

A new Subgenus of Giant Snakes (Anaconda) from South America (Serpentes: Boidae).

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Received 12 February 2012, Accepted 4 April 2012, Published 30 April 2012.

ABSTRACT

A review of the taxonomy of the New World boids finds several genera as currently recognized to be paraphyletic.

There are available genus names for those species within genera that have been found to be composite, should they be split to ensure monophyletic genera.

The only potential exception to this is within the genus *Eunectes* Wagler, 1830 as currently recognized.

There is a strong argument in favor of splitting the so-called Yellow Anacondas away from the so-called Green Anacondas, at the genus level as a result of clear and consistent differences between the relevant taxa.

This paper formalizes this division by taking a conservative position and naming and defining a new subgenus, *Maxhoserboa* subgen. nov. for the Yellow Anaconda and related species.

Keywords: Taxonomic revision; new subgenus; *Eunectes*; *Maxhoserboa*; *murinus*; *deschauenseei*; *notaeus*; *beniensis*; snakes.

INTRODUCTION

The large and giant South American Boa species known as "Anaconda" have fascinated people ever since they first became known to Europeans and no doubt prior.

Allegedly reaching lengths up to 10 metres (33 feet), although none accurately recorded have ever come close to this, the Green Anaconda, averaging about five metres in length is still by far (on average) the heaviest living snake on the planet, even if not the longest.

The longest recorded living snake to date is the far thinner Asiatic Reticulated Python (*Broghammerus reticulatus*).

Almost every kid's book about "dangerous" animals features the Green Anaconda (*Eunectes murinus*) as part of the script.

In 1997 a so-called adventure film titled "Anaconda" was made to highlight the size and ferocity of these particularly large snakes. It was complete with all the embellishment and hype that a blockbuster film would be expected to have.

Native to most of the northern half of South America east of the Andes, these snakes are reasonably common where they occur and therefore well-known to science.

The larger and better-known Green Anaconda (*Eunectes*

murinus) has been a staple of major public zoos for decades, while the somewhat smaller and more even tempered Yellow Anaconda (*E. notaeus*) has been popular with herpetoculturists since at least the late 1970's when numbers of live specimens were imported to Europe and the USA to satisfy the burgeoning reptile pet trade (see Fig 9.4 Reed and Rodda 2009).

As a result of their abundance both in the wild and more recently in captivity, there are numerous excellent publications dealing with all aspects of these snakes, including, Albuquerque et. al. (2010), Barone (2003), Bellosa (2003), Bellosa and Mössle (2009), Calle et. al. (1994), Calle et. al. (2001), Cope (1869), Gay (1993), Gilmore and Murphy (1993), Infante-Rivero et. al. (2008), Lamonica et. al. (2007), Müller (1970), Petzold (1983) Rivas (1998, 2000, 2001, 2007), Rivas and Corey (2008), Rivas and Burghardt (2001), Rivas and Owens (2000), Rivas et. al. (1995, 1999, 2001, 2007a, 2007b, 2008), Schreitmüller (1924), Starace (1998), Strimple (1993, 1997), Strimple et. al. (1997), Trutnau (1982) and Vaz-Silva (2007).

The taxonomy at the genus level has been fairly stable since Wagler first created the genus *Eunectes* in 1830.

At the species level, the two most widespread and common

forms have been consistently recognized, namely Green (*Eunectes murinus*) and Yellow (*E. notaeus*), with most authors not recognizing other described variants until the period post-dating year 2000 (see McDiarmid et. al. 1999).

In recent years a number of described variants have been given full species status, mainly as a result of five studies published by Dirksen and Böhme, namely Dirksen (2001), Dirksen (2002), Dirksen and Böhme (1998a), Dirksen and Böhme (1998b) and Dirksen and Böhme (2005) and others similar publications by Dirksen in particular.

Dirksen has also promoted the "new" species that he described in 2002 via his own personal website (<http://www.anakondas.de>) that is dedicated to Anacondas.

Broadly speaking there are two main clades within the genus as currently recognized.

First is the larger Green Anacondas (*Eunectes murinus*), the type species described by Linnaeus in 1758. The clade apparently includes the lesser-known and smaller species *E. beniensis*, a taxon first described by Dirksen in 2002.

Secondly are the distributionally disjunct and considerably smaller, Yellow Anacondas, (*E. notaeus*), described by Cope in 1862, and the lesser-known species *E. deschauenseei*, described by Dunn and Conant in 1936, a taxon regarded by many for some years as merely a variant of *notaeus*.

Phylogenies of these two main lineages relying on morphological and molecular evidence have been done and show that each lineage is effectively monophyletic.

Furthermore, fossil evidence from the region shows *Eunectes* to have ancient origins dating as far back as the middle Miocene (16-11.6 MYA) of Columbia for the now extinct taxon *E. stirtoni* (Hsiou and Albino 2009) or perhaps even earlier (same authors).

On that basis it seems obvious that the snakes should be split into two genera or at least subgenera, as has been proposed for other South American and Caribbean boa genera as indicated by Noonan and Chippindale (2006), see in particular for the genera *Epicrates* and *Eryx* as currently recognized.

However until the post 2000 period, *Eunectes* as recognized only contained two recognized and superficially similar species, so there was a strong and compelling argument by taxonomists against the creation of two monotypic genera for these snakes even though differences were obvious.

However, noting that there are now currently four recognized species within *Eunectes sensu lato* (Dirksen and Böhme 2005) and they fall into two distinct and mutually exclusive groups, the argument against the creation of two monotypic genera has been effectively removed.

This argument in favor of division becomes more compelling in the knowledge that other regionally isolated forms of *E. notaeus* in particular have been assessed as being highly distinct and are likely to be formally described and named as full species in the near future (Mendez, et. al. 2007, Reed and Rodda 2009).

Reed and Rodda (2009) also note that matings between *E. murinus* and *E. notaeus* have failed to produce viable offspring, which accords with the sympatry of the two species in the wild through wide areas.

This is significant as results of cross-generic matings between pythons have been widely posted on the internet (see for example www.kingsnake.com hybrid forum and Hoser 1989) with these offspring apparently being viable.

There are other significant facts that point to *Eunectes* as currently recognized, long consisting of two distinct lineages and this includes an overlay of present distributions of the "Yellow" Anacondas versus that of the "Green" when reconciled with the known climatic history of the South American continent over the past 20 million or more years (see Noonan and Chippindale 2006).

This evidence that the two lineages of "Green" and "Yellow" Anacondas is ancient is in fact confirmed by the current

distributions of the two forms.

The Green Anaconda (*murinus*) is distributed throughout most of the Amazon basin and nearby areas. By contrast the Yellow Anacondas (*E. notaeus* and *E. deschauenseei*) are in effect split into two widely separated areas, generally north and south of the centre of distribution, indicating that the population has been split by the more wide-ranging species, which as noted don't cross-breed, further noting that reproductively at least, most boids and pythons are conservative and maintain an ability to breed with congeners both in captivity and in the wild even when phenotypically very different.

As a result of the above facts, the genus *Eunectes* Wagler, 1830 is herein divided into two, with a new subgenus, *Maxhoserboa* subgen. nov. being formally named and described according to the Zoological Code (Ride 1999) herein.

The genus *Eunectes* is herein defined herein as a nominate subgenus to only include the so-called Green Anacondas.

If one seeks to get a definition of the genus *Eunectes* in total, including both listed subgenera below, then one only needs to combine the diagnoses for both.

SUBGENUS *EUNECTES* WAGLER, 1830

Type species: *Boa marina* Linnaeus, 1758.

Diagnosis: Large to extremely large boid snakes from central and South America.

In this genus as defined herein, the ground color is typically olive green upon which are scattered dark (black to blackish brown) usually ovoid blotches of varying size; these blotches can be single, paired, joined or alternating down the midline, depending on the individual. There are typically no saddles or other types of dorsal patterns, making for a very clean appearance of black blotches on a solid background. A second lateral series of irregular dark markings is typically present, sometimes presenting as small circles with centers that are lighter, usually yellow, than the ground color. Southern specimens have more and smaller darker blotches.

Notable of the Green Anacondas (*E. murinus* and *E. beniensis*) is their massive thick build, with large individuals having midbody diameters in excess of 0.3 metre (Coburn, 1991).

In comparison to all other pythons and boas, the eyes and nostrils of *Eunectes (sensu lato)* are positioned more dorsally, as is typical of many semi-aquatic vertebrates.

Dirksen and Böhme (2005) defined the Green Anaconda (*E. murinus*) as having 239-269 ventrals, 53-81 dorsal mid body rows, 4 black head stripes, suborbitals between the oculars and supralabials, black dorsal blotches usually half as long as the dorsal width when one looks at the whole animal, and black lateral spots with yellowish centres that are lighter than the ground color.

In contrast all other species of Anaconda have five head stripes, no scales between the oculars and labials and lower dorsal mid body scale row counts.

The Beni Anaconda is similar in appearance to the Green Anaconda, although the blotches are not as ovoid. It's blotches are darker and more numerous and the size attained is only about 2/3 the length of the species *E. murinus*.

The genus (and subgenus) is found in suitable wetter and swampy habitats throughout most parts of Northern South America, except for the west coast and colder high-altitude areas.

SUBGENUS *MAXHOSERBOA* GEN. NOV.

Type species: *Eunectes notaeus* Cope, 1862

Diagnosis: Snakes in this subgenus are easily separated from those species remaining within the genus *Eunectes* (the nominate subgenus) by the following suite of characters (see entire diagnosis): the coloration is strongly "yellow" as opposed to "green" seen in the subgenus *Eunectes*. In DeSchauenseei's Anaconda (*E. deschauenseei*), the yellowish ground color is somewhat muted to a yellowish green or light brown and tends

to be most prominent in the lateral surfaces. These snakes are separated from similar looking pythons by the absence of the prominent labial pits seen in the pythons.

After noticing the yellowish ground cover, an obvious identifying feature of this genus is the many black dorsal blotches and smaller lateral blotches present. The number and size of blotches is generally sufficient to differentiate the Yellow Anacondas from the Green (*Eunectes*).

DeSchaunsee's Anaconda has fewer (87-126) and larger dorsal oval blotches (usually solid) separated by two or three scales, as well as small lateral irregular blotches. The yellow Anaconda has 101-175 dorsal blotches, separated by only one or two scales, the dorsal blotches tend to have lighter centres.

The Yellow Anaconda also has numerous irregular lateral blotches which tend to form complete or incomplete ocelli on the upper flanks below the dorsal blotches, below which are numerous black flecks.

The two Yellow Anaconda species exhibit very similar scale counts, including 43-54 dorsal mid body rows, 213-237 ventrals (Dirksen, 2002).

The two species of Yellow Anaconda can be easily separated by distribution.

The DeSchaunsee's Anaconda is found only in the region of the Brazilian island of Marajo, nearby areas of the mouth of the Amazon and several drainages in French Guiana. The area between the two known distributional centres for this species may also have specimens, but has not been properly searched for the taxon to date.

The Yellow Anaconda is widespread in the region it occurs in. This includes the Pantanal in Bolivia and Brazil, from 15 Deg South Latitude, through aquatic habitats of the Paraguay and Parana River basins below 250 metres elevation in Paraguay and Argentina reaching 32 deg south latitude in the Parana basin. While the Yellow Anaconda has a species range in excess of 400,000 square kilometres, the snakes are only found where suitable aquatic habitats exist (see Dirksen 2002, and Dirksen and Henderson 2002).

Where Yellow Anacondas (*Maxhoserboa* subgen. nov.) and Green Anacondas (subgenus *Eunectes*) are sympatric, the former can be easily distinguished by any of the following: 1/ The presence of fewer than 50 dorsal mid body rows (Green Anacondas have more than 50 rows), 2/ No scales present between the supralabials and the oculars (present in the Green Anaconda) and 3/ The presence of five dark head stripes (the Green Anaconda only has four, see Fig. 8.1 Starace 1998, Dirksen 2002).

Etymology: Named in honour of my Sydney-based cousin, Max Hoser in honour of his many public services.

Species within *Maxhoserboa* subgen. nov.

Eunectes (Maxhoserboa) notaeus (type species)

Eunectes (Maxhoserboa) deschaunseei

Species remaining within the subgenus *Eunectes*

Eunectes (Eunectes) murinus (type species)

Eunectes (Eunectes) beniensis

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PO Box 599
Doncaster, Victoria, 3108.
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ISSN 1836-5698 (Print)
ISSN 1836-5779 (Online)