

The following sample is taken from *Breeding Insects as Feeder Food* published as both an ebook and in hardcopy on Amazon.

The images have been removed from this sample but the formatting is retained.

Cockroaches

Introduction

Members of the order Blattodea, there are about 4,500 species of cockroach, which live in a wide range of environments around the world. Although considered pests associated with disease, there are only about 30 species that are commonly found in proximity with humans and, of these, only four are considered serious pests.

Cockroaches are mainly nocturnal and will normally try to avoid light. Although most species prefer warm climates, cockroaches are among the hardiest insects and can survive extremes at both end of the temperature scale. Some species are capable of remaining active for a month without food and are able to survive on very limited sustenance. They are omnivorous, feeding on organic materials, including decaying plant matter, but they will also eat dead insects and animals.

Compared to crickets, cockroaches have some advantages as feeder insects. They are unlikely to attack a small chameleon in the same way that a cricket might. They are longer lived and are hardier. Most are easier to breed than crickets and they make no noise! Unfortunately, despite these advantages, they are not as readily accepted by some animals as crickets are.

Cockroaches suffer from a perception they harbour disease and that they smell. The species shown below will not do so if kept in clean conditions and fed correctly.

For mantis, cockroaches can be a better choice than crickets. They are normally readily eaten and do not seem to carry the same risk of disease to mantis.

Species

There are around a dozen species of cockroach commonly being bred as food for reptiles and other insectivores. The most common of these species are:

Lobster roach - *Nauphoeta cinerea*

Dubia or Guyana Spotted roach - *Blaptica dubia*

Turkistan roach - *Shelfordella lateralis*

Madagascan Hissing roach - *Gromphadorhina portentosa*

Green Banana or Cuban roach - *Panchlora nivea*

The care and breeding of all the common species are virtually identical, so a general description of housing, food, etc., is given below. Any specific differences needed for a species are mentioned under its own sub-heading.

Most of the other species likely to be encountered will share the needs of one of these shown below. None of the pest species are covered and these should be avoided for health reasons.

Life Cycle

In most species there is a marked sexual dimorphism and the sexes can be differentiated prior to adulthood. The females normally produce a hardened egg case called an ootheca (from a Latinised form of two Greek words meaning 'egg' and 'covered' – covered egg). In some species the oothecae are dropped or laid, while in others they are carried inside the female until they hatch, making it appear that the youngsters are born live, without the egg stage.

One female may produce dozens of oothecae during her life and each ootheca may contain between 10 and 50 eggs depending on the species.

The hatchlings from an ootheca are referred to as nymphs. They will undergo several skin changes, typically between five and seven, until they become sub-adults and, finally, adults. Because the nymphs resemble adults in many ways this is called an incomplete metamorphosis.

The lifespan of cockroaches is subject to species and environment but most will live up to one year, although the Madagascan Hissing roach may live for three years or more.

Housing

With the exception of the Dubia and Turkestan roaches, most species can climb plastic (and glass) and can also run along the underneath of the lid, so any ventilation holes need to be covered in fine-wire mesh. A tight-fitting lid is also needed, not just to prevent escapes but to stop wild geckoes and other predators climbing into the box. Before I realised what was happening I lost several cockroaches to these unwanted visitors. As geckoes can crawl through very small gaps, I now use window/door foam draught excluder placed along the top edge of the container to keep them out.

As an extra protection against the risk of escapees a barrier can be made by rubbing a 8cm (3.1") wide band of Vaseline along the inside of the container just below the lid. Cockroaches are unable to get a grip on the petroleum jelly and cannot climb out. This method works well for nymphs but some adults can fly, so the lid will be needed as well. Vaseline has the disadvantage that it attracts dirt and needs removing and replacing every few months.

An alternative to Vaseline that can work well, although more expensive, is a Teflon-based paint sold in the States as Bug Stop specifically for painting around the top edges of cages to prevent insects climbing out. It is water-based, so can be damaged when cleaning out the container and may require a touch-up.

The size of the containers needed to house the main breeding stock of cockroaches will vary depending on their adult size. For most species, any plastic box of between 25 litres and 80 litres will work well. Ventilation holes should be drilled in the lid or, preferably, openings about 10cm (4") square should be cut out and covered with a fine-wire mesh hot-glued in place. Madagascan Hissing roaches are best kept in 80 litre storage containers.

For all but the Green Banana roach no substrate is needed, as it makes cleaning difficult. Glue two egg flats together with white glue. These can stand on end and create a suitable hiding area. Several of these hiding areas can be used together and the number you will need depends on the size of the container and the number of roaches.

Temperature

All cockroaches will breed well at between 27°C and 32°C (80°F - 90°F) but some will breed faster at higher temperatures as detailed below.

Feeding

Cockroaches are remarkably easy to feed – they eat almost anything! However, to get the best results from your breeding efforts and to provide the best food for your insectivores more than dinner scraps are needed.

Aside from quantity, the food for all types of cockroaches will be similar. Due to the inevitable higher humidity in the container it is important that any food used, dry or ‘wet’, is monitored and removed if it shows signs of mould.

Dried dog food is a good source of protein and can be simply left in a corner of the cage; it is more readily eaten when it has been crushed to a powder. Fish flakes will also provide good protein but can be expensive and best used only for the nymphs. Other dried foods, like bran and oats, can be given but should be placed in a shallow feeding dish, such as a jar lid, which can be easily removed, cleaned and replaced, as the food is prone to going mouldy if it gets damp or contaminated with droppings.

If the diet regularly contains a good proportion of ‘wet’ food then it is unnecessary to provide water. I have never added water to the colonies of any species of cockroach I have bred. Water can be quickly fouled and may increase the risk of mould. If you want to put water in the cage, it is better to use water gel crystals. Alternatively, a shallow dish of water can be provided with cotton wool or a sponge in it to prevent drowning; this will need to be replaced regularly to stop bacteria and smell.

Breeding

Dubia or Guyana Spotted roach - *Blaptica dubia*

Dubia roaches are popular for the ease with which they breed and their relative longevity. Males can live for nine months but females will often live for double that. The adults are about 5cm (2") in length and males can be distinguished from the females by having wings.

Females will become mature at about six months old and from that time will produce roughly twenty to thirty 2.5mm (0.1") long white nymphs every month or so. These are produced ovoviviparitally, which means that the female lays an ootheca but then pulls it back inside herself to incubate. This gives the appearance that the female is a live-bearer.

The absence of exposed, laid oothecae has advantages to the hobbyist in that there is neither the need to set up hatching boxes nor any fear of the adults eating them, although there is little evidence of cannibalism among the species if they are kept well fed.

Males are territorial and too many males in a confined space can lead to fighting and reduced breeding. A ratio of one male to between three and five females is ideal; excess males can be fed to your reptiles or larger mantis.

Adults can climb plastic but not as successfully as some other species, making them less of an escape threat. Males can fly but not far nor without provocation.

Lobster roach - *Nauphoeta cinerea*

This species is often incorrectly listed as *Naupheta cinerea*. Also known as Speckled roaches or Woodies, adult Lobster roaches grow to 3cm or 4cm (1.2" to 1.6") long and both sexes live for about one year, maturing at around three to four months. At this age, the females will start to produce oothecae which they will retain inside themselves for roughly a month before producing 30 to 40 small nymphs. Like the Dubia roach, the young are produced ovoviviparitally, which gives the appearance that the female is a live-bearer.

Unlike many cockroaches, Lobster roaches display no obvious sexual dimorphism and both sexes are winged. A comparison will show that the males are flatter in the body and have longer wings. The female's abdomen is more rounded than the males and for those with the patience and keen eyesight, females have two small white dots on the underside at the rear end of her abdomen. Most people start a colony with 50 to 100 roaches and assume that there will be an adequate distribution of sexes.

Lobster roaches can climb plastic and glass with ease, so a secure container is essential. This ability can make feeding them to your reptile a challenge, as they can disappear into the cage and hide at the bottom, unseen and thus uneaten. Despite having wings it is unlikely that they will use them to escape as they tend to flutter weakly rather than fly.

This species is popular because of its reputation for being one of the fastest breeders on the captive cockroach list. They thrive at the higher end of the temperature range and at 32°C (90°F) they will reproduce rapidly. Because of the speed at which the colony can grow it is important to plan ahead and ensure that they are not too crowded, as once they reach a critical mass they will start to die off rapidly.

Turkestan roach - *Shelfordella lateralis*

There is confusion about the correct name of this species and in the States it is commonly advertised as *Blatta lateralis* and can sometimes be found elsewhere as *Shelfordella tartara*. Even the common name can be confusing: Turkistan or Turkestan. I have opted for the spelling of the country.

Less commonly known as Rusty Reds, the Turkestan roach is my favourite feeder food not just for chameleons but also for mantis. They can't climb smooth plastic and the males rarely fly. They are active runners, which means they will attract the attention of chameleons and other reptiles that rely on movement to sight their prey. Young nymphs can be a good food for small insectivores and pose no risk to them, unlike small crickets.

The adults are sexually dimorphic, with winged males and wingless females. The males are also a lighter brown-red colour than the females. They grow to about 2.5cm to 3cm (1" - 1.2") long and can live for up to one year. Both sexes mature at around three to five months and the females will then lay an ootheca every couple of weeks. Each ootheca may contain between 20 to 30 eggs. The oothecae take two to four weeks to hatch, subject to temperature. Some ootheca may take longer, so don't throw older ones away too quickly.

The oothecae are normally scattered about the container but can also be found hidden in depressions in the egg cartons. You can either leave them to hatch where they are or collect them for hatching in a different container. The advantage of using a hatching box is that you can monitor the growth of your colony more easily and you can keep the oothecae at a slightly higher humidity. If the humidity drops too low then oothecae may not hatch. Having the small

nymphs in a separate container makes it easier to feed them to small insectivores as it removes the need to separate out the larger nymphs and adults each time you use them as food.

Turkestan roaches like a high temperature and anything between 30°C and 35°C (86°F - 95°) is ideal. If your colony is slow to get going or the number of oothecae seems fewer than expected, check that the temperature is not too low. Getting a colony thriving is not as easy as with some other species but once established the numbers increase rapidly.

Try to keep a ratio of one male to every four females, although this is not as critical as with Dubia roaches.

Madagascan Hissing roach – *Gromphadorhina portentosa*

At anything from 5cm to 10cm (2" - 4") in length, weighing up to 20 grams (0.7 ounces) when full grown and living for three years or longer, the Madagascan Hissing cockroach is an impressive insect.

It is easy to identify males as they have two large bumps on the top of the prothorax that some have likened to horns; these are called pronotal bumps. The males are also larger than the females. Neither sex has wings.

Madagascan Hissing roaches differ from the other roaches in this section not simply because they are bigger but also as this is the one species that is often bought and sold as a pet. This means that the cages they are kept in can range from utilitarian, plain plastic boxes with no substrate to ornamental showcases containing leaf mould, logs and plants. As we are concerned with breeding this species as a feeder insect we will focus on the former.

This species prefers temperatures in the range of 26°C to 35°C (79°F - 95°F), with a moderate humidity – don't keep them dry but be careful not to allow mould to grow.

Despite comments often made to the contrary, Madagascan Hissing roaches can tolerate lower temperatures. I once inadvertently placed a colony in the corner of our garage in the winter where it was forgotten and subjected to 10°C or 50°F (and lower) over a period of several weeks. The colony survived with minimal losses and started breeding again once the temperature was raised. I would not recommend such low temperatures but this shows how resilient some species can be.

If the roaches are not breeding, check that the temperature is not too low.

To have a good breeding colony you will need to use a plastic storage bin of about 80 litres capacity. Ventilation is important, as is a barrier of Vaseline or Bug Stop – all sizes can climb but the smaller nymphs can do so with ease.

The food and water requirements are the same as for other species. Mine only receive 'wet' food as the water source and thrive but some breeders use water crystals or even shallow dishes with wet cotton wool or sponge. Being larger, there is less risk of the nymphs drowning.

Madagascan Hissing roaches take about five months to mature. They are ovoviviparous, producing oothecae that hatch within the female's body making it appear as though this is a live-bearing species. The females will give birth to between 30 and 50 young every two months or so.

The males are territorial and defend their small territories by pushing rivals with their 'horns' and hissing. Females and nymphs can enter the defended territory without disturbance but rival males are attacked.

To create a successful breeding colony it is necessary to allow the males to have territories to defend. This can be done by placing blocks of egg flats in the cage. White-glue four or five flats together to make a block and stand the block on its end. Males will each find a part of the block they will defend, which will facilitate the breeding cycle.

The hissing sound is unique to Madagascan Hissing roaches as it is produced by forcing air through spiracles on the abdomen – other insects rub body parts together to make their sounds. The hissing sound can be made by nymphs of either sex from the fourth instar onward and can be a warning sound or, in the males, a challenge to fight.

This is an interesting species to keep in its own right. As a feeder insect it has the advantage of being large and popular with Parson's chameleons. Full-size adults might be a challenge even for larger reptiles but the nymphs are ideal for most animals.

Green Banana or Cuban roach - *Panchlora nivea*

The Green Banana roach is an interesting species to breed. Its requirements are slightly different to the other species but its green colouration and habit of flying makes it a good food item for chameleons and other active hunters. There are two types normally available – the standard one and a 'giant' form. Their needs are identical and some breeders keep both types together with no hybridisation.

This species is an expert at escaping: the adults will fly at the slightest provocation and they can climb fast on almost any surface. Smaller nymphs do not seem as good at climbing smooth surfaces and prefer to lurk in the substrate. Whether this ability to escape is a problem depends on where you live. In northern Europe, with its colder winter temperatures, it is very unlikely that any escapees would survive long enough to breed. Even in a heated house the humidity would be too low for an infestation. Other locations and climates may favour the roaches and would require a more carefully designed cage set-up to prevent escapees.

A smaller container is normally used for Green Banana roaches than for the larger species. A 5 litre plastic box would be sufficient for a small colony but double that size would be better. Its height needs to allow for a Vaseline barrier at the top edge but this will only stop the nymphs from escaping and not the adults.

Green Banana roaches need a warm and humid environment with a soil substrate. Most people use coconut fibre or an open peat-based soil to a depth of about 5cm to 7.5cm (2" - 3"). Ventilation is needed, so small holes will need to be made in the lid. You may need to adjust the size or amount of the holes as there is a fine balance between allowing adequate ventilation and keeping the humidity high; if it becomes dry, the roaches will die. It is advisable to hot-glue fine wire gauze across holes in the lid to stop nymphs escaping.

Green Banana roaches like to hide, so part of the substrate should be covered. Inside the container egg flats are likely to get wet and go mouldy very quickly, so cork bark is a better choice. Simply placed on top of the substrate, it will provide a hiding place for adults and nymphs.

Males are about 15mm (0.6") long and females up to 25mm (1") in length; when adult the 'giant' form is roughly 25% bigger. The females are ovoviviparous, producing oothecae that hatch within their bodies making it appear as though this is a live-bearing species. Nymphs

take between three and four months to mature. A female can produce about 30 nymphs at a time, every two months. The young nymphs are very small and quickly disappear into the substrate.

The roaches eat the normal cockroach foods already mentioned and will get enough water from the 'wet foods' described earlier. Put food in shallow dishes but only small amounts at a time as they do not eat much and the heat and humidity will make it go mouldy quickly. Remove all bad food; mould can kill the roaches. If you need to spray the substrate to increase the humidity the food dish should be removed first.

Tank cleaners like isopods or springtails (Collembola) can help to control mould without hurting the roaches. They will thrive in the damp substrate and feed on food scraps and droppings. They are not a substitute for good hygiene but will help.

Caution

Some species of cockroaches don't move very much and others are quick to hide, so some predators simply ignore them. How well your animal accepts cockroaches will depend a great deal on how they are offered. If they are simply dropped into the cage, the cockroaches may quickly disappear from view but if the non-climbing species are put into a deep enough dish they will remain visible and are more likely eaten.

An infestation of escaped cockroaches will be viewed, perhaps unfairly, as a greater health hazard than crickets. Some species are also better escape artists than crickets, with the ability to fly, so you should use all possible precautions to avoid escapees.