Canadian Agronomist

DIGGING INTO RESEARCH

Assessing zero-till drills for sod-seeding

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Sod-seeding alfalfa to rejuvenate perennial grass pastures using currently available zero-till seeding equipment can be a successful option for livestock producers. In the thin Black soil zone of western Canada, alfalfa continued to persist nine years after seeding whether herbicides were used at establishment or not.

Annual field crops are commonly seeded with zero-till seed drills in the prairie region of western Canada. However, zero-till seed drills for sod-seeding into an existing perennial forage have not been evaluated.

The objective of this research was to compare six commercially available zero-till seed drill openers for sod-seeding alfalfa into an old crested wheatgrass pasture in Lanigan, Saskatchewan. Researchers also compared suppression of the existing vegetation with or without glyphosate prior to seeding. The persistence of alfalfa was evaluated nine years after sod-seeding.

The Prairie Agricultural Machinery Institute (PAMI) modified and equipped a specialized plot drill with six commercially available seed drill openers. The drill was equipped with accurate seed metering and draft measurement equipment. The study compared six openers: Dutch Industries 19 mm narrow single-shoot knife, Morris Industries 100 mm paired-row double shoot opener,

Bourgault Tillage Tools 100 mm paired row double shoot opener, Dutch Industries 9 mm double shoot sideband opener, Atom-Jet double shoot opener, and SeedMaster twin shank opener.

The plots were sod-seeded with AC Grazeland alfalfa at 5.34 lbs./ac (6 kg/ha) in 2011. The study also included two control plots. A disturbed control was established at seeding using a Dutch narrow row opener without any alfalfa seed. The undisturbed control was not seeded or disturbed with any openers.

During the growing season in 2011, researchers analyzed the draft force, seedling establishment, alfalfa cover, forage DM yield, and forage composition data.

The results in 2011 showed that all six seed drill openers performed similarly, with no differences in seedling establishment, alfalfa composition, alfalfa yield or forage yield. Compared to the control treatments, all six seed drill openers resulted in greater seedling establishment, and higher alfalfa composition and yield.

Suppression of existing vegetation for establishment

In the year of establishment, study results showed that the application of glyphosate for suppression of existing vegetation prior to seeding resulted in greater alfalfa seedling establishment, alfalfa composition and alfalfa yield. Field assessments in 2011 showed there were more seedlings in July when the existing vegetation had been treated with glyphosate, and in September there was greater alfalfa composition in the forage and greater alfalfa yield.

However, nine years later, there was no evidence of benefits to the herbicide application over the long-term. In June 2020, results of the measurements of the same variables of alfalfa seedling establishment, alfalfa composition and alfalfa yield, did not indicate any differences between plots with a herbicide application for vegetation suppression and plots with no herbicide application.

In the future, an economic analysis of long-term response trials would be useful to monitor the longevity and confirm the costs of herbicide vegetation control.

Alfalfa yields similar over the long term

The research study site was included in a flexible grazing rotation with beef cow–calf pairs from 2012 to 2019. The paddock was moderately grazed during the May to October growing season, with early grazing in June or July and then regrowth grazing in August or September.

Researchers returned to the study site nine years later in June 2020, and re-evaluated the key variables of alfalfa plant cover, alfalfa composition, alfalfa yield and forage yield. After nine years, the results were similar for all of the variables among the six seed drill openers. There was also no difference in any of these variables due to herbicide application nine years prior.

When comparing the sod-seeded plots to the unseeded controls, there was greater alfalfa composition and forage yield in the sod-seeded plots.

Overall, the study shows that livestock producers can successfully use available zero-till seeding equipment for sod-seeding alfalfa to rejuvenate grass pastures in the thin Black soil zone of western Canada. The alfalfa can be established without a herbicide application for vegetation suppression, although the initial alfalfa yield will be lower. Producers can expect sod-seeded alfalfa to persist in rejuvenated pastures for at least nine years.

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P. G. Jefferson, N. Gregg, L. Hill, and H.A. Lardner (2021). Comparison of six zero-till seed drill openers for establishment and persistence of sod-seeded alfalfa (*Medicago sativa* L.) in a cool-season perennial grass pasture. Canadian Journal of Plant Science, https://doi.org/10.1139/cjps-2020-0299

Photo of herbicide treated October 2011 plot by Kathy Larson