

College of Agriculture and Life Sciences
Extension Poultry Science
Scott Hall / Campus Box 7608
Raleigh, North Carolina 27695

**REPORT ON PULLET REARING PERIOD
33rd NORTH CAROLINA LAYER PERFORMANCE
AND MANAGEMENT TEST¹**

919.515.2621 (phone)
919.515.7070 (fax)

Vol. 33, No. 2
February 1999

The North Carolina Layer Performance and Management Test is conducted under the auspices of the Cooperative Extension Service at North Carolina State University and the North Carolina Department of Agriculture. The flock is maintained at the Piedmont Research Station, Salisbury, North Carolina. Mr. Raymond Coltrain is the Piedmont Research Station Superintendent; Mr. David Joyce is Resident Manager of the flock; Pam Jenkins is the Statistical Research Assistant; and Dr. K. E. Anderson is Project Leader. The purpose of this program is to assist poultry industry personnel in North Carolina, across the country, and internationally in the evaluation of commercial layer stocks and management systems.

The data presented herein represents the analysis of the rearing period for the 33rd North Carolina Layer Performance and Management Test. Performance Summary tables provide growing period data from closed housing.

For further information contact:

Dr. Kenneth E. Anderson
Poultry Science Department
North Carolina State University
Box 7608
Raleigh, NC 27695-7608
Phone (919) 515-5527
FAX (919) 515-7070
ken_anderson@ncsu.edu

33rd NORTH CAROLINA LAYER PERFORMANCE AND

¹The use of trade names in this publication does not imply endorsement by the North Carolina Cooperative Extension Service of the products named nor criticism of similar ones not mentioned.

Employment and program opportunities are offered to all people regardless of race, color, national origin, sex, age or handicap. North Carolina State University, North Carolina A&T State University, U.S. Department of Agriculture, and local governments cooperating.

MANAGEMENT TEST
Volume 33 No. 2

Report on Pullet Rearing Period

Dates of Importance:

The eggs for the 33rd NCLP&MT were set on June 10, 1998 at the Piedmont Research Station (NCDA) Poultry Unit. The flock was hatched on July 1, 1998 and the pullets were moved to the laying facilities on October 27-28, 1998 during their 17th week of age. The age of the flock at transfer was lowered to approximately 17 weeks due to current trends in the industry and requests of the breeders to move the flock prior to excessive egg production in the rearing houses.

Experimental Design:

The test was a factorial arrangement of treatments and the main effect was strain. The analysis was divided by pullet strain. With the remodeling of the pullet rearing facilities to a Quad-deck cage system in a light tight house, all of the birds were reared in the same environment.

Strain--Samples of fertile eggs were provided/acquired from the breeders according to the rules which govern the conductance of the test. All eggs were set and hatched concurrently (Hatch/Serology Report Vol. 33, No. 1). A total of four white egg and four brown egg strains were entered in the test for a total of eight strains. At hatch the chicks were sexed to remove the males. Each strain was sexed according to breeder recommendations, *i.e.* feather, color, or vent sexing. For the layer test, a minimum of 1000 white and brown egg pullets/strain were wanted for placement at the initiation of the test. However, if the number of pullets hatched were below the prescribed numbers, the chicks were divided as equally as possible between the levels and replicates within the grow house.

Pullet Housing--The chicks were randomly assigned to the growing cages with white egg and brown egg replicates being intermingled throughout the house. The white egg strains occupied approximately ½ of the house and brown egg strains occupied the other half of the house. All strains were assigned to be represented as equally as possible in all cage rows, cage levels, and throughout the length of the house where applicable.

House 8--is an environmental controlled closed brood-grow facility with 3 banks of quad-deck cages in each room. Each room has been assigned a number and each side of each bank has been assigned a row number, and each cage section within each row and level/row has been assigned a replicate number, for statistical analysis pairs of rows have been designated as blocks. Thus, each block consists of two rows containing 24 replicates on all levels. This allows for a total of 3,744 pullets per room resulting in a total pullet count in House 8 of 14,976. The white and brown-egg strains were randomly assigned to the

replicates in the house. Entrant strains were assigned to the replicates in a restricted randomized manner with the restrictions being that all strains were approximately equally represented in all rows, levels, and rooms. All chicks were brooded in the same cage during the entire 17 wk rearing period. Paper was placed on the cage floor for the first 7 days within each of the replicate series within each row. Each cage within the replicate was filled with 13 white-egg or brown-egg (13 per 24" x 26" cage) pullets on the day of hatch for a rearing allowance of 48 sq in for the white-egg layers. The same number of pullets were grown in each replicate for both white and brown-egg strains. The room dividers were removed for this test so that all birds were essentially reared in a contiguous house.

Pullet Management and Nutrition:

Pullets were fed *ad libitum* by hand daily. Feed consumption and body weights were monitored bi-weekly beginning at 2 weeks of age. All mortality was recorded daily, but mortality attributed to the removal of males and accidental deaths from a replicate have been excluded from the 33rd NCLP&MT Grow Report from day 1 through 8. Starter (with Amprol at 454 g/ton), Grower and Developer diets are provided in the diet formulation section. Each pullet placed was provided with 1 kg of Starter per bird. Thus, the white-egg and brown-egg replicates in brood-grow House 8 (52 females) were given 52 kg of starter feed per replicate. Thereafter, all birds were placed onto the grower diet on which they remained until 12 weeks of age. From 12 weeks (September 23, 1998) to approximately 17 weeks (October 28, 1998) of age, all strains were provided with the developer diet.

Precision Beak Trimming:

Beak trimming was begun at 14 days of age using a Lyons Precision beak trimmer, with an 14/64" guide hole. The trim was a block cut with an approximate blade temp of 1100° F (dull red). Beak trimming was completed in 3 days.

Pullet Vaccination and Beak Trimming Schedule

Pullet vaccination and beak trimming schedules are outlined below. At 10 wk of age the pullets' beaks were evaluated to determine the extent of regrowth. Regrowth was not extensive enough to warrant retrimming at 11 wk, therefore no pullets were retrimmed.

<u>Age</u>	<u>Date</u>	<u>Event</u>
Hatch	July 1, 1998	HVT Marek's Vac. by injection in neck
Day 10	July 11, 1998	Newcastle (B1) and Bronchitis (Mass.) via aerosol spray (Triple Vac)
Day 14 thru Day 16	July 15, 1998 July 17, 1998	Precision Beak Trim
Day 35	August 20, 1998	Newcastle (LaSota) and Bronchitis (Mass.) via aerosol spray (ComboVac)
Day 63	September 3, 1998	Newcastle (LaSota) and Bronchitis (Mass.) via aerosol spray (ComboVac)
Day 70	September 10, 1998	Fowl Pox and Avian Encephalomyelitis vaccination via the wing web
Day 105	October 15, 1998	Newcastle (Lasota) and Bronchitis (Mass.) via aerosol spray (ComboVac)

Lighting Schedule

The lighting schedule for the pullet controlled environment facility is outlined below:

<u>Age</u>	<u>Date</u>	<u>Photoperiod (hrs/day)</u>
Days 1-2	July 2-3, 1998	24
Day 3	July 4, 1998	23
Day 5	July 7, 1998	22
Day 7	July 9, 1998	21
Day 9	July 11, 1998	20
Day 11	July 13, 1998	19
Day 13	July 15, 1998	18
Day 15	July 17, 1998	17
Day 17	July 19, 1998	16
Day 19	July 21, 1998	15
Day 21	July 23, 1998	14
Day 23	July 25, 1998	13
Day 25	July 27, 1998	12
Day 27	July 29, 1998	11
Day 29 through Week 15	July 31 through October 15, 1998	10
Week 16	October 22, 1998	12
Week 17	October 29, 1998	14

Diet Formulations

BROOD-GROW PERIOD DIETS Diet¹ Identification

Ingredient	Starter	Grower	Developer
	-----%-----		
Corn	58.15	61.98	65.65
Soybean meal	28.13	23.09	17.30
Wheat Midds	4.50	5.93	7.80
Oats	4.96	5.00	4.96
Limestone	1.17	1.60	1.72
Methionine	.25	.12	--
Dical	1.67	1.73	1.79
Salt	.25	.25	.25
Vit. premix	.10	.10	.10
Min. premix	.05	.05	.05
Mold Inhibitor	.10	.10	.10
Tracer	.05	.05	.05
Lysine	.61	--	.22
Protein %	20.0	18.0	16.0
ME kcal/kg	2970.0	2970.0	2970.0
Calcium %	0.90	1.10	1.10
T. Phos. %	.70	.69	.69
Lysine %	1.10	.95	.95
TSAA %	.66	.65	.65

¹Diets in crumblized form.

Starter - Amprol was added at the rate of 454 g/ton of feed; each female fed 1.02 kg of starter.

Grower - fed through 12 weeks of age.

Developer - fed through 17 weeks of age or until moved to layer house.

DESCRIPTION OF DATA TABLE STATISTICS

Rearing period performance of white egg and brown egg strains are shown in Tables 1-3 and 4-6, respectively. Following are the descriptions of the observations taken throughout the rearing period. Data presented in this report will be in metric.

Breeder (Strain):

Short identification of the breeder and strain of the stock. See more complete information in the table following the data tables.

Protein per Bird to 119 Days:

Calculated cumulative protein intake per bird to 119 days.

Metabolizable Energy per Bird to 119 Days:

Calculated cumulative metabolizable energy intake per bird to 119 days.

Feed Cost per Bird to 119 Days:

Calculated feed cost per bird to 119 days. Using average regional feed prices; Starter \$182.24/T; Grower \$165.43/T; Developer \$155.45/T.

Livability 1-119 Days:

The percentage of the birds housed which survived during days 1-119. Males and accidental deaths which were removed are excluded from the analysis of livability from day 1 through 8.

Body Weights (2, 4, 6, 8...17 Weeks):

Bi-weekly average body weights of all birds within representative cages. Sample size for these were approximately 60 birds/strain/brood-grow house. Cages selected were, as much as possible, a representative sample from all cage levels, rows, and strains.

Feed Consumption (1-2, 3-4, 5-6...17, 1-17 Weeks):

Feed consumption per bird within the time periods indicated. The last column in the table is the cumulative feed intake per bird throughout the growing period. Estimated feed consumed is calculated using pullet days which compensates for males removed from the flock at any time.

Statistical Analyses and Separation of Means:

Analyses of variance were performed on all data using the GLM procedure of SAS Institute (1989)². Separate analyses were conducted for white and brown egg strains. Significant differences (P<.01) within white and brown egg strains are noted by different letters among columns of means.

Metric Conversions

1 lb = 453.6 g	1 g = .03527 oz
1 lb = .4536 kg	1 kg = 2.204 lb
1 oz = 28.35 g	1 g = 1000 mg
	1 kg = 1000 g

²SAS Institute, 1989. SAS® User's Guide: Statistics, Version 6 Edition, SAS Institute, Inc., Cary, North Carolina.

Table 1. Body Weight¹ of White-Egg Entries, 33rd NCLP&MT

Breeder	------(Weeks of Age)-----							
	2	4	6	8	10	12	14	16
	------(kg)-----							
	-							
Bovans White	.10	.20	.36 ^B	.53	.60 ^C	.76	.85 ^B	.97 ^B
Bovans White(Exp.)	.10	.21	.38 ^{AB}	.55	.69 ^B	.85	.96 ^A	1.08 ^A
Hy-Line W-98	.10	.22	.40 ^A	.58	.76 ^A	.89	1.03 ^A	1.13 ^A
Hy-Line W-36	.10	.21	.39 ^{AB}	.54	.68 ^B	.84	.97 ^A	1.08 ^A
Average	.10	.20	.38	.55	.68	.84	.95	1.07

^{ABC} Denotes significant differences between strains

¹The average initial body weight was 36.9g ± 0.2.

Table 2. Feed Consumption of White-Egg Entries, 33rd NCLP&MT

Breeder	------(Weeks of Age)-----								
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	1-16
	------(kg per bird)-----								
	--								
Bovans White	.14	.39 ^A	.51	.61	.74	.92	.87 ^A	.91 ^{AB}	5.10
Bovans White (Exp.)	.14	.35 ^{AB}	.49	.60	.74	.88	.80 ^{AB}	.84 ^B	4.83
Hy-Line W-98	.14	.38 ^{AB}	.54	.60	.79	.92	.87 ^A	.95 ^A	5.19
Hy-Line W-36	.16	.36 ^B	.48	.62	.71	.90	.79 ^B	.85 ^B	4.71
Average	.14	.36	.51	.61	.75	.93	.83	.89	4.96

^{AB} Denotes significant differences between strains

Table 3. Feed Cost and Livability of White-Egg Entries, 33rd NCLP&MT

Breeder	Pro- tein	Met. Energy	Lysine	TSAA	Feed Cost	Livability (1-119 d)	Flock Uniformity
	------(per bird to 119 days)-----						(% of pullets within $\pm 10\%$ of \bar{x})
	(g)	(kcal)	(g)	(g)	(\$)	(%)	
Bovans White	927 ^A	15143	52.9 ^A	34.4	0.84 ^A	97.2 ^A	79.2 ^A
Bovans White (Exp.)	879 ^{AB}	14338	50.1 ^{AB}	32.6	0.80 ^{AB}	97.5 ^A	80.9 ^A
Hy-Line W-98	948 ^A	15430	54.2 ^A	35.1	0.86 ^A	91.3 ^B	62.6 ^B
Hy-Line W-36	845 ^B	13976	48.0 ^B	31.5	0.77 ^B	97.5 ^A	82.6 ^A
Average	900	14722	51.3	33.4	0.82	95.9	76.3

^{AB} Denotes significant differences between strains

Table 4. Body Weight¹ of Brown-Egg Entries, 33rd NCLP&MT

Breeder	------(Weeks of Age)-----							
	2	4	6	8	10	12	14	16
	------(kg)-----							
Bovans Brown	.11	.24	.44	.64	.78	.99	1.11	1.24
Bovans Goldline	.11	.24	.46	.66	.81	1.00	1.15	1.28
Hy-Line CV-21(Exp.)	.11	.24	.45	.68	.86	1.04	1.19	1.34
Hy-Line Brown	.11	.24	.46	.68	.82	1.02	1.18	1.33
Average	.11	.24	.45	.66	.82	1.01	1.16	1.30

¹The average initial body weight was 37.6g ± 0.6.

Table 5. Feed Consumption of Brown-Egg Entries, 33rd NCLP&MT

Breeder	------(Weeks of Age)-----								
	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16	1-16
	------(kg per bird)-----								
	--								
Bovans Brown	.14	.36	.54	.64	.75	.96	.88	.93	5.21
Bovans Goldline	.13	.36	.54	.63	.75	.95	.87	.93	5.15
Hy-Line CV-21 (Exp.)	.13	.38	.54	.67	.78	.97	.88	.97	5.32
Hy-Line Brown	.13	.36	.56	.66	.79	1.01	.92	.96	5.39
Average	.13	.37	.55	.65	.77	.97	.89	.95	5.27

Table 6. Nutrient Intake, Feed Cost, and Livability of Brown-Egg Entries, 33rd NCLP&MT

Breeder	Pro- tein	Met. Energy	Lysine	TSAA	Feed Cost	Livability (1-119 d)	Flock Uniformity
	------(per bird to 119 days)-----						(% of pullets within $\pm 10\%$ of \bar{x})
	(g)	(kcal)	(g)	(g)	(\$)	(%)	
Bovans Brown	939	15466	53.9	35.1	0.85	99.2 ^A	80.0
Bovans Goldline	928	15311	53.3	34.7	0.84	97.7 ^{AB}	78.7
Hy-Line CV-21(Exp.)	959	15797	55.0	35.9	0.87	95.0 ^B	90.0
Hy-Line Brown	971	16025	55.6	36.3	0.88	95.5 ^B	87.7
Average	949	15650	54.5	35.5	0.86	96.9	84.1

^{AB} Denotes significant differences between strains

Entries 33rd NCLP&MT
Stock Suppliers and Categories

<u>Breeder</u>	<u>Stock</u>	<u>Category</u> ¹	<u>Source</u>
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	W-36	I-A	Hy-Line International 4432 Highway 213, Box 309 Mansfield, GA 30255
	W-98	I-A	(Same)
	Hy-Line Brown	I-A	Hy-Line International 1915 Sugar Grove Dallas Center, IA 50063
	Hy-Line CV-21 Experimental	III-A	(Same)
Centurion Poultry 1471 Lane Creek Road Bogart, GA 30622	Bovans White	I-A	Centurion Poultry Inc. 1471 Lane Creek Road Bogart, GA 30622
	Bovans White Experimental	III-A	(Same)
	Bovans Brown	I-A	(Same)
	Bovans Goldline	I-A	(Same)

¹ I = Extensive distribution in southeast United States
 II = Little or no distribution in southeast United States
 III = Unavailable for commercial distribution in United States
 A = Entry requested
 C = Entry not requested