SOME ADVANTAGES AND DISADVANTAGES OF ALL-PULLET FLOCKS

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by

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INTRODUCTION

It had long been known that the dairy cow reached her peak of production not during her first year, but later in life. This was also known to be true with the beef cow, the sow, the ewe, and most all other classes of livestock. It was believed that the same condition existed in poultry. It was not until the trap nest was devised that a hen's egg production could be accurately known.

By using the trap nest along with other equipment, it was possible to compare winter and fall egg production, egg size, and hatchability between hens and pullets.

Up to this time there had been some controversy over these points, however no proof could be furnished and the true facts could not be known until the trap nest became popular.

Many people believed pullet eggs were smaller than hen eggs, which probably led them to conclude that progeny from pullet eggs would be smaller and weaker than chicks from eggs laid by hens. It was further believed that pullet off-spring would have lower livability than chicks hatched from hen eggs.

The coming of the trap nest and the individual egg scales had made it possible to compare egg production and egg weights between hens and pullets, yet livability of progeny was hardly more than a guess. It was not until the wing and leg bands became part of the breeders' standard supplies, that livability of progeny between chicks hatched from pullet and hen eggs could intelligently be compared.

The loss from laying-house mortality varies considerably from year to year. Egg producers have for many years practiced the most

modern methods of feeding and management in the hope of keeping mortality as low as possible. Few producers however thought of keeping the pullets and hens separated as a means of reducing laying-house mortality.

The increased demands for poultry and eggs during the recent war stimulated production of these commodities. Large commercial producers began to sell their laying birds as soon as they had completed one year of laying, which would be about the time the hens would go into a molt. The laying quarters would then be filled with fully-mature pullets. The producer who normally had high losses from avian tuberculosis or from colds, quickly found that by practicing the all-pullet system of management his mortality could be greatly reduced, and his annual egg production notably increased.

ANNUAL EGG PRODUCTION

Many workers have kept production records on chickens for several years and most all agree that a pullet will lay more eggs during her first year than any other year throughout her lifetime. The only exception this writer was able to find was that of Ball, Alder, Egbert, and Turpin (1914, 1916), whose work is presented in Table III. It is also interesting to note that many of these workers including Jull (1938) and Hall and Marble (1933) observed that the higher the pullet year production the greater the decline in yearly production.

Harris and Lewis[1] (1922) studies the correlation between first and second year production of 432 chickens. They found the first year average to be 173.7 eggs while the second year average was 139.8 eggs, a 24% decline.

Trap nest records kept by Thompson[2] (1942) on 1,431 S. C. White Leghorn hens, some living throughout the sixth laying year, are summarized in Table I. It was pointed out that the greatest drop was during the second year, which was 34%. The least drop was during the fourth year which was about 10% less than the previous year. It will be noted that only two hens during their second year laid 250 eggs which was the production for 32.3% of the pullets during their first laying year.

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[1]Harris, J. A., and H. R. Lewis, "The Correlation Between First and Second Year Egg Production in the Domestic Fowl," Genetics, VII (May, 1922), pp. 280-283.

[2]Thompson, William C., "Egg-Production Behavior of Hens," New Jersey Agricultural Experiment Station Bulletin, 700 (November, 1942), pp. 4-9.

TABLE I

Distribution of Egg-Yield Annual Totals on S. C. White Leghorn Hens Living More Than One Laying Year

Class	Single Comb White Leghorns					
No. Eggs Per Yr.	1st yr.	2nd yr.	3d yr.	4th yr.	5th yr.	6th yr.
325	1					
300	67					
275	279					
250	462	2				
225	387	42	3	2		
200	182	191	34	3	1	
175	47	345	95	15	2	
150	5	235	81	31	1	1
125	1	133	79	38	9	1
100		72	33	18	8	
75		36	22	17	7	
50		24	12	6	8	1
25		16	11	3	6	1
0		16	11	4	1	2
Total No. Eggs	1,431	1,112	381	137	43	6
Average Egg Prod.	254	167	149	133	98	70

Insko[3] (1946) published production records kept on Barred Plymouth Rocks and White Leghorns for 11 years. He observed in the Plymouth Rocks that the pullets averaged 172.5 eggs, while the hens laid 122.3 eggs, a difference of 29%. In the Leghorns the pullets laid 172 eggs while the hens laid only 137.5 eggs, a decrease of 20%.

Data kept for six years and published by Hall and Marble[4] (1933) on annual egg production and percentage of first year and the preceding year are presented in Table II. These workers

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[3]Insko, W. M., "Comparisons of Pullet and Hen Flocks." Poultry Short Course, (1946), 1-6.

[4]Hall, G. O., and D. R. Marble, "The Relationship Between The First Year Egg Production and Egg Production of Later Years", Poultry Science, X (May, 1931), 194-203.

stated that after the first year, the decline in production from year to year was gradual and fairly regular.

TABLE II

Average Annual Egg Production, Percentage of First Year and of the Preceding Year

Year	Number Birds	Average Production	% First Yr. Production	% of Preceding Year
1	372	191.60	- - - -	- - - -
2	372	137.90	71.79	71.79
3	132	109.72	57.27	79.56
4	42	91.36	47.68	83.27
5	14	84.86	44.29	92.87
6	7	63.57	35.18	74.91

Table III was compiled by Jull[5] (1928), and is a summary of records kept by several workers who were observing egg production in different breeds and varieties of chickens. Jull concluded that the higher the pullet year production the greater the decline in yearly egg production.

It will be noted that Ball, Alder, Egbert and Turpin (1914, 1916) observed egg production to be greater during the second year in two pens of the white Leghorns that they were observing.

These are the only two cases that have been reported and both pens had a total of only 87 birds. The pullet-year average for these two pens was less than 120 eggs. This condition may have been caused by disease, poor management or improper feeding during the first year. Regardless of the reason these two cases do not

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[5]Jull, Morley A., "Second Year Egg Production in Relation to First Year Egg Production in the Domestic Fowl." Poultry Science, VII (September, 1938), 276-286.

TABLE III

Second Year Production as a Percentage of Frist Year Production in Various Breeds of the Domestic Fowl

Breed and Variety	Authority	Yr. Reported	No. of Birds	Production		2nd yr. Prod. as a % of 1st yr. Prod.
				1st Yr.	2nd Yr.	
Barred Plymouth Rocks	Bittenbender	1928	48	160.71	134.96	83.98
Barred Plymouth Rocks	Mussehl	1928	50	216.00	131.70	60.97
Barred Plymouth Rocks	Lunn	1928	146	228.42	164.71	72.11
Barred Plymouth Rocks	B. A. I.	1928	37	220.76	148.54	67.29
White Plymouth Rocks	Bittenbender	1928	89	174.07	114.43	65.74
White Plymouth Rocks	Lewis, Hannas, and Wene	1919	170	155.00	119.10	76.84
Rhode Island Reds	Bittenbender	1928	124	183.97	120.15	65.31
Rhode Island Reds	Hayes	1928	450	219.48	139.08	63.37
Rhode Island Reds	Payne	1928	32	197.00	139.00	70.56
Rhode Island Reds	Mussehl	1928	50	217.40	153.60	70.56
Rhode Island Reds	Lewis, Hannas and Wene	1919	80	150.60	117.20	77.82
Rhode Island Reds	B. A. I.	1928	75	205.69	151.43	73.62
White Wyandottes	Bittenbender	1928	64	186.31	124.63	66.89
White Wyandottes	Mussehl	1928	16	202.40	137.40	67.89
White Wyandottes	Lewis, Hannas, and Wene	1919	150	144.30	115.40	79.97
White Leghorns	Ball, Alder	1914	58	117.00	146.00	124.79
White Leghorns	Egbert, and	1916	29	119.00	139.00	116.81
White Leghorns	Turpin	1916	100	153.00	101.00	66.01
White Leghorns	Bittenbender	1928	910	210.30	152.82	72.67
White Leghorns	Harris & Lewis	1922	443	174.05	139.79	80.32
White Leghorns	Lunn	1928	103	232.81	171.44	73.64
White Leghorns	Mussehl	1928	50	218.70	169.10	77.32
White Leghorns	Payne	1928	32	257.00	173.00	67.32
White Leghorns	B. A. I.	1928	73	227.60	183.23	80.51
White Leghorns	Lewis, Hannas and Wene	1919	600	169.70	137.60	81.08

alter the fact that records kept on several thousands of hens show that production is highest during the pullet year.

Martin and Insko[6] (1933) published production records kept on 450 White Leghorns, some living seven years. The pullets laid over 200 eggs during their first year. Production for later years was compared with the first year which was rated as 100. The ratings for the second through the seventh years were 61, 72, 60, 63, 49, and 45 respectively.

In a short article, Ogle[7] (1947) stated that egg production decreased about 20% each year, and that one will need birds of the 200 egg quality in the pullet year to be profitable through three laying years.

According to Byerly[8] (1947), chickens lay about 20% more eggs during their first year of production than during their second year.

Data published by Clark[9] (1939) on the production of 188 White Leghorns, some living for 10 years, are presented in Table IV. The average decline in production from year to year for the first nine years was 21%.

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[6] Martin, J. Holmes, and W. M. Insko, Jr., "Relationship Between Age, Fecundity and Hatchability." Poultry Science, XIII (May, 1934), 188-190.

[7] Ogle, R. C., "Pullets lay Best." Breeders Gazette, (February, 1947), 17.

[8] Byerly, T. C., "Pullets Pay Better." Poultry Tribune, (January, 1947), 11.

[9] Clark, Thomas B., "The Relation of Production and Egg Weight to Age in White Leghorn Fowls." Poultry Science, XIX (January, 1939), 61-66.

TABLE IV

The Mean Production and the Percentage of Change in Production from the Preceding Year

Year	Number Birds	Mean Production	%Change from Preceding Year
1	188	168.52	-------
2	178	135.98	- 19.31
3	165	105.66	- 22.30
4	153	90.61	- 14.24
5	130	75.64	- 16.52
6	109	58.72	- 22.37
7	98	47.60	- 18.94
8	71	30.48	- 35.97
9	51	24.78	- 18.70
10	26	27.19	+ 9.73

It is not expected that two workers will observe the exact percentage of decline in egg production from pullet to yearling year. One worker will even observe different rates of decline in production when he is observing two breeds or two strains within the same breed. This is to be expected since egg production depends upon many hereditary and environmental factors.

FALL AND WINTER EGG PRODUCTION

According to Byerly[1] (1947) mature pullets lay twice as many eggs during the fall as the same birds lay as yearlings in the corresponding time.

Baker[2] (1947) said "The big advantage of all-pullet flocks is the increased production of early fall and winter eggs."

Records kept on 50 poultry flocks consisting of all-pullet flocks and mixed flocks were compiled by Shultis[3] (1933). During the months of September through December, he observed that some all-pullet flocks laid at a rate of 58%, while the highest rate of lay for flocks consisting of both pullets and hens was 41%. He further stated that hens usually lay about 30 eggs during this period while pullets averaged about 60 eggs.

Table V was published by Insko[4] (1946) and contains data on the comparison of winter egg production between pullets and hens in the Leghorn and Barred Plymouth Rock breeds. He pointed out that the pullets in both breeds produced more than twice as many eggs during this period as did the hens.

It is interesting to note that all workers concluded that egg production was higher in pullet flocks than in either mixed flocks or all-hen flocks, yet few workers observed the same production

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[1]Byerly, op. cit., (January), 11.

[2]Baker, Ralph, "The All-Pullet Flock is Successful in Iowa," American Poultry Tribune, (February, 1947), 44.

[3]Shultis, Arthur, "The Effect of Percentage of Flock Pullets on Fall Egg Production," A Study of the Price of Eggs as Affected by Size, Quality, and Seasonal Distribution of Production, (January, 1933).

[4]Insko, W. M., "Comparisons of Pullet and Hen Flocks," Poultry Short Course, (1946), 1-6.

TABLE V

Comparison of Winter Egg Production at the Kentucky Station
(Averages of 5nYears-1937-38 through 1941-42)

Breed	Winter Eggs		
	Pullets	Hens	Difference
Barred Rocks	51.9	25.5	26.4
White Leghorn	52.8	20.7	32.1

for either the hens or pullets during this period. Winter egg production, as is true with annual egg production, depends upon many factors, several of which are different in the many sections of the United States. These factors would include feeding, housing, time of hatch, and climatic conditions.

Livestock shed their old coats during the spring months but this is not true of poultry, which shed their feathers, a process called molting, and get new feathers near the end of the year. For most chickens, this process takes place during the last three months of the year; however some may require a little more or less time. A very high percentage of pullets hatched around the first of April begin laying about the middle of September, which is about the time most old hens go into a molt. Only a small percentage of hens will lay during the time they are molting and even fewer will lay during the time that wing and tail feathers are growing. Pullets seldom go into a complete molt until they have laid one full year. The fact that pullets are laying during the time that old hens are molting and growing new feathers explains why pullets lay more eggs during the fall and early winter than do hens.

As has previously been stated, unless pullets start laying exceedingly early, during July or August, they seldom go through a

oomplete molt until the end of the first laying year. However pullets as well as hens may go into summer or fall partial molts, which are usually caused by improper feeding, management, housing and climatic conditions. It is not likely that pullets would have any more or any less partial molts than would hens under the same conditions.

EGG SIZE, MEASURED BY WEIGHT

Clark[1] (1939) published egg-weight records on 188 hens, some living for 10 years. A summary of these records is presented in Table VI. He concluded that the egg weight was greater in the second year than in the first and that it remained at approximately the same level during the second and third years and decreased gradually with age up to the tenth year.

TABLE VI

Mean Yearly Egg Weight and the Differences Between Years

Year	Number of Birds	Mean Egg Weight (grams)	Difference (grams)
1	188	53.15	-------
2	178	56.83	3.68
3	165	56.50	- 0.33
4	153	55.97	- 0.53
5	130	54.11	- 1.86
6	109	53.74	- 0.37
7	98	52.75	- 0.99
8	71	50.35	- 2.40
9	51	49.55	- 0.80
10	26	47.41	- 2.14

In an article on all-pullet flocks, Ogle[2] (1947) concluded that if a pullet is fully mature when she begins laying, only the first dozen eggs will be small. From that time forth age has no affect on the size of the egg.

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[1] Clark, op. cit., XIX, 61-64.

[2] Ogle, op. cit., (February, 1947, 17.

Thompson[3] (1942) was more inclined to agree with Clark (1934) on egg weight than he was with Ogle (1947) when he stated, "Old hens will tend to lay larger eggs throughout the year than will pullets during their first laying year."

It will be noted that the workers on this subject observed different results. From Table VI it will be observed that the difference in the average weight of eggs laid by pullets and yearling hens was 3.68 grams. This appears to be a big difference but it must be realized that the first dozen or so of eggs produced by a pullet are much smaller than two ounces and that these extra small eggs would naturally cause the pullet's annual egg weight to average light.

Some of the other workers concluded that age had no effect on size of eggs, while others said hens laid larger eggs throughout the year than did pullets. None of these workers presented records to substantiate their conclusions. Ogle may have found such a small difference that he thought it unimportant while Thompson may have found about the same difference and concluded that it was significant.

The difference in egg size may be large in a few instances, but in almost all comparisons, if the pullets were fully mature, and if there was a difference, it would be so small that it would be considered insignificant.

It is seldom that pullets, which have been laying a month or longer, will lay more eggs that weigh less than 24 ounces per dozen than will yearlings or older hens.

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[3]Thompson, op. cit., 700, 8-12.

Some workers have observed that pullets lay smaller eggs throughout their pullet year than do yearling hens, because of the fact that the pullets were probably underdeveloped when they began laying.

HATCHABILITY

Insko[1] (1946) published results of a two-year study of hatchability of hen and pullet eggs. Table VII is a condensation of his work.

TABLE VII

Hatchability of Hen and Pullet Eggs
(Summary of Two Years, 1939-40)

	Eggs Set	In-fertile	%Fer-tile	Strong Chicks	% Hatch	% Hatchability
B. R. Hens	952	65	93.1	649	68.2	73.1
B. R. Pullets	2689	140	94.8	2036	75.7	79.8
W. L. Hens	862	59	93.1	623	72.3	77.5
W. L. Pullets	1692	75	95.6	1277	75.5	79.0

Hatchability records kept for seven years and published by Martin and Insko[2] (1933) showed that per cent of hatchability showed a slight tendency to decline with age.

Some research has been done in the comparison of hatchability between pullet and hen eggs, but much more experimentation could be carried out. Most breeders feel that they must have at least one year's laying record on all hens before they can intelligently select the best hens for their breeding pens, and extensive research would have to prove that pullet eggs hatched much better than eggs from hens before the breeders would keep pullets.

Data presented in Table VII definitely proved that in this study pullet eggs hatched somewhat better than did hen eggs. The pullet eggs in the Barred Rock breed gave 6.7% hatchability over

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[1]Insko, op. cit., (1946) 5.

[2]Martin and Insko, op. cit., XIII, 190.

the hen eggs, while the difference in the White Leghorn breed was only 1.5% in favor of the pullets.

Results in this study verify observations made in a previous study by Martin and Insko (1933).

The difference in hatchability of pullet and hen eggs in both breeds is in favor of the pullets. This difference however, is small and should be considered insignificant. It should be clearly understood that this report is only a two-year study and could hardly be considered as the foundation for an established fact.

It is true that data collected by these two workers led them to conclude that hatchability gradually decreases with age. If this difference actually did exist in all experiments on this subject, it would not alter the fact that there is no appreciable difference between the hatchability of pullet eggs and eggs from older hens.

LIVABILITY OF PROGENY

There are only a few records available on the comparison of livability of chicks hatched from eggs produced by pullets and eggs laid by hens. Again Insko[1] (1946) has done the most research on this subject. His work was the only material this writer was able to find. A summary of his work is reproduced in Table VIII.

TABLE VIII

Livability of Chicks Hatched from Hen and Pullet Eggs
(Summary of Two Years, 1939-40)

Chicks From	Number Started	Mortality (155 days)	% Raised
Barred Rock Hens	382	27	92.9
Barred Rock Pullets	500	24	95.2
White Leghorn Hens	406	27	93.3
White Leghorn Pullets	510	18	96.5

It will be observed from the table that the chicks from pullets had about 3% higher livability than chicks from eggs produced by hens.

This two-year comparison does show that livability of chicks from pullet eggs is higher than chicks from hen eggs, yet the percentage is so small that it could hardly be considered significant.

Until much more work is done on this subject it would probably be safe to conclude that the age of the hen has no appreciable effect on the livability of progeny.

Since this report is the only one available for observation, livability of progeny from hens and pullets should not be given

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[1] Insko, op. cit., (1946) 4.

too much consideration. Selection, feeding and management would have much more influence upon livability of progeny than would the age of the dams.

LAYING HOUSE MORTALITY

A 5-year study of the comparison of mortality between pullets and hens in the Leghorn and Plymouth Rock breeds, conducted and published by Insko[1] (1946) revealed that pullets had a little lower mortality than did hens. Table IX is a summary of Insko's work.

TABLE IX

Comparison of Mortality Between Pullet and Hen Flocks
At The Kentucky Station
(Average of 5 Years, 1937-38 through 1941-42)

White Leghorns	% Mortality	Barred Plymouth Rocks	% Mortality
Pullets	23.2	Pullets	12.3
Hens	25.4	Hens	20.6
Difference	2.2	Difference	8.3

Dow[2] (1942) and Sicer[3] (1945) concluded that there was no significant difference in comparing laying house mortality between pullet and hen flocks.

According to Ogle[4] (1947) and Jones[5] (1946), mortality was significantly higher among the pullets than among the hens. Table X was published by Jones in 1946. It compares mortality between hens and pullets for a period of 16 years.

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[1] Insko, op. cit., (1946, 2.

[2] Dow, George F., "Egg Production in Maine," Maine Agricultural Experiment Station Bulletin, 412 (July, 1942), 16.

[3] Sicer, Joe W., "All Pullet Flocks Earn More Money," Poultry Tribune, (December, 1945) 17, 52.

[4] Ogle, op. cit., (February, 1947), 17.

[5] Jones, Roy E., "Culling and Mortality Statistics," The Twenty-Seventh Connecticut Home Egg Laying Contest, Summary Issue, XII (September, 1946), 3.

TABLE X

Comparison of Pullet and Hen Mortality in the Twenty-Seventh Connecticut Home Egg Laying Contest
(16-Year Summary, 1930-31 through 1945-46)

Year	Pullet	Hen	Year	Pullet	Hen
1930-31	15.9%	11.3%	1938-39	11.1%	8.2%
1931-32	17.4%	12.9%	1939-40	11.0%	8.2%
1932-33	15.8%	13.2%	1940-41	11.6%	6.4%
1933-34	15.0%	11.0%	1941-42	11.0%	6.7%
1934-35	12.6%	11.1%	1942-43	11.2%	5.9%
1935-36	12.6%	11.9%	1943-44	11.2%	4.9%
1936-37	11.7%	8.4%	1944-45	7.6%	4.6%
1937-38	10.3%	7.1%	1945-46	7.7%	6.9%

Observations made on the comparison of mortality between pullets and hens in the review of literature appears to be very different among many of the workers. Some observed mortality higher among pullets, some found it to be higher in the hen flocks, while others observed no appreciable difference.

The percent of mortality can be greatly reduced by close and continuous culling, as certain infectious diseases, such as coryza and bronchitis, may markedly increase mortality. The disease cycle would be broken in all pullet flocks which would naturally cause mortality to be lower in all pullet flocks than in flocks consisting of both hens and pullets.

Since the chicken of today is bred to lay many more eggs than her ancestors laid a score of years ago, it is easy to see that there is a much greater strain on her body than would be true of a hen producing only about half as many eggs. If pullets are not fully mature both sexually and physically, they will not lay as many eggs as they are bred to lay, or else they will lay at such a rapid rate that they will use all the nutrients from the feed

for egg production which means that their bodies will not receive the nutrients needed to remain healthy and vigorous. This condition would weaken the bird, which would increase mortality.

Since laying house mortality is directly or indirectly affected by many factors such as physical and sexual development of the bird, management and feeding, and outbreaks of diseases, it is possible for workers to find mortality about the same between pullets and hens, or higher among hens than pullets, or vice versa.

The average pullet mortality for both breeds in Table IX was 17.7% and the average for the hens was 23%, which is a difference of 5.3% in favor of the pullets. In Table X the average percent mortality for the 16 years was 12.1 for the pullets and 8.6 for the hens, a difference of 3.5% less for the hens. These small differences are hardly significant when we realize that the percent of mortality in many of the better flocks will vary at least this much or even more from year to year.

DISEASE RESISTANCE

Table XI is a condensation of a report compiled by the Iowa Poultry Husbandry Staff[1] (1947). That station has probably done more research on avian tuberculosis than has any other. These workers observed that less than one half of one percent of the birds in all pullet flocks had tuberculosis, while 3.43% of the birds in flocks where old hens were kept reacted to the test. Other interesting points brought out by these workers were: During the past 10 years the percentage of reactors in all flocks decreased from 8.5% to 2.32%, and the percentage of tubercular flocks in all flocks tested during the last 10 years dropped from 69.79% to 42.16%. The reason given for the decrease of avian tuberculosis during the last 10 years was attributed, to very large degree, to the increased number of all pullet flocks in Iowa.

TABLE XI

Summary of Avian Tuberculin Testing in Iowa
(Concluded, 2-3-1947)

	All-Pullet Flocks	Mixed Flocks	All Flocks
Number Flocks	68	98	166
Number Birds	12,398	20,440	32,838
Number Positive	59	703	762
Percent Positive	0.47	3.43	2.32
No. Flocks Positive	12	58	70
% Flocks Positive	17.64	59.18	42.16

[1]Poultry Husbandry Staff of the Iowa State College, Agricultural Extension Service, "Summary of Avian Tuberculin Testing in Iowa", Poultry-Swine Tuberculosis Survey, (February, 1947).

Baker[2] (1947), in a short article, said, "The all-pullet flock lessens the danger of outbreaks of diseases in the flock." Byerly[3] (1947) made a similar statement when he stated, "All-pullet flocks are not exposed to diseased-carrying old hens." According to Sicer[4] (1945), it is a good practice to sell all the old hens before the pullets are housed, as an excellent means of controlling avian tuberculosis and preventing a carryover of colds.

It is interesting to note that all workers on this subject observed the same general results; namely, that all pullet flocks have fewer reactors to avian tuberculosis and fewer birds come down with colds.

Each disease runs in a cycle. It is easily understood that when this cycle is broken the severity of the disease is greatly lessened. In hen flocks, individual hens may carry the disease and yet show only a few if any of the symptoms. This condition would perpetuate the disease from year to year. In all pullet flocks, all birds are disposed of a few weeks before the young pullets are brought in from the range.

The premises are thoroughly cleaned, disinfected, and rested a few days before the pullets are housed. By following this system, it is clear that the cycle of any disease would be broken.

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[2]Baker, op. cit., (February, 1947), 44.

[3]Byerly, op. cit., XIX, 11.

[4]Sicer, op. cit., (December, 1945) 17, 52.

It is not expected that the reader will assume that one flock is more resistant to contagious diseases than another. All-pullet flocks are so managed that there are at least a few weeks that the laying quarters are free from hens, which would break the cycle in most all diseases. This condition does not exist in mixed flocks, as there are always hens in the laying quarters. The keeping of hens more than one laying year would cause the laying house to be occupied continuously. This system of management would not break the cycle of diseases and it would be possible for a contagious disease, that had been carried over by the old hens, to break out during most any season of the year.

Tuberculosis is one of the most common diseases that is carried over from year to year by mixed flocks. This disease does cause a great amount of damage to the poultry industry in certain sections of the United States. Avian tuberculosis however, is not a problem in Oklahoma.

SUMMARY

This study shows some of the advantages and disadvantages of "All-Pullet Flocks", considering:

1. Annual Egg Production
2. Fall and Winter Egg Production
3. Egg Size--measured by weight
4. Hatchability
5. Livability of Progeny
6. Laying House Mortality
7. Disease Resistance

This review and study of records led the writer to draw the following conclusions.

1. Pullets lay more eggs during their first year of production than any other year throughout their lifetime.

2. The rate of decline in production from pullet to yearling years varies considerably.

3. The higher the pullet year production the greater the percent of decline in yearly production.

4. Only the first dozen or so of eggs produced by pullets are significantly smaller than eggs produced by old hens.

5. Pullets lay about twice as many eggs during the fall and early winter as do hens.

6. There is no appreciable difference in hatchability between pullet and hen eggs.

7. There is no significant difference in livability of progeny hatched from pullet and hen eggs.

8. There appears to be no appreciable difference in laying house mortality between all-pullet flocks and all-hen flocks.

9. The number of birds reacting to the avian tuberculin test in all-hen flocks is somewhat higher than it is in all-pullet flocks.

10. Fewer all-pullet flocks have reacted to the avian tuberculin test than has been true with all-hen flocks.

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