ALABAMA A&M AND AUBURN UNIVERSITIES

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Feeding Game Birds: Pheasant, Quail, and Partridge

Limited information is available concerning the nutrient requirements of game birds that are frequently considered part of the poultry industry, including the ring-necked pheasant, bobwhite quail, Japanese quail, chukar partridge, and Hungarian partridge. All of these game birds are gallinaceous birds related to grouse, wild and domestic turkeys, and chickens. Although these game bird species do not constitute a major share of the poultry industry, there is an increasing number of specialized farms involved in their production.

Some recent information exists on the nutrient requirements of pheasant, quail, and partridge; however, there is a tendency to rely on information for the turkey. A challenge exists in designing game bird diets since birds can be reared for commercial meat production or for hunting preserves. Birds grown for release are not required to grow at the maximum rate, and in many cases achieving a high rate of gain would be detrimental to flight ability.

Ring-necked Pheasant

Pheasants originate from Asia, and there are many different varieties. Pheasant names seem to be related to the native homeland, such as the Chinese ring-neck and Mongolian, Szechwan, and Japanese pheasants. The common English pheasant also originated in Asia and was first introduced into the United States in the late 1700s and early 1800s in New Jersey and Pennsylvania. Within a few years, they became well established in this region.

Information concerning the nutrient requirements of the ring-necked pheasant (*Phasianus cholchincus*) suggests that diets with relatively high nutrient concentrations are required during the starter period. Protein and amino acid requirements mirror those of turkeys. Pheasants are also prone to leg disorders and abnormal feather growth when specific key macronutrients (protein, methionine, calcium, and phosphorus) and micronutrients (niacin, riboflavin, choline, manganese, and zinc) are deficient. The manner in which birds are reared and fed will depend on the prevailing marketing option: hunting preserves or gourmet meat production. Primarily, pheasants are reared for use on hunting preserves. Diets relatively high in protein and low in energy can be used to encourage the development of lean pheasants that are more suited for hunting.

Table 1 outlines starter, grower, holding, and breeder nutrient specifications for pheasants. Dietary recommendations provided throughout this publication provide the necessary information to formulate complete diets that do not need supplementation and should provide adequate nutrients to meet the bird's requirements. The starter diet is fed from hatch to 4 weeks of age, followed by the grower/finisher diet until market age, or until selection for breeding. Birds that will be released for sporting purposes can be fed 5 to 10 percent cracked grain after 12 weeks of age. At 16 weeks, when one-half of the daily feed allotment can be grain, the bird can switch to whole grain. Such a feeding program should result in a stronger, hardier bird and one that is more capable of foraging when released. If it is not possible to feed supplemental grains, the holding diet can be introduced after 7 to 9 weeks for pheasants that will be released for sport. The pheasant breeder diet should be introduced to birds at least 2 weeks before egg production is expected, or at the time of the first egg.

Table 1. Diet Specifications for Ring-necked Pheasant (as percentage or unit per pound of diet)

		Starter	Grower/Finisher	Holding	Adult Breeder
Nutrient	**Unit[1]**	**0–4 wks**	**4–12 wks**	**> 12 wks**	
Crude protein	%	26.0–28.0	22.0–24.0	16.0–18.0	16.0
Metabolizable energy	Kcal	1340.	1340.	1250.	1270.
Calcium	%	1.30	1.10	0.85	2.60
Nonphytate Phosphorus	%	0.60	0.48	0.42	0.42
Sodium	%	0.18	0.18	0.18	0.18
Methionine	%	0.60	0.46	0.35	0.42
Methionine + Cystine	%	1.10	0.82	0.64	0.64
Lysine	%	1.50	1.10	0.78	0.75
Threonine	%	1.10	0.92	0.70	0.65
Tryptophan	%	0.26	0.23	0.20	0.20
		Percentage amount per lb of diet			
Vitamins added per lb of diet		100%	80%	70%	100%
Vitamin A	IU	3200.			
Vitamin D	ICU	1150.			
Vitamin E	IU	20.0			
Vitamin K	mg	1.0			
Thiamin	mg	1.0			
Riboflavin	mg	3.0			
Niacin	mg	20.0			
Choline	mg	100.			
Pyridoxine	mg	1.4			
Pantothenic acid	mg	2.5			
Folic acid	mg	1.0			
Vitamin B12	mcg	5.0			
Biotin	mcg	50.0			
Trace minerals added per lb of diet					
Manganese	mg	35.0			
Iron	mg	20.0			
Copper	mg	5.0			
Zinc	mg	40.0			
Iodine	mg	0.2			
Selenium	mg	0.136			

[1]Units of measure are: Kcal=Kilocalorie; IU=International Unit; ICU=International Chick Unit; mg=milligram; mcg=microgram

Table 2 provides information concerning expected body weight, feed consumption, and feed efficiency of male and female ring-necked pheasants to 18 weeks of age.

Table 2. Body Weight, Cumulative Feed Consumption, and Feed Efficiency of Ring-necked Pheasants

Age	Body Weight (g)[1]		Feed Consumption (g)		Feed Efficiency (g:g)[2]	
(wks)	Male	Female	Male	Female	Male	Female
2	85	85	144	144	1.71	1.71
4	220	200	430	416	1.98	2.07
6	380	350	866	794	2.23	2.28
8	620	520	1496	1352	2.43	2.61
10	830	660	2161	1915	2.61	2.88
12	1050	820	3136	2747	2.97	3.33
14	1300	960	4092	3640	3.15	3.78
16	1475	1025	5163	4709	3.51	4.59
18	1530	1080	6338	5827	4.14	5.40

[1]To convert gram values to pound units, divide by 454.
[2]Feed efficiency is the amount of feed required per unit of body weight.

Table 3. Diet Specifications for Bobwhite Quail (as percentage or unit per pound of diet)

		Starter	**Grower**	**Finisher/Holding**	**Adult Breeder**
Nutrient	**Unit[1]**	**0–6 wks**	**6–10 wks**	**> 10 wks**	
Crude protein	%	26.0–28.0	22.0–24.0	18.0–20.0	16.0–18.0
Metabolizable energy	Kcal	1300.	1250.	1225.	1280.
Calcium	%	0.90	0.80	0.70	2.60
Nonphytate Phosphorus	%	0.45	0.38	0.35	0.42
Sodium	%	0.18	0.18	0.18	0.18
Methionine	%	0.55	0.48	0.38	0.42
Methionine + Cystine	%	1.00	0.85	0.72	0.64
Lysine	%	1.30	1.10	0.90	0.75
Threonine	%	1.00	0.80	0.70	0.65
Tryptophan	%	0.26	0.23	0.20	0.20
		Percentage amount per lb of diet			
Vitamins added per lb of diet		100%	80%	70%	100%
Vitamin A	IU	3200.			
Vitamin D	ICU	1150.			
Vitamin E	IU	20.0			
Vitamin K	mg	1.0			
Thiamin	mg	1.0			
Riboflavin	mg	3.0			
Niacin	mg	20.0			
Choline	mg	100.			
Pyridoxine	mg	1.4			
Pantothenic acid	mg	2.5			
Folic acid	mg	1.0			
Vitamin B12	mcg	5.0			
Biotin	mcg	50.0			
Trace minerals added per lb of diet					
Manganese	mg	35.0			
Iron	mg	20.0			
Copper	mg	5.0			
Zinc	mg	40.0			
Iodine	mg	0.4			
Selenium	mg	0.136			

[1]Units of measure are: Kcal=Kilocalorie; IU=International Unit; ICU=International Chick Unit; mg=milligram; mcg=microgram

Bobwhite Quail

Bobwhite quail (*Colinus virginianus*) are game birds indigenous to the United States, and their distinctive call, color, and flight patterns make them popular for sport. In many parts of the United States, loss of natural habitats has created a market demand for commercially bred birds that are used to stock hunting preserves and some native wild areas. Several species of bobwhite quail exist. The Eastern bobwhite is the most common species in the wild and in confinement, but four other species include the Plains bobwhite, masked bobwhite, Texas bobwhite, and Florida bobwhite. The jumbo bobwhite is a commercially available strain that has been selected for marketing traits such as appearance and meat production. However, the Japanese quail appears to be more suited for meat production.

Very limited information concerning the nutrient requirements of the bobwhite quail has been published. Bobwhite quail dietary recommendations that meet or exceed nutrient requirements are shown in table 3. The starter diet should be fed as a complete feed during the first 6 to 8 weeks. From 6 to 10 weeks of age, birds should be placed on the grower diet, followed by the finisher diet until they reach market age (meat production purpose), or as suited for the production of sport birds tailored to a release program. Birds that are to be released for sporting purposes can be fed 5 to 10 percent cracked grain after 10 weeks of age. Up to one-half of the daily feed allotment can be cracked grain while the birds are provided an adjustment period of 3 to 4 weeks. Such a feeding program should result in a stronger, hardier bird that is more capable of foraging when released.

An alternative program would be to introduce the finisher diet a few weeks earlier, at approximately 8 to 9 weeks, for quail that will be released for sport. As with other game birds reared commercially, bobwhite quail grown for game-release farms should be fed diets of relatively low-energy (1200 – 1250 kcal/lb) content during the growing period to prevent excessive fattening. The finisher diet can also be used as a holding diet, whether birds are being held for release or as future breeders. The quail breeder diet should be introduced to birds at least 2 weeks before egg production is expected, or at first egg. For best results, gradually change over from a holding diet to the breeder diet over a period of a week.

Table 4 provides information concerning expected body weight, feed consumption, and feed efficiency of bobwhite quail to 10 weeks of age.

Japanese Quail

Japanese quail (*Coturnix coturnix japonica*), also known as coturnix, pharaoh's, stubble, and Eastern quail, are used for commercial meat and egg production for specialty markets and as a valued research animal. Historically, Japanese quail have been widely distributed in Europe and Asia, and Egyptians trapped large numbers from their farmlands for meat. In Japan, birds were not only kept as pets, but also for meat and egg production for several centuries. Japanese quail were originally introduced into the United States by bird fanciers around 1870. Hawaii has been the only state to successfully establish this species as a wild population.

The nutrient requirements of Japanese quail have been documented to a greater extent than other game birds. This is largely due to the bird's widespread functionality as a producer of meat and eggs, research animal, and ease in handling, propagation, and reproduction for amateur bird fanciers and hobbyists. Japanese quail requirements are shown in table 5. Extensive amounts of information concerning the nutrient requirements of the Japanese quail have been published. Starter/grower diet should be fed as a complete feed during the first 6 to 8 weeks. Birds should then be placed on finisher diet until they reach market age (meat production purpose). Japanese quail selected for rapid growth rate may require higher concentrations of dietary nutrients such as protein (and amino acids), calcium, and phosphorus than random-bred quail. Japanese quail will likely mature at around 7 to 8 weeks of age when body weight reaches 150 to 160 grams. A quail breeder diet should be introduced to birds at least 2 weeks before egg production is expected, or at the sight of the first egg. For best results, gradually change over from a holding diet to the breeder diet over a period of a week. During a 15-week laying cycle, a breeder will produce approximately 80 eggs with a hatch rate of 80 percent.

Table 6 provides information concerning approximate body weight, feed consumption, and feed efficiency of Japanese quail to 10 weeks of age.

Chukar Partridge

The chukar partridge (*Alectoris gracea chukar*), which originates from Central Asia, was first released in California in 1932; its release continued through 1955. Approximately 52,000 birds were released during this period in all but four counties. As a result, chukar partridge have become established in the desert and semiarid regions of California where precipitation seldom exceeds 10 inches per year.

The chukar partridge is also popular as a release bird for recreational hunting in many parts of the United States. Chukar partridge are docile and easily raised in captivity. Although most birds reared in captivity are released for sport, there is a small need for producing meat birds for a limited restaurant trade.

The chukar is easily identified by the black band running across the forehead, through the eyes, down the neck, and meeting

Table 4. Body Weight, Cumulative Feed Consumption, and Feed Efficiency of Bobwhite Quail

Age (wks)	Body Weight (g)[1]	Feed Consumption (g)	Feed Efficiency (g:g)[2]
1	16	16	1.00
2	35	53	1.51
4	80	163	2.04
6	122	328	2.69
8	160	515	3.22
10	190	750	3.95

[1]To convert gram values to pound units, divide by 454.
[2]Feed efficiency is the amount of feed required per unit of body weight.

Table 5. Diet Specifications for Japanese Quail (as percentage or unit per pound of diet)

		Starter/Grower	**Finisher**	**Adult Breeder**
Nutrient	**Unit[1]**	**0–6 wks**	**>6 wk to market**	
Crude protein	%	24.0–26.0	17.0–19.0	18.0–20.0
Metabolizable energy	Kcal	1315.	1315.	1315.
Calcium	%	0.80	0.70	2.50
Nonphytate Phosphorus	%	0.30	0.25	0.35
Sodium	%	0.15	0.15	0.15
Methionine	%	0.50	0.42	0.45
Methionine + Cystine	%	0.75	0.68	0.70
Lysine	%	1.30	0.90	1.00
Threonine	%	1.02	0.85	0.74
Tryptophan	%	0.22	0.20	0.19
		Percentage amount per lb of diet		
Vitamins added per lb of diet		100%	80%	100%
Vitamin A	IU	3000.		
Vitamin D	ICU	1000.		
Vitamin E	IU	18.0		
Vitamin K	mg	1.0		
Thiamin	mg	1.0		
Riboflavin	mg	2.8		
Niacin	mg	20.0		
Choline	mg	115.		
Pyridoxine	mg	1.5		
Pantothenic acid	mg	7.0		
Folic acid	mg	1.0		
Vitamin B12	mcg	5.0		
Biotin	mcg	50.0		
Trace minerals added per lb of diet				
Manganese	mg	25.0		
Iron	mg	30.0		
Copper	mg	5.0		
Zinc	mg	30.0		
Iodine	mg	0.2		
Selenium	mg	0.136		

[1]Units of measure are: Kcal=Kilocalorie; IU=International Unit; ICU=International Chick Unit; mg=milligram; mcg=microgram

Table 6. Body Weight, Cumulative Feed Consumption, and Feed Efficiency of Japanese Quail

Age	**Body Weight (g)[1]**		**Feed Consumption (g)**		**Feed Efficiency (g:g)[2]**	
(wks)	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
2	40	40	50	50	1.25	1.25
4	90	100	180	190	2.00	1.90
6	120	130	300	330	2.50	2.53
8	130	160	350	450	2.69	2.81
10	140	170	400	510	2.86	3.00

[1]To convert gram values to pound units, divide by 454.
[2]Feed efficiency is the amount of feed required per unit of body weight.

as a gorget between the white throat feathers and upper breast. The lower breast and back are generally ashy-gray. The feathers of the flanks are gray at the base and have two black bands at the tip, giving the appearance of numerous bands of black bars flanking the side. The bill, legs, and feet are orange-red in the adult. It is difficult to differentiate between male and female adult birds since distinguished sexual dimorphism is not apparent in mature birds. Males are generally larger than females, may have a more predominant metatarsal spur, and have a gray superciliary line that appears lighter and extends to the crown.

Limited information exists concerning the nutrient requirements of the chukar partridge. Reports indicate, however, that chukar partridge requirements are similar to those of the turkey and other game birds. Chukar partridge appear to do well on diets that may not be well defined; the birds will adjust their intake accordingly to meet growth and maintenance requirements. As with most birds that will be released for sport hunting, a low-energy, high-fiber diet may be more suited for producing a lean, strong, flying-type bird.

Although nutrient recommendations are quite obscure for this bird, table 7 provides some base dietary specifications that can be used to formulate a complete diet that should meet the nutrient requirements of the chukar partridge during starter, grower/finisher, and breeding periods. Note that these recommendations are nearly the same as those for other game birds previously discussed. When rearing numerous game bird species in a single location, a single diet for starting, growing, and finishing

Table 7. Diet Specifications for Chukar Partridge (as percentage or unit per pound of diet)

		Starter	**Grower/Finisher**	**Adult Breeder**
Nutrient	**Unit[1]**	**0–6 wks**	**>6 wks to market**	
Crude protein	%	24.0–28.0	17.0–19.0	18.0–20.0
Metabolizable energy	Kcal	1315.	1325.	1340.
Calcium	%	1.20	1.00	3.00
Non-phytate Phosphorus	%	0.50	0.42	0.45
Sodium	%	0.18	0.18	0.18
Methionine	%	0.60	0.46	0.52
Methionine + Cystine	%	1.10	0.80	0.82
Lysine	%	1.30	0.90	0.85
Threonine	%	1.10	0.85	0.78
Tryptophan	%	0.24	0.22	0.22
		Percentage amount per lb of diet		
Vitamins added per lb of diet		100%	80%	100%
Vitamin A	IU	2950.		
Vitamin D	ICU	910.		
Vitamin E	IU	18.0		
Vitamin K	mg	1.0		
Thiamin	mg	1.0		
Riboflavin	mg	2.8		
Niacin	mg	20.0		
Choline	mg	100.		
Pyridoxine	mg	1.4		
Pantothenic acid	mg	7.0		
Folic acid	mg	1.0		
Vitamin B12	mcg	5.0		
Biotin	mcg	50.0		
Trace minerals added per lb of diet				
Manganese	mg	23.0		
Iron	mg	28.0		
Copper	mg	5.0		
Zinc	mg	28.0		
Iodine	mg	0.2		
Selenium	mg	0.136		

[1]Units of measure are: Kcal=Kilocalorie; IU=International Unit; ICU=International Chick Unit; mg=milligram; mcg=microgram

will be most commonly employed for feeding all species involved. A complete game bird breeder diet should be introduced to birds at least 2 weeks before egg production is expected, or at first egg. For best results, gradually change over from a holding diet to the breeder diet over a period of a week.

Table 8 provides information concerning approximate body weight, feed consumption, and feed efficiency of chukar partridge to 12 weeks of age.

Table 8. Body Weight, Cumulative Feed Consumption, and Feed Efficiency of Chukar Partridge

Age (wks)	Body Weight (g)[1]	Feed Consumption (g)	Feed Efficiency (g:g)[2]
2	70	126	1.80
4	180	360	2.00
6	300	840	2.80
8	380	1368	3.60
10	490	2058	4.20
12	550	2805	5.10

[1]To convert gram values to pound units, divide by 454.
[2]Feed efficiency is the amount of feed required per unit of body weight.

Table 9. Diet Specifications for Hungarian Partridge (as percentage or unit per pound of diet)

Nutrient	Unit[1]	Starter 0–4 wks	Grower 4–8 wks	Finisher > 8 wks	Adult Breeder
Crude protein	%	24.0–26.0	22.0–24.0	18.0–20.0	17.0–18.0
Metabolizable energy	Kcal	1275.	1300.	1315.	1270.
Calcium	%	0.90	0.85	0.80	2.60
Nonphytate Phosphorus	%	0.45	0.42	0.40	0.42
Sodium	%	0.18	0.18	0.18	0.18
Methionine	%	0.51	0.48	0.42	0.42
Methionine + Cystine	%	1.00	0.85	0.70	0.64
Lysine	%	1.27	1.18	1.00	0.75
Threonine	%	0.95	0.80	0.65	0.65
Tryptophan	%	0.26	0.25	0.20	0.20
		Percentage amount per lb of diet			
Vitamins added per lb of diet		100%	80%	70%	100%
Vitamin A	IU	2950.			
Vitamin D	ICU	910.			
Vitamin E	IU	18.0			
Vitamin K	mg	1.0			
Thiamin	mg	1.0			
Riboflavin	mg	2.8			
Niacin	mg	18.0			
Choline	mg	100.			
Pyridoxine	mg	1.4			
Pantothenic acid	mg	7.0			
Folic acid	mg	1.0			
Vitamin B12	mcg	5.0			
Biotin	mcg	50.0			
Trace minerals added per lb of diet					
Manganese	mg	30.0			
Iron	mg	20.0			
Copper	mg	5.0			
Zinc	mg	40.0			
Iodine	mg	0.2			
Selenium	mg	0.136			

[1]Units of measure are: Kcal=Kilocalorie; IU=International Unit; ICU=International Chick Unit; mg=milligram; mcg=microgram

Hungarian Partridge

The Hungarian or gray partridge (*Perdix perdix*) was introduced into the western United States in the early 20th century and has become established as a game bird in the Canadian plains and the north central and northwestern United States. In the wild, the Hungarian partridge ranges throughout western and eastern Europe, and its habitat may extend into Siberia and the Steppe of Eastern Europe and Asia. It maintains a very widespread and stable distribution in its native habitats. In the United States, the Hungarian partridge is raised commercially and released on hunting preserves. Hungarian partridge are a difficult target for even the most experienced hunter and are well liked for their "cannon ball" flight.

The gray partridge is monogamous, quarrelsome in groups, prone to disease, erratic in egg production, nervous and difficult to handle, and, in general, difficult to rear in large numbers since it is intolerant of density, particularly during breeding season. On the positive side, the bird is readily sexed, easy to hatch, and fairly accommodating when it comes to diet.

Nutritional requirements of the Hungarian partridge are not as well investigated and defined as those of domestic poultry, pheasant, or quail. However, their nutritional requirements are probably close to those of turkeys and other game birds. The nutrient recommendations shown in table 9 should provide good results in the formulation of a complete diet that does not require supplementation. Two primary factors should be considered when feeding birds where questionable information exists: protein and mineral levels of the feed, which are designed to meet the requirements of the birds at different stages of development. Feed should be available to the birds at all times and should be sheltered from rain and snow. A breeder diet should be introduced to birds at least 2 weeks before egg production is expected, or at first egg. For best results, gradually change over from a holding diet to the breeder diet over a period of a week.

Table 10 provides information concerning body weight, feed consumption, and feed efficiency estimates for Hungarian partridge to 13 weeks of age.

Table 10. Body Weight, Cumulative Feed Consumption, and Feed Efficiency of Hungarian Partridge

Age (wks)	Body Weight (g)[1]	Feed Consumption (g)	Feed Efficiency (g:g)[2]
4	124	260	2.10
8	265	850	4.21
13	342	1885	5.48

[1]To convert gram values to pound units, divide by 454.
[2]Feed efficiency is the amount of feed required per unit of body weight.

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