

Special Report

Lancaster Farming

POULTRY NOTES

SHELL DAMAGE AND MONITORING SHELL WEAKNESS WITH SPECIFIC GRAVITY

Dr. Paul H. Patterson
Assistant Professor
Poultry Science
Penn State

The actual cost of shell damage to the egg industry would be a difficult thing to accurately measure, although a recent estimate made by C. F. Strong and R. W. Bastein, suggest that it could cost the industry \$200 million per year.

Shell damage can be encountered in a number of places, with the enclosed list clarifying some major causes:

1. Damaged cages or collection trays.
2. Excessive bird density in cages.
3. Operation of egg collection equipment at speeds which are too fast.
4. Stacking egg flats more than six high.
5. Failure to double the bottom flat in stacks.
6. Failure to separate oversized eggs in flats.

7. Careless handling of eggs on flats or pallets.

8. Failure to remove dead birds before belt collection.

9. Rough areas in floors where forklifts or egg carts travel.

10. Excessive disturbance of birds during peak laying hours, e.g.-manure cleanout, spraying, etc.

11. Failure to carefully maintain and clean egg handling equipment.

12. Failure to properly secure egg containers in trucks.

13. Excessive temperature difference between eggs and wash water.

14. Factors which reduce shell quality such as old hens, heat stress, or improper nutrition.

15. Increased body checks due to crowding in cages or extended day length.

A simple thing such as the number of birds per cage can have a dramatic effect on shell quality.

Dr. D. A. Roland, Sr. demonstrated this quite clearly in a 1978 study (Table 1).



Dr. Paul H. Patterson

Table 1

Hens/cage	Body checks
2	8.3
3	14.9
4	33.8

Eggs gathered between 6 and 7:30 am.

One of the best monitoring procedures for measuring shell quality is specific gravity. Research in Table 2 shows that specific gravity of eggs is negatively correlated with the probability that eggs will crack during processing (Holder et al., 1974, Poultry Sci. 58:250).

Table 2

Specific gravity	% cracks
1.065	27.3
1.070	21.0
1.075	11.1
1.080	7.5
1.085	2.4
1.090	0.7

To start a weekly specific gravity testing program, secure a hydrometer that measures the specific gravity of solutions between 1.060 and 1.100. Next get five to nine 5-gallon plastic buckets and add three gallons of water and 3 pounds of salt to each. A dilution of 1 pound of salt to 1 gal of water will give a specific gravity of approximately 1.079. Using the hydrometer, add salt or water to each bucket to reach the desired specific gravity. An eggshell quality score can be assigned to eggs that float in the specific gravity solutions as listed below.

Specific Gravity

- 1.060
- 1.065
- 1.070
- 1.075
- 1.080
- 1.085
- 1.090
- 1.095
- 1.100

Egg Score

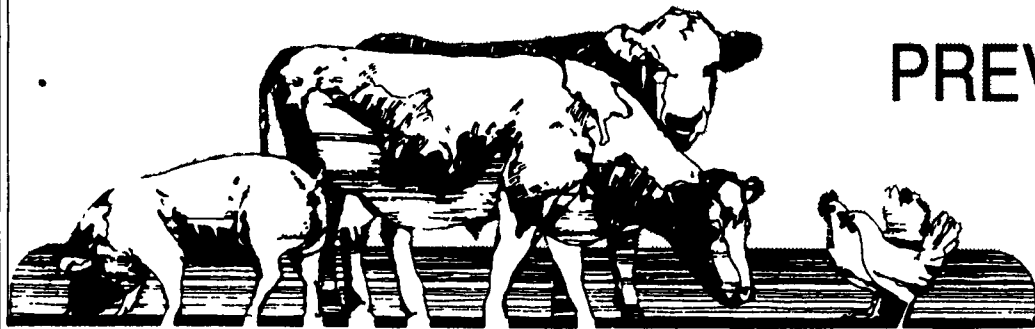
- 0 (thinnest shell)
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8 (thickest shell)

Place thirty eggs in a wire mesh basket that fits inside the plastic buckets and lower the basket and eggs into the solution having the lowest specific gravity. Remove the sinking eggs to the next highest specific

gravity solution and count and record the number of floaters with their specific gravity. Continue moving sinking eggs forward until they float. Calculate the percentage of floaters in each solution and calculate the average specific gravity of the entire lot of eggs. For best results, standardize the age and temperature of the eggs you evaluate as well as the temperature of the specific gravity solutions (room temperature is easiest).

A good hydrometer for egg testing should be about 155 mm long with 0.001 divisions from 1.060 to at least 1.100. They can be obtained from Fisher Scientific for \$18 (cat. no. 11-556G) at the following address, or by calling (215) 640-7940. Customer Service: Pittsburgh P. O. Box 3029 Malvern, PA 19355

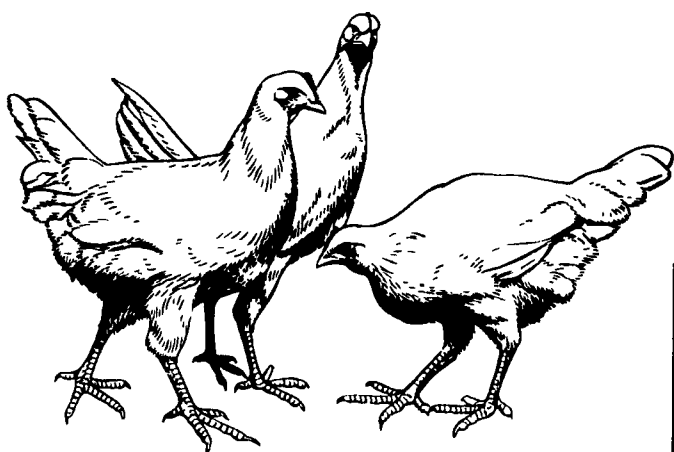
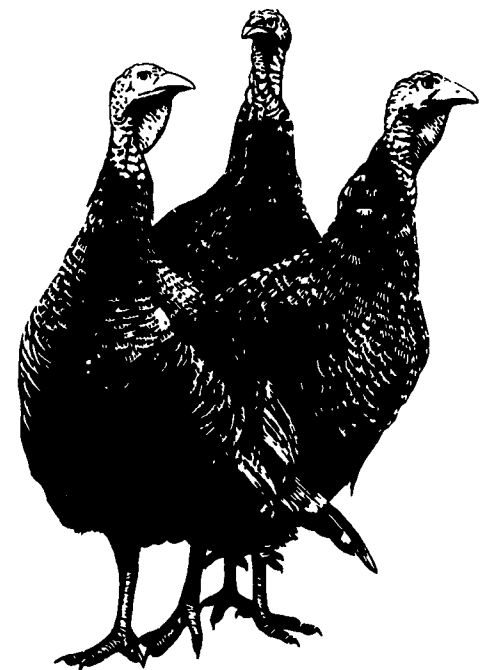
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