

MIDNIGHT FEEDING OF COMMERCIAL LAYING HENS EVALUATED FOR EGG SHELL QUALITY

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Economic losses from cracked and broken eggs continues to be a major problem facing the commercial egg industry. Reports from the United States and Europe would suggest that between 6.4 and 6.7 percent of eggs produced are either lost or not collected because of poor shell quality.

A recent study conducted by

researchers at the University of Florida attempted to determine whether hens would consume feed and improve egg shell quality when lights and feeders were allowed to run for 45 minutes at midnight. (Harms, Douglas and Sloan, 1996, Journal of Applied Poultry Research, vol. 5 pp. 1-5).

The premise of their study was to provide calcium from the feed for egg shell formation after midnight when most of the shell is being formed. Previous work had determined that 87 percent of the dietary calcium carbonate was metered out of the hen's gizzard between 8 a.m. and 8 p.m. with very little available at night.

Three field experiments were conducted to determine the influence of midnight feeding on egg shell quality of commercial hens. Experiment 1 consisted of four houses containing 90,000 hens each which received feed at midnight. Four other houses served as control houses. Specific gravity (which indicates shell density and strength with higher values) increase on eggs collected at 9 a.m. from hens fed at midnight in all four comparisons but only one was significantly improved (Table 1). Specific gravity of eggs collected at 3 p.m. were significantly improved in three of the four comparisons.

Table 1. Egg specific gravity from hens in four comparisons with one half fed at midnight. (Experiment 1)

Hen age (wk)	Midnight feeding ^a	Specific gravity ^b 9 am eggs	Specific gravity 3 pm eggs
40	Yes	849*	857*
36	No	830	832
56	Yes	839	874*
52	No	834	859
62	Yes	833	829
58	No	823	864
65	Yes	828	815
61	No	824	827

^aYes indicates hens were fed at midnight and specific gravity was measured 4 days later.

^bSpecific gravity units coded 1.0xxx.

*Indicates measurements differ significantly (P<0.05) from day 1.

In Experiment 2, egg shell quality was measured before initiating the midnight feeding program in two cool-cell pad houses (contain-

ing 71,000 hens each). There was an improvement in shell weight, percent shell weight per unit surface area (SWUSA) in the cool

end of both houses. However, shell weight was not affected in the warm end of the houses (Table 2).

Table 2. Egg weight and quality from two flocks fed at midnight. (Experiment 2)

House	Treatment Location ^a	Day ^b	Shell wt (g)	Percent shell (%)	SWUSA ^c	Egg wt (g)
1	Cool	1	5.38	8.67	73.4	62.3
		4	5.63*	9.05*	76.7*	62.3
1	Warm	1	5.41	9.05	75.8	60.0
		4	5.38	8.91	74.8	60.4
		4	5.38	8.91	74.8	60.4
2	Cool	1	5.77	8.89	76.3	65.1
		4	5.94*	9.34*	79.6*	63.8*
2	Warm	1	5.77	8.71	75.2	66.4
		4	5.76	9.04*	77.1	63.8*

^aIndicates cool or warm end of the hen house.

^bDay 1 is the day the experiment started and day 4 is four days later.

^cShell weight per unit of surface area.

*Indicates that these data differ significantly (p<0.05) from day 1.

In Experiment 3, comparisons were made in two pairs of houses. Egg shell quality was measured on

day 1 and after 4 days of midnight feeding. Shell weight was increased with both comparisons.

however, percent shell and SWUSA were not affected.

Table 3. Egg weight and quality from four flocks when two were fed at midnight. (Experiment 3)

Feed program	Day ^a	Strain	Age (wk)	Egg wt (g)	Shell wt (g)	Percent shell	SWUSA
Control	1	Delta	44	67.9	6.12	9.03	78.5
	4			66.7*	6.01*	9.02	78.0
Midnight	1	Delta	40	66.3	5.91	8.91	77.0
	4			68.2*	6.03*	8.87	77.2
Control	1	W-36	28	56.4	4.98	8.85	72.8
	4			57.2	5.00	8.76	72.4
Midnight	1	W-36	30	57.0	5.12	9.00	74.3
	4			58.4	5.27*	8.99	74.9

^aDay 1 is the day the experiment was started and day 4 is four days later.

*Indicates the hens were given feed at midnight.

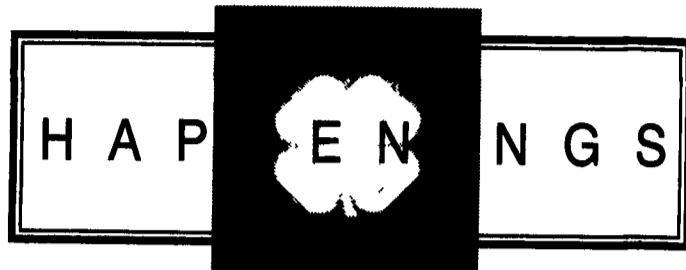
*Indicates that these data differ significantly (p<0.05) from day 1.

The authors concluded that midnight feeding can improve egg shell quality. They felt it is necessary to both turn on the lights and run the automatic feeder in order to stimulate the hens to consume feed. Prior attempts to stimulate feed intake with laying hens maintained in open houses and fed by hand were found to be of no benefit because the hens were not stimulated to eat just by hand feeding. Midnight feeding apparently can be more beneficial for improving egg shell quality of eggs laid in the morning than for eggs laid

in the afternoon.

While the results are plausible in terms of coordinating shell formation with feeding calcium, are encouraging and suggest a positive response for shell quality, I would caution anyone that these were only short term evaluations e.g. impact all within one week's time. What the long term impact of these programs is remains to be seen.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Cooperative Extension is implied.



West Friendship 4-H

On March 20, the West Friendship 4-H Livestock Club held its monthly meeting.

Anthony Fleg have an interesting and informative project talk on beekeeping. This demonstration included the habits, use, and necessity of honey bees.

Anthony also brought a hive for the members to examine.

Another highly commendable demonstration was given by Steve Allison, Lauren Paper, and Rachel Reinhardt on the selection of market lambs. They explained what to look for when selecting a project animal, such as a long thick loin and a well-muscled leg.

Before the meeting, many members attended a workshop to learn how to complete their project workbooks. The workbooks are new in the livestock area and are a fun and enjoyable way to learn about the many aspects of raising livestock.

On April 17, the West Friendship 4-H Livestock Club held its monthly meeting. Before the business meeting, the members gathered outdoors and were treated to an excellent program on sheep showmanship given by Mary Reinhardt and Lyndasy Glascock. Lyndasy brought one of her sheep, and demonstrated the proper way to hold and brace the animal. Mary discussed show ring etiquette and what to expect in the show ring.

After the meeting, Cortney Hill-Dukehart gave a very informative project talk on beef cattle. Cortney explained how to halter brake a steer, and prepare him for a show, while blending in a wonderful sense of humor.

Adult Volunteer and Swine Project Leader J.G. Warfield held a Swine Selection Workshop for the West Friendship 4-H Livestock Club on Sunday, April 21. He has been breeding and raising pigs for many years, and gave a very interesting and informative workshop. His daughter Andrea and his son Ben are members of the West Friendship 4-H Livestock Club, and both are involved in swine. Several members were present, and the many aspects of swine selection were discussed.

The West Friendship 4-H Livestock Club, and the West Friendship Always in Action 4-H Club will have a food booth at the CB Rally on May 26. They will be serving a full array of food and beverages. The two clubs would like to thank the Glennwood Lions Club for allowing them the use of their facilities during the CB Rally.

The West Friendship 4-H Livestock Club will also be selling tickets for a 50/50 raffle through-

out the year, prior to the drawing at the Howard county Fair. Half of the proceeds go to the club, and the other half goes to the winner of the drawing.

The proceeds from these fundraisers benefit the West Friendship 4-H Livestock Club and the West Friendship Always in Action 4-H Club. This support enables them to make donations to 4-H related causes, continue doing community service, and "Make the Best Better!"

The West Friendship 4-H Livestock Club is being recognized as an outstanding 4-H club by the University of Md. Cooperative Extension Service. The West Friendship 4-H Livestock Club will receive their plaque at the state 4-H recognition program held at the Maryland State Fairgrounds, Timonium, Md., in the Horse Sales Pavilion, on June 30.

York County 4-H Members Participate In State Rabbit Convention

Three members of the 'York County 4-H Rabbit and Small Animal Club participated in the youth royalty and educational contests and the rabbit show on April 27-28 at the State Rabbit Convention held at the Clinton County Fairgrounds.

Rijelle Kraft, Manchester, was first runner-up in the state duchess contest. She also was awarded second place in the state for her educational display on 'The Ten Top Reasons To Buy A Rabbit.'

Rijelle also showed a best of variety French Lop in the rabbit show. Melissa Stough, Glen Rock, also participated in the duchess contest and showed the best of breed mini-lop in the show. Lucas Kraft, Manchester, showed the best of variety Dutch Rabbit.

Conodoguinet Sheep Club

The third meeting of the Conodoguinet Sheep Club was held on April 17 at Francine Martin's house.

A video entitled, "Harvesting Your Wool Crop" was watched, and Mrs. Witter gave a program called, "Are EWE Ready For Spring."

The benefit auction was discussed, and items were turned in. If you still have items to be turned in, call Mrs. Witter. The cookie and candy orders were also turned in to Mrs. Myers.

Speeches were given by Linnea Hoover and Sonya Rinker. There will be a Quiz Bowl in October with the Livestock Club.

The next meeting will be held at Zach Reed's house on May 15.