



COLLECTION
PRO-AGRO

Quail farming in tropical regions

Ricarda Mondry

Contributors

COORDINATOR

E. Lionelle Ngo-Samnick

AUTHOR

Ricarda Mondry

PRINCIPAL REVIEWER

Michel Havard

REVIEWERS

Jean François Bruno Ottou, Cristina Rebière,
Pascal Nondjock, *WRENmedia* and Bianca Beks

ILLUSTRATIONS

Éric C. Mengaptche

TRANSLATION

BLS

LAYOUT

Stéphanie Leroy

The Pro-Agro Collection is a joint publication by Engineers Without Borders, Cameroon (ISF Cameroon) and The Technical Centre for Agricultural and Rural Cooperation (CTA).

CTA – P.O. Box 380 – 6700 AJ Wageningen – The Netherlands – www.cta.int
EWB Cameroon – P.O. Box 12888 – Yaoundé – Cameroon – www.isf-cameroun.org
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Cover photo: © Zoonar GmbH/Alamy
ISBN (CTA): 978-92-9081-602-7

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General

information

Although quail farming is known for its relative simplicity, low space requirements and financial resources as well as being subject to ever growing demand, it remains a marginal activity by comparison with the potential it offers.

As an excellent way to increase income, it can be practised on a small or large scale. This guide is an outreach tool to encourage small-scale farmers to get involved in rearing quail and to give pertinent advice to farmers already active in the business.

Depending on their investment capacity and the demand identified for quail meat and eggs, breeders can plan the scale of their future business. However, it is recommended that they start with a small-scale cycle (6 months) with a small group of around ten quail to become familiar with this species, and then gradually move on to 30, 100 or even 1,000 quail if the business is successful and if the corresponding market exists.

Quail are resistant to disease, with a high level of productivity and few constraints in terms of breeding. Bearing in mind the large number of countries that have no detailed regulations concerning quail farming, this guide shows housing traditionally used and provides guidance on appropriate occupancy density for commercial farming of this species. It must always be taken into account that, irrespective of the variety of quail, if resources permit investing in good housing and a lower density of occupation avoids overstressing the animals. In addition, the breeder is compensated in the long run by a lower mortality rate, relatively bigger quail and a better rate of laying.

The technical operations described in this manual can be adapted by the users. The main thing for the operator is to be fully familiar with the basic principles presented. Breeders will then, depending on their environment and observations, be able to adapt our guidance to their needs and resources.

1

DESCRIPTION OF THE QUAIL

A member of the Phasianidae family (like pheasants and partridges), the quail is a small, stocky bird with short legs and varied plumage. Quail breeding is also known as coturniculture.

The quail is farmed for its eggs (intended for consumption, decoration and remedies) and for its meat, which is increasingly sought after among high-income Africans.

There are several different species:

- **The Common Quail (*Coturnix coturnix*)** is the wild variety, measuring 16-18 cm and weighing 70-135 g. A protected species, it migrates between Europe and Africa. In Cameroon, it can be legally commercialised within the framework of 'non-conventional' farming.



↑ *Common quail*

- **The Japanese Quail (*Coturnix japonica*)** was domesticated more than 700 years ago in Japan. It is now the most frequently farmed species for its egg production and/or its meat. Its plumage is mottled grey with brown speckles. The female is slightly larger than the male and has a lighter throat with black speckles. The male has a darker, caramel-brown throat. The Japanese quail produces up to 300 eggs per year and can weigh up to 300 g, although most weigh around 180 g when 50 days old. Other variations of this species have different colours, including albino, white, isabelline, silvery, brown, mixed, and

black tuxedo. A new species, *Coturnix japonica Jumbo*, shows much improved animal performance.



↑ *Coturnix japonica*

- **The King Quail (*Coturnix chinensis* or *Chinese Painted Quail* or *Button Quail*)** are very easy to rear as they socialise among themselves and leave other species alone. Measuring only 12-14 cm and weighing about 40 g, they are raised purely as decorative birds. The male has a clearly delineated black and white pattern on its throat, while the female has striped plumage in brown and wheat colours. The colour of the King Quail varies and can also be tawny, white, silvery, brown, black, etc.



↑ *Coturnix chinensis*

There are also about ten other species and 20 or so sub-species, several of which are bred as ornamental birds (the Harlequin, Blue, Rain, Stubble, New Zealand).

Varieties from European pasture land are generally more resistant but smaller and weigh less than the Japanese, Egyptian and Chinese varieties which result from long-term selection and are consequently more celebrated in terms of breeding.

2

BREEDING TECHNIQUES

2.1 Housing

Quail are robust birds that do not mind low temperatures, but prefer a dry climate. Cohabitation with other poultry species is difficult and there is a significant risk of the quail being killed by chickens. Chicken wire used to create a quail pen must have smaller mesh than that generally used for chickens and must cover the top of the pen. Finally, for biosecurity reasons (disease prevention), a combination of species is not recommended.

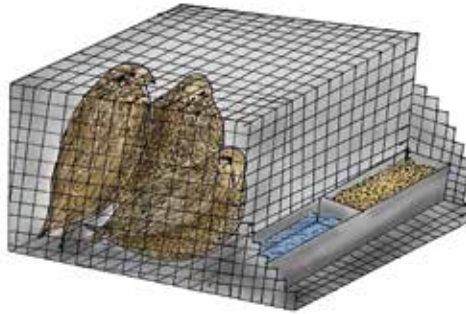
Wild quail run, jump up to 20-30 cm and scratch the earth to find insects, but they only fly during migration periods or to escape predators. In this case, the quail can fly a few metres and make big leaps. This ability to fly requires particular care in a farming situation, as they can hit their heads against the cage and injure or even kill themselves. This can be avoided by restricting the height of the cages to approximately 25 cm or using bird houses with a height of at least 2 m.

However, the first solution, which does not allow breeding in line with the species, should be avoided, and the use of cages 40 to 50 cm high is preferable. This means that the quail cannot build up enough momentum to seriously hurt themselves against the top, but it does allow them to perform small jumps which are natural to them. If necessary, you can attach a polystyrene sheet inside the top of the cage. Cages and bird houses 60 to 150 cm high are the most dangerous and should therefore be avoided.

Bearing in mind the aggression between males, it is preferable to have just one male with three to five females in each bird house. This also avoids the male tiring the females. If there are too many quail there is a risk of fighting, even between females.

Quail have periods of aggression that manifest themselves in the form of violent attacks with the beak pecking the head of the other birds in the cage, especially at night. They may have a bloody head in the morning. To avoid this, action must be taken as soon as signs of violence are observed by isolating the aggressive individuals (this applies to both sexes). Isolate the bird for 1 or 2 days at most, then return it to the cage. This simple precaution is often enough to calm the bird's aggressiveness.

To avoid water and food soiling the bedding, drinking troughs and feeders should not be placed on the ground, but at a height of 10 cm, for example on bricks. Alternatively, they may be attached to the outside of the cage.



External drinking troughs and feeders

Quail rearing can be conducted in cages (with bedding or on a mesh base) or on the floor (with or without bedding).

Floor rearing

Quail can be reared directly on the floor in an upgraded housing (at least 2 m high, with good ventilation and a large solid door to facilitate cleaning and prevent theft), made of banco (a type of adobe) or cement, and covered with straw or corrugated iron depending on the farmer's resources and the availability of materials. They can be reared with or without bedding (5-10 cm of wood shavings, moss or sawdust).

A housing measuring 2 m x 1 m x 2 m can hold 160 birds for brooding for up to 4 weeks, or 80 adults (preferably by dividing the building in two). However it is better to reduce these numbers by half.

For reproduction, divide the housing henhouse into two compartments and breed two groups with one male and five females in each compartment.



↑ *Housing for quail*

If you have a large floor area, split the site into areas allowing six birds/m², i.e. one male and five females, ensuring you have enough room to move about with work tools. It is possible to construct a building with several bird houses measuring 2 m x 1 m x 2 m. In this case, a 4 m x 8 m room can contain eight bird houses.

Provided you have good ventilation and enough space to handle the birds, the shape and floor plan of the coops is not particularly important



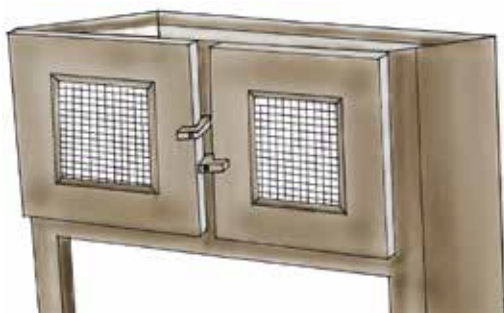
→ *Patterns for a battery of wood/cement cages*

To make it easier to collect the eggs and prevent the quail from laying wherever they choose, or even hiding the eggs, construct nests for 10 quails. Place a few branches on the floor and construct small wooden nesting boxes (20 cm x 20 cm x 15 cm) or set down some bricks. Some birds, however, will always lay their eggs outside of the boxes. It is therefore necessary to collect eggs two or three times a day to limit losses.

To guarantee year round laying, it is generally necessary to provide light for 16-18 hours per day. In the tropics, where hours of day-light are similar all year round, it is enough to ensure that the building is well exposed and naturally lit. For safety reasons, solar energy is preferred to oil lamps.

Cage rearing

Cage rearing is often chosen in urban or periurban areas, as it requires little space. The cages are often made with several floors. However, this method is not recommended as it does not allow the cage to be properly aired and causes the birds to be stressed. It is therefore better to leave some room between the cages to ensure better air circulation, and not to have more than three floors.



The cages must be well ventilated and installed in buildings protecting the quail from sun, rain and wind.

The cages can be made of white wood and chicken wire or chicken wire alone. If wood is used, it is better to attach the planks so that they can be replaced individually if they are damaged or deteriorate.

Since raising poultry within a family is often the responsibility of the women of the family, breeding quail can therefore also be a way of promoting gender equality

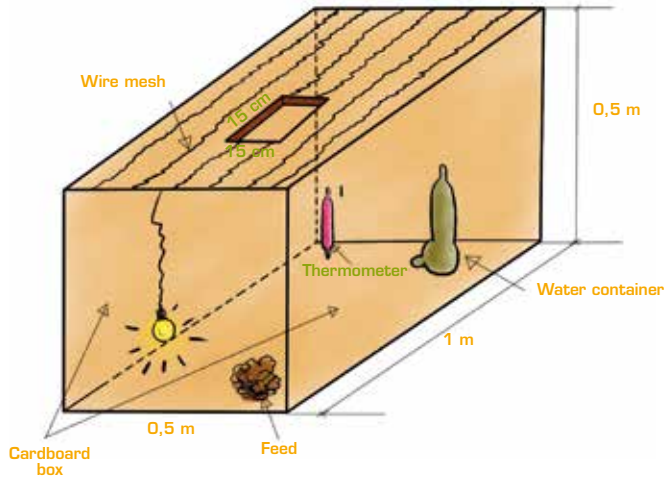


It must be remembered that quail produce large quantities of excrement that will impregnate the wood. It will be difficult to maintain a good level of hygiene needed to avoid disease. A chicken wire cage is easier to clean and disinfect.

The bottom of the cage can be made of wood and covered with 5 cm of wood shavings, or 1.5 cm wire mesh. The floor must be horizontal to fatten up of the birds, but with a slight 5° slope for laying hens, to make it easier to collect the eggs. For quail chicks, it is necessary to cover the 7 mm wire mesh with paper for the first week at least, as their feet are too small and they could seriously hurt themselves. Later, the mesh wire should have spaces of no more than 7 mm until the birds are fully grown, when 1.5 cm mesh can be used.

Cages can be built to the following measurements: 1 m long x 0.5 m wide x 0.5 m high, or 2 m x 0.5 m x 0.5 m. The second option allows the quail to run. For cages 2 m long, plan movable parts that can be separated into two compartments so that they can be used for smaller groups of breeders if necessary.

The 1 m x 0.5 m x 0.5 m cages can accommodate a group of breeders consisting of one male and five females. If the male is too active, it can be separated from the females by dividing the cage with removable planks that can be withdrawn from time to time. Alternatively, they can house up to 40 laying quail or 80 for brooding for up to 4 weeks. However, to ensure rearing that is suitable for the species it would be best for this space to house no more than 20 adults.



↑ **Quail cage**

The feeders and drink troughs can be placed inside the cage, or attached to the outside for added cleanliness and to save space. Equipment for raising quail chicks can be used such as in 4.3.

Arrange individual access to the feeders and water to prevent the birds from hurting themselves. Feeding time always causes a lot of pushing and shoving.

→ **External drinking troughs and feeders**



It is a good idea to add a small sand bath (about 30 cm x 35 cm). This will improve cohabitation by making the quail less aggressive. In addition, it is excellent protection against mites and other external parasites, and the ingestion of sand is good for the digestive system. The sand bath and the nesting box can be attached to the outside of the cage.

If the cages are used without wire mesh on the floor, nesting boxes can be placed inside. Although some quail will nest anywhere in the cage, which means comprehensive checking will be necessary, this solution will make it easier to collect the eggs.

2.2 Reproduction

Like hens reared for laying, modern laying quail that are the result of a long selection process lay all year round. However, the number of eggs laid is higher between February and September.

The male and the female begin to reproduce around 6 weeks old. However, it is better to wait until the male and female are 8 weeks old to ensure the production of fertile eggs. By 8 months old the male's fertility decreases considerably. It must then be replaced.

As soon as the first eggs are discovered in the bird houses, the birds must be divided into breeding groups (one male and four to five females).

In nature, the female builds her nest on the ground, well hidden in the tall grass. When raised in a quail house or a cage, she will rarely sit on her eggs if she cannot find a discreet spot. That is why the Japanese quail has, in many cases, lost the brooding instinct. But although it does not brood, the quail continues to lay on a daily basis.

Quail eggs are incubated artificially. On average, this takes 16-19 days. Buying an electric incubator is preferable for a production of more than 30 quail per month. For smaller enterprises, create incubators yourself using simple materials: a white wooden box with 40-60 watt bulbs, a small fan to distribute the warmth and an electric thermostat to regulate the temperature at a stable level. This procedure is explained in more detail in 3.1.



As the risks of consanguinity are high, it is necessary to make sure that males are not crossed with their daughters or granddaughters, as the resulting chicks will develop flaws from the third generation (deformed claws, weak leg joints, decreased production). It is therefore advisable to exchange males with other breeders every year. You should also import chicks from other countries from time to time, as quail from different breeders from the same country may often be related.

The male has a cloacal gland that begins to secrete at about 6 weeks of age, which is proof that it has reached maturity. It also begins to sing at the same age.

It is also possible to have quail eggs incubated by hens, but preferably small breeds.

2.3 Feed

Feed represents almost 70% of the cost of rearing quail. It is mainly composed of grains such as maize, sorghum or millet. Adult quail eat around 14-18 g per day (up to 20-25 g/day depending on the laying rate and nutritional quality of the feed). The food must always be fresh. To achieve this, store it in a well-sealed container in a cool and dry place, protected from rodents, dust mites and other pests. Wild birds can transmit disease to the farm. Feed stored for more than 2 or 3 months is subject to vitamin loss and can become rancid, especially in hot climates.

Quail need high-protein feed:

- Protein content should be 25-28% for starter feed (as well as 1% calcium and 0.5% phosphorus), 22% for fattening and 24% for laying hens. The feed must be finely ground. If possible, use starter feeds for turkey chicks, as they usually contain 25-28% protein. If you use chicken starter feed containing only 20-22% protein, the quail chicks will grow more slowly. Alternatively, it is possible to use pullet feed.
- From 5 weeks of age, add ground shells or limestone. Laying hens need 3% calcium. If it is very hot the quail will eat less, so increase this to 3.5% calcium for laying hens.

- In addition, provide a little fruit and vegetables (lettuce, apple, cabbage, banana, papaya, courgette, carrot), especially on family farms. If they are used to it, the quail will also appreciate leftovers of rice or cooked pasta, though the quantity should be limited. These leftovers should not be left in the cages too long as they will rot quickly, meaning that the feeders will have to be thoroughly cleaned.
- With a good overall protein content, and lysine in particular, soya meal has much lower calcium and phosphorus values, although it is six times as rich in potassium. It also gives the meat a very good flavour.

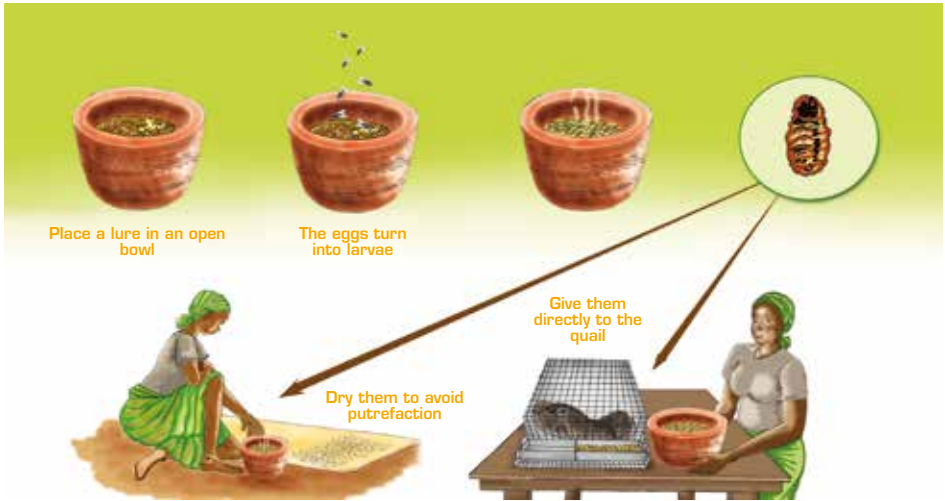


Feed options for quail

To increase the protein and energy levels of the feed, add insects such as termites, fly larvae or pupae, or mealworms.

To produce fly larvae or pupae:

- Place a lure of animal excrement or entrails in an open bowl to attract flies to lay their eggs.
- After 24-36 hours the eggs become larvae and 4 or 5 days later, pupae.
- Give them to the quail as they are. Dry them in the sun or roast them to avoid putrefaction.
- The larvae contain more than 50% protein and almost 5,500 kcal per kilo of dry matter compared to more than 70% protein and almost 4,500 kcal for the pupae.



👆 **How to produce larvae**

You can enrich starter feed for baby chicks with 10% pupae or 15% larvae to achieve a protein rate more suitable for quail chicks.

Adult quail need at least 1.5-2.5 cm of space at the feeder. They must be given plenty to eat, but not so much that it is wasted.

An insufficient amount of feed is one of the causes of violence among the birds. If it is impossible to isolate a violent bird, the feed dose can be temporarily increased as soon as signs of aggression appear. Do not use this method more than two or three times as the quail will become accustomed to it, which will create a vicious circle of aggressive behaviour.

If the purpose of rearing the quail is to sell the eggs for use in remedies, use feed made from organically grown grain (without chemical fertilisers or pesticides) and do not give the birds antibiotics.

To improve efficiency, only half fill the feeders as quail become very agitated when feeding. If the containers are completely filled, half of the food will be ejected.

Water

Particularly during the first week, make sure that the small chicks do not drown in water troughs. To prevent this, half fill the troughs with small pebbles or marbles that will be removed in the second week. Keep at least 0.6 cm of space per quail at the water trough. Use nipple drinkers for adult quail (one nipple for five quail).

It is important to maintain a supply of clean water at all times. The drinkers should therefore be cleaned at least once a day.

Change the water if it has feed in it. It must not be too warm, as this causes pathogenic agents to multiply.

If possible, add a drop of methylene blue to the water once a week. This will noticeably reduce respiratory diseases among the quail while purifying the water, as it is an antiseptic with mild fungicidal and bactericidal properties.

It is sensible to clean and disinfect the drinkers and feeders every week to prevent diseases. In a bucket of hot water, add a little detergent and scrub them with a stiff brush. Then add a little sodium hydrochlorite (bleach) to a bucket of hot water and scrub again. Finally, rinse them and check they are operating correctly before replacing them.

White vinegar is also a very good disinfectant that kills germs; use it, even diluted with water, on equipment like the drinkers and feeders at least once a month, or when the quail show signs of illness.

2.4 Health

If kept away from other poultry rearing set-ups, the quail do not usually suffer from a lot of illnesses, although they can contract most chicken diseases (avian cholera, variola, Newcastle disease, and avian flu). It is recommended to administer anti-parasite medication every 2-3 months.

Aspergillosis can be a real problem, particularly during a quail's first 3 weeks. It is caused by fungi contained in the grains. The symptoms are shortness of breath and general breathing difficulties due to thick yellow deposits or a greenish felt-like coating in the trachea or air sacs. Treatment is difficult and usually requires advice from a vet.

Medicinal methylene blue (which can be bought from a pharmacy) should be used. Do not misuse this product, as it is poisonous

Later on, coccidiosis and enteritis can affect quail. The symptoms of coccidiosis are white and bloody diarrhoea often leading to a high mortality rate. It can be treated with terramycin or chloramphenicol. Enteritis results in bloody diarrhoea. The quail eat little or stop eating completely, and the disease has a very high mortality rate. Cages must be thoroughly disinfected, and other quail must be treated with streptomycin and given calcium.

It is possible to vaccinate against *Salmonella typhimurium*. This disease causes white diarrhoea, respiratory difficulties and death, particularly among young quail, as well as a swollen abdomen and joints among adults. A broad-spectrum antibiotic can be administered, but it is better to start over with healthy breeders, and then vaccinate.



The best protection against diseases is to observe a strict hygiene regime at each stage of rearing.

2.5 Problems, causes and solutions

The main problems, causes and solutions for rearing quail are summarised in the table below:

Problems	Causes	Solutions
Delayed laying	Not enough protein in the feed, delayed growth	Increase protein
No eggs laid	Less than 16 hours of light per day	Ensure lighting 16-18 hours per day
	Internal parasites (worms)	Treat with wormer, e.g. Capizol® or VPV® (multi-purpose poultry wormer)
Eggshells too fragile	Not enough calcium in the feed	Increase calcium
Eggs are small and fragile	Female is too young	Do not allow females to reproduce before the age of 6 weeks
Light coloured eggs	Eggs not fertile or kept more than 10 days	Reduce the number of females per male, and change the males if they are too old. Keep the eggs less than 10 days before putting them in the incubator
Dead embryos	Wrong temperature	Check the temperature
	Eggs not turned frequently enough	Mark the eggs and be sure to turn them daily
	Consanguinity	Swap the males, import new eggs
Chicks well developed, but stayed in the eggs	Temperature too low, or suddenly too high, or too humid	Check temperature and humidity regularly
Deformations of beak or toes, eyes missing	Temperature too high	Check the temperature
Chicks hatching prematurely	Temperature too high	Check the temperature
Chicks hatching late	Temperature too low	Check the temperature (do not open the door)
Cannibalism	Density too high	Reduce the density
	Inadequate watering	Increase watering
	Strong light	Reduce light strength

The table below shows a summary of the common diseases and their treatments:

Symptoms	Diseases	Preventive treatments	Curative treatments
<ul style="list-style-type: none"> • Coughs, sneezing • Runny nose, serous then mucous • Breathing difficulties • Swollen head and eyes • Conjunctivitis 	<ul style="list-style-type: none"> • Infectious Coryza 	<ul style="list-style-type: none"> • Create a quarantine space before the quail arrive • Add a drop of methylene blue to the water once a week 	<ul style="list-style-type: none"> • Isolate the sick bird • Administer sulfonamides or tetracycline
<ul style="list-style-type: none"> • Delayed growth • Weight loss • Anaemia • Low rate of egg laying 	<ul style="list-style-type: none"> • Ascariidiosis 	<ul style="list-style-type: none"> • Renew bedding every 6 months • De-parasite every 2 months 	<ul style="list-style-type: none"> • Administer mebendazole, piperazine salts, and wormazine

2.6 Farm management

To be able to carry out efficient breeding and gradually improve productivity, it is necessary to keep accurate records.

Record the following events and their dates in a notebook:

- Births
- Death or loss (disease, theft, predators, etc.)
- Planned removals (family consumption, sale, gift, ceremonies, etc.)
- Eggs laid
- Eggs consumed, sold, given away
- Quail purchased or received as a gift

In a second notebook, record all treatments administered with the date and the exact dose (vaccines, wormers, external antiparasites, disinfectant used for the cages, etc.).

In a third notebook, record all expenditure and income, including the date of sale or purchase.

If you are incubating your own eggs, it is necessary to keep a fourth notebook in the form of a journal, noting each parameter selected or changed (temperature, humidity, number of times the eggs have been turned, etc.), as well as the date and number of chicks hatched, in order to gradually improve your hatch and fertility rate.

3

REARING PROCESS IN STAGES

3.1 Incubation

Eighteen hours of light per day are required to ensure regular and optimum laying. The selection of eggs for incubation is important. Eggs to be incubated:

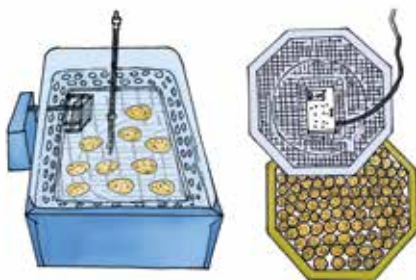
- must have a smooth, matt shell
- must not have a broken or shiny shell
- must not be spherical

Do not store the eggs for more than 10 days before placing them in the incubator. It is best to store them in a cool place at around 15°C.

Incubation lasts 16-18 days. Use static hatching chambers or small incubators with static ventilation. The incubation temperature is 38.5-39°C in the incubator. Humidity should be 55-60% for the first 14 days and on the 15th day be increased to 70% or more.

The eggs must be placed horizontally or pointing down and should not be turned for the first 3 days. From the second to the 14th day, turn the eggs regularly, at least 2 or 3 times every 24 hours to prevent the embryo sticking to the shell. Forgetting to turn the eggs, even for a single day, can cause serious losses. It is therefore helpful to mark each egg on one side. During the first 3 days, do not open the incubator as this will change the temperature, and this is the point at which the eggs are most fragile.

→
**Incubator for
150 eggs**



If the incubator is poorly ventilated, cool the eggs by removing them one by one from the hatching chamber for 5-10 minutes. The temperature is slightly lower in forced-air incubators. It is not necessary to take the eggs out on a daily basis, however they must be turned 3 times a day.

To save room in the incubator, 'candle' the eggs every seventh day to eliminate 'clear' eggs, or when they are put into the hatching basket on the 12th day. Clear eggs have no dark spot.

On the 14th day, transfer the eggs to a hatcher, which is a similar piece of equipment with the same capacity. Do not turn them from the 15th day.

Do not turn the eggs during the last 2 days of incubation, as it can cause the chicks to die. During these final days, the chicks will choose their exit position.

Egg candling consists of illuminating the inside of the egg, making the shell transparent. Visibility is improved if the shell is light

3.2 Hatching

Hatching takes place between the 16th and 18th day for 85-90% of the fertilised eggs, which corresponds to 75-80% of the eggs placed in incubation. Consanguinity can lead to a deformity rate of 10% among the chicks.

It is preferable not to open the hatching incubator from the 15th day until all the chicks have hatched, as every time the door is opened, the humidity drops considerably. The chicks will weigh 5-6 g. They must remain in the hatching incubator for 24 hours after hatching to be perfectly dry. They do not need food during this period.



3.3 Starting period

The quail chicks grow at a very fast rate during the first days of life. The first feathers appear from the third day, and at 3 weeks the young quail are fully covered. The sex can also be identified from the age of three.

This stage is extremely important as all of the other rearing stages depend on its success.

Thoroughly clean and disinfect the quail house before installing the chicks. Use dry, absorbent bedding that is not too rough. Place strong paper or hessian on the floor for the first week to prevent the young quail absorbing wisps of bedding. If you use wire mesh cages, place strong paper on the mesh for up to the first week, so that their legs and feet are not damaged.

Never mix quail chicks of different ages. Avoid overcrowding. On the floor space, do not have more than 40 chicks/m².

Prepare and turn on the warm brooder 24 hours before hatching to ensure that the temperature on the floor under the brooder or at the level of the mesh floor is between 38-40°C. For example, if using a 250 watt lamp, place it approximately 60 cm from the floor. For a 15 watt lamp, place it 7 cm from the floor and raise it about 2 cm every 4 days for 3 weeks. In this way the temperature at the level of the chicks will gradually fall.

From the second day, the quail chicks are placed under the brooder, which provides a temperature of 40°C for the next 3 days. The temperature is then reduced by 1°C until a constant (if possible) temperature of 23-25°C is reached. If the chicks huddle together under the brooder, this indicates that they are too cold. If they stay a long way from the lamp, they are too hot. If they are very agitated, they are too hot or they have no drink or food.

The length required for the feeders is 120 cm, and 40 cm for the water troughs for 100 young quail. During the first week, fill the feeders to the top, then when they have learned how to feed themselves properly, reduce the level to avoid waste. When the young birds have learned how to drink correctly, raise the drinkers slightly so that the water does not spoil the bedding. Change the water at least once a day and whenever it becomes tainted.

3.4 Fattening

From the third week, after the starting period, place the quail into cages or quail houses/chicken coops, where they will remain until the seventh week until slaughter. Each cage or house must contain birds of the same age.

For wire mesh cages, remove the droppings every 3 days.

To make the work easier on a small quail farm, place old newspapers under the cage, and change this as often as necessary. Another solution is a removable metal tray placed under the cage, which helps with efficient washing and disinfecting.

If bedding is used, it is possible to leave it in place until the end, provided enough has been installed, so as to prevent an excess of excrement that could be eaten by the quail and cause enteritis. In any case, it is essential to change the bedding before the next hatching and avoid diseases. It can be used or sold as manure.

It is not necessary to provide more than 8 hours of light per day, as is the case for the breeders. This means that sexual maturity will be reached more slowly and the quail, which will not have enough energy to fight or copulate, will fatten up more quickly.

The normal mortality rate can reach 10% during fattening. The best birds will be kept as breeders.

3.5 Slaughter

The quail are killed by strangulation or decapitation at 45-50 days, when they weigh between 160-180 g.

They can be plucked first or the skin and feathers can be removed at the same time. The second method is easier to perform for a large number of birds, but the skin protects the meat from drying up.

- Perform the plucking with care so as not to damage the skin. Dip the carcass into a bucket of cold water to facilitate the plucking.
- To remove the skin, dip the carcass into a bucket of cold water. This prevents the feathers becoming detached and separating the skin from the body.



The viscera are then removed and the carcass is washed. Wash thoroughly to clean off all the blood (coagulated or not). It is possible to freeze ready-to-cook carcasses for the restaurant market.

Observe a strict hygiene regime and wash your hands frequently during the process.

4

OTHER INFORMATION

4.1 Farmer's operating account

Projected operating accounts for three different quail farms enable us to present three quail rearing groups in Cameroon.

Operation A: one male, four females, 800 eggs laid, of which 480 were sold directly, 320 were incubated, 256 hatched (80%), and 230 survived (mortality rate 10%).

Expenditure				Revenue			
Designation	Unit	Unit price	Total	Designation	Unit	Unit price	Total
Quail feed	Kg	230	52,900	Quail (230)	Quail	1,500	345,000
Breeder feed	Kg	230	10,063	Eggs (480)	Egg	75	36,000
Equipment (2 years)		18,000	9,000				
Cages (5 years)	1	200,000	40,000				
Housing (10 years)		200,000	20,000				
Incubator (5 years)		150,000	30,000				
Unexpected costs	-	N/A	20,000				
Total			181,963	Total			381,000
				Profit			199,037

A breeding programme with one male and four females can provide a profit margin of more than 190,000 CFA F (€289.60) after 12 months of activity.

Operation B: four males, 12 females, 2,400 eggs laid, of which 1,440 were sold directly, 960 were incubated, 768 hatched (80%), and 691 survived (mortality rate 10%).

Expenditure				Revenue			
Designation	Unit	Unit price	Total	Designation	Unit	Unit price	Total
Quail feed	Kg	230	158,930	Quail (691)	Quail	1,500	1,071,000
Breeder feed	Kg	230	32,200	Eggs (1,440)	Eggs	75	108,000
Equipment (2 years)		30,000	15,000				
Cages (5 years)	1	500,000	100,000				
Housing (10 years)		200,000	20,000				
Incubator (5 years)		220,000	44,000				
Unexpected costs	-	N/A	60,000				
Total			430,130	Total			1,179,000
				Profit			748,870

A breeding programme with four males and 12 females can provide a profit margin of more than 700,000 CFA F (€1,067.10) after 12 months of activity.

Operation C : 12 males, 36 females, 7,200 eggs laid, of which 4,320 were sold directly, 2,880 were incubated, 2,304 hatched (80%) and 2,074 survived (mortality rate 10%).

Expenditure				Revenue			
Designation	Unit	Unit price	Total	Designation	Unit	Unit price	Total
Quail feed	Kg	230	492,890	Quail (2,074)	Quail	1,500	3,214,500
Breeder feed	Kg	230	96,600	Eggs (4,320)	Egg	75	324,000
Equipment (2 years)		90,000	45,000				
Cages (5 years)	1	800,000	160,000				
Housing (10 years)		500,000	50,000				
Incubator (5 years)		300,000	60,000				
Unexpected costs	-	N/A	180,000				
Total			430,130	Total			3,538,500
				Profit			2,454,010

A breeding programme with 12 males and 36 females can provide a profit margin of more than 2,400,000 CFA F (€3,658.77) after 12 months of activity.

It is possible to diversify the sources of income by selling quail chicks as starter packages for other businesses, laying hens that have reached maturity, quail feathers to make decorative items and jewellery or to fill cushions, or ready-to-use cages (once the relatively simple technique of making them has been mastered).

4.2 Quail consumption

Quail is farmed for its eggs (intended for consumption, ornament and remedies) and for its meat, which is increasingly sought after among high-income Africans, particularly for ceremonies or parties (for baptisms, weddings, communion, restaurant visits, etc).

Quail meat

The meat of the quail can be prepared in the same way as that of chickens, with a shorter cooking time due to its smaller size. It is not only low in bad cholesterol, but quail can also help reduce it.

Quail skewers (for four people)

Ingredients

- 4 quail
- 60 g of fatty bacon
- Pepper, salt

Preparation

- Salt and pepper the inside of the quail.
- Gather together the legs and wings along the side of the body to give the birds a compact shape.
- Surround them with a strip of fatty bacon and tie them up.
- Thread the birds onto skewers and grill them for 10 to 12 minutes.

Oven roasted quail

Ingredients

- 8 quail
- 5 cloves of garlic
- 2-3 bay leaves
- Fresh thyme
- Salt, pepper
- Olive oil

Preparation

- Wash the quail thoroughly. Cut them in half, place in a Pyrex or terra cotta dish.
- Make a marinade with the garlic, bay leaves, oil, salt and pepper. Sprinkle the quail with the marinade and leave in the fridge for several hours (at least 10 hours, sprinkling them from time to time).
- Remove the quail from the fridge and add some thyme to each piece. Add a little water or white wine to the bottom of the dish.
- Place the covered dish into a preheated oven and leave to cook for 45 minutes. Baste occasionally with the juice from the meat.

Quail eggs

Quail eggs can be preserved in the refrigerator for 1 month. They are five times smaller than chicken eggs, but much richer in nutritional elements: potassium and proteins, phosphorus, iron (five times more than hens' eggs), calcium, zinc and vitamins A, B1, B6 and B2. They contain no, or very little, cholesterol, which is the main risk factor in cardiovascular diseases.

As a remedy, quail eggs are known for being effective in the treatment of vitamin and mineral deficiencies, asthma, diabetes, low sex drive and allergies (especially to pollen and domestic dust mites). They also speed up the regeneration of the liver. In this context, it is often recommended to eat raw eggs. It is therefore important to ensure a very clean operation observing biosecurity guidelines (disease prevention), to avoid diseases that can be transmitted to humans, such as salmonella or avian flu. Consult your doctor about accurate doses of treatments based on quail eggs.

For normal eating, quail eggs can be prepared and eaten in the same way as chicken eggs.

Boiled egg: boil the eggs for 1.5 minutes in lightly salted boiling water.

Fried eggs or omelette: cook them in a hot frying pan, season to taste with salt and pepper or chilli pepper and any combination of herbs and spices.

As the shells of quail eggs are very hard, it is often easier to break them first into a small dish before putting them in the frying pan. It is also possible to remove the shell with a knife or give it a very sharp tap.



4.3 Useful contacts

■ CENTRE SONGHAI

01 BP 597 Porto Novo

Benin

Tel.: (+229) 20246881 / (+229) 20247250

www.songhai.org

■ CONSEIL INTERPROFESSIONNEL DES CAILLES DU CAMEROUN

Tel.: (+237) 696 20 62 12/675 06 00 72/675 34 84 78

E-mail: cicac2009@yahoo.fr

■ IRAD NKOLBISSON

Contact: Dr. Jean François Bruno Ottou

Yaoundé

Cameroon

Tel.: (+237) 6 74 31 41 94

E-mail: ottoujfb@yahoo.fr

■ MISSION CATHOLIQUE DE BAFIA

Contact: Père Bernard Klein

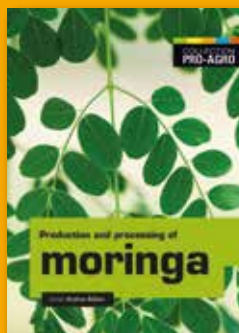
BP 118 Bafia

Cameroon

Tel.: (+237) 699 52 50 96

E-mail: klein_bernard@yahoo.fr

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Quail farming in tropical regions

PRO-AGRO is a collection of practical, illustrated guides that are jointly published by CTA and EWB Cameroon. They are an ideal source of information for farmers, rural communities and extension workers in tropical and subtropical regions.

This manual covers the main aspects of rearing quail in a tropical environment, such as housing, food, health, reproduction and farm management, providing step-by-step details. The economic and financial aspects related to the profitability of this business are presented, as are some basic recipes for quail and quail eggs.

- **The Technical Centre for Agricultural and Rural Cooperation (CTA)** is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities. CTA operates under the framework of the Cotonou Agreement and is funded by the EU.

- **Engineers without Borders (EWB)** is a network of professionals in more than 64 countries to promote human development through improved access to scientific and technical knowledge. In Cameroon, EWB works together with local people to improve their livelihoods and strengthen their technical capacity by sharing and diffusing information adapted to their needs.

