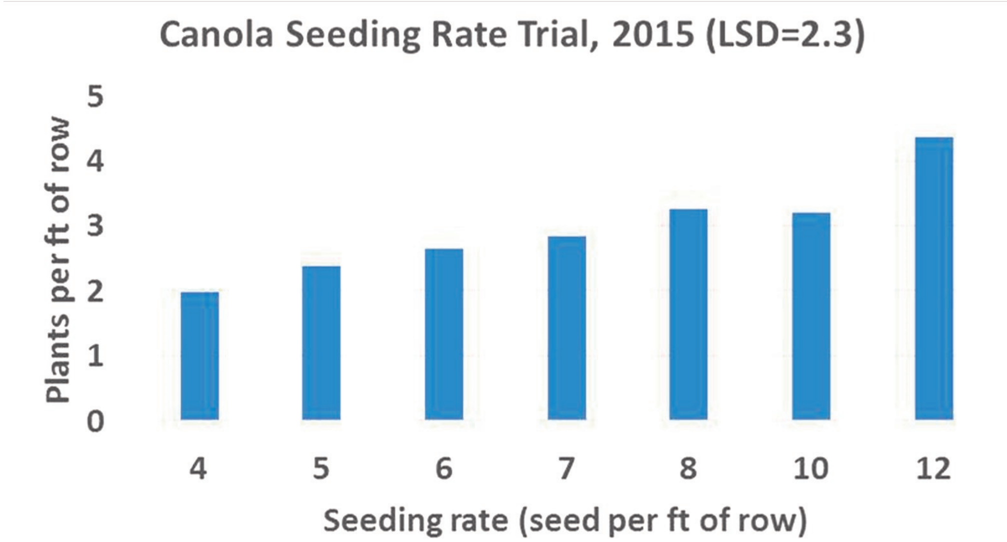
row were counted per plot. Canola stands ranged from 1.9 to 4.4 plants per ft of row, and increased incrementally with seeding rate (Fig. 1). Percent of seed that produced plants increased with planting rate, and at 10 seeds per ft, only 32% of seed failed to emerge. Percent establishment was much lower at lower planting rates, and at 4 seeds per ft ~50% of seed failed to emerge. Conditions were dry, and bloom began not long after the stand assessments were recorded. As a consequence, yield was not recorded.



Canola Seedling Root Damage Caused by Ammonium Fertilizers

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Toxicity to crops due to banding ammonium-based fertilizers below the root is well documented. Tap-rooted crops such as canola are more susceptible to toxicity than wheat, which has a fibrous root system. Because of the increased susceptibility of canola it is important to carefully consider the rate, source, and placement of ammonium-based fertilizer applications when including canola in a primarily wheat rotation. Symptoms of halted apical growth, premature lateral root emergence, taproot shrinkage, and necrosis have been observed by growing canola seedlings along the face of an office scanner (Fig. 1). While these symptoms do not necessarily lead to seedling death, they may be responsible for increasing seedling vulnerability to other stresses as well as reducing the potential for a strong tap root.

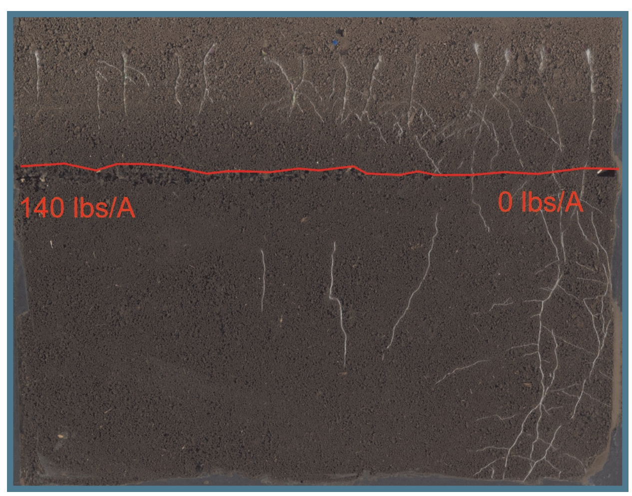

Figure 1.

When banding fertilizers at planting, it is important to consider rate, place, and source. **Rate:** The rate can increase the size of the toxic zone (Fig. 1). Note that while the seedlings growing above the medium rates suffered damage to their tap roots they were able to recover and able to avoid the toxicity zone with lateral roots. **Source:** The ammonium source may also influence the size of the toxic zone. Forms of ammonium-based fertilizers which have higher pH cause an increase in ammonia gas movement through the soil. Ammonia gas is more deadly to plant roots and causes an expanded toxic zone. **Place:** Ideally fertilizer should be placed to the side or to the side and below the seed. However, this will infrequently be an option as it requires adjustments to seeding drills. If changing the fertilizer placement is not an option, split applying fertilizer may be the best approach.

Conclusion: If banding ammonium-based fertilizer at planting, consider adjusting rate, place, and source to reduce damage to seedling root systems. It is preferable to place the fertilizer below and to the side of the seed; decreasing the N rates may decrease the potential for damage; the source, and specifically the pH of the source fertilizer, can influence the distance at which toxicity symptoms may be observed from the seed.

Effect of Insecticide Applications on Early-Planted Winter Canola in Northern Idaho

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Recently, some dryland Pacific Northwest (PNW) winter canola growers have been planting their crops earlier than is traditional to improve establishment by planting before soil moisture is lost to evaporation later in the season. To assess the need for summer insecticide applications in early plantings, we conducted a four-year trial at Moscow, ID. Early-planted canola was subjected to four different treatments; (1) seed treated with the label rate of Helix Xtra® plus a late summer foliar application of Warrior II®, (2) the seed treatment alone, (3) the late summer application of the foliar insecticide alone, or (4) no seed or foliar insecticide treatment.

In each year of the trial, insects damaged the canola during the late summer and early fall. Untreated plots were devastated by flea beetle and aphid infestations during the summers of 2010 and 2011 (Table 1). Despite the impact of insect infestation on the untreated plots, no yield loss was seen from not controlling insects in those years. This is likely because favorable growing conditions in late September and October allowed the plants to recover after insect populations had decreased. A yield loss was seen in the no-control plots in the 2013-2014 crop, likely due to less favorable fall conditions that did not allow for recovery. No differences in seedling emergence, establishment, or disease due the presence or absence of the seed treatment were observed.

Table 1. *Insect damage and yield of canola with insecticide treatments.*

	Insecticide Treatment			
Crop Year	No Insecticide	Seed Trt Only	Foliar Only	Seed Trt and Foliar
	----------------------- *score*[1] --------------------			
2010-11	1.2 c[2]	5.3 b	5.7 b	7.7 a
2011-12	1.4 c	6.1 b	6.0 b	8.3 a
	-------------------- *lbs./acre* ---------------------			
2010-11	3,425	3,424	3,451	3,348
2011-12	4,276 ab	4,499 a	4,143ab	3,925 b
2012-13	1,503	1,592	1,648	1,652
2013-14	1,251 b	1,474 ab	1,666 a	1,676 a

[1]A score of 1 indicates severe damage and a score of 9 indicates no damage.
[2]Means within rows with the different letters are significantly ($p<0.05$) different.

Based on this data, winter canola can recover from severe insect damage in appropriate fall growing conditions. In some years, such conditions will not occur and canola will benefit from late summer insecticide applications. Since growers cannot accurately predict weather conditions six to eight weeks in advance, controlling summer insect infestations is recommended in case good growing fall conditions do not occur. In addition, the use of a seed treatment with an insecticide-fungicide package should be strongly considered to reduce the risk of unexpected seedling damage from insects as well as from seedling diseases and black leg disease. A fungicidal seed treatment to control black leg is often required by state law in the PNW, and adding an insecticide to it is a simple and routine matter.