

# A review of the North American Garter Snakes Genus *Thamnophis* Fitzinger, 1843 (Serpentes:Colubridae).

Raymond T. Hoser

488 Park Road, Park Orchards, Victoria, 3114, Australia.

Phone: +61 3 9812 3322 Fax: 9812 3355 E-mail: viper007@live.com.au

Received 17 March 2012, Accepted 6 April 2012, Published 30 April 2012.

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## ABSTRACT

The Garter Snakes, *Thamnophis* Fitzinger, 1843 are familiar to most American herpetologists. The taxonomy of this and related Colubrid genera has been unstable as modern molecular methodology has shown that at times morphological convergence between species has hidden actual phylogenetic relationships between wider groups of taxa.

Alternatively, morphologically distinct snakes have been shown to be closely related. As a result, genera have been named, later relegated to synonymy and at times resurrected to accommodate species subsequently found to be divergent as earlier believed.

Most recently Hoser (2012) divided the related genera *Regina* Baird and Girard, 1853 and *Nerodia* Baird and Girard, 1853, to place component species within the resurrected genus *Liodytes* Cope, 1892 and to create the new genera *Funkus* Hoser, 2012 and *Mariolisus* Hoser, 2012 to accommodate species.

Phylogentic studies by Pyron et. a. (2011) confirmed the obviously paraphyletic nature of *Thamnophis* as generally defined at the time, leading the authors to specifically note the paraphyletic nature of the genus.

This paper subdivides the four obvious groups into the genera *Thamnophis* Fitzinger, 1843, *Chilopoma* Cope, 1875, and two new genera, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov. for the unnamed groups.

The genus *Adelophis* Dugès, 1879 includes the two species currently placed within the genus, namely *copei* and *foxi*, herein relegated to subgenus status within *Chilopoma* Cope, 1875, and has several related taxa added.

The taxon *sirtalis* is placed in the new monotypic subgenus *Pughus* subgen. nov., within *Thamnophis*. The species *cyrtopsis* is placed in a new subgenus *Whybrowus* subgen. nov. within *Gregswedoshus* gen. nov.. The so-called *eques* group is placed in a subgenus *Neilsonnemanus* subgen. nov. also within *Gregswedoshus* gen. nov..

**Keywords:** new genus; subgenus; taxonomy; nomenclature; Garter Snake; *Thamnophis*; *Adelophis*; *Gregswedoshus*; *Brucerogersus*; *Pughus*; *Chilopoma*; *Whybrowus*; *Neilsonnemanus*.

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## INTRODUCTION

Garter Snakes of the genus *Thamnophis* Fitzinger, 1843 are familiar to many people in North America, being the most widely distributed genus on the continent and the only snake native to Alaska.

Named Garter Snakes, because most are longitudinally lined, like the fancy garters that men used to use to hold up socks, these snakes are smallish, usually averaging about 60 cm as adults in total length and of thin build.

In Canada in particular, large breeding aggregations occur in spring and at times become draw cards for tourists.

In the 1950's and 1960's when herpetoculture was in its infancy, they were commonly kept as pets.

While still popular as a pet snake species, Garter Snakes have declined in relative popularity in favor of larger species, in particular Corn Snakes, Boas, Pythons and other species.

While most of the "True" Garter Snakes have been placed within the broad genus *Thamnophis* Fitzinger, 1843 for many years, some taxa have been moved between this and other genera including the closely related "Water Snake" genera *Nerodia* and *Regina*.

Modern phylogenetic studies have confirmed the relationships between the various species and seen the genus *Thamnophis* as broadly recognized in early 2012 to in fact consist of four monophyletic groups which should be separated at the genus level.

Of relevance is that recently Hoser (2012) divided the related genera *Regina* Baird and Girard, 1853 and *Nerodia* Baird and Girard, 1853, to place component species within the resurrected genus *Liodytes* Cope, 1892 and to create the new genera *Funkus* Hoser, 2012 and *Mariolisus* Hoser, 2012 to accommodate species, thereby in effect dividing two paraphyletic genera into five.

Phylogenetic studies by Pyron et. al. (2011) confirmed the obviously paraphyletic nature of *Thamnophis* as generally defined at the time (see fig 2, p. 337), leading the authors to specifically note the paraphyletic nature of the genus (p. 340).

The wide-ranging results of Pyron et. al. (2011) have been calibrated by myself against other similar molecular phylogenetic studies specific to the Snail-eating Snakes (Guo et. al. 2011), True Vipers (Wüster et. al. 2008), Pitvipers (Castoe et. al. 2003, 2005, and 2006), Coral Snakes (da Silva and Sites 2001), various colubrids (Lawson et. al. 2005) among others as well as earlier molecular phylogenetic studies on *Thamnophis sensu lato* (e.g. Queiroz et. al. 2002) and been shown to be accurate and consistent.

As a result, those results are accepted for the Garter Snakes (*Thamnophis*) as accurate.

The taxa missed in Pyron et. al's analysis can also be readily assigned to the various species groups tested, meaning the results were in effect more-or-less comprehensive for the Garter Snakes (*Thamnophis sensu lato*).

Following on from this is the inevitable result that this paper subdivides the four obvious groups into the genera *Thamnophis* Fitzinger, 1843, *Chilopoma* Cope, 1875, and two new genera, *Gregswedoshus* gen. nov. and *Brucerozersus* gen. nov. for the unnamed groups.

The genus *Adelophis* Dugès, 1879 includes the two species currently placed within the genus, namely *copei* and *foxi*, herein relegated to subgenus status within *Chilopoma* Cope, 1875, due to the issue of date priority and has several related taxa added, all presently known under the generic name *Thamnophis*.

The taxon *sirtalis* is placed in the new monotypic subgenus *Pughus* subgen. nov. within *Thamnophis*. The species *cyrtopsis* is placed in a new subgenus *Whybrowus* subgen. nov. within *Gregswedoshus* gen. nov.. The so-called *eques* group is placed in a subgenus *Neilsonnemanus* subgen. nov. also within *Gregswedoshus* gen. nov..

The body of literature detailing with and summarizing what's known about Garter Snakes (*Thamnophis sensu lato*) is vast and includes the following key publications: Amiel and Wassersug (2010), Baird and Girard (1853), Boulenger (1893), Boundy (1999), Conant (1938, 2003), Conant and Cope (1875, 1886), Collins (1991), Cope (1876, 1885, 1888, 1892), Conant (1950), de Queiroz and Smith (1996), Dowling (1951), Fitch (1940), Gartside et. al. (1977), Hallmen and Sonnerberg (2006), Holbrook (1842), Kennicott (1860), Langford and Borden (2006a, 2006b), Langford et. al. (2011), Linnaeus (1766), McGuire and Grismer (1993), Price (1978), Pyron and Burbink (2009), Rossman (1961, 1963, 1969, 1970), Rossman and Burbink (2005), Rossman and Stewart (1987), Rossman and Wallach (1987), Rossman et. al. (1989, 1996), Smith (1945), Smith (1939, 1942a, 1942b, 1951), Smith and Chiszar (2003), Stebbins (1985), Tanner (1959), Thompson (1957), Todd and Wassersug (2010), Taylor (1940) and Wood et. al. (2011).

## GENUS *THAMNOPHIS* FITZINGER, 1843 *SENSU LATO*

*Thamnophis* as a genus has been defined in many texts so a detailed description here is not necessary. The primary purpose of this paper is to formally name and define according to the Zoological Code (Ride et. al. 1999), the two genera and one subgenus within the species group that currently are unnamed, as well as to redefine the other similarly defined groups.

In summary, *Thamnophis* is defined herein as the Common Garter Snake and nearest relatives, otherwise known as the *sirtalis* group, diagnosed below.

The Garter Snakes *sensu lato* are typically smallish slender snakes, usually attaining about 60 cm total length as adults, sporting some kind of pattern involving longitudinal stripes. Most have two very small white or yellow spots on the top of the head. They have keeled scales, 130-170 ventrals and a single anal.

They are separated from Water Snakes (*Natrix*) by the fact that *Natrix* have a divided anal.

When agitated or alarmed these snakes will flatten out their bodies thereby enhancing the overall body patterning. Wild specimens commonly pass an anal discharge with a distinctive odor. Diet is varied and is known to include vertebrates and other small animals.

While these snakes live in all kinds of habitats, in drier areas they are generally found in proximity to water.

## GENUS *THAMNOPHIS* FITZINGER, 1843

**Type species:** *Coluber saurita* Linnaeus, 1766.

**Diagnosis:** This group of Garter Snakes are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

### Content of *Thamnophis* Fitzinger, 1843

*Thamnophis sauritus* (Linnaeus, 1766)

*Thamnophis sirtalis* (Linnaeus, 1758)

*Thamnophis proximus* (Say, 1823)

### SUBGENUS *PUGHUS* SUBGEN. NOV.

**Type species:** *Coluber sirtalis* Linnaeus, 1758.

**Diagnosis:** This monotypic subgenus is separated from all others within the genus *Thamnophis* by the fact that this taxon has a lateral stripe including most of the second dorsal scale row at mid-body. It also has 17 or 19 mid-body scale rows.

Other snakes within the genus *Thamnophis* (subgenus *Thamnophis*) are characterized and diagnosed herein by the following suite of characters: lateral stripe involving the fourth dorsal row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, single anal plate, keeled dorsal scales and no vertical bars on any supralabials.

**Etymology:** Named in honour of the long-term President of the Victorian Association of Amateur Herpetologists, Mick Pugh, of Geelong, Victoria, Australia for an enormous amount of largely unrecognized work in terms of Australian herpetology and reptile conservation.

#### GENUS *CHILOPOMA* COPE, 1875

**Type species:** *Chilopoma rufipunctatum* Cope, 1875

**Diagnosis:** The group of snakes within the genus *Thamnophis* as defined within this paper (above) are separated from the snakes of the genus *Chilopoma* by the following suite of characters: That group of Garter Snakes are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

The two species of snakes formerly placed in the genus *Adelophis* Dugès, 1879, but now placed in the genus *Chilopoma* Cope, 1875, namely *foxi* and *copei*, share several morphological characteristics not seen in any *Thamnophis* (*sensu lato*) as in all genera defined in this paper, including all others in *Chilopoma* Cope, 1875, and this includes the presence of only five supralabial scales (vs six or more in all other species formerly placed within *Thamnophis*) and a lack of reduction in dorsal scale row numbers posteriorly. In addition, both *foxi* and *copei* have striping patterns unlike those of any *Thamnophis* (*sensu lato*), although they also differ from each other in this respect (Rossman and Blaney, 1968).

The species *rufipunctatum* Cope, 1875, the type species for the nominate subgenus *Chilopoma subgen. nov.* identified in this paper, is separated from all other snakes in the genera identified and defined within this paper by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

The other snakes within the genus *Chilopoma* are diagnosed and separated from others within the relevant genera identified in this paper (*Thamnophis*, *Gregswedoshus* gen. nov. and *Brucerothersis* gen. nov.) by the following suite of characters: maximum number of dorsal mid-body rows usually 17; maxillary teeth 16-20; top of head usually unpatterned; two rows of relatively small black spots between the light vertebral and lateral stripes; nuchal blotches predominantly brown; there may or may not be a prominence of black bar along posterior suture of SL 5 equal to, or less than, bar along SL 6 and 7 suture; ventrals averaging 135-155 in males, 130-150 in females; subcaudals averaging 60-75 in males, 50-65 in females; tail of moderate length, prefrontal suture usually slightly longer than the internasal suture (mean PFL/INL 105-106%); muzzle tip usually moderately broad (mean INR/NR 105-120%); anterior nasal usually shorter than posterior nasal (mean AN/PN 75-78%); parietals usually of moderate length (mean FL/PL 70-85%); and frontal usually of moderate width posteriorly (mean FW/PFWA 70-90%); the dorsal color typically including longitudinal vertebral stripes may or may not be obscured by speckling.

One species within *Chilopoma*, namely *Chilopoma valida* (Kennicott, 1860) is unusual in that it has a divided anal. All others within this genus have a single anal plate. All have keeled scales.

The center of distribution for the genus is Mexico.

#### Content of Genus *Chilopoma* Cope, 1875

*Chilopoma rufipunctatum* Cope, 1875 (Type species)  
*Chilopoma angustirostris* (Kennicott, 1860)  
*Chilopoma copei* (Dugès, 1879)  
*Chilopoma bogerti* (Rossman and Burbink, 2005)  
*Chilopoma conanti* (Rossman and Burbink, 2005)  
*Chilopoma exsul* (Rossman, 1969)  
*Chilopoma foxi* (Rossman and Blaney, 1968)  
*Chilopoma godmani* (Günther, 1894)  
*Chilopoma lineri* (Rossman and Burbink, 2005)  
*Chilopoma melanogaster* (Weigmann, 1830)  
*Chilopoma mendax* (Walker, 1955)  
*Chilopoma scalaris* (Cope, 1861)  
*Chilopoma scaliger* (Jan, 1863)  
*Chilopoma sumichrasti* (Cope, 1866)  
*Chilopoma valida* (Kennicott, 1860)

#### SUBGENUS *ADELOPHIS* DUGÈS, 1879

**Type species:** *Adelophis copei* Dugès, 1879

**Diagnosis:** The subgenus *Adelophis* now includes all species within the genus *Chilopoma* except for the single taxon placed within the subgenus *Chilopoma*, namely *C. rufipunctatum* Cope, 1875.

This obviously means *Adelophis* now includes species formerly referred to the genus *Thamnophis*.

The diagnosis for this subgenus (*Adelophis*) is most easily done by diagnosing the species *C. rufipunctatum* Cope, 1875, thereby eliminating it from the genus *Chilopoma*, as a result leaving all other species within this subgenus.

The type species for the nominate subgenus *Chilopoma subgen. nov.* identified in this paper, is *C. rufipunctatum* Cope, 1875 and separated from all other snakes in the genera identified and defined within this paper as well as all *Chilopoma* placed in the subgenus *Adelophis* by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

#### Content of subgenus *Adelophis* Dugès, 1879

*Chilopoma (Adelophis) copei* (Dugès, 1879)  
*Chilopoma (Adelophis) bogerti* (Rossman and Burbink, 2005)  
*Chilopoma (Adelophis) conanti* (Rossman and Burbink, 2005)  
*Chilopoma (Adelophis) exsul* (Rossman, 1969)  
*Chilopoma (Adelophis) foxi* (Rossman and Blaney, 1968)  
*Chilopoma (Adelophis) godmani* (Günther, 1894)  
*Chilopoma (Adelophis) lineri* (Rossman and Burbink, 2005)  
*Chilopoma (Adelophis) melanogaster* (Weigmann, 1830)  
*Chilopoma (Adelophis) mendax* (Walker, 1955)  
*Chilopoma (Adelophis) scalaris* (Cope, 1861)  
*Chilopoma (Adelophis) scaliger* (Jan, 1863)  
*Chilopoma (Adelophis) sumichrasti* (Cope, 1866)  
*Chilopoma (Adelophis) valida* (Kennicott, 1860)

#### GENUS *BRUCEROTHERSIS* GEN. NOV.

**Type species:** *Eutaenia chrysocephala* Cope, 1885

**Diagnosis:** The genus is separated from the genera *Thamnophis*, *Chilopoma* and *Gregswedoshus* by the following suite of characters: A slender body, and a wide, flat head, with a large eye. *Brucerothersis* gen. nov. has a head more triangular in shape than seen in other Garter Snakes in the genera *Thamnophis*, *Chilopoma* and *Gregswedoshus* gen. nov..



The side of the eye contracts the frontal plate, so that it is not wider than the superciliaries posteriorly. Superior labials eight, none higher than long, fourth and fifth below orbit. The inferior surfaces are dark which causes a good definition of the lateral line. There are representations of two rows of lateral black spots, but they are merely black scale-borders, those of the inferior row the more distinct, although these may vary and sometimes appear bar or zig-zag like, sometimes interspersed with white. A similar row of black edges on the first row of scales. All of these spots become distinct on the sides of the neck. Nuchal spot large, black, conspicuous and with a shallow notch behind; no occipital or other spots on the head. The gastrosteges often have black bases. Keeled dorsal scales and a single anal plate.

This genus is known from two described species only. These occur in Mexico, Honduras, El Salvador, and Guatemala.

**Etymology:** Named in honor of Bruce Rogers, of Kangaroo Ground, Victoria, Australia for services to Australian culture and environment.

**Content of Genus *Brucerogersus* gen. nov.**

*Brucerogersus chrysocephalus* (Cope, 1885)

*Brucerogersus fulvus* (Bocourt, 1893)

**GENUS GREGSWEDOSHUS GEN. NOV.**

**Type species:** *Eutainia elegans* Baird and Girard, 1853

**Diagnosis:** In the first instance, this genus can be diagnosed and separated from *Thamnophis*, *Chilopomoa* and *Brucerogersus* gen. nov. by the following suite of characters: keeled or unkeeled dorsal scales, single anal, 17-21 dorsal mid-body rows, usually reducing by two near the vent, 120-170 ventrals, less than 27 maxillary teeth, the number usually being in the range 20-23, usually 6-7 supralabials, the posterior ones the same color as the temporal and set off before and after with black-edged light areas, vertebral stripe is usually but not always brightly colored and distinct, nuchal blotches not usually conspicuous or absent, venter may or may not have dark pigment, but if it does it usually forms several rows of dark spots or an irregular dark reticulated pattern.

Separated from all other relevant genera, namely *Thamnophis*, *Chilopomoa* and *Brucerogersus* gen. nov. also by eliminating the other three genera, with which this one can be possibly confused with by using the characters to define each as given above.

*Thamnophis* are separated from all other relevant genera (defined herein), formerly placed within *Thamnophis* by the following suite of characters: Single anal, lateral stripe involving the fourth dorsal scale row anteriorly, 3 or more maxillary teeth, 19 or less mid-body rows, no vertical bars on any supralabials; or if 17 dorsal scale rows anteriorly, the lateral stripe involves most of the second dorsal scale row at midbody.

The two species of snakes formerly placed in the genus *Adelophis* Dugès, 1879, but now placed in the genus *Chilopomoa* Cope, 1875, namely *foxi* and *copei*, share several morphological characteristics not seen in any *Thamnophis* (*sensu lato*) as in all genera defined in this paper, including all others in *Chilopomoa* Cope, 1875, and this includes the presence of only five supralabial scales (vs six or more in all other species formerly placed within *Thamnophis*) and a lack of reduction in dorsal scale row numbers posteriorly. In addition, both *foxi* and *copei* have striping patterns unlike those of any *Thamnophis* (*sensu lato*), although they also differ from each other in this respect (Rossman and Blaney, 1968).

The species *rufipunctatum* Cope, 1875, the type species for the nominate subgenus *Chilopomoa subgen. nov.* identified in this paper, is separated from all other snakes in the genera identified and defined within this paper by the following suite of characters: the presence of two moderately small, separate nuchal blotches, broad supralabial bars, black-edged brown wedges on each side of the belly, a dorsum olive or brown with conspicuous dark brown spots that fade on the tail. There are no well-defined or developed stripes or pale crescent behind the corner of the

mouth. Vestiges of the dorsal and lateral stripes are sometimes present on the neck. Venter is grayish-brown, lightening on the throat, the head is long, the snout is blunt and there are 8 supralabials and 21 dorsal mid-body rows.

The other snakes within the genus *Chilopomoa* are diagnosed and separated from others within the relevant genera identified in this paper (*Thamnophis*, *Gregswedoshus* gen. nov. and *Brucerogersus* gen. nov.) by the following suite of characters: maximum number of dorsal mid-body rows usually 17; maxillary teeth 16-20; top of head usually unpatterned; two rows of relatively small black spots between the light vertebral and lateral stripes; nuchal blotches predominantly brown; there may or may not be a prominence of black bar along posterior suture of SL 5 equal to, or less than, bar along SL 6 and 7 suture; ventrals averaging 135-155 in males, 130-150 in females; subcaudals averaging 60-75 in males, 50-65 in females; tail of moderate length, prefrontal suture usually slightly longer than the internasal suture (mean PFL/INL 105-106%); muzzle tip usually moderately broad (mean INR/NR 105-120%); anterior nasal usually shorter than posterior nasal (mean AN/PN 75-78%); parietals usually of moderate length (mean FL/PL 70-85%); and frontal usually of moderate width posteriorly (mean FWP/FWA 70-90%); the dorsal color typically including longitudinal vertebral stripes may or may not be obscured by speckling.

One species within *Chilopomoa*, namely *Chilopomoa valida* (Kennicott, 1860) is unusual in that it has a divided anal. All others within the genus *Chilopomoa* have a single anal plate and keeled scales.

The center of distribution for the genus *Chilopomoa* is Mexico.

The genus *Brucerogersus* gen. nov. is separated from the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* by the following suite of characters: A slender body, and a wide, flat head, with a large eye. *Brucerogersus* gen. nov. has a head more triangular in shape than seen in other Garter Snakes in the genera *Thamnophis*, *Chilopomoa* and *Gregswedoshus* gen. nov..

The side of the eye contracts the frontal plate, so that it is not wider than the superciliaries posteriorly. Superior labials eight, none higher than long, fourth and fifth below orbit. The inferior surfaces are dark which causes a good definition of the lateral line. There are representations of two rows of lateral black spots, but they are merely black scale-borders, those of the inferior row the more distinct, although these may vary and sometimes appear bar or zig-zag like, sometimes interspersed with white. A similar row of black edges on the first row of scales. All of these spots

become distinct on the sides of the neck. Nuchal spot large, black, conspicuous and with a shallow notch behind; no occipital or other spots on the head. The gastrosteges often have black bases. Keeled dorsal scales and a single anal plate.

This genus *Brucerogersus* gen. nov. is known from two described species only. These occur in Mexico, Honduras, El Salvador, and Guatemala.

The genus *Gregswedoshus* gen. nov. is found widely in North and Central America.

**Etymology:** Named in honor of Greg Swedosh, of Warrandyte, Victoria, Australia for many hours of unpaid computer services, without which the books, *Smuggled: The Underground Trade in Australia's Wildlife* (Hoser 1993), and *Smuggled-2: Wildlife trafficking, crime and corruption in Australia* (Hoser 1996), may never have been published. It was only as a direct consequence of the publication of these books that Australian governments were forced to repeal draconian laws banning private ownership of reptiles and other native species as pets. Those laws had been in place for over 20 years when this happened.

As this paper goes to print in 2012, those rights are again under threat.

**Content of Genus *Gregswedoshus* gen. nov.**

*Gregswedoshus elegans* (Baird and Girard, 1853) (Type species)

*Gregswedoshus atratus* (Kennicott, 1860)

*Gregswedoshus brachystoma* (Cope, 1892)

*Gregswedoshus butleri* (Cope, 1889)

*Gregswedoshus couchii* (Kennicott, 1859)

*Gregswedoshus cyrtopsis* (Kennicott, 1860)

*Gregswedoshus eques* (Reuss, 1834)

*Gregswedoshus gigas* (Fitch, 1940)

*Gregswedoshus hammondii* (Kennicott, 1860)

*Gregswedoshus marcianus* (Baird and Girard, 1853)

*Gregswedoshus nigronuchalis* (Thompson, 1957)

*Gregswedoshus ordinoides* (Baird and Girard, 1852)

*Gregswedoshus postremus* (Smith, 1942)

*Gregswedoshus rossmani* (Conant, 2000)

*Gregswedoshus pulchrilatus* (Cope, 1885)

*Gregswedoshus radix* (Baird and Girard, 1853)

**SUBGENUS *WHYBROWUS* SUBGEN. NOV.**

**Type Species:** *Eutaenia cyrtopsis* Kennicott, 1860

**Diagnosis:** *Whybrowus* subgen. nov. is separated from all other species in the genus *Gregswedoshus* gen. nov. (and *Thamnophis*, *Chilopomoa* and *Brucerogeterus* gen. nov.) by the following suite of characters: A whitish or pale yellow vertebral stripe separates two large black blotches on the back of the head. A white crescent occurs between each blotch and the corner of the mouth. There is a lateral stripe on the second and third scale rows, often wavy or irregular because it may be partly invaded by black spots from above and below. Dorsally the ground color is usually olive brown with two alternating rows of elongate spots between the stripes which often present as a zig-zag line. The spots fade on the tail. Belly is greenish white, 19 mid-body dorsal rows. While easily confused with subgenus *Neilsonnemanus* subgen. nov. That subgenus normally has 21 mid-body rows (rarely 19), the lateral stripe is on the third or fourth rows and any dorsal pattern extends well out onto the tail (as opposed to fading at the anterior part of the tail).

As for all *Gregswedoshus* gen. nov., in *Whybrowus* subgen. nov. dorsal scales are keeled and the anal single.

This monotypic subgenus is found from southwestern USA to El Salvador and Guatemala.

**First or subsequent reviser note:** In the event that a decision is made at any stage to merge the subgenera *Whybrowus* subgen. nov. with *Neilsonnemanus* subgen. nov., then *Whybrowus* subgen. nov. should be the name used.

**Etymology:** Named in honor of Pete Whybrow of Taggerty, Victoria, Australia for numerous services to herpetology.

**Content of *Whybrowus* subgen. nov.**

*Gregswedoshus (Whybrowus) cyrtopsis* (Kennicott, 1860)

(Monotypic for the type species)

**SUBGENUS *NEILSONNEMANUS* SUBGEN. NOV.**

**Type species:** *Coluber eques* Reuss, 1834

**Diagnosis:** The snakes in the subgenus *Neilsonnemanus* subgen. nov. are similar in most respects to those of subgenus *Whybrowus* subgen. nov. from which they can be separated by having 21 mid-body rows (rarely 19), as opposed to 19 in *Whybrowus* subgen. nov.; in *Neilsonnemanus* subgen. nov. the lateral stripe is on the third or fourth rows and any dorsal pattern extends well out onto the tail (as opposed to fading at the anterior part of the tail).

*Neilsonnemanus* subgen. nov. are striped or checkered Garter Snakes of varying color, often with a whitish or greenish crescent behind the mouth, paired black blotches at the back of the head and the lateral stripe on the third or fourth rows anteriorly, sometimes only the third, this stripe often moving slightly to be on the second and third rows posteriorly. Sides are usually checkered in some way with dark spots on an olive or brown background. There are invariably vertical bars present on at least some supralabial sutures.

As for all *Gregswedoshus* gen. nov., dorsal scales are keeled and the anal single.

This subgenus is distributed in North and Central America.

**Etymology:** Named in honour of Neil Sonneman of Murrumbidgee, near Myrtleford, Victoria, Australia in recognition for his services to herpetology spanning a number of decades.

**Content of subgenus *Neilsonnemanus* subgen. nov.**

*Gregswedoshus (Neilsonnemanus) eques* (Reuss, 1834) (Type species)

*Gregswedoshus (Neilsonnemanus) marcianus* (Baird and Girard, 1853)

*Gregswedoshus (Neilsonnemanus) postremus* (Smith, 1942)

*Gregswedoshus (Neilsonnemanus) pulchrilatus* (Cope, 1885)

*Gregswedoshus (Neilsonnemanus) rossmani* (Conant, 2000)

**REFERENCES CITED**

- Amiel, J. J. and Wassersug, R. J. 2010. Temperature differentials between the bodies and tails of ribbon snakes (*Thamnophis sauritus*): ecological and physiological implications. *Amphibia-Reptilia* 31:257-263.
- Baird, S. F. and C. Girard. 1853. Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1.- Serpents. Smithsonian Inst., Washington, xvi:172 pp.
- Barton, A. J. 1956. A statistical study of *Thamnophis brachystoma* (Cope) with comments on the kinship of *T. butleri* (Cope). *Proc. Biol. Soc. Washington* 69:71-82.
- Boulenger, G. A. 1893. *Catalogue of the snakes in the British Museum* (Nat. Hist.) I. London (Taylor and Francis):448 pp.
- Boundy, J. 1999. Systematics of the garter snake *Thamnophis atratus* at the southern end of its range. *Proc. Cal. Acad. Sci.* 51(6):311-336.
- Castoe, T. A., Chippindale, P. T., Campbell, J. A., Ammerman, L. L. and Pa, C. L. 2003. Molecular systematics of the Middle American jumping vipers (genus *Atropoides*) and phylogeography of the *Atropoides nummifer* complex. *Herpetologica* 59(3):420-431.
- Castoe, T. A., Mahmood, M. S. and Parkinson, C. L. 2005. Modeling nucleotide evolution at the mesoscale: The phylogeny of the Neotropical pitvipers of the *Porthidium* group (Viperidae: Crotalinae). *Molecular Phylogenetics and Evolution* 37(3):881-898.
- Castoe, T. A. and Parkinson, C. L. 2006. Bayesian mixed models and the phylogeny of pitvipers (Viperidae: Serpentes). *Molecular Phylogenetics and Evolution* 39(1):91-110.
- Conant, R. 1938. The Reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.
- Conant, R. 1950. On the taxonomic status of *Thamnophis butleri* (Cope). *Bulletin of the Chicago Academy of Sciences* 9(4):71-77.
- Conant, R. 2003. Observations on Garter Snakes of the *Thamnophis eques* Complex in the Lakes of Mexico's Transvolcanic Belt, with Descriptions of New Taxa. *American Museum Novitates* 3406:1-64.
- Conant, R. and Collins, J. T. 1991. *A Field Guide to Reptiles and Amphibians of Eastern/Central North America*, 3rd ed. Houghton Mifflin (Boston/New York), xx + 450 pp.
- Cope, E. D. 1875. In Yarrow, H.C., Report upon the collections of batrachians and reptiles made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 871, 1872, 1873, and 1874, Chapter IV, L, pp. 509-584, In: *Report upon geography*. Government Printing office, Washington D.C.
- Cope, E. D. 1886. Thirteenth contribution to the herpetology of tropical America. *Proc. Amer. Philos. Soc.* 23:271-287[1885]
- Cope, E. D. 1888. On the *Eutaenia* of Southeastern Indiana. *Proc. US Natl. Mus.* 11:399-400. [1889]
- Cope, E. D. 1892. A new species of *Eutaenia* from western Pennsylvania. *American Naturalist* 26:964-965.
- da Silva, N. G. and Sites, J. W. 2001. Phylogeny of South American Triad Coral Snakes (Elapidae: *Micrurus*) Based on Molecular Characters. *Herpetologica* 57(1):1-22.

- de Queiroz, A. and Smith, H. M. 1996. Geographic Distribution. *Thamnophis eques*. *Herpetological Review* 27(3):155.
- Dowling, H. G. 1951. A practical solution of the nomenclature of the common gartersnake and the ribbonsnake. *Copeia* 1951(4):309-310.
- Gartside, D. F., Rogers, J. S. and Dessauer, H. C. 1977. Speciation with Little Generic and Morphological Differentiation in the Ribbon Snakes *Thamnophis proximus* and *T. sauritus* (Colubridae). *Copeia* 1977(4):697-705.
- Guo, Y., Yunke, W., Shunping, H., Haito, S. and Zhao, E. 2011. Systematics and molecular phylogenetics of Asian snail-eating snakes (Pareatidae). *Zootaxa* 3001:57-64.
- Hallmen, M. and Sonnenberg, J. 2006. Hilfen zur Unterscheidung einiger Unterarten und Farbformen bei Strumpfbandnattern (1.-3. *T. s. sirtalis*, *T. s. similis*; 4. *T. proximus*, *T. sauritus*, *T. radix*, *T. s. sirtalis*). *Draco* 6 (25):50-59.
- Fitch, H. C. 1940. A biogeographical study of the *ordinoides* artenkreis of garter snakes (genus *Thamnophis*). *Univ. Calif. Publ. Zool.* 44:1-150.
- Holbrook, J. E. 1842. *North American Herpetology; or, A description of the reptiles inhabiting the United States*. Vol I (2nd ed.). J. Dobson, Philadelphia:152 pp.
- Kennicott, R. 1860. Descriptions of new species of North American serpents in the museum of the Smithsonian Institution, Washington. *Proc. Acad. Nat. Sci. Philadelphia* 12:328-338.
- Langford, G. and Borden, J. A. 2006a. *Thamnophis sauritus sauritus* Maximum size. *Herpetological Review* 37(1):95.
- Langford, G. J. and Borden, J. A. 2006b. *Thamnophis sauritus sauritus* (Eastern ribbon snake). Maximum size. *Herpetological Review* 37(1):95.
- Langford, G. J., Borden, J. A. and Nelson, D. H. 2011. Ecology of the Eastern Ribbonsnake (*Thamnophis sauritus*) in Southern Alabama with Evidence of Seasonal Multiple Broods. *Herp. Cons. Biol.* 6(3).
- Lawson, R., Slowinski, J. B., Crowther, B. I. and Burbink, F. T. 2005. Phylogeny of the colubroidea (Serpentes): New evidence from the mitochondrial and nuclear genes. *Molecular phylogenetics and evolution* 37:581-601.
- Linné, C. von [= Linnaeus, C.] 1766. *Systema naturæ per regna tria naturæ, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Tomus I. Editio duodecima, reformata. Laurentii Salvii, Stockholm, Holmiae:532 pp.
- McGuire, J. A. and Grismer, L. L. 1993. The taxonomy and biogeography of *Thamnophis hammondi* and *Thamnophis digueti* (Reptilia: Squamata: Colubridae) in Baja California, Mexico. *Herpetologica* 49(3):354-365.
- Price, A. H. 1978. New locality records and range extensions for *Thamnophis brachystoma* (Reptilia: Serpentes) in Pennsylvania. *Bull. Maryland Herp. Soc.* 14(4):260-263.
- Pyron, R. A. and Burbrink, F. T. 2009. Neogene diversification and taxonomic stability in the snake tribe Lampropeltini (Serpentes: Colubridae). *Molecular Phylogenetics and Evolution* 52(2):524-529.
- Pyron, R. A., et. al. 2011. The phylogeny of advanced snakes (Colubroidea), with discovery of a new subfamily and comparison of support methods for likelihood trees. *Mol. Phylogenet. Evol.* 58:349-342.
- Queiroz, A., Lawson, R. and Lemos-Espinal, J. A. 2002. Phylogenetic Relationships of North American Garter Snakes (*Thamnophis*) Based on Four Mitochondrial Genes: How Much DNA Sequence Is Enough? *Molecular Phylogenetics and Evolution* 22:315-329.
- 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.
- Rossman, D. A. 1961. Nomenclatural status of the Neotropical subspecies of the colubrid snake, *Thamnophis sauritus*. *Notulae Naturae* (340):1-2.
- Rossman, D. A. 1963. The colubrid snake genus *Thamnophis*: A revision of the *sauritus* group. *Bull. Florida St. Mus.* 7:99-178.
- Rossman, D. A. 1969. A new Natricine snake of the genus *Thamnophis* from Northern Mexico. *Occasional papers of the Museum of Zoology, Louisiana State University* (39):1-4.
- Rossman, D. A. 1970. *Thamnophis sauritus*. Catalogue of American Amphibians and Reptiles (99):1-2.
- Rossman, D. A. and Blaney, R. M. 1968. A new Natricine snake of the genus *Adelophis* from western Mexico. *Occasional papers of the Museum of Zoology, Louisiana State University* (35):1-12.
- Rossman, D. A. and Burbrink, F. T. 2005. Species limits within the Mexican garter snakes of the *Thamnophis godmani* complex. *Occ. Papers Mus. Nat. Science* (79):1-43.
- Rossman, D. A. and Stewart, G. R. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). *Occ. Pap. Mus. Zool. Louisiana State Univ.* (63):1-25.
- Rossman, D. A. and Wallach, V. 1987. *Adelophis* Dugès. Mountain meadow snakes. Catalogue of American Amphibians and Reptiles 408:1-2.
- Rossman, D. A., Liner, E. A., Trevino, C. H. and Chaney, A. H. 1989. Redescription of the garter snake *Thamnophis exsul* Rossman, 1969 (Serpentes: Colubridae). *Proc. Biol. Soc. Washington* 102(2):507-514.
- Rossman, D. A., Ford, N. B. and Seigel, R. A. 1996. *The Garter Snakes: Evolution and Ecology*. University of Oklahoma Press, Norman, OK:322 pp.
- Smith, A. G. 1945. The status of *Thamnophis butleri* Cope, and a redescription of *Thamnophis brachystoma* (Cope). *Proc. Biol. Soc. Washington* 58:147-154.
- Smith, H. M. 1939. Notes on Mexican reptiles and amphibians. *Zoological Series of Field Museum of Natural History* 24(4):15-35.
- Smith, H. M. 1942a. The synonymy of the garter snakes (*Thamnophis*), with notes on Mexican and Central American species. *Zoologica*, Scientific Contributions of the New York Zoological Society 27(3/4):97-123.
- Smith, H. M. 1942b. Summary of the collections of snakes and crocodylians made in Mexico under the Walter Rathbone Bacon Traveling Scholarship. *Proceeding of the U. S. National Museum* 93(3169):393-504.
- Smith, H. M. 1951. The identity of the ophidian name *Coluber eques* Reuss. *Copeia* 1951(2):138-140.
- Smith, H. M. and Chiszar, D. 2003. The checkered nomenclatural history of the Narrow-headed Garter Snake, *Thamnophis rufipunctatus* (Cope). *Bulletin of the Chicago Herpetological Society*. 38(3):46-48.
- Stebbins, R. C. 1985. *A Field Guide to Western Reptiles and Amphibians*, 2nd ed. Houghton Mifflin, Boston.
- Tanner, W. W. 1959. A new *Thamnophis* from western Chihuahua with notes on four other species. *Herpetologica* 15(4):165-172.
- Taylor, E. H. 1940. Two new snakes of the genus *Thamnophis* from Mexico. *Herpetologica* 1(7):183-189.
- Thompson, F. G. 1957. A new Mexican gartersnake (Genus *Thamnophis*) with notes on related forms Occasional Papers of the Museum of Zoology, University of Michigan (584):1-10.
- Todd, J. and Wassersug, R. 2010. Caudal pseudoautotomy in the Eastern Ribbon Snake *Thamnophis sauritus*. *Amphibia-Reptilia* 31:213-215.
- Wood, D. A., Vandergast, A. G., Lemos Espinal, J. A., Fisher, R. N. and Holycross, A. T. 2011. Refugial isolation and divergence in the narrowhead Garter Snake species complex (*Thamnophis rufipunctatus*) as revealed by multilocus DNA sequence data. *Molecular Ecology* 20:3856-3878.
- Wüster, W., Peppin, L., Pook, C. E. and Walker, D. E. 2008. A nesting of vipers: Phylogeny and historical biogeography of the Viperidae (Squamata: Serpentes). *Molecular Phylogenetics and Evolution* 49(2):445-459.