

Keeping of Parson's chameleon (*Calumma parsonii* (Cuvier, 1824)) at BION Terrarium Center

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This chameleon species was first described as *Cameleonis rariss* in 1768 by James Parsons. Being identified and named after James Parsons (the chameleon of Parson) by George Cuvier in 1824, *Chamaeleo parsonii parsonii* is the largest Malagasy species of the Chamaeleonidae family. Parson's chameleons are endemic to areas of humid primary forests of northern and eastern shores of Madagascar. They also inhabit high-altitude cool tropical rainforests of St. Mary's Island (Fig. 5). There are 2 subspecies known (Nečas, 2004).



Figure 1. *Calumma parsonii*, “yellow giant” female (left) and male (right).



Figure 2. *Calumma parsonii*, “orange eyed” young male.



Figure 3. *C. parsonii*: “yellow-lipped” and “cherry-eyed”. Photos by Alexander Kiselev.

Nominative subspecies is *Calumma parsonii parsonii*. The coloration of the males is fairly stable with variations of green to turquoise-blue as the ground color. There are three brownish diagonal stripes moving down from the dorsum towards the anterior of the body. Highlighting the center of the flank is a pale yellow-white spot. The eye turrets are large and can be a clear yellow to a deep copper or orange. Females’ predominant ground color is green varying from yellow-green to bluish-green with the same diagonal stripes and flank spot. These stripes are much less pronounced in females. Females of both subspecies are generally smaller than the males (Claw, Vences, 1994). The squamation of both sexes is homogeneous and smooth, formed of quadrangular scales. The male has a paired divergent rostral process, which is often warty and denticulated at its termination; the female has none. Stress coloration in the males is a general blanching of overall color or a darkening, showing black diagonal stripes with dark spotting scattered over the body. Stressed females display an increase in yellow color, which shows as spots or blotches. When this coloration reaches its peak, the female appears to be yellow with green spotting (de Vosjoli, Ferguson, 1995). The maximum total length of the nominative subspecies is 650 mm (25.6 in) (snout-to-vent length

(SVL) is 295 mm (11.6 in), tail length (TL) is 400 mm (15.7 in) for males; SVL=200 mm (7.9 in), TL=295 mm (11.6 in) for females). According to some sources, maximum total length can reach 810 mm (31.89 in). *Calumma p. parsonii* has its range in the mountain forests on the elevated eastern zone of Madagascar. They are found from the north of Montagne d'Ambre to Fort Dauphin. They have also been found on (possible locality of the "yellow-lipped" variation) and in Ambanja on the west coast of Madagascar. This



subspecies is commonly found at altitudes of 400 to 1200 m a.s.l. (de Vosjoli, Ferguson, 1995; Davison, 1997).

Figure 4. *C. p. cristifers*. Photos by Craig Durbin.

Calumma parsonii cristifer is smaller than the nominative subspecies, with total length about 500 mm (19.7 in) (SVL=260 mm (10.24 in), TL=215 mm (8.46 in) for males; SVL=220 mm (8.66 in), TL=175 mm (6.90 in) for females). Both sexes have a dorsal crest that is distinct over the first half to two-thirds of the body, formed of small, regular, conical tubercles (Fig. 4). Another distinguishing feature is a feeble parietal crest. There are several variations in coloring between individuals. Males can have colors ranging from dark green to light green-yellow. There are some males which show bluish hues to full body blue coloration. Males will typically have a rust-orange spot on their flanks. Female colors range from brown-tan to green, sometimes with a white-yellow spot on the flanks. Males have a pronounced rostral process, and some females also show a less developed rostral process. Neonate coloration can be tan, brown, orange, green, and green-blue, often from the same clutch. *Calumma p. cristifer* is found in a limited range of the eastern zone of rainforest and does not overlap into the range of *Calumma p. parsonii*. The sole location of this subspecies is Perinet (Andasibe). It is found at altitudes of 800 to 1300 m a. s. l. (de Vosjoli, Ferguson, 1995).

Average age at sexual or reproductive maturity is around 3 years for both sexes. Range age at sexual or reproductive maturity for males and females is from 3 to 5

years. Females may not lay eggs every breeding season. One female can lay only 1 clutch (20-60 eggs depending on female's size) during breeding season. Eggs hatch in 18-24 months.

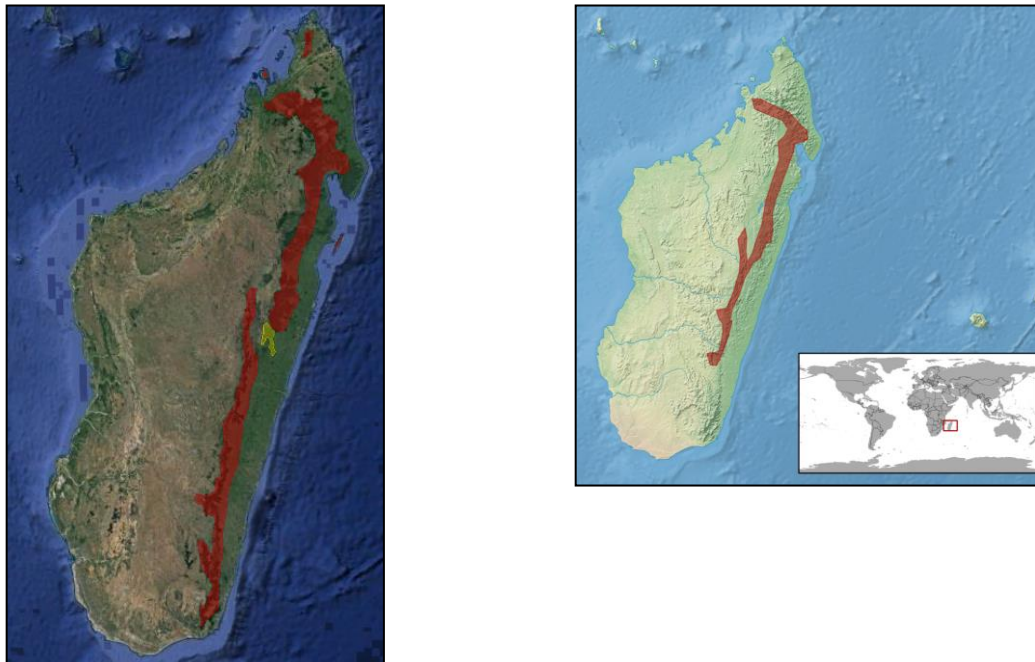


Figure 5. *C. p. parsonii* (red) and *C. p. cristifer* (yellow) distribution areas according to literature resources (de Vosjoli, Ferguson, 1995) (left); *C. parsonii* (sensu lato) distribution area according to https://en.wikipedia.org/wiki/Parson%27s_chameleon (right).

According to Craig Durbin, who successfully keep *C. p. cristifers* for many years, sexual maturity occurs at around 2-3 years. Females breed yearly and gestation is around 100 days. Incubation had been successful with and without using a diapause period. Eggs hatched after around 13 months. Females can sometimes produce infertile clutches.

Average lifespan is 10-12 years in the wild, and up to 14 years in captivity (Jenkins et al., 2011).

There are three basic different types of *C. p. parsonii* coloration: yellow giant (YG) (Fig. 1) or honey-colored (mainly from Anosibe An'ala district), yellow-lipped (YL) or yellow-eyed (Fig. 3) (on the islands of Nosy Boraha and Nosy Be), and orange-eyed (OE) or white-lipped (mainly found in Tomatave and Soenierana districts) (Fig. 2) (Claw, Vences, 2007). However, extremely rare or abnormal color morphs, like cherry-eyed individuals, can be found from time to time. One of such rarities was raised by Russian chameleon expert Alexander Kiselev (Fig. 3).

Parson's chameleons are quite easy to sex when being adult. Males have well-seen rostral process and are larger than females. But it's not always easy to do it with juveniles. Typical approach to sexing, based on presence of hemipenal bulges doesn't work with this species, as hemipenes are located in slots in the tail and this may be the reason why they are not as obvious as, for example, in *Furcifer pardalis* (Cuvier, 1829).

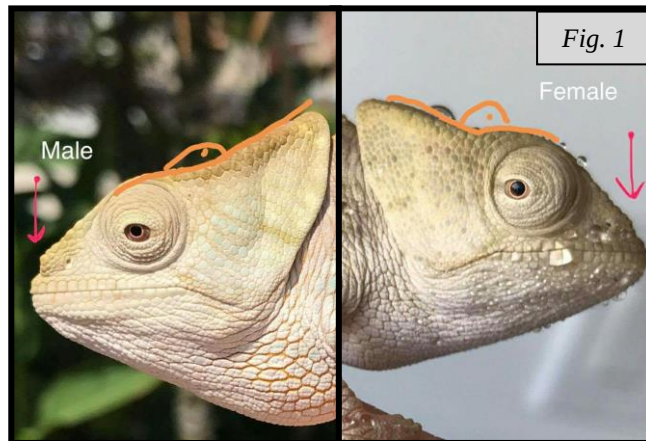


Figure 6. *C. p. parsonii* features useful for sexing at early age (photos by Craig Durbin).

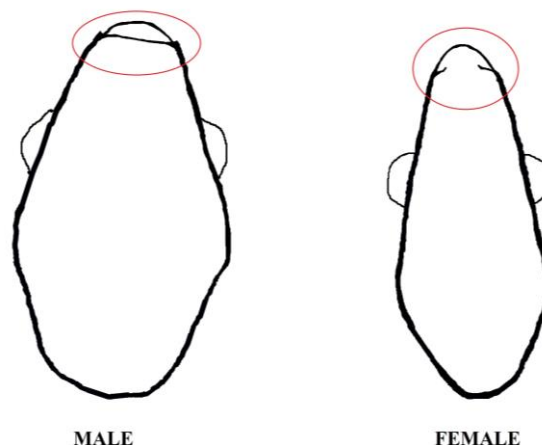


Figure 7. Additional *C. p. parsonii* features useful for sexing at early age.

There are many suggested strategies of sexing of young individuals of *C. parsonii*. According to Craig Durbin (<https://www.facebook.com/primochams/>) who raised the babies of “orange-eyed” morph, blue dots on males’ cheeks are one of the first indicators of sex. Of course this might just be because of the certain color phase of the individuals and other OE from a different area may color up differently. So this indicator is not very reliable.

In most cases overall body color remains the same between males and females of a certain age before reaching sexual maturity. What seems to be the determining indicator is the formation of the rostral process. The males have a more vertical front

and the females have more sloped front. The babies pictured are between 20g and 45g (Fig. 6).

We use another approach to sexing, mentioned by Craig Durbin which is based on the head shape. According to this methodology, males have wider heads when viewed from above. Also the lateral parts behind the eyes are more noticeable than in females, covering more than half of the eyes. Females, on the other hand, have narrower heads and less prominent lateral parts behind the eyes. Males have a steeper front part of the helmet, which when viewed from above, divides the front of the head into two sections. In contrast, this part of the helmet in females is more sloping (Fig. 7). But this method doesn't give 100% successful sexing because of natural variability. This method is used also when animals weigh of 30-45 g. Probably combination of two methods mentioned above may give more reliable results, but this requires further investigations and work of many experts.

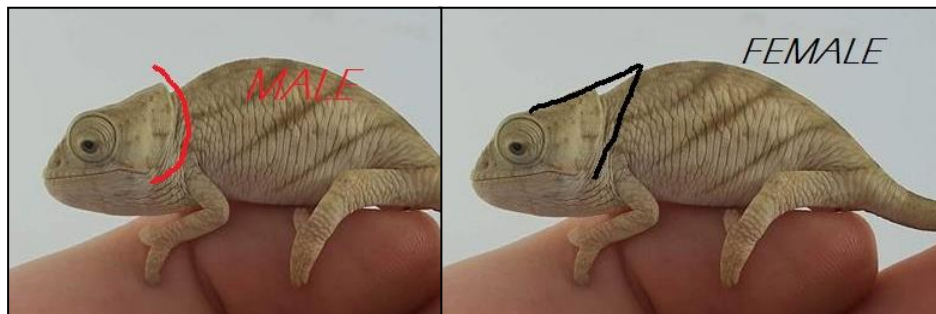


Figure 8. Additional features used for sexing in *C. parsonii* based on casque form (photo by Frédéric Cornu).

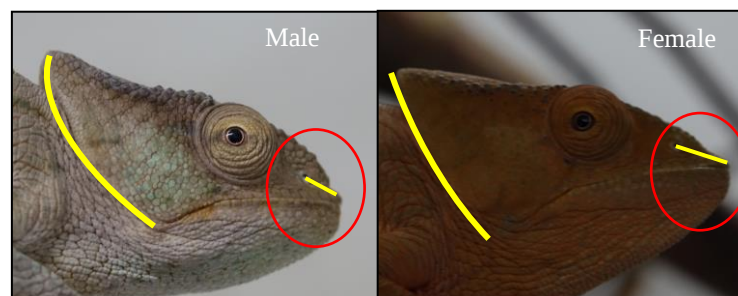


Figure 9. Features (lips' length and casque form) used for sexing in *C. parsonii* young individuals.

But recently we found another approach to sex juveniles at early age of 2-3 months, used by one of chameleon experts – Frédéric Cornu. It is based on the evaluation of the head shape from the profile side. In this case, female has a more acute angle at the top of the casque, and its edge has a straight form. In contrast, male has a casque with slightly rounded edge and a shorter and blunter top (Fig. 8). But this approach works mostly when the animals are young. For example, OEs have such

trends of casque shape during almost all life stages. It is more difficult about all the Giants. The shape of the males' casque could be longer and straighter like a female when they grow, so it is better to sex them young.

But, according to Frédéric Cornu when you have specimens older than 1.5 years also the distance between the nostril and a mouth top can also be used for sexing in addition to the casque shape. As females have longer heads, consequently the above-mentioned distance is a bit longer than in males (Fig. 9).

But it must be mentioned that none of the approaches described above gives 100% of successful sexing and there is always a small part of surprise.

In a natural environment Parson's chameleons undergo changes in seasons that include cool winter temperatures. Some keepers allow the same changes with captive specimens. This is achieved by reducing temperatures and lighting cycles during the winter period. During this time *C. parsonii* have a greatly reduced food intake, with some individuals not feeding for up to 5-6 months. During brumation, healthy chameleons will have very little weight loss. Some keepers believe that brumation helps females with their reproductive cycles and maintaining good health. Females will often lay eggs 2-3 months into their brumation period.

Keeping and breeding requirements

Adults

Keeping. We keep adults in vertical terrariums 200*100*150 cm (79*39*59 in). Decoration includes several branches for climbing, artificial and living plants and lianas. We use no substrate (Fig. 10, 11, 12).



Figure 10. Adult and young individual of *C. parsonii*.

Lighting. We use Zoo Med 5 UVB lamp for providing lighting, heating and UV. The lighting period is 12/12 hours at summer period and 8/16 hours at autumn-winter-spring period.

Temperature. Daytime temperature is +23 - +25 °C (73.4 - 77.0 F) (for 12 hours), nighttime - +18 - +20 °C (64.4 - 68.0 F) (for 12 hours).



Figure 11. Adult females of *C. parsonii* inside enclosures of 2m height.

Humidity. Humidity level is 80–90% with 2-3 sessions of intensive spraying during the day. We provide first spray 1 hour after turning the heating off, when animals are warmed-up enough.

Water. We use a drip irrigation system for 30 minutes 2 times a day.



Figure 12. Laboratory for keeping of young (left) and adult (right) *C. parsonii*.

Diet. Diet consists of crickets, Turkestan cockroaches and locusts (without the hind legs). For adults food is provided every other day (3-5 insects per head). We offer “Repashy” supplements every feeding.

Juveniles

Keeping. We keep juveniles (total length of 80-85 mm (3.14-3.35 in) in 45*45*60 cm (18*18*24 in) terrariums. Decoration includes 3-4 branched branches for climbing and living plants (small-leaved Benjamin figs, plants of *Chlorophytum* and *Crassula* genera) (Fig. 12) to retain moisture. We keep juveniles separately because they could perform aggressive behavior towards each other that causes problems with feeding.

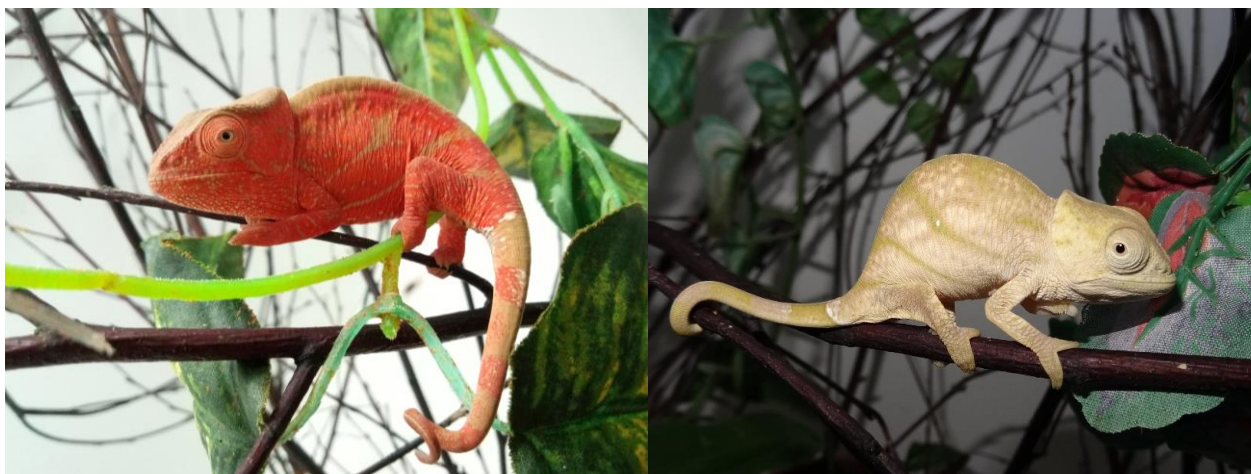


Figure 12. Young *C. parsonii* inside a decorated laboratory terrarium.

Lighting. The lighting time is 12/12 hours per day regardless of the period of the year. We use same lamps as for adults.

Temperature. Daytime temperature is +24 °C (75.2 F), nighttime - +18 - +20 °C (64.4 - 68.0 F). We use no incandescent lamps for heating. We use full-spectrum lamps to maintain required temperature in the laboratory.

Humidity. Humidity level is the same as for adults.

Water. We use a drip irrigation system (pouring of water in to irrigation system 2 times per day).

Diet. Diet for juveniles consists of crickets and Turkestan cockroaches. We feed juveniles every day (5-7 insects per head) until they gain total length of 150-160 mm (5.9-6.3 in). During this period a few feeding dishes are attached to the branches. We offer “Repashy” supplements every feeding. We also give them fruit flies from time to time.

Rickets (deformation and softening of the bones) may develop in juveniles and adults in case of improper husbandry. In this case the exposure to UV should be increased (“hard” UV over 280 nm during 2 minutes every other day until improvement). Liquid calcium gluconate is offered with drinking water by 2-3 drops from 2 ml syringe

every other day until improvement) (Fig. 13). Additional health issues include mouth infections (stomatitis) and sores on the pads of the feet. Periodic inspections and quick action to address these issues are key strategy to preventing major health problems.



Figure 13. Giving calcium gluconate to *C. parsonii*.

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