Saskatchewan AgriARM Applied Research Management

Wheatland Conservation Area Inc.
Swift Current, SK.

Early Defoliation of Forage Cereals to Delay Maturity for Swath Grazing
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ADOPT 2015

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Final Report

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2015 Report

Project Objectives

The goal of this project is to demonstrate the use of early defoliation (simulated grazing) to delay the maturity of early seeded forage cereal crops for swath grazing.

Project Rationale

Oats and barley are commonly grown across the province for livestock feed and cut for green feed or swath grazing. Within the past two years a new variety of both oats (CDC Haymaker) and barley (CDC Maverick) have been released by the Crop Development Centre in Saskatoon. Recent research and demonstrations has also resulted in renewed interest in new triticale varieties for swath grazing and green feed (Bunker). These varieties need to be demonstrated so that producers can decide if and how these new varieties fit into their green feed and swath grazing programs.

Also research and demonstrations have shown that dry matter yields of cereals for swath grazing decline as seeding date is delayed in the spring. Early seeding date will maximize dry matter yield of cereals for swath grazing in most years, but crop quality can suffer because the crop will need to be swathed in early August and lay in a swath until cattle are turned on to the swaths in late fall. As a result many producers forego production for late maturity by planting in late June. If early seeded cereals could be clipped (or grazed) to delay maturity and still produce as much at the soft dough stage as a late seeded crop then total forage yield per acre could be increased. In the U.S., winter wheat is grazed in the spring prior to stem elongation then harvested later for grain with little impact on yield. This same principle could be used to harvest more forage per acre using cereals.

This project will demonstrate the effect on dry matter yield of using early season defolitaion to delay the maturity of early seeded cereals for swath grazing. In this demonstration two defoliation stages 1) vegetative and 2) stem elongation will be used to demonstrate the recommended stage and a late stage of spring defoliation.

Methods

The project was set up as randomized small plots with four replicates. Annual forages demonstrated and evaluated included:

1. CDC Maverick barley, seeded early and late
2 CDC Haymaker oat , seeded early and late
3 Bunker Triticale, seeded early and late

Cutting treatments were:

1. Early seeded cut at soft dough (Check)
2. Late seeded cut at soft dough (Check)
3. Early seeded, cut at late vegetative (< Feekes 6), cut again at soft dough
4. Early seeded, cut at early jointing (>Feekes 6), cut again at soft dough

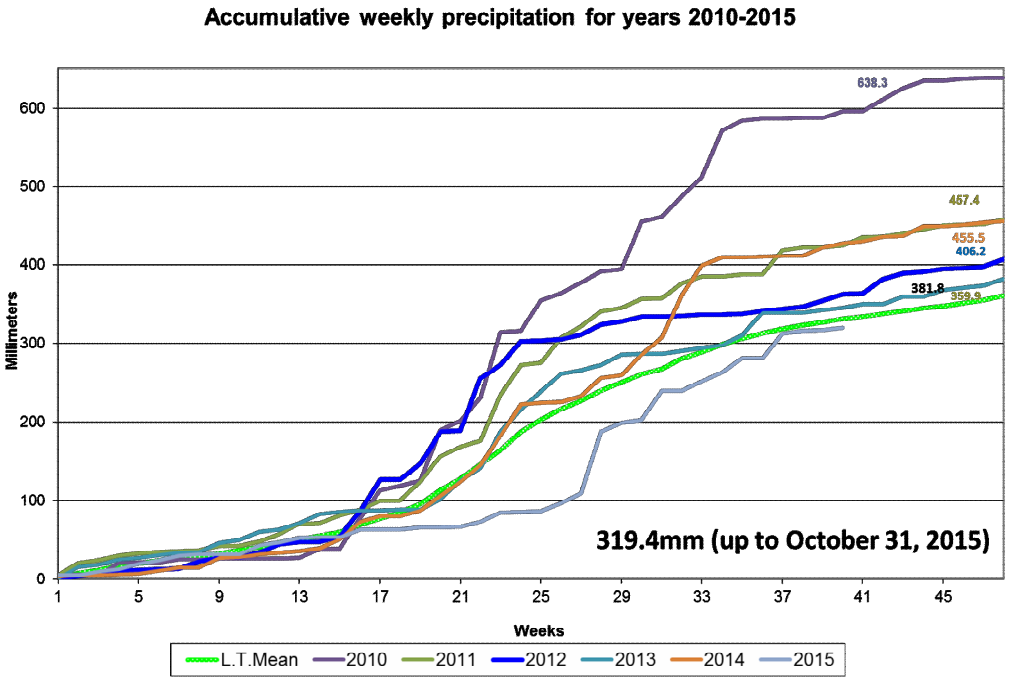
All varieties were seeded early mid May (~May 20) and late June (~June 20) for swath grazing. Targeted plot size was 3m x 8m; however plot size may be adjusted to equipment size and available space. Production (dry matter yield) was collected by each of the scheduled harvesting times by harvesting 1 m2 in two locations per plot.
Two forage samples were taken at the early dough stage from each of the 12 treatments and sent for quality analysis (protein, energy and minerals).

Measurements Taken:

Date when the crop reaches the soft dough stage, Dry matter yield (DMY) and quality (%protein, % minerals and %TDN) of the varieties tested.

22-May	Preseed burnoff (Express + glyphosate) (trt 1-3, 7-12)
27-May	Seed early treatments with (109 lbs/ac urea + 39 lbs/ac Map) aim for May 20 to 30 (trt 1-3, 7-12) Seed Maverick-138 lbs/ac; Haymaker oats-126 lbs/ac; Bunker triticale 150 lbs/ac (May change rates based on seed lots obtained)
16-Jun	Emergence counts on early seeded (trt 1-3, 7-12) (4 rows by 1 meter)
none	Incrop herbicide on early seeded (Trt 1-3) (If deemed necessary) No incrop herbicide on simulated grazing (trt 7-12)
12-Jun	Preseed burnoff (Express + glyphosate) (trt 4-6)
17-Jun	Seed late treatments (109 lbs/ac urea + 39 lbs/ac Map) aim for June 20 to early July (trt 4-6) Seed at same rates as step 2 above
03-Jul	Emergence counts on late seeded (trt 4-6)
none	Incrop herbicide on late seeded (4-6) (if deemed necessary)
22-Jun	Havested late vegetative <Feeks 6; 4 leaf stage trt 7,8,9 (1 sq. meter x 2 spots) and sampled 10 plants from outside edge of each side of square. Mowed plots with mower.
02-Jul	Harvest early jointing >Feeks (Approximately 6 leaf) 6 trt 10,11,12 Same harvest procedure as in step 9 above.
29-Jul	Harvested Treaments at soft dough 1 & 7 (barley) 1 sq. m. x 2 spots per plot
04-Aug	Harvested Treatments at soft dough 2, 3, 8, and 9 1 sq. m. x 2 spots per plot
17-Aug	Harvested soft dough treatments 4 and 10 (barley) 1 sq. m. x 2 spots per plot
24-Aug	Harvested Treatments at soft dough (Trts 5,6,11, and 12)
14-Sep	Sent samples from rep 1 and 2 to Central Testing Labs

General Site Conditions



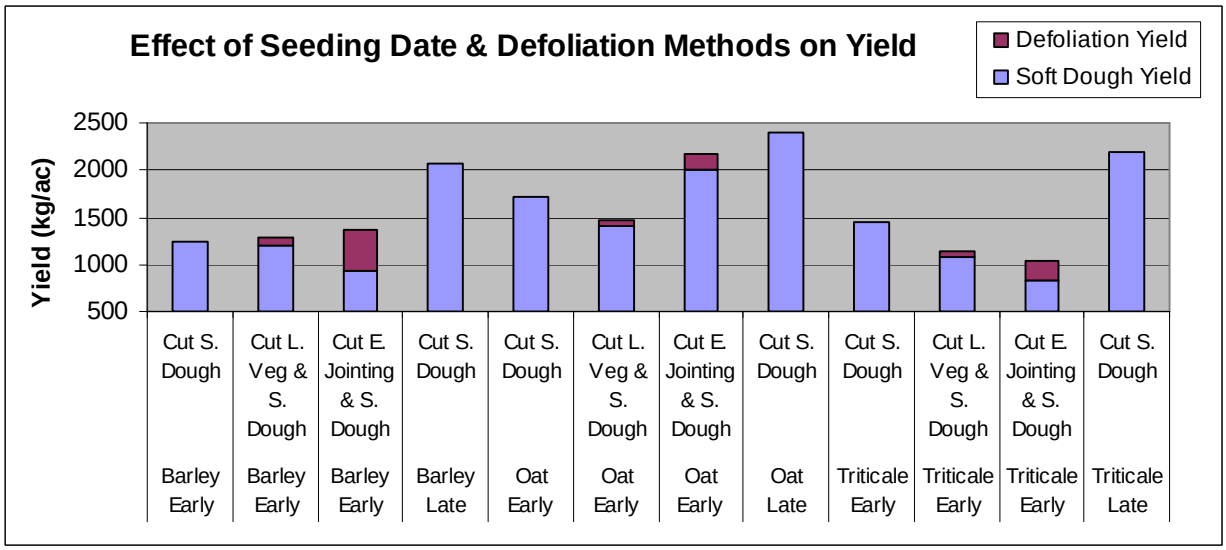
Graph 1. Accumulative weekly precipitation for years 2010-2015.

The site is situated 1 mile south of Swift Current. The soil is classified as a Swinton silty loam. For the most part in 2015, lower than average precipitation in the early growing season had a negative impact for shallow seeded crops. Severe drought like conditions continued through May, June, and July having a negative effect on yield potential and made it difficult to show treatment responses in certain trials. Overall yields for oilseed crops were lower than average due to lack of rain fall. Deeper seeded cereal crops had close to average yields. This was generally the case for area producers who experienced similar conditions resulting in similar yields.

Results

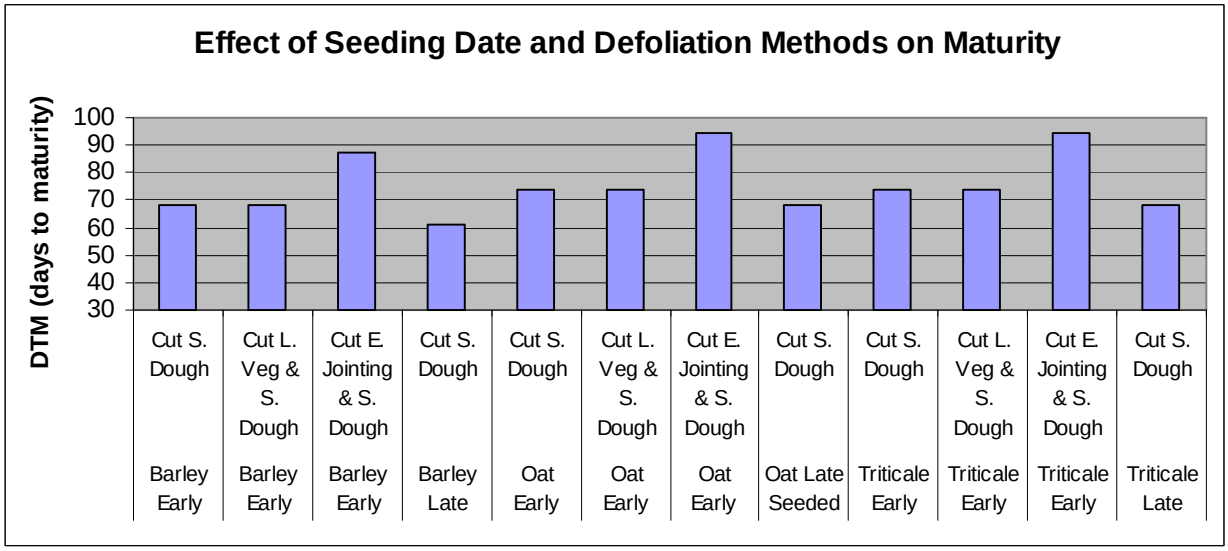
In 2015, spring soil moisture was severely limited and drought condition persisted through much of the growing season. Late season rains did come and the late seeded treatments took advantage of the moisture, while the early seeded treatments were past the point of recovery . The dry mater forage yield, cut at the soft dough stage, in all three crops was greatest when seeded late. This is not typical and is a reflection of the type of year we had (Graph 2.). From the early seeded treatments of triticale and barley, we saw better forage yield cut at soft dough, from the treatments where no defoliation operation was done. The exception was the oats where we saw higher yields cut at soft dough from the treatment where we performed an early jointing defoliation operation.

Graph2.



Another objective of the study was to try to delay maturity of the crop so it could be swathed at a later date and not be subjected to adverse weather late in the season to preserve forage quality. From the two defoliation methods used, the early jointing method was far better at delaying maturity than was the late vegetative method (Graph 3.). Utilizing a later seeding date also resulted in a later maturity date, even though the days to maturity was less. For example the oats seeded late took 68 days to mature and was cut on Aug. 24, whereas the oats seeded early with an early jointing defoliation operation was done, took 93 days to mature and cut on the same day, Aug.24.

Graph 3.



Conclusions

Traditionally, seeding cereals for forages is best done early in the spring to take advantage of early season soil moisture and maximizing forage dry matter yields for swath grazing, but crop quality can suffer because a crop swathed August is subjected to adverse environmental conditions that

can reduce feed quality. As a result many producers delay seeding and forego production in favor of later maturity, however, in 2015, due to abnormal weather patterns, we benefited from higher forage yields from our late seeded crops and at the same time benefited from delayed maturity. Since this was not a typical growing season, producers may be looking for the optimum defoliation method. Our data indicates defoliating the crop at the early jointing stage is the best method of delaying maturity and maintaining forage yield and quality.

Acknowledgements

We thank the Ministry of Agriculture for all our ADOPT projects including plot signage and verbal acknowledgement at field days and on PowerPoint slides during presentations. This will continue at each venue where an extension activity occurs. We also thank Shannon Chant (Saskatchewan Ministry of Agriculture) for her help.

Summary

The goal of this project is to demonstrate the use of early defoliation (simulated grazing) to delay the maturity of early seeded forage cereal crops for swath grazing.

This project demonstrates the effect on dry matter yield of using early season defolitaion to delay the maturity of early seeded cereals for swath grazing. In this demonstration two defoliation stages 1) vegetative and 2) stem elongation were used to demonstrate the recommended stage and a late stage of spring defoliation. Annual forages studied were 1) CDC Maverick barley, seeded early and late, 2) CDC Haymaker oat , seeded early and late, and 3) Bunker Triticale, seeded early and late.

Traditionally, seeding cereals for forages is best done early in the spring to take advantage of early season soil moisture and maximizing forage dry matter yields for swath grazing, but crop quality can suffer because a crop swathed August is subjected to adverse environmental conditions that can reduce feed quality. As a result many producers delay seeding and forego production in favor of later maturity, however, in 2015, due to abnormal weather patterns, we benefited from higher forage yields from our late seeded crops and at the same time benefited from delayed maturity. Since this was not a typical growing season, producers may be looking for the optimum defoliation method. Our data indicates defoliating the crop at the early jointing stage is the best method of delaying maturity and maintaining forage yield and quality.

This project will be promoted during Crop Production Week in Saskatoon in January and locally at Cropportunities 2016 on March 3rd in Swift Current (200+ expected participants). This project was promoted on a CKSW radio program called "Walk the Plots" which we broadcast in the summer on a weekly basis. As well this topic was brought to the attention of the group on the Annual Field Day on July 16th (100 participants) as well as a number of smaller individual tours. This topic will also be posted on our website.