The University of Georgia
Cooperative Extension Service
College of Agricultural and Environmental Sciences / Athens, Georgia 30602-4356

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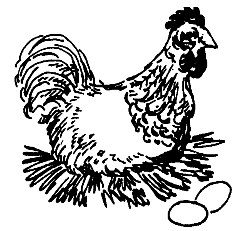

COMMERCIAL EGG TIP . . .

MANURE OUTPUT FROM A TUNNEL VENTILATED, HIGH RISE LAYER HOUSE

Nutrient management planning is becoming a necessity in response to increased regulatory efforts to minimize non-point source pollution of ground and surface waters. Poultry manure has long been used to fertilize soils because it is a good source of plant nutrients. As with any type of fertilizer, it is possible to over-apply poultry manure, causing potential for non-point source pollution. Nutrient budgeting to match the agronomic requirements of crops and forages can help prevent over-application of poultry manure.

Before a nutrient budget can be put together for a layer farm, it is necessary to know the amount of manure produced annually from the layer house and the concentration of plant nutrients in the manure. These factors depend on how the manure is managed. According to North and Bell (1990), chicken droppings contain 75-80% moisture when voided from the bird. They begin to dry immediately, but the amount of drying is affected by temperature, humidity, air speed, exposed surface area, and length of storage. Simple drying concentrates plant nutrients in manure. If the manure is allowed to accumulate, composting in the undisturbed pile may further reduce manure mass by volatilization of organic matter and promotion of moisture loss. Composting tends to reduce the concentration of nitrogen relative to the concentrations of other plant nutrients.

The tunnel ventilated, high rise layer house which has become common in the Southeastern United States offers a different manure management system from other types of layer houses. Large volumes of air, particularly in hot weather, are drawn at relatively high speeds along the length of the manure stacks in the pit before being exhausted through fans on the ends of the house. Table 1 shows estimates of manure production based on measurements from a tunnel ventilated house in north Georgia. Included for comparison are data from a curtain sided, high rise house in south Georgia, and some other published estimates. Table 2 shows corresponding manure nutrient compositions for each situation.

Table 1. Estimates of annual commercial layer manure production.

Situation	Moisture	"As Is" Basis (lb/hen)	Dry Matter Basis (lb/hen)	"As Is" Basis (tons/100,000 hens)
Tunnel High Rise[1]	40 %	19.6	11.7	980
Curtain High Rise[2]	64 %	30.0	10.9	1498
Conventional High Rise[3]	59 %	27.8	11.4	1390
Fresh Manure, Unstored[4]	75-80 %	91.2	20.5	4560

[1] 365 days accumulation. Sampled in February. North Georgia.
[2] 246 days accumulation, adjusted to 365 days. Sampled in July. South Georgia.
[3] Adapted from Patterson and Lorenz, 1996. Pennsylvania.
[4] Adapted from North and Bell, 1990.

Table 2. Nutrient composition of layer manure in different situations (% "as is" basis; lb/ton as is" in parentheses) . Sources same as in Table 1.

Nutrient	Tunnel High Rise	Curtain High Rise	Conventional High Rise	Fresh Manure, Unstored
Total N	2.0 (41)	0.8 (15)	1.8 (37)	1.3 (26)
P_2O_5	4.7 (94)	3.1 (63)	2.7 (55)	1.1 (22)
K_2O	2.9 (58)	2.0 (39)	1.6 (31)	0.6 (12)
Ca	9.6 (192)	5.7 (114)	6.4 (128)	-
Mg	1.2 (14)	0.3 (6)	0.4 (9)	-
$/ton[1]	45.64	26.64	30.49	

[1]Assumes the following values: N=$0.30/lb, P_2O_5=$0.25/lb, K_2O=$0.12/lb, Ca=$0.015/lb. (No value projected for Mg).

The tunnel house produced less tonnage of manure than is typical of other high rise house designs, primarily because the manure was drier. This would reduce manure hauling costs. Manure nutrient analyses are influenced by feed formulation and bird management, making differences between nutrient analyses of manure samples from different situations difficult to evaluate. However, the greater concentrations of P_2O_5, K_2O, Ca, and Mg in manure from the tunnel ventilated house are consistent with the manure's lower moisture content. This manure had the highest value per ton based on summed values of the individual plant nutrient components (Table 2). Given that the increased nutrient value of the dryer manure is recognized, an egg producer able to control the rate of air movement over stored manure could maximize the land base available for manure application by drying the manure as much as possible. A load of manure having higher economic value can be moved further before transportation costs become prohibitive. Once at the land application site, a load of manure with higher nutrient concentration can be spread over a larger area.

It is important to note that the figures presented here are for general information. For accurate nutrient management planning, it is essential for egg producers to determine manure output for each of their houses in operation and to do nutrient analyses of the manure. There will be too much farm to farm variation to rely on a standard set of estimates.

References:

North, M.O., and D. D. Bell, 1990. Pages 879-885 *in:* Commercial Chicken Production Manual. 4th ed. Chapman & Hall, New York, NY.

Patterson, P. H., and E. S. Lorenz, 1996. Manure nutrient production from commercial White Leghorn hens. *Journal of Applied Poultry Research* 5:260-268.

A. Bruce Webster
Extension Poultry Scientist

William C. Merka
Extension Poultry Scientist

Sidney A. Thompson
Professor

Consult with your poultry company representative before making management changes.

"Your local County Extension Agent is a source of more information on this subject"