POULTRY SCIENCE AND TECHNOLOGY GUIDE

from North Carolina State University at Raleigh / Extension Poultry Science

Feed Measurement for Commercial Pullets and Layers

Optimum nutrient intake is a key factor in producing quality pullets and obtaining efficient production from commercial layers. Feed formulations and feeding programs are designed so that optimum intake is attained at a certain feed consumption rate. If feed consumption changes because of weather or other factors, a flock will either underconsume or overconsume nutrients. If a flock's feed consumption is being monitored, the nutrient intake can be calculated; and the feed formula or feeding program can then be changed quickly to correct nutrient intake. It follows, then, that *feed measurement is the initial step in assuring optimum nutrient consumption by pullets and layers.*

The use of bulk feed bins, augers, automatic feeders, and feed carts are all obstacles in the way of accurate feed measurement. These obstacles make measuring with automatic or semiautomatic equipment difficult, but it is possible. The secret is to find the system that best fits your equipment and operation. Once the "bugs" are worked out, it is not a big chore to have a successful feed measurement program.

Feed Measurement Alternatives

Dump scales — Dump scales are usually mounted under an auger either alongside bulk feed tanks or over an automatic feeder bin. The scales are calibrated to trip and dump at a desired weight directly into an automatic feeder or into a small catch bin. If a catch bin is used the feed is then augered to the automatic feeders. The scales can be rigged to stop dumping at a preset number of dumps or just to count the number of dumps.

Bulk feed bin on electronic scales — Bulk feed bins are mounted on stress gauges. The stress gauges electronically register the weight of the feed and bulk tanks on a continuous basis. Feed taken out of or put into the bulk bins can be determined over any given period of time. Stress gauges should be mounted at four points for desired accuracy.

Auger volume — A clock is spliced into the circuit of the auger motor in order to determine auger running time. By multiplying the number of minutes the auger ran by the weight of feed output per minute, an estimation of feed used is made. Changes in density of feed and mechanical problems (belt slippage, debris restricting auger flow, etc.) must be considered for reliable measurement. Refer to latter section of this guide for specifics on determining auger output.

Platform scales — This method can be used very well with feed carts. A floor-mounted scale is installed so that a feed cart can be driven onto it easily. Weighing the cart before filling, after filling, and after feeding gives the weight of feed used.

Feed bin inventory — A systematic inventory is taken of bin contents. The inventory and feed deliveries are used to calculate feed eaten by chickens. This system is reliable over a period of 2 to 3 weeks. Poor inventory estimates or change in feed density can give misleading results.

Cart or hopper volume — Feed carts or feed hoppers are calibrated to marks on the sides. Filling feed to marks and recording feed levels before filling the next time gives a measurement of feed used. Changes in feed density must be considered for this method to be reliable.

Test trough — A removable trough in front of a known number of chickens is weighed before and after feeding, usually once per 24-hour period.

Procedure for Determining Feed Consumption by Auger Output

The success of feed measurement using the auger volume method depends to a large extent upon an accurate determination of auger delivery. Following a step-by-step procedure when determining feed consumption by measuring auger output will assure accuracy.

Equipment needed — The equipment needed to measure the auger output includes a regular platform or other suitable scale, a container such as a tub or garbage can, an electric clock spliced into the auger circuit or a watch with a second hand, and a record sheet. You will also need a person with a desire to do an accurate job.

Measuring auger delivery — Fill the container, starting and stopping the auger at least twice. The starting and stopping simulates normal operation. Record the time it takes to fill the container. Deter-

mine the number of pounds of feed in container. Divide the feed weight by the number of minutes required to fill the container to get the feed output per minute. Repeat and take an average.

Example—calculation of auger delivery:

Time to fill container	=1 min. 45 sec. (105 sec.)
Weight of container and feed	=139.5 lb.
Minus weight of container	=10.5 lb.
Weight of feed from auger in 105 sec.	=129.0 lb.

129 lb. (weight of feed) ÷ 105 sec. (time to fill container) = 1.228 lb./sec. or 73.7 lb.min.

Keeping daily records — The auger running time is recorded from a clock spliced into the auger motor's electrical circuit at the same time each day. To obtain the feed used during the 24-hour period, the auger running time is multiplied by the pounds of feed delivered per minute.

Example — calculation of feed consumed with auger running 65 minutes in a 20,000-hen flock:

73.7 lb./min. (auger delivery) X 65 min. (running time) = 4,790 lb. in 24 hours

4,790 lb. (feed consumed) ÷ 20,000 (hen number) = 24 lbs./day/100 hens

Coping with Feed Density Changes

Feed density changes will necessitate recalculation of feed measurement in the auger-volume, bin-inventory, and cart- or hopper-volume methods. There are two ways to approach the problem. The first is to recalibrate as shown earlier for auger delivery. The second is to use an index comparing the old and new feed. To obtain the index, the weight of a level container of new feed is divided by the weight of an equal volume of old feed. The index figure obtained is then multiplied by the old calibration.

Example—density index calculation:

$$\frac{\text{135 lb. (weight of new feed)}}{\text{129 lb. (weight of old feed)}} = 1.05 \text{ index}$$

1.05 X 73.7 lb./min. (old auger delivery rate) = 77.4 (new delivery rate) X 65 min. = 5,031 lb. of new feed (compared with 4,790 lb. of old feed)

Double-Check to Assure Accuracy

Regardless of which method is used to measure feed consumed by a flock of birds, failures in the method will occur. The dump scales and the stress gauges, although reliable, will have mechanical problems occasionally; and all methods are subject to human error. A cross-reference on feed used is essential, particularly if consumption information is being used to fine-tune a feeding program. Using a feed bin inventory system in combination with one of the other methods is a good double check. The system you use should have a minimum accuracy of plus or minus 2 percent. Using our previous example, that would be 96 pounds per day error above or below the 4,790 pounds. For example, a 2-percent weigh error would be .5 pound per 100 hens per day or a range from 23.5 pounds per 100 hens per day to 24.5 pounds per 100 hens per day for the 20,000-bird flock.

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