MINNESOTA TURF SEED COUNCIL
NEWSLETTER
April 23, 2019

INTRODUCTION

Welcome to the second edition of the Northern Minnesota Turf Seed Growers Newsletter for 2019. The primary objective of this newsletter is to report on weather conditions, crop growth & development, pest management and to chart year-to-date perennial ryegrass growing degree days (GDD) compared to the previous six years. The newsletter is scheduled for weekly distribution from the beginning of ryegrass green-up through swathing.

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RYEGRASS GROWING DEGREE DAYS (GDD)

Ryegrass GDD will be tracked for the 2019 growing season with comparisons to the previous six years. In northern MN, the accumulation of GDD is triggered after the snow has melted from perennial ryegrass fields. The base temperature for ryegrass is 32 degrees F (T Base = 32 F)
Formula to calculate GDD:

$$\frac{(\text{Daily High Temp} + \text{Daily Low Temp}) - \text{T base}}{2}$$

Reported GDD are based on the total accumulation from the beginning of the calendar year, after snow has melted from ryegrass fields, to the current date. Thus far in 2019, we have accumulated 102 GDD as of April 21st (Table1).

Table 1. Growing degree days (GDD), March & April 2013 to March & April 2019 near Roseau MN.

Year	**2019**	**2018**	**2017**	**2016**	**2015**	**2014**	**2013**	**2019 vs. 18**
March	0	0	90	38	119	0	0	0
April		184	458	263	367	159	80	
April 1-21	102							
Total		184	548	301	486	159	80	
*April 22 - May 1	136							

* Forecasted GDD at Roseau for the next 10 days.

GENERAL CROP CONDITION

Perennial ryegrass plants are beginning to break winter dormancy. The frost is making its way out of the ground, as soil that was dry during the day, is moist in the morning with ponded water in areas of the fields. As of April 21st, frost depths in fields at the Magnusson Research Farm ranged from 12 to 16 inches in bluegrass sod to 18 to 24 inches deep in tilled ground. The average soil temperatures were 44 F in tilled ground and 38 F in turf conditions.

Perennial ryegrass breaks winter dormancy in more of a gradual than rapid process (e.g. flipping a switch). Perennial ryegrass variety, time of seeding (spring vs. fall), size of the crown going into winter, residue on the soil surface, temperatures and soil moisture are all factors that influence the speed in which ryegrass breaks dormancy.

CROP MANAGEMENT

When should spring nitrogen be applied in perennial ryegrass? In northern MN, perennial ryegrass goes through three distinct phases in the uptake and utilization of nitrogen from the soil.

- **Phase 1 - Slow nitrogen uptake - up to approximately 700 GDD**
- **Phase 2 - Rapid nitrogen uptake - 700 - 1,300 GDD**
- **Phase 3 - Nitrogen redistribution - greater than 1,300 GDD**

Thus far in 2019, we have accumulated 102 GDD. Previous fertility data suggests if some nitrogen was applied in the fall, spring applications can be delayed until approximately, 700 GDD without yield consequence. In a spring only program, nitrogen should be applied earlier (up to 500 GDD) as ryegrass may exhibit symptoms of fertility stress, if plant available nitrogen is not the root zone. Ideally, rainfall after spring applications of fertilizer will assist the movement of nitrogen into the rooting zone. The current 10-day forecast indicates an average GDD accumulation of 13.6/day and the average GDD for early May is 16/day. Based on this weather data the accumulation of 500 GDD will take approximately 3.5 weeks and 700 GDD by the end of the third week in May.

What about sulfur? Recent research suggests that spring applied sulfur may play an important role in top-end ryegrass production. This is especially true if fields are low in sulfur and have a heavy straw load. In these conditions, sulfur can be tied up by soil microbes and not available for root uptake.

Table 2. Perennial Ryegrass Yield, Plant Height, Relative Chlorophyll Index (RCI) and Vigor Rating in 'Evolution' Perennial Ryegrass in 2018.

Treatment	Seed Yield	Plant Height^	RCI*	Vigor#
	#/acre	(Inches)	(Index)	(1-9 scale)
26-0-0-30s	1660	21	639	7.7
26-0-0	1342	19	528	4.3
Field applied Nitrogen, 110-0-0	1325	19	513	4.7
LSD (0.05)	139	2	76	1.5

Farmer cooperators: Brian and Sheldon Rice
^ Average of 5 heights in each treatment and rep (3 treatments x 3 reps = 9 samples
* Relative Chlorophyll Index (RCI) on 6/4. Higher number more chlorophyll
# Vigor on 6/4. 1 low vigor light green color, 9 = high vigor dark green color

The results in Table 2, were collected from an on-farm trial in cooperation with Rice Farms in 2018. Trial design was a RCB with three replications. Spring soil test for sulfur was 10 ppm and OM was 3%. The 26-0-0 (57# urea) was applied to account for the nitrogen in the AMS treatment.

Summary of these results include:

- A spring application of sulfur gave higher ryegrass seed yields than the field rate of nitrogen 110-0-0, or the additional urea 136-0-0
- Ryegrass was taller, greener and more vigorous from AMS compared to urea alone
- The additional urea, 136-0-0 gave similar results as the field rate of 110-0-0
- Additional information can be found at the MN Turf Seed web site: 2018 U of MN Research Progress Reports: http://www.mnturfseed.org/html/progress_reports.html

Next week's newsletter will be released on April 30th, 2019.