

FINAL REPORT

FIFTH NORTH CAROLINA RANDOM SAMPLE EGG LAYING TEST

The North Carolina Random Sample Poultry Tests are conducted under the auspices of the North Carolina Department of Agriculture and the School of Agriculture at North Carolina State. Mr. S. J. Childs, Jr., is Resident Manager of the tests at the Piedmont Research Station, Route 6, Salisbury, North Carolina, and Dr. G. A. Martin, Department of Poultry Science, N. C. State, Raleigh, N. C., is Project Leader.

This is the summary report of the 1963-64 laying test and covers performance from February 9, 1963 through June 21, 1964, when the flock reached 500 days of age. Copies of the report may be obtained from Mr. S. J. Childs, Jr., address above.

Chicks for each entry were hatched at the test site from a case of eggs selected by random procedure as a nest sample from a randomly selected supply flock or from at least 10 cases of eggs at the participating hatchery. Chicks were sexed and 120 pullets were wingbanded for growing in replicated pens of 60 pullets. All mash feeds are mixed by the test personnel. The starting ration was 20% protein with 870 cal. productive energy per pound and was fed during the first 56 days. The growing ration, with 16% protein and 860 calories, is fed from the 57th through 150th days and the laying ration with 16% protein and 840 calories, was fed from the 151st through 500th days. During hot weather, the laying mash formula was altered to provide an 820-calorie ration.

The disease control program during the growing period was intra-ocular Newcastle-bronchitis vaccination at 1-day-old, coccidiosis vaccination at 5 days old with subsequent feeding of a coccidiostat. Newcastle booster at 29 days old, fowl pox in the wing web at 9 weeks old, and Newcastle-bronchitis dust at 16 weeks old. All birds were debeaked to control cannibalism. Birds were confined to the houses throughout the test and general management was in accord with good commercial practices in North Carolina.

Information Concerning Data Reported

Computing services for this project are provided under the terms of the National Institutes of Health grant no. FR-00011.

TABLE I

Entry No. is assigned at random to the particular entry.

Breeder is the name used to distinguish entries. Complete stock identification, breeder's address, and address of the sample source are given elsewhere in the report.

Net Pullets or Hens is the number of pullets at one week, at housing, and at 500 days with sexing errors, first week mortality, and accidental deaths excluded.

% Mortality is the percentage of the net pullets that died during the specified periods. A veterinarian was retained to perform autopsies upon all birds (except as noted) that died after the first week. The cause of death was noted and these findings are summarized in TABLE III by categories.

Feed Consumed was calculated in such a manner as to make it independent of mortality and to reflect feed consumption per bird for a 150-day growing period and a 350-day laying period.

% Loss (downgrades) is the percentage by which total egg value was reduced below Grade A egg value due to downgrades from candling. We express our appreciation to Mr. Carl Tower of the N. C. Department of Agriculture and his co-workers for providing candling service on one day of production each month. Market value of all eggs is calculated on the basis of the candling reports.

Chick Price is the 3-year average price per sexed pullet in lots of 1,000 as calculated from price lists.

Feed Cost 1-150 days and 151-500 days was calculated by charging the feed per pullet housed each month at the 3-year average of monthly feed prices reported by the North Carolina Department of Agriculture. Prices are tabulated elsewhere in this report.

Cost of Feed and Chicks charges the net pullets at one week against the survivors at 150 days at the reported chick price. This figure was added to the two feed cost figures for the total.

Value of Eggs was calculated by crediting the weekly egg production at the 3-year weekly average Grade A price for that week and size class as reported by the Federal-State Market News Service at Raleigh. At the close of each quarter, this value was discounted by the percentage reduction below Grade A value due to downgrades (except dirties) from candling of three days of production during the quarter.

Value of Meat was calculated by applying the 3-year average price of that class of fowl during the last week of June to the total weight of marketable survivors for the pen and dividing by the number of pullets housed. Average prices were \$.1079 for entries that averaged between 6 and 7 lbs., \$.0990 for entries between 5 and 6 lbs., and \$.0675 for entries between 4 and 5 lbs.

I. O. F. C. C. is Income over Feed and Chick Cost per pullet housed. This does not represent profit since costs of brooding, vaccines, medicants, oyster shells, grit, depreciation on equipment, insurance, interest on investment, labor, etc. are not deducted from income. Three-year average prices by months are tabulated later. This figure is applicable only to the cost, price, and environment combination of this test.

Duncan Range Test of I. O. F. C. C. This may have little meaning to those who have not used statistical procedures. Basically this test indicates that differences greater than those spanned by any one of the vertical lines would not be expected to occur more than five times out of 100 tests if all birds had the same ability to produce. Few of us can insure 19 to 1 odds in our favor on the daily business transactions in which we are involved. It is, therefore, better to observe the performance of a stock in more than one test or in the same test for more than a single year to ascertain its value relative to other stocks.

TABLE II

Days to 50% Production was the age of the pullets on the first day of the earliest two consecutive days on which production reached or exceeded 50%.

Egg Size Distribution (%) was obtained by crediting the weekly total egg production to size classes proportional to those observed on the total production of one day. The sums of these weekly totals were converted to percentages at the end of the test. See discussion of size classes on page 5.

Average Egg Weight in ounces per dozen were obtained by mass-weighing of one day's eggs each week. The average weight for this day was multiplied by the weekly production and the weekly products were accumulated for the test. The total weight of eggs was divided by the number of eggs laid to determine average weight.

Average Body Wt. was the average of individual weights of all birds in the pens on 150th and 500th days.

Hen-Day Production Percentages represent the daily average number of eggs produced per 100 hens of the entry during the specified period.

Eggs per Pullet Housed is the total number of eggs produced divided by the number of pullets housed. The Duncan test is explained at the end of TABLE I.

TABLE III

Cause of Mortality as determined by autopsy is reported as percentages of net pullets at one week for the growing period and of net pullets housed for the laying period.

Hen-Days Lost to Mortality per Bird represents the average number of days by which the entry failed to provide 350 hen-days per pullet housed. This figure has a slightly higher correlation with eggs per pullet and a slightly lower correlation with IOFCC than percent mortality has.

Pounds of Feed Per-Dozen Eggs and Pound of Eggs were calculated by dividing the total feed consumed in the last 350 days by the total dozens and pounds of eggs laid. Feed per 24 ounces of eggs is 1.5 times feed per pound of eggs. The Duncan test is explained at the end of TABLE I.

TABLE IV

Colored Inclusions (Breakout): Blood Spots and Meat Spots were observed by breaking one day's production from each pen at about 30-day intervals throughout the year. Spots exceeding 1/8 inch were classified as large and those of lesser size as small. Breakout data was not used for egg value calculations.

Candled Grade %. Official graders, who check egg quality for the enforcement of the North Carolina egg law, candled the production of one day each month. The percentages reported are a summary of their findings.

Albumen Quality in Haugh Units was measured on an equal number of eggs from each pen and approximately one day's production per quarter. Since this factor undergoes seasonal change, the quarterly averages and the annual average are given.

Shell Score (specific gravity) was secured by using salt solutions to determine the specific gravity of eggs. The eggs with specific gravity below 1.068 were given a value of 0, those between 1.068 and 1.072 a value of 1, etc., with those exceeding a specific gravity of 1.100 receiving a value of 9. One day's production from each pen was classified in September, December, March, and June. Since this factor undergoes seasonal changes, the quarterly averages and the annual average are given.

Two Year Summary - TABLE V

Selected items have been averaged over the two years of testing. The entries are arranged in descending order of eggs per pullet housed. These are averages of the stocks as entered and in some cases are not the same breeding combination; e.g. Demler Farms entered their KROSS in the fourth test and their Regal in the fifth test. Nevertheless, these averages should be better indicators of future performance in this test than a single-year summary would be. For an excellent presentation of average performance in all tests, the reader is referred to the USDA Agricultural Research Service publications 44-79-4, December, 1963, which presents a 2-year average regressed mean for each stock.

FEED PRICE-EGG VALUE TABLE

Three-year average monthly feed prices and three-year average egg prices for weeks beginning in the indicated months of this report are listed below.

	Three-Year Average Feed Prices (\$ per ton)			Three-Year Average Egg Price (¢ per doz)			
	Starter	Grower	Layer	A Large	A Medium	A Small	A Pee Wee
July		85.60	93.33	34.8	27.0	18.4	13.2
Aug.			94.00	39.4	27.8	18.0	13.1
Sept.			93.67	43.4	32.3	19.5	14.2
Oct.			93.33	39.2	28.7	21.6	14.3
Nov.			92.67	41.2	29.4	23.5	15.6
Dec.			92.67	38.7	31.2	25.6	17.0
Jan.			93.67	38.0	34.7	30.4	18.0
Feb.	90.87		93.67	35.4	32.4	29.8	18.5
Mar.	89.93		94.00	33.2	29.0	23.9	18.7
Apr.		85.27	93.33	29.9	25.2	20.5	16.7
May		84.93	93.00	27.2	21.4	17.3	14.1
June		85.93	93.33	28.5	21.2	16.2	13.3

COMPARATIVE DATA between TESTS

Now that the North Carolina Random Sample Egg Laying Test has completed five cycles, it may be of interest to note some trends in average performance. No major changes in management and no changes in feed formulae have been made during these tests.

AVERAGE PERFORMANCE

Test No.	1	2	3	4	5
IOFCC	\$1.54	\$1.73	\$1.88	\$1.93	\$0.98
Eggs/pullet housed	220	228	233	243	222
Prod. rate after 50%	71.2%	72.1%	73.7%	73.6%	73.3%
Egg weight (oz/doz)	25.3	25.7	25.6	25.1	25.0
lbs. of feed/doz eggs	4.47	4.47	4.59	4.65	4.53
lbs. of feed/lb eggs	2.83	2.78	2.84	2.96	2.89
% laying mortality-Total	12.6%	10.7%	12.4%	5.0%	18.0%
- Due to leukosis	2.7%	5.9%	7.1%	1.4%	12.8%

LEUKOSIS PROBLEM

The great increase of mortality in the fifth test was due primarily to a 9-fold increase in the percentage of birds dying from leukosis. Heavy losses from leukosis began in the second replicate when the birds were 12 weeks old. This replicate experienced $17\frac{1}{2}$ times as much leukosis mortality as was found in the first replicate during the growing period. The higher mortality from leukosis continued throughout the laying period in the second replicate. At the end of the test, leukosis mortality was 18.1% in replicate two and 7.6% in replicate one. No explanation of the difference in losses from leukosis in the two replicates is apparent. No report has been received at this time from samples of blood which were sent to the Regional Laboratory at East Lansing, Michigan, for thorough testing.

SIZE CLASSES OF EGGS

This test classifies all eggs which weigh 23 oz. per doz. or more but less than 26 oz. per doz. as large. Other size classes are scaled up or down in blocks of 3 oz. per doz. from large. Thus the size classes are those recommended for individual shell eggs by the USDA. In some tests the size classes are set one ounce per dozen higher than this scale. A study of the effect of this difference in scale settings gave the percentages listed below for eggs in each size class. Percentages for the higher scale settings are enclosed in ().

Weekly Av. Egg Weight	Extra large & over	Large	Medium	Small	Pee Wee
19	0(0)	2(0)	28(15)	55(55)	15(30)
20	0(0)	6(2)	44(28)	44(56)	6(14)
21	0(0)	15(6)	55(44)	28(44)	2(6)
22	2(0)	28(15)	55(55)	15(28)	0(2)
23	6(2)	44(28)	44(55)	6(15)	0(0)
24	15(6)	55(44)	28(44)	2(6)	0(0)
25	30(15)	55(55)	15(28)	0(2)	0(0)
26	50(30)	44(55)	6(15)	0(0)	0(0)
27	70(50)	28(44)	2(6)	0(0)	0(0)

Although this table is based upon normal distribution and the variation found in this test, it should give reasonably accurate results for converting test data to your market situation.

G. A. Martin, Project Leader

LIST OF ENTRANTS IN FIFTH N. C. RANDOM SAMPLE LAYING TEST

<u>BREEDER AND ADDRESS</u>	<u>STOCK DESIGNATION</u>	<u>SOURCE OF SAMPLE</u>
Arbor Acres Farm, Inc. Glastonbury, Conn.	WL StrX Queens	Arbor Acres Farm, Inc. Concord, N. C.
Babcock Poultry Farms Ithaca, N. Y.	WL 3wX B-300	Harrold's Hatchery Winterville, Ga.
Beamsdale Farm Lawndale, N. C.	WL StrX 66	Beamsdale Hatchery Lawndale, N. C.
Cameron Leghorn Research Farm Beaver Springs, Pa.	WL StrX 924	Cameron Leghorn Research Farm, Beaver Springs, Pa.
Cashman Leghorn Farm Webster, Ky.	WL 3wX Hi-Cash	Cashman Leghorn Farm Webster, Ky.
Joe K. Davis Hatchery Earl, N. C.	X B RIR X BPR Davis Combiner Sex-Link	Joe K. Davis Hatchery Earl, N. C.
DeKalb Agricultural Assoc. Sycamore, Ill.	INX 151	Lancaster's Hatchery Windsor, N. C.
Demler Farms, Inc. Anaheim, Calif.	IB Regals	Raleigh Hatchery Raleigh, N. C.
Eby's Poultry Farm Carrollton, Texas	IBX 681 Hybrids	Eby's Poultry Farm Carrollton, Texas
Earl W. Garrison, Inc. Bridgeton, N. J.	WL StrX Garrison- Stever X300	Joe Stever Farm Huntingdon, Pa.
Ghostley's Poultry Farm Anoka, Minn.	WL 3wX Pearls	All Star Assoc. Farms Albemarle, N. C.
Harco Orchards & Poultry Farms, Inc., South Easton, Mass.	RIR PS Group I	Harco Orchards & Poultry Farms, Inc., S. Eaton, Mass.
Heisdorf & Nelson Farms, Inc. Kirkland, Wash.	WL StrX "Nick Chick"	J. C. Castleberry Hatchery Apex, N. C.
Honegger Farms Co., Inc. Forrest, Ill.	WL StrX H-62 Layers	FCX Hatchery Wallace, N. C.
Hubbard Farms, Inc. Walpole, N. H.	XB Comet	Hubbard Farms Statesville, N. C.
Hy-Line Poultry Farms Des Moines, Iowa	INX 934-H	Tar Heel Chicks Hatchery Monroe, N. C.
Ideal Poultry Breeding Farm Cameron, Texas	WL StrX H3W-2	Ideal Poultry Breeding Farm, Cameron, Texas
Kimber Farms, Inc. Fremont, Calif.	WL 3wX K-137	Hubbard Farms, Inc. Statesville, N. C.
Pa. Farm Bureau Harrisburg, Pa.	WL StrX L.S.C. 55	Pa. Farm Bureau Hatchery Grantville, Pa.
Shaver Poultry Breeding Farms Ltd., Galt, Ontario, CANADA	WL 3wX Starcross 288	Grieder Leghorn Farms, Inc. Mount Joy, Pa.

TABLE I, Test 5-4: a. Numbers, Mortality, Feed, & Loss; b. Cost and Income per Pullet

a. Entry No.	Breeder	Net Pullets or Hens			% Mortality		Feed Consumed		% Loss (down- grades)
		at 1 week	Housed	Sold	8-150 days	151-500 days	1-150 days	151-500 days	
20	Pa. Farm Bu.	114	95	85	13.2	8.6	20.4	89.8	0.9
18	Hy-Line	120	100	88	5.8	12.0	20.9	91.5	1.2
16	Harco	116	94	87	14.0	7.8	24.9	99.5	2.8
7	Gar.-Stever	117	100	89	7.0	10.0	20.0	88.0	1.8
14	Hubbard	118	98	77	9.3	18.4	23.9	96.8	2.4
11	Shaver	116	86	71	20.1	17.3	21.4	99.1	1.7
3	Cashman	119	97	78	13.4	19.6	22.3	98.2	2.8
10	Davis	120	95	79	13.3	17.2	25.4	103.9	2.2
17	Honegger	119	97	83	12.5	14.5	21.0	94.3	2.0
15	Kimber	120	91	81	15.8	11.8	21.0	93.2	1.9
5	Eby	120	100	84	9.2	16.0	20.8	89.2	2.2
1	De Kalb	120	100	83	7.5	15.0	20.8	91.1	1.9
2	Babcock	118	82	70	23.3	17.6	20.7	94.5	3.0
4	Cameron	114	93	74	13.8	21.4	21.7	98.2	1.2
12	Ideal	117	95	67	12.1	29.4	20.3	92.1	1.5
8	Arbor Acres	114	100	70	5.3	30.0	20.3	94.6	2.0
13	Ghostley	113	93	70	13.4	22.8	20.8	94.2	1.3
6	Demler	115	93	71	15.6	22.1	20.4	84.7	1.8
19	Heisdorf & N.	119	91	71	16.1	19.8	20.3	92.4	2.4
9	Beamsdale	109	92	66	12.7	28.5	20.7	88.9	1.8
Average		117	95	77	12.6	18.0	21.4	93.7	1.9

b. Entry No.	Chick Price	Feed Cost		Cost of Feed & Chicks	Value of Eggs	Value of Meat	IOFCC	Duncan test of IOFCC
		1-150 days	151-500 days					
20	.385	.991	3.940	5.379	6.759	.283	1.663	
18	.557	.946	4.016	5.554	6.808	.267	1.521	
16	.407	1.211	4.386	6.074	6.720	.624	1.270	
7	.378	.922	3.823	5.152	6.143	.269	1.260	
14	.362	1.109	4.054	5.566	6.352	.447	1.233	
11	.426	1.128	4.104	5.790	6.577	.412	1.200	
3	.447	1.088	4.034	5.642	6.406	.423	1.186	
10	.340	1.229	4.398	6.027	6.446	.583	1.002	
17	.420	1.015	3.946	5.447	6.051	.358	.963	
15	.453	1.059	4.044	5.661	6.282	.291	.912	
5	.350	.978	3.799	5.164	5.797	.261	.894	
1	.553	.966	3.882	5.449	6.046	.259	.855	
2	.407	1.194	3.983	5.762	6.344	.271	.854	
4	.320	1.071	3.919	5.369	5.780	.394	.805	
12	.380	.978	3.525	4.940	5.497	.221	.778	
8	.337	.920	3.627	4.903	5.451	.208	.757	
13	.413	1.009	3.721	5.213	5.675	.234	.696	
6	.380	1.003	3.423	4.882	5.247	.225	.589	
19	.447	1.041	3.690	5.280	5.602	.239	.561	
9	.380	.999	3.539	4.981	5.311	.211	.541	
Average		.407	1.043	3.893	5.412	.324	.977	

TABLE II, Test 5-4: a. Maturity and Egg Size; b. Body Weight and Egg Production

a. Entry No.	Breeder	Days to 50 % Prod.	Egg Size Distribution (%)					Av. Egg Weight (oz./doz.)
			Pee Wee	Small	Medium	Large	Ex. Lg. & over	
18	Hy-Line	162.5	0.6	6.7	23.1	35.5	34.1	24.7
20	Pa. Farm Bu.	162.5	0.5	4.7	22.1	38.7	34.0	24.8
3	Cashman	162.5	1.3	6.8	24.9	38.0	29.0	24.5
16	Harco	170.5	0.1	2.2	12.3	30.3	55.0	26.3
2	Babcock	159.5	0.5	5.8	21.0	33.8	38.8	25.2
11	Shaver	168.0	0.3	2.1	17.2	33.2	47.1	25.9
14	Hubbard	165.5	0.4	3.6	20.6	38.7	36.7	25.1
10	Davis	164.5	0.3	2.4	15.9	32.4	49.1	26.1
7	Gar.-Stever	164.5	0.6	5.9	23.1	38.8	31.5	24.7
15	Kimber	162.5	0.3	4.4	20.2	34.1	41.0	25.2
17	Honegger	166.0	0.7	5.0	26.8	39.7	27.8	24.5
1	De Kalb	167.5	0.5	5.5	20.9	32.6	40.6	25.3
5	Eby	168.5	0.6	6.4	25.3	36.3	31.5	24.6
4	Cameron	170.0	0.3	4.1	21.6	35.4	38.6	25.3
19	Heisdorf & N.	168.0	0.3	4.7	26.6	40.2	28.2	24.7
9	Beamsdale	163.0	1.2	10.2	30.2	38.3	20.2	23.8
13	Ghostley	172.5	0.4	3.8	19.9	40.8	35.1	25.0
6	Demler	164.5	0.6	8.4	28.6	37.7	24.7	24.2
12	Ideal	166.5	0.4	3.7	20.1	34.0	41.9	25.3
8	Arbor Acres	170.5	0.3	2.5	16.9	32.3	47.9	25.8
Average		166.0	0.5	4.9	21.9	36.0	36.6	25.0

b. Entry No.	Av. Body Wt.		Hen-Day Production Percentages							Eggs/ Pullet Housed	Duncan test of Eggs/P.H.
	150 days	500 days	151-240 days	241-330 days	331-420 days	421-500 days	471-500 days	After 50%			
18	3.5	4.5	78.0	81.8	74.7	67.7	68.6	77.5	251.1		
20	3.6	4.7	74.9	81.0	74.7	66.5	65.9	76.1	245.6		
3	4.1	5.3	75.7	82.6	80.8	78.2	76.0	81.0	245.1		
16	4.9	6.3	67.0	77.0	75.7	70.2	62.7	75.5	239.6		
2	3.7	4.9	74.9	79.1	75.2	67.0	64.7	75.6	236.0		
11	3.7	5.0	69.8	83.1	77.0	71.7	69.8	78.1	234.3		
14	4.5	5.8	74.3	80.1	73.2	64.2	61.8	75.4	230.9		
10	5.1	6.5	74.2	75.7	73.2	62.6	60.0	73.7	229.1		
7	3.4	4.5	70.0	76.3	69.1	62.9	63.5	71.7	227.6		
15	3.6	4.9	75.9	77.4	63.8	58.8	59.6	70.7	227.2		
17	3.6	5.0	66.7	78.1	75.6	67.7	63.4	74.2	226.5		
1	3.6	4.6	66.6	73.2	71.0	67.9	68.1	72.2	222.7		
5	3.5	4.6	67.2	74.1	66.4	63.0	61.3	70.1	217.3		
4	3.6	5.1	67.4	77.9	73.5	56.3	57.1	71.9	207.1		
19	3.5	4.6	68.8	80.2	68.4	57.9	53.6	71.8	207.0		
9	3.4	4.4	69.7	73.0	66.1	63.9	64.6	70.1	205.5		
13	3.5	4.6	64.0	75.5	68.1	69.3	69.4	72.6	205.0		
6	3.4	4.4	68.7	72.7	65.0	51.6	51.9	66.8	197.8		
12	3.4	4.6	67.4	76.3	67.1	61.5	62.6	71.0	196.6		
8	3.3	4.4	63.7	75.2	68.3	59.0	56.4	70.3	192.3		
Average		3.7	4.9	70.2	77.5	71.3	64.4	63.0	73.3	222.2	

TABLE III, Test 5-4: a.Cause of Mortality; b.Cause and Days Lost and Feed Conversion

a.		Leukosis		Respir.	Hemorrhage		Peritonitis		
Entry	Breeder	8-150	151-500	8-150	8-150	151-500	8-150	151-500	
No.		days,%	days,%	days,%	days,%	days,%	days,%	days,%	
20	Pa. Farm Bu.	9.6	5.6	--	--	----	--	--	
18	Hy-Line	4.2	10.0	--	--	----	--	1.0	
2	Babcock	20.0	13.5	--	--	----	--	--	
3	Cashman	11.7	12.4	0.8	--	1.1	--	3.0	
11	Shaver	15.8	15.3	0.9	--	1.0	--	1.0	
7	Gar.-Stever	3.5	9.0	--	0.9	1.0	0.9	--	
1	De Kalb	5.8	7.0	--	--	1.0	--	2.0	
16	Harco	10.5	6.7	0.9	--	----	1.8	1.1	
14	Hubbard	6.8	17.4	1.7	--	----	--	1.0	
12	Ideal	9.5	22.1	--	--	----	--	1.1	
15	Kimber	15.0	9.8	--	--	----	--	1.0	
5	Eby	5.0	7.0	--	--	----	--	1.0	
17	Honegger	8.3	9.3	0.8	0.8	1.1	--	--	
6	Demler	11.2	15.6	1.8	--	1.0	0.9	2.3	
19	Heisdorf & N.	11.9	14.2	1.7	--	1.2	--	--	
9	Beamsdale	11.8	17.7	--	--	----	--	3.0	
13	Ghostley	8.0	17.6	2.7	--	----	--	--	
8	Arbor Acres	4.5	20.0	--	--	1.0	--	1.0	
10	Davis	9.2	11.9	--	--	----	--	2.1	
4	Cameron	10.3	14.8	--	--	2.2	--	--	
Average		9.6	12.8	0.6	0.1	0.5	0.2	1.0	
b.		Cause of Mortality				Hen-Days	Pounds of		Duncan
Entry	Reproduc- tive	Miscellaneous				lost to	feed per		range
No.	151-500	No. Autopsy				Mortal.	doz.	1b. of	test
	days,%	8-150	151-500	8-150	151-500	Per Bird	eggs	eggs	feed/1b.
20	2.0	1.8	1.0	1.8	----	21.3	4.13	2.66	
18	1.0	0.8	----	0.8	----	20.8	4.13	2.67	
2	1.6	1.7	2.6	1.7	----	34.4	4.36	2.76	
3	3.1	----	----	0.8	----	42.2	4.25	2.77	
11	----	0.8	----	2.6	----	39.7	4.51	2.79	
7	----	0.9	----	0.9	----	24.5	4.33	2.80	
1	3.0	0.8	2.0	0.8	----	30.4	4.49	2.83	
16	----	0.8	----	----	----	19.7	4.71	2.86	
14	----	----	----	0.8	----	36.1	4.53	2.89	
12	4.2	0.8	1.0	1.7	1.0	63.3	4.62	2.91	
15	1.0	----	----	0.8	----	24.5	4.60	2.92	
5	6.0	1.7	----	2.5	2.0	30.8	4.51	2.93	
17	2.1	1.7	2.1	0.8	----	36.4	4.49	2.93	
6	1.2	0.9	2.3	0.9	----	47.3	4.46	2.95	
19	1.2	1.7	2.2	0.8	1.0	50.3	4.58	2.96	
9	6.6	----	1.2	0.9	----	51.3	4.45	2.98	
13	3.0	----	1.2	2.7	1.0	53.7	4.68	2.99	
8	4.0	0.9	3.0	----	1.0	62.8	4.85	3.01	
10	1.1	3.3	2.1	0.8	----	32.8	4.95	3.03	
4	2.3	1.7	2.2	1.7	----	51.0	4.88	3.09	
Average		1.0	1.1	1.2	0.3	38.7	4.53	2.89	

TABLE IV, Test 5-4: a.Spots and Canded Grade; b.Albumen and Shell Quality

a. Entry No.	Breeder	Colored Inclusions(Breakout)				Candled Grade, %				Loss
		Blood Spots,%		Meat Spots,%		A & B over	C	Crax. & Chx.		
		Large	Small	Large	Small					
1	DeKalb	3.1	3.7	0.1	0.4	94.9	3.0	0.3	1.0	0.8
2	Babcock	3.8	5.3	0.4	0.5	92.9	4.1	0.3	1.4	1.3
3	Cashman	3.7	3.8	---	---	91.7	6.0	0.5	1.0	0.8
4	Cameron	1.1	2.4	0.5	0.5	95.6	3.4	0.5	0.3	0.2
5	Eby	2.2	1.8	0.1	---	93.4	4.2	0.4	1.5	0.5
6	Demler	2.2	2.8	0.1	---	93.7	5.1	0.3	0.6	0.3
7	Gar.-Stever	1.9	2.4	0.1	0.1	94.2	4.4	0.1	0.7	0.6
8	Arbor Acres	1.1	3.0	0.3	---	94.2	3.2	0.4	2.1	0.1
9	Beamsdale	1.0	1.6	0.1	0.1	94.6	3.5	0.1	1.7	0.1
10	Davis	1.3	2.6	9.1	33.2	94.3	3.3	1.5	0.3	0.6
11	Shaver	2.2	3.2	---	---	94.3	4.1	0.9	0.4	0.3
12	Ideal	1.5	2.7	---	0.5	95.2	3.7	0.1	0.6	0.4
13	Ghostley	0.8	1.6	0.1	---	94.4	4.8	0.2	0.6	---
14	Hubbard	0.9	1.0	7.0	42.0	93.9	2.5	2.2	1.1	0.3
15	Kimber	1.1	2.1	---	0.2	93.2	5.8	0.3	0.4	0.3
16	Harco	0.4	0.7	7.5	42.4	92.4	4.8	1.5	0.4	0.9
17	Honegger	1.6	1.5	0.2	---	93.2	5.3	0.1	1.0	0.4
18	Hy-Line	1.1	1.7	---	0.1	96.2	2.7	0.3	0.5	0.3
19	Heisdorf & N.	3.5	2.4	0.1	---	92.6	4.8	0.5	1.6	0.5
20	Pa. Farm Bu.	1.4	2.0	---	0.1	97.1	2.4	---	0.3	0.2
Average		1.8	2.4	1.4	6.0	94.1	4.1	0.5	0.9	0.4

Entry No.	Albumen Quality in Haugh Units					Shell Score (Specific Gravity)				
	Aug.	Nov.	Feb.	May	Average	Sept.	Dec.	Mar.	June	Average
1	90.7	82.8	77.1	71.2	80.4	4.44	4.16	3.42	2.90	3.73
2	89.0	80.3	75.6	69.8	78.7	4.80	4.55	3.29	2.66	3.82
3	87.2	78.0	73.5	68.8	76.8	4.63	4.05	3.52	2.63	3.71
4	91.4	82.4	79.2	74.0	81.8	4.70	4.02	3.75	2.97	3.86
5	84.9	77.3	73.5	67.4	75.8	4.51	4.25	3.74	2.60	3.78
6	89.0	80.6	76.2	70.0	79.0	5.00	4.50	3.84	2.71	4.01
7	86.2	77.6	72.4	69.4	76.4	5.12	4.87	4.03	3.50	4.38
8	91.4	82.8	77.6	74.1	81.5	4.76	4.20	3.40	3.33	3.92
9	89.1	79.2	75.5	69.8	78.4	4.59	4.03	4.00	2.90	3.88
10	88.6	81.6	76.4	72.0	79.6	3.04	4.68	2.62	1.46	2.95
11	88.1	79.6	73.4	68.6	77.4	5.27	4.58	3.56	2.90	4.08
12	87.8	78.8	73.5	68.4	77.1	4.82	4.87	4.29	3.48	4.36
13	91.2	80.3	78.9	74.1	81.1	5.04	5.08	4.03	3.26	4.35
14	88.5	80.7	76.1	69.0	78.6	3.10	3.14	2.40	2.11	2.69
15	93.5	83.7	77.6	74.0	82.2	5.70	5.16	4.28	3.71	4.71
16	89.2	81.5	78.0	72.1	80.2	3.52	2.70	2.56	2.06	2.71
17	90.5	83.4	79.8	71.6	81.3	3.96	3.93	3.31	2.03	3.31
18	83.6	75.5	69.0	67.4	73.9	4.72	4.22	3.88	3.26	4.02
19	89.1	79.4	76.2	72.4	79.3	4.66	4.46	3.57	2.60	3.82
20	92.5	83.7	79.8	73.2	82.3	4.63	4.37	3.14	3.00	3.78
Average	89.1	80.5	76.0	70.9	79.1	4.55	4.29	3.53	2.80	3.79

TABLE V, Tests 4 and 5: Two-Year Summary

Line No.	Breeder	Stock Designation		Mortality		% Prod. after 50%	IOFCC	Eggs/ Pullet Housed
		1962-63	1963-64	8-150 days, %	151-500 days, %			
1	Hy-Line	934-H	same	3.8	6.0	77.8	2.033	260.0
2	Cashman	Hi-Cash	same	8.0	12.8	79.2	1.650	248.8
3	Babcock	B-300	same	12.5	10.3	74.8	1.414	243.6
4	Honegger	Layers	H-62	7.6	9.2	76.0	1.563	243.2
5	Kimber	K-137	same	9.2	7.9	73.6	1.542	240.2
6	Harco	PS, RIR	same	7.4	6.9	74.2	.974	237.3
7	Eby	681 Hybrids	same	5.0	11.5	72.4	1.454	232.2
8	Gar.-Stever	Hi-Bred	X-300	4.0	7.5	71.8	1.546	231.1
9	De Kalb	#151	same	4.2	8.5	71.4	1.378	230.6
10	Beamsdale	#66	same	7.3	15.8	72.9	1.296	228.9
11	Heisdorf & N.	"Nick Chick"	same	9.4	11.9	72.6	1.364	226.2
12	Ghostley	Pearl	same	7.2	12.9	73.6	1.324	226.1
13	Demler	KROSS	Regals	9.1	14.6	69.0	1.316	217.8
14	Ideal	H-3-W	H3W-2	7.8	17.2	71.8	1.304	217.6
15	Arbor Acres	Queen	same	3.6	22.0	73.2	1.319	214.0
Average				7.1	11.7	73.6	1.432	233.2

Line No.	Age at 50% Prod.	Lbs. Body Wt.		Av. egg weight (oz./doz.)	Lbs. Feed per eggs		% Loss (down-grades)	Albumen Quality (H.U.)	Shell Score (s.g.)
		150 days	500 days		doz.	lbs.			
1	162.2	3.4	4.5	24.8	4.13	2.66	2.2	74.2	3.56
2	166.5	3.8	5.0	24.8	4.41	2.85	3.0	76.5	3.48
3	161.2	3.7	4.8	25.0	4.42	2.82	4.0	77.0	3.65
4	165.2	3.6	4.8	24.7	4.45	2.88	3.0	80.4	3.24
5	164.5	3.6	4.8	25.2	4.54	2.88	2.8	82.0	4.24
6	172.0	4.9	6.4	26.2	4.91	2.99	4.2	78.6	2.37
7	170.0	3.4	4.6	25.0	4.60	2.94	2.6	75.6	3.43
8	169.2	3.3	4.4	24.6	4.42	2.88	2.4	76.3	3.94
9	166.8	3.5	4.4	25.4	4.55	2.86	2.2	82.2	3.54
10	166.2	3.4	4.4	24.2	4.51	2.97	2.2	78.8	3.53
11	167.2	3.5	4.6	24.8	4.54	2.93	2.2	80.0	3.60
12	173.5	3.5	4.6	25.2	4.72	3.00	2.1	80.0	3.98
13	165.8	3.6	4.7	24.4	4.46	2.93	2.3	77.4	3.56
14	169.2	3.4	4.6	25.4	4.73	2.96	2.6	77.8	3.81
15	171.2	3.4	4.4	25.8	4.81	2.98	2.4	81.2	3.60
Av.	167.4	3.6	4.7	25.0	4.55	2.90	2.7	78.5	3.57