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A Survey of Egg Production and Farm Egg Handling Methods in Hennepin County, Minnesota

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INTRODUCTION

This survey was made in the summer and fall of 1947. A questionnaire was prepared by the extension economists at University Farm for use in obtaining information about farm flocks, egg production, farm egg handling methods, and producer problems in marketing eggs. Questionnaires were mailed to over 1500 representative producers in Hennepin county by the county agricultural agent. The returns were favorable, however, a substantial proportion of the farmers in Hennepin county do not keep poultry or "have only a few hens" and for that reason could not fill in the questionnaires. The tables and summary presented here are based on reports from 121 producers who had a poultry enterprise. The information provided appears to be typical of the conditions existing in Hennepin county.

The producers surveyed are near the large Twin Cities consuming area. For this reason they obtain a higher producer price for eggs than producers in the surplus egg areas of the state. The surplus egg areas must look to Chicago, eastern and western markets for their outlets. There is some indication from this survey and an earlier state-wide survey that Hennepin county producers are using more effective methods in egg production and handling than generally prevail in Minnesota. For this reason the information obtained and the resulting recommendations should be in large part applicable to the state as a whole. This study indicates that most Hennepin county producers could do a better job in managing their flocks and handling their eggs, so that the eggs sold are of higher quality. Other handlers in the producer to consumer marketing chain can retain the quality of eggs delivered by the producer but they can not improve it. Therefore, the first important step is for producers to deliver high quality eggs. It is also quite clear that the larger flock owners used more desirable egg production and handling methods than the smaller flock owners.

The information obtained from Hennepin county producers from the mail questionnaires was summarized and analyzed by extension economists of the Agricultural Extension Division of the University of Minnesota. The recommendations presented were also made by them. The reports were summarized according to the size of flocks, in the following manner:

Group I - 0 - 99 layers
Group II 100 - 199 layers
Group III - 200 - 299 layers
Group IV - 300 - 499 layers
Group V - 500 or more layers.

Group V included two flocks with 750 layers, two with 1,000 layers, one with 2,000 layers and the largest one with 8,000 layers.

EGG PRODUCTION METHODS

Breed of Chickens

Nearly three fourths of all the layers kept by reporters were White Leghorns. Practically all of the larger flock owners had White Leghorns. Apparently those with less than 100 layers were as much interested in having some poultry meat to eat as in egg production, and such flocks were largely of the mixed and heavy breeds. Some reporters mentioned only "mixed" or "heavy" and did not designate the breed. The number that reported in each flock size group and the percentage of each breed is given in Table I.

TABLE I - Breed of Layers

Group	I	II	III	IV	V	Total
Number Reporting	19	37	27	23	15	121
Percent of each breed:						
Leghorns	36.8	64.9	81.5	87.0	86.7	71.1
Austra-White	5.3	5.4	7.4	8.7	--	5.8
White Rocks	15.8	5.4	3.7	- -	--	5.0
Mixed and Heavy	42.1	24.3	7.4	4.3	13.3	18.1
	100.0	100.0	100.0	100.0	100.0	100.0

When Pullets Start To Lay

Producers throughout Minnesota, including Hennepin county, could increase their net returns from the laying flocks by getting pullets into production earlier in the fall. In many cases this would require chicks from an earlier hatch, better feeding and management so that pullets mature more rapidly, and earlier housing of pullets in the fall. For the state as a whole more than 3 times as many eggs are produced in the peak production months of March and April than in the low production month of November. On the other hand, prices over a ten year period are about twice as high in the late fall months compared with the peak production months in spring. This survey shows that producers in Hennepin county, who have the facilities could improve their egg income considerably by getting pullets into production earlier in the fall. The question was asked "what month do your pullets get up to a 40 to 50 percent production level". The information obtained is given in Table II.

TABLE II - When Pullets Get up to 40 to 50 Percent Production

Group	I	II	III	IV	V	Total
Number Reporting	15	31	27	23	15	111
Percent in each month:						
September	6.7		3.7	4.3	13.3	4.5
October	33.3	22.6	40.8	26.1	60.0	34.2
November	33.3	45.1	25.9	43.5	6.7	33.3
December	20.0	22.6	22.2	17.4	--	18.0
Other *	6.7	9.7	7.4	8.7	20.0	10.0
	100.0	100.0	100.0	100.0	100.0	100.0

*No month was given. In "6 months", in "7 months" etc. One flock in January.

Confinement Practice

Commercial flocks and many large "farm flocks" in the United States, including many in Minnesota, are not allowed farmstead range. Such flocks are confined to a comfortable laying house all year round. Because they are kept on a uniform feed ration during the summer as well as the winter the eggs produced have a much more uniform yolk color and a more uniform flavor. Some farm flock owners follow a system of partial confinement, by allowing the laying flock to range only in the afternoon, or late afternoon, when most of the eggs have been laid, or by limiting the all day range to a small yard. More confinement of laying flocks will improve the quality, and consequently the competitive market position, of Minnesota and Hennepin county eggs. This survey shows that confinement of laying flocks was more common with large producers than with small producers in Hennepin county as indicated in Table III.

TABLE III - Laying Flock Confinement Practices

Group	I	II	III	IV	V	Total
Number reporting	19	36	27	23	15	120
Percent following each practice:						
Total Confinement	5.3	30.6	40.8	47.8	60.0	35.8
Partial Confinement	36.8	33.3	48.1	43.5	33.3	39.2
Free Range	57.9	36.1	11.1	8.7	6.7	25.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Floor Space Provided per Laying Hen

A floor space of 3 square feet is generally recommended for Leghorn hens and somewhat more for larger hens. Small and very small flock owners in Hennepin are allowing more than enough space, probably because the quarters provided were not specially constructed for laying hens, or because they at one time considered the poultry enterprise as a significant part of providing family income, and have since cut down the flock and turned to other farm enterprises or to work off the farm. The medium sized flock owners crowded the layers more than those with the larger flocks. The amount of space provided is given in Table IV.

TABLE IV - Floor Space Provided Laying Hens

Group	I	II	III	IV	V
Number Reporting	15	32	19	22	13
Square Feet per Hen	5.3	4.1	2.4	2.7	2.8

EGG HANDLING METHODS

Frequency of Gathering Eggs

The body temperature of a hen is over 100°F. When eggs are allowed to remain in the nest they are exposed to this high temperature, not only by the hen laying the egg but by the hens that follow to lay their eggs. This is especially true if the nest space is too limited. In hot weather eggs should be gathered at least three times a day. About three-fourths of all the eggs are laid before 1:00 P. M. Eggs will be exposed to the body heat of hens only a limited time if they are gathered about 9:00 A. M., again at about 1:00 P. M. and then late in the afternoon. Less than one-fourth of the reporters from Hennepin county gathered the eggs 3 times per day and about one-fifth gathered only once a day as indicated in Table V.

TABLE V - Frequency of Gathering Eggs

Group	I	II	III	IV	V	Total
Number reporting	19	36	27	23	15	120
Number of times a day -	Percent					
Once	31.6	27.8	22.2	--	6.7	19.2
Twice	52.6	58.3	51.9	60.9	26.7	52.5
Three times	15.8	8.3	25.9	26.1	60.0	23.3
Other	--	5.6	--	13.0	6.6	5.0
	100.0	100.0	100.0	100.0	100.0	100.0

Containers used for Gathering Eggs and Method of Cooling

Any clean container that keeps breakage at a minimum is satisfactory for gathering eggs. However, it is expedient, saves extra work, and is a common practice to allow eggs to cool in the container in which they are gathered. That it is a common practice was indicated by Hennepin county producers, as given in Table VII. It is highly important to remove the body heat from eggs rapidly if high quality is to be retained. Although a can or pail is satisfactory for gathering eggs, it is not satisfactory for cooling eggs. Twice as much time is required than if the eggs are cooled in wire or reed baskets. Eggs should not be packed in a case as soon as they are gathered. The fillers and flats are excellent insulation and retain the body heat of the eggs. When immediately packed in a case the body heat of eggs will escape even more slowly than if stored in a can or pail. Some producers allow their eggs to cool in the container in which they are gathered. With this practice it would be highly desirable if wire and reed baskets would be used for gathering. The information obtained on gathering and cooling eggs is given in Tables VI and VII.

TABLE VI - Containers Used for Gathering Eggs

Group	I	II	III	IV	V	Total
No. of Flocks	18	37	27	23	15	120
Percent gathered in each:						
Can or pail	61.1	54.1	59.2	52.2	33.3	53.3
Wire or reed baskets	22.2	40.5	40.8	43.5	66.7	41.7
Other	16.7	5.4	--	4.3	00.0	5.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

TABLE VII - Method of Cooling Eggs

Group	I	II	III	IV	V	Total
Number reporting	17	35	26	22	15	115
Percent cooled each way:						
Left in Container	70.6	68.6	80.8	81.8	80.0	75.7
Packed in Case	5.9	20.0	3.8	13.6	20.0	13.0
Other	23.5	11.4	15.4	4.6	--	11.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

Where Eggs are Kept

The place where eggs are kept should be humid, and the temperature should be low. When the air in the place where the eggs are kept is too dry, the air cell of the egg will soon enlarge and the eggs will grade down. When the temperature is too high the egg white will become watery, and the yolk soft, which is frequently referred to as a heated egg, and again the eggs will grade down. If possible the eggs should be kept at a temperature of 50°F. or less. With these two factors in mind, humidity and temperature, the egg producer should select the best storage place on his farm. In some cases it may be the basement, in other cases a special cellar, or some other favorable place. Eggs are about as perishable as milk or cream and for large flock owners a special cooler is justified. The farm holding

conditions for Hennepin county eggs can be improved upon as can be observed from Table VIII.

TABLE VIII - Where Eggs are Kept

Group	I	II	III	IV	V	Total
Number Reporting	19	37	27	23	15	121
Percent held each place:						
Basement or Special cellar	68.4	62.2	59.3	65.2	66.7	63.6
House or summer kitchen	21.1	32.4	37.0	26.1	26.7	29.8
Shed or other	10.5	5.4	3.7	8.7	6.6	6.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Volume of Dirty Eggs

Dirty, or even soiled eggs, have to be sold at a lower price. Some eggs will be soiled or dirty, but good management practices will keep the percentage low. The larger producers in Hennepin county gathered less dirty eggs than the smaller producers as is indicated in Table IX.

TABLE IX - Proportion of Dirty Eggs

Group	I	II	III	IV	V	
Number Reporting	12	31	20	21	14	
Percent dirty eggs	10.7	10.6	10.8	9.6	5.6	

How Eggs are Sorted

The best way to utilize irregular and off grade eggs is in the home. When so used, the internal quality of slightly dirty, slightly cracked, or soft shelled eggs is about equal to that of the eggs that sell well. Irregular shaped eggs and unusually large or small eggs should be similarly used. Such sorting makes it possible to put a more uniform pack on the market. None of the Hennepin county reporters candled their eggs before they were sold but nearly three-fourths of them did some sorting, as indicated in Table X.

TABLE X - How Eggs Are Sorted

Group	1	II	III	IV	V	Total
Number reporting	18	37	27	23	15	120
Percent of each :						
Sorted	72.2	62.2	81.5	78.3	80.0	73.3
Not Sorted	27.8	37.8	18.5	21.7	20.0	26.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Egg Washing and the Solutions Used

The washing of eggs removes the outside protective layer which is frequently referred to as the cuticle. That is why a washed egg has a shiny or glossy appearance compared with a freshly laid clean egg that has a chalky appearance. Washing is not harmful if the egg is used soon after washing, but washed eggs deteriorate more rapidly than unwashed eggs, and will not stand up as well in storage. That is why management practices should be followed that will result in a very high percentage of clean eggs. It is also more desirable to brush soiled or slightly dirty spots instead of washing them. As long as dirty eggs that have been washed will bring a higher market price than they will if sold dirty, producers will find it desirable to wash eggs. There is considerable difference in the effect that different washing solutions have on eggs. University of Missouri experiments indicate that a diluted lye solution is the best for washing eggs. None of the Hennepin county producers who reported used a lye solution. Many large egg handlers and processors have found that some of the washing powders are satisfactory and practical. Just water, or soap water, or vinegar are all unsat-

isfactory. There is considerable room for improvement in the selection of suitable solutions for washing eggs. The proportion of Hennepin county producers that wash eggs and the cleaning methods used is given in Tables XI and XII.

TABLE XI - Proportion of Eggs Washed

Group	I	II	III	IV	V	Total
Number Reporting	17	35	27	23	15	117
Percent of each:						
Washed	94.1	94.3	88.9	100.	86.7	93.2
Not Washed	5.9	5.7	11.1	—	13.3	6.8
Total	100.0	100.0	100.0	100.	100.0	100.0

TABLE XII - Egg Cleaning Methods

Group	I	II	III	IV	V	Total
Number Reporting	17	35	26	23	13	114
Washing solutions used:						
Vinegar	5.9	5.7	15.4	13.0	7.7	9.6
Water	58.8	80.0	69.2	65.3	69.2	70.2
Soap Water	5.9	2.9	—	—	—	1.8
Washing Powder	11.8	2.8	3.9	8.7	—	5.3
Other cleaning methods*	17.6	8.6	11.5	13.0	23.1	13.1
	100.0	100.0	100.0	100.0	100.0	100.0

Frequency of Marketing Eggs

The consumer wants good quality eggs. This is possible only when holding conditions are favorable all along the marketing chain, and when eggs move from producers to consumers as rapidly as possible. In hot weather eggs should be sent to market as frequently as possible. Many Hennepin county producers who reported marketed their eggs only once a week which is not sufficiently often for retaining high quality in eggs until they reach the consumer. The larger flock owners marketed their eggs more frequently than the smaller flock owners as can be observed from Table XIII.

TABLE XIII - Frequency of Marketing Eggs

Group	I	II	III	IV	V	Total
Number Reporting	18	37	25	23	15	118
Number of times a week- percent:						
Once	33.3	62.2	44.0	43.5	26.7	45.8
Twice	33.3	13.5	36.0	39.1	40.0	29.7
Three times	5.6	8.1	12.0	—	13.3	7.6
Other *	27.8	16.2	8.0	17.4	20.0	16.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

*Some sales made daily, others "when consumers stop" and others reported "less than once a week."

Eggs Sold on Grade

Sellers of high quality eggs like to sell on grade. Sellers of lower quality eggs prefer selling eggs on a "flock run" or "current receipts" basis because if their eggs were graded a large proportion would classify in the lower grade and the average price might not be higher than the current receipts price. About two-thirds of Hennepin county producers sell their eggs on grade as is indicated in Table XIV.

TABLE XIV - Proportion of Eggs Sold on Grade

Group	I	II	III	IV	V	Total
Number Reporting	18	37	27	23	15	120
Percent sold each way:						
Grade	27.8	62.2	66.7	82.6	86.7	65.0
Current Receipts (flock run)	72.2	37.8	33.3	17.4	13.3	35.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Where Producers Sell Eggs

Eggs move in a variety of ways from producers to consumers of which a few are as follows:

1. Producers directly to consumers
2. Producers to a city retail merchant to consumers
3. Producers to a county merchant to a city retail merchant to consumers
4. Producers to a local produce company to a city retail merchant to consumers
5. Producers to a local produce company to a wholesale produce company to a city retail merchant to consumers
6. Producers to an egg merchant to consumers
7. Producers to an egg merchant to a city retail merchant to consumers
8. Producers to a country store or local produce company to hucksters and to consumers
9. Producers to a country store or local produce company to hucksters to a city retail merchant to consumers

The way eggs move from producers to consumers is influenced by the location of producers in relation to the location of consumers and the services that one or the other is willing to perform, such as the transporting, grading, and handling of the eggs. Whatever the method, it is desirable to move eggs from producers to consumers as directly and as rapidly as possible. In Hennepin county there is indication that the trend has been toward more direct producer to consumer selling of eggs. To whom Hennepin county producers sell eggs, and the price received by those who sold only on a current receipts basis is given in Table 15.

TABLE XV - Where Producers Sell Eggs

Group	I	II	III	IV	V	Total	Price received Current R.	Number Reporting
Number Reporting	19	37	27	23	15	121		
Percent sold to various buyers:								
To Consumers	57.9	46.0	40.7	52.2	40.0	47.1	47.1¢	16
To Grocery Stores	36.8	29.7	40.7	30.4	33.3	33.9	44.1	10
To Produce Companies	5.3	10.8	11.1	13.0	20.0	11.6	44.3	4
Other	—	13.5	7.5	4.4	6.7	7.4		
Total	100.0	100.0	100.0	100.0	100.0	100.0		

Prices Received for Different Sizes of Eggs

Not all reporters provided egg price information. As previously indicated about one-third sold their eggs on a current receipts basis. The price information provided by a limited number who sold their eggs on grade is given in Table XVI.

TABLE XVI - Average Price Received Per Dozen for Eggs Sold on Grade

Group	I	II	III	IV	V	Total
Number Reporting	2	9	6	7	9	33
Cents per dozen for various sizes:						
Extra Large	—	53.5	55.0	60.3	57.7	56.5
Large	45.0	46.4	48.2	51.0	50.8	49.1
Medium	39.5	39.3	43.0	44.8	43.0	42.8
Small	34.0	40.5	45.0	50.0	45.3	43.2
Pullet	—	—	—	36.5	32.0	35.0