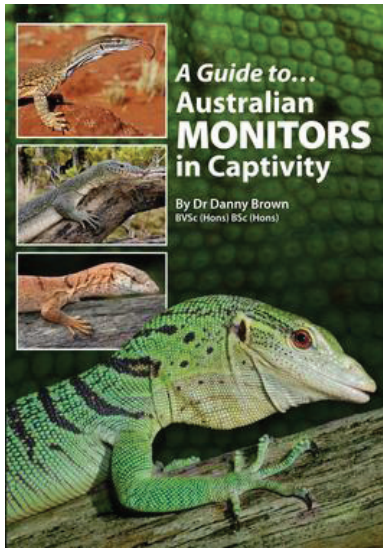


BOOK REVIEWS

Monitor Husbandry from an Australian Keeping Perspective



A Guide to Australian Monitors in Captivity

DANNY BROWN

ABK Reptile Publications, Burleigh. 2012.

Paperback, 263 p.

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Beginning with Jifi Rotter's *Die Warane* in 1963, there have been many books published to date which focus on the husbandry of monitor lizards in captivity (Balsai, 1992, 1997; Bartlett, 1996, 2006; Bayless, 2006; Bennett, 1998; Bennett & Thakoordyal, 2003; Berghof, 2009; Coborn, 1997; Eidenmüller, 1997, 2003, 2007, 2009; Faust, 2001; Husband & Bonnett, 2009; Kirschner *et al.*, 1996; Lipfert & Dickoff, 2004; Sprackland, 1992, 2000, 2009; Suzuki, 2006). Considering that monitor husbandry has experienced many advancements and paradigm shifts over its history, particularly in the past two decades, recommendations on their care and breeding presented in some of these earlier works are now antiquated by today's keeping standards; surpassed by keeping methodologies supported by a firmer understanding of monitor biology and their tolerances and requirements in captivity. With each new book on the subject of monitor husbandry come greater expectations and a responsibility to improve on previous works by presenting current and biologically-appropriate information.

For many years, books on monitor husbandry were authored by European and North American keepers and enthusiasts (e.g., Balsai, 1992, 1997; Bartlett & Bartlett, 1996; Bennett, 1998; Eidenmüller, 1997; Kirschner *et al.*, 1996; Rotter, 1963; Sprackland, 1992). It is important to note that although Australia now has a booming reptile and amphibian hobby, many Australian monitors were first kept and bred in European and North American collections decades before they were legally available

to and widely-kept by Australian herpetoculturists. Due largely to prohibitions on the keeping of native reptiles by several Australian states, it wasn't until around the mid to late 1990s that monitor keeping in Australia began to catch up with other parts of the world, with captive breeding success becoming more commonplace in private collections. Around this time, Vincent & Wilson (1999) authored the book, *Australian Goannas*, which offered a uniquely Australian perspective on the keeping and breeding of monitor lizards. This approach was later adopted by Husband & Bonnett (2008) in their chapter on monitors appearing in Swan's (2008), *Keeping and Breeding Australian Lizards*, and is continued once again with Danny Brown's new book entitled, *A Guide to Australian Monitors in Captivity*. As there are more than 20 monitor lizard species currently kept and bred in Australian collections, it only seems right that Australian keepers continue this tradition of advancing knowledge about the husbandry of species found right in their own backyards.

A Guide to Australian Monitors in Captivity focuses solely on the captive management and breeding of monitor lizards indigenous to Australia. The cover to this 263 page paperback book features vivid photographs of *V. gouldii*, *V. indicus*, *V. gilleni*, and *V. prasinus*. Inside, the book's pages are of a quality glossy finish, and feature 397 crisp color photographs. Fourteen tables provide additional data and information which supplement the text.

Following a brief introduction, the book is divided

into several chapters which discuss various aspects of captive husbandry: general management, housing, feeding methods and nutrition, breeding, and common diseases and disorders. Following these chapters are species accounts. Listings of Australian herpetological societies and useful informational websites are provided towards the end of the book, which are followed by a brief bibliography of selected works for further reading and a glossary of terms appearing in the text.

The chapter on general management covers a broad spectrum of topics including specimen acquisition and transportation, keeping legalities, general safety and security, and quarantine procedures. The following chapter on housing discusses the logistics and suitability of indoor and outdoor enclosures, as well as substrates, refuge sites, environmental enrichment, heating and lighting, and humidity relations. Under feeding methods and nutrition, the author discusses various vertebrate and invertebrate prey items, including their nutritional compositions and instructions for culturing several species, as well as dietary supplementation and feeding difficulties. The chapter on breeding covers sex identification, sexual maturity, courtship and copulation, reproductive biology, nesting, egg incubation and neonatal care, and offers strategies for enhancing reproductive success. The following chapter on diseases discusses nutritional, parasitic, physiological, and reproductive disorders commonly seen in captives and provides information on their prevention, identification, and treatment.

The book's species accounts are broken down into several groups based on size and ecological similarities: large terrestrial and arboreal species (*V. giganteus*, *V. gouldii*, *V. panoptes*, *V. rosenbergi*, *V. spenceri*, *V. varius*), rock dwelling species (*V. glauerti*, *V. glebopalma*, *V. kingorum*, *V. pilbarensis*), small terrestrial species (*V. acanthurus*, *V. baritji*, *V. storri*, *V. primordius*, *V. brevicauda*, *V. eremius*), small to medium arboreal species (*V. gilleni*, *V. bushi*, *V. caudolineatus*, *V. tristis*, *V. scalaris*), and semi-aquatic species (*V. mertensi*, *V. mitchelli*, *V. semiremex*, *V. indicus*). Accounts include physical descriptions of each species including variation between genders and localities, as well as information on the natural history, housing, feeding, breeding, and sex identification of species within the group.

A Guide to Australian Monitors in Captivity is an easy read which should be useful to monitor keepers of all backgrounds and experience levels, especially beginning hobbyists that may be intimidated by heavy text. In several sections, the book reads like an instruction manual or care-sheet, which may be a familiar format

for novice keepers as they establish baseline husbandry for which to build upon as they gain more knowledge and experience. Equally as useful, the author simplifies and explains several complex metabolic processes which are often misunderstood or misinterpreted by reptile keepers, such as UV utilization and Vitamin D3 metabolism (p. 57).

Generally speaking, the husbandry information presented in this book is current and up to date. One of the most important aspects of captive management touched upon in this book in sufficient detail is thermal husbandry. The appropriate ranges of temperatures required by monitor lizards to thermoregulate properly and reach preferred body temperatures in captivity are often misunderstood or overlooked by private keepers and zoos, which can lead to thermally compromised individuals and a host of associated health issues (e.g., Mendyk *et al.*, 2013). Attitudes towards the basking temperatures offered to monitors in captivity have markedly changed over the last two decades (Anonymous, 1997; Good, 1999; Retes & Bennett, 2001; Husband & Vincent, 2009), with many successful keepers and breeders now providing surface basking temperatures which exceed 45° C. It is pleasing to see that this book promotes elevated basking temperatures ranging from 55-70° C, as these are more likely to enable captives to reach their optimal body temperatures and maintain healthy physiologies.

One of the most impressive features of this book is the chapter on sex identification. Reliably sexing monitor lizards has presented major challenges for those attempting to keep and breed them in captivity (e.g., Horn & Visser, 1997). The descriptive detail and accompanying photographic references presented in this book on sex determination are unmatched by any other work on the subject. While an entire chapter is dedicated to discussions on sex determination in the genus, the topic is also revisited again in each species account. Comparative photographs depicting gender-related morphological differences including head size and shape, jawline morphology, and tail base morphology are provided for most species covered in the book and should prove to be very useful to zoos and private keepers. Many of these sexing techniques may be used as alternatives to other semi-reliable sexing methods such as ultrasonography and radiography which are largely inaccessible to private keepers, or used in conjunction with other sexing techniques to improve accuracy.

Another useful feature of this book is that it highlights many different housing arrangements and styles of enclosures that are suitable for monitor lizards,

including both indoor and outdoor setups. Numerous photographs depicting a variety of enclosure designs can help keepers learn which elements of their design are critical, as they design and construct their own customized enclosures and approaches to husbandry.

The section on diseases and their prevention provides useful information on the identification and treatment of common maladies that will be useful for all monitor keepers. Some discussion of gout and its potential causes (i.e., inadequate temperatures, chronic dehydration, etc.) would have been useful, especially considering its frequency of occurrence in captive monitor lizards (Hartdegen, 2002; Garner, 2008; Mendyk *et al.*, 2013).

The chapter on diet and nutrition offers useful information on the nutritional components of many commonly offered vertebrate and invertebrate prey items, and also offers instructions for culturing crickets, locusts, cockroaches and isopods in captivity. Although the chapter focuses primarily on whole prey items, which are ideal for monitor lizards, I do consider some of the book's dietary recommendations to be biologically inappropriate and reminiscent of antiquated husbandry practices that favored keeper convenience over suitability for the animal, such as canned cat food (p. 78). Most surprising was the recommendation of offering grated cheese as an "occasional treat" to captives (p. 78).

Another useful discussion explains the genetics of the "Bell's" color phase in *V. varius*. Although this naturally-occurring color phase is common in Australian collections and animals with this condition have been bred to multiple generations in captivity, its genetics are often misunderstood.

Barring the few husbandry recommendations discussed above, I have only two criticisms of this book. My main criticism deals with several sections in this book which appear to be very general in their information, where they could even be inserted into similar works on other lizard taxa. Some of this vague and sometimes confusing information conflicts with monitor lizard biology. For instance, since all monitor lizards are represented by the single genus *Varanus*, statements such as "*Each genus or unique species has been dealt with individually...*" (p. 16), and "*This book covers all Australian genera that are currently maintained in captivity...*" (p. 16) suggest that these sections of text were written for some other broader work on Australian lizards. Additional statements such as "*...hatchlings of diurnal species...*" (p. 123), "*...particularly for diurnal species that require a heat lamp...*" (p. 123), and "*Even species that lay soft-shelled eggs...*" (p. 108), are equally

as confusing, as there are no nocturnal monitor species, nor do they lay any other type of egg besides soft-shelled eggs. In another example, the statement, "*Generally, following courtship, the male grips the female by the skin of her neck or shoulders with his mouth.*" (p. 102) typifies agamid reproduction rather than that of monitor lizards, as biting is not a part of the behavioral repertoire of monitors during courtship or copulation.

The author has recently produced three additional books in the same series on Australian gekkonids and pygopods (Brown, 2012c), skinks (Brown, 2012b), and agamids (Brown, 2012d), as well as a forthcoming all-inclusive work entitled, "*A Guide to Australian Lizards in Captivity*". While I have yet to view these additional works, based on the statements highlighted above, it is possible that they were intended for use in some of these other titles, or have been reused in multiple works.

My other criticism deals with the book's general lack of bibliographic references. Numerous reproductive data are presented throughout the book without citing from whom or which publications they originated. While a brief bibliography of suggested readings does appear towards the back of the book, it is incomplete in its coverage of works on the keeping and breeding of Australian monitors. The formatting for these references is also inconsistent, with page numbers provided for some references but not for others, which can complicate sourcing and acquiring some of these publications.

Typographical errors were minimal and hardly noticeable; the only mistake worth noting was the use of Merten's rather than Mertens' water monitor as the common name for *V. mertensi* (named after German herpetologist Robert Mertens).

In sum, *A Guide to Australian Monitors in Captivity* is an important contribution to the husbandry and breeding of monitor lizards. The author's personal experience and knowledge of this genus in captivity shines through with this work, offering many sensible husbandry recommendations that are consistent with monitor lizard biology and follow current keeping methodologies. Keepers of all backgrounds and experience levels should find this book useful, especially for modifying and customizing their own enclosures and husbandry practices. Although the book focuses solely on Australian species, much of the information should be applicable to African and Asian taxa as well. Accordingly, it should be read and kept on hand by private keepers, zoos and veterinarians working with these animals in captivity.

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Intensive husbandry has occurred for all commonly farmed domesticated livestock species, which traditionally have been farmed extensively (10). Livestock potentially benefit under intensive husbandry from protection from environmental extremes and predators, and more frequent and closer inspection by the stockperson. From an animal welfare perspective, the latter might also provide opportunities for improved transparency of farm activities. One of the larger challenges ahead for improving animal welfare in intensive production systems may relate to providing environments that are conducive to positive emotional states (64). Projects funded by the Australian Centre for International Agricultural Research (ACIAR) to improve the use of local feed resources to. Animal husbandry is the last priority for the farming community, though recently poultry and cattle farming are progressing very fast. From: Biodiversity and Climate Change Adaptation in Tropical Islands, 2008. Related terms Dairy cattle are also kept in tropical areas, which is the consequence of the culinary assimilation by tropical countries of Western diets. In tropical areas, there is a clear preference for poultry, which is easy to produce and much more effective in terms of amount of feed per unit meat compared to large animals. Typical stock feeds are soybean and sorghum in Southeast Asia and maize in Brazil. View chapter Purchase book. In animal husbandry management decisions that need to be done daily are configured according to the correctness of the decisions to be made. At this point, smart systems give many opportunities to farmers. Milking, feeding, environmental control, reproductive performance constitute everyday jobs most affected by correct management decisions. Human errors in this works and decisions made big effect on last product quality and profitability are not able to be risked. This chapter deal with valuable information on the latest challenges and key innovations affecting the animal husbandry. Also, inn