EGG QUALITY AS AFFECTED BY FARM FLOCK MANAGEMENT PRACTICES

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By

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Bachelor of Science

Oklahoma Agricultural and Mechanical College

Stillwater, Oklahoma

1939

Submitted to the Department of Poultry Husbandry

Oklahoma Agricultural and Mechanical College

In Partial Fulfillment of the Requirements

For the Degree of

MASTER OF SCIENCE

1948

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ACKNOWLEDGMENTS

The writer is particularly indebted to Professor R. B. Thompson, Head of the Poultry Department and Mr. Harry E. Hathaway, Marketing Specialist of the Poultry Department, for their assistance, suggestions, and criticisms during the planning and conducting of this study.

Full credit is given for the timely suggestions and assistance of all other staff members of the Poultry Department.

Mr. Wilbur Payn is given due credit for his cooperation and assistance in supplying egg grading services and records.

Appreciation is also expressed to the twenty-four farmers and farm women who cooperated by answering the questions on the surveys.

Acknowledgment is given to Mr. Shawnee Brown, Director of Extension, for making it possible for the writer to conduct this study and surveys in connection with his regular assignment.

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INTRODUCTION

In Oklahoma there is a need for greater emphasis on a quality egg program. Particularly is this true among our tenant farmers and small flock owners. Their housing, equipment, and investment are not conducive to proper management. As a result, the highest quality egg is not produced and the quality of the egg that is produced is not maintained. The need for maintaining a uniform high standard of egg quality has long been recognized by special trades and exporting countries. In contrast, locally produced eggs have shown wide variation in quality and have not afforded the purchaser a guarantee of satisfaction. The responsibility for this condition must be shared by all, through whose hands the eggs have passed, from the laying bird to the consumer. The farmer is not exempt from blame. In fact, the general farmer is more to blame than the farmer who more or less specializes in poultry keeping.

A balanced feed of the correct ingredients, combined with a good management program and the proper handling of the eggs, will result in as high quality eggs as the breeding of the bird will permit. An egg, from the time it is laid, never improves in quality. Even under the best conditions of handling and storage it begins to deteriorate, and the sooner it reaches the consumer the less false is the description "fresh egg" and the more apt it is to give satisfaction.

Quality eggs must be considered under two separate headings: First, producing quality eggs; and second, maintaining egg quality. It is the second of these with which this study primarily deals, and mainly the extent to which the quality can be maintained while the eggs are temporarily held on the farm.

The farmer can exercise the most effective control of, and minimize the loss of, egg quality if he can be taught to practice the same care and management of market eggs as he does of hatching eggs. It is with this statement in

mind that this survey is undertaken and recommendations made for maintaining market egg quality. The twofold purpose of this study is to see to what extent farmers will adopt egg quality maintaining recommendations, and how much improvement in quality they get by the adoption of the practices.

LITERATURE REVIEW

Almquist (1933) reports that there are several more direct methods of measuring egg quality than by candling, but these methods are only suitable for experimental work or checking the quality of the egg after it has been broken out. He reports further that the agreement of candling grade with actual broken out quality will be relatively close for very high and very low quality eggs, but that the intermediate groups will differ perhaps a little more widely than the grades established by different experienced candlers when classifying eggs of intermediate quality.

There is a seasonal trend in interior quality of hens' eggs, decreasing from March or April through the summer, according to Hunter, Van Wagenen, and Hall (1936). They report the highest quality eggs being produced from November to March.

There is a significant seasonal loss in albumen quality, reports Lorenz and Newlon (1944) which they think is partially due to increased age of the birds, since they did find that pullets produced eggs with better albumen quality than did the hens. They found that the greatest loss of albumen quality occurred within the first 24 hours after the eggs were laid, and that during the one-week periods which they studied, the broken out interior quality of the egg actually deteriorated more than the estimate obtained by candling.

According to Lorenz and Almquist (1936) the percentage of firm whites is lowered by high air temperatures. Also egg weight is lessened by increased air temperature, which accounts partially for smaller eggs during the warmer season.

That low egg production of the individual bird tends to be associated with a higher albumen index than is the case of higher producing birds, was an observation of Jeffrey (1941).

Funk (1935) measured the temperature of newly laid eggs and found them to vary from 92°F. to 102°F. He reports that when these eggs were held in an egg room at 50°F., and cooled to below 68°F., it required the following time: A single egg, one hour; an egg in the center of three layers of eggs on a wire tray, 3 hours; an egg in the center of a wire basket of eggs, five hours; an egg in the center of a galvanized pail of eggs, 10 hours; and an egg placed in the center of a chilled case, 15.5 hours. He also found that the time necessary to cool eggs was decreased by the circulation of air in the cooling room.

Skoglund and Tomhave (1941) gathered eggs during the time when a thermometer in the nest showed the temperature to be from 83° to 90°F., after the eggs had been in the nest for four, six and eight hours, and compared the results with the gathering of eggs during the month of March at a much lower temperature. The eggs were gathered every 30 minutes and held in a refrigerator for four, six and eight hours, then broken out, and loss of quality checked against that of eggs left in the nests during the summer season for four, six and eight hours. They report a great loss of egg quality from the eggs left in the warm nests.

There is a wide variation in the percentage of clean eggs produced during different seasons of the year, with the percentage of clean eggs being the greatest during the hot, dry season of the year, says Funk (1937). He also reports that the number of dirty eggs was reduced 50 percent by gathering four times per day instead of one time per day, and that when open nests were used, the percentage of dirty eggs was reduced by 6.3 percent by darkening the nests. These findings are in general agreement with Huttar (1928) who found that the percentage of dirty eggs produced by the Cornell poultry flock varied from 9.8 percent in July to 24.6 percent in March.

Van Wagenen (1930) found that the percentage of dirty eggs varied from

77 percent with a straw litter and no nesting material, to 23.2 percent with straw litter and shavings for nesting materials.

Funk (1938) presented evidence to show that dirty eggs can be effectively cleaned with a one percent solution of sodium hydroxide, and that the egg so cleaned kept as well in storage as clean unwashed eggs and commanded prices equivalent to and were as good in cooking tests as clean storage eggs.

In a study on the market qualities of eggs from 109 farms in Southern Illinois, Alp, Ashby, and Card (1938) found that limited flock range was important in production of quality eggs; also, the quick cooling of eggs after laying. They also found that moisture in the place the eggs were stored apparently helped to retain their quality, and that hot summer weather in Southern Illinois was not a serious handicap to the production of quality eggs, provided reasonable care was given the eggs.

Eggs given a shaking treatment sufficient to cause marked deformation of air spaces and significant increases in yolk shadows did not undergo liquification of the whites in eggs in which the firm white layer was not ruptured, according to Almquist, Nelson, and Lorenz (1934). Also, they reported that the increase in yolk shadows as a result of shaking may be due to a releasing of physical structures which tend to hold the yolk in a central position in the egg.

According to Temperton (1947), experiments conducted in North Ireland indicated that one-third of all eggs that were cased large end down were graded as seconds after being hauled from farm to grading station. However, no mention was made of the lapse of time between casing and delivery to grading station.

In their discussion of producing and marketing good eggs, Elliot and Card (1933) recommended the following production practices: Frequent gathering

of eggs, cooling eggs before casing, producing infertile eggs, preventing dirty eggs, feeding properly, and culling hens that lay poorly shaped, thin shelled and small eggs. The marketing recommendations were: Grading of eggs, proper packaging and packing, frequent selling, and choosing the most profitable outlet available.

From a study of an Illinois hatcheryman's egg records, Hamann (1947) reports 35 percent Grade A eggs produced in 1945 with no producer education, 84 percent with one year producer education, and 89.9 percent with two years producer education.

EXPERIMENTAL PROCEDURE

The twenty-four farms selected for this study are located in the vicinity of Okarche, Oklahoma. They constitute the egg route of a trucker who makes the route once a week with a refrigerated truck, delivering the eggs to an egg buyer in Oklahoma City. The trucker pays the farmer one cent per dozen above current receipts for his eggs at the time he picks them up. The buyer pays the trucker current receipts plus six cents per dozen for pickup and delivery charges. The eggs were graded by licensed graders and any excess premium, above original cost, handling and grading was handed back to the producer by the trucker at his next weekly pickup.

The farms were indiscriminately assigned numbers from one to twenty-four and will be identified only by number. All of the receipts from these farms for a six weeks' period covering the last part of July and the month of August were graded and tabulated. The results are shown in Table I.

After this six weeks' supply of eggs were graded the farms were all visited and a survey taken to determine under what conditions the eggs were produced. The following questions, which required a "yes" or "no" answer, were asked in the survey: (They are tabulated in Tables III and IV.)

1. Do you feed a balanced ration?
2. Do you provide grit for birds at all times?
3. Do you provide oyster shell for birds at all times?
4. Do you have running water in hen house?
5. Do you take the roosters out of your flock after hatching season?
6. Do you follow a program of confinement or semi-confinement of the hens in laying house?
7. Do you have at least 3½ to 4 sq. ft. of floor space per hen?
8. Do you change litter on floor and in nests when it becomes dirty or

too moist?

9. Are birds screened from droppings pit and on droppings boards?
10. Do you have at least one roomy nest for each 5 hens (6-7-8-9-10)?
11. Are hens prevented from roosting in nests?
12. Are broody hens prevented from sitting on newly laid eggs?
13. Are eggs gathered at least two times a day (1-2-3-More)?
14. Are eggs gathered in ventilated pails?
15. Do you use clean dry hands when gathering eggs?
16. Do you cool body heat from eggs immediately after gathering?
17. Are you sure that eggs are thoroughly cooled before casing?
18. Do you use new or clean fillers and flats for casing eggs?
19. Do you hold eggs in a cool moist place (30° - 40° - 50° - 60° - 65°) before marketing?
20. Do you place eggs in case - small end down?
21. Do you market eggs at least two times per week (1-2-3-More)?
22. Are eggs protected from heat - cold - and rough handling enroute to market?
23. Do you sell to a dealer who buys eggs on "grade"?
24. Do you wash or otherwise clean dirty eggs?
25. Do you keep farm records?

In addition, the following information was also secured:

a. Breed
b. Number of layers in flock
c. Number of pullets in flock
d. Type and size of house
e. Type of litter used on floor and in nests
f. Which - droppings boards or droppings pit

g. Type of egg storage room

h. Do you sell eggs to a hatchery?

i. Do you pullorum test all breeding stock?

j. Do you use built-up litter system?

k. Do you feed a home-mixed ration?

l. Do you have an egg cooler?

Two-thirds of the farms were randomly selected to receive recommendations for producing and maintaining egg quality after the first farm visit survey was completed on each of these selected farms. The farmer or farm wife was handed a mimeographed copy of the following recommendations:

The recommendations for an egg quality program can be divided into two sections. (a) Recommendations for producing quality eggs, and (b) recommendations for maintaining the quality produced.

A. Producing quality eggs:

1. Select laying stock which has been bred to produce eggs of satisfactory size, shape, and color; good shell texture which persists throughout the year; and firm, thick, white, which holds up well under handling. If selling hatching eggs or raising own flock replacements, select Standard-bred stock.

2. Manage and feed the layers for high egg production, and strong, clean shells. Feed a complete ration. A flock that produces many high quality eggs must have plenty of good feed. The term "complete ration" means a high quality laying mash, grain, oyster shell or limestone, and clean fresh water. Your hens must have plenty of calcium and vitamin D (or direct sunshine) to produce eggs with good, strong shells. What you feed your hens affects yolk color. A medium golden yellow yolk can be secured by feeding rations normally

recommended. If the birds eat lots of green feeds, the eggs will have dark yolks. To prevent this, confine your layers until midafternoon each day.

3. Produce infertile eggs for market, as soon as your hatching season is over. Keep all male birds away from the laying flock if you are producing market eggs. Infertile eggs are best for summer marketing as they do not lose market value and grade as quickly as fertile eggs. A temperature of 80 degrees Fahrenheit will cause rapid growth of the embryo in fertile eggs.
4. Pullorum test all breeding flocks.

B. Maintaining egg quality:

1. Provide sanitary, well-ventilated quarters for the laying flock, allowing about 3½ square feet of floor space per bird for light breeds and four square feet for heavy breeds.
2. Provide plenty of clean, dry litter on the floor and in the nests. Stir litter regularly and change when it becomes too dirty or moist. If you are following built-up litter program, remove <u>wet</u> litter, add to what is left.
3. Screen the birds from the droppings pit or boards with 1½-inch mesh wire.
4. Provide one clean, roomy nest for each 5 layers. Prevent the hens from roosting in the nests.
5. Broody hens should not be allowed to sit on newly laid eggs.
6. Gather eggs twice daily, in a ventilated pail or basket. Gather more often in very hot or very cold weather.
7. Have clean, dry hands when gathering the eggs.
8. Cool body heat from the eggs immediately after gathering, by placing

them in a cool, moist place that will allow free circulation of air around the eggs. A clean, well ventilated cellar room, free from odors, is desirable.

9. After eggs are thoroughly cooled and ready for marketing, place them, small end down, in standard 15 or 30-dozen egg cases, using clean, firm fillers and flats.
10. Market eggs at least twice a week.
11. Never stand case of eggs on end.
12. Protect from heat and cold enroute to market.
13. Avoid unnecessary delays and rough handling in transit.
14. Sell to dealers who appreciate high quality eggs and who are properly equipped to care for the eggs until delivered to consumer.
15. Sell on the "grade" basis, as far as possible and practical, it pays you most for quality.

There are many factors that contribute to the success of a quality program, but the principal one is profit.

All business is necessarily built around the profit motive, and this applies to the producer as much as it does to egg dealers and consumers. Business recognizes that profits are the result of wise investments in money, time, and effort, plus the performance of a good job. Give the producer the proper incentive, and he will also be encouraged to do a better job. One sure way of accomplishing this objective is to give him a fair monetary reward for the time and effort he expends to produce a quality product. The development of proper price and quality relationships is fundamental in accomplishing this result. You cannot do this by buying eggs on a current receipt basis. Quality and price relationships can best be established through the development of a grading program that recognizes quality in buying on a quality-grading basis.

Such a program favors not only the producer, but it also favors the handler or dealer, and finally the consumer.

Sufficient time was allowed for the adoption of the practices. Then a second six weeks' supply of egg collections and grading was started the third week in February. See Table II for tabulation. Immediately following this six weeks' period, the second series of farm visits was made where the same twenty-five questions were checked. See Tables III and IV.

For convenience in analyzing the surveys, the farms were divided into three groups. Group I and Group II are the 16 farms that received the recommendations - Group I being the eight that adopted more practices per farm than the eight in Group II. Group III is the eight farms that received no recommendations.

DISCUSSION

The existence of the egg route being operated by a farmer with a refrigerated truck, and the grading facilities of the egg buyer, afforded an excellent opportunity for studying the quality of eggs produced on farms in the Okarche area. The eggs received the same handling and treatment from the time they were picked up at the farm until they were graded, with the exception of the twenty miles traveled over county roads from the first farm where eggs were picked up to the twenty-fourth farm. All of the eggs then were hauled ten more miles over county roads and twenty miles over paved road.

The data collected in this "pilot" study does not lend itself well to a statistical analysis. It is broad and general in scope, and can best be used as a technique study.

The contributions which the adopted recommendations made toward the production and maintenance of egg quality cannot be accurately evaluated or graded, one against another; therefore, they have been treated as equals.

The list of recommended practices and the questionnaire were made up and mimeographed before any of the farm visits were made; therefore, they were not specific for these farms, but are general practices taken from text books, bulletins, circulars, and leaflets that contribute directly or indirectly to the production and maintenance of egg quality.

At the time this study was planned, it was thought that the farms on this egg route were poultry farms. When the first farm visits were made, it was discovered that they were just stock farms that kept a flock of chickens. The route was developed by one of the farmers who was hauling vegetables to a fruit and vegetable market. He was asked to also bring them some eggs. At some seasons of the year he had gathered up from his neighbors more eggs than the market could use, so he started selling to the egg buyer on "grade." He enlarged his route by taking in more relatives and neighbors.

Twenty-one of the flocks are predominately Leghorn breeding. Farm No. 6 has a flock of White Plymouth Rocks. Farm No. 14 has approximately equal numbers of White Wyandottes, New Hampshires, and White Plymouth Rocks. Farm No. 20 has a flock of White Wyandottes.

Farms numbers 1, 2, 4, 13, 15, 16, 21 and 22 have all-pullet flocks - the others vary from 42.9 percent to 100 percent pullet flocks. Farm No. 12 with the 42.9 percent pullet flock adopted none of the recommended practices and showed a 6.2 percent decrease in Grade A eggs.

The poultry houses vary in size, construction and type of roof. Sizes varied from 14 by 14 feet to 20 by 42 feet. Construction is of lumber, tile and brick. There are shed, semi-monitor and gable roofs.

All of the farmers professed to use straw for litter on the floor and in the nests, and to clean out and replenish the litter as needed. It was evident that they did so, to varying degrees. Most of them were in fair condition when the first series of farm visits were made; however, they were not in good condition when the second series of visits were made. The visits were made just following about four weeks of very wet weather. This accounts for the increase in percentage of dirty eggs.

Only farms numbers 1 and 2 have droppings pits - farms numbers 5, 6, 7, 9, 12, 13, 19 and 23 have droppings boards. The other 14 farms have sloping perches with neither droppings pit or droppings boards.

None of the farms has an egg cooler, but all except numbers 7, 10, and 13 use a cellar or basement for holding the eggs until the trucker calls for them.

TABLE I

PERCENTAGE OF EGGS IN VARIOUS GRADES
FROM ALL FARMS FOR EACH SIX WEEKS

	Grade A	Grade C	Checks	Dirties	No Grade
First 6 weeks 28,388 eggs	69.51	14.24	11.14	4.28	.83
Second 6 weeks 60,229 eggs	70.80	11.70	10.50	6.00	1.00

TABLE II

PERCENTAGE OF EGGS IN VARIOUS GRADES
BY GROUPS OF FARMS FOR EACH SIX WEEKS

	Grade A	Grade C	Checks	Dirties	No Grade
Group I					
First 6 weeks 9,846 eggs	65.50	13.60	14.70	4.60	1.60
Second 6 weeks 19,311 eggs	68.50	10.30	13.40	6.40	1.40
Group II					
First 6 weeks 7,880 eggs	74.50	12.50	9.60	2.90	.50
Second 6 weeks 23,505 eggs	73.20	10.80	10.20	4.90	.90
Group III					
First 6 weeks 10,661 eggs	69.40	16.10	9.00	5.10	.40
Second 6 weeks 17,413 eggs	70.00	14.60	7.70	7.10	.60

There is very little change shown in Table I for the Grade A, checks, and "no grade" eggs. Grade C shows a slight percentage decrease in the second period as compared with the first. This is what we would expect according to the findings of Lorenz and Almquist (1936) that the high air temperature of summer months causes a rapid breakdown of albumen quality. The second period showed a percentage increase of dirty eggs over the first period which was to be expected according to Funk (1937) and Huttar (1928), who report the percentage of clean eggs being the greatest during the hot, dry season of the year. The first period collections were made in the hot, dry season and the second collections during a very rainy period of time.

The data in Table II is the same as in Table I, except that it is broken down into the three groups for further analysis. Group I farms had a fair increase in percentage of Grade A eggs, while there was no appreciable change in the other two groups. This would indicate that the recommended practices adopted by them did tend to raise the percentage of quality eggs from these farms.

It is to be noted, also, from a comparison of Tables II and VII that there is an indication of some correlation between the percentage of Grade A eggs and the percentage of pullets in the flocks of each of the groups. This is in agreement with Lorenz and Newlon (1944) who reported that pullets produced eggs with better albumen quality than did hens.

As shown in Table III only one of the 16 farms where recommendations were made did not adopt one or more of the recommendations. This was farm No. 10, which was already carrying out 9 of the 25 recommendations. This farm showed no appreciable increase in Grade A eggs. In contrast is the improvement made on farms numbers 1 and 4. Farm No. 1 was carrying out 14 practices originally and adopted five new practices, which were numbers 7, 9, 11, 17, and 20. This

farm with an all-pullet flock showed an increase of 8.7 percent in Grade A eggs. This larger percentage of increase is probably accounted for by the fact that this farm was at the beginning and at the end of the study producing the lowest percentage of Grade A eggs of all the farms. Farm No. 4 was carrying out 10 practices originally and adopted five new practices which were numbers 3, 11, 13, 17, and 20. This farm, also an all-pullet flock, showed an increase of 6.0 percent Grade A eggs. This is an exceptionally nice increase since this farm raised the percentage of Grade A eggs from 84.1 to 90.1. All of the practices adopted by these two farms were very simple and required little expense, time or effort.

From Table IV it can readily be seen that all the farms were carrying out practice numbers 18, 22, and 23. This was because the buyer was furnishing the clean fillers and flats and buying the eggs on "grade" and the trucker was protecting the eggs while enroute to market. None of the farms were carrying out practices numbers 6 and 14, and none of them adopted either of the practices. Very few general poultry farms in the area practice confinement or semi-confinement and none of them use ventilated pails for gathering the eggs. There were seven other practices recommended which were not adopted by any of the 24 farms - they are as follows: Numbers 2, 4, 5, 16, 19, 21, and 25. Practice numbers 16 and 19 will probably be adopted by several of the farms to which they were recommended later in the season.

Table V is self-explanatory. It shows which practices each of the farms were using originally, with the percentage of Grade A eggs being produced. This is compared with the adopted practices and the resultant increase or decrease in Grade A eggs.

TABLE III

NUMBER OF PRACTICES BEING USED BY FARMS INDIVIDUALLY AND BY GROUPS BEFORE AND AFTER RECOMMENDATIONS

FARM NUMBER	BEFORE	AFTER
1	14	19
2	20	21
3	10	11
4	10	15
5	16	18
6	19	21
7	10	15
8	16	17
9	12	12
10	9	9
11	10	15
12	17	17
13	17	18
14	7	15
15	14	15
16	15	16
17	13	16
18	7	9
19	11	12
20	10	11
21	11	11
22	15	16
23	11	15
24	10	10
Group I farms	91	128
Group II farms	113	120
Group III farms	100	106
All 24 farms	304	354

TABLE IV

NUMBER OF FARMS USING EACH OF THE RECOMMENDED PRACTICES BEFORE AND AFTER THE RECOMMENDATIONS WERE MADE

PRACTICE NUMBER	BEFORE	AFTER
1	22	23
2	7	7
3	20	22
4	3	3
5	12	12
6	0	0
7	7	9
8	20	23
9	4	5
10	10	13
11	6	8
12	23	24
13	9	16
14	0	0
15	22	24
16	1	1
17	5	14
18	24	24
19	21	21
20	4	16
21	3	3
22	24	24
23	24	24
24	19	24
25	14	14

TABLE V

RECOMMENDED PRACTICES IN USE AND THE PERCENTAGE OF GRADE A EGGS FIRST 6 WEEKS COMPARED WITH ADOPTED PRACTICES AND PERCENTAGE OF GRADE A EGGS SECOND 6 WEEKS, BY FARMS

Farm Number	Individual Practice Numbers		Percentage of Grade A eggs	
	In Use	Adopted	Before	After
1	1 2 3 8 10 12 13 15 18 19 22 23 24 25	7 9 11 17 20	41.0	49.7
2	1 2 3 4 5 8 9 10 11 12 13 15 16 17 18 19 22 23 24 25	20	80.2	79.9
3	1 3 8 12 15 18 19 22 23 24	20	87.3	82.9
4	1 8 10 12 15 18 19 22 23 24	3 11 13 17 20	84.1	90.1
5	1 3 4 5 8 9 11 12 13 15 17 18 19 22 23 25	20 24	66.2	74.0
6	1 2 3 5 7 8 9 10 11 12 13 15 18 19 21 22 23 24 25	17 20	51.3	51.3
7	1 8 11 12 15 18 22 23 24 25	3 10 13 17 20	62.4	66.1
8	1 3 5 7 8 10 12 15 17 18 19 20 22 23 24 25	13	78.6	78.1
9	1 3 5 8 11 12 15 18 19 22 23 24		65.7	69.7
10	1 3 8 12 15 18 22 23 24		73.8	74.8
11	1 3 8 12 15 18 19 22 23 25	7 13 17 20 24	62.1	62.8
12	1 3 4 5 7 8 10 12 15 18 19 20 21 22 23 24 25		68.4	62.2
13	1 3 5 6 7 8 10 11 12 15 17 18 19 20 22 23 24	13	64.9	64.3
14	3 12 18 19 22 23 25	1 8 10 13 15 17 20 24	62.8	64.6
15	1 2 3 7 8 10 12 13 15 18 19 22 23 25	24	73.5	76.9
16	1 2 3 5 8 12 15 17 18 19 21 22 23 24 25	20	72.9	72.4
17	1 3 5 7 8 12 13 15 18 19 22 23 24	10 17 20	70.6	71.9
18	3 13 18 19 22 23 24	12 15	71.9	77.2
19	1 2 3 5 12 15 18 19 22 23 24	8	68.0	64.2
20	1 3 5 8 12 15 18 19 22 23	24	71.4	69.1
21	1 3 8 12 13 15 18 22 23 24 25		78.6	76.8
22	1 2 3 5 8 12 13 15 18 19 20 22 23 24 25	17	78.7	77.8
23	1 7 10 12 15 18 19 22 23 24 25	8 13 17 20	65.5	68.5
24	1 8 10 12 15 18 19 22 23 24		64.3	66.0

Each farm presents a complex picture, by virtue of having used different practices in the beginning and adopting various new ones. It cannot be said that the increase or decrease in quality eggs is the direct result of any specific practice adoption.

Not all farms that adopted a practice showed an increase in egg quality. Each practice, except No. 8, showed a percentage increase in the total Grade A eggs produced, by the group of farms which adopted the practice. Practice No. 8 resulted in a very slight percentage decrease of Grade A eggs for farms numbers 14, 19 and 23, as a group. See Table VI.

Twenty-two farms were already feeding a balanced ration (Practice No. 1) and farm No. 14 changed to a balanced ration - leaving only farm No. 18 feeding grain and only occasionally a little mash and doing a pretty fair job at that.

Twenty farms were providing oyster shell (Practice No. 3) for their birds. Two farms - numbers 4 and 7, adopted this practice and showed a 6.5 percent increase in Grade A eggs.

Seven farms were providing more than three and one-half square feet of floor space per layer in the hen house.(Practice No. 7) Farms numbers 1 and 11 adopted this practice - which resulted in an increase of 3.2 percent Grade A eggs.

Ten farms were providing at least one roomy nest for each five layers. (Practice No. 10) Farms numbers 7, 14, and 17 adopted this practice and got a percentage increase of 3.1 in Grade A eggs.

Six farms were preventing hens from roosting in the nests at night. (Practice No. 11) Farms numbers 1 and 4 adopted this practice and increased the Grade A eggs 3.0 percent.

TABLE VI

PRACTICES ADOPTED, SHOWN BY INDIVIDUAL FARM NUMBERS AND BY GROUPS

Practice Number	Number of the Individual Farm Adopting the Practice		
	Group I	Group II	Group III
1	14		
3	4 7		
7	1 11		
8	14 23	19	
9	1		
10	7 14 17		
11	1 4		
12			18
13	4 7 11 14 23	8 13	
15	14		18
17	1 4 7 11 14 17 23	22	6
20	1 4 5 7 11 14 17 23	2 16	3 6
24	5 11 14	20	15

TABLE VII

SIZE OF FLOCKS AND PERCENTAGE PULLETS IN FLOCK BY GROUPS OF FARMS

	Group I	Group II	Group III
Number of layers in flock	980	1,065	970
Average size of flock	122	133	121
Percentage of pullets in flock	70.0	87.8	69.1

TABLE VIII

PERCENTAGE - INCREASE OR DECREASE IN GRADE A EGGS AS A RESULT OF ADOPTING PRACTICES

Practice Number	Number of Different Farms Adopting This Practice *	Percentage Grade A Eggs		
		Before	After	Increase or Decrease
1	1	62.8	64.6	1.8
3	2	76.8	83.3	6.5
7	2	51.9	55.1	3.2
8	3	63.8	63.4	- .4
9	1	41.0	49.7	8.7
10	3	65.6	68.7	3.1
11	2	67.2	70.2	3.0
12	1	71.9	77.2	5.3
13	7	70.1	71.0	.9
15	2	67.2	69.7	2.5
17	9	63.9	67.1	3.2
20	12	68.8	70.8	2.0
24	5	66.4	69.3	2.9

*The individual number of the farm which adopted each of the above practices is shown in Table VI.

Nine farms were gathering eggs at least two times a day. (Practice No. 13) Farms numbers 4, 7, 8, 11, 13, 14, and 23 adopted this practice and got an increase of Grade A eggs of .9 percent. This percentage should be much greater in the summer time.

On the original survey, twenty-two of the farmers and farm women reported they used clean, dry hands when gathering eggs. (Practice No. 15) The other two, numbers 14 and 18 reported on the second survey that they had adopted the practice. Their percentage increase in Grade A eggs was 2.5.

Five farms reported originally that they were thoroughly cooling eggs before casing them. (Practice No. 17) Farms numbers 1, 4, 6, 7, 11, 14, 17, 22, and 23 adopted this practice, which resulted in a 3.2 percent increase in Grade A eggs.

Only four farmers were placing the eggs in the case small end down. (Practice No. 20) Farms numbers 1, 2, 3, 4, 5, 6, 7, 11, 14, 16, 17, and 23 adopted this practice and secured an increase of 2.0 percent in Grade A eggs.

Nineteen farmers were washing, or otherwise cleaning dirty eggs. (Practice No. 24) Farms numbers 5, 11, 14, 15, and 20 adopted this practice and secured a 2.9 percent increase in Grade A eggs.

SUMMARY

The need for maintaining a uniform high standard of egg quality has long been recognized in the state. Locally produced eggs have shown a wide variation in quality and have not afforded the purchaser a guarantee of satisfaction.

Quality eggs must be dealt with under two separate headings: Producing quality eggs and Maintaining egg quality.

The purpose of this study was twofold: First, to see if farmers would adopt practices recommended to them personally at their farms, for producing and maintaining egg quality and, secondly, to see if there would be a larger percentage of high quality eggs produced on the farms where the recommendations were adopted.

Twenty-four farms were included in this study. They are located in the vicinity of Okarche, Oklahoma. They were selected because they constitute an egg route of a trucker who makes the route once a week delivering the eggs to an egg buyer in Oklahoma City who grades them. The trucker pays current receipt price for the eggs when picked up. The next week he pays the producer the amount the eggs "grade out" above current receipts, trucking, handling, and grading.

For convenience in analyzing the surveys, the farms were divided into three groups. Group I and Group II are the 16 farms that received recommendations - Group I being the eight that adopted more practices than the eight in Group II. Group III is the eight farms that received no recommendations.

After the first series of farm visits, it was discovered that the sixteen, where recommendations were made, were already using an average of 12 of the 25 recommendations made. They accepted an average of three new recommended practices. The farms in Group I accepted an average of five new practices

and increased the percentage of Grade A eggs appreciably, while there was very little or no increase in Groups II and III. Only one farm, where recommendations were made, failed to adopt one or more new practices and one farm adopted eight new practices.

Each of the thirteen practices adopted resulted in an increase in percentage of Grade A eggs for the farms, as a group, which adopted the practice; except practice number eight, which showed a very slight decrease.

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