

A Division of Central American Snake genera, *Coniophanes* Hallowell in Cope, 1860 into six subgenera and *Conophis* Peters, 1860 into two genera (Serpentes: Colubridae: Dipsadinae).

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ABSTRACT

The black-striped snakes of North, Central and South America have had a relatively stable taxonomic history at the genus level. The genus *Coniophanes* Hallowell in Cope, 1860 has been well accepted by herpetologists since being defined.

Notwithstanding this, six divergent and well-defined species groups are known.

To better identify them, six subgenera are erected and defined to accommodate them according to the Zoological Code.

The available names are *Coniophanes* for the *fissidens* species group and *Hydrocalamus* Cope, 1885 for the *quinquevittatus* group.

The four newly named subgenera are, *Smythserpens* gen.nov., *Cottonserpens* gen.nov., *Laidlawserpens* gen.nov. and *Daraninserpens* gen.nov..

Relatively recent studies into the genus *Conophis* Peters, 1860 has seen species removed from this genus and placed elsewhere (e.g. Hoge 1958 and Villa 1971). Further to this, the most divergent member of the genus and type species *C. vittatus* Peters, 1860 is left in the genus and the others are placed in a new subgenus *Whittonserpens* gen. nov..

Keywords: *Coniophanes*; *Conophis*; *Hydrocalamus*; *Smythserpens*; *Cottonserpens*; *Laidlawserpens*; *Daraninserpens*; *Whittonserpens*; new subgenera; taxonomy; snake; colubrid.

INTRODUCTION

The Black-striped Snakes are found from the southern United States through Central America to Peru. Originally placed in *Coluber*, the genus *Coniophanes* was erected Hallowell in Cope, 1860.

Various synonyms were used to describe these snakes in the late 1800's and early 1900's including, *Tachymenis* (now used for other snakes), *Taeniophis* (a genus name which was the same as a genus for fish), *Erythrolamprus* (now used for other snakes), *Glaphyrophis* (now used for other snakes), *Homalopsis* (now used for other snakes), *Hydrops* (now used for other snakes) and *Dromicus* (now used for other snakes).

Hydrocalamus Cope, 1885 was barely used by anyone except Cope himself, but has now been resurrected herein for a subgenus as indicated below.

The number of described species within what has been generally called *Coniophanes* has steadily increased to 17 recognized forms as of the current date.

Notwithstanding this steady increase in species number, there have been no attempts for many years to split the genus in any way, due to several factors, the most obvious being the morphological similarities of relevant species.

Furthermore a number of major studies published in the latter part of the 1900's looked into these snakes and failed to make

any taxonomic moves on given species groups.

What needs to be considered at the present time is not just the conclusions by the relevant authors, but the facts and circumstances leading to them.

Numerous authors have recognized well-defined species groups within *Coniophanes*, each of which are potentially recognizable at either genus or subgenus level.

Contradicting this is the context of the major studies or publications involving the genus (e.g. Myers 1966, 1969 or Bailey 1939) being in a period when herpetologists were merging genera into synonymy rather than looking at erecting new ones as had been the case in the 1800's.

Since 2000, there has been a major shift in taxonomic thinking among herpetologists with a renewed surge in terms of descriptions of taxa at all levels.

Paraphyletic genera have been broken up (e.g. *Elaphe* sensu lato) and at the species level, the underlying rate of descriptions of new species has increased as reported on the websites for *Zootaxa*, *Zoological Record* and the ICZN.

Coniophanes presents an unusual case in that while the genus is large and divided into distinct species groups, the question begs whether or not it is wise to divide the genus into its most obvious six subgroups by creating five new genera.

Because the component taxa are divergent from one another, it is effectively inevitable that *Coniophanes* as presently understood must be split in some way.

Taking a most conservative position, I have decided to split the species groups along the logical lines of division into subgenera.

The use of subgenera in this context allows for the nomenclatural stability of the group to be preserved, while at the same time allowing herpetologists to recognize the given phylogenetic units.

While the species of *Coniophanes* are generally small and innocuous and not in high demand by snake keepers and other reptile hobbyists, professionally employed government-funded herpetologists have done a number of important studies into these snakes.

This reflects in the fact that the majority of important publications in terms of *Coniophanes* are by these people as opposed to those by so-called amateurs, who have often made major contributions into our general knowledge of other snake genera.

Important publications relating to the genus *Coniophanes* and the relevant species include; Alvarez (1982), Andersson (1901), Bailey (1937, 1939), Baird (1859), Bauer et. al. (1995), Cadle (1989), Campbell (1989), Canseco-Marquez et. al. (2000), Conant (1955, 1965), Conant and Collins (1991), Cope (1860, 1862, 1866, 1868, 1870, 1871, 1885), Dixon (2000), Dixon and Lemos-Espinal (2010), Duméril et. al. (1854), Flores-Villela and Canseco-Márquez (2004), Flores-Villela and Smith (2009), Goldberg and Bursey (2007), Günther (1858), Hall (1951), Jan (1863, 1865), Koller (2005), Lee (2000), Lehr (2002), Linder (2007), Mahrtdt (1969), Martin (1958), McCoy et. al. (1986), McCranie (2011), McCranie and Castañeda (2005), McDiarmid (1963), Mejenes López (1999), Minton et. al. (1960), Myers (1966, 1969), Pérez-Santos (1986), Pérez-Santos and Moreno (1988), Peters (1950), Peters (1863, 1864, 1870), Peters et. al. (1970), Ponce-Campos and Smith (1981), Savage (2002), Schmidt and Andrews (1936), Schwartz and Henderson (1991), Smith (1940, 1941a), Smith and Taylor (1950a), Stejneger (1891), Stuart (1935), Taylor (1949), Urbina-Cardona et. al. (2006), Valdivieso and Tamsitt (1963), Vences et. al. (1998), Wellman (1959), Wilson and McCranie (2003), Wilson and Meyer (1985), Wright and Wright (1957), Zug et. al. (1979) and Zweifel (1959).

Relying on these publications, I have divided *Coniophanes* six ways as seen below.

Relatively recent studies into the superficially similar Central American Dipsadine genus *Conophis* Peters, 1860 has seen

species removed from this genus and placed elsewhere (e.g. Hoge 1958 and Villa 1971).

Wellman (1963) provided evidence for the removal of the species *Conophis nevermanni* from the genus, by stating that it "differs so much from the other species that it might be placed in a separate group."

Villa did this in 1971 when he erected the genus *Crisantophis* to accommodate the species. Interestingly however, Wellman (1963) actually identified the species *C. vittatus* Peters, 1860 as being the most divergent member of the genus, meaning it should probably have been the first to be split from the rest. Besides differences in hemipenial detail, Wellan (1963) wrote: "*Conophis vittatus* is readily set apart from other members of the genus on the basis of the universal presence of seven supralabials. In basic coloration it also differs, having no stripe on the 1st scale-row, or spots on the venter, and a maximum of four broad stripes on the body."

In order to rectify the obvious inconsistency of one divergent taxon being removed from the genus and not another, this is corrected here.

However as *C. vittatus* is the type species, it is the remainder of the genus that must be removed from *Conophis*. These are the three species, *lineatus*, *morai* and *pulcher*.

So within this paper, the most divergent member of the genus and type species *C. vittatus* Peters, 1860 is left in the genus *Conophis* and the others placed in a new subgenus *Whittonserpens* gen. nov. named and defined according to the Zoological Code (Ride et. al. 1999).

Important publications in terms of *Conophis* as currently recognized include, Auth et. al. (1998), Boulenger (1896), Conant (1965), Cope (1861, 1867, 1871, 1876, 1895, 1900), Ditmars (1931), Dowling (2002), Duellman (1958), Duméril et. al. (1854, 1909), Garman (1884a, 1884b), Goyenechea and Flores-Villela (2006), Günther (1858), Hoge (1958), Jan and Sordelli (1866, 1881), Mertens (1952a, 1952b), Mittleman (1944), Neill and Allen (1961), Pérez-Higareda et. al. (2002), Peters (1860), Savage (1949), Schmidt (1928), Schmidt and Inger (1957), Smith (1939, 1941b, 1942), Smith and Taylor (1950), Smith et. al. (1993), Stuart (1948, 1950a, 1950b), Taylor (1955), Taylor and Smith (1939), Thomas et. al. (2006), Webb (2001), Wellman (1963) and Wettstein (1934).

GENUS *CONIOPHANES* HALLOWELL IN COPE, 1960

Type species: *Coronella fissidens* Günther, 1858

Diagnosis: A generalized colubrid genus containing about 17 recognized species with the basic arrangement of enlarged head shields, nasal partially or completely divided; a loreal; one or two preoculars; round pupil, two pairs of chin shields; smooth dorsal scales; without apical pits in 17-25 dorsal mid-body rows, with a reduction anterior to the vent; anal and subcaudals divided; 8-15 subequal maxillary teeth separated by a diastema from two grooved fangs.

No hypapophyses on the dorsal vertebrae. The combination of a loreal, divided anal, smooth scales without apical pits, scale row reduction anterior to the vent and striped colour pattern will separate this genus from any other central American genus.

Hemipenial morphology varies between species groups within the genus and is diagnostic for them. Bailey (1939) was apparently the first to divide the genus into well-defined species groups.

Distribution: Extreme southern Texas and Sinaloa Mexico through Central America and Western South America to Northwestern Peru.

SUBGENUS *CONIOPHANES* SUBGEN. NOV.

Type species: *Coronella fissidens* Günther, 1858

Diagnosis: This subgenus is separated from all other subgenera defined within this paper by the lack of a temporal stripe, immaculate ventrals, or alternatively with only tiny black spots, and hemipenes that are single, spinous and capitate.

Comment: In literature, this subgenus should be attributed to Hallowell in Cope, 1860, even though this is the first formal diagnosis of the group as a subgenus.

Distribution: Mexico to Colombia.

Content of subgenus *Coniophanes*

Coniophanes (Coniophanes) fissidens (Günther, 1858) (Type species).

Coniophanes (Coniophanes) alvarezii Campbell, 1989.

Coniophanes (Coniophanes) andresensis Bailey, 1937.

SUBGENUS *HYDROCALAMUS* COPE, 1885

Type species: *Homalopsis quinque-vittatus* Duméril, Bibron and Duméril, 1854

Diagnosis: *Hydrocalamus* are separated from all other subgenera defined in this paper by the lack of a light temporal stripe, the presence of large irregular spots on the ventrals, and the hemipenes are slightly bilobed, spinous and capitate.

Distribution: Veracruz Mexico, south to northern Guatemala.

Content of subgenus *Hydrocalamus* Cope, 1885

Coniophanes (Hydrocalamus) quinquevittatus (Duméril, Bibron and Duméril, 1854) (Type species).

Coniophanes (Hydrocalamus) bipunctatus (Günther, 1858).

SUBGENUS *SMYTHSERPENS* SUBGEN. NOV.

Type species: *Coniophanes lateritius* Cope, 1862

Diagnosis: *Smythserpens* gen. nov. are separated from all other subgenera defined in this paper by the usual lack of any trace of longitudinal striping, 17-19 dorsal mid-body rows, over 110 ventrals and 84-99 subcaudals.

Distribution: Mexico only.

Etymology: Named in honour of Michael Smyth of Croydon, Victoria, Australia in recognition of eight years valuable work with Snakebusters, Australia's best live reptile shows, educating countless people about reptiles and animal welfare.

Content of subgenus *Smythserpens* gen. nov.

Coniophanes (Smythserpens) lateritius Cope, 1862.

Coniophanes (Smythserpens) melanocephalus (Peters, 1869).

Coniophanes (Smythserpens) sarae Ponce-campos and Smith, 2001.

SUBGENUS *COTTONSERPENS* SUBGEN. NOV.

Type species: *Coniophanes piceivittis* Cope, 1869

Diagnosis: Separated from all other subgenera defined within this paper by the following suite of characters, 25 scale rows at midbody, 9-10 infralabials, a small sub-preocular scale, and a pattern of three dark brown stripes over a pale brown body, including a broad mid-dorsal one.

The small subpreocular scale is unique to this subgenus within *Coniophanes* (absent from the rest).

Distribution: Mexico through central America to Costa Rica.

Etymology: Named in honour of Thomas Cotton of Ringwood, Victoria, Australia in recognition of eight years valuable work with Snakebusters, Australia's best live reptile shows, educating countless people about reptiles and animal welfare.

Content of subgenus *Cottonserpens* gen. nov.

Coniophanes (Cottonserpens) piceivittis Cope, 1869 (Type species).

Coniophanes (Cottonserpens) michoacanensis Flores-Villela and Smith, 2009.

Coniophanes (Cottonserpens) schmidtii Bailey, 1937.

Coniophanes (Cottonserpens) taylori Hall, 1951.

SUBGENUS *LAIDLAWSERPENS* SUBGEN. NOV.

Type species: *Tachymenis dromiciformis* Peters, 1863

Diagnosis: Snakes in this subgenus are separated from the other subgenera described in this paper by having 17-21 mid-body rows, 132-141 ventrals and a deeply bifurcated hemipenis.

The belly is diffused with brown pigment and with a dark smudge across base of each ventral plate.

Distribution: East Panama (*C. joanae*), South Ecuador and Peru (*C. dromiciformis*) and Peru (*C. longinquus*).

Etymology: Named in honour of Michael Laidlaw of Ringwood, Victoria, Australia in recognition of eight years valuable work with Snakebusters, Australia's best live reptile shows, educating countless people about reptiles and animal welfare.

Content of subgenus *Laidlawserpens* gen. nov.

Coniophanes (Laidlawserpens) dromiciformis (Peters, 1863).

Coniophanes (Laidlawserpens) joanae Myers, 1966.

Coniophanes (Laidlawserpens) longinquus Cadle, 1989

GENUS *DARANINSERPENS* SUBGEN. NOV.

Type species: *Taeniophis imperialis* Baird, 1859

Diagnosis: Separated from all other subgenera described in this paper by having 15-19 dorsal mid-body rows and different hemipenal morphology. All *Coniophanes* hemipenes except those of this subgenus have basal hooks, abundant gross ornamentation, and either are not bilobed or are capitate.

In this subgenus the hemipenes are long and slender, without spines, deeply bifurcate and calyculate but not capitate; 118-143 ventrals and 67-94 subcaudals.

Other diagnostic features of this subgenus include a buff brown dorsum with 3 dark stripes of purplish grey or dull violet (a wide middorsal one of 1 and 2 half scales), a lateral one on the second to half of fourth row, a pinkish buff or cream line from muzzle over eye to the upper border of the second upper temporal scale, the venter is capucine buff on the chin to peach red on the rear, anals are never keeled, 8 supralabials.

The species *Coniophanes meridanus* Schmidt and Andrews, is separated from *Coniophanes imperialis*, by lacking the sharply defined dorsolateral lines and ventral spots, and more reddish in general coloration, as well as having 17-15 dorsal mid-body rows as opposed to 19-17 in *Coniophanes imperialis*.

Distribution: South Texas (USA) to Honduras in Central America.

Etymology: Named in honour of Dara Nin of Ringwood, Victoria, Australia in recognition of eight years valuable work with Snakebusters, Australia's best live reptile shows, educating countless people about reptiles and animal welfare.

Content of *Daraninserpens* subgen. nov.

Coniophanes (Daraninserpens) imperialis (Baird, 1859) (Type species).

Coniophanes (Daraninserpens) meridanus Schmidt and Andrews, 1936.

GENUS *CONOPHIS* PETERS, 1860

Type species: *Conophis vittatus* Peters, 1860

Diagnosis: This genus is now monotypic for the species *vittatus*, with the common name of "Striped Road Guarder".

It is diagnosed by the following suite of characters: The hemipenes of *Conophis* are slightly bifurcate having forked sulcus spermaticus, moderately calyculate, having spines covering the surface from the base to near the apex. These spines are largest near the base and are reduced to small papillate projections near the apex. The apex terminates in a small disc having three to five laminae in *C. vittatus* (one laminae in *Whittonserpens* gen. nov.). The sulcus is bifurcate; the fork is near the base and almost gives the appearance of two sulci on some specimens. Distally the apices are widely separated, and the intervening space gives the hemipenis a slightly bilobed appearance in this species (compared with a deeply bilobed appearance in *Whittonserpens* gen. nov.).

In *C. vittatus* there are 8-12 prediastemal maxillary teeth, subequal in length, and followed by short diastema and one enlarged fang or two; fangs grooved, only one functional at any one time, unless snake is in process of shedding teeth; teeth 6-

10 on palatine, 15 to 19 on pterygoid, 15 to 21 on dentary; teeth on dentary decreasing in size posteriorly; large parotid (venom) gland on either side of head in temporal region; head shields of basically unmodified colubrid type excepting decurved rostral; rostral concave below and therein modified for burrowing; internasals and prefrontals paired; nasals divided; loreal single; preocular one, rarely two; postoculars, two; supralabials, 7-8, 3rd and 4th or 4th and 5th under eye; infralabials, 8-11, usually 9 or 10; temporals, normally 1 plus 2 plus 3; chin-shields subequal in length; ventrals, 149-183, rounded and overlapping; caudals, 55-89, paired and imbricate; anal divided; dorsal scales smooth and in 19 rows at mid-body with no apical pits or keels; scale reduction normally involving fusion of 3rd and 4th rows, resulting in 17 scale-rows near tail; tail length more than 20 per cent of body length; maximum total length exceeding 1.1 meters; dorsal color pattern consisting of dark stripes, or no darkening, on paler ground-color; ventral surfaces immaculate pale yellowish or white, except on specimens having single lateral dark spots on some or all ventrals; pupil round; The supralabials are immaculate white or pale tan, except that in some specimens the dorsal most part of some supralabials are dark brown or black as they are included in the ventral boundary of the dark stripe that passes through the eye. There are no dusky markings on the chin or on any of the ventral scales. The presence and position of the three or four dark stripes on the body and the absence of brown on the 1st scale-row or on the ventral scales, in combination with the generic characters, distinguish *Conophis vittatus* from all other Mexican snakes. The only other snake that occurs in western México that has been confused with *C. vittatus* is the superficially similar looking *Coniophanes piceivittatus taylori*, which has 25, instead of 19, mid-body scale-rows.

The species *Conophis vittatus* is diurnal or crepuscular; feeding primarily on small lizards, sometimes on small mammals or other snakes. The preceding was essentially adapted and modified from the diagnosis given by Wellman (1963).

Distribution: Semi-arid regions of southern México and Central America as far south as Costa Rica.

GENUS WHITTONSERPENS GEN. NOV.

Type species: *Tomodon lineatum* Duméril, Bibron and Duméril, 1854

Diagnosis: This genus comprises three species, namely *lineatus*, *morai* and *pulcher*.

Conophis vittatus (now monotypic for that genus) is readily set apart from *Whittonserpens* gen. nov. on the basis of the universal presence of seven supralabials. In basic coloration it also differs, having no stripe on the first scale-row, or spots on the venter, and a maximum of four broad stripes on the body.

Whittonserpens gen. nov. is also separated from *Conophis* by hemipenal morphology. The hemipenes of *Conophis* are slightly bifurcate having forked sulcus spermaticus, moderately calculate, having spines covering the surface from the base to near the apex. These spines are largest near the base and are reduced to small papillate projections near the apex. The apex terminates in a small disc having three to five laminae in *C. vittatus* (one laminae in *Whittonserpens* gen. nov.). The sulcus is bifurcate; the fork is near the base and almost gives the appearance of two sulci on some specimens. Distally the apices are widely separated, and the intervening space gives the hemipenis a slightly bilobed appearance in this species (compared with a deeply bilobed appearance in *Whittonserpens* gen. nov.).

Other distinctive features of *Whittonserpens* gen. nov. are in the account above for *Conophis*.

Distribution: Semi-arid regions of southern México and Central America as far south as Costa Rica.

Etymology: *Whittonserpens* gen. nov. is named in honour of Evan Whitton of Sydney, Australia a leading investigative author in Australia. His books detailing endemic and systemic

corruption in the Australian legal system and government should be mandatory reading for all Australians as well as people in other countries interested as to how corrupt things really are in the "Lucky Country".

Content of genus *Whittonserpens* gen. nov.

Whittonserpens lineatum (Duméril, Bibron and Duméril, 1854)(Type species).

Whittonserpens morai (Pérez-Higareda, López-Luna and Smith, 2002).

Whittonserpens pulcher (Cope, 1869).

First Reviser Note: Should any reviser decide to merge or synonymise genera or subgenera as named herein, the order of priority for retention should be as published herein (in the order as published).

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