



**AGRICULTURAL  
EXTENSION  
SERVICE**

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**TWENTY-EIGHTH  
NORTH CAROLINA LAYER PERFORMANCE  
AND MANAGEMENT TEST  
First Laying Cycle Report**

**Vol. 28, No. 2  
March 1990**

The North Carolina Layer Performance and Management Test is conducted under the auspices of the Agricultural 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. J. B. Carey was Project Leader. The purpose of this program is to assist poultrymen in evaluation of stocks of commercial layers and management systems.

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**Layer Management and Nutrition:**

Layer diets are identified as diets A, B, C, D, E, F, G, and H. Formulations are presented in the succeeding section. Feed was offered ad libitum in accordance with the following schedule:

DIET FORMULATIONS

<u>Ingredient</u>	<u>Diet ID</u>							
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>	<u>G</u>	<u>H</u>
	-----Pounds per Ton-----							
Corn	1197	1170	1149	1200	1165	1135	1110	1024
Wheat midds	260	224	200	50	19	21	10	10
Soybean meal	315	370	415	495	560	610	650	725
Limestone	192	190	190	205	205	178	173	173
Methionine	1	1	1	1	1	2	2	3
Dynamate®	4	4	4	4	4	4	4	4
Phosphorus	20	30	30	35	35	38	40	40
Salt	4	4	4	4	4	4	4	4
Vit. premix	2	2	2	2	2	2	2	2
Min. premix	1	1	1	1	1	1	1	1
Gertian Violet	1	1	1	1	1	1	1	0
CuSO <sub>4</sub>	1	1	1	1	1	1	1	1
Tracer	1	1	1	1	1	1	1	1
Choline	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

Calculated Analysis

Protein	14.1	15.1	15.9	16.9	18.1	19.2	19.9	21.3
ME	1204	1200	1199	1226	1223	1229	1227	1229
Calcium	3.84	3.96	3.97	4.31	4.32	3.89	3.83	3.84
T. Phos.	0.56	0.65	0.65	0.67	0.67	0.71	0.74	0.74
Lysine	0.72	0.79	0.85	0.93	1.02	1.09	1.14	1.24
TSAA	0.54	0.56	0.59	0.63	0.67	0.74	0.77	0.85

### Data Collection Schedule and Procedures:

Egg Production--All eggs that had the potential of being marketable products 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. Summarization of egg production occurred at fourteen-day intervals. Egg production 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.

Feed Consumption--All feed offered for consumption was recorded for each unit. At fourteen-day intervals, all feed not consumed was weighed and feed consumption calculated. Feed intake was calculated and reported. Feed costs were based on a three-year average regional price 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.

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.

### 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. Second and third order interactions were tested for significance. Mean differences were separated via the PDIFF option of the GLM procedure.

### DESCRIPTION OF DATA TABLE STATISTICS

Performance of white egg strains is presented in Tables 1-9; brown egg strains in Tables 10-18.

### Breeder (Strain):

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

**Layer House:**

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

**Population:**

The number of birds per cage:

<u>Population</u>	<u>Cage Size</u>	
	<u>Width</u>	<u>Depth</u>
3	12"	14"
4	16"	14"
6	24"	14"

Floor space was 56 in<sup>2</sup> per bird and feeder space was 4" per bird in all cages.

**Growing House:**

"Closed" denotes performance of hens reared in an enclosed pullet facility. "Open" denotes performance of hens reared in a curtain-sided pullet facility.

**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 hen days.

**Egg Mass:**

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

**Mortality:**

The percentage of birds housed at 126 days which died prior to 43 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	61.56
A	Large	61.56
A	Medium	52.92
A	Small	39.07
A	Pee Wee	39.88
B	All	39.88
Cracks	All	31.99

**Feed Cost:**

The calculated feed cost per hen housed at 126 days, using three-year regional average prices, weighted average price of \$157.34 per ton.

**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,  
28TH NCLPMT (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 (%)
H & N (Nick Chick)	Closed	25.6	58.8WXY	247.3	82.5	49.7	5.6
	Open	25.8	59.7VW	241.5	82.8	50.7	9.5
	Average	25.7	59.2	244.4A	82.6ABC	50.2BC	7.6BC
Hyline (W-36)	Closed	24.4	58.7XY	248.3	81.3	49.2	2.4
	Open	24.4	58.3Y	248.0	82.2	49.3	6.3
	Average	24.4	58.5	248.1A	81.8C	49.2C	4.4C
Shaver (288A)	Closed	25.5	58.4XY	240.7	82.2	49.3	9.5
	Open	26.0	59.2WXY	244.5	83.6	50.8	9.8
	Average	25.8	58.8	242.6A	82.9ABC	50.1BC	9.6B
DeKalb (XL-Link)	Closed	25.9	58.5XY	251.3	84.9	51.2	7.3
	Open	26.8	59.8VW	248.0	84.7	52.1	9.9
	Average	26.4	59.2	249.6A	84.8A	51.7AB	8.6BC
Hisex (White)	Closed	26.3	60.3UV	254.9	86.9	53.5	8.6
	Open	27.2	60.9U	242.3	82.0	50.8	9.1
	Average	26.8	60.6	248.6A	84.4AB	52.1A	8.8BC
ISA/Babcock (B300)	Closed	24.9	58.9WXY	245.8	81.7	49.2	4.6
	Open	25.5	59.4VWX	247.3	82.2	50.1	4.2
	Average	25.2	59.1	246.6A	81.9BC	49.7C	4.4C
Colonial (365-S)	Closed	24.1	53.3Z	227.4	80.8	44.6	15.4
	Open	24.9	53.8Z	216.4	81.0	45.1	20.6
	Average	24.5	53.6	221.9B	80.9C	44.9D	18.0A
All Strains	Closed	25.2	58.1	245.1	82.9	49.5	7.6
	Open	25.8	58.7	241.1	82.6	49.8	9.9
	Average	25.5	58.4	243.1	82.8	49.7	8.8

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

U,V,W,X,Y,Z - Differing letters denote significant differences ( $P < .01$ ), comparisons made among laying house and strain combinations.

TABLE 2. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.3	6.5	26.1	44.3	22.8
	Open	0.6	5.0	21.3	42.7	30.3
	Average	0.5	5.8	23.7	43.5	26.6
Hyline (W-36)	Closed	0.6	6.5	25.7	44.6	22.7
	Open	0.4	7.5	26.9	44.4	20.8
	Average	0.5	7.0	26.3	44.5	21.8
Shaver (288A)	Closed	0.5	5.4	28.5	46.1	19.5
	Open	0.2	4.9	26.6	43.0	25.3
	Average	0.4	5.1	27.6	44.6	22.4
DeKalb (XL-Link)	Closed	0.5	6.2	27.9	44.3	21.1
	Open	0.2	5.4	22.3	42.3	29.8
	Average	0.4	5.8	25.1	43.3	25.5
Hisex (White)	Closed	0.1	4.1	20.1	44.9	30.8
	Open	0.3	4.0	18.7	39.0	38.0
	Average	0.2	4.0	19.4	42.0	34.4
ISA/Babcock (B300)	Closed	0.3	6.1	23.3	49.3	20.9
	Open	0.4	5.4	22.6	45.5	26.1
	Average	0.4	5.8	23.0	47.4	23.5
Colonial (365-S)	Closed	3.3	18.5	47.7	26.5	4.0
	Open	3.1	19.0	44.1	29.1	4.7
	Average	3.2	18.8	45.9	27.8	4.3
All Strains	Closed	0.8	7.6	28.5	42.9	20.3
	Open	0.8	7.3	26.1	40.9	25.0
	Average	0.8	7.5	27.3	41.9	22.6

\*There are no significant differences among these means.

TABLE 3. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES, 28TH NCLPMT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
H & N (Nick Chick)	Closed	96.1	1.9	1.2	0.7	10.85	5.45
	Open	96.5	1.6	1.1	0.8	10.76	5.33
	Average	96.3A	1.8B	1.2C	0.8BC	10.81A	5.39AB
HyLine (W-36)	Closed	96.8	1.0	1.0	1.1	11.00	5.43
	Open	96.9	0.9	0.9	1.4	10.87	5.36
	Average	96.8A	0.9C	1.0C	1.3A	10.93A	5.39AB
Shaver (288A)	Closed	97.0	1.4	1.1	0.5	10.67	5.30
	Open	96.9	1.5	0.9	0.8	10.81	5.42
	Average	96.9A	1.4BC	1.0C	0.6C	10.74A	5.36B
DeKalb (XL-Link)	Closed	96.4	1.5	1.3	0.8	11.09	5.47
	Open	95.9	1.9	1.4	0.7	11.04	5.58
	Average	96.2AB	1.7B	1.4BC	0.8BC	11.06A	5.53AB
Hisex (White)	Closed	95.4	2.1	1.8	0.7	11.32	5.47
	Open	95.0	1.9	1.8	1.3	10.66	5.64
	Average	95.2B	2.0B	1.8AB	1.0ABC	10.99A	5.56A
ISA/Babcock (B300)	Closed	95.8	1.7	1.3	1.2	10.82	5.39
	Open	96.9	1.3	1.0	0.8	11.03	5.45
	Average	96.3A	1.5BC	1.2C	1.0ABC	10.93A	5.42AB
Colonial (365-S)	Closed	93.1	3.5	2.3	1.2	9.21	5.01
	Open	93.6	2.8	2.3	1.2	8.72	4.85
	Average	93.4C	3.1A	2.3A	1.2AB	8.97B	4.93C
Average	Closed	95.8	1.9	1.5	0.9	10.71	5.36
	Open	96.0	1.7	1.4	1.0	10.56	5.38
	Average	95.9	1.8	1.4	0.9	10.63	5.37

A,B,C,D - Differing letters denote significant differences ( $P < .01$ ), comparisons made among average values only, differences among laying house and strain combinations are not significant ( $P > .05$ ).



TABLE 4. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (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 (%)
H & N (Nick Chick)	3	25.4	58.9	245.8	82.9	50.0	6.3
	4	25.8	59.7	247.7	83.4	51.1	7.0
	6	25.9	59.2	239.8	81.6	49.6	9.5
Hyline (W-36)	3	24.2	58.2	249.0	81.9	49.0	3.6
	4	24.5	58.7	250.5	82.0	49.6	3.7
	6	24.5	58.6	245.0	81.3	49.1	5.7
Shaver (288A)	3	25.8	58.7	239.2	83.5	50.3	11.5
	4	25.5	58.8	242.7	82.4	49.9	9.9
	6	26.0	58.8	245.8	82.8	50.0	7.4
DeKalb (XL-Link)	3	26.0	59.0	246.1	84.4	51.3	8.9
	4	26.3	59.2	249.6	85.4	52.0	10.1
	6	26.8	59.3	253.2	84.6	51.7	6.8
Hisex (White)	3	26.3	60.8	246.0	82.7	51.3	8.9
	4	26.6	60.1	256.0	86.7	53.2	7.9
	6	27.5	60.8	243.9	83.8	52.0	9.6
ISA/Babcock (B300)	3	25.5	59.6	249.6	82.2	50.3	3.7
	4	24.7	58.4	245.4	82.9	49.7	6.3
	6	25.4	59.3	244.7	80.7	49.1	3.1
Colonial (365-S)	3	24.6	53.6	220.5	80.0	44.3	16.5
	4	24.4	53.8	213.8	80.2	44.7	21.0
	6	24.5	53.3	231.4	82.5	45.5	16.4
Average	3	25.4	58.4	242.3	82.5	49.5	8.5
	4	25.4	58.4	243.7	83.3	50.0	9.4
	6	25.8	58.5	243.4	82.5	49.6	8.4

\*There are no significant differences among these means.

TABLE 5. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Population (Birds/Cage)	Peewee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	3	0.5	5.7	25.8	44.9	23.2
	4	0.4	5.4	21.9	42.8	29.5
	6	0.6	6.2	23.3	42.9	27.0
Hyline (W-36)	3	0.5	7.7	27.3	44.2	20.3
	4	0.5	6.7	25.9	43.4	23.5
	6	0.5	6.5	25.7	45.8	21.5
Shaver (288A)	3	0.6	5.2	28.5	43.1	22.7
	4	0.3	5.1	27.6	44.5	22.5
	6	0.2	5.1	26.7	46.1	22.0
DeKalb (XL-Link)	3	0.3	5.8	26.0	43.7	24.1
	4	0.4	5.6	25.9	42.3	25.8
	6	0.4	5.9	23.4	43.9	26.5
Hisex (White)	3	0.2	3.3	18.8	42.6	35.2
	4	0.3	4.7	20.8	43.2	31.0
	6	0.2	4.0	18.6	40.1	37.2
ISA/Babcock (B300)	3	0.3	5.3	22.0	44.3	28.1
	4	0.4	6.3	23.8	52.1	17.4
	6	0.3	5.7	23.1	45.8	25.0
Colonial (365-S)	3	3.1	19.0	44.8	28.9	4.2
	4	3.0	17.9	45.5	29.6	4.0
	6	3.5	19.4	47.4	25.0	4.7
Average	3	0.8	7.4	27.6	41.7	22.5
	4	0.8	7.4	27.3	42.6	21.9
	6	0.8	7.6	26.9	41.4	23.4

\*There are no significant differences among these means.

TABLE 6. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Population (Birds/Cage)	Grade	Grade	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
		A (%)	B (%)				
H & N (Nick Chick)	3	97.1	1.5	0.9	0.4	10.85	5.37
	4	95.7	2.1	1.2	1.0	11.03	5.43
	6	96.1	1.7	1.4	0.8	10.54	5.37
HyLine (W-36)	3	97.2	1.0	0.7	1.1	10.91	5.41
	4	96.5	1.0	1.2	1.3	11.03	5.41
	6	96.8	0.9	1.0	1.3	10.86	5.36
Shaver (288A)	3	97.2	1.3	0.9	0.6	10.52	5.24
	4	97.1	1.4	0.9	0.6	10.80	5.35
	6	96.5	1.6	1.2	0.6	10.91	5.48
DeKalb (XL-Link)	3	95.5	2.1	1.6	0.8	10.87	5.39
	4	96.8	1.6	0.9	0.7	11.10	5.49
	6	96.2	1.4	1.6	0.8	11.22	5.71
Hisex (White)	3	95.2	1.9	1.8	1.1	10.90	5.51
	4	95.1	2.1	1.7	1.1	11.26	5.54
	6	95.2	2.1	1.9	0.8	10.80	5.62
ISA/Babcock (B300)	3	96.4	1.3	1.3	0.9	11.13	5.51
	4	96.6	1.7	0.9	0.8	10.84	5.28
	6	95.9	1.6	1.3	1.1	10.81	5.47
Colonial (365-S)	3	93.0	3.6	2.4	1.1	8.92	4.95
	4	94.2	2.4	2.2	1.2	8.71	4.82
	6	92.9	3.3	2.4	1.4	9.28	5.04
Average	3	95.9	1.8	1.4	0.9	10.58	5.34
	4	96.0	1.7	1.3	1.0	10.68	5.33
	6	95.7	1.8	1.5	1.0	10.63	5.43

\*There are no significant differences among these means.

TABLE 7. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality >140d (%)
H & N (Nick Chick)	Closed	25.6	58.1	249.5	84.3	49.7	7.5
	Open	25.8	60.4	239.3	81.0	50.8	7.7
Hyline (W-36)	Closed	23.9	56.9	253.2	83.0	48.3	3.5
	Open	24.9	60.2	243.1	80.5	50.2	5.3
Shaver (288A)	Closed	25.3	57.1	245.7	84.4	49.0	10.9
	Open	26.2	60.5	239.5	81.4	51.1	8.4
DeKalb (XL-Link)	Closed	25.8	57.7	253.4	86.5	51.1	10.6
	Open	27.0	60.6	245.9	83.1	52.3	6.6
Hisex (White)	Closed	26.2	59.4	251.2	83.9	50.3	7.1
	Open	27.3	61.7	246.0	85.0	54.0	10.6
ISA/Babcock (B300)	Closed	25.0	58.2	248.5	82.6	48.9	5.2
	Open	25.3	60.1	244.6	81.3	50.5	3.5
Colonial (365-S)	Closed	24.0	52.2	229.1	83.2	44.5	17.3
	Open	25.0	54.9	214.7	78.5	45.2	18.7
Average	Closed	24.9	56.7	247.9	83.8	48.4	7.9
	Open	25.6	59.5	242.3	82.0	50.6	7.3

\*There are no significant differences among these means.

TABLE 8. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.5	7.2	29.3	43.1	20.1
	Open	0.5	4.3	18.1	44.0	33.1
Hyline (W-36)	Closed	0.7	9.7	34.3	42.5	12.8
	Open	0.3	4.2	18.3	46.5	30.7
Shaver (288A)	Closed	0.5	7.1	35.9	43.9	12.6
	Open	0.2	3.2	19.2	45.2	32.2
DeKalb (XL-Link)	Closed	0.5	7.7	32.0	42.3	17.5
	Open	0.2	3.9	18.2	44.3	33.5
Hisex (White)	Closed	0.2	5.1	23.9	43.7	27.0
	Open	0.2	2.9	14.8	40.3	41.8
ISA/Babcock (B300)	Closed	0.4	7.1	27.4	47.3	17.7
	Open	0.3	4.5	18.5	47.5	29.2
Colonial (365-S)	Closed	4.2	23.9	48.7	20.8	2.4
	Open	2.2	13.6	43.1	34.9	6.2
Average	Closed	1.0	9.7	33.1	40.5	15.7
	Open	0.6	5.2	21.5	43.2	29.5

\*There are no significant differences among these means.

TABLE 9. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL LAYER HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
H & N (Nick Chick)	Closed	95.9	1.9	1.5	0.8	10.68	5.37
	Open	96.7	1.6	0.9	0.7	10.94	5.41
HyLine (W-36)	Closed	96.9	0.9	1.0	1.2	10.81	5.39
	Open	96.8	0.9	1.0	1.3	11.06	5.40
Shaver (288A)	Closed	96.9	1.6	0.9	0.6	10.43	5.27
	Open	97.0	1.3	1.2	0.6	11.05	5.44
DeKalb (XL-Link)	Closed	96.3	1.6	1.4	0.7	10.89	5.41
	Open	96.0	1.8	1.3	0.8	11.24	5.64
Hisex (White)	Closed	94.6	2.4	1.9	1.1	10.80	5.56
	Open	95.8	1.6	1.8	0.8	11.17	5.56
ISA/Babcock (B300)	Closed	96.3	1.6	1.1	1.1	10.73	5.39
	Open	96.4	1.5	1.3	0.9	11.12	5.45
Colonial (365-S)	Closed	92.4	3.8	2.5	1.2	8.78	4.86
	Open	94.3	2.4	2.2	1.2	9.16	5.01
Average	Closed	95.6	2.0	1.4	1.0	10.44	5.32
	Open	96.1	1.6	1.4	0.9	10.82	5.42

\*There are no significant differences among these means.

TABLE 10. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES, 28TH NCLPMT (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 (%)
ISA/Babcock (Brown)	Closed	27.1	62.9	247.1	82.1	52.3XY	3.3
	Open	27.5	63.6	246.1	81.7	52.7X	5.3
	Average	27.3B	63.2A	246.6AB	81.9AB	52.5	4.3
Hisex (Brown)	Closed	26.6	63.0	232.7	78.7	50.3YZ	8.0
	Open	26.8	63.5	242.2	79.8	51.2XYZ	3.5
	Average	26.7B	63.2A	237.4BC	79.2C	50.8	5.8
DeKalb (Sex-Sal-Link)	Closed	26.9	60.6	238.2	79.1	49.7Z	5.7
	Open	28.1	61.8	248.2	82.3	52.7X	3.3
	Average	27.5AB	61.2B	243.2BC	80.7BC	51.2	4.5
Hubbard (Golden Comet)	Closed	27.7	62.7	235.9	79.5	50.5YZ	7.0
	Open	28.6	63.2	235.0	80.1	51.1XYZ	9.2
	Average	28.2A	62.9A	235.5C	79.8BC	50.8	8.1
Hyline (Brown)	Closed	28.0	62.0	249.3	83.0	52.3XY	4.1
	Open	28.5	62.0	256.4	84.2	53.0X	2.8
	Average	28.2A	62.0B	252.9A	83.6A	52.6	3.4
All Strains	Closed	27.2	62.2	240.7	80.5	51.0	5.6
	Open	27.9	62.8	245.6	81.6	52.2	4.8
	Average	27.6	62.5	243.1	81.1	51.6	5.2

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

U,V,W,X,Y,Z - Differing letters denote significant differences ( $P < .01$ ), comparisons made among laying house and strain combinations.

X,Y,Z - Differing letters denote significant differences ( $P < .01$ ), comparisons made among laying house and strain combinations.

TABLE 11. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock (Brown)	Closed	0.1	1.5	13.6	37.6	47.1
	Open	0.2	0.9	12.5	34.3	52.1
	Average	0.2	1.2	13.1	36.0	49.6
Hisex (Brown)	Closed	0.3	1.4	14.0	34.4	50.0
	Open	0.3	1.3	12.8	34.0	51.6
	Average	0.3	1.3	13.4	34.2	50.8
DeKalb (Sex-Sal-Link)	Closed	0.3	3.5	20.1	42.2	33.9
	Open	0.2	3.1	16.8	38.7	41.2
	Average	0.2	3.3	18.4	40.4	37.6
Hubbard (Golden Comet)	Closed	0.3	2.5	12.8	35.0	49.4
	Open	0.2	1.7	13.7	33.1	51.2
	Average	0.3	2.1	13.3	34.0	50.3
Hyline (Brown)	Closed	0.1	1.5	15.4	42.0	41.0
	Open	0.0	1.3	15.6	41.9	41.2
	Average	0.1	1.4	15.5	42.0	41.1
All Strains	Closed	0.2	2.1	15.2	38.3	44.3
	Open	0.2	1.7	14.3	36.4	47.5
	Average	0.2	1.9	14.7	37.3	45.9

\*There are no significant differences among these means.



TABLE 12. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES, 28TH NCLPMT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade	Grade	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
		A (%)	B (%)				
ISA/Babcock (Brown)	Closed	95.2Z	2.3	1.3XY	1.2Y	11.09	5.73
	Open	96.4XYZ	2.2	0.5Z	0.9Y	11.15	5.81
	Average	95.8	2.3A	0.9	1.0	11.12A	5.77B
Hisex (Brown)	Closed	95.6YZ	1.8	1.6XY	1.0Y	10.43	5.55
	Open	95.5YZ	2.0	1.3XY	1.2Y	10.87	5.72
	Average	95.6	1.9AB	1.4	1.1	10.65B	5.64B
DeKalb (Sex-Sal-Link)	Closed	95.5YZ	1.7	1.7X	1.1Y	10.85	5.71
	Open	96.4XYZ	1.6	1.3XY	0.7Y	11.44	5.94
	Average	96.0	1.6B	1.5	0.9	11.15A	5.83AB
Hubbard (Golden Comet)	Closed	97.4X	0.8	0.9YZ	0.9Y	10.59	5.71
	Open	96.1YZ	0.9	1.0XYZ	2.0X	10.38	5.79
	Average	96.8	0.8C	1.0	1.4	10.48B	5.75B
HyLine (Brown)	Closed	95.9YZ	1.4	1.6X	1.1Y	11.17	5.94
	Open	96.7XY	1.3	1.2XY	0.8Y	11.50	6.12
	Average	96.3	1.3BC	1.4	1.0	11.37A	6.03A
Average	Closed	95.9	1.6	1.4	1.1	10.83	5.73
	Open	96.2	1.6	1.1	1.1	11.08	5.88
	Average	96.1	1.6	1.2	1.1	10.95	5.80

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

U,V,W,X,Y,Z - Differing letters denote significant differences ( $P < .01$ ), comparisons made among laying house and strain combinations.

TABLE 13. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality >140d (%)
ISA/Babcock (Brown)	Closed	27.6	61.7	252.2	83.7	51.9	3.7
	Open	27.0	64.7	240.9	80.1	53.2	4.8
Hisex (Brown)	Closed	26.3	61.9	243.0	81.2	50.6	4.9
	Open	27.1	64.6	231.9	77.3	51.0	6.6
DeKalb (Sex-Sal-Link)	Closed	27.4	59.5	250.4	83.1	50.8	5.4
	Open	27.6	62.8	236.1	78.3	51.5	3.7
Hubbard (Golden Comet)	Closed	28.0	62.0	238.7	79.9	49.6	7.3
	Open	28.4	63.9	232.2	79.8	52.0	8.9
Hyline (Brown)	Closed	27.8	60.8	258.9	84.8	52.2	3.1
	Open	28.6	63.2	246.9	82.3	53.1	3.8
Average	Closed	27.2	60.8	246.2	82.2	50.5	5.8
	Open	27.2	63.7	235.1	78.7	51.5	5.5

\*There are no significant differences among these means.

TABLE 14. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock (Brown)	Closed	0.2	1.6	17.1	41.0	40.0
	Open	0.1	0.8	9.0	30.9	59.2
Hisex (Brown)	Closed	0.4	1.8	17.3	37.7	42.7
	Open	0.1	0.8	9.5	30.7	58.8
DeKalb (Sex-Sal-Link)	Closed	0.2	4.3	24.5	44.6	26.5
	Open	0.3	2.4	12.4	36.3	48.7
Hubbard (Golden Comet)	Closed	0.2	3.3	16.0	37.0	43.5
	Open	0.3	0.9	10.5	31.1	57.1
Hyline (Brown)	Closed	0.1	2.2	19.5	44.7	33.5
	Open	0.1	0.6	11.4	39.2	48.7
Average	Closed	0.2	2.7	18.9	41.0	37.2
	Open	0.2	1.1	10.6	33.6	54.5

\*There are no significant differences among these means.

TABLE 15. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
ISA/Babcock (Brown)	Closed	95.3	2.4	1.1	1.2	11.06	5.84
	Open	96.2	2.2	0.7	0.9	11.17	5.69
Hisex (Brown)	Closed	95.3	1.9	1.7	1.1	10.69	5.62
	Open	95.8	1.9	1.2	1.1	10.61	5.65
DeKalb (Sex-Sal-Link)	Closed	96.1	1.4	1.6	0.9	11.11	5.83
	Open	95.9	1.8	1.4	0.9	11.19	5.82
Hubbard (Golden Comet)	Closed	96.2	1.0	1.0	1.8	10.42	5.80
	Open	97.3	0.7	0.9	1.1	10.55	5.70
HyLine (Brown)	Closed	96.1	1.3	1.6	1.1	11.42	6.04
	Open	96.5	1.4	1.2	0.9	11.31	6.02
Average	Closed	95.8	1.6	1.4	1.2	10.94	5.83
	Open	96.4	1.6	1.1	1.0	10.97	5.78

\*There are no significant differences among these means.

TABLE 16. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (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 (%)
ISA/Babcock (Brown)	3	26.5	62.4	247.2	82.1	51.9	3.1
	4	27.5	63.9	242.1	81.2	52.7	6.3
	6	27.8	63.3	250.4	82.5	53.0	3.5
Hisex (Brown)	3	26.8	63.7	238.4	78.7	50.8	3.1
	4	26.6	63.2	237.7	80.1	51.3	7.9
	6	26.8	62.8	236.3	78.9	50.2	6.3
DeKalb (Sex-Sal-Link)	3	27.1	61.1	242.9	80.5	50.9	5.3
	4	27.6	61.2	246.5	81.0	51.2	2.5
	6	27.8	61.3	240.3	80.7	51.3	5.8
Hubbard (Golden Comet)	3	28.1	62.9	229.7	78.3	49.7	6.8
	4	27.9	63.1	237.4	80.1	51.0	6.9
	6	28.6	62.9	239.2	81.1	51.7	10.7
Hyline (Brown)	3	28.9	61.8	252.7	83.6	52.6	3.7
	4	28.0	62.4	255.5	83.6	53.1	1.6
	6	27.8	61.8	250.4	83.5	52.3	4.9
Average	3	27.5	62.4	242.2	80.6	51.2	4.4
	4	27.5	62.7	243.8	81.2	51.9	5.0
	6	27.7	62.4	243.3	81.4	51.7	6.2

\*There are no significant differences among these means.

TABLE 17. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock (Brown)	3	0.2	1.3	14.4	38.7	45.4
	4	0.2	0.7	11.1	33.9	54.0
	6	0.1	1.6	13.6	35.2	49.5
Hisex (Brown)	3	0.5	1.2	11.9	31.7	54.7
	4	0.2	1.4	13.5	33.9	51.0
	6	0.2	1.4	14.8	36.9	46.7
DeKalb (Sex-Sal-Link)	3	0.2	3.5	18.3	41.7	36.4
	4	0.1	4.0	18.7	39.6	37.6
	6	0.4	2.5	18.3	40.1	38.7
Hubbard (Golden Comet)	3	0.3	2.1	13.3	32.8	51.6
	4	0.2	2.2	13.3	32.7	51.6
	6	0.3	2.1	13.2	36.7	47.7
Hyline (Brown)	3	0.1	1.7	17.2	41.2	39.8
	4	0.0	1.2	14.0	41.2	43.6
	6	0.1	1.4	15.2	43.4	39.9
Average	3	0.3	2.0	15.0	37.2	45.6
	4	0.1	1.9	14.1	36.3	47.6
	6	0.2	1.8	15.0	38.5	44.5

\*There are no significant differences among these means.

TABLE 18. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLPMT (140-434 DAYS)\*

Breeder (Strain)	Population (Birds/Cage)	Grade	Grade	Cracks (%)	Loss (%)	Egg Income (\$/Hen)	Feed Cost (\$/Hen)
		A (%)	B (%)				
ISA/Babcock (Brown)	3	96.2	1.6	1.0	1.2	11.11	5.70
	4	96.0	2.4	0.7	0.9	10.99	5.72
	6	95.1	2.8	1.0	1.0	11.26	5.89
Hisex (Brown)	3	94.8	1.7	2.0	1.6	10.67	5.68
	4	96.3	1.7	1.0	1.0	10.68	5.61
	6	95.7	2.3	1.3	0.7	10.60	5.62
DeKalb (Sex-Sal-Link)	3	96.5	1.1	1.3	1.0	11.15	5.74
	4	96.0	1.7	1.4	0.9	11.25	5.92
	6	95.4	2.0	1.7	0.9	11.04	5.81
Hubbard (Golden Comet)	3	96.5	1.1	0.7	1.7	10.16	5.66
	4	97.2	0.6	0.8	1.3	10.61	5.73
	6	96.6	0.8	1.3	1.3	10.68	5.86
HyLine (Brown)	3	96.1	1.2	1.5	1.2	11.31	6.20
	4	96.3	1.4	1.3	1.0	11.54	6.03
	6	96.6	1.4	1.4	0.6	11.26	5.86
Average	3	96.0	1.3	1.3	1.3	10.88	5.80
	4	96.3	1.6	1.1	1.0	11.01	5.80
	6	95.9	1.8	1.3	0.9	10.97	5.81

\*There are no significant differences among these means.

STOCK SUPPLIERS AND CATEGORIES

<u>Breeder</u>	<u>Stock</u>	<u>Category*</u>	<u>Source</u>
Hisex Division Pilch, Inc. Box 438 Troutman, NC 28166	Hisex White	I-A	Wonder Chick 500 South Oak Street Searcy, AR 72143
Colonial Poultry Farms, Inc., P.O. Box 89 Pleasant Hill, MO 64080	Colonial True-Line 365-S	II-A	Colonial Poultry Farms, Inc., P.O. Box 89 Pleasant Hill, MO 64080
ISA-Babcock, Inc. P.O. Box 280 Ithaca, NY 14851	ISA-Babcock B300	I-A	AGRI General 42 Pinewood Avenue Lititz, PA 17543
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	Hy-Line W-36	I-C	Not applicable
Shaver Poultry Breeding Farms, Ltd., Box 400 Ontario, CANADA N1R 5V9	Shaver Starcross 288-A	I-A	Merrill Poultry Farms Inc., Route 2, Box 21 Paul, ID 83347
DeKalb AgResearch, Inc. 3825 154th Avenue NE Redmond, WA 98052	DeKalb XL-Link	I-A	H & N, Inc. 3825 154th Avenue NE Redmond, WA 98052
Hubbard Farms Walpole, NH 03608	Hubbard Golden Comet	I-A	Bowers Brothers Hatchery, Route 4, P.O. Box 100 Albemarle, NC 28001
DeKalb AgResearch, Inc. 3100 Sycamore Road DeKalb, IL 60115	DeKalb Sex-Sal-Link "G"	I-A	Pee Dee Hatchery P.O. Box 148 Hartsville, SC 29550
Hisex Division Pilch, Inc. Box 438 Troutman, NC 28166	Hisex Brown	I-A	Pilch, Inc. Box 438 Troutman, NC 28166
ISA-Babcock, Inc. P.O. Box 280 Ithaca, NY 14851	ISA Brown	I-A	Clock & DeCloux 197 Maple Street Norwich, CT 06360
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	Hy-Line Brown	I-C	Not applicable

\*I = Extensive distribution in southeast United States.

II = Little or no distribution in southeast United States.

A = Entry requested.

C = Entry not requested.



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