this hypothesis. These research results and principles were presented at three 2017 WOCS winter workshops. Fertility recommendations will be published in a forthcoming PNW nutrient management guide.

Table 1. Seed yield and survival at Moscow, ID in 2014, 2015 as affected by Nitrogen rate and timing.

	Seed Yield			
Fertilizer Timing Treatment	2014	2015	Mean	Winter Survival
	——————————*lbs. per acre*——————————			——score[1]——
Reduced N at Planting Only	1680 a[2]	2695 a	2154 a	6.5 b
All at Planting	1978 b	2405 a	2178 a	5.4 a
None at Planting 50% in Fall, 50% in Spring	2346 c	3775 b	3038 b	6.9 b
25% at Planting, 25% in Fall, 50% in Spring	2306 c	3594 b	2929 b	6.7 b
25% at Planting, 75% in spring	2360 c	3257 b	2794 b	6.8 b

[1]Scored on a scale of 1 to 9 with one equaling no survival and nine equaling complete survival.
[2]Means within columns with different letters are significantly ($P<0.05$) different.

Effects of Increasing Seeding Rates on Spring Canola Yields

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Canola seed, particularly transgenic seed, is expensive. Canola is also hard-seeded, and germination of seed can be ~50%. Increased canola seed rates could offer increased crop establishment, resulting in crop and weed competiveness, and productivity by maximizing above ground growth and yield potential. A study was established near Pullman, WA, to evaluate a range of seeding rates. Spring canola variety Hyclass 930 was planted on April 20th, 2016 using a Monosem planter calibrated to deliver seeding rate treatments detailed in Table 1, on an10 inch row spacing. The study was conducted as a randomized complete block design with 3 replications of 10 by 75 ft plots. The entire study was fertilized with 20 lb of sulfur and 80 lb of nitrogen, and glyphosate was spilt applied at 0.387 lb ai A^{-1}, with 0.124 lb ai A^{-1} of cloypralid added in the later application timing. Crop stand counts were recorded 62 days after treatment. The study was harvested using a plot combine with a 5 foot header on September 20, 2016. All data were subjected to an analysis of variance using the statistical package built into the Agricultural Research Manager software system (ARM 8.5.0, Gylling Data Management). Spring canola stand counts significantly increased as the seeding rate increased, with 10 plants m^{-1}

for the 26 seed m^{-1} treatment (4 lb A^{-1}) and 31 plants m^{-1} for the 79 plants m^{-1} seeding rate (12 lb A^{-1}). Based on intended seeding rates on average crop establishment was 43% on average for all treatments. Yields increased as seeding rates increased. Yield for the seeding rate of 79 seeds m^{-1} (12 lb A^{-1}) was significantly higher than the lowest seeding rate of 26 seeds m^{-1} (4 lb A^{-1}), with 1362 lb A^{-1} compared to 824 lb A^{-1}. No reduction in yield was observed as seeding rate increased. Previous studies have found both increases and decreases in yield as seeding rates increased (Hanson et al. 20. Crop establishment and drill type should be taken into consideration when choosing a seeding rate to utilize maximum yield and economic returns. Fertilizer requirements, cultivar type and seed cost should also be taken into consideration when choosing seeding rate.

Table 1. Stand counts and yield for spring canola seeding rates (Hyclass 930). Pullman, WA, 2016. Means followed by the same letter are not statistically significantly different (α=0.05).

				June 21, 2016	*August 18, 2016*
Treatment #	**Seeding Rate**			**Stand Counts**	**Yield**
	seed/m	**seed/ft**	**lb/A**	**plants/meter**	**lb/A**
1	26	8	4	10 a	824 a
2	32	10	5	15 ab	985 ab
3	39	12	6	16 ab	1012 ab
4	46	14	7	18 abc	970 ab
5	52	16	8	23 bc	1006 ab
6	66	20	10	25 cd	1222 ab
7	79	24	12	31 d	1362 b
Hill drop	20	6	3	12 a	1139 ab

Soil Microbial Communities of the Lind Camelina Cropping Systems Experiment

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Acreage of *Brassica* crops in the Inland Pacific Northwest have expanded in recent years with the increased demand for oilseed products. Canola has seen the largest surge in production, but other oilseed crops such as camelina are also of interest. Oil quality, tolerance to heat and drought stress, and low input costs have accelerated the interest in camelina. Crop rotations that include *Brassicas* have been reported to increase yields and reduce fungal pathogens in subsequent crops. *Brassica* crops, including camelina, contain glucosinolates (GSLs) which hydrolyze to produce isothiocyanates (ITCs). The production of ITCs is the mechanism responsible for the "biofumigation" effect. The biofumigation effect is generally considered positive; however, the non-selectivity of ITCs has potential to impact beneficial soil organisms. The GSL profiles of canola and distribution in the plant have been extensively studied while little is known about those of camelina. We assessed the soil microbial communities of camelina (C) produced in a 3-year winter wheat (WW)-C-summer fallow (SF) rotation compared to the 2-year WW-SF rotation. Five years of data collected from a 9-year experiment at the Lind Dryland Research Station are presented. Soil microbial community composition was determined using phospholipid fatty acid (PLFA) analysis. PLFA's extracted from soil are divided into biomarker groups representing fungi, mycorrhizae, gram negative, and gram positive bacteria. Data show biomarkers amounts decreasing with