

# The chameleons of the Greek mainland: taxonomic allocation and conservation needs of a second European species (Squamata: Sauria: Chamaeleonidae)

Die Chamäleons vom griechischen Festland:  
Taxonomische Zuordnung und Schutzprioritäten einer zweiten europäischen Art  
(Squamata: Sauria: Chamaeleonidae)

WOLFGANG BÖHME & ANDREA BONETTI & GEORGIOS CHIRAS

## KURZFASSUNG

Die einzige vom griechischen Festland (SW Peloponnes) bekannte Chamäleon-Population gehört nicht zur aus Europa bekannten Art *Chamaeleo chamaeleon* (LINNAEUS, 1758), sondern zum afrikanischen *C. africanus* LAURENTI, 1768 - Komplex. Die exakte taxonomische Stellung dieser griechischen Population innerhalb des Komplexes bedarf noch weiterer Untersuchungen, doch unterscheidet sie sich von den subsaharischen *C. africanus* - Populationen durch deutlich größere Körpermaße und eine unterschiedliche Färbungsvariabilität. Wahrscheinlich geht das griechische Vorkommen auf eine bereits in der Antike erfolgte passive Einschleppung zurück. Die Population hat sich dort seitdem als zweite europäische Chamäleonart etabliert, wurde aber erst jetzt als solche identifiziert. Ihr einziger Fundort in Europa ist ernsthaft durch hohen touristischen Druck gefährdet, weshalb *C. africanus* sofort auf die offizielle Liste besonders geschützter Tierarten Griechenlands bzw. der Europäischen Union gesetzt werden sollte.

## ABSTRACT

The only known chameleon population in mainland Greece (SW Peloponnesos) does not belong to the European species *Chamaeleo chamaeleon* (LINNAEUS, 1758) but to the African *C. africanus* LAURENTI, 1768 species complex. The exact taxonomic position of this Greek population within the complex has still to be determined; the individuals differ, however, from African subsaharan representatives by their much larger size and different range of colour variability. Most likely, the presence of *C. africanus* in Greece is due to passive human transport already in the antiquity, since that it established itself as a second chameleon species to occur in Europe, but was discovered only now. The only European location where it is known to occur is seriously threatened by tourist's pressure. *C. africanus* therefore should immediately be placed on the official list of protected animal species of Greece, and of the European Union, respectively.

## KEY WORDS

Sauria, Chamaeleonidae, *Chamaeleo africanus*, first record, Europe, Greece; conservation

## INTRODUCTION

The only chameleon species known to occur in Europe is the Common or European Chameleon, *Chamaeleo chamaeleon* (LINNAEUS, 1758). Published records for Greece comprise the islands of Chios, Samos and Crete (KLAVER 1981; KLAVER & BÖHME 1997), and two localities on the Peloponnesos (SCHREIBER 1912; BÖHME 1989). Whereas its presence on Chios and Samos is considered to be natural (being close to the neighbouring Anatolian distribution area), its status for Crete is disputed, and most authors agree in that the two Peloponnese records are due to human trans-

port or passive rafting at best (WERNER 1938; WETTSTEIN 1958; BÖHME 1989). Moreover, one of these two populations, viz. Maina (SCHREIBER 1912), is almost certainly extinct (BRINGSØE 1985). The other one, in the southwestern Peloponnesos, was discovered and described on the basis of a photograph showing a fairly big chameleon on the hand of a Greek hotel owner (BÖHME 1989: fig. 1). The photograph came with the reliable information that a reproducing chameleon population would be existing there at least for several decades.

## SPECIES IDENTITY OF THE PELOPONNESE CHAMELEON

In July, 1997, the senior author visited the Peloponnesos to have a look at the chameleons and their habitat, on which he had briefly published eight years ago. He was lucky to meet there with the two junior authors who were familiar with this chameleon population and others since several years. On July 7, 1997, we made a joint excursion into the habitat, and a big male was soon discovered on a *Tamarix* tree. A much smaller female was found in a neighbouring *Phragmites* stand. The huge male (total length 43 cm: fig. 1) exhibited a distinct tarsal spur (fig. 2) and showed not even traces of occipital flaps in its neck region (fig. 3) - both characters being non-existent in *C. chamaeleon*, but diagnostic for the tropical African species *C. africanus* LAURENTI, 1768! Extensive photographic material taken in the past few years by the first junior author (BONETTI unpubl.) documents the constancy of these two distinguishing characters, the first of which (tarsal spur) is, however, sexually dimorphic and present only in males. Complete lack of occipital flaps was also visible in the subadult female found (fig. 4) and moreover, was observed in two (badly smashed, but nonetheless preserved) road-kills. An entire, preserved and much faded specimen was seen some days later in an old pharmacy in a nearby town where it has been kept, according to the owner, since several decades at least.

Unfortunately, these two important distinguishing features that characterise *C. africanus*, had not been discernible on the photograph which was the first evidence of the existence of these chameleons in the Peloponnesos. But the size of the specimen figured, and its overall similarity with the

newly recovered specimens clearly indicate that it belongs to the same *C. africanus*-like population. We therefore have to conclude that (i) *C. chamaeleon* does not occur on the Greek mainland, and (ii) there is a second chameleon species in Europe that has been able to establish a viable population for many generations, viz. *C. africanus* (sensu lato: see below).

*Chamaeleo africanus* is currently considered to form a superspecies made up by two allopatric semispecies, the second of which (*C. [a.] calcaricarens* BÖHME, 1985) lacks a tarsal spur in the male sex and occurs largely east of the Ethiopian rift valley to Somalia in the east (BÖHME 1985). The "nominotypic" semispecies (*C. [a.] africanus*) has a subsaharan distribution and ranges from Mali in the west through the whole Sahelo-Sudanien belt to the Red Sea coast in Sudan. However, as several other Afrotropical faunal elements, it was able to penetrate the Sahara northwards along the Nile valley as far as Upper Egypt. An isolated outpost population exists near Alexandria (Ramleh: "in the gardens of Europeans", ANDERSON 1898: 230). This hitherto northernmost locality record is documented already by literature references from the 16th and 17th century (ANDERSON op. cit.). This author also states that it is "common at Wadi Halfa, which may account to occasional imports to Lower Egypt". Hence, ANDERSON (op. cit.) obviously regarded the population(s) of Lower Egypt as introduced, though already since long.

There are nearly no morphological data published for the Alexandria population which is the geographically closest to the Greek one except the measurements of

Figs. 1 - 4 (opposite page): *Chamaeleo africanus* LAURENTI, 1768. Photographs by WOLFGANG BÖHME.  
Abb. 1 - 4 (gegenüberliegende Seite): *Chamaeleo africanus* LAURENTI, 1768. Photos: WOLFGANG BÖHME.

Fig. 1: Adult male *C. africanus* from Peloponnesos, Greece.

Abb. 1: Adultes männliches *C. africanus* vom Peloponnes, Griechenland.

Fig. 2: Right hindleg of the adult male *C. africanus* from Greece. Observe the tarsal spur.

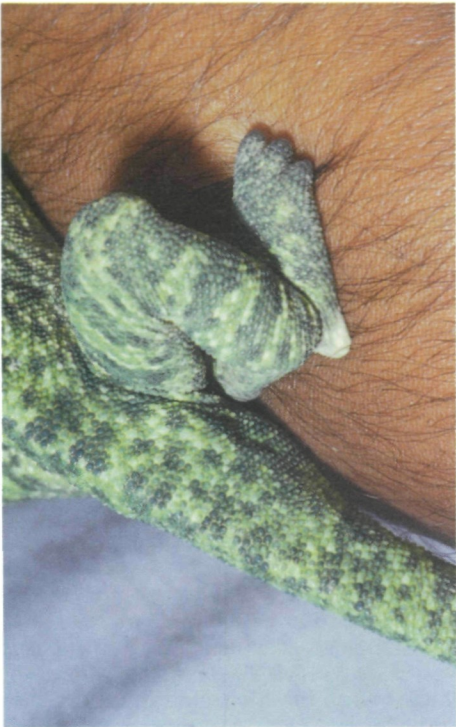
Abb. 2: Rechtes Hinterbein des adulten griechischen *C. africanus* - Männchens. Man beachte den Fersensporn.

Fig. 3: Occipital region of the adult male *C. africanus* from Greece. Even traces of occipital lobes are lacking.

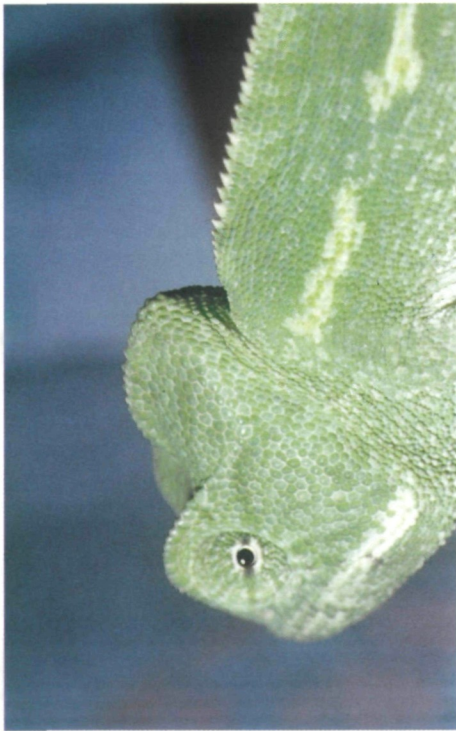
Abb. 3: Occipitalregion des adulten griechischen *C. africanus* - Männchens ohne jede Andeutung von Occipitallappen.

Fig. 4: Subadult female of a Greek *C. africanus*.

Abb. 4: Subadultes Weibchen eines griechischen *C. africanus*.



1 2 3 4



a male from Ramleh measuring  $123 + 128 = 251$  mm total length (TL) (ANDERSON op. cit.). This is within the range of Upper Egyptian and Sudanian specimens (232 - 255 mm TL: ANDERSON op. cit.; HECHENBLEIKNER 1940), but in strong contrast to the Peloponnese specimens. The big male figured here (figs. 1-3) is 430 mm in TL, and a female encountered earlier by M. BONETTI measured even 460 mm TL! These are exceptionally big specimens also within their population and many more morphometric data are urgently needed for sound conclusions on the relationship of the African populations and the Greek one. Nonetheless, it seems already obvious that the European representatives of the *C. africanus* complex are not only at the upper end of the body size range in this species, but are definitely representing a different size class! However, there is some indication that the specimens of the Nile delta also reach bigger dimensions than their subsaharan African conspecifics (BAHA EL DIN, pers. comm.).

Consequently, three hypotheses as to the taxonomic identity of the Greek population can be put forward:

(i) The Peloponnese chameleons are taxonomically identical with the Afri-

can *C. africanus* populations but were able to increase their body size as compared with their African conspecifics, due to founder effects and genetic drift.

(ii) The Peloponnese and the (like-wise big-growing) Alexandria populations are both differentiated from the subsaharan populations of *C. africanus*, due to an older immigration event in the latter and a subsequent passive transportation from the Nile delta to Greece.

(iii) The Peloponnese (and Alexandria ?) populations form a new (third) distinct species within the *C. africanus* superspecies.

Although these three hypotheses urgently need (and will be subject to) evaluation based on more material and various methods including genetic molecular approaches, we are in favour of the second hypothesis at the moment. The area where the Peloponnese chameleons are primarily living (see below) has been colonized by humans since the Mycenaean era, i.e. 3200-3500 ybp., at least. At that time, people there already practiced intensive cultural exchange with Ancient Egypt, involving much boat traffic across the Mediterranean Sea.

## CONSERVATION NEEDS

In the area where the chameleons are living, the beaches are the most sensible part of their habitat. This is also true for *Caretta caretta* (LINNAEUS, 1758), which partly uses the same beaches as nesting sites (BÖHME 1994). As generally known, the beaches of Greece, and, thus, also of southwestern Peloponnesos undergo a rapid touristic development along with the well-known threats to flora and fauna. The main threats to the chameleons are: agricultural mechanization (tractors etc.), cars, illegal campers and the dogs which are often associated with them. Chameleons are quite often killed by cars when they try to cross the road, particularly females migrating to the beaches in order to deposit their egg-clutches in the sandy soil. Those females which succeeded in reaching the beach uninjured, are often killed by patrolling dogs. The dogs are also a major threat to the clutches and hatchlings of the sea tur-

tles (see BÖHME 1994).

A second problem is caused by the fact that *C. chamaeleon* is the only Chamaeleonid in the lists of protected species in Greece and Europe, respectively. The identification of the Peloponnese chameleon as belonging to the African species *C. africanus* would lead to the loss of its protected status in Greece (and all of Europe), despite the fact that all *Chamaeleo* species are protected by severe world-wide commercial restrictions under CITES! Therefore, as soon as possible two main measures have to take effect in order to protect and save this unique population of *C. africanus* in Europe:

(i) The immediate protection of the area where it lives by restricting the access for campers, tourists and their cars, and particularly the dogs that may come with these people.

(ii) The immediate inclusion of *C.*

*africanus* on the list of protected species in Greece (and in Europe in general).

We hope that this preliminary article may help to realize these first and urgent measures, particularly in view of the possibility that this chameleon population -

next to its presumed ancestral population near Alexandria - may be the only surviving representative of a taxonomically distinct form. In any case, conservation measures should be taken before it is too late to precisely analyze its taxonomic identity.

#### ACKNOWLEDGMENTS

The senior author thanks his son MORITZ for help in the field. He is much indebted to Prof. Dr. GÜNTHER NOBIS and his wife, Dr. ASTA NOBIS (Bonn and Pyla), for their hospitality in Greece, and for many valuable informations concerning the chameleons discussed in this

paper. He is further indebted to SHERIF M. BAHÄ EL DIN (Cairo) for his informations on the Nile delta population of *C. africanus* which are most important for the subsequent studies to be made.

#### REFERENCES

- ANDERSON, J. (1989): Zoology of Egypt. I. Batrachia and Reptilia. London (Quaritch), 371 pp.
- BÖHME, W. (1985): Zoogeographical patterns of the lizard fauna of the African subsaharan belt, with preliminary description of a new chameleon, pp. 471-478. In: SCHUCHMANN, K.-L. (ed.): African vertebrates: systematics, phylogeny and evolutionary ecology. Zoologisches Forschungsinstitut und Museum A. Koenig, Bonn.
- BÖHME, W. (1989): Neuer Nachweis von *Chamaeleo chamaeleon* (LINNAEUS, 1758) vom Peloponnes, Griechenland - Herpetofauna, Weinstadt; 11 (59), 32-34.
- BÖHME, W. (1994): Ein aktueller Nistnachweis der Unechten Karettschildkröte, *Caretta caretta* (LINNAEUS, 1758) in der Voidokilia-Bucht, SW-Peloponnes. - Tier und Museum, Bonn; 4 (1): 1-3.
- BRINGSØE, H. (1985): A checklist of Peloponnesian amphibians and reptiles, including new records from Greece. - Ann. Mus. Gouladris, Kifissia; 7: 271-318.
- HECHENBLEIKNER, H. (1940): The Chamaeleonidae. Unpubl. PhD thesis, Harvard University, Cambridge/Mass., 394 pp.
- KLAVER, C. J. J. (1981): *Chamaeleo chamaeleon* (LINNAEUS, 1758) - Gemeines oder Gewöhnliches Chamäleon, pp. 218-238. In: BÖHME, W. (ed.): Handbuch der Reptilien und Amphibien Europas; Vol. 1, Echten I; Wiesbaden (Akademische Verlagsgesellschaft).
- KLAVER, C. J. J. & BÖHME, W. (1997): Chamaeleonidae. Das Tierreich; Berlin, New York (de Gruyter), Vol. 112, pp. i-xv + 1-85.
- SCHREIBER, E. (1912): Herpetologia europaea. Jena (Fischer), 2nd ed., 960 pp.
- WERNER, F. (1938): Die Amphibien und Reptilien Griechenlands. Stuttgart (Schweizerbarth); 116 pp.
- WETTSTEIN, O. (1953): Herpetologia aegaea. Sitzungsber. österreich. Akad. Wiss., Wien, mathem.-naturwiss. Klasse; (1) 162; 651-833.

DATE OF SUBMISSION: May 18th, 1998

Corresponding editor: Heinz Grillitsch

AUTHORS: Prof. Dr. WOLFGANG BÖHME, Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, D-53113 Bonn, Germany; Dr. ANDREA BONETTI, Via Concordia 10, CH - 6900 Lugano, Switzerland; GEORGIOS CHRIS, Sarandapora Str. 38, GR-26223 Patras, Greece.

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Herpetozoa](#)

Jahr/Year: 1998

Band/Volume: [11\\_1\\_2](#)

Autor(en)/Author(s): Böhme Wolfgang, Bonetti Andrea, Chiras Georgios

Artikel/Article: [The chameleons of the Greek mainland: taxonomic allocation and conservation needs of a second European species \(Squamata: Sauria: Chamaelonidae\). 87-91](#)