

A review of the South American snake genera *Leptodeira* and *Imantodes* including three new genera and two new subgenera (Serpentes: Dipsadidae: Imantodini).

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ABSTRACT

A review of the phylogeny and taxonomy of the snake genera *Leptodeira* and *Imantodes* finds both genera as currently recognized to be paraphyletic.

There are no available genus names for those species substantially different to the type species groups.

This paper formalizes the obvious intra-generic divisions.

Leptodeira is subdivided into three genera, with two new genera, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. being formally named and diagnosed according to the Zoological Code. Similarly, a subgenus *Crossmanus* subgen. nov. is erected, diagnosed and named to accommodate divergent taxa from within the remainder of *Leptodeira*.

Imantodes is divided into two genera, with a new genus *Maclachlanus* gen. nov. and a subgenus from the remainder of *Imantodes* identified as *Neilsimpsonus* subgen. nov., both being formally named and diagnosed according to the Zoological Code.

Keywords: Taxonomic revision; new genus; *Leptodeira*; *Lukefabaserpens*; *Ginafabaserpenae*; *Crossmanus*; *Imantodes*; *Maclachlanus*; *Neilsimpsonus*; snakes.

INTRODUCTION

The closely related genera *Leptodeira* (the Cat-eyed Snakes) and *Imantodes* (Vine snakes) have been the subject of numerous studies in terms of their phylogeny. Included are those of Cadle and Greene (1993), Daza et. al. (2009), Duellman (1958a), Mulcahy (2007), Mulcahy et. al. (2011), Myers (1982), Pyron et. al. (2011), Reyes-Velasco and Mulcahy (2010), Taub (1967), Taylor (1938), Zaher (1999) and Zaher, et. al. (2009).

Studies of other aspects of these snakes include: Aveiro-Lins et. al. (2006), Ávila and Kawashita-Ribeiro (2011), Barrio-Amorós and Brewer-Carias (2008), Calderon et. al. (2003), Cisneros-

Heredia (2006), Claessen (2003), Cope (1867), Cope (1870), Cope (1894), Cope (1899), Duellman (1958b), Duellman (1978), Duellman and Salas (1991), Duméril (1853), Duméril et. al. (1854), Dundee et. al. (1986), Golder (1983), Greer (1965), Griffin (1917), Günther (1860), Günther (1868), Hartweg and Oliver (1940), Hidalgo (1980), Jansen and Köhler (2003), Lee (2000), Liner (2007), McCranie (2007), Oliver (1942), Peters et. al. (1970), Peterson et. al. (1995), Pizzatto et. al. (2008), Porras (2006), Porras and Solórzano (2006), Rivas et. al. (2012), Savage (2002), Savage and Norman (1987), Schmidt and Andrews (1936), Smith (1942), Smith and Tanner (1944), Smith et. al. (1995), Taylor (1936), Taylor (1951), Vences et. al. (1998), Whithworth and Beirne (2011), Wilson and Meyer (1985), Wilson

et. al. (1979), Zug, et. al. (1979), Zweifel (1959a) and Zweifel (1959b).

This has led a number of authors to surmise the relationships of snakes within the two genera, including what were assumed to be the most basal and the most derived members of the genera.

The more recent studies involving nuclear and mitochondrial DNA have broadly upheld the general conclusions to the effect that the two genera are monophyletic to one another and also closely related to one another, with *Imantodes* as currently recognized being basal to *Leptodeira*.

However the divisions within each genus in terms of the component species are so deep that a number of studies have found the genera to be in effect paraphyletic when assessed in a manner consistent with other colubrid snakes and where generic distinctions are drawn.

The results of Pyron et. al. (2011) mirrors that of Mulcahy, et. al. (2011) and Myers (2011), which in turn (in the main) mirrors the results of the very comprehensive morphology-based analysis of Duellman (1958a).

In conjunction with other more recent studies relating to the morphology and biology of the component species, the totality is a compelling argument in favor of dividing both genera as indicated in the abstract.

One species in particular, that currently known as *Leptodeira nigrofasciata* consistently sits between the two genera *Leptodeira* and *Imantodes* as currently recognized and was recognized as far back as 1958 as being widely divergent from the rest (Duellman 1958a). As no one has recently proposed the merger of these two genera (a view not supported by the molecular data) the only tenable option is the removal of *Leptodeira nigrofasciata* from *Leptodeira* and the placement within its own (new genus).

This is done below where the taxon is placed in the genus *Lukefabaserpens* gen. nov.

A similar situation exists for the species currently known as *Leptodeira frenata*, which although not as basal as *L. nigrofasciata* also warrants being placed in its own monotypic genus and so is assigned to *Ginafabaserpenae* gen. nov..

A similar situation to that just described also exists for the species taxon currently known as *Imantodes inornatus*, which sits basal to both *Imantodes* and *Leptodeira* according to the phylogeny presented by Pyron et. al. (2011) and due to its strong divergence, cannot possibly be placed in either genus and so is also placed in a new genus below (*Maclachlanus* gen. nov.).

As already inferred, *Leptodeira* is subdivided into three genera, broadly in line with the species groups defined by Duellman (1958a), page 14, and elsewhere in his monograph, with the final division in line with that seen in the results of Pyron et. al. (2011), in turn calibrated as accurate from other similar studies (see for example the results of earlier molecular studies for Coral Snakes and Rattlesnakes cited in Hoser 2012).

This means herein there are two new genera, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. formally named and diagnosed according to the Zoological Code (Ride 1999). A subgenus within what remains of *Leptodeira* to accommodate divergent members is also formally named and diagnosed according to the Zoological Code, called *Crossmanus* subgen. nov..

Imantodes is divided two ways, with a new genus *Maclachlanus* gen. nov. being formally named and diagnosed according to the zoological code, as well as a subgenus to accommodate two divergent taxa within what remains of *Imantodes*.

THE GENUS LEPTODEIRA FITZINGER, 1843

The Genus *Leptodeira* was diagnosed by Duellman (1958a).

The key elements are adapted and republished here with some additions and modifications arising from other sources cited above:

The genus is placed within the Colubridae, because the

hemipenes has an unforked or only slightly forked sulcus spermaticus and hypapophyses are absent from the body vertebrae.

The genus *Leptodeira* is characterized by maxillary teeth that increase in size posteriorly followed by a diastema and two enlarged, grooved fangs. The loreal scale is wider than high, there are immaculate ventral scales and sublateral scale row reduction. There are two apical pits, elliptical pupil, divided anal, smooth dorsal scales, normal complement of colubrid head shields and a capitate hemipenis with many large spines.

In the genus (*sensu lato*) as recognized by Duellman (1958a), there are 8-18 maxillary teeth which increase in length posteriorly, are followed by a diastema and two enlarged grooved fangs.

The palatine teeth vary from seven to twelve in number, pterygoid 16-32, dentary 14-28, the large temporal venom glands sit on either side of the head in the temporal region.

The head shields are of an unmodified colubrid type, with a short rostral, paired internasals and prefrontals, divided nasals, and a single loreal. The snout is blunt and not protruding. The prooculars are one to four; postoculars one to four; upper labials 7-9, usually eight; lower labials eight to twelve, usually ten; temporals usually 1+2+3; chinshields normally subequal in length; 150-208 rounded and overlapping ventrals; divided anal; 54-107 divided imbricate subcaudals; dorsal scalation is smooth with 17-25 mid body rows; there are two apical pits and keels occasionally present in the anal region only; scale reduction normally involving the paravertebral row; tail length is more than 20 per cent of the body length, neck narrow, head distinct; maximum length usually slightly exceeds a metre.

What were described by Duellman (1958a) as the species groups, were separated on the nature of the hemipenes, the dentition and certain skull elements, particularly the quadrates, vomers, and maxillaries.

Analysis of the characters shows that the most useful in a systematic study of the snakes are the numbers of ventrals, subcaudals, and dorsal scale rows, the numbers of upper labials and preocular scales, the number, shape, and size of the body blotches, and the nature of the dorsal head pattern and hemipene morphology. Analysis of numerous character clines shows that parallel clines may exist in two or more species in certain characters, but that in others the clines may diverge. Discontinuous clines are common. In some cases these are correlated with striking morphological changes between populations and become incorporated in the characteristics of subspecies, which are ignored in this paper.

Studies of the skull of *Leptodeira (sensu lato)* indicate that the skull is a normal colubrid type without striking specializations. Certain skeletal elements readily identify it from related genera. The poison glands (modified posterior portions of parotid glands) are large and produce a venom of sufficient strength to kill small frogs and lizards. The distribution of the genus is essentially throughout the American tropics to elevations of about 2000 meters. Some forms are restricted to semi-arid habitats; others live in tropical rain forest. Two species range from semi-arid to wet forest environments; each has a subspecies adapted to arboreal life in the forest by having a reduced number of dorsal scale rows, enlarged vertebral and paravertebral scale rows, and a laterally compressed body. Snakes of this genus feed primarily on frogs and toads; some lizards are included in the diet. The snakes are nocturnal and appear to reach their greatest abundance at times of congregations of breeding frogs and toads, which appear to be their main diet.

These snakes are also known to feed on lizards.

So far as is known, all species are oviparous and may lay as many as 13 eggs.

As inferred already colours and patterns are variable and dorsally may consist of any of dark spots, blotches or bands on a lighter ground colour, or sometimes relatively plain in colour,

while the ventral surfaces are usually immaculate cream, white or with only scattered darker flecks.

The genus *Leptodeira* (*sensu lato*) is found from the far south of the United States, through central America and into the northern half of South America, generally including the region north of the tropic of Capricorn, excluding the Andes and west and the far east of the continent.

For the record, the similar and monotypic False Cat Eyed Snake *Pseudoleptodeira latifasciata*, is separated from this genus by the fact that the loreal scale is not wider than high, it does not have immaculate ventral scales and does not have sublateral scale row reduction.

The species *uribei*, sometimes in the past placed within the genera *Pseudoleptodeira* and more recently within *Leptodeira* is herein placed in the genus *Ginafabaserpenae* gen. nov. with the species *frenata*, the species *frenata* being the type for the genus.

The genus *Imantodes* is separated from *Leptodeira*, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. by the loss of bifurcation of the sulcus spermaticus versus a reduction to a small terminal fork or expanded flat area in the genus *Leptodeira*.

The entire monograph of Duellman (1958a) is available for download from the internet as a giant pdf file for free as of early 2012 and therefore it is not my intention to repeat its contents here.

Instead this paper's focus is to complete the formalities of the divisions of the relevant genera in light of the most recent molecular findings.

The separation of the taxa within the newly described subgenus and two separate genera of *Leptodeira* is done within the diagnoses of each below.

In contrast to Duellman (1958a), the monotypic False Cat Eyed Snake *Pseudoleptodeira latifasciata* is not treated as being within *Leptodeira* and is ignored for the purposes of diagnoses and the like, having been separated from the relevant taxa above.

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Lukefabaserpens gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira*.

The relevant three species within the new monotypic genus *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* (*Ginafabaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginafabaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginafabaserpenae* gen. nov.

The two genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be further separated from one another by the characters outlined in the Key in Duellman (1958a) pages 14-16.

SUBGENUS CROSSMANUS SUBGEN. NOV.

Type species: *Crotaphopeltis punctata* Peters, 1866

(Known in most contemporary texts as *Leptodeira punctata*)

Diagnosis: *Crossmanus* subgen. nov. is separated from all snakes within the rest of the genus *Leptodeira*, and the snakes

within the genera *Lukefabaserpens* gen. nov. *Ginafabaserpiniae* gen. nov. and *Pseudoleptodeira* by the following suite of characters:

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. (containing the species taxa formerly known as *Leptodeira nigrofasciata*, *L. uribei* and *L. frenata*) both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpiniae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

The other snakes within what's left of *Leptodeira* are separated from *Crossmanus* subgen. nov. by having a hemipenis that usually has a cup-shaped depression in the capitulum which is set off from the rest of the organ by a fold, maxillary teeth normal or reduced in number and a dorsal body colour pattern consisting of dark blotches on a light ground colour.

Leptodeira is found from Mexico running south and into South America.

Two members of *Crossmanus* subgen. nov., namely *splendida* and *septentrionalis* are characterized and separated from all other *Leptodeira* by a hemipenis with many spines and without a deep fold around the base of the capitulum and a high number of maxillary teeth.

The species *punctata* (type for the subgenus) is unusual among all other *Leptodeira* in having a different general body pattern and appearance, but also in the reduced number of ventrals, subcaudals, labials and teeth, giving it appearance similar to snakes of the genus *Hypsiglena*.

Crossmanus punctata is characterised by 150-167 ventrals, 54-69 subcaudals, 19 dorsal mid body rows (15 posteriorly); the hemipenis *in situ* extends for six caudals; there is a median row of three large spines, the distal spine being the largest; on each side there are two rows of smaller spines; four or five spines in each row, which converge distally; the distal spine is common to both rows; the sulcus is opposite the primary row of spines and extends to the middle of the capitulum, the capitulum is disc-shaped, finely crenulated, and set off from the rest of the organ by a deep fold.

The coloration of *Crossmanus punctata* is a ground color of yellowish brown to light tan dorsally. There are five or six longitudinal rows of black or dark spots on the dorsum. The largest spots are on rows 7 and 8, in some individuals these are fused across the vertebral scale row to form a series of transverse bars. The second row of spots is on scale rows 3 and 4; these spots are smaller than the dorsal ones and are often indistinct. The lowermost row of spots is on scale rows 1 and 2. These are often reduced to a dark area on the edges of the scales. There is a black nuchal blotch, four or six scales in length and extending laterally to the third scale row. This blotch may be divided along the midline. The tail is marked dorsally with three to five rows of small dark spots. The belly is an immaculate cream color.

The top of the head is cream-yellow to tan and may have an ornate head pattern consisting of an 8-shaped mark on the frontal and parietals with an anterior Y-shaped projection on the frontal and prefrontals and a nape stripe extending posteriorly from the parietals from the length of three or four dorsal scales. This pattern is often fragmented.

Crossmanus punctata is the only species within all of *Leptodeira*, *Lukefabaserpens* and *Ginafabaserpiniae* that does not have a longitudinal series of dorsal body blotches of varying size and colour.

Crossmanus subgen. nov. ranges from Mexico into South America.

Etymology: Named in honor of Bradley Crossman, born and

raised in Sydney Australia and since having spent time at various locations including Airlie Beach, Queensland, where for many years he conducted wildlife and reptile rescues and the like and essential public education about reptiles.

In a story repeated across Australia many times, his successful business enterprise at Airlie Beach was closed down by corrupt government wildlife officers who wanted to monopolize the "wildlife space" and used their position as both regulator and competitor to close down a business rival that they couldn't match on the basis of standards.

Species within *Crossmanus* subgen. nov.

Leptodeira (*Crossmanus*) *punctata* (Peters, 1866) (Western Cat-eyed Snake)

Leptodeira (*Crossmanus*) *splendida* (Günther, 1895) (Splendid Cat-eyed Snake)

Leptodeira (*Crossmanus*) *septentrionalis* (Kennicott, 1859) (Northern Cat-eyed-Snake)

Other species remaining within Genus *Leptodeira* as defined within this paper.

Leptodeira (*Leptodeira*) *annulata* (Linnaeus, 1758) (Type species for the genus) (Banded Cat-eyed Snake)

Leptodeira (*Leptodeira*) *bakeri* Ruthven, 1936 (Baker's Cat-eyed Snake)

Leptodeira (*Leptodeira*) *maculata* (Hallowell, 1861) (Southwestern Cat-eyed Snake)

Leptodeira (*Leptodeira*) *rubricata* (Cope, 1893) (Boca Mala Cat-eyed Snake)

Total of seven species within this genus.

GENUS LUKEFABASERPENS GEN. NOV.

Type species: *Leptodeira nigrofasciata* Günther, 1868

Diagnosis: Separated from all (other) *Leptodeira* by the following suite of characters:

In terms of the two new genera *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Lukefabaserpens gen. nov. and *Ginafabaserpenae* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira*.

The relevant three species within the new monotypic genus *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov. can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* and *uribei* (*Ginafabaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginafabaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginafabaserpenae* gen. nov.

Lukefabaserpens gen. nov. is further recognizable by having 10-21 large dorsal body blotches, extending to, or nearly the ventrals, forming long body bands with straight edges with no lateral intercalary spots, no ornate head pattern on the frontals or parietals, two preoculars and usually 17 mid-body scale rows.

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpiniae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

Lukefabaserpens gen. nov. ranges from Central America, Costa Rica, Honduras, Nicaragua northward through arid and semi-arid habitats to Mexico.

They are a smaller taxon than species of *Ginafabaserpenae* gen.

nov. and *Leptodeira*.

In common with the genus *Pseudoleptodeira*, this genus is separated from *Ginafabaserpenae* gen. nov. and *Leptodeira* by long dark bands on the body, hemipenis with spinus capitulum, somewhat elongated and flattened head and reduced numbers of teeth on all dentigerous bones.

The Mexican snakes assigned to the genus *Lukefabaserpens* gen. nov. have been referred to the species *mystacina* (Cope 1869), but Duellman (1848a) found it to be merely a regional variant of *nigrofasciata*, for which the key diagnostic characters varied clinally across the distributional range of the species *nigrofasciata*.

As already mentioned, in the species *nigrofasciata*, there is distinct clinal variation from southern Mexico through to Costa Rica. As one moves south there is an increase in body bands and a decrease in the number of ventrals and subcaudals.

The subgenus *Lukefabaserpens* gen. nov. is monotypic for the type species *nigrofasciata*.

Etymology: Named in honour of Melbourne Australia based lawyer, Luke Faba, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

The corrupt wildlife officers, Ron Waters, Glen Sharp, Emily Gibson and others (see definitions of terms in Hoser 1999) were working on behalf of rival business operators with whom they had an improper relationship and protected from prosecution when they committed wildlife and safety offences on a regular basis.

Furthermore they fabricated charges and false allegations against company Snakebusters, whom none of the other newly licenced enterprises could match by standard, in order to remove Snakebusters from a "market" they could not otherwise compete in on the basis of standard.

The DSE officers also breached competitive neutrality laws in that they were part of the same government umbrella organization in control of the dysfunctional government-owned Melbourne Zoo, the main business competitor of Snakebusters for "in school" educational incursions and excursions and breached their statutory role.

As they were simultaneously in the role of regulator of their main commercial competitor, namely Snakebusters, they should not have illegally used their power to shut down a business competitor who had never breached any written rules.

The Zoo and DSE officials illegally abused this position to corruptly fabricate criminal charges against Snakebusters and then ram through criminal convictions with a combination of legal firepower that only the taxpayer funded government department could afford (at a total cost of several million dollars!) and by "judge shopping" to ensure that they got friendly judgments in their favor in a manner by which it simply wasn't financially viable or possible for Snakebusters to pursue the matter through the higher courts.

There were countless false claims and allegations made by these people against Snakebusters, many of which put public safety at risk.

Such false claims included that the Snakebusters venomoid snakes (see Hoser 2004a and Hoser 2004b), had all regenerated venom and were dangerous (they weren't) and that the venomoid bites shown on video of myself and others in the period 2006 to 2011, including my daughter taking venomoid bites, and all showing no ill effects, were routine for dangerous snakes as they falsely claimed that so-called dry bites are extremely common from species such as Taipans, Death Adders and the like.

As a result of this false advice from DSE people and other business competitors, at least two people who heeded this

wrong advice died from Snakebite in the period from 2009-2011. These DSE officials are also the very same people responsible for bushfire prevention and management.

These are the same officials responsible in part for the 172 Victorians needlessly killed in the Black Saturday bushfires of 7 Feb 2009.

Instead of dealing with the impending bushfire disaster in the period leading up to the fires at end 2008 and early 2009, DSE officers were raiding Snakebusters shows at Shopping Malls and elsewhere, creating public alarm at these events and pumping money into legal teams to bog Snakebusters down at extended VCAT (tribunal) hearings and the like in late 2008, where they repeatedly claimed I, Raymond Hoser was delusional to believe that dozens of people could die in a bushfire event in Victoria.

As a result of the vast amount of money, manpower and resources the DSE devoted to unlawfully attacking Snakebusters in January 2009 and earlier in the period 2006 to 2008, the DSE were totally unprepared for the bushfires that happened on 7 February 2009, leading to the totally preventable deaths of 172 people and huge (avoidable) property losses.

Lawyers such as Luke Faba, who worked for the unfairly matched underdog (Snakebusters) against hateful cowards hiding behind the shield of an over-powerful government and totally corrupt bureaucracy deserve to be honored by having a genus of snake named after them.

Species within *Lukefabaserpens* gen. nov.

Lukefabaserpens nigrofasciata (Günther, 1868) (The genus is monotypic for the species)

Common name: Black-banded Cat-eyed Snake

GENUS GINAFABASERPENAE GEN. NOV.

Type species: *Sibon frenatum* Cope, 1886

(Known in most contemporary texts as *Leptodeira frenata*)

Diagnosis: Separated from all (other) *Leptodeira* and *Lukefabaserpens* gen. nov. by the following suite of characters:

The snakes of this genus have a dark post-orbital stripe, usually in contact with the first body blotch, whereas those of the genera *Leptodeira* and *Lukefabaserpens* gen. nov. do not.

In terms of the two new genera *Ginafabaserpenae* gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from *Leptodeira* by dentition. *Leptodeira* has 13 or more maxillary teeth anterior to the diastema whereas for the other genera, the number is 12 or less (see Duellman (1958a) table 1, p. 17).

Ginafabaserpenae gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from *Leptodeira* by the lower number of dentary teeth, 17 or less, versus 19 or more in *Leptodeira*.

The relevant three species within the new genera *Ginafabaserpenae* gen. nov. and *Lukefabaserpens* gen. nov. both can be separated from one another by the number of pterygoid teeth. *Lukefabaserpens* gen. nov. usually has 18 or less, versus usually 20 or more in *Ginafabaserpenae* gen. nov..

For the species *nigrofasciata* (*Lukefabaserpens* gen. nov.) there are 10-12 maxillary teeth anterior to the diastema and for the species *frenata* and *uribei* (*Ginafabaserpenae* gen. nov.) there are 8-10 maxillary teeth anterior to the diastema.

Lukefabaserpens gen. nov. is easily separated from *Ginafabaserpenae* gen. nov. on the basis of mid-body scale row count. For *Lukefabaserpens* gen. nov. there are 17-19 dorsal mid body scale rows, versus more than 19 in *Ginafabaserpenae* gen. nov.

Ginafabaserpenae gen. nov. is separated from all *Leptodeira*, *Lukefabaserpens* gen. nov. and *Pseudoleptodeira* by hemipen morphology.

In all species except *Ginafabaserpenae* gen. nov. there is a small to large cup in the capitulum, whereas this is absent in *Ginafabaserpenae* gen. nov..

Furthermore in *Ginafabaserpenae* gen. nov. the capitulum is set off by a deep fold and the distal spines are larger than the

proximal ones.

Pseudoleptodeira is separated from all other snakes in the genera *Lukefabaserpens* gen. nov. *Ginafabaserpenae* gen. nov. and *Leptodeira* by having more than 19 mid body rows, seven to ten long dark bands on the body and a light occipital region.

The genus *Ginafabaserpenae* gen. nov. occurs from central Veracruz southwards and eastwards through southern Mexico in the states of Tabasco and Chiapas, throughout the Yucatan Peninsula in El Peten in Guatemala and British Honduras and offshore islands as well as the Pacific Coast of Mexico.

Etymology: Named in honour of Melbourne Australia based lawyer, Gina Faba, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

See also for etymology of *Lukefabaserpens* gen. nov. (Luke Faba) above.

Species within *Ginafabaserpenae* gen. nov.

Ginafabaserpenae frenata (Cope, 1886) (Rainforest Cat-eyed Snake)

Ginafabaserpenae uribei (Bautista and Smith, 1992) (Uribe's False Cat-eyed Snake)

THE GENUS *IMANTODES* DUMÉRIL, 1853

Known as the Vine Snakes, Tree Snakes or Chunk-headed snakes, these are smallish (rarely more than a metre long), very thin and delicate snakes with a relatively large head and bulging eyes with elliptical pupils.

These snakes are so light that they can often crawl over leaves at night, without moving them and disturbing the sleeping prey lizards that they sometimes eat.

They occur in Middle America from Mexico southwards to the north of South America.

Myers (1982) summed up his view of the phylogeny and taxonomy of the group in the abstract of his paper. In it he wrote:

"The widespread Neotropical genus *Imantodes* (Colubridae) is partially revised in order to determine the relationships of a distinctive new snake discovered on an isolated ridge in eastern Panama. The six species of blunt-headed vine snakes now recognized are equally divided between two monophyletic assemblages - the *cenchoa* and *lentiferus* groups - based on hemipenial characters, maxillary dentition, relative tongue (fork) length, and coloration (reduction of pigmentation in the primitive blotched markings) ... From examination of type specimens of old names currently in the synonymy of *Imantodes cenchoa*, it is concluded that (1) the placement of *Himantodes anisolepis* and *H. platycephalus* is correct, (2) *Himantodes hemigenius* is a junior synonym of *I. gemmistratus*, and (3) the name *Himantodes semifasciatus* is a composite of *I. cenchoa* and *I. gemmistratus*. A lectotype is designated to keep *semifasciatus* with *cenchoa*, but the nominal subspecies *Imantodes cenchoa semifasciatus* is nonetheless considered invalid. A lectotype also is designated for *Imantodes lentiferus*."

As of then and as recently as early 2012, the six recognized species within the genus *Imantodes* are as follows:

Imantodes cenchoa (Linnaeus, 1758) (the type species for the genus) (Blunt-headed Treesnake)

Imantodes gemmistratus (Cope, 1861) (Central American Treesnake)

Imantodes inornatus (Boulenger, 1896) (Speckled Blunt-headed Treesnake)

Imantodes lentiferus (Cope, 1894) (Amazon basin Treesnake)

Imantodes phantasma Myers, 1982 (Phantasma Tree Snake)

Imantodes tenuissimus Cope, 1867 (Yucatán Bluntheaded Snake)

The division of the genus as done by Myers is in broad

accordance with the DNA results published by Pyron et. al. 2011, where Myers also identified two monophyletic assemblages.

One of those assemblages, the so-called *lentiferus* group, is in fact itself composite and according to the evidence of Pyron et. al. 2011, sits relatively closely phylogenetically to the main *cenchoa* group.

While Myers (1982) placed the taxon *inornatus* as basal to the other two in the *lentiferus* group, Pyron et. al. found this taxon to be basal to all others in the genus *Imantodes* as defined by Myers (1982) and perhaps the closely related genus *Leptodeira*. In fact the taxon *inornatus* is so widely divergent of the others in the *lentiferus* group and all other *Imantodes*, that it clearly forms a third taxonomic group.

Hence, on the basis of a revisiting of the morphological evidence published by Myers (1982) and the more recent evidence of Pyron et. al. (2011), there's now no question whatsoever that the taxon *inornatus* should be placed in it's own genus, and separated apart from all other snakes placed in *Imantodes* by Myers (1982).

However on the basis of the evidence of Myers (1982) and in particular Pyron et. al. (2011), it was however a difficult question as to whether or not to erect a new genus for the two species *lentiferus* and *phantasma*.

As a result, I have taken a conservative position and erected a subgenus for these two taxa.

THE GENUS *IMANTODES* DUMÉRIL, 1853 (*SENSO LATO*)

Few snakes can be confused with the snakes in the genus *Imantodes*. This due to their highly attenuated, vertically compressed bodies and conspicuous head with bulbous eyes, stuck on a ridiculously long and thin neck.

Genus *Imantodes* is separated from other similar snakes by the loss of bifurcation of the sulcus spermaticus versus a reduction to a small terminal fork or expanded flat area in the genera *Leptodeira*, *Lukefabaserpens* gen. nov. and *Ginafabaserpenae* gen. nov..

The preferred food of *Imantodes* is frogs, toads and to a lesser extent small lizards, that are usually hunted for at night.

SUBGENUS *NEILSIMPSONUS* SUBGEN. NOV.

Type species: *Himantodes lentiferus* Cope, 1894

(Known in most contemporary texts as *Imantodes lentiferus*)

Diagnosis: Within the genus *Imantodes senso lato*, the *cenchoa* group, including the species *cenchoa*, *gemmistratus* and *tenuissimus* are separated from the others (including the two species within this subgenus) by the relatively small hemipenis that only extends 4-5 subcaudals when everted, versus 6-8 in the others (*lentiferus*, *phantasma* within this subgenus and *Maconchieus* gen. nov. being monotypic for the species *inornatus*), making the latter group's hemipenes of more typical colubrid size.

The genus *Maconchieus* gen. nov. is separated from all other *Imantodes* species by the fact that the hemipenis has a free overhanging edge of the capitulum which is a common condition in colubrids having unicapitate hemipenes. In contrast to the condition in *Maconchieus* gen. nov. the asulcate edge of the capitulum is variously scalloped or emarginated in the taxa *lentiferus* and *phantasma* (which includes the total of this subgenus). Despite minor variation in this part of the hemipenis, the taxa *lentiferus* and *phantasma* share an unusual tendency for the overhanging edge of the capitulum to be proximally connected by a slightly oblique, elongated cluster of small spines. In those two species, the hemipenes are asymmetrical in that this small cluster of spines extends to the capitulum in a slightly dextral direction (when the hemipenes are appressed posteriad with the sulci spermatici against the tail), on both the right and left organs.

Snakes in *Neilsimpsonus* subgen. nov. have only shallow grooving on the rear fangs versus deep grooving on other

snakes remaining in what's left of *Imantodes*.

Snakes in *Neilsimpsonus* subgen. nov. are not vividly banded or blotched as seen in other snakes remaining in what's left of *Imantodes*.

Species within *Neilsimpsonus* subgen. nov.

Imantodes (Neilsimpsonus) lentiferus (type species)

Imantodes (Neilsimpsonus) phantasma

Other species remaining within Genus *Imantodes* as defined within this paper.

Imantodes (Imantodes) cenchoa (the type species for the subgenus)

Imantodes (Imantodes) gemmistratus

Imantodes (Imantodes) tenuissimus

Total of five species within this genus.

GENUS *MACONCHIEUS* GEN. NOV.

Type species: *Himantodes inornatus* Boulenger, 1896

(Known in most contemporary texts as *Imantodes inornata*)

Diagnosis: The genus *Maconchieus* gen. nov. is separated from all *Imantodes* species by the following suite of characters:

Pattern of vague dark lines or of relatively light blotches, appearing as a pattern of short blackish dorsal crosslines and similar, alternating lateral lines on golden or light-brown body, with the upper surfaces that are only somewhat darkened or dusted by black speckling; less than 220 ventrals and less than 140 subcaudals; about 17-21+2 maxillary teeth, the fangs with only shallow, basal grooves; hemipenis of moderate size, spinose or not at asulcate edge of capitulum, but this region with a deep overhang or naked pocket.

Within the genus *Imantodes senso lato*, the *cenchoa* group, including the species *cenchoa*, *gemmistratus* and *tenuissimus* are separated from the others (including this genus) by the relatively small hemipenis that only extends 4-5 subcaudals when everted, versus 6-8 in the others (*lentiferus*, *phantasma* and *Maconchieus* gen. nov.), making the latter group's hemipenes of more typical colubrid size.

The genus *Maconchieus* gen. nov. is separated from all other *Imantodes* species by the fact that the hemipenis has a free overhanging edge of the capitulum which is a common condition in colubrids having unicapitate hemipenes. In contrast to the condition in *Maconchieus* gen. nov. the asulcate edge of the capitulum is variously scalloped or emarginated in the taxa *lentiferus* and *phantasma*. Despite minor variation in this part of the hemipenis, the taxa *lentiferus* and *phantasma* share an unusual tendency for the overhanging edge of the capitulum to be proximally connected by a slightly oblique, elongated cluster of small spines. In those two species, the hemipenes are asymmetrical in that this small cluster of spines extends to the capitulum in a slightly dextral direction (when the hemipenes are appressed posteriad with the sulci spermatici against the tail), on both the right and left organs.

Etymology: Named in honor of Melbourne Australia based barrister and lawyer, Lachlan McConchie, who in 2011-2012 worked extremely hard in a series of legal battles against corrupt government wildlife officials working for the Victorian Government Wildlife Department (known as DSE) to fight for the rights of ordinary Victorians to be safely and properly educated about reptiles by Snakebusters reptile shows and displays.

See also for etymology of *Lukefabaserpens* gen. nov. (Luke Faba) above.

Species within *Maconchieus* gen. nov.

Maconchieus inornata (the genus is monotypic for this species)

Important first reviser notes:

Due to the fact that a number of phylogenies have been produced that robustly test the conclusions and outcomes of this paper, I'd anticipate the various generic placements to come into general usage fairly quickly.

However, there may be inertia by some herpetologists to place

the species *Lukefabaserpens nigrofasciata* in a monotypic genus apart from the taxa *Ginafabaserpenae frenata* and *Ginafabaserpenae uribei*.

If any subsequent worker chooses to merge these genera for any reason, then the name *Lukefabaserpens* should take precedence over *Ginafabaserpenae*.

REFERENCES CITED

- Aveiro-Lins, G., Rocha-Barbosa, O., Salomao, M. G., Puerto, G. and Loguercio, M. F. C. 2006. Topographical anatomy of the blunthead treesnake, *Imantodes cenchoa* (Linnaeus, 1758) (Colubridae: Xenodontinae). *International Journal of Morphology* 24(1):43-48.
- Ávila, R. W. and Kawashita-Ribeiro, R. A. 2011. Herpetofauna of São João da Barra Hydroelectric Plant, state of Mato Grosso, Brazil. *Check List* 7(6):750-755.
- Barrio-Amorós, C. L. and Brewer-Carias, C. 2008. Herpetological results of the 2002 expedition to Sarisari-ama, a tepui in Venezuelan Guayana, with the description of five new species. *Zootaxa* 1942:1-68.
- Boulenger, G. A. 1896. *Catalogue of the snakes in the British Museum, Vol. 3*. London (Taylor and Francis), xiv + 727 pp
- Cadle, J. E., and Greene, H. W. 1993. Phylogenetic patterns, biogeography, and the ecological structure of neotropical snake assemblages, p. 281-293. In: *Species Diversity in Ecological Communities: Historical Perspectives*. R. E. Ricklefs and D. Schletter (eds.). University of Chicago Press, Chicago.
- Calderon, R., Cedeño-Vázquez, J. R. and Pozo, C. 2003. New distributional records for amphibians and reptiles from Campeche, Mexico. *Herpetological Review* 34(3):269-272.
- Claessen, H. 2003. De slangen van de Guyanas Deel VI. *Lacerta* 61(5):177-187.
- Cisneros-Heredia, D. F. 2006. Notes on the distribution and natural history of the Bluntheaded vine snake, *Imantodes cenchoa*, in Ecuador. *Herpetological Bulletin* 97:4-7.
- Cope, E. D. 1867. Fifth contribution to the herpetology of tropical America. *Proc. Acad. nat. Sci. Philadelphia* 18[1866]:317-323.
- Cope, E. D. 1870. Seventh contribution to the herpetology of tropical America. *Proc. Amer. Philos. Soc.* 11[1869]:147-169.
- Cope, E. D. 1894. On the species of *Himantodes* Dumeril and Bibron. *American Naturalist* 28:612-614.
- Cope, E. D. 1899. Contributions to the herpetology of New Granada and Argentina, with descriptions of new forms. *Philadelphia Mus. Sci. Bull.* (1):1-19.
- Daza, J. M., Smith, E. N., Páez, V. P. and Parkinson, C. L. 2009. Complex evolution in the Neotropics: the origin and diversification of the widespread genus *Leptodeira* (Serpentes: Colubridae). *Molecular Phylogenetics and Evolution* 53:653-667.
- Duellman, W. E. 1958a. A monographic study of the colubrid snake genus *Leptodeira*. *Bull. Amer. Mus. Nat. Hist.* 114(1):1-152.
- Duellman, W. E. 1958b. Systematic status of the colubrid snake, *Leptodeira discolor* Günther. *University of Kansas Publications Museum of Natural History* 2011:1-9.
- Duellman, W. E. 1978. The biology of an equatorial herpetofauna in Amazonian Ecuador. *Misc. Publ. Univ. Kans. Mus. Nat. Hist.* 65:1-352.
- Duellman, W. E. and Salas, A. W. 1991. Annotated checklist of the amphibians and reptiles of Cuzco Amazonico, Peru. *Occas. Papers Mus. of Natur. Hist., Univ. of Kansas, Lawrence* (143):13 pp.
- Duméril, A. M. C., Bibron, G. and Duméril, A. H. A., 1854. *Erpétologie générale ou histoire naturelle complète des reptiles*. Tome septième. Deuxième partie, comprenant l'histoire des serpents venimeux. Paris, Librairie Encyclopédique de Roret: i-xii + 781-1536.
- Duméril, A. M. C. 1853. Prodrome de la classification des reptiles ophidiens. *Mém. Acad. Sci., Paris*, 23:399-536.
- Dundee, H. A., White, D. A. and Rico Gray, V. 1986. Observations on the distribution and biology of some Yucatán Peninsula amphibians and reptiles. *Bull. Maryland Herp. Soc.* 22:37-150.
- Golder, F. 1893. Haltung und Zucht von *Leptodeira nigrofasciata* Günther 1868 (Serpentes, Colubridae). *Salamandra* 20(1):3-10.
- Greer, A. E. 1965. Distribution notes for *Leptodeira punctata*, *Tropidodipsas philippi* and *Tropidodipsas malacodryas* in northwestern Mexico. *Herpetologica* 21(3):237.
- Griffin, L. E. 1917. *Leptodeira albofusca* (Lacépède) a synonym of *Leptodeira annulata* (Linnaeus). *Annals of the Carnegie Museum* 11(1-2):321-326.
- Günther, A. 1860. On new reptiles and fishes from Mexico. *Proceedings of the Zoological Society of London* 1860:316-319.
- Günther, A. 1868. Sixth account of new species of snakes in the collection of the British Museum. *Ann. Mag. Nat. Hist.* (4)1:413-429.
- Hartweg, N., and Oliver, J. A. 1940. A contribution to the herpetology of the isthmus of Tehuantepec. IV. *Misc. Publ. Mus. Zool. Univ. Michigan* No. 47:1-31.
- Hoser, R. T. 1999. *Victoria Police Corruption* (1 and 2), Kotabi Publishing, Australia. 1536 pp.
- Hoser, R. T. 2004a. Surgical Removal of Venom Glands in Australian Elapid Snakes: The creation of venomoids. *Herptile* 29(1):37-52. (online via links from <http://www.herp.net>)
- Hoser, R. T. 2004b. Silicone snakes cause sensation in Australia and elsewhere. *Hard Evidence* (November 2004) 4(6):25-29. (online via links from <http://www.herp.net>)
- Hoser, R. T. 2012. A reclassification of the Rattlesnakes; species formerly exclusively referred to the genera *Crotalus* and *Sistrurus* and a division of the Elapid genus *Micrurus*. *Australasian Journal of Herpetology* 11:2-24.
- Hidalgo, H. N. 1980. *Enyaliosaurus quinquecarinatus* (Gray) and *Leptodeira nigrofasciata* Günther in El Salvador. *Herpetological Review* 11:42-43.
- Jansen, M. and Köhler, G. 2003. Biogeographische Analyse der Herpetofauna von ausgewählten Hochlandgebieten Nicaraguas. *Salamandra* 38(4) [2002]:269-286.
- Lee, J. C. 2000. *A field guide to the amphibians and reptiles of the Maya world*. Cornell University Press, Ithaca.
- Liner, E. A. 2007. *A Checklist of the Amphibians and Reptiles of Mexico*. Louisiana State University Occasional Papers of the Museum of Natural Science 80:1-60.
- McCranie, J. R. 2011. *The snakes of Honduras*. SSAR, Salt Lake City:725 pp.
- Mulcahy, D. G. 2007. Molecular systematics of neotropical cat-eyed snakes: a test of the monophyly of *Leptodeirini* (Colubridae: Dipsadinae) with implications for character evolution and biogeography. *Biological Journal of the Linnean Society*, 92:483-500.
- Mulcahy, D. G., Beckstead, T. H. and Sites, J. W. jnr. 2011. Molecular systematics of the Leptodeirini (Colubroidea: Dipsadidae) Revisited: Species-tree Analyses and Multi-locus Data. *Copeia* (3):407-217.
- Myers, C. W. 1982. Blunt-headed vine snakes (*Imantodes*) in Panama, including a new species and other revisionary notes. *American Museum Novitates* (2738):1-50.
- Myers, C. W. 2011. A new genus and new tribe for *Enicognathus melanauchen* Jan, 1863, a neglected South American snake (Colubridae: Xenodontinae), with taxonomic notes on some Dipsadinae. *American Museum Novitates* 3715:1-33.
- Oliver, J. A. 1942. A new snake of the genus *Imantodes* from Mexico. *Copeia* 1942 (1):1-2.
- Peters, J. A., Donoso-Barros, R. and Orejas-Miranda, B. 1970. Catalogue of the Neotropical Squamata: Part I Snakes. Part II Lizards and Amphisbaenians. *Bull. US Natl. Mus.* 297:347 pp.
- Peterson, H. W., Smith, H. M. and Chizsar, D. 1995. Some

- noteworthy amphibians and reptiles from the region of Chapala, Jalisco, Mexico. *Bulletin of the Chicago Herpetological Society* 30 (5):90-91.
- Pizzatto, L., Cantor, M., de Oliveira, J. L., Marques, O. A. V. and Capovilla, V. 2008. Reproductive Ecology of Dipsadine Snakes, with emphasis on South American Species *Herpetologica* 64(2):168-179.
- Porras, L. W. 2006. Die Schlangen des costa-ricanischen Trockenwaldes. *Reptilia* (Münster) 11(5):32-37.
- Porras, L. W. and Solórzano, A. 2006. Costa Rica's venomous snakes. *Reptilia* (GB) (48):11-17.
- Reyes-Velasco, J., and Mulcahy, D. G. 2010. Additional taxonomic remarks on the genus *Pseudoleptodeira* (Serpentes: Colubridae) and the phylogenetic placement of "*P. uribei*". *Herpetologica* 66:99-110.
- Ride, W. D. L. (ed.) et. al. (on behalf of the International Commission on Zoological Nomenclature 1999. *International code of Zoological Nomenclature*. The Natural History Museum - Cromwell Road, London SW7 5BD, UK (also commonly cited as "ICZN 1999").
- Rivas, G. A., Molina, C. R. Ugueto, C. N., Barros, T. R. and Bar-Rio-Amoros, C. L. 2012. Reptiles of Venezuela: an updated and commented checklist. *Zootaxa* 3211:10-64.
- Savage, J. M., and Norman, S. Jnr. 1987. The *Imantodes* (Serpentes: Colubridae) of Costa Rica: Two or three species? *Rev. Biol. Trop.* 33:107-132.
- Savage, J. M. 2002. *The Amphibians and Reptiles of Costa Rica: A Herpetofauna Between Two Continents, Between Two Seas*. University of Chicago Press:934 pp.
- Schmidt, K. P., and Andrews, E. W. 1936. Notes on snakes from Yucatán. *Field Mus. Nat Hist. Zool. Ser.* 20:167-187.
- Smith, H. M. 1942. Mexican herpetological miscellany. *Proc. US Natl. Mus.* 92 (3153):349-395.
- Smith, H. M., Ramirez-Bautista, A and Chiszar, D. 1995. The nomenclatural status of Muller's two varietal names of *Dipsas cenchoa* (Reptilia: Serpentes). *Bull. Maryland Herp. Soc.* 31 (4):198-203.
- Smith, H. M. and Tanner, W. W. 1944. Description of a new snake from Mexico. *Copeia* 1944(3):131-136.
- Taub, A. M. 1967. Comparative histological studies on Duvernoy's gland of colubrid snakes. *Bulletin of the American Museum of Natural History* 138:1-50.
- Taylor, E. H. 1936. Notes on the Herpetological fauna of the Mexican state of Sinaloa. *Univ. Kansas Sci. Bull.* 24(20):505-537.
- Taylor, E. H. 1938. Notes on the Mexican snakes of the genus *Leptodeira*, with a proposal of a new snake genus, *Pseudoleptodeira*. *University of Kansas Science Bulletin* 25:315-355.
- Taylor, E. H. 1951. A brief review of the snakes of Costa Rica. *Univ. Kansas Sci. Bull.* 34 (1):3-188.
- Vences, M., Franzen, M., Flaschendräger, A., Schmitt, R. and Regös, J. 1998. Beobachtungen zur Herpetofauna von Nicaragua: kommentierte Artenliste der Reptilien. *Salamandra* 34(1):17-42.
- Whithworth, A. and Beirne, C. 2011. *Reptiles of the Yachana Reserve*. Global Vision International:130 pp.
- Wilson, L. D., and Meyer, J. R. 1985. *The Snakes of Honduras*. 2d ed. Milwaukee Publ. Mus. Publ., Biol. and Geol. No. 6:150 pp.
- Wilson, L. D., McCranie, J. R. and Porras, L. 1979. New departmental records of amphibians and reptiles from Honduras. *Herpetological Review* 10(1):25.
- Zaher, H. 1999. Hemipenial morphology of the South American Xenodontine snakes, with a proposal for a monophyletic Xenodontinae and a reappraisal of colubroid hemipenes. *Bulletin of the American Museum of Natural History* 240:1-168.
- Zaher, H., Grazziotin, F. G., Cadle, J. E. Murphy, R. W., Moura-Leite, J. C. and Bonatto, S. L. 2009. Molecular phylogeny of advanced snakes (Serpentes, Caenophidia) with an emphasis on the South American Xenodontines: a revised classification and descriptions of new taxa. *Papéis Avulsos de Zoologia* 49:115-153.
- Zug, G. R., Hedges, S. B. and Sunkel, S. 1979. Variation in reproductive parameters of three neotropical snakes, *Coniophanes fissidens*, *Dipsas catesbyi*, and *Imantodes cenchoa*. *Smithsonian Contr. Zool.* 300:1-20.
- Zweifel, R. G. 1959a. The provenance of reptiles and amphibians collected in Western Mexico by J. J. Major. *American Museum Novitates* (1949):1-9.
- Zweifel, R. G. 1959b. Snakes of the genus *Imantodes* in western Mexico. *American Museum Novitates* 1961:1-17.

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