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FIRST CYCLE REPORT OF THE TWENTY-NINTH

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 Piedmont Research Station, Salisbury, North Carolina. Mr. Raymond Coltrain is Piedmont Research Station Superintendent; Mr. Ed Radford is Resident Manager of the flock; 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.

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29th NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST

Protocol

Entries:

Fourteen entries were accepted in accordance with the rules and regulations of the test. Seven white egg strains and seven brown egg strains participated.

Dates of Importance:

The eggs were set on February 13, 1990 and hatched on March 7, 1990. The pullets were moved to laying facilities on July 13, 1990 (18 weeks of age). First cycle production records commenced on July 25, 1990 (20 weeks of age) until molt was induced on May 21, 1991. This report includes production data summarized 20-63 weeks.

Test Design:

The test was a factorial arrangement of treatments. Main effects were strain, layer housing, layer cage population and density. The following are general descriptions of the main effects:

Strain--Samples of fertile eggs were provided from the breeders. All eggs were set and hatched concurrently. A total of seven white egg strains and seven brown egg strains participated in the test.

Pullet Housing--The white egg chicks were assigned at random (one strain/row) to the replicates in rows 1 through 4, while the brown-egg strains were assigned in the same manner to rows 5 through 8. All chicks were brooded in the center level of cages within each of the 7 replicate series (i.e. the 3-cage levels) within each row. Each center-cage-level replicate were filled with 60 white-egg (30 per 24" x 20" cage) or 48 brown-egg (24 per 24" x 20" cage) pullets on the day of hatch. At 42 days of age, 1/3 of the birds in each brooding replicate were moved to the top cages, and 1/3 were moved to the bottom cages for a final rearing allowance of 48 sq. in. for the white-egg layers and 60 sq. in. for the brown-egg layers. House 8 is an open-sided brood-grow facility with six rows of 48" wide by 40" deep single deck cages. Each cage was assigned a replicate number, and the white-egg strains were assigned to rows 1 through 3 in a restricted random manner with the restriction being that one strain-replicate group was assigned at random per block of seven consecutive cages. Forty white-egg and 30 brown-egg females were started and grown in each replicate. Refer to the 29th North Carolina Layer Performance and Management Test Growing Report (Vol. 29, No. 2) for details of pullet management, nutrition, and performance.

Layer Housing--Two lay houses (4 and 5) were utilized. 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. The replicate blocks contain cages that are either 12", 16", 24" or 32" wide. All cages are 14" deep. House 5 is a standard height open-sided laying house with a flush manure handling system.

a standard height open-sided laying house with a flush manure handling system. It has two banks of triple deck cages and two banks with four levels of cages. Again, each side of a bank was designed as a row and each row was divided into nine eight-foot replicate blocks/level. The replicate blocks contain cages that are either 12", 16", 24" or 32" wide. All cages are 14" deep. Both houses contain feeder systems so that feed consumption can be determined per replicate block. The seven white strains were assigned to the replicate blocks in approximately 1/2 of each house. The seven brown-egg strains were assigned to the other half of each house. Pullets from all strain and pullet housing combinations were moved to both laying houses randomly over a three-day period. Photoperiod in both laying facilities was 16.5 hours light, 7.5 hours dark, with artificial illumination provided by compact fluorescent lamps.

Layer Management and Nutrition:

Layer diets are identified as Diets D, E, F, G, H, I, M, N, O, P, and Q. Formulations are presented in the succeeding section. Feed was offered ad libitum in accordance with the following guidelines:

MINIMUM DAILY INTAKE OF NUTRIENTS PER BIRD AT VARIOUS STAGES OF PRODUCTION

Production Stage	> 87% and Pre-Peak	87-80%	80-70%	<70%
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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

MINIMUM DAILY INTAKE OF NUTRIENTS PER BIRD Cont.

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 (lbs)	Diet Fed	
		White Egg Strains	Brown Egg Strains
Weeks 19-20	-	D	D
Pre-Peak and > 87%	< 21.0 21.1-22.9 23.0-24.9 25.0-26.9 27.0-28.9 >29.0	F G I N P Q	E F H M O Q
80-87%	< 21.0 21.1-22.9 23.0-24.9 25.0-26.9 27.0-28.9 >29.0	G H M O Q Q	F G I N P Q
70-80%	< 21.0 21.1-22.9 23.0-24.9 25.0-26.9 27.0-28.9 >29.0	H I N P Q Q	G H M O Q Q
< 70%	< 21.0 21.1-22.9 23.0-24.9 25.0-26.9 27.0-28.9 >29.0	I M O Q Q Q	H I N O Q Q
Post-Molt < 70%	< 21.0 21.1-22.9 23.0-24.9 25.0-26.9 27.0-28.9 >29.0	G H M O Q Q	F G I N P Q

LAYING PERIOD DIETS

Ingredient	Diet Identification ¹					
	D	E	F	G	H	I
	-----Pounds per Ton-----					
Corn	961.4	1031.0	1114.9	1186.4	1247.6	1311.7
Soybean Meal	737.1	679.5	624.6	574.5	530.4	485.0
Wheat Midds						2.3
Limestone	200.1	194.2	184.7	179.5	174.1	167.3
Methionine	.8	.8	.3	.6	.7	.9
Dical Phos	28.4	28.2	26.9	24.3	24.0	22.5
Salt	6.2	5.6	5.5	5.4	5.4	5.3
Vit. premix	2.0	2.0	2.0	2.0	2.0	2.0
Min. premix	1.0	1.0	1.0	1.0	1.0	1.0
Poultry Fat	61.0	55.7	38.1	24.3	12.8	
GV-11, Nar.	1.0	1.0	1.0	1.0	1.0	1.0
Tracer	1.0	1.0	1.0	1.0	1.0	1.0
Total	2000.0	2000.0	2000.0	2000.0	2000.0	2000.0
Protein %	22.0	20.9	19.9	19.0	18.2	17.4
ME kcal/kg	2871.0	2900.0	2900.0	2900.0	2900.0	2900.0
Calcium %	4.20	4.08	3.88	3.75	3.64	3.49
T. Phos. %	.62	.61	.59	.56	.55	.53
Lysine %	1.28	1.20	1.13	1.06	1.00	.93
TSAA %	.75	.72	.67	.66	.64	.63

¹Diets in mash form.

LAYING PERIOD DIETS

Ingredient	Diet Identification ¹				
	M	N	O	P	Q
	-----Pounds per Ton-----				
Corn	1327.2	1340.6	1356.9	1369.3	1385.5
Soybean Meal	441.5	404.3	369.8	347.9	309.1
Wheat Midds	38.2	68.6	88.9	98.6	125.8
Limestone	160.8	154.2	152.8	153.4	148.4
Methionine	1.2	1.4	1.5	1.7	1.9
Dical Phos	21.1	20.9	20.1	19.1	17.9
Salt	5.0	5.0	5.0	5.0	5.0
Vit. premix	2.0	2.0	2.0	2.0	2.0
Min. premix	1.0	1.0	1.0	1.0	1.0
Poultry Fat					
GV-11, Nar.	1.0	1.0	1.0	1.0	1.0
Tracer	1.0	1.0	1.0	1.0	1.0
Choline Cl					.1
l-Lysine					1.3
Total	2000.0	2000.0	2000.0	2000.0	2000.0
Protein %	16.7	16.1	15.5	15.1	14.5
ME kcal/kg	2900.0	2900.0	2900.0	2900.0	2900.0
Calcium %	3.35	3.22	3.18	3.18	3.07
T. Phos. %	.52	.52	.50	.50	.49
Lysine %	.88	.83	.78	.75	.75
TSAA %	.62	.61	.59	.59	.58

¹Diets in mash form.

Data Collection Schedule and Procedures:

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

Egg Weight--At fourteen-day intervals, all eggs produced in the previous 24-hour period were weighed and sorted by size. Extra large, large, medium, small, and pee wee categories were defined as having a minimum weight of 27, 24, 21, 18 and < 18 ounces per dozen, respectively. Percentages of eggs within each size category, average egg weight, and egg mass were calculated and reported.

Egg Quality--At fourteen-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 at the point of production with no handling prior to examination. Egg income was calculated at fourteen-day intervals 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 unit. At fourteen-day intervals, feed not consumed was weighed and feed consumption was calculated. Daily feed intake (lbs./100 hens/day) was calculated and reported for each strain. Feed costs were based on average regional prices and were calculated at fourteen-day intervals and summarized for complete production cycles.

Mortality--All mortality was recorded daily. 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 ($P < .01$) within white and brown egg strains are noted by differing letters among columns of means. All data were subjected to ANOVA utilizing the GLM procedure of SAS, with main effects of strain, layer house, growing house, and population. 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 egg and brown egg strains are shown on Tables 1-18.

Breeder (Strain):

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

Layer House:

"Open" denotes performance in the curtain-sided flush facility. "Closed" denotes performance in the controlled environment high rise facility.

Population and Space Allocations:

White Hens per Cage	Cage Size Width Depth	Floor Space per Bird	Feeder Space per Bird	Water Nipples per Cage
3	12" x 14"	56 in ²	4 in	2
4	16" x 14"	56 in ²	4 in	2
6	24" x 14"	56 in ²	4 in	3
8	32" x 14"	56 in ²	4 in	3

Brown Hens per Cage	Cage Size Width Depth	Floor Space per Bird	Feeder Space per Bird	Water Nipples per Cage
2	12" x 14"	84	6 in	2
3	16" x 14"	75	5.3 in	2
4	24" x 14"	84	6 in	3
6	32" x 14"	75	5.3 in	3

Eggs per Bird Housed:

The total number of eggs produced divided by the number of birds housed at 126 days.

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 126 and 434 days of age.

Feed Consumption:

The pounds of feed consumed daily per 100 hens.

Egg Weight:

The average egg weight of biweekly samples in grams per egg.

Egg Income:

The calculated income per hen housed at 126 days, from egg production using three-year regional average egg prices as follows:

<u>Grade</u>	<u>Size</u>	<u>Cents/Dozen</u>
A	Extra Large	79.8
A	Large	79.8
A	Medium	71.15
A	Small	57.02
A	Pee Wee	28.51
B	All	28.51
Cracks	All	42.29

Feed Cost:

The calculated feed cost per hen housed at 126 days, using average price per ton.

<u>Diets</u>	<u>Price</u>
D	168.86
E	164.35
F	159.05
G	161.58
H	148.42
I	144.57
M	142.76
N	137.13
O	137.82
P	128.77
Q	139.76

Grade Information:

The average grade of eggs according to USDA grading standards.

Egg Size Distribution:

The proportion of the eggs falling into the following size categories:

<u>Size Category</u>	<u>Ounces/Dozen</u>
Pee Wee	< 18
Small	18 - 21
Medium	21 - 24
Large	24 - 27
Extra Large	> 27

TABLE 1. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality > 140d (%)
DeKalb (XL-Link)	Closed	26.1	59.7	221.0 ^{YZ}	76.1	46.3	12.0 ^{XYZ}
	Open	26.8	59.9	210.0 ^Z	75.7	46.1	17.0 ^Z
	Average	26.5 ^B	59.8 ^A	215.5	75.9 ^B	46.2 ^{AB}	14.5
H & N (Nick Chick)	Closed	25.7	59.5	227.6 ^Y	76.2	46.2	7.3 ^{XY}
	Open	25.9	59.3	226.2 ^Y	76.5	46.2	8.1 ^{XY}
	Average	25.8 ^B	59.4 ^{AB}	226.9	76.3 ^{AB}	46.2 ^{AB}	7.7
HiSex (White)	Closed	26.1	59.4	223.1 ^Y	76.5	46.2	10.2 ^{XYZ}
	Open	26.1	59.4	219.4 ^{YZ}	75.5	45.6	9.4 ^{XYZ}
	Average	26.1 ^B	59.4 ^{AB}	221.3	76.0 ^B	45.9 ^{AB}	9.8
ISA/Babcock (B300)	Closed	25.5	59.2	226.2 ^Y	76.0	45.8	6.6 ^X
	Open	26.3	59.5	217.7 ^{YZ}	76.6	46.2	14.7 ^{YZ}
	Average	25.9 ^B	59.3 ^{AB}	222.0	76.3 ^{AB}	46.0 ^{AB}	10.7
HyLine (W-36)	Closed	23.5	57.2	226.8 ^Y	74.9	43.6	4.3 ^X
	Open	24.3	57.7	219.0 ^{YZ}	75.2	44.1	10.0 ^{XYZ}
	Average	23.9 ^A	57.5 ^D	222.9	75.1 ^B	43.9 ^C	7.1
Shaver (288A)	Closed	26.1	58.5	223.7 ^Y	76.3	45.4	8.4 ^{XY}
	Open	26.4	58.5	227.3 ^Y	76.4	45.4	6.4 ^X
	Average	26.3 ^B	58.5 ^C	225.5	76.3 ^{AB}	45.4 ^B	7.4
Tatum (T-100)	Closed	26.1	58.8	228.9 ^Y	77.8	46.6	8.6 ^{XY}
	Open	26.2	59.3	226.6 ^Y	77.4	46.5	8.6 ^{XY}
	Average	26.1 ^B	59.0 ^{BC}	227.7	77.6 ^A	46.5 ^A	8.6
All Strains	Closed	25.6	58.9	225.3	76.3	45.7	8.2
	Open	26.0	59.1	220.9	76.2	45.7	10.6
	Average	25.8	59.0	223.1	76.2	45.7	9.4

A,B,C,D - Different letters denote significant differences ($P < .01$), comparisons made among strain average values. Differences among individual laying house and strain averages are not significant.

X,Y,Z - Different letters denote significant strain x housing interactions ($P < .01$).

TABLE 2. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES
29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
DeKalb (XL-Link)	Closed	2.8	7.6	17.5	37.9	34.1
	Open	2.9	6.8	16.8	38.2	35.3
	Average	2.9 ^B	7.2 ^B	17.2 ^{CD}	38.1 ^B	34.7 ^A
H & N (Nick Chick)	Closed	3.5	6.9	16.4	40.9	32.4
	Open	3.3	7.2	17.3	41.4	30.8
	Average	3.4 ^{AB}	7.0 ^B	16.9 ^{CD}	41.1 ^A	31.6 ^{AB}
HiSex (White)	Closed	3.0	7.8	16.2	40.7	32.3
	Open	3.9	6.6	16.1	41.4	31.9
	Average	3.4 ^{AB}	7.2 ^B	16.2 ^D	41.1 ^A	32.1 ^{AB}
ISA/Babcock (B300)	Closed	3.7	7.9	16.3	39.9	32.3
	Open	3.8	7.3	15.3	39.7	33.8
	Average	3.8 ^{AB}	7.6 ^B	15.8 ^D	39.8 ^{AB}	33.1 ^{AB}
HyLine (W-36)	Closed	4.8	10.4	23.3	40.4	21.0
	Open	4.1	10.2	21.2	42.1	22.4
	Average	4.5 ^A	10.3 ^A	22.3 ^A	41.3 ^A	21.7 ^D
Shaver (288A)	Closed	3.7	7.9	19.9	41.4	27.1
	Open	3.8	7.9	19.3	42.5	26.5
	Average	3.7 ^{AB}	7.9 ^B	19.6 ^B	42.0 ^A	26.8 ^C
Tatum (T-100)	Closed	3.8	7.2	18.0	41.8	28.9
	Open	2.5	7.6	18.8	40.4	30.7
	Average	3.2 ^B	7.4 ^B	18.4 ^{BC}	41.1 ^A	29.8 ^{BC}
All Strains	Closed	3.6	8.0	18.2	40.4	29.7
	Open	3.5	7.7	17.8	40.8	30.2
	Average	3.6	7.8	18.0	40.6	30.0

A,B,C - Different letters denote significant differences ($P < .01$), comparisons made among strain average values. Differences among individual laying house and strain averages are not significant.

TABLE 3. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
DeKalb (XL-Link)	Closed	96.3	1.7	1.8	0.2	13.93 ^{XYZ}	5.18
	Open	96.5	2.4	1.0	0.2	13.19 ^Z	5.04
	Average	96.4 ^C	2.1 ^{AB}	1.4	0.2	13.56	5.11 ^A
H & N (Nick Chick)	Closed	96.3	2.2	1.1	0.3	14.24 ^{XY}	5.27
	Open	96.7	2.4	0.7	0.1	14.18 ^{XY}	5.19
	Average	96.5 ^{BC}	2.3 ^A	0.9	0.2	14.21	5.23 ^A
HiSex (White)	Closed	96.8	1.7	1.2	0.2	14.01 ^{XY}	5.24
	Open	96.3	2.1	1.3	0.3	13.72 ^{XYZ}	5.17
	Average	96.6 ^{ABC}	1.9 ^{ABC}	1.3	0.3	13.87	5.21 ^A
ISA/Babcock (B300)	Closed	97.4	1.4	0.9	0.3	14.21 ^{XY}	5.22
	Open	97.0	1.6	1.2	0.3	13.61 ^{XYZ}	5.08
	Average	97.2 ^{ABC}	1.5 ^{BC}	1.0	0.3	13.91	5.15 ^A
HyLine (W-36)	Closed	97.4	1.6	0.8	0.2	13.95 ^{XY}	4.87
	Open	97.4	1.5	0.9	0.2	13.57 ^{YZ}	4.77
	Average	97.4 ^A	1.5 ^{BC}	0.9	0.2	13.76	4.82 ^B
Shaver (288A)	Closed	97.8	1.0	1.1	0.1	14.04 ^{XY}	5.23
	Open	96.9	1.6	1.3	0.2	14.20 ^{XY}	5.34
	Average	97.3 ^{AB}	1.3 ^C	1.2	0.2	14.12	5.28 ^A
Tatum (T-100)	Closed	97.3	1.6	0.9	0.2	14.33 ^X	5.26
	Open	95.9	2.5	1.3	0.3	14.09 ^{XY}	5.19
	Average	96.6 ^{ABC}	2.0 ^{AB}	1.1	0.3	14.21	5.23 ^A
All Strains	Closed	97.0	1.6	1.1	0.2	14.10	5.18
	Open	96.7	2.0	1.1	0.2	13.79	5.11
	Average	96.9	1.8	1.1	0.2	13.94	5.15

A,B,C - Different letters denote significant differences ($P < .01$), comparisons made among strain average values. Differences among individual laying house and strain averages are not significant.

X,Y,Z - Different letters denote significant strain x housing interactions ($P < .01$).

TABLE 4. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF WHITE EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds /Cage)	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality > 140d (%)
DeKalb (XL-Link)	3	26.0	60.0	220.6	76.3	46.7	11.8
	4	27.1	60.1	208.2	76.2	46.5	19.6
	6	26.3	59.9	210.9	75.3	46.0	16.1
	8	26.4	59.3	222.5	75.8	45.7	10.4
H & N (Nick Chick)	3	25.8	59.1	229.1	77.1	46.3	9.4
	4	25.5	59.7	225.5	76.3	46.3	7.8
	6	25.6	59.2	227.1	75.8	45.8	5.7
	8	26.2	59.5	226.0	76.1	46.2	7.8
HiSex (White)	3	25.9	59.4	225.2	76.2	46.1	7.3
	4	25.9	59.0	226.0	76.5	45.8	8.9
	6	26.3	59.5	216.5	76.1	46.0	13.0
	8	26.3	59.8	217.4	75.3	45.8	10.1
ISA/Babcock (B300)	3	25.2	58.9	225.9	75.9	45.4	9.0
	4	25.7	59.7	217.2	75.8	45.9	12.2
	6	26.4	59.5	220.0	76.8	46.5	13.6
	8	26.4	59.2	224.7	76.7	46.1	7.8
HyLine (W-36)	3	23.5	57.6	226.0	74.2	43.5	3.1
	4	24.1	57.3	216.6	75.3	44.0	11.8
	6	24.4	57.4	218.3	75.0	43.9	11.0
	8	24.0	57.5	230.7	75.7	44.2	2.6
Shaver (288A)	3	25.7	58.6	224.1	75.9	45.2	8.0
	4	26.6	58.9	223.9	76.8	46.1	9.0
	6	26.3	58.0	225.7	77.1	45.5	8.7
	8	26.4	58.4	228.4	75.5	44.9	3.9
Tatum (T-100)	3	25.9	59.1	230.2	77.4	46.4	6.2
	4	25.8	59.2	227.7	77.9	46.8	10.4
	6	26.6	59.2	228.8	78.3	47.2	7.3
	8	26.2	58.5	224.2	76.8	45.7	10.4
All Strains	3	25.4	59.0	225.9	76.1	45.7	7.8
	4	25.8	59.1	220.7	76.4	45.9	11.4
	6	25.9	59.0	221.0	76.4	45.9	10.8
	8	26.0	58.9	224.8	76.0	45.5	7.6

*There are no significant differences among these means.

TABLE 5. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES.
29TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds /Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
DeKalb (XL-Link)	3	2.2	7.9	16.7	37.1	36.1
	4	2.1	7.7	16.8	38.2	35.3
	6	3.3	6.2	17.3	36.0	37.3
	8	4.0	7.0	17.8	41.0	30.2
H & N (Nick Chick)	3	2.5	8.0	18.7	42.1	28.7
	4	3.8	5.6	16.8	40.2	33.7
	6	3.3	8.0	15.4	43.1	30.3
	8	4.0	6.6	16.6	39.1	33.8
HiSex (White)	3	4.0	7.0	15.3	41.0	32.7
	4	3.4	7.8	17.0	43.3	28.6
	6	3.1	6.8	17.2	41.2	31.7
	8	3.3	7.2	15.2	38.8	35.5
ISA/Babcock (B300)	3	3.5	7.7	17.1	42.1	30.0
	4	3.2	7.2	15.0	40.2	34.4
	6	3.8	8.1	14.8	38.1	35.2
	8	4.5	7.5	16.3	38.8	32.9
HyLine (W-36)	3	4.6	9.8	21.8	42.3	21.6
	4	4.6	10.5	22.9	40.4	21.6
	6	4.8	9.9	22.2	40.9	22.1
	8	3.8	11.1	22.1	41.5	21.5
Shaver (288A)	3	3.4	8.7	18.7	41.9	27.3
	4	2.9	8.3	18.6	40.2	30.0
	6	4.7	7.2	20.9	42.8	24.2
	8	3.8	7.4	20.3	43.0	25.6
Tatum (T-100)	3	3.5	6.7	18.1	42.0	29.8
	4	2.5	7.9	19.3	39.2	31.1
	6	3.2	7.6	17.2	41.8	30.3
	8	3.5	7.4	19.1	41.4	28.1
All Strains	3	3.4	8.0	18.1	41.2	29.4
	4	3.2	7.9	18.0	40.2	30.7
	6	3.8	7.7	17.9	40.5	30.2
	8	3.8	7.7	18.2	40.5	29.6

*There are no significant differences among these means.

TABLE 6. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds /Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
DeKalb (XL-Link)	3	96.1	1.9	1.7	0.2	13.92	5.11
	4	96.3	2.3	1.3	0.2	13.11	5.05
	6	97.2	1.4	1.2	0.3	13.29	5.00
	8	95.9	2.6	1.3	0.2	13.92	5.27
H & N (Nick Chick)	3	96.7	2.2	1.0	0.1	14.36	5.22
	4	95.8	2.9	1.0	0.4	14.06	5.18
	6	96.5	2.1	1.1	0.2	14.22	5.22
	8	97.0	2.2	0.6	0.2	14.19	5.31
HiSex (White)	3	97.2	1.6	1.0	0.2	14.16	5.22
	4	96.1	1.9	1.6	0.4	14.05	5.25
	6	96.6	1.9	1.4	0.1	13.61	5.16
	8	96.5	2.2	1.1	0.3	13.65	5.19
ISA/Babcock (B300)	3	97.3	1.6	0.9	0.2	14.17	5.13
	4	97.4	1.5	0.8	0.3	13.67	5.04
	6	96.8	1.5	1.5	0.3	13.74	5.16
	8	97.2	1.5	1.0	0.3	14.05	5.28
HyLine (W-36)	3	97.5	1.4	1.0	0.1	14.02	4.88
	4	97.7	1.5	0.7	0.2	13.35	4.70
	6	97.1	1.8	0.8	0.3	13.45	4.73
	8	97.2	1.5	1.0	0.3	14.22	4.97
Shaver (288A)	3	97.9	1.0	0.9	0.2	14.07	5.19
	4	97.5	1.1	1.2	0.2	14.06	5.26
	6	96.9	1.8	1.1	0.2	14.07	5.24
	8	96.9	1.4	1.6	0.1	14.29	5.43
Tatum (T-100)	3	96.1	2.5	1.2	0.1	14.36	5.27
	4	96.6	2.0	1.1	0.3	14.20	5.19
	6	96.8	1.7	1.0	0.4	14.33	5.26
	8	97.0	1.8	1.0	0.2	13.95	5.19
All Strains	3	97.0	1.7	1.1	0.2	14.15	5.15
	4	96.8	1.9	1.1	0.3	13.79	5.10
	6	96.8	1.7	1.1	0.3	13.82	5.11
	8	96.8	1.9	1.1	0.2	14.04	5.23

*There are no significant differences among these means.

TABLE 7. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES, 29TH NCLP&MT
(140-434 DAYS)

Breeder (Strain)	Laying House	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality > 140d (%)
HyLine (Brown)	Closed	28.8	61.6	234.9	78.2	48.7	4.9
	Open	28.3	62.0	240.9	79.2	49.6	3.3
	Average	28.6 ^{AB}	61.8 ^D	237.9 ^A	78.7 ^B	49.2 ^B	4.1 ^A
Hisex (Brown)	Closed	28.1	62.1	227.3	75.7	47.4	5.8
	Open	28.8	63.1	227.7	76.9	49.0	7.4
	Average	28.5 ^{AB}	62.6 ^{BCD}	227.5 ^{BC}	76.3 ^C	48.2 ^{BC}	6.6 ^{AB}
ISA (Brown)	Closed	27.9	63.5	228.1	74.9	48.3	3.8
	Open	28.1	63.4	225.0	75.8	48.5	8.4
	Average	28.0 ^A	63.5 ^A	226.5 ^{BCD}	75.4 ^{CD}	48.4 ^{BC}	6.1 ^{AB}
H & N (Brown Nick)	Closed	28.9	62.5	243.9	81.9	51.5	7.8
	Open	28.6	62.6	243.3	81.7	51.7	6.0
	Average	28.7 ^{AB}	62.6 ^{BCD}	243.6 ^A	81.8 ^A	51.6 ^A	6.9 ^{AB}
DeKalb (Sex-Sal-Link)	Closed	30.5	62.6	220.3	73.6	47.3	8.1
	Open	31.0	62.7	218.5	73.9	47.4	10.9
	Average	30.7 ^C	62.7 ^{BC}	219.4 ^D	73.8 ^{DE}	47.4 ^C	9.5 ^B
Tatum (T-173)	Closed	29.2	62.8	219.9	72.9	46.7	4.8
	Open	29.1	63.4	220.2	73.2	47.5	5.9
	Average	29.1 ^B	63.1 ^{AB}	220.1 ^{CD}	73.1 ^E	47.1 ^C	5.2 ^{AB}
Arbor Acres (Brown)	Closed	29.6	62.4	227.8	75.4	47.8	3.2
	Open	28.7	62.0	228.8	74.9	47.6	2.9
	Average	29.1 ^B	62.2 ^{CD}	228.3 ^B	75.2 ^{CD}	47.7 ^C	3.1 ^A
All Strains	Closed	29.0	62.5	228.9	76.1	48.2	5.5
	Open	28.9	62.7	229.2	76.5	48.8	6.4
	Average	29.0	62.6	229.0	76.3	48.5	5.9

A,B,C,D,E - Different letters denote significant differences ($P < .01$), comparisons made among strain average values only. Differences among laying house and strain averages are not significant.

TABLE 8.

EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES,
29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
HyLine (Brown)	Closed	0.9	4.8	15.2	35.3	43.8
	Open	1.2	4.4	13.5	35.5	45.4
	Average	1.0 ^{BC}	4.6	14.3	35.4 ^A	44.6 ^C
Hisex (Brown)	Closed	1.3	4.1	14.2	33.7	46.7
	Open	1.5	3.7	10.0	30.5	54.3
	Average	1.4 ^{ABC}	3.9	12.1	32.1 ^{AB}	50.5 ^B
ISA (Brown)	Closed	0.8	4.0	11.0	27.6	56.5
	Open	1.4	3.4	10.6	28.9	55.7
	Average	1.1 ^{BC}	3.7	10.8	28.3 ^C	56.1 ^A
H & N (Brown Nick)	Closed	0.6	3.5	13.5	34.6	47.8
	Open	1.0	4.4	11.7	33.5	49.4
	Average	0.8 ^C	4.0	12.6	34.1 ^A	48.6 ^{BC}
DeKalb (Sex-Sal-Link)	Closed	1.6	5.2	12.0	29.2	52.0
	Open	2.3	4.8	10.9	28.6	53.5
	Average	2.0 ^{AB}	5.0	11.5	28.9 ^{BC}	52.7 ^{AB}
Tatum (T-173)	Closed	1.8	5.3	10.4	28.7	53.8
	Open	2.6	4.1	9.3	26.7	57.2
	Average	2.2 ^A	4.7	9.8	27.7 ^C	55.5 ^A
Arbor Acres (Brown)	Closed	1.5	5.0	12.2	32.4	48.9
	Open	2.2	4.3	12.3	34.4	46.9
	Average	1.8 ^{ABC}	4.6	12.2	33.4 ^A	47.9 ^{BC}
All Strains	Closed	1.2	4.6	12.6	31.6	49.9
	Open	1.7	4.1	11.2	31.2	51.8
	Average	1.5	4.3	11.9	31.4	50.8

A,B,C - Different letters denote significant differences ($P < .01$), comparisons made among strain average values only. Differences among laying house and strain averages are not significant.

TABLE 9. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
HyLine (Brown)	Closed	96.7	2.1	0.9	0.3	14.95	6.03
	Open	97.4	1.8	0.7	0.2	15.42	6.07
	Average	97.1	1.9	0.8	0.2	15.18 ^A	6.05 ^{BC}
Hisex (Brown)	Closed	96.9	1.6	1.1	0.4	14.46	5.91
	Open	96.2	2.2	1.1	0.5	14.50	6.00
	Average	96.5	1.9	1.1	0.5	14.48 ^{BC}	5.95 ^C
ISA (Brown)	Closed	97.3	1.7	0.5	0.5	14.64	5.92
	Open	96.0	2.1	1.5	0.4	14.44	5.90
	Average	96.6	1.9	1.0	0.5	14.54 ^{BC}	5.91 ^C
H & N (Brown Nick)	Closed	96.4	2.2	1.0	0.5	15.47	6.01
	Open	96.9	1.9	0.5	0.7	15.47	6.01
	Average	96.6	2.0	0.8	0.6	15.47 ^A	6.01 ^{BC}
DeKalb (Sex-Sal-Link)	Closed	94.9	2.5	2.1	0.4	14.06	6.28
	Open	96.3	2.4	1.0	0.4	14.00	6.33
	Average	95.6	2.5	1.6	0.4	14.03 ^C	6.31 ^A
Tatum (T-173)	Closed	96.4	2.3	1.1	0.3	14.03	6.08
	Open	96.0	1.8	1.5	0.6	14.04	6.13
	Average	96.2	2.1	1.3	0.4	14.04 ^C	6.11 ^{BC}
Arbor Acres (Brown)	Closed	96.8	1.5	1.5	0.2	14.60	6.21
	Open	96.3	2.4	1.1	0.2	14.60	6.12
	Average	96.5	1.9	1.3	0.2	14.60 ^B	6.17 ^{AB}
All Strains	Closed	96.5	2.0	1.2	0.4	14.60	6.06
	Open	96.4	2.1	1.1	0.4	14.64	6.08
	Average	96.5	2.0	1.1	0.4	14.62	6.07

A,B,C,D - Different letters denote significant differences ($P < .01$), comparisons made among strain average values only. Differences among laying house and strain averages are not significant.

TABLE 10. EFFECTS OF POPULATION ON PERFORMANCE OF BROWN EGG ENTRIES, 29TH NCLP&MT
(140-434 DAYS)

Breeder (Strain)	Population (Birds /Cage)	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality > 140d (%)
HyLine (Brown)	2	28.5	61.8	240.4	79.2	49.3	3.1
	3	27.7	61.7	234.4	77.6	48.3	4.2
	4	29.1	62.0	238.9	80.0	50.2	7.0
	6	29.1	61.7	237.9	78.0	48.8	2.1
Hisex (Brown)	2	27.9	62.4	224.3	76.2	47.9	7.8
	3	27.8	62.7	231.0	75.9	48.2	6.2
	4	29.6	62.2	238.0	77.7	49.0	2.3
	6	28.6	62.9	216.7	75.2	47.8	10.1
ISA (Brown)	2	27.8	63.0	229.2	76.5	49.1	7.0
	3	27.6	63.4	224.3	74.0	47.5	4.2
	4	28.4	64.1	233.2	76.4	49.0	3.8
	6	28.0	63.4	219.5	74.5	48.0	9.3
H & N (Brown Nick)	2	27.8	62.4	248.4	81.5	51.2	5.2
	3	28.9	62.0	243.9	82.7	51.8	7.3
	4	29.7	63.0	249.8	82.3	52.2	4.8
	6	28.6	62.8	232.4	80.7	51.1	10.4
DeKalb (Sex-Sal- Link)	2	30.2	62.0	226.8	75.2	47.8	3.9
	3	29.8	62.2	224.8	74.8	47.8	6.2
	4	31.9	63.1	218.6	74.2	47.8	9.6
	6	30.9	63.4	207.5	70.9	46.0	18.1
Tatum (T-173)	2	29.1	63.5	218.5	72.7	47.3	5.5
	3	28.1	63.1	219.9	72.9	46.7	4.4
	4	29.7	62.7	222.2	74.0	47.4	6.3
	6	29.7	63.1	219.6	72.8	47.2	4.9
Arbor Acres (Brown)	2	28.7	61.1	227.2	75.4	46.9	3.3
	3	29.0	62.9	228.0	74.8	47.8	1.7
	4	30.4	62.8	232.4	75.9	48.8	4.2
	6	28.5	62.0	225.7	74.5	47.3	3.1
All Strains	2	28.6 ^A	62.3	230.7 ^A	76.7 ^{AB}	48.5	5.1
	3	28.4 ^A	62.6	229.5 ^A	76.1 ^{AB}	48.3	4.9
	4	29.8 ^B	62.8	233.3 ^A	77.2 ^A	49.2	5.4
	6	29.1 ^{AB}	62.8	222.8 ^B	75.3 ^B	48.0	8.3

A,B - Different letters denote significant differences (P < .01).

TABLE 11. EFFECTS OF POPULATION ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds /Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
HyLine (Brown)	2	0.5	4.3	14.0	36.8	44.4
	3	1.3	4.1	14.2	36.6	43.8
	4	0.8	5.2	14.5	32.9	46.6
	6	1.5	4.8	14.5	35.4	43.9
Hisex (Brown)	2	0.7	4.0	12.8	34.0	48.5
	3	1.7	3.7	12.8	30.0	51.8
	4	2.4	4.1	11.2	32.4	49.9
	6	0.7	3.9	11.5	32.1	51.8
ISA (Brown)	2	1.9	3.7	11.4	29.2	53.8
	3	0.9	3.5	10.8	29.1	55.7
	4	0.9	3.1	10.5	26.3	59.3
	6	0.8	4.5	10.6	28.5	55.6
H & N (Brown Nick)	2	0.8	4.4	12.9	33.9	47.9
	3	1.0	3.8	13.3	35.3	46.6
	4	0.9	3.7	12.1	31.4	51.9
	6	0.6	3.9	12.1	35.6	47.9
DeKalb (Sex-Sal-Link)	2	2.4	5.4	11.8	31.3	49.2
	3	2.8	5.3	12.2	28.7	51.0
	4	2.6	2.3	11.9	28.4	54.8
	6	0.1	6.9	10.0	27.2	55.8
Tatum (T-173)	2	1.7	4.5	9.9	25.4	58.6
	3	2.3	4.3	10.0	30.9	52.5
	4	2.7	4.9	10.9	27.2	54.3
	6	2.2	5.1	8.7	27.3	56.7
Arbor Acres (Brown)	2	1.9	6.3	12.2	35.6	43.8
	3	1.2	3.5	12.9	31.7	50.6
	4	2.2	4.1	10.8	32.2	50.6
	6	1.8	4.5	12.9	34.2	46.6
All Strains	2	1.4	4.7	12.1	32.3	49.4
	3	1.6	4.0	12.3	31.7	50.3
	4	1.8	3.9	11.7	30.1	52.5
	6	1.1	4.8	11.5	31.5	51.2

*There are no significant differences among these means.

TABLE 12. EFFECTS OF POPULATION ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES,
29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Population (Birds /Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
HyLine (Brown)	2	97.2	1.8	0.7	0.2	15.38	6.09
	3	96.1	2.9	0.9	0.1	14.90	5.83
	4	97.7	1.5	0.6	0.2	15.26	6.09
	6	97.2	1.5	0.8	0.5	15.19	6.20
Hisex (Brown)	2	97.2	1.7	0.9	0.2	14.34	5.80
	3	96.5	1.8	1.1	0.6	14.67	5.92
	4	96.7	1.7	1.2	0.5	15.14	6.32
	6	95.8	2.3	1.2	0.6	13.76	5.77
ISA (Brown)	2	97.4	1.5	0.6	0.5	14.69	5.87
	3	96.1	1.9	1.5	0.4	14.40	5.88
	4	96.2	2.5	0.8	0.5	14.95	6.14
	6	96.8	1.5	1.2	0.5	14.12	5.76
H & N (Brown Nick)	2	97.3	1.4	1.0	0.4	15.86	5.96
	3	96.6	2.2	0.5	0.7	15.44	5.99
	4	95.6	2.8	0.8	0.8	15.76	6.34
	6	97.0	1.7	0.8	0.5	14.81	5.75
DeKalb (Sex-Sal-Link)	2	96.7	1.9	1.1	0.3	14.60	6.35
	3	96.1	2.8	0.8	0.4	14.35	6.20
	4	95.6	2.5	1.3	0.6	13.93	6.46
	6	93.9	2.6	3.1	0.3	13.24	6.23
Tatum (T-173)	2	96.1	2.0	1.5	0.4	13.91	6.09
	3	95.4	2.8	1.3	0.4	14.00	5.89
	4	96.1	2.4	1.2	0.3	14.15	6.23
	6	97.2	1.1	1.2	0.6	14.08	6.22
Arbor Acres (Brown)	2	97.1	2.0	0.8	0.1	14.47	6.07
	3	96.5	2.0	1.2	0.2	14.57	6.14
	4	96.4	1.4	2.1	0.1	14.97	6.45
	6	96.1	2.3	1.2	0.4	14.39	6.01
All Strains	2	97.0	1.8	0.9	0.3	14.75 ^A	6.03 ^A
	3	96.2	2.3	1.0	0.4	14.62 ^A	5.98 ^A
	4	96.3	2.1	1.1	0.4	14.88 ^A	6.29 ^B
	6	96.3	1.9	1.3	0.5	14.23 ^B	5.99 ^A

A,B - Different letters denote significant differences (P < .01).

TABLE 13. EFFECTS OF DENSITY ON PERFORMANCE OF BROWN EGG ENTRIES, 29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Density (sq in /bird)	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality > 140d (%)
HyLine (Brown)	74.6	28.4	61.7	236.2	77.9	48.6	3.1
	84	28.8	61.9	239.6	79.6	49.7	5.1
Hisex (Brown)	74.6	28.2	62.8	223.9	75.6	48.0	8.2
	84	28.7	62.3	231.1	77.0	48.5	5.1
ISA (Brown)	74.6	27.8	63.4	221.7	74.3	47.8	6.9
	84	28.1	63.6	231.2	76.5	49.0	5.4
H & N (Brown Nick)	74.6	28.7	62.4	238.1	81.7	51.4	8.9
	84	28.8	62.7	249.2	81.9	51.7	5.0
DeKalb (Sex-Sal- Link)	74.6	30.4	62.8	216.1	72.8	46.9	12.2
	84	31.0	62.5	223.0	74.8	47.8	6.6
Tatum (T-173)	74.6	29.0	63.1	219.4	72.8	47.0	4.7
	84	29.4	63.1	220.4	73.3	47.3	5.9
Arbor Acres (Brown)	74.6	28.8	62.5	226.7	74.7	47.6	2.5
	84	29.6	62.1	230.4	75.7	48.0	3.5
All Strains	74.6	28.7	62.7	226.0 ^B	75.7 ^B	48.2	6.6
	84	29.2	62.6	232.1 ^A	77.0 ^A	48.9	5.2

A,B - Different letters denote significant differences (P < .01).

TABLE 14. EFFECTS OF DENSITY ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES,
29TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Density (sq in /bird)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
HyLine (Brown)	74.6 84	1.4 0.7	4.4 4.8	14.4 14.3	36.0 34.8	43.8 45.5
Hisex (Brown)	74.6 84	1.2 1.5	3.8 4.1	12.2 12.0	31.0 33.2	51.8 49.2
ISA (Brown)	74.6 84	0.8 1.4	4.0 3.4	10.7 11.0	28.9 27.7	55.6 56.5
H & N (Brown Nick)	74.6 84	0.8 0.9	3.9 4.1	12.7 12.6	35.4 32.7	47.3 49.8
DeKalb (Sex-Sal-Link)	74.6 84	1.5 2.4	6.1 4.0	11.1 11.8	27.9 30.0	53.4 51.8
Tatum (T-173)	74.6 84	2.2 2.2	4.8 4.7	9.3 10.3	29.0 26.3	54.7 56.4
Arbor Acres (Brown)	74.6 84	1.5 2.1	4.0 5.1	12.8 11.4	32.9 33.7	48.8 47.7
All Strains	74.6 84	1.3 1.6	4.4 4.3	11.8 11.9	31.6 31.2	50.8 51.0

*There are no significant differences among these means.

TABLE 15. EFFECTS OF DENSITY ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES,
29TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Density (sq in /bird)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
HyLine (Brown)	74.6 84	96.7 97.5	2.2 1.6	0.9 0.7	0.3 0.2	15.05 15.32	6.01 6.09
Hisex (Brown)	74.6 84	96.2 96.9	2.1 1.7	1.2 1.0	0.6 0.3	14.21 14.74	5.85 6.06
ISA (Brown)	74.6 84	96.4 96.8	1.8 2.0	1.3 0.7	0.5 0.5	14.25 14.72	5.82 6.00
H & N (Brown Nick)	74.6 84	96.8 96.4	1.9 2.1	0.6 0.9	0.6 0.6	15.13 15.81	5.87 6.15
DeKalb (Sex-Sal-Link)	74.6 84	95.0 96.2	2.7 2.2	1.9 1.1	0.3 0.5	13.80 14.29	6.21 6.40
Tatum (T-173)	74.6 84	96.4 96.1	1.8 2.2	1.3 1.3	0.5 0.4	14.02 14.03	6.06 6.16
Arbor Acres (Brown)	74.6 84	96.4 96.6	2.2 1.7	1.2 1.6	0.3 0.1	14.48 14.76	6.07 6.29
All Strains	74.6 84	96.3 96.7	2.1 1.9	1.2 1.0	0.4 0.4	14.42 ^B 14.82 ^A	5.99 ^A 6.16 ^B

A,B - Different letters denote significant differences ($P < .01$).

STOCK SUPPLIERS AND CATEGORIES

<u>Breeder</u>	<u>Stock</u>	<u>Category</u>	<u>Source</u>
DeKalb AgResearch, Inc. 3100 Sycamore Road DeKalb, IL 60115	XL Link	I-A	Brickland Breeder Farms Route 1, Box 308 Kenbridge, VA 23944
H & N International 3825 154th Avenue, NE Redmond, WA 98052	H & N "Nick Chick"	I-A	Wheelock Hatchery 2170 Wayne Road Chambersburg, PA 17201
Hisex Division Pilch, Inc. Box 438 Troutman, NC 28166	Hisex White	I-A	Euribred, Inc. P.O. Box 719 Troutman, NC 28166
ISA-Babcock, Inc. P.O. Box 280 Ithaca, NY 14851	B-300	I-A	American Selected Products 615 Copeland Mill Road Suite 1-B Westerville, OH 43081
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	W-36	I-A	Hy-Line International 1005 4th Avenue, SE Spencer, IA 51301
Shaver Poultry Breeding Farms, Ltd. Box 400 Ontario, CANADA N1R 5V9	288A (Shaver White)	I-A	American Selected Products, Inc. 209 Grove Street Silver Lake, MN 55381
Tatum Farms Route 3 Dawsonville, GA 30534	T-100	II-A	Tatum Farms Route 3 Dawsonville, GA 30534
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	Hy-Line Brown	II-A	Lakeview Farms Route 3, Box 818 Searcy, AR 72143
Hisex Division Pilch, Inc. Box 438 Troutman, NC 28166	Hisex Brown	I-A	Euribred, Inc. P.O. Box 719 Troutman, NC 28166
ISA-Babcock P.O. Box 280 Ithaca, NY 14851	Babcock Brown	II-A	Clock & DeCloux 1609 Trumansburg Road Ithaca, NY 14850
H & N International 3825 154th Avenue, NE Redmond, WA 98052	Brown Nick	II-A	Wheelock Hatchery 2170 Wayne Road Chambersburg, PA 17201
DeKalb AgResearch, Inc. 3100 Sycamore Road DeKalb, IL 60115	Sex-Sal-Link	I-A	Heartland Hatcheries, Inc. 509 South Wayne Street P.O. Box 911 Portland, IN 47371
Tatum Farms Route 3 Dawsonville, GA 30534	T-173	II-A	Tatum Farms Route 3 Dawsonville, GA 30534
Arbor Acres Marlborough Road Glastonbury, CT 06033-6501	Brown	II-A	Clock and DeCloux 1609 Trumansburg Road Ithaca, NY 14850

*I = Extensive distribution in southeast United States.

II = Little or no distribution in southeast United States.

A = Entry requested.

C = Entry not requested.