

A COMPARISON OF WHITE PLYMOUTH ROCKS AND NEW  
HAMPSHIRE FOR BROILER PRODUCTION

by

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## INTRODUCTION

Broiler production in the United States has sprung from a highly seasonal small scale business to an important place in the agricultural picture during the last few years. In past years, a grower would produce about two lots per year for fall and winter markets. This was to utilize his equipment until he was ready to use it to brood his birds for flock replacement. But now the picture has changed from a seasonal one into one of a year around business.

Recent discoveries in requirements and feed ingredients have been incorporated into commercially blended mixtures to make poultry feeding easy, while the development of new strains and crosses has made possible the profitable production of poultry meat.

A highly specialized broiler industry has been developed in Delmarva, Shenandoah Valley, Chatham-Wilkes, North Carolina, northern Georgia, northwest Arkansas, east Connecticut, and Texas. These areas produce 315.403 millions of broilers, annually, for the market.

Consumers are now buying broiling and frying chickens throughout the year. In many sections of the country production of young chickens can be carried on profitably.

The practice of raising chickens in confinement and the development of high energy feeds has caused chicks to be grown to weights of three to four pounds and yet be tender for broiling, frying, or roasting.

Many breeds and crosses are used in the production of broilers, with special preference being shown to certain breeds in various areas. Two of the leading breeds used are the White Plymouth Rock and the New Hampshire. The fast feathering strains of these breeds grow faster and make greater gains than most of the slow feathering strains. Because of the popularity of these breeds, the Kansas strain of fast feathering White Rocks and the New Hampshires were chosen for comparison for broiler production in the southeast Texas area.

The experiments reported here were conducted in the Poultry Department at The Mary Allen College, Crockett, Texas.

Two groups were used in this study, fall hatched chicks and winter hatched chicks of both breeds. The fall hatched group was started September 19, 1949, and the winter hatched group, February 14, 1950.

The purpose of this study was (1) to compare White Plymouth Rock chicks with New Hampshire chicks for broiler production; (2) to compare fall hatched chicks with winter hatched chicks; and (3) to determine the time of year the feed cost was most favorable to the broiler producers of east Texas.

#### REVIEW OF LITERATURE

Seeger, Tomhave, and Shrader (1948), in conducting the Chicken of Tomorrow contest at Georgetown, Delaware, reported that at twelve weeks and two days of age, the highest scoring pen of New Hampshires averaged 3.53 pounds and required 3.34 pounds

of feed per pound of gain in body weight. The highest scoring pen of White Rocks in the same contest averaged 3.20 pounds and required 3.21 pounds of feed per pound of gain in body weight.

McAdams (1950) reports that at the Purina Research Farm on a 50-50 sex basis, New Hampshires averaged 3.39 pounds and required 3.08 pounds of feed per pound of gain in body weight at eleven weeks of age. Wilcke (1950) reports that at the Purina Research Farm on a 50-50 sex basis, White Rocks averaged 3.37 pounds and required 3.28 pounds of feed per pound of gain in body weight at eleven weeks of age.

Jull (1943) reported that 12 week old birds of equal sex ratio should average 2.64 pounds each, on 8.79 pounds of feed or 3.32 pounds of feed per pound gain.

Production costs vary with the producing area, the season, and general price level.

Perry and Dow (1946) found the following broiler distribution cost in Maine: 63 percent for feed, 14 percent for baby chicks, 14 percent for labor, 5 percent for overhead and 4 percent for miscellaneous.

Hoffman (1946) found the following average broiler distribution cost: 57.84 percent for feed, 20.62 percent for baby chicks, 9.7 percent for labor, 6.08 percent for miscellaneous, 4.72 percent for overhead, and 1.04 percent for marketing cost.

## MATERIAL AND TECHNIQUE

The chicks were brooded in a shed roof type permanent brooder house. The section that was designated for this experiment was 20 by 30 feet in size, which was divided to form two pens each 20 by 15 feet. For 200 birds, this exceeded the floor space of at least 0.5 square foot per chick recommended by Newlon and Buster of the California Station. The house had six glass windows in front, two on the end, and two on the back and four openings beneath the front windows. The building had a concrete floor.

Two model p-12 gas heated brooder stoves were used in this study. Each brooder had a 60 inch canopy which was ample to furnish heat for more than 300 chicks. The stoves were located in the center of each pen and thoroughly checked and tested prior to their use. No heat was used with the fall hatched group hence the brooder stoves were not used for this group.

Clean pine shavings were used for litter. The litter was spread about one inch deep before the chicks were put in the house and fresh litter was added weekly until a total depth of five inches was reached at the end of the twelve week period. Four hundred pounds of litter were used in each pen for both groups in this study.

Four reel type baby chick feeders twenty-four inches long were used until after the end of the fourth week. Then four feeders four feet long were used.

Three one gallon glass waterers were placed in each pen until the end of the fourth week, after which the number was increased



to five per pen. Purina Checkertabs were used in the drinking water at the rate of four per gallon until a total of 150 had been used in each pen.

The feeders and waterers were cleaned and scalded with hot lye water once per week. Purina Broiler Chow Special, a commercial broiler mash, was used in all experiments. This is an all mash feed. It was composed of the following ingredients: corn meal, meat scraps, fish meal, soybean oil meal, ground oats, corn gluten meal, fish solubles, dried whey, dehydrated alfalfa meal, animal protein factor supplement, riboflavin supplement, D-activated animal sterol, 0.01 percent Calcium Carbonate, 0.25 percent iodized salt, 0.01 percent manganese sulphate.

The calculated chemical analysis per 100 pounds was as follows:

Guaranteed analysis	Percent
Crude protein not less than	22.0
Crude fat not less than	3.5
Crude fibre not less than	4.5
Nitrogen Free Extract not less than	47.0

The mash was hopper fed ad-libitum. The chicks used in this study were secured from reliable poultry breeders. The fall hatched group came from the following sources: The Fast Feathering White Rocks from J. O. Coombs in Sedgwick, Kansas, and the New Hampshires from the Lindstrom Hatchery in Clinton, Missouri.

The chicks for the winter hatched group were secured from De Forest Hatchery, Peabody, Kansas. In both groups the White Rocks were of the Kansas fast feathering strain. The strain of the New

Hampshires, was unknown.

The Brooder house was thoroughly cleaned and scalded with hot lye water. After drying, one inch of shavings was spread in both pens. The brooder stove was operated twenty-four hours prior to the arrival of the chicks. The chicks were uncrated, counted, and fed and watered upon arrival. The brooder stove was kept at a temperature of ninety-five degrees for the first two days and gradually lowered until the chicks were able to live without heat. This was done with the winter hatched group. No heat was used with the fall hatched group. Newspaper in four layers was spread over the shavings, first to prevent the chicks from eating the shavings and second to hold feed until the chicks had become accustomed to eating the mash.

Each day until the third day a layer of paper was removed and fresh feed sprinkled over the remaining paper for the chicks to eat. On the fourth day all the newspapers were removed and the mash feeders were put in. When the chicks were first put under the hover a wire brooder guard consisting of one inch poultry mesh twelve inches high was placed eighteen inches from the hover to prevent the chicks from straying too far from the heat. After seven days the wire brooder guard was removed because it was no longer needed.

During the first week of both feeding periods the feeders were filled to three-fourths their capacity and after the first week were filled to a little more than half their capacity to prevent waste of feed. A piece of one inch mesh hardware cloth was cut to fit loosely in the feeders to save feed.



The chicks were weighed in groups at four, eight, and twelve weeks of age. A platform scale was used for weighing.

#### EXPERIMENTAL DATA

The chicks when received were vigorous and healthy. Both groups feathered well and grew off rapidly with very little mortality.

#### Mortality

There is no set standard for mortality. Voorhies and Read (1929) have made the only extensive study of daily mortality in young chicks and their data cover the first fourteen days of the brooding period for over 6,000,000 chicks in 1927, 1928, and 1929. They concluded that there are indications of a typical curve depicting the chances of life for a baby chick during the first fourteen days of the brooding period, and that baby chicks have approximately 920 chances out of 1000 of reaching the fifteenth day of the brooding period.

Charles and Stuart (1934) offered the following rearing expectancy:

	percent
mortality the first three weeks .....	2-15
mortality after 1st three weeks to maturity ...	2-10

Fall Hatched Group. The mortality of this group was 4.5 percent and 5.0 percent for the White Rocks and New Hampshires respectively, Table 1. All the mortality in both groups of birds

Table 1. Weekly mortality (fall hatched group)\*.

Week	White Rocks			New Hampshires		
	No. :	Cumulative :	Cumulative :	No. :	Cumulative :	Cumulative :
	dead :	total :	mortality :	dead :	total :	mortality :
	1	1	1 percent :	1	1	1 percent
1	4	4	2.0	5	5	2.5
2	3	7	3.5	3	8	4.0
3	2	9	4.5	2	10	5.0
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					

\*50-50 sex basis

Table 2. Weekly mortality (winter hatched group)\*.

Week	White Rocks			New Hampshires		
	No. :	Cumulative :	Cumulative :	No. :	Cumulative :	Cumulative :
	dead :	total :	mortality :	dead :	total :	mortality :
	1	1	1 percent :	1	1	1 percent
1	3	3	1.5	4	4	2.0
2	2	5	2.5	2	6	3.0
3	2	7	3.5	2	8	4.0
4	0					
5	0					
6	0					
7	0					
8	0					
9	0					
10	0					
11	0					
12	0					

\*sexed cockerels

used in this study occurred during the first three weeks.

Winter Hatched Group. The mortality in this group was lower than that of the fall hatched group, amounting to 3.5 percent for the White Rocks and 4.0 percent for the New Hampshires, Table 2. In both the fall and winter hatched groups, the White Rocks had a lower rate of mortality than the New Hampshires. All mortality was from miscellaneous causes.

#### Rate of Growth and Feed Consumption

According to Jull (1943) there is really no "growth standard" for any breed or variety of chickens, for the simple reason that strains of the same breed or variety may differ in their inherent rates of growth, and rates of growth will vary considerably with environmental conditions, diseases encountered, and the quality of feed used.

In this study, both groups were started the same time, fed the same feed and the same managerial practices were carried out in both groups. Group weights were recorded at four week intervals.

Fall Hatched Group. Table 3 gives the average weights and the amount of feed consumed per chick at four week intervals.

At the end of the first four week period the White Rocks weighed 0.84 pound and had consumed 1.60 pounds of feed per bird, while the New Hampshires weighed 0.89 pound and had consumed 1.64 pounds of feed per bird. The difference in average weights per bird was 0.05 pound in favor of the New Hampshires but they had

Table 3. Growth and feed consumption per bird by four-week periods (fall hatched group)\*.

Week :	No. of:	Total :	Average:	Gain per:	Feed consumed :	Feed per
:	birds:	weight :	weight:	period :	Per :	Cumula-:
:	:	(lb) :	(lb) :	(lb) :	period:	tive :
:	:	:	:	:	:	gain
White Rocks						
4	191	160.44	.84	.84	1.60	1.60
8	191	441.21	2.31	1.47	4.80	6.40
12	191	700.97	3.67	1.36	6.18	12.58
New Hampshires						
4	190	169.10	.89	.89	1.64	1.64
8	190	456.00	2.40	1.51	4.56	6.20
12	190	731.50	3.85	1.45	5.79	11.99

\*50-50 sex basis

consumed 0.04 pound more feed per bird, than the White Rocks. The White Rocks required 1.90 pounds of feed per pound of gain while the New Hampshires required 1.84 pounds of feed per pound of gain. The difference in the amount of feed required per pound of gain was 0.06 pound in favor of the New Hampshires for this period.

At the end of the second four week period the White Rocks averaged 2.31 pounds on a total of 6.40 pounds of feed. The New Hampshires averaged 2.40 pounds on a total of 6.20 pounds of feed. The feed required per pound of gain was 2.77 pounds for the White Rocks and 2.58 pounds for the New Hampshires. There was a difference of 0.09 pound in average weight per bird 0.20 pound of feed consumed per bird in favor of the New Hampshires at the end of the eight week period. The difference in the amount of feed required to produce one pound of gain was 0.19 in favor of the New Hampshires.

At the end of the third four week period, the White Rocks averaged 3.67 pounds on a total of 12.58 pounds of feed while the New Hampshires had an average weight of 3.85 pounds on a total of 11.99 pounds of feed. The White Rocks gained one pound of weight for each 3.42 pounds of feed consumed and the New Hampshires gained one pound of weight for each 3.11 pounds of feed consumed. The difference in the average weights per bird and the average amounts of feed consumed per bird was 0.18 and 0.59 pound, respectively, in favor of the New Hampshires. The difference in the amount of feed required per pound of gain was 0.31 pound in favor of the New Hampshires.

Winter Hatched Groun. Table 4 gives the average weights and the amount of feed consumed per chick at four week intervals.

At the end of the first four week period the White Rocks weighed 0.87 pound and had consumed 1.70 pounds of feed per bird, while the New Hampshires weighed 0.93 pound and had consumed 1.79 pounds of feed per bird. The difference in average weights per bird was 0.06 pound in favor of the New Hampshires, but they had consumed 0.09 pound of feed per bird more than the White Rocks. The White Rocks required 1.95 pounds of feed per pound of gain while the New Hampshires required 1.92 pounds of feed per pound of gain. The difference in the amount of feed required per pound of gain was 0.03 pound in favor of the New Hampshires for this period.

At the end of the second four week period the White Rocks averaged 2.42 pounds on a total of 6.52 pounds of feed. The feed required per pound of gain was 2.68 pounds for the White Rocks and 2.57 pounds for the New Hampshires. There was a difference of 0.11 pound in average weight on the same amount of feed in favor of the New Hampshires for the eight week period.

At the end of the third four week period, the White Rocks averaged 3.90 pounds on a total of 13.06 pounds of feed while the New Hampshires had an average weight of 4.05 pounds on a total of 12.53 pounds of feed. The White Rocks gained one pound of weight for each 3.34 pounds of feed consumed and the New Hampshires gained one pound of weight for each 3.09 pounds of feed consumed. The difference in the average weights per bird and the average amounts of feed consumed per bird was 0.15 and



Table 4. Growth and feed consumption per bird by four-week periods (winter hatched group)\*.

Week :	No. of:	Total :	Average:	Gain per:	Feed consumed :	Feed per	
:	birds:	weight :	weight:	period :	Per :	Cumula-:	pound of
:	:	(lb) :	(lb) :	(lb) :	period:	tive :	gain
White Rocks							
4	193	157.71	.87	.87	1.70	1.70	1.95
8	193	467.06	2.42	1.55	4.82	6.52	2.68
12	193	752.7	3.90	1.48	6.54	13.06	3.34
New Hampshires							
4	192	178.56	.93	.93	1.79	1.79	1.92
8	192	485.76	2.55	1.60	4.73	6.52	2.57
12	192	777.60	4.05	1.52	6.01	12.53	3.09

\*sexed cockerels

0.53 pound, respectively, in favor of the New Hampshires. The difference in the amount of feed required per pound of gain was 0.25 pound in favor of the New Hampshires.

In comparing the fall hatched chicks with the winter hatched chicks both breeds made their fastest and most economical gains during the winter period.

At four weeks of age the winter hatched White Rocks weighed 0.03 pound more per bird but had eaten 0.10 pound of feed more per bird than the fall hatched group. The difference in the amount of feed required per pound of gain was 0.05 pound in favor of the fall hatched group. The winter hatched New Hampshires weighed 0.04 pound more per bird and had eaten 0.15 pound of feed more per bird than the fall hatched group. The difference in the amount of feed required per pound of gain was 0.08 pound per bird in favor of the fall hatched group.

At eight weeks of age the winter hatched White Rocks weighed .11 pound more per bird but had eaten 0.12 pound of feed more per bird than the fall hatched group. The difference in the amount of feed required per pound of gain was 0.09 pound in favor of the winter hatched group. The winter hatched New Hampshires weighed 0.13 pound more per bird but had eaten 0.32 pound more feed per bird than the fall hatched group. The difference in the amount of feed required per pound of gain was 0.01 pound in favor of the winter hatched group.

At twelve weeks of age the winter hatched White Rocks weighed 0.23 pound more per bird but had eaten 0.48 pound more feed per bird than the fall hatched group. The difference in the amount of

feed required per pound of gain was 0.08 pound in favor of the winter hatched group. The winter hatched New Hampshires weighed 0.20 pound more per bird but had eaten 0.54 pound more feed per bird than the fall hatched group. The difference in the amount of feed required per pound of gain was 0.02 pound in favor of the winter hatched group.

The total amount of feed consumed by the fall hatched group of chicks is given in Table 5.

Table 5. Total feed consumption. (Fall hatched group)\*

Week	No. of chicks	No. of lbs. of feed Per flock	Cumulative, lbs. Per bird
White Rocks			
1- 4	191	305.60	1.60
5- 8	191	916.80	4.80
9-12	191	1180.38	6.18
New Hampshires			
1- 4	190	311.60	1.64
5- 8	190	866.40	4.56
9-12	190	1100.10	5.79

\*50-50 sex basis

At four weeks of age, the New Hampshires had consumed 5.0 pounds of feed per flock or 0.04 pound of feed per bird more than the White Rocks.

At eight weeks of age, the White Rocks had consumed 50.4 pounds of feed per flock or 0.20 pound of feed per bird more than the New Hampshires.

At twelve weeks of age, the White Rocks had consumed 124.68 pounds of feed per flock or 0.59 pound of feed per bird more than the New Hampshires.

The cost of the feed will be accounted for in the cost of production section.

The total amount of feed consumed by the winter hatched group of chicks is given in Table 6.

Table 6. Total feed consumption. (Winter hatched group)\*

Week	No. of chicks	No. of lbs. of feed flock	Per bird	Cumulative, lbs. flock	Per bird
White Rocks					
1- 4	193	328.10	1.70	328.10	1.70
5- 8	193	930.26	4.82	1258.36	6.52
9-12	193	1262.22	6.54	2520.58	13.06
New Hampshires					
1- 4	192	343.68	1.79	343.68	1.79
5- 8	192	908.16	4.73	1251.84	6.52
9-12	192	1153.92	6.01	2405.76	12.53

\*sexed cockerels

At four weeks of age, the New Hampshires had consumed 15.58

pounds of feed per flock or 0.09 pound of feed per bird more than the White Rocks.

At eight weeks of age, the White Rocks had consumed 22.10 pounds of feed per flock or 0.00 pound of feed per bird more than the New Hampshires.

At twelve weeks of age, the White Rocks had consumed 114.82 pounds more feed per flock or 0.53 pound of feed per bird than the New Hampshires.

The cost of the feed will be accounted for in the cost of production section.

#### Income

Average prices for the east Texas area were secured from the Agricultural Statistician, Austin, Texas. The value of the broilers at intervals of 4, 8, and 12 weeks of age was computed for the fall hatched and winter hatched group, Table 7.

Table 7. Average broiler prices at various dates.

Fall hatched group		:	Winter hatched group	
October 17, 1949	- 27.2¢ per lb.		March 13, 1950	- 32.3¢ per lb.
November 14, 1949	- 30.1¢ " "		April 2, 1950	- 32.3¢ " "
December 5, 1949	- 29.8¢ " "		May 1, 1950	- 31.6¢ " "

Fall Hatched Group. At the end of the first four week period

the White Rocks were worth \$43.64 for the flock or \$0.23 per bird. The New Hampshires were worth \$46.00 per flock or \$0.24 per bird. At eight weeks of age the White Rocks were worth \$132.80 per flock or \$0.70 per bird, while the New Hampshires were worth \$137.26 per flock or \$0.72 per bird. At 12 weeks of age, the White Rocks had a total value of \$208.89 per flock or \$1.09 per bird. The New Hampshires were worth \$217.99 per flock or \$1.15 per bird, Table 8.

At the age of four weeks, the New Hampshires exceeded the White Rocks in value by a margin of \$2.36 or about \$0.01 per bird. At the age of eight weeks the New Hampshires exceeded the White Rocks in value by a margin of \$4.46 or about \$0.02 per bird. At 12 weeks of age the New Hampshires exceeded the White Rocks in value by a margin of \$9.10 or about \$0.06 per bird.

Winter Hatched Chicks. Table 9 gives the value of this group at four week intervals. At four weeks of age, the White Rocks were worth \$54.17 per flock or \$0.28 per bird and the New Hampshires were worth \$57.67 per flock or \$0.30 per bird. At eight weeks of age, the White Rocks were worth \$150.86 per flock or \$0.78 per bird and the New Hampshires were worth \$156.90 per flock or \$0.82 per bird. At twelve weeks of age, the White Rocks were worth \$237.85 per flock or \$1.23 per bird and the New Hampshires were worth \$245.72 per flock or \$1.28 per bird.

The New Hampshires exceeded the White Rocks in value by the following margins: at four weeks of age, \$3.53 per flock or \$0.02 per bird; at eight weeks of age, \$6.04 per flock or \$0.03 per bird.



Table 8. Value of broilers at four week intervals. (Fall hatched group)\*

Age in weeks :	No. of chicks :	Total weight (lb) :	Average weight (lb) :	Price per lb. :	Value		
:	:	:	:	:	Per flock :	Per	Per bird
White Rocks							
4	191	160.44	.84	\$.272	\$ 43.64	\$	.23
8	191	441.21	2.31	.301	132.80		.70
12	191	700.97	3.67	.298	208.89		1.09
New Hampshires							
4	190	169.10	.89	\$.272	\$ 46.00	\$	.24
8	190	456.00	2.40	.301	137.26		.72
12	190	731.50	3.85	.298	217.99		1.15

\*50-50 sex basis

Table 9. Value of broilers at four week intervals. (Winter hatched group)\*

Age in : weeks :	No. of : chicks :	Total : weight : (lb)	Average : weight : (lb)	Price : per lb. :	Value		
					Per flock	Per bird	
White Rocks							
4	193	167.71	.87	\$.323	\$ 54.17	\$ .28	
8	193	467.06	2.42	.323	150.86	.78	
12	193	752.70	3.90	.316	273.85	1.23	
New Hampshires							
4	192	178.56	.93	\$.323	\$ 57.67	\$ .30	
8	192	485.76	2.53	.323	156.90	.82	
12	192	777.60	4.05	.316	245.72	1.28	

\*sexed cockerels

At twelve weeks of age, \$7.87 per flock or \$0.05 per bird.

In comparing the fall hatched with the winter hatched chicks, both breeds proved to have their greatest value in the winter hatched group. The winter hatched White Rocks exceeded the fall hatched White Rocks by a margin of \$28.96 per flock or \$0.14 per bird and there was no fuel charge for the fall hatch. The winter hatched New Hampshires exceeded the fall hatched New Hampshires in value by a margin of \$27.74 or \$0.13 per bird.

### Cost of Production

Fall Hatched Group. The items of cost of production for this group is given in Table 10. The difference in cost of production was due to a difference in feed cost as the other items of cost were the same for both breeds. At the end of the first four week period the New Hampshires consumed 6.0 pounds of feed per flock more than the White Rocks. This represented a difference in feed cost of \$0.31 for this period. At the end of the second four week period the White Rocks consumed 50.4 pounds of feed in excess of that consumed by the New Hampshires. This represented a difference in feed cost of \$2.55 per flock. At the end of the third four week period, the White Rocks consumed 80.23 pounds of feed in excess of the New Hampshires which represented a difference in feed cost of \$4.08 per flock.

The total cost of production for the fall hatched group is given in Table 11. The White Rocks cost \$181.22 per flock or

Table 10. Expenses by four week periods (fall hatched group)\*.

Item	No. of birds:	Amount	Total cost		No. of birds:	Amount	Total cost	
			Per :	bird :			Per :	bird :
First four-week period								
White Rocks								
Chicks	200		\$32.00	\$ .16	200		\$32.00	\$ .16
Feed	191	305.6 lbs.	15.99	.08	190	311.6 lbs.	15.89	.08
Litter	191	200 lbs.	.50	.003	190	200 lbs.	.50	.003
Labor	191	14 hrs.**	5.04	.03	190	14 hrs.	5.04	.03
Checker-tabs	191	150	1.50	.008	190	150	1.50	.008
Overhead	191	***	3.02	.02	190		3.02	.02
Total cost	191		\$57.65	\$ .30	190		\$57.95	\$ .31
Second four-week period								
Feed	191	916.8 lbs.	\$46.75	\$ .24	190	866.4 lbs.	\$44.19	\$ .23
Litter	191	100 lbs.	.25	.0013	190	100 lbs.	.25	.0013
Labor	191	14 hrs.**	5.04	.03	190	14 hrs.	5.04	.03
Overhead	191	***	3.02	.02	190		3.02	.02
Total cost	191		\$55.07	\$ .29	190		\$52.50	\$ .28
Third four-week period								
Feed	191	1180.38 lb.	60.19	\$ .32	190	1100.1 lb.	\$56.11	\$ .30
Litter	191	100 lbs.	.25	.0013	190	100 lbs.	.25	.0013
Labor	191	14 hrs.**	5.04	.02	190	14 hrs.	5.04	.02
Overhead	191	***	3.02	.02	190		3.02	.02
Total cost	191		\$68.50	\$ .36	190		\$64.42	\$ .34

\*70-50 sex basis

\*\*Rate per hour, 36¢

\*\*\*five percent for 12 week period

Table 11. Total expenses (fall hatched group)\*.

Item	No.	Price per: unit	Kind	Total cost	
				Per flock	Per bird
White Rocks					
Chicks	200	\$.16	Unsexed	\$ 32.00	\$.16
Feed	2402.78 lb.	.051	Broiler Chow sp.	122.54	.64
Litter	400 lbs.	.25 cwt.	Shavings	1.00	.005
Labor	42 hrs.	.36	Hand	15.12	.08
Checker-tabs	150	.01	Drinking tablets	1.50	.008
Overhead**				9.06	.05
Total cost				\$181.22	\$.95
New Hampshires					
Chicks	200	\$.16	Unsexed	\$ 32.00	\$.16
Feed	2278.1 lb.	.051	Broiler Chow sp.	116.19	.61
Litter	400 lbs.	.25 cwt.	Shavings	1.00	.005
Labor	42 hrs.	.36	Hand	15.12	.08
Checker-tabs	150	.01	Drinking tablets	1.50	.008
Overhead**				9.06	.05
Total cost				\$174.87	\$.92

\*50-50 sex basis

\*\*Depreciation cost on building and equipment, 5 percent for 12 weeks.

\$0.95 per bird. The New Hampshires cost \$174.87 per flock or \$0.92 per bird. The difference was \$6.35 per flock or about \$0.03 per bird in favor of the New Hampshires. The White Rocks consumed 124.63 pounds of feed more than the New Hampshires for the 12 week period. This represented a feed cost of \$6.35 per flock or about \$0.03 per bird. Therefore the lower production cost of the New Hampshires was due to a lower cost of feed.

The distribution of broiler production cost is given in Table 12. Feed is the leading item of cost in each group followed by cost of chicks, labor, overhead and miscellaneous in the order named.

Table 12. Distribution of broiler production cost (fall hatched group)\*.

Item	White Rocks		New Hampshires	
	Cost per flock	Percent	Cost per flock	Percent
Feed	\$122.54	67.62	\$116.19	66.45
Baby chicks	32.00	17.66	32.00	18.30
Labor	15.12	8.34	15.12	8.64
Overhead**	9.06	5.00	9.06	5.18
Miscellaneous***	2.50	1.38	2.50	1.43
Total	\$181.22	100.00	\$174.87	100.00

\*50-50 sex basis

\*\*depreciation cost on building and equipment, 5 percent for 12 weeks.

\*\*\*cost of litter, fuel, and checker-tabs



Winter Hatched Group. The items of cost by 4 week intervals are given in Table 13. The difference in cost of production was due to a difference in feed cost as the other items of cost were the same for both breeds. The New Hampshires consumed 15.58 pounds of feed in excess of the White Rocks during the first 4 week period. This amounted to \$0.83 difference in the cost of feed per flock for this period. During the second 4 week period the White Rocks consumed 22.1 pounds of feed in excess of the New Hampshires. This amounted to \$1.18 difference in feed cost per flock for this period. At the end of the third 4 week period, the White Rocks had consumed 108.3 pounds of feed in excess of the New Hampshires. This represented a difference in feed cost of \$5.74 per flock for this period.

The total cost of production for the winter hatched group is given in Table 14. The White Rocks cost \$196.01 per flock or \$1.02 per bird. The New Hampshires cost \$189.93 per flock or \$0.99 per bird. The difference was \$6.08 per flock or \$0.03 per bird in favor of the New Hampshires. The White Rocks consumed 114.82 pounds of feed more than the New Hampshires for the 12 week period. This represented a feed cost of \$6.08 per flock or \$0.03 per bird. Hence the lower cost of production of the New Hampshires was due to a lower cost of feed.

In comparing production cost of the fall hatched group with that of the winter hatched group, both breeds had a higher cost of production in the winter hatched group than in the fall hatched group. The total cost of production for the White Rocks

Table 13. Expenses by four week periods (winter hatched group)\*.

Item	No. of birds	Amount	Total cost	No. of birds	Amount	Total cost
			Per bird			Per bird
First four-week period						
White Rocks						
Chicks	200		\$28.00	200		\$28.00
Feed	193	328.1 lb.	17.39	192	343.58 lb.	18.22
Fuel, gas	193	6000 cu ft	3.50	192	6000 cu ft	3.50
Litter	193	200 lbs.	.50	192	200 lbs.	.50
Labor	193	14 hrs.**	5.04	192	14 hrs.	5.04
Checker-tabs	193	150	1.50	192	150	1.50
Overhead	193	***	3.26	192		3.26
Total	193		\$59.19	192		\$60.02
Second four-week period						
New Hampshire						
Feed	193	230.26 lb.	\$49.30	192	908.16 lb.	\$48.13
Fuel, gas	193	6000 cu ft	3.50	192	6000 cu ft	3.50
Litter	193	100 lbs.	.25	192	100 lbs.	.25
Labor	193	14 hrs.**	5.04	192	14 hrs.	5.04
Overhead	193	***	3.27	192		3.27
Total	193		\$61.36	192		\$60.19
Third four-week period						
Feed	193	1262.22 lb	\$66.90	192	1153.92 lb	\$61.16
Litter	193	100 lbs.	.25	192	100 lbs.	.25
Labor	193	14 hrs.**	5.04	192	14 hrs.	5.04
Overhead	193	***	3.27	192		3.27
Total	193		\$75.46	192		\$69.72

\*sexed cormorants

\*\*rate, 36¢ per hour

\*\*\*.5 percent for 12 weeks

Table 14. Total expenses (winter hatched group)\*.

Item	No.	Price: per unit	Kind	Total cost: Per unit	No.	Kind	Price: per unit	Total cost: Per unit
White Rocks								
Chicks	200	\$ .14	sexed cockerels	\$ 28.00	200	sexed cockerels	\$ .14	\$ 28.00
Feed	2520.58	.053	broiler chow special	133.59	2405.76 lbs.	broiler chow special	.053	127.51
Fuel	12000 cu ft	**	natural gas	7.00	12000 cu ft	natural gas	**	7.00
Litter	400 lbs	.25 cwt	shavings	1.00	400 lbs	shavings	.25 cwt	1.00
Labor	42 hrs	.36	hand	15.12	42 hrs	hand	.36	15.12
Checker-tabs	150	.01	drinking tablets	1.50	150	drinking tablets	.01	1.50
Overhead		***		9.80			***	9.80
Total cost				\$196.01				\$189.93
				\$1.02				\$ .99

\*sexed cockerels

\*\*\$1.50 per thousand for 1st thousand and \$.50 per thousand for each additional thousand

\*\*\*depreciation cost on buildings and equipment at rate of 5 percent for 12 weeks

during the winter hatched period was \$196.01 and \$181.22 for the fall hatched group. The cost of production for the winter hatched group exceeded the cost of production for the fall hatched group by \$14.79 per flock or \$0.07 per bird. The total cost of production of the New Hampshires during the winter hatched period was \$189.93 and \$174.87 for the fall hatched group. The cost of production of the winter hatched New Hampshires was \$15.06 per flock or \$0.07 per bird in excess of the fall hatched group. This increase in cost was due to the following factors:

1. Feed cost had advanced from 5.1¢ per pound for the fall hatched group to 5.3¢ per pound for the winter hatched group.

2. There was no fuel cost for the fall hatched group, but there was a total fuel cost of \$7.00 per flock for each breed in the winter hatched group.

3. The winter hatched group, being all cockerels, consumed more feed per bird than did the fall hatched group.

The distribution of broiler production cost is given in Table 15. Feed is the leading item of cost, followed by cost of chicks, labor, overhead, and miscellaneous in the order named.

Table 15. Distribution of broiler production cost (winter hatched group)\*.

Item	White Rocks		New Hampshires	
	Cost per:	Percent	Cost per :	Percent
	flock :		flock :	
Feed	\$133.59	68.15	\$127.51	67.14
Baby chicks	28.00	14.29	28.00	14.74
Labor	15.12	7.71	15.12	7.96
Overhead**	9.80	5.00	9.80	5.00
Miscellaneous***	9.50	4.85	9.50	5.00
Total	\$196.01	100.00	\$189.93	100.00

\*sexed cockerels

\*\*depreciation cost on building and equipment, 5 percent for 12 weeks

\*\*\*cost of litter, fuel and checker-tabs

# Net Profit and Labor Income

Fall Hatched Group. The net profit and labor income for this group are given in Table 16. The White Rocks showed a net profit of \$27.67 per flock or \$0.14 per bird. They had a labor income of \$42.79 per flock or \$0.22 per bird. The New Hampshires had a net income of \$43.12 per flock or \$0.23 per bird. They had a labor income of \$58.24 per flock or \$0.31 per bird. The net profit showed by the New Hampshires exceeded the net profit shown by the White Rocks by a margin of \$15.45 per flock or \$0.09 per bird. The margin of difference for labor income was the same as shown for net income.

Table 16. Net profit and labor income (fall hatched group)\*.

Item	White Rocks			New Hampshires		
	Total:	Per	Per	Total:	Per	Per
	birds:	flock	bird	birds:	flock	bird
Total income	191	\$208.89	\$1.09	190	\$217.99	\$1.15
Total expenses	191	181.22	.95	190	174.87	.92
Net profit	191	27.67	.14	190	43.12	.23
Total spent for labor	191	15.12	.08	190	15.12	.08
Labor income	191	\$ 42.79	\$ .22	190	\$ 58.24	\$ .31

\*50-50 sex basis



Winter Hatched Group. The net profit and labor income for this group are given in Table 17. The White Rocks showed a net profit of \$41.84 per flock or \$0.21 per bird. The labor income was \$56.96 per flock or \$0.29 per bird. The New Hampshires had a net profit of \$55.79 per flock or \$0.29 per bird. They had a labor income of \$70.91 per flock or \$0.37 per bird. The difference in the net profit was \$13.95 per flock or \$0.08 per bird in favor of the New Hampshires. The difference in the labor income was \$13.95 per flock or \$0.08 per bird in favor of the New Hampshires.

Table 17. Net profit and labor income (winter hatched group)\*.

Item	White Rocks			New Hampshires		
	Total: birds	Per flock	Per bird	Total: birds	Per flock	Per bird
Total income	193	\$237.85	\$1.23	192	\$245.72	\$1.28
Total expenses	193	196.01	1.02	192	189.93	.99
Net profit	193	41.84	.21	192	55.79	.29
Total spent for labor	193	15.12	.08	192	15.12	.08
Labor income	193	\$ 56.96	\$ .29	192	\$ 70.91	\$ .37

\*sexed cockerels

Table 18 gives the net income and labor income per chick at four week intervals. For the fall hatched group, the White Rocks would have shown a net loss of \$0.07 at four weeks of age. The labor income would have shown a net loss of \$0.04 per bird. At

eight weeks of age the White Rocks would have shown a net profit of \$0.11 per bird and a labor income of \$0.16 per bird. At twelve weeks of age, the White Rocks showed a net profit of \$0.14 per bird and a labor income of \$0.22 per bird. The New Hampshires at four weeks of age would have shown a net loss of \$0.07 and a net loss of \$0.04 for net profit and labor income. At eight weeks of age, the New Hampshires would have shown a net profit of \$0.14 and a labor income of \$0.19 per bird. At twelve weeks of age, they would have had a net profit of \$0.23 and a labor income of \$0.31 per bird.

Table 18. Net profit and labor income per chick at various ages (fall hatched group)\*.

Item	White Rocks			New Hampshires		
	Age in weeks			Age in weeks		
	4	8	12	4	8	12
Total income	\$ .23	\$ .70	\$1.09	\$ .24	\$ .72	\$1.15
Total expenses	.30	.59	.95	.31	.58	.92
Net profit	-.07	.11	.14	-.07	.14	.23
Total spent for labor	.03	.05	.08	.03	.05	.08
Labor income	-.04	.16	.22	-.04	.19	.31

\*50-50 sex basis

The difference in net income was in favor of the New Hampshires at various ages. At four weeks of age, \$0.00, at eight weeks of age, \$0.03 per bird and at twelve weeks of age, \$0.09

per bird. The differences in labor income were in favor of the New Hampshires at four week intervals. The figures for the four, eight, and twelve week periods were the same differences that were shown in net income.

The data for the winter hatched group are given in Table 19. The difference in net income per chick was in favor of the New Hampshires at various ages. At four weeks of age, a minus \$0.02, at eight weeks of age, \$0.03, and at twelve weeks of age, \$0.03. The difference in labor income per chick at various ages was in favor of the New Hampshires.

In comparing the fall hatched group with the winter hatched group, both the White Rocks and the New Hampshires had a greater net income and labor income per chick in the winter hatched group than in the fall hatched group. At four weeks of age, the winter hatched White Rocks had a minus \$0.04 advantage over the fall hatched group. At eight weeks of age they had an \$0.05 advantage, and at twelve weeks of age they had a \$0.07 advantage. The figures for labor income, represented the same difference as was shown in the net income, which was in favor of the winter hatched White Rocks. The winter hatched New Hampshires had the following margins of profit over the fall hatched New Hampshires for net income: at four weeks of age, a minus \$0.06; at eight weeks of age, \$0.05; and at twelve weeks of age, \$0.06. The margin of difference for the labor income was in favor of the winter hatched New Hampshires; at four weeks of age, \$0.06, at eight weeks of age, \$0.05, and at twelve weeks of age, \$0.06.

Table 19. Net profit and labor income per chick at various ages (winter hatched group)\*.

Item	White Rocks			New Hampshire		
	Age in weeks			Age in weeks		
	4	8	12	4	8	12
Total income	\$ .28	\$ .73	\$ 1.23	\$ .30	\$ .82	\$ 1.28
Total expenses	.31	.62	1.02	.31	.63	.99
Net profit	\$-.03	\$ .16	\$ .21	\$-.01	\$ .19	\$ .29
Total spent for labor	.03	.05	.08	.03	.05	.08
Labor income	\$ .00	\$ .21	\$ .29	\$ .02	\$ .24	\$ .37

\*sexed cockerels

## DISCUSSION

The New Hampshires had a higher rate of mortality than the White Rocks. The fall hatched group of both breeds had a slightly higher rate of mortality than the winter hatched group. Mortality was low in both varieties.

The fall hatched New Hampshires had a mortality of 5 percent and the winter hatched New Hampshires had 4 percent. The fall hatched White Rocks had a mortality of 4.5 percent and the winter hatched White Rocks had 3.5 percent. All the mortality in both groups occurred during the first three weeks. It was within the rearing expectancy for the first three weeks set up by Charles and Stuart (1946). The rate of growth for both breeds in the fall and winter hatched groups was better than the rate of growth given by Jull (1943).

The New Hampshires had a greater value at four week intervals than the White Rocks. Both breeds in the winter hatched group had a greater value at four week intervals than the fall hatched group.

The New Hampshires had a greater net income per chick than the White Rocks at four week intervals.

Both breeds of the winter hatched group had a greater net income per chick than did the fall hatched group.

The labor income for the New Hampshires was greater than the labor income for the White Rocks. The labor income for both breeds was greater for the winter hatched group than it was for the fall hatched group.



## SUMMARY

1. A study was made comparing White Rocks with New Hampshires for broiler production. Two hundred birds of each breed were used in each of two groups; a fall hatched, started in September and a winter hatched, started in February.

2. The New Hampshires in both the fall and winter hatched groups had a greater average weight, used feed more efficiently, and yielded a greater net return than the White Rocks but the White Rocks had slightly less mortality in both periods.

3. Both breeds in the winter hatched group yielded a greater return than did the fall hatched group.

4. Feed cost was more favorable to the broiler producer in the fall in east Texas than it was in the winter. In spite of this, the winter broiler producer realized a greater profit because the increase in cost of feed was offset by an increase in the prices paid for broilers and more favorable growing conditions for broilers.

5. Had each group been started four weeks earlier the producer would have had an advantage of \$0.003 per pound for the fall hatched group and \$0.007 per pound for the winter hatched group.

6. The high livability of chicks, good rate of growth, and the low cost of labor in this study enabled the grower to receive a fair profit per bird in all four groups.



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## BIBLIOGRAPHY

- Charles, Thomas B., and Homer O. Stuart. Commercial Poultry Farming. Danville, Ill.: Interstate Printers, 1946. 544 p.
- Cyphers, Charles A. The Best Breeds for Broilers. Reliable Poultry Journal, 36 (12) 660-662, 1935.
- Davidson, J. A., C. M. McGary and C. G. Card. Summer Broiler Production. Quarterly Bulletin, Michigan Agricultural Experiment Station Bulletin 26, 222-232, 1944.
- Hanke, O. A. Sixty Million Broilers in Del-Mar-Va. Poultry Tribune, 48 (1) 1942.
- Heuser, Gustave F. Feeding Poultry. New York: John Wiley and Sons, 1946. 543 p.
- Hoffman, Edmund. Successful Broiler Growing. Mount Morris, Ill.: Watt Publishing Co. 1946. 186 p.
- Hoffman, Edmund, and H. E. Tomhave. Superior Strains for Broiler Production. U. S. Poultry and Egg Magazine. 50 (1): 30-32. 1944.
- Johnson, Hugh A. Cost of Producing Broilers in Sussex County, Delaware. Delaware Agricultural Experiment Station Pamphlet 14. 1944.
- Jull, Morley A. Successful Poultry Management. New York: McGraw-Hill Book Co., 1943. 467 p.
- Lippincott, William A., and Leslie E. Card. Poultry Production. 7th Edition. Philadelphia, Penn.: Lea and Febiger. 1946. 440 p.
- McAdams, J. H. Facing Today's Broiler Price Problem. Checker-board News. May-June, 1950. p. 4.
- Mehrhof, N. R. and A. W. O'Steen. Raising Chicks, Broilers, and Pullets. Florida Agricultural Extension Bulletin 128. 1946.
- Newlon, W. E., and M. W. Buster. Brooding and Pullet Management. California Agricultural Extension Circular, 28:1-34. 1929.
- Parnell, E. D., and S. A. Moore. Broiler Production. Texas Agricultural Experiment Station Bulletin 143. 1945.
- Payne, Loyal F. Poultry Management. Kansas Agricultural Experiment Station Circular 244. 1948.

- Perry, Alvah L., and George F. Dew. Cost and Returns in Broiler Production. Maine Agricultural Experiment Station Bulletin 441. 1946.
- Polk, H. D., and Charles E. Burnett. Broiler Production with High Protein Feeds. Mississippi Agricultural Experiment Station Bulletin 374. 1943.
- Rice, James E., and Harold E. Botsford. Practical Poultry Management. 5th edition. New York: John Wiley and Sons. 1949. 614 p.
- Seeger, Karl C., A. E. Tomhave, and H. L. Shrader. The Results of the Chicken-Of-Tomorrow 1948 National Contest. Delaware Experiment Station, Miscellaneous publication No. 65. 1949.
- Vondell, John H. A Study of Four Strains of Broiler Chicks. U. S. Egg and Poultry Magazine. 51 (6) 269-281. 1945.
- Voorhies, E. C., and C. A. Read. A Biometrical Study of the Mortality of Single Comb White Leghorn Chicks. Hilgardia. 5: 531-590. 1931.
- West, H. O. Broiler Production. Mississippi Agricultural Experiment Station Bulletin 370. 1942.
- Wilcke, H. L. Personal correspondence. 1950.
- Winter, Alden R., and Ernest M. Funk. Poultry Science and Practice. Chicago, Ill.: Lippincott, 1941. 739 p.