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Chameleons of the
Genus Furcifer

CHAMELEONS OF THE GENUS FURCIFER

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Furcifer minor. Photo: C. Anderson

Chameleons have always attracted the interest of humans. They are creatures that are known around the world for their many unusual (or unusually developed) characteristics. They have been attributed symbolic meaning, and have been quite popular as pets in captivity. Following are some of the striking features that are characteristic of chameleons, and for which they are widely known.

In most species of chameleons the tail is prehensile, and serves as a fifth functional extremity used to grasp branches when the chameleon is climbing in trees and bushes. When not in use, the tail is rolled up into a spiral under its base.

With independently moving eyes, the chameleon is capable of seeing at almost any angle around its body. The eyes are covered with fused eyelids that allow light to enter the pupils through a small pinhole opening only. The eyes of the chameleon are well adapted for effectively locating prey or danger without requiring the animal to move its head or body. They also play an important role in the shooting mechanism of the tongue.

The tongue of the chameleon is very long (in many species longer than the snout-vent length). It can be extended fully in a split second, and has a sticky tip to grasp prey (usually insects), which is then quickly drawn back into the mouth to be crushed by the powerful jaws and swallowed.

Furcifer antimena. Photo: P. Martínez Carrión

Furcifer antimena. Photo: P. Martínez Carrión

Chameleons are especially known for their ability to change color. This can be done quickly, and is used by the animals for intraspecific communication, for camouflage (to hide from prey or predators), and to control thermoregulation.

Zygodactylous extremities (pincer-like feet with toes fused into two opposable bundles) enable the chameleon to grasp branches firmly. This ability combined with unusual muscle-fiber function allows a chameleon to perch in the branches for long periods of time without moving — resting, but not so relaxed as to fall, even in windy weather.

All of these and other characteristics make the chameleon a textbook example of a sit-and-wait (or ambush) predator: an animal whose hunting strategy is to find an advantageous spot where it can safely remain motionless until prey comes close enough to be quickly seized by surprise.

Chameleons are currently classified in about a dozen genera of the lizard family Chamaeleonidae. The genus *Furcifer* was first described by Fitzinger in 1843, but this genus name was not used for nearly 150 years. In 1986, Klaver and Böhme conducted extensive and revolutionary studies of external morphology and lung and hemipene structure. Based on their findings, they re-erected the genus *Furcifer* from synonymy, and the name has since been generally accepted and used.

Furcifer balteatus. Photo: P. Martínez Carrión

At present, the genus *Furcifer* comprises 21 species. The majority of these species were scientifically described during the 19th century, but have been known by different generic names (mostly *Chamaeleo* or *Chamaeleon*). Four species (*Furcifer angeli*, *F. belalandaensis*, *F. petteri*, and *F. tuzetae*) were added to the list of known species in the 1960s and 1970s thanks to the works of Brygoo, Bourgat, and Domergue. The most recently described species of the genus are *F. nicosiai* (described by Jesu, Mattioli & Schimmenti in 1999) and *F. timoni* (described by Glaw, Koehler, and Vences in 2009).

The distribution range of the genus *Furcifer* centers on the island of Madagascar, which is almost entirely inhabited by different species in different areas — from the coastal lowlands through the foothills of different mountain ranges, and even to the tops of the mountains, including the central massif. From Madagascar, representatives of

Furcifer petteri. Photo: P. Martínez Carrión

Furcifer verrucosus. Photo: P. Martínez Carrión

Furcifer oustaleti. Photo: C. Anderson

Furcifer minor. Photo: C. Anderson

Furcifer pardalis. Photo: C. Anderson

Furcifer rhinoceratus. Photo: C. Anderson

this genus dispersed naturally to the Comoros Islands (between northern Madagascar and the African mainland), which are home to two endemic species: *F. cephalolepis* and *F. polleni*. East of Madagascar, *F. pardalis* is abundant on the islands of Mauritius and Réunion; the possibility that the species was artificially introduced to these islands (i.e., with the help of humans) has not been ruled out. One species was reported to occur on the African mainland — *F. oustaleti* was found in Ngong Forest near Nairobi in the 1970s, but has not been found there since. It was apparently carried there by humans, either accidentally or intentionally. Additionally, as a result of escapes from breeders and hobbyists, *F. pardalis* has been able to establish local populations even in California, Texas, and Florida. Thanks to its large size, attractive coloration, and relatively easy husbandry, this species has become quite popular among terrarium keepers.

Table 1. Checklist of the Genus *Furcifer* Fitzinger, 1843

Species and author	Range
Furcifer angeli (Brygoo & Domergue, 1968)	NW Madagascar
Furcifer antimena (Grandidier, 1872)	SW Madagascar
Furcifer balteatus (Duméril & Bibron, 1851)	E Madagascar
Furcifer belalandaensis (Brygoo & Domergue, 1970)	SW Madagascar
Furcifer bifidus (Brongniart, 1800)	E Madagascar
Furcifer campani (Grandidier, 1872)	Central Madagascar
Furcifer cephalolepis (Günther, 1880)	Grande Comore, Comoro Islands
Furcifer labordi (Grandidier, 1872)	Coastal W Madagascar
Furcifer lateralis (Gray, 1831)	All Madagascar except N and NE
Furcifer minor (Günther, 1879)	S Madagascar
Furcifer monoceras (Boettger, 1913)	NW Madagascar
Furcifer nicosiai Jesu, Mattioli & Schimmenti, 1999	Tsingy de Bemaraha Massive, W Madagascar
Furcifer oustaleti (Mocquard, 1894)	All Madagascar
Furcifer pardalis (Cuvier, 1829)	E and NE Madagascar incl. offshore islands (Nosy Bé, Nosy Boraha, Nosy Faly, Nosy Mangabe), Mauritius and Reunion
Furcifer petteri (Brygoo & Domergue, 1966)	Montagne d'Ambre, N Madagascar
Furcifer polleni (Peters, 1873)	Mayotte, Comoro Islands
Furcifer rhinoceratus (Gray, 1845)	Central W Madagascar
Furcifer timoni Glaw, Koehler & Vences, 2009	Montagne d'Ambre, N Madagascar
Furcifer tuzetae (Brygoo, Bourgat & Domergue, 1972)	Andrenalamivola near Ambiky, S Madagascar
Furcifer verrucosus (Cuvier, 1829)	SW Madagascar
Furcifer willsi (Günther, 1890)	E Madagascar

Habitat types occupied by species of the genus *Furcifer* range from lowland humid tropical forests to montane forests, dry forests, and open montane grassland. Some species (e.g., *F. petteri*, *F. timoni*, and *F. belalandaensis*) are restricted to small isolated distribution areas, and have specific climatic requirements. Other species (e.g., *F. pardalis*, *F. lateralis*, and *F. oustaleti*) inhabit huge ranges and live in a variety of diverse habitats — these chameleons tend to be ecologically flexible, adapting readily even to environments that have been altered by humans, such as gardens, plantations, or fences, and even in close proximity to people. Because of drastic destruction of natural habitat in Madagascar, some of these highly adaptive species have replaced others that originally lived in areas where habitat has been destroyed.

Chameleons of the genus *Furcifer* vary in size from less than 20 centimeters (e.g., *F. campani*) to more than 60 centimeters (*F. oustaleti*, which is the largest chameleon species of all). In physical appearance, some species (such as *F. lateralis* and *F. campani*) have no extraordinary or outstanding features outside the typical prototype of the

Furcifer pardalis. Photo: C. Anderson

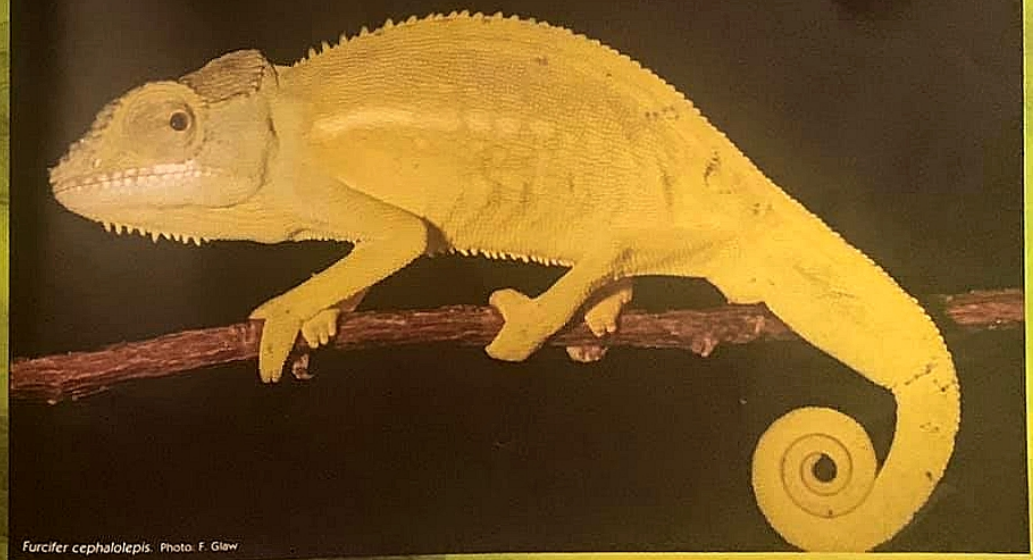
Furcifer oustaleti. Photo: C. Anderson

Furcifer bifidus. Photo: F. Glaw

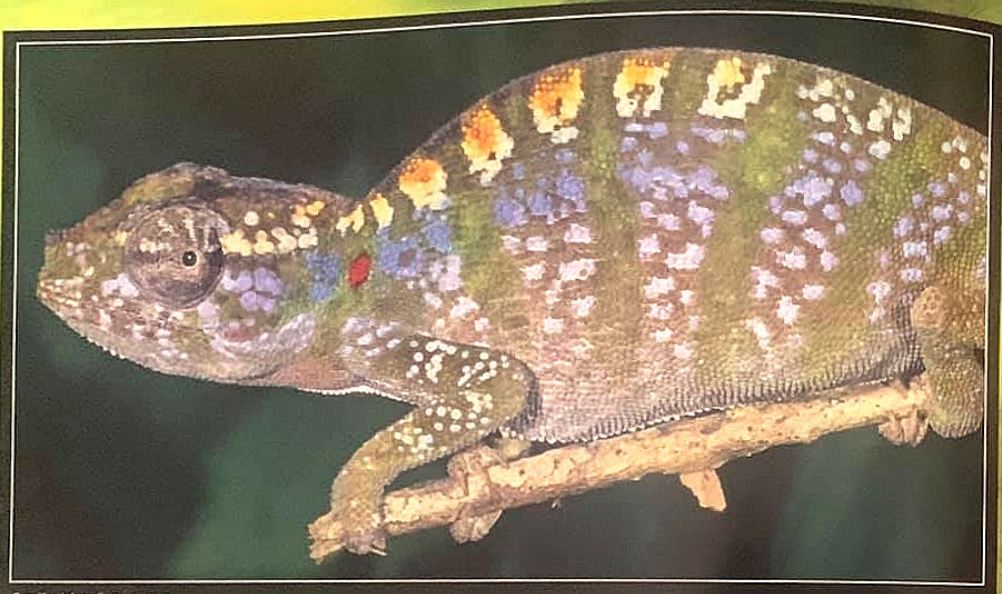
Furcifer oustaleti. Photo: C. Anderson

Furcifer willsii. Photo: F. Glaw

Furcifer polleni. Photo: F. Glaw



Furcifer cephalolepis. Photo: F. Glaw



Furcifer labordi. Photo: F. Glaw

Furcifer timoni. Photo: F. Glaw

chameleon family. Other species present various bizarre morphological features, such as high spiky dorsal crests (e.g., *F. labordi* and *F. antimena*), high helmets on their heads (e.g., *F. oustaleti*, *F. labordi*, and *F. antimena*), single rostral horns (e.g., *F. labordi*, *F. rhinoceratus*, and *F. antimena*), double rostral horns (e.g., *F. wilsii*, *F. petteri*, *F. timoni*, *F. balteatus*, *F. bifidus*, and *F. minor*), or extremely enlarged scales (e.g., *F. verrucosus*).

Some species of *Furcifer* (e.g., *F. oustaleti*) have the ability to display only a few colors on their bodies, remaining mostly gray or brown. Other species (e.g., *F. lateralis*, *F. campani*, *F. minor*, *F. antimena*, etc.) can display extremely colorful and complex patterns of red, pink, yellow, blue, etc.

Local people of Madagascar often view chameleons with respect

Furcifer nicosiai. Photo: F. Glaw

Furcifer angeli. Photo: F. Glaw

or fear, or even hatred. The "strange" creatures are often considered evil or *fady* (taboo).

Thanks to their bizarre appearance and interesting natural history, some species of *Furcifer* are popular pets. The only species that is kept and bred in captivity on a large scale is *F. pardalis*, commonly called the panther chameleon. Especially in the United States, this species is available in several color morphs, known mostly by the Malagasy names of the places from which the original breeding stock was collected.

Legal trade in chameleons of the genus *Furcifer* is regulated by the national laws of their countries of origin (either wild caught or captive bred) and by international regulations such as CITES and others.

Not long ago, *Furcifer labordi* gained world renown as a result of a field study that showed this species to be an extraordinarily short-lived land vertebrate. It hatches, grows to sexual maturity, mates, lays eggs, and dies in as little as 6 months time. The species is adapted to very particular and climatically demanding regions of dry deciduous lowland forest of central-eastern Madagascar. It is a phenomenon that has been known for decades in other chameleon species. ■

Furcifer timoni. Photo: F. Glaw