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IMPROVED RATIONS AND FEEDING PROCEDURES FOR PHEASANTS

by

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Pittman–Robertson Project 9-R

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INTRODUCTION

Recent Wisconsin studies on hunting season returns from artificially propagated pheasants released in the wild have shown a much higher recovery rate than has been previously reported. Hunter checks in the years 1948 to 1950 in southern Wisconsin showed that an average of 54 per cent of released pheasant cocks were taken by hunters (Kabat, Kozlik and Thompson, unpublished data compiled by Wisconsin Pittman–Robertson project 9-R). This is considerably higher than the 5 per cent return found by Tubbs (1946) in Michigan from 1935 to 1940. The Wisconsin studies have also indicated that artificially propagated hens released in spring play an important role in maintaining a relatively high shootable population through their contribution to the year's wild pheasant hatch.

In spite of this apparent success in the stocking of artificially propagated birds in the wild, one of the difficulties in raising pheasants at many game farms has been the high cost of feeding. A sound feeding policy is the keynote of a pheasant restoration-propagation program. A lack of knowledge of the nutritional requirements of pheasants can result in unnecessary expense, both in high feed costs and in pheasant losses.

In order to improve this game management practice, a study was initiated in 1951 to investigate suitable formulas for economical rations, better methods of purchasing rations, and improved feeding procedures. This investigation was made in connection with an experimental pheasant breeding study carried on as a part of Wisconsin Pittman–Robertson project 9-R. All rations and feeding procedures described in this paper involved 1050 true pheasants *(Phasianus)* used in the breeding study. The birds were reared in brooder houses and given access to attached sun porches at five days of age and to 25-by-50-foot runs at five weeks of age.

RATIONS

The experimental pheasants were fed three different kinds of rations—starter, grower, and breeder—to meet their nutritional requirements at various stages of growth and development. In the past, all rations used were ordered from feed companies by submitting a list of limited specifications for each ration, and allowing the manufacturers to formulate the ration. This procedure often resulted in rations that were inadequate due to a lack of knowledge of pheasant nutritional requirements.

Formulas were devised for two of the three Wisconsin pheasant rations. In these formulas the exact amount of each ingredient was specified. Such formulas give feed companies a better opportunity to provide adequate and economical rations that will best satisfy the nutritional needs of pheasants at various ages. Formulas were devised for the starter and breeder rations, due to their importance in the breeding program.

Detailed specifications for the various nutrients, designed to meet the requirements of pheasants, were used in formulating the new rations. These specifications were standardized on the basis of the experience and recommendations of the state game farm and the Poultry Husbandry Department of the University of Wisconsin, modified by published data on pheasant nutrition. Specifications for the starter, grower, and breeder rations are presented in Table 1.

The Wisconsin rations incorporated the specified amounts of these required nutrients, and at the same time utilized easily obtainable and inexpensive feedstuffs. These special rations, along with a staple winter maintenance diet, will be discussed in the following pages.

Starter Ration

The formula for the Wisconsin starter ration, based upon the specifications outlined in Table 1, appears in Table 2. The ration was ordered by submitting the formula to a feed company.

The starter ration was fed to young pheasant chicks from the time of hatching until six weeks of age. This ration is high in protein and

Table 1

Specifications for Pheasant Rations

	Starter	*Grower*	*Breeder*
Protein, minimum per cent of total ration	27.0	26.0	20.0
Vitamin A, I. U. per lb.	6000.0	6000.0	6000.0
Vitamin D, I. C. U. per lb.	600.0	sunlight	sunlight
Riboflavin, mg. per lb.	2.0	2.0	2.0
Fish meal, per cent of total ration	5.0	———	2.0*
Meat scrap (50% protein), per cent of total ration	10.0	10.0	5.0
$MnSO_4$, oz. per ton of feed	8.0	4.0	4.0
Phosphorus, per cent of total ration	1.0	1.0	0.75
Calcium, per cent of total ration	1.5	1.5	1.5**
Iodized salt, per cent of total ration	1.0	1.0	0.5
Maximum fiber, per cent of total ration	5.0	7.0	7.0

* 1% fish solubles can be substituted for fish meal.
** In addition, feed oyster shell free-choice.

Note:
Starter—make into crumblings.
Grower—make into pellets, 3/32 in. diameter.
Breeder—make into pellets, 3/16 in. diameter.

Table 2

Formula for Wisconsin Pheasant Starter Ration

Ingredients	*Pounds*
Ground yellow corn, No. 2 dent	26.
Ground oats, No. 3 or better	7.0
Wheat middlings	5.0
Wheat bran, pure	5.0
Soybean oil meal	26.0
Fish meal, 60% protein	6.0
Meat scraps, 50% protein	10.0
Dried whey, fortified with riboflavin	5.0
Alfalfa meal, 20% dehydrated	5.0
Bone meal	1.0
Ground oyster shell	2.0
Fish oil (400D–2000A)	0.5
Iodized salt	1.0
	100.0

Note:
Make into crumblings for starting pheasants.
Must contain 27% protein and not more than 5% fiber.
Add 8 oz. of $MnSO_4$ (manganese sulphate) per ton of feed.

rich in nutrients that are very important during the critical and rapid period of growth in the first few weeks of a young pheasant's life.

In 1951, the mortality at eight weeks of age for 360 hybrid pheasants was 8 per cent. The mortality for approximately 600 hybrids at twelve weeks of age was 9.4 per cent. The low mortality is believed to be due principally to the new starter ration, but may also have been influenced by hybrid vigor, and by the grower ration that was fed after six weeks of age.

In 1951, experimental studies by M. L. Sunde and W. W. Cravens (unpublished) of the University of Wisconsin Poultry Husbandry Department were carried on with pheasant chicks in battery brooders. These experiments indicated that growth obtained by using the Wisconsin starter ration compared favorably with that obtained from other starter rations tested.

One of the main results of nutritional deficiency noticed in pheasant chicks is perosis, or slipped tendon. Some investigators have found that a manganese deficiency caused perosis in domestic fowl. Gallup and Norris (1939) designed a ration low in manganese which produced an 80 per cent incidence of perosis in a group of New Hampshire chicks. However, when the amount of manganese was increased to 50 parts per million by adding manganese salts, perosis was reduced to 4 per cent. When using Single Comb White Leghorn chicks, only 30 parts per million of manganese were required for complete protection against perosis.

Ringrose, Martin, and Insko (1939) found that a basal diet containing only 10 parts per million of manganese gave a high incidence of perosis to turkey poults. The incidence of perosis was gradually reduced when 20 parts per million or above of manganese were added. Manganese chloride was effective to a certain extent in preventing perosis in pheasants, according to Wilgus, Norris and Heuser (1937).

The Wisconsin starter contained 8 ounces of manganese sulphate per ton of feed (68 parts per million of manganese). Since perosis has been frequently observed in pheasant chicks in the past, this comparatively high amount of manganese was added as a precautionary measure. No signs of perosis were observed in the 900 young pheasants fed the starter ration (Table 2) and whose dams were fed the Wisconsin breeder ration in 1951.

The efficiency of the utilization of manganese in a starter ration is known to be related to the quantity of calcium and phosphorus pres-

ent. Too great an amount of calcium and phosphorus added to a starter ration without raising the manganese level will decrease the effectiveness of manganese in the prevention of perosis.

Skoglund (1940) showed that any practical ration containing less than 2.84 per cent calcium and 1.08 per cent phosphorus is within the limits that pheasants can tolerate, providing the manganese content of the ration is more than 35 parts per million.

Callenbach and Murphy, in Skoglund (1940), conducted preliminary studies on the calcium and phosphorus requirements of ring-necked pheasant chicks. This work was carried on in battery brooders. The chicks were supplied with calcium levels ranging from .5 per cent to 3 per cent and with phosphorus levels ranging from .5 per cent to 1 per cent. The results indicated that for proper growth and bone development, pheasant chicks required 1.5 per cent calcium and .75 per cent of phosphorus, when brooded in batteries. The amounts of calcium and phosphorus used in the Wisconsin starter ration were within the limits recommended by Callenbach, Murphy, and Skoglund.

Experimental studies have also been made using different protein levels and varying proportions of animal and vegetable protein. Norris *et al.* (1936) engaged in a series of experiments using different proportions of protein (15, 18, 21, 24, 27, 30, and 33 per cent), and found that the maximum growth of pheasants for the first eight weeks of life was attained on a 30 per cent protein diet, although excellent growth was also attained on 21, 24 and 27 per cent protein diets.

Callenbach, Hunter, and Murphy, in Skoglund (1940), formulated a 28 per cent protein pheasant starter ration using special 65 per cent protein meat scraps as the main source of protein. Satisfactory results were obtained with this ration when it was mixed as specified.

Skoglund (1940) reported an improved ration for starting ring-necked pheasant chicks which is presented in Table 3 for comparison with the Wisconsin starter ration. In Skoglund's studies, 1200 pheasant chicks were used, and ten rations containing different amounts of white fish meal, soybean oil meal and 65, 55 or 50 per cent protein meat scraps were fed. Varying amounts of animal protein feeds and soybean oil meal were used to control the percentage of total ash and calcium and the calcium:phosphorus ratios. His recommended ration appearing in Table 3 contained 27.25 per cent protein and was not only the best from a biological standpoint, but it was the most economical ration studied at that time, making use of easily obtainable

feedstuffs. Most of the feedstuffs in the Wisconsin starter ration were the same as those contained in Skoglund's ration. The proportions of these feedstuffs, however, were adjusted in accordance with current knowledge of pheasant nutritional requirements and the availability of feeds in Wisconsin.

Table 3

Formula for Pheasant Starter Ration

(After W. C. Skoglund [1940])

Ingredients	*Pounds*
Ground yellow corn	11.20
Wheat bran	15.00
Wheat flour middlings	12.50
Ground oats	10.00
Dried skimmilk	12.50
Alfalfa leaf meal	5.00
50% protein meat scraps	11.05
White fishmeal	2.75
Soybean oil meal	19.50
Salt	0.50
Cod liver oil (400 A.O.A.C. chick units of vitamin D per gram)	0.25
	100.25

(Contains 27.25% protein)

Scott and Reynolds (1948) recommended a starter ration for pheasants (Diet C) that contained 28–29 per cent protein (Table 4). The Wisconsin starter ration was comparable to that of Scott and Reynolds in that it approximated the 28 per cent protein content and contained many of the same ingredients. Feedstuffs such as liver meal and dried brewers' yeast were omitted from the Wisconsin ration because they are expensive.

Grower Ration

The grower ration was fed from six weeks of age until approximately sixteen to twenty weeks of age. No specific formula was devised for the grower ration. When ordering a grower feed, a list of grower specifications (Table 1) was sent to various feed companies for bids, and the feed was bought from the company that was able to provide a feed to meet the specifications at the lowest cost. This procedure was believed to be an economical one.

Table 4

Formula for Pheasant Starter Ration

(After M. L. Scott and R. E. Reynolds [1948]—Diet C)

Ingredients	*Pounds*
Yellow cornmeal	18.0
Wheat standard middlings	14.0
Oats, pulverized	10.0
Soybean meal, expeller	30.0
Fish meal	10.0
Liver and glandular meal	3.0
Skimmilk, dried	5.0
Whey, dried	2.0
Yeast, dried brewers'	4.0
Dicalcium phosphate	1.0
Limestone	1.5
Fish liver oil (2000 A–400 D)	1.0
Salt	0.5
$MnSO_4$	0.025
	100.025

(Contains 28–29% protein)

The nutritional requirements of the pheasant chicks are believed to be less critical during the period following six weeks of age and for this reason the grower ration contained less protein and was higher in fiber content than the starter. This ration proved to be less expensive than the starter, since protein concentrates are among the most expensive feedstuffs in a ration.

No published information was found on specific grower rations, because in most experimental studies starter rations have been used throughout the growing period.

Breeder Ration

The formula for the Wisconsin breeder ration, based upon the specifications in Table 1 is presented in Table 5. The ration was ordered by submitting the formula to a feed company.

The breeder ration was fed to adult birds from approximately one month before egg laying began until early July when no more hatching eggs were required. At this time the adult breeders were shifted to the grower ration.

Table 5

Formula for Wisconsin Pheasant Breeder Ration

Ingredients	*Pounds*
Ground yellow corn, No. 2 dent	30.5
Ground oats, No. 3 or better	11.0
Alfalfa meal, 20% dehydrated	5.0
Wheat bran, pure	5.0
Wheat middlings	10.0
Corn gluten meal	6.0
Soybean oil meal	18.0
Fish solubles, condensed	1.0
Meat scraps, 50% protein	5.0
Dried whey, fortified with riboflavin	5.0
Bone meal	1.0
Ground oyster shell	1.5
Fish oil (400D–2000A)	0.5
Iodized salt	0.5
	100.0

Note:
Make into pellets, 3/16 in. diameter.
Must contain not less than 20% protein and not more than 7% fiber.
Feed additional oyster shell free-choice.
Add 4 oz. of $MnSO_4$ (manganese sulphate) per ton of feed.

Few experimental studies on pheasant breeder rations have been conducted. When composing the list of specifications for the Wisconsin breeder ration, specifications for turkey breeder rations (which have been used by pheasant breeders with fairly satisfactory results) were modified and used.

Breeder rations are of great importance, not only to keep the breeding birds in a healthy condition, but to provide the hen pheasant with the essential nutrients which will be stored in the eggs for the production of healthy chicks. It is essential that a chick be properly nourished throughout its embryonic development so that it will be strong enough to hatch and also to grow well during its first few days of life.

Winter Maintenance Ration

Each winter a maintenance ration made of 60 per cent whole yellow corn and 40 per cent wheat is purchased by the state game farm and fed until approximately one month before egg laying commences the following spring. The game farm has found in the past that this rela-

tively inexpensive ration is satisfactory for maintaining adult pheasants in a healthy condition during the winter months.

The winter maintenance ration was fed to the experimental pheasants beginning in October.

FEEDING PROCEDURE

The seasonal feeding schedule followed in this study is presented in Table 6.

Table 6

Seasonal Feeding Schedule

Period	*Rations Fed*	
	Adults	*Juveniles*
November–January	Winter maintenance	--------
February–March	Breeder	--------
April–June	Breeder	Starter
July–September	Grower	Starter if under 6 weeks old Grower if over 6 weeks old
October	Change from grower to winter maintenance	Change from grower to winter maintenance

The following general procedures for feeding pheasants were designed from practices used by the game farm and from several new techniques developed in the experimental breeding studies. They are offered here as guides in pheasant feeding.

1. Do not keep feed for more than a month before it is to be fed. A significant amount of vitamin A and other nutrients may be lost if the feed is stored for a longer period.
2. Feed chicks and growing pheasants every day as much as they will consume in a twenty-four-hour period.
3. Do not allow feed to become wet in the hoppers. Pheasants accustomed to eating pellets will not consume feed that is wet or in broken-down form.
4. Provide a constant source of fresh water at all times.
5. Supply green feeds to pheasants at all stages of growth.

6. Provide pheasants with feed hoppers with a "lip". This will reduce the waste of feed by scratching.
7. Feeding grower and breeder rations in pellet form will cut down the loss of feed by wind and handling.

SUMMARY AND CONCLUSIONS

Pheasants used in an experimental breeding study were fed three different rations—starter, grower, and breeder—to satisfy their nutritional requirements during different stages of growth and development. Formulas for the starter and breeder rations were devised from specifications for the various nutrients designed to meet the requirements of pheasants. Such formulas specifying the exact amount of each ingredient aid feed manufacturers in bidding for orders and producing suitable pheasant rations.

These specifications were designed for general use in formulating rations, whereas the rations themselves were designed for use in Wisconsin. The rations used in other localities based upon these specifications should utilize feedstuffs easily obtained in those localities in order to secure the most economical diets.

The Wisconsin starter and breeder rations were experimentally tested during 1951 with satisfactory results. The improved rations and feeding procedures established as a result of this investigation have now been adopted for future use in the experimental pheasant breeding program.

Rations carefully formulated in accordance with the nutritional requirements of pheasants will help to reduce unnecessary expense, both in high feed costs and in pheasant losses. Such expense has long been one of the obstacles in a pheasant restoration-propagation program. While these studies were conducted primarily to improve Wisconsin's pheasant restoration program, they will also benefit private game breeders who raise pheasants for varied purposes. A knowledge of basic food requirements should also prove to be important in the determination of range requirements.

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