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A new species of the genus *Oligodon* Fitzinger, 1826 (Squamata: Colubridae) from southern Vietnam and Cambodia

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Abstract

A new species of the *Oligodon cyclurus*-group is described from southern Vietnam and Cambodia, *Oligodon saintgironsi* **spec. nov.** It differs from other members of this group by the combination of 19 scale rows at the neck, 17 or 18 dorsal scale rows at midbody, a long and robust tail, very long and thin hemipenes, and a blotched pattern. It is most similar to *Oligodon ocellatus* (Morice, 1875). *Oligodon analepticos* Campden-Main, 1970 is confirmed as a synonym of *Oligodon ocellatus*. A key to the *Oligodon cyclurus*-group is provided.

Key words: *Oligodon, Oligodon saintgironsi* **spec. nov.**, *Oligodon ocellatus*, *Oligodon analepticos*, taxonomy, Vietnam, Cambodia

Introduction

The genus *Oligodon* Fitzinger, 1826, widespread throughout central and tropical Asia, contained 67 species as of August 1st, 2008 (Uetz & Hallermann, 2008) and the description of at least three other taxa is in press (David *et al.*, in press). Smith (1943) and Wagner (1976) recognized several informal groups within the genus, mostly on the basis of hemipenial morphology. In the absence of a phylogeny of the genus, these groups are convenient for discussing the taxonomy of the genus.

Both Smith (1943) and Wagner (1975, 1976) recognized the "*Oligodon cyclurus*-group", which currently includes *O. cyclurus* (Cantor, 1839), *O. fasciolatus* (Günther, 1864), *O. chinensis* (Günther, 1888), *O. formosanus* (Günther, 1872), and *O. ocellatus* (Morice, 1875). This group is mainly characterized by (1) long and deeply forked hemipenes, neither spinose or papillate, (2) 17–23 dorsal scale rows, (3) 10–12 maxillary teeth, (4) a full complement of head scales, including a loreal and a presubocular, (5) anal plate entire; and (6) a mainly blotched and/or reticulated pattern, never prominently striped (although specimens of *Oligodon cyclurus* from Myanmar and western Thailand may have occasionally a pair of broad paravertebral stripes along with the dorsal blotches). These species are widespread from Myanmar to southern China and to southern Thailand. They are quite large for the genus, *O. fasciolatus* and *O. ocellatus* reaching up to 807 mm and 852 mm respectively (Wagner, 1975; our data).

As for several other groups of *Oligodon*, there has been much confusion concerning the binomen *Oligodon cyclurus*, because Cantor's (1839) description of the species failed to mention either a type specimen or type locality. However, it was obviously based on a specimen collected in Bengal, according to the Bengali vernacular name that he indicated. We follow Wagner (1975) in retaining the specific epithet *cyclurus* for the

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western populations (Northeast India, Bangladesh, Yunnan Province of China, Myanmar, and extreme western Thailand) with 19 dorsal scale rows behind neck and at midbody, and in referring specimens with 21 or 23 rows to *Oligodon fasciolatus*, with *O. cyclurus smithi* (Werner, 1925) and *O. cyclurus superfluens* Taylor, 1965 as synonyms of *O. fasciolatus*. In contrast, Das (2004) referred specimens with 21 or 23 rows to *O. cyclurus*. This problem will be addressed elsewhere.

Campden-Main (1970a) discussed specimens from South Vietnam with 19 dorsal scale rows. This author correctly noticed that these specimens were not conspecific with *Oligodon cyclurus* (Cantor, 1839) but were conspecific with the holotype of *Simotes brevicauda* Steindachner, 1867, a taxon known from a single specimen from "Cochinchina". Boulenger (1894) placed *Simotes brevicauda* into the synonymy of *Simotes cyclurus* Cantor, 1839, now *Oligodon cyclurus*. Unfortunately, *Oligodon brevicauda* (Steindachner, 1867) thus became a secondary homonym of *Oligodon brevicauda* Günther, 1862, a valid species from southwestern India. As a consequence, Campden-Main (1970a: 763) created the replacement name *Oligodon analepticos* for Steindachner's species. Saint Girons (1972) briefly discussed this complex of species and considered *Oligodon analepticos* to be a junior subjective synonym of *Oligodon ocellatus* (Morice, 1875). This position has been followed by subsequent authors.

In examining specimens from southern Vietnam, we came across three specimens rather similar to *Oligodon ocellatus* but with a much longer tail, very long hemipenes and 17 or 18 dorsal scale rows at midbody. In the *O. cyclurus*-group, 17 dorsal scale rows is met only in *Oligodon chinensis*, a northern species barely reaching the north of central Vietnam (Huong Son, Hà Tinh Province; Nguyen *et al.*, 2005; on a biogeographic basis, we consider doubtful the occurrence in Gia Lai Province mentioned by these authors). Blotched specimens with 19 rows at neck and midbody are known in *Oligodon cyclurus* (Cantor, 1839) (not found east of western Thailand) and *Oligodon ocellatus* (Morice, 1875). *Oligodon formosanus*, also with 19 rows, is never blotched.

Our three specimens show major differences in scalation, morphometry and hemipenial morphology to *Oligodon ocellatus*, *O. chinensis* and other species of the *Oligodon cyclurus*-group, and to all other species of the genus of this region. As a consequence, we refer these specimens to a new species which is here described.

Material and methods

A total of 85 preserved specimens of the *Oligodon cyclurus*-group were examined for external morphological characters and dentition, both regarded as taxonomically useful in the genus *Oligodon* by Wall (1923), Smith (1943) and Wagner (1975). These specimens are listed in the Appendix.

Measurements, except body and tail lengths, were taken with a slide-caliper to the nearest 0.1 mm; all body measurements were made to the nearest millimetre. Ventral scales were counted according to Dowling (1951). The terminal scute is not included in the number of subcaudals. Dorsal scale row counts are given at one head length behind head, at midbody (i.e., at the level of the ventral plate corresponding to a half of the total number of ventrals), and at one head length before vent. Values for paired head characters are given in left / right order.

Abbreviations of morphological characters are as follows: *Morphometry*: (1) ED—eye diameter (horizontal); (2) HL—head length (from the tip of rostral to the posterior end of the jaw); (3) SnL—snout length (from the tip of rostral to the anterior eye margins); (4) SVL—snout-vent length; (5) TaL—tail length; (6) TaL/TL—ratio tail length / Total length; (7) total length. *Scalation*. (8) ASR—number of dorsal scale rows at neck (about 1 HL behind head); (9) Ate—anterior temporal scale; (10) DSR—dorsal scale rows; (11) IL—infralabial scales; (12) LOR—loreal scale; (13) MSR—number of dorsal scale rows at midbody (at number of VEN/2); (14) PosOc—postocular scale; (15) PreOc—preocular scale; (16) PreSubOc—presubocular scale (below the preocular); (17) PSR—number of dorsal scale rows before vent; (18) SC—subcaudal scales; (19) SL—supralabial scales; (20) SL-Eye—number of supralabials entering orbit; (21) VEN—ventral scales.

Museum abbreviations. – AMNH: American Museum of Natural History, New York, USA. – BMNH: The Natural History Museum, London, UK. – CAS: California Academy of Sciences, San Francisco, USA. – IEBR: Institute for Ecology and Biological Research, Hanoi, Vietnam. – MHL: Muséum d'Histoire naturelle de Lyon, Lyon, France. – MNHN: Muséum National d'Histoire Naturelle, Paris, France. – NMW: Naturhistorisches Museum Wien, Wien, Austria. – PSGV: Gernot Vogel's private collection, Heidelberg, Germany. – USNM: United States National Museum, Washington, USA.

Results

Our investigations allow us to recognize three species of the *Oligodon cyclurus*-group in southern Vietnam. *Oligodon fasciolatus* (Günther, 1864) has 21 or 23 DSR at neck and 21 at midbody. In this region, only two species have 19 DSR at neck, *Oligodon ocellatus* (Morice, 1875) and a new species that we describe as:

Oligodon saintgironsi spec. nov.
(Figs. 1–10)

Holotype. MNHN 1974.1264 (adult male), from "Arboretum de Trang Bôm", now Arboretum of Bien Hoa, Dong Nai Province, southern Vietnam. Deposited by Sergeant Poilane, no date but probably collected around 1930–40.

Paratypes. MNHN 1877.0050 (formerly MNHN 5236) (adult male), "Cambodge", Cambodia. Deposited by Mr. Harmand; MNHN 1974.1272 (adult female), "Institut de Recherches agronomiques, Saïgon", now in Ho Chi Minh City. Deposited by Sergeant Poilane, no date.

Diagnosis. A species of the genus *Oligodon cyclurus*-group, characterized by (1) very long, deeply forked hemipenes, reaching to at least 28th SC, thin, smooth and not spinose throughout; (2) a long and thick tail in males with a ratio Tal/TL > 0.19; (3) 19–17(18)–15 dorsal scale rows; (4) reductions between 19 and 17 rows occurring between VEN 62 and 84 (x = 77.3); (5) 10–12 maxillary teeth, the last three strongly enlarged; (6) anal plate single; (7) full complement of head scales, including a presubocular in all specimens; (8) 8 supralabials; (9) 2 anterior temporals; and (10) blotched dorsal pattern, with large blotches.

Oligodon saintgironsi **spec. nov.** can be diagnosed by the combination of 19 dorsal scale rows on the anterior half to third of the body, 17–18 dorsal scale rows at midbody, a long and strong tail in both sexes, very long, deeply forked hemipenes, and a blotched dorsal pattern. It differs from all other species of the *Oligodon cyclurus*-group by the combination of (1) the length of hemipenes, (2) the relative length of the tail, and (3) in having only 17 or 18 scale rows at midbody vs. 19, 21, and 23 rows in all others. *Oligodon saintgironsi* **spec. nov.** differs from *O. chinensis* which has also 17 MSR by (1) much longer hemipenes (28–29 SC vs. 12–13 SC in *O. chinensis*), and the dorsal scale row formula, 19–17(18)–15 in *O. saintgironsi* vs. 17–17–15 in *O. chinensis*. Additional comparisons with other species of the *Oligodon cyclurus*-group and of the genus *Oligodon* appear below in the Discussion.

The specimens do not seem to have been mentioned previously under any name in the literature, although specimens of *Oligodon cyclurus* with "rarely 17 rows" cited in Campden-Main (1970b: 40) may refer to *O. saintgironsi* **spec. nov.** Wagner (1975) had not examined these specimens.

Etymology. This species is named in honour of Dr. Hubert Saint Girons (1926–2000), noted French histologist and herpetologist, formerly in the *Centre National de la Recherche Scientifique*, in the Paris University and in the *Muséum National d'Histoire Naturelle*. This name is a genitive based on the author's last name. Although a specialist of European vipers, H. Saint Girons conducted research in Cambodia (a. o., Saint Girons, 1972) and was the first recent author to recognize the validity of *Oligodon ocellatus* (Morice, 1875) for Indochinese populations with 19 dorsal scale rows, and the synonymy of *O. analepticos* with this taxon.

Description of the holotype (Figs. 1–6). Body robust but elongate; head ovoid, short, thick, barely distinct from the poorly defined neck; snout elongate, long (28.9 % of HL, or 1.8 times as long as diameter of eye); pupil round; tail long, robust, tapering.

Dentition: 12 (9+3) maxillary teeth, the last three being strongly enlarged and blade-shaped. SVL: 435 mm; TaL: 103 mm; TL: 538 mm; HL: 18.90 mm; ratio TaL/TL: 0.191.

Body scalation: DSR: 19–17–15; scales small and all smooth. VEN: 170 (plus 2 preventrals), angulated; SC: 59, all paired; anal plate entire. Scale row reductions as follows:

$$19 \quad \frac{4+5 \rightarrow 4\ (62)}{4+5 \rightarrow 4\ (66)} \quad 17 \quad \frac{4+5 \rightarrow 4\ (125)}{4+5 \rightarrow 4\ (127)} \quad 15$$

Head scalation: Rostral thick, curved onto upper snout surface, well visible from above, separating internasals by about one half of their length; nasals divided, "butterfly-shaped", about 1.8 times as long as high, vertically divided, with the posterior part smaller; nostril large, oval, piercing top of middle of nasal; internasals subrectangular, in broad contact, shorter than prefrontals; prefrontals subrectangular, distinctly wider than long; suture between prefrontals 1.7 times longer than the suture between the internasals; frontal hexagonal, 1.2 times as long as wide; 1/1 supraoculars, distinctly longer than wide, about as wide as prefrontals; two large, subtriangular parietals, much longer than frontal, in broad contact; 1/1 small, subrectangular loreal scales, in contact with nasal; 8/8 supralabials, 1st SL small, 2nd and 3rd in contact with loreal, 4th and 5th entering orbit, 6th and 7th largest; 1/1 preoculars, tall and narrow; 1/1 small presuboculars; 2/2 postoculars; 2 + (1+1)/1 / 2 + (1+1)/1 temporals, anterior ones elongated; 9 / 9 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 2nd small, 5th IL largest.

Coloration and pattern in alcohol: The upper surface is brownish-ochre, darker on the upper part of the back than on the lower, greyish-tan sides, with scales densely dotted with minute dark brown dots; many scales of the sides more or less strongly edged with very dark brown; a pale yellowish-tan vertebral stripe, as wide as the vertebral scale row, extends from the occipital marking up to the tip of the tail; 13 butterfly-shaped vertebral blotches straddling and interrupting the vertebral stripe, maroon and narrowly edged with blackish-brown, about 1–2 scales long on the vertebral line, 2–3 scales long at their longest part on each side, and a total of 7 dorsal scales wide, thus reaching the 5th dorsal scale row on each side at midbody; 3 irregular, oblique faint bands made up by wider and stronger dark anterior edge of scales between each vertebral blotch, forming a zigzag on the side; on each side, a small, irregular dark brown blotch under the tip of each dorsal blotch on the 4th DSR. The dorsal surface of the tail is as the upper body surface, with the vertebral stripe and 4 butterfly-shaped dorsal blotches, but without distinct faint bands although many scales are very narrowly edged with black.

The head is dark greyish-brown, slightly darker than body, with numerous minute scattered dark dots; side of the snout lighter; SL 1–3 pale greyish-yellow on lower half, strongly powdered with dark brown on upper part; a conspicuous darker maroon transverse marking on the snout, in front of eyes, not reaching internasals, extending downwards and backwards across the eye then downwards to produce a short, dark, conspicuous oblique streak on SL 5 (top) and SL 6; SL 7–8 pale yellow on lower half, dotted with brown on upper part; an irregular, oblique and diffuse dark brown streak from posterior temporals to corner of the mouth; a large, conspicuous arrow-shaped cephalic marking, dark maroon, narrowly edged with blackish-brown, apex pointing forward and reaching the middle of the frontal, backwards obliquely across the neck, nearly reaching each tip of the 7th VEN; infralabials, chin and throat uniformly pale yellowish-cream.

FIGURE 1. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. General view from above. Photograph by Patrick David.

FIGURE 2. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. General oblique view. Photograph by Patrick David.

FIGURE 3. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. Dorsal view at midbody. Photograph by Patrick David.

FIGURE 4. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. Head, left side. Photograph by Patrick David.

Venter pale yellowish-cream, most ventrals with a small brown blotch near both tips, small, dot-shaped or even often absent in the anterior half of body, then progressively larger, subrectangular and more conspicuous in posterior half; tail uniformly yellowish-cream below.

Variation (Figs. 8–10). Major characters of the three available specimens are summarized in Table 1. All other main morphological characters of the paratypes agree with those described for the holotype and are not repeated here. In contrast to the holotype, they have only 10 maxillary teeth (7 + 3 enlarged). Maximal TL: 676 mm (MNHN 1974.1272, female); snout 1.7–1.8 times as long as diameter of eye; frontal 1.2–1.3 times as long as wide. MNHN 1877.0050 has 18 dorsal scale rows at midbody, the first scale row reduction occurring at exactly VEN/2. Full complement of head scales with, in all specimens: 8/8 SL, 1/1 presubocular and 2/2 anterior temporals, followed by 2 or 3 posterior temporals, and 9/9 IL.

FIGURE 5. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. Head, right side. Photograph by Patrick David.

TABLE 1. Main morphological data of *Oligodon saintgironsi* **spec. nov.** Abbreviations are explained in the Material & Methods, plus: 1st red = position (given as number of ventral scale) of the first dorsal scale row reduction.

Number	Sex	Dorsal colour	Dorsal and tail patterns	Ventral pattern	SVL (mm)	TaL (mm)	Ratio TaL/TL	VEN	SC	1st red.	DSR
MNHN 1974.1264	♂	Ochre-tan	13 + 4 blotches	Uniform	435	103	0.191	170	59	62	19–17–15
MNHN 1877.0050	♂	Ochre	10 + 2 blotches	Small spots	425	108	0.203	166	55	83	19–18–15
MNHN 1974.1272	♀	Ochre brown	12 + 3 blotches	Uniform	567	109	0.161	184	53	84	19–17–15

The colour and pattern of the paratypes are similar to that of the holotype, but the vertebral stripe is very faint in MNHN 1974.1272, which also has a darker background colour, more reddish-ochre than yellowish-ochre. The blotches below the lower tips of dorsal blotches are quite variable, reduced to an irregular faint zigzag in MNHN 1877.0050 or producing extensive extensions below the main blotch in MNHN 1974.1272. This latter specimen also has a venter with one row of large, subrectangular blotches on tips of ventrals, making the venter nearly dark posteriorly.

Hemipenes (based on MNHN 1974.1264 and MNHN 1877.0050). —In situ (Figs. 7, 10), each organ is very long and thin, reaching SC 27 or 28 and bifurcating opposite SC 5. Entirely smooth with large calyces throughout, smaller on the third proximal part, larger and scalloped on the distal part. The sulcus is not prominent but is visible up to the tip of each branch of the organ.

FIGURE 6. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. Ventral view. Photograph by Patrick David.

FIGURE 7. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1264. Holotype. Close-up view of the hemipenes. Photograph by Patrick David.

FIGURE 8. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1974.1272. Paratype. General view. Photograph by Patrick David.

Distribution (Fig. 11). **Vietnam**. Currently known only from the south of the country: Dong Nai Province: Bien Hoa. District of Ho Chi Minh City. Ho Chi Minh City. **Cambodia**. No precise locality.

Oligodon saintgironsi **spec. nov.** occurs in sympatry with *O. ocellatus*. Both species are quite similar in pattern. Because the latter species has been considered valid only quite recently (Saint Girons, 1972), we provide a summary of its taxonomy and variation.

Oligodon ocellatus **(Morice, 1875)**

(Figs. 12–16)

Simotes brevicauda Steindachner, 1867: 61. **Type locality**. "Cochinchina".**Holotype**. NMW 16530 (female). Collected by M. Verreaux, 1865. **Status.** Name preoccupied in the genus *Oligodon* by *Oligodon brevicauda* Günther, 1862 (a valid taxon from India).

Simotes ocellatus Morice, 1875a: 61 [Morice, 1875b: 57]. **Type locality**. "Tay-ninh, Cochinchine Française", now Tay Ninh, Tay Ninh Province, southern Vietnam, 11°18'N 106°06'E. **Syntypes**. MHL 42000347 (formerly MHL 1571; male), MHL 42000354 (1) (formerly MHL 1569a; male), MHL 42000354 (2) (formerly MHL 1569b; female), MHL 42000359 (formerly MHL 1572; female).

Oligodon analepticos Campden-Main, 1970a: 763. Replacement name for *Simotes brevicauda* Steindachner, 1867. Synonymized with *Oligodon ocellatus* (Morice, 1875) by Saint Girons (1972: 63).

FIGURE 9. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1877.0050. Paratype. General view. Photograph by Patrick David.

FIGURE 10. *Oligodon saintgironsi* **spec. nov.** Specimen MNHN 1877.0050. Paratype. Close-up view of the tail. Note the long and thick tail. Photograph by Patrick David.

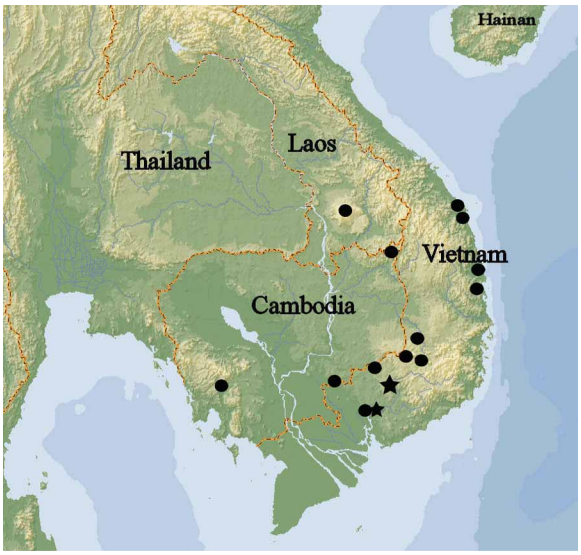

FIGURE 11. Ranges of *Oligodon saintgironsi* **spec. nov.** (stars), and *Oligodon ocellatus* (circles). *Oligodon saintgironsi* is known also from an unspecified locality in Cambodia.

Taxonomic comments. Morice (1875a: 61; 1875b: 57) described this species in naming it as follows: "Simotes ocellé, *Simotes ocellatus* ou plutôt *binotatus*" (Ocellated Simotes, *Simotes ocellatus* or rather *binotatus*). This dual name has never been discussed in the literature because the description of *Simotes ocellatus* remained overlooked until Saint Girons (1972), who did not mention this problem but implicitly selected *Simotes ocellatus*. Anyway, *Simotes binotatus* Morice, 1875 is a junior primary homonym of *Simotes binotatus* Duméril, Bibron & Duméril, 1854, a subjective junior synonym of *Xenodon venustus* Jerdon, 1853, now *Oligodon venustus*, a valid species of southwestern India.

We have examined the holotype of *Simotes brevicauda* Steindachner, 1867 (nec *Oligodon brevicauda* Günther, 1862), NMW 16530 (Figs. 12–14) and refer it without ambiguity to *Oligodon ocellatus*. As a consequence, *Oligodon analepticos* Campden-Main, 1970, a replacement name for *Simotes brevicauda* Steindachner, 1867, is also considered by us to be a synonym of *O. ocellatus* (Morice, 1875). This species has 19 dorsal scale rows at midbody in all known specimens. It was not recognized as a valid taxon, distinct from *Oligodon cyclurus*, until Campden-Main (1970a). This confusion explains the numerous mentions of *Oligodon cyclurus* or *Oligodon purpurascens* (Schlegel, 1837) from Indochina (for example in Bourret, 1936 and Deuve, 1970), both species having 19 dorsal scale rows at midbody. *Oligodon cyclurus*, as now defined, does not occur east of a line extending from southern Yunnan to Western Thailand, whereas *Oligodon purpurascens* is unknown north of southern Thailand. A chresonymy is beyond the scope of the present paper but *O. cyclurus* was mentioned from Vietnam as recently as in Nguyên *et al.* (2005).

Diagnosis. A species of the genus *Oligodon cyclurus*-group, characterized by (1) long and deeply forked hemipenes, reaching 15th–17th SC, thin, smooth and not spinose throughout; (2) 19–19–15 (rarely 13) dorsal scale rows; (3) reductions between 19 and 17 rows occurring between VEN 79–107 (mean 90.3); (4) a very short tail, TaL/TL 0.097–0.141; (5) 9–11 maxillary teeth, the last two or three strongly enlarged; (6) anal plate single; (6) head scalation complete, including a presubocular; (7) 8 (rarely 7) supralabials; (9) 2 anterior temporals; and (10) a typically blotched dorsal pattern, with large blotches in most specimens, or sometimes merely a reticulated pattern with very faint blotches.

Variation (based on Wagner [1975] and 24 examined specimens). – Body robust but elongate; head short, thick, barely distinct from the poorly defined neck; snout elongate (24.5–31.5 % of HL, or 1.85–2.0 times as long as diameter of eye); pupil round; tail robust, tapering. Dentition. 9–11 maxillary teeth, the last 2 or 3 strongly enlarged and blade-shaped. Maximal TL 852 mm (SVL 757 mm; TaL 95 mm; MHL 42006419) for a

male. The longest known female is 618 mm (SVL 550 mm, TaL 68 mm long; MNHN 1939.0002). Ratio TaL/TL: 0.097–0.141, with a weak sexual dimorphism (see below).

FIGURE 12. *Oligodon ocellatus*. Specimen NMW 16530 (holotype of *Simotes brevicauda* Steindachner, 1867). General view. Photograph by Gernot Vogel.

Body scalation: DSR: 19–19–15(13); scales small, all smooth, ovoid.

Scale row reductions: first reduction (19?17) at VEN 79–107; second reduction (17?15) at VEN 97–115. According to Wagner (1975), a third reduction (15?13), not encountered by us, may occur between VEN 140–150. VEN: 157–180 (plus 2 preventrals), angulated; SC: 26–44, all paired; anal plate entire. Note: Wagner (1975) mentioned a maximum of 180 ventrals, a value much higher than our counts for 24 specimens; however Stuart *et al.* (2006) recorded a female from Cambodia with 173 VEN.

Head scalation: Rostral thick, curved onto upper snout surface, well visible from above, separating internasals by about half of their length; nasals subrectangular, about 1.8 times as long as high, vertically divided, with the posterior part distinctly smaller; nostril crescentic, piercing middle of nasal; internasals subrectangular, in broad contact, shorter than prefrontals; prefrontals subrectangular, distinctly wider than long; frontal hexagonal, 1.2 times as long as wide; 1/1 supraoculars, distinctly longer than wide, about as wide as prefrontals; two large, subtriangular parietals, much longer than frontal, in broad contact; 1/1 small, elongate loreal scales, in contact with nasal; 8 (rarely 7 or 9) supralabials, 1st SL small, 2nd and 3rd in contact with loreal, usually 4th and 5th entering orbit, 6th and 7th largest; 1/1 preoculars, tall and narrow; 1/1 small presuboculars; 2/2 postoculars; 2+2 / 2+2 temporals, anterior ones elongated; 8 or 9 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 5th largest.

Coloration and pattern in alcohol. The upper surface is yellow ochre, beige brown, brownish-ochre or dark yellowish brown, with many scales distinctly edged with very dark brown-grey producing usually strong, irregular, dark bands; this pattern is met in 14 of our 26 specimens; in three of them, the dark bands are so strong that they could be considered to be narrow blotches; in the 12 other specimens, the dorsal pattern com-

prises 11–14 rhomboid vertebral blotches, sometimes constricted in their middle, yellowish-brown, greyish-brown, 3 scales long at their longest part on the vertebral row, and a total of 7 dorsal scale wide; in this second pattern, 3 strong, irregular, oblique bands formed by wider and stronger dark anterior edge of scales between each vertebral blotch, forming a zigzag on the side; on each side, a small, irregular dark brown blotch dark brown below the tip of each dorsal blotch on the 4th and 5th DSR, more or less distinct and large, connected or not to the dorsal blotch. The dorsal surface of the tail is as the upper body surface, with the vertebral stripe and 2–3 dorsal blotches, with or without distinct fasciatures although many scales are very narrowly edged with black.

FIGURE 13. *Oligodon ocellatus*. Specimen NMW 16530 (holotype of *Simotes brevicauda* Steindachner, 1867). Head, left side. Photograph by Gernot Vogel.

The head is dark ochre-brown or dark greyish-brown, darker than body, with numerous minute scattered dark dots; side of snout paler; supralabials pale greyish-yellow on lower half, strongly powdered with dark brown on upper part; a more or less distinct, large darker maroon transverse marking on snout, in front of eyes, not reaching internasals, extending downwards and backwards across the eye then downwards, to produce a short, dark, conspicuous oblique streak on SL 5 (top) and SL 6; SL 7–8 pale yellow on lower half, dotted with brown on upper part; an oblique and diffuse dark brown streak from posterior temporals to corner of mouth; a large, conspicuous arrow-shaped cephalic marking, dark maroon, narrowly edged with blackish-brown, the apex pointing forward and reaching the middle of the frontal, backwards oblique across the neck, nearly reaching each tip of the 6th or 7th VEN; infralabials, chin and throat uniformly cream, yellowish-tan or pale yellowish-brown. The venter is pale yellowish-cream or pale yellowish-ochre, usually entirely uniform. Tail uniformly yellowish-cream below.

Hemipenes. In situ, each organ is long and thin, reaching SC 15–17 and bifurcating opposite SC 4 or 5, entirely smooth, proximal third covered with oblique flounces, distal part covered with small calyces, scalloped proximally, smooth distally; sulcus spermaticus reaching the tip of each branch.

FIGURE 14. *Oligodon ocellatus*. Top: specimen NMW 16530 (holotype of *Simotes brevicauda* Steindachner, 1867). Middle: NMW 19166-1. Bottom: left NMW 19166-3; right NMW 19166-2. Photograph by Gernot Vogel.

FIGURE 15. *Oligodon ocellatus*. Specimen MNHN 1939.0002. General view. Photograph by Patrick David.

FIGURE 16. *Oligodon ocellatus*. Specimen MNHN 1897.0423. General view. Photograph by Patrick David.

Sexual dimorphism. It is weakly present in (1) the ratio TaL/TL (based on our material): males: 0.111–0.141 (x = 0.124, s = 0.012); females: 0.094–0.122 (x = 0.111, s = 0.008); (2) the number of subcaudals (based on Wagner [1975] and our material): males: 32–44 (x = 35.9, s = 3.6); females: 26–33 (x = 30.2, s = 2.1).

Distribution (Fig. 11). **Vietnam**. South (Nguyên *et al.*, 2005; examined specimens): Quang Nam-Danang Province: Chu Lai, Nui Quieu, Phùc Son. Binh Dinh Province: Bông Son (or Hoai Nhon). Lam Dong Province: Bao Loc; Fyan (or Ngoc Son). Phu Yen Province: Tuy Hoa. Dac Lac Province: M'Drak District. Dong Nai Province: near Phuong Lam. Tay Ninh Province: Tay Ninh. **Cambodia**. Koh Song Province: Kirirom (Saint Girons, 1972). Ratanakiri Province: Taveng (Stuart *et al.*, 2006). **Laos**. Champasak Province: Xépian National Biodiversity Conservation Area (Teynié *et al.*, 2004).

Discussion

Comparisons with other species. In the *Oligodon cyclurus*-group, namely those species of the Indochinese Region with deeply forked hemipenes, *Oligodon saintgironsi* **spec. nov.** differs from all other species by the characters summarized in Table 2.

Oligodon chinensis is the sole species of the *Oligodon cyclurus*-group that shares 17 MSR with *O. saintgironsi* **spec. nov.** In contrast, this value is typical of members of the *Oligodon cinereus*-group (Smith, 1943; Wagner, 1975, 1976), members of which differ from both species of the *O. cyclurus*-group with 17 MSR in (1) a different hemipenial morphology; with short, barely forked and papillate hemipenes, (2) an uniform pattern, reticulate or made of dark crossbars, (3) a shorter tail, with a ratio TaL/TL usually < 0.15 with the exception of *O. macrurus* (Angel, 1927), in which the tail is even longer than in *O. saintgironsi*.

Most species of the *O. taeniatus*-group have 17 MSR. They differ from *O. saintgironsi* spec. nov in (1) short, papillate hemipenes and (2) usually a striped pattern (see David *et al.*, 2008). Within the *O. taeniatus*-group, *Oligodon barroni* is blotched but has a dorsal scale row formula of 17–17–15 rows and at most 160 VEN.

There are other *Oligodon* species having 17 MSR but none occurs in Indochina; all of them differ from *O. saintgironsi* **spec. nov.** in their hemipenial morphology, colouration pattern, and other characters summarized by Smith (1943).

TABLE 2. Summary of main morphological characters in the *Oligodon cyclurus* group. Abbreviations: see Material & Methods. Values of rare occurrence are placed within brackets. Sources: Smith (1943), Wagner (1975), Zhao (2006) and our own data based on examined specimens (see Appendix).

Characters	*Oligodon*					
	cyclurus	*fasciolatus*	*ocellatus*	*saintgironsi*	*chinensis*	*formosanus*
TL max (mm)	710	807	852	676	729	942
TaL / SVL ♂	0.127–0.156	0.155–0.216	0.112–0.141	0.191–0.203	0.187–0.195	0.165–0.195
TaL / SVL ♀	0.107–0.138	0.116–0.158	0.094–0.114	0.161	0.152–0.158	0.149–0.164
ASR	19	21–23	19	19	17	19
MSR	19	21	19	17–18	17	19
PSR	17–15	17	(13)15	15	15	(15) 17
1st reduction (VEN)	82–115	74–112	79–107	62–86	116–148	94–114
2nd reduction (VEN)	118–174	101–137	97–115	125–127	----	164
VEN ♂	160–173	160–186	156–165	166–170	175–184	155–176
VEN ♀	168–172	163–196	152–180 (1)	184	182–206	164–189
SC ♂	37–48	43–61	32–44	55–59	60–64	49–55
SC ♀	30–44	34–48	26–33	53	47–53	43–48
SL	(7) 8	8	(7) 8	8	8	(6) 7–8
SL-Eye	4+5	4+5	4+5	4+5	4+5	3+4 / 4+5
PreSubOc	0–1	(0) 1	(0) 1	1	0 (1)	(0) 1
IL	8	8	9–10	9	(8) 9	9
Dorsal pattern	Reticulate or narrow blotches	Reticulate or large blotches	Reticulate or large blotches	Blotched	Blotched	Reticulate
Vertebral stripe	None	None	None	Narrow	None	Broad
Length of hemipenes (SC)	15–18	14–21	15–17	27–28	12–13	15–18

Key to the *Oligodon cyclurus*-group

We include in this key all known members of the *Oligodon cyclurus*-group. This group of *Oligodon* is mainly characterized by long and deeply forked hemipenes, neither spinose or papillate, 17–23 dorsal scale rows, 10–12 maxillary teeth, a full complement of head scales, including a loreal and a presubocular, anal plate entire; and a body usually blotched or reticulated pattern, never prominently striped. We also include in the key the Indo-Malayan species *Oligodon purpurascens*, as currently defined (Tweedie, 1983). This latter species has often been confused with members of the *O. cyclurus*-group.

1. 21 or 23 DSR at neck and midbody ..... *Oligodon fasciolatus*
- No more than 19 rows at midbody 2
2. 19 DSR at neck and midbody 3
- 17 or 19 rows at neck, no more than 18 DSR at midbody 6

3. Overall body colour grey or greyish-brown; dorsal pattern reticulated with a broad vertebral stripe .... *Oligodon formosanus*
- Overall body colour shades of ochre or brown; dorsal pattern usually blotched; vertebral stripe reduced to a narrow line or absent 4
4. Hemipenes long, thin, strongly forked and calyculate; unknown south of central Thailand; pattern made either of dorsal blotches broad and long (3 dorsal scales long) or strongly reticulate with fasciatures 5
- Hemipenes long, single, with large papilla; unknown north of southern peninsular Thailand; dorsal blotches narrow (1 or 2 dorsal scales long) ..... *Oligodon purpurascens*
5. Dorsal scale row reduction from 17 to 15 posterior to VEN 115; dorsal blotches, when present, rather narrow and dark brown or black; northeastern India, Myanmar, Yunnan, and extreme western Thailand .... *Oligodon cyclurus*
- Dorsal scale row reduction from 17 to 15 DSR at most at VEN 115; dorsal blotches, when present, rather long and broad, with a lighter centre; southern Vietnam, southern Laos and Cambodia .... *Oligodon ocellatus*
6. 17 DSR at neck; hemipenes extend to SC 13 ..... *Oligodon chinensis*
- 19 DSR at neck; hemipenes extend to SC 28 ..... *Oligodon saintgironsi* **spec. nov.**

This paper is a small step towards a complete resolution of the taxonomy of *Oligodon cyclurus*-group. A thorough examination of the material might reveal additional species in this group. The discovery of the present new species on the basis of three long preserved specimens reveals both the poor knowledge of the species diversity in the genus *Oligodon* and in the Vietnamese snake fauna as a whole. Additional specimens of *O. saintgironsi* **spec. nov.** should be sought in collections among Vietnamese specimens identified as *O. cyclurus* or O. *purpurascens*. Newly collected specimens are also necessary. The taxonomy of this group is also far from being fully resolved. The examination of a moderate number of *O. fasciolatus* suggests some differences in scalation between blotched (*O. cyclurus smithi* sensu Taylor, 1965) and plain or reticulated specimens (*O. cyclurus multifasciatus*), especially in the numbers of ventral and subcaudal scales.

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References

Boulenger, G.A. (1894) *Catalogue of the Snakes in the British Museum (Natural History). Volume II., containing the conclusion of the Colubridae Aglypha*e, British Museum (Natural History), London, xi + 382 pp, Pls. 1–20.

Bourret, R. (1936) *Les Serpents de l'Indochine. Tome II. Catalogue systématique descriptif*. Henri Basuyau et Cie, Tou-

louse, 505 pp.
Campden-Main, S.M. (1970a) The identity of *Oligodon cyclurus* (Cantor, 1839) and revalidation of *Oligodon brevicauda* (Steindachner, 1867) (Serpentes: Colubridae). *Proceedings of the Biological Society of Washington*, 82 (58), 763–766.
Campden-Main, S.M. (1970b) A field guide to the snakes of South Vietnam. Smithsonian Institution, Washington, v + 112, 1 plate.
Cantor, T. (1839) Spicilegium Serpentium Indicorum. B. Innocuous Serpents. *Proceedings of the Zoological Society*, 1839 (75), 49–55.
Clary, J., Ineich, I., Martelli, J.-L. & H.M. Smith (2001) Catalogue des collections de Reptiles du Muséum d'Histoire naturelle de Lyon. Deuxième note: Colubridae et Atractaspididae. *Cahiers scientifiques*, Lyon, 2002 (2), 5–61.
Das, I. (2004) On neotype designations for *Coronella cyclura* Cantor, 1839 (Serpentes: Colubridae). *Hamadryad*, 29 (1): 133–134.
David, P., Vogel, G. & van Rooijen, J. (2008) A revision of the *Oligodon taeniatus* (Günther, 1861) (Squamata: Colubridae) group, with the description of three new species from the Indochinese Region. *Zootaxa*, in press.
Deuve, J. (1970) Serpents du Laos. *Mémoires de l'ORSTOM*, Paris, 39, 1–251.
Dowling, H.G. (1951) A proposed standard system of counting ventrals in snakes. *British Journal of Herpetology*, 1 (5), 97–99.
Morice, A. (1875a) Coup d'oeil sur la faune de la Cochinchine française. *Archives de Médecine navale*, 24, 5–101.
Morice, A. (1875b) *Coup d'oeil sur la faune de la Cochinchine française*, H. Georg, Lyon, 101 pp.
Nguyên V.S., Hô, T.C. & Nguyên, Q.T. (2005) *Danh luc ech nhái và bò sát Viêt Nam. A checklist of Amphibians and Reptiles of Vietnam*, Nhà Xuat ban Nông Nghiêp, Hanoi, 180 pp. (In Vietnamese).
Saint Girons, H. (1972) Les serpents du Cambodge. *Mémoires du Muséum National d'Histoire Naturelle*, Paris, (Nouvelle série), (Série A, Zool.), 74, 1–170, Pls. 1–42.
Smith, M.A. (1943) *The Fauna of British India, Ceylon and Burma, including the whole of the Indo-chinese subregion. Reptilia and Amphibia. Vol. III, Serpentes*, Taylor & Francis, London, xii + 583 pp.
Steindachner, F. (1867) *Reise der Österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859, unter dem Befehln des Commodore B. von Wüllerstorf-Urbair. Zoologischer Theil. Erster Band (Wirbelthiere). Reptilien.* Wien, Kaiser-König. Hof-u. Staatsdrückerei: 1–98, Pls. 1–3.
Stuart, B.L., Ko, S. & Thy, N. (2006) A collection of Amphibians and Reptiles from hilly eastern Cambodia. *The Raffles Bulletin of Zoology*, 54 (1), 129–155.
Taylor, E.H. (1965) The serpents of Thailand and adjacent waters. *University of Kansas Science Bulletin*, 45 (9), 609–1096.
Teynié, A., David, P., Olher, A. & Luanglath, K. (2004) Notes on a collection of Amphibians and Reptiles from southern Laos, with a discussion of the occurrence of Indo-Malayan species. *Hamadryad*, 29 (1), 33–62.
Tweedie, M.W.F. (1983) *The snakes of Malaya*, Third edition, Singapore National Printers, Singapore, 167 pp., Pls. 1–12.
Uetz, P. & Hallermann, P. (2008) The TIGR Reptile Database. Available from http://www.reptile-database.org (accessed on August 10th, 2008).
Wagner, F.W. (1975) A revision of the Asian colubrid snakes *Oligodon cinereus* (Günther), *Oligodon joynsoni* (Smith), and *Oligodon cyclurus* (Cantor). Unpublished MS thesis, Baton Rouge, Louisiana State University, 1–97.
Wagner, F.W. (1976) *A reassessment of infrageneric groupings and relationships of the Asian Colubrid snake genus* Oligodon, Seminar 511, Louisiana State University, Baton Rouge, 37 pp.
Wall, F. (1923) A review of the Indian species of the genus *Oligodon* suppressing the genus *Simotes* (Ophidia). *Records of the Indian Museum*, 25 (3), 305–334.
Zhao, E. (2006) *Zhongguo Shelei* [Snakes of China], Anhui Science and Technology Publishing House Publ., Hefei (Anhui Province), Vol. I, 372 pp; Vol. II, 279 pp.

Appendix. Specimens examined

Oligodon chinensis (N = 13). **Vietnam**. Cao Bang Province. MNHN 1896.0042, Cao Bang; MNHN 1935.0420, MNHN 1938.0139, "Ngan-Son, Tonkin", now Ngan Son. Bac Kan Province. IEBR A0707a–b, Ba Bê National Park, Ba Bê; MNHN 1928.0014, "Bac Kan (Tonkin)", now Bac Can. Lang Son Province. MNHN 1896.0041, Lang Son. Quang Ninh Province. MNHN 1911.0043, "Pointe-Pagode, Tonkin", a small cape south of Tien Yen. Vinh Phú Province. MNHN 1935.0008, "Tam Dao, Tonkin", now Tam Dao Hill Station. - **People's Republic of China**. MNHN 7453, MNHN 1999.7952-53, "Kiangsi Oriental", now Jiangxi Province; PSGV 491, Fujian Province.

Oligodon cyclurus (N = 2). **Myanmar**. MNHN 4241, "Birmanie"; MNHN 1893.0389, Bhamo, Kachin State.

Oligodon fasciolatus (N = 29). **Cambodia**. MNHN 1896.0419, "Cambodge", no locality. - **Laos**. MNHN 1884.0561,

Luang Prabang; MNHN 1896.0631-0632, “Laos”, no locality; MNHN 1962.0277, “Seno, 30 km E de Savanakhet”, now Ban Xénô, just east of Uthompho, Savannakhet Province; MNHN 1985.0411, 4 km West of Vientiane. - **Myanmar**. BMNH 1908.6.23.46, “Burma”. - **Thailand**. CAS 111327, yard at 14 km of Soi Prachankadee II, ca 19°33'N, 100°39'E, Bangkapi District of Greater Bangkok, Samut Prakan Province; MNHN 0925, “Siam”; MNHN 1884.0537, “Kemarat, Laos”, now Khemarat (or Khemmarat), Ubon Ratchathani Province; MNHN 1998.0530, Ban Khao Kling, Kaeng Krachan District, Phetchaburi Province. - **Vietnam**. BMNH 1938.8.7.30, “Dalat, Doan, Annam”, now near Dalat, Lam Dong Province; BMNH 1938.8.7.31, “Pulo Condor”, now Con Dao Island; MHL 42000346, MHL 42006347, MHL 42006317, MHL 42006361, “Cochinchine”, now Southern Vietnam; MHL 42000355, “Chau Doc, Cochinchine”, now Châu Doc, An Giang Province; MHL 42000358, “Poulo Condor, Basse Cochinchine”, now Con Dao Island; MHL 42002087-2088, “Saïgon, Cochinchine”, now Ho Chi Minh City; MNHN 1419, MNHN 1999.9093-94, “Cochinchine”, now Southern Vietnam; MNHN 5451, “Poulo Condor”, now Con Dao Island; MNHN 1896.0064, “Tonkin”; MNHN 1896.0636, “Saïgon”, now Ho Chi Minh City; MNHN 1922.0283, “Dông-Trang: 12 à 15 km à l’ouest de Nha Trang”, now Dong Trang, near Nha Trang, Khánh Hoa Province; MNHN 1974.1262, “Province de Ha Tinh (Annam)”, Ha Tinh Province; MNHN 1974-1263, “Institut de Recherches agronomiques, Saïgon”, now in Ho Chi Minh City.

Oligodon formosanus (N = 17). **People’s Republic of China**. Guangdong Province. MNHN 5235, “Canton (Chine)”, now Guangzhou. Guangxi Zhuang Province. MNHN 1902.0068, “Lungchow, Kouang-Si (Chine méridionale)”, now Longzhou, Longzhou District. Zhejiang Province. PSGV S0020. No precise locality. MNHN 7454, MNHN 1874.0046, “Chine”. - **Vietnam**. Ha Giang Province. AMNH 15290, Khau Ria, Du Gia, Yen Minh. Cao Bang Province. MNHN 1900.0329, Cao Bang; MNHN 1904.0397, “Bao Lac, Haut Tonkin”, now Bao Lac. Vinh Phú Province. MNHN 1908.0204, “Environs de La-Pho: alt. 150 à 200 m”, now La Phù. Thanh Hoa Province. MNHN 1911.0044, “Trieu-Yen, Tonkin”, now Thieu Yen. No precise locality. MNHN 1890.0407, MNHN 1890.0407A, MNHN 1890.0408, MNHN 1890.0408A-0408B, MNHN 1950.0431-0432, “Tonkin”, now North Vietnam.

Oligodon ocellatus (N = 24). **Vietnam**. Binh Dinh Province. USNM 164373, Landing Zone Sandra, 35 miles NE Bông Son, 1 mile E of An Lao Valley, 2300 ft. Dong Nai Province. USNM 90409, USNM 95080, “station agricole de Blao, Prov. Haut Donaï, 800 m. alt, Annam”, now Blao exploitation, near Phuong Lam. Lam Dong Province. USNM 146178-79, “Fyan, Vietnam”, now Fyan or Ngoc Son. Quang Nam-Danang Province. MNHN 1897.0423, Nui Quieu; NMW 19167-1, NMW 19167-2, Phùc Son; USNM 163859, near Chu Lai. Tay Ninh Province. MHL 42000347 (formerly MHL 1571; syntype), MHL 42000354/1-2 (formerly MHL 1569a-b; 2 syntypes), MHL 42000359 (formerly MHL 1572; syntype), “Tay Ninh, Cochinchine”, now Tay Ninh. No precise locality. MHL 42006419, MNHN 1910.0016, MNHN 1999.8095 (ex MNHN 1910.16A), “Cochinchine”, now Southern Vietnam; MNHN 1910.0017, MNHN 1939.0002, “Indochine”, no locality; NMW 16530 (holotype of *Simotes brevicauda* Steindachner, 1867), “Cochinchina”, now southern Vietnam; NMW 19166-1 - NMW 19166-4, “Annam”, now central Vietnam. - **Laos**. MNHN 2003.3343, Xepian National Biodiversity Conservation Area, Champasak Province.

Note. The correspondence between current and former MHL numbers was established by Clary *et al.* (2001).