Australasian Journal of Herpetology **14:9-16.**
Published 30 June 2012.

ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)

A review of the taxonomy of the living Crocodiles including the description of three new tribes, a new genus, and two new species.

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Received 12 March 2012, Accepted 30 April 2012, Published 30 June 2012.

ABSTRACT

Despite the obvious interest of Crocodilians to people and the fact that most living species are well-studied, the taxonomy of the living Crocodilians has been inconsistent with modern classification systems used for other vertebrates.

This paper reviews Crocodiles and updates the taxonomy and nomenclature.

The largest genus *Crocodylus* as currently understood is divided four ways. This is done using pre-existing names for three genera, namely *Crocodylus* Laurenti, 1768 exclusively for the species *niloticus*; *Motina* Gray, 1844 for the four New World Crocodile species; *Oopholis* Gray, 1844 for the Asian/Australian species and a new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus*.

Oopholis is subdivided into subgenera, with the name *Philas* Gray, 1874 being available for the smaller freshwater species within *Oopholis.*

These four genera are in turn are placed in a new tribe Crocodylini tribe nov.

The genera *Mecistops* Gray, 1844 and *Osteolaemus* Cope, 1861 are placed in their own tribe Mecistopsini tribe nov..

The genera and *Gavialis* Gray, 1831 and *Tomistoma* Müller, 1846 are also placed in their own tribe Gavialini tribe nov..

A new Freshwater Crocodile is formally described, namely the species *O. adelynhoserae* from southern New Guinea (formerly regarded as a variant of *O. novaeguineae*).

A second new Freshwater Crocodile is formally described, namely the species *O. jackyhoserae* from the Liverpool River system of Arnhem Land, Northern Territory Australia (formerly regarded as a variant of *O. johnstoni*).

As implicitly stated already, the subfamily Crocodylinae is subdivided into three tribes, formally named for the first time.

This paper presents a summary list of the classification listing all 29 now recognized living species in the order Crocodylia within their higher level placements.

Keywords: Taxonomic revision; new genera; genus; subgenus; *Crocodylus*; *Oxycrocodylus*; Crocodylini; *Osteolaemus*; *adelynhoserae*; *jackyhoserae; Oopholis*; *Motina*; Crocodylini; Mecistopsini; Gavialini; new tribes.

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INTRODUCTION

Crocodiles eat humans!

For that reason alone, they attract the attention of people. In the last 100 years the Crocodylia have also become a family of economic importance to many people as species are harvested for skins and meat. This significance has increased with the establishment of crocodile farms for the specific purpose of raising large numbers of carcasses for sale.

Due to these factors and the relatively small number of species (less than 30 living Crocodile and Alligator species globally), Crocodilians are without doubt among the best-studied of reptiles.

While there have been numerous taxonomic studies into these species, aided in part by a good fossil record for the group and ancestors, the taxonomy of the group has until now been far from stable.

Most well-known species of Crocodilian have been placed in their own (often monotypic) genera by various authors, usually without justification, over the last two centuries.

As a result there are available, "names" for almost any taxonomic configuration of the group one could imagine. However due largely to the small number of extant species, herpetologists have tended to lump all the true crocodiles into the single genus *Crocodylus* Laurenti, 1768, as much out of laziness than for any sensible reason based on actual phylogenies.

Numerous phylogenies have been proposed not just for those species within *Crocodylus* as generally recognized, but also in terms of associated genera including species often assigned to *Crocodylus* by past authors.

Since about 2000 and with the advent of molecular methods, the true phylogeny of the entire extant Crocodylidae has become well established and arguments over the major detail have all but evaporated (see results of Oaks 2007 and others).

The relevant clades have been diagnosed and as a result some of the older and available generic names such as *Mecistops* Gray, 1844, have been revived (McAiley, et. al. 2006), with relevant taxa or taxon placed within.

However the one species currently classified within *Crocodylus* by most authorities to date and in greatest need of removal from the genus based on modern phylogenies published, is the species *suchus* (Hekkala et. al. 2011). As a result, I publish a description of a new genus to accommodate the species below.

The taxonomy of the Alligatoridae has in recent years been considerably more stable than that of the Crocodylidae and this paper presents the currently accepted taxonomy for the extant species.

The purpose of this paper is not to summarize all that is known about extant Crocodilians.

Instead it is to present a new taxonomic arrangement in the wake of recent molecular studies, such as those of the authors cited within this paper, that reflects the true phylogeny of the modern extant Crocodilians and places the taxonomy in line with that of the other living reptiles in terms of where the boundaries for genera and species are drawn.

Where new groups, tribes, genus (single) or species are formally named for the first time, these are diagnosed in sufficient detail to enable identification of the said crocodiles in accordance with the Zoological Code (Ride et. al. 1999). Further details on the relevant species groups, species or subspecies can be found in the relevant literature cited at the end of this paper.

THE CROCODILES THEMSELVES

There have been numerous important studies on the modern crocodiles. An excellent summary of knowledge of the group to 2006 was published by Trutnau and Sommerlad (2006), although the results of some very important molecular studies have been published in the five years since then.

The excellent bibliography (and contents within) at the rear of that book is also relied upon in terms of this paper and the various taxonomic judgments made within.

Rather than rehash the entire bibliography of the book by Trutnau and Sommerlad (2006) with additions, I shall merely make mention of some key studies relevant to the conclusions made within this paper.

These include: Abercrombie et. al. (1980), Adams et. al. (1980), Brochu (1997, 2001, 2003), Burgin (1980), Bustard (1980), Cogger et. al. (1993), Cope (1861), Davis et. al. (2002), Densmore (1983), Densmore and Owen (1989), Densmore and White (1991), Eaton, et. al. (2008), Gartside et. al. (1977), Geoffroy (1807), Glenn et. al. (1988), Gray (1870), Guggisberg (1972), Hall (1989, 1991), Hall and Johnson (1987), Hall and Portier (1994), Harshman et. al. (2003), Hekkala et. al. (2011), Helfernberger (1981), Inger (1948), Janke et. al. (2005), Ko Ko et. al. (2006), Lawson et. al. (1989), Lee et. al. (2009), Lilljeborg (1867), Machkour-M'Rabet et. al. (2009), Man et. al. (2011), Martin (2008), McAiley, et. al. (2006), Menzies et. al. (1979), Miles et. al. (2009), Montague (1984), Neill (1971), Oaks (2007), Ouboter and Nanhoe (1998), Piras et. al. (2009), Platt and Thorbjarnarson (2000), Rainwater et. al. 1988, Romer (1956), Ruffeil and Farrias (2008), Sah and Stuebing (1996), Schmidt (1928), Schmitz et. al. (2003), Seymour, et. al. (2004), Solmu (1994), Spix (1825), St. John et. al. (2012), Summers (2005), Tucker et. al. (1996), Waitkuwait (1989), Webb et. al. (1983a, 1983b), Wells and Wellington (1984, 1985), Wermuth (1953), Whitaker and Basu (1983).

Most species, subspecies and the like have been already described at some stage in the past.

However it is noted that some have been synonymized and effectively ignored for many years.

One group example is seen in the taxonomic history of the species group lumped within "*Osteolaemus tetraspis* Cope, 1861".

For many years the taxon-group was treated as being a single species within *Crocodylus* (e.g. Murray, 1862a, 1862b, Bocage, 1866). In 1867, Lilljeborg erected a new genus *Halcrosia* for the same group.

This name subsequently was synonymised with *Osteolaemus,* as were the species taxa, *osborni* Schmidt, 1919 and *afzelii* Lilljeborg, 1867, both since found to be specifically distinct in the last decade (Eaton, 2010). One can add to this a potential fourth species from the same genus apparently found in the region of Nigeria, for which a description has been deferred herein pending further work by Eaton and others.

Other examples include the species taxa "*Crocodylus suchus* Geoffroy, 1807*"* long thought by most herpetologists as being synonymous with "*Crocodylus niloticus*" (see Schmitz et. al. 2003). "*Crocodylus suchus"* is herein placed in a new genus as a result of further evidence provided by Hekkala et. al. (2011).

Smaller Freshwater species from Asia and Australasia have also been taxonomically neglected.

"*Crocodylus mindorensis*" Schmidt, 1935, from the Philippines has recently been removed from synonymy with "*Crocodylus novaeguineae*".

The taxon *mindorensis* has also been considered a variant of *siamensis* (Neill 1971), and would as a matter of course reasonably be concluded as having characteristics intermediate between the two species found to the east and west.

However the results of Man et. al. (2011) Fig. 2, places the taxon *siamensis* closest to *palustris* and then *C. porosus*, leading me to place it in that species group.

Man et. al. (2011) found the species *mindorensis* and *novaeguineae* to be sufficiently divergent from the other Asian taxa to warrant being placed in a subgenus as done herein.

The other Australia/New Guinea taxa either previously known or described herein were not investigated by Man et. al., but can be

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assumed to be within this subgroup.

Of note is that Man et. al. did not divulge the source of the *novaeguineae* investigated so their results may have been from the taxon described herein as *adelynhoserae* sp. nov. from southern New Guinea as opposed to the northern species *novaeguineae.*

Man et. al. (2011) placed the taxa *niloticus* and *acutus* particularly close and on their results alone, they could not be split at the genus level. However based on the earlier results of other authors such as McAliley et. al. (2006) which were quite different, I've maintained the split at the genus level, resurrecting the genus *Motina* to accommodate the four Central American crocodiles.

The taxon described as the species "*webbi*" Wells and Wellington, 1985 has been synonymized by virtually all authors since with the pre-existing "*johnstoni*".

Although note that in this paper I resurrect "*webbi*" at subspecies level within "*johnstoni*" to create a new combination for the species name.

That the "normal" Northern Territory Freshwater Crocodiles are different to those from coastal Queensland had been known for a long time. The only serious question has been whether or not this should be recognized at the species level or not.

In the absence of molecular data, I recognize the Northern Territory/Western Australian Freshwater Crocodiles at the subspecies level only, but using the available name, *webbi.*

The species, *Crocodylus raninus* Müller and Schlegel, 1844 of Borneo has long been ignored by taxonomists, but has recently been accorded full species status as another "Freshwater" species (Ross 1990, 1992).

An alleged Freshwater species from Sulawesi remains in need of investigation, to see if in fact it even exists and/or is conspecific with either *novaeguineae* or *raninus.*

Two well-defined species level taxa have been effectively described in the literature, but not formally named according to the Zoological Code (Ride et. al. 1999).

As a result they are formally described and named herein for the first time.

A new Freshwater Crocodile is formally described, namely the species *adelynhoserae* from southern New Guinea (formerly regarded as a variant of *novaeguineae*).

The species *novaeguineae* is herein restricted to the region north of the central cordillera on Island New Guinea.

Another new Freshwater Crocodile is formally described, namely the species *jackyhoserae* currently only known from the Liverpool River system of Arnhem Land, Northern Territory Australia (formerly regarded as a variant of *C. johnstoni*). This newly described taxon is best known in the recent literature as the dwarf sandstone country form of Freshwater Crocodile.

These new species are both herein placed within the genus *Oopholis* Gray, 1844, the genus including all Australasian Crocodiles and the subgenus *Philas* Gray, 1874, the group containing all the smaller Freshwater species.

THE LAYOUT OF THE CLASSIFICATION WITHIN THIS PAPER

The taxonomic judgments made within this paper, have either been stated or alluded to already in this paper and because they are in the main derived from the results of recent molecular studies are not rehashed here.

It is presented in the following manner.

The family Crocodylidia is defined, followed by the newly defined tribes, each defined and which lists the content genera.

The genera are not specifically defined, save for the new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus.* In terms of the other available generic names used within this paper, I hereby rely either on the original descriptions by the authors and/or modified ones as provided by later authors cited within this paper.

The largest genus *Crocodylus* as currently understood is divided four ways. This is done using pre-existing names for three genera, namely *Crocodylus* Laurenti, 1768 exclusively for the species *niloticus*; *Motina* Gray, 1844 for the four New World Crocodile species; *Oopholis* Gray, 1844 for the Asian/Australian species and a new monotypic genus *Oxycrocodylus* gen. nov. for the African species *suchus.*

Oopholis is subdivided into subgenera, with the name *Philas* Gray, 1874 being available for the smaller freshwater species within *Oopholis.*

These four genera are in turn are placed in a new tribe Crocodylini defined herein.

The genera *Mecistops* Gray, 1844 and *Osteolaemus* Cope, 1861 are placed in their own tribe Mecistopini tribe nov. defined herein.

The genera *Gavialis* Gray, 1831 and *Tomistoma* Müller, 1846 are also placed in their own tribe Gavialini tribe nov. defined herein.

Following the tribe and genus descriptions, the two new species are formally named and described.

Following the descriptions is presented a simple list of the extant Crocodylidae (with the Gavialidae subsumed within as a new tribe) and Alligatoridae, noting that there is nothing new proposed within this paper for that family.

FAMILY CROCODYLIDAE (TRUE CROCODILES)

The order Crocodylia includes, crocodiles, alligators (including Caimans and the like), and various extinct forms as well.

These are all the familiar crocodile/alligator-type reptiles. They are usually large, usually semi-aquatic and covered by leathery scaly skin, typically with raised rows of shields along the back, large mouth and sharp teeth. All are egg-layers.

Eyes situated atop their heads enable them to keep a lookout for prey, while their thick powerful, vertically flattened tails swiftly propel them through the water.

Crocodiles and alligators are top-notch hunters and will eat just about any kind of meat they can get their teeth to catch. With teeth specialized just for spearing, neither family bothers to chew its food, they swallow large chunks or the entire prey animal whole.

Their eyesight above water is excellent, and thanks to vertical pupils that can open up extra wide to let in additional light and they also have keen night vision. The slit-like ears are also very sensitive to sounds.
The sense of smell is also highly developed due to special organs in their snouts.

The Crocodylidae (including Gharials and kin) are separated from other extant forms (alligators and kin) by the following suite of characters: Alligators have a wide "U"-shaped, rounded snouts (like a shovel), whereas crocodiles tend to have longer and more pointed "V"-shaped snouts.

In alligators, the upper jaw is wider than the lower jaw and completely overlaps it. Therefore, the teeth in the lower jaw are almost completely hidden when the mouth closes, fitting neatly into small depressions or sockets in the upper jaw. However, in crocodiles, the upper jaw and lower jaw are approximately the same width, and so teeth in the lower jaw fit along the margin of the upper jaw when the mouth is closed. Therefore, the upper teeth interlock (and "interdigitate") with the lower teeth when the mouth shuts.

Crocodiles have a jagged fringe on their hind legs and feet; alligators do not. Alligator have webbed feet; crocodiles do not.

Unlike Alligators, crocodiles and kin have functioning salt glands on their tongue.

This allows crocodiles to easily filter out salt and therefore allows them to inhabit brackish and saltwater habitats. While alligators also have these structures, they appear to have lost the ability to use them for excreting significant amounts of salt and hence prefer to stay in freshwater areas.

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TRIBE CROCODYLINI TRIBE NOV.

(Terminal taxon: *Crocodylus niloticus*)

Diagnosis: Separated from others within the Crocodilinae by the following suite of characters: Medium to long snout, usually more than 1.5 times the width at its base. Ridges on the upper side of the snout appear as pairs of rostrally converging preorbital ridges, unpaired preorbital bulges and elevated triangular surfaces. Most species have a premaxilla that is perforated to make room for the first pair of mandibular teeth. There is no ossified median nasal septum. The iris is greenish. In older animals the frontal edges of the orbits extend to the thirteen or fourteenth maxillary teeth. The upper eyelids have a rough, furrowed surface and have almost no ossification. The supratemporal fenestrae are relatively large. The vomers are not visible at the palate. The mandibular symphysis extends almost to the fourth to eighth mandibular teeth. The nuchals and dorsals are separated from each other. The median longitudinal pair of dorsal scales shows pronounced parallel keels past the root of the tail. The rear edges of the limbs have more-or-less pronounced scale crests.

Content: *Crocodylus* Laurenti, 1768; *Motina* Gray, 1844; *Oopholis* Gray, 1844; *Oxycrocodylus* gen. nov..

TRIBE MECISTOPSINI TRIBE NOV.

(Terminal Taxon: *Mecistops cataphractus*)

Diagnosis: The tribe is most easily defined by defining the two component genera of quite different external appearances.

Species within this tribe are diagnosed and separated from all other extant crocodilians by one or other of the following two suites of characters:

1/ A small-to-medium-sized crocodilian (usually around 2.5 m, but maximum sizes reported to be up to 4.2 m) takes its common name from its narrow, specialized snout, where it resembles the new world crocodile taxon *intermedius*. Protective scales over the back of the neck are present in three or four rows and merge with the scales on the back, unlike the other extant members of the Crocodylidae which have two distinct rows of scales. Blotches which are present on back are more typical of the Gavialini and some Alligators. Dentition: 5 (rarely 4) pre-maxillary; 13-14 maxillary; 15-16 mandibular, total number of teeth is 64-70 (Genus *Mecistops*); or,

2/ Heavily armoured (neck, back, tail) with pronounced, ossified ventral scales. Nuchal scale pattern: 3 transverse series (1: two large scales; 2: two large scales; 3: two very small scales). Adult colouration uniformly dark on the back and sides, with lighter brown banding on body and tail of juveniles, and yellow patterning on head. Belly colour is yellowish with numerous black patches. Maximum recorded size 1.9m (6.3 feet). Short, blunt snout (snout length = basal width), more similar in fact to a Caiman, which may be due to the fact that this genus *Osteolaemus* has a similar ecology the dwarf caimans. Dentition: 4 pre-maxillary; 12-13 maxillary; 14-15 mandibular, total number of teeth is 60-64 (Genus *Osteolaemus*). Within *Osteolaemus, O. tetraspis* is lighter in colour, with more pointed, upturned snout. Heavy dorsal scale armour on back has led to the name 'rough-backed' dwarf crocodile. *O. osborni* is poorly known. It appears to have a down-turned snout and less dorsal armour. It is believed one or possibly two other species of *Osteolaemus* occur in west Africa, at least one of which has an available name (*afzelii* Lilljeborg, 1867).

Content: *Mecistops* Gray, 1844; *Osteolaemus* Cope, 1861.

TRIBE GAVIALINI TRIBE NOV.

(Terminal Taxon:*Gavialis gangeticus*)

Diagnosis: The two component genera have not always been classified together. Recently a number of authors have placed them in either the family Gavialidae or the subfamily Gavialinae.

However the results of molecular studies have not upheld the placement, instead finding the two genera to be well rooted within the Crocodylidae. While these two genera do sit apart from the other extant crocodile genera, I do not believe a subfamily placement is warranted and hence they are placed within a new tribe, defined herein.

The diagnosis for the tribe to separate it from all other extant crocodilians is best done by separately defining each of the monotypic genera (even though each genus does in fact have features in common). The tribe is therefore defined by species with one or other of the following suite of characters:

1/ Extremely long and narrow snouts that are set off from the rest of the skull and lacking ridges or jagged seams. The fourth tooth of the lower jaw does not slide into a hole or groove in the upper jaw; all teeth of the upper jaw and lower jaw bite past each other and are slightly pointed towards the outside so that their tips extend outside the edges of the jaws. The teeth are homodontic. All of the maxillary teeth or mandibular teeth are of similar size. The nasals are separated by medial enlargements on the maxillary bones, which together form a median seam, not only separated from the nasal opening but also from the premaxillary bones. The supratemporal fenestrae are larger than in other crocodilians and in their shape and size similar to the circular orbits. The postorbital pillar begins on the jugal, which has an isodiametric cross section in the area of the infratemporal foramina. The quadrate does not participate in the rear edge of the infratemporal foramen. The choana do not have a raised medial septum or bulging rim at the rear. The dorsal and flank scales are underlain by ossifications of the skin. The ventral scales are not ossified. The nuchals and dorsals are not separate. The backs of limbs have a scale crest (genus *Gavialis*), or;

2/ Long and narrow snouts, whose length can be up to 4.5 times the width at its base. There are no ridges on the top of the head. The premaxilla have grooves on each side into which the first mandibular teeth fit. There is no median bony nasal septum. The frontal edges of the orbits extend to the fifteenth and sixteenth maxillary teeth. The iris is brown. The upper eyelids have a rough surface and have little ossification. The supratemporal fenestrae are quite large. Their distance from each other is about half their diameter. The vomers at the palate are at the level of the frontal edges of the palatal fenestrae and not visible. The palatines extend to the level of the twelfth and thirteenth maxillary teeth and do not or barely extend past the frontal edges of the palatal fenestrae. The mandibular symphysis extends to the fourteenth to fifteenth mandibular teeth. The splenials participate in the formation of the mandibuloar symphysis. The nuchals and dorsals are not separate. The median longitudinal rows of dorsal scales continue to have parallel keels past the root of the tail. There are longitudinal scale crests on the rear sides of the four limbs (genus *Tomistoma*).

Content: *Gavialis* Oppel, 1811; *Tomistona* Müller, 1838.

GENUS *OXYCROCODYLUS* GEN. NOV.

Type species: *Crocodilus suchus* Geoffroy, 1807

Diagnosis: Physically similar in appearance to the Nile Crocodile (*Crocodylus niloticus*), now monotypic for the genus *Crocodylus*. The genus *Oxycrocodylus* gen. nov. is monotypic for the species *suchus*.

In *Crocodylus niloticus* (including all recognized or named subspecies) there are 16-20 scales per transversal ventral scale row, whereas in *Oxycrocodilus* gen. nov. there are just 12-15.

In *Oxycrocodylus* gen. nov. the ear slit is angled at 40 to 45 degrees, whereas in *Crocodylus niloticus* the ear slit is angled at about 30 degrees.

Oxycrocodylus gen. nov. is noted for its smaller adult size than *Crocodylus niloticus* (usually 1.5-2.5 metres versus 4-5 metres, for males of both species), shorter, more thickset build and considerably more docile temperament.

Oxycrocodylus gen. nov. is only likely to be confused with the species *niloticus*.

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Other African crocodile genera are defined within the tribe *Mecistopini* tribe nov. above (relied upon as part of this diagnosis) and are therefore easily separated from this taxon.

The exact distribution of this genus is not certain due to the past confusion with *Crocodylus niloticus.* However it is known to inhabit southern parts of the Sahara region in permanent and semi-permanent waterways, usually adjacent to rocky refugia with relatively dense vegetation. In wetter regions where it occurs, the genus is generally uncommon in major rivers, but often more common in smaller tributaries.

Reports of dwarf races of *Crocodylus niloticus* in various parts of Africa, may in fact be attributable to the new genus *Oxycrocodylus* gen. nov..

It is also likely that there is more than one species of *Oxycrocodylus* gen. nov. within Africa, presumably each being confined to one or more major drainage system or region.

The genus is reported to have occurred in the Nile River System as recently as the early 1900's and was apparently well-known to Ancient Egyptians with mummified skulls of this genus being found among artifacts.

Etymology: Named in honor of my Great Dane dog Oxyuranus (in turn named after an Australian genus of elapid snake). In the eight year period from 2004 to 2012, he kept the Snakebusters facility safe from numerous burglary attempts. These were by inexperienced snake handler imitators and business competitors who thought that they could enhance their own prospects by attacking the Snakebusters enterprise and steal reptiles.

These persons not only sought to attack Snakebusters, but also committed countless other crimes and wrongful actions, solely motivated by a desire to make a lot of easy money and with no regard for reptiles or even people for that matter.

Oxyuranus (we called him "Oxy") did a sterling duty in protecting our property for many years and without ever complaining, putting him ahead of human security guards, enabling Australia's best reptile education and shows to continue. As a result, over 2 million people were exposed to Snakebusters education one way or other and as a result herpetology in Australia got a major boost.

In other words this dog did more for herpetology than most people, including many ostensibly within the field. Therefore it's appropriate he have a genus of crocodile named in his honor.

***OOPHOLIS (PHILAS) ADELYNHOSERAE* SP. NOV.**

Holotype: A preserved specimen number: 121997 at the California Academy of Sciences (CAS), USA, from Balimo, Papua New Guinea, Lat: 8.0471013888889 S, Long: 142.95652169444 E. The specimen was supplied by Fred Parker in 1968.
The California Academy of Sciences (CAS), USA is a government owned facility that allows access to its collection for research purposes.

Paratype: A preserved specimen number: 121998 at the California Academy of Sciences (CAS), USA, from Balimo, Papua New Guinea, Lat: 8.0471013888889 S, Long: 142.95652169444 E. The specimen was supplied by Fred Parker in 1968.
The California Academy of Sciences (CAS), USA is a government owned facility that allows access to its collection for research purposes.

Diagnosis: This species was formerly classified as a variant of *O. novaeguineae* until now.

It is separated from *O. novaeguineae* by 5 or 6 post-occipital scales on the neck, versus 4 (consistently) in *O. novaeguineae*.

O. adelynhoserae sp. nov. has a distinctly narrower snout than *O. novaeguineae*. *O. novaeguineae*. appear to have triangular head and snout, with minimal curvature inwards at the posterior part of the snout, whereas in *O. adelynhoserae* sp. nov. the upper part of the snout narrows more rapidly giving the snout the appearance of being separate from the rest of the head

In both species the snout is roughly twice as long as it is wide at the base.

O. adelynhoserae sp. nov. nests during the wet season, whereas *O. novaeguineae* nests during the dry season. *O. adelynhoserae* sp. nov. lays fewer, larger eggs which hatch into significantly (by 5 cm) longer hatchlings on average.

The two species have quite different breeding biologies.

O. novaeguineae averages 35.2 eggs per clutch while *O. adelynhoserae* sp. nov. lays an average of 21.7 per clutch. *O. novaeguineae* typically nests on floating plant islands in overgrown canals and sidearms. By contrast *O. adelynhoserae* sp. nov. usually nests on land (Hall and Johnson 1987, Hollands 1987).

Hatchling *O. adelynhoserae* sp. nov. measure 25-30 cm, versus 20-25 cm in *O. novaeguineae* and 18-20 cm in *O. johnstoni.*

O. adelynhoserae sp. nov. is the species of Freshwater Crocodile found south of the central cordillera of New Guinea, with the centre of distribution being the Fly River system and tributaries. Specimens from Port Moresby and environs formerly attributed to *O. novaeguineae* are attributable to *O. adelynhoserae* sp. nov..

O. novaeguineae is now restricted to the river systems north of the central cordillera, with the distribution centered on the Sepik River System and tributaries.

While the species distribution boundaries for each of *O. novaeguineae* and *O. adelynhoserae* sp. nov. are not known, it is likely that *O. adelynhoserae* sp. nov. encroaches that of *O. novaeguineae* on the south-east end of Island New Guinea, based on known distributions of other species groups with north-south divisions on island New Guinea. An obvious example includes the Scrub Pythons (*Australiasis amethistina*).

There have been numerous studies published on "*O. novaeguineae*". Unfortunately many of these would in fact be attributable to *O. adelynhoserae* sp. nov.. Herpetologists looking at studying New Guinea crocodiles in the future should be aware of the fact that previous studies did not differentiate between the two local Freshwater species.

Etymology: Named in honor of my daughter Adelyn Hoser for her many valuable contributions to herpetology and reptile education in the first 13 years of her life.

***OOPHOLIS (PHILAS) JACKYHOSERAE* SP. NOV.**

Holotype: A preserved specimen number: R90361 at the Australian Museum Sydney, from the Liverpool River, Arnhem Land, Northern Territory. (12° 42' S, 133° 47' E), caught and lodged in October 1979.

The Australian Museum is a government owned facility that allows access to its collection for research purposes.

Paratypes: Preserved specimen numbers: R90359 and R90360 at the Australian Museum Sydney, from the Liverpool River, Arnhem Land, Northern Territory. (12° 42' S, 133° 47' E), caught and lodged in October 1979.

The Australian Museum is a government owned facility that allows access to its collection for research purposes.

Diagnosis: Separated from *O. johnsoni* (including *O. johnsoni webbi*) the only species it is likely to confused with by the lower number of transversal scales on the ventral side 20, versus 22-24 in *O. johnsoni.*

O. johnsoni consistently has 4 large post-occipitals in a row, while *O. jackhoserae* sp. nov. sometimes has five or six.

O. jackhoserae sp. nov. is readily separated from *O. johnsoni* by it's considerably more elongate and gracile build and consistently smaller adult size (males average under 1.5 m in *O. jackhoserae* sp. nov. versus 1.7 m in *O. johnsoni*), giving it a common name of "Dwarf Freshwater Crocodile". *O. jackhoserae* sp. nov. has considerably longer limbs and is immediately separated from *O. johnsoni* and all others in the genus *Oopholis* by this trait.

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The length of the front limb in the “arm-pit” to the beginning of the hind limb (at apex) is 54 to 56.8 per cent of the distance in *O. johnsoni* versus 57-58 per cent in *O. jackhoserae* sp. nov..

O. jackhoserae sp. nov. is also separated from *O. johnsoni* by the fact that the scutes are generally more raised than is seen in *O. johnsoni*, giving *O. jackhoserae* sp. nov. a somewhat rugose appearance.

This species was formerly classified as a variant of *O. johnsoni* until now.

O. jackhoserae sp. nov. is known only from the Liverpool River system, Arnhem Land, Northern Territory Australia, although there have been unconfirmed reports of so-called Dwarf Freshwater Crocodiles from other parts of the Northern Territory. Whether these are *O. jackhoserae* sp. nov. or some other taxon isn’t known.

While I recognize the taxon *webbi* as diagnosed by Wells and Wellington in 1985, that taxon is treated herein as a subspecies of *O. johnstoni*, and is the locally occurring variant of that species in the Northern Territory in the region adjacent to where the new taxon *O. jackyhoserae* sp. nov. occurs.

The diagnosis for *O. jackyhoserae* sp. nov. given here applies in terms of both subspecies *O. j. johnsoni* and *O. j. webbi* in terms of comparisons with those taxa.

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NEW CLASSIFICATION OF EXTANT (LIVING) CROCODYLIA

ORDER CROCODYLIA
FAMILY CROCODYLIDAE

TRIBE CROCODYLINI TRIBE NOV.

GENUS *CROCODYLUS* LAURENTI, 1768

Crocodylus niloticus Laurenti, 1768 (Nile crocodile).

GENUS *MOTINA* GRAY, 1844

Motina acutus (Cuvier, 1807) (American crocodile).

Motina moreletii (Duméril and Bibron, 1851) (Morelet's crocodile).

Motina intermedius (Graves, 1819) (Orinoco crocodile).

Motina rhombifer (Cuvier, 1807) (Cuban crocodile).

GENUS *OOPHOLIS* GRAY, 1844

Oopholis palustris comb. nov. (Lesson, 1831) (Mugger crocodile).

Oopholis porosus (Schneider, 1801) (Saltwater crocodile).

Oopholis siamensis comb. nov. (Schneider, 1801) (Siamese crocodile).

SUBGENUS *PHILAS* GRAY, 1874

Oopholis (*Philas*) *adelynhoserae* sp. nov. (South New Guinea Freshwater Crocodile).

Oopholis (*Philas*) *jackyhoserae* sp. nov. (Liverpool River Freshwater Crocodile).

Oopholis (*Philas*) *johnsoni* comb. nov. (Krefft, 1873) (Australian Freshwater crocodile).
Oopholis (*Philas*) *mindorensis* comb. nov. (Schmidt, 1935) (Philippine crocodile).

Oopholis (*Philas*) *novaeguineae* comb. nov. (Schmidt, 1928) (North New Guinea crocodile).

Oopholis (*Philas*) *raninus* comb. nov. (Müller and Schlegel, 1844) (Borneo Freshwater Crocodile).

GENUS *OXYCROCODYLUS* GEN. NOV.

Oxycrocodylus suchus comb. nov. (Geoffroy, 1807) (Desert Crocodile).

TRIBE MECISTOPSINI TRIBE NOV.

GENUS *MECISTOPS* MÜLLER, 1846

Mecistops cataphractus (Cuvier, 1825) (Slender-snouted crocodile).

GENUS *OSTEOLAEMUS* COPE, 1861

Osteolaemus afzelii (Lilljeborg, 1867) (African Dwarf crocodile).

Osteolaemus osborni (Schmidt, 1919) (African Dwarf crocodile).

Osteolaemus tetraspis Cope, 1861 (African Dwarf crocodile).

TRIBE GAVIALINI TRIBE NOV.

GENUS *GAVIALIS* OPPEL, 1811.

Gavialis gangeticus (Gmelin, 1789) (Gharial).

GENUS *TOMISTOMA* MÜLLER, 1838

Tomistoma schlegelii (Müller, 1858) (False Gharial).

FAMILY ALLIGATORIDAE

SUBFAMILY ALLIGATORINAE

GENUS *ALLIGATOR* CUVIER, 1807

Alligator mississippiensis (Daudin, 1802) (American Alligator).
Alligator sinensis Fauvel, 1879 (Chinese Alligator).

SUBFAMILY CAIMANINAE

GENUS *PALEOSUCHUS* GRAY, 1862

Paleosuchus palpebrosus (Cuvier, 1807) (Cuvier's Dwarf Caiman).

Paleosuchus trigonatus (Schneider, 1801) (Smooth-fronted Caiman).

GENUS *CAIMAN* SPIX, 1825

Caiman yacare (Daudin, 1802) (Yacare Caiman).

Caiman crocodilus (Linnaeus, 1758) (Spectacled Caiman).

Caiman latirostris (Daudin, 1802) (Broad-snouted Caiman)

GENUS *MELANOSUCHUS* GRAY, 1862

Melanosuchus niger (Spix, 1825) (Black Caiman)

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