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Dairy Update

**SUPPLEMENTAL LIGHT MAY
 INCREASE MILK YIELD**

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NOTE: This material was abstracted from Michigan State University Extension Bulletin E-2013 (November, 1986). Authors of this 8-page bulletin are E.P. Stanisiewski and H.A. Tucker, Department of Animal Science, Michigan State University, East Lansing, MI.

Dairy cows exposed to 16 hours of fluorescent lighting per day during fall and winter months produced 8% more milk than herdmates exposed to normal amounts of light. Eight-foot, two-tube fluorescent light fixtures, providing approximately 100 watts per lamp, were installed in 13 stanchion barns at the rate of one fixture for every four cows. The type of fluorescent lamp (cool-white or simulated-sunlight) used didn't appear to make a difference.

Economic Assessment

The potential costs and benefits are outlined in Table 1. Daily net profits are estimated to be 16 cents per cow. The time required to pay off the added investment runs from 317 days in a 100-cow herd to 345 days in a 20-cow herd when the cost of electricity is 8 cents per kwh and milk is valued at \$11.60 per cwt. Supplemental lighting is recommended for use only during the fall and winter months provided cows access natural light in the spring and summer. Thus, the cost of supplemental lighting can be paid in full in two winters or less.

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Table 1. Itemized income and costs from 16 hours of supplemental light for dairy herds.

Affected factor, per cow	Daily income	Daily cost
8 percent increase in milk yield ¹	\$.46	
0.16 percent decrease in milk fat ²		\$.13
6 percent increase in feed intake ³		.10
Power needed to operate an 8-ft light fixture for 16 hr ⁴		.07
TOTAL	\$.46	\$.30
Net	\$.16	

Fixed costs for cows in stanchion barns	Herd size:	Cost per cow			
		20	40	100	200
8-ft dust-and-moisture-resistant, rapid-start, high-output light fixture (\$180 @ 1 per 4 cows)		\$45.00	\$45.00	\$45.00	\$45.00
Automatic timer (\$85)		4.25	2.13	.85	.43
Labor (licensed electrician @ \$30/hr)		6.00 ^a	6.00 ^b	4.80 ^c	4.80 ^d
TOTAL		\$55.25	\$53.13	\$50.65	\$50.23

PAYOFF TIME NEEDED FOR FIXED COSTS: $\frac{\$55.25}{.16} = 345$ days; $\frac{\$50.23}{.16} = 314$ days

Range: 314 to 345 days

- ¹ Based on 50 lb/day at \$11.60 cwt
² Milk fat differential, \$.16/cwt for each 0.1 percent under 3.5 percent
³ \$1.68/day for 1400 lb cow producing 50 lb/day
⁴ Two lamps/fixture, 100 watts each at \$.08/kwh

- ^a 4 hr estimated labor time
^b 8 hr estimated labor time
^c 16 hr estimated labor time
^d 32 hr estimated labor time

Questions and Answers

Q. To be effective, how intense does the lighting need to be?

A. Light intensity is measured in lighting units called footcandles. A minimum of 20 footcandles, preferably 30 or more, is recommended. At this intensity, you should be able to easily read printed material located near a cow's head.

Q. How many light fixtures will I need to install in a stall barn and how should they be positioned in the barn?

A. Satisfactory results were achieved when 8 foot fixtures were placed at the rate of one every four cows (6 to 8 feet apart), 7 to 10 feet above the cows' heads. Note: fixtures are to be placed parallel to the feed alley.

Q. If I have free-stall housing, can I still use a supplemental lighting program?

A. The formula for free-stall housing does not appear to be as clear cut as that used in tie-stall or stanchion housing. Studies at Michigan State University have shown that six 8-foot fluorescent light fixtures per 50 free stalls, situated over the alley between two rows of stalls, is adequate to stimulate milk yield. It is best, however, to place the lights over the cows' heads in the areas where they spend the most time.

Q. What about extending the supplemental lighting period beyond 16 hours?

A. In this case, longer isn't necessarily better. On the basis of results from several trials, a 16-hour period was found to be the optimal length in the fall and winter -- matching that of natural daylight in the summer months.

Q. Is an automatic timeclock to turn the supplemental lights on and off necessary?

A. An automatic timer isn't required, but it is convenient. Use of a timer frees labor and ensures a 16-hour lighting period.

Q. Would there be any benefit from just supplementing the regular daylength for about 4 to 8 hours during the dark, and letting the natural sunlight, or daylength, take care of the rest?

A. It is possible to turn on your lights a few hours prior to dawn and turn them off after sunrise, or turn the lights on prior to dusk and extend the daylength into the night. Depending on the number of lamps you have, this could result in a significant savings in electricity. In any case, be sure that the total continuous duration of light that your cows receive is 16 hours.