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Quadruplets, Triplets and Twins in Chameleons (Sauria: Chamaeleonidae)

PETR NEČAS¹, SERGII PROKOPIEV, CRAIG DURBIN,
JÜRGEN VAN OVERBEKE & CHRISTOPH ROTH

¹ Corresponding author: petr.necas@me.com

ABSTRACT

A historical overview of documented occurrence of chameleon twins, triplets and quadruplets and their life history is presented, with reports on the first documented twins in *Calumma parsonii parsonii* (CUVIER, 1852) and *Trioceros laterispinis* (LOVERIDGE, 1932); second documented triplets in *Chamaeleo calypttratus* DUMÉRIL & DUMÉRIL, 1851 and *Furcifer pardalis* (CUVIER, 1829) and first documented quadruplets in *Chamaeleo calypttratus*.

Key words: *Calumma parsonii*, *Chamaeleo calypttratus*, *Furcifer pardalis*, *Trioceros jacksonii*, *Trioceros laterispinis*, *Trioceros quadricornis*, twins, triplets, quadruplets, captivity

INTRODUCTION

For about three decades chameleons have been gaining in popularity as pets and two species have been established in large numbers in captive populations including *Chamaeleo calypttratus* and *Furcifer pardalis*. Recently *Furcifer lateralis*, *Furcifer oustaleti*, *Trioceros jacksonii* and *Calumma parsonii* have also been successfully bred in captivity in increasing numbers.

As data on the reproductive biology of chameleons in the wild are still rather scarce and there is no single observed case of twins or triplets from the wild, we rely in the study of this phenomenon, on observations from captivity, which are, unfortunately, not often published. From the hundreds of thousands of chameleons produced in captivity annually in recent years (PETR NEČAS'S estimate based on analysis of internet data), the occurrence of twins or triplets is very rare, with documented observations being reported only several times in history. The occurrence of twins and triplets is likely appearing more frequently than reported, as the birth process is very rarely observed in captivity in viviparous species as well as the little more frequently but still rarely observed hatching process of oviparous species. Also, very rarely, numbers of empty eggshells are compared with the numbers of hatchlings, which often count dozens of individuals remaining the probability of noticing the twins much lower than in the case of some other reptiles,

producing significantly lower numbers of eggs.

It is currently unknown to what an extent conditions captivity influence the frequency of occurrence of twins and triplets. There is also virtually no base from which to assess the reasons of their appearance both in the wild and in captivity. Therefore, it can be assumed their occurrence is based solely on coincidence. There is, however, evidence collected by SERGII PROKOPIEV, that inbreeding increases the frequency of the appearance of twins significantly.

HISTORICAL OVERVIEW

There are known cases of only 6 species in total (including this report), of both viviparous species (2 – marked with VP) as well as oviparous species (4 – marked with OP) having been reported to produce twins:

Calumma parsonii (OP),
Chamaeleo calypttratus (OP),
Furcifer pardalis (OP),
Trioceros laterispinis (VP),
Trioceros jacksonii (VP),
Trioceros quadricornis (OP).

There are known cases of only 2 species in total (including this report), of oviparous species having produced

triplets (4 cases in history known only, including this report):

Chamaeleo calypttratus,

Furcifer pardalis.

Quadruplets have been reported in Chamaeleonidae only today in the following species:

Chamaeleo calypttratus.

KENT MANCHEN (1994) reported on a case of two pairs of twins within one clutch of *Furcifer pardalis*.

KENT MANCHEN (1994) simultaneously reported on a case of dead siblings birth of *Trioceros jacksonii* from Hawaii mentioned by THOMAS VILLEGAS.

MIKE MONGE (KEN KALISCH IN WWW) reported on triplets of *Chamaeleo calypttratus* in one egg.

NECAS (1999) mentioned rare cases of twin birth and observed (PETR NECAS, PERS. OBS.) twins of *Trioceros jacksonii xantholophus* and in *Chamaeleo calypttratus*.

KATRIN PAWLIK (IN LITT.) from Berlin, Germany, had in 2010 two pairs of twins within 20 eggs of the wild caught *Furcifer pardalis* from Toamasina (= Diego Suarez). The twin hatchlings were significantly smaller than their siblings and their growth rate was slower. They were raised individually with special care till adulthood.



Fig 1. Twins of *Chamaeleo calypttratus* (Yemen); foto SERGI PROKOPIEV

“FLCHAMS” from Florida, USA, reported in Facebook on 24th September 2015 about a case of Siamese twins of *Chamaeleo calypttratus* joined in the pelvic region.

BARBARA SUSAN BOWEN (IN LITT.) from the USA reported about a case of twins of *Furcifer pardalis* (Ambanja local form), originating from a clutch produced by captive bred, hatched in 2016. Both twins hatched alive, one being significantly smaller. The smaller one died at age of 2 weeks, the larger one at 4 weeks age.

LISA GIBBS (IN LITT.) from the USA reported in March 2017

on conjoined twins of *Furcifer pardalis* that died fully developed prior hatch. They originated from a captive bred pair from Nosy Faly local population.



Fig 2. Ventrally conjoined Siamese twins of *Trioceros quadricornis* (Cameroon); foto TYLENE DUNCAN

TYLENE DUNCAN (IN LITT.) reported on two cases of twins of *Trioceros quadricornis*, one pair was conjoined ventrally (siamese).

“CHAMELEON HOUSE” reported in Facebook on 29th March 2018 about a case of twins of *Furcifer pardalis*.

CHERYL GARCIA (IN LITT.) from PEMBERVILLE, USA, reported about a case of twins of *Trioceros jacksonii xantholophus* being born in one egg-sac on 11th October 2018. They were a part of a big clutch of 32 siblings, deposited by a wild caught female imported gravid from Kenya. The female was rather weak, so were the newborn ones; they had to be assisted penetrating and leaving the egg-sac and died within few days after birth, actually same as all their siblings.

“WORLD OF REPTILES” reported in Facebook on 19th October 2018 about a case of twins of *Chamaeleo calypttratus* (Translucent form).

BARBARA SUSAN BOWEN (IN LITT.) from the USA reported about a case of twins of *Furcifer pardalis* (Ambanja local form), originating from a 20 eggs clutch produced by captive bred parents (dam Tiamat, sire Mythos), hatched

on 24th December 2018. Both twins hatched alive, were same size and started moving around within 5 minutes after hatching. One of the twins died within few days, but the second was still alive at age of three months, showing slower growth rate than other siblings from same clutch.

ECKHARDT (2018) reported on a triplet from a single egg in *Furcifer pardalis*.

revealed. Unfortunately, though showing some signs of life initially, they did not survive. Later, one more egg from same clutch revealed further un-hatched twins. The eggs originated from a wild caught gravid female. It laid 60 eggs, out of which 48 made it full term. Neither the size of the clutch, nor the twins were the result of the captive conditions obviously. This is the first known documented case of reported (double) twins in this species.



Fig 3. Twins of *Calumma p. parsonii* (Madagascar); foto CRAIG DURBIN

OBSERVATIONS

Double case of twins in *Calumma parsonii parsonii*

On the 30th January 2019, CRAIG DURBIN found an evidently hatching egg of the same size within a series of eggs of *Calumma parsonii parsonii*, the s.c. “Yellow lip form”. After cutting it open, two fully developed babies, twins, of a little smaller size than other siblings, were

Triplets and twins in *Chamaeleo calypttratus*

SERGII PROKOPIEV provided evidence (except the unconfirmed pers. observation of M. MONGE – see above) of the first reported triplets of *Chamaeleo calypttratus*, as well as the first reported case of twins in the partially albinotic breeding line (called “translucents” in the USA and “piebalds” in Europe) of the same species, hatched in 2016. The triplets were not able to hatch and died in the egg.

Many cases of twins (around 40) originate in his own extensive breeding program within the last 20 years, which has produced many tens of thousands of offspring of *Chamaeleo calytratus*. On average, one case of twins is appearing every 1250 hatchlings. The appearance of twins in partly albinotic hatchlings is about three times more frequent than in normally colored hatchlings. In one clutch of 45 eggs, as a rarity 5, even 7 pairs of twins were present! The twins have often difficulties with hatching and die (70%) within the hatching process or several days after, showing general weakness, sleepiness and inability to eat. As a rule, if they survive, survive both. About 10% of the twins can make it to adulthood without special care, further 20% with special care. They are however weaker, showing much slower growth rate as their siblings from same clutch.



Fig 4. Triplets of *Chamaeleo calytratus* (Yemen);
foto SERGII PROKOPIEV



Fig 5. Quadruplets of *Chamaeleo calytratus* (Yemen);
foto SERGII PROKOPIEV



Fig 6. Triplets of *Furcifer pardalis* (Ambilobe, Madagascar);
foto CHRISTOPH ROTH



Fig 7. Twins of piebald *Chamaeleo calytratus* (Yemen);
foto SERGII PROKOPIEV

Triplets of *Furcifer pardalis*

CHRISTOPH ROTH provided evidence of a triplet of *Furcifer pardalis* (from Ambilobe population) as a result of his breeding program. On 18th July 2018, 27 eggs were laid, incubated at 25°C in moist Vermiculite. They started to hatch the first week of March 2019. The conjoined triplet was found in a collapsed egg after cutting it open. It did not show signs of life.



Fig 7. Twins of *Furcifer pardalis* (Toamasina, Madagascar);
foto KATRIN PAWLIK

Twins of *Trioceros laterispinis*

JÜRGEN VAN OVERBEKE from Belgium reported on twins in *Trioceros laterispinis* of extremely small size, which were raised with intensified care till adulthood.

Quadruplets in *Chamaeleo calypttratus*

SERGII PROKOPIEV found quadruplets in one egg in January 2020, laid by a female, which was partially albinotic and was of unusual small and dwarfed habitus, very likely due to problematic genetics of the lines heavily affected by inbreeding.

CONCLUSIONS

As a rule, the following observations are made:

- The eggs with twins are often different than others in shape and size (bigger), sometimes indistinct from others,
- The twins are of smaller size than the non-twin siblings,
- The twins are often malformed,
- The twins are weak,
- The twins have difficulties in hatching and often have to be assisted,
- The twins often keep their fetal position,

- The twins sleep almost all the time,
- The twins have difficulties starting to eat,
- The twins show a lower survival rate and die usually within hours or days after birth,
- Siamese conjoined twins appear rarely,
- Rarely, the twins grow to adulthood and even reproduce,
- Neither triplets nor quadruplets have been reported alive, no data on their biology are therefore available.



Fig 8. Twins of *Trioceros jacksonii xantholophus* (Kenya);
Foto CHERYL GARCIA



Fig 9. One of the twins of *Furcifer pardalis* (Ambanja, Madagascar),
at age of 3 weeks; Foto BARBARA SUSAN BOWEN

LITERATURE

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Fig 10. Twins of *Calumma p. parsonii* with shared yolk sac (Madagascar); Foto CRAIG DURBIN