FIRST CYCLE REPORT OF THE THIRTY FOURTH

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. The flock is maintained at the NCDA&CS Piedmont Research Station, Salisbury, North Carolina. Mr. Raymond Coltrain is the Piedmont Research Station Superintendent; Mr. David Joyce is the 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 poultrymen in evaluation of commercial layer stocks and management systems.

The data presented herein represents the analysis of the first production cycle and Molt of the 34th North Carolina Layer Performance and Management Test. Performance summary tables are available for each strain, density, and molt treatment used as well as for the combined results.

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34th NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST
Protocol Procedures Used

Entries:

A total of six 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 34th NCLP&MT were set on July 18, 2000, at the Piedmont Research Station (NCDA&CS) Poultry Unit. The flock was hatched on August 9, 2000, and the pullets were moved to the laying facilities on November 29-30, 2000, during their 16th week of age. The age of the flock at transfer was lowered to approximately 16 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.

First cycle production records commenced on December 6, 2000 (17 weeks of age), until molt was induced on November 13, 2001. The molt records commenced on November 13, 2001 (66 weeks of age), and ended on December 11, 2001 (70 weeks of age). This report includes production data summarized from 17 to 66 weeks, and 66 to 70 weeks.

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 2/3 of the house and brown egg strains occupied the other 1/3 of the house. All strains were assigned to be represented as equally as possible in all rooms, row, and levels.

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 resulting in a total pullet count in House 8 of 14,976. 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) 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 in placed 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. 34, 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 approximately 2/3 of the each house and brown egg strains occupied the other 1/3 of each house. All strains were assigned to be represented as equally as possible in all houses, row, and levels.

House 4 is a high rise, environmentally controlled facility with three banks of four-deck high cages. Each side of each bank was designated as a row, and each row was divided into nine eight-foot replicate blocks/level.

There are a total of 216 replicates in house 4 which can support 6,048 hens.

House 5 is a standard height totally enclosed force ventilated open-sided laying house with a flush manure handling system. It has 2 banks of triple deck cages and two banks with 4 levels of cages. 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 7,056 hens.

Cage density is dictated by the replicates that contain cages that were either 30.5 or 40.5 cm wide. In both houses the cages were 40.5 cm deep therefore, when the bird population was held constant at 4 hens per cage, densities for the 30.5 and 40.4 cm cages were 48 in^2 (310 cm^2) and 64 in^2 (413 cm^2), respectively. Both houses contain feeder systems which allow feed consumption to be determined per replicate block. 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.

Test Design:

The arrangement for the laying test involved a completely randomized design and the main effects were set up in a factorial arrangement. The main effects were strain, density, and molt treatment. House effects have been monitored and in the last 2 tests there have been no differences between the environmentally controlled houses. 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 six white egg strains and three brown egg strains participated in the test. See the 34th Hatch Report (Vol. 34, No. 1) for details.

Density

All individual cages within each block contained 4 hens for both the brown and the white egg layers. Thus the replicate blocks contained either 32 or 24 hens per replicate, for the block with 30.5 cm or 40.5 cm lengths, respectively. Cage densities for each 4 hen cage group were 310 cm^2 (48 in^2) and 413 cm^2 (64 in^2) for these two types of cages. Initial population size was constant throughout the test, so population size was not a factor 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 four groups such that all strains, densities, and levels were approximately equally represented in both houses. Each group received one of the following treatments during the molt period commencing at 66 wks of age.

Full Fed Control: 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.

Feed Restriction: The following regimen was followed for this molting program.

Day -7	Day length was increased to 24 hr at 65 weeks of age for the entire flock.
Day -7	A sample of birds was weighed to determine the premolt weight. Target weight (30% body weight loss) was calculated using the premolt weight.
Day 0	All remaining feed was removed from the feeders and the light period was reduced to 9 hours. All moribund birds were removed before feed restriction.

Day +1 A booster vaccination for Newcastle/Bronchitis was provided.
Day +8 A sample of birds was weighed 8 days after feed removal to determine body weight loss. Weight loss per day was calculated using body weights and target weight for 30% weight loss was determined.
Day +13 Birds were weighed to determine body weight loss. Strains and/or treatment groups were put back on full feed of Molt-1 Diet (16% CP diet containing 2.0% Ca)
Day +24 Day light hours were increased to 12 hours.
Day +28 All selected replicates were weighed. Birds which had been on a molt program were returned to layer diet E. Day length was increased to 14 hours.
Day +31 Lights were returned to 16.5 hours of day light

Sample replicates from all strains or treatment groups were randomly selected. These replicates were monitored as aforementioned. When the weight loss target was reached for the treatment group or strain, all replicates of that strain or group were returned to feed based on their sampled sister replicates weight loss.

Note: Induced molts can be started at almost any age of production, but generally, laying and breeding hens are started into the molt somewhere between 55 to 70 weeks of age. The weeks in the above table were, therefore, adjusted accordingly, depending on the exact week in which the induced molt procedure was started.

Restricted Feeding: This program uses a short fast and a low protein, energy, balanced diet to support hen body maintenance. The following program was used to implement the molt.

Day -7 The light period was increased to 24 hours.
Day -7 A sample of birds was weighed to determine the premolt weight. Target weight (24% body weight loss) was calculated using the premolt weight.
Day 0 All remaining feed was removed from the feeders and the light period was reduced to 9 hours. All moribund birds were removed before feed restriction.
Day +1 A booster vaccination for Newcastle/Bronchitis was provided.
Day +4 Feed Low protein/energy maintenance diet. Expected 3 or 6 kg/100 hens daily based on egg production. Feed allocation highest at 0% production.
Day +8 A sample of birds was weighed 8 days after feed removal to determine body weight loss. Weight loss per day was calculated using body weights and a target weight for 24% weight loss was determined.
Day +11 Feed Low protein/energy maintenance diet. Expected 6 or 7.25 kg/100 hens daily based on egg production. Feed allocation was highest at 0% production.
Day +13 Birds were weighed to determine body weight loss.
Day +18 Feed Low protein/energy maintenance diet. Expected 8.2 kg/100 hens daily based on egg production.
Day +24 The light period was increased to 12 hours.
Day +28 All selected replicates were weighed. Birds which had been the molt program were returned to layer diet E. Day length was increased to 14 hours.
Day +31 Lights were returned to 16.5 hours of day light

NOTE: Light schedule was the guide. Adjust for actual conditions and to match the requirements of the molting program and desired stimulation.

COMMENTS: Hens should have ceased egg production by Day 4. When egg production was not close to zero, only 3 kg/100 hens was provided until egg production ceased. The Low Protein/energy diet does not sustain egg production. It is designed to keep hens out of production and provide for body maintenance needs. Livability is excellent with this program. The diet is bulky, such that a full trailer load will only weigh 2/3 of a normal full load. Please keep this fact in mind when ordering feed. Diet E will bring hens back into peak production. Feed

intake and egg size will determine which diet to progress toward.

******* The goal is for the birds to attain approximately their 18 week body weight.

Non-anorexic molt program: The hens were fed a diet that was low protein and low energy, and that was balanced for the vitamins and minerals required for body maintenance. This diet has been shown to maintain an an-ovulatory state for the entire rest period. The management and light program was consistent with the other molting programs.

Day -7	The light period was increased to 24 hours.
Day -7	A sample of birds was weighed to determine the premolt weight. Target weight (24% body weight loss) was calculated using the premolt weight.
Day 0	All remaining laying feed was removed from the feeders and replaced with a low protein/energy maintenance diet, and the light period was reduced to 9 hours. The low protein/energy maintenance diet was provided on an *ad libitum* basis.
Day +1	A booster vaccination for Newcastle/Bronchitis was provided.
Day +8	A sample of birds was weighed 8 days after the feed change to determine body weight loss. Weight loss per day was calculated using body weights and target weight for 24% weight loss was determined.
Day +13	All birds in all selected replicates were weighed to determine body weight loss.
Day +24	The light period was increased to 12 hours.
Day +28	All selected replicates were weighed. Birds which had been the molt program were returned to layer diet E. Day length was increased to 14 hours.
Day +31	Lights were returned to 16.5 hours of day light

NOTE: Light schedule is guide. Adjust for actual conditions and to match the requirements of the molting program and desired stimulation.

HOUSE TEMPERATURE: Maintain house temperature at 75± 5° F, but the birds should not pant. Please react to environmental temperatures.

Layer Nutrition:

Layer diets are identified as Diets D, E, F, G, H, I, M, N, O, P, and Q 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. The diets are provided to the birds in a crumblized form to reduce feed wastage. Dietary formulations are presented in the following section. 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 (see Table). The diet fed at any given time provides the nutrient intake and is determined based upon flock production stage, and average daily feed intake. Supplemental calcium was provided to the hens in the form of oyster shells mixed at the farm at the rate of 2%.

The diets provided during the molt, consisted of a low protein/energy diet and a Molt 1 diet. These are described in the tables which follow. Both of the molt diets were formulated to provide the layer 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

Production Stage	> 87% and Pre-Peak	87-80%	80-70%	<70%
White-Egg Layers				
Protein (g/day)	19	18	17	16
Calcium (g/day)	3.8	3.8	4.0	4.0
Lysine (mg/day)	820	780	730	690
TSAA (mg/day)	700	670	630	590

Brown Egg Layers

Protein (g/day)	20	19	18	17
Calcium (g/day)	3.8	3.8	3.8	4.0
Lysine (mg/day)	830	820	780	730
TSAA (mg/day)	710	700	670	630

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	F	E
	9.57-10.39	G	F
	10.43-11.29	I	H
	11.34-12.20	N	M
	12.25-13.11	P	O
	>13.15	Q	Q
80-87%	< 9.52	G	F
	9.57-10.39	H	G
	10.43-11.29	M	I
	11.34-12.20	O	N
	12.25-13.11	Q	P
	>13.15	Q	Q
70-80%	< 9.52	H	G
	9.57-10.39	I	H
	10.43-11.29	N	M
	11.34-12.20	P	O
	12.25-13.11	Q	Q
	>13.15	Q	Q
< 70%	< 9.52	I	H
	9.57-10.39	M	I
	10.43-11.29	O	N
	11.34-12.20	Q	O
	12.25-13.11	Q	Q
	>13.15	Q	Q
Post-Molt < 70%	< 9.52	G	F
	9.57-10.39	H	G
	10.43-11.29	M	I
	11.34-12.20	O	N
	12.25-13.11	Q	P
	>13.15	Q	Q

LAYING PERIOD DIETS

	Diet Identification[1]				
	Layer Diets				
Ingredient	D	E	F	G	H
	Pounds Per Ton				
Corn	952.30	985.50	1067.90	1097.10	1153.50
Corn Gluten Meal	100.00	100.00	128.00	82.00	24.00
Soybean Meal 48%	618.00	592.00	500.00	512.00	525.00
Calcium Carb	188.00	188.00	188.00	188.00	180.00
Phosphate Mono/D	29.50	30.00	30.00	30.00	30.00
Sodium Bi-Carb	3.00	2.50	2.50	3.00	3.00
Salt	6.00	6.00	6.00	6.00	6.50
Methionine	2.50	2.60	2.80	3.70	4.00
Choline Chloride	7.70	6.40	6.80	5.20	4.00
Vitamin premix	1.00	1.00	1.00	1.00	1.00
Min. premix	1.00	1.00	1.00	1.00	1.00
T - Premix	1.00	1.00	2.00	2.00	2.00
Fat	88.00	82.00	63.00	68.00	64.00
MYC-OUT 65	1.00	1.00	1.00	1.00	2.00
.06 Sel Premix	1.00	1.00	1.00	1.00	1.00
Total	2000	2000	2000	2000	2000
Protein %	21.49	21.03	20.00	18.99	17.75
ME kcal/kg	2925	2925	2925	2925	2925
Calcium %	4.00	4.00	3.99	3.99	3.84
T. Phos %	0.63	0.63	0.62	0.61	0.61
Lysine %	1.16	1.06	0.94	0.94	0.94
TSAA %	0.89	0.84	0.84	0.83	0.79

LAYING PERIOD DIETS

	Diet Identification[1]					
	Layer Diet					
Ingredient	I	M	N	O	P	Q
	Pounds Per Ton					
Corn	1214.80	1285.50	1353.50	1407.10	1420.50	1427.70
Corn Gluten Meal	5.00					
Soybean Meal 48%	500.00	451.00	398.00	360.00	286.00	226.00
Wheat Midds			5.00		63.00	117.00
Calcium Carb	184.00	180.00	182.50	184.00	185.00	186.50
Phosphate Mono/D	23.00	26.00	22.50	21.00	18.50	16.50
Sodium Bi-Carb	3.00	3.00	3.00	3.00	4.00	4.00
Salt	6.00	6.00	6.00	6.00	5.00	5.00
Methionine	3.20	2.75	2.50	2.20	2.00	1.30
Lysine		0.75	0.50	0.20		
Choline Chloride	3.00	2.00	0.50	0.50		
Vit. premix	1.00	1.00	1.00	1.00	1.00	1.00
Min. premix	1.00	1.00	1.00	1.00	1.00	1.00
T - Premix	1.00	1.00	1.00	1.00	1.00	1.00
Fat	52.00	37.00	20.00	10.00	10.00	10.00
MYC-OUT 65	2.00	2.00	2.00	2.00	2.00	2.00
.06% Sel Premix	1.00	1.00	1.00	1.00	1.00	1.00
Total	2000	2000	2000	2000	2000	2000
Protein %	16.79	15.75	14.75	13.99	12.75	11.75
Me kcal/kg	2925	2925	2925	2882	2875	2859
Calcium %	3.85	3.79	3.80	3.81	3.80	3.80
T. Phos %	0.53	0.55	0.51	0.48	0.46	0.44
Lysine %	0.90	0.86	0.78	0.72	0.62	0.55
TSAA %	0.71	0.66	0.62	0.59	0.55	0.49

LAYING PERIOD DIETS

Diet Identification[1]

	Layer Diet	
Ingredient	Low Protein/Energy Diet	Molt-1
	Pounds Per Ton	
Corn	694.94	1223.40
Soybean Hulls	1158.08	
Soybean Meal		215.10
Wheat Midds	34.84	220.20
Calcium Carb	25.68	83.30
Phosphate Mono/D	53.04	35.10
Sodium Bi-Carb		3.10
Salt	9.15	5.00
Methionine	2.67	2.10
Lysine		0.40
Choline Cl 60%	1.00	1.50
Vet premix	1.00	1.00
Min. premix	1.00	1.00
Fat	9.99	5.10
Mold Inhibitor	1.00	2.00
.06% Sel Premix	1.00	1.00
Iron Sulfate		0.2
Manganese Sulfate		0.5
EXT/EXP Soy		200.00
Total	2000	2000
Protein %	9.8	15.99
Me kcal/kg	1650	2866
Calcium %	1.33	2.00
T. Phos %	0.70	0.72
Lysine %	0.42	0.85
TSAA %	0.35	0.65

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, categorized as to the cause, 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 blocking effect for the layer house 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

Characterizations of the flock mortality by strain are shown in Tables 1 to 4. First cycle performance of white and brown egg strains are shown on Tables 5 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.

Population and Density Allocations:

White and Brown Hens per Cage	Cage Size Width Depth	Floor Space per Bird	Feeder Space per Bird	Water Nipples per Cage
4	30.5 cm x 40.7 cm	310 cm^2 (48 in^2)	7.6 cm 3.0 in	1
4	40.7 cm x 40.7 cm	413 cm^2 (64 in^2)	10.2 cm 4.0 in	1

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 and 462 days of age. Mortality which occurred during the molt period are reported separately. Characterization of the mortalities was done by Drs. John Barnes, DVM, Donna Carver, DVM, Gina Alban, DVM, and Nancy Reimers, DVM. The following list of conditions (with abbreviations) were concluded to have resulted in the death of the hen. Cause of death could not be determined = UND; Prolapse/Vent Persecution = PRO/VP; This grouping included blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Lymphoid Leukosis = LL; Nephritis = NEP; Peritonitis = PER; Hen became entrapped = ENT; Endocardiosis = END; Pneumonia = PN; Fecal Impaction = FI; Infected Laceration = IL; Renal Disease = RD; Ruptured Liver = RL; Facture = X; Cancer = CAN.

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 as follows:

Grade	Size	Cents/Dozen
A	Extra Large	75.7
A	Large	73.8
A	Medium	59.9

Grade	Size	Cents/Dozen
A	Small	44.1
A	Pee Wee	22.1
B	All	22.1
Checks	All	39.1

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.

Diets	Price Per Ton
D	177.85
E	176.30
F	176.65
G	176.50
H	176.00
I	166.95
M	169.40
N	152.10
Molt - 1	164.00
LP/LE Molt	127.36

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:

Following are the size classifications 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. 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.

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

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

TABLE 1. MORTALITY CHARACTERIZATION OF THE WHITE EGG STRAINS IN THE 34TH NCLP&MT (119-462 DAYS)

Breeder (Strain)	UND	PRO/ VP	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	VG	VV	LL	NEP	PER	ENT
	%															
Hy-Line (W-36)	35.7	7.1	0	3.6	35.7	3.6	14.3	0	0	0	0	0	0	0	0	0
Hy-Line (W-98)	48.8	4.9	9.8	2.4	12.2	2.4	9.8	2.4	2.4	2.4	0	0	0	0	0	2.4
Bovans (White)	35.2	14.8	0	0	5.6	1.9	27.8	1.9	0	1.9	0	3.7	0	0	1.9	5.6
DeKalb (White)	24.1	15.5	5.2	1.7	1.7	5.2	34.5	1.7	1.7	0	1.7	0	0	0	0	6.9
DeKalb (Sigma)	32.3	25.8	3.2	3.2	3.2	6.5	19.4	3.2	0	0	0	0	3.2	0	0	0
Bovans (Experiment)	31.0	13.8	0	0	13.8	3.5	10.3	0	10.3	0	3.5	0	0	3.5	3.5	6.9

Sample size n = 241
Cause of death could not be determined = UND; Prolapse/Vent Persecution = PRO/VP; blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Lymphoid Leukosis = LL; Nephritis = NEP; Peritonitis = PER; Hen became entrapped = ENT.

TABLE 2. MORTALITY CHARACTERIZATION OF THE WHITE EGG STRAINS IN THE 34th NCLP&MT DURING THE MOLT PERIOD (462 -490 DAYS)

Breeder (Strain)	UND	PRO/ VP	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	VG	VV	CAN	PN	FI	ENT
	%															
Hy-Line (W-36)																