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## Feeding Poultry for Profit

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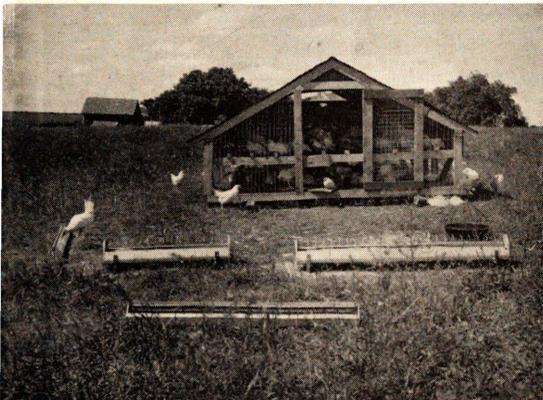
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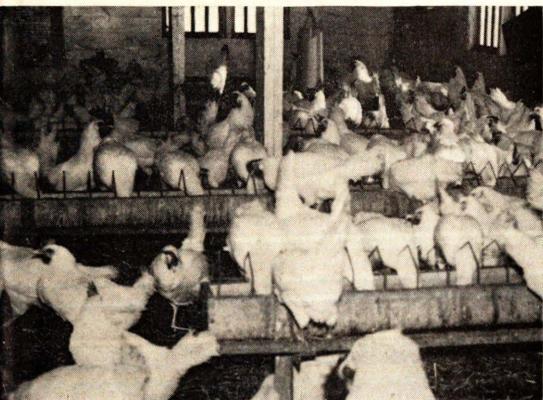
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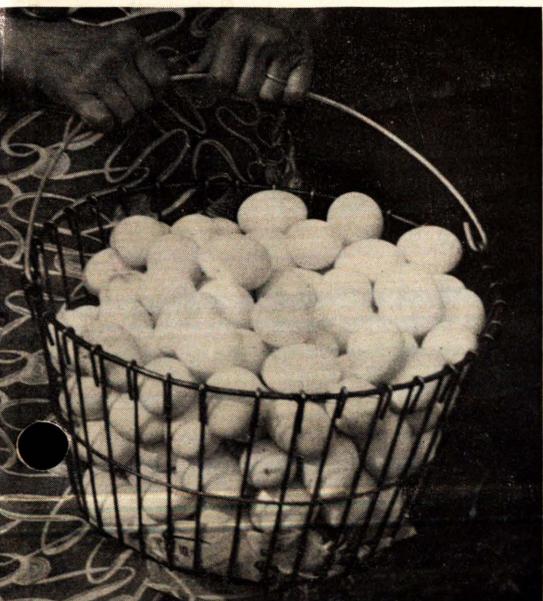
in the starting period,



in the growing period and



in the laying house



yield profitable production.

# feeding poultry For Profit

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AGRICULTURAL EXTENSION SERVICE  
SOUTH DAKOTA STATE COLLEGE  
U.S. DEPT. OF AGRICULTURE, Cooperating  
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# feeding poultry

## For Profit

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## Feeding Principles

Feeding poultry for profit involves essentially the use of top quality stock, proper management and care, proper facilities, and last, but certainly not least important, a good feed. The feed accounts for well over 50 per cent of the cost of poultry, meat and egg production, hence its importance cannot be considered lightly. A good feed supplies all of the essential nutrients in the required amounts for each type of production.

As newer knowledge about the requirements is obtained, the recommendations for specific nutrients are revised to correspond with those findings. Thus the feeds used today are much different from those used just a few years ago. One needs only to consider the differences in feed efficiencies to realize that changes have been made. The American Feed Manufacturers reports that in 1936 a

ton of feed produced 3217 eggs, whereas in 1951 the number of eggs produced increased to 4190. Even greater differences have been observed in meat production. Where once four pounds of feed per pound of gain was thought to be good, now as low as 2.5 pounds of feed per pound of gain have been obtained by commercial broiler producers.

### What Must a Feed Contain?

A complete poultry ration contains all of the essential amino acids (building blocks of protein), minerals and vitamins, and sources of energy (fats and carbohydrates) required for growth, activity, and egg production. Some of the specific essentials, their value (deficiency symptoms) and sources of those materials are given in Table I. Not all of the vitamins or minerals are listed, those that are not are usually provided in sufficient amounts and little attention is given to them in feed formulation.

Table I. Some Essentials of Poultry Diets

Nutrient	Value	Sources
Carbohydrates and fats	Energy, convert to body and egg fat	Cereals, by-products animal and vegetable fats and oils
Proteins—Essential amino acids	Muscle, egg yolk and white, blood constituents, etc.	Meat scraps, fish meal, soybean meal
Water	65-75% of egg and body weight	Fresh water
Minerals—13(?)		
Calcium	Skeleton, egg shells, body fluids (rickets)	Oyster shell, limestone
Phosphorus	Skeleton, body fluids (rickets)	Bonemeal, various phosphates
Manganese	Normal bone formation (perosis)	Manganese sulfate
Iodine	Normal thyroid function (goiter)	Iodized salt
Sodium	Ionic balance of body fluids	Iodized salt
Chlorine	Ionic balance of body fluids	Iodized salt
Vitamins—13(?)		
A	All necessary for rapid growth	Fish oils—alfalfa
D	Normal surface tissues, general condition	Fish oils—synthetic vitamins
E	Normal bone formation, (rickets, thin shells)	Whole cereals, green feed
K	Fertility—nervous tissue (crazy chick)	Green feeds
Riboflavin	Normal blood clotting (hemorrhage)	Milk and fermentation by-products
Cobalamine (B <sub>12</sub> )	Good hatchability (curled toes)	Animal proteins and fermentation mashers
Niacin	Good hatchability	Wheat by-products, synthetic vitamins
Pantothenic Acid	General condition (broken feathers—perosis)	Cereal grains, synthetic vitamins
Stimulators	General condition (dermatitis)	
Antibiotics	(Not essential)	
	More rapid growth (10-15%); Better feed efficiency (0-10%); Increased egg production (0-8%); Increased hatchability (0-5%)	Fermentation mashers Microbial growth
Arsenicals	More rapid growth (0-5% over antibiotics)	Synthetic
	Better feed efficiency, feathering, shank color	Chemicals

## Producing Pullets

In growing out good pullets that will "lay and pay" it is necessary to get them off to a good start. They should be in the brooder house and on feed within 24 to 48 hours after they were removed from the incubator. Each chick should have at least one inch of feeder space and one-half square foot of floor space up to six to eight weeks of age. During this time the starter mash would be the only feed given to the birds.

At six to eight weeks of age, they should be introduced to scratch grains and a growing mash and allowed to balance their own ration. Uncontrolled restricted feeding or skimping on feed at this point or in any stage of poultry production is certainly false economy. There are recommendations for controlled restricted feeding that have shown satisfactory results, however most controlled experimental studies conducted by our State Experiment Stations have shown no benefit from such procedures.

### Follow Recommendations

Methods of feeding will be given in summary later, certainly the recommendations of the feed dealer should be followed in any feeding system. That would apply whether it be the all-mash, equal parts of mash and grain, or free choice mash and grain. As long as the individual birds receive their requirements, any feeding systems will work; some systems may be easier to use and more economical, depending on the conditions involved.

The successful poultrymen consider adequate sanitation of his equipment along with segregation of young birds from old birds a must for producing healthy pullets. They should go into the laying house with reserves of

certain nutrients, and with a vitality that will last through a long period of egg production. He will be on his toes and observe drops in feed consumption as an evidence that something has or is going wrong and will be prompt to try to remedy the situation whether it be disease or some other management factor.

With coccidiostats in the feed there are usually no serious losses from that disease. However, proper care and management, along with spot treatments in cases of serious outbreaks are still necessary.

### Growing Facilities

The question of type of growing facilities or range demands consideration. A good green range may save up to 10 to 15 percent of the feed cost, however there are certain advantages also to confinement rearing. Unless the ranges are rotated every year, disease contamination will be a problem, whereas, the facilities for confinement rearing can be thoroughly cleaned between seasons. Advocates of either system are those who have successfully used them—pointing out again that there is more than one right way to do any number of things.

### Waste From Feeders

Whether feeding growing birds or layers, the feeders never should be more than one third full. Feed wastage becomes excessive and thus greatly increases costs when the troughs are kept over half full all the time.

The key to a good poultry range is sufficient moisture for rapid growth of the forage - legumes under such conditions are a tasty source of high quality protein and vitamins. Cockerels should be separated from the pullets as soon as the brooding period is over. The cockerels can be penned separately and grown out for meat purposes, eliminating competition at the feeders for the pullets.

# Feeding Layers

In feeding laying hens our first prerequisite is to feed them in such a way that we get maximum egg production from the minimum amount of feed. That is only attained however when the layers consume a maximum intake of a balanced ration. The importance of maximum intake is shown in Table II.

Table II. Effect of Reducing Feed on Production and Profit

Amount of feed ed	Av. no. eggs per hen annually	Lbs. of feed consumed per doz. eggs	Feed cost per doz. eggs* in cents	Profit above feed cost per hen†
Group				
1. Free access	182	4.4	13.2	\$1.79
2. 87½% of Group 1	124	5.6	16.8	.85
3. 75% of Group 1	88	6.8	20.4	.34

(From "Poultry Nutrition" by W. R. Ewing)

\*Feed cost \$3 per 100 lbs.

†Average egg price 25 cents a dozen.

We see from the data of this actual experiment how restricted feed intake greatly reduced egg production. Actually the amount of feed required to produce a dozen eggs is greater under restricted feed intake. Thus profits would drop sharply under farm conditions.

## Various Systems

Poultrymen are particularly concerned about the various systems of feeding for laying hens. Again it is true that any system used properly will produce the desired results. The three are all mash (crumbles, pellets etc.), equal parts of mash and grain, and free choice mash and grain (mash (1) : grain (2)). These feeding systems will work equally well, however, the most efficient results under our conditions would most often be obtained with the free-choice system. the poultryman buys a minimum amount of prepared feed, and uses a maximum amount of his home grown grains. Under either system, the important consideration is to use the mash according to the feed manufacturers directions, certainly never to try to "get by" by restricting the feed intake. Certain strains or types of layers respond better to different feeding systems—in many cases one's actual experience will determine which system he is to use.

The importance of good stock and proper facilities along with top quality management cannot be over-emphasized for maximum egg production. The fact that as the number of eggs laid per bird increase the amount of feed necessary to produce a dozen eggs decreases, keep one determined to strive for the maximum ratio of production.

## Adequate Water Needed

Water requirements cannot be overlooked. Most poultrymen provide too little watering space. At least one automatic fountain for every hundred hens or the equivalent of a five gallon water trough should be provided.

ed. That the rate of egg production will affect water consumption has been amply shown by the experimental results shown in Table III. Since water is so economical to provide, there is no excuse for not having enough of it available to the chickens. Just one day's shortage will show up in reduced egg production the next day.

Table III. The Relation Between Eggs Produced and Water Consumed

Annual Egg Production	Pounds of Water Consumed
179	130
216	155
230	171
243	178

(Taken from "Poultry Nutrition" by W. R. Ewing)

# Feeding Broilers, Friers, Capons

In feeding for meat production our primary concern is to produce as much meat as is possible from the minimum amount of feed. Again maximum feed intake is required. Most broilers and fryers are kept on all-mash (pellets, crumbles) until they are ready for market, using feeds similar to that shown in the feed formula chart for broilers. It is possible to reduce the protein content of the ration to 18 per cent at seven to eight weeks of age, that would be especially a savings if the birds are grown out to the heavier four and five pound weights.

Little information is available concerning the feeding of capons. Many producers have had very satisfactory results by using high amounts of whole grains after about eight weeks of age. Up to that time they should be cared for just as for broilers on replacement stock. It is logical to assume that for producing the heavier weight capons, that the primary constituents of the diet are energy containing feedstuffs. Satisfactory results have been obtained with diets as low as 12 to 13 per cent in protein content. Many commercial feed companies have feeding systems to recommend for capon production, and a bulletin on capon production may be obtained on request from the Extension Service poultryman.

# Summary

A summation of the systems of feeding along with examples of poultry feed formulas and recommendations for their use are given in Tables IV and V. There are several alternatives that have been shown to produce satisfactory results—the one each individual poultrymen will use will depend upon his own consideration of the relative advantages and disadvantages.

**Table IV. Methods Of Feeding**

There are three common methods of feeding:

1. All mash system
2. Mash and controlled grain system
3. Cafeteria system

### All Mash

The all mash system is a complete ration that provides all of the essential nutrients to produce eggs and meat.

**Advantages—**

- a. Requires less skill in feeding.
- b. Saves labor.
- c. Well adapted to feeding in automatic feeders.
- d. Color of egg yolks can be controlled more uniformly.

**Disadvantages—**

- a. Usually costs more than other systems of feeding.
- b. Promotes wet litter.
- c. Difficult to secure high feed consumption unless supplemented with pellets or appetizer feeds.

**How to Feed—**

At 10 weeks gradually replace chick starter with all mash feed.

Use no supplement grain.

House pullets before reaching 10 per cent production. Continue with all mash. Supplement with pellets or an appetizer feed.

### Mash, Controlled Grains

As the name implies, this system uses both grain and mash. An 18 to 22 per cent protein mash is self-fed in hoppers. Grains are controlled by hand-feeding at a ratio of 40 to 45 per cent grain to 50 to 55 per cent mash.

**Advantages—**

- a. Cost is usually lower than for all mash system.
- b. It is more palatable and easier to obtain high feed consumption.
- c. Can regulate your feeding program to changes in temperature, season, etc.
- d. Better management results from this system as the caretaker has greater opportunity to observe the flock.

**Disadvantages—**

- a. Requires greater skill in feeding.
- b. More labor is required since it is necessary to feed grains regularly.
- c. There is less uniformity of yolk color and interior quality.

**How to Feed—**

At eight weeks start hand feeding whole grains.

At 10 weeks gradually replace starter with 20 per cent laying mash.

Grains should total about 50 per cent of total ration.

Feed whole grains in late afternoon for best results.

When birds start laying, limit whole grains to 8 lbs. per 100 birds daily.

Increase grain to 12 lbs. per 100 birds daily when birds are 10 months old.

### Cafeteria

The free choice feeding of whole grains and mash. A 26 per cent protein mash is fed free choice with one or more grains at a ratio of one third mash to two thirds grain.

**Table V. Examples of Poultry Feed Formulas  
Chicken**

Ingredients	Starter (0-8 weeks)	Broiler Mash <sup>1</sup>	Grower <sup>2,3</sup> (8-? weeks)	Laying Mash <sup>2</sup>	Laying Concentrate <sup>4</sup>	Breeder Mash <sup>2</sup>
	Per Ton					
Ground yellow corn	800	1140	500	520	200	680
Pulverized oats <sup>5</sup>	300	-----	300	200	120	200
Wheat flour midds	100	-----	-----	-----	-----	-----
Wheat Standard midds	100	-----	300	400	300	200
Wheat bran	-----	-----	200	200	300	200
Meat scraps	100	-----	100	100	300	200
Fish meal	50	40	-----	-----	-----	80
Soybean meal (44%)	380	630	300	400	540	200
Dried buttermilk	50	20	-----	-----	-----	80
Dried Brewers Yeast	-----	-----	-----	-----	-----	-----
Alfalfa meal	60	40	200	100	120	80
Steamed bonemeal	20	80	40	40	60	40
Ground Limestone	20	10	-----	-----	-----	-----
Salt mix <sup>6</sup>	10	10	20	20	30	20
Animal fats	-----	40	-----	-----	-----	-----
Fish Oil (300D-750A)	10	-----	-----	20	30	20
Methionine <sup>7</sup>	1	-----	-----	-----	-----	-----
Vit. A Equivalent 15,000 In g.	-----	-----	-----	-----	-----	-----
Vit. D Equivalent 1500 Icu g.	-----	-----	-----	-----	-----	-----
Calcium Pantothenate	-----	6	-----	-----	-----	-----
Niacin	-----	10	-----	-----	-----	-----
Riboflavin	1	3	-----	0.5	1.0	2
Vitamin B <sub>12</sub>	1	5	3	3	5	5
Antibiotics <sup>8</sup>	2-10-100	2-10-100	2-10-100	0(4-20-200)	0(6-30-300)	0(4-20-200)
Arsenicals <sup>9</sup>	45-120	45-120	45-120	0(90-240)	0(135-360)	0(4-20-200)
Calculated protein	20	20	20	20	26	20

### Advantages—

- a. Lower cost.
- b. Larger percent of farm grains can be utilized.

### Disadvantages—

- a. Does not adapt itself to the feeding of old hens or meat-type pullets.
- b. Less uniformity in weight and condition of birds.
- c. Less uniformity in color of egg yolk and interior quality.
- d. Flockowner usually does not do as good a job in management and culling the flock.

### How to Feed—

At eight weeks, put limited amounts of whole corn and oats in front of birds along with starter, gradually increasing amounts of whole grain.

At ten weeks of age, gradually replace starter with 25 to 27 per cent balancer.

Continue feeding corn and oats free choice.

At least three fifths of feeder space should be devoted to balancer.

Watch birds to prevent excessive grain feeding.

(The above table is taken from the feeding edition of the Management Guide and Yearbook (1954) of the Nebraska Poultry Improvement Association).

### Footnotes *to table V.*

1. Provided all ingredients are of excellent quality, this diet will give satisfactory results. Both the starter and broiler mashes should be fed as all-mash diets for six weeks; then grain feeding may begin on a limited scale.

2. To be fed with equal parts of grain, supplemented with oyster shell and granite grit.

3. These diets are intended for use with limited green range. If luxuriant green forage is available, the alfalfa meal may be replaced by wheat by-products or ground cereal grains.

4. To be fed free choice with grain, supplemented with oyster shell and granite grit.

5. Various other cereals could replace oats, such as wheat, milo, millet, barley or corn.

6. A mixture of 39 pounds of iodized salt and one pound of manganese sulfate.

7. From one to two pounds of methionine may be added for improved feed efficiency and feathering; also one to two pounds of betaine or choline chloride should be added to turkey starters.

8. Various antibiotics, such as penicillin (to which the lower level applies) aureomycin, bacitracin, and teramycin intermediate level for the latter three can be used in starter and grower rations for improved growth and feed efficiency. Work at this station indicates that the antibiotics may be added to laying and breeding rations to effect from zero to eight percent improvement in egg production, hatchability, and feed efficiency. Antibiotic and vitamin B<sub>12</sub> potencies are indicated by the manufacturer and should be used accordingly. Recent evidence indicates that under certain conditions of endemic infections, higher levels of antibiotics may be used economically.

9. The organic arsenicals (3 nitro 4 hydroxy phenylarsonic acid, lower level, and arsanilic acid, higher level).

### General Rules

**MIXING:** Do not attempt to mix these rations unless adequate facilities for thorough mixing are available. Some substitution of ingredients is possible but **no** substitutions should be made without a proper consideration of the chemical and nutritive properties of the ingredients involved.

**FEEDER SPACE:** Limited access to feed either brought about by inadequate feeder space or uncontrolled restricted feeding will result in reduced production and poor feed efficiency. The following amount of feeder space should be available for 100 birds:

Chicks to eight weeks of age—two four foot troughs.

Growing chicks eight to twenty weeks of age—two six foot troughs.

Laying hens—two eight foot troughs.

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