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## Better Rations - More Eggs

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# Better Rations~ More Eggs

By F.E. Mussehl

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THE UNIVERSITY OF NEBRASKA  
COLLEGE OF AGRICULTURE  
EXPERIMENT STATION  
LINCOLN

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## Better Rations — More Eggs

F. E. MUSSEHL

Well-bred and well-fed hens are conceded to be economical producers of a very wholesome food product, eggs,— but our hens are not miracle workers and they insist on the right kind of raw material for building the egg. Nebraska poultry growers fortunately have all the natural feeds — corn, wheat, oats, barley, and dairy and packing house by-products — readily available at lower cash prices than prevail in most other states, and so our special problem is that of combining them so that eggs may be produced at the lowest cost per dozen.

### FEEDING PRINCIPLES

Prices of particular feeds may vary, and as they do, it is sometimes good business policy to vary our mixtures. This we can do safely if we meet certain requirements.

The principles of feeding can best be demonstrated by considering corn as a poultry feed. Corn is, in fact, the basic poultry feed in most sections because of its high palatability, digestibility, and reasonableness of cost. But hens put on a ration of corn alone will not lay eggs, because such a ration is deficient in minerals, in proteins of the right quality, and probably also in some of the vitamins.

If we re-enforce the corn ration with minerals, our hens will lay a few eggs but not many because the ration is still very deficient. When we add to the corn and minerals some good complete animal protein, as is furnished by milk or packing house products, egg production is much improved but is still not at its best. The addition of some succulent green feed like clover will, however, further improve egg production.

The principles of feeding can be represented quite fairly in a table of additions as follows:

	Symbols represent increasing egg production
I. Corn alone.....	0
II. Corn + ash (mainly calcium, phosphorus and chlorine furnished by salt).....	+
III. Corn + ash + animal protein.....	++
IV. Corn + ash + animal protein + green feed.....	+++
V. Corn + ash + animal protein + green feed + other feeds which add palatability and attractiveness.....	+++++



Practically all grains and grain products are deficient in the same essentials as corn, so that combining grains, tho helpful, does not entirely solve our feeding problem.

#### WHAT TO FEED

A program for "150 eggs per hen" production must be planned around a good, complete dry mash mixture. Several satisfactory dry mash formulas are listed on the last pages of this circular. The dry mash mixture, being made from ground grains, milling by-products, and usually packing house products, is less palatable because of its finely ground form than is the scratch feed. For this reason it is safe to keep it before the hens at all times without danger of over-feeding. Dry-mash feeding saves labor and is positive insurance against underfeeding.

#### ANIMAL PROTEIN IS ESSENTIAL

The one element in the laying-hen ration that is most often lacking is some form of complete protein, such as meat meal, tankage, dried buttermilk, skim milk, or liquid buttermilk. Experimental work at the Purdue Agricultural Experiment Station has shown that the addition of 6 pounds of a high grade tankage to a typical grain ration increased egg production from 59 eggs per hen in the check pen (no animal protein) to 183 eggs per hen in the tankage fed lot. When skim milk or buttermilk is available at all times, we can dispense with the meat meal or tankage in the mash mixture,

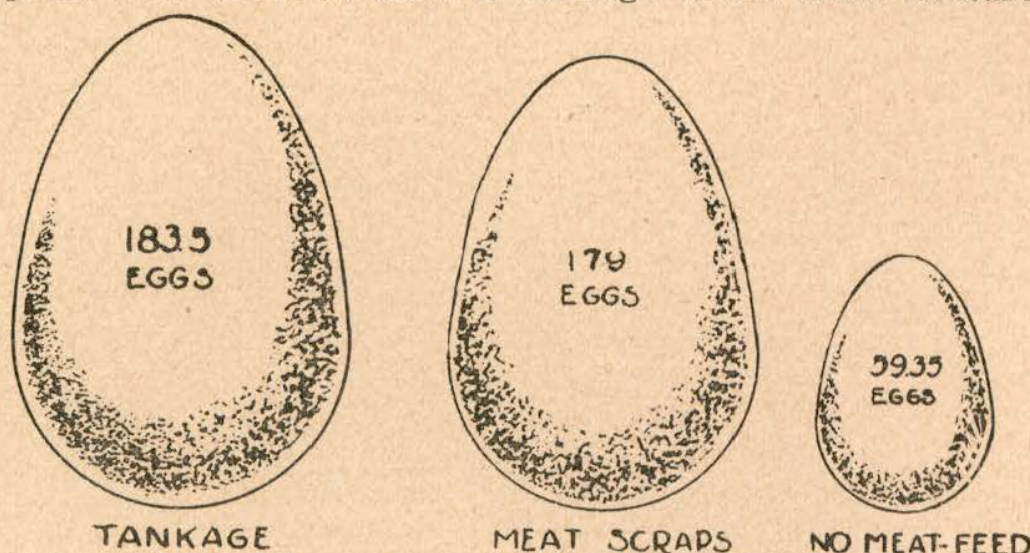


FIG. 1.—Comparative egg records of hens fed tankage, meat scraps, and no animal protein feed. From Circular 101, Purdue Agricultural Experiment Station.



but each hen must consume about 110 pounds of milk per year to get the equivalent protein furnished by 6 pounds of tankage.

Occasionally it is advisable to feed moist mash. Moistening the same mixture that is kept before the hens at all times, with buttermilk or sour milk, to a crumbly consistency, results in a combination much relished by our hens. Greater skill in feeding is required when the moist-mash method of feeding is used, since careless feeding will put the flock out of condition. The best time of the day to feed moist mash is at noon, and only as much should be fed as the birds will clean up readily in about twenty minutes. The moist mash should be fed in troughs or pans which can be thoroly and regularly cleaned.

### SCRATCH FEEDS

Whole or cracked corn is usually the foundation of all scratch feeds. Corn is very palatable and since it is so well liked most flocks are always ready to rustle for it, thus encouraging the exercise which is probably essential during the winter months. Wheat, barley, and oats can also be used in the scratch mixture, relative prices being the determining factor.

The amount of scratch feed to be given the flock will be determined by the amount of dry mash which the hens eat. During the winter months it is best to feed about twice as much scratch feed as mash, whereas during the spring and summer months the ratio should be reversed. The heaviest feed should be given late in the afternoon just before the birds go to roost. A schedule of scratch grain feeding for each month of the year is suggested in Table I.

TABLE 1.—*Amounts of grain per 100 hens per day and suggested standard of production*

MONTH	Pounds per day	Morning	Evening	Eggs per hen per month	Per cent production
November .....	12	4	8	5	16.67
December .....	12	4	8	6	19.3
January .....	12	4	8	9	29.0
February .....	12	4	8	12	43.0
March .....	10	4	6	19	61.3
April .....	10	4	6	21	70.0
May .....	10	4	6	20	64.5
June .....	8	3	5	16	53.3
July .....	8	3	5	14	45.1
August .....	6	2	4	13	41.9
September .....	5	2	3	9	30.0
October .....	5	2	3	6	19.4



### SUCCULENCE AND WATER

Succulent feeds like alfalfa, clover, blue grass, sprouted oats, etc., are rich in the vitamins which have assumed great importance as our knowledge of feeding essentials has increased. These feeds have a good effect on the digestive system and many poultrymen are finding succulent feeds more beneficial than drugs and tonics in this respect.

Sprouted oats are one of the best forms of succulence, and these can be prepared very easily without buying expensive equipment. At the Agricultural College Poultry Farm the box-method of sprouting is used. The oats are soaked in a large tub or barrel for about 12 hours. They are then drained and shoveled into shallow boxes to a depth of 3 or 4 inches, water being sprinkled over them as they become dry. In a basement room in which the temperature can be kept between 50° and 80° F., sprouting proceeds rapidly, and the oats are ready to feed in five days. The hens like them best when the sprouts are about one-half inch long. Mangel beets, sugar beets, and similar root crops can be used as succulent feeds, but recent experimental work at the California Experiment Station indicates that they are not as valuable as field-grown greens. Carrots are, however, considered the equal of field-grown greens.

A dozen eggs contain about a pint of water, and a hundred hens in good production will require 4 gallons of water per day. Good, clean, fresh water should be made available at all times.

### MINERAL FEEDS

The mineral requirements of laying hens are relatively great, the finished egg itself consisting of over 10 per cent of ash. The calcium which is needed for egg shell building can usually be furnished best with oyster shell. Our hens should have free access to this at all times in addition to grit which is needed for grinding feeds in the gizzard.

Recent experimental work has indicated not only that we must provide sufficient calcium and phosphorus for egg building but that a certain kind of radiant energy is essential for proper assimilation of these elements. Fortunately, this form of energy, known as ultra-violet radiation, is furnished by the direct sunshine which is liberally provided under Nebraska conditions. The sunlight which comes thru glass has most of the ultra-violet radiation filtered out of it, however, so that our management should be planned to get the hens into direct sunlight whenever possible. Certain glass substitutes which



are now being manufactured permit ultra-violet radiation to pass thru, and these will likely find wide use in poultry houses.

Another mineral which hens need in small amounts is common salt. The only safe way to feed this element, however, is to include it in the mash mixture and when so included, care must be taken to see that the salt is finely granulated and thoroly mixed with the rest of the mash. One pound of salt per 100 pounds of mash is recommended.

#### ARTIFICIAL LIGHTING IN WINTER

Winter egg production can be considerably increased by artificial lighting. Two flocks of 90 Leghorn pullets each were given the same kind of feed and were housed in the same kind of poultry houses at this Experiment Station. One lot was, however, lighted from 5 a. m. until daylight. The lighted lot laid 3,407 eggs during the same time that the unlighted birds laid 2,559. The additional eggs produced by the lighted flock during the period of lighting (from December 18 to March 1) sold for \$25.44.

Lights are used of course only during the fall and winter months, when the hen's working day is comparatively short. The lighting period covers a time from about October 1 to March 1 each year, and well-developed pullets which are ready to start laying about November 1 usually respond best to lighting. When lights are used on yearling hens their use should be postponed until about January 1.

Two common methods of lighting are practiced, these being morning lights (from 4:30 a. m. until daylight) and evening lights (from sunset to about 9:00 p. m.). Morning lighting seems to give best general satisfaction because of greater ease in working out a feeding and management schedule. The morning feed of scratch grain can be thrown in the litter the evening before and an alarm clock operated switch will turn on the lights at the desired time. The points which must be emphasized when lights are used are regularity in their use, proper feeding, and a good supply of water.

#### TOTAL FEED REQUIREMENTS

Accurate records which have been kept at the Vineland, New Jersey, Egg Laying Contest indicate that birds of the general purpose type, Plymouth Rocks, Reds, and Wyandottes, will consume about 85 pounds of feed per bird per year. Leghorns consumed 76 pounds per bird. The total feed consumption was about equally divided between scratch and mash





FIG. 2.—The dry-mash ingredients can be well mixed by turning them over on the floor about four times. Whether to buy prepared feeds or mix rations at home is a question of cost, quality, and convenience. Figure the cost of the ingredients in the ration, add a reasonable charge for mixing, and then compare the price of home-mixed feeds with commercial feeds.

feeds, tho the proportions of these varied depending on the season of the year. The pounds of feed required to produce a pound of egg were 4.6 for the general purpose breeds and 3.5 for the Leghorns.

It is estimated that, with good birds given good care so that the total annual production averages 150 eggs per hen, a \$10 per ton fluctuation in feed prices represents a fluctuation of  $3\frac{1}{2}$  cents per dozen in the cost of the eggs produced. In other words, when feed goes up \$10 per ton we must sell our eggs for  $3\frac{1}{2}$  cents per dozen more, to make the same labor and managerial income.



## RATIONS FOR LAYING HENS

(Add 1 pound finely divided salt to each 100 pounds of all dry mash mixtures)

## Number I

SCRATCH FEED	DRY MASH
Cracked yellow corn	Corn meal ..... 150 pounds
	Shorts ..... 150 pounds
	Bran ..... 100 pounds
Sprouted oats for succulent feed	Meat meal or tankage 100 pounds

## Number II

SCRATCH FEED	DRY MASH
Cracked yellow corn.... 500 pounds	Corn meal (yellow)..... 200 pounds
Wheat ..... 100 pounds	Ground wheat..... 100 pounds
Heavy oats ..... 100 pounds	Ground barley..... 100 pounds
	Meat meal or tankage 100 pounds

## Number III

SCRATCH FEED	DRY MASH
Cracked yellow corn.... 500 pounds	Corn meal ..... 100 pounds
Wheat ..... 100 pounds	Bran ..... 100 pounds
	Shorts ..... 100 pounds
	Skim milk or buttermilk to drink

## Number IV

SCRATCH FEED	DRY MASH
Cracked yellow corn.... 500 pounds	Yellow corn meal..... 100 pounds
Wheat ..... 100 pounds	Bran ..... 100 pounds
Barley ..... 100 pounds	Shorts ..... 100 pounds
Kafir ..... 100 pounds	Pulverized oats..... 100 pounds
	Meat meal or tankage 100 pounds

[10M]



