



Male and female Central Notted Dragons (*Ctenophorus nuchalis*).

## H U S B A N D R Y

# Captive Care of the Central Netted Dragon<sup>1</sup>

Shannon Plummer

New Farm, Queensland 4005, Australia (centralnetteddragon@mac.com)

Photographs by the author except where noted.

With their easy-going temperament and unusual color combinations, Central Netted Dragons (*Ctenophorus nuchalis*) have become increasingly popular pets. Central Netted Dragons are small, energetic agamid lizards with a calm temperament that allows them to be handled easily. One of the reasons these lizards are so popular is their striking appearance. A dark reticulated pattern overlays a body color of pale brick-brown with a pallid unpatterned belly. They have a rounded

head with a row of enlarged scales curving under both eyes and above each exposed ear, and small spines made up of soft skin around their head and nape. Central Netted Dragons are sexually dimorphic. Adult males average 250–280 mm (9–11") in total length and 100 mm (4") from snout to vent (SVL). Females are usually smaller. Males also have larger heads in relation to their bodies.

## Habitat

Central Netted Dragons inhabit a vast area of central Australia, occurring throughout the desert plains of Western Australia, the Northern Territory, and also in western Queensland and parts of New South Wales. They are abundant in open sandy areas with sparse vegetation, increasing substantially in number in areas artificially cleared of vegetation.

These lizards are diurnal and terrestrial, spending their days basking on logs, stones, and termite mounds. Predators include birds of prey, larger reptiles such as monitors and snakes, and mammals such as foxes and feral cats. When the desert temper-



A dark reticulated pattern overlays a body color of pale brick-brown with a pallid unpatterned belly.



Two females (left) are distinctly smaller than the two males (right).

## About the Author

Shannon Plummer is a wildlife photographer. Her style of fine art photography caught the attention of the international photography community where she won several prestigious international awards and acclaim from her peers. She is also a wildlife rehabilitator for sick, injured, and orphaned Australian wildlife, specializing in reptiles. Shannon has a deep interest in dragons, monitors, and pythons, which she keeps and breeds along with various other reptiles needing rehabilitation.

<sup>1</sup> This article is excerpted from *Captive Care of the Central Netted Dragon* by Shannon Plummer. For more complete and detailed care information, you can obtain a copy through selected pet stores or by logging onto [www.centralnetteddragon.com](http://www.centralnetteddragon.com).

atures peak during the middle of the day, Central Netted Dragons retreat into their cool burrows. They are known to have several burrows, usually found at the base of *Spinifex* shrubs or stumps.

### Life Span

Although the life expectancy of most wild reptiles is difficult to estimate, the general consensus is that Central Netted Dragons are relatively short-lived. Captive lizards are expected to live around 6–7 years; however, some have been reported to live more than nine years. In the wild, where they are subject to

predators, disease, and lack of food and water, they generally survive only 2–3 years.

### Outdoor Housing

If you live in an area with a climate similar to that of the Australian regions inhabited by the Central Netted Dragon, an outdoor enclosure is ideal, as it mimics the lizards' natural environment. You should add several retreats, basking areas, and shade, while providing a balanced diet and clean water. The walls will need to be high enough to prevent escape attempts, and enclosure design should take into account the height and position of potential basking areas such as shrubs or stumps. These lizards have very strong limbs and are quite capable of jumping a considerable height. Walls of the enclosure should be smooth to avoid injury, as your lizard will initially spend a lot of time trying to escape (rubbing its snout on the walls and trying to climb out). You can also cover the enclosure with wire or shade cloth to keep predators out.

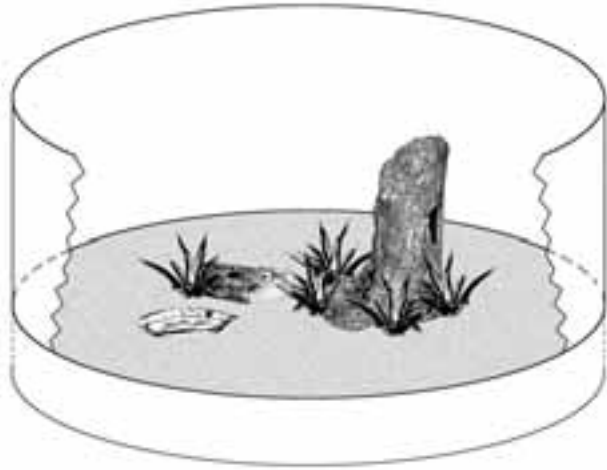
The enclosure should be as large as possible to allow your lizards adequate space to run and dig. Position your enclosure where it will receive the maximum amount of sunlight, but remember that adequate shade must be available at all times. Even though the Central Netted Dragon is a desert-dwelling lizard, fresh water must always be provided, either from a water dish changed daily or a pool at ground level. Make sure the sides of the pool have a gradual descent to allow easy access. Alternatively, a large rock or branch set in the pool gives the lizard something to cling to while submerged or drinking. Central



The natural distribution of Central Netted Dragons.



Typical *Ctenophorus nuchalis* habitat.



Example of an outdoor enclosure design.

Netted Dragons are capable swimmers, but prefer to be touching something in the water if they cannot reach the bottom.

The water quality can be maintained by the addition of a “waste degrader” such as Exo Terra’s® Biotoze™, a probiotic waste digester that contains natural, healthy bacteria that eliminate organic waste. Water still needs to be changed at least once a week, and, if feces can be seen in the water, it must be changed immediately and the container cleaned and sanitized. Heavy rain can flood an outdoor enclosure, so sufficient drainage is important. This also provides a shady area protected from the elements. Elevated features such as stumps, logs, or stones will provide a retreat should water accumulate.

If the enclosure is positioned to take full advantage of the sun, no extra heat or light is needed. However, if the enclosure is not in an ideal location, providing an additional basking spot by using a heat lamp or ceramic heat emitter is beneficial.

### Indoor Housing

An indoor enclosure provides the most versatile housing for keepers in any climate and provides a good opportunity to observe your lizard. Keep in mind that Central Netted Dragons are terrestrial and are best kept in the largest enclosure you can afford. A guide for minimum sizing is 100 x 40 cm (40 x 16”) with a reasonable height of at least 400 mm (16”). An enclosure of this size will accommodate as many as three lizards. If you want to keep more than one lizard, don’t house males together. Central Netted Dragons are highly territorial, and battles for dominance will result in stress and possible injury. House a male with one or more females, or keep only females if you don’t want to breed them.

Ventilation is important and best provided by using some form of mesh for the top or even for part of one side of the enclosure. If you choose to vent one side, make sure you install the mesh at the “cool” end of the cage. However, be careful when using wire mesh or screens — if the reptiles can reach the wire they will rub their snouts trying to escape and injure themselves. With this in mind, position any side ventilation about halfway up the enclosure. An open-mesh top is critical for allowing the passage of light and heat.

The enclosure should be easy to clean, ideally with smooth, watertight surfaces. The substrate should be selected to replicate the lizards’ natural environment, which for Central Netted Dragons means sand. Many varieties of sand are available, from reptile-specific sands purchased at a pet store to sand from your local hardware store. An economical option is bulk sand such as that used in children’s sandboxes. Be sure to choose sand that can be used for water filtration; this is a safer option than sand that has been heavily bleached or chemically treated. Central Netted Dragons are avid diggers, so provide as much sand depth as possible to allow them to engage in natural behavior.

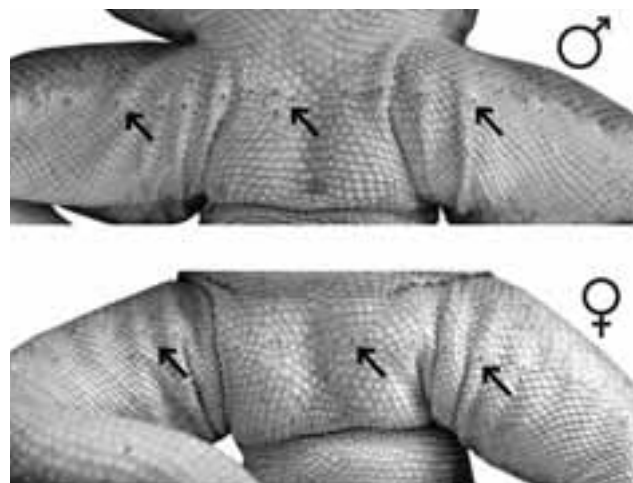
The most important features in an enclosure are retreats that give lizards a place to hide when they feel threatened. Some dragons also like to sleep in a protected area, so a retreat is essential for minimizing stress levels. When housing more than one lizard, each animal should have an individual retreat. Because these lizards love to dig, features should be positioned so they are steady and won’t tumble onto your lizard if it digs under or around them. As a general rule, try to place heavy items so their bases are in contact with the bottom of the enclosure and surrounded by packed sand so that your lizard cannot get stuck under them and subsequently be injured or suffocate.

The addition of some plants will add a finishing touch and make it feel more like home for your lizards. Plants like *Spinifex* or succulents can be used as long as they don’t have spikes that can cause injury. You also can choose from a variety of artificial silk or plastic plants.

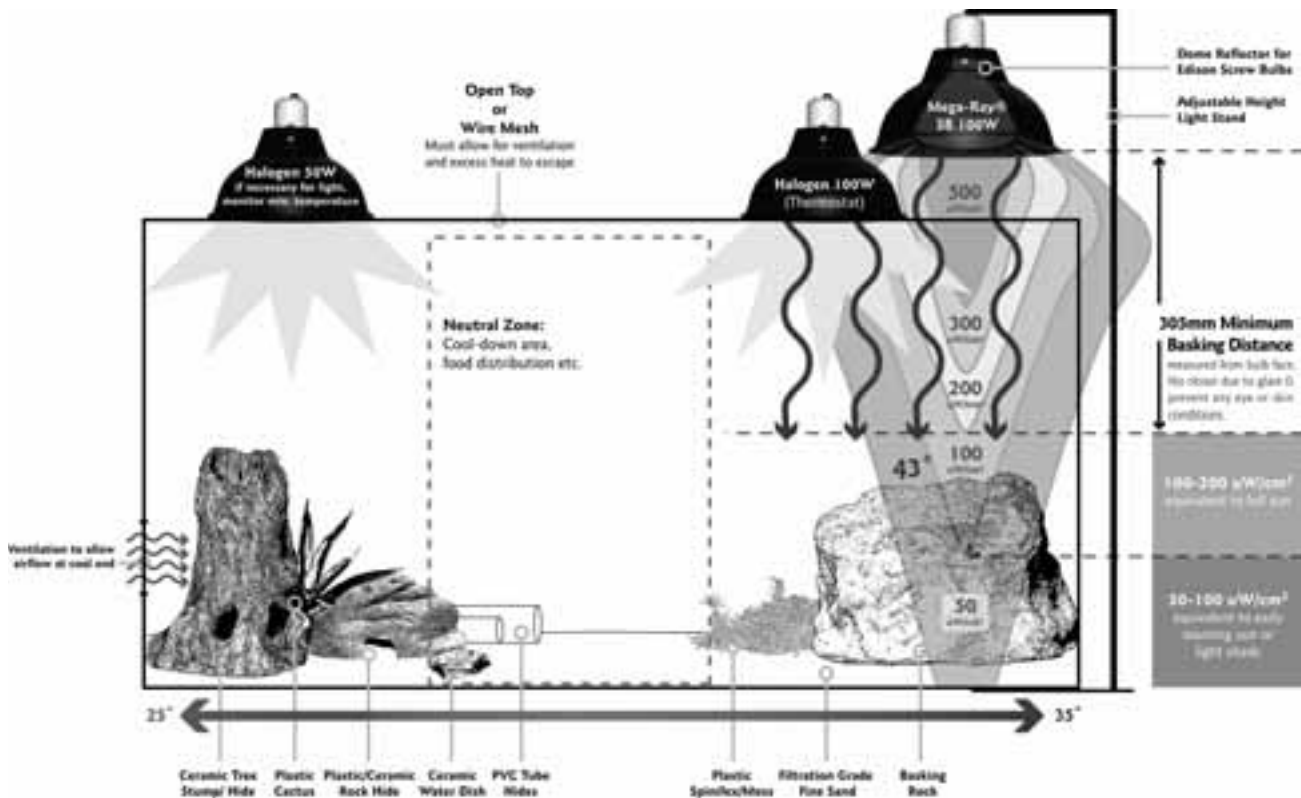
Make sure the water you provide is in a solid container that cannot be spilled. The container must be cleaned and water replaced daily. When using tap water, condition the water by using a reptile water conditioner that will remove chlorine and chloramines as well as ammonia. If you see any feces in the water, you need to empty the container and clean and sanitize it before putting it back in the enclosure. I recommend using a veterinary grade disinfectant such as Chlorhexidine for cleaning features and the enclosure itself.

### Heating and Lighting

A temperature gradient allows your dragon to thermoregulate by shuttling between low and high temperature areas in the



Comparing femoral pores is one way to determine sex.



An indoor habitat showing proper heat and lighting.

enclosure. The ambient daytime temperature should be around 25 °C (77 °F) at the cold end of the enclosure, whereas the hot end and basking areas should be maintained at 35–40 °C (95–104 °F). These temperatures should be constant with minimal fluctuations.

Place a thermometer in the basking area to make sure the temperature does not exceed a maximum temperature of 43 °C (109 °F). Depending on the size of the enclosure, the light generated from the basking area may be enough for the entire enclosure; however, if you feel the cooler end is not bright enough, use a low-wattage fluorescent or halogen globe positioned so that it will not affect the minimum temperature range. Make sure you have a second thermometer placed in the cold end to monitor the gradient.

Lights in summer should generally be on from 0500–1830 h. This provides at least 13 solid hours of UV light and closely replicates a summer day. During winter, the photoperiod should be reduced to 8–10 hours a day, and overall temperatures reduced.

Because Central Netted Dragons are desert-dwelling lizards, lighting is one of the most important aspects of caring for your dragons. Providing ideal lighting is absolutely critical for their physical and psychological health. In the wild, the sun fulfills all the dragons' heat and light requirements. Reptiles are tetrachromatic, meaning that their eyes possess four types of cones (light receptors that respond to different wavelengths or colors of light). This gives them the ability to view a portion of the UVA range. Studies show that correct reptile color rendering of artificial light is not only necessary for intersexual recognition, but also for motion perception during foraging and for maintaining

an animal's sense of well being. The immune system is as dependant on the correct heat and light as it is on nutrients derived from diet.

While no artificial light can replicate the full benefits of direct sunlight, current technology can fulfill a dragon's needs. This cannot be done with a single lamp and must be accomplished with a combination of specific bulbs. While I don't have the opportunity to go into fine detail in this article about the pros and cons of various lamps and how to use them appropriately, note that my book, from which this article is extracted, does explore this subject in much greater detail.

Ultraviolet light is very important to your dragon's health, in particular that portion in the spectrum known as UVB. UVB-light allows lizards to synthesize Vitamin D3 in their skin, which in turn mediates the absorption of calcium and the development of strong, healthy bones. Vitamin D3 also is needed for the health of the immune system and of muscles, including those of the gut and reproductive system. Without UVB, dragons of any age can develop Metabolic Bone Disease (MBD). However, UVB light will not prevent MBD without adequate levels of calcium. Vitamin D3 allows a reptile's body to absorb the calcium needed for bone strength. Central Netted Dragons are mainly insectivorous and are susceptible to MBD since most insects are not rich in calcium. This is why a calcium supplement is vital.

UVA and UVB can be obtained through the provision of a Mercury Vapor Lamp or fluorescent tube; however, not all brands are alike and making the right choice will greatly affect the health of your dragon. I recommend researching [www.uvguide.co.uk](http://www.uvguide.co.uk), a website dedicated to testing and publish-

ing information on various brands of UV-emitting bulbs. Replace Mercury Vapor bulbs every 12–18 months and fluorescent bulbs every 6–12 months. Mark the installation date on the bulb so you remember when to replace it.

### Diet

Central Nettle Dragons wait for insects to pass before striking, often leaving an elevated basking spot to feed on a passing insect before returning to bask. An 18-month field study of Central Nettle Dragons in 1970 in Alice Springs and the Simpson Desert investigated stomach contents from 156 individuals over all seasons. The study found that the diet of dragons in natural habitats was composed of 71.9% insect prey, 24.3% vegetation, and 3.7% sand and debris. The remaining 0.1% was a lizard in one of the 156 stomachs.

A safe and healthy diet is crucial for optimal health. Use only live insects that have not been exposed to insecticides or chemicals. Feed adult dragons two or three times a week and allow them to eat as much as they want over the course of about 20 minutes. Some authorities suggest feeding small reptiles like Central Nettle Dragons more frequently, as many as five times a week. However, if not very carefully monitored, this can result in an overweight dragon with health problems such as a fatty liver. However, growing juveniles should be fed as many as five times a week.

The most popular choices for a staple diet are crickets and cockroaches (also known as “woodies”), but dragons also love mealworms and silkworms, which can be used occasionally to add variety. Whether you choose crickets or woodies, they should always be “gut loaded” before feeding them to your dragon to provide the highest nutritional value. To prepare the insects, you can feed them vegetables and fruit as well as cat or dog food, moist or dry. I use pieces of oranges, apples, and carrots sprinkled with a vitamin supplement for insectivores, as well as a calcium powder. The fruit keeps the insects well hydrated without having to use additional water sources. To avoid



Central Nettle Dragons relish small insects such as crickets and woodies.

impaction, feed your dragon only insects that are equal to or smaller than the width of the dragon’s head. If in doubt, go smaller. No crickets or woodies should be left in the enclosure after each dragon has finished feeding. These insects are experts at hiding until nightfall, when they come out and harass and bite your dragons. Aside from interrupting their sleep, bites can result in open sores, especially in young dragons. Dragons should receive a balance of vitamins and minerals, such as a multi-vitamin supplement, to avoid common deficiencies. Too much can also be harmful, so don’t use the multi-vitamin more than once a week.

Some dragons will enthusiastically eat certain leaves and flowers, while others will refuse. For dragons that accept them, fresh leaves and flowers should be offered on a regular basis. Some plants can induce diarrhea, and others are toxic or provide little or no nutritional value (e.g., iceberg lettuce), so be careful what you offer. The most popular plant is the dandelion, and for good reason. Dandelion leaves are high in calcium and Vitamin



Central Nettle Dragons are sexually dimorphic as seen here with the smaller female in front.



A male *Ctenophorus nuchalis* bites a female's nape while attempting copulation.

And dragons usually love the young flower buds. Bok Choy also is high in calcium and Vitamin A and seems to be accepted by dragons that enjoy dandelions. Hibiscus flowers also are a favorite, but be sure they have not been exposed to pesticides or insecticides.

### Breeding

For breeding purposes, your dragons need to be healthy and maintained in as natural an environment as possible in order to encourage mating. The sex of a Central Netted Dragon can be determined by comparing the following characteristics: (1) Males have a larger head-to-body ratio compared to females; (2) males have larger and more distinct femoral pores (located on the underside of hind thighs; known as pre-anal pores when situated above the vent); (3) a male's tail will taper gradually to the end, whereas a female's tail will start out thick at the vent and then rapidly taper for the remainder of the tail length. Accurately determining the sex of younger dragons is difficult, and the only certain way is to take the lizard to a reptile veterinarian to be probed.



The enlarged abdomen of this female indicates that she is gravid and due to lay soon.

Like many other lizards, Central Netted Dragons demonstrate very interesting courtship behaviors. When a male and female are housed together, the male will display his dominance



A hatchling may take several hours or even more than a day to fully emerge from the egg.



A hatchling breaks through the soft egg and takes its first breath.



Hatchling *Ctenophorus nuchalis* are tiny (seen here next to an Australian 20-cent piece).



by vigorous head bobbing and chasing the female around the enclosure. The female will respond with subdued head bobbing and slow arm waving as signs of submission. The male will attempt to bite the female at the back of the neck and then mate with her.

Females are oviparous (= egg laying), laying 2–3 clutches of 2–6 eggs during spring and summer. Gravid females need warm summer temperatures to effectively develop eggs. A specific covered area filled with moistened sand or vermiculite is most appropriate as a nesting site. The same medium is used during the incubation process. Covering the nesting area enables the female to feel less vulnerable, especially if she is still housed with the male.



Hatchlings quickly establish a hierarchy.

Be careful if you have water bowls in the enclosure, as gravid females may use these for nesting areas, which will spoil the eggs. They may want to drink regularly, so providing regular access to water is important, although this should be supervised until eggs are deposited. The female will become quite restless prior to laying her eggs and will dig all over the enclosure looking for the perfect spot. A gravid female usually will stop eating during the weeks prior to laying. You will notice that after she has laid, she will seem to have suddenly lost a substantial amount of weight. This is the best indication that the enclosure needs to be searched carefully for eggs. When you locate the eggs, they should be carefully excavated without



Central Netted Dragons (*Ctenophorus nuchalis*) will reward proper housing and care with a calm temperament, a willingness to interact with the keeper, and, if desired, a disposition to reproduce in captivity.

being turned. The soft leathery white eggs should be handled with care and placed in the incubation medium in the same orientation in which they were found. Eggs should be incubated at temperatures of 28–32 °C (82–90 °F) and will take 8–11 weeks to hatch.

Hatchlings require considerably more care than juveniles or adults. They should not be housed with older dragons, as they will be seen as food and quickly killed. Keep them in a very simple set-up at first. Use damp paper towel as flooring and provide a basking area and several retreats in various temperature ranges. Keep the paper towel moist by misting with filtered water several times a day for the first week or so, and once a day thereafter. Offer food immediately. Suitable prey includes small crickets and tiny woodies, as well as access to fresh, finely chopped dandelion leaves.

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