NORTHWEST CROPS & SOILS PROGRAM

2021 Fall Forage Oat Seeding Rate Trial

Dr. Heather Darby, UVM Extension Agronomist
Sara Ziegler, Ivy Krezinski, and Laura Sullivan
UVM Extension Crops and Soils Technicians
(802) 524-6501

Visit us on the web at http://www.uvm.edu/nwcrops

THE UNIVERSITY OF VERMONT EXTENSION

2021 FALL FORAGE OAT SEEDING RATE TRIAL

Dr. Heather Darby, University of Vermont Extension
heather.darby[at]uvm.edu

In 2021, the University of Vermont Extension's Northwest Crop and Soils Program evaluated the performance of forage oats planted at various seeding rates. In the Northeast, cool season perennial grasses dominate pastures and hay meadows that farmers rely on. Often times during the fall months, the perennial pasture will decline in yield and quality. The addition of cool season annual forages, such as oats, into the grazing system during this time may help improve the quality and quantity of forage. To maximize fall forage yields, farmers want to know if they should increase oat seeding rates. To determine if higher seeding rates of oats will boost fall forage production, a trial was initiated in the fall of 2021 to evaluate oat seeding rates from 75 to 200 lbs per acre.

MATERIALS AND METHODS

The trial was established at Borderview Research Farm in Alburgh, VT, and the plot design was a randomized complete block with four replications (Table 1). The soil type was Benson rocky silt loam and the previous crop was milkweed. Six seeding rates of the forage oat variety Everleaf 126 were the treatments.

Table 1. Forage oat seeding rate trial management, Alburgh, VT, 2021.

Location	Borderview Research Farm – Alburgh, VT
Soil type	Benson rocky silt loam
Previous crop	Milkweed
Tillage operations	Pottinger TerraDisc
Planting equipment	Great Plains Cone seeder
Treatments (seeding rates in lbs ac^{-1})	75 100 150 175 200
Replications	4
Plot size (ft)	5 x 20
Planting date	23-Aug
Harvest date	3-Nov

The seedbed was prepared with a Pottinger TerraDisc. The trial was planted with a cone seeder on 23-Aug into 5' x 20' plots. On 3-Nov, the plots were harvested using a Carter flail forage harvester equipped with a scale in a 3' x 20' area and the plot weight recorded. An approximate 1 lb subsample of the harvested material was collected and dried to determine dry matter content and calculate dry matter yield.

Variations in yield and quality can occur because of variations in genetics, soil, weather and other growing conditions. Statistical analysis makes it possible to determine whether a difference among varieties is real, or whether it might have occurred due to other variations in the field. At the bottom of each table, a LSD value is presented for each variable (i.e. yield). Least Significant differences (LSD's) at the 10% level of probability are shown. Where the difference between two varieties within a column is equal to or greater than the LSD value at the bottom of the column, you can be sure in 9 out of 10 chances that there is a real difference between the two varieties. Treatments that were not significantly lower in performance than the highest value in a particular column are indicated with an asterisk. In this example, A is significantly different from C but not from B. The difference between A and B is equal to 1.5, which is less than the LSD value of 2.0. This means that these varieties did not differ in yield. The difference between A and C is equal to 3.0, which is greater than the LSD value of 2.0. This means that the yields of these varieties were significantly different from one another. The asterisk indicates that B was not significantly lower than the top yielding variety.

Variety	Yield
A	6.0
B	7.5*
C	**9.0***
LSD	2.0

RESULTS

Weather data was recorded with a Davis Instrument Vantage Pro2 weather station, equipped with a WeatherLink data logger at Borderview Research Farm in Alburgh, VT (Table 2).

Table 2. Weather data for Alburgh, VT, 2021.

	August	September	October
Average temperature (°F)	74.0	62.8	54.4
Departure from normal	3.25	0.14	4.07
Precipitation (inches)	2.29	4.09	6.23
Departure from normal	-1.25	0.42	2.40
Growing Degree Days (base 41°F)	1006	655	433
Departure from normal	86	3	130

Based on weather data from a Davis Instruments Vantage Pro2 with WeatherLink data logger.
Historical averages are for 30 years of NOAA data (1991-2021) from Burlington, VT.

Temperatures were above normal in August and October but were average in September. Dry conditions persisted through August, but rainfall finally arrived in September and October with 2.46 inches above normal accumulating in October. From August through October, there were an accumulated 2094 Growing Degree Days (GDDs) at a base temperature of 41° F, which is 219 more than the 30-year normal. In general, conditions were favorable for forage growth.

Planting forage oats at seeding rates ranging from 75 lbs ac^{-1} up to 200 lbs ac^{-1} produced statistically similar dry matter yields (Table 3). The average yield was 1.06 tons ac^{-1} with no significant difference between any of the treatments, even when the seeding rate was more than doubled. These data suggest that, for planting a fall forage oat monoculture, a seeding rate of 75 lbs ac^{-1} is sufficient to produce optimal yields.

Table 3. Yield of six forage oat seeding rates, 2021.

Seeding rate	Dry matter yield	
lbs ac^{-1}	lbs ac^{-1}	tons ac^{-1}
75	2261	1.13
100	2381	1.19
150	**2486**	**1.24**
175	1752	0.876
200	1767	0.883
LSD (p = 0.10)	NS†	NS
Trial mean	2129	1.06

†NS- Not statistically significant.

DISCUSSION

Seeding fall forage oats can help extend the grazing season providing supplemental high-quality forage late in the season. When planting at an optimal time in our region, approximately in mid to late August, yields of approximately 1 ton of dry matter per acre can be attained from seeding rates as low as 75 lbs ac^{-1}. No additional yield benefit was observed from increasing the seeding rate, even to levels more than double that rate. However, it is important to note that under scenarios of delayed planting beyond mid to late August or sub-optimal soil fertility, higher seeding rates may provide additional benefit but these scenarios were outside the scope of this trial.

ACKNOWLEDGEMENTS

This trial was funded by the Organic Research and Extension Initiative, project no. 2016-51300-25735. UVM Extension would like to thank Roger Rainville and his staff at Borderview Research Farm in Alburgh for their generous help with the trials. We would like to acknowledge Henry Blair, John Bruce, Catherine Davidson, Hillary Emick, and Lindsey Ruhl for their assistance with data collection and entry. The information is presented with the understanding that no product discrimination is intended and no endorsement of any product mentioned or criticism of unnamed products is implied.

UVM Extension helps individuals and communities put research-based knowledge to work.