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Caring for crocodilians



A young dwarf caiman, perfectly equipped and very willing to bite even at this age!

While venomous snakes inspire fear and awe, there is another group of reptiles that not only evoke these emotions, but also possess the power and strength of true hunters. While many people are happy just to learn about crocodilians from television documentaries, some dedicated enthusiasts are keen to have the opportunity to work with and study these intelligent creatures at first hand in their homes. If you've ever wondered what is involved, Colin Stevenson explains their care needs and what it is like, living up close with crocodilians.

Keeping crocodilians is obviously a controversial subject. This article focuses not on the emotions, however, but about the realities of caring for these reptiles correctly, in terms of legislation, husbandry and health care. At the outset, it has to be said there is no way to cover the captive management of such large and potentially dangerous animals in detail here – so many aspects of maintaining these reptiles rely on experience and hands-on training. This article can only give a brief insight into the subject, providing you with an idea of the knowledge and techniques that are required to look after these magnificent animals safely and correctly.

► The snout of the false gharial (*Tomistoma schlegelii*) is relatively short, compared with that of the gharial itself.



A gharial photographed in the wild in Nepal. This is a very streamlined species.

The crocodilian family

Today, there are 23 species of crocodilians inhabiting the tropical and subtropical wetlands of the planet, although the likelihood is that this number will increase, as some existing species may well be divided into two or more species, with a review of the taxonomy of crocodilians currently underway. There are three families: the Crocodylidae (which includes all the crocodiles plus the false gharial or tomistoma), Alligatoridae (embracing the alligators and caimans), and Gavialidae (a monotypic family, consisting exclusively of the gharial).

Their family tree extends back over 200 million years, with branches of that tree leading to the dinosaurs and birds. As odd as it sounds, that means the crocodiles and the birds share more recent ancestors than crocodiles do with other reptiles.

Apart from the Chinese alligator (*Alligator sinensis*), all alligators and

caimans are New World animals. Crocodiles can be found on most continents that straddle the equator, whereas the gharial (*Gavialis gangeticus*) is restricted to the Indian subcontinent, mainly occurring today in just India and Nepal, although individuals are still occasionally reported from Bangladesh.

Crocodilians are long-lived animals, with most having a life expectancy just short of our own. This is significant, because if you do want to keep them, then you should be prepared to house these animals for a long time – and at considerable expense too. I hear often of caimans living to the 'old age' of 20 years. If kept correctly, and barring any injuries or diseases, they should live much longer.

Their growth rates are remarkable. From hatchlings weighing perhaps 60g (2.1oz), some crocodilians can increase in mass to over 7000 times their birth



▲ A saltwater crocodile – it rests in the water largely hidden, with its eyes breaking the surface.

weight. Even a 'small' *Crocodylus* species can attain a length of over 3m (10ft), and males of several species including saltwater (*Crocodylus porosus*) and Nile crocodiles (*C. niloticus*) can grow to 4.5-5m (16ft).

All species share the same fundamental biology. They are semi-aquatic predators that have adapted to own the water's edge/water's surface niche. This is where they are the undisputed rulers, and have been since before the dinosaurs bowed out 65 million years ago. Their eyes, nose and ears are located on the top plane of the head, while the palatal valve at the back of the mouth stops water from entering the stomach or lungs.

Crocodilians can stay low in the water largely unseen, yet they are still able to see, hear, smell and breathe. As a result, they can play the waiting game with their prey.

Suitable species

Although more species of crocodilians are available these days, largely as the result of widespread breeding on farms, some are simply not practical to keep outside of professional collections. The author would consider ANY of the *Crocodylus* species to be completely unsuitable for private ownership – these species simply grow too large to be kept and maintained in the typical house. Just about all animals that do start out being kept in such surroundings eventually end up in a zoo or rescue centre, despite their owners' determination that this would never happen...

Species generally considered possible for private keepers to maintain include the dwarf caiman (*Paleosuchus*

Know your crocodilian

When a crocodile closes its jaws, there are sockets in the top jaw that receive some of the lower teeth. These teeth remain visible with the jaw closed. When an alligator or caiman closes its jaws, those lower teeth fit into a series of pits behind the upper teeth, and the lower teeth are therefore not visible when the mouth is closed. This provides a means to tell the groups apart. Caimans differ from alligators by having a cartilaginous septum dividing the nostrils, whilst alligators have a bony septum instead. The gharial is distinct: only it has such a long, narrow jaws designed almost exclusively for catching fish.



The lower teeth are not visible in the case of an alligator or caiman, when its mouth is closed. A young American alligator (*Alligator mississippiensis*) is seen here.



The closed mouth of a Nile crocodile, with lower teeth visible.



The snout of the gharial is unique in terms of its appearance.

palpebrosus), the spectacled caiman (*Caiman crocodilus crocodilus*), the Chinese alligator (*Alligator sinensis*), and the west African dwarf crocodile (*Osteolaemus tetraspis*). No surprise that these are some of the smaller crocodilians, but they are also bred in collections, and they are fairly widely available, typically at prices ranging from £500-1000 each.

Occasionally, the smooth-fronted caiman (*Paleosuchus trigonatus*) can be seen in the trade, but this species is not legally imported into Europe at present, nor is it bred regularly here. American alligators (*Alligator mississippiensis*), Nile crocodiles (*Crocodylus niloticus*), Siamese crocodiles (*Crocodylus siamensis*), Cuban crocodiles (*C. rhombifer*), Morelet's crocodiles (*C. moreletii*), even saltwater crocodiles (*C. porosus*) have appeared on dealers' lists in recent years. However, these large species are, as already mentioned, not appropriate except for professional collections. Some of these animals are also from questionable sources, with potential legal implications for owners.

By far the most common crocodilian that is offered, however, is the spectacled caiman. These are extremely common in the wild, found across most of northern South America, and into Central America as far as Mexico. Feral populations are also established in Florida. The dwarf caiman and spectacled caiman in trade originate from Guyana, and are subject to international quotas. Although the smooth-fronted caiman is also potentially available from Guyana, current EU rules forbid its importation.

Dwarf caimans have been bred in Europe and the UK many times now, so captive-bred animals are available. Spectacled caimans are also bred, but less often, as wild caught specimens are cheap and supplies are regular. Similarly, west African dwarf crocodiles have been bred regularly for many years in UK and



WARNING All crocodilians have incredibly powerful jaws that can cause serious injury, including loss of limbs, or even fatal wounds. Even a relatively inconsequential bite is likely to become infected. Owning a crocodilian is a serious undertaking, especially as these reptiles can move much faster than most people would realise. It would be highly irresponsible not to point this out, even if it may seem obvious. You need to consider other family members too, before taking a decision to set out to acquire any of these reptiles.

▲ Siamese crocodile hatchlings may look cute, but they will grow too large to be suitable for domestic surroundings.

▼ The huge hind foot of a 4.2m (14ft) saltwater crocodile with author's hand shown for scale. This species is just too large and dangerous for private keepers to maintain indoors in domestic surroundings. Photo courtesy of the author.

European collections and by private keepers. Chinese alligators are imported into Europe at fairly regular intervals. This species is bred in large numbers in China, despite the wild population crashing to alarming levels.

Laws

You must be aware of the law regarding the ownership of crocodilians. All members of the group fall under the *Dangerous Wild Animals Act, 1976* here in the UK, and you will be required to have a licence before starting out to acquire stock. You need to apply to your local authority for this

purpose. It regulates the Act, and determines fees and inspection costs.

In order to grant a licence, a local authority needs to be satisfied that an applicant can house and maintain the species in question, both safely



A young spectacled caiman. This is one of the more commonly kept species in private collections.



◀ A favourite young Chinese alligator of mine, named 'Alicia Sparkle' by my daughter. These alligators usually have relatively calm dispositions. Photo courtesy of the author.

and securely, having appropriate knowledge and experience for this purpose, as well as possessing applicable insurance, notably third party liability. Inspections will therefore include a veterinarian who will be looking at the enclosure and making sure that you know what you are doing! These inspections will be required whenever the licence is renewed, and as the animal grows, so the enclosure needs to be upgraded appropriately. The licensed animals need to remain at the approved premises at all times, unless permission has been granted to move them.

Keeping a crocodilian without a DWA licence will result in a large fine, confiscation of the animal, and payment of legal and potentially other costs too, such as temporary accommodation.

In addition to DWA licensing however,

prospective owners should be aware of the status of the species under the global Convention on International Trade in Endangered Species, abbreviated to CITES. All crocodilians are listed under CITES appendices I or II. Therefore, some – such as the Chinese alligator which is listed on Appendix I – require CITES certificates to enter the UK.

To arrange this, you will need to contact the Animal and Plant Health Agency (APHA) (<https://www.gov.uk/cites-imports-and-exports>). Be sure to obtain any certificates from the previous owner. Any CITES I animal offered to you without a certificate will be illegal and should not be bought. Obtaining an animal within the European Union and bringing it into the UK is also illegal without the correct certification. If you are told that you do not require

▲ The power of a crocodilian comes not just from its jaws, but also its powerful tail as well. This large saltwater crocodile was photographed in northern Australia.



paperwork for a CITES I animal, then walk away. Otherwise, you will be breaking the law. Check with APHA for the most up-to-date advice, as the regulations do change from time to time.

Captive management

Before getting into any specifics, it is vital to be aware of what you would be taking on, in terms of the space required. Even the smaller crocodilians are large animals. An adult male dwarf caiman will attain a length of 1.5m (5ft). In the wild, some populations of this species can even exceed 2m (6.5ft). Crocodilians require space. They may start off small, but they will grow rapidly so that within 3-4 years, they will need an enclosure roughly equivalent to a medium-sized room.

Like all reptiles, crocodilians are ectotherms, meaning that they rely on their environment for warmth and cannot regulate their body temperature internally. (Cold-blooded is the familiar – if inaccurate – term that is often used). This reliance on their environment for warmth is a critical factor in the husbandry of crocodilians. All those bumps along a crocodile's back are actually individual bony plates (known as osteoderms) that act like solar panels to help an individual to warm its body more rapidly when it is basking in the sun. Heating the enclosure is therefore an important consideration. Furthermore, you will need to ensure that they receive sufficient UV lighting as well.

When it comes to keeping any species of reptile successfully, you must research its natural history and origins in order to provide a suitable habitat. In the case of crocodilians, is it a forest species (like a dwarf caiman or west African dwarf crocodile), a basking specialist (such as a spectacled caiman or Nile crocodile), or a more cold-tolerant species that may benefit from larger variations in seasonal temperatures, such as the Chinese alligator? Such factors must be incorporated into the design of the enclosure, including its location, as well as maintenance routines.

There are behavioural differences to consider as well. This affects maintenance schedules, handling tolerance and techniques, as well as feeding routines. It all comes down to 'know your species.'

Stress is a significant factor as well, when keeping crocodilians in collections. Clearly, the aim must be to minimise stress, and providing plenty of hiding opportunities is critical for this purpose.

In terms of the health and welfare of a crocodilian, you need to determine the location of your nearest exotics vet who is comfortable working with these animals. In my experience, these are few and far between, although the number of exotic vets is currently increasing, which may help in the future. Any health issues will require handling of the crocodilian, and when they get large, this is potentially dangerous to you, other people and to the reptile itself. Consider obtaining some training or mentoring if at all possible. This can otherwise prove to be a serious issue.

When entering a crocodile enclosure, it is always sensible to have some means of fending off an attack. This can be a strong pole that you can use to protect yourself. Often, if you tap the pole to the side of the crocodile, it will turn toward it, allowing you to make your exit. In extreme circumstances, tapping the crocodile along the jaws will deter it from advancing on you, without harming the crocodile. This is for an emergency only – it is definitely best not to get into a dangerous situation in the first place if it can be avoided.

Another option is a light but strong board that can act as a barrier between you and the crocodile. Never reach out with your hand near a crocodile to pick up or move anything. Always remember that they can move to their side much faster than you can react, and can strike you under these circumstances.



▲ Securely holding a juvenile Cuban crocodile. The gloves are optional, and the author prefers not to use them in most cases. Notice how the hands have secured the crocodile's neck firmly but without squeezing here. The tail is tucked between the arm and the body to reduce struggling. Photo courtesy of the author.

Crocodiles also possess the ability to jump well, as displayed by this Cuban crocodile.



Signs of health

Choosing a healthy crocodilian is similar to selecting any other reptile. You are looking for an animal that is active, does not appear either too thin or overweight, has no obvious injuries or abnormalities, and has clear, bright eyes.

You should look at the teeth of the crocodilian too: missing or crooked teeth can indicate a level of metabolic bone disease, or at least a poor diet. Often, this can be corrected but the teeth may never return to perfect placement, depending on how long the condition has been developing. If it actively tries to bite when being picked up, this can be an additional reassuring sign of good health.

Once you have made your choice, the crocodilian should then be placed inside a plastic box of suitable size for the journey home. Punch some ventilation holes in the lid first. The box should ideally be a dark colour, rather than transparent, as this will encourage it to settle down better inside. A slightly damp towel can be placed here as well, to stop the crocodilian from sliding about, which will be stressful. If the weather is cool, then either a hot water bottle, filled with reasonably warm but never boiling water, or a heat pack can be used carefully, to prevent the reptile becoming chilled on its journey.

It is very important for Chinese

▲ This young crocodilian has healthy teeth.

alligators especially to be kept slightly damp by spraying them lightly and frequently with warm water from a spray bottle until they are home. On arrival, they should be placed gently into the water, which is at that the required temperature (see below).

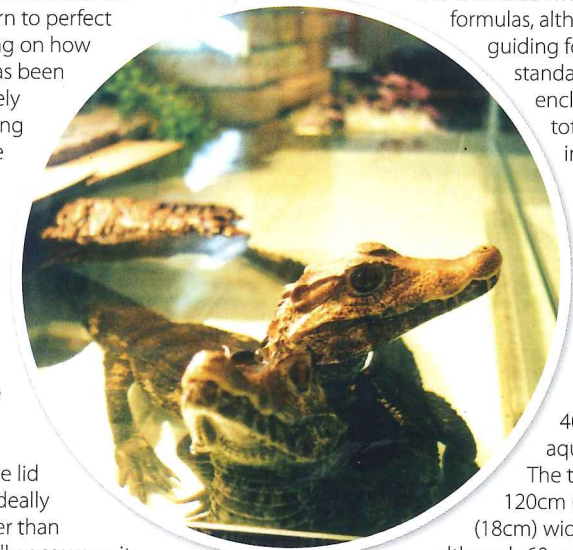
Enclosures

People often ask me how large an enclosure for a crocodilian should be. This is an area where there are no simple formulas, although if you want a

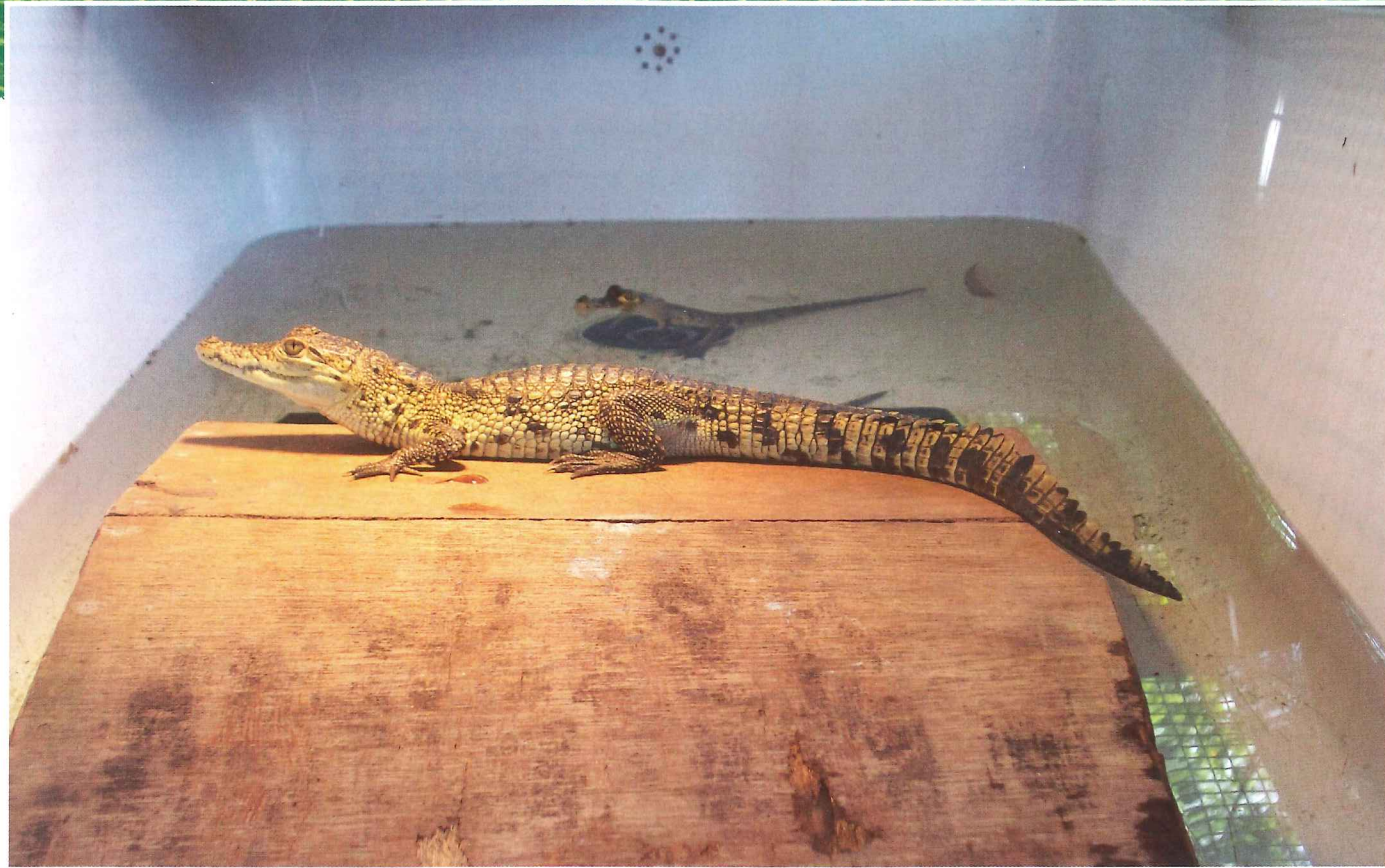
guiding formula, some zoo standards ask for an enclosure 2.5 times the total length of the animal in both width and length of enclosure. For a 1.8m (6ft) spectacled caiman therefore, this equates to an area of 4.5x4.5m (15x15ft)! How's the lounge room looking now?

For hatchlings under 40cm (16in), a large aquarium is acceptable. The tank should be at least 120cm (4ft) tank, by 45cm (18cm) wide as a minimum, although 60cm (24in) in width would be better. Other options at this stage include plastic ponds or large garden tubs.

Once a crocodilian exceeds 50-60cm (20-24in), it is time to get your DIY equipment ready and build something yourself. Concrete ponds, fibreglass ponds, or large plastic ponds (such as a Waterland turtle tub), are all possible options. Essentially, you are creating a



▲ Dwarf caimans in a custom-made tank, with 10mm (0.4in) glass being required for safety and security. Ventilation allows air-flow, and the filtration and heating is kept beyond reach of the caimans. A land section is formed by means of a shelf over the water. Photo courtesy of the author.



large pond for the crocodilian to swim in, along with a land area where it can not only bask, but also move around freely. Crocodilians will often spend a significant amount of time on land, especially at night, and this requirement should be reflected in the design of their surroundings.

Adult crocodilians require an enclosure as large as possible. For the smaller species, 3x2m (10x6.5ft) is really a minimum. You can't get away with less – sorry! The best design for crocodilian enclosures is where the full area is used to create the pond. If you have an area of

▲ **Morelet's crocodile hatchlings in a large bath used as secure enclosure. They have a mesh lid for safety and security, with a wooden hide box that also allows for basking. A lamp is being used here, but natural sunlight is also provided.** Photo courtesy of the author.

▼ **A juvenile black caiman being housed in a Waterland turtle tub as the pond, with branches provided for hides.** Photo courtesy of the author.

3x2.5m (10x8ft) for example then make a pond that size. You can then use a suitable material to construct a land area over a portion of this water.

By this means, you not only maximise the use of the space, effectively creating a larger enclosure, but you are also providing a means for the crocodilian to remain in the water and be hidden. This will minimise stress and allow the reptile to

adapt to its new home faster. Furthermore, it can also climb on top of this shelter for basking.

Without this overhanging land area however, you will need to provide some shelters in the enclosure instead, particularly in the water section.

These can be as simple as placing a wooden sheet across some bricks set apart in the water.



A dwarf caiman hatchling. Even a capping roof tile provides a simple but effective hide and basking area for young crocodilians. Photo courtesy of the author.

The crocodilian will spend a good deal of time under the hide, feeling much more secure and starting to feed quickly in such surroundings.

A word on pond shape...if you are planning to house more than one crocodilian in an enclosure, then you would do well to provide visual barriers within the pond. This can be achieved by using an irregular shape for the design of the pond (in the form of an 'L', or, better still, an 'S' or 'Z'). Also place rocks and/or logs within the water body at surface level. The aim is to provide each individual with its own 'space' without being in visual contact with its companions.

Keeping in mind that crocodilians are semi-aquatic creatures and not rock climbers, you must provide a means for them to enter and exit the water easily. This 'haul out' area must be carefully made: if it is too smooth, then the crocodile may either be unable to exit the pool or will suffer abrasions for its

efforts. Should this area be too rough, the crocodilian can be injured as the result of sliding across the rough surface. With concrete, you can embed rounded areas to provide footholds that are sufficient to avoid abrasions.

Barriers and walls should be a minimum of 1.2m (48in) in height, ideally angled in at the top and made in such a way that there is no risk of the crocodilians being able to climb them. Smooth walls or vertical bars work best. Creative design can make these look quite attractive and naturalistic if required.

Any substrate used should be easily cleaned or replaced, and safe for the crocodile. I do not recommend using pebbles or stones in the aquariums of younger crocodiles, as they can be swallowed, causing fatal blockages. If stones are used for aesthetic reasons, use a size that the animal is unable to swallow. As with other reptiles, avoid cedar and pine in the enclosure.

► **An enclosure under construction at the Danish Crocodile Zoo. Note the varying water depths, the land area overlaying the pond to provide ample space and security for the crocodiles, plus the solidly-built ramp for easy entry into and out of the water. Ridges allow for grip when exiting, and do not cause abrasions to the crocodile's feet.**

Photo courtesy of the author.



Did you know?

Chainlink fences can be climbed by young crocodiles! They should never be used in enclosures housing young animals. In fact, I've seen crocodiles up to around 1.8m (6ft) long escape using the footings provided by metal or plastic meshes. Avoid them!

Heating

Since crocodilians originate from warmer areas of the world, so you will need to maintain the water temperature at around 27-28°C (81-82°F). In smaller tanks, an aquarium heater will do the job nicely. Always protect any heater within the enclosure, or it may be broken as the crocodilian swims around, hitting it with its tail. Thermostats provide vital protection against overheating: if the heater gets stuck in the 'on' position, the water will heat up gradually to a fatal temperature for the crocodilian. Don't take the chance; believe me - yes, it does

happen, and water temperatures above 36°C (97°F) are likely to be fatal for crocodilians.

For larger enclosures, and once the crocodilian exceeds about 90cm (3ft), always use external water heaters. These heaters attach to the return hose of external filters, with Hydor being a reliable brand in my experience. Crocodiles over that size will destroy equipment placed in the pond. For large enclosures, you will be aiming to create a warm room, and the heating system here will also maintain the water temperature in the pond.



African slender-snouted crocodiles (*Mecistops cataphractus*): this exhibit shows the 'S'-shaped design of the pond which serves to reduce aggression, and also the use of logs as visual barriers employed at the Madras Crocodile Bank Trust in India. Photo courtesy of the author.

Appropriate insulation should be fitted under the floor, ceiling, and walls. Remember to include insulation on the door to the room as well, as this will help to keep the heat in, and costs down. If adapting a shed or garage into a croc's home, then 10cm thick panels such as Kingspan or Celotex are required. Condensation can be a problem if the insulation and ventilation are not adequate though, and this poses an obvious potential hazard with exposed electrical equipment in the enclosure.

Some people have incorporated under floor heating either within the room itself, or in the concrete of the pond itself, so you can then manipulate the water temperature. This is normally only considered for large ponds housing the bigger species. Other keepers have used portable heaters or heat exchange systems to heat the room itself and provide the basis for ambient temperatures equivalent to tropical levels. Basking lights will be needed to provide a hot spot of around 32°C (90°F), and the background temperature should be set around 26-27°C (79-81°F), being maintained also at night.

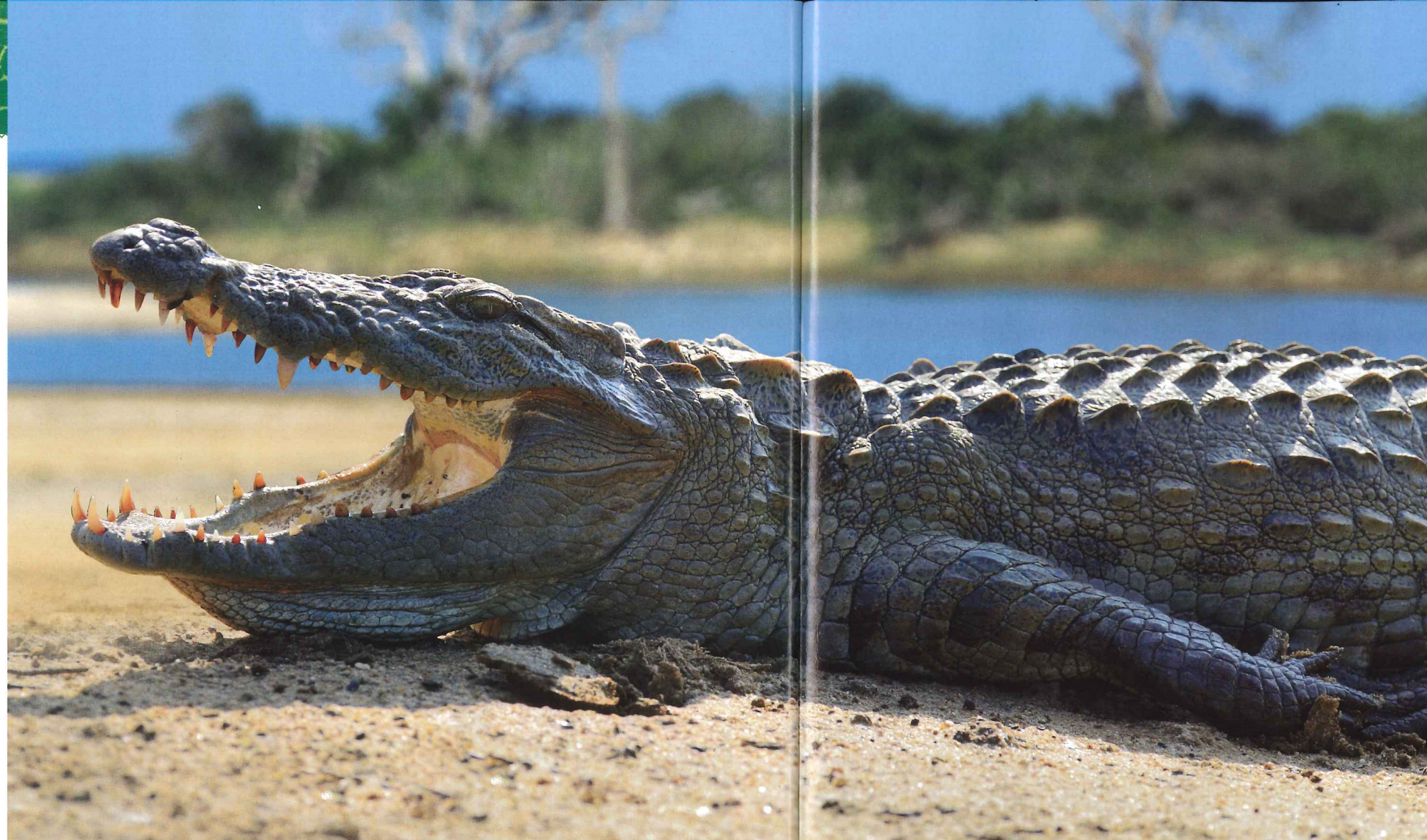
Lighting

Crocodilians bask, but this particular behaviour varies, depending on the species concerned. Although some crocodile farms have successfully maintained healthy crocodiles in complete darkness, they paid a lot of attention to diet and nutrition. There are clear benefits to providing UVB lighting for crocodilians, and this should be considered as a means of protecting against the effects of metabolic bone disease (MBD).

Either very good tubes (remembering that UVB is effective from these only at close ranges) or mercury vapour lamps that provide UVB and heat are suitable. For larger animals, mercury vapour lamps are safer to use and easier to guard against damage. A new range of lighting from Arcadia is also proving to be excellent for large enclosures.

▲ Some crocodilians are more inclined to sunbathe than others. If the water level starts to fall, they may head off in search of other nearby stretches of water, or burrow into the mud in order to survive until the rains return.

▼ Just as with other reptiles, basking spots are important in a crocodilian's quarters. This is a west African dwarf crocodile.



Good quality lighting will help to prevent metabolic bone disease. A Philippine crocodile is shown here.



A 12 hour day/night cycle is best to regulate the crocodilian's diurnal cycle. The light exposure can also be manipulated to mimic breeding seasons, but this aspect of care is outside the scope of this article.

Filtration

The pond should have a filter in place to minimise water changes. When designing the pond, do yourself a particular favour, and incorporate a drain into the system. I have learnt this the hard way; having a drain makes life so much easier, simpler

and safer. Good filtration can be achieved using an internal filter for small crocodilians, but an external filter (of the type used in ponds) will be needed for large enclosures. Bear in mind that larger crocodilians will easily destroy an internal filter!

Ideally, incorporate an overflow outlet into the filtration or drainage as well. Pool water can develop a film of protein on the surface, which is likely to irritate a crocodilian's eyes. An overflow drain can remove this and so helps to ensure higher water quality.

Feeding and nutrition

Crocodilians have the most powerful bite on the planet. Their teeth and jaws are designed not to let go, once they seize their quarry. If a crocodile bites its prey and feels resistance, it will roll – spinning rapidly on its bodily axis, in order either to tear off chunks of flesh to eat or to knock an animal off balance so it can be dragged more easily into the water. This is often described as the so-called 'death roll'. Crocodiles eating on land will tilt their head to the side in order to be able to grasp food lying here on a firm surface. Keep this in mind when feeding them in an enclosure.

While crocodilians are young, they prey predominantly on invertebrates. As they grow, they consume progressively larger items. This should be reflected in their captive care. These reptiles eat whole prey items, allowing them to benefit from the nutrients contained within all organs of the prey, including the stomach. Feeding whole food items is therefore very important.

A young crocodilian can be offered crickets, cockroaches, and large worms, such as earthworms or lob worms. Gut-load the invertebrates before feeding them to a crocodile. Youngsters being fed on this type of fare should be provided with food 4-5 times a week. Record exactly what you feed an individual, and weigh the crocodile regularly so that you can adjust the quantity of food as

necessary. As the young reptile grows, so it is possible to start offering the occasional pinkie mouse as part of its diet.

Once a crocodilian has reached over 40cm (16in), the number of pinkies can be increased, but under no circumstances feed a crocodilian less than 60cm (24in) with any furred mice; instead, offer them rat pups. This is essential because some crocodilians under this size have suffered impaction and died from a build-up of fur in their digestive tract. Once they are larger, cut feeding back to three times a week.

The exact amounts of food will vary for each species, but as a guide, a 60cm (24in) spectacled caiman may consume four large rat pups at each feed. Its weight should be monitored, though, and feeding reduced to twice per week if necessary, to prevent it from becoming obese, as this can ultimately be a cause of premature death. Since each species has a different growth rate, and individual animals also vary in this regard, prescribing specific amounts of food is not practical.

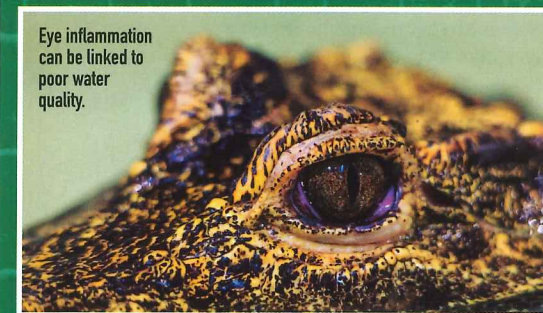
Adult crocodilians can be fed once a week (or twice each week, if provided with smaller meals). The food will depend on the species, with adult dwarf caiman eating smaller rats, while larger crocodilians can be offered anything ranging from large rats to chickens or even rabbits. Frozen food of this type

Maintenance

Daily checks that need to be made include:

- A check on the crocodilian's appearance for any wounds and injuries, and any changes in its behaviour, which could indicate ill-health.
- The temperatures: a good maximum/miniature thermometer gives you great control in this regard. It also allows you to check that the thermostat settings are accurate. If you have an infra-red thermometer, use that to verify basking spot temperatures, and check the water temperature.
- Remove any faeces and uneaten food – either on land or in the water.
- Filtration: make sure the system is running correctly, with no leaks or signs of a blockage. If water clarity has worsened, this is a clear indication that it is time to clean the filter.
- Check the enclosure for any indications of damage, and always make sure that the barrier or fence is secure. Look for any sharp projections or broken areas that could injure the crocodilian too. There must obviously be no leaks in the pond, and all electrical equipment should be working and secure, out of the crocodilian's reach. Make sure that a crocodilian can exit its pool easily, and that the haul-out area is always clean and in good condition.

Eye inflammation can be linked to poor water quality.



Weekly tasks:

- Clean the filter.
- Partial water changes necessary to remove the surface layer of protein.
- Check electrical equipment and thermostats.

Monthly tasks:

- Clean enclosure, replacing any soiled substrate.
- Carry out a water change and clean the pond.
- Ensure all locks are secure and licensing conditions are complied with.
- Handle the crocodilian if appropriate to desensitise it to being handled.
- Weigh the crocodilian and adjust its diet if necessary.



Regular, brief handling sessions can be beneficial for young crocodilians, like this west African dwarf individual.

Did you know?

If you have more than one crocodilian in an enclosure, it is best to get them 'station trained'. This means getting each individual to associate with its own individual feeding area. This avoids conflicts over food, and controls the diet of both animals, rather than risking one of them eating all the food.

should be fully defrosted before being offered to any crocodilian.

There is no problem in offering pieces of lean beef or chicken – straight from the supermarket – to crocodilians. However, this type of food should most definitely be dusted with a calcium/vitamin D3 powdered supplement, and it should in no way form the basis of the diet.

I would recommend such items never appear on the menu for a crocodilian more frequently than every third feed as an example. Larger crocodilians can even take a liking to chicken drumsticks! It is quite simple to place a vitamin tablet into this type of food, to maximise the nutritional value for the crocodilians. Every third feed will again be about right, to avoid the risk of any overdose.

If your crocodilian feeds from tongs, then it is easier to control the diet. With larger animals, be sure to use long and strong tongs for your safety and that of the animal. Be aware as ever that they can move very quickly and at the edge of the water, they have an advantage over you. Crocodilians will jump toward food, and can jump higher than people realise. Again, your safety is vital here, and it is no time to be a hero. Many accidents have left people with serious injuries as a result of them making poor decisions when feeding a crocodilian.

If the reptile does not take food from



Feeding large crocodiles needs to be carried out with care.



Using tongs to feed fish to west African dwarf crocodiles.

tongs, then leave the food on the land section later in the day. The crocodilian will usually take it soon after you leave. In contrast, it may take some time to feed if you are present.

Supplements

I'm a firm believer in supplements for animals in my care. A good multi-vitamin is a safe starting point. For small crocodiles, this could be a reptile multi-vitamin powder such as Nutrobal; for larger animals, a multi-vitamin tablet placed inside the food to be fed to the crocodilian is a better option.

Vitamin C can be added every second feed (with the amount used reflecting crocodilian's size), and it should help to keep the crocodile's immune system ticking over nicely. You should also

consider adding vitamin E and selenium along with the vitamin C. Vitamin E is important during the lead up to the breeding season as well.

Calcium and vitamin D3 can be added to insects and pinkies for young crocodiles being careful not to overdose. For larger animals, especially if UVB is being provided, then add a supplement of this type every second feed. If your crocodile is exhibiting any degree of tooth loss, or the teeth appear slightly glassy, add calcium/vitamin D3 to the diet in quantities appropriate to the product and ensure the UVB lighting is in good working order. Remember to replace the light source as recommended by the manufacturer – typically after 10-12 months. In addition, add a sea kelp supplement to every 2-3 feedings.



▲ Crocodiles have a more varied diet in the wild, seeking aquatic prey such as fish, as well as seizing quarry on land. Supplements will help to make up for any dietary shortfalls.

◀ Environmental problems can also crop up, if the crocodilian's housing is unsuitable. An American alligator showing foot abrasions caused by too steep an exit from pool. Veterinary treatment was required and the pond was subsequently modified. Photo courtesy of the author.

These steps will help to maintain good health, and I have used this approach to address dental issues successfully. It may not be just nutritional deficiencies at work here though, as tooth loss in crocodilians can also be caused by stress.

I also routinely add B vitamins to any food that has been frozen. The reason is simple: freezing will destroy thiamine, one of the B vitamins. If you feed your crocodile on fish that has been frozen, adding B vitamins is essential! Otherwise, a deficiency can arise, ultimately triggering neurological symptoms.

Health concerns

■ **Feeding problems:** hatchling crocodilians can prove difficult feeders,

with dwarf caimans having gained a particular reputation in this regard. As mentioned, with a newly acquired young crocodilian, offer it live crickets or locusts at night, and then leave it alone. Don't stand around waiting to see it eat: it will wait until you have gone. Once it is eating, you can leave a small pinkie near the water's edge, again at night. The aim is to ensure the dwarf caiman starts to acquire a healthy appetite as soon as possible in your care.

Spectacled caimans in contrast normally start feeding fairly quickly. If a new hatchling is not eating though, this is not an immediate cause for concern. Just offer it food every second evening or so. Leave the caiman alone and do not handle it. Otherwise, you'll simply be stressing the animal and making the problem worse. Check that temperatures are right, and that it has ample places to hide. Placing the enclosure in a quiet part of the home is important as well.

Supplementing the diet as described above and providing UVB lighting and correct temperatures should ensure proper calcium metabolism, avoiding any signs of metabolic bone disease, to which these reptiles are susceptible. This is partly a reflection of their rapid rate of growth.

■ **Parasites:** when you first acquire a

crocodilian, you can deworm it with Panacur – which contains fenbendazole and is available from many reptile and pet supply shops, or vets. This may well be advisable with wild caught stock, but is less significant in the case of captive-bred individuals. Follow the dosage instructions carefully, and add the solution to the crocodile's food via a syringe. Crocodilians don't get the mite problems that can be encountered with snakes and lizards.

■ **Body condition:** a crocodilian's neck and the base of the tail should be full, but not bulging. The skin should be clean and clear of discolouration. The belly skin should also be clear of any redness that can indicate an underlying infection and septicaemia. If this area appears to be red and inflamed, veterinary advice should be sought without delay.

The tissue inside the mouth should be yellow or white in colour, depending upon the species. If it is dark red – especially toward the rear of the mouth, then again, a veterinary check-up will be essential.

The value of keeping crocodilians

There are aspects of an animal's behaviour and natural history that are difficult, if not impossible, to study in the wild. As a result, keeping crocodilians has allowed us to learn more about them. In fact, breeding crocodilians in private facilities and zoos has provided much of what we now know about crocodilian reproduction.

Another area where private keepers have contributed significantly is in terms of crocodile conservation. Some projects have been funded primarily by private keepers and crocodilian enthusiasts. The Chinese alligator and the gharial have both benefitted from funds donated from these sources.

In conclusion

Crocodilians are clearly my favourite animals! Whilst their attraction to some hobbyists is understandable, they require such specialised and demanding care that only the most serious enthusiasts prepared to commit themselves for decades to keeping these reptiles should consider acquiring them.

It is worth emphasising that crocodilians should never be viewed as pets, but should be regarded as display animals – despite the photographs that you may see on some Facebook pages. Serious keepers do not see their crocodilians as animals to be cuddled and hugged, but instead, they aim to learn as much as possible about all aspects of biology, conservation and captive care, increasing our understanding of these truly fascinating reptiles.

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Good recording

It can be really useful to record feeding and maintenance data for your animal – what was eaten and when, as well as temperature logs, cleaning and handling dates. If problems occur these records may hold clues to the causes(s) and solution.