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FIRST CYCLE REPORT OF THE THIRTY SIXTH

NORTH CAROLINA LAYER PERFORMANCE

AND MANAGEMENT TEST

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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 and Consumer Services. The flock is maintained at the Piedmont Research Station, Salisbury, North Carolina. Mr. Joe Hampton is the Piedmont Research Station Superintendent; Mr. Aaron Sellers 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 first production cycle and molt of the 36th North Carolina Layer Performance and Management Test. Performance summary tables are available for each strain, and molt treatment used as well as for the combined results. You can view this report on our website at http://www.ces.ncsu.edu/depts/poulsci/tech_manuals/layer_reports/36_first_cycle_report.pdf

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36th NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST
Protocol Procedures Used

Entries:

A total of nine white egg and three brown egg strains were accepted in accordance with the rules and regulations of the test.

Dates of Importance:

The eggs for the 36th NCLP&MT were set on March 8, 2005 at the North Carolina Dept. of Agriculture and Consumer Services, Piedmont Research Station, Poultry Unit at Salisbury, NC. The flock was hatched on March 29, 2005 and the pullets were moved to the laying facilities on July 21 to July 26, 2005 during their 17th week of age. The age of the flock at transfer was lowered to reflect current trends in the industry and requests of the breeders to move the flock prior to onset of egg production in the rearing houses.

First cycle production records commenced on July 27, 2005 (17 weeks of age), through the molt period which was induced on July 5, 2006. The molt records commenced on July 5, 2005 (66 weeks of age), and ended on August 2, 2006 (70 weeks of age). This report includes production data summarized from 17 to 66 weeks, and 66 to 70 weeks. A table showing the changes in body weights from 17 to 66 wk of age and the weight loss during the molt period is included in the molt period information.

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 75 % of the house and brown egg strains occupied the other 25 % of the house. All strains were assigned to be represented as equally as possible in each room, row, and cage level.

House 8--is an environmentally controlled closed brood-grow facility with 3 banks of quad-deck cages in each room. Each room has been assigned a number, 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 (i.e. approximately 3 reps/strain) on all levels resulting in a randomized incomplete block. This allows for a total of 3,744 pullets per room. Rooms 2 to 4 were used for the 36th NCLP&MT resulting in a total pullet count in House 8 of 11,232. The white and brown-egg strains were randomly assigned to three replicates within each block in the house. Entrant strains were assigned to the blocks 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 16 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 in^2 (310 cm^2). The same numbers of pullets were grown in each replicate for both white and brown-egg strains. The room dividers were in place between the rooms for this test. The environmental conditions were maintained the same in each room, so that all birds were essentially reared in a contiguous house. Pullet nutrition and husbandry practices are published in the Pullet Rearing Report (Vol. 36, No. 2).

Layer Housing:

The hens were randomly assigned to the replicate cages with white egg and brown egg strains being intermingled throughout the houses. The white egg strains occupied 75% of the house and brown egg strains occupied the other 25%. All strains were assigned to be represented as equally as possible in all rows, and levels.

House 5 is a standard height totally enclosed force ventilated laying house with a scraper pit manure handling system. It has 2 banks of triple deck cages and two banks with 4 levels of cages. The replicates are equipped with feed hoppers to supply and monitor feed consumption for each individual replicate and the feed is distributed by an automatic feeding system. Again, each side of a bank was designated as a row and each row was divided into 9 8-foot replicates/level. There are a total of 252 replicates in house 5 which can support 6,048 hens. The cage density is dictated by the cage size in each replicate that contain cages that were either 30.5 or 40.6 cm wide and 40.6 cm deep. The cages were 30.5 and 40.6 cm cages which allowed for a constant density of 64 in^2 (413 cm^2), at 3 or 4 hens/cage, respectively. The white-egg and brown-egg 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 cage sizes.

House 7 is a standard height windowless enclosed force ventilated house with battery cages. The cages consist of 4 rows of a Tri-Deck Stacked Layer Cage System. There is 60' of cage row with each side being designated a row. Each row is divided into six 10' cage row sections consisting of 4 cages /section with a 24" space between cage sections for feed hoppers and feed recovery. The waste collection system consists of manure belt cleaning. This configuration provides for 144 experimental units each consisting of 4 - 24" x 20" cages which held 7 hens at 68 in^2 for a total of 28 hens/replicate and a house total of 4032 hens. Feeder system is designed to allow for automatic feeding and individual replicate feed consumption records.
The white-egg and brown-egg 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, and levels.

Laying House and Molting Lighting Schedules:

Age	Date	House 5	House 7
		(Light Hours)	(Light Hours)
Housing Pullets	July 20-26,2005	10.0	10.0
17 Weeks[1]	July 27, 2005	11.0	11.0
18 Weeks	August 3, 2005	11.5	11.5
19 Weeks	August 9, 2005	12.0	12.0
20 Weeks	August 16, 2005	12.5	12.5
21 Weeks	August 23, 2005	13.0	13.0
22 Weeks	August 30, 2005	13.5	13.5
23 Weeks	September 6, 2005	14.0	14.0
24 Weeks	September 13, 2005	14.25	14.25
25 Weeks	September 20, 2005	14.5	14.5
26 Weeks	September 28, 2005	14.75	14.75
27 Weeks	October 4, 2005	15.0	15.0
28 Weeks	October 11, 2005	15.25	15.25
29 Weeks	October18, 2005	15.5	15.5
30 Weeks	October 25, 2005	15.75	15.75
31 Weeks	November 1, 2005	16.0	16.0
Through 66 Weeks	July 5, 2006	16.0	16.0

Test Design:

The laying test set up as a completely randomized factorial design. The main effects within House 5 were strain, population, and molt treatment and in House 7 the main effects were strain and molt treatment. Following are general descriptions of the main effects:

Strain

The samples of fertile eggs were provided directly by the breeders involved. All eggs were set and hatched concurrently. A total of nine white egg strains and three brown egg strains participated in the test. See the 36th Hatch Report (Vol. 36, No. 1) for details.

Density

In House 5, all individual cages within each block contained either the brown or the white egg layers. Thus each replicate included 24 hens in 30.5 x 40.6 cm cages for 8 cages with 3 hens/cage or 40.6 x 40.6 cm cages for 6 cages with 4 hens/cage. Cage densities were held constant at 413 cm^2 (64 in^2) for the two cage dimensions to approximate the commercial animal welfare guidelines as closely as possible. The initial population sizes provided for a constant density and feeder space allocation. Therefore density and feeder space were not factors in this test.

Population and Density Allocations in House 5.

White and Brown Hens per Cage	Cage Size Width Depth	Floor Space per Bird	Feeder Space per Bird	Water Nipples per Cage
3	30.5 cm x 40.7 cm	413 cm^2 (64 in^2)	10.2 cm 4.0 in	1
4	40.7 cm x 40.7 cm	413 cm^2 (64 in^2)	10.2 cm 4.0 in	1

In House 7, all individual cages within each block contained either the brown or the white egg layers. Thus the replicate consisted of 28 hens/replicate, the hens were contained in 4 cages measuring 61 x 50.8 cm (24" x 20") and each cage held 7 hens at 439 cm^2 (68 in^2). These cage dimensions represent the commercial animal welfare guidelines. The initial population sizes provided for a constant density and feeder space allocation. Therefore, density and feeder space were not factors in this test.

Layer Management (Molting):

The molt experiment was conducted utilizing all hens involved in the layer test. Participating strains were randomly divided into three groups such that all strains, populations, and levels were approximately equally represented. In this test each group received one of the following treatments during the molt period commencing at 66 wks of age. The weeks in the molt tables were, therefore, adjusted accordingly, depending on the exact week in which the induced molt procedure was started.

Samples of replicates from all strains and/or treatment groups were randomly selected for monitoring weight loss as described below. The Molt Protocol indicated that when the weight loss target was reached for each sample treatment group or strain, all replicates of that strain or group were to be returned to feed based on their sister replicates weight loss. This monitoring plan was not effective and the weight loss for all of the replicates was exceeded by 5 to 7 % as shown in the molt period data tables.

Specific monitoring criteria for all of the molt programs included the following.

The goal is for the birds to attain approximately 24% body weight loss.

House temperatures were maintained at 80$\pm$ 5^o F with close monitoring of the birds and environment to ensure that hens did not pant.

The 1st production period lighting schedule was used as the guide for adjusting the light cycle following the molt. Actual house conditions and the flock's reaction to the NCSU Non-Fasting Molting Program affected how the light stimulation was given.

Molting Lighting Schedules:

Age	Date	House 5	House 7
		(Light Hours)	(Light Hours)
Through 66 Weeks	July 5, 2006	16.0	16.0
66 Weeks	July 5, 2006	8 hr	8 hr
69 Weeks	July 26, 2006	12.0	12.0
70 weeks	August 2, 2006	13.0	13.0
71 Weeks	August 9, 2006	14.0	14.0
72 Weeks	August 16, 2006	15.0	15.0
73 Weeks through end of test (110 wk)	August 23, 2006 to May 10, 2007	16.0	16.0

The stated goal was for the hens to have ceased egg production by Day 4-6 of the molt period. The White Egg Strains ranged from 7 to 9 d, and the Brown Egg Strains went as long as 18 d to 0 egg production However, the hens were allowed to consume all of the feed provided during the molt. The molting ration was designed to keep hens out of production, and to provide for skeletal and muscle maintenance. Livability was excellent with this program. The diet is bulky, such that a full trailer load weighed about 2/3 of a normal full load. Diet E was used to bring the hens back into peak production. After the first period of the second cycle feed intake and egg size will be used to determine diet progression.

Molt Program Names and Treatment Codes:

Program Name	Brief Description	Treatment Code
Full Fed Control	Not Molted	NM
Non-anorexic molt program	LP/LE Diet no fasting	NA
Non-anorexic molt program[low sodium]	LP/LE/LNa Diet no fasting	NALS

Full Fed Control (NM): The replicates assigned to the full fed control group were maintained according to the standard management program as outlined previously. The laying house was partitioned such that the lighting program was consistent for maximum egg production.

Non-anorexic molt program (NA): The hens were fed a low protein, low energy diet that contained adequate Ca for maintenance. When birds in the sample replicate being weighed reached their target weight, that replicate and all sister replicates were returned to full feed. The induced molt was started at 66 wks of age. The Non-anorexic molt low energy diet was designed to keep hens out of production while providing balanced nutrition for body maintenance only.

Procedural steps:

Day -7 Sample of birds will be weighed to determine the pre-molt weight. Target weight (24% body weight loss) will be calculated using the pre-molt weight.

Day 0 NA program instigated with the remaining layer feed being removed and replaced with the NA molt diet and daylight hours reduced. Controlled light housing, reduce the day length to 8 hr. Remove morbid birds before feed restriction.

Day +7 Sample of birds weighed 7 days after diet change to determine body weights.

Day +9 Sample of birds weighed 9 days after diet change to determine body weight. Weight loss per day calculated using 7 and 9 day body weights and target date for 24% weight loss determined. When the target date for the 24% body weight loss is determined the hens will not be weighed until target date at which time they will be returned to the layer feed if body weight loss has been achieved.

Day +28 Birds will be fed layer diet and light stimulated.

Non-anorexic molt program[low sodium] (NALS): The hens were fed a diet, which was low protein, energy, and sodium, and contained adequate Ca for maintenance. When birds in the sample replicate being weighed reached target weight that replicate and all sister replicates were returned to full feed. The induced molt was started at 66 wks of age. This Non-anorexic molt low energy and Sodium diet was designed to quickly trigger cessation of egg production and to keep hens out of production while being provided balanced nutrition for body maintenance only.

Procedural steps:

Day -7 Sample of birds will be weighed to determine the pre-molt weight. Target weight (24% body weight loss) will be calculated using the pre-molt weight.

Day 0 NALS program instigated with the remaining layer feed being removed and replaced with the NALS molt diet and daylight hours reduced. Controlled light housing, reduce the day length to 8 hr. Remove morbid birds before feed restriction.

Day +7 Sample of birds weighed 7 days after diet change to determine body weights.

Day +9 Sample of birds weighed 9 days after diet change to determine body weight. Weight loss per day calculated using 7 and 9 day body weights and target date for 24% weight loss determined. When the target date for the 24% body weight loss is determined the hens will not be weighed until target date at which time they will be returned to the layer feed if body weight loss has been achieved.

Day +28 Birds will be fed layer diet and light stimulated.

Layer Nutrition:

Layer diets were identified as Diets D, E, F, G, H, I, M, N, and O which consist of a pre-lay diet and a series of layer diets formulated to assure a daily protein, mineral and amino acid intake as shown below. Feed was offered ad libitum in accordance with the guidelines that all birds should receive acceptable nutrient intake at all times depending on the bird's age and production rate as shown in the Laying House Feeding Program Table.

The diets provided during the molt, consisted of a low protein/energy diet and a low protein/energy/Sodium diet described in the Molt Diets Table which follow. The molt diets were formulated to provide the hens with the nutrients needed to maintain a static body weight with no egg production.

Minimum Daily Intake of Nutrients Per Bird at Various Stages of Production in the 36th NCLP&MT

Production Stage	Pre-Peak > 87%	87-80%	80-70%	<70%
White Egg Layers				
Protein[1](g/day)	19	18	17	16
Calcium (g/day)	4.0	4.1	4.2	4.3
Lysine (mg/day	820	780	730	690
TSAA (mg)day)	700	670	630	590
Brown Egg Layers				
Protein[1](g/day)	20	19	18	17
Calcium (g/day)	4.0	4.0	4.1	4.2
Lysine (mg/day	830	820	780	730
TSAA (mg)day)	710	700	670	630

[1] If the egg production is higher than predicted values protein intake should be increased by 1%

Note: House temperatures dictate the body maintenance demand of the hen if the house temperature is 75 to 80°F feed protein content should be increased accordingly to compensate for metabolic heat needed to maintain a homeostatic body temperature. If the house temperature is at or above 85°F no adjustment is needed.

LAYING HOUSE FEEDING PROGRAM

Rate of Production	Consumption Per 100 Birds/Day (kg)	Diet Fed: White Egg Strains	Diet Fed: Brown Egg Strains
Weeks 17-26	< 9.52	D	D
Pre-Peak and > 87%	< 9.52	D	D
	9.57-10.39	F	E
	10.43-11.29	H	G
	11.34-12.20	I	H
	12.25-13.11	M	I
	>13.15	N	M
80-87%	< 9.52	F	E
	9.57-10.39	G	F
	10.43-11.29	I	H
	11.34-12.20	M	I
	12.25-13.11	N	M
	>13.15	O	N
70-80%	< 9.52	H	G
	9.57-10.39	I	H
	10.43-11.29	M	I
	11.34-12.20	N	M
	12.25-13.11	O	N
	>13.15	O	O
< 70%	< 9.52	H	G
	9.57-10.39	I	H
	10.43-11.29	N	M
	11.34-12.20	O	N
	12.25-13.11	O	O
	>13.15	O	O

Note: Low house temperatures and egg production higher than breeder guides for any given hen age will require an adjustment to the dietary phase feeding program to ensure the hens are in a positive nutrient status.

LAYING PERIOD DIETS

Ingredients	D	E	F	G	H
Corn	866.71	925.46	997.91	1068.19	1131.97
Soybean meal	663.18	621.10	552.33	499.80	457.65
Wheat Midds					
Fat (Tallow)	110.88	102.43	87.73	74.61	64.32
Gluten Meal 60%	95.83	88.37	100.00	99.23	90.80
D.L. Methionine	3.08	2.89	2.52	2.26	2.48
Lysine 78.8%					
Soybean Hulls					
Ground Limestone	132.42	133.70	135.07	134.02	132.50
Coarse Limestone	75.00	75.00	75.00	75.00	75.00
Bi-Carbonate	3.00	3.00	3.00	3.00	3.00
Phosphate Mono/D	36.77	34.73	32.84	30.36	28.79
Salt	6.00	5.99	5.95	5.93	5.92
Vit. premix	1.00	1.00	1.00	1.00	1.00
Min. premix	1.00	1.00	1.00	1.00	1.00
Mold Inhibitor	1.00	1.00	1.00	1.00	1.00
T-Premix	1.00	1.00	1.00	1.00	1.00
.06% Selenium Premix	1.00	1.00	1.00	1.00	1.00
Choline Cl 60%	2.14	2.33	2.65	2.59	2.57
Calculated Analysis					
Protein %	22.0	21.0	20.00	19.00	18.0
ME kcal/kg	2926.0	2926.0	2926.0	2926.0	2926.0
Calcium %	4.45	4.45	4.45	4.40	4.35
T. Phos. %	0.71	0.68	0.65	0.61	0.59
Lysine %	1.15	1.09	1.00	0.93	0.87
TSAA %	0.89	0.85	0.81	0.77	0.75

LAYING PERIOD DIETS

Ingredients	I	M	N	O
Corn	1199.47	1258.28	1309.81	1371.93
Soybean meal	406.08	363.91	340.24	333.87
Wheat Midds				
Fat (Tallow)	52.26	43.80	38.85	14.71
Gluten Meal 60%	89.84	82.64	61.54	25.79
D.L. Methionine	2.02	1.62	1.75	1.80
Lysine 78.8%				
Soybean Hulls				
Ground Limestone	158.82	160.10	161.33	167.71
Coarse Limestone	50.00	50.00	50.00	50.00
Bi-Carbonate	3.00	3.00	3.00	3.00
Phosphate Mono/D	26.79	24.75	22.60	20.30
Salt	5.90	5.89	5.89	5.89
Vit. premix	1.00	1.00	1.00	1.00
Min. premix	1.00	1.00	1.00	1.00
Mold Inhibitor	1.00	1.00	1.00	1.00
T-Premix	1.00	1.00	1.00	1.00
.06% Selenium Premix	1.00	1.00	1.00	1.00
Choline Cl 60%	0.83	1.02		
Calculated Analysis				
Protein %	17.00	16.00	15.00	14.00
ME kcal/kg	2926.0	2926.0	2926.0	2860.0
Calcium %	4.35	4.35	4.35	4.45
T. Phos. %	0.56	0.52	0.49	0.47
Lysine %	0.80	0.74	0.70	0.68
TSAA %	0.70	0.65	0.62	0.58

MOLT PERIOD DIETS

Ingredient	Molt Diet s		
	Low ME	Low ME/Na	Resting
Corn	702.50	712.00	1427.70
Corn Gluten Meal			
Soybean Hulls	1164.77	1190.80	226.00
Soybean Meal 48%			117.00
Wheat Midds	18.26		186.50
Coarse Limestone	17.78	33.00	16.50
Phosphate Mono/D	69.84	43.50	4.00
Bentonite		8.00	
Salt	9.16		5.00
Methionine	2.69	2.70	1.30
Choline Chloride		2.00	
Vit. premix	1.00	2.00	1.00
Min. premix	1.00	2.00	1.00
T - Premix	1.00		1.00
Fat	9.99		10.00
MYC-OUT 65	1.00	2.00	2.00
.06% Sel Premix	1.00	2.00	1.00
Total	2000	2000	2000
Calculated Analysis			
Protein %	9.92	9.96	11.75
Me kcal/kg	1650	1618	2859
Calcium %	1.33	1.40	3.80
T. Phos %	0.88	0.59	0.44
Lysine %	0.42	0.42	0.55
TSAA %	0.35	0.35	0.49

Data Collection Schedule and Procedures:

Egg Production--All eggs that had the potential of being marketed were credited toward the test unit's (replicate) egg production, regardless of the shell condition at the time of collection. All eggs were collected and recorded daily. Egg production was summarized at twenty-eight day intervals, and was calculated and reported on a hen-day basis.

Egg Weight--At twenty-eight day intervals, all eggs produced in the previous 24-hour period were weighed and sorted by size (See egg size distribution). Percentages of eggs within each size category, average egg weight (g), and egg mass (g) were calculated and reported.

Egg Quality--At twenty-eight day intervals, all eggs produced within the previous 24 hours were examined by candling light and graded according to current USDA standards for egg quality. Eggs were graded in the pilot processing facility and handled as they would be in a commercial off-line facility.

Egg Price--Egg income was calculated using three-year regional average prices for farm value of eggs based on egg production and quality evaluation.

Feed Consumption--All feed offered for consumption was recorded for each replicate. At twenty-eight day intervals, feed not consumed was weighed back and feed consumption was calculated. Daily feed intake (kg/100 hens/day) was calculated and reported for each strain. Feed costs were based on the actual feed prices for each feed delivery which were calculated and summarized for the complete production cycle.

Mortality--All mortalities were recorded daily, and obvious accidents were not included in reported mortalities.

Statistical Analyses and Separation of Means:

Analyses of variance were performed on all data. Separate analyses were conducted for white and brown egg strains. Significant differences ($P < 0.01$) within white and brown egg strains are noted by differing letters among columns of means. The layer houses was not significant, therefore, data for houses 4 and 5 were pooled in this analysis. All data were subjected to ANOVA utilizing the GLM procedure of SAS, with main effects of strain and density. First and second order interactions were tested for significance. Mean differences were separated via the PDIFF option of the GLM procedure.

DESCRIPTION OF DATA TABLE STATISTICS

First cycle performance of white and brown egg strains are shown on Tables 1 to 10. The molt period performance and weight loss data of the white and brown egg strains are shown on Tables 10 to 18.

Breeder (Strain):

Short identification codes of the breeder and strain of the stock were developed. See more complete information following data tables in Table .

Hen Housed Eggs per Bird:

The total number of eggs produced divided by the number of birds housed at 119 days.

Hen Day Egg Production:

The average daily number of eggs produced per 100 hens per day.

Egg Mass:

The average daily production of egg mass in grams per hen day.

Mortality:

The percentage of birds which died between 119 through 462 days of age and 462 through 490 which occurred during the molt period are reported separately

Feed Consumption:

The kilograms of feed consumed daily per 100 hens (housed or hen days).

Feed Conversion:

The grams of egg produced per gram of feed consumed.

Egg Weight:

The average egg weight (gms) for each period sampled. Weight of all eggs collected from previous 24 hours divided by the number of eggs collected.

Egg Income:

The calculated income per hen housed at 119 days, from egg production using three-year regional average egg prices 2003 to 2006.

Three Year Regional Average Egg Prices

Grade	Size	$$/Dozen
A	Extra Large	0.872
A	Large	0.839
A	Medium	0.669
A	Small	0.519
A	Pee Wee	0.260
B	All	0.445
Checks	All	0.445

Grade Information:

The average grade of all eggs sampled according to USDA grading standards over all sampling periods. Grades are established by personnel trained in USDA grading standards.

Egg Size Distribution:

The following size classifications were used for establishing the USDA egg size grading. There has been blending of egg size in this test with the weight cutoff between medium and large being 23.5 ounces/doz. This maximizes the number of USDA large eggs just as would occur in a commercial plant. The proportion of the eggs falling into the following size categories are reported in the tables.

USDA Egg Weights Used To Establish The Egg Size Distribution Weighted for Large Eggs.

Size Category	Ounces/Dozen
Pee Wee	< 18
Small	18 - 21
Medium	21 - 23.5
Large	23.5 - 27
Extra Large	> 27

Feed Cost:

The calculated feed cost per hen housed at 119 days, using the pounds/diet consumed and the average price of each diet per ton.

The Average Contract Feed Price For Feed Purchases.

Diets	Price Per Ton
D	198.4
E	195.0
F	190.4
G	186.4
H	182.0
I	175.4
M	170.4
N	165.0
O	158.6
Molt Diet LP/LE	144.6
Molt Diet LP/LE/LS	138.7
Resting	153.7

Metric Conversions:

1 lb = 453.6 g
1 lb = .4536 kg
1 oz = 28.35 g

1 g = .03527 oz
1 kg = 2.204 lb
1 g = 1000 mg
1 kg = 1000 g

TABLE 1. EFFECT OF WHITE EGG STRAIN AND POPULATION ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Feed Consumption (kg/100/hen/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
LSL-Lite	3	10.8	0.49	293.2	86.9	56.0	4.5	142
White	4	11.1	0.48	290.2	87.2	56.6	5.1	141
	Average	11.0^{A}	0.48^{B}	291.7^{A}	87.1^{A}	56.3^{A}	4.8^{BCD}	142
Bovans	3	10.6	0.50	286.1	84.8	55.9	4.5	144
White Exp.	4	10.6	0.49	284.1	84.3	55.8	4.3	141
	Average	10.6^{AB}	0.50^{AB}	285.1^{ABC}	84.5^{DE}	55.9^{AB}	4.4^{BCD}	143
Bovans	3	10.7	0.49	286.6	87.6	55.6	8.9	141
White	4	10.7	0.48	277.0	86.2	54.5	12.7	142
	Average	10.7^{AB}	0.48^{B}	281.8^{C}	86.9^{AB}	55.0^{BC}	10.8^{A}	142
DeKalb	3	10.3	0.50	290.5	85.7	55.3	3.0	142
White Exp.	4	10.5	0.49	287.1	85.4	55.0	3.3	141
	Average	10.4^{B}	0.50^{AB}	288.8^{AB}	85.6^{BCD}	55.1^{BC}	3.2^{CD}	142
DeKalb	3	10.7	0.50	282.0	85.7	56.9	8.8	142
White	4	10.6	0.50	289.4	86.4	56.7	6.1	142
	Average	10.7^{AB}	0.50^{AB}	285.7^{ABC}	86.0^{ABC}	56.8^{A}	7.4^{AB}	142
Hy-Line	3	9.7	0.50	280.1	82.0	52.0	0.7	143
(W-36)	4	9.8	0.49	278.6	81.8	52.1	1.8	143
	Average	9.8^{C}	0.50^{AB}	279.3^{C}	81.9^{F}	52.0^{D}	1.3^{D}	143
Hy-Line	3	10.7	0.49	285.1	83.5	54.8	1.3	139
(W-98)	4	11.0	0.48	282.1	83.5	55.6	3.8	145
	Average	10.8^{A}	0.48^{B}	283.6^{BC}	83.5^{E}	55.2^{BC}	2.5^{CD}	142
CV-20	3	10.0	0.49	282.0	83.0	52.3	2.6	141
	4	9.8	0.51	281.2	83.4	53.2	3.0	140
	Average	9.9^{C}	0.50^{AB}	281.6^{C}	83.2^{EF}	52.8^{D}	2.8^{CD}	141
ISA	3	10.0	0.51	287.3	85.3	54.7	5.6	142
White Exp.	4	10.0	0.51	283.9	85.0	54.4	5.9	143
	Average	10.0^{C}	0.51^{A}	285.6^{ABC}	85.2^{CD}	54.5^{C}	5.8^{BC}	142
All Strains	3	10.4	0.49	285.9	84.9	54.8	4.4	142
	4	10.4	0.49	283.7	84.8	54.9	5.1	142

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B,C,D,E - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 2. EFFECT OF WHITE EGG STRAIN AND POPULATION ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Egg Weight (g egg/hen/d)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
LSL-Lite White	3	60.2	0.0	1.2	7.7	28.8	61.9
	4	60.5	0.0	1.7	8.0	25.1	65.0
	Average	60.3^{C}	0.0	1.4^{B}	7.8^{ABC}	26.9^{BC}	63.4^{CD}
Bovans White Exp.	3	61.8	0.1	1.2	5.0	23.5	69.9
	4	61.8	0.0	0.8	5.6	21.2	72.2
	Average	61.8^{B}	0.0	1.0^{B}	5.3^{D}	22.3^{D}	71.1^{AB}
Bovans White	3	59.5	0.0	1.4	8.6	31.4	58.3
	4	59.3	0.0	1.3	8.2	32.1	58.2
	Average	59.4^{D}	0.0	1.4^{B}	8.4^{AB}	31.8^{A}	58.2^{EF}
DeKalb White Exp.	3	60.3	0.0	1.5	7.3	29.9	61.0
	4	60.4	0.1	1.5	7.8	27.3	62.8
	Average	60.3^{C}	0.0	1.5^{B}	7.6^{ABC}	28.6^{AB}	61.9^{DE}
DeKalb White	3	61.8	0.0	1.8	6.4	22.7	68.7
	4	61.3	0.2	1.5	7.9	23.2	66.9
	Average	61.5^{B}	0.1	1.7^{B}	7.2^{BC}	22.9^{CD}	67.8^{BC}
Hy-Line (W-36)	3	59.2	0.0	2.5	10.2	27.8	59.4
	4	59.2	0.3	3.3	8.3	31.2	56.7
	Average	59.2^{D}	0.1	2.9^{A}	9.3^{A}	29.5^{AB}	58.1^{EF}
Hy-Line (W-98)	3	62.3	0.0	0.8	6.3	21.7	70.9
	4	63.1	0.0	0.7	6.1	18.9	74.0
	Average	62.7^{A}	0.0	0.8^{B}	6.2^{CD}	20.3^{D}	72.5^{A}
CV-20	3	58.9	0.3	3.4	7.7	33.2	55.2
	4	59.4	0.0	2.4	8.2	32.1	57.1
	Average	59.1^{D}	0.2	2.9^{A}	7.9^{ABC}	32.7^{A}	56.1^{F}
ISA White Exp.	3	59.2	0.1	3.1	7.9	31.2	57.4
	4	59.3	0.1	2.8	7.4	31.8	57.6
	Average	59.3^{D}	0.1	3.0^{A}	7.7^{ABC}	31.5^{A}	57.5^{EF}
All Strains	3	60.3	0.0	1.9	7.5	27.8	62.5
	4	60.5	0.1	1.8	7.5	27.0	63.4

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B,C,D,E,F - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 3. EFFECT OF WHITE EGG STRAIN AND POPULATION ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
LSL-Lite	3	97.6	1.0	1.1	0.2	20.18	7.77
White	4	96.7	1.1	1.8	0.3	19.88	7.89
	Average	97.1^{A}	1.1^{C}	1.5^{C}	0.2	20.03^{A}	7.83^{AB}
Bovans	3	95.9	1.5	2.5	0.0	19.74	7.61
White Exp.	4	95.0	1.2	3.5	0.4	19.51	7.60
	Average	95.4^{B}	1.4^{ABC}	3.0^{A}	0.2	19.62^{AB}	7.60^{ABC}
Bovans	3	95.8	2.0	2.0	0.3	19.48	7.47
White	4	95.9	1.9	1.9	0.2	18.87	7.34
	Average	95.8^{B}	2.0^{A}	2.0^{BC}	0.2	19.17^{BC}	7.40^{CD}
DeKalb	3	95.7	1.7	2.3	0.3	19.79	7.46
White Exp.	4	95.4	1.6	2.9	0.2	19.51	7.56
	Average	95.5^{B}	1.7^{ABC}	2.6^{AB}	0.3	19.65^{AB}	7.51^{C}
DeKalb	3	95.4	2.3	2.0	0.3	19.22	7.51
White	4	95.8	1.9	2.1	0.3	19.72	7.58
	Average	95.6^{B}	2.1^{A}	2.1^{BC}	0.3	19.47^{B}	7.54^{BC}
Hy-Line	3	96.2	1.2	2.4	0.2	19.02	7.09
(W-36)	4	97.0	0.8	1.9	0.3	18.92	7.12
	Average	96.6^{AB}	1.0^{C}	2.2^{ABC}	0.3	18.97^{C}	7.11^{D}
Hy-Line	3	95.7	2.0	2.1	0.2	19.60	7.80
(W-98)	4	95.6	1.7	2.7	0.1	19.44	7.90
	Average	95.7^{B}	1.8^{AB}	2.4^{AB}	0.2	19.52^{B}	7.85^{A}
CV-20	3	96.0	1.1	2.6	0.2	19.06	7.24
	4	97.2	0.9	1.7	0.1	19.24	7.05
	Average	96.6^{AB}	1.0^{C}	2.1^{ABC}	0.2	19.15^{BC}	7.14^{D}
ISA	3	97.0	1.0	2.2	0.1	19.62	7.20
White Exp.	4	96.1	1.3	2.4	0.3	19.27	7.12
	Average	96.5^{AB}	1.2^{BC}	2.3^{ABC}	0.2	19.44^{BC}	7.16^{D}
All	3	96.1	1.5	2.1	0.2	19.52	7.46
Strains	4	96.1	1.4	2.3	0.2	19.37	7.46

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 4. EFFECT OF BROWN EGG STRAIN AND POPULATION ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Feed Consumption (kg/100/hen/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
Bovans Brown	3	11.0	0.49	290.6	86.7	57.7	5.2	142
	4	11.1	0.49	291.2	86.5	57.6	4.6	141
	Average	11.1^{A}	0.49^{B}	290.9	86.6^{A}	57.6^{B}	4.9	141
Bovans Goldline	3	11.3	0.50	289.1	86.5	59.7	3.9	140
	4	11.1	0.50	291.9	86.3	58.9	2.9	142
	Average	11.2^{A}	0.50^{B}	290.5	86.4^{AB}	59.3^{A}	3.4	141
Hy-Line Brown	3	10.3	0.52	286.6	85.3	56.5	3.8	142
	4	10.3	0.51	287.1	84.8	56.7	2.3	143
	Average	10.3^{B}	0.51^{A}	286.8	85.0^{B}	56.6^{B}	3.0	142
All Strains	3	10.9	0.50	288.8	86.1	58.0	4.3	141
	4	10.8	0.50	290.1	85.9	57.7	3.2	142

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 5. EFFECT OF BROWN EGG STRAIN AND POPULATION ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Egg Weight (g egg/hen/d)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Bovans	3	62.8	0.1	1.1	4.9	20.7	73.3
Brown	4	62.8	0.0	0.9	4.7	19.6	74.4
	Average	62.8[B]	0.0	1.0	4.8	20.2	73.8
Bovans	3	64.5	0.0	0.7	4.2	17.6	77.4
Goldline	4	63.8	0.0	0.4	5.0	18.1	76.1
	Average	64.2[A]	0.0	0.5	4.6	17.9	76.7
Hy-Line	3	62.1	0.0	0.7	4.7	23.7	70.6
Brown	4	62.4	0.0	0.5	4.0	21.0	74.3
	Average	62.2[B]	0.0	0.6	4.3	22.4	72.4
All	3	63.1	0.0	0.8	4.6	20.7	73.8
Strains	4	63.0	0.0	0.6	4.6	19.6	74.9

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 6. EFFECT OF BROWN EGG STRAIN AND POPULATION ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Bovans	3	96.2	1.5	2.2	0.1	20.17	8.00
Brown	4	96.1	1.3	2.4	0.2	20.13	8.05
	Average	96.1	1.4	2.3	0.1	20.15	8.03[A]
Bovans	3	96.2	1.5	2.2	0.1	20.13	8.11
Goldline	4	96.2	1.2	2.6	0.1	20.26	8.07
	Average	96.2	1.3	2.4	0.1	20.19	8.09[A]
Hy-Line	3	96.8	1.2	2.0	0.1	19.90	7.45
Brown	4	97.0	1.2	1.9	0.0	20.08	7.52
	Average	96.9	1.2	1.9	0.0	19.99	7.48[B]
All	3	96.4	1.4	2.1	0.1	20.07	7.85
Strains	4	96.4	1.2	2.3	0.1	20.16	7.88

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 7. EFFECT OF WHITE EGG STRAIN ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Feed Consumption (kg/100/hen/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
LSL-Lite White	10.2^{A}	0.52	298.7^{A}	88.1^{AB}	56.4^{AB}	3.0^{C}	141^{B}
Bovans White Exp.	10.0^{AB}	0.52	286.8^{BCD}	85.1^{D}	55.2^{BC}	4.5^{BC}	140^{BC}
Bovans White	10.0^{AB}	0.53	293.7^{AB}	88.5^{A}	56.3^{AB}	6.9^{AB}	139^{C}
DeKalb White Exp.	9.9^{AB}	0.52	293.1^{AB}	86.7^{BC}	55.3^{ABC}	3.2^{BC}	140^{BC}
DeKalb White	10.2^{A}	0.52	286.8^{BCD}	86.2^{CD}	56.5^{A}	9.4^{A}	142^{B}
Hy-Line (W-36)	9.3^{C}	0.52	279.7^{D}	82.0^{F}	51.3^{D}	1.4^{C}	142^{B}
Hy-Line (W-98)	10.2^{A}	0.51	283.4^{CD}	83.6^{E}	54.5^{C}	2.1^{C}	138^{C}
CV-20	9.3^{C}	0.53	282.6^{CD}	83.3^{EF}	51.8^{D}	2.3^{C}	142^{B}
ISA White Exp.	9.7^{B}	0.52	289.7^{BC}	85.9^{CD}	54.6^{C}	4.5^{BC}	146^{A}

A,B,C,D,E,F - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 8. EFFECT OF WHITE EGG STRAIN AND POPULATION ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Egg Weight (g egg/hen/d)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
LSL-Lite White	59.8^{B}	0.0	1.5^{CD}	7.8^{BCD}	30.3^{BC}	60.2^{BC}
Bovans White Exp.	60.8^{A}	0.0	1.1^{D}	7.1^{CD}	26.3^{CD}	65.4^{AB}
Bovans White	59.8^{B}	0.1	1.4^{CD}	7.9^{BCD}	31.5^{AB}	58.8^{C}
DeKalb White Exp.	59.7^{B}	0.1	1.0^{D}	7.1^{CD}	31.7^{AB}	59.8^{C}
DeKalb White	61.0^{A}	0.1	1.7^{BCD}	6.4^{D}	24.1^{D}	67.6^{A}
Hy-Line (W-36)	58.3^{C}	0.1	3.4^{A}	11.1^{A}	32.6^{AB}	52.6^{D}
Hy-Line (W-98)	61.6^{A}	0.0	0.9^{D}	6.7^{D}	22.5^{D}	69.6^{A}
CV-20	58.2^{C}	0.1	2.7^{AB}	9.5^{AB}	35.0^{A}	52.6^{D}
ISA White Exp.	58.8^{C}	0.1	2.1^{BC}	9.0^{BC}	35.4^{A}	52.8^{D}

A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 9. EFFECT OF WHITE EGG STRAIN AND POPULATION ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
LSL-Lite White	97.3	0.8^{BCD}	1.7	0.2	20.56^{A}	7.44^{A}
Bovans White Exp.	96.2	1.0^{ABC}	2.5	0.4	19.73^{BC}	7.29^{AB}
Bovans White	96.3	1.6^{A}	1.8	0.3	20.04^{AB}	7.14^{AB}
DeKalb White Exp.	96.7	1.3^{AB}	1.8	0.2	20.13^{AB}	7.19^{AB}
DeKalb White	96.7	1.6^{A}	1.6	0.2	19.75^{BC}	7.24^{AB}
Hy-Line (W-36)	97.9	0.4^{D}	1.3	0.4	18.94^{D}	6.73^{C}
Hy-Line (W-98)	96.7	0.6^{CD}	2.4	0.3	19.58^{BC}	7.39^{A}
CV-20	97.0	0.9^{BCD}	2.0	0.1	19.22^{CD}	6.74^{C}
ISA White Exp.	96.9	1.1^{ABC}	1.7	0.9	19.63^{BC}	7.01^{BC}

A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 10. EFFECT OF BROWN EGG STRAIN ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Feed Consumption (kg/100/hen/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
Bovans Brown	10.5[A]	0.51	297.5[A]	87.7[A]	57.0[AB]	3.0	138[B]
Bovans Goldline	10.4[A]	0.52	293.0[AB]	86.7[A]	57.9[A]	3.3	141[A]
Hy-Line Brown	10.0[B]	0.53	288.5[B]	85.0[B]	55.8[B]	1.8	141[A]

A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 11. EFFECT OF BROWN EGG STRAIN AND POPULATION ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Egg Weight (g egg/hen/d)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Bovans Brown	61.3[B]	0.0	0.5	4.9	26.2[A]	68.2
Bovans Goldline	62.5[A]	0.0	0.5	5.4	20.1[B]	73.9
Hy-Line Brown	61.7[AB]	0.0	0.4	5.0	24.2[AB]	70.2

A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 12. EFFECT OF BROWN EGG STRAIN AND POPULATION ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 36th NCLP&MT (119-462 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Bovans Brown	96.6	1.1	1.9	0.4	20.64	7.70[A]
Bovans Goldline	96.2	1.7	2.0	0.1	20.31	7.60[AB]
Hy-Line Brown	97.0	0.8	2.1	0.1	20.12	7.30[B]

TABLE 13. EFFECT OF WHITE EGG STRAIN AND POPULATION ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Feed Consumption (kg/100/hen/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality	Egg Income ($/hen)	Feed Costs ($/hen)	Days to 0% Production
LSL-Lite	3	7.7	9.7	38.2	1.6	0.67	0.34	9
White	4	7.2	9.8	37.1	1.1	0.65	0.32	10
	Average	7.4	9.8	37.7	1.4^{ABC}	0.66^{ABC}	0.33	9^{ABC}
Bovans	3	7.2	9.9	36.7	0.3	0.68	0.33	9
White Exp.	4	7.4	9.8	36.9	2.3	0.68	0.33	8
	Average	7.3	9.9	36.8	1.3^{ABC}	0.68^{AB}	0.33	8^{C}
Bovans	3	7.2	9.3	38.6	2.4	0.61	0.30	9
White	4	7.8	9.0	37.8	2.3	0.60	0.32	8
	Average	7.5	9.2	38.2	2.4^{A}	0.61^{C}	0.31	9^{C}
DeKalb	3	6.7	10.2	37.6	1.1	0.68	0.30	10
White Exp.	4	7.1	9.3	35.4	1.5	0.58	0.32	11
	Average	6.9	9.7	36.5	1.3^{ABC}	0.63^{BC}	0.31	10^{A}
DeKalb	3	6.8	8.9	36.6	2.6	0.60	0.28	10
White	4	7.5	10.1	38.2	1.9	0.68	0.33	10
	Average	7.1	9.5	37.4	2.3^{A}	0.64^{ABC}	0.31	10^{AB}
Hy-Line	3	6.2	9.8	35.4	0.5	0.68	0.29	9
(W-36)	4	6.4	10.1	36.3	0.3	0.70	0.30	9
	Average	6.3	9.9	35.8	0.4^{BC}	0.69^{A}	0.29	9^{BC}
Hy-Line	3	6.9	9.8	36.0	0.0	0.65	0.32	9
(W-98)	4	6.8	9.4	35.0	0.6	0.62	0.31	9
	Average	6.9	9.6	35.5	0.2^{C}	0.63^{BC}	0.32	9^{BC}
CV-20	3	6.9	9.7	36.0	0.1	0.66	0.32	8
	4	6.2	9.8	35.8	1.0	0.69	0.28	9
	Average	6.5	9.8	35.9	0.5^{BC}	0.68^{AB}	0.30	8^{C}
ISA	3	6.5	9.8	37.3	1.9	0.66	0.29	9
White Exp.	4	6.9	9.7	37.2	1.8	0.65	0.30	8
	Average	6.7	9.7	37.2	1.9^{AB}	0.66^{ABC}	0.30	9^{BC}
All	3	6.9	9.7	36.9	1.2	0.65	0.31	9
Strains	4	7.0	9.7	36.6	1.4	0.65	0.31	9

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

A,B,C - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 14. EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder	Molt Program	Feed Consumption	Eggs Per Bird Housed	Egg Production	Mortality	Egg Income	Feed Costs	Days to 0% Production
(Strain)		(kg/100/hen/d)		(HD%)		($/hens)	($/hens)	(Days)
LSL-Lite	NM	11.8	21.8	84.6^{ab}	1.3	1.46	0.54	.
White	NA	5.4	3.7	13.9^{de}	1.6	0.25	0.23	9
	NALS	5.1	3.9	14.4^{de}	1.1	0.27	0.22	9
Bovans	NM	10.2	22.2	82.2^{bc}	2.1	1.53	0.49	.
White Exp.	NA	6.1	3.4	13.0^{e}	1.7	0.24	0.25	8
	NALS	5.7	4.0	15.1^{de}	0.1	0.28	0.25	9
Bovans	NM	11.5	20.9	87.6^{a}	2.4	1.36	0.49	.
White	NA	5.6	3.2	13.6^{de}	4.2	0.22	0.21	8
	NALS	5.5	3.4	13.4^{de}	0.5	0.23	0.22	9
DeKalb	NM	10.3	21.7	80.9^{bc}	1.7	1.37	0.49	.
White Exp.	NA	5.3	3.3	12.5^{e}	0.7	0.23	0.22	9
	NALS	5.1	4.3	16.1^{de}	1.7	0.29	0.22	11
DeKalb	NM	9.9	20.8	82.1^{bc}	1.6	1.40	0.45	.
White	NA	5.9	3.5	13.5^{de}	2.1	0.25	0.24	8
	NALS	5.7	4.1	16.6^{d}	3.1	0.27	0.23	12
Hy-Line	NM	9.0	22.0	79.1^{c}	0.4	1.52	0.44	.
(W-36)	NA	5.0	3.6	13.4^{de}	0.7	0.26	0.22	8
	NALS	4.9	4.2	15.1^{de}	0.2	0.29	0.22	10
Hy-Line	NM	10.4	21.4	79.1^{c}	0.0	1.38	0.50	.
(W-98)	NA	5.3	3.5	12.9^{e}	0.3	0.25	0.23	8
	NALS	5.0	3.9	14.4^{de}	0.4	0.27	0.22	9
CV-20	NM	9.7	21.8	80.1^{bc}	0.1	1.50	0.47	.
	NA	5.2	3.6	13.3^{de}	0.0	0.25	0.23	8
	NALS	4.7	3.9	14.4^{de}	1.5	0.27	0.20	9
ISA	NM	9.5	21.6	81.9^{bc}	0.5	1.45	0.44	.
White Exp.	NA	5.2	3.9	15.4^{de}	2.7	0.27	0.21	9
	NALS	5.5	3.8	14.5^{de}	2.4	0.26	0.23	9
All	NM	10.2^{Y}	21.6^{Y}	82.0	1.1	1.44^{Y}	0.48^{Y}	.
Strains	NA	5.4^{Z}	3.5^{Z}	13.5	1.5	0.25^{Z}	0.23^{Z}	8^{Z}
	NALS	5.2^{Z}	3.9^{Z}	14.9	1.2	0.27^{Z}	0.22^{Z}	10^{Y}

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

a,b,c,d,e - Different letters denote significant strain * molt program interactions (P<.01).

X,Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.

TABLE 15. EFFECT OF WHITE EGG STRAIN AND POPULATION ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
LSL-Lite	3	1.22	1.74	42.8	1.39	20.4	1.48
White	4	1.24	1.80	46.2	1.38	23.1	1.51
	Average	1.23^{ABC}	1.77^{BC}	44.5^{B}	1.38^{B}	21.8	1.50^{B}
Bovans	3	1.26	1.82	44.7	1.44	20.6	1.49
White Exp.	4	1.24	1.74	40.8	1.41	19.0	1.48
	Average	1.25^{AB}	1.78^{B}	42.7^{B}	1.42^{B}	19.8	1.49^{B}
Bovans	3	1.12	1.68	50.4	1.32	21.4	1.39
White	4	1.18	1.74	46.6	1.40	19.4	1.47
	Average	1.15^{D}	1.71^{BC}	48.5^{AB}	1.36^{B}	20.4	1.43^{B}
DeKalb	3	1.23	1.75	43.3	1.40	20.0	1.48
White Exp.	4	1.21	1.77	46.9	1.39	21.3	1.47
	Average	1.22^{BC}	1.76^{BC}	45.1^{B}	1.39^{B}	20.6	1.48^{B}
DeKalb	3	1.22	1.74	43.0	1.38	20.5	1.46
White	4	1.18	1.73	48.2	1.36	21.3	1.50
	Average	1.20^{BCD}	1.73^{BC}	45.6^{B}	1.37^{B}	20.9	1.48^{B}
Hy-Line	3	1.18	1.73	47.8	1.40	18.6	1.46
(W-36)	4	1.19	1.72	44.6	1.40	18.6	1.45
	Average	1.18^{CD}	1.72^{BC}	46.2^{B}	1.40^{B}	18.6	1.45^{B}
Hy-Line	3	1.27	2.01	58.2	1.58	21.3	1.66
(W-98)	4	1.27	1.95	53.1	1.52	21.4	1.57
	Average	1.27^{A}	1.98^{A}	55.6^{A}	1.55^{A}	21.4	1.62^{A}
CV-20	3	1.18	1.69	43.5	1.37	19.0	1.42
	4	1.18	1.70	43.9	1.36	19.9	1.41
	Average	1.18^{CD}	1.70^{C}	43.7^{B}	1.36^{B}	19.4	1.42^{B}
ISA	3	1.18	1.79	51.1	1.43	19.6	1.47
White Exp.	4	1.21	1.71	41.6	1.36	20.3	1.42
	Average	1.19^{CD}	1.75^{BC}	46.4^{B}	1.40^{B}	20.0	1.45^{B}
All	3	1.21	1.77	47.2	1.41	20.2	1.48
Strains	4	1.21	1.76	45.8	1.40	20.5	1.48

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 16. EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
LSL-Lite	NM	1.24	1.75	40.9	1.64	6.2	1.75
White	NA	1.22	1.77	44.9	1.21	31.8	1.38
	NALS	1.22	1.80	47.7	1.31	27.3	1.37
Bovans	NM	1.25	1.72	37.9	1.62	6.1	1.65
White Exp.	NA	1.24	1.83	46.8	1.30	29.0	1.42
	NALS	1.26	1.80	43.4	1.35	24.4	1.39
Bovans	NM	1.14	1.77	55.6	1.64	7.2	1.64
White	NA	1.17	1.64	40.9	1.19	27.0	1.34
	NALS	1.15	1.71	48.9	1.25	27.0	1.31
DeKalb	NM	1.21	1.73	42.8	1.63	6.3	1.67
White Exp.	NA	1.20	1.80	50.4	1.25	30.5	1.42
	NALS	1.23	1.75	42.0	1.31	25.1	1.35
DeKalb	NM	1.17	1.73	49.3	1.62	6.3	1.64
White	NA	1.22	1.76	45.1	1.21	31.2	1.47
	NALS	1.20	1.71	42.4	1.28	25.2	1.33
Hy-Line	NM	1.20	1.73	44.3	1.64	4.8	1.66
(W-36)	NA	1.17	1.71	46.2	1.23	27.5	1.35
	NALS	1.18	1.74	48.1	1.33	23.5	1.35
Hy-Line	NM	1.28	1.89	47.0	1.77	5.9	1.80
(W-98)	NA	1.28	2.04	59.7	1.41	30.8	1.55
	NALS	1.26	2.02	60.2	1.46	27.4	1.50
CV-20	NM	1.17	1.68	43.5	1.57	6.8	1.59
	NA	1.18	1.69	44.1	1.25	26.4	1.38
	NALS	1.19	1.71	43.6	1.28	25.1	1.28
ISA	NM	1.19	1.70	42.6	1.58	7.2	1.60
White Exp.	NA	1.18	1.76	49.3	1.27	27.5	1.39
	NALS	1.21	1.78	47.2	1.33	25.2	1.36
All	NM	1.21	1.75	44.9	1.64^{X}	6.3^{Z}	1.67^{X}
Strains	NA	1.21	1.78	47.5	1.26^{Z}	29.1^{X}	1.41^{Y}
	NALS	1.21	1.78	47.1	1.32^{Y}	25.6^{Y}	1.36^{Z}

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

X,Y,Z - Different letters denote significant differences ($P < .01$), comparisons made among strain average values.

TABLE 17. EFFECT OF BROWN EGG STRAIN AND POPULATION ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	Feed Consumption (kg/100/hen/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality (%)	Egg Income ($/hen)	Feed Costs ($/hen)	Days to 0% Production
Bovans	3	7.1	10.6	39.8	1.2	0.73	0.32	14
Brown	4	7.1	10.3	39.0	1.9	0.72	0.33	13
	Average	7.1	10.4	39.4	1.6	0.72	0.32	13
Bovans	3	7.2	10.3	40.0	2.1	0.72	0.33	15
Goldline	4	7.2	10.6	39.2	2.8	0.72	0.34	12
	Average	7.2	10.5	39.6	2.4	0.72	0.33	13
Hy-Line	3	6.6	10.1	37.1	1.6	0.72	0.31	12
Brown	4	6.4	10.5	38.8	0.2	0.72	0.30	14
	Average	6.5	10.3	38.0	0.9	0.72	0.30	13
All	3	7.0	10.3	39.0	1.6	0.72	0.32	14
Strains	4	6.9	10.5	39.0	1.6	0.72	0.32	13

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.

TABLE 18. EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Molt Program	Feed Consumption (kg/100/hen/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality (%)	Egg Income ($/hen)	Feed Costs ($/hen)	Days to 0% Production
Bovans	NM	9.7	22.3	83.6	1.4	1.54	0.49	.
Brown	NA	6.0	3.6	13.9	2.0	0.26	0.25	9
	NALS	5.5	5.3	20.8	1.3	0.37	0.23	18
Bovans	NM	10.6	22.3	84.4	2.4	1.52	0.53	.
Goldline	NA	5.2	3.9	14.9	2.1	0.27	0.22	10
	NALS	5.9	5.1	19.6	2.8	0.36	0.26	16
Hy-Line	NM	9.1	21.4	78.5	0.1	1.50	0.47	.
Brown	NA	5.2	4.1	15.7	1.9	0.29	0.22	11
	NALS	5.1	5.4	19.8	0.7	0.38	0.23	14
All	NM	9.8^{Y}	22.0^{X}	82.2^{X}	1.3	1.52^{X}	0.50^{Y}	.
Strains	NA	5.5^{Z}	3.9^{Z}	14.8^{Z}	2.0	0.27^{Z}	0.23^{Z}	10^{Z}
	NALS	5.5^{Z}	5.3^{Y}	20.1^{Y}	1.6	0.37^{Y}	0.24^{Z}	16^{Y}

X,Y,Z - Different letters denote significant differences ($P < .01$), comparisons made among molt program average values.

TABLE 19. EFFECT OF BROWN EGG STRAIN AND POPULATION ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Population[1]	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Bovans	3	1.54	2.09	35.8	1.72	17.5	1.78
Brown	4	1.51	2.08	37.6	1.67	19.4	1.74
	Average	1.53[A]	2.08	36.7[B]	1.69	18.4	1.76
Bovans	3	1.49	2.11	41.7	1.70	19.1	1.77
Goldline	4	1.48	2.12	43.0	1.75	17.8	1.78
	Average	1.49[A]	2.11	42.4[AB]	1.72	18.4	1.77
Hy-Line	3	1.40	2.03	45.6	1.65	18.9	1.74
Brown	4	1.40	2.08	48.6	1.71	17.5	1.73
	Average	1.40[B]	2.05	47.1[A]	1.68	18.2	1.74
All	3	1.48	2.07	41.1	1.69	18.5	1.76
Strains	4	1.47	2.09	43.1	1.71	18.2	1.75

[1]All strains were housed at a constant density of: 413 cm^2 equals 64 in^2.
A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 20. EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN STAIR-STEP CAGES (HOUSE 5)

Breeder (Strain)	Molt Program	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Bovans	NM	1.51	2.03	34.2	1.92	5.3	1.94
Brown	NA	1.51	2.12	40.6	1.54	27.4	1.69
	NALS	1.56	2.10	35.5	1.63	22.6	1.66
Bovans	NM	1.45	2.11	45.5	1.99	5.5	1.99
Goldline	NA	1.50	2.08	38.4	1.53	26.2	1.63
	NALS	1.51	2.16	43.1	1.65	23.6	1.69
Hy-Line	NM	1.38	2.02	46.3	1.91	5.2	1.93
Brown	NA	1.42	2.07	46.3	1.53	26.2	1.67
	NALS	1.39	2.07	48.7	1.59	23.3	1.62
All	NM	1.45	2.05	42.0	1.94^{X}	5.3^{Z}	1.95^{Y}
Strains	NA	1.48	2.09	41.7	1.53^{Z}	26.6^{X}	1.66^{Z}
	NALS	1.49	2.11	42.4	1.62^{Y}	23.2^{Y}	1.66^{Z}

X,Y,Z - Different letters denote significant differences ($P < .01$), comparisons made among molt program average values.

TABLE 21. EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder	Molt Program	Feed Consumption	Eggs Per Bird Housed	Egg Production	Mortality	Egg Income	Feed Costs	Days to 0% Production
(Strain)		(kg/100/hen/d)		(HD%)	(%)	($/hen)	($/hen)	
LSL-Lite	NM	8.8	23.0^{a}	83.7^{a}	0.6	1.59^{a}	0.47	.
White	NA	5.5	3.5^{d}	12.9^{cd}	1.1	0.24^{d}	0.24	9
	NALS	4.5	3.4^{d}	12.6^{cd}	0.5	0.24^{d}	0.20	10
	Average	6.3	10.0	6.4	0.7	0.69	0.30^{AB}	10
Bovans	NM	9.0	21.9^{ab}	82.2^{a}	1.1	1.51^{ad}	0.46	.
White Exp.	NA	5.1	3.0^{d}	11.3^{cd}	0.9	0.22^{d}	0.22	7
	NALS	5.4	3.7^{d}	14.2^{c}	1.3	0.26^{d}	0.23	9
	Average	6.5	10.6	35.9	1.1	0.66	0.30^{AB}	8
Bovans	NM	8.9	20.5^{bc}	83.0^{a}	1.1	1.41^{bc}	0.42	.
White	NA	5.1	3.1^{d}	12.3^{cd}	3.0	0.22^{d}	0.21	8
	NALS	4.9	3.7^{d}	13.8^{cd}	0.0	0.25^{d}	0.22	8
	Average	6.3	9.1	36.4	1.4	0.63	0.28^{B}	8
DeKalb	NM	8.8	22.0^{bc}	81.0^{a}	1.0	1.50^{ab}	0.46	.
White Exp.	NA	6.1	3.3^{d}	12.7^{cd}	3.5	0.23^{d}	0.26	9
	NALS	4.5	3.8^{d}	14.3^{c}	1.3	0.27^{d}	0.20	10
	Average	6.5	9.7	36.0	1.9	0.67	0.31^{AB}	9
DeKalb	NM	8.8	20.6^{bc}	82.3^{a}	0.5	1.42^{bc}	0.42	.
White	NA	5.5	2.9^{d}	12.0^{cd}	3.3	0.20^{d}	0.22	9
	NALS	5.4	2.7^{d}	11.2^{cd}	3.2	0.19^{d}	0.22	8
	Average	6.6	8.7	35.1	2.4	0.60	0.29^{B}	8
Hy-Line	NM	9.1	19.7^{c}	73.8^{b}	1.3	1.32^{c}	0.47	.
(W-36)	NA	4.4	3.5^{d}	12.5^{cd}	0.4	0.25^{d}	0.20	8
	NALS	4.9	3.5^{d}	12.6^{cd}	0.1	0.25^{d}	0.22	9
	Average	6.1	8.9	33.0	0.6	0.61	0.30^{AB}	9
Hy-Line	NM	10.6	22.0^{ab}	79.6^{a}	0.0	1.45^{b}	0.56	.
(W-98)	NA	5.6	3.0^{d}	10.9^{cd}	1.3	0.21^{d}	0.24	8
	NALS	4.9	3.4^{d}	12.6^{cd}	0.5	0.25^{d}	0.22	11
	Average	7.0	9.5	34.4	0.6	0.64	0.34^{A}	10
CV-20	NM	7.8	21.5^{b}	79.3^{a}	1.1	1.47^{b}	0.40	.
	NA	4.2	2.9^{d}	10.5^{d}	0.8	0.20^{d}	0.18	8
	NALS	4.5	3.9^{d}	14.3^{c}	0.0	0.28^{d}	0.20	10
	Average	5.5	9.4	34.7	0.7	0.65	0.26^{B}	9
ISA	NM	8.0	20.8^{bc}	80.4^{a}	1.1	1.43^{bc}	0.40	.
White Exp.	NA	6.0	3.2^{d}	11.8^{cd}	0.0	0.23^{d}	0.27	9
	NALS	5.4	3.7^{d}	14.0^{cd}	2.0	0.25^{d}	0.23	9
	Average	6.5	9.2	35.4	1.0	0.64	0.30^{AB}	9
All	NM	8.9^{Y}	21.3	80.6	0.9	1.45	0.45^{Y}	.
Strains	NA	5.3^{Z}	3.1	11.9	1.6	0.22	0.23^{Z}	8
	NALS	4.9^{Z}	3.5	13.3	1.0	0.25	0.21^{Z}	9

A,B - Different letters denote significant differences (P<.01), comparisons made among molt program average values.
a,b,c,d - Different letters denote significant strain * molt program interactions (P<.01).
Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.

TABLE 22. EFFECT OF WHITE EGG STRAIN AND POPULATION ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Molt Program	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
LSL-Lite	NM	1.18	1.72	46.3	1.71	0.6^{f}	1.73
White	NA	1.23	1.83	48.8	1.25	31.7^{ab}	1.40
	NALS	1.21	1.82	49.7	1.31	27.7^{abcd}	1.37
	Average	1.21^{A}	1.79^{B}	48.3	1.42^{BC}	20.0	1.50^{AB}
Bovans	NM	1.19	1.80	52.1	1.75	2.7^{f}	1.76
White Exp.	NA	1.26	1.80	43.4	1.34	25.7^{cd}	1.42
	NALS	1.22	1.76	44.7	1.32	24.8^{cd}	1.35
	Average	1.22^{A}	1.79^{B}	46.7	1.47^{AB}	17.7	1.51^{AB}
Bovans	NM	1.11	1.79	61.1	1.70	4.9^{ef}	1.71
White	NA	1.15	1.71	49.8	1.16	32.4^{a}	1.33
	NALS	1.15	1.70	48.5	1.25	26.7^{bcd}	1.34
	Average	1.13^{B}	1.73^{BC}	53.1	1.37^{C}	21.4	1.46^{BC}
DeKalb	NM	1.21	1.78	47.2	1.69	4.8^{ef}	1.73
White Exp.	NA	1.19	1.77	48.9	1.19	32.5^{a}	1.32
	NALS	1.23	1.81	47.4	1.34	25.7^{cd}	1.40
	Average	1.21^{A}	1.78^{B}	47.8	1.41^{BC}	21.0	1.49^{AB}
DeKalb	NM	1.23	1.80	45.7	1.73	3.5^{ef}	1.73
White	NA	1.19	1.70	43.3	1.14	32.5^{a}	1.35
	NALS	1.19	1.72	45.2	1.28	25.5^{cd}	1.34
	Average	1.20^{A}	1.74^{BC}	44.7	1.38^{C}	20.5	1.47^{BC}
Hy-Line	NM	1.17	1.74	48.3	1.70	2.1^{f}	1.70
(W-36)	NA	1.14	1.65	44.2	1.25	23.4^{d}	1.30
	NALS	1.15	1.77	54.3	1.32	25.6^{cd}	1.35
	Average	1.15^{B}	1.72^{BC}	48.9	1.42^{BC}	17.0	1.45^{BC}
Hy-Line	NM	1.25	1.98	58.8	1.78	10.1^{e}	1.80
(W-98)	NA	1.23	1.88	53.1	1.36	27.4^{abcd}	1.49
	NALS	1.25	1.88	50.8	1.41	25.2^{cd}	1.42
	Average	1.24^{A}	1.92^{A}	54.2	1.52^{A}	20.9	1.57^{A}
CV-20	NM	1.14	1.70	49.4	1.62	4.6^{ef}	1.62
	NA	1.11	1.63	46.9	1.21	25.4^{cd}	1.26
	NALS	1.15	1.71	48.5	1.28	25.0^{cd}	1.30
	Average	1.13^{B}	1.68^{C}	48.3	1.37^{C}	18.3	1.39^{C}
ISA	NM	1.19	1.71	43.7	1.63	4.9^{ef}	1.63
White Exp.	NA	1.19	1.77	48.7	1.24	29.7^{abc}	1.36
	NALS	1.21	1.77	45.5	1.29	27.0^{bcd}	1.33
	Average	1.20^{A}	1.75^{BC}	46.0	1.39^{C}	20.5	1.44^{BC}
All	NM	1.18	1.78	50.3	1.70^{x}	4.2	1.71^{y}
Strains	NA	1.19	1.75	47.5	1.24^{z}	29.0	1.36^{z}
	NALS	1.19	1.77	48.3	1.31^{y}	25.9	1.35^{z}

A,B,C - Different letters denote significant differences (P<.01), comparisons made among molt program average values.
a,b,c,d,e,f - Different letters denote significant strain * molt program interactions (P<.01).
x,y,z - Different letters denote significant strain * molt program interactions (P<.01).

TABLE 23. EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON PERFORMANCE OF HENS IN THE 36th NCLP&MT (462-490 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Molt Program	Feed Consumption (kg/100/hen/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality (%)	Egg Income ($/hen)	Feed Costs ($/hen)	Days to 0% Production
Bovans	NM	9.0	21.8	82.7	0.5	1.49	0.48	.
Brown	NA	4.8	3.1	12.2	3.8	0.23	0.20	10^{Z}
	NALS	5.0	5.0	18.4	2.7	0.35	0.22	18^{Y}
	Average	6.3	10.0	37.8^{A}	2.3	0.69	0.30	14
Bovans	NM	9.6	22.0	82.6	1.2	1.45	0.52	.
Goldline	NA	5.2	3.2	11.7	1.0	0.23	0.23	10^{Z}
	NALS	5.2	4.3	16.3	2.5	0.29	0.22	18^{Y}
	Average	6.7	9.8	36.9^{AB}	1.6	0.66	0.32	14
Hy-Line	NM	8.1	21.4	78.2	2.4	1.50	0.45	.
Brown	NA	4.2	2.9	10.7	0.4	0.21	0.18	9^{Z}
	NALS	4.8	3.9	14.5	1.5	0.27	0.21	6^{Z}
	Average	5.7	9.4	34.5^{B}	1.5	0.66	0.28	7
All	NM	8.9^{Y}	21.7^{X}	81.2^{X}	1.4	1.48^{X}	0.48^{Y}	.
Strains	NA	4.7^{Z}	3.1^{Z}	11.5^{Z}	1.7	0.22^{Z}	0.20^{Z}	10
	NALS	5.0^{Z}	4.4^{Y}	16.4^{Y}	2.2	0.31^{Y}	0.22^{Z}	14

A,B - Different letters denote significant differences (P<.01), comparisons made among molt program average values.
X,Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.

TABLE 24. EFFECT OF BROWN EGG STRAIN AND POPULATION ON HENS IN THE 36th NCLP&MT (462-490 DAYS) IN BATTERY CAGES (HOUSE 7)

Breeder (Strain)	Molt Program	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Bovans Brown	NM	1.37[c]	2.06	50.0	1.93	6.0	1.93
	NA	1.51[a]	1.93	27.3	1.52	20.3	1.60
	NALS	1.43[bc]	2.04	42.6	1.56	23.5	1.56
	Average	1.44	2.01	40.0	1.67	16.6	1.70
Bovans Goldline	NM	1.42[bc]	1.99	39.5	1.90	4.5	1.90
	NA	1.45[abc]	1.89	30.8	1.50	19.8	1.59
	NALS	1.47[ab]	2.05	39.4	1.60	22.0	1.61
	Average	1.45	1.98	36.6	1.66	15.4	1.70
Hy-Line Brown	NM	1.40[bc]	1.96	39.9	1.87	4.9	1.87
	NA	1.40[bc]	2.01	43.6	1.58	20.9	1.61
	NALS	1.38[c]	2.08	51.1	1.62	22.4	1.62
	Average	1.39	2.02	44.9	1.69	16.1	1.70
All Strains	NM	1.40	2.00	43.1	1.90[X]	5.1[Z]	1.90[Z]
	NA	1.45	1.94	33.9	1.53[Z]	20.3[Y]	1.60[Y]
	NALS	1.43	2.06	44.4	1.59[Y]	22.6[Y]	1.59[Y]

a,b,c - Different letters denote significant strain * molt program interactions (P<.01).
X,Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.

Table 25. Entries in the 36th NCLP&MT by Breeder, Stock Suppliers, and Categories

Breeder	Stock	Category[1]	Source
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
	Hy-Line Brown	I-A	(Same)
	W-98	I-A	Hy-Line North America 79 Industrial Rd E-town, PA 17022
	CV-20	I-A	(Same)
Lohmann Tierzucht Inc., N.A. 2433 Bethany Rd Sycamore, IL 60178	Lohmann LSL-Lite	I-A	Hy-Line North America 79 Industrial Rd E-town, PA 17022
Centurion Poultry 1471 Lane Creek Road Bogart, GA 30622	Bovans White	I-A	Centurion Poultry Inc. P.O. Box 591 86 O'Neal Road Lexington, GA 3064822
	Bovans White Experimental	III-A	(Same)
	Bovans Brown	I-A	(Same)
	Bovans Goldline	I-A	(Same)
Centurion Poultry 1471 Lane Creek Road Bogart, GA 30622	Dekalb White	I-A	Centurion Poultry Inc. P.O. Box 591 86 O'Neal Road Lexington, GA 3064822
	Dekalb White Experimental	III-A	(Same)
ISA North America Box 400 Cambridge, Ontario N1R 5V9 Canada	ISA White Experimental	III-A	Cox Brothers Poultry Farm R.R. #1 Maitland, Nova Scotia B0N 1T0 Canada

[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