

NORTHEAST SARE 2000 FARMER/GROWER GRANT REPORT

Project Title: Pasture Illumination

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Introduction

I am a full-time dairy farmer and have been for 29 years. I own my farm and rent additional cropland. Total pastureland and cropland is 230 acres. I grow corn, oats, and mixed hay as well as 2 to 5 acres of potatoes. I recently installed a rotational grazing system on my farm as well as a manure structure with a milk-house filter system. I intensively graze about 30 acres of pasture that is broken into 30 paddocks. I also installed a water system so each paddock has water in the paddock. I plan to expand my grazing system in the future.

From April 15, 1999, to November 23, 1999, I have watched my cows graze in my grazing system. I pasture both during the day and at night. At night, when it gets dark the cows always lay down and eat a circle of grass around their head. When I would go to get them in the morning (3:30 am) the cows would be lying in the same spot where they originally laid down when it became dark. I use a four-wheeler to move my cows. When the light from the four-wheeler would shine on the paddocks the cows would immediately stand up and start to graze. Penn State says that dry-matter intake can be increased in the barn by leaving the lights on in the barn so that the cows can see to eat. I used two portable halogen lights on my one-acre paddocks to illuminate my pastures so that my cows were stimulated to graze at night. When they graze more they will produce more milk and make my operation more profitable.

Results and Observations

I built my lights out of aluminum with a base to hold the 12-volt battery and an extendable pole with a halogen light mounted on the end. Be sure to install rubber between the batteries and metal to prevent the batteries from grounding. A simple switch controls the on/off of the lights. I used deep cycle marine batteries because they can be discharged again and again and still be recharged. The halogen light is the high beam from a Chevy pick up truck. I built two complete units and have about \$385 in each light. They could be built cheaper if steel were used instead of aluminum. I turn the lights on and when the batteries get low I simply put them on the charger all day and they are ready to go that evening. The only real work is moving the lights and recharging the batteries. I want to install a solar panel to charge the batteries therefore making this idea even less labor intensive. I have one-acre paddocks and I place the light in one corner of the paddock and the entire paddock is illuminated. Before the lights the cows would go to pasture at dark, graze for about a half-hour and lay down. With the lights on the cows go

to pasture at dark, graze for two to four hours then lay down. This increases dry matter intake and therefore milk production. I have also seen an increase in grazing efficiency and more uniform grazing.

During the last week in May and the first week in June I ran my first trial using the lights. From May 24 to May 28 I did not use the lights for grazing and recorded my milk production. Cows went on pasture about dark and stayed there until I went to get them for the morning milking. Milk production during this time averaged 47.4 pounds per cow per day. That was for 28 cows, 14 jersey and 14 holsteins. From May 30 to June 3 I illuminated the pastures at night using one halogen light that ran off of a battery. Weather conditions were the same both weeks and the cow numbers were the same. The only change was the illumination of the paddocks during the second week. Milk production averaged 50 pounds per cow per day while using the lights. A 3-pound per cow per day increase in production.

Over the week this increase in milk production equated to a 439 pound increase. My milk price at that time was \$14.30 per hundred. At that milk price the lights were putting an average of \$10.46 per day more profit into my pocket with minimal effort on my end. Over the summer I ran one trial per month. The data from my first trial along with additional data is summarized in the pages that follow. I saw my best results in September when the days became shorter. My second best increase was in July and then August. I attributed this to beating heat stress during the hot months of summer. Warm days usually hinder the cows from grazing therefore reducing milk production. Using pasture illumination and grazing at night, I was able to increase dry matter intake and increase milk production.

Conclusions

Illuminating pastures at night increased my milk production between 2.4 and 5.8 pounds per cow per day. I had little investment in the lights and movement of the lights. This practice provides the most benefits during hot months and in the fall when the days become shorter. These lights can also be used in the barn when the power is off. I also used them while installing my new milking parlor this past fall.

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June

Illuminated pasture one light

Pickup date	Production Pounds	Average per cow Pounds/day
05/30/00	2699	48.2
06/01/00	2736	48.9
06/03/00	2973	53.1
Total	8408	50.0

Non-illuminated pasture

Pickup date	Production Pounds	Average per cow Pounds/day
05/24/00	2691	48.1
05/26/00	2639	47.1
05/28/00	2639	47.1
Total	7969	47.4

Economics

May milk \$14.30 per hundred

Illuminated production	8408 pounds
Non-illuminated production	7969 pounds
Difference	439 pounds

439 pounds * \$14.30 per hundred	\$62.78 per six days
	\$10.46 per day increase

Note: Pickup represents two days milkings.
 28 cows, 14 Jersey, 14 Holstein

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July

Illuminated pasture one light

Pickup date	Production Pounds	Average per cow Pounds/day
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07/20/00	3020	40.8
07/22/00	3140	42.4
07/24/00	3190	43.1
Total	9350	42.1

Illuminated production	9350 pounds
Non-illuminated production	8430 pounds
Difference	920 pounds

Non-illuminated pasture

Pickup date	Production Pounds	Average per cow Pounds/day
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07/14/00	2870	38.8
07/16/00	2740	37.0
07/18/00	2820	38.1
Total	8430	38.0

Note: Pickup represents two days milkings.
37 cows

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August

Illuminated pasture one light

Pickup date	Production Pounds	Average per cow Pounds/day
08/23/00	3360	42.0
08/25/00	3410	42.6
08/27/00	3320	41.5
Total	10090	42.0

Illuminated production	10090 pounds
Non-illuminated production	9350 pounds
Difference	740 pounds

Non-illuminated pasture

Pickup date	Production Pounds	Average per cow Pounds/day
08/17/00	3110	38.9
08/19/00	3160	39.5
08/21/00	3080	38.5
Total	9350	39.0

Note: Pickup represents two days milkings.

40 cows

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September

Illuminated pasture one light

Pickup date	Production Pounds	Average per cow Pounds/day
09/24/00	3140	40.3
09/26/00	3290	42.2
09/28/00	3180	40.8
Total	9610	41.1

Illuminated	9610 pounds
Non-illumin	8260 pounds
Difference	1350 pounds

Non-illuminated pasture

Pickup date	Production Pounds	Average per cow Pounds/day
09/18/00	2660	34.1
09/20/00	2790	35.8
09/22/00	2810	36.0
Total	8260	35.3

Note: Pickup represents two days milkings.

39 cows

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October

Illuminated pasture one light

Pickup date	Production Pounds	Average per cow Pounds/day
10/17/00	2710	36.6
10/19/00	2580	34.9
10/21/00	2690	36.4
Total	7980	35.9

Illuminated production	7980 pounds
Non-illuminated production	7430 pounds
Difference	550 pounds

Non-illuminated pasture

Pickup date	Production Pounds	Average per cow Pounds/day
10/11/00	2560	34.6
10/13/00	2490	33.6
10/15/00	2380	32.2
Total	7430	33.5

Note: Pickup represents two days milkings.
37 cows