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# Crucifer flea beetle and cabbage seedpod weevil incidence affected canola grain yield and quality

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Figure 1: (A-B) Damage symptoms on canola leaf stages; and (C) pods (shriveled); (D) flea beetles actively feeding on stems under warm and dry conditions of Montana.

Canola, *Brassica napus* L., is an important oilseed crop worldwide including Montana. The crucifer flea beetle, *Phyllotreta cruciferae*, (Coleoptera: Chrysomelidae) and the cabbage seedpod weevil, *Ceutorhynchus obstrictus* (Coleoptera: Curculionidae) are reported to be two economically important insect pests of canola in Montana. Cabbage seedpod weevil was first detected in Montana during the 1999 growing season at very low levels in Fergus County, by 2013

farmers were concerned not only by the high incidence of flea beetle but also cabbage seedpod weevil on canola and mustard crops. Neonicotinoid seed treatment and post-emergence chemical pesticides (such as bifenthrin, deltamethrin, gamma-cyhalothrin and lambda-cyhalothrin) are being used routinely by canola growers to control both insect pests. Although, several past studies were performed to determine the effect of N fertilization on pest pressure, there

have not been any studies on the influence of fertilizers, particularly nitrogen on the incidence of insect pests on canola. Therefore, the studies were conducted to determine the feeding impacts of flea beetle and cabbage seedpod weevil on canola seed yield and quality with respect to N soil fertility and commonly applied imidacloprid insecticide as seed treatment.

Replicated field trials were conducted at two locations in Conrad at the Western Triangle Agricultural Research Center research field area and Sweetgrass (near to the Canadian border), both representing dryland rain fed (i.e., non-irrigated) conditions, in 2017. The treatment structure consisted of four levels of N including: no external application of N, 50, 100 and 150 lbs/ac of N at the time of canola seeding. Each level of N either received insecticide imidacloprid (Gaucho 600®) seed treatment or no treatment. At seeding, all plots received 20 pounds of phosphorus, 20 pounds potassium and 20 pounds sulfur per acre. No foliar sprays of any pest control were applied to the research trials. Based on the soil tests performed, residual N level was about 16 lbs/ac at Conrad compared to only 3.5 lbs/ac at the Sweetgrass location. Experimental plots at Conrad were seeded on May 1<sup>st</sup> and at Sweetgrass location plots were seeded on May 6, 2017 using Hy-Class® 955 cultivar at a rate of 12 seeds per foot, using a four-row plot drill with 12 inch row-row spacing. Recorded weather data from

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Figure 2: (A) cabbage seedpod weevil larvae; (B) nymphs feeding on canola; and (C) exit holes made by larvae as they leaving to pupate in the soil. Photo by M. Dolinski and H. Carcamo, Agriculture and Agri-Food Canada.

April-August showed that both locations experienced dry conditions throughout the growing season especially from July to August when the warm and dry spell prevailed until the crop harvest. Average monthly precipitation at Conrad for the months of June, July and August was 4.9, 0.9, and 0.26 inches, compared to Sweetgrass where the average rainfall during these months was about 5.2, 2.0 and 0.04 inches, respectively.

Each plot was visually rated for the flea beetle feeding injury, four times i.e. cotyledon, four leaf, pre-flowering and pod formation stages of canola. Cabbage seedpod weevil damage assessments were performed on the pods at the pod maturation stage only. Pods were randomly sampled per plot, and damaged or undamaged pods were determined in the lab by visual inspection using seedpod weevil damage characteristics (feeding holes) followed by the opening of pods with a sharp blade to check the presence of larvae inside the pods.

Study results showed that flea beetle feeding pressure based on crop injury ratings was very high throughout the canola growing season at Conrad as compared to the Sweetgrass location. More than 70% injury was recorded at four leaf stage of canola in Conrad while the highest injury ratings were about 11% at four leaf and pre-flowering canola stages at the Sweetgrass location. At Sweetgrass where flea beetle feeding pressure remained low during the entire growing season, injury ratings varied among the N levels at the cotyledon stage but not during the other crop growth stages. On the other hand, insecticide significantly impacted the feeding injury ratings at cotyledon and pre-flowering stage. Interaction between N levels and insecticide seed treatment for flea beetle feeding injury was not significant at both the locations.

Mean seedpod weevil percent infested pods were low at Conrad (range 5-13%) compared to Sweetgrass location where the percent infested pods were high and range 6-26%. However, there was no trend for the N levels for cabbage seedpod weevil percent infested pods and no significant differences

were observed among insecticide treated and untreated plots at both the locations.

Yield levels were low at both the locations with average seed yield ranging from about 16-19 bu/ac and from 7-12 bu/ac respectively, at the Conrad and Sweetgrass locations. Although, yield increased slightly with the increase in N level with highest at 100 lbs/ac N level, differences were not significant among the N levels at Conrad location. Similar trend of no significant differences were among the N levels for the grain quality parameters. In contrast insecticide averaged over the N levels, canola yield TKW and percent oil content were significantly higher in insecticide treated than the untreated plots. At Sweetgrass where flea beetle pressure was low, impact of N levels was more pronounced as compared to Conrad location. Significant differences were among the N levels for canola yield, test weight and percent oil content. Yield levels increase with the increase in N application, with highest mean yield (11.4 bu/ac) at the 150 lbs/ac N rate. Insecticide averaged over the N levels, both yield and percent oil content were significantly higher in the insecticide treated than the untreated plots. However, no significant impact of insecticide was observed on the other grain quality parameters.

Overall, the studies demonstrate that if dry and warm conditions prevail over the canola growing season significant damage can occur even at the later stages of canola development and exhibit considerable damage during the pod formation stage thereby impacting the yield and grain quality parameters. Although, yield was highest at the 100 and 150 pounds of N/ac treatment levels, flea beetle injury pressure likely masked the statistical differences among them. In contrast, when the flea beetle feeding pressure was low, impact of N was more pronounced on the yield and grain quality. No differences among insecticide treated and untreated plots at both locations for seedpod weevil likely indicate that the effects of seed treatment with insecticide did not last long enough to impact the pod stage.

## Curmudgeons Day

Date celebrated:  
January 29th

Curmudgeons Day is one of those holidays most people find hard to believe is real.

There's no need to worry, though, because you don't have to be grumpy to celebrate it.

There are many schools of thought regarding Curmudgeons Day. Some say it's a holiday where you're supposed to stay home all day and do nothing. Others, though, see it as a day when you're permitted to be as miserable and grouchy as you like. In fact, they consider it a day when grumpiness should be celebrated.



If you're not feeling too ill-tempered, though, you can still celebrate Curmudgeons Day, and have fun while doing it. Here are a few ideas on how to celebrate this holiday without necessarily being grumpy yourself:

- Spread the cheer and make a curmudgeon you know laugh;
- Watch a film featuring curmudgeons, such as Grumpy Old Men;
- Take a few moments to appreciate your life and why you really shouldn't be grumpy.

Curmudgeons Day is an official holiday, but if you really can't seem to get into the right mood to be true to it, you can always have a bit of fun with the family.