Saskatchewan AgriARM Applied Research Management

Wheatland Conservation Area Inc.
Swift Current, SK.

Desiccant Options for Red Lentils.
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ADOPT 2016

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Final Report

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2016 Report

Abstract

In 2016 a trial was done in Swift Current titled "Desiccant Options for Red Lentils". The purpose of this demonstration is to show farmers the currently registered desiccant options for lentils, allowing them to select an appropriate chemistry to suit their needs for desication, weeds control, seed viability, and budget. This demonstration consisted of seven registered desiccant options for lentils as well as an untreated check to demonstrate the effectiveness of a desiccant. The Glufosinate treatment provided the fastest dry down at 7.5 days and, as expected, the slowest dry down from the untreated check where the crop was left to mature and dry down on it's own, at just over 19 days. Another message extended to producers using glyphosate as a dry down product was not to use the harvested crop for next years seed source, since there are germination concerns. Germinations test showed there was no significant difference between the top three treatments which included the plots that were left untreated, the plots treated with glufosinate, and the plots treated with Reglone + LI700. These are followed by all the treatments containing glyphosate along with the treatment with Heat LQ with significantly poorer germination levels as low as 68.5%. In 2016, dry down products has less of an effect on yield an grain quality due to favorable weather condition from the time of desiccation to the time the trial was harvested. One exception was a rainfall event eight days after desiccant application where approximately 1/2 of an inch rain fell. This precipitation event may have had a negative effect on yield for the one treatment that had already reached 100% dry down (Glufosinate) due to environmental losses, however these losses were not quantified.

Project Objectives

The objective of this demonstration is to determine which registered products provide the most effective desiccation of red lentils.

Project Rationale

The practice of using a pre-harvest desiccants has become quite common in numerous crops grown on the prairies. Producers have struggled for a number of years when deciding which pre-harvest dry down product to use. Issues regarding dry down speed, seed viability, pre-harvest weed control, and cost all factor into the decision. With the addition of some newer dry down products available for red lentils, this decision becomes become more complex.

Due to the indeterminant growth habit of lentils, physiological stress is required to dry down and mature the crop. Dry and hot environmental conditions can often help, but farmers have been using desiccants as a way to hasten the dry-down process. Farmers in southwest Saskatchewan

have received higher than normal precipitation and near optimal growing conditions over the past few years. In addition, multiple fungicide applications are used to control the higher disease pressure lately found in lentil. Both environmental conditions and application of fungicide has contributed to the delay in maturity of lentils. Since the optimum harvest window is relatively small for red lentils, these delays can be very costly in terms of increased harvest losses and seed quality. Also, the products on the market differ substantially in terms of dry down speed and cost. The purpose of this demonstration is to show farmers the currently registered desiccant options for lentils, allowing them to select an appropriate chemistry to suit their needs for desication, weeds control, seed viability, and budget.

Methods

This demonstration consisted of seven registered desiccant options for lentils as well as an untreated check to demonstrate the effectiveness of a desiccant. A treatment was added (Glyphosate followed by Reglone Ion 7 days later) due to the thick density of the crop stand. Treatments were arranged as a randomized complete block design with four replicates. CDC Maxim lentils was direct seeded into cereal stubble at 160 viable seeds/m2 using a Fabro Cone Seeder. Fertilizer, inoculants, fungicides, and pesticides were applied to maximize grain yield. All treatments were applied at physiologic maturity (when bottom 15% of pods were brown and rattle when shaken) and harvested when dry. The treatments were as follows:

1) Glufosinate (1.09L/ac) GoodHarvest
2) Glyphosate (360 g ai/ac)
3) Heat (28.4 g ai/ac + 0.2 L/ac Merge)
4) Glyphosate (360 g ai/ac) + Heat (28.4 g ai/ac + 0.2 L/ac Merge)
5) Reglone (0.6 L/ac)
6) Glyphosate (360 g ai\ac) + LI 700 surfactant
7) Untreated
8) Glyphosate (360 g ai/ac) followed by Reglone Ion 7 days later

The following Measurements were taken:

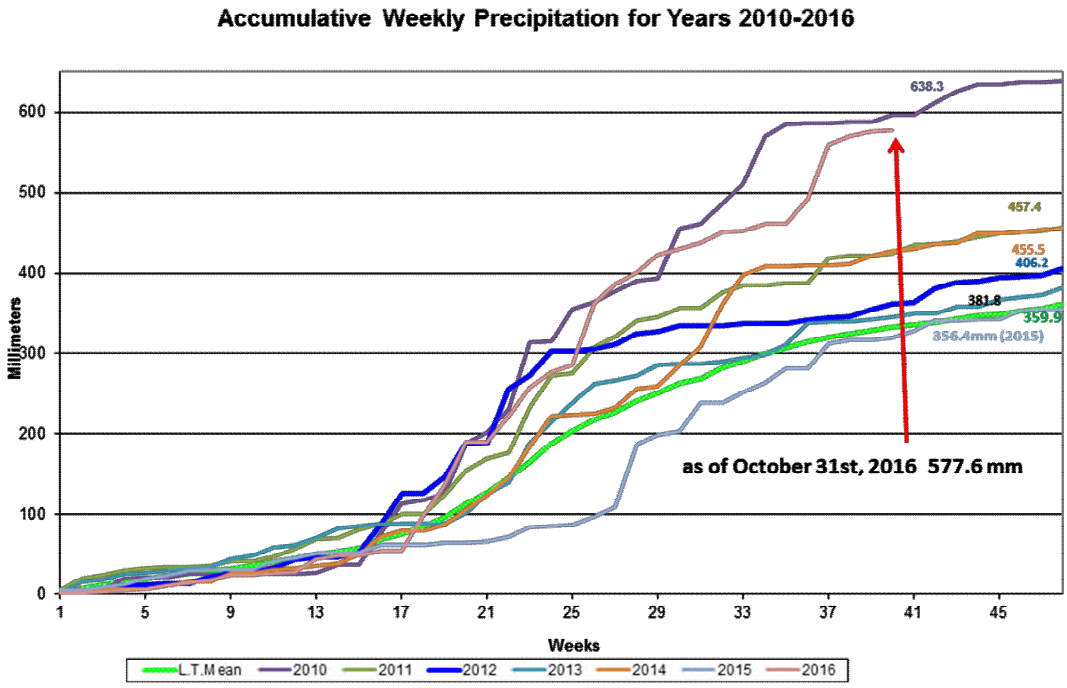
- Rates of dry-down every two days after treatment application (0-100% visual assessment + photographs of each plot)
- Grain yield
- Grain quatily
- Grain moisture at harvest
- Germination of harvested seed (% of 100 seeds)
- Cost of each treatment application

Other field note were as follows:

12-May	Pre-seed burnoff @ .67 l/ac of RT540	
16-May	Seeded trial with Fabro plot drill; 9 inch row spacing; atomjet knife openers	
	Imax CL lentils seeded at 184 seeds/m2 to get 160 viable seeds/m2 50.76 grams/1000 seeds; 95% germ, 10% mortality	
	Fertilitiy:	40 lb/ac of P sidebanded
	Inocculant:	Tagteam LCO @ 3.6 lb/ac in seed row.

08-Jun	Incrop with Odyssey @ 17.3 g/ac + Poast Ultra @ 190 ml/ac + Merge @ .5 l/100 L
16-Aug	Applied all desiccant treatments
	Rates of dry down recorded every second day and photos taken
22-Aug	Applied second app (Reglone Ion @ 0.61 l/ac) to treatment 8 only
02-Sep	Combined all plots with Zurn combine (7 rows taken)
	Grain yields weighed.
	Grain moistures done (moistures done after equibriation period)
	Grain quality rated
	Germination of harvested seed
	Cost of each treatment recorded

General Site Conditions



Graph 1. Accumulative weekly precipitation for years 2010-2016.

Spring precipitation and soil moisture was poor, which enabled us to complete early field preparation and seeding without delay. Rain started to fall in May and continued into the growing season and through harvest. This generally resulted in good crop development and yield, however, disease and harvest delays were and issue in some cases due to abundant precipitation and two bouts of wet heavy snowfall midway through harvest.

Results

Weather conditions played a large role in the outcome of this trial. Abundant seasonal rainfall amounts produced a thick heavy plant stand, however, due to the indeterminate growth habit of lentils, these wet conditions had a limiting effect on yield. Overall lentil yields were lower than average in southwest Saskatchewan and some lentil fields were not harvested due to poor yields.

With a very narrow optimum harvest window for lentils, desiccant efficiency and rate of dry down also play an important role. The longer the unharvested crop is exposed to inclement weather, the greater the risk of less than ideal grain quality and environmental harvest losses.

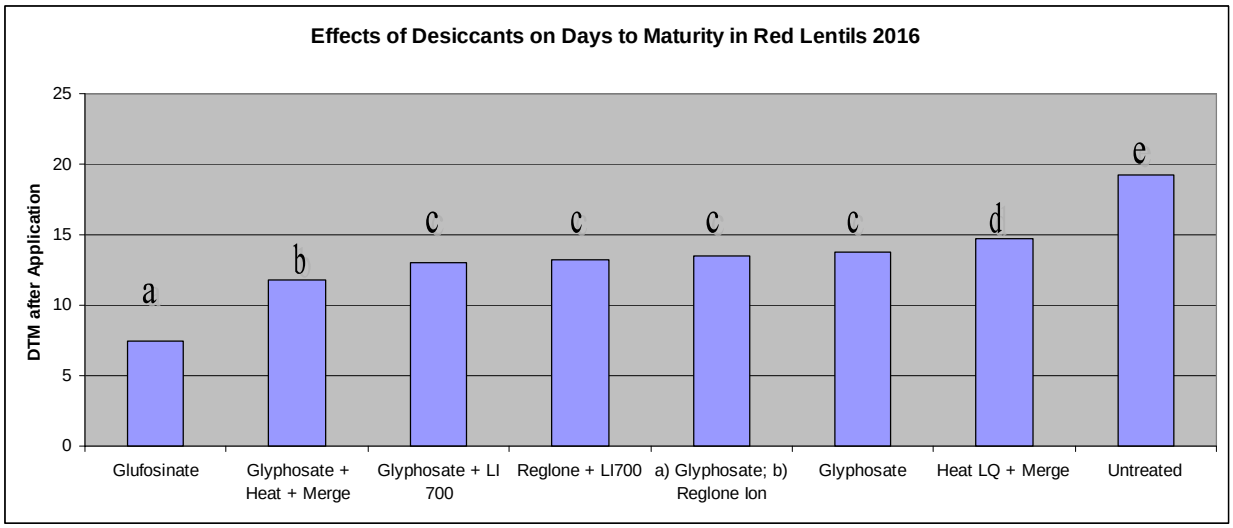
The table below (Table 1.) shows the daily temperatures, along with precipitation amounts from the date the desiccants were applied (Aug 16, 2016) to the date the crop was harvested (Sept.2, 2016). The table shows hot and dry conditions for the entire dry down period , with the exception of one major rainfall event eight days after desiccant application where approximately 1/2 of an inch rain fell and may have delayed the dry down process somewhat. This precipitation event may have also had a negative effect on yield for the treatments that had already reached 100% dry down (Glufosinate) due to environmental losses.

Table 1.

2016 SWIFT CURRENT RESEARCH CENTER DAILY WEATHER					
(from day of desiccant application to harvest Aug 16-Sept 2)					
Year	Month	Day	Max T	Min T	Rain
2016	8	16	28.9	13.4	0
2016	8	17	24.9	15.7	0
2016	8	18	20.3	9.8	0.2
2016	8	19	17.9	6.8	0
2016	8	20	23.5	7.6	0
2016	8	21	30.5	11.9	0
2016	8	22	26.3	14.3	0
2016	8	23	16.8	7.9	12.4
2016	8	24	16.2	8.9	0.6
2016	8	25	19	7.4	0.5
2016	8	26	18.6	10.8	0.7
2016	8	27	26.8	6.7	0
2016	8	28	18.9	12.4	0
2016	8	29	22.9	4.1	0
2016	8	30	26.9	9.1	0
2016	8	31	26.5	12.7	0
2016	9	1	28.7	16.7	0
2016	9	2	26	14.9	0

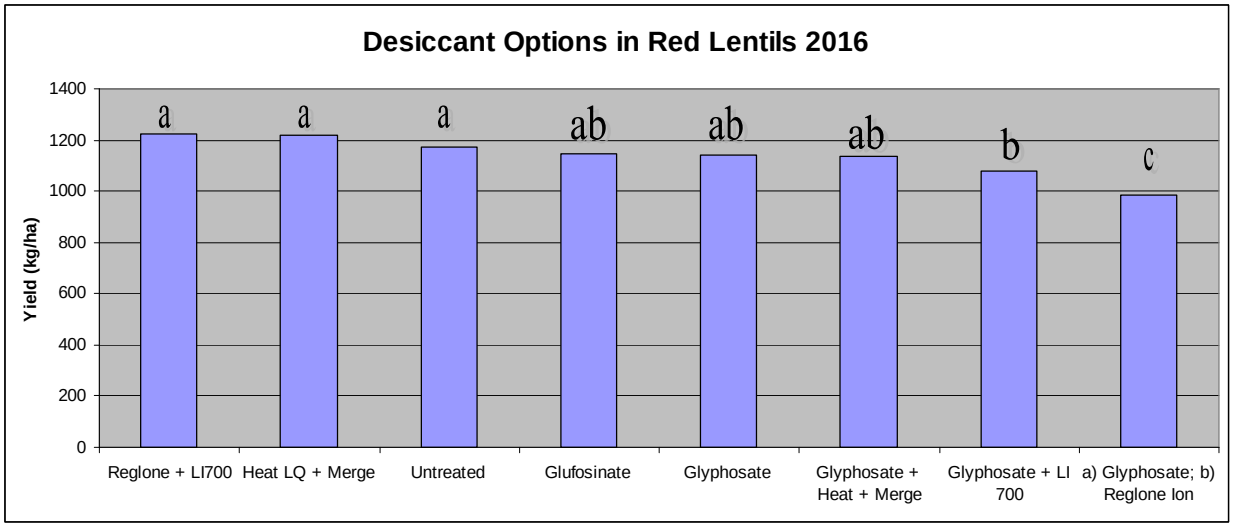
In this trial, we saw the fastest dry down from the Glufosinate (Good Harvest) treatment at 7.5 days and, as expected, the slowest dry down from the untreated check where the crop was left to mature and dry down on it's own, at just over 19 days (Graph 1.).

Graph 1.



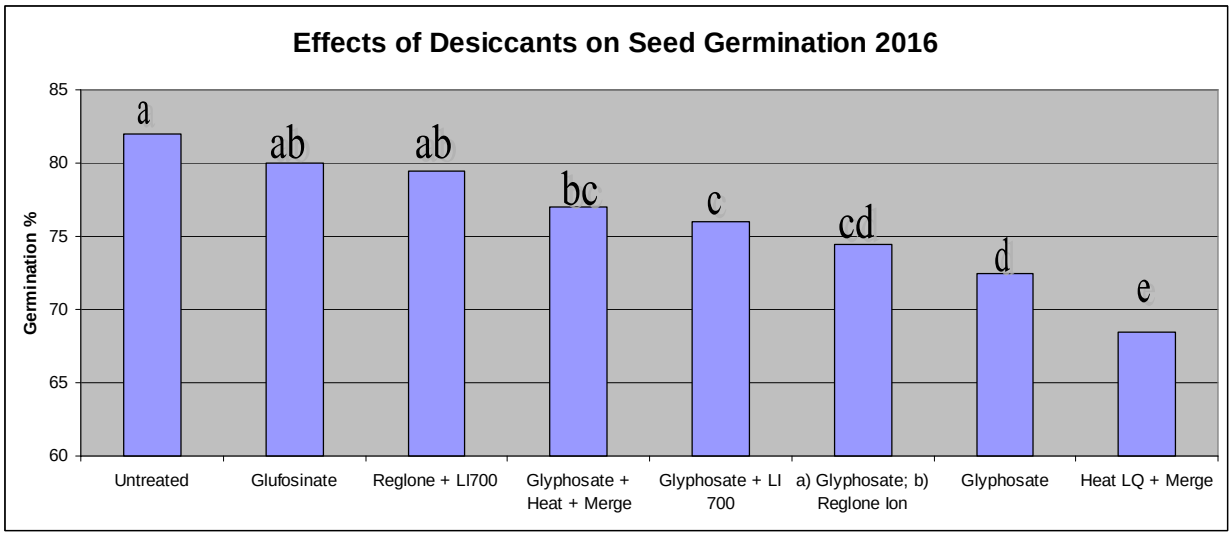
The longer the unharvested crop sits in the field exposed to the elements, the greater the risk of less than ideal grain quality and environmental harvest losses. In 2016, dry down products has less of an effect on yield an grain quality due to favorable weather condition from the time of desiccation to the time the trial was harvested. One exception was a rainfall event eight days after desiccant application where approximately 1/2 of an inch rain fell. This precipitation event may have had a negative effect on yield for the one treatment that had already reached 100% dry down (Glufosinate) due to environmental losses (Graph 2.). All harvested samples in 2016 graded a Canada No.2 for quality.

Graph 2.



Another message extended to producers using glyphosate as a dry down product was not to use the harvested crop for next years seed source, since there are germination concerns. Germinations were done on all eight dry down treatments (Graph 3.). There was no significant difference between the three treatments with the highest germinations, which came from the plots that were left untreated, the plots treated with glufosinate, and the plots treated with Reglone + LI700. These are followed by all the treatments containing glyphosate along with the treatment with Heat LQ with significantly poorer germination levels as low as 68.5%.

Graph 3.



Cost per Treatment

Treatment	Cost per Acre
Heat LQ + Merge	$12.95
Untreated	$0.00
Glyphosate	$4.20
Glyphosate + Heat + Merge	$13.60
Glyphosate + LI 700	$6.70
Glufosinate	$8.44
Reglone + LI700	$18.10
a) Glyphosate; b) Reglone Ion	$17.52

*two application

Conclusions

The decision of which dry down product to use is based on a number of factors and cost is not necessarily the most important factor in the decision. Obviously, the untreated check is by far the cheapest treatment since no application is performed, however, risk factors come into play. The longer an unharvested crop sits in the field exposed to the elements, the greater the risk of less than ideal grain quality, lodging issues and environmental harvest losses. In this case, severe economic losses could be incurred. On the other hand, there is no need sinking dollars into multiple applications when weather conditions are favorable for dry down and crop stands are such that one application provides reasonable coverage. With a heavy thick crop this can be a lot to ask of a single desiccant application. In 2016, we experienced favorable dry down conditions, with daily high temperature for the period averaging over 25 degrees Celsius and only approximately 1/2 inch of precipitation for the period. The Glufosinate treatment provided the fastest dry down at 7.5 days and, as expected, the slowest dry down from the untreated check where the crop was left to mature and dry down on it's own, at just over 19 days. Another message extended to producers using glyphosate as a dry down product was not to use the harvested crop for next years seed source, since there are germination concerns. Germinations test showed there was no significant difference between the top three treatments which included the plots that were left untreated, the plots treated with glufosinate, and the plots treated with Reglone + LI700. These are followed by all the treatments containing glyphosate along with the treatment with Heat LQ with significantly poorer germination levels as low as 68.5%. In 2016, dry down products has less of an effect on

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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 purpose of this demonstration is to show farmers the currently registered desiccant options for lentils, allowing them to select an appropriate chemistry to suit their needs for desication, weeds control, seed viability, and budget. This demonstration consisted of seven registered desiccant options for lentils as well as an untreated check to demonstrate the effectiveness of a desiccant as follows:

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This project was promoted during Crop Production Week in Saskatoon in January and will be 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 17th (100 participants) as well as a number of smaller individual tours. This topic will also be posted on our website.


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