



# New crocodiles found in Africa

All photos courtesy Matthew Shirley

For decades, it has been generally accepted that there are 23 living crocodilian species. However, new studies indicate that there are in fact now 27 species, with Africa being home to these newly-discovered crocodiles – and there could be more! This has significant implications, as Colin Stevenson reports.

The problem with investigating crocodilian biology and ecology is that these reptiles often live in regions that are hard to access and more difficult to negotiate, with political unrest making it dangerous even to enter some areas, particularly parts of West Africa. Home to the river Congo and bounded by the Sahara desert to the north, this legendary land of rainforest, desert and coast is home to an amazing diversity of wildlife. Unfortunately, it also holds a diverse array of dangers, ranging from militants to malarial mosquitos.

The crocodiles found in this part of the world have therefore remained enigmatic. Little-studied and poorly understood, some of the most fundamental questions about their biology and ecology are still either unknown or vague. Not only this, but the unknown status of these populations made management and conservation programmes impossible.

Over recent years, University of Florida researchers have been instrumental in changing this situation. The three

crocodiles from this part of the world that have been the subject of study are the Nile crocodile (*Crocodylus niloticus*); the African slender-snouted crocodile (*Mecistops cataphractus*; formerly *Crocodylus cataphractus*); and the dwarf crocodile, (*Osteolaemus tetraspis*). Some surprising results have followed.

## Nile crocodiles

These represent the typical iconic species of African crocodile: tackled by Tarzan, and featured in hundreds of documentaries, often displaying an appetite for wildebeest and zebras. The range of this crocodile was previously considered to

extend across most of Africa. Historically, Egyptians worshipped Nile crocodiles. They kept some of these reptiles in sacred pools, and regarded them as being 'tame'. When such animals died, a number were even mummified. The crocodile-like deity that these people worshipped was known as Sobek, a figure associated with the River Nile and fertility, and regarded as a protective god that safeguarded the ruling pharaohs.

Over the course of more recent centuries, villages in Burkina Faso in West Africa have maintained similar sacred crocodile pools. Today, these crocodiles now attract tourists, as they can be

approached very closely, and offer great photo opportunities. Visitors are even pictured sitting on these animals, which are unusually tolerant of people.

## Ancient beliefs were true!

What is interesting is that the ancient Egyptians themselves apparently recognised that there were differences in the crocodile population: those in the Nile flowing through their country were large, and not safe to approach, whereas crocodiles from further west were smaller and more docile. It is these smaller crocodiles that were kept within the sacred pools and temples, and mummified in honour of Sobek. As far back as the 5<sup>th</sup> century BC, Herodotus acknowledged this fact, writing that there were differing opinions of crocodiles from various towns, with some populations being held sacred, whereas others were considered dangerous.

Recent scientific 21<sup>st</sup> century analysis of some of the Nile crocodiles in West Africa showed that these animals were most definitely not Nile crocodiles! This prompted further investigation. Researchers looked at DNA samples from across the historic and present range of the Nile crocodile, including mummified crocodiles from the ancient sacred temples.

The results confirmed that the western population of the Nile crocodiles, and those from the sacred pools in Egypt, were a different species from the Nile crocodile itself. The 'new' species has been called *Crocodylus suchus*, a name given to it in 1807 by Geoffroy Saint-Hilaire, who himself had clearly recognised these animals as a separate species more than 200 years ago. So, we are now left with a largely western and northern range for *Crocodylus suchus*, and a southern and eastern distribution for *C. niloticus*.

## A broader question

The research is interesting not only because these crocodiles represent separate species – they have different

numbers of chromosomes, and there are some morphological variations, as reflected in their appearance. The Nile crocodile is now considered to be more closely-related to others from the New World than it is with this 'new' species, which is now commonly referred to as 'the' West African crocodile. This has implications for crocodilian evolution and dispersal, requiring further investigations that will be fascinating to follow. In the meantime, zoos around the world are starting to announce that they have examples of *C. suchus* that had previously been identified as Nile crocodiles.

## African slender-snouted crocodiles

About ten years ago, this species, known scientifically as *Crocodylus cataphractus*, was shown to be distinct from other crocodiles in the *Crocodylus* genus. It was proposed that this animal should be placed in its own genus: *Mecistops*, from a



Mecistops\_westafrika\_cotedivoire\_hatchling



Mecistops\_gabon\_juvenile\_tree

Mecistops\_centralafrika\_gabon\_juvenile

description originally accorded to it by George R. Gray in 1844. Although most crocodile researchers now accept this, it still awaits official endorsement.

*M. cataphractus* is perhaps the least-known crocodilian alive today. Matthew Shirley from the University of Florida has led the effort to study this species, establish its conservation status and develop management programmes. His studies have contributed significantly to information about the range and populations of *M. cataphractus*, along with the ecology of this crocodile. It is restricted to west and central Africa, inhabiting the jungles and forests of the region.

## How many?

In a study published recently, Matthew revealed morphological differences between the west and central populations, as well as clear molecular variations, in terms of DNA. The results are consistent with the African slender-snouted crocodile representing not one, but a number of different species, separated by the Cameroon Volcanic Line.

*M. cataphractus* is often described as a 'medium-sized' crocodile. However, several captive male specimens in European zoos are impressively large, suggesting that the species currently grouped under this general description may grow to different sizes. Both Emmen Zoo in the Netherlands and the Danish Crocodile Zoo have such animals, with the latter individual measuring over 4m (13ft) in length.

This mound-nesting species is often observed in dense habitat, utilising logs and exposed rocks for basking. Relatively inoffensive by nature, these crocodiles are not considered a danger to people. They are hunted locally for meat.



Csuchus\_burkinafaso\_head3





### Dwarf crocodiles

The diminutive dwarf crocodile is widely kept in collections around the world, and has been bred many times since the 1970s, both privately and in zoos. It has generally been assumed to be *Osteolaemus tetraspis* – the West African dwarf crocodile. However, it has now emerged that things are not as straightforward as previously thought.

The dwarf crocodile was first described in 1860 as *Osteolaemus tetraspis*, from a specimen obtained in Gabon. Then during 1919, Karl Schmidt described a second species from the Congo region, which he named *Osteoblepharon osborni*. This species was subsequently revised in the scientific literature first to *Osteolaemus osborni*, relegated to subspecific status as *O. t. osborni*. In recent decades, even this has been disputed, with the suggestion that the subspecies designation was not valid, and just a single species existed.

### What's in a name?

The problem is not just one of taxonomy and naming, although clearly, we humans feel a need to have all parts of nature correctly labelled (an impossible task, since 'correctly' is entirely subjective!). There are practical ramifications for both conservation and management when names are changed though, as will become clear.

A study by Mitch Eaton in 2009 published the results from samples of dwarf crocodiles collected in three regions of West Africa. These revealed that there are three distinctive lineages. Dwarf crocodiles from the Congo Basin are designated as *Osteolaemus osborni*; others from the Ogooué River basin (Gabon) as *Osteolaemus tetraspis*; and, a third, unnamed species currently referred to as *Osteolaemus cf. tetraspis* has been recognised from the Upper Guinean forests of West Africa. These regions are separated from each other by geographical barriers, which would theoretically prevent any movement of these different dwarf crocodile populations.

### European results

Since 2010, the European Studbook for dwarf crocodiles has tested most animals in their records being held in European zoos. Although all three species are represented in zoos across Europe, most are from the

► *Ospnov\_westafrica\_cotedivoire\_adult*

▼ *Ospnov\_burrow\_senegal*



Ogooué basin lineage, with very few of the Congo lineage. Not surprisingly, there are also now hybrids within the zoo population too, given the widespread breeding of these particular crocodiles that has taken place in the past.

It is important to note that the testing has been carried out at a molecular level, by analysing the DNA of these animals. Whilst there are some skull characters that differ, seeing these variations in living animals is almost impossible. In other words, if someone is trying to convince you that they have a rare *Osteolaemus osborni*, ask to see the DNA test results!

### Conservation implications

So, rather than just three crocodile species that were recognised at the start of the millennium within western and central parts of Africa, science has now confirmed that there are at least seven here, with the range of the Nile crocodile now confined to eastern and southern parts of the continent. Although academically interesting, and confirming the value of DNA studies when it comes to distinguishing species, this raises serious important conservation issues too.

The Nile crocodile, for example, is currently classified as 'Lower Risk, least concern' by the IUCN. This designation is based on the fact that the species has a wide range across Africa, and there are significant populations that exist. Overall, numbers are high enough to warrant this status. However, we now have the West African crocodile to consider in this context.

This species has a significantly reduced range, with some populations being very small and requiring management programmes to ensure that they not only continue to survive, but hopefully increase in numbers. Until *C. suchus* is formally accepted as a new species, though, it will be treated as *C. niloticus*, and considered to be of least concern.

One critical issue here is that sustainable use programmes – the commercial utilisation of crocodilians for skins, meat and tourism – are currently allowed, having been based on the status of the Nile crocodile. Unfortunately, it is clear from existing information that some *C. suchus* populations could not withstand commercial utilisation, so acknowledging it as a separate species is vital to ensure that management programmes for this species are appropriate, being based on accurate knowledge of its numbers and the threats that it faces.

### More questions to answer

For the dwarf crocodile and slender-snouted crocodile, there remains much to do. Not only do these new species revisions also require acceptance by the scientific community, but we also need to know more about the distribution of each species. At the moment, we have some broad geographic outlines of where they are found, but in order to manage them effectively, we need to understand the individual distributions of the different species. It has already been said that working in these areas is difficult, and there is a lot of ground to cover.

We have to understand the boundaries between the different species of dwarf crocodiles, as well as those separating the slender-snouted crocodiles, determining



▲ *niloticus gabon*

exactly how many species exist in this case. More of the gaps in our knowledge of their ecology will then be filled in, and a better sense of the status of these different populations will follow.

At present, the dwarf crocodile is listed as 'Vulnerable', according to the IUCN, but we have only a vague notion of the status of each individual species. In the case of the slender-snouted crocodile, its status is being revised presently and this is likely to move from the previous assessment of 'Data Deficient' (reflecting the previous absence of studies that had been carried out on the species) to perhaps 'Critically Endangered', based on the fact that the West African species is nearly extinct in the wild. In contrast, the central species has some robust populations, particularly in Gabon as has been reported by Matthew Shirley.

◀ *Ospnov\_westafrica\_cotedivoire\_subadult\_head1*

### The impact of what has happened

Reports in the general media over the past few months have tended to give the impression that redefining these species was largely an academic exercise. However, there are significant consequences to this work in reality, and in fact, it was the desire to implement effective conservation management plans for African crocodiles that led to these discoveries being made in the first place.

Only by knowing the individual species that you are dealing with can you devise the right plan to protect it. Indeed, without this work, it is entirely possible that we could have seen the disappearance of a crocodile species without truly knowing it had ever existed in the first place!

\* Colin Stevenson has been Director of the Madras Crocodile Bank Trust in India, and he is currently working with both Crocodiles of the World and the Danish Crocodile Zoo as a consultant. He is also a contributor to the Crocodilian Advisory Group.

◀ *Mecistops\_westafrica\_gambia\_juvenile\_head*



## Plan a visit

Crocodiles of the World, Burford Road, Brize Norton, Oxfordshire OX18 3NX is open to the public seven days



a week, from 10am–5pm, but is closed on Christmas Day. It offers the opportunity to see more crocodiles in close-up than anywhere else in the UK. For more information, see <http://www.crocodilesoftheworld.co.uk/>