

# Guinea Fowl Production

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## INTRODUCTION

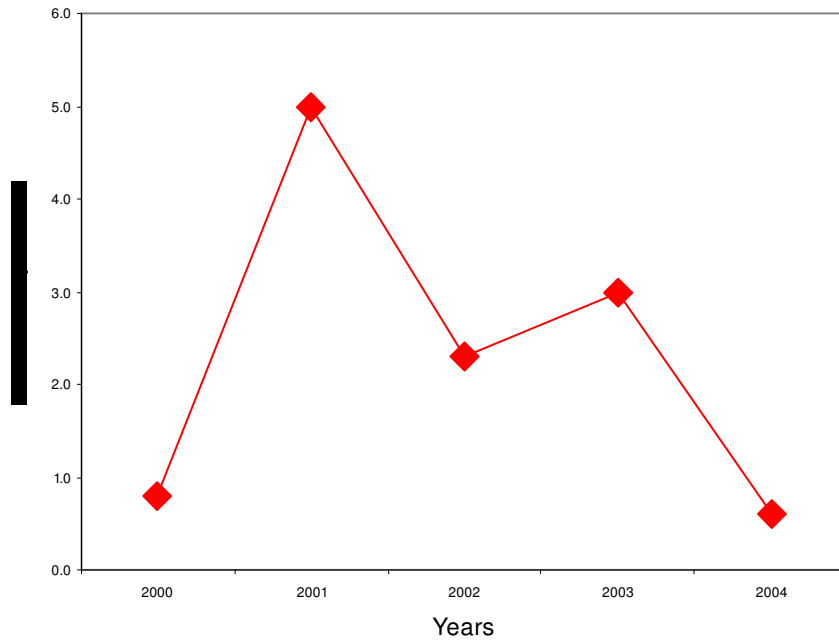
The term “guinea” fowl is the common name of the seven species of gallinaceous birds of the family *Numididae*, which is indigenous to Africa. It is well adapted to the realities of life on African continent. The strains are descended from the helmeted guinea fowl, *Numida meleagris*. In many parts of the world, guinea fowls are raised mainly for their gamey flesh and eggs. Guinea fowl has a taste similar to other game birds and has many nutritional qualities that make it a worthwhile addition to the diet. The meat of a young guinea is tender and of especially fine flavour, resembling that of wild game. The meat is lean and rich in essential fatty acids. Guinea fowls have a high yield of 80% after processing with excellent meat to bone ratio. Other people raise them for their unique ornamental value. Of the three domestic varieties (the pearl, the white and the lavender), the purplish coloured pearl is the most common. The largest member of the family is the 60 cm vulturine guinea fowl, *Acryllium vulturium*, found in tropical East Africa. They are classified in the phylum Chordata, subphylum Vertebrata, class Aves, order *Galliformes* and family *Numididae*. The Greeks and Romans are reported to be the first to domesticate guinea fowls.

Guinea fowl is a promising genetic resource for evolving a low input-grain saving poultry alternative for production in the developing world. The rearing of guinea fowl is a potential alternate poultry system. Commercial guinea fowl production is at its infant stage in Botswana. As a result, the quantities of eggs and meat produced by guinea fowls are not known. Numerous visits by individuals to Animal Health and Production offices across the country seeking information on guinea fowl farming indicates that this type of bird has generated interest in the minds of many people. It is clear from Figure 1 that guinea fowl meat imports have been declining over the past five years. The decline in guinea meat production probably indicates that there is production occurring countrywide.

## ORIGIN AND DISTRIBUTION

The guinea fowl is descended from the wild species of Africa. The fowls derive their name from Guinea, part of the west coast of Africa. As already mentioned guinea fowls (*Numida meleagris*) are indigenous to Africa, but they were brought to Europe during middle ages. In Africa, guineas are hunted as game birds; and in England they are sometimes used to stock game preserves. Guineas have been domesticated for many centuries; ancient Greeks and Romans raised them for table birds. To date, guineas are ubiquitous. It is believed that they might be more popular were it not for their harsh and seemingly never-ending cry, and their narrow disposition. There are three varieties of

guinea fowls: the pearl, the white and lavender (the most popular). As shown in Table 1 there are nine different subspecies of helmeted guinea fowl.



**Figure 1** Guinea fowl meat imports (Poultry Annual Reports)

**Table 1** Nine different subspecies of helmeted guinea fowl

Species	Common name	Distribution
<i>N.m. meleagris</i>	Bristle nosed guinea fowl	Lake Chad and Sudan
<i>N.m. sabyi</i>	Filoplume-necked guinea fowl	Morocco
<i>N.m. galeata</i>	Grey breasted guinea fowl	Cameroon, Senegal and Nigeria
<i>N.m. marungensis</i>	Marunga helmeted guinea fowl	DRC and Zambia
<i>N.m. damarensis</i>	Namibian guinea fowl	Namibia and Western Botswana
<i>N.m. coronata</i>	Helmeted guinea fowl	RSA and Southern Botswana
<i>N.m. mitrata</i>	Mitred guinea fowl	Mozambique, Zimbabwe and Zambia
<i>N.m. reichnowi</i>	Reichnowi's guinea fowl	Uganda, Kenya and Tanzania

DRC= Democratic Republic of Congo; RSA= Republic of South Africa  
 Source: van Niekerk (1993)

### Domesticated varieties

Guineas have been domesticated for many years; they were raised as table birds by the ancient Greeks and Romans. They were brought to the United States by the early settlers. Figure 2 shows some varieties of guinea fowls.



**Figure 2** Varieties of guinea fowls

### Breeds of guinea fowls

There are several breeds of guinea fowl, but the most common are:

- a. *Numida meleagris*, the common or red-wattled guinea fowl, which is a domestic strain of guinea that has acclimatised throughout the world.
- b. *Numida ptilorhyncha*, which carries a collarette of feathers on the upper part of the neck. It is common in Madagascar and Reunion, both in the domestic and the wild state.

The common guinea is a bird that weighs about 2 kg when mature. The male is comparatively not as heavy as the female. The difference in size is, however, minute and does not make it possible to differentiate between the two sexes.

### CHARACTERISTICS OF A GUINEA FOWL

The characteristics of a guinea fowl include:

- The head and neck are bare, but there may be some wattles. The wattles on a male guinea are much larger than on the female.
- It is timid, with a more gregarious behaviour than that of the chicken; fits of panic with crowding together of birds, capable of causing heavy losses, are feared.

- Darkness and presence of perches reduce the bird's timidity where it likes to hide and to remain motionless when afraid. As a result, darkened buildings with reduced light intensity allow large numbers of guinea fowls to be raised.
- The guinea fowl is extremely noisy and cannot be reared nearer to residential houses.
  - In the wild state, plants play an important role in guinea nutrition. Guinea fowls can cause damage to crops, especially to young plants. While feeding it does not scratch with its claws, but uses its beak for tearing with abrupt head movements, a form of behaviour that leads to tremendous feed wastage from the feeders, especially when mash is used.
  - The guinea fowl is more resistant to heat than the chicken, and raising it requires a higher temperature. It withstands transportation better than the chicken.

Some special features of guinea fowls include:

- Hardy birds
- Suitable to many agro-climatic condition
- Resistant to many common diseases
- No requirement of elaborate and expensive housing
- Excellent foraging capabilities
- Consumes all non-conventional feeds not used in chicken feeding
- More tolerant to mycotoxin and aflatoxin
- Hard shell provides minimum breakage and low keeping quality
- Guinea fowl meat is rich in vitamin and low in cholesterol

## **REARING SYSTEMS**

Three methods of rearing guinea fowls are free range, semi-free range and intensive system. When kept intensively, low light intensity should be used to reduce possible flightiness. These rearing methods are discussed briefly in the sections below.

### **Free range**

This is the predominant rearing method common in Africa. Free range guinea fowl constitutes an important resource for resource-poor farmers in some countries, especially in developing countries. Improvements in this type of farming are of economic importance, because they involve the entire rural population. These improvements include placing drinking water at the disposal of the birds, and protecting their health.

### **Semi-free rearing**

For 1000 keets, a starter house of 24 m<sup>2</sup> is required during the first three weeks of life. This communicates with the rearing house to which chicks are then transferred and which comprises a 40 m<sup>2</sup> shelter, equipped with perches into an aviary of 200 m<sup>2</sup>. Guinea fowls may be reared in a house with perches communicating with more or less spacious enclosure, which is surrounded by a wire fence 1.5 to 2 m high. Pinioning of keets intended for breeding is essential in these rearing conditions. Pinioning prevents the birds from flying by putting them out of balance.

### **Intensive rearing**

In this type of rearing birds do not have access to an outdoor enclosure and has replaced semi-rearing because it can give better performance. Light and dark houses may be used. Guinea fowls are raised for breeding on soil or in batteries. For rearing on soil, densities are from 3 to 5 birds per square metre, and the houses are usually equipped with perches. In modern breeding units guinea fowls are usually reared in batteries and artificially inseminated.

### **DISTINGUISHING GUINEA COCKS FROM HENS**

Next to quietening guineas, the hardest problem can be to sex them. Male and female guinea fowls differ so little in appearance that many find it difficult to distinguish them from each other. Usually, sex may be distinguished by the cry of the birds after they are about 2 months old and by larger helmet and wattles and coarser head of the male.

In young male guineas aged 12 to 15 weeks, the wattles are larger, curve out more and have thicker edges than the females. By 15-16 weeks the females wattles are also thickening. The adult male has a slightly larger helmet and wattles and coarser head than females. The cry of the female sounds like a “buckwheat, buck-wheat” or put-rock, put-rock,” and is quite different from the one-syllable shriek of the male. When excited, both the male and female emit one-syllable cries, but at no time does male’s cry sound like “buckwheat, buckwheat”.

### **MANAGEMENT OF BREEDING STOCK**

Guinea hens start to lay in the spring (with increasing daylight) and continue laying for about 6-9 months. The egg laying period can be extended and early fertility improved by using artificial lighting. Domesticated guinea breeding birds are usually allowed free range. However, on some farms the breeders are kept confined during laying period in houses equipped with wire-floored run porches. They are difficult to confine in open yards unless their wings are pinioned or one wing is clipped. In their wild state, guinea fowls mate in pairs. This tendency prevails also among domesticated guineas if males and females in the flock are equal in number.

Artificial insemination of breeders is practised in some countries such as Australia. The birds are kept in cages with males being individually caged. Because of the small volume of semen from guinea males, domestic roosters (*Gallus* sp.) are often crossed with guinea hens. The crossbred will grow as large as the fowl parent, while retaining the gamey flavour. Hatchability tends to vary with the strain of rooster used. The offsprings of the cross called “Guin-hens” are sterile and look like a turkey cross.

### **Mating ratio**

Under domestic conditions, it is not necessary to mate the birds in pairs to obtain fertile eggs. High ratios of females to males result in poor fertility. Higher fertility rates are obtained in flocks where male to female ratio is 4-5 or of six females. According to United States Department of Agriculture (USDA), when guineas are kept closely

confined, one male may be mated with six to eight females and several hens will use the same nest. However, a ratio of 1 male to 5 females appears to give optimal fertility. Breeders are usually kept for 2 or 3 seasons.

### **Feeding Breeding Stock**

A breeder mash containing 22 to 24% protein should be made available to the birds, beginning about a month before eggs are expected. A good commercial chicken or turkey mash will give satisfactory results, with birds either on range or in confinement, when fed in accordance with the manufacturer's directions. Clean fresh water should always be available.

### **EGG PRODUCTION**

The number of eggs a guinea hen will lay depends on her breeding and management. A hen that is of a good stock and is carefully managed may lay 100 or more eggs a year. Generally, breeders produce well for 2 to 3 years; sometimes they are kept as long as 4 to 5 years in small flocks. In such flocks, hens usually lay about 30 eggs and then go broody. Selection of breeders for egg and meat production traits, as practised with chickens, would likely result in considerable improvement.

The economical traits of guinea fowl reported in literature are presented in Table 1. Guinea fowl can begin to lay as early as 16-17 weeks. In tropical Africa, laying only occurs during the rainy season and few weeks that follow. A clutch size of 12 to 15 eggs is common. Guinea fowl egg is smaller than that of hens, and on average weighs 40 g and has very hard shells which are difficult to test for fertility by candling. The hardness of eggshell may cause problems with artificial incubation. Incubation period is 26 to 28 days. The average weight of a keet at one-day-old is 24.62 g while live weight of 1.48 kg is achieved at 16 weeks of age. In the temperate climate laying period for guinea fowls is 40 weeks. Caged guinea hens could lay 170 – 180 eggs per annum, of which 150 are fit to incubate to produce 110 keets. A hen reared on the soil lays 70 to 100 eggs per annum, which can produce 40 to 60 keets.

**Table 1** Some production traits of guinea fowl

Egg laid per year (number)	100
Egg weight (grams)	40-45
Egg fertility	75-80
Hatchability	75-80
Egg weight/body weight (%)	2.8
Mature weight (kilograms)	1.6-1.7
Sexual maturity age (days)	186
Incubation period (days)	26-28
One-day-old keet weight (grams)	24.62

**Source:** Fani *et al.* (2004)

## **Hatching Egg Collection**

Under normal temperature conditions hatching eggs should be collected four times a day. However, under extremes of heat (over about 28 °C) or cold (below about 5 °C) more frequent collection is recommended. High ambient temperature is one known cause of eggshell quality problems. During heat stress, feed intake is depressed and egg weight declines. Eggs should be stored in a temperature range of 15.5-18.5 °C and a relative humidity of 70-80%. If held for over 7 days before setting, hatchability declines progressively with increasing storage time. Other factors affecting hatchability are egg size, egg shape, shell quality and variations in incubator temperature as well as excessive shell porosity.

Shell quality from young breeder flocks is usually good and hatches are high, but as the birds continue through their laying year shell thickness and shell quality deteriorate and hatchability declines. Time egg is laid also has an effect on hatchability. For instance, hatching eggs laid early in the morning have poorer hatchability than those laid later in the day.

## **INCUBATION**

Eggs can be hatched either naturally or artificially. Egg handling prior to incubation is of paramount importance. Eggs should be collected at least twice daily and very dirty eggs discarded. As already mentioned the normal incubation period for guinea eggs is 26 to 28 days and 24 to 25 days for the crossbreeds. The incubation method is the same as for turkey eggs.

Natural methods of incubation are generally used in small flocks. For larger flocks, incubators are more satisfactory. It is common to use chicken hens for hatching a small number of guinea eggs as they are more adaptable than guinea hens. Guinea hens usually are too wild to be set anywhere except in nests where they have become broody.

As soon as some of the guinea keets hatch and begin to move about, the guinea hen is likely to leave the nest, abandoning the eggs that are not hatched. These eggs may hatch if, while still warm, they are placed under another broody hen or in an incubator. Twelve to 15 eggs may be set under a guinea hen; 20 to 28 may be set under a large chicken hen. It is, however, necessary that hens are treated for lice before they are set. Forced-draft incubators should be operated at about 37.5 and 37.2°C and 57 to 58% humidity. During incubation, eggs must be turned regularly (minimum of three times) each day for the first 24 days for pure guineas and 21 days for crossbreeds.

## **Rearing and brooding**

Guinea chicks are known as keets. Although guinea keets may be raised in the same manner as chicks and baby poults (*e.g.*, in brooder houses and brooders), they are subject to chilling during the first few weeks. Keets need to be brooded for about 4-weeks to avoid mortality due to chilling. They should be stocked at about 20 to the metre square at one-day-old, but there should be enough space to move away from the brooder if they are

too hot. If not reared intensively, keets should be given access to outside pens to range by 10 weeks of age.

All types of poultry brooders may be suitable for keets and should operate between 37 °C and 37.5 °C from day old being reduced by 4 °C each week. Keets can be weaned off heat at 4 weeks if the weather is suitable. The stocking density for guinea fowls in intensive rearing is 10 birds / m<sup>2</sup>. It is also suggested that if guineas are raised in broiler-style housing up to 14 weeks of age they require about 900 cm<sup>2</sup> of floor space per bird.

Good shavings are important in brooding if brooding is on the floor. Keets can also be brooded on wire, the same as chickens. Initially a cover (clean Hessian) may need to be placed over the wire mesh to stop keets from falling through. A smooth cover such as paper is not satisfactory and can lead to leg problems.

## **NUTRITION**

In the wild, guinea fowl eat a variety of foods but most important are weed seeds, and waste grain which fall to the ground after harvesting of crops. Some common guinea fowl diet includes: fruits, berries, seeds, grass, spiders, insects, worms, molluscs and frogs. Since one of the main sources of wild guineas is insects, guineas have gained popularity for use in reducing insect populations in gardens and around the home, especially because unlike chickens, they do not scratch the dirt much and do very little damage to the garden.

Suitably formulated diets (starter, grower and finisher) for guinea fowl are available from commercial feed milers (Table 2). The starter diet presented in Table 2 should be fed to 4 weeks of age, followed by grower diet 1 to 10 weeks of age, then the second grower diet up to the time that the birds are marketed or until they are selected for breeding. Breeding birds are switched to the breeding diet shown in Table 2 approximately 2 weeks before eggs are expected. These diets will be supplemented by range feed. The starter diet should contain 24% protein and should be fed for the first 4 weeks. Grower ration of 20% protein should then be fed until 8 weeks of age and a finisher diet containing 16% protein fed until market age (14-16 weeks). At this age they should have reached average live weight of 2 kg. A commercial turkey diet or a high energy chick starter crumble are a suitable diet for domesticated guinea fowl. A good feeding program utilises a turkey crumble (0-4 or 0-6 weeks), a turkey grower (6-14 weeks) and a turkey breeder diet from 15 weeks onwards. A good commercial turkey feed breeder mash, which contain 22 or 24% protein, should be fed to laying guinea hens. Turkey diets have the advantage of containing an anti-blackhead drug.



**Table 2** Nutrient composition of guinea fowl diets

Nutrient	Starter	Grower		Breeder
		1	2	
Crude protein (%)	24-25	20	15	18
Metabolizable energy (MJ/kg)	12.13	12.13	11.30	12.13
Calcium (%)	1.2	1.00	0.80	3.0
Available phosphorus (%)	0.50	0.50	0.40	0.40
Sodium (%)	0.18	0.48	0.18	0.18
Arginine (%)	1.5	1.20	0.80	0.91
Lysine (%)	1.30	1.20	0.82	0.83
Methionine (%)	0.52	0.45	0.34	0.55
Methionine + cystine (%)	0.91	0.80	0.61	0.74
Tryptophan (%)	0.22	0.22	0.15	0.17
Histidine (%)	0.54	0.45	0.35	0.41
Leucine (%)	1.50	1.40	1.10	0.80
Isoleucine (%)	1.00	1.70	1.30	0.73
Phenylalanine (%)	1.00	0.93	0.74	0.74
Phenylalanine (%) + tyrosine (%)	1.50	1.4	1.1	1.00
Threonine (%)	0.93	0.81	0.62	0.71
Valine (%)	1.10	1.00	0.75	0.72
<b>Vitamins (per kg of diet)</b>				
Vitamin A (IU)	5000	4000	4000	5000
Vitamin D <sub>3</sub> (IU)	2500	2000	2000	2500
Choline equivalents (mg)	1000	750	750	1000
Riboflavin (mg)	4.0	3.0	3.0	4.0
Pantothenic acid (mg)	12	9.0	9.0	12
Vitamin B <sub>12</sub> (mg)	0.012	0.01	0.01	0.012
Folic acid (mg)	1.0	0.0.8	0.0.8	1.0
Biotin (mg)	0.25	0.20	0.20	0.25
Niacin (mg)	60	40	40	60
Vitamin K (mg)	2.0	1.5	1.5	2.0
Vitamin E (IU)	25	15	15	25
Thiamin (mg)	2.5	2.0	2.0	2.5
Pyridoxine (mg)	5.0	4.0	4.0	5.0
<b>Trace minerals (per kg of diet)</b>				
Manganese (mg)	70	55	55	70
Iron (mg)	80	70	70	80
Copper (mg)	10	8.0	8.0	10
Zinc (mg)	80	60	60	80
Selenium (mg)	0.30	0.2	0.2	0.3
Iodine (mg)	0.40	0.4	0.4	0.4

Source: Ensminger et al. (1990); Leeson &amp; Summers (1997)

In its lifetime, the guinea fowl consumes an average of 43 kg of feed, which is 12 kg during growing period and 31 kg during the laying period (Say, 1987). The nutritional characteristics of guinea fowl feed is close to those for chicken, but percentage of lysine and methionine recommended for growth and laying feeds are slightly higher for guinea fowl. In intensive rearing conditions, feed conversion ratios (FCR) are between 3.1 and 3.5 for slaughter at 12 to 13 weeks and mean live weight of 1.2 to 1.3 kg (Say, 1987). According to Table 3, adult guinea fowl weighs 1.5 kg and that the young stock is ready for table at 12 to 16 weeks. During this period males and females weigh 1.25 and 1.2 kg, respectively. It is recommended that birds for breeding should be allowed to grow more slowly and naturally.

**Table 3** Body weight, feed intake and conversion rates during keets growth

Period (weeks)	Weight gain (g)	Feed intake (g) (x)	Conversion rates (x)
0 - 4	380	670	1.76
5 - 8	590	1090	2.86
9 - 11	400	1735	4.34
12	110	630	5.73
13	100	635	6.35
0 - 11	1370	4095	2.99
0 - 12	1480	4725	3.19
0 - 13	1580	5360	3.39

x. Ration assayed at Metabolisable energy – 3000 kcal, ambient temperature 20 °C  
g Grams

**Source:** Batty (1992)

## DISEASES

Domestic guinea fowl have not yet been fully domesticated so they have the hardiness of their wild relatives. Therefore, they do not suffer from many pests and diseases as compared to fully domesticated species such as chickens and other poultry. For example, guineas are more tolerant to NCD virus than chickens. Generally, most diseases of chickens affect guinea fowls. Table 4 gives a summary of some pests and diseases of guinea fowl and their treatment.

Under smallholder conditions adult birds may be lost due to poisoning, predators (snakes, dogs, wild cats), fighting, theft and floods, whereas in keets mite infestations, malnutrition, cold and scorching heat, predation, floods and physical injuries are the main cause of mortality. Like in family chickens, the use of ethnoveterinary medicine predominates under smallholder guinea production.

**Table 4** Summary of some pests and diseases of guinea fowl

<b>Symptoms</b>	<b>Pest/disease</b>	<b>Treatment</b>
Birds loose weight and are weak. Low egg production. Most eggs are infertile. Presence of lice or fleas around the head and neck.	Fleas or lice	Actellic powder or Actellic liquid. Also, karbadust.
Birds have no energy. Watery droppings with no blood. Low egg production.	Roundworms	Ruzine or ascarex
Birds loose weight and are weak. Watery and bloody droppings. Feathers are rough. They huddle together in groups.	Coccidiosis	Amidostat
Keets loose weight Keets wattles darken They drool from the mouth and smell bad.	Trichomoniasis	Amidostat

Source: Downes (1999)

## **MARKETING**

Guinea fowls may be sold alive by the farmers to the poultry processors and/or prospective farmers. The birds are dressed if sold to the hotels and restaurants. The birds are usually dressed and scalded in the same way as chickens, except in very special cases where they are marketed like game birds with the feathers left on as is the case in the United States.

Guinea fowls are almost always ready at 15 weeks and usually 16 to 18 weeks of age when they are sold. At this age their live weight is 1.25 to 1.47 kg with dressed weight of 1.02 and 1.25 kg. It, however, appears that the most appropriate market age is 12 weeks of age. In Botswana, a guinea fetches P75 to P120 depending on the weight of the bird. Guinea fowl meat is drier and leaner than chicken meat and has a gamey flavour. It is largely a speciality meat which needs to be marketed accordingly. Producers need to be certain of the demand before embarking on large-scale production. There is also some demand for live birds for hobby farmers and enthusiasts.

## **REFERENCES**

Available from the author on request.