

Charles J.J. Klaver and Wolfgang Böhme
Chamaeleonidae

DAS TIERREICH

The Animal Kingdom

Eine Zusammenstellung und Kennzeichnung der rezenten Tierformen
A Compilation and Characterization of the Recent Animal Groups

Herausgeber/Editors

HEINZ WERMUTH
(Wirbeltiere)

MAXIMILIAN FISCHER
(Wirbellose)

Teilband **112** Part



Walter de Gruyter · Berlin · New York 1997

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Citation

Das Tierreich, Part 112
Charles J.J. Klaver and Wolfgang Böhme
Verlag Walter de Gruyter & Co., Berlin · New York 1997

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Library of Congress Cataloging-in-Publication Data

Klaver, Charles, Chamaeleonidae / Charles J.J. Klaver and Wolfgang Böhme. p. cm. – (Das Tierreich : Teilbd. 112 = The Animal kingdom . pt. 112) Includes index ISBN 3-11-015187-1 (alk. paper) 1. Chameleons. I. Böhme, Wolfgang. II. Title. III. Series; Tierreich ; Teilbd. 112. QL666.L23K5 1997 597.95–dc21	97-29347 CIP
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Die Deutsche Bibliothek – Cataloging-in-Publication Data

Das Tierreich : eine Zusammenstellung und Kennzeichnung der rezenten Tierformen = The animal kingdom / Hrsg. Heinz Wermuth ; Maximilian Fischer. – Berlin ; New York : de Gruyter Teilw. hrsg. von Robert Mertens ; Willi Hennig. – Teilw. hrsg. von F. E. Schulze ... – Teilw. fortges. von R. Hesse Teilbd. 112. Chamaeleonidae / Charles J.J. Klaver and Wolfgang Böhme. – 1997 ISBN 3-11-015187-1

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Typesetting and Printing: Tutte Druckerei GmbH, Salzweg-Passau.

Binding: Lüderitz & Bauer GmbH, Berlin.

*Die Liste der rezenten Amphibien und Reptilien ist
dem Andenken an*

HERRN PROF. DR. ROBERT MERTENS,

*Direktor emeritus des Natur-Museums und
Forschungs-Instituts Senckenberg zu Frankfurt am Main,
als Dank der Fachkollegen für seine überragenden
Verdienste um die Herpetologie gewidmet.*

Chamaeleonidae

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Introduction

The present book contains the third list concerning the Chamaeleonidae in the series of DAS TIERREICH published this century; the two preceding lists were compiled by FRANZ WERNER (1911) and by ROBERT MERTENS (1966). WERNER (1911) recognized 7 (7) species of *Brookesia*, 7 (7) species of *Rhampholeon* and 74 (87) species of *Chamaeleo*, in total 88 (101) species (the numbers between brackets indicate the total number of taxa, i. e. species and subspecies). Fifty-five years later MERTENS (1966) registered 16 (20) species of *Brookesia* (including *Rhampholeon*) and 69 (113) species of *Chamaeleo*, resulting in a total number of 85 (133). In view of the slight decrease in the total number of species recognized and the increase in the number of subspecies, MERTENS expected the total number of chamaeleon taxa to increase little in the future and thought a decrease to be more likely. However, numerous new species, mainly from Madagascar, have been described since 1966, resulting in the present numbers: 23 (24) species of *Brookesia*, 11 (14) species of *Rhampholeon* and 98 (133) species of 'ordinary' chameleons, a total of 132 (171) species. The 'ordinary' chameleons are presently classified in the following genera: *Calumma* with 18 (25) species, *Furcifer* with 19 (20) species, *Bradypodion* with 15 (27) species and *Chamaeleo* with 46 (61) species. The genus *Chamaeleo* is further subdivided into two subgenera, viz. *Chamaeleo* with 14 (24) species and *Trioceros* with 32 (37) species (fide KLAVER & BÖHME 1986). This means that the number of species recognized has increased in 30 years by more than 50 %. To find an increase in the same order of magnitude, we have to go back to the end of the last century and compare the total

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number of species registered by BOULENGER (1887) with that of WERNER (1911), viz. 49 versus 88. This indicates in our opinion that the stasis perceived by MERTENS (1966) was a result of lack of effort in collecting and/or study. The numerous studies of BRYGOO and collaborators during the 1970's, based on recently collected material from Madagascar, proves this by documenting many new and revalidated species. A similar phenomenon for African chameleons is demonstrated by the activities of ARTHUR LOVERIDGE from the 1930's till the 1950's and of numerous German herpetologists who described material collected in German colonial Africa in the second half of the last century and the beginning of the 20th century. Consequently we are inclined to expect the number of known chameleon species to continue to rise in the future as a result of the study of newly collected material from little studied areas, especially mountainous regions, and of the ample museum material of variable 'species' as, e. g. *B. fischeri*, *B. pumilum* and *Ch. dilepis*. Moreover, even the study of literature may lead to the discovery of new species which we found out ourselves much to our surprise (KLAVER & BÖHME 1988).

In the introduction to his list MERTENS (1966: VI) discussed the status of the various (sub-)genera within the Chamaeleonidae and chose to restrict himself to the use of two generic names, viz.: *Brookesia* and *Chamaeleo*, although he also voiced his expectation that a subdivision of these two genera would occur in the future as a result of further investigations. Subsequently KLAVER & BÖHME (1986) revised the subdivision of the Chamaeleonidae and recognized two sub-families, viz.: Brookesiinae and Chamaeleoninae. The Brookesiinae were subdivided into two genera, viz.: *Brookesia* and *Rhampholeon*, the Chamaeleoninae into four genera, viz.: *Bradypodion*, *Calumma*, *Chamaeleo* and *Furcifer*. The genus *Chamaeleo* was subdivided into two subgenera, viz.: *Chamaeleo* and *Trioceiros*. The authors admitted that their classification was provisional, subject to refining in the future as a result of further evidence from additional comparative studies.

Subsequently HOFMAN & al. (1991: 260) found their immunological data to be more or less in concordance with the proposed classification, although they also noticed contradictions between the outcomes of the studies of the different character sets. Nevertheless, this classification was adopted in both the primary literature, e. g. BROADLEY & HOWELL (1991), RAXWORTHY (1991), TILBURY (1991, 1992), EMMRICH (1993, 1994), NEČAS (1994) and RAXWORTHY & NUSSBAUM (1995) and the secondary literature, e. g. GLAW & VENCES (1991) and HENKEL & HEINECKE (1993). Apparently it is considered a better estimate of the phylogenetic relationship of chameleon species than the classification of MERTENS (1966).

Unpublished observations on the hemipenes of *Rhampholeon spectrum* and *R. temporalis* revealed these to possess calyces, whose absence was supposed to be a synapomorphy of the Brookesiinae. Apparently in these two species

the plesiomorph calyculate condition is retained. More important, however, is the observation (also unpublished) of an apical ornamentation consisting of four rotulae in the hemipenes of *R. kerstenii*, which falsifies the defining characteristic of the Brookesiinae, viz.: dual apical ornamentation (KLAVER & BÖHME 1986). This problem could be remedied by transferring *R. kerstenii* to the Chamaeleoninae, but this solution would be too convenient and obfuscate taxonomically important observations. Incidentally, these remarkable observations on *R. kerstenii* also falsify the informal subdivision of *Rhampholeon* into two sections as proposed by RIEPPEL (1987). Pending necessary supplementary studies we, therefore, do not retain in this list the subfamilial subdivision we proposed in 1986. We do, however, retain the generic subdivision as we still consider it to reflect the chameleon affinities best. The sequence in which the genera will be presented in this list is not alphabetical, but will conform to the phylogenetic scheme (see KLAVER & BÖHME 1986).

In this list we consider the Chamaeleonidae to include only chameleon species and not agamid species as well (*contra* FROST & ETHERIDGE 1989). We find the argumentation of these authors unconvincing. Their dismissive attitude towards an alternative classification indicates that their parochial approach does not even convince themselves. This is, of course, not surprising as a classification is to be considered a Linnaean convention, i.e. various classifications can be equally consistent with a perceived phylogeny.

We should like to point out that this list is not a purely nomenclatural one, i.e. that we do not accept uncritically the most recent nomenclatural acts in literature. The most recent nomenclatural acts may be, in our opinion, less sufficiently substantiated than earlier ones; in such cases we adopt the older as a guideline for the nomenclature of chameleons in the present list. We are aware that this is a subjective undertaking, but it is in our opinion acceptable when explicitly stated and, wherever necessary, explained in adjoining comments. We find this more realistic than to accept any nomenclatural act indiscriminately or to adhere to what we consider a better substantiated nomenclatural act without comment, but we are aware that readers may be of a different opinion. To illustrate our point of view we refer to MERTENS (1966: VIII), who stated that his list had „... in erster Linie einen nomenklatorischen, nicht taxionomischen Charakter.” Unfortunately, he did not always comply with his quoted intention nor with the (then) recent major studies on chameleon taxonomy. For instance, RAND (1963) cogently demonstrated the taxa *schubotzi* and *kintensis* to be valid species and *altaeelsonis* synonymous with *hoehnelii*, but MERTENS nevertheless chose to treat them as valid subspecies of *rudis*, *bitaeniatus* and *hoehnelii* respectively. Similarly, LOVERIDGE (1957a) and HILLENUS (1959) argued convincingly that the taxa *vinckei*, *mertensi* and *marunguensis* are synonymous with *anchietae*, but MERTENS considered them valid subspecies of *anchietae* without argumentation. Whatever the motives of MERTENS might have

been, we prefer not to take such an implicit dualistic attitude, but either accept the last nomenclatural act or, if not, explain our different point of view explicitly.

Next to references of original descriptions, new name combinations and presently recognized synonyms, the references used in the two previous Tierreich lists of WERNER (1911) and MERTENS (1966) and in the two comprehensive publications by BRYGOO (1971, 1978) will be cited. As to nomenclature, we should like to point out that we reproduce throughout the list the spelling used in the works referred to without appending a 'sic' in case of an incorrect spelling. This is done to avoid a (necessarily) too prolific use of this indication and we hope that whenever an aberrant spelling occurs, it is the result of a correct representation of the original spelling instead of our own mistake.

Whenever possible information about type specimen(s) is presented and, when appropriate, a short comment will be added to explain relevant issues. It should be noted that collection numbers of type material given in this list may differ from those cited in the literature, because type material may have been largely re-registered (e.g. BMNH material) or transferred to another museum. The literature cited throughout the text is compiled in a separate list of references.

For help in supplying information about type specimens we should like to thank N. B. Ananjeva (ZISP), F. Andreone (MRSN), W. R. Branch (PEM), L. Capocaccia (MCSN), E. Crespo (Univ. de Lisboa), H. Grillitsch (NMW), R. Günther (ZMB), G. Haagner (PEM), H. O. von Hagen (PUM), H. Hohmann (UMB), I. Ineich (MHNP), M. Jacquat (MHNC), B. de Klerk (AM), H.-W. Koepcke (ZMH), E. Kramer (NMB), M. Laudahn (SMF), C. McCarthy (BMNH), A. Resetar (FMNH), G. Rosado (MCZ) and G. Swinney (NMS).

For help finding and for supplying literature we thank F.F.J.M. Pieters and E. Zwart of the Artis Library, Amsterdam and the personnel of the Library of the Teyler's Museum, Haarlem and the Library of the Royal Netherlands Academy of Sciences, Amsterdam.

Collection acronyms

AM	– Albany Museum, Grahamstown, South Africa.
AMNH	– American Museum of Natural History, New York, U.S.A.
ANSP	– Academy of Natural Sciences, Philadelphia, U.S.A.
BMNH	– British Museum (Natural History), now The Natural History Museum, London, United Kingdom.
CBMAG	– City of Bristol Museum and Art Gallery, Bristol, United Kingdom.
DNSM	– Durban Natural Sciences Museum, Durban, South Africa.
FMNH	– Field Museum of Natural History, Chicago, U.S.A.
LIV	– Liverpool Museum, Liverpool, United Kingdom.
LRC	– private collection of L. Raw, Merrivale, South Africa.
MBL	– Museu Bocage, Lisbon, Portugal.
MCSN	– Museo Civico di Storia Naturale „Giacomo Doria”, Genova, Italy.
MCZ	– Museum of Comparative Zoology, Cambridge, U.S.A.
MHNC	– Musée d’Histoire naturelle, La Chaux-de-Fonds, Switzerland.
MHNG	– Muséum d’Histoire Naturelle, Genève, Switzerland.
MHNP	– Muséum national d’Histoire Naturelle, Paris, France.
MRAC	– Musée Royal de l’Afrique Centrale, Tervuren, Belgium.
MRSN	– Museo Regionale di Scienze Naturali, Torino, Italy.
NMB	– Naturhistorisches Museum, Basel, Switzerland.
NMS	– National Museums of Scotland, Edinburgh, Scotland.
NMW	– Naturhistorisches Museum, Wien, Austria.
NM	– Natal Museum, Pietermaritzburg, South Africa.
NRM	– Naturhistoriska Riksmuseet, Stockholm, Sweden.
PEM	– Port Elizabeth Museum, University of Port Elizabeth, South Africa.
PUM	– Philipps-Universität, Marburg, Germany.
SAM	– South African Museum, Cape Town, South Africa.
SMF	– Senckenberg Museum, Frankfurt a. M., Germany.
SMNS	– Staatliches Museum für Naturkunde, Stuttgart, Germany.
TM	– Transvaal Museum, Pretoria, South Africa.
UM	– Umtali Museum, now Natural History Museum of Zimbabwe (NMZB), Bulawayo, Zimbabwe.
UMB	– Übersee-Museum, Bremen, Germany.