The genus *Macaca* is the most widely distributed of non-human primates. All macaque species, except the North African Barbary macaque, are found in 20 countries in the South-East Asia region. Fossil evidence suggests that, in the Pleistocene period, the macaques were more widespread, living throughout most of Eurasia and northern Africa, but they have now disappeared between North Africa and South-East Asia. Over the comparatively short time span of 5 million years, macaques have evolved diverse forms, from long-tailed arboreal types to robust terrestrial animals, and live in a variety of habitats. Studies of this group will give us important insights into the speciation process in a radiating group of non-human primates.

Although macaques are probably one of the most studied cercopithecine monkeys both in the wild and in captivity, data from long-term studies and pioneering work on little-known species are only just emerging. In this book, world authorities on macaques interpret recent research and present up-to-date syntheses of many aspects of macaque ecology, evolution, behaviour and conservation. This book will prove to be the definitive synthesis of the subject for all those interested in this fascinating group of monkeys for many years to come.
EVOLUTION AND ECOLOGY OF MACAQUE SOCIETIES
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Edited by

JOHN E. FA
The International Training Centre for Breeding and
Conservation of Endangered Species, Jersey
Wildlife Preservation Trust, Les Augrès Manor,
Jersey, Channel Islands

and

DONALD G. LINDBURG
Center for Reproduction of Endangered Species,
Zoological Society of San Diego, USA
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Contributors

Burton, F. D.
*Department of Anthropology, Scarborough College, University of Toronto, Scarborough, Ontario, Canada M1C 1A4*

Caldecott, J. O.
*Independent consultant in conservation and biodiversity management, 79, Windsor Road, Cambridge, CB4 3JL, UK*

Chan, L.
*Department of Anthropology, Scarborough College, University of Toronto, Scarborough, Ontario, Canada M1C 1A4*

de Ruiter, J. R.
*Department of Comparative Physiology, Ethology and SocioEcology Group, University of Utrecht, De UithofPadualaan 14, University of Utrecht, Utrecht 3058 TB, The Netherlands*

Present address: Institute of Zoology, Zoological Society of London, Regent’s Park, London NW1 4RY, UK

Fa, J. E.
*Jersey Wildlife Preservation Trust, Les Augrès Manor, Jersey, Channel Islands*

Fedigan, L. M.
*Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada T6G 2H4*

Feistner, A. T. C.
*Jersey Wildlife Preservation Trust, Les Augrès Manor, Jersey, Channel Islands*

Froehlich, J. W.
*Department of Anthropology, University of New Mexico, Albuquerque, NM 87131-1086, USA*

Gadsby, E. L.
*Housing Estate P.O. Box 107, Calabar, Cross River State, Nigeria, or c/o Flora and Fauna International (FFPS), Gt Eastern House, Tenison Road,*
Contributors

Cambridge CB1 2BU, UK
Gonder, M. K.
Department of Anthropology, University Station, University of Alabama, Birmingham, AL 35294, USA
Griffin, L.
Department of Anthropology, University of Alberta, Edmonton, Alberta, Canada T6G 2H4
Harvey, N. C.
Center for Reproduction of Endangered Species, Zoological Society of San Diego, P.O. Box 551, San Diego, CA 92112-0551, USA
Harya Putra, D. K.
Lab. Fisiologi, Fakultas Peternakan Unud, Universitas Udayana, Denpasar, Bali, Indonesia
Hauser, M. D.
Department of Anthropology & Psychology, Program in Neuroscience, Harvard University, Cambridge, MA 02138, USA
Hill, D. A.
The Center for African Area Studies, Kyoto University, Shimoadachi-cho, Sakyo-ku, Kyoto 606, Japan
Present address: School of Biological Sciences, University of Sussex, Falmer Brighton, BN1 9QG, UK
Hoelzer, G. A.
Genetics Laboratory, Department of Anthropology, Columbia University, New York, NY 10027, USA
Present address: Department of Biology and Department of Environmental and Resource Sciences, University of Nevada Reno, Reno, NV 89557, USA
Iwamoto, T.
Department of Biology, Faculty of Education, Miyazaki University, 1-1 Gakuen-Kibanbadai-Nishi, Miyazaki 889-21, Japan
Jiang Haisheng
South China Institute of Endangered Animals, 105 Xingang Road West, Guangzhou, Peoples’ Republic of China
Kohlhaas, A.
Environmental Population and Organismic Biology, University of Colorado at Boulder, Boulder, CO 80309-0334, USA
Present address: Department of Biological Sciences, California State University, Stanislaus, Turlock, CA 95382, USA
KueSter, J.
Abteilung Funktionelle Morphologie, Ruhr-Universität, Bochum, Postfach 102140, D-44780 Bochum, Germany
Contributors

Lind, R.
Jersey Wildlife Preservation Trust, Les Augrès Manor, Jersey, Channel Islands

Lindburg, D. G.
Center for Reproduction of Endangered Species, Zoological Society of San Diego, P.O. Box 551, San Diego, CA 92112-0551, USA

Liu Zhenhe
South China Institute of Endangered Animals, 105 Xingang Road West, Guangzhou, Peoples’ Republic of China

Maruhashi, T.
Department of Human and Cultural Science, Musashi University, Toyotama-kami 1-26, Nerimaku, Tokyo 176, Japan

Maryanski, A.
Department of Sociology, University of California, Riverside, CA 92521, USA

Mehlman, P. T.
Laboratory Animal Breeders & Services, P.O. Box 557, Yemassee, SC 29945, USA

Melnick, D. J.
Department of Anthropology, Columbia University, New York, NY 10027, USA

Ménard, N.
URA 373 CNRS, Université de Rennes, Station Biologique de Paimpont, 35380 Paimpont, Rennes, France

Nakagawa, N.
Shion Junior College, 6-11-1, Omika, Hitachi, Ibaraki 319-12, Japan

Oi, T.
Forestry and Forest Products Research Institute, Tohoku Research Center, 72, Nabeyashiki, Shimokuriyagawa, Morioka, Iwate 020-01, Japan

Okayasu, N.
Laboratory of Human Evolution Studies, Faculty of Science, Kyoto University, Sakyo-ku, Kyoto 606, Japan

Paul, A.
Institut Für Anthropologie, Universität Göttingen, Buegerstrasse 50, D-37073 Göttingen, Germany

Qu Wenyouan
Department of Biology, Henan Normal University, Sinxiang, Henan, People’s Republic of China

Rhine, R. J.
Department of Psychology, University of California, Riverside, CA 92521, USA

Scheffrahn, W.
Institute of Anthropology, University of Zurich, Winterthurer Strasse 190, Zurich CH 8057, Switzerland
Contributors

Southwick, C. H.
*Environmental Population and Organismic Biology, University of Colorado at Boulder, Boulder, CO 80309-0334, USA*

Soumah, A. G.
*Primate Research Institute, Kyoto University, Kanrin, Inuyama, Aichi 484, Japan*

Sprague, D. S.
*Laboratory of Human Evolution Studies, Faculty of Science, Kyoto University, Sakyo, Kyoto 606, Japan*
*Present address: Center for African Area Studies, Kyoto University, Sakyo, Kyoto 606, Japan*

Supriatna, J.
*Department of Anthropology, University of New Mexico, Albuquerque, NM 87131, USA, and Universitas Indonesia, Depok 16424, Indonesia*

Suzuki, S.
*Laboratory of Human Evolution Studies, Faculty of Science, Kyoto University, Sakyo, Kyoto 606, Japan*

Takasaki, H.
*The Center for African Area Studies, Kyoto University, Shimoadachi-cho, Sakyo, Kyoto 606, Japan*

Tsukahara, T.
*Department of Anthropology, Faculty of Science, University of Tokyo, Bunkyo, Tokyo 113, Japan*

Vallet, D.
*URA 373 CNRS, Université de Rennes, Station Biologique de Paimpont, 35380 Paimpont, Rennes, France*

van Amerongen, A.
*Department of Comparative Physiology, Ethology and SocioEcology Group, University of Utrecht, De UithofPadualaan 14, University of Utrecht, The Netherlands*

van Hooff, J. A. R. A. M.
*Ethology and SocioEcology Group, University of Utrecht, De UithofPadualaan 14, University of Utrecht, The Netherlands*

van Noordwijk, M. A.
*Department of Comparative Physiology, Ethology and SocioEcology Group, University of Utrecht, De UithofPadualaan 14, University of Utrecht, The Netherlands*
*Present address: Department of Biological Anthropology and Anatomy, Duke University, The Wheeler Building, 3705-B Erwin Road, Durham, NC 27705, USA*
Contributors

van Schaik, C. P.
Department of Biological Anthropology and Anatomy, Duke University, The Wheeler Building, 3705-B Erwin Road, Durham, NC 27705, USA

Wheatley, B. P.
Department of Anthropology, University Station, University of Alabama, Birmingham, AL 35294-3350, USA

Yokota, N.
Oita Junior College, 3-3-8, Chiyo-Machi, Oita, Oita 870-91, Japan

Zeller, A.
Department of Anthropology, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1

Zhang Yongzu
Institute of Geography, Academia Sinica, Beijing, People’s Republic of China

Zhao Qi-Kun
Kunming Institute of Zoology, Chinese Academy of Sciences, Kunming, Yunnan 650223, People’s Republic of China

Note: The names of Chinese contributors have, by request, been given in Chinese style, with the surname first, in the chapter titles and List of contributors.
General introduction

J. E. FA AND D. G. LINDBURG

Macaque studies – new insights and future perspectives

The genus *Macaca* is probably one of the most widespread primate groups in the world. Its 19 extant species are found in northwestern Africa and on a number of island and continental areas in southern and eastern Asia. The radiation of this group is considered to have taken place relatively recently, around 5 million years ago, and yet the number of species that has emerged is unequalled by any other group of primates. Such a variety of forms, species that differ in morphology and ecology, represent a most alluring group of animals for the study of problems associated with species radiation and adaptation to different environments – from semi-arid, warm and cold temperate to tropical forest habitats (to say nothing of environments now modified by man).

What we have proposed to do in this book is to give readers a look at ‘variation in a most variable’ primate group by offering examples of evolutionary biology and ecology that appear from studying the macaques. This book represents an effort to consolidate information now available on the wide variety of macaque species that are currently being studied. As with its counterpart, the 1980 book *The macaques: studies in ecology, behaviour and evolution*, edited by one of us, we have also tried to include reports from all recent field investigations of little-known macaques. Once again, this objective has only been partly realised since there are still glaring gaps in our knowledge of some taxa. Nonetheless, the great satisfaction in the present book is that it includes a greater number of investigations than the first as a result of the growing interest in the field. This is patently reflected in the number of contributors and the size of the book. Whereas the 1980 book comprised 13 chapters, the present book has double this number. Equally, the number of authors has gone up from 23 to 53 in line
with a notable increment in field and laboratory studies of the group. While neither book has been able to embrace all the individuals working on macaques (constraints are imposed as much by the editors’ awareness of field studies as by fieldworkers’ readiness for publication), each represents a significant proportion of contemporary research.

The present book is divided into four main sections: Biogeography and evolution; Population biology, ecology and conservation; Mating and social systems; and Communication. Chapters are set to lead the reader from general overviews of topics, such as Hoelzer and Melnick’s new insights into the evolutionary relationships of the macaques, genetic consequences of macaque social organisations as well as the intricacies of vocal and non-vocal communication, to more specific analyses and findings of a species’ ecology, reproduction and social behaviour. All contributions, however, aim to present much more than new data. They cover widely their respective subject areas and in themselves are significant summaries of the ‘state of the art’.

The first section of the book, on biogeography and evolution, starts with a new framework of macaque evolution. This chapter builds upon past schemas based on palaeontology, morphology and genetics but expands on this with new molecular genetic evidence. The following two chapters (Scheffrahn et al.; Froehlich and Supriatna) give clear examples of speciation processes in two main groups of macaques: the wide ranging long-tailed macaques and the restricted but differentiated Sulawesi macaques. Both studies employ modern genetic techniques to decipher speciation patterns.

The book’s second part focuses on ecological topics. Various chapters concentrate on intra-specific comparisons of macaques living in differing habitats. This is a crucial topic for continuous study, since the plasticity shown by these primates can allow us to understand their ability to cope with habitats ranging from snowy elevations to rain forests. In this light, Chinese rhesus macaques are compared between tropical and temperate environments (Southwick et al.), Barbary macaque population dynamics are observed in forest and scrub in Algeria (Ménard and Vallet) and Japanese macaques (Nakagawa et al.; Maruhashi and Takasaki) are examined within a variety of habitats on the Japanese islands. Another chapter in this section concentrates on group dynamics of Macaca nigrescens in Sulawesi (Kohlhaas and Southwick) and three others take count of the influence of human intervention on the behaviour and ecology of long-tailed macaques in Bali (Wheatley et al.), Barbary macaques in Gibraltar (Fa and Lind) and Tibetan macaques in China (Zhao). Throughout
these three papers, the conservation of the species in these human-affected environments is thoroughly discussed.

Our third section in the book presents novel approaches to deciphering reproductive and social systems. Although it has been long recognised that macaques differed significantly in mating patterns, some authors arguing for an ecological influence on this, information collected until now has been merely observational. Using the DNA fingerprinting techniques now available, we are able to probe deeper into mate choice and reproductive isolation among the different species (Burton and Chan; Lindburg and Harvey; Oi), quantify lifetime reproductive success for males and females (Paul and Kuester) and understand the mechanisms involved in the structuring of macaque societies (Hill and Okayasu; Melnick and Hoelzer; Sprague et al.). The importance of long-term studies is clearly epitomised by Rhine and Maryanski’s 21 year study of social history and by Fedigan and Griffin’s analysis of reproductive seasonality.

The last section of the book presents three chapters on communication mechanisms among macaques. Mehman’s observations reveal fascinating ways in which Barbary macaques use branch-shaking behaviour to communicate. Zeller’s study of facial expression opens up a rich new field of investigation into kin recognition. The last chapter in the book, by Hauser, aptly gathers our current understanding of vocal communication in the macaques.

We are most grateful to the contributors to this volume for their interest throughout the venture (or adventure) of editing their work. We are also greatly indebted to Alan Crowden, Tracey Sanderson and Harriet Stewart for their unfailing help throughout the production of this book. Tracey and Harriet endured the last moments of gestation of the book (the latter similarly engaged in her own gestation of twins) and without them, we are certain this would have been a lesser volume. The unfailing support and constant help of Monique Williamson, the senior editor’s wife, is more than gratefully acknowledged. Monique gave of her time in organising and editing papers, typing material, sometimes even translating, and all in all encouraging the completion of the book.