
**PRESSING PROBLEMS:
DISTRIBUTION, THREATS, AND CONSERVATION STATUS OF THE
MONITOR LIZARDS (VARANIDAE: VARANUS SPP.) OF SOUTHEAST
ASIA AND THE INDO-AUSTRALIAN ARCHIPELAGO**

ANDRÉ KOCH¹, THOMAS ZIEGLER², WOLFGANG BÖHME¹, EVY ARIDA³, AND MARK AULIYA⁴

¹Zoologisches Forschungsmuseum Alexander Koenig & Leibniz Institute for Animal Biodiversity, Section of Herpetology,
Adenauerallee 160, 53113 Bonn, Germany, email: andrepscalkoch@web.de

²AG Zoologischer Garten Köln, Riehler Straße 173, 50735 Köln, Germany

³Museum Zoologicum Bogoriense, Jl. Raya Bogor km 46, 16911 Cibinong, Indonesia

⁴Helmholtz Centre for Environmental Research – UFZ, Department of Conservation Biology,
Permoserstr. 15, 04318 Leipzig, Germany

Abstract.—We update an earlier review (Mertens 1959) of the monitor lizards of Southeast Asia and the Indo-Australian Archipelago, emphasizing the importance of this island region as a center of varanid diversity and endemism. Currently, 44 monitor lizard species (i.e., 60% of the known global varanid diversity) are recognized from this vast study region. New Guinea and the surrounding offshore islands harbor the highest diversity in terms of species (15) and subgenera (four). We provide a detailed identification key to all monitor lizards found in the study area. Moreover, we critically review the conservation status of all monitor lizard species involved as needed in light of urgent conservation issues. Major threats to monitor lizards include: (1) habitat destruction; (2) the international trade in reptile skins and in monitors as pets; and (3) human consumption. Current export figures of seven focal monitor species (i.e., *Varanus beccarii*, *V. boehmei*, *V. macraei*, *V. melinus*, *V. prasinus*, *V. salvator*, and *V. yuwonoi*) of the commercial skin and pet trade reflect export allowances that are not based on sound information from population studies, meaning that current harvest levels may be unsustainable and could threaten the viability of these Indonesian island endemics. Therefore, these monitor lizard species require special attention by the relevant authorities and conservationists of both the source and the consuming countries. The conservation status of all monitor lizard species and their assessment in the International Union for Conservation of Nature (IUCN) Red List is in need of a critical update and we strongly recommend the establishment of an IUCN Species Survival Commission (SSC) Monitor Specialist Group. Therefore, this review of distribution, threats, and conservation status of Southeast Asian and Indo-Australian monitor lizards is intended to support customs officers and other government agents in: (1) more strictly enforcing the regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); (2) monitoring trade activities, annual harvest levels, and export quotas; (3) in reducing current unsustainable harvest levels; and, (4) in reducing over-exploitation and extinction risks of *Varanus* spp. in the wild.

Key Words.—conservation status; deforestation impact; Indonesia; New Guinea; Philippines; species diversity; trade impact;

INTRODUCTION

Monitor lizards of the family Varanidae represent an ancient group of anguimorph reptiles. Next to crocodiles and pythons, they comprise the largest living poikilothermic predators on our planet. Monitor lizards inhabit Africa, the Arabian Peninsula, the Middle East as well as South and Southeast Asia. They also inhabit the Indo-Australian Archipelago, including Australia and several remote Pacific island groups (such as the Solomons, Admiralties, and Marianas). Although they are morphologically uniform, monitor lizards show remarkable differences in body size ranging from a mere 20 cm to more than 3 m in total length (Mertens 1942; Pianka and King 2004). The closest extant relatives of varanids are the rare Bornean Earless Monitor (*Lanthanotus borneensis*) and the Chinese Crocodile Lizard (*Shinisaurus crocodilurus*; Ast 2001; Hedges and

Vidal 2009; Vidal et al. 2012). Despite enormous differences in morphology and ecology (terrestrial, arboreal, and aquatic habits), all recent monitor lizard species are still classified in the single genus *Varanus* Merrem, 1820, whose monophyly has been supported by several morphological (Branch 1982; Böhme 1988a; Becker et al. 1989; Card and Kluge 1995), and molecular genetic approaches (Baverstock et al. 1993; Fuller et al. 1998; Ast 2001). Ecologically, monitor lizards show a wide variety of adaptations. While most species are terrestrial, the New Guinean tree monitor lizards of the *V. prasinus* species group are highly arboreal and probably rarely visit the forest floor. Other species, such as the Southeast Asian water monitors of the *V. salvator* complex, display semi-aquatic to terrestrial life habits and are always associated with aquatic environments. Most monitor lizard species are carnivores or scavengers. However, a small radiation of endemic frugivorous varanids in

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identify sustainable take-off levels and evaluate the economic feasibility in the captive propagation and management of selected *Varanus* spp. (Werner 1991). Moreover, the long-term conservation of Southeast Asian and Indo-Australian monitor lizard diversity may also imply the need to temporarily suspend trade in threatened species and in such with a high extinction risk in the wild. Hopefully soon IUCN Red List Assessments will be available, guiding both consuming and source countries in order to maintain viable populations of *Varanus* spp. in the long-term.

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