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College of Agriculture and Life Sciences

FINAL REPORT OF THE TWENTY-EIGHTH NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST

Office of Extension Poultry Science
Box 7608
Raleigh, N.C. 27695-7608
(919) 737-2621

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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; Dr. J. B. Carey was Project Leader; and Dr. K. E. Anderson is current Project Leader. The purpose of this program is to assist poultrymen in evaluation of commercial layer stocks and management systems.

For further information contact:

Dr. Kenneth E. Anderson
Poultry Science Department
North Carolina State University
Box 7608
Raleigh, NC 27695-7608

28th NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST

Protocol

Entries

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

Dates of Importance:

The eggs were set on January 7, 1988 and hatched on January 28, 1988. The pullets were moved to laying facilities on June 2, 1988 (18 weeks of age). First cycle production records commensed on June 16, 1988 (20 weeks of age) until molt was induced on April 20, 1989 and concluded on January 29, 1990 (104 weeks of age). This report includes production data summarized in three sections: 20-63 weeks, 63-104 weeks, and 20-104 weeks).

Test Design:

The test was a factorial arrangement of treatments. Main effects were strain, pullet housing, layer housing, and layer cage population. This is considerably different from previous tests. 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 five brown egg strains participated in the test.

Pullet Housing--Within strain, equal numbers of birds were started in open-sided or controlled environment pullet facilities. Within the controlled environment facility, birds were started in the center level of a three-deck cage system. At six weeks of age, the birds were spread throughout the cage decks. Cage dimensions in the controlled environment facility were 20" x 24". Thirty birds were started per cage. After six weeks of age, 10 birds were housed per cage for a final rearing floor space allowance of 48 in^2 per bird. Within the open-sided facility, cage dimensions were 40" x 48". Cages were arranged in a single deck. Forty birds were started and reared per cage. Floor space allotment was 48 in^2 per bird. Refer to the 28th North Carolina Layer Performance and Management Test Growing Report (Vol. 2, No. 1) for details of pullet management, nutrition, and performance.

Layer Housing--Open-sided and controlled environment laying facilities were utilized. The open-sided facility utilized a flush/lagoon system and the controlled environment facility a high-rise design for waste management. Pullets from all strain and pullet housing combinations were moved to both laying houses. 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 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:

Rate of Production	Consumption per bird (lbs)	Diet Fed: White Egg Strains	Diet Fed: Brown Egg Strains
Pre-peak and > 87%	<.21	H	H
	>.21	G	G
	>.23	E	F
	>.25	D	E
	>.27	C	D
	>.29		C
80-87%	< .21	G	G
	> .21	F	G
	> .23	D	E
	> .25	C	D
	> .27	B	C
	> .29		A
70-80%	< .21	F	F
	> .21	E	F
	> .23	C	D
	> .25	B	C
	> .27	A	B
	> .29		A
< 70%	< .21	E	E
	> .21	D	E
	> .23	B	C
	> .25	A	B
	> .27		A

DIET FORMULATIONS

Ingredient	Diet ID A	B	C	D	E	F	G	H
	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
Gentian Violet	1	1	1	1	1	1	1	0
CuSO4	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. Egg production was summarized 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.

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 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.

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

First Cycle Performance of white egg and brown egg strains are shown on Tables 1-18; Second Cycle Performance on Tables 19-36; Summarized Performance on Tables 37-54.

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

Population and Space Allocations:

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

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 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 to 434 days of age and between 435 to 728 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:

Grade	Size	Cents/Dozen
A	Extra Large	66.77
A	Large	66.77
A	Medium	57.96
A	Small	45.00
A	Pee Wee	39.02
B	All	39.02
Cracks	All	28.73

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:

Size Category	Ounces/Dozen
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 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 (%)
H & N	Closed	25.6	58.8WXY	247.3	82.5	49.7	5.6
(Nick Chick)	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	Closed	24.4	58.7XY	248.3	81.3	49.2	2.4
(W-36)	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	Closed	25.5	58.4XY	240.7	82.2	49.3	9.5
(288A)	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	Closed	25.9	58.5XY	251.3	84.9	51.2	7.3
(XL-Link)	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	Closed	26.3	60.3UV	254.9	86.9	53.5	8.6
(White)	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	Closed	24.9	58.9WXY	245.8	81.7	49.2	4.6
(B300)	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	Closed	24.1	53.3Z	227.4	80.8	44.6	15.4
(365-S)	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	Closed	25.2	58.1	245.1	82.9	49.5	7.6
Strains	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 NCLP&MT (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 NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N	Closed	96.1	1.9	1.2	0.7	11.19	5.45
(Nick Chick)	Open	96.5	1.6	1.1	0.8	11.10	5.33
	Average	96.3A	1.8B	1.2C	0.8BC	11.14A	5.39AB
HyLine	Closed	96.8	1.0	1.0	1.1	11.35	5.43
(W-36)	Open	96.9	0.9	0.9	1.4	11.23	5.36
	Average	96.8A	0.9C	1.0C	1.3A	11.29A	5.39AB
Shaver	Closed	97.0	1.4	1.1	0.5	11.01	5.30
(288A)	Open	96.9	1.5	0.9	0.8	11.17	5.42
	Average	96.9A	1.4BC	1.0C	0.6C	11.09A	5.36B
DeKalb	Closed	96.4	1.5	1.3	0.8	11.46	5.47
(XL-Link)	Open	95.9	1.9	1.4	0.7	11.41	5.58
	Average	96.2AB	1.7B	1.4BC	0.8BC	11.43A	5.53AB
Hisex	Closed	95.4	2.1	1.8	0.7	11.71	5.47
(White)	Open	95.0	1.9	1.8	1.3	11.06	5.64
	Average	95.2B	2.0B	1.8AB	1.0ABC	11.39A	5.56A
ISA/Babcock	Closed	95.8	1.7	1.3	1.2	11.17	5.39
(B300)	Open	96.9	1.3	1.0	0.8	11.39	5.45
	Average	96.3A	1.5BC	1.2C	1.0ABC	11.28A	5.42AB
Colonial	Closed	93.1	3.5	2.3	1.2	9.46	5.01
(365-S)	Open	93.6	2.8	2.3	1.2	8.99	4.85
	Average	93.4C	3.1A	2.3A	1.2AB	9.22B	4.93C
Average	Closed	95.8	1.9	1.5	0.9	11.05	5.36
	Open	96.0	1.7	1.4	1.0	10.91	5.38
	Average	95.9	1.8	1.4	0.9	10.98	5.37

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

TABLE 4. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH 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 (%)
H & N	3	25.4	58.9	245.8	82.9	50.0	6.3
(Nick Chick)	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	3	24.2	58.2	249.0	81.9	49.0	3.6
(W-36)	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	3	25.8	58.7	239.2	83.5	50.3	11.5
(288A)	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	3	26.0	59.0	246.1	84.4	51.3	8.9
(XL-Link)	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	3	26.3	60.8	246.0	82.7	51.3	8.9
(White)	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	3	25.5	59.6	249.6	82.2	50.3	3.7
(B300)	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	3	24.6	53.6	220.5	80.0	44.3	16.5
(365-S)	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 NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	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 NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N	3	97.1	1.5	0.9	0.4	11.21	5.37
(Nick Chick)	4	95.7	2.1	1.2	1.0	11.35	5.43
	6	96.1	1.7	1.4	0.8	10.87	5.37
HyLine	3	97.2	1.0	0.7	1.1	11.28	5.41
(W-36)	4	96.5	1.0	1.2	1.3	11.38	5.41
	6	96.8	0.9	1.0	1.3	11.20	5.36
Shaver	3	97.2	1.3	0.9	0.6	10.88	5.24
(288A)	4	97.1	1.4	0.9	0.6	11.14	5.35
	6	96.5	1.6	1.2	0.6	11.27	5.48
DeKalb	3	95.5	2.1	1.6	0.8	11.23	5.39
(XL-Link)	4	96.8	1.6	0.9	0.7	11.47	5.49
	6	96.2	1.4	1.6	0.8	11.59	5.71
Hisex	3	95.2	1.9	1.8	1.1	11.30	5.51
(White)	4	95.1	2.1	1.7	1.1	11.65	5.54
	6	95.2	2.1	1.9	0.8	11.20	5.62
ISA/Babcock	3	96.4	1.3	1.3	0.9	11.49	5.51
(B300)	4	96.6	1.7	0.9	0.8	11.19	5.28
	6	95.9	1.6	1.3	1.1	11.16	5.47
Colonial	3	93.0	3.6	2.4	1.1	9.17	4.95
(365-S)	4	94.2	2.4	2.2	1.2	8.96	4.82
	6	92.9	3.3	2.4	1.4	9.54	5.04
Average	3	95.9	1.8	1.4	0.9	10.94	5.34
	4	96.0	1.7	1.3	1.0	11.02	5.33
	6	95.7	1.8	1.5	1.0	10.98	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 NCLP&MT (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 9. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL LAYER HOUSING, 28TH NCLP&MT (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	11.08	5.37
	Open	96.7	1.6	0.9	0.7	11.21	5.41
HyLine (W-36)	Closed	96.9	0.9	1.0	1.2	11.19	5.39
	Open	96.8	0.9	1.0	1.3	11.39	5.40
Shaver (288A)	Closed	96.9	1.6	0.9	0.6	10.84	5.27
	Open	97.0	1.3	1.2	0.6	11.35	5.44
DeKalb (XL-Link)	Closed	96.3	1.6	1.4	0.7	11.30	5.41
	Open	96.0	1.8	1.3	0.8	11.56	5.64
Hisex (White)	Closed	94.6	2.4	1.9	1.1	11.23	5.56
	Open	95.8	1.6	1.8	0.8	11.54	5.56
ISA/Babcock (B300)	Closed	96.3	1.6	1.1	1.1	11.11	5.39
	Open	96.4	1.5	1.3	0.9	11.45	5.45
Colonial (365-S)	Closed	92.4	3.8	2.5	1.2	9.12	4.86
	Open	94.3	2.4	2.2	1.2	9.33	5.01
Average	Closed	95.6	2.0	1.4	1.0	10.84	5.32
	Open	96.1	1.6	1.4	0.9	11.12	5.42

*There are no significant differences among these means.

TABLE 10. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES, 28TH 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 (%)
ISA/Babcock	Closed	27.1	62.9	247.1	82.1	52.3XY	3.3
(Brown)	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	Closed	26.6	63.0	232.7	78.7	50.3YZ	8.0
(Brown)	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	Closed	26.9	60.6	238.2	79.1	49.7Z	5.7
(Sex-Sal-Link)	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	Closed	27.7	62.7	235.9	79.5	50.5YZ	7.0
(Golden Comet)	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	Closed	28.0	62.0	249.3	83.0	52.3XY	4.1
(Brown)	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	Closed	27.2	62.2	240.7	80.5	51.0	5.6
Strains	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 - Differing letters denote significant differences ($P < .01$), comparisons made among average values.

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

Table 12. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES, 28TH NCLP&MT (140-434 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	Closed	95.2Z	2.3	1.3XY	1.2Y	11.53	5.73
(Brown)	Open	96.4XYZ	2.2	0.5Z	0.9Y	11.60	5.81
	Average	95.8	2.3A	0.9	1.0	11.57A	5.77B
Hisex	Closed	95.6YZ	1.8	1.6XY	1.0Y	10.88	5.55
(Brown)	Open	95.5YZ	2.0	1.3XY	1.2Y	11.33	5.72
	Average	95.6	1.9AB	1.4	1.1	11.10BC	5.64B
DeKalb	Closed	95.5YZ	1.7	1.7X	1.1Y	11.16	5.71
(Sex-Sal-Link)	Open	96.4XYZ	1.6	1.3XY	0.7Y	11.76	5.94
	Average	96.0	1.6B	1.5	0.9	11.46AB	5.83AB
Hubbard	Closed	97.4X	0.8	0.9YZ	0.9Y	11.02	5.71
(Golden Comet)	Open	96.1YZ	0.9	1.0XYZ	2.0X	10.82	5.79
	Average	96.8	0.8C	1.0	1.4	10.92C	5.75B
HyLine	Closed	95.9YZ	1.4	1.6X	1.1Y	11.66	5.94
(Brown)	Open	96.7XY	1.3	1.2XY	0.8Y	12.01	6.12
	Average	96.3	1.3BC	1.4	1.0	11.84A	6.03A
Average	Closed	95.9	1.6	1.4	1.1	11.25	5.73
	Open	96.2	1.6	1.1	1.1	11.50	5.88
	Average	96.1	1.6	1.2	1.1	11.38	5.80

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

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

TABLE 13. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH 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 (%)
ISA/Babcock	3	26.5	62.4	247.2	82.1	51.9	3.1
(Brown)	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	3	26.8	63.7	238.4	78.7	50.8	3.1
(Brown)	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	3	27.1	61.1	242.9	80.5	50.9	5.3
(Sex-Sal-Link)	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	3	28.1	62.9	229.7	78.3	49.7	6.8
(Golden Comet)	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	3	28.9	61.8	252.7	83.6	52.6	3.7
(Brown)	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 14. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (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 15. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	3	96.2	1.6	1.0	1.2	11.55	5.70
(Brown)	4	96.0	2.4	0.7	0.9	11.45	5.72
	6	95.1	2.8	1.0	1.0	11.69	5.89
Hisex	3	94.8	1.7	2.0	1.6	11.13	5.68
(Brown)	4	96.3	1.7	1.0	1.0	11.14	5.61
	6	95.7	2.3	1.3	0.7	11.04	5.62
DeKalb	3	96.5	1.1	1.3	1.0	11.45	5.74
(Sex-Sal-Link)	4	96.0	1.7	1.4	0.9	11.57	5.92
	6	95.4	2.0	1.7	0.9	11.35	5.81
Hubbard	3	96.5	1.1	0.7	1.7	10.59	5.66
(Golden Comet)	4	97.2	0.6	0.8	1.3	11.04	5.73
	6	96.6	0.8	1.3	1.3	11.12	5.86
HyLine	3	96.1	1.2	1.5	1.2	11.79	6.20
(Brown)	4	96.3	1.4	1.3	1.0	11.97	6.03
	6	96.6	1.4	1.4	0.6	11.75	5.86
Average	3	96.0	1.3	1.3	1.3	11.30	5.80
	4	96.3	1.6	1.1	1.0	11.44	5.80
	6	95.9	1.8	1.3	0.9	11.39	5.81

*There are no significant differences among these means.

TABLE 16. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (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	Closed	27.6	61.7	252.2	83.7	51.9	3.7
(Brown)	Open	27.0	64.7	240.9	80.1	53.2	4.8
Hisex	Closed	26.3	61.9	243.0	81.2	50.6	4.9
(Brown)	Open	27.1	64.6	231.9	77.3	51.0	6.6
DeKalb	Closed	27.4	59.5	250.4	83.1	50.8	5.4
(Sex-Sal-Link)	Open	27.6	62.8	236.1	78.3	51.5	3.7
Hubbard	Closed	28.0	62.0	238.7	79.9	49.6	7.3
(Golden Comet)	Open	28.4	63.9	232.2	79.8	52.0	8.9
Hyline	Closed	27.8	60.8	258.9	84.8	52.2	3.1
(Brown)	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 17. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (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 18. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-434 DAYS)*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	Closed	95.3	2.4	1.1	1.2	11.56	5.84
(Brown)	Open	96.2	2.2	0.7	0.9	11.57	5.69
Hisex	Closed	95.3	1.9	1.7	1.1	11.17	5.62
(Brown)	Open	95.8	1.9	1.2	1.1	11.04	5.65
DeKalb	Closed	96.1	1.4	1.6	0.9	11.51	5.83
(Sex-Sal-Link)	Open	95.9	1.8	1.4	0.9	11.40	5.82
Hubbard	Closed	96.2	1.0	1.0	1.8	10.85	5.80
(Golden Comet)	Open	97.3	0.7	0.9	1.1	10.98	5.70
HyLine	Closed	96.1	1.3	1.6	1.1	11.92	6.04
(Brown)	Open	96.5	1.4	1.2	0.9	11.75	6.02
Average	Closed	95.8	1.6	1.4	1.2	11.40	5.83
	Open	96.4	1.6	1.1	1.0	11.35	5.78

*There are no significant differences among these means.

TABLE 19. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES, 28TH NCLP&MT (435-728 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	Closed	23.3	63.2	180.1	68.6	48.9	7.5
(Nick Chick)	Open	23.7	64.6	171.9	68.8	50.1	8.8
	Average	23.5B	63.9B	176.0A	68.7AB	49.5AB	8.2B
Hy-Line	Closed	22.1	63.4	176.7	63.7	45.9	5.9
(W-36)	Open	22.4	63.2	172.8	65.7	47.4	9.1
	Average	22.2C	63.3B	174.8AB	64.7CD	46.7CD	7.5B
Shaver	Closed	22.8	62.6	163.1	63.6	44.7	5.3
(288A)	Open	23.1	63.5	160.6	63.0	45.6	5.2
	Average	22.9BC	63.0B	161.8B	63.3D	45.1D	5.3B
DeKalb	Closed	23.5	62.5	177.7	67.4	47.1	6.4
(XL-Link)	Open	23.6	63.3	174.8	68.3	49.0	4.2
	Average	23.6B	62.9B	176.3A	67.8ABC	48.1BC	5.3B
Hisex	Closed	24.4	65.0	185.3	72.7	52.6	8.2
(White)	Open	24.8	65.9	172.8	67.7	49.8	7.4
	Average	24.6A	65.5A	179.0A	70.2A	51.2A	7.8B
ISA/Babcock	Closed	23.1	63.4	180.8	66.3	47.0	4.9
(B300)	Open	23.5	63.6	178.2	65.6	46.9	4.2
	Average	23.3B	63.5B	179.5A	66.0BCD	46.9BCD	4.6B
Colonial	Closed	22.1	57.8	147.2	64.8	41.2	14.0
(365-S)	Open	22.9	57.8	142.7	67.7	43.3	10.9
	Average	22.5C	57.8C	145.0C	66.2BCD	42.3E	12.4A
All	Closed	23.0	62.6	173.0	66.7	46.8	7.5
Strains	Open	23.4	63.1	167.7	66.7	47.4	7.1
	Average	23.2	62.9	170.3	66.7	47.1	7.3

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 ($P>.01$).

TABLE 20. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES, 28TH NCLP&MT (435-728 DAYS)

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.3	0.3	6.7	43.3	49.4
	Open	0.3	0.0	3.6	35.2	60.9
	Average	0.3	0.2	5.2	39.2	55.2
Hy-Line (W-36)	Closed	0.5	0.3	6.7	40.1	52.3
	Open	0.3	0.2	7.1	42.6	49.9
	Average	0.4	0.3	6.9	41.3	51.1
Shaver (288A)	Closed	0.1	0.5	10.2	42.9	46.3
	Open	0.1	0.1	7.1	42.4	50.3
	Average	0.1	0.3	8.6	42.7	48.3
DeKalb (XL-Link)	Closed	0.3	0.2	9.9	46.0	43.5
	Open	0.3	0.4	7.0	40.9	51.4
	Average	0.3	0.3	8.5	43.5	47.4
Hisex (White)	Closed	0.3	0.0	3.4	31.3	65.0
	Open	0.1	0.1	2.5	28.0	69.3
	Average	0.2	0.1	2.9	29.7	67.2
ISA/Babcock (B300)	Closed	0.4	0.0	3.8	45.3	50.5
	Open	0.2	0.1	5.3	41.9	52.6
	Average	0.3	0.0	4.5	43.6	51.6
Colonial (365-S)	Closed	0.3	5.8	35.6	42.8	15.4
	Open	0.6	5.3	31.0	46.0	17.2
	Average	0.5	5.5	33.3	44.4	16.3
All Strains	Closed	0.3	1.0	10.9	41.7	46.1
	Open	0.3	0.9	9.1	39.6	50.2
	Average	0.3	0.9	10.0	40.6	48.2

*There are no significant differences among these means.

TABLE 21. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES, 28TH NCLP&MT (435-728 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	Closed	92.9	4.7	1.5	0.9	8.47	3.85
	Open	92.7	4.8	1.8	0.6	8.23	3.71
	Average	92.8B	4.8B	1.7B	0.7B	8.35AB	3.78AB
Hy-Line (W-36)	Closed	94.9	2.9	1.3	0.9	8.42	3.96
	Open	94.8	2.7	1.3	1.2	8.22	3.75
	Average	94.8A	2.8C	1.3B	1.0B	8.32AB	3.86AB
Shaver (288A)	Closed	94.5	3.5	1.4	0.6	7.71	3.69
	Open	93.6	4.5	1.3	0.7	7.58	3.69
	Average	94.0AB	4.0BC	1.4B	0.6B	7.64B	3.69B
DeKalb (XL-Link)	Closed	92.6	4.1	2.4	1.0	8.22	3.92
	Open	93.4	4.1	1.9	0.7	8.36	3.80
	Average	93.0B	4.1BC	2.1B	0.8B	8.29AB	3.86AB
Hisex (White)	Closed	93.1	4.2	2.0	0.7	8.77	3.91
	Open	92.1	4.5	2.1	1.3	8.01	3.93
	Average	92.6B	4.3BC	2.0B	1.0B	8.39A	3.92AB
ISA/Babcock (B300)	Closed	94.1	3.9	1.4	0.6	8.55	4.02
	Open	92.0	5.5	1.4	1.1	8.31	3.97
	Average	93.0AB	4.7B	1.4B	0.8B	8.43A	4.00A
Colonial (365-S)	Closed	86.9	8.1	3.5	1.4	6.20	3.30
	Open	87.0	7.2	3.7	2.1	5.99	3.11
	Average	87.0C	7.7A	3.6A	1.8A	6.09C	3.21C
All Strains	Closed	92.7	4.5	1.9	0.9	8.05	3.81
	Open	92.2	4.8	1.9	1.1	7.81	3.71
	Average	92.5	4.6	1.9	1.0	7.93	3.76

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

TABLE 22. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Feed Cons (lbs/100 hens/d)	Egg Weight (g/egg)	Egg Per Bird Housed	Eggs Production (HD%)	Egg Mass (g/HD)	Mortality >140d (%)
H & N	3	23.2	63.3	169.6	66.6	47.5	9.5
(Nick Chick)	4	23.7	64.5	186.0	71.3	51.7	6.9
	6	23.6	63.9	172.4	68.2	49.2	8.0
Hy-Line	3	21.7	62.8	177.9	65.2	46.7	5.7
(W-36)	4	22.6	63.8	171.1	62.8	45.5	9.0
	6	22.4	63.4	175.4	66.0	47.8	7.8
Shaver	3	22.7	63.0	158.8	63.6	45.3	5.8
(288A)	4	22.7	63.0	158.5	63.7	45.3	6.3
	6	23.4	63.1	168.2	62.6	44.8	3.7
DeKalb	3	23.6	62.7	178.2	68.0	48.1	4.3
(XL-Link)	4	23.9	63.0	175.0	69.8	49.2	7.4
	6	23.3	63.0	175.5	65.7	46.8	4.2
Hisex	3	24.1	65.4	173.4	68.3	50.1	8.5
(White)	4	24.2	64.7	183.3	70.3	50.2	6.9
	6	25.5	66.3	180.5	72.0	53.3	8.0
ISA/Babcock	3	23.4	64.2	180.3	65.7	47.3	3.7
(B300)	4	23.0	62.5	180.5	68.2	47.6	5.3
	6	23.4	63.8	177.6	63.9	45.9	4.7
Colonial	3	22.3	57.7	146.6	66.2	42.2	10.7
(365-S)	4	22.5	57.7	147.2	68.3	43.6	12.3
	6	22.7	58.2	141.1	64.2	41.0	14.4
Average	3	23.0	62.7	169.3	66.2	46.7	6.9
	4	23.2	62.7	171.7	67.8	47.6	7.7
	6	23.5	63.1	170.1	66.1	47.0	7.3

*There are no significant differences among these means.

TABLE 23. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	3	0.4	0.1	6.2	41.8	51.4
	4	0.2	0.2	4.5	35.9	59.2
	6	0.2	0.2	4.7	40.0	54.9
Hy-Line (W-36)	3	0.6	0.2	10.5	42.8	46.0
	4	0.5	0.5	4.9	37.7	56.6
	6	0.1	0.1	5.4	43.6	50.8
Shaver (288A)	3	0.1	0.4	11.1	38.0	50.4
	4	0.2	0.2	8.3	44.4	46.9
	6	0.0	0.2	6.5	45.6	47.7
DeKalb (XL-Link)	3	0.3	0.3	7.8	45.9	45.6
	4	0.1	0.3	9.1	42.6	47.8
	6	0.5	0.3	8.4	41.8	48.9
Hisex (White)	3	0.3	0.0	3.1	28.6	67.9
	4	0.2	0.1	3.4	36.3	60.0
	6	0.1	0.1	2.3	24.0	73.5
ISA/Babcock (B300)	3	0.1	0.0	5.1	36.8	58.0
	4	0.7	0.0	4.1	52.3	42.9
	6	0.1	0.0	4.5	41.7	53.8
Colonial (365-S)	3	0.6	6.5	31.4	44.7	16.8
	4	0.4	5.2	33.4	44.8	16.2
	6	0.5	4.9	35.0	43.7	15.9
Average	3	0.3	1.1	10.7	39.8	48.0
	4	0.3	0.9	9.7	42.0	47.1
	6	0.2	0.8	9.5	40.1	49.4

*There are no significant differences among these means.

TABLE 24. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	3	93.0	4.9	1.6	0.6	8.04	3.74
	4	92.5	4.9	1.8	0.8	8.76	3.87
	6	93.0	4.5	1.7	0.8	8.26	3.73
Hy-Line (W-36)	3	95.0	2.7	1.2	1.0	8.42	3.87
	4	94.3	3.2	1.5	1.0	8.09	3.90
	6	95.2	2.5	1.1	1.1	8.45	3.81
Shaver (288A)	3	93.5	4.0	1.6	0.9	7.44	3.58
	4	94.1	3.9	1.5	0.5	7.51	3.58
	6	94.5	4.1	1.0	0.4	7.99	3.91
DeKalb (XL-Link)	3	92.9	4.3	1.9	0.8	8.31	3.89
	4	92.4	4.3	2.3	1.0	8.16	3.77
	6	93.6	3.6	2.2	0.7	8.41	3.93
Hisex (White)	3	92.8	3.8	2.3	1.0	8.06	3.82
	4	92.1	4.7	2.0	1.2	8.49	3.96
	6	92.9	4.4	1.8	0.8	8.61	3.98
ISA/Babcock (B300)	3	92.3	4.8	1.8	1.0	8.36	4.05
	4	93.2	4.9	1.2	0.6	8.43	3.88
	6	93.6	4.3	1.3	0.8	8.50	4.06
Colonial (365-S)	3	86.1	8.5	4.2	1.1	6.08	3.19
	4	87.8	7.3	3.6	1.3	6.36	3.18
	6	87.0	7.2	3.0	2.9	5.84	3.24
Average	3	92.2	4.7	2.1	0.9	7.81	3.73
	4	92.3	4.8	2.0	0.9	7.97	3.74
	6	92.8	4.4	1.7	1.1	8.01	3.81

*There are no significant differences among these means.

TABLE 25. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 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	Closed	23.2	63.1	172.1	67.7	48.2	9.2
(Nick Chick)	Open	23.8	64.7	179.8	69.7	50.8	7.1
Hy-Line	Closed	21.6	61.5	174.9	64.7	45.1	8.7
(W-36)	Open	22.9	65.2	174.7	64.7	48.2	6.3
Shaver	Closed	22.5	61.3	157.5	62.6	43.3	5.6
(288A)	Open	23.4	64.7	166.1	64.0	46.9	4.9
DeKalb	Closed	23.4	61.7	170.3	68.2	47.2	7.4
(XL-Link)	Open	23.7	64.1	182.3	67.5	48.9	3.1
Hisex	Closed	24.3	64.4	177.9	68.4	48.7	9.6
(White)	Open	24.9	66.6	180.1	72.0	53.8	6.0
ISA/Babcock	Closed	23.2	62.6	172.1	63.4	44.4	4.2
(B300)	Open	23.3	64.3	186.8	68.5	49.5	4.9
Colonial	Closed	22.2	56.5	140.8	62.7	38.9	13.5
(365-S)	Open	22.8	59.2	149.1	69.7	45.6	11.4
Average	Closed	22.7	61.3	167.8	65.4	44.8	8.7
	Open	23.3	63.8	178.1	68.0	48.8	6.3

*There are no significant differences among these means.

TABLE 26. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.2	0.2	7.5	44.5	47.6
	Open	0.4	0.1	2.8	34.0	62.7
Hy-Line (W-36)	Closed	0.5	0.5	11.7	51.3	36.0
	Open	0.3	0.0	2.1	31.4	66.2
Shaver (288A)	Closed	0.1	0.5	13.8	51.6	34.0
	Open	0.1	0.1	3.4	33.7	62.7
DeKalb (XL-Link)	Closed	0.2	0.5	13.1	49.1	37.1
	Open	0.4	0.2	3.8	37.8	57.8
Hisex (White)	Closed	0.1	0.1	4.4	35.8	59.6
	Open	0.2	0.0	1.5	23.6	74.7
ISA/Babcock (B300)	Closed	0.3	0.0	6.3	49.5	43.9
	Open	0.3	0.0	2.8	37.7	59.2
Colonial (365-S)	Closed	0.5	7.9	39.9	41.6	10.2
	Open	0.5	3.2	26.6	47.2	22.5
Average	Closed	0.3	1.4	13.8	46.2	38.4
	Open	0.3	0.5	6.1	35.1	58.0

*There are no significant differences among these means.

TABLE 27. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	Closed	92.3	4.9	1.9	0.9	8.18	3.71
	Open	93.4	4.6	1.5	0.5	8.52	3.85
Hy-Line (W-36)	Closed	94.9	2.9	1.3	1.0	8.14	3.82
	Open	94.8	2.8	1.3	1.1	8.50	3.90
Shaver (288A)	Closed	94.0	4.5	0.9	0.6	7.30	3.61
	Open	94.1	3.5	1.8	0.7	7.98	3.77
DeKalb (XL-Link)	Closed	93.1	3.7	2.1	1.1	7.90	3.71
	Open	92.9	4.4	2.1	0.6	8.68	4.01
Hisex (White)	Closed	92.2	4.4	2.2	1.2	8.23	3.96
	Open	93.0	4.2	1.9	0.8	8.54	3.88
ISA/Babcock (B300)	Closed	93.0	4.7	1.4	0.9	8.01	3.97
	Open	93.1	4.7	1.5	0.7	8.85	4.03
Colonial (365-S)	Closed	84.7	9.0	3.9	2.4	5.75	3.22
	Open	89.2	6.3	3.3	1.1	6.44	3.19
Average	Closed	92.0	4.9	2.0	1.2	7.64	3.71
	Open	92.9	4.4	1.9	0.8	8.22	3.80

*There are no significant differences among these means.

TABLE 28. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES, 28TH NCLP&MT (435-728 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	Closed	24.8	66.4	163.4	61.6	46.5	10.2
(Brown)	Open	25.2	67.3	164.5	64.0	49.3	9.3
	Average	25.0AB	66.9AB	163.9AB	62.8	47.9	9.9
Hisex	Closed	24.2	66.7	149.3	58.6	44.4	8.4
(Brown)	Open	24.3	66.6	160.2	60.8	46.1	9.8
	Average	24.2B	66.6AB	154.7B	59.7	45.3	9.1
DeKalb	Closed	24.4	63.8	159.9	60.4	43.8	8.8
(Sex-Sal-Link)	Open	25.8	65.0	176.4	65.0	48.4	5.4
	Average	25.1AB	64.4C	168.1A	62.7	46.1	7.1
Hubbard	Closed	25.3	67.4	155.5	60.7	46.2	7.0
(Golden Comet)	Open	26.5	67.5	151.1	62.1	47.8	12.8
	Average	25.9A	67.5A	153.3B	61.4	47.0	9.9
Hy-Line	Closed	24.3	66.2	172.2	62.7	47.0	3.8
(Brown)	Open	24.8	66.1	175.7	64.0	47.9	4.7
	Average	24.6B	66.1B	173.9A	63.4	47.4	4.2
All	Closed	24.6	66.1	160.0	60.8	45.6	7.6
Strains	Open	25.3	66.5	165.6	63.2	47.9	8.5
	Average	25.0	66.3	162.8	62.0	46.7	8.0

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

TABLE 29. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock	Closed	0.6	0.0	2.3	26.2	70.8
(Brown)	Open	0.4	0.2	1.9	22.2	75.4
	Average	0.5	0.1	2.1	24.2BC	73.1E
Hisex	Closed	0.1	0.7	4.3	22.2	72.8
(Brown)	Open	0.3	0.4	2.5	25.5	71.2
	Average	0.2	0.5	3.4	23.9BC	72.0E
DeKalb	Closed	0.2	0.1	9.0	37.7	53.1
(Sex-Sal-Link)	Open	0.1	0.2	3.5	34.4	61.7
	Average	0.2	0.2	6.2	36.0A	57.4C
Hubbard	Closed	0.6	0.2	0.5	18.8	79.9
(Golden Comet)	Open	0.4	0.4	0.9	17.4	81.3
	Average	0.5	0.1	0.7	18.1C	80.6A
Hy-Line	Closed	0.1	0.2	3.3	29.2	67.1
(Brown)	Open	0.3	0.0	3.5	28.3	68.0
	Average	0.2	0.1	3.4	28.7B	67.6E
All	Closed	0.3	0.3	3.9	26.8	68.8
Strains	Open	0.3	0.3	2.4	25.6	71.5
	Average	0.3	0.2	3.2	26.2	70.2

A,B,C - 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).

TABLE 30. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES, 28TH NCLP&MT (435-728 DAYS)

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	Closed	92.8	4.8	1.5	1.0	7.85	4.11
(Brown)	Open	93.7	4.2	1.0	1.1	7.98	4.05
	Average	93.2B	4.5A	1.3	1.0	7.92AB	4.08
Hisex	Closed	93.9	4.0	1.1	1.0	7.17	3.89
(Brown)	Open	93.9	4.3	0.9	0.9	7.64	4.03
	Average	93.9B	4.2A	1.0	1.0	7.41B	3.96
DeKalb	Closed	94.6	3.3	1.4	0.7	7.66	4.08
(Sex-Sal-Link)	Open	94.9	3.3	1.0	0.8	8.77	4.33
	Average	94.7AB	3.3AB	1.2	0.8	8.21A	4.20
Hubbard	Closed	96.3	1.6	0.8	1.2	7.51	4.04
(Golden Comet)	Open	95.4	2.5	1.1	1.0	7.31	3.99
	Average	95.9A	2.1B	1.0	1.1	7.41B	4.01
Hy-Line	Closed	94.8	3.0	1.4	0.8	8.16	4.24
(Brown)	Open	93.7	3.4	1.8	1.2	8.35	4.28
	Average	94.2B	3.2AB	1.6	1.0	8.25A	4.26
Average	Closed	94.5	3.3	1.2	0.9	7.67	4.07
	Open	94.3	3.5	1.2	1.0	8.01	4.14
	Average	94.4	3.4	1.2	1.0	7.84	4.10

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

TABLE 31. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 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	3	24.5	66.5	161.3	61.6	46.7	11.6
(Brown)	4	25.3	67.6	163.1	64.7	49.8	8.1
	6	25.3	66.5	167.3	62.2	47.2	10.0
Hisex	3	24.2	67.2	159.0	59.3	45.3	8.4
(Brown)	4	24.3	66.7	150.9	60.1	45.6	9.4
	6	24.3	66.1	154.3	59.7	44.8	9.5
DeKalb	3	24.7	64.3	170.1	63.3	46.6	6.1
(Sex-Sal-Link)	4	25.3	64.2	168.9	62.4	45.7	8.2
	6	25.2	64.7	165.3	62.4	45.9	6.9
Hubbard	3	25.7	67.6	152.9	60.3	46.3	10.6
(Golden Comet)	4	26.1	67.4	159.8	61.8	47.4	7.4
	6	25.9	67.5	147.1	62.0	47.3	11.8
Hy-Line	3	24.3	65.5	171.9	62.8	46.5	5.1
(Brown)	4	24.8	66.9	178.5	63.4	48.1	2.7
	6	24.7	65.9	171.4	63.9	47.7	4.9
Average	3	24.7	66.2	163.1	61.5	46.3	8.4
	4	25.1	66.6	164.2	62.5	47.3	7.2
	6	25.1	66.1	161.1	62.0	46.6	8.6

*There are no significant differences among these means.

TABLE 32. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock	3	0.2	0.1	2.6	24.8	72.2
(Brown)	4	0.5	0.1	1.2	20.5	77.8
	6	0.8	0.2	2.5	27.3	69.3
Hisex	3	0.1	0.5	3.0	20.5	75.8
(Brown)	4	0.2	0.7	3.9	21.9	73.3
	6	0.3	0.4	3.2	29.2	66.9
DeKalb	3	0.2	0.1	4.4	38.4	57.0
(Sex-Sal-Link)	4	0.3	0.2	6.8	35.5	57.2
	6	0.0	0.2	7.5	34.2	58.0
Hubbard	3	0.3	0.1	0.7	17.9	81.1
(Golden Comet)	4	0.7	0.3	1.1	15.5	82.5
	6	0.4	0.0	0.4	20.9	78.3
Hy-Line	3	0.2	0.4	4.3	31.3	63.8
(Brown)	4	0.3	0.0	2.6	23.7	73.5
	6	0.1	0.0	3.3	31.2	65.4
Average	3	0.2	0.2	3.0	26.6	70.0
	4	0.4	0.3	3.1	23.4	72.9
	6	0.3	0.2	3.4	28.6	67.6

There are no significant differences among these means.

TABLE 33. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock (Brown)	3	93.7	4.4	1.0	0.9	7.81	4.04
	4	93.0	4.6	1.2	1.2	7.95	3.98
	6	92.9	4.5	1.6	1.0	7.99	4.22
Hisex (Brown)	3	93.4	4.4	1.1	1.1	7.67	4.07
	4	94.3	3.9	0.7	1.1	7.14	3.85
	6	93.9	4.2	1.3	0.6	7.40	3.96
DeKalb (Sex-Sal-Link)	3	95.2	3.0	1.2	0.6	8.42	4.17
	4	94.7	3.3	1.1	0.9	8.20	4.24
	6	94.3	3.6	1.4	0.8	8.01	4.21
Hubbard (Golden Comet)	3	95.9	2.2	0.6	1.3	7.46	4.05
	4	95.4	2.3	1.0	1.3	7.73	4.18
	6	96.3	1.7	1.3	0.7	7.04	3.82
Hy-Line (Brown)	3	94.5	3.2	1.6	0.7	8.21	4.21
	4	95.0	2.7	1.2	1.1	8.42	4.41
	6	93.2	3.7	1.9	1.1	8.13	4.16
Average	3	94.6	3.4	1.1	0.9	7.91	4.11
	4	94.5	3.3	1.1	1.1	7.89	4.13
	6	94.1	3.5	1.5	0.8	7.71	4.07

*There are no significant differences among these means.

TABLE 34. EFFECTS OF GROWING ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 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	Closed	24.8	65.4	157.8	60.7	45.3	12.1AB
(Brown)	Open	25.2	68.3	170.1	64.9	50.5	7.7ABC
Hisex	Closed	23.7	65.5	158.4	59.1	43.8	6.3BC
(Brown)	Open	24.8	67.8	151.1	60.3	46.7	11.9AB
DeKalb	Closed	25.0	62.9	169.4	63.0	45.2	5.2C
(Sex-Sal-Link)	Open	25.2	65.9	166.8	62.4	47.0	8.9ABC
Hubbard	Closed	25.8	66.7	156.2	59.6	44.9	6.0BC
(Golden Comet)	Open	26.0	68.3	150.4	63.1	49.1	13.8A
Hy-Line	Closed	24.4	65.2	175.4	63.4	46.8	5.0C
(Brown)	Open	24.8	67.1	172.4	63.3	48.1	3.5C
Average	Closed	24.5	64.9	161.2	60.4	44.3	6.6
	Open	24.7	67.3	158.9	61.2	46.9	8.7

A,B,C - Differing letters denote significant differences ($P<.01$), comparisons made among growing house and strain combinations.

TABLE 35. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock	Closed	0.3	0.2	3.4	32.5	63.6
(Brown)	Open	0.6	0.1	0.9	15.9	82.6
Hisex	Closed	0.2	0.7	5.4	27.9	65.7
(Brown)	Open	0.2	0.4	1.3	19.8	78.3
DeKalb	Closed	0.2	0.3	8.4	44.1	47.1
(Sex-Sal-Link)	Open	0.1	0.0	4.1	28.0	67.8
Hubbard	Closed	0.5	0.1	1.0	23.3	75.1
(Golden Comet)	Open	0.5	0.1	0.5	12.8	86.1
Hy-Line	Closed	0.2	0.2	4.0	34.7	61.0
(Brown)	Open	0.2	0.1	2.8	22.7	74.2
Average	Closed	0.3	0.3	4.4	32.5	62.5
	Open	0.3	0.1	1.9	19.8	77.8

*There are no significant differences among these means.

TABLE 36. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (435-728 DAYS)*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	Closed	93.1	4.3	1.5	1.1	7.58	4.02
(Brown)	Open	93.3	4.7	1.1	0.9	8.25	4.14
Hisex	Closed	93.4	4.2	1.1	1.3	7.60	4.05
(Brown)	Open	94.3	4.2	0.9	0.6	7.21	3.87
DeKalb	Closed	94.7	3.5	1.1	0.6	8.26	4.23
(Sex-Sal-Link)	Open	94.8	3.0	1.3	0.9	8.17	4.18
Hubbard	Closed	95.5	2.0	1.3	1.2	7.49	4.19
(Golden Comet)	Open	96.2	2.2	0.7	0.9	7.33	3.84
Hy-Line	Closed	94.6	2.9	1.5	1.0	8.33	4.31
(Brown)	Open	93.9	3.5	1.6	1.0	8.18	4.21
Average	Closed	94.3	3.4	1.3	1.1	7.85	4.16
	Open	94.5	3.5	1.1	0.9	7.83	4.05

*There are no significant differences among these means.

TABLE 37. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES, 28TH NCLP&MT (140-728 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	Closed	24.5	60.7	427.4	75.7	49.3	13.1
(Nick Chick)	Open	24.8	61.8	413.4	76.0	50.4	18.4
	Average	24.6BC	61.2	420.4AB	75.8ABC	49.9ABC	15.7B
Hy-Line	Closed	23.3	60.7	425.0	72.7	47.8	8.3
(W-36)	Open	23.4	60.4	420.8	74.1	48.5	15.4
	Average	23.4D	60.6	422.9AB	73.4C	48.2CD	11.9BC
Shaver	Closed	24.2	60.1	403.9	73.1	47.3	14.8
(288A)	Open	24.6	61.0	405.0	73.5	48.6	15.0
	Average	24.4BC	60.6	404.4B	73.3C	48.0D	14.9BC
DeKalb	Closed	24.8	60.2	428.9	76.3	49.5	13.7
(XL-Link)	Open	25.3	61.3	422.9	76.7	50.8	14.0
	Average	25.0B	60.7	425.9AB	76.5AB	50.1AB	13.9BC
Hisex	Closed	25.4	62.3	440.2	80.0	53.1	16.8
(White)	Open	26.0	63.0	415.1	75.0	50.4	16.5
	Average	25.7A	62.7	427.7A	77.5A	51.7A	16.6B
ISA/Babcock	Closed	24.0	60.8	426.6	74.1	48.3	9.5
(B300)	Open	24.5	61.2	425.5	74.1	48.7	8.4
	Average	24.3C	61.0	426.1AB	74.1BC	48.5BCD	9.0C
Colonial	Closed	23.1	55.2	374.6	72.9	43.2	29.4
(365-S)	Open	24.0	55.5	359.1	74.5	44.3	31.5
	Average	23.6D	55.4	366.9C	73.7C	43.8E	30.4A
All	Closed	24.2	60.0	418.1	75.0	48.4	15.1
Strains	Open	24.7	60.6	408.8	74.8	48.8	17.0
	Average	24.4	60.3	413.5	74.9	48.6	16.1

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).

TABLE 38. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.3	3.8	17.8	43.9	34.1
	Open	0.5	2.9	13.7	39.5	43.4
	Average	0.4	3.4	15.8	41.7	38.8
Hy-Line (W-36)	Closed	0.5	3.9	17.7	42.7	35.2
	Open	0.4	4.4	18.5	43.6	33.2
	Average	0.4	4.1	18.1	43.1	34.2
Shaver (288A)	Closed	0.3	3.3	20.7	44.7	30.9
	Open	0.2	2.9	18.4	42.7	35.9
	Average	0.3	3.1	19.5	43.7	33.4
DeKalb (XL-Link)	Closed	0.4	3.7	20.3	45.0	30.6
	Open	0.2	3.3	15.8	41.7	39.0
	Average	0.3	3.5	18.0	43.3	34.8
Hisex (White)	Closed	0.2	2.3	12.9	39.1	45.5
	Open	0.2	2.3	11.9	34.3	51.3
	Average	0.2	2.3	12.4	36.7	48.4
ISA/Babcock (B300)	Closed	0.4	3.5	15.1	47.6	33.5
	Open	0.3	3.2	15.3	43.9	37.3
	Average	0.3	3.3	15.2	45.8	35.4
Colonial (365-S)	Closed	2.1	13.1	42.6	33.4	8.8
	Open	2.0	13.2	38.6	36.3	9.9
	Average	2.1	13.2	40.6	34.9	9.4
All Strains	Closed	0.6	4.8	21.0	42.3	31.2
	Open	0.5	4.6	18.9	40.3	35.7
	Average	0.6	4.7	19.9	41.3	33.5

*There are no significant differences among these means.

TABLE 39. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	Closed	94.7	3.2	1.3	0.8	19.66	9.30
	Open	94.8	3.0	1.5	0.7	19.33	9.04
	Average	94.7	3.1B	1.4BC	0.7C	19.49A	9.17
Hy-Line (W-36)	Closed	96.0	1.9	1.2	1.0	19.77	9.39
	Open	95.9	1.7	1.1	1.3	19.44	9.12
	Average	95.9	1.8C	1.1C	1.2AB	19.61A	9.25
Shaver (288A)	Closed	95.9	2.3	1.3	0.5	18.72	8.99
	Open	95.4	2.8	1.1	0.7	18.75	9.11
	Average	95.6	2.6BC	1.2C	0.6C	18.74A	9.05
DeKalb (XL-Link)	Closed	94.7	2.6	1.8	0.9	19.68	9.40
	Open	94.8	2.9	1.6	0.7	19.77	9.38
	Average	94.7	2.8BC	1.7BC	0.8BC	19.72A	9.39
Hisex (White)	Closed	94.3	3.0	1.9	0.7	20.48	9.39
	Open	93.7	3.1	1.9	1.3	19.06	9.57
	Average	94.0	3.1B	1.9B	1.0BC	19.77A	9.48
ISA/Babcock (B300)	Closed	95.0	2.7	1.4	0.9	19.73	9.41
	Open	94.7	3.2	1.2	0.9	19.70	9.43
	Average	94.8	3.0B	1.3C	0.9BC	19.71A	9.42
Colonial (365-S)	Closed	90.3	5.6	2.8	1.3	15.65	8.32
	Open	90.7	4.8	2.9	1.6	14.99	7.96
	Average	90.5	5.2A	2.9A	1.5A	15.32B	8.14
All Strains	Closed	94.4	3.0	1.7	0.9	19.10	9.17
	Open	94.3	3.1	1.6	1.0	18.72	9.09
	Average	94.3	3.1	1.6	1.0	18.91	9.13

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

TABLE 40. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 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	3	24.3	60.8	415.3	75.0	48.9	15.8
(Nick Chick)	4	24.8	61.7	433.7	77.5	51.3	13.9
	6	24.8	61.2	412.2	75.1	49.4	17.5
Hy-Line	3	23.0	60.2	426.8	73.8	48.1	9.4
(W-36)	4	23.6	60.8	421.6	72.6	47.8	12.7
	6	23.5	60.6	420.4	73.8	48.6	13.6
Shaver	3	24.3	60.5	398.1	73.8	48.2	17.3
(288A)	4	24.2	60.6	401.2	73.3	47.9	16.2
	6	24.8	60.7	414.0	73.0	47.8	11.1
DeKalb	3	24.8	60.6	424.4	76.4	50.0	13.2
(XL-Link)	4	25.2	60.8	424.7	77.8	50.8	17.5
	6	25.1	60.9	428.7	75.4	49.6	10.9
Hisex	3	25.2	62.7	419.4	75.7	50.7	17.5
(White)	4	25.4	62.1	439.2	78.7	51.9	14.8
	6	26.5	63.1	424.4	78.0	52.6	17.7
ISA/Babcock	3	24.5	61.6	430.0	74.1	49.0	7.4
(B300)	4	23.9	60.1	425.9	75.7	48.8	11.6
	6	24.4	61.2	422.3	72.5	47.7	7.9
Colonial	3	23.5	55.3	367.1	73.3	43.4	27.2
(365-S)	4	23.5	55.4	361.1	74.3	44.2	33.2
	6	23.6	55.3	372.5	73.6	43.6	30.8
Average	3	24.2	60.2	411.6	74.6	48.3	15.4
	4	24.4	60.2	415.3	75.7	49.0	17.1
	6	24.7	60.4	413.5	74.5	48.5	15.6

*There are no significant differences among these means.

TABLE 41. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	3	0.4	3.3	17.4	43.6	35.2
	4	0.3	3.2	14.6	39.9	42.1
	6	0.4	3.6	15.3	41.7	39.0
Hy-Line (W-36)	3	0.5	4.6	20.2	43.5	31.2
	4	0.5	4.0	17.0	41.0	37.5
	6	0.3	3.8	17.1	44.8	34.0
Shaver (288A)	3	0.4	3.1	21.1	40.9	34.5
	4	0.3	3.1	19.4	44.4	32.9
	6	0.1	3.0	18.1	45.9	32.8
DeKalb (XL-Link)	3	0.3	3.5	18.3	44.7	33.2
	4	0.3	3.4	18.8	42.4	35.2
	6	0.5	3.5	17.0	43.0	36.1
Hisex (White)	3	0.2	1.9	12.2	36.7	49.0
	4	0.2	2.7	13.3	40.3	43.4
	6	0.1	2.4	11.6	33.2	52.8
ISA/Babcock (B300)	3	0.2	3.0	14.8	41.2	40.7
	4	0.6	3.7	15.5	52.1	28.2
	6	0.2	3.3	15.2	44.0	37.3
Colonial (365-S)	3	2.1	13.8	39.1	35.5	9.5
	4	1.9	12.5	40.3	36.1	9.2
	6	2.2	13.2	42.2	32.9	9.4
Average	3	0.6	4.7	20.5	40.9	33.3
	4	0.6	4.7	19.8	42.3	32.6
	6	0.6	4.7	19.5	40.8	34.5

*There are no significant differences among these means.

TABLE 42. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	3	95.2	3.0	1.2	0.5	19.24	9.11
	4	94.3	3.3	1.4	0.9	20.11	9.31
	6	94.7	2.9	1.5	0.8	19.13	9.09
Hy-Line (W-36)	3	96.2	1.8	1.0	1.1	19.70	9.27
	4	95.5	2.0	1.3	1.2	19.47	9.31
	6	96.1	1.6	1.1	1.2	19.65	9.17
Shaver (288A)	3	95.5	2.5	1.2	0.8	18.32	8.82
	4	95.8	2.5	1.2	0.6	18.64	8.94
	6	95.6	2.7	1.1	0.5	19.25	9.39
DeKalb (XL-Link)	3	94.3	3.1	1.7	0.8	19.54	9.27
	4	94.8	2.8	1.5	0.8	19.63	9.26
	6	95.0	2.4	1.8	0.7	20.00	9.63
Hisex (White)	3	94.1	2.8	2.1	1.1	19.36	9.33
	4	93.8	3.3	1.8	1.1	20.14	9.50
	6	94.2	3.2	1.8	0.8	19.81	9.59
ISA/Babcock (B300)	3	94.6	2.9	1.5	1.0	19.85	9.56
	4	95.1	3.1	1.0	0.7	19.62	9.16
	6	94.9	2.8	1.3	1.0	19.66	9.53
Colonial (365-S)	3	89.9	5.8	3.2	1.1	15.25	8.14
	4	91.3	4.6	2.8	1.2	15.32	8.00
	6	90.2	5.1	2.7	2.1	15.39	8.28
Average	3	94.3	3.1	1.7	0.9	18.75	9.07
	4	94.4	3.1	1.6	0.9	18.99	9.07
	6	94.4	3.0	1.6	1.0	18.99	9.24

*There are no significant differences among these means.

TABLE 43. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 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	24.4	60.3	421.7	76.2	49.0	16.7
	Open	24.8	62.2	419.1	75.5	50.8	14.7
Hy-Line (W-36)	Closed	22.8	58.8	428.1	74.1	47.0	12.2
	Open	24.0	62.3	417.7	72.8	49.3	11.6
Shaver (288A)	Closed	24.0	58.9	403.3	73.8	46.6	16.5
	Open	24.8	62.3	405.6	72.9	49.4	13.4
DeKalb (XL-Link)	Closed	24.7	59.4	423.6	77.6	49.4	18.0
	Open	25.4	62.1	428.2	75.5	50.8	9.8
Hisex (White)	Closed	25.3	61.5	429.2	76.3	49.6	16.7
	Open	26.1	63.8	426.1	78.7	53.9	16.6
ISA/Babcock (B300)	Closed	24.2	60.1	420.7	73.2	47.0	9.4
	Open	24.4	61.9	431.4	75.0	50.1	8.5
Colonial (365-S)	Closed	23.1	54.0	369.9	73.2	42.1	30.7
	Open	24.0	56.7	363.8	74.2	45.4	30.1
Average	Closed	23.9	58.7	415.7	74.8	46.9	16.6
	Open	24.5	61.4	420.5	75.2	49.9	13.6

*There are no significant differences among these means.

TABLE 44. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
H & N (Nick Chick)	Closed	0.3	4.2	20.0	43.7	31.9
	Open	0.5	2.6	11.6	39.7	45.7
Hy-Line (W-36)	Closed	0.6	5.8	24.8	46.2	22.6
	Open	0.3	2.4	11.4	40.1	45.8
Shaver (288A)	Closed	0.3	4.3	26.6	47.1	21.6
	Open	0.2	1.9	12.5	40.3	45.2
DeKalb (XL-Link)	Closed	0.4	4.6	24.0	45.2	25.8
	Open	0.3	2.3	12.1	41.5	43.8
Hisex (White)	Closed	0.2	3.0	15.6	40.3	40.9
	Open	0.2	1.7	9.1	33.2	55.8
ISA/Babcock (B300)	Closed	0.4	4.1	18.5	48.3	28.8
	Open	0.3	2.6	11.9	43.3	42.0
Colonial (365-S)	Closed	2.6	17.1	45.0	29.6	5.7
	Open	1.5	9.2	36.2	40.1	13.0
Average	Closed	0.7	6.2	24.9	42.9	25.3
	Open	0.5	3.2	15.0	39.7	41.6

*There are no significant differences among these means.

TABLE 45. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF WHITE EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
H & N (Nick Chick)	Closed	94.2BC	3.3	1.6	0.9	19.26	9.08
	Open	95.2AB	3.0	1.2	0.6	19.73	9.26
Hy-Line (W-36)	Closed	96.0A	1.8	1.1	1.1	19.33	9.21
	Open	95.9AB	1.8	1.1	1.2	19.88	9.30
Shaver (288A)	Closed	95.6AB	2.9	0.9	0.6	18.14	8.88
	Open	95.7AB	2.3	1.4	0.6	19.33	9.22
DeKalb (XL-Link)	Closed	94.8ABC	2.6	1.7	0.9	19.21	9.12
	Open	94.6ABC	3.0	1.7	0.7	20.24	9.65
Hisex (White)	Closed	93.5CD	3.3	2.0	1.2	19.46	9.51
	Open	94.6ABC	2.8	1.8	0.8	20.08	9.44
ISA/Babcock (B300)	Closed	94.8ABC	3.0	1.2	1.0	19.12	9.35
	Open	94.9ABC	2.9	1.4	0.8	20.30	9.48
Colonial (365-S)	Closed	88.9E	6.2	3.1	1.8	14.86	8.08
	Open	92.0D	4.2	2.7	1.2	15.77	8.20
Average	Closed	94.0	3.3	1.7	1.1	18.48	9.03
	Open	94.7	2.8	1.6	0.9	19.33	9.22

A,B,C,D,E - Differing letters denote significant differences (P<.01), comparisons made among growing house strain combinations.

TABLE 46. EFFECTS OF LAYING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES, 28TH NCLP&MT (140-728 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	Closed	26.0WXYZ	64.4	410.5	72.1	49.8	13.5
(Brown)	Open	26.4WXYZ	65.2	410.5	73.1	51.3	14.9
	Average	26.2	64.8A	410.5AB	72.6AB	50.6	14.2AB
Hisex	Closed	25.4Z	64.6	381.9	68.9	47.8	16.4
(Brown)	Open	25.6YZ	64.8	402.4	70.5	49.1	13.3
	Average	25.5	64.7A	392.2BC	69.7C	48.4	14.9AB
DeKalb	Closed	25.7XYZ	62.0	398.1	70.0	47.2	14.5
(Sex-Sal-Link)	Open	26.9VW	63.2	424.6	73.9	50.8	8.7
	Average	26.3	62.6C	411.3AB	71.9ABC	49.0	11.6BC
Hubbard	Closed	26.6VWXY	64.7	391.4	70.3	48.7	14.0
(Golden Comet)	Open	27.6V	65.0	386.1	71.3	49.7	22.0
	Average	27.1	64.9A	388.7C	70.8BC	49.2	18.0A
Hy-Line	Closed	26.2WXYZ	63.7	421.5	73.1	50.1	7.9
(Brown)	Open	26.7VWX	63.8	432.1	74.3	50.8	7.4
	Average	26.5	63.8B	426.8A	73.7A	50.4	7.7C
All	Closed	26.2	63.9	400.7	70.9	48.7	13.3
Strains	Open	26.4	64.4	411.1	72.6	50.3	13.3
	Average	26.3	64.1	405.9	71.7	49.5	13.3

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

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

TABLE 47. EFFECTS OF LAYING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Laying House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock	Closed	0.3	0.9	8.8	32.7	57.3
(Brown)	Open	0.3	0.6	8.0	29.1	62.0
	Average	0.3	0.7C	8.4BC	30.9B	59.7A
Hisex	Closed	0.2	1.1	9.8	29.2	59.7
(Brown)	Open	0.3	0.9	8.4	30.4	59.9
	Average	0.3	1.0BC	9.1BC	29.8B	59.8A
DeKalb	Closed	0.2	2.1	15.3	40.3	42.1
(Sex-Sal-Link)	Open	0.2	1.9	11.1	36.8	50.1
	Average	0.2	2.0A	13.2A	38.6A	46.1B
Hubbard	Closed	0.4	1.5	7.6	28.1	62.4
(Golden Comet)	Open	0.3	1.0	8.3	26.4	64.1
	Average	0.3	1.3B	7.9C	27.2B	63.2A
Hy-Line	Closed	0.1	1.0	10.3	36.6	52.0
(Brown)	Open	0.1	0.8	10.4	36.1	52.6
	Average	0.1	0.9BC	10.3B	36.3A	52.3B
All	Closed	0.2	1.3	10.4	33.4	54.7
Strains	Open	0.2	1.0	9.2	31.8	57.8
	Average	0.2	1.2	9.8	32.6	56.2

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

TABLE 48. EFFECTS OF LAYING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Laying House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock (Brown)	Closed	94.1	3.4	1.4	1.1	19.38	9.84
	Open	95.2	3.1	0.7	1.0	19.58	9.85
	Average	94.6B	3.3A	1.1	1.0	19.48AB	9.85BC
Hisex (Brown)	Closed	94.8	2.8	1.4	1.0	18.05	9.43
	Open	94.8	3.0	1.1	1.1	18.97	9.76
	Average	94.8B	2.9AB	1.2	1.0	18.51BC	9.60C
DeKalb (Sex-Sal-Link)	Closed	95.1	2.4	1.5	0.9	18.81	9.79
	Open	95.7	2.3	1.2	0.8	20.52	10.27
	Average	95.4AB	2.4B	1.4	0.9	19.67A	10.03AB
Hubbard (Golden Comet)	Closed	96.9	1.2	0.9	1.0	18.53	9.75
	Open	95.8	1.6	1.1	1.5	18.13	9.78
	Average	96.4A	1.4C	1.0	1.3	18.33C	9.77BC
Hy-Line (Brown)	Closed	95.4	2.1	1.5	1.0	19.83	10.18
	Open	95.3	2.2	1.5	1.0	20.36	10.40
	Average	95.4AB	2.2BC	1.5	1.0	20.09A	10.29A
All Strains	Closed	95.3	2.4	1.3	1.0	18.92	9.80
	Open	95.4	2.4	1.1	1.1	19.51	10.01
	Average	95.3	2.4	1.2	1.0	19.22	9.91

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

TABLE 49. EFFECTS OF POPULATION SIZE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 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	3	25.5	64.2	408.6	72.0	49.7	14.8
(Brown)	4	26.5	65.5	405.2	73.1	51.5	14.3
	6	26.6	64.7	417.7	72.6	50.5	13.4
Hisex	3	25.5	65.2	397.4	69.2	48.5	11.6
(Brown)	4	25.5	64.7	388.5	70.3	48.9	17.3
	6	25.6	64.2	390.6	69.5	47.9	15.8
DeKalb	3	26.0	62.5	413.0	72.1	49.1	11.4
(Sex-Sal-Link)	4	26.5	62.5	415.4	71.9	48.9	10.7
	6	26.6	62.8	405.6	71.8	49.0	12.7
Hubbard	3	27.0	64.9	382.7	69.5	48.3	17.3
(Golden Comet)	4	27.0	64.9	397.2	71.2	49.4	14.3
	6	27.3	64.8	386.3	71.8	49.9	22.4
Hy-Line	3	26.7	63.4	424.7	73.5	50.0	8.8
(Brown)	4	26.4	64.3	434.0	73.7	51.0	4.2
	6	26.3	63.6	421.8	73.9	50.3	9.9
Average	3	26.1	64.0	405.3	71.3	49.1	12.8
	4	26.4	64.4	408.1	72.0	49.9	12.2
	6	26.5	64.0	404.4	71.9	49.5	14.9

*There are no significant differences among these means.

TABLE 50. EFFECTS OF POPULATION SIZE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock (Brown)	3	0.2	0.8	9.4	32.8	56.8
	4	0.3	0.5	6.9	28.2	64.2
	6	0.4	1.0	8.9	31.8	57.9
Hisex (Brown)	3	0.4	0.9	8.1	27.0	63.7
	4	0.2	1.1	9.5	28.8	60.5
	6	0.2	1.0	9.8	33.6	55.3
DeKalb (Sex-Sal-Link)	3	0.2	2.0	12.3	40.3	45.2
	4	0.2	2.4	13.6	37.8	46.0
	6	0.2	1.5	13.7	37.6	47.0
Hubbard (Golden Comet)	3	0.3	1.2	7.9	26.4	64.2
	4	0.4	1.4	8.1	25.3	64.8
	6	0.4	1.2	7.8	30.0	60.6
Hy-Line (Brown)	3	0.2	1.2	11.7	37.0	50.0
	4	0.1	0.7	9.2	33.8	56.2
	6	0.1	0.8	10.1	38.2	50.7
Average	3	0.2	1.2	9.9	32.7	56.0
	4	0.2	1.2	9.5	30.8	58.3
	6	0.3	1.1	10.1	34.2	54.3

*There are no significant differences among these means.

TABLE 51. EFFECTS OF POPULATION SIZE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Population (Birds/Cage)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock	3	95.1	2.9	1.0	1.1	19.36	9.74
(Brown)	4	94.7	3.4	0.9	1.0	19.41	9.70
	6	94.1	3.6	1.3	1.0	19.68	10.11
Hisex	3	94.2	2.9	1.6	1.4	18.80	9.74
(Brown)	4	95.4	2.7	0.9	1.1	18.29	9.46
	6	94.9	3.1	1.3	0.7	18.44	9.59
DeKalb	3	95.9	2.0	1.3	0.8	19.87	9.91
(Sex-Sal-Link)	4	95.4	2.4	1.3	0.9	19.77	10.16
	6	94.9	2.7	1.5	0.9	19.36	10.01
Hubbard	3	96.2	1.6	0.7	1.5	18.05	9.71
(Golden Comet)	4	96.4	1.4	0.9	1.3	18.77	9.91
	6	96.4	1.2	1.3	1.0	18.16	9.68
Hy-Line	3	95.4	2.1	1.5	1.0	20.00	10.41
(Brown)	4	95.7	2.0	1.3	1.1	20.40	10.44
	6	95.1	2.5	1.6	0.9	19.88	10.02
Average	3	95.4	2.3	1.2	1.1	19.22	9.90
	4	95.5	2.4	1.1	1.1	19.33	9.93
	6	95.1	2.6	1.4	0.9	19.10	9.88

*There are no significant differences among these means.

TABLE 52. EFFECTS OF GROWING HOUSE ON PERFORMANCE OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 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	Closed	26.3	63.3	410.0	72.5	49.0	15.8
(Brown)	Open	26.1	66.3	411.0	72.7	52.1	12.5
Hisex	Closed	25.1	63.4	401.4	70.4	47.7	11.2
(Brown)	Open	26.0	66.0	382.9	69.0	49.2	18.6
DeKalb	Closed	26.2	61.0	419.8	73.3	48.4	10.6
(Sex-Sal-Link)	Open	26.5	64.1	402.9	70.5	49.6	12.6
Hubbard	Closed	26.9	64.0	394.9	70.0	47.6	13.3
(Golden Comet)	Open	27.3	65.8	382.6	71.7	50.7	22.7
Hy-Line	Closed	26.2	62.7	434.3	74.4	49.9	8.0
(Brown)	Open	26.8	64.8	419.4	73.0	51.0	7.3
Average	Closed	25.9	62.5	407.4	71.5	47.9	12.3
	Open	26.0	65.2	394.0	70.2	49.5	14.2

*There are no significant differences among these means.

TABLE 53. EFFECTS OF GROWING HOUSE ON EGG SIZE DISTRIBUTION OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Growing House	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
ISA/Babcock (Brown)	Closed	0.3	1.0	11.2	37.4	50.1
	Open	0.3	0.5	5.5	24.4	69.2
Hisex (Brown)	Closed	0.3	1.3	12.2	33.5	52.6
	Open	0.2	0.6	6.0	26.1	67.1
DeKalb (Sex-Sal-Link)	Closed	0.2	2.6	17.6	44.3	35.3
	Open	0.2	1.4	8.8	32.8	56.8
Hubbard (Golden Comet)	Closed	0.3	1.9	9.6	31.2	56.9
	Open	0.4	0.6	6.2	23.3	69.5
Hy-Line (Brown)	Closed	0.1	1.4	13.0	40.5	45.1
	Open	0.2	0.4	7.7	32.2	59.5
Average	Closed	0.2	1.6	12.7	37.4	48.0
	Open	0.3	0.7	6.9	27.8	64.4

*There are no significant differences among these means.

TABLE 54. EFFECTS OF GROWING HOUSE ON EGG QUALITY AND INCOME OF BROWN EGG ENTRIES IN ALL HOUSING, 28TH NCLP&MT (140-728 DAYS)*

Breeder (Strain)	Growing House	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/Hen)	Feed Cost ($/Hen)
ISA/Babcock (Brown)	Closed	94.3	3.2	1.3	1.2	19.14	9.87
	Open	94.9	3.3	0.9	0.9	19.82	9.83
Hisex (Brown)	Closed	94.5	2.9	1.4	1.2	18.77	9.67
	Open	95.1	2.9	1.0	0.9	18.25	9.52
DeKalb (Sex-Sal-Link)	Closed	95.5	2.4	1.4	0.8	19.77	10.06
	Open	95.4	2.3	1.4	0.9	19.56	10.00
Hubbard (Golden Comet)	Closed	95.9	1.4	1.1	1.5	18.34	9.99
	Open	96.8	1.4	0.8	1.0	18.31	9.54
Hy-Line (Brown)	Closed	95.4	2.0	1.6	1.0	20.25	10.35
	Open	95.3	2.3	1.4	0.9	19.53	10.23
Average	Closed	95.1	2.4	1.4	1.1	19.25	9.99
	Open	95.5	2.5	1.1	0.9	19.17	9.83

*There are no significant differences among these means.

STOCK SUPPLIERS AND CATEGORIES

Breeder	Stock	Category*	Source
Hisex Division Pilch, Inc. Box 438 Troutman, NC 28166	Hisex White	I-A	Wonder Chick 500 South Oak St. 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 Av. 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., Rt. 2 Box 21 Paul, ID 83347
DeKalb AgResearch, Inc. 3100 Sycamore Rd. DeKalb, IL 60115	DeKalb XL-Link	I-A	Clay's Hatchery Route 1 Blackstone, VA 23824
H & N International 3825 154th Ave., NE Redmond, WA 98052	H & N "Nick Chick"	I-A	H & N Internationa 3825 154th Ave, NE Redmond, WA 98052
Hubbard Farms Walpole, NH 03608	Hubbard Golden Comet	I-A	Bowers Brothers Hatchery P.O. Box 100 Albemarle,N C 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,S C 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 St. 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.