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HATCH AND SEROLOGY REPORT OF THE THIRTY EIGHTH NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST AND ALTERNATIVE MANAGEMENT TEST

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The North Carolina Layer Performance and Management Test is conducted under the auspices of the North Carolina Layer Performance and Management Program, Cooperative Extension Service at North Carolina State University and the North Carolina Department of Agriculture and Consumer Services. The flock is maintained at the Piedmont Research Station-Poultry Unit, Salisbury, North Carolina. Mr. Joe Hampton is Piedmont Research Station Superintendent; Mr. Kelly Snider is Poultry Unit Manager of the flock; Mrs. Pamela Jenkins is coordinator of data compilation and statistical analysis; and Dr. K. E. Anderson is Project Leader. The purpose of this program is to assist poultry management teams in evaluation of commercial layer stocks and management systems.

Copies of current and past reports are maintained for public access at http://www.ces.ncsu.edu/depts/poulsci/tech_manuals/layer_reports/38_hatch_report.pdf .

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HATCH AND SEROLOGY REPORT OF THE THIRTY EIGHTH NORTH CAROLINA LAYER PERFORMANCE AND MANAGEMENT TEST

Dates of Importance and Entries:

Nineteen entries were accepted or acquired in accordance with the rules and regulations of the test. The eggs were placed into trays and set on December 15, 2009 and were pulled from the hatchers on January 6, 2010. Eleven commercial white egg strains, seven commercial brown egg strains, and one heritage brown egg strain that are participating in the current test. Table 1, shows the source of the laying stock (Breeder) and the strain which was entered in the test and Table 5 provides the breeder, source of eggs, and entry status of each strain. The egg deliveries to the Research Station occurred from December 10-15 and all eggs arrived in good condition. The eggs for each of the strains were shipped directly to the station via delivery truck, FedEx ground freight, or via US Mail. There were few broken eggs and the number of dirty eggs was minimal among all shipments for the represented strains. The eggs were set 90 eggs/tray and allowed to come to room temperature prior to placement in the incubators. At time of transfer, two egg trays were transferred to each hatching tray, and were then placed into the hatchers. Only obvious leakers or contaminated eggs were removed at transfer to facilitate the hatch and were noted on the hatching tray labels.

Table 1. 38th North Carolina Layer Performance and Management Test Strain Code Assignments

Strain No.	Source of Stock	Source Code	Strain
1	Hy-Line	HL	W-36
2	Hy-Line	HL	W-98
3	Lohmann	L	H&N Nick Chick
4	Lohmann	L	LSL Lite
5	ISA	ISA	Bovans White
6	ISA	ISA	Shaver White
7	ISA	ISA	Dekalb White
8	ISA	ISA	Babcock White
9	ISA	ISA	EXP. White
10	Novogen	N	White
11	ISA	ISA	Bovans Robust
12	Hy-Line	HL	Brown
13	Hy-Line	HL	Silver Brown
14	Tetra Americana	TA	TETRA Brown
15	Tetra Americana	TA	TETRA Amber
16	ISA	ISA	Brown
17	ISA	ISA	Bovans Brown
18	Novogen	N	Brown
19	NCSU	NC	BPR

Data Collection:

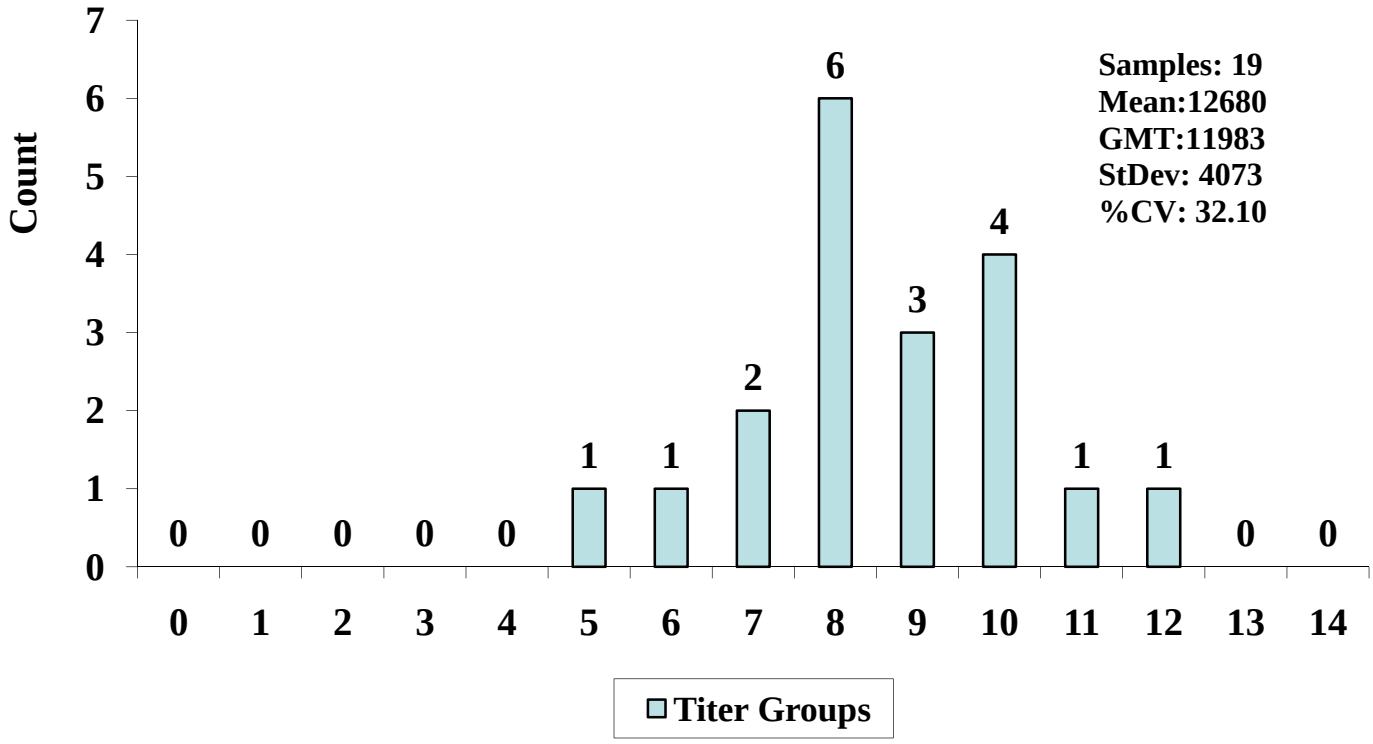
Serology: The serum samples were obtained by collecting a blood sample from 20 male chicks obtained from each strain at the time of hatch. The blood was allowed to agglutinate and the serum to separate for collection. The serum samples were then pooled by combining the individual samples from ten chicks per strain into 1 ml samples or aliquots. The pooled samples were collected and packaged and refrigerated until delivery and testing at the NC Department of Agriculture & Consumer Services, Rollins Diagnostic Laboratory for MG and by Synbiotics Corp for IBD. The serological tests were conducted for Infectious Bursal Disease using the Agar Gel Immuno Diffusion (AGID) method and Mycoplasma gallisepticum using the ELISA test. The serum pools were adequate for each of the 19 strains. Serology results for MG and IBD are shown in Table 2. The chicks were MG negative and the IBD antibody levels were positive, indicative of a reasonable breeder vaccination programs in the breeder flocks of all strains. IBD titers were present in all the strains and the titer levels for the individual samples appeared to have a greater variation between strains than seen in previous reports. The distribution of the sample titers across strains is shown in Figure 1.

Table 2. Status of the IBD parental immunity and determination of MG presence in the participating strains in the 38th NCLP&MT

Strain	MG[1]	IBD[2]	
		Result	S/P
HL W-36	- Neg	+ Pos	4.447
HL W-98	- Neg	+ Pos	2.583
H&N Nick Chick	- Neg	+ Pos	6.180
LSL Lite	- Neg	+ Pos	3.987
Bovans White	- Neg	+ Pos	5.190
Shaver White	- Neg	+ Pos	3.223
Dekalb White	- Neg	+ Pos	7.727
Babcock White	- Neg	+ Pos	6.737
ISA EXP. White	- Neg	+ Pos	5.863
N White	- Neg	+ Pos	6.303
Bovans Robust	- Neg	+ Pos	5.063
HL Brown	- Neg	+ Pos	4.120
HL Silver Brown	- Neg	+ Pos	3.190
TETRA Brown	- Neg	+ Pos	4.340
TETRA Amber	- Neg	+ Pos	4.037
ISA Brown	- Neg	+ Pos	2.267
Bovans Brown	- Neg	+ Pos	4.443
N Brown	- Neg	+ Pos	5.140
NC BPR	- Neg	+ Pos	6.103

[1]MG status was determined using the ELISA method
[2]IBD status was determined using Agar Gel Immune Diffusion (AGID) by Synbiotics Corp

Figure 1. Distribution of strain serum samples across titer groups (582-IBD-XR)



Hatch and Hatch Residues: The analysis of fertility and embryonic mortality was conducted on a random sample of the egg and hatch residues remaining in the hatching trays at transfer and on the hatch day. Table 3 shows the percent usable chicks, cull chicks, and residue of the total eggs set. Table 4 shows the distribution of the residue by each embryonic category and is based upon the percentages based upon the total residue.

Table 3. Analysis of hatch by evaluating chicks pulled, female, male, and cull chicks as a percentage of the total eggs set

Strain	Chicks Pulled	Female Chicks[1]	Male Chicks	Cull Chicks	Total Egg Residue
	----------%----------				
HL W-36	72.55	37.04	35.51	0.90	26.54
HL W-98	73.85	33.93	39.92	0.89	25.26
H&N Nick Chick	72.35	29.48	42.87	0.94	26.71
LSL Lite	76.50	25.32	51.18	1.58	21.92
Bovans White	78.95	35.09	43.86	0.35	20.70
Shaver White	69.30	33.56	35.74	2.08	28.63
Dekalb White	75.00	30.86	44.14	1.47	23.53
Babcock White	80.29	38.10	42.19	1.17	18.55
ISA EXP. White	76.67	33.33	43.33	1.28	22.06
N White	83.78	39.92	43.86	1.39	14.83
Bovans Robust	87.05	39.24	47.81	0.56	12.39
HL Brown	93.42	45.83	47.60	0.50	6.08
HL Silver Brown	68.23	29.24	38.99	0.72	31.05
TETRA Brown	76.29	38.10	38.19	0.39	23.33
TETRA Amber	59.53	27.97	31.56	0.50	39.97
ISA Brown	81.99	40.40	41.59	0.28	17.73
Bovans Brown	74.46	33.90	40.56	0.50	25.04
N Brown	82.15	37.28	44.87	0.33	17.51
NC BPR	27.59	12.06	15.53	0.33	72.08

[1]Calculated as a percentage of total eggs set.

Table 4. Analysis of breakout on eggs set to determine cause of embryo mortality as percent of residue

		Early Dead		Dead		Air Cell		Pipped			Abnormal		Upside	
Strain	**Infertile**	**Mem**	**Blood**	**Mid**	**Late**	**Pre-pip**	**Post-pip**	**Live**	**Dead**	**Contam[1]**	**Shell[2]**	**Embryo**	**Down[3]**	**Crack**
		%												
HL W-36	21.80	10.43	12.80	4.74	7.11	22.27	6.64	8.53	3.79	0.95	0.47	0.00	0.00	0.47
HL W-98	16.12	7.02	8.26	1.24	5.37	31.40	6.20	19.42	3.31	0.41	0.83	0.00	0.00	0.41
H&N Nick Chick	17.13	17.13	11.13	3.21	5.14	21.20	2.57	17.13	2.14	0.86	0.00	0.00	0.00	2.36
LSL Lite	33.24	14.87	11.66	2.62	6.41	17.78	1.17	8.75	2.92	0.58	0.00	0.00	0.00	0.00
Bovans White	27.39	19.75	14.65	3.18	3.82	13.38	5.10	6.37	5.10	0.00	1.27	0.00	0.00	0.00
Shaver White	10.20	7.14	5.61	0.77	4.34	13.52	8.93	39.54	8.67	0.77	0.00	0.00	0.51	0.00
Dekalb White	65.44	6.76	6.37	1.93	3.67	6.76	1.16	6.18	0.77	0.58	0.19	0.00	0.00	0.19
Babcock White	24.05	12.37	25.09	2.41	6.87	13.06	2.75	8.93	3.44	0.69	0.00	0.00	0.00	0.34
ISA EXP. White	32.27	5.11	23.96	2.24	4.15	13.74	2.56	12.14	2.56	1.28	0.00	0.00	0.00	0.00
N White	7.36	6.69	17.06	2.34	4.35	24.41	2.34	29.43	4.35	1.67	0.00	0.00	0.00	0.00
Bovans Robust	30.77	9.62	14.42	1.44	3.85	17.31	4.81	13.46	3.85	0.00	0.00	0.00	0.48	0.00
HL Brown	40.58	10.14	11.59	1.93	7.25	21.26	2.90	2.42	1.45	0.00	0.00	0.00	0.00	0.48
HL Silver Brown	34.72	8.08	6.55	2.40	4.80	15.94	8.08	3.93	11.35	3.28	0.00	0.00	0.22	0.66
TETRA Brown	24.50	6.63	10.95	0.00	11.24	29.97	2.88	8.93	3.17	1.44	0.00	0.00	0.00	0.29
TETRA Amber	35.77	8.27	8.08	0.77	6.54	23.65	6.35	5.96	3.65	0.77	0.00	0.00	0.00	0.19
ISA Brown	36.42	8.38	7.51	0.87	6.07	22.83	5.78	4.62	5.20	1.45	0.00	0.00	0.00	0.87
Bovans Brown	32.77	9.88	6.02	0.96	6.27	26.02	9.40	3.13	4.10	0.24	0.48	0.00	0.24	0.48
N Brown	34.49	9.81	12.03	1.58	11.08	24.37	3.48	0.95	0.63	0.32	0.32	0.00	0.00	0.95
NC BPR	61.89[4]	3.96	11.89	0.22	7.71	6.83	0.44	4.85	1.32	0.00	0.66	0.00	0.00	0.22

[1]Contaminated eggs.
[2]Abnormal shell structure.
[3]Eggs set with the small end up.
[4]The eggs from the heritage strain were saved for an extremely long period of time, there was no germ development in eggs from long term storage. Normal residue in BPR eggs is typically 25% infertile.

PULLET HOUSING AND MANAGEMENT:

Housing: The chicks were weighed then randomly assigned to the growing replicates with white egg and brown egg replicates being intermingled throughout the rooms within the house. The white egg strains occupied approximately 58 % of the house and brown egg strains occupied the other 42 % of House 8 and 8 and 92 % of House 2, respectively. Strain assignment codes indicate the cage/pen arrangement, replicate identification numbers, and the strain assignments for brood-grow House 2 and 8. Strain codes are maintained by the PI and Unit Manager for identification of birds and record keeping. Individual birds are identified by a permanent identification tag which identifies the replicate number; indicate room, row, level and replicate within room-row-level-replicate, for the four digits, respectively. The replicate number identifies the strain to the unit manager and PI.

House 2 – is a slat-litter facility which contains 24 pens (12' x 18') for a total sq ft of 216. The pullets would be housed at approximately 144 in^2 per hen for a total hen population of 216 hens/pen. Until the pullets are 12 wk of age the house will serve dual purpose for brooding and rearing of both the range and cage free birds. The house is being set up to include whole house heat capabilities. There will be 227 to 306 chicks started in each pen with the rearing protocol being identical to the cage reared hens. Roosts will be included in the rearing pen to allow the pullets to learn to utilize vertical space. This improves the use of nests as a hen. At 12 weeks of age the birds which are to be used on the range will be moved to their respective range facility where the completion of the rearing will be done.

House 8 - is an environmentally controlled windowless brood-grow facility with 3 banks of quad-deck cages in each room. Each room has been assigned a number and 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 on all levels. This allows for a total of 3,744 pullets per room resulting in a total pullet count. For this study 3 rooms will be utilized in House 8 for a total of 9,600 pullets. The white and brown egg strains will be randomly assigned to the replicates within the house. Entrant strains will be assigned to the replicates in a restricted randomized manner with the restrictions being that all strains are approximately equally represented in all rooms, rows, and levels, as described earlier under the experimental design. All chicks will be brooded in the same cage during the entire 16 wk rearing period. Paper will be placed on the cage floor for the first 7 days within each of the replicate series within each row. Each cage within the replicate will be 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 sq. in. for the white and brown-egg layers.

Table 5. Entries in the 37th NCLP&MT by Breeder, Stock Suppliers, and Categories

Breeder	Stock	Category[1]	Source
Hy-Line International 2583 240th Street Dallas Center, IA 50063	W-36	I-A	Hy-Line International 4432 Highway 213, Box 309 Mansfield, GA 30255
	Hy-Line Brown	I-A	(Same)
	W-98	I-A	Hy-Line International 17458 G. Avenue Perry, IA 50220
	Hy-Line Silver Brown	I-A	Dallas Center Research Farm 2418 N Ave. Dallas Center, IA 50063
Lohmann Tierzucht Gmbh Am Seedeich 9-11 . P.O.Box 460 D-27454 Cuxhaven, Germany	Lohmann LSL-Lite	I-A	Hy-Line North America 1755 West Lakes Parkway West Des Moines, IA 50266
H&N International 321 Burnett Ave South, Suite 300 Renton, Washington 98055	H&N "Nick Chick"	I-A	Feather Land Farms 32832 E. Peral Road Coberg, OR 97408
Instiut de Selection Animale (A Hendrix Genetic Company) ISA North America 650 Riverbend Drive, Suite C Kitchener, Ontario N2K 3S2 Canada	Bovans White	I-A	CPI-South Central Hatchery 5087 County Road 35 Bremen, AL 35033
	Bovans Robust	II-A	(Same)
	Bovans Brown	I-A	(Same)
	Babcock White	I-A	ISA North America 650 Riverbend Drive Kitchener, Ontario N2K 3S2 Canada
	Dekalb White	I-A	(Same)
	Experimental White	III-A	(Same)
	Shaver White	II-A	Brickland Hatchery Midwest Farms, LLC. 135 S. Epes St. Blackstone, VA 23824
	ISA Brown	II-A	Westwind Hatchery 8382 Lakeview St. Interlaken, NY 14847
North Carolina State University Dept of Poultry Science Box 7608 Raleigh, NC 27695	NCSU Barred Plymouth Rock	III-C	North Carolina State University Dept of Poultry Science Box 7608 Raleigh, NC 27695
Tetra Americana, LLC 1105 Washington Road Lexington, GA 30648	TETRA Brown	I-A	CPI-MidAmerica Hatchery 111 Stoddart Street Beaver Dam, WI 53916
	TETRA Amber	I-A	(Same)
NOVOGEN S.A.S. Mauguérand – Le Foeil BP 265 22 800 QUINTIN - FRANCE	NOVOgen WHITE	I-A	Kendrick Farm 25 Dr Breley Rd East Freetown, PA 02717
	NOVOgen BROWN	I-A	Highland Hills Farm 105 Hurricane Road Westmoreland, NH 03467

[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