NC STATE UNIVERSITY

FINAL REPORT OF THE THIRTY FOURTH

NORTH CAROLINA LAYER PERFORMANCE

AND MANAGEMENT TEST

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The North Carolina Layer Performance and Management Test is conducted under the auspices of the Cooperative Extension Service a t North Carolina State University and the North Carolina Department of Agriculture. The flock is maintained at the NCDA&CS Piedmont Research Station, Salisbury, North Carolina. Mr. Raymond Coltrain is the Piedmont Research Station Superintendent; Mr. David Joyce is the Resident Manager of the flock; Pam Jenkins is the Statistical Research Assistant; and Dr. K. E. Anderson is Project Leader. The purpose of this program is to assist poultrymen in evaluation of commercial layer stocks and management systems.

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

For further information contact:

Dr. Kenneth E. Anderson
Poultry Science Department
North Carolina State University
Box 7608
Raleigh, NC 27695-7608
Tel: (919) 515-5527
Fax: (919) 515-7070
Email: ken_anderson@ncsu.edu

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

Entries:

A total of six white egg and three brown egg strains were accepted in accordance with the rules and regulations of the test.

Dates of Importance:

The eggs for the 34th NCLP&MT were set on July 18, 2000, at the Piedmont Research Station (NCDA&CS) Poultry Unit. The flock was hatched on August 9, 2000, and the pullets were moved to the laying facilities on November 29-30, 2000, during their 16th week of age. The age of the flock at transfer was lowered to approximately 16 weeks due to current trends in the industry and requests of the breeders to move the flock prior to excessive egg production in the rearing houses.

First cycle production records commenced on December 6, 2000 (17 weeks of age), until molt was induced on November 13, 2001. The molt records commenced on November 13, 2001 (66 weeks of age), and ended on December 11, 2001 (70 weeks of age). The second cycle records commenced on December 11, 2001 (70 wk of age), and the flock was terminated on August 28, 2002 (107 wk of age) the flock was terminated early due to the state's budgetary crisis. This report includes production data summarized from 17 to 66 wk, 66 to 70 wk, and 70 to 107 wk of age.

Pullet Housing:

The chicks were randomly assigned to the growing cages with white egg and brown egg replicates being intermingled throughout the house. The white egg strains occupied approximately 2/3 of the house and brown egg strains occupied the other 1/3 of the house. All strains were assigned to be represented as equally as possible in all rooms, row, and levels.

House 8--is an environmentally controlled closed brood-grow facility with 3 banks of quad-deck cages in each room. Each room has been assigned a number, each side of each bank has been assigned a row number, and each cage section within each row and level/row has been assigned a replicate number. For statistical analysis, pairs of rows have been designated as blocks. Thus, each block consists of two rows containing 24 replicates (i.e. approximately 3 reps/strain) on all levels resulting in a randomized incomplete block. This allows for a total of 3,744 pullets per room resulting in a total pullet count in House 8 of 14,976. The white and brown-egg strains were randomly assigned to three replicates within each block in the house. Entrant strains were assigned to the blocks in a restricted randomized manner with the restrictions being that all strains were approximately equally represented in all rows, levels, and rooms. All chicks were brooded in the same cage during the entire 16 wk rearing period. Paper was placed on the cage floor for the first 7 days within each of the replicate series within each row. Each cage within the replicate was filled with 13 white-egg or brown-egg (13 per 24" x 26" cage) pullets on the day of hatch for a rearing allowance of 48 in^2 (310 cm^2) for the white-egg layers. The same number of pullets were grown in each replicate for both white and brown-egg strains. Dividers were placed between the rooms for this test. The same environmental conditions were maintained in each room, so that all birds were essentially reared in a contiguous house. Pullet nutrition and husbandry practices are published in the Pullet Rearing Report (Vol. 34, No. 2).

Layer Housing:

The hens were randomly assigned to replicate cages with white egg and brown egg strains being intermingled throughout the houses. The white egg strains occupied approximately 2/3 and brown egg strains occupied the other 1/3 of each house. All strains were assigned to be represented as equally as possible in all houses, row, and levels.

House 4 is a high rise, environmentally controlled facility with three banks of four-deck high cages. Each side of each bank was designated as a row, and each row was divided into nine eight-foot replicate blocks/level. There are a total of 216 replicates in house 4 which can support 6,048 hens.

House 5 is a standard height totally enclosed force ventilated open-sided laying house with a flush manure handling system. It has 2 banks of triple deck cages and two banks with 4 levels of cages. Again, each side of a bank was designated as a row and each row was divided into 9 8-foot replicates/level. There are a total of 252 replicates in house 5 which, can support 7,056 hens.

Cage density is dictated by the size of the replicates which contain cages that were either 30.5 or 40.5 cm wide. In both houses the cages were 40.5 cm deep therefore, when the bird population was held constant at 4 hens per cage, densities for the 30.5 and 40.4 cm wide cages were 48 in^2 (310 cm^2) and 64 in^2 (413 cm^2), respectively. Both houses contain feeder systems which allow feed consumption to be determined per replicate block. The white-egg and brown-egg strains were assigned to the replicates in a restricted randomized manner, with the restrictions being that all strains were approximately equally represented in all rows, levels and cage sizes.

Test Design:

The arrangement for the laying test involved a completely randomized design and the main effects were set up in a factorial arrangement. The main effects were strain, density, and molt treatment. House effects have been monitored and in the last 2 tests there have been no differences between the environmentally controlled houses. Following are general descriptions of the main effects:

Strain

The samples of fertile eggs were provided directly by the breeders involved. All eggs were set and hatched concurrently. A total of six white egg strains and three brown egg strains participated in the test. See the 34th Hatch Report (Vol. 34, No. 1) for details.

Density

All individual cages within each block contained 4 hens for both the brown and the white egg layers. Thus the replicate blocks contained either 32 or 24 hens per replicate, for the block with 30.5 cm or 40.5 cm lengths, respectively. Cage densities for each 4 hen cage group were 310 cm^2 (48 in^2) and 413 cm^2 (64 in^2) for these two types of cages. Initial population size was constant throughout the test, so population size was not a factor in this test.

Layer Management (Molting):

The molt experiment was conducted utilizing all hens involved in the layer test. Participating strains were randomly divided into four groups such that all strains, densities, and levels were approximately equally represented in both houses. Each group received one of the following treatments during the molt period commencing at 66 wks of age. The molt period ended when the hens reached 70 wks of age.

Full Fed Control: The replicates assigned to the full fed control group were maintained according to the standard management program as outlined previously. The laying house was partitioned such that the lighting program was consistent for maximum egg production.

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

Day -7   Day length was increased to 24 hr at 65 weeks of age for the entire flock.
Day -7   A sample of birds was weighed to determine the premolt weight.

	Target weight (30% body weight loss) was calculated using the premolt weight.
Day 0	All remaining feed was removed from the feeders and the light period was reduced to 9 hours. All moribund birds were removed before feed restriction.
Day +1	A booster vaccination for Newcastle/Bronchitis was provided.
Day +8	A sample of birds was weighed 8 days after feed removal to determine body weight loss. Weight loss per day was calculated using body weights and target weight for 30% weight loss was determined.
Day +13	Birds were weighed to determine body weight loss. Strains and/or treatment groups were put back on full feed of Molt-1 Diet (16% CP diet containing 2.0% Ca)
Day +24	Day light hours were increased to 12 hours.
Day +28	All selected replicates were weighed. Birds which had been on a molt program were returned to layer diet E. Day length was increased to 14 hours.
Day +31	Lights were returned to 16.5 hours of day light

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

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

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

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

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

COMMENTS: Hens should have ceased egg production by Day 4. When egg production was not close to zero, only 3 kg/100 hens was provided until egg production ceased. The Low Protein/energy

diet does not sustain egg production. It is designed to keep hens out of production and to provide for body maintenance needs. Livability is excellent with this program. The diet is bulky, such that a full trailer load will only weigh 2/3 of a normal full load. Please keep this fact in mind when ordering feed. Diet E will bring hens back into peak production. Feed intake and egg size will determine which diet to progress toward.

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

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

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

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

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

Layer Nutrition:

Layer diets are identified as Diets D, E, F, G, H, I, M, N, O, P, and Q which consist of a pre-lay diet and a series of layer diets formulated to assure a daily protein, mineral and amino acid intake as shown below. The diets are provided to the birds in a crumblized form to reduce feed wastage. Dietary formulations are presented in the following section. Feed was offered <u>ad libitum</u> in accordance with the guidelines that all birds should receive acceptable nutrient intake at all times depending on the bird's age and production rate (see Table). The diet fed at any given time provides the nutrient intake and is determined based upon flock production stage, and average daily feed intake. Supplemental calcium was provided to the hens in the form of oyster shells mixed at the farm at the rate of 2% due to a diagnosis of osteoporosis in the hens.

The diets provided during the molt, consisted of a low protein/energy diet and a Molt 1 diet. These are described in the tables which follow. Both of the molt diets were formulated to provide the layer with the nutrients needed to maintain a static body weight with no egg production.

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

Production Stage	> 87% and Pre-Peak	87-80%	80-70%	<70%
<u>White-Egg Layers</u>				
Protein (g/day)	19	18	17	16
Calcium (g/day)	3.8	3.8	4.0	4.0
Lysine (mg/day)	820	780	730	690
TSAA (mg/day)	700	670	630	590
<u>Brown Egg Layers</u>				
Protein (g/day)	20	19	18	17
Calcium (g/day)	3.8	3.8	3.8	4.0
Lysine (mg/day)	830	820	780	730
TSAA (mg/day)	710	700	670	630

LAYING HOUSE FEEDING PROGRAM

Rate of Production	Consumption Per 100 Birds/Day (kg)	Diet Fed	
		White Egg Strains	Brown Egg Strains
Weeks 17-26	< 9.52	D	D
Pre-Peak and > 87%	< 9.52	F	E
	9.57-10.39	G	F
	10.43-11.29	I	H
	11.34-12.20	N	M
	12.25-13.11	P	O
	>13.15	Q	Q
80-87%	< 9.52	G	F
	9.57-10.39	H	G
	10.43-11.29	M	I
	11.34-12.20	O	N
	12.25-13.11	Q	P
	>13.15	Q	Q
70-80%	< 9.52	H	G
	9.57-10.39	I	H
	10.43-11.29	N	M
	11.34-12.20	P	O
	12.25-13.11	Q	Q
	>13.15	Q	Q
< 70%	< 9.52	I	H
	9.57-10.39	M	I
	10.43-11.29	O	N
	11.34-12.20	Q	O
	12.25-13.11	Q	Q
	>13.15	Q	Q
Post-Molt < 70%	< 9.52	G	F
	9.57-10.39	H	G
	10.43-11.29	M	I
	11.34-12.20	O	N
	12.25-13.11	Q	P
	>13.15	Q	Q

LAYING PERIOD DIETS

Diet Identification[1]

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

LAYING PERIOD DIETS

Diet Identification[1]

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

LAYING PERIOD DIETS

Diet Identification[1]

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

Data Collection Schedule and Procedures:

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

Egg Weight --At twenty-eight day intervals, all eggs produced in the previous 24-hour period were weighed and sorted by size (See egg size distribution). Percentages of eggs within each size category, average egg weight (g), and egg mass (g) were calculated and reported.

Egg Quality--At twenty-eight day intervals, all eggs produced within the previous 24 hours were examined by candling light and graded according to current USDA standards for egg quality. Eggs were graded in the pilot processing facility and handled as they would be in a commercial off-line facility.

Egg Price--Egg income was calculated using three-year regional average prices for farm value of eggs based on egg production and quality evaluation.

Feed Consumption--All feed offered for consumption was recorded for each replicate. At twenty-eight day intervals, feed not consumed was weighed back and feed consumption was calculated. Daily feed intake (kg/100 hens/day) was calculated and reported for each strain. Feed costs were based on the actual feed prices for each feed delivery which were calculated and summarized for the complete production cycle.

Mortality--All mortalities were recorded daily, categorized as to the cause, and obvious accidents were not included in reported mortalities.

Statistical Analyses and Separation of Means:

Analyses of variance were performed on all data. Separate analyses were conducted for white and brown egg strains. Significant differences (P < 0.01) within white and brown egg strains are noted by differing letters among columns of means. The blocking effect for the layer house was not significant, therefore, data for houses 4 and 5 were pooled in this analysis. All data were subjected to ANOVA utilizing the GLM procedure of SAS, with main effects of strain and density. First and second order interactions were tested for significance. Mean differences were separated via the PDIFF option of the GLM procedure.

DESCRIPTION OF DATA TABLE STATISTICS

Characterizations of the flock mortality by strain are shown in Tables 1 to 6. First cycle performance of white and brown egg strains are shown on Tables 7 to 12. The molt period performance and weight loss data of the white and brown egg strains are shown on Tables 13 to 20. The second cycle tables are divided into white egg layer strain and density (Tables 21 to 23)and strain and molt treatment (Tables 24 to 26), brown egg layer strain and density (Tables 27 to 29)and strain and molt treatment (Tables 30 to 32). The second cycle is then shown segregated by white and brown egg strains with the strain and density within each molt treatment (Tables 33 to 56). Overall performance is shown by: white egg strains; strain and density (Tables 57 to 59) and strain and molt treatment (Tables 60 to 62); brown egg strains; strain and density (Tables 63 to 65) and strain and molt (Tables 66 to 68). Body weights and gains are shown in Tables 69 to 72.

DESCRIPTION OF DATA FIGURES

Bi-weekly hen day egg production at 48 sq. in. by molt program shown in Figures 1 to 9. By-weekly hen day egg production at 64 sq. in. by molt program shown in Figures 10-18.

Breeder (Strain):

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

Population and Density Allocations:

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

Hen Housed Eggs per Bird:

The total number of eggs produced divided by the number of birds housed at 119 days.

Hen Day Egg Production:

The average daily number of eggs produced per 100 live hens per day.

Egg Mass:

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

Mortality:

The percentage of birds which died between 119 and 462 days of age. Mortality which occurred during the molt period are reported separately. Characterization of the mortalities was done by Drs. John Barnes, DVM, Donna Carver, DVM, Gina Alban, DVM, and Nancy Reimers, DVM. The following list of conditions (with abbreviations) were concluded to have resulted in the death of the hen. Cause of death could not be determined = UND; Prolapse,Vent Persecution, cloacal distension = PRO; Blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Hepatitis = HEP; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Lymphoid Leukosis = LL; Nephritis = NEP; Peritonitis = PER; Hen became entrapped = ENT; Endocardiosis = END; Pneumonia = PN; Fecal Impaction = FI; Infected Laceration = IL; Renal Disease = RD; Ruptured Liver = RL; Facture = X; Cancer = CAN; Egg Bound = EB.

Feed Consumption:

The kilograms of feed consumed daily per 100 hens (housed or hen days).

Feed Conversion:

The grams of egg produced per gram of feed consumed.

Egg Weight:

The average egg weight (gms) for each period sampled. Weight of all eggs collected from previous 24 hours divided by the number of eggs collected.

Egg Income:

The calculated income per hen housed at 119 days, from egg production using three-year regional average egg prices as follows:

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

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

Egg Size Distribution:

Following are the size classifications used for establishing the USDA egg size grading. There has been blending of egg size in this test with the weight cutoff between medium and large being 23.5. This maximizes the number of USDA large eggs just as would occur in a commercial plant. The proportion of the eggs falling into the following size categories are reported in the tables.

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

Feed Cost:

The calculated feed cost per hen housed at 119 days, using the pounds/diet consumed and the average price of each diet per ton.

Diets	Price Per Ton
D	177.85
E	176.30
F	176.65
G	176.50
H	176.00
I	166.95
M	169.40
N	152.10
Molt - 1	164.00
LP/LE Molt	127.36
O	159.55
P	151.40
Q	139.80

Grade Information:

      The average grade of all eggs sampled according to USDA grading standards over all sampling periods. Grades are established by personnel trained in USDA grading standards.

Metric Conversions:

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1 lb =  453.6 g              1 g = .03527 oz
1 lb = .4536 kg              1 kg = 2.204 lb

1 oz = 28.35 g               1 g = 1000 mg
                             1 kg = 1000 g
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TABLE 1. MORTALITY CHARACTERIZATION OF THE WHITE EGG STRAINS IN THE 34TH NCLP&MT (119-462 DAYS)

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

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

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

Breeder (Strain)	UND	PRO	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	VG	VV	CAN	PN	FI	ENT
								%								
Hy-Line (W-36)	0	0	0	0	50.0	0	0	50.0	0	0	0	0	0	0	0	0
Hy-Line (W-98)	18.8	0	0	0	0	0	68.8	0	0	0	0	0	0	6.3	0	6.3
Bovans (White)	18.2	9.1	0	0	0	0	72.7	0	0	0	0	0	0	0	0	0
DeKalb (White)	20.0	6.7	0	0	0	0	53.3	20.0	0	0	0	0	0	0	0	0
DeKalb (Sigma)	17.7	11.7	0	5.9	0	0	5.9	52.9	0	0	0	0	0	0	5.9	0
Bovans (Experiment)	28.6	14.3	0	28.6	0	0	14.3	1.0	0	0	0	0	14.3	0	0	0

Sample size n = 68
Cause of death could not be determined = UND; Prolapse, Vent Persecution, Cloacal Distension = PRO; Blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Nephritis = NEP; Peritonitis = PER; Hen became entrapped = ENT; Endocardiosis = END; Pneumonia = PN; Fecal Impaction = FI; Cancer = CAN.

TABLE 3. MORTALITY CHARACTERIZATION OF THE WHITE EGG STRAINS IN THE 34TH NCLP&MT (490-749 DAYS)

Breeder (Strain)	UND	PRO	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	VG	VV	LL	EB	PER	RD	ENT	CAN
										%								
Hy-Line[1] (W-36)	17.4	8.7	0	0	30.4	0	0	0	4.4	0	13.0	0	0	4.4	8.7	0	4.4	4.4
Hy-Line (W-98)	16.0	4.0	0	0	4.0	0	16.0	0	16.0	0	4.0	4.0	0	8.0	12.0	4.0	0	12.0
Bovans[2] (White)	16.7	13.3	3.3	3.3	6.7	0	23.3	3.3	3.3	0	0	3.3	0	0	3.3	0	6.7	0
DeKalb (White)	13.5	13.5	0	0	8.1	0	35.1	0	16.2	2.7	0	0	0	0	2.7	2.7	0	5.4
DeKalb (Sigma)	16.1	13.5	5.3	0	10.5	5.3	10.5	0	5.3	0	0	0	0	0	5.3	0	5.3	0
Bovans (Exp)	11.5	11.5	3.9	3.9	11.5	0	19.2	3.9	3.9	0	0	0	3.9	7.7	7.7	0	11.5	0

Sample size n = 160
Cause of death could not be determined = UND; Prolapse, Vent Persecution, Cloacal Distension = PRO; blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Lymphoid Leukosis = LL; Egg Bound = EB; Nephritis = NEP; Peritonitis = PER; Renal Disease = RD; Hen became entrapped = ENT.
[1] Heart Failure 4.4 %
[2] Endocardiosis 3.3 %; Hepatitis 6.7 %; Fracture 3.3 %

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TABLE 4. MORTALITY CHARACTERIZATION OF THE BROWN EGG STRAINS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	UND	PRO	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	CAN	X	IL	RD	RL	ENT
							-- %										
Hy-Line (Brown)	42.9	7.1	3.6	0	7.1	3.6	17.9	0	10.7	0	0	0	3.6	0	3.6	0
Bovans (Brown)	37.5	12.5	6.3	0	6.3	3.3	29.0	0	0	0	0	3.1	0	0	0	0
DeKalb (Brown)	42.4	6.1	6.1	0	18.2	3.0	12.1	0	0	0	6.1	0	0	3.0	0	3.0

Sample size n = 93
Cause of death could not be determined = UND; Prolapse, Vent Persecution, Cloacal Distension = PRO; Blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Hen became entrapped = ENT; Pneumonia = PN; Infected Laceration = IL; Renal Disease = RD; Ruptured Liver = RL; Facture = X; Cancer = CAN.

TABLE 5.   MORTALITY CHARACTERIZATION OF THE BROWN EGG STRAINS IN THE 34th NCLP&MT DURING THE MOLT PERIOD (462 - 490 DAYS)

Breeder (Strain)	UND	PRO	HEM	DEH	FLS	FEC	OST	SO	SAL	SEP	VG	VV	LL	PN	FI	ENT
							%									
Hy-Line (Brown)	0	22.2	0	0	0	11.1	55.6	11.1	0	0	0	0	0	0	0	0
Bovans (Brown)	23.1	0	0	23.1	0	0	53.9	0	0	0	0	0	0	0	0	0
DeKalb (Brown)	8.3	8.3	0	16.7	0	0	41.7	8.3	8.3	0	0	0	0	0	0	8.3

Sample size n = 34
Cause of death could not be determined = UND; Prolapse, Vent Persecution, Cloacal Distension = PRO; Blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Dehydration = DEH; Fatty Liver Syndrome = FLS; Fecalith = FEC; Osteoporosis = OST; Starve out and Emaciated = SO; Salpingitis = SAL; Septicemia = SEP; Visceral Gout = VG; Vegetative Valvular Endo. = VV; Lymphoid Leukosis = LL; Hen became entrapped = ENT; Pneumonia = PN; Fecal Impaction = FI.

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TABLE 6. MORTALITY CHARACTERIZATION OF THE BROWN EGG STRAINS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	UND	PRO	HEM	HEP	FLS	PER	OST	PN	SAL	SEP	CAN	X	IL	RD	RL	ENT
										%						
Hy-Line (Brown)	17.7	0	11.8	5.9	23.5	5.9	17.7	0	0	0	0	11.8	0	0	0	5.9
Bovans (Brown)	26.3	10.5	0	0	0	0	15.8	0	26.3	0	15.8	0	0	0	0	5.3
DeKalb (Brown)	20.1	20.0	0	0	6.7	6.7	6.7	6.7	6.7	0	20.0	0	0	0	0	6.7

Sample size n = 51
Cause of death could not be determined = UND; Prolapse, Vent Persecution, Cloacal Distension = PRO; Blood loss, hepatic, liver, pulmonary, perihepatic, and renal hemorrhages = HEM; Hepatitis = HEP; Fatty Liver Syndrome = FLS; Peritonitis = PER; Osteoporosis = OST; Pneumonia = PN; Salpingitis = SAL; Septicemia = SEP; Hen became entrapped = ENT; Pneumonia = PN; Infected Laceration = IL; Renal Disease = RD; Ruptured Liver = RL; Facture = X; Cancer = CAN.

TABLE 7.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
Hy-Line	310	10.2	.45	255.0	79.5	46.1	9.8	143.7
(W-36)	413	11.3	.42	266.9	81.5	47.2	7.5	143.3
	Average	10.7^B	.43^A	261.0^{BC}	80.5^D	46.7^C	8.7^D	143.5^A
Hy-Line	310	11.1	.44	249.3	79.2	48.8	15.6	131.0
(W-98)	413	12.5	.41	273.8	82.7	51.0	5.6	131.6
	Average	11.8^A	.43^A	261.6^{BC}	81.0^D	49.9^A	10.6^{CD}	131.3^E
Bovans	310	10.8	.46	261.6	86.0	49.2	20.8	134.5
(White)	413	12.2	.42	282.6	88.8	50.9	13.6	134.1
	Average	11.5^A	.44^A	272.1^A	87.4^A	50.0^A	17.2^{AB}	134.3^D
DeKalb	310	11.0	.45	254.0	83.3	49.2	19.3	139.8
(White)	413	11.9	.43	269.1	86.7	51.4	15.3	139.1
	Average	11.4^A	.44^A	261.6^{BC}	85.0^B	50.3^A	17.3^A	139.5^{BC}
DeKalb	310	11.1	.41	246.4	80.4	46.3	16.9	140.0
(Sigma)	413	12.5	.39	265.7	83.0	48.3	10.2	140.6
	Average	11.8^A	.40^B	256.1^C	81.7^D	47.3^C	13.6^{BC}	140.3^B
Bovans	310	10.5	.45	258.6	81.9	47.2	14.1	138.7
(Experiment)	413	12.1	.41	275.5	85.3	49.3	8.1	137.7
	Average	11.3^A	.43^A	267.1^{AB}	83.6^C	48.2^B	11.1^{CD}	138.2^C
All Strains	310	10.8^Z	.44^Y	254.2^Z	81.7^Z	47.8^Z	16.1^Y	137.9
	413	12.1^Y	.41^Z	272.3^Y	84.7^Y	49.7^Y	10.1^Z	137.7
	Average	11.4	.43	263.2	83.2	48.7	13.1	137.8

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D,E - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 8.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE DISTRIBUTION
            OF HENS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	57.5	2.0	8.3	20.3	49.1	20.0
(W-36)	413	57.5	2.7	9.0	18.8	47.3	22.0
	Average	57.5^C	2.3^A	8.7^A	19.6^{CD}	48.2^B	21.0^C
Hy-Line	310	61.5	0.3	3.9	13.6	37.7	44.1
(W-98)	413	61.6	0.3	4.1	13.7	36.7	44.9
	Average	61.6^A	0.3^C	4.0^D	13.6^E	37.2^C	44.5^A
Bovans	310	56.9	0.9	8.1	27.4	48.2	15.2
(White)	413	57.1	1.0	8.4	25.8	47.1	17.6
	Average	57.0^C	0.9^B	8.2^A	26.6^A	47.6^B	16.4^D
DeKalb	310	58.7	1.1	5.8	18.9	49.5	24.5
(White)	413	58.9	0.7	5.4	19.0	48.7	25.9
	Average	58.8^B	1.0^B	5.6^C	18.9^D	49.1^{AB}	25.2^B
DeKalb	310	57.2	2.2	8.1	24.1	45.9	19.3
(Sigma)	413	57.8	2.1	7.1	20.4	47.7	22.4
	Average	57.5^C	2.2^A	7.6^{AB}	22.3^{BC}	46.8^B	20.9^C
Bovans	310	57.3	1.0	7.1	24.1	50.9	16.7
(Experiment)	413	57.6	0.8	5.9	23.7	51.8	17.6
	Average	57.5^C	0.9^B	6.5^{BC}	23.9^B	51.4^A	17.1^D
All Strains	310	58.2	1.3	6.9	21.4	46.9	23.3
	413	58.4	1.3	6.6	20.2	46.6	25.1
	Average	58.3	1.3	6.8	20.8	46.7	24.2

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among
strain average values.

TABLE 9.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
           OF HENS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	98.2	0.7	0.9	0.2	14.22	6.36
(W-36)	413	98.6	0.6	0.7	0.1	14.89	7.20
	Average	98.4^A	0.6^C	0.8^B	0.1	14.56^{BC}	6.78^C
Hy-Line	310	96.8	1.8	1.3	0.1	14.50	6.79
(W-98)	413	97.6	1.2	1.0	0.2	16.01	8.04
	Average	97.2^B	1.5^A	1.1^{AB}	0.1	15.25^A	7.41^A
Bovans	310	97.5	1.4	1.0	0.1	14.44	6.38
(White)	413	98.3	0.8	0.7	0.2	15.71	7.50
	Average	97.9^A	1.1^B	0.9^B	0.2	15.07^A	6.94^{BC}
DeKalb	310	98.1	0.9	0.8	0.2	14.47	6.51
(White)	413	98.2	0.6	0.9	0.3	15.41	7.16
	Average	98.1^A	0.8^{BC}	0.8^B	0.2	14.94^{AB}	6.83^C
DeKalb	310	97.2	1.2	1.5	0.2	13.54	6.60
(Sigma)	413	97.3	0.9	1.6	0.2	14.84	7.78
	Average	97.2^B	1.1^{BC}	1.6^A	0.2	14.19^C	7.19^{AB}
Bovans	310	98.0	1.0	1.0	0.1	14.48	6.47
(Experiment)	413	98.1	0.6	1.2	0.1	15.56	7.59
	Average	98.0^A	0.8^{BC}	1.1^B	0.1	15.02^A	7.03^{BC}
All Strains	310	97.6^Z	1.2^Y	1.1	0.1	14.27^Z	6.52^Z
	413	98.0^Y	0.8^Z	1.0	0.2	15.40^Y	7.54^Y
	Average	97.8	1.0	1.1	0.2	14.84	7.03

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 10.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
             NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)	Age at 50% Production (Days)
Hy-Line	310	11.8	.42	236.5	82.5	50.4	22.6	135.5
(Brown)	413	12.6	.41	279.9	85.4	52.1	7.3	133.9
	Average	12.2	.42	258.2	84.0^B	51.3^B	14.9	134.7^A
Bovans	310	11.9	.43	240.8	84.6	51.2	25.0	129.9
(Brown)	413	12.8	.42	282.7	87.5	53.4	9.8	129.5
	Average	12.3	.43	261.8	86.0^A	52.3^B	17.4	129.7^B
DeKalb	310	12.2	.43	234.1	86.3	53.3	28.1	134.3
(Brown)	413	13.4	.41	279.6	87.4	54.2	10.4	133.2
	Average	12.8	.42	256.9	86.9	53.7^A	19.3	133.7^A
All Strains	310	12.0^Z	.43^Y	237.1^Z	84.5^Z	51.6^Z	25.2^Y	133.2
	413	12.9^Y	.41^Z	280.8^Y	86.8^Y	53.2^Y	9.2^Z	132.2
	Average	12.4	.42	258.9	85.6	52.4	17.2	132.7

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 11. EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
DISTRIBUTION OF HENS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	60.9	0.3	2.8	14.3	45.3	37.1
(Brown)	413	60.8	0.1	2.7	14.6	46.8	35.5
	Average	60.8^B	0.2	2.8	14.5	46.0^{AB}	36.3^B
Bovans	310	60.4	0.1	2.4	15.5	48.8	32.9
(Brown)	413	60.9	0.2	2.1	14.1	48.4	34.9
	Average	60.6^B	0.1	2.2	14.8	48.6^A	33.9^B
DeKalb	310	61.5	0.3	2.0	12.1	43.9	41.3
(Brown)	413	61.8	0.3	2.0	12.6	42.1	42.6
	Average	61.7^A	0.3	2.0	12.4	43.0^B	41.9^A
All Strains	310	60.9	0.2	2.4	14.0	46.0	37.1
	413	61.2	0.2	2.3	13.8	45.8	37.7
	Average	61.1	0.2	2.3	13.9	45.9	37.4

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.

TABLE 12.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
            OF HENS IN THE 34th NCLP&MT (119-462 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	97.4	1.3	1.3	0.0	13.86	6.55
(Brown)	413	98.1	0.6	1.3	0.0	16.48	8.01
	Average	97.8	0.9	1.3	0.0	15.17	7.28
Bovans	310	97.6	1.1	1.2	0.0	14.09	6.52
(Brown)	413	98.3	0.5	1.1	0.0	16.71	7.98
	Average	97.9	0.8	1.2	0.0	15.40	7.25
DeKalb	310	97.4	1.3	1.3	0.1	13.81	6.41
(Brown)	413	98.0	1.0	1.0	0.0	16.57	8.28
	Average	97.7	1.1	1.1	0.1	15.19	7.35
All Strains	310	97.5^Z	1.2^Y	1.3	0.0	13.92^Z	6.49^Z
	413	98.2^Y	0.7^Z	1.1	0.0	16.59^Y	8.09^Y
	Average	97.8	1.0	1.2	0.0	15.25	7.29

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 13. EFFECT OF WHITE EGG STRAIN, DENSITY AND SYNCHRONIZED MOLT ON HENS IN THE 34th NCLP&MT (462-490 DAYS)

Breeder (Strain)	Density[1] (cm^2)	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Hy-Line (W-36)	310	1.26	1.78	41.3	1.41	20.9	1.51
	413	1.27	1.88	46.3	1.49	20.5	1.56
	Average	1.26^B	1.83^{BC}	43.8^A	1.45	20.7	1.54
Hy-Line (W-98)	310	1.40	1.97	40.5	1.50	23.9	1.64
	413	1.39	2.00	45.5	1.54	22.5	1.64
	Average	1.40^A	1.98^A	43.0^A	1.52	23.2	1.64^A
Bovans (White)	310	1.21	1.77	45.9	1.36	23.3	1.44
	413	1.19	1.73	44.4	1.33	22.8	1.43
	Average	1.20^C	1.75^{CD}	45.1^A	1.34	23.0	1.43^c
DeKalb (White)	310	1.29	1.80	40.5	1.39	22.7	1.49
	413	1.26	1.91	49.9	1.43	25.1	1.50
	Average	1.28^B	1.86^B	45.2^A	1.41	23.9	1.49^{BC}
DeKalb (Sigma)	310	1.29	1.75	33.9	1.35	22.5	1.47
	413	1.31	1.79	35.6	1.36	24.8	1.48
	Average	1.30^B	1.77^{BCD}	34.8^B	1.35	23.6	1.48^{BC}
Bovans (Experiment)	310	1.28	1.73	35.2	1.34	22.0	1.44
	413	1.28	1.74	35.6	1.37	20.1	1.47
	Average	1.28^B	1.73^D	35.4^B	1.36	21.1	1.46^{BC}
All Strains	310	1.29	1.80	39.5	1.39	22.5	1.50
	413	1.29	1.84	42.9	1.42	22.6	1.51
	Average	1.29	1.82	41.2	1.41	22.6	1.51

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P < .01), comparisons made among strain average values.

TABLE 14.   EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON HENS IN THE 34th NCLP&MT (462-490 DAYS)

Breeder (Strain)	Molt Program	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Hy-Line	NM	1.29	1.80	34.4	1.74^{B}	3.7	1.79
(W-36)	NF	1.22	1.84	50.8	1.37^{EF}	25.5	1.37
	SF	1.27	1.84	45.5	1.40^{DEF}	24.3	1.40
	FR	1.27	1.84	44.3	1.31^{EFGH}	29.3	1.59
Hy-Line	NM	1.42	2.00	44.4	1.89^{A}	5.6	1.95
(W-98)	NF	1.38	1.93	40.0	1.39^{EF}	27.7	1.43
	SF	1.42	2.01	41.8	1.43^{DE}	29.0	1.44
	FR	1.37	1.99	45.7	1.38^{EF}	30.6	1.75
Bovans	NM	1.21	1.72	38.6	1.68^{BC}	2.4	1.71
(White)	NF	1.19	1.73	46.6	1.16^{HI}	32.9	1.18
	SF	1.18	1.74	48.4	1.28^{EFGHI}	26.6	1.28
	FR	1.23	1.79	46.9	1.25^{FGHI}	30.3	1.56
DeKalb	NM	1.29	1.85	43.4	1.77^{AB}	4.4	1.82
(White)	NF	1.25	1.80	41.8	1.26^{FGHI}	29.6	1.30
	SF	1.24	1.85	49.0	1.29^{EFGHI}	30.3	1.29
	FR	1.33	1.93	46.7	1.32^{EFG}	31.3	1.56
DeKalb	NM	1.31	1.82	39.1	1.73^{B}	4.7	1.76
(Sigma)	NF	1.25	1.75	35.6	1.27^{EFGHI}	27.6	1.32
	SF	1.34	1.81	32.9	1.28^{EFGHI}	29.5	1.29
	FR	1.30	1.70	31.4	1.14^{I}	32.7	1.54
Bovans	NM	1.25	1.59	29.7	1.56^{CD}	1.8	1.60
(Experiment)	NF	1.29	1.82	39.6	1.39^{EF}	24.0	1.42
	SF	1.28	1.73	35.5	1.29^{EFGH}	25.0	1.31
	FR	1.30	1.78	36.9	1.18^{GHI}	33.4	1.50
All Strains	NM	1.30	1.80	38.3	1.73	3.8^{Z}	1.77^{X}
	NF	1.26	1.81	42.4	1.30	27.9^{Y}	1.34^{Z}
	SF	1.29	1.83	42.2	1.33	27.4^{Y}	1.33^{Z}
	FR	1.30	1.84	42.0	1.26	31.3^{X}	1.58^{Y}

X,Y,Z - Different letters denote significant differences (P < .01), comparisons made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.
A,B,C,D,E,F,G,H,I - Different letters denote significant differences (P<.01), comparisons made among strain by molt program average values.

TABLE 15.   EFFECT OF BROWN EGG STRAIN, DENSITY AND SYNCHRONIZED MOLT ON HENS
            IN THE 34th NCLP&MT (462-490 DAYS)

Breeder (Strain)	Density[1] (cm^2)	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Hy-Line	310	1.56	2.17	38.8	1.72	20.6	1.82
(Brown)	413	1.58	2.20	39.5	1.77	19.1	1.89
	Average	1.57	2.18	39.2	1.75^A	19.9	1.85
Bovans	310	1.58	2.11	34.0	1.68	20.4	1.85
(Brown)	413	1.59	2.10	34.8	1.67	20.6	1.83
	Average	1.58	2.10	34.4	1.67^{AB}	20.5	1.84
DeKalb	310	1.53	2.11	36.7	1.65	21.3	1.82
(Brown)	413	1.56	2.07	32.3	1.61	21.7	1.75
	Average	1.54	2.09	34.5	1.63^B	21.5	1.78
All Strains	310	1.56	2.13	36.5	1.68	20.8	1.83
	413	1.58	2.12	35.5	1.68	20.5	1.82
	Average	1.57	2.12	36.0	1.68	20.6	1.82

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
There are no significant differences among these means.

TABLE 16.   EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON HENS
             IN THE 34th NCLP&MT (462-490 DAYS)

Breeder (Strain)	Molt Program	17 Wk Body Wt (kg)	66 Wk Body Wt (kg)	1st Cycle Wt Gain (%)	Lowest Body Weight (kg)	Molt Weight Loss (%)	70 Wk Body Wt (kg)
Hy-Line	NM	1.58	2.19	40.0	2.09	4.8	2.10
(Brown)	NF	1.56	2.18	39.7	1.66	23.6	1.69
	SF	1.57	2.20	38.9	1.72	21.6	1.72
	FR	1.58	2.16	38.1	1.53	29.4	1.90
Bovans	NM	1.60	2.11	32.1	2.07	2.3	2.14
(Brown)	NF	1.56	2.15	35.8	1.61	24.8	1.65
	SF	1.53	2.05	37.3	1.55	24.2	1.61
	FR	1.65	2.11	32.3	1.46	30.7	1.97
DeKalb	NM	1.53	2.02	33.3	1.92	4.3	1.99
(Brown)	NF	1.59	2.15	36.6	1.63	24.1	1.65
	SF	1.53	2.07	34.5	1.53	26.1	1.57
	FR	1.52	2.12	33.6	1.45	31.6	1.92
All Strains	NM	1.57	2.11	35.1	2.02^X	3.8^Z	2.08^X
	NF	1.57	2.16	37.4	1.63^Y	24.2^Y	1.66^Z
	SF	1.55	2.11	36.9	1.60^Y	24.0^Y	1.63^Z
	FR	1.58	2.13	34.7	1.48^Z	30.6^X	1.93^Y

X,Y,Z - Different letters denote significant differences (P < .01), comparisons made among
molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR =
13-day fast.

TABLE 17.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE
             34th NCLP&MT DURING THE MOLT PERIOD (462-490 DAYS)*

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	7.4	7.2	28.8	1.0	0.43	0.28
(W-36)	413	8.6	7.7	29.9	0.6	0.47	0.31
	Average	8.0	7.5^A	29.3	0.8^C	0.45^A	0.29
Hy-Line	310	7.8	6.1	27.3	3.0	0.37	0.27
(W-98)	413	8.2	7.6	29.6	1.3	0.47	0.30
	Average	8.0	6.9^{AB}	28.5	2.2^{ABC}	0.42^{AB}	0.28
Bovans	310	7.3	6.7	31.0	2.7	0.40	0.22
(White)	413	9.0	7.5	31.8	2.1	0.45	0.28
	Average	8.1	7.1^{AB}	31.4	2.4^{AB}	0.42^{AB}	0.25
DeKalb	310	8.2	7.0	31.4	3.2	0.42	0.26
(White)	413	8.7	7.3	32.1	2.3	0.44	0.25
	Average	8.4	7.1^{AB}	31.7	2.7^A	0.43^A	0.26
DeKalb	310	8.6	6.0	26.3	3.6	0.35	0.29
(Sigma)	413	9.0	7.2	29.5	2.1	0.43	0.30
	Average	8.8	6.6^B	27.9	2.9^A	0.39^B	0.29
Bovans	310	7.9	6.7	28.0	1.7	0.41	0.27
(Experiment)	413	9.1	8.1	31.6	0.6	0.49	0.33
	Average	8.5	7.4^A	29.8	1.2^{BC}	0.45^A	0.30
All Strains	310	7.8	6.6	28.8	2.6^Y	0.40	0.27
	413	8.8	7.6	30.8	1.5^Z	0.46	0.29
	Average	8.3	7.1	29.8	2.0	0.43	0.28

[1]The following is the conversion from square centimeters to square inches:
310 equals 48 square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons
made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons
made among density average values.
*There was insufficient egg size and quality data for the molt period.
This information will be included in the second cycle tables.

TABLE 18. EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT PROGRAM ON PERFORMANCE
          OF HENS IN THE 34th NCLP&MT DURING THE MOLT PERIOD (462-490 DAYS)*

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Mortal- ity (%)	Egg Income ($/hen)	Feed Costs ($/Hen)
Hy-Line	NM	12.6	20.5	80.4	0.3	1.24	0.51
(W-36)	NF	7.0	3.2	12.7	1.3	0.19	0.22
	SF	5.8	3.1	12.4	1.3	0.19	0.18
	FR	6.7	3.0	11.9	0.4	0.18	0.27
Hy-Line	NM	12.8	18.3	76.7	1.1	1.12	0.47
(W-98)	NF	7.0	3.0	12.4	3.0	0.19	0.22
	SF	5.4	3.0	12.1	2.6	0.18	0.17
	FR	6.8	3.1	12.6	2.0	0.19	0.28
Bovans	NM	12.9	19.3	85.8	1.6	1.15	0.44
(White)	NF	6.8	3.0	13.1	2.2	0.18	0.18
	SF	6.0	3.1	13.8	3.2	0.18	0.16
	FR	6.9	3.0	13.0	2.6	0.17	0.23
DeKalb	NM	12.9	19.8	87.6	1.2	1.19	0.43
(White)	NF	7.2	2.8	11.8	2.0	0.17	0.19
	SF	6.1	2.9	13.3	2.2	0.18	0.16
	FR	7.6	3.1	14.3	5.6	0.19	0.25
DeKalb	NM	13.1	18.4	76.7	0.9	1.09	0.48
(Sigma)	NF	8.5	2.9	12.6	4.2	0.17	0.25
	SF	6.0	2.6	10.7	1.1	0.15	0.18
	FR	7.6	2.6	11.6	5.3	0.15	0.26
Bovans	NM	12.8	19.8	78.7	0.5	1.20	0.50
(Experiment)	NF	7.9	3.2	13.3	1.7	0.20	0.24
	SF	6.2	3.1	12.5	0.7	0.18	0.18
	FR	7.0	3.6	14.7	1.8	0.21	0.26
All Strains	NM	12.8	19.3	81.0	0.9^Z	1.16	0.47
	NF	7.4	3.0	12.7	2.4^Y	0.18	0.22
	SF	5.9	3.0	12.5	1.8^{YZ}	0.18	0.17
	FR	7.1	3.1	13.0	2.9^Y	0.18	0.26

Y,Z - Different letters denote significant differences (P<.01), comparisons
made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR =
13-day fast.
*There was insufficient egg size and quality data for the molt period.
This information will be included in the second cycle tables.

TABLE 19.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN
            THE 34th NCLP&MT DURING THE MOLT PERIOD (462-490 DAYS)*

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Mortal- ity (%)	Egg Income ($/hen)	Feed Costs ($/Hen)
Hy-Line	310	8.2	6.5	30.3	1.8	0.39	0.25
(Brown)	413	9.2	8.6	33.1	1.5	0.52	0.35
	Average	8.7	7.5	31.7^B	1.6	0.46	0.30
Bovans	310	9.1	6.8	33.9	3.3	0.41	0.27
(Brown)	413	9.2	8.7	34.5	2.4	0.53	0.34
	Average	9.2	7.7	34.2^{AB}	2.8	0.47	0.30
DeKalb	310	9.3	6.8	35.4	2.2	0.41	0.27
(Brown)	413	9.2	8.6	36.0	1.9	0.53	0.33
	Average	9.2	7.7	35.7^A	2.1	0.47	0.30
All Strains	310	8.9	6.7	33.2	2.4	0.41	0.26^Z
	413	9.2	8.6	34.5	1.9	0.53	0.34^Y
	Average	9.0	7.7	33.9	2.2	0.47	0.30

[1]The following is the conversion from square centimeters to square inches:
310 equals 48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons
made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons
made among molt program average values.
*There was insufficient egg size and quality data for the molt period. This
information will be included in the second cycle tables.

TABLE 20.   EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT PROGRAM ON PERFORMANCE
            OF HENS IN THE 34th NCLP&MT DURING THE MOLT PERIOD (462-490 DAYS)*

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Eggs Per Bird Housed	Egg Production (HD%)	Mortality (%)	Egg Income ($/hen)	Feed Costs ($/Hen)
Hy-Line	NM	13.0	18.6	77.4	1.3	1.13	0.50
(Brown)	NF	8.3	4.3	18.0	1.2	0.26	0.26
	SF	5.9	3.7	16.1	2.0	0.22	0.17
	FR	7.7	3.5	15.3	2.0	0.21	0.28
Bovans	NM	14.1	18.9	82.0	2.0	1.15	0.50
(Brown)	NF	8.1	3.8	17.4	3.0	0.23	0.22
	SF	5.7	3.6	16.2	3.4	0.22	0.16
	FR	8.8	4.7	21.1	2.9	0.29	0.32
DeKalb	NM	14.4	18.2	86.6	1.5	1.12	0.47
(Brown)	NF	8.1	4.2	17.6	2.5	0.25	0.24
	SF	5.4	3.4	15.3	2.6	0.21	0.16
	FR	9.0	5.0	23.3	1.6	0.31	0.33
All Strains	NM	13.8^{X}	18.6	82.0^{X}	1.6	1.13	0.49^{W}
	NF	8.2^{Y}	4.1	17.7^{YZ}	2.2	0.25	0.24^{Y}
	SF	5.6^{Z}	3.6	15.9^{Z}	2.7	0.22	0.16^{Z}
	FR	8.5^{Y}	4.4	19.9^{Y}	2.2	0.27	0.31^{X}

W,X,Y,Z - Different letters denote significant differences (P<.01),
comparisons made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR =
13-day fast.
*There was insufficient egg size and quality data for the molt period.
This information will be included in the second cycle tables.

TABLE 21.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	10.9	.41	153.4	68.6	45.7	6.2
(W-36)	413	12.4	.37	161.9	70.1	46.9	6.5
	Average	11.7^B	.39^A	157.7	69.4	46.3	6.4^C
Hy-Line	310	11.8	.39	135.3	66.7	46.5	7.5
(W-98)	413	12.7	.38	162.2	69.5	48.3	7.0
	Average	12.2^{AB}	.38^A	148.8	68.1	47.4	7.2^{BC}
Bovans	310	11.7	.40	132.2	73.3	47.0	11.3
(White)	413	13.6	.36	153.3	76.2	48.9	12.9
	Average	12.7^A	.38^A	142.8	74.7	48.0	12.1^A
DeKalb	310	11.6	.39	130.3	70.7	46.8	11.5
(White)	413	13.2	.37	143.5	74.2	48.7	13.1
	Average	12.4^{AB}	.38^A	136.9	72.4	47.8	12.3^A
DeKalb	310	12.0	.36	126.0	68.0	44.4	12.0
(Sigma)	413	13.5	.34	151.2	71.8	47.1	10.5
	Average	12.7^A	.35^B	138.6	69.9	45.7	11.2^A
Bovans	310	11.2	.39	138.9	68.8	44.7	11.5
(Experiment)	413	12.9	.36	161.2	71.4	47.0	9.0
	Average	12.1^{AB}	.38^A	150.0	70.1	45.9	10.3^{AB}
All Strains	310	11.5^Z	.39^Y	136.0^Z	69.3^Z	45.8	10.0
	413	13.1^Y	.36^Z	155.6^Y	72.2^Y	47.8	9.8
	Average	12.3	.38	145.8	70.8	46.8	9.9

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 22. EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	64.7	0.0	0.0	1.5	48.0	50.0
(W-36)	413	65.1	0.1	0.1	2.3	40.1	56.9
	Average	64.9^B	0.1	0.0^B	1.9^{DE}	44.0	53.4^B
Hy-Line	310	68.1	0.0	0.0	0.5	23.9	75.2
(W-98)	413	68.4	0.0	0.1	0.8	21.5	77.3
	Average	68.2^A	0.0	0.1^B	0.6^E	22.7	76.3^A
Bovans	310	63.2	0.0	0.2	4.7	56.0	38.6
(White)	413	63.6	0.0	0.2	5.7	50.4	43.0
	Average	63.4^{CD}	0.0	0.2^{AB}	5.2^{AB}	53.2	40.8^{CD}
DeKalb	310	64.7	0.0	0.2	4.8	43.1	51.7
(White)	413	65.3	0.0	0.1	3.6	40.9	55.1
	Average	65.0^B	0.0	0.1^B	4.2^{BC}	42.0	53.4^B
DeKalb	310	62.5	0.1	0.8	7.7	54.2	36.7
(Sigma)	413	63.5	0.0	0.2	5.0	51.9	42.4
	Average	63.0^D	0.0	0.5^A	6.4^A	53.0	39.5^D
Bovans	310	64.1	0.0	0.1	3.4	51.1	45.0
(Experiment)	413	64.3	0.0	0.0	2.7	49.9	46.9
	Average	64.2^{BC}	0.0	0.1^B	3.1^{CD}	50.5	45.9^C
All Strains	310	64.5	0.0	0.2	3.8	46.0^Y	49.5^Z
	413	65.0	0.0	0.1	3.4	42.4^Z	53.6^Y
	Average	64.8	0.0	0.2	3.6	44.2	51.6

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 23.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.8	2.0	1.6	0.6	9.21	4.41
(W-36)	413	97.3	1.1	1.2	0.4	9.83	5.12
	Average	96.6^A	1.6^B	1.4	0.5	9.52	4.77^A
Hy-Line	310	94.3	3.3	2.0	0.5	8.14	4.30
(W-98)	413	95.0	2.9	1.4	0.8	9.79	5.37
	Average	94.6^B	3.1^A	1.7	0.7	8.97	4.84^A
Bovans	310	96.0	1.9	1.7	0.4	7.89	3.81
(White)	413	97.0	0.9	1.7	0.3	9.21	4.87
	Average	96.5^A	1.4^B	1.7	0.4	8.55	4.34^B
DeKalb	310	95.0	2.8	1.7	0.4	7.77	3.87
(White)	413	97.1	1.0	1.4	0.5	8.71	4.54
	Average	96.1^A	1.9^B	1.6	0.4	8.24	4.20^C
DeKalb	310	96.1	1.7	2.0	0.2	7.47	4.03
(Sigma)	413	96.8	1.1	1.8	0.3	9.08	5.09
	Average	96.5^A	1.4^B	1.9	0.2	8.28	4.56^{AB}
Bovans	310	97.2	1.5	1.1	0.2	8.39	4.10
(Experiment)	413	97.1	1.1	1.6	0.2	9.76	5.25
	Average	97.1^A	1.3^B	1.4	0.2	9.08	4.67^A
All Strains	310	95.7^Z	2.2^Y	1.7	0.4	8.15^Z	4.09^Z
	413	96.7^Y	1.3^Z	1.5	0.4	9.40^Y	5.04^Y
	Average	96.2	1.8	1.6	0.4	8.77	4.56

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 24.   EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON PERFORMANCE OF HENS IN THE
            34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line (W-36)	NM	12.5	.33	142.7^{CDE}	63.2^{F}	40.3^{E}	8.3
	NF	11.1	.42	160.7^{AB}	70.9^{DE}	48.7^{ABCD}	5.5
	SF	11.3	.41	163.4^{AB}	71.1^{DE}	48.4^{ABCD}	5.9
	FR	11.8	.41	163.9^{A}	72.3^{CD}	47.6^{BCD}	5.7
Hy-Line (W-98)	NM	12.1	.32	118.1^{G}	56.4^{G}	38.4^{E}	9.8
	NF	12.2	.40	156.3^{ABC}	71.0^{DE}	50.0^{ABC}	5.7
	SF	12.3	.40	155.3^{ABC}	71.5^{BCD}	50.4^{ABC}	8.8
	FR	12.4	.41	165.5^{A}	73.5^{BCD}	50.8^{ABc}	4.7
Bovans (White)	NM	12.7	.33	124.6^{FG}	66.7^{EF}	40.9^{E}	15.7
	NF	12.3	.39	142.7^{CDE}	75.5^{ABCD}	49.5^{ABCD}	13.6
	SF	12.6	.40	149.0^{ABCDE}	79.5^{A}	51.3^{AB}	12.4
	FR	13.1	.39	154.7^{ABC}	77.2^{ABC}	50.0^{ABC}	6.7
DeKalb (White)	NM	12.5	.33	123.0^{FG}	65.1^{F}	41.0^{E}	17.4
	NF	11.7	.41	146.9^{BCDE}	74.1^{ABCD}	49.4^{ABCD}	11.7
	SF	12.8	.40	140.9^{CDE}	76.4^{ABCD}	51.4^{AB}	10.3
	FR	12.5	.39	136.8^{DEF}	74.1^{ABCD}	49.2^{ABCD}	9.7
DeKalb (Sigma)	NM	12.8	.27	113.7^{G}	55.2^{G}	34.3^{F}	15.4
	NF	12.4	.40	154.0^{ABC}	78.0^{AB}	52.5^{A}	10.3
	SF	13.0	.37	152.3^{ABCD}	74.9^{ABCD}	50.4^{ABC}	10.1
	FR	12.7	.36	134.5^{EF}	71.5^{DE}	45.7^{D}	9.1
Bovans (Experiment)	NM	12.3	.32	134.7^{EF}	62.2^{F}	39.1^{E}	13.9
	NF	11.9	.40	155.7^{ABC}	72.5^{BCD}	48.9^{ABCD}	7.7
	SF	11.6	.40	156.2^{ABC}	71.1^{DE}	47.0^{CD}	9.9
	FR	12.7	.38	153.5^{ABCD}	74.6^{ABCD}	48.5^{ABCD}	9.6
All Strains	NM	12.5	.32^{Z}	126.1	61.5	39.0	13.4^{Y}
	NF	11.9	.40^{Y}	152.7	73.7	49.8	9.1^{Z}
	SF	12.3	.40^{Y}	152.9	74.1	49.8	9.6^{Z}
	FR	12.5	.39^{Y}	151.5	73.9	48.7	7.6^{Z}

A,B,C,D,E,F,G - Different letters denote significant differences (P<.01), comparisons made
among strain by molt program average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 25.　EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line (W-36)	NM	63.8	0.0	0.2	2.8	51.6^{BC}	44.8
	NF	65.2	0.1	0.0	1.6	44.3^{CDEF}	53.9
	SF	65.1	0.1	0.0	1.8	41.4^{DEF}	56.3
	FR	65.5	0.1	0.0	1.5	38.9^{EF}	58.7
Hy-Line (W-98)	NM	68.0	0.0	0.1	0.6	24.0^{G}	74.9
	NF	67.6	0.0	0.1	0.7	26.7^{G}	72.1
	SF	68.3	0.0	0.0	0.4	20.6^{G}	79.3
	FR	69.0	0.0	0.0	0.7	19.6^{G}	78.9
Bovans (White)	NM	61.4	0.0	0.7	9.7	61.7^{A}	27.2
	NF	64.0	0.0	0.1	4.3	48.6^{BCDE}	46.6
	SF	63.8	0.0	0.1	3.8	52.5^{ABC}	43.1
	FR	64.4	0.0	0.0	3.2	50.0^{BCD}	46.3
DeKalb (White)	NM	62.9	0.0	0.2	7.4	51.6^{BC}	40.6
	NF	65.1	0.0	0.2	3.6	43.6^{CDEF}	52.4
	SF	65.7	0.0	0.1	4.3	36.5^{FG}	58.9
	FR	66.3	0.0	0.0	1.6	36.2^{FG}	61.8
DeKalb (Sigma)	NM	62.1	0.2	1.0	7.8	52.2^{BC}	37.7
	NF	62.8	0.0	0.1	6.1	58.4^{AB}	35.3
	SF	63.4	0.0	0.2	5.8	53.2^{ABC}	40.1
	FR	63.7	0.0	0.6	5.7	48.3^{BCDE}	45.0
Bovans (Experiment)	NM	62.8	0.0	0.1	4.7	58.0^{AB}	36.3
	NF	64.9	0.0	0.0	3.4	45.3^{CDEF}	50.8
	SF	64.5	0.0	0.0	1.9	50.1^{BCD}	47.7
	FR	64.5	0.0	0.1	2.2	48.6^{BCDE}	48.8
All Strains	NM	63.5^{Z}	0.0	0.4^{Y}	5.5^{Y}	49.9	43.6^{Z}
	NF	64.9^{Y}	0.0	0.1^{Z}	3.3^{Z}	44.5	51.9^{Y}
	SF	65.1^{Y}	0.0	0.1^{Z}	3.0^{Z}	42.4	54.2^{XY}
	FR	65.6^{Y}	0.0	0.1^{Z}	2.5^{Z}	40.3	56.7^{X}

A,B,C,D,E,F,G - Different letters denote significant differences (P<.01), comparisons made among strain by molt program average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 26.   EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	NM	95.8	2.2	1.2	0.8	8.51^{EFG}	4.67
(W-36)	NF	97.6	1.0	1.3	0.1	9.82^{ABC}	4.67
	SF	96.3	2.0	1.4	0.3	9.87^{AB}	4.82
	FR	96.6	1.1	1.5	0.7	9.88^{AB}	4.90
Hy-Line	NM	92.6	4.0	2.1	1.4	6.98^{I}	4.20
(W-98)	NF	95.2	3.1	1.4	0.3	9.42^{ABCDE}	4.96
	SF	95.0	2.7	1.5	0.8	9.40^{ABCDE}	4.99
	FR	95.8	2.5	1.6	0.1	10.70^{A}	5.19
Bovans	NM	95.5	2.0	2.0	0.4	7.29^{HI}	3.93
(White)	NF	97.7	0.9	1.1	0.3	8.66^{DEFG}	4.28
	SF	97.2	1.3	1.3	0.1	8.99^{BCDEFG}	4.38
	FR	95.5	1.5	2.4	0.6	9.26^{ABCDEF}	4.78
DeKalb	NM	94.6	2.6	2.2	0.7	7.24^{HI}	3.89
(White)	NF	95.7	2.4	1.4	0.5	8.83^{CDEFG}	4.32
	SF	96.9	1.6	1.3	0.3	8.53^{DEFG}	4.39
	FR	97.2	1.0	1.4	0.3	8.35^{FG}	4.22
DeKalb	NM	95.1	2.0	2.7	0.3	6.64^{I}	4.36
(Sigma)	NF	97.2	1.1	1.5	0.2	9.27^{ABCDEF}	4.55
	SF	96.7	1.6	1.5	0.2	9.11^{ABCDEF}	4.95
	FR	96.9	0.9	1.9	0.2	8.09^{GH}	4.39
Bovans	NM	97.4	1.1	1.2	0.3	8.08^{GH}	4.41
(Experiment)	NF	98.0	0.5	1.3	0.2	9.49^{ABCD}	4.72
	SF	96.7	1.8	1.4	0.1	9.45^{ABCDE}	4.74
	FR	96.6	1.7	1.6	0.2	9.28^{ABCDEF}	4.83
All Strains	NM	95.1^{Z}	2.3	1.9	0.7	7.46	4.24^{Z}
	NF	96.9^{Y}	1.5	1.3	0.3	9.25	4.58^{Y}
	SF	96.5^{Y}	1.8	1.4	0.3	9.23	4.71^{Y}
	FR	96.4^{Y}	1.4	1.7	0.4	9.16	4.72^{Y}

A,B,C,D,E,F,G - Different letters denote significant differences (P<.01), comparisons
made among strain by molt program average values.
X,Y,Z - Different letters denote significant differences (P<.01), comparisons made among
molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 27.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	12.4	.37	123.5	66.7	45.3	7.2
(Brown)	413	13.5	.35	158.5	69.6	47.3	5.8
	Average	13.0	.36	141.0^A	68.1^{AB}	46.3^A	6.5
Bovans	310	12.7	.34	112.7	64.3	43.0	8.8
(Brown)	413	13.3	.34	144.4	66.4	45.1	8.5
	Average	13.0	.34	128.5^B	65.4^B	44.0^B	8.7
DeKalb	310	13.2	.35	113.0	67.0	45.5	8.9
(Brown)	413	13.9	.35	153.7	71.1	48.1	9.9
	Average	13.6	.35	133.4^{AB}	69.0^A	46.8^A	9.4
All Strains	310	12.8^Z	.35	116.4^Z	66.0^Z	44.6^Z	8.3
	413	13.6^Y	.35	152.2^Y	69.0^Y	46.8^Y	8.1
	Average	13.2	.35	134.3	67.5	45.7	8.2

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain by molt program average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 28.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm²)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	67.3	0.0	0.0	1.7	31.8	65.8
(Brown)	413	67.6	0.0	0.1	1.1	30.5	68.0
	Average	67.5	0.0	0.0	1.4	31.2	66.9
Bovans	310	66.7	0.0	0.0	1.8	35.5	62.4
(Brown)	413	67.3	0.0	0.0	1.6	32.8	65.0
	Average	67.0	0.0	0.0	1.7	34.1	63.7
DeKalb	310	67.8	0.1	0.0	0.9	28.3	70.3
(Brown)	413	67.5	0.0	0.1	1.6	31.0	67.0
	Average	67.7	0.1	0.1	1.3	29.7	68.6
All Strains	310	67.3	0.0	0.0	1.5	31.9	66.2
	413	67.5	0.0	0.1	1.4	31.4	66.6
	Average	67.4	0.0	0.0	1.5	31.6	66.4

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.

TABLE 29.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.6	3.1	1.2	0.1	7.43	4.16
(Brown)	413	96.9	1.7	1.4	0.0	9.68	5.57
	Average	96.2	2.4	1.3	0.1	8.56^A	4.87
Bovans	310	96.5	2.1	1.3	0.2	6.84	4.02
(Brown)	413	96.0	1.9	2.0	0.1	8.74	5.18
	Average	96.3	2.0	1.6	0.1	7.79^B	4.60
DeKalb	310	96.3	1.9	1.7	0.0	6.87	4.03
(Brown)	413	96.7	1.8	1.4	0.2	9.36	5.43
	Average	96.5	1.9	1.5	0.1	8.11^{AB}	4.73
All Strains	310	96.1	2.4	1.4	0.1	7.05^Z	4.07^Z
	413	96.5	1.8	1.6	0.1	9.26^Y	5.39^Y
	Average	96.3	2.1	1.5	0.1	8.15	4.73

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 30.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON PERFORMANCE OF HENS IN THE
            34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	NM	12.5	.33	127.8	60.4	40.3	8.3
(Brown)	NF	12.8	.37	145.9	69.2	47.1	6.2
	SF	13.0	.38	141.8	70.5	48.6	6.6
	FR	13.6	.36	148.6	72.4	49.2	4.8
Bovans	NM	13.2	.29	114.5	57.9	38.3	12.3
(Brown)	NF	12.2	.37	133.3	67.5	45.1	6.1
	SF	13.1	.34	129.0	65.9	45.1	7.9
	FR	13.6	.36	137.3	70.1	47.6	8.4
DeKalb	NM	14.0	.29	110.1	60.1	40.2	9.7
(Brown)	NF	12.9	.36	140.3	68.3	46.6	7.6
	SF	13.4	.37	134.4	71.7	48.3	12.3
	FR	13.9	.37	148.6	76.0	52.0	8.1
All Strains	NM	13.2	$.30^Z$	117.5^Z	59.5^Z	39.6^Z	10.1
	NF	12.6	$.37^Y$	139.8^Y	68.3^Y	46.2^Y	6.6
	SF	13.1	$.36^Y$	135.1^Y	69.4^{XY}	47.4^{XY}	9.0
	FR	13.7	$.37^Y$	144.8^Y	72.8^X	49.6^X	7.1

X,Y,Z - Different letters denote significant differences (P<.01), comparisons made
among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day
fast.

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TABLE 31.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON EGG WEIGHT AND EGG SIZE
             DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	NM	66.7	0.0	0.1	2.1	34.1	63.0
(Brown)	NF	67.9	0.0	0.0	1.6	28.7	68.7
	SF	67.4	0.0	0.1	0.9	31.6	67.1
	FR	67.9	0.0	0.0	0.9	30.2	68.7
Bovans	NM	66.1	0.0	0.1	3.5	38.2	57.7
(Brown)	NF	66.8	0.0	0.0	1.3	34.6	63.6
	SF	67.4	0.0	0.0	1.4	31.4	66.9
	FR	67.8	0.0	0.0	0.7	32.3	66.7
DeKalb	NM	66.8	0.1	0.2	2.1	35.7	61.6
(Brown)	NF	68.0	0.0	0.0	1.0	32.7	65.9
	SF	67.5	0.1	0.0	0.8	27.2	71.7
	FR	68.4	0.0	0.0	1.2	23.1	75.3
All Strains	NM	66.6^Z	0.0	0.1	2.6^Y	36.0^Y	60.8^Z
	NF	67.6^Y	0.0	0.0	1.3^Z	32.0^{YZ}	66.1^{YZ}
	SF	67.4^Y	0.0	0.0	1.0^Z	30.1^{YZ}	68.6^Y
	FR	68.0^Y	0.0	0.0	1.0^Z	28.5^Z	70.3^Y

X,Y,Z - Different letters denote significant differences (P<.01), comparisons made
among molt program average alues.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day
fast.

TABLE 32.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS)

Breeder (Strain)	Molt Program	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	NM	94.8	3.4	1.6	0.2	7.64	4.38
(Brown)	NF	96.2	1.9	1.9	0.0	8.82	5.06
	SF	97.2	2.1	0.7	0.0	8.67	4.86
	FR	96.8	2.2	1.0	0.0	9.09	5.17
Bovans	NM	94.9	3.8	1.2	0.1	6.82	4.29
(Brown)	NF	96.4	1.7	1.9	0.0	8.10	4.46
	SF	97.0	1.1	1.5	0.4	7.86	4.71
	FR	96.8	1.3	1.8	0.0	8.39	4.93
DeKalb	NM	95.8	2.5	1.7	0.0	6.63	4.23
(Brown)	NF	96.8	1.7	1.4	0.1	8.56	4.93
	SF	96.4	1.9	1.7	0.0	8.20	4.72
	FR	96.8	1.4	1.4	0.3	9.06	5.05
All Strains	NM	95.2^{Z}	3.2^{Y}	1.5	0.1	7.03^{Z}	4.30^{Z}
	NF	96.4^{YZ}	1.8^{Z}	1.7	0.0	8.49^{Y}	4.82^{Y}
	SF	96.9^{Y}	1.7^{Z}	1.3	0.1	8.24^{Y}	4.76^{Y}
	FR	96.8^{Y}	1.7^{Z}	1.4	0.1	8.85^{Y}	5.05^{Y}

X,Y,Z - Different letters denote significant differences (P<.01), comparisons made
among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day
fast.

TABLE 33.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line (W-36)	310	11.6	.35	135.9	61.5	39.6	8.0
	413	13.3	.32	149.5	64.9	41.1	8.6
	Average	12.5	.33	142.7^{A}	63.2^{A}	40.3^{A}	8.3^{C}
Hy-Line (W-98)	310	11.6	.32	106.3	54.1	37.0	10.3
	413	12.6	.32	130.0	58.8	39.7	9.4
	Average	12.1	.32	118.1^{C}	56.4^{BC}	38.4^{A}	9.8^{BC}
Bovans (White)	310	11.3	.35	114.3	63.7	39.3	14.1
	413	14.0	.30	135.0	69.6	42.6	17.3
	Average	12.7	.33	124.6^{B}	66.7^{A}	40.9^{A}	15.7^{AB}
DeKalb (White)	310	11.4	.35	121.0	64.0	39.8	15.1
	413	13.6	.32	124.9	66.3	42.2	19.7
	Average	12.5	.33	123.0^{BC}	65.1^{A}	41.0^{A}	17.4^{A}
DeKalb (Sigma)	310	12.0	.27	102.7	52.0	32.1	15.3
	413	13.7	.27	124.6	58.4	36.6	15.4
	Average	12.8	.27	113.7^{C}	55.2^{C}	34.3^{B}	15.4^{AB}
Bovans (Experiment)	310	11.6	.33	124.9	60.6	38.0	14.5
	413	13.0	.32	144.4	63.8	40.1	13.3
	Average	12.3	.32	134.7^{AB}	62.2^{AB}	39.1^{A}	13.9^{ABC}
All Strains	310	11.6^{Z}	.33	117.5^{Z}	59.3^{Z}	37.6	12.9
	413	13.4^{Y}	.31	134.7^{Y}	63.6^{Y}	40.4	14.0
	Average	12.5	.32	126.1	61.5	39.0	13.4

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 34.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	64.4	0.0	0.1	1.1	50.1	48.6
(W-36)	413	63.2	0.0	0.2	4.4	53.0	41.0
	Average	63.8^B	0.0	0.2	2.8^{CD}	51.6^B	44.8^B
Hy-Line	310	68.4	0.0	0.0	0.4	23.6	75.7
(W-98)	413	67.6	0.0	0.3	0.9	24.4	74.0
	Average	68.0^A	0.0	0.1	0.6^D	24.0^C	74.9^A
Bovans	310	61.6	0.0	0.6	9.2	62.6	26.9
(White)	413	61.1	0.0	0.7	10.1	60.9	27.5
	Average	61.4^D	0.0	0.7	9.7^A	61.7^A	27.2^C
DeKalb	310	62.1	0.0	0.4	9.0	55.1	35.2
(White)	413	63.7	0.0	0.0	5.8	48.1	45.9
	Average	62.9^{BC}	0.0	0.2	7.4^{AB}	51.6^B	40.6^B
DeKalb	310	61.6	0.4	1.9	10.1	54.1	32.4
(Sigma)	413	62.6	0.0	0.1	5.4	50.4	42.9
	Average	62.1^{CD}	0.2	1.0	7.8^{AB}	52.0^B	37.7^B
Bovans	310	62.7	0.0	0.3	5.4	57.6	35.9
(Experiment)	413	62.8	0.0	0.0	4.1	58.4	36.7
	Average	62.8^{BCD}	0.0	0.1	4.7^{BC}	59.0^{AB}	36.3^{BC}
All Strains	310	63.5	0.1	0.5	5.8	50.5	42.4
	413	63.5	0.0	0.2	5.1	49.2	44.7
	Average	63.5	0.0	0.4	5.5	49.9	43.6

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made
among strain average values.

TABLE 35.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.2	2.9	1.2	0.6	8.15	4.27
(W-36)	413	96.4	1.4	1.2	0.9	8.86	5.07
	Average	95.8^{AB}	2.2^{AB}	1.2	0.8	8.51^A	4.67
Hy-Line	310	91.9	4.6	3.0	0.6	6.29	3.80
(W-98)	413	93.3	3.5	1.1	2.1	7.68	4.60
	Average	92.6^C	4.0^A	2.1	1.4	6.98^C	4.20
Bovans	310	94.1	3.1	2.5	0.4	6.63	3.36
(White)	413	97.0	1.0	1.5	0.5	7.95	4.49
	Average	95.5^{AB}	2.0^B	2.0	0.4	7.29^{BC}	3.93
DeKalb	310	93.6	3.3	2.6	0.5	7.05	3.58
(White)	413	95.5	1.8	1.9	0.9	7.44	4.21
	Average	94.6^{BC}	2.6^{AB}	2.2	0.7	7.24^C	3.89
DeKalb	310	94.8	2.1	3.1	0.0	5.93	3.93
(Sigma)	413	95.3	1.9	2.2	0.6	7.35	4.78
	Average	95.1^{ABC}	2.0^B	2.7	0.3	6.64^C	4.36
Bovans	310	97.0	1.5	1.2	0.4	7.46	3.98
(Experiment)	413	97.7	0.7	1.3	0.3	8.71	4.84
	Average	97.4^A	1.1^B	1.2	0.3	8.08^{AB}	4.41
All Strains	310	94.4^Z	2.9^Y	2.3	0.4	6.92^Z	3.82^Z
	413	95.9^Y	1.7^Z	1.5	0.9	8.00^Y	4.67^Y
	Average	95.1	2.3	1.9	0.6	7.46	4.24

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 36.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
            NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conver- sion (g egg/ g feed)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	12.2	.32	105.5	57.5	38.4	10.4
(Brown)	413	12.8	.33	150.2	63.3	42.2	6.2
	Average	12.5	.33	127.8	60.4	40.3	8.3
Bovans	310	13.1	.29	97.5	56.3	37.2	9.8
(Brown)	413	13.4	.29	131.6	59.5	39.3	14.7
	Average	13.2	.29	114.5	57.9	38.3	12.3
DeKalb	310	14.3	.27	95.2	57.3	38.8	7.3
(Brown)	413	13.7	.30	125.1	62.9	41.5	12.1
	Average	14.0	.29	110.1	60.1	40.2	9.7
All Strains	310	13.2	.29	99.4^Z	57.0	38.1	9.2
	413	13.3	.31	135.6^Y	61.9	41.0	11.0
	Average	13.2	.30	117.5	59.5	39.6	10.1

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 37. EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	66.7	0.0	0.0	3.1	35.8	60.4
(Brown)	413	66.7	0.0	0.1	1.1	32.5	65.6
	Average	66.7	0.0	0.1	2.1	34.1	63.0
Bovans	310	66.2	0.0	0.0	3.9	37.7	57.8
(Brown)	413	66.1	0.0	0.2	3.0	38.7	57.6
	Average	66.1	0.0	0.1	3.5	38.2	57.7
DeKalb	310	67.6	0.2	0.1	1.6	31.6	66.3
(Brown)	413	66.0	0.0	0.3	2.6	39.8	56.9
	Average	66.8	0.1	0.2	2.1	35.7	61.6
All Strains	310	66.8	0.1	0.0	2.9	35.0	61.5
	413	66.3	0.0	0.2	2.2	37.0	60.0
	Average	66.6	0.0	0.1	2.5	36.0	60.8

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.

TABLE 38.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED
             COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-MOLTED

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	94.5	3.7	1.5	0.3	6.26	3.70
(Brown)	413	95.2	3.1	1.7	0.0	9.02	5.05
	Average	94.8	3.4	1.6	0.2	7.64	4.38
Bovans	310	95.3	3.5	1.1	0.1	5.82	3.76
(Brown)	413	94.5	4.1	1.4	0.0	7.82	4.83
	Average	94.9	3.8	1.2	0.1	6.82	4.29
DeKalb	310	96.2	2.2	1.7	0.0	5.77	3.97
(Brown)	413	95.4	2.8	1.8	0.0	7.49	4.49
	Average	95.8	2.5	1.7	0.0	6.63	4.23
All Strains	310	95.3	3.1	1.4	0.1	5.95^Z	3.81^Z
	413	95.1	3.4	1.6	0.0	8.11^Y	4.79^Y
	Average	95.2	3.2	1.5	0.1	7.03	4.30

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line (W-36)	310	10.7	.43	154.1	70.8	48.2	7.1
	413	11.6	.41	167.1	71.0	49.2	4.2
	Average	11.1	.42	160.6	70.9[B]	48.7	5.6[B]
Hy-Line (W-98)	310	11.5	.41	141.3	69.9	49.1	6.2
	413	12.8	.39	171.3	72.1	50.9	5.2
	Average	12.2	.40	156.3	71.0[B]	50.0	5.7[B]
Bovans (White)	310	11.3	.41	129.9	73.8	47.8	12.7
	413	13.2	.38	155.5	77.2	51.1	14.5
	Average	12.2	.40	142.7	75.5[AB]	49.5	13.6[A]
DeKalb (White)	310	11.7	.41	132.8	73.0	49.1	11.6
	413	11.9	.41	160.0	75.4	49.8	11.8
	Average	11.8	.41	146.4	74.2[AB]	49.5	11.7[AB]
DeKalb (Sigma)	310	12.1	.40	142.9	76.6	51.2	10.1
	413	12.8	.40	165.7	79.5	54.0	10.2
	Average	12.4	.40	154.3	78.0[A]	52.6	10.2[AB]
Bovans (Experiment)	310	11.0	.41	146.4	69.8	46.1	9.7
	413	12.7	.39	165.8	74.9	51.4	5.8
	Average	11.8	.40	156.1	72.3[B]	48.7	7.7[AB]
All Strains	310	11.4[Z]	.41	141.2[Z]	72.3[Z]	48.6	9.5
	413	12.5[Y]	.40	164.2[Y]	75.0[Y]	51.1	8.6
	Average	11.9	.40	152.7	73.7	49.8	9.1

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 40.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-FASTED MOLT

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	64.0	0.0	0.0	2.0	56.8	40.9
(W-36)	413	66.2	0.1	0.0	1.3	32.9	65.6
	Average	65.1^B	0.1	0.0	1.6	44.8^B	53.2^B
Hy-Line	310	66.8	0.0	0.2	0.7	32.3	66.2
(W-98)	413	68.3	0.0	0.0	0.8	21.4	77.6
	Average	67.6^A	0.0	0.1	0.7	26.9^C	71.9^A
Bovans	310	63.0	0.0	0.2	4.5	57.6	37.3
(White)	413	64.9	0.0	0.1	4.2	40.3	55.1
	Average	63.9^{BC}	0.0	0.1	4.3	49.0^{AB}	46.2^{BC}
DeKalb	310	65.2	0.0	0.2	4.4	41.9	53.5
(White)	413	65.1	0.0	0.2	2.8	44.3	52.4
	Average	65.1^B	0.0	0.2	3.6	43.1^B	52.9^B
DeKalb	310	62.2	0.0	0.0	7.3	59.7	32.9
(Sigma)	413	63.4	0.0	0.1	4.8	56.5	38.3
	Average	62.8^C	0.0	0.1	6.1	58.1^A	35.6^C
Bovans	310	65.0	0.0	0.0	3.5	46.1	50.2
(Experiment)	413	65.0	0.0	0.0	3.3	44.0	52.2
	Average	65.0^B	0.0	0.0	3.4	45.0^B	51.2^B
All Strains	310	64.4^Z	0.0	0.1	3.7	49.1^Y	46.8^Z
	413	65.5^Y	0.0	0.1	2.9	39.9^Z	56.9^Y
	Average	64.9	0.0	0.1	3.3	44.5	51.9

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made
among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 41.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-FASTED MOLT

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	96.7	1.5	1.8	0.0	9.32	4.32
(W-36)	413	98.4	0.4	1.0	0.2	10.31	5.03
	Average	97.6	1.0	1.4	0.1	9.82	4.67^{AB}
Hy-Line	310	96.2	2.3	1.2	0.3	8.55	4.25
(W-98)	413	94.5	3.7	1.5	0.3	10.32	5.64
	Average	95.	3.0	1.4	0.3	9.43	4.95^{A}
Bovans	310	97.7	0.7	1.3	0.3	7.84	3.70
(White)	413	97.8	0.9	1.0	0.3	9.47	4.85
	Average	97.7	0.8	1.1	0.3	8.65	4.28^{B}
DeKalb	310	93.6	4.8	1.4	0.3	7.86	3.95
(White)	413	97.5	0.4	1.5	0.6	9.72	4.68
	Average	95.6	2.6	1.4	0.4	8.79	4.31^{B}
DeKalb	310	96.8	1.5	1.5	0.3	8.55	4.23
(Sigma)	413	97.6	0.7	1.5	0.2	10.03	4.91
	Average	97.2	1.1	1.5	0.2	9.29	4.57^{AB}
Bovans	310	98.0	0.7	1.2	0.1	8.94	4.27
(Experiment)	413	98.0	0.4	1.4	0.2	10.10	5.19
	Average	98.0	0.5	1.3	0.2	9.52	4.73^{AB}
All Strains	310	96.5	1.9	1.4	0.2	8.51^{Z}	4.12^{Z}
	413	97.3	1.1	1.3	0.3	9.99^{Y}	5.05^{Y}
	Average	96.9	1.5	1.3	0.3	9.25	4.58

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 42.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
            NCLP&MT (490-749 DAYS), NON-FASTED MOLT

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	11.8	.39	131.8	68.7	46.3	6.6
(Brown)	413	13.8	.35	160.8	69.9	47.9	5.5
	Average	12.8	.37	146.3	69.3	47.1	6.0
Bovans	310	11.9	.37	113.4	66.2	43.8	8.1
(Brown)	413	12.5	.37	152.7	68.7	46.4	4.1
	Average	12.2	.37	133.0	67.4	45.1	6.1
DeKalb	310	12.3	.37	117.1	65.6	44.3	10.2
(Brown)	413	13.5	.36	163.2	71.0	48.8	5.3
	Average	12.9	.36	140.2	68.3	46.5	7.7
All Strains	310	12.0	.38	120.8^Z	66.8	44.8	8.3
	413	13.3	.36	158.9^Y	69.9	47.7	5.0
	Average	12.6	.37	139.8	68.3	46.2	6.6

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 43.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-FASTED MOLT

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	67.4	0.0	0.1	1.8	31.0	65.5
(Brown)	413	68.4	0.0	0.0	1.4	26.1	72.3
	Average	67.9	0.0	0.0	1.6	28.5	68.9
Bovans	310	66.1	0.0	0.0	1.0	39.8	59.0
(Brown)	413	67.4	0.0	0.0	1.6	29.5	68.3
	Average	66.8	0.0	0.0	1.3	34.7	63.6
DeKalb	310	67.5	0.0	0.0	1.6	36.6	61.3
(Brown)	413	68.5	0.0	0.0	0.6	29.1	70.0
	Average	68.0	0.0	0.0	1.1	32.9	65.6
All Strains	310	67.0	0.0	0.0	1.4	35.8	61.9
	413	68.1	0.0	0.0	1.2	28.2	70.2
	Average	67.6	0.0	0.0	1.3	32.0	66.1

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.

TABLE 44.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS), NON-FASTED MOLT

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.9	2.3	1.6	0.1	7.87	4.23
(Brown)	413	96.5	1.3	2.2	0.0	9.83	5.90
	Average	96.2	1.8	1.9	0.1	8.85	5.06
Bovans	310	95.8	2.5	1.8	0.0	6.87	3.77
(Brown)	413	96.9	1.1	2.1	0.0	9.30	5.16
	Average	96.3	1.8	1.9	0.0	8.08	4.46
DeKalb	310	96.3	2.2	1.5	0.0	7.09	4.09
(Brown)	413	97.3	1.3	1.3	0.2	10.01	5.76
	Average	96.8	1.7	1.4	0.1	8.55	4.93
All Strains	310	96.0	2.3	1.6	0.0	7.27^{Z}	4.03^{Z}
	413	96.9	1.2	1.8	0.1	9.71^{Y}	5.60^{Y}
	Average	96.4	1.8	1.7	0.0	8.49	4.82

[1]The following is the conversion from square centimeters to square inches: 310 equals
48 square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 45.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
            NCLP&MT (490-749 DAYS), 5-DAY FAST RESTRICTED FEED

Breeder (Strain)	Density[1] (cm²)	Feed Cons (kg/100 hens/d)	Feed Conver- sion (g egg/ g feed)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	10.7	.42	158.4	69.5	47.5	4.9
(W-36)	413	12.0	.40	168.3	73.0	49.6	7.3
	Average	11.3	.41	163.4	71.3^B	48.6	6.1
Hy-Line	310	11.7	.42	143.7	70.4	49.9	8.8
(W-98)	413	12.8	.39	166.3	72.7	50.8	8.9
	Average	12.3	.40	155.0	71.5^B	50.4	8.8
Bovans	310	12.9	.40	136.3	80.7	52.9	12.1
(White)	413	12.0	.41	162.0	77.6	49.3	12.8
	Average	12.4	.41	149.2	79.1^A	51.1	12.4
DeKalb	310	11.6	.41	128.5	71.8	49.7	13.1
(White)	413	14.0	.39	152.3	80.4	52.9	8.2
	Average	12.8	.40	140.4	76.1^{AB}	51.3	10.6
DeKalb	310	11.7	.40	143.9	73.7	50.1	10.3
(Sigma)	413	14.3	.34	161.8	76.1	50.7	9.8
	Average	13.0	.37	152.8	74.9^{AB}	50.4	10.0
Bovans	310	11.1	.41	142.1	70.5	46.3	11.7
(Experiment)	413	12.1	.39	169.9	71.8	47.8	8.2
	Average	11.6	.40	156.0	71.1^B	47.0	9.9
All Strains	310	11.6^Z	.41^Y	142.1	72.8	49.4	10.1
	413	12.9^Y	.39^Z	163.4	75.3	50.2	9.2
	Average	12.2	.40	152.8	74.0	49.8	9.7

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 46.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 5-DAY FAST RESTRICTED FEED

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	65.0	0.1	0.0	1.7	42.7	54.9
(W-36)	413	65.3	0.0	0.0	1.6	40.3	57.7
	Average	65.2^{BC}	0.1	0.0	1.7^{BC}	41.5^B	56.3^B
Hy-Line	310	68.5	0.0	0.0	0.5	19.5	80.0
(W-98)	413	68.1	0.0	0.0	0.3	21.9	77.7
	Average	68.3^A	0.0	0.0	0.4^C	20.7^C	78.8^A
Bovans	310	63.9	0.0	0.0	2.2	53.1	44.5
(White)	413	63.7	0.0	0.2	5.7	52.0	41.2
	Average	63.8^{CD}	0.0	0.1	3.9^{ABC}	52.6^A	42.9^C
DeKalb	310	65.9	0.0	0.0	3.7	35.2	60.6
(White)	413	65.5	0.0	0.1	4.7	37.6	57.5
	Average	65.7^B	0.0	0.1	4.2^{AB}	36.4^B	59.1^B
DeKalb	310	62.9	0.0	0.4	7.0	53.8	38.3
(Sigma)	413	63.8	0.0	0.0	4.7	52.7	41.8
	Average	63.4^D	0.0	0.2	5.8^A	53.3^A	40.0^C
Bovans	310	64.3	0.0	0.0	2.1	52.3	45.5
(Experiment)	413	64.6	0.0	0.0	1.7	48.5	49.3
	Average	64.5^{BCD}	0.0	0.0	1.9^{BC}	50.4^A	47.4^C
All Strains	310	65.1	0.0	0.1	2.9	42.8	54.0
	413	65.2	0.0	0.0	3.1	42.2	54.2
	Average	65.1	0.0	0.1	3.0	42.5	54.1

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 47.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 5-DAY FAST RESTRICTED FEED

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	96.1	2.3	1.2	0.4	9.54	4.55
(W-36)	413	96.5	1.7	1.7	0.2	10.21	5.09
	Average	96.3	2.0	1.4	0.3	9.88	4.82^{AB}
Hy-Line	310	94.8	3.1	1.1	1.1	8.67	4.48
(W-98)	413	95.2	2.2	2.1	0.6	10.10	5.50
	Average	95.0	2.6	1.6	0.8	9.38	4.99^{A}
Bovans	310	97.2	1.9	1.0	0.0	8.26	4.05
(White)	413	97.3	0.6	1.7	0.3	9.73	4.68
	Average	97.2	1.2	1.3	0.1	9.00	4.36^{B}
DeKalb	310	96.5	1.9	1.4	0.3	7.75	3.87
(White)	413	97.3	1.2	1.2	0.3	9.26	4.87
	Average	96.9	1.5	1.3	0.3	8.51	4.37^{B}
DeKalb	310	95.7	2.3	1.8	0.2	8.53	4.25
(Sigma)	413	97.5	1.0	1.4	0.2	9.74	5.63
	Average	96.6	1.7	1.6	0.2	9.13	4.94^{A}
Bovans	310	98.3	1.1	0.5	0.1	8.69	4.18
(Experiment)	413	95.3	2.4	2.2	0.0	10.20	5.30
	Average	96.8	1.7	1.4	0.1	9.45	4.74^{AB}
All Strains	310	96.4	2.1	1.2	0.3	8.57^{Z}	4.23^{Z}
	413	96.5	1.5	1.7	0.3	9.87^{Y}	5.18^{Y}
	Average	96.5	1.8	1.4	0.3	9.22	4.70

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 48.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
             NCLP&MT (490-749 DAYS), 5-DAY FAST RESTRICTED FEED

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	12.3	.39	129.9	69.2	48.0	6.0
(Brown)	413	13.6	.37	153.4	72.1	49.3	7.7
	Average	13.0	.38	141.6	70.6	48.6	6.8
Bovans	310	12.9	.35	120.6	66.1	44.7	8.2
(Brown)	413	13.2	.35	136.6	65.7	45.5	7.5
	Average	13.0	.35	128.6	65.9	45.1	7.8
DeKalb	310	12.6	.38	113.5	70.7	47.5	12.4
(Brown)	413	14.3	.35	156.5	72.6	49.2	12.1
	Average	13.4	.37	135.0	71.6	48.3	12.2
All Strains	310	12.6	.37	121.3[Z]	68.6	46.7	8.8
	413	13.7	.35	148.8[Y]	70.1	48.0	9.1
	Average	13.1	.36	135.1	69.4	47.4	9.0

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 49.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 5-DAY FAST
            RESTRICTED FEED

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	67.3	0.0	0.0	1.1	31.2	67.4
(Brown)	413	67.5	0.0	0.1	0.7	32.0	66.8
	Average	67.4	0.0	0.1	0.9	31.6	67.1
Bovans	310	67.5	0.0	0.0	1.6	31.1	67.2
(Brown)	413	67.2	0.0	0.0	1.2	31.8	66.5
	Average	67.4	0.0	0.0	1.4	31.4	66.9
DeKalb	310	67.4	0.0	0.0	0.6	24.5	74.7
(Brown)	413	67.6	0.2	0.0	0.9	29.9	68.7
	Average	67.5	0.1	0.0	0.8	27.2	71.7
All Strains	310	67.4	0.0	0.0	1.1	28.9	69.8
	413	67.5	0.1	0.0	0.9	31.2	67.3
	Average	67.4	0.0	0.0	1.0	30.1	68.6

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.

TABLE 50.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
            OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 5-DAY FAST RESTRICTED FEED

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	96.2	3.1	0.7	0.0	7.89	4.33
(Brown)	413	98.2	1.1	0.7	0.0	9.43	5.36
	Average	97.2	2.1	0.7	0.0	8.66	4.84
Bovans	310	97.2	1.3	1.0	0.5	7.36	4.35
(Brown)	413	96.8	0.9	2.0	0.4	8.31	5.02
	Average	97.0	1.1	1.5	0.4	7.83	4.69
DeKalb	310	96.1	1.7	2.2	0.0	6.93	3.76
(Brown)	413	96.8	2.1	1.1	0.0	9.54	5.76
	Average	96.4	1.9	1.6	0.0	8.24	4.76
All Strains	310	96.5	2.0	1.3	0.2	7.39^Z	4.15^Z
	413	97.3	1.4	1.2	0.1	9.09^Y	5.38^Y
	Average	96.9	1.7	1.3	0.1	8.24	4.76

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 51.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
            NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	10.9	.44	165.8	72.8	47.4	5.2
(W-36)	413	12.7	.37	160.9	71.5	47.8	6.3
	Average	11.8	.41	163.3^A	72.1	47.6	5.7
Hy-Line	310	12.1	.42	150.2	72.7	49.9	4.4
(W-98)	413	12.7	.41	181.7	74.3	51.7	5.2
	Average	12.4	.41	165.9^A	73.5	50.8	4.8
Bovans	310	11.3	.42	148.5	74.9	48.0	6.3
(White)	413	15.1	.35	160.1	79.9	52.3	6.9
	Average	13.2	.39	154.3^{AB}	77.4	50.2	6.6
DeKalb	310	11.8	.41	135.9	73.2	48.4	7.0
(White)	413	13.1	.38	136.6	74.9	50.1	12.8
	Average	12.5	.40	136.2^B	74.0	49.2	9.9
DeKalb	310	12.2	.37	116.2	70.1	44.5	11.7
(Sigma)	413	13.1	.36	154.5	73.0	46.9	6.0
	Average	12.6	.37	135.3^B	71.5	45.7	8.8
Bovans	310	11.2	.42	142.4	73.9	48.2	10.4
(Experiment)	413	14.2	.35	165.0	75.3	48.7	8.7
	Average	12.7	.38	153.7^{AB}	74.6	48.4	9.6
All Strains	310	11.6^Z	.41^Y	143.2^Z	72.9	47.7	7.5
	413	13.5^Y	.37^Z	159.8^Y	74.8	49.6	7.6
	Average	12.5	.39	151.5	73.9	48.7	7.6

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 52.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line (W-36)	310	65.0	0.0	0.0	1.4	44.2	53.1
	413	65.9	0.2	0.0	1.5	33.1	64.9
	Average	65.4^{BC}	0.1	0.0^B	1.4^B	38.7^A	59.0^{BC}
Hy-Line (W-98)	310	68.6	0.0	0.0	0.4	20.7	78.5
	413	69.5	0.0	0.0	1.1	18.5	80.1
	Average	69.1^A	0.0	0.0^B	0.7^B	19.6^C	79.3^A
Bovans (White)	310	64.1	0.0	0.0	3.2	51.4	44.7
	413	64.7	0.0	0.0	3.0	48.8	47.9
	Average	64.4^{BC}	0.0	0.0^B	3.1^{AB}	50.1^A	46.3^{CD}
DeKalb (White)	310	66.0	0.0	0.0	1.9	38.1	59.8
	413	66.7	0.0	0.0	1.4	34.2	63.9
	Average	66.3^B	0.0	0.0^B	1.7^B	36.1^B	61.9^B
DeKalb (Sigma)	310	63.4	0.0	0.6	6.3	48.5	44.2
	413	64.0	0.0	0.6	5.4	48.4	45.5
	Average	63.7^C	0.0	0.6^A	5.8^A	48.4^A	44.8^D
Bovans (Experiment)	310	64.4	0.0	0.0	2.8	48.4	48.3
	413	64.6	0.0	0.2	1.5	48.8	49.3
	Average	64.5^{BC}	0.0	0.1^B	2.2^B	48.6^A	48.8^{BCD}
All Strains	310	65.2	0.0	0.1	2.7	41.9	54.8
	413	65.9	0.0	0.1	2.3	38.6	58.6
	Average	65.6	0.0	0.1	2.5	40.3	56.7

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 53.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
            OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.0	1.3	2.2	1.4	9.83	4.54
(W-36)	413	98.3	1.0	0.7	0.0	9.88	5.24
	Average	96.7	1.1	1.5	0.7	9.86^A	4.89^{AB}
Hy-Line	310	94.7	2.8	2.3	0.1	9.08	4.62
(W-98)	413	97.0	2.1	0.8	0.2	11.12	5.74
	Average	95.9	2.5	1.6	0.1	10.10^A	5.18^A
Bovans	310	95.4	1.7	2.1	0.8	8.85	4.15
(White)	413	95.6	1.4	2.8	0.3	9.62	5.42
	Average	95.5	1.5	2.4	0.6	9.24^{AB}	4.78^{ABC}
DeKalb	310	96.2	1.5	1.7	0.6	8.23	4.03
(White)	413	98.2	0.6	1.2	0.1	8.40	4.36
	Average	97.2	1.0	1.4	0.3	8.32^B	4.19^C
DeKalb	310	97.0	1.2	1.5	0.3	6.95	3.73
(Sigma)	413	96.7	0.7	2.4	0.2	9.32	5.07
	Average	96.9	0.9	2.0	0.3	8.13^B	4.40^{BC}
Bovans	310	95.7	2.5	1.6	0.2	8.53	3.98
(Experiment)	413	97.6	0.7	1.6	0.2	10.07	5.72
	Average	96.6	1.6	1.6	0.2	9.30^{AB}	4.85^{AB}
All Strains	310	95.7	1.8^Y	1.9	0.6	8.58^Z	4.17^Z
	413	97.2	1.0^Z	1.6	0.2	9.73^Y	5.26^Y
	Average	96.4	1.4	1.7	0.4	9.16	4.72

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 54.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th
            NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conver- sion (g egg/ g feed)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	13.2	.37	128.8	71.6	48.8	4.8
(Brown)	413	13.9	.36	168.3	73.1	49.6	4.8
	Average	13.6	.36	148.6	72.3	49.2	4.8
Bovans	310	13.2	.36	118.9	68.5	46.1	9.6
(Brown)	413	14.1	.36	155.6	71.9	49.3	7.0
	Average	13.6	.36	137.2	70.2	47.7	8.3
DeKalb	310	13.6	.38	124.7	74.2	51.1	6.3
(Brown)	413	14.3	.37	172.6	77.7	52.9	10.1
	Average	13.9	.37	148.6	75.9	52.0	8.2
All Strains	310	13.3	.37	124.1^Z	71.5	48.7	6.9
	413	14.1	.36	165.5^Y	74.2	50.6	7.3
	Average	13.7	.37	144.8	72.8	49.6	7.1

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

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TABLE 55. EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
DISTRIBUTION OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	68.0	0.0	0.0	0.7	28.4	70.7
(Brown)	413	67.7	0.0	0.0	1.2	32.3	66.4
	Average	67.9	0.0	0.0	0.9	30.3	68.5
Bovans	310	67.2	0.0	0.0	0.7	33.4	65.8
(Brown)	413	68.5	0.0	0.0	0.7	30.9	67.9
	Average	67.8	0.0	0.0	0.7	32.2	66.8
DeKalb	310	68.7	0.0	0.0	0.1	21.4	78.0
(Brown)	413	68.0	0.0	0.0	2.4	24.6	72.8
	Average	68.4	0.0	0.0	1.3	23.0	75.4
All Strains	310	68.0	0.0	0.0	0.5	27.7	71.5
	413	68.0	0.0	0.0	1.4	29.3	69.0
	Average	68.0	0.0	0.0	1.0	28.5	70.3

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.

TABLE 56.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
            OF HENS IN THE 34th NCLP&MT (490-749 DAYS), 13-DAY FAST

Breeder (Strain)	Density[1] (cm²)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	95.8	3.0	1.1	0.1	7.82	4.40
(Brown)	413	97.8	1.3	0.9	0.0	10.35	5.92
	Average	96.8	2.2	1.0	0.0	9.09	5.16
Bovans	310	97.7	1.1	1.1	0.0	7.32	4.24
(Brown)	413	95.8	1.7	2.6	0.0	9.45	5.63
	Average	96.8	1.4	1.9	0.0	8.38	4.93
DeKalb	310	96.5	1.7	1.5	0.2	7.60	4.26
(Brown)	413	97.2	1.1	1.2	0.5	10.54	5.85
	Average	96.9	1.4	1.4	0.4	9.07	5.05
All Strains	310	96.7	2.0	1.2	0.1	7.58^Z	4.30^Z
	413	96.9	1.4	1.6	0.2	10.11^Y	5.80^Y
	Average	96.8	1.7	1.4	0.1	8.85	5.05

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 57.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON OVERALL PERFORMANCE OF HENS IN THE
            34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line (W-36)	310	10.4	.42	415.3	72.7	44.6	17.2
	413	11.6	.39	436.4	74.5	45.8	14.6
	Average	11.0^B	.41^A	425.8	73.6	45.2	15.9^C
Hy-Line (W-98)	310	11.3	.41	390.9	71.8	46.4	25.9
	413	12.4	.39	444.0	74.8	48.5	13.6
	Average	11.9^A	.40^A	417.5	73.3	47.5	19.8^{BC}
Bovans (White)	310	11.0	.42	400.3	78.3	46.9	34.8
	413	12.6	.39	443.6	81.0	48.6	28.5
	Average	11.8^A	.40^A	422.0	79.7	47.8	31.6^A
DeKalb (White)	310	11.1	.41	390.7	75.7	46.9	33.9
	413	12.3	.40	419.7	79.1	48.9	30.6
	Average	11.7^A	.41^A	405.2	77.4	47.9	32.2^A
DeKalb (Sigma)	310	11.4	.38	379.2	73.0	44.2	32.5
	413	12.7	.36	423.8	75.9	46.4	22.8
	Average	12.1^A	.37^B	401.5	74.4	45.3	27.7^A
Bovans (Experiment)	310	10.7	.41	404.1	74.1	44.8	27.5
	413	12.3	.38	444.9	77.2	47.0	17.9
	Average	11.5^{AB}	.40^A	424.5	75.7	45.9	22.7^B
All Strains	310	11.0^Z	.41^Y	396.7^Z	74.3^Z	45.6^Z	28.6^Y
	413	12.3^Y	.38^Z	435.4^Y	77.1^Y	47.5^Y	21.3^Z
	Average	11.7	.40	416.1	75.7	46.6	25.0

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 58.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE DISTRIBUTION OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	60.7	1.1	4.6	11.8	49.2	33.1
(W-36)	413	60.9	1.5	5.0	11.1	44.8	37.3
	Average	60.8^C	1.3^A	4.8^A	11.5^C	47.0^B	35.2^B
Hy-Line	310	64.5	0.2	2.2	7.7	31.7	57.9
(W-98)	413	64.7	0.1	2.3	7.8	30.2	59.4
	Average	64.6^A	0.2^C	2.2^C	7.7^D	30.9^C	58.7^A
Bovans	310	59.6	0.5	4.5	17.4	52.2	25.1
(White)	413	59.9	0.5	4.7	16.8	49.3	28.4
	Average	59.8^D	0.5^B	4.6^A	17.1^A	50.7^A	26.7^C
DeKalb	310	61.3	0.6	3.2	12.5	47.4	36.0
(White)	413	61.6	0.4	3.0	11.9	46.1	38.4
	Average	61.5^B	0.5^B	3.1^B	12.2^C	46.7^B	37.2^B
DeKalb	310	59.6	1.2	4.7	16.6	49.8	27.1
(Sigma)	413	60.3	1.1	4.0	13.5	49.8	31.2
	Average	60.0^D	1.2^A	4.4^A	15.0^B	49.8^A	29.2^C
Bovans	310	60.2	0.5	3.9	15.0	51.9	28.3
(Experiment)	413	60.5	0.4	3.3	14.3	51.7	29.9
	Average	60.4^{CD}	0.5^B	3.6^B	14.7^B	51.8^A	29.1^C
All Strains	310	61.0	0.7	3.8	13.5	47.0^Y	34.6^Z
	413	61.3	0.7	3.7	12.6	45.3^Z	37.4^Y
	Average	61.2	0.7	3.8	13.0	46.2	36.0

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B,C,D - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 59.   EFFECT OF WHITE EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
            OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm²)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	97.1	1.3	1.2	0.4	23.85	11.04
(W-36)	413	98.1	0.8	0.9	0.2	25.19	12.63
	Average	97.6^A	1.0^B	1.0^B	0.3	24.52	11.83^{BC}
Hy-Line	310	95.8	2.4	1.6	0.3	23.01	11.37
(W-98)	413	96.5	1.9	1.1	0.4	26.30	13.76
	Average	96.2^C	2.2^A	1.4^{AB}	0.3	24.66	12.57^A
Bovans	310	96.9	1.6	1.3	0.2	22.71	10.41
(White)	413	97.6	1.0	1.2	0.2	25.37	12.68
	Average	97.3^{AB}	1.3^B	1.2^B	0.2	24.04	11.55^{BC}
DeKalb	310	96.8	1.7	1.2	0.3	22.63	10.65
(White)	413	97.8	0.8	1.1	0.4	24.55	11.97
	Average	97.3^{AB}	1.2^B	1.1^B	0.3	23.59	11.31^C
DeKalb	310	96.7	1.5	1.7	0.2	21.41	10.97
(Sigma)	413	97.0	1.0	1.8	0.2	24.35	13.18
	Average	96.8^{BC}	1.2^B	1.7^A	0.2	22.88	12.07^{AB}
Bovans	310	97.7	1.2	1.0	0.1	23.28	10.84
(Experiment)	413	97.7	0.8	1.4	0.1	25.81	13.18
	Average	97.7^A	1.0^B	1.2^B	0.1	24.55	12.01^{AB}
All Strains	310	96.8^Z	1.6^Y	1.3	0.2	22.81^Z	10.88^Z
	413	97.5^Y	1.0^Z	1.2	0.3	25.26^Y	12.90^Y
	Average	97.1	1.3	1.3	0.3	24.04	11.89

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
A,B,C - Different letters denote significant differences (P<.01), comparisons made among
strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 60.   EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON PERFORMANCE OF HENS IN THE 34th
NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line (W-36)	NM	11.6	.39	425.3^{ABC}	73.6^{HI}	44.1^{G}	17.2
	NF	10.5	.42	422.9^{ABC}	73.1^{HIJ}	45.6^{DEFG}	15.8
	SF	10.7	.42	428.3^{AB}	73.7^{GHI}	45.8^{CDEFG}	15.4
	FR	11.2	.40	426.8^{ABC}	73.9^{FGH}	45.4^{EFG}	15.2
Hy-Line (W-98)	NM	11.7	.39	393.3^{DE}	70.8^{IJ}	45.2^{FG}	24.8
	NF	11.6	.40	421.5^{ABC}	73.7^{GHI}	47.7^{ABCDE}	18.0
	SF	11.8	.40	421.3^{ABC}	74.0^{FGH}	48.2^{ABC}	20.8
	FR	12.2	.39	433.7^{A}	74.8^{EFGH}	48.7^{A}	15.4
Bovans (White)	NM	11.8	.39	414.1^{ABCD}	78.6^{ABCD}	46.1^{BCDEFG}	35.1
	NF	11.6	.41	416.0^{ABCD}	79.2^{ABC}	47.9^{ABCD}	33.1
	SF	11.6	.42	424.8^{ABC}	81.2^{A}	48.9^{A}	33.3
	FR	12.3	.39	432.9^{A}	79.7^{AB}	48.1^{ABC}	25.1
DeKalb (White)	NM	11.8	.40	407.4^{ABCDE}	77.6^{BCDE}	46.9^{ABCDEF}	37.0
	NF	11.3	.41	413.8^{ABCD}	76.8^{BCDEFG}	47.6^{ABCDE}	27.8
	SF	12.0	.40	399.0^{CDE}	78.1^{ABCD}	49.0^{A}	32.2
	FR	11.7	.40	400.6^{BCDE}	77.1^{BCDEF}	47.9^{ABCD}	32.0
DeKalb (Sigma)	NM	12.0	.35	384.9^{E}	70.4^{J}	41.6^{H}	29.5
	NF	12.0	.39	422.8^{ABC}	78.3^{ABCD}	48.4^{AB}	27.2
	SF	12.3	.37	413.9^{ABCD}	75.8^{DEFGh}	47.0^{ABCDEF}	24.2
	FR	11.9	.37	384.3^{E}	73.3^{HIJ}	44.3^{G}	29.8
Bovans (Experiment)	NM	11.6	.39	420.5^{ABC}	74.1^{FGH}	44.2^{G}	24.1
	NF	11.5	.40	427.9^{AB}	76.2^{CDEFGH}	46.9^{ABCDEF}	21.5
	SF	11.0	.41	424.1^{ABC}	74.8^{EFGH}	45.7^{DEFG}	20.6
	FR	12.0	.39	425.4^{ABC}	77.6^{BCDE}	46.9^{ABCDEF}	24.6
All Strains	NM	11.8	.39	407.6	74.2	44.7	27.9^{y}
	NF	11.4	.40	420.8	76.2	47.3	23.9^{z}
	SF	11.6	.40	418.6	76.3	47.4	24.4^{yz}
	FR	11.9	.39	417.3	76.1	46.9	23.7^{z}

A,B,C,D,E,F,G - Different letters denote significant differences (P<.01), comparisons made among strain by molt program average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

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TABLE 61.   EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	NM	60.0	1.6	4.7	13.1	50.9	29.3
(W-36)	NF	60.9	1.2	4.5	11.0	46.9	36.2
	SF	61.0	1.1	4.8	11.0	45.7	37.1
	FR	61.2	1.0	5.2	10.8	44.4	38.1
Hy-Line	NM	64.4	0.2	2.1	7.9	32.0	57.4
(W-98)	NF	64.0	0.2	2.9	8.6	33.9	54.0
	SF	64.6	0.1	2.0	7.3	29.4	60.9
	FR	65.3	0.1	1.8	7.2	28.3	62.3
Bovans	NM	58.9	0.5	4.9	19.4	54.7	20.1
(White)	NF	59.9	0.6	4.4	17.3	47.8	29.5
	SF	60.0	0.4	4.6	16.5	50.3	27.8
	FR	60.3	0.5	4.4	15.1	50.2	29.5
DeKalb	NM	60.5	0.6	3.0	14.7	49.9	31.5
(White)	NF	61.4	0.6	3.2	12.5	47.2	36.3
	SF	61.9	0.4	3.2	11.2	45.2	39.9
	FR	62.1	0.5	3.2	10.3	44.7	41.0
DeKalb	NM	59.2	1.5	4.6	16.9	50.3	26.0
(Sigma)	NF	59.8	1.1	4.6	14.7	52.0	27.5
	SF	60.4	1.2	3.6	13.7	50.1	31.0
	FR	60.5	0.9	4.6	14.9	47.0	32.2
Bovans	NM	59.9	0.6	3.3	14.9	54.4	26.2
(Experiment)	NF	60.7	0.4	3.9	14.9	49.7	30.8
	SF	60.6	0.4	3.4	14.3	51.9	29.6
	FR	60.4	0.5	3.7	14.5	51.3	29.8
All Strains	NM	60.5^Z	0.8	3.8	14.5^Y	48.7^Y	31.8^Z
	NF	61.1^Y	0.7	3.9	13.2^{YZ}	46.3^Z	35.7^Y
	SF	61.4^Y	0.6	3.6	12.3^Z	45.5^Z	37.7^Y
	FR	61.6^Y	0.6	3.8	12.1^Z	44.3^Z	38.8^Y

Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt
program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 62.   EFFECT OF WHITE EGG STRAIN AND MOLT PROGRAM ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line (W-36)	NM	97.4	1.3	0.8	0.4	24.26^{ABCD}	12.07^{BCD}
	NF	98.1	0.8	0.9	0.1	24.53^{ABCD}	11.44^{CDE}
	SF	97.2	1.3	1.2	0.2	24.69^{ABC}	11.67^{BCDE}
	FR	97.7	0.7	1.2	0.4	24.62^{ABC}	12.14^{BCD}
Hy-Line (W-98)	NM	95.3	2.8	1.3	0.6	23.03^{DEF}	11.67^{BCDE}
	NF	96.6	2.0	1.2	0.1	24.79^{ABC}	12.49^{ABC}
	SF	96.3	1.7	1.5	0.5	24.98^{AB}	12.72^{AB}
	FR	96.4	2.0	1.4	0.1	25.83^{A}	13.38^{A}
Bovans (White)	NM	97.0	1.6	1.2	0.2	23.40^{CDE}	11.12^{DE}
	NF	98.1	0.7	0.9	0.3	23.79^{BCD}	11.35^{CDE}
	SF	97.4	1.1	1.3	0.2	24.26^{ABCD}	11.33^{CDE}
	FR	96.6	1.6	1.5	0.3	24.73^{ABC}	12.39^{ABC}
DeKalb (White)	NM	96.8	1.5	1.3	0.4	23.52^{BCD}	11.03^{E}
	NF	97.1	1.3	1.2	0.3	24.02^{BCD}	11.44^{CDE}
	SF	97.4	1.3	0.9	0.3	23.35^{CDE}	11.42^{CDE}
	FR	97.9	0.8	1.0	0.3	23.48^{BCDE}	11.35^{CDE}
DeKalb (Sigma)	NM	96.4	1.6	1.8	0.2	21.62^{F}	11.71^{BCDE}
	NF	97.5	0.8	1.3	0.4	24.23^{ABCD}	12.19^{BCD}
	SF	96.4	1.6	1.8	0.2	23.68^{BCD}	12.75^{AB}
	FR	97.0	0.9	2.0	0.1	21.97^{EF}	11.64^{BCDE}
Bovans (Experiment)	NM	97.7	1.0	1.1	0.2	24.24^{ABCD}	11.84^{BCDE}
	NF	98.2	0.6	1.1	0.1	24.83^{ABC}	12.13^{BCD}
	SF	97.5	1.3	1.1	0.1	24.55^{ABCD}	11.73^{BCDE}
	FR	97.3	1.2	1.5	0.1	24.57^{ABC}	12.35^{ABC}
All Strains	NM	96.8^{Z}	1.6^{Y}	1.3	0.3	23.35	11.57^{Z}
	NF	97.6^{Y}	1.1^{Z}	1.1	0.2	24.36	11.84^{YZ}
	SF	97.0^{YZ}	1.4^{YZ}	1.3	0.3	24.25	11.94^{YZ}
	FR	97.2^{YZ}	1.2^{Z}	1.4	0.2	24.20	12.21^{Y}

A,B,C,D,E,F,G - Different letters denote significant differences (P<.01), comparisons made
among strain by molt program average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt
program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 63. EFFECT OF BROWN EGG STRAIN AND DENSITY ON PERFORMANCE OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Feed Cons (kg/100 hens/d)	Feed Conversion (g egg/ g feed)	Eggs Per Bird Housed	Egg Production (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	310	11.9	.39	366.8	73.7	46.9	31.6
(Brown)	413	12.9	.38	446.9	76.6	48.8	14.8
	Average	12.4	.39	406.9	75.2^B	47.9^B	23.2^B
Bovans	310	12.1	.39	360.2	74.0	46.5	37.2
(Brown)	413	12.9	.38	435.5	76.4	48.5	20.8
	Average	12.5	.38	397.8	75.2^B	47.5^B	29.0^A
DeKalb	310	12.5	.39	354.2	76.0	48.6	38.9
(Brown)	413	13.5	.37	442.0	78.3	50.3	22.0
	Average	13.0	.38	398.1	77.2^A	49.5^A	30.4^A
All Strains	310	12.1^Z	.39	360.4^Z	74.6^Z	47.3^Z	35.9^Y
	413	13.1^Y	.38	441.5^Y	77.1^Y	49.2^Y	19.2^Z
	Average	12.6	.38	400.9	75.8	48.3	27.6

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among density average values.

TABLE 64. EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG WEIGHT AND EGG SIZE
DISTRIBUTION OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	310	63.7	0.1	1.5	8.7	39.9	49.2
(Brown)	413	63.8	0.1	1.5	8.5	40.3	49.3
	Average	63.7^{AB}	0.1	1.5	8.6	40.1^{AB}	49.3^{AB}
Bovans	310	63.1	0.1	1.3	9.4	43.7	45.2
(Brown)	413	63.7	0.1	1.2	8.3	42.1	47.9
	Average	63.4^{B}	0.1	1.3	8.9	42.9^{A}	46.6^{B}
DeKalb	310	64.2	0.2	1.1	7.2	37.8	53.3
(Brown)	413	64.3	0.2	1.1	7.6	37.6	53.3
	Average	64.3^{A}	0.2	1.1	7.4	37.7^{B}	53.3^{A}
All Strains	310	63.7	0.1	1.3	8.4	40.5	49.2
	413	63.9	0.1	1.3	8.1	40.0	50.2
	Average	63.8	0.1	1.3	8.3	40.2	49.7

[1]The following is the conversion from square centimeters to square inches: 310 equals 48 square inches; 413 equals 64 square inches.
A,B - Different letters denote significant differences (P<.01), comparisons made among strain average values.

TABLE 65.   EFFECT OF BROWN EGG STRAIN AND DENSITY ON EGG QUALITY, INCOME AND FEED COSTS
OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Density[1] (cm^2)	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	310	96.7	2.0	1.3	0.1	21.69	10.96
(Brown)	413	97.7	1.1	1.3	0.0	26.69	13.96
	Average	97.2	1.5	1.3	0.0	24.19	12.46
Bovans	310	97.1	1.5	1.2	0.1	21.33	10.79
(Brown)	413	97.4	1.1	1.5	0.1	25.97	13.52
	Average	97.3	1.3	1.3	0.1	23.65	12.15
DeKalb	310	96.9	1.6	1.4	0.1	21.11	10.73
(Brown)	413	97.5	1.3	1.1	0.1	26.47	14.11
	Average	97.2	1.5	1.3	0.1	23.79	12.42
All Strains	310	96.9^Z	1.7^Y	1.3	0.1	21.38^Z	10.82^Z
	413	97.5^Y	1.2^Z	1.3	0.0	26.38^Y	13.86^Y
	Average	97.2	1.4	1.3	0.1	23.88	12.34

[1]The following is the conversion from square centimeters to square inches: 310 equals 48
square inches; 413 equals 64 square inches.
Y,Z - Different letters denote significant differences (P<.01), comparisons made among
density average values.

TABLE 66.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON PERFORMANCE OF HENS IN THE
            34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Feed Cons (kg/100 hens/d)	Feed Conver- sion (g egg/ g feed)	Eggs Per Bird Housed	Egg Produc- tion (HD%)	Egg Mass (g/HD)	Mortality (%)
Hy-Line	NM	12.1	.38	403.4	73.2	46.1	22.6
(Brown)	NF	12.2	.39	411.4	75.1	47.8	21.4
	SF	12.4	.39	402.9	76.2	48.8	25.4
	FR	12.8	.38	409.8	76.1	48.8	23.5
Bovans	NM	12.7	.37	397.7	74.6	46.6	30.8
(Brown)	NF	11.8	.40	398.5	75.1	47.2	27.2
	SF	12.4	.38	393.6	74.3	47.3	28.7
	FR	13.0	.38	401.6	76.7	48.9	29.5
DeKalb	NM	13.1	.38	383.3	76.7	48.6	34.9
(Brown)	NF	12.4	.39	403.7	75.0	48.0	24.7
	SF	13.2	.37	397.4	77.4	49.6	33.3
	FR	13.3	.39	408.1	79.6	51.6	28.8
All Strains	NM	12.6	.38	394.8	74.8^{Z}	47.1^{Z}	29.4
	NF	12.1	.39	404.5	75.1^{z}	47.7^{z}	24.4
	SF	12.6	.38	398.0	76.0^{YZ}	48.6^{YZ}	29.1
	FR	13.0	.38	406.5	77.5^{Y}	49.8^{Y}	27.2

Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt
program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 67.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON EGG WEIGHT AND EGG SIZE
            DISTRIBUTION OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Egg Weight (g/egg)	Pee Wee (%)	Small (%)	Medium (%)	Large (%)	Extra Large (%)
Hy-Line	NM	63.2	0.1	1.7	9.4	41.9	46.5
(Brown)	NF	63.8	0.1	1.9	8.7	38.6	50.2
	SF	63.7	0.0	1.5	8.5	40.5	49.1
	FR	64.2	0.1	1.1	7.8	39.5	51.3
Bovans	NM	63.0	0.1	1.1	10.2	44.3	43.9
(Brown)	NF	63.1	0.1	1.5	9.6	43.3	45.1
	SF	63.7	0.0	1.4	8.0	41.7	48.3
	FR	64.0	0.1	0.9	7.6	42.2	48.9
DeKalb	NM	63.8	0.3	1.5	7.6	40.4	49.8
(Brown)	NF	64.2	0.2	1.0	8.5	39.3	50.8
	SF	64.2	0.1	0.7	6.9	38.3	53.7
	FR	64.9	0.1	1.3	6.6	32.8	58.9
All Strains	NM	63.3^{Z}	0.2	1.4	9.1	42.2	46.7
	NF	63.7^{yz}	0.1	1.5	8.9	40.4	48.7
	SF	63.9^{yz}	0.1	1.2	7.8	40.2	50.4
	FR	64.3^{y}	0.1	1.1	7.3	38.2	53.0

Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt
program average alues.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 68.   EFFECT OF BROWN EGG STRAIN AND MOLT PROGRAM ON EGG QUALITY, INCOME AND FEED
            COSTS OF HENS IN THE 34th NCLP&MT (119-749 DAYS)

Breeder (Strain)	Molt Program	Grade A (%)	Grade B (%)	Cracks (%)	Loss (%)	Egg Income ($/hen)	Feed Costs ($/hen)
Hy-Line	NM	96.7	2.0	1.2	0.1	23.82	12.04
(Brown)	NF	97.0	1.2	1.7	0.0	24.38	12.63
	SF	97.6	1.2	1.1	0.0	24.04	12.26
	FR	97.2	1.6	1.1	0.0	24.52	12.92
Bovans	NM	96.8	2.1	1.1	0.0	23.52	12.01
(Brown)	NF	97.1	1.2	1.5	0.1	23.59	11.64
	SF	97.5	0.9	1.4	0.2	23.42	12.21
	FR	97.7	1.0	1.3	0.0	24.07	12.76
DeKalb	NM	97.0	1.8	1.1	0.1	22.73	11.58
(Brown)	NF	97.3	1.3	1.3	0.1	24.12	12.53
	SF	97.1	1.4	1.4	0.0	23.84	12.71
	FR	97.4	1.3	1.1	0.1	24.49	12.84
All Strains	NM	96.8	2.0^{Y}	1.1	0.0	23.36	11.87
	NF	97.2	1.3^{Z}	1.5	0.1	24.03	12.27
	SF	97.4	1.2^{Z}	1.3	0.1	23.77	12.39
	FR	97.4	1.3^{Z}	1.2	0.1	24.36	12.84

Y,Z - Different letters denote significant differences (P<.01), comparisons made among molt
program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

TABLE 69.   EFFECT OF WHITE EGG STRAIN, DENSITY AND SYNCHRONIZED MOLT ON
            HEN BODY WEIGHTS AND GAINS IN THE 34th NCLP&MT

Breeder (Strain)	Density[1] (cm^2)	107 Wk Body Wt (kg)	2nd Cycle Wt Gain (g)	2nd Cycle Wt Gain (%)	Total Wt Gain (g)	Total Wt Gain (%)
Hy-Line	310	1.86	376	26.1	600	47.7
(W-36)	413	1.97	407	29.1	703	55.8
	Average	1.92^B	391	27.6	651^{AB}	51.7
Hy-Line	310	2.08	485	32.6	678	48.9
(W-98)	413	2.12	472	31.6	727	52.5
	Average	2.10^A	479	32.1	702^A	50.7
Bovans	310	1.86	431	34.3	645	53.5
(White)	413	1.79	370	29.6	601	50.8
	Average	1.83^B	400	31.9	623^{BC}	52.1
DeKalb	310	1.82	330	25.6	531	42.2
(White)	413	1.97	502	38.6	702	56.0
	Average	1.89^B	416	32.1	616^{BC}	49.1
DeKalb	310	1.82	377	27.3	534	42.1
(Sigma)	413	1.90	432	33.3	585	45.0
	Average	1.86^B	405	30.3	560^C	43.5
Bovans	310	1.90	446	32.5	618	48.4
(Experiment)	413	1.87	429	30.3	592	46.3
	Average	1.89^B	438	31.4	605^{BC}	47.4
All Strains	310	1.89	408	29.7	601	47.1
	413	1.94	435	32.1	650	51.1
	Average	1.92	422	30.6	626	49.1

[1]The following is the conversion from square centimeters
to square inches: 310 equals 48 square inches; 413 equals
64 square inches.
A,B,C - Different letters denote significant differences
(P < .01), comparisons made among strain average values.

TABLE 70.   EFFECT OF WHITE EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON HEN BODY WEIGHTS
            AND GAINS IN THE 34th NCLP&MT

Breeder (Strain)	Molt Program	107 Wk Body Wt (kg)	2nd Cycle Wt Gain (g)	2nd Cycle Wt Gain (%)	Total Wt Gain (g)	Total Wt Gain (%)
Hy-Line (W-36)	NM	1.77	-14	-0.3	480	37.6
	NF	1.96	564	41.2	739	60.1
	SF	2.01	631	45.2	736	58.0
	FR	1.92	385	24.3	650	51.1
Hy-Line (W-98)	NM	2.01	16	0.8	592	42.4
	NF	2.07	700	49.2	689	50.5
	SF	2.19	779	54.4	772	54.6
	FR	2.13	421	24.1	757	55.4
Bovans (White)	NM	1.72	-8	-0.6	512	42.8
	NF	1.85	697	60.6	662	56.3
	SF	1.85	569	45.9	661	55.8
	FR	1.88	342	21.9	657	53.7
DeKalb (White)	NM	1.70	-73	-3.9	403	32.0
	NF	1.90	636	52.1	657	53.4
	SF	1.95	653	51.0	713	57.7
	FR	2.01	447	29.3	691	53.2
DeKalb (Sigma)	NM	1.72	40	2.6	406	31.3
	NF	1.87	531	40.7	620	49.9
	SF	1.93	640	51.1	591	44.8
	FR	1.92	409	26.8	623	48.0
Bovans (Experiment)	NM	1.76	127	8.0	506	40.6
	NF	2.03	641	45.4	738	57.1
	SF	1.87	584	44.8	591	46.2
	FR	1.89	399	27.3	584	45.5
All Strains	NM	1.78^Y	15^Z	1.1^Z	483^Y	37.8^Y
	NF	1.95^X	628^X	48.2^X	684^X	54.6^X
	SF	1.97^X	642^X	48.7^X	677^X	52.9^X
	FR	1.96^X	400^Y	25.6^Y	660^X	51.2^X

X,Y,Z - Different letters denote significant differences (P < .01), comparisons made among
molt program average values.
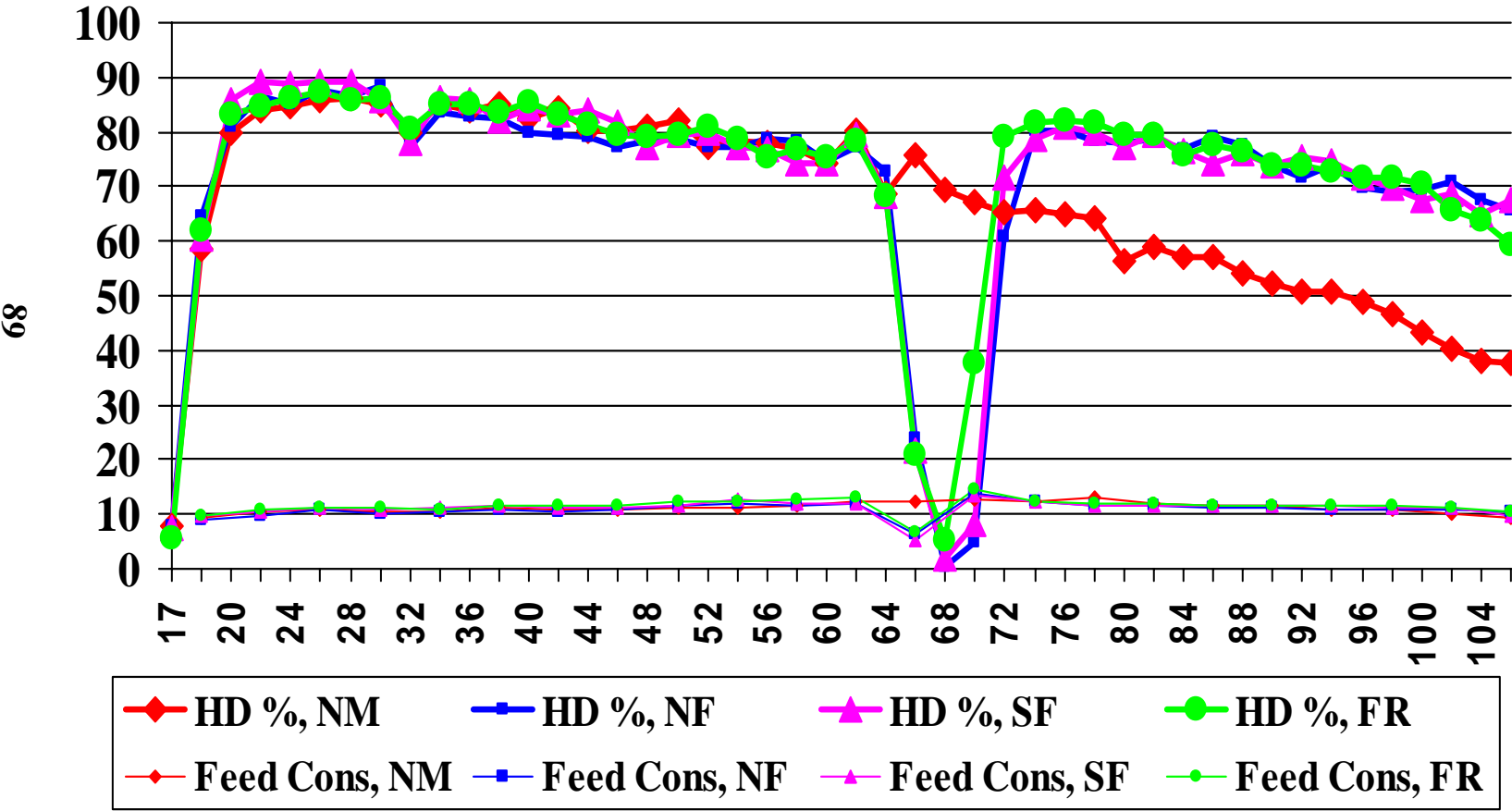NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR =
13-day fast.

TABLE 71.   EFFECT OF BROWN EGG STRAIN, DENSITY AND SYNCHRONIZED MOLT ON
             HEN BODY WEIGHTS AND GAINS IN THE 34th NCLP&MT

Breeder (Strain)	Density[1] (cm^2)	107 Wk Body Wt (kg)	2nd Cycle Wt Gain (g)	2nd Cycle Wt Gain (%)	Total Wt Gain (g)	Total Wt Gain (%)
Hy-Line	310	2.21	397	22.6	643	41.3
(Brown)	413	2.26	361	21.0	680	43.2
	Average	2.23	379	21.8	662	42.3
Bovans	310	2.15	296	17.7	573	36.9
(Brown)	413	2.22	427	26.5	629	39.9
	Average	2.18	361	22.1	601	38.4
DeKalb	310	2.18	390	39.0	655	44.0
(Brown)	413	2.14	429	42.9	583	37.3
	Average	2.16	410	24.7	619	40.7
All Strains	310	2.18	361	21.4	624	40.7
	413	2.21	405	24.4	631	40.1
	Average	2.20	383	22.9	628	40.4

[1]The following is the conversion from square centimeters to square inches:
310 equals 48 square inches; 413 equals 64 square inches.
There are no significant differences among these means.

TABLE 72.   EFFECT OF BROWN EGG STRAIN AND SYNCHRONIZED MOLT TREATMENT ON
            HEN BODY WEIGHTS AND GAINS IN THE 34th NCLP&MT

Breeder (Strain)	Molt Program	107 Wk Body Wt (kg)	2nd Cycle Wt Gain (g)	2nd Cycle Wt Gain (%)	Total Wt Gain (g)	Total Wt Gain (%)
Hy-Line	NM	2.17	100	5.0	599	38.1
(Brown)	NF	2.25	592	35.3	696	44.9
	SF	2.18	466	27.1	608	38.8
	FR	2.33	359	20.0	743	47.2
Bovans	NM	2.08	-56	2.4	482	30.6
(Brown)	NF	2.28	723	44.9	729	47.2
	SF	2.15	504	31.7	619	40.6
	FR	2.22	275	14.1	573	35.1
DeKalb	NM	2.09	109	6.1	553	36.3
(Brown)	NF	2.20	573	34.7	602	38.0
	SF	2.18	609	39.9	645	42.3
	FR	2.19	348	18.2	676	46.0
All Strains	NM	2.11^{Y}	51^{Z}	2.9^{Z}	545^{Y}	35.0
	NF	2.25^{X}	629^{X}	38.3^{X}	676^{X}	43.4
	SF	2.17^{XY}	526^{X}	32.9^{X}	624^{XY}	40.6
	FR	2.25^{X}	327^{Y}	17.4^{Y}	664^{X}	42.8

X,Y,Z - Different letters denote significant differences (P < .01),
comparisons made among molt program average values.
NM = Non-molted; NF = Non-fasted molt; SF = 5-day fast restricted feed; FR = 13-day fast.

Figure 1. Hy-Line "W-36" Strain, Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
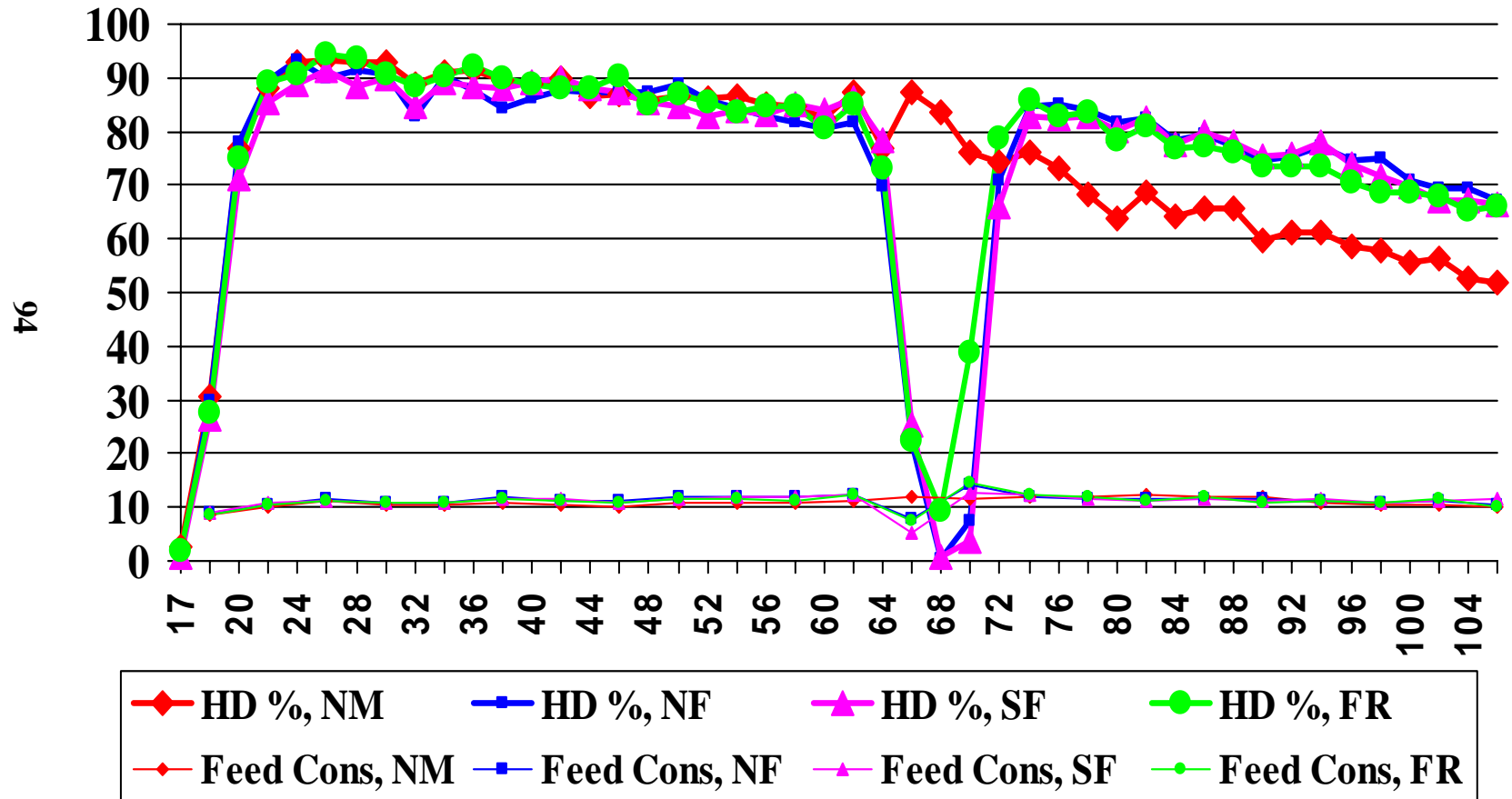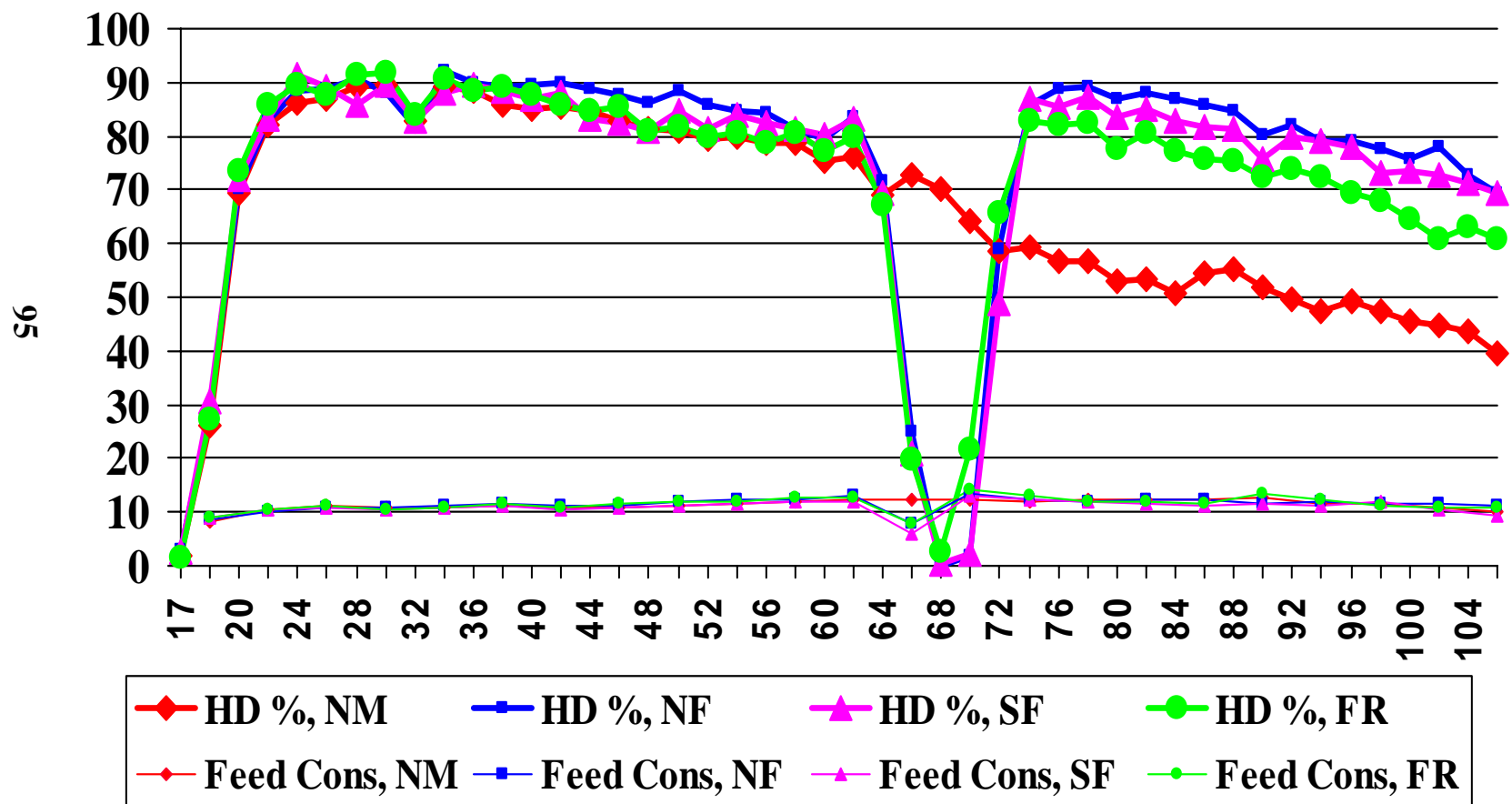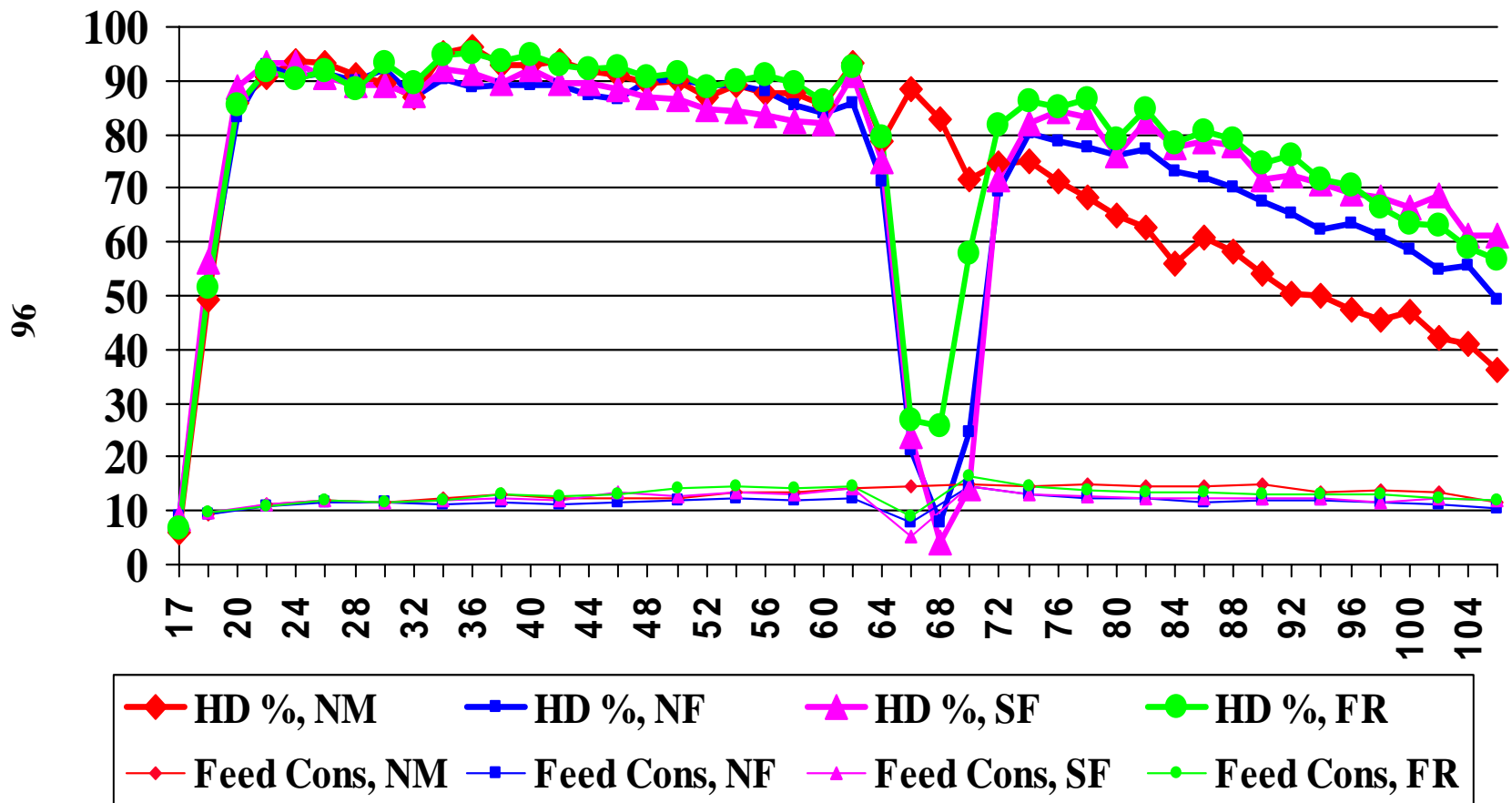- Feed Cons, SF
- Feed Cons, FR
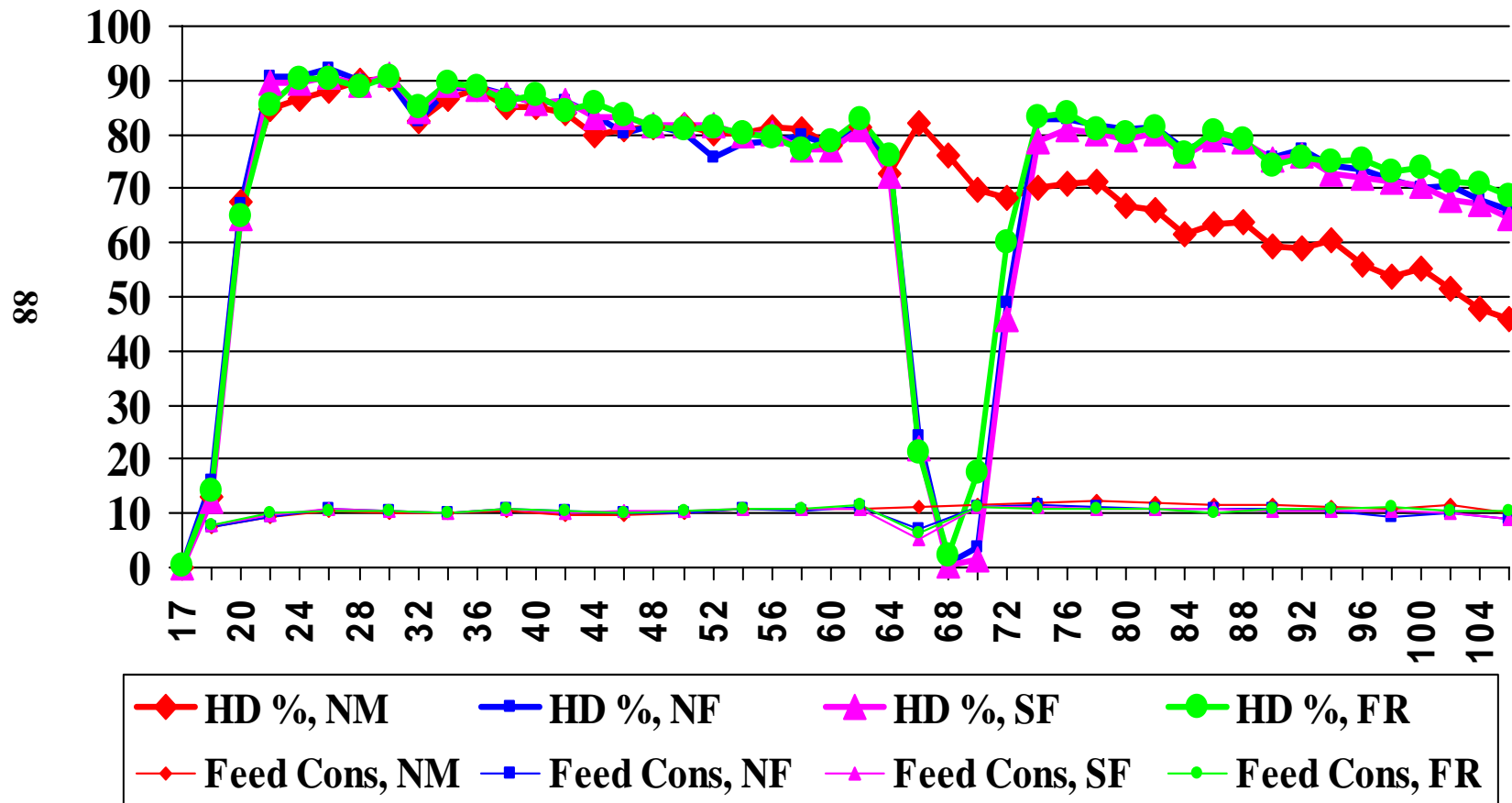
1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 2. Hy-Line "W-98" Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
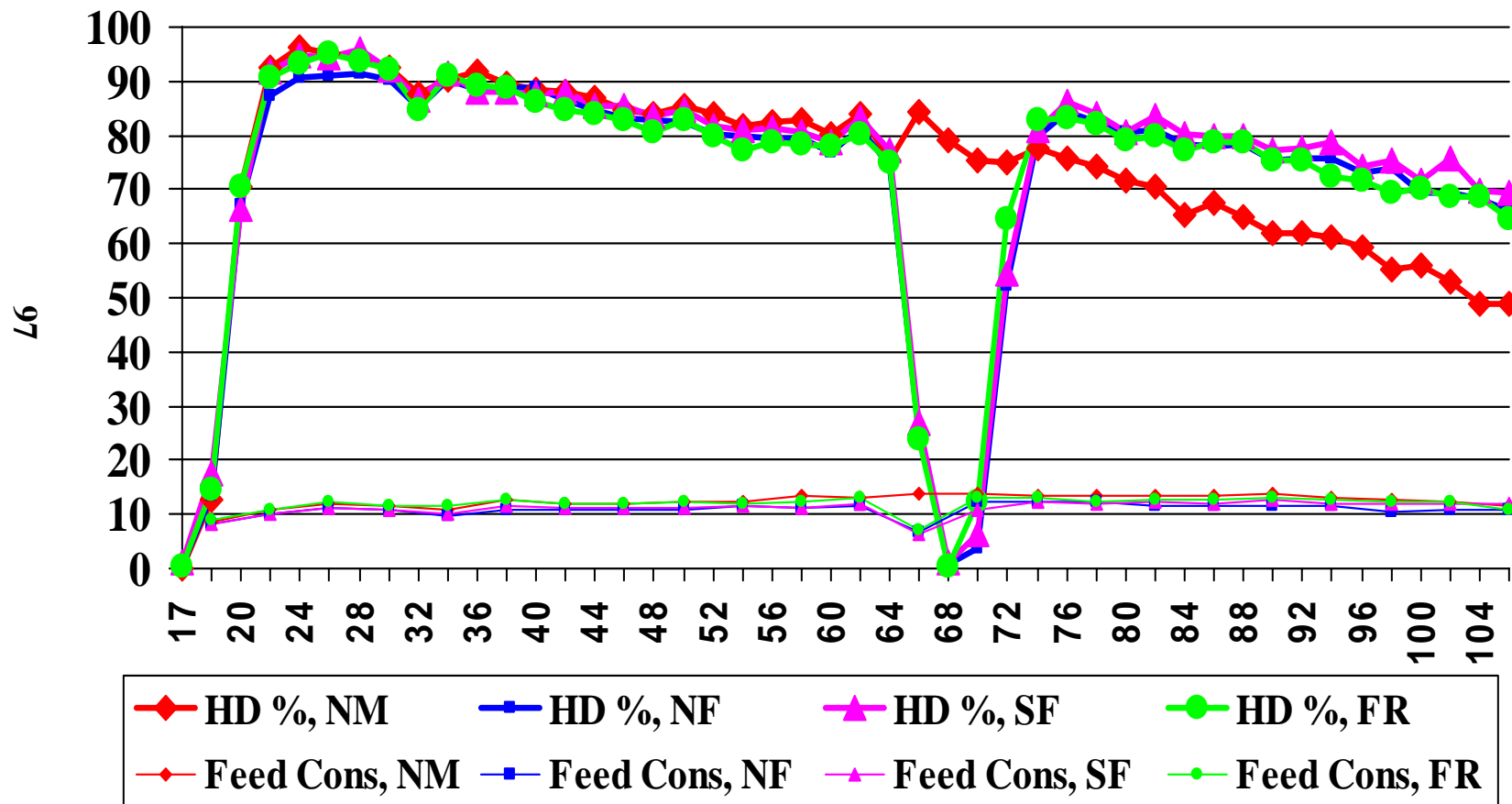- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program; SF=Short Fast molt Program; FR=13 d Fast Molt Program

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Figure 3. Hy-Line Brown Strain, Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
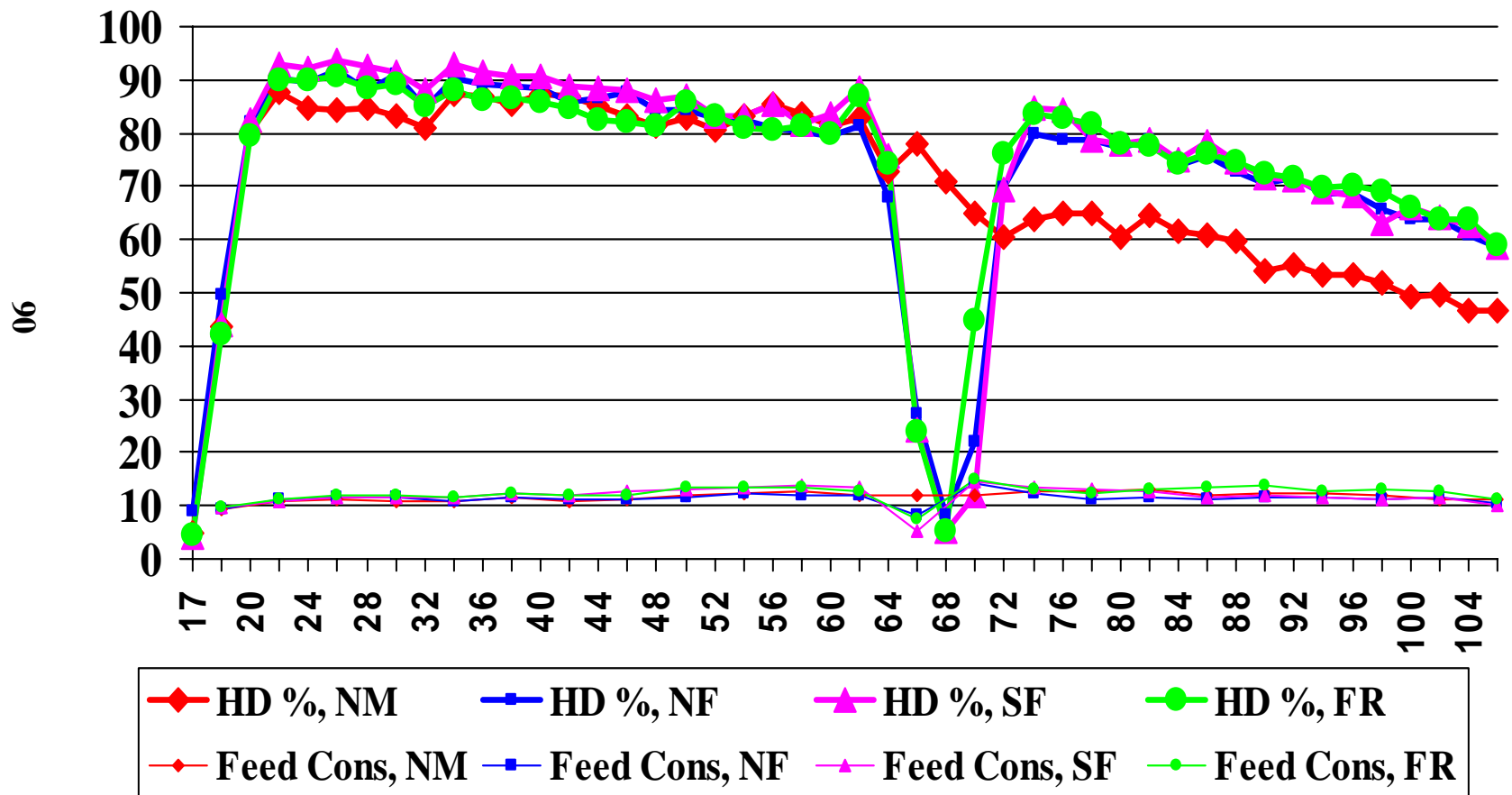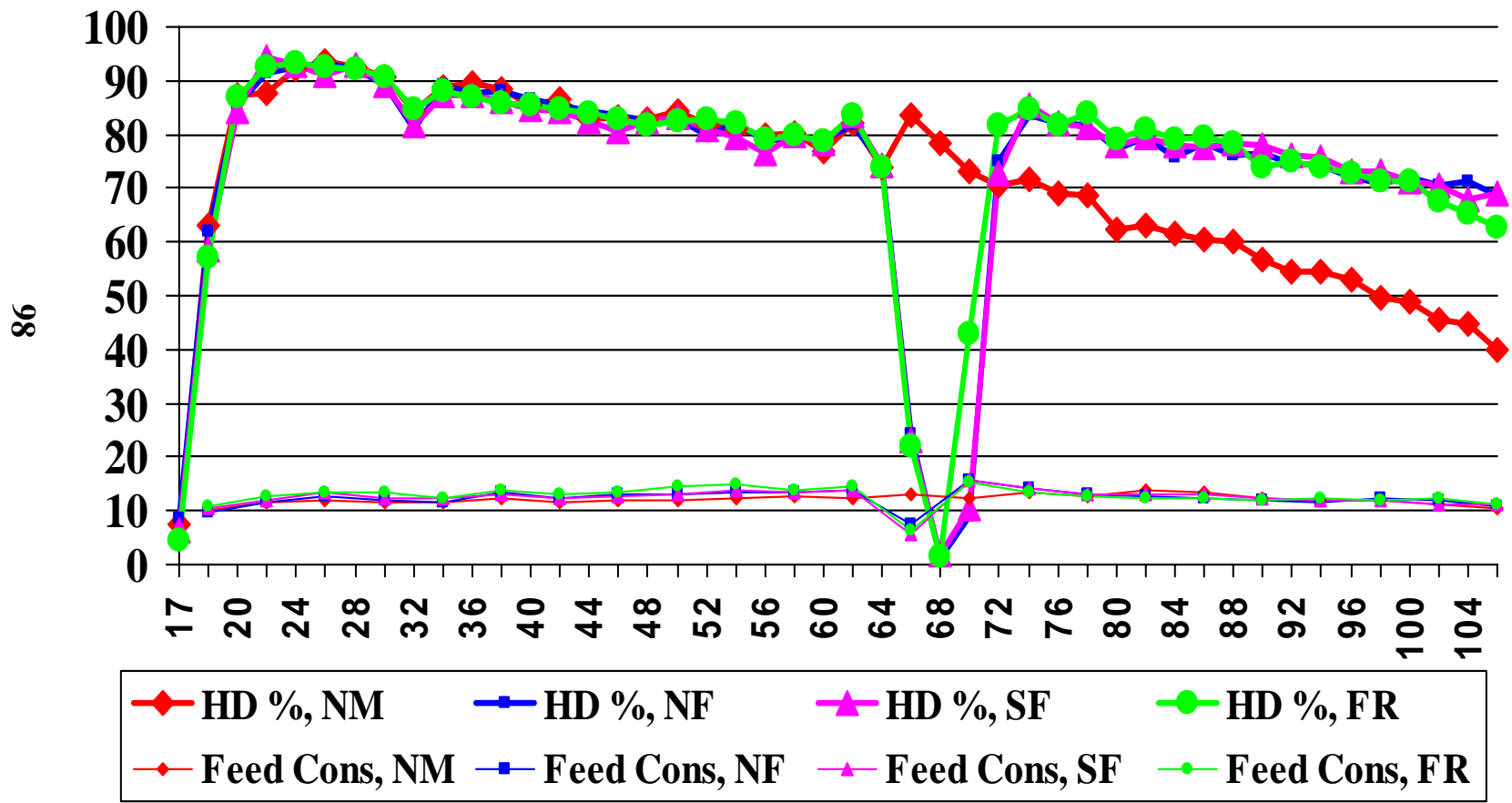
1 NM = Non-molted; NF=Non-fasted Molt Program; SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 4. Bovans White Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

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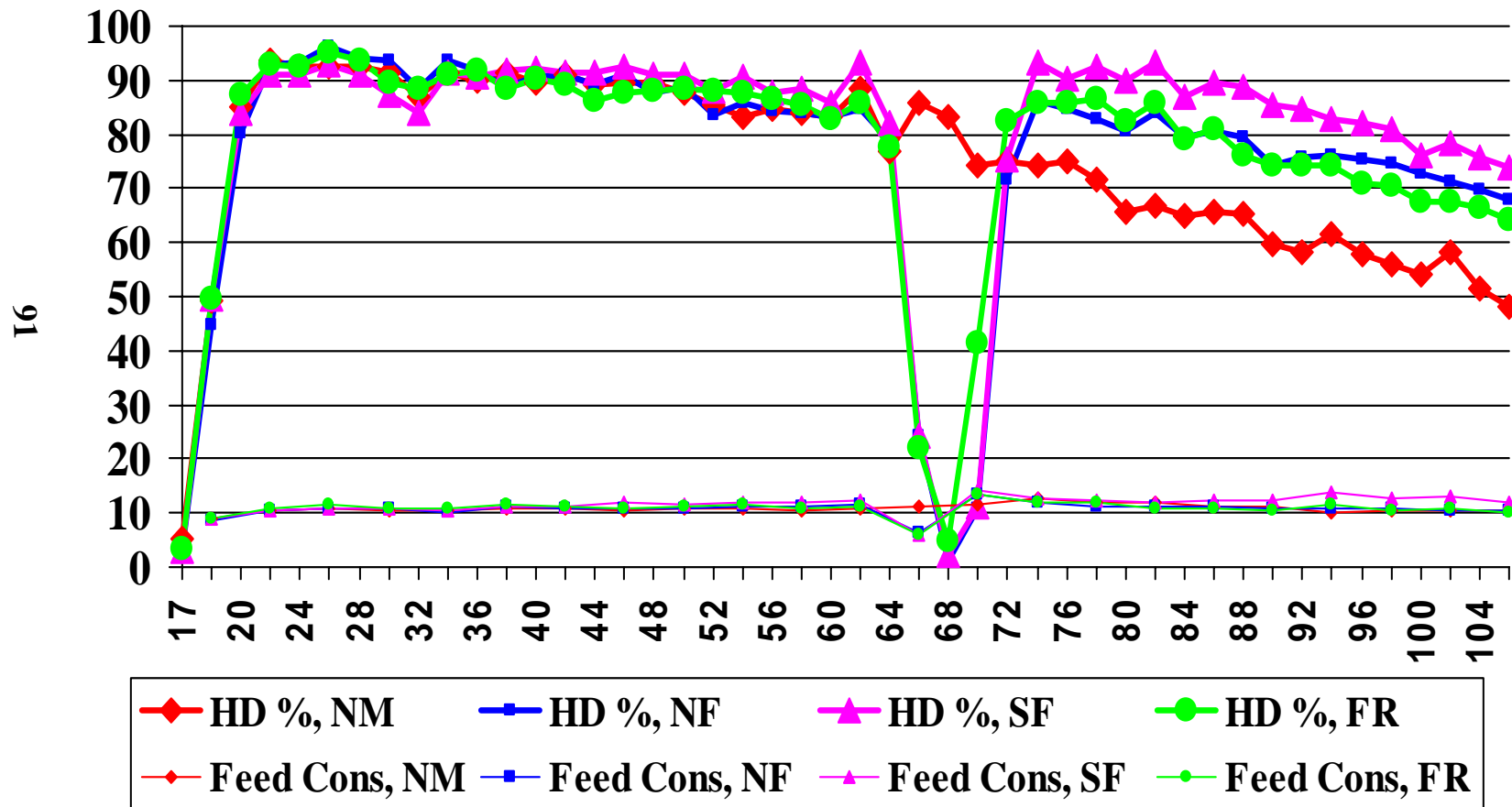
Figure 5. Bovans White Exp. Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend: HD %, NM; HD %, NF; HD %, SF; HD %, FR; Feed Cons, NM; Feed Cons, NF; Feed Cons, SF; Feed Cons, FR
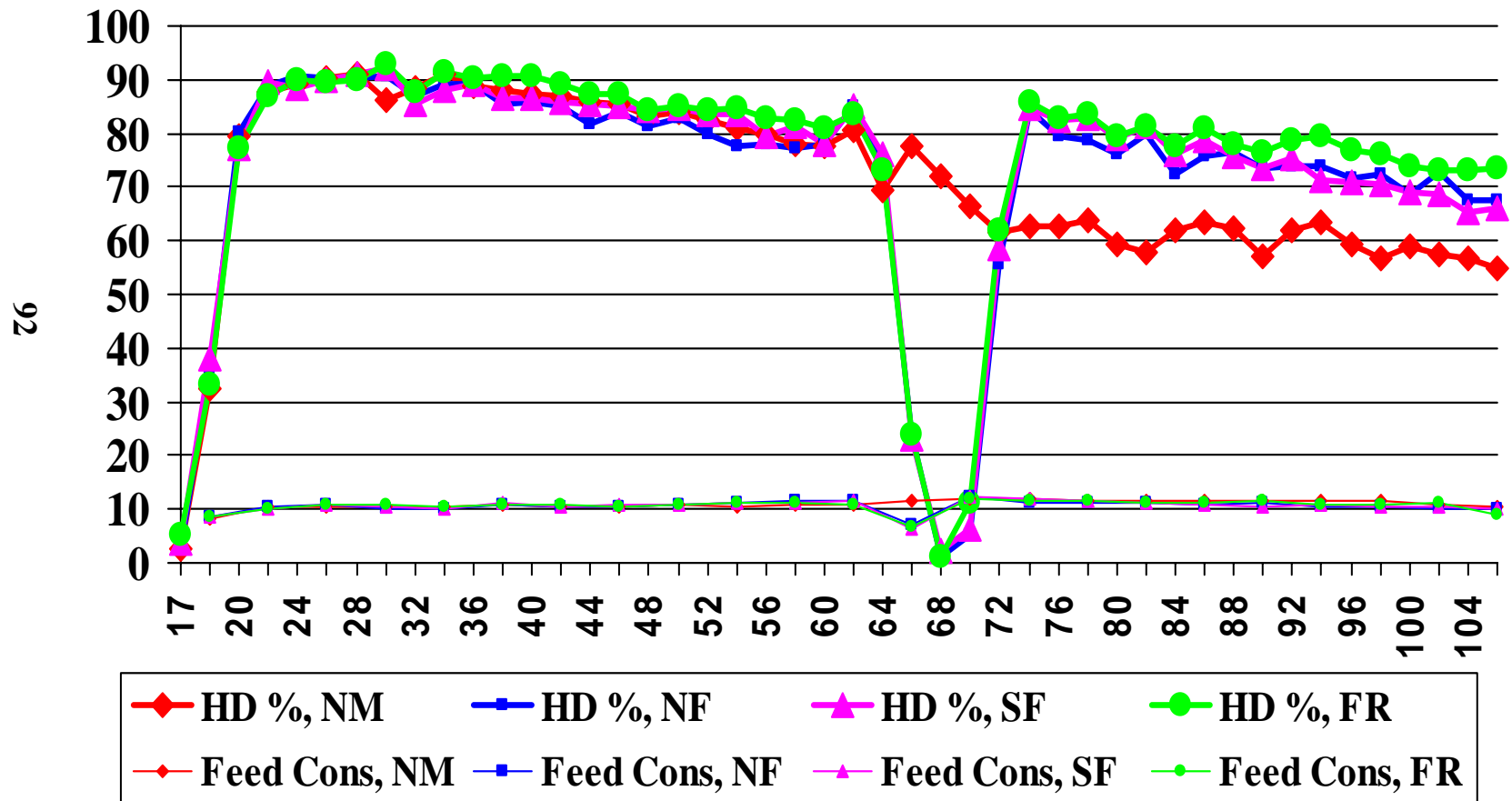
1 NM = Non-molted; NF=Non-fasted Molt Program; SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 6. Bovans Brown Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
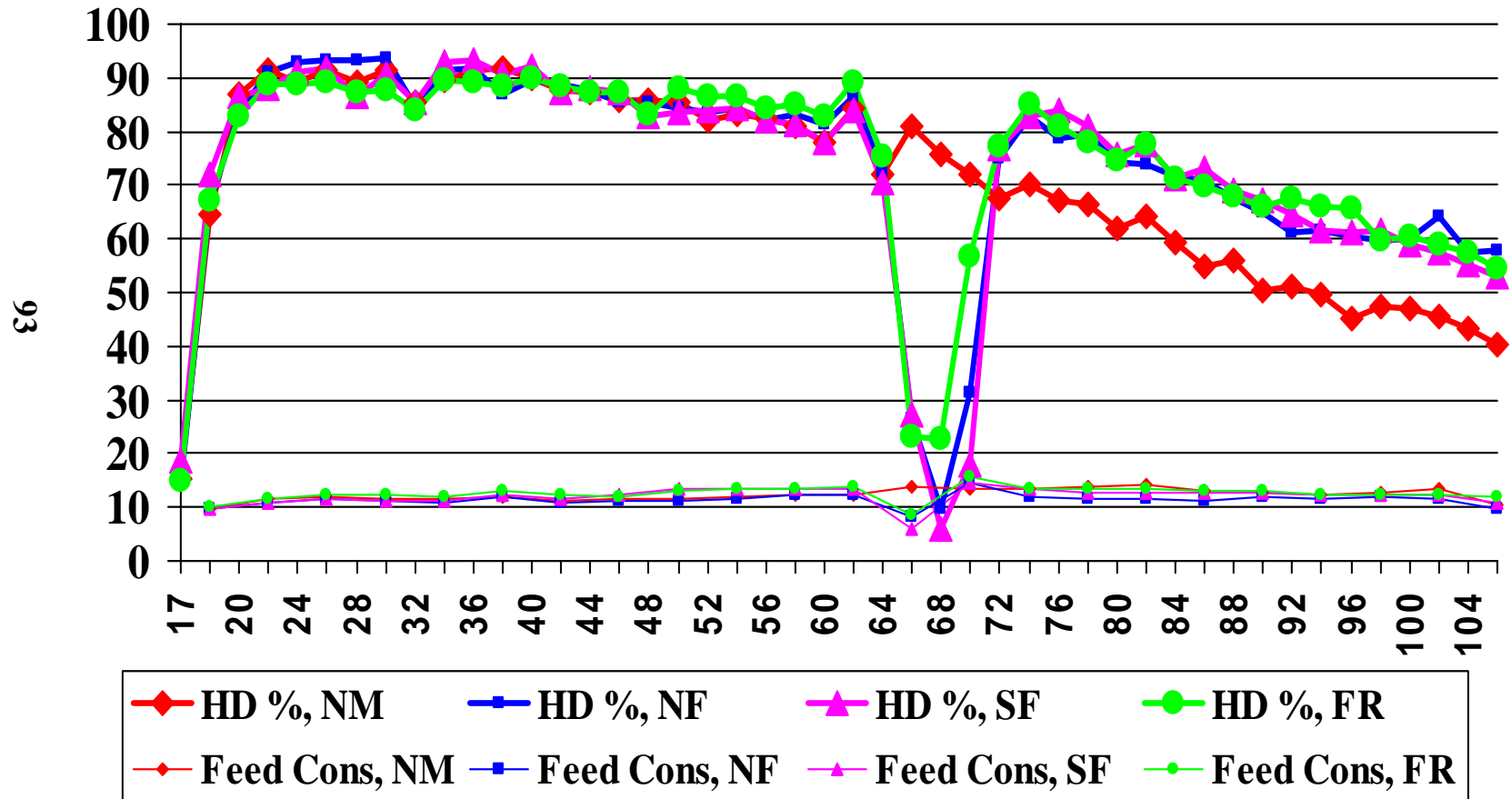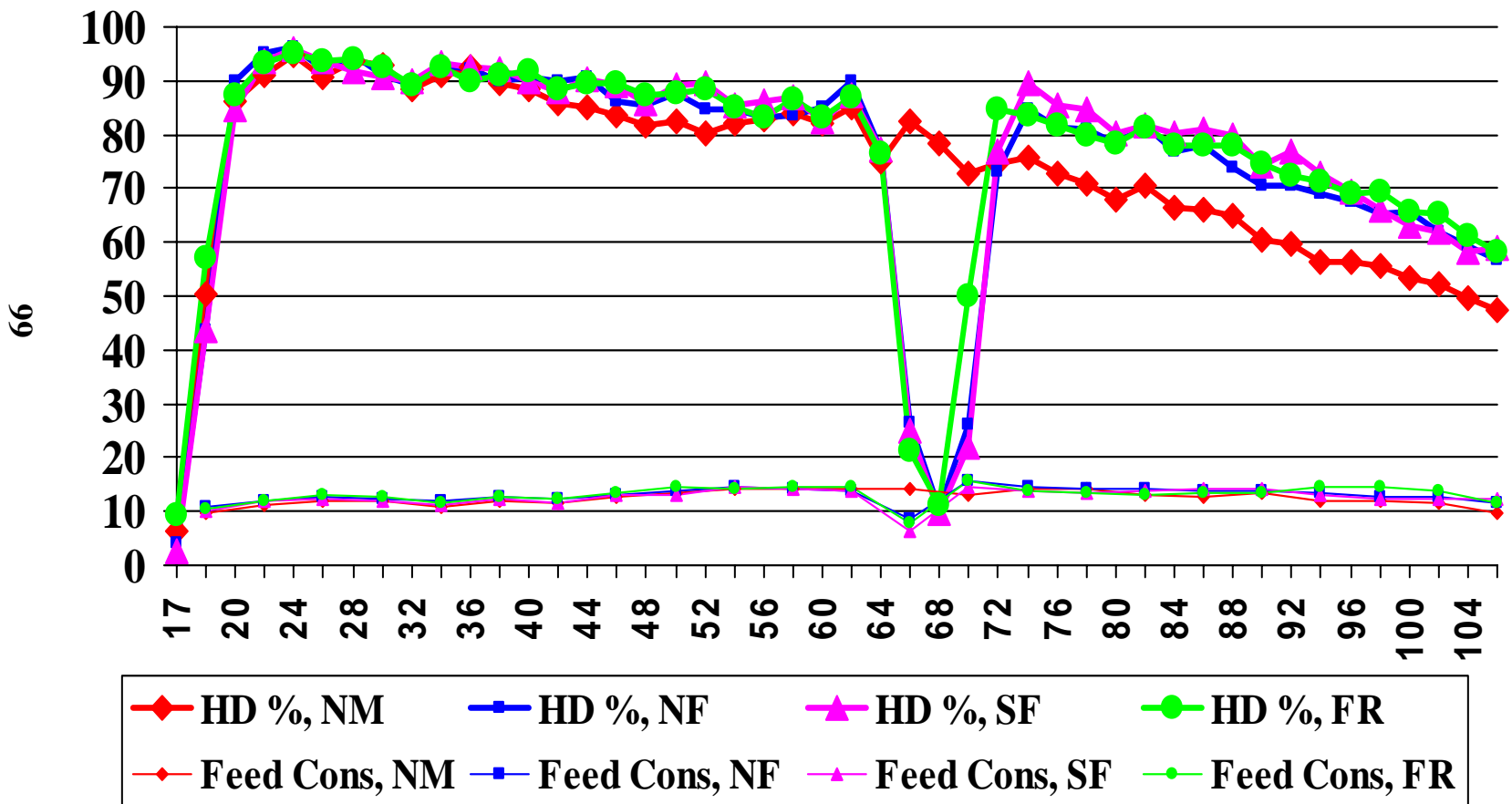
1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 7. DeKalb White Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
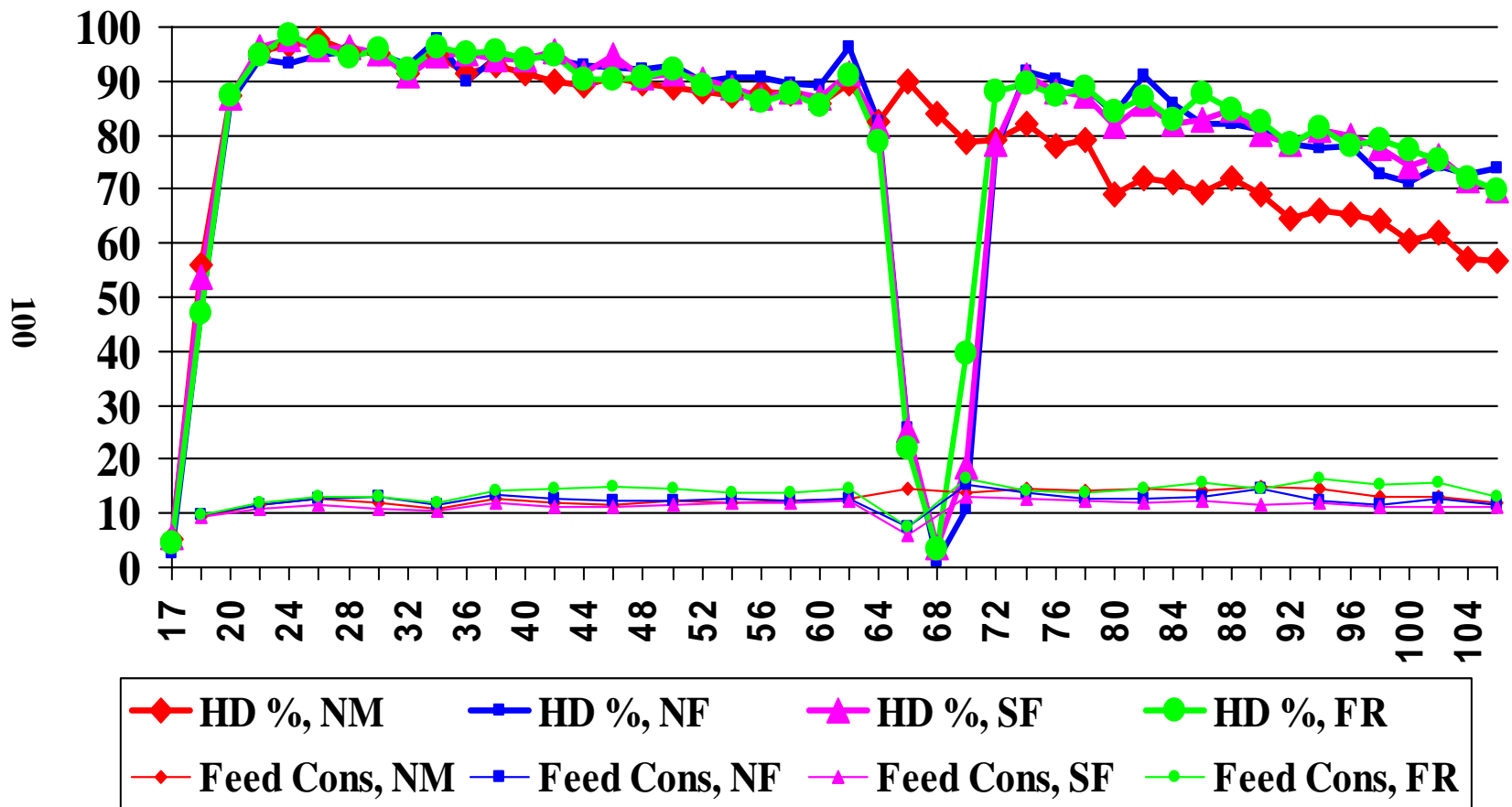
1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 8. DeKalb Sigma Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 9. DeKalb Brown Strain , Bi-weekly Percent Egg Production at 48 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
HD %, NM | HD %, NF | HD %, SF | HD %, FR
Feed Cons, NM | Feed Cons, NF | Feed Cons, SF | Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 10. Hy-Line "W-36" Strain, Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
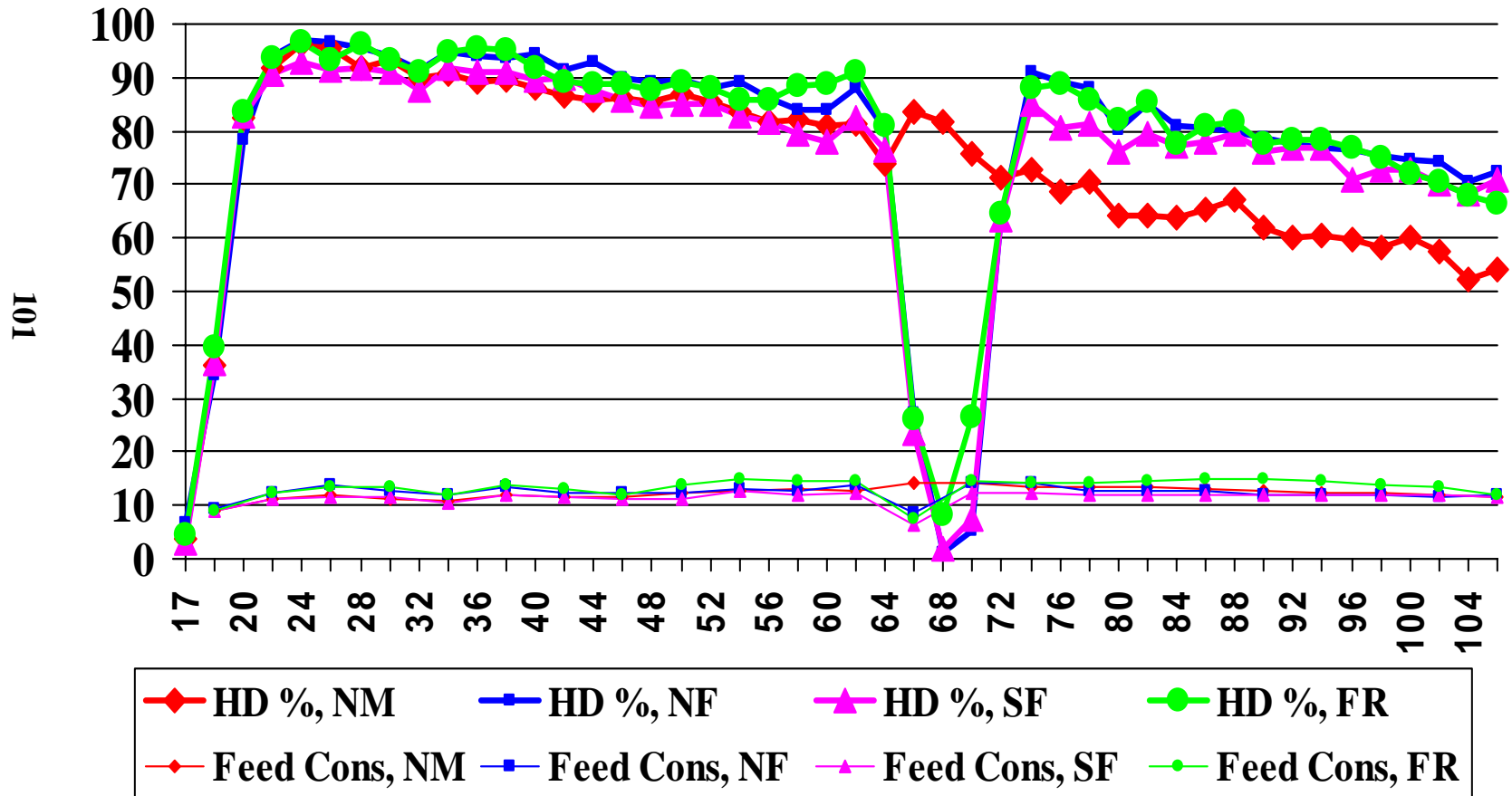
1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 11. Hy-Line "W-98" Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

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Figure 12. Hy-Line Brown Strain, Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
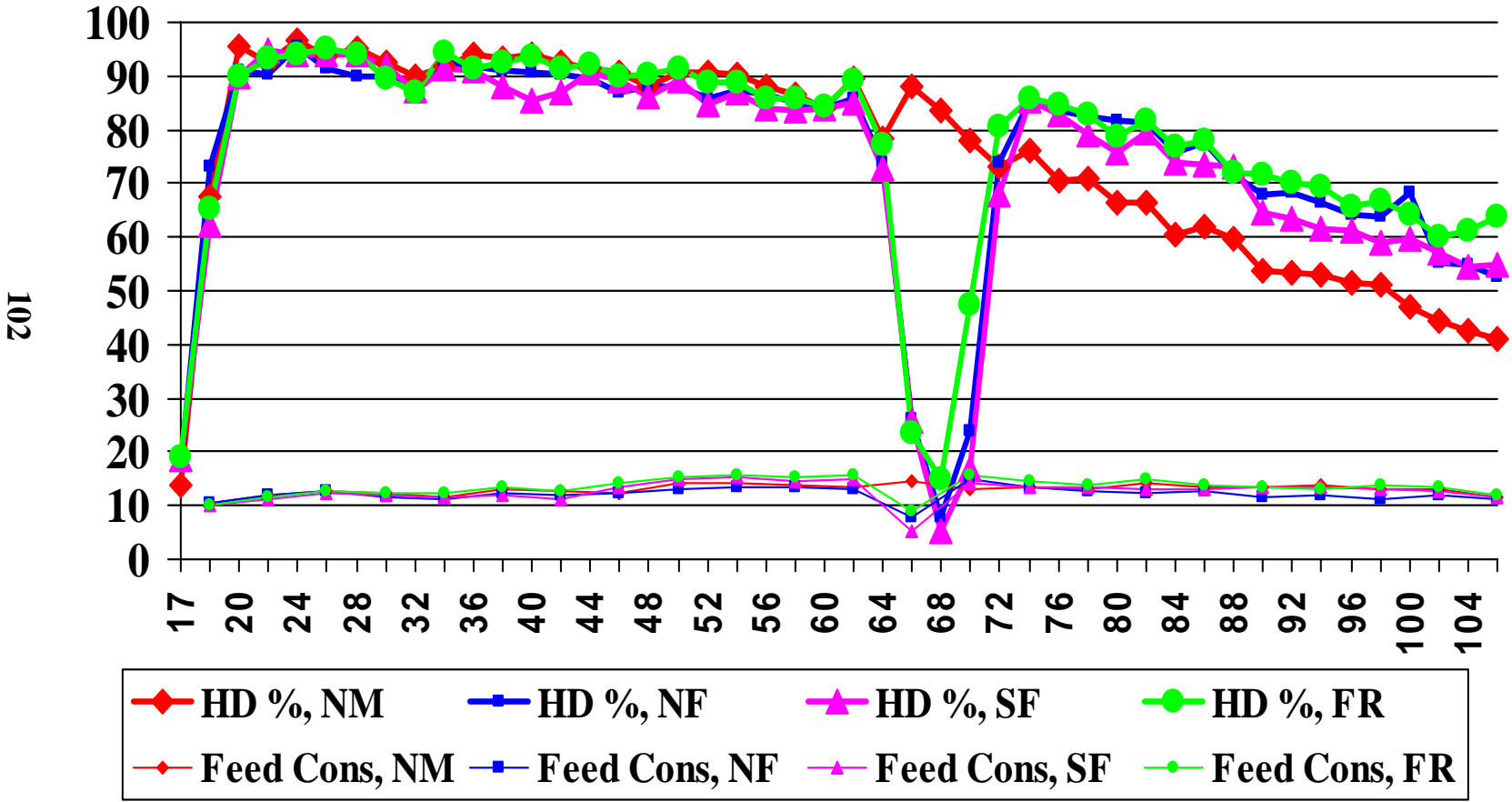- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

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Figure 13. Bovans White Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
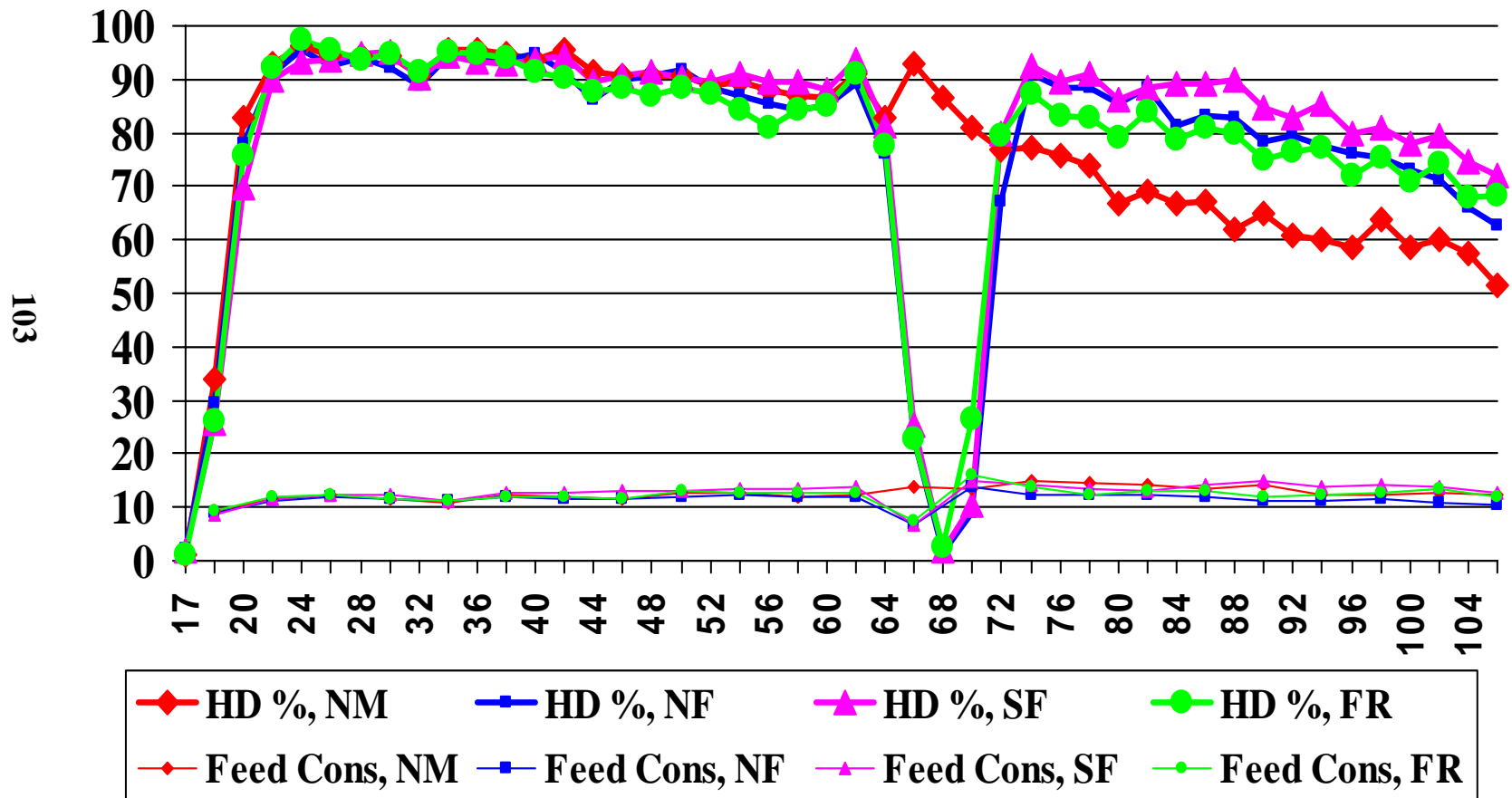
1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 14. Bovans White Exp. Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

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Figure 15. Bovans Brown Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens
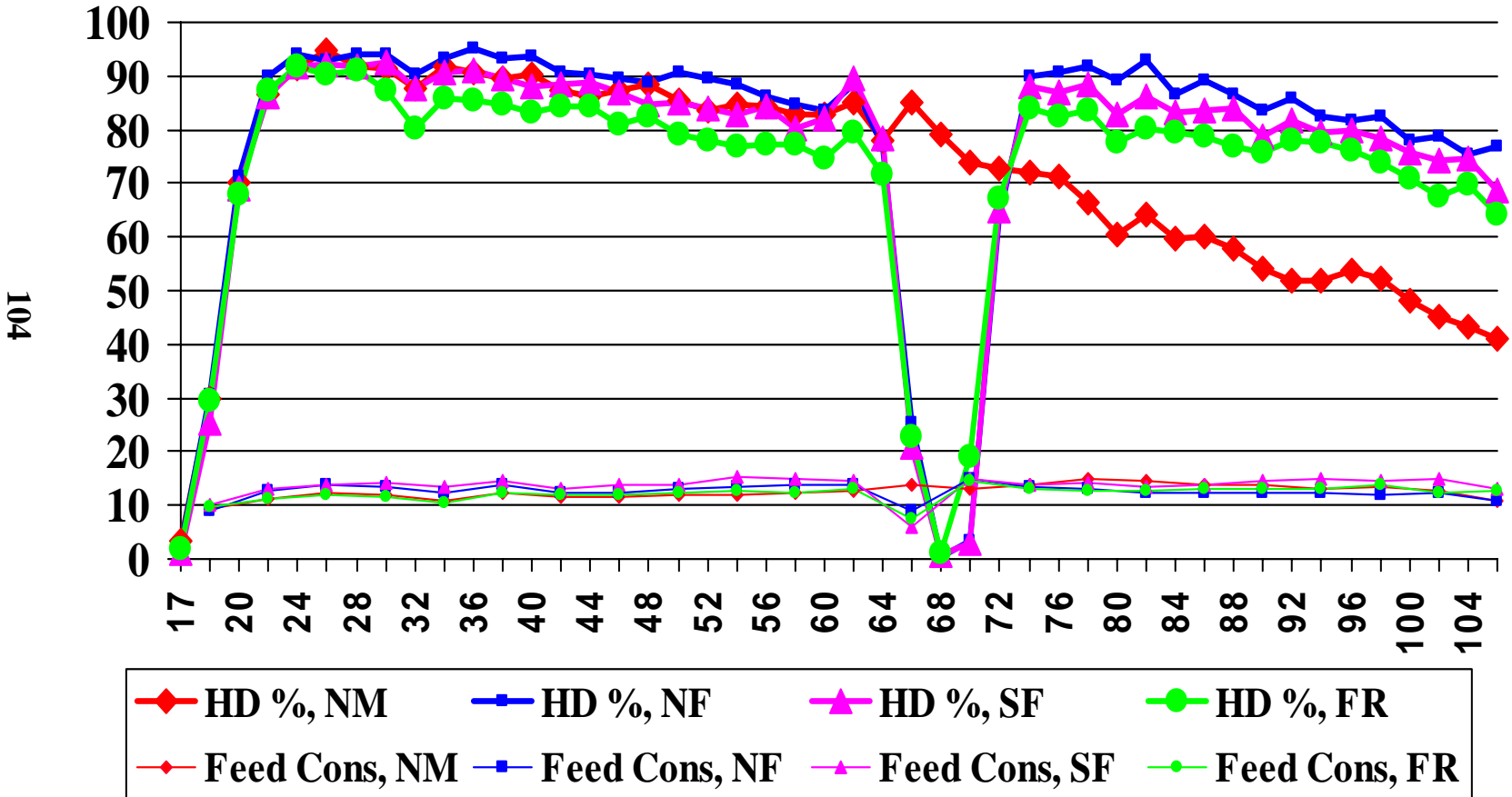
1 NM = Non-molted; NF=Non-fasted Molt Program; SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 16. DeKalb White Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

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Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Figure 17. DeKalb Sigma Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

1 NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

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Figure 18. DeKalb Brown Strain , Bi-weekly Percent Egg Production at 64 sq in. by molt program[1] and Period Feed Consumption kg per 100 Hens

Legend:
- HD %, NM
- HD %, NF
- HD %, SF
- HD %, FR
- Feed Cons, NM
- Feed Cons, NF
- Feed Cons, SF
- Feed Cons, FR
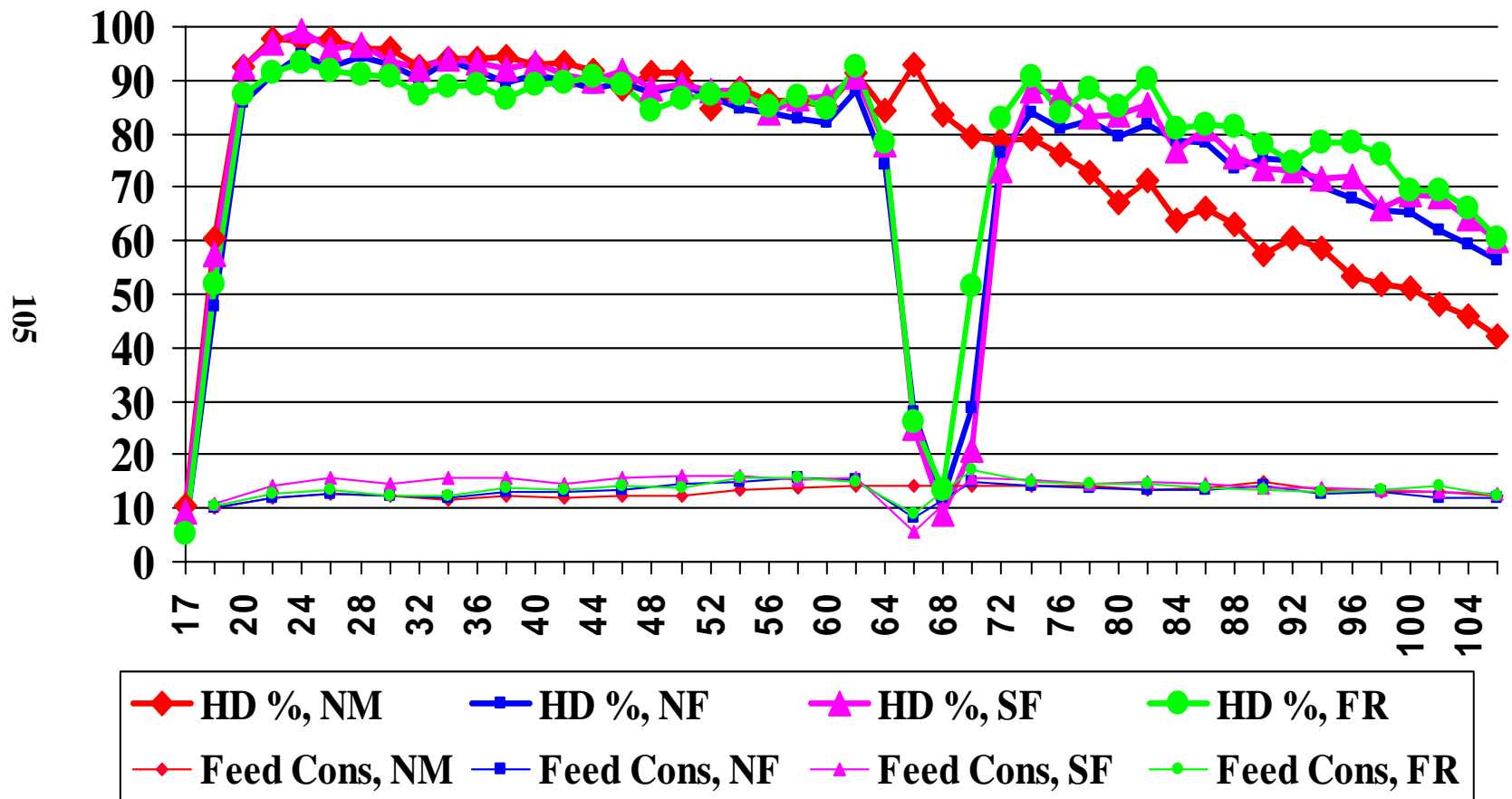
[1] NM = Non-molted; NF=Non-fasted Molt Program;
SF=Short Fast molt Program; FR=13 d Fast Molt Program

Entries 34th NCLP&MT
Stock Suppliers and Categories

Breeder	Stock	Category[1]	Source
Hy-Line International P.O. Box 310 Dallas Center, IA 50063	W-36	I-A	Hy-Line International 4432 Highway 213, Box 309 Mansfield, GA 30255
	W-98	I-A	(Same)
	Hy-Line Brown	I-A	(Same)
Centurion Poultry 1471 Lane Creek Road Bogart, GA 30622	Bovans White	I-A	Centurion Poultry Inc. P.O. Box 591 86 O'Neal Road Lexington, GA 3064822
	Bovans White Experimental	III-A	(Same)
	Bovans Brown	I-A	(Same)
Centurion Poultry 1471 Lane Creek Road Bogart, GA 30622	DeKalb White	I-A	Centurion Poultry Inc. P.O. Box 591 86 O'Neal Road Lexington, GA 3064822
	DeKalb Sigma	I-A	(Same)
	DeKalb Brown	I-A	(Same)

[1] I = Extensive distribution in southeast United States
 II = Little or no distribution in southeast United States
III = Unavailable for commercial distribution in United States
 A = Entry requested
 C = Entry not requested