



A revision of the *Oligodon taeniatus* (Günther, 1861) group (Squamata: Colubridae), with the description of three new species from the Indochinese Region

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Abstract

The group of Asian colubrid species morphologically similar to *Oligodon taeniatus* (Günther, 1861), previously containing only *O. taeniatus*, *Oligodon mouhoti* (Günther, 1864) and *Oligodon barroni* (Smith, 1916), is revised on the basis of variation in external morphology and dentition of 175 specimens. The confused nomenclatural history of *O. taeniatus* and its name bearing type is discussed. A neotype is described for *Simotes quadrilineatus* Jan & Sordelli, 1865, a synonym of *O. taeniatus*. The holotype of *Simotes taeniatus* var. *mouhoti* Boulenger, 1914 is identified. Three new species within this group are described. *Oligodon pseudotaeniatus* **spec. nov.** is described on the basis of specimens from central Thailand. This species is morphologically similar to *Oligodon taeniatus*, but differs by the combination of 17 dorsal scale rows at midbody, 8 supralabials, the absence of dark dorsal and tail blotches and the presence of a vertebral stripe edged with black but no dorsolateral stripes. *Oligodon devei* **spec. nov.** is described on the basis of specimens from southern Vietnam and Laos; it differs from other known species of the group by the combination of 12–15 maxillary teeth, 17 dorsal scale rows at midbody, usually seven supralabials, the absence of dark dorsal and tail blotches and the presence of a broad vertebral stripe, often conspicuously orange or rusty red. This species is most similar to *Oligodon barroni* but differs from the latter by a higher number of maxillary teeth and the absence of dark dorsal and tail blotches. Lastly, *Oligodon moricei* **spec. nov.** is described on the basis of a single specimen from southern Vietnam. It differs from other species by the combination of a broad rusty brown vertebral stripe edged with two broad black stripes, 12 maxillary teeth, 17 dorsal scale rows, a high number of ventral scales, seven supralabials and a dark cloudy or smoky venter. These new species are compared with other species known from the Indo-Chinese Region. The diagnoses of *O. taeniatus*, *O. mouhoti* and *O. barroni* are revised. A key to members of the group is given.

Key words: *Oligodon*, *Oligodon barroni*, *Oligodon devei* **spec. nov.**, *Oligodon moricei* **spec. nov.**, *Oligodon mouhoti*, *Oligodon pseudotaeniatus* **spec. nov.**, *Oligodon taeniatus*, Neotype, Taxonomy, Cambodia, Laos, Thailand, Vietnam

Introduction

The colubrid genus *Oligodon* Boie, 1827 (type species: *Oligodon bitorquatus* Boie in Boie, 1827, by monotypy) is widely represented in central and tropical Asia, eastwards as far as eastern Indonesia. As of 1 November, 2007, the genus includes 68 recognized species (The TIGR Reptile Database: <http://www.reptile-database.org>). The taxonomy of this genus is intricate and sorely needs revision. Several species have a limited range and are distinguished from others by a combination of subtle differences in morphological characters, making this genus taxonomically challenging. Nevertheless, Smith (1943) and Wagner (1975, 1976) recognized informal groups within the genus, based largely on hemipenial morphology.

One of these groups constitutes what both Smith (1943) and Wagner (1976) recognized as the “*Oligodon taeniatus*-group”, which includes *O. taeniatus* (Günther, 1861), *Oligodon mouhoti* (Günther, 1864), and *Oligodon barroni* (Smith, 1916). This group is mainly characterized by (1) deeply forked hemipenes with two large papillae (see Smith, 1943: 209), (2) 17 or 19 dorsal scale rows, (3) 10–18 maxillary teeth, a rather high number in the genus *Oligodon*, (4) a complete head scalation complement, including a loreal and sometimes a presubocular, (5) an entire anal plate; and (6) a striped dorsal pattern, with the presence of one vertebral stripe and, on each side, of one or two dark dorsal stripes. These species are currently known from Thailand (mostly north of the Peninsula), Cambodia, Laos and Vietnam. These small snakes are usually below 450 mm in total length.

There has been a large amount of confusion in the literature centered on these three morphologically similar taxa. The confusion arose from a mistake made by Günther (1864) on the number of dorsal scale rows of the type of his *Simotes taeniatus* Günther, 1861, erroneously corrected to 17 rows, whereas the holotype had indeed 19 scale rows as written by Günther (1861). Accepting this unfortunate correction, Jan & Sordelli (1865) named specimens with 19 rows as *Simotes quadrilineatus* Jan & Sordelli, 1865. This confusion led several authors, including Boulenger (1894) and Smith (1943), to use the specific nomen *taeniatus* for specimens with 17 dorsal scale rows, and *quadrilineatus* for those with 19 rows. In so doing, Smith (1943) erroneously regarded *Simotes taeniatus* var. *mouhoti* Boulenger, 1914 (now *Oligodon mouhoti*; 17 dorsal scale rows)

as a synonym of *Oligodon taeniatus* sensu Günther (1864). The matter was addressed by Campden-Main (1969), who revalidated the combinations *Oligodon taeniatus* (19 scale rows) and *Oligodon mouhoti* (17 rows). The validity of the third species of the group recognized by Smith (1943), *Oligodon barroni* Smith, 1916, has not been challenged in the literature.

Campden-Main (1969) published a short discussion of variation in *O. taeniatus* and *O. mouhoti*, with emphasis on the number of dorsal scale rows and on the dorsal colour pattern. However, he did not clarify all problems, as will be shown below. For example, Deuve (1970) recorded “*Oligodon taeniatus*” from Laos in mentioning specimens with 17 dorsal scale rows. This refers either to *Oligodon mouhoti* or *Oligodon barroni*, but definitely not to *O. taeniatus*. However, the unpublished notes of Deuve (1985) contain the description of eight specimens from the vicinity of Vientiane that he referred to as “*Oligodon taeniatus* var. *mouhoti*”, all of them with 17 scale rows at midbody. Nevertheless, none of these specimens agrees with *Oligodon mouhoti* as now conceived, or with *Oligodon barroni* (Smith, 1916), a species to which some of these Laotian specimens are close in their scalation characters but distinct in their uniform dorsal colour pattern (see Teynié et al., 2004; Teynié & David, 2007). In addition, several Vietnamese specimens in collections exhibit a bright, orange or reddish-brown vertebral stripe. None of them fits in scalation and colour pattern with the species as conceived by Smith (1943) or Campden-Main (1969). These discrepancies led us to investigate this group in more detail. We present here the results of a revision of the group based on morphological data.

Material and methods

This revision is based on a total of 175 preserved specimens, of which 170 were examined for external morphological characters and dentition, both regarded as taxonomically useful in the genus *Oligodon* by Wall (1923), Smith (1943) and especially Campden-Main (1969) and Wagner (1975). Data used for comparison originate from specimens that we examined ourselves (see under each species) and not from the literature, because of the uncertain identification of too many specimens. Unpublished notes of Deuve (1985) were however used, for which we retained data from five specimens.

A total of 49 morphological characters were recorded for each specimen. Not all variables listed in this table proved to be useful in univariate and multivariate analyses. Only 39 morphometrical and meristic characters were retained in our analyses, either standing on their own or derived from the raw characters. Others proved to be of no value for this group. Characters and their abbreviations are listed in Table 1.

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. The number of ventral scales was counted according to Dowling (1951). The terminal scute is not included in the number of subcaudals. The 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.

Analyses of morphological data. – We employed both univariate and multivariate analyses for our data. In our univariate analyses, morphometric variables were analysed using ratios. All ratios involving measures of any part of the head were considered only in adult specimens in order to cope with possible ontogenic variation. On the basis of mean values of total lengths observed in our sample, we arbitrarily fixed as 250 mm the lower size limit to regard examined specimens as adult.

Univariate analyses. The analyses of morphological data were based on comparisons of statistical values (mean value and standard deviation). A Mann-Whitney test (*U* test; Siegel, 1956) was applied when necessary. Abbreviations are: *n*: number of specimens. – *x*: mean value. – *s*: standard deviation. – *P*: probability of occurrence of a value as extreme as or more extreme than the observed value. – *U*: the Mann-Whitney test statistic.

TABLE 1. List of morphological characters used in this study and their abbreviation.

Number	Abbreviation	Characters
Morphometry		
1	SVL	Snout-vent length
2	TaL	Tail length
3	TL	Total length
4	HL	Head length (from the tip of rostral to posterior end of the jaw)
5	SnL	Snout length (from the tip of rostral to anterior eye margins)
6	ED	Eye diameter (horizontal)
7	SnL/ED	Ratio snout length / Eye diameter
8	L-Fro	Length of frontal scale
9	W-Fro	Width of frontal scale
10	TaL/TL	Ratio tail length / total length
11	HL/SVL	Ratio head length / snout-vent length
12	SnL/HL	Ratio snout length / head length
13	L-Fro/W-Fro	Ratio length of frontal / width of frontal
Anatomy		
14	TEETH	Number of maxillary teeth (on one side)
Scalation		
15	DSR	Dorsal scale rows
16	ASR	Dorsal scale rows at neck (at 10 th VEN)
17	MSR	Dorsal scale rows at midbody
18	VEN	Ventral plates
19	SC	Subcaudal plates
20	SL	Supralabial scales
21	ANA	Anal plate: 1: single - 2: divided
22	Lor-l	Number of loreal scale (0 or 1) on left
23	Lor-r	Number of loreal scale (0 or 1) on right
24	Lor-m	Mean number of loreals
25	SL-l	Number of supralabials on left
26	SL-r	Number of supralabials on right
27	SL-tot	Total number of supralabials
28	SL-lor-l	Position of SLs in contact with the loreal on left
29	SL-lor-r	Position of SLs in contact with the loreal on right
30	SL/Eye-l	Position of SLs entering orbit on left
31	SL/Eye-r	Position of SLs entering orbit on right
32	PreOc-l	Number of preoculars on left
33	PreOc-r	Number of preoculars on right
34	PreSubOc-l	Number of presuboculars on left
35	PreSubOc-r	Number of presuboculars on right
36	PostOc-l	Number of postoculars on left
37	PostOc-r	Number of postoculars on right
38	Atem-l	Number of anterior temporals on left

...continue

TABLE 1. (continued)

Number	Abbreviation	Characters
39	Atem-r	Number of anterior temporals on right
40	IL-l	Number of infralabials on left
41	IL-r	Number of infralabials on right
42	IL-tot	Total number of infralabials
43	IL/1st child	Position of ILs in contact with anterior chin shield
Pattern		
44	BODCOL	Body colour: 1 : grey; 2 : brown or ochre
45	BODBLOT	Dorsal blotches: 1 : small, irregular; 2 : large, saddle-like
46	TAILBLOT	Tail blotches: 0 : none; 1 : small blotches; 2 : two large blotches
47	NUCVEN	Contact of the nuchal collar with ventrals (at least on one side): 0 : no contact; 1 : in contact
48	VERTSTRIPE	Vertebral stripes: 0 : absent; 1 : narrow (lines); 2 : single broad stripe
49	LATERSTRIPE	Lateral stripe: 0 : absent; 1 : present

Multivariate analyses. – Before running multivariate analyses, morphometric variables were regressed to a common SVL using bivariate regression with SVL as independent (e.g. Thorpe 1975, 1983; How et al., 1996; Turan, 1999). This procedure was performed to correct for potential ontogenetic variation between the samples of the various species. The following allometric equation was used: $X_{adj} = X - \beta(SVL - SVL_{mean})$ where X_{adj} is the adjusted value of the morphometric variable, X is the original value, SVL is the snout-vent length, SVL_{mean} is the overall mean snout-vent length and β is the coefficient of the linear regression of X against SVL . In the case of sexually dimorphic morphometric variables, sex was included as an independent variable in the regression analysis. Homoscedasticity and linearity were verified by visually inspecting the scatter plot. Normality of residuals was verified by Kolmogorov-Smirnov tests. The adequacy of the procedure was assessed by testing the significance of the correlation between the adjusted variables and SVL (e.g., Turan, 1999).

Because missing values cannot be included in multivariate analyses, only specimens without missing values were included. Linear discriminant analysis was used to analyse quantitative variables and was consequently restricted to meristic and morphometric characters. Nonlinear canonical correlation analysis (OVERALS) is capable of analysing quantitative and qualitative variables simultaneously and was thus used to include aspects of both morphology and colouration. The latter technique uses optimal scaling (e.g. Shen & Lai, 1998) to quantify the categories of qualitative variables. In nonlinear canonical correlation analysis the correlation between species, as a multiple nominal variable, and the independent variables was maximized. This specific application can be regarded as a nonlinear version of discriminant analysis (Michailidis & De Leeuw, 1998). Two separate sets of independent variables were specified in the analysis. The first set of variables comprised all morphological characters whereas the second set comprised all colouration characters. The aim of using these two separate sets of variables was to obtain canonical variates that represent a balance of both morphology and colouration. Qualitative variables regarding colouration were specified as single nominal variables, and quantitative variables regarding various aspects of morphology were specified as numeric. The individual values on the first two canonical variates, either obtained by linear or nonlinear discriminant analysis, were plotted to visualize the separation between the species. All statistical analyses were carried out with the software SPSS (2003; SPSS for Windows. Release 11.5.2.1. Standard Version. SPSS Inc., Chicago).

Museum abbreviations. – BMNH: The Natural History Museum, London, UK. – CAS: California Academy of Sciences, San Francisco, USA. – IEBR: Institute of Ecology and Biological Resources, Hanoi, Vietnam. – IRSNB: Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium. – ITBCZ: Institute of Tropical Biology - Collection of Zoology, Ho Chi Minh City, Vietnam. – MHL: Muséum d’Histoire naturelle de Lyon, Lyon, France. – MNHN: Muséum national d’Histoire naturelle, Paris, France. – SRL: Société royale du Laos, Vientiane, Laos. – USNM: United States National Museum, Washington, D. C., USA.

Results

The 175 available specimens were included in both univariate and multivariate analyses. For the latter, a total of 18 characters was retained (see Table 2). Morphometric variables were regressed to a common SVL of 268 mm. Tail length was found to be sexually dimorphic, so that sex was included in the regression model. The adjusted variables showed no significant correlation with SVL, therefore the size effect had been eliminated. No ontogenic variation in major morphometric ratios or in colour pattern was noted.

Initial morphological examination revealed three groups of specimens which appeared to differ in the number of dorsal scale rows and the dorsal colour pattern from the recognized taxa *Oligodon taeniatus*, *O. mouhoti* and *O. barroni*. For these reasons they were treated as possible undescribed taxa. Thus, these three putative taxa were included as separate *a priori* groups in the analyses besides *Oligodon taeniatus*, *O. mouhoti* and *O. barroni*. In Figures 1–3 these taxa are already indicated by formal names (*O. pseudotaeniatus*, *O. deuvei* and *O. moricei*), although formal descriptions are provided later, in the taxonomy section of this paper. Figure 1 shows the results of a nonlinear canonical correlation analysis. Component loadings are given in Table 2.

TABLE 2. Component loadings from nonlinear canonical correlation analysis (see Fig. 1).

Characters	Correlation with first canonical variate	Correlation with second canonical variate
SL/Eye	0.746	-0.514
BODBLOT	0.671	-0.603
TAILBLOT	0.757	0.356
NUCVEN	-0.142	0.437
LATERSTRIPE	-0.810	0.585
VERTSTRIPE	-0.298	0.395
TaL/TL	-0.045	-0.191
W-Fro	0.432	-0.507
L-Fro	0.009	-0.200
SC	-0.167	-0.164
ASR	-0.912	-0.273
VEN	-0.172	0.266
TEETH	-0.620	0.408
IL-tot	-0.171	0.555
Lor-m	-0.203	-0.438
PreSubOc	-0.121	0.319
MSR	-0.741	-0.198
SL	-0.669	0.487

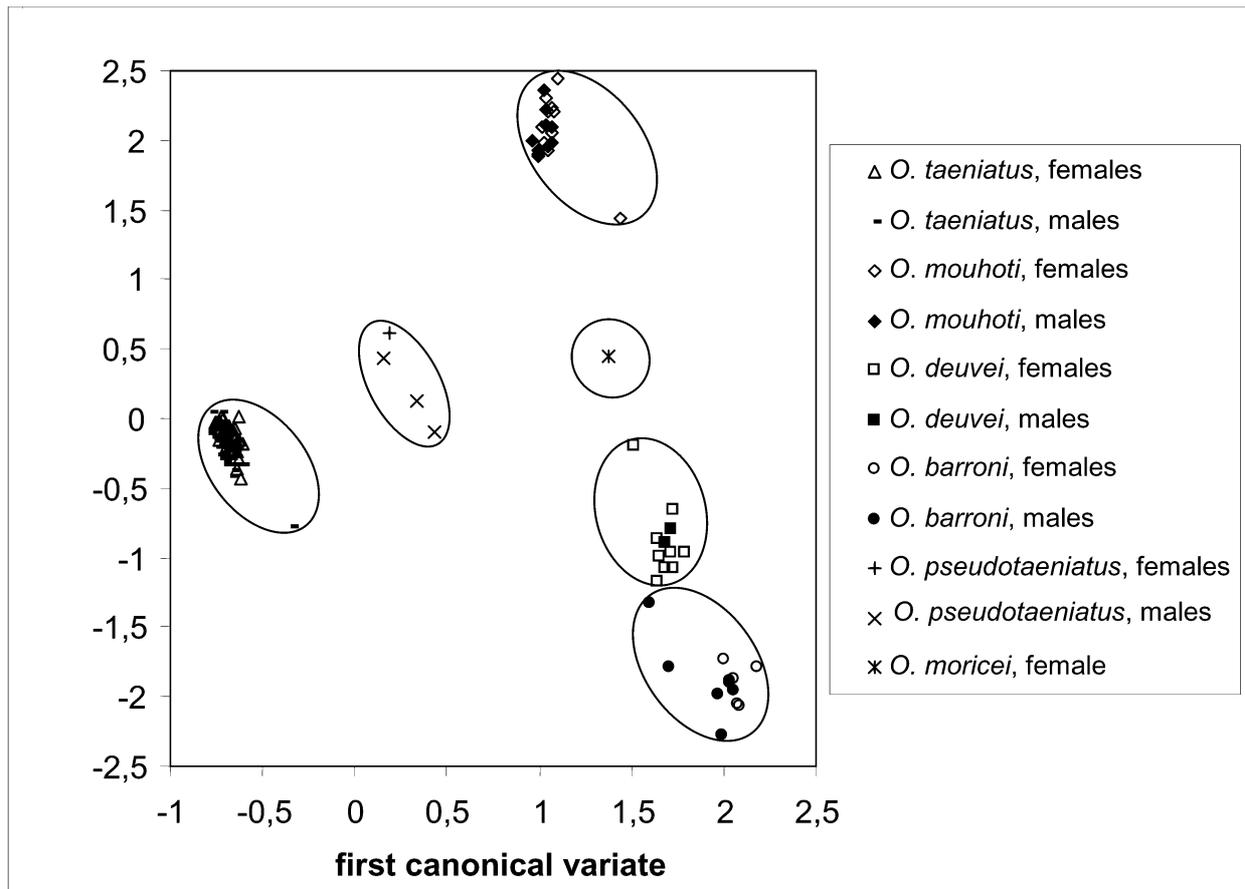


FIGURE 1. Ordination of *O. taeniatus*, *O. mouhoti*, *O. pseudotaeniatus* **spec. nov.**, *O. deuvei* **spec. nov.**, *O. barroni*, and *O. moricei* **spec. nov.** along the first two canonical variates based on nonlinear canonical correlation analysis of morphological and colouration characters.

TABLE 3. Structure matrix showing correlations between original characters and constructed canonical variates for males (ordination shown in Fig. 2).

Characters	Correlation with first canonical variate	Correlation with second canonical variate
TEETH	0.494	-0.257
PreSubOc	0.361	0.074
W-Fro	-0.300	0.169
L-Fro	-0.127	0.037
TaL/TL	0.060	0.348
SC	0.116	0.299
SL	0.271	0.033
VEN	0.065	-0.262
IL	0.092	-0.120
Lor-m	-0.066	0.066

Six clusters are clearly separated. Three of them correspond to specimens referable to *Oligodon taeniatus*, *O. mouhoti* and *O. barroni* respectively, of which all types were examined by us. The three other clusters are separated from those recognized taxa. In subsequent analyses, *O. taeniatus* was excluded because this is the only species with 19 dorsal scale rows. Linear discriminant analyses were run on males and females separately. Results are depicted in Figs. 2 and 3, with corresponding structure matrices given in Table 3 and 4,

respectively. In each analysis, both discriminant functions were highly significant ($p = 0.00001$) based on Wilk's lambda. Due to the fact that some variables violated the assumptions of discriminant analysis these significance levels should be viewed with some caution. However, given the very high significance levels, there is little doubt about the validity of the separation among the clusters. In conclusion, besides the previously recognized species *Oligodon taeniatus*, *O. mouhoti* and *O. barroni*, three valid but yet unnamed taxa are represented. Formal descriptions of these species are provided below.

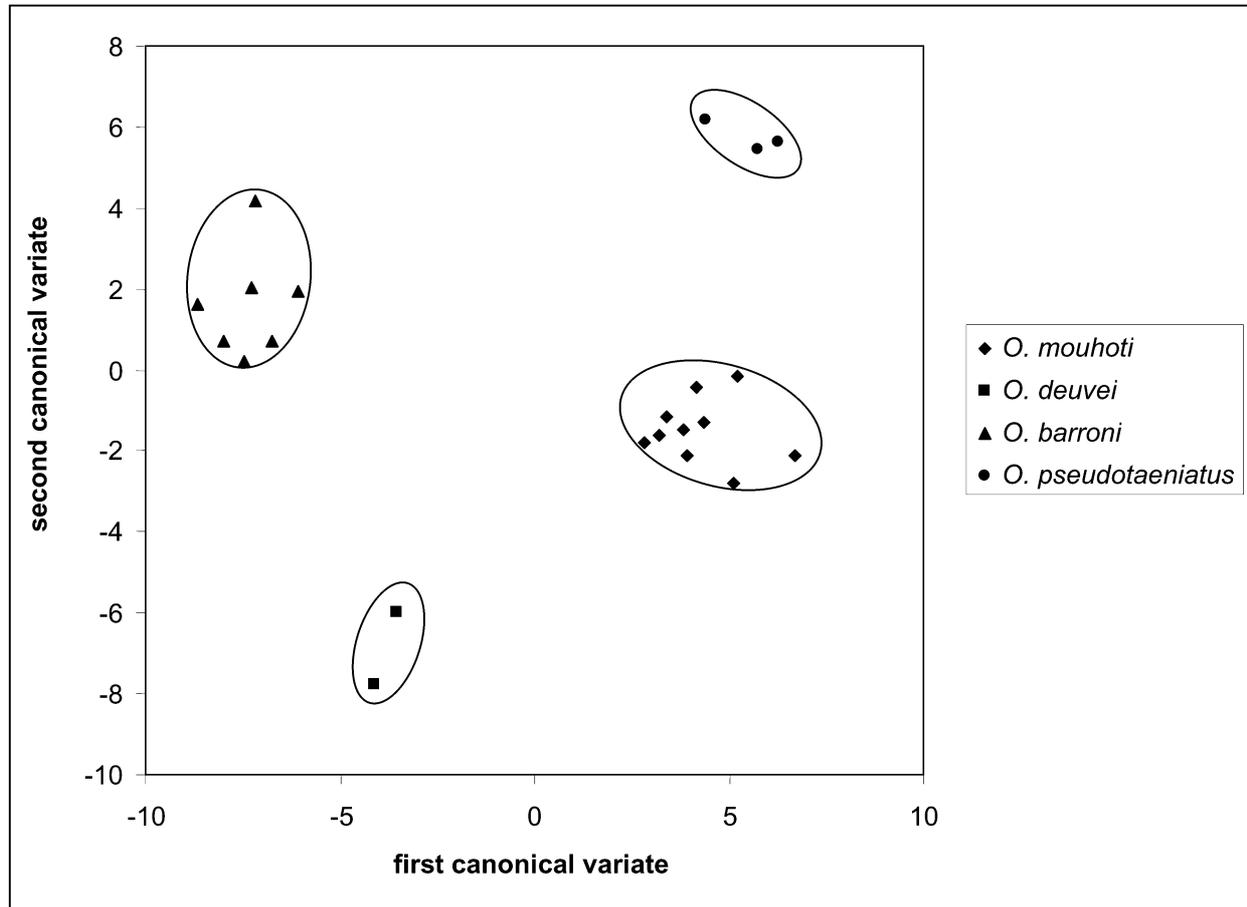


FIGURE 2. Ordination of males of *O. mouhoti*, *O. pseudotaeniatus* spec. nov., *O. devei* spec. nov. and *O. barroni* along the first two canonical variates based on linear discriminant analysis of morphological characters.

Oligodon taeniatus (Günther, 1861)

(Figs. 4–9)

Simotes taeniatus Günther, 1861: 189. – **Type locality.** not given in the original description but “Cambodia” according to the BMNH Catalogue. – **Holotype.** BMNH 1946.1.3.27 (male). Collected by Henri Mouhot.

Simotes quadrilineatus Jan & Sordelli, 1865: Pl. IV: Fig. 3. – **Type locality, by virtue of neotype designation.** Bangkok, Thailand. – **Neotype, by present designation:** MNHN 1991.1819 (adult female), from “Bangkok”, Thailand. Collected by Firmin Bocourt. The holotype was the specimen depicted on Jan & Sordelli's plate, from “Bangkok”, according to page 8 of the Index of the volume; specimen now lost (see below). – **Synonymized** with *Simotes taeniatus* Günther, 1861 by Boulenger (1914: 70).

Material (108 specimens). – **THAILAND.** Ayuthaya Province. BMNH 1910.6.3.20 (male), “Ayuthia”, now Ayuthaya. Bangkok Province and region. BMNH 1914.5.11.6, BMNH 1969.1825–1826 (3 males), BMNH 97.10.8.26, BMNH 1956.1.13.3, BMNH 1969.1777, BMNH 1969.1820–1821, BMNH

1969.1823–1824 (7 females), Bangkok; MNHN 0598(1), MNHN 630 (2 males), MNHN 0598(2) (female), MNHN 1991.1819 (female, neotype of *Simotes quadrilineatus*), “Bang-kok (Siam)”, now Bangkok. Chachoengsao Province. MNHN 1885.0400 (female), “Petriou”, now Chachoengsao. Chonburi Province. BMNH 97.10.8.32 (juvenile), “Bourtong, Siam”, now Bo Thong. Nakhon Ratchasima Province. BMNH 1969.1819 (unsexed), “Ban Taang, Korat”, an unidentified locality. Prachinburi Province. MNHN 1885.0380 (female),

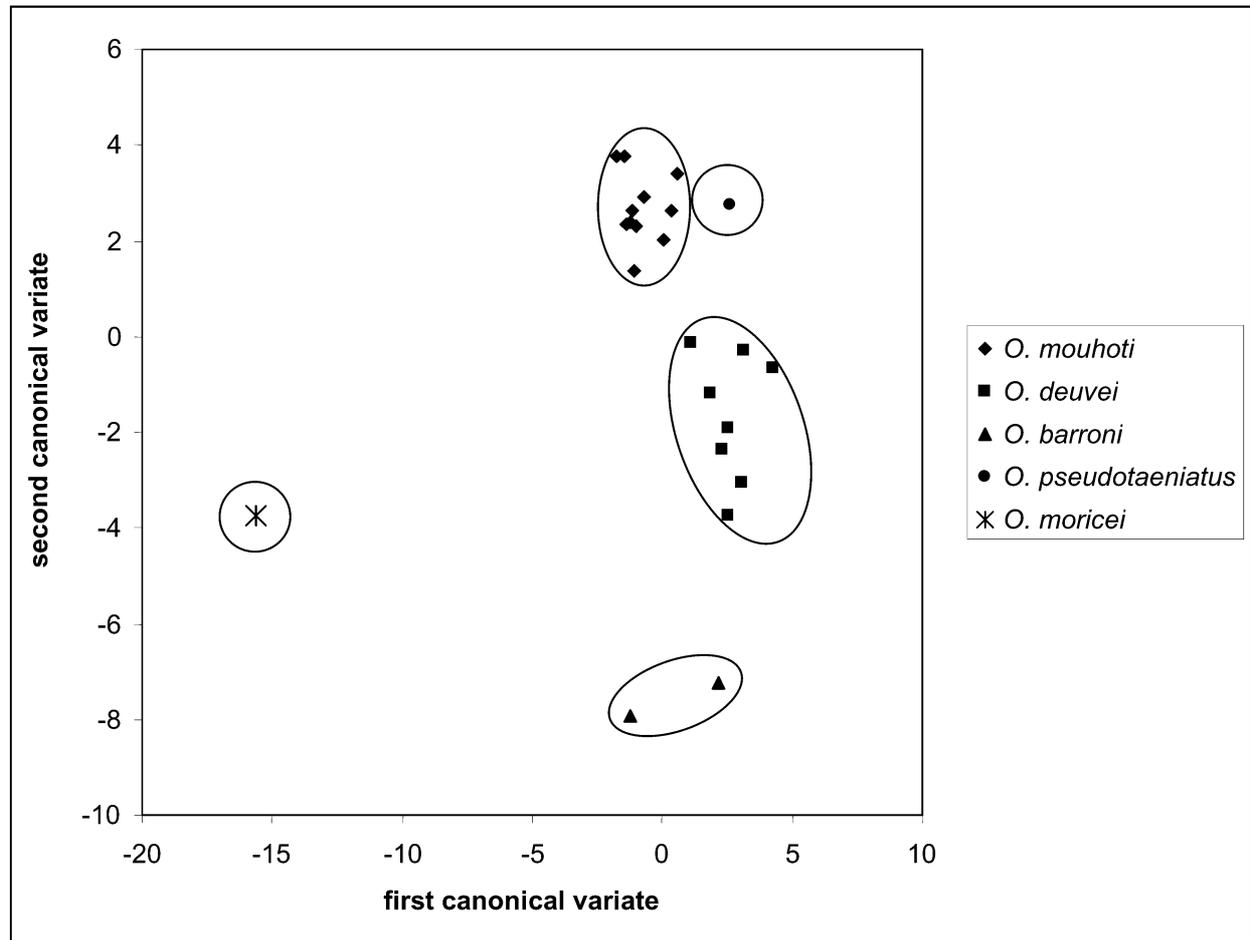


FIGURE 3. Ordination of females of *O. mouhoti*, *O. pseudotaeniatus* **spec. nov.**, *O. devei* **spec. nov.**, *O. barroni*, and *O. moricei* **spec. nov.** along the first two canonical variates based on linear discriminant analyses of morphological characters.

TABLE 4. Structure matrix showing correlations between original characters and constructed canonical variates for females (ordination shown in Fig. 3).

Characters	Correlation with first canonical variate	Correlation with second canonical variate
TEETH	0.036	0.398
PreSubOc	0.000	0.200
W-Fro	-0.100	-0.300
L-Fro	-0.040	-0.130
TaL/TL	0.340	-0.250
SC	-0.150	-0.280
SL	0.190	0.322
VEN	0.448	0.255
IL	-0.014	0.020
Lor-m	0.017	-0.075

MNHN 1885.0381 (male), “Entre Kabin et Pékim”, now between Kabinburi and Prachinburi. Prachinburi or Sa Kaew Province. MNHN 1885.0365 (female), “Entre Vatana et Kabin”, now between Watthana Nakhon, Province of Sa Kaew and Kabinburi, Province of Prachinburi. Ubon Ratchathani Province. BMNH 1969.1814 (female), “Nong Wah, Ubon”, now Nong Wa, near Ubon Ratchathani. No precise locality. BMNH 65.4.28.6, BMNH 78.2.14.12, BMNH 1969.1815–1816, BMNH 1987.1767 (5 males), BMNH 1987.1768 (female) “Siam”. – **THAILAND OR CAMBODIA**. MNHN 1885.0355–0356 (2 females), “Entre Batambang et Vatana (Siam)”, now between Battambang, Province of Battambang, Cambodia and Watthana Nakhon, Province of Sa Kaew, Thailand. – **CAMBODIA**. Koh Song Province. MNHN 1970.0425, MNHN 1970.0428 (2 males), MNHN 1970.0426–0427 (2 females), Kirirom. Kompong Chhnang Province. MNHN 1970.0430, MNHN 1970.0432–0434 (3 females), MNHN 1970.0431, MNHN 1970.0435 (2 males), Trapeang Chan. Phnom Penh Province. BMNH 1920.1.20.4075A–C (3 males), “Pneum-Penh”, now Phnom Penh. Siem Reap Province. MNHN 1970.0429 (female), Angkor. No locality. BMNH RR1946.1.3.24 (ex 61.4.12.40) (female), BMNH RR1946.1.3.27 (male; holotype), “Cambodia”. – **LAOS**. Champasak Province. MNHN 2005.0239 (juvenile, probably female), Paksé. – **VIETNAM**. An Giang Province. BMNH 1920.1.20.2867 (male), Long Xuyen. Bac Kan Province. IEBR A.0755 (Field Number LM 24), Lung Minh, Ba Be (female). District of Ho Chi Minh. BMNH 1920.1.20.4077A, BMNH 1920.1.20.4077C–D, BMNH 1969.1818 (4 males), BMNH 1920.1.20.4077B, BMNH 1920.1.20.4077E–G (4 females), “Saigon”; CAS 16705 (male), “Saigon”; MNHN 1180 (female), MNHN 1999.8164 (female; ex MNHN 1180), “Saïgon, Cochinchine (Indochine)”, now Ho Chi Minh City; MNHN 1974.1265, MNHN 1974.1270 (2 males), MNHN 1974.1268, MNHN 1974.1271 (2 females), “Région de Saïgon, Vietnam Sud”, now region of Ho Chi Minh City; MNHN 1975.0126 (male), “Saïgon, Bun-Buik”, in the vicinity of Ho Chi Minh. Minh Hai Province. MNHN 1885.0321, MNHN 1885.0323–0326 (5 males), “Ba-Chieu, Cochinchine”, now Bac Lieu. Tay Ninh Province. ITBCZ 127 (male), Lo Go National Park, Xa Mat; MHL 42002098–1, MHL 42002098–2, MHL 42002098–5, MHL 42002098–6 (4 males), MHL 42002098–3, MHL 42002098–4 (2 females), MHL 42002104 (sex unknown), “Tay Ninh, Cochinchine”. Tiên Giang Province. MHL 42000378–1, MHL 42000378–2 (2 males), MHL 42000378–3, MHL 42000378–4 (2 females) “Mi-Tho, Basse Cochinchine”, now My Tho. Vinh Long Province. MHL 42000303–1, MHL 42000303–2, MHL 42000303–4 (3 males), MHL 42000303–3, “Tra-On”, now Tra On. No precise locality. *North Vietnam*. MHL 42006375 (male), “Tonkin”. *Southern Vietnam*. MHL 42002111–1, MHL 42002111–5, MHL 42002155, MHL 42006414–1, MHL 42006414–2 (5 females), MHL 42002111–2, MHL 42002111–3, MHL 42002111–4, MHL 42002178, MHL 42002229 (5 males), “Cochinchine”; MNHN 1864.0313, MNHN 1999.8165 (2 males), MNHN 1999.8166 (female), MNHN 1865.0024, MNHN 1884.0406 (2 males), MNHN 1908.0054 (female), MNHN 1999.8161, MNHN 1999.8163 (2 females; both ex MNHN 1908.0054), MNHN 1999.8162 (male; ex MNHN 1908.0054), “Cochinchine”. – **NO LOCALITY**. MNHN 1910.0018, MNHN 1912.0422 (2 females), “Indochine”.

Taxonomic comments. – Boulenger (1894: 228) erroneously mentioned five specimens as types of *Simoetes taeniatus*. Two are indeed referable to *Oligodon taeniatus*. The three other specimens from the same locality deposited by H. Mouhot are referable to *Oligodon mouhoti* (see below). The presence of specimens with 19 and 17 dorsal scale rows in the same collection misled Günther (1864). Thus, the collections of the BMNH include two specimens collected by Henri Mouhot in Cambodia, BMNH 1946.1.3.24 (previously 61.4.12.40) and BMNH 1946.1.3.27 (original number unknown). However, it is obvious that Günther (1861) established the description on the basis of a single specimen. Although the values of ventrals and subcaudals cited by Günther do not agree well with either of these two specimens, they are quite close to those of BMNH 1946.1.3.27. As H. Mouhot deposited only five specimens (Boulenger, 1894: 228; C. J. McCarthy, pers. comm, October 2007), of which only two are referable to *Oligodon taeniatus*, we consider the specimen BMNH 1946.1.3.27 to be the holotype. This specimen has 158 ventrals and 42 subcaudals instead of 155 and 44 as cited by Günther.



FIGURE 4. *Oligodon taeniatus*. Specimen BMNH 1946.1.3.27, holotype. General view of body. Photograph by Patrick David.



FIGURE 5. *Oligodon taeniatus*. Specimen BMNH 1946.1.3.27, holotype. Dorsal view at midbody. Photograph by Patrick David.



FIGURE 6. *Oligodon taeniatus*. Specimen BMNH 1946.1.3.27, holotype. Ventral view. Photograph by Patrick David.

The confusion between *Oligodon taeniatus*, *O. quadrilineatus* and, to a lesser extent, *O. mouhoti*, was discussed in the Introduction. The combination *Oligodon quadrilineatus* was used as recently as by Chan-ard et al. (1999) and Nabhitabhata et al. (2004). Examination of Jan & Sordelli's (1865) plate makes it clear that the sole specimen that they depicted, and thus the holotype of *Simotes quadrilineatus*, had 19 scale rows and no spots on the tail. Four specimens, all collected by Bocourt during his travel to Siam (Bocourt, 1866) were considered syntypes of *Simotes quadrilineatus* in the catalogues of the MNHN, all under the single number MNHN 630. Subsequently, three of them were renumbered as MNHN 1991.1817 to 1819. Two of them, MNHN 1991.1817–1818 are typical *Oligodon mouhoti*, and cannot qualify as the holotype of *Simotes quadrilineatus*. MNHN 630 and 1991.1819 are indeed typical *Oligodon taeniatus*, but, thanks to the precision of Jan & Sordelli's drawing, especially of the ventral pattern where blotches are clearly visible, it appears that none of them is the specimen depicted on Plate 7 of Jan & Sordelli (1865). Furthermore, the characters noted in the description provided by Jan in Bocourt (1866) confirms that neither can be considered the holotype of *Simotes quadrilineatus*. We could not trace this specimen, which is neither in Paris or in the *Museo Civico di Storia Naturale* in Milan, of which Jan was then the head. According to Dr Stefano Cali (pers. comm., September

2007), the whole of Jan's collection was destroyed in 1943, when the museum was set on fire. No type specimen described by Jan is still extant. So, we consider the holotype to be lost. We describe here a neotype for *Simotes quadrilineatus*, from the series collected by Bocourt:



FIGURE 7. *Oligodon taeniatus*. Specimen BMNH 1969.1818. General view of body. Photograph by Patrick David.

Neotype of *Simotes quadrilineatus* (Figs. 8–9): MNHN 1991.1819 (adult female), from “Bangkok”, Thailand. Collected by Firmin Bocourt.

Morphology. Body elongated but robust; head barely distinct from neck; snout projecting over the lower jaw, long, rounded, amounting to 30.0 % of HL or 1.7 times as long as diameter of eye; pupil black and round; tail thick at its base and tapering.

SVL 259 mm, TaL 39 mm; HL 11.2 mm; ratio TaL/TL 0.131.

Dentition. 14 (11 + 3 enlarged) maxillary teeth.

Body scalation. DSR: 19–19–15 rows, scales all smooth, small and ovoid. VEN: 161 (+ 1 preventral); SC 34, paired; Anal entire.

Head scalation. As described for the species with: rostral distinctly curved onto the upper snout surface, well visible from above, separating internasals by half of their length; nasals subrectangular, vertically divided; prefrontals subrectangular, distinctly wider than long; frontal hexagonal, ogive-like, 1.3 times as long as wide; a large supraocular on each side, distinctly longer than wide, as wide as prefrontals; two large, subtriangular parietals, much longer than the frontal, in broad contact; 1/1 small subrectangular loreal scale, about 1.5 times as long as high, in contact with the nasal; 8/8 SL, 1st SL small, 2nd and 3rd in contact with loreal, 4th and 5th entering orbit, 6th and 7th largest; 1/1 high preocular; no presubocular on either sides; 2/2 postoculars; temporals 1+2/1+2; 9/9 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields.

Colouration. The upper body surface is greyish-brown, with scales narrowly edged with dark brown; a narrow greyish-yellow vertebral stripe extends from the nuchal marking up to the base of the tail, edged on each of its sides with a wider brown paravertebral stripe, intersected with small, irregular dark brown subrect-

angular blotches every 4 scales; an irregular, dark brown lateral stripe on each side on DSR 3–4, extends from the neck to the vent. Dorsally, the tail is as the upper body surface, with a greyish-yellow vertebral stripe wider than on the body and strongly edged with a blackish-brown stripe on each side; a dark brown lateral stripe on each side on the edges of subcaudals.

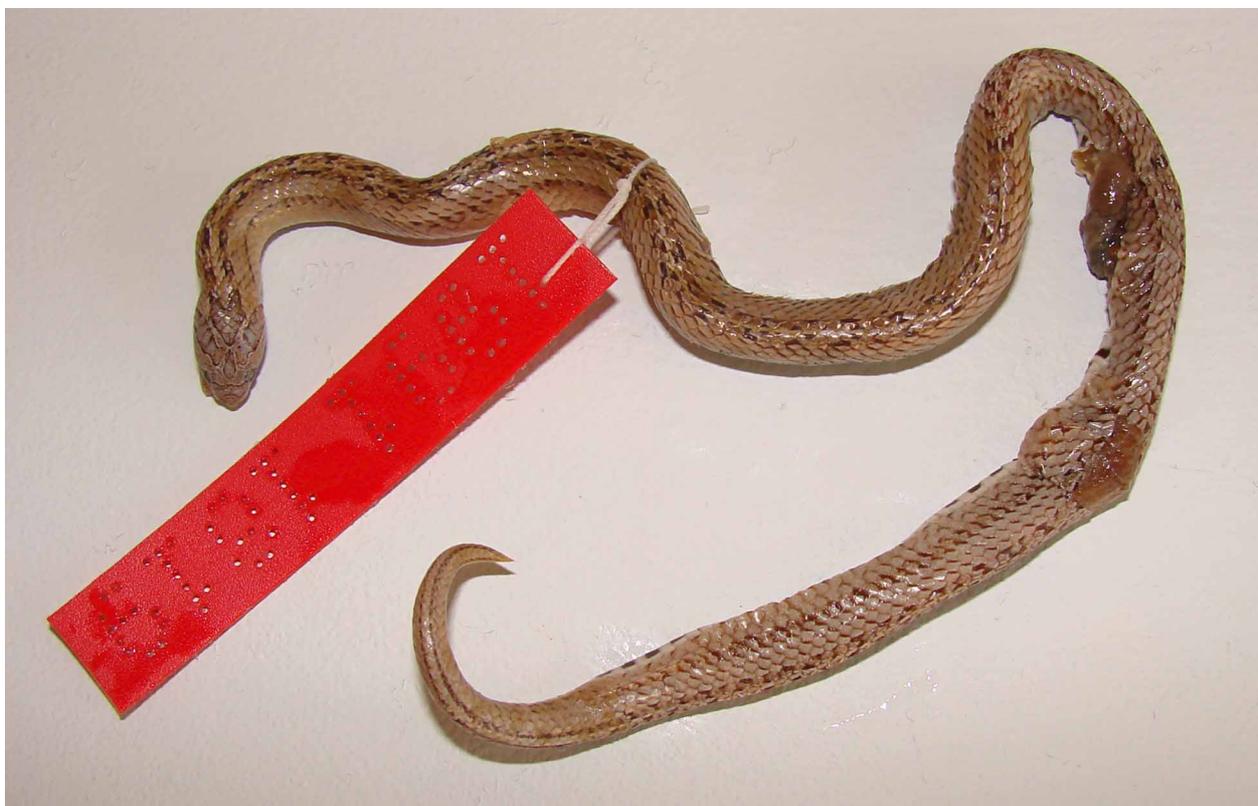


FIGURE 8. *Oligodon taeniatus*. Specimen MNHN 1991.1819, neotype of *Simotes quadrilineatus* Jan & Sordelli, 1865. General view. Photograph by Patrick David.

The head is greyish-brown, darker than body; supralabials lighter, strongly variegated with brown; five main markings present: a transversal dark brown marking on the snout, in front of eyes, extending downwards and backwards across the eye down to SL 5–6; a short, narrow, ogive shaped, longitudinal streak on the frontal; on each side, an oblique dark brown bar extends along frontal, anterior part of parietals and posterior temporals, the neck side behind the corner of the mouth, then, downwards, vanishes well before reaching the ventrals; a conspicuous, arrow or heart-shaped, dark brown nuchal blotch, with two branches pointing backwards; infralabials, chin and throat uniformly creamish-yellow.

The venter is creamish-yellow with two (rarely one) irregular blackish-brown subrectangular blotches near tips of the ventrals; some ventrals without blotches. Tail below with few subrectangular blotches in its anterior half, uniform towards its tip.

Diagnosis. – A species of the genus *Oligodon* characterized by: (1) a large size for the *O. taeniatus*-group, up to about 450 mm in total length; (2) deeply forked hemipenes, not spinose but fitted with two large papillae; (3) 19 dorsal scale rows at midbody, 15 before vent; (4) 14–17 maxillary teeth, the last two strongly enlarged; (5) head scalation complete, rarely including a presubocular; (6) 8 supralabials; (7) anal plate single; (8) the presence of two dark longitudinal paravertebral stripes edging a pale (yellow in life) vertebral stripe, and two narrower dorsolateral stripes; (9) five main, well defined blotches on upper head surface: one anterior transverse marking across the snout; one longitudinal blotch on the frontal; two temporal oblique bars, directed posteriorly downwards; and one large, arrow-shaped nuchal blotch; and (10) bases of the oblique central streaks often (about 50 % of the examined specimens) reach the ventral scales at least on one side.



FIGURE 9. *Oligodon taeniatus*. Specimen MNHN 1991.1819, neotype of *Simotes quadrilineatus* Jan & Sordelli, 1865. Head, left side. Photograph by Patrick David.

Oligodon taeniatus differs from all other species of the *taeniatus*-group by the combination of (1) 19 scale rows at midbody and (2) a pattern made of one vertebral stripe edged with two paravertebral stripes, plus one dorsolateral stripe on each side. This pattern is constant in all examined specimens.

Description and variation (based on Campden-Main [1969] and 105 examined specimens). – *Morphology.* Body rather elongated but not especially thin; head ovoid, short, thick, barely distinct from the poorly defined neck; snout projecting over lower jaw, long, amounting to 26.4–30.3 % ($x = 28.6$ %, $s = 1.3$) of HL, or 1.7–2.0 ($x = 1.8$, $s = 0.1$) times as long as diameter of eye; eye rather small, with a round pupil; tail rather thick but tapering. Maximal total length 447 mm (SVL 367 mm, TaL 80 mm) for a male (BMNH 1920.1.20.4075A). The largest examined female is 424 mm long (SVL 367 mm, TaL 57 mm; IEBR A.0755 (Field Number LM 24)). In our sample (105 specimens), there is no noticeable difference in maximal sizes of males and females. Ratio TaL/TL: 0.165–0.204, with a strong sexual dimorphism (see below).

Dentition. 14–17 maxillary teeth ($x = 15.5$, $s = 0.8$), the last two being strongly enlarged and blade-like.

Body scalation. DSR: 19–19–15, without exception; scales small, ovoid, all smooth.

VEN: 146–165 (plus 1–2 preventrals), slightly angulate; SC: 31–48, all paired (with a strong sexual dimorphism); anal plate entire.

Head scalation. Rostral thick, curved onto the upper snout surface, well visible from above, separating internasals up to one half of their length; nasals subrectangular, about 1.6–2.0 times as long as high, slightly “butterfly-shaped”, vertically divided, with the posterior part distinctly smaller than anterior one; nostril crescentic, piercing middle of nasal just forward of the division; internasals subrectangular, in broad contact, much shorter than prefrontals; prefrontals subrectangular, distinctly wider than long; frontal hexagonal, ogive-like pointing caudally, 1.25–1.45 times as long as wide ($x = 1.35$, $s = 0.06$); an undivided supraocular on each side, distinctly longer than wide, about as wide as prefrontals; behind, two very large, subtriangular parietals,

much longer than the frontal, in broad contact; 1/1 small, elongate subrectangular loreal scale, about 1.3–1.8 times as long as high, in broad contact with the nasal; loreal absent in only 1 out of 105 specimens; 8/8 supralabials (7 on one side in only 1/210 occurrences), 1st SL small, 2nd and 3rd in contact with loreal in all specimens, 4th and 5th entering orbit (in 208/210 occurrences), 5th only in only 1/210 occurrences, 6th and 7th largest; 1/1 preocular, high and narrow, in all examined specimens; a small presubocular present (in 94/210 occurrences; 44.8%) or absent (116/210; 55.2%); in only 9 specimens out of 105 the presubocular is present on one side only; 2/2 small postoculars in all examined specimens; 1/1 elongated anterior temporal in all specimens, 2/2 or rarely 1/(1+1) posterior temporals; 9/9 infralabials (exceptionally 10/10 in 2/105 specimens), first pair in contact, IL 1–4 (exceptionally 1–5 in 5/105 specimens) in contact with anterior chin shields, 5th IL the largest.

Colour and pattern in alcohol and in life. The upper surface is brownish-grey or sea grey or greyish-tan (same in life, with brighter colours), with dorsal scales finely edged with dark brown posteriorly; from the nape mark up to about the level of the vent, a conspicuous but narrow, pale, cream or greyish-yellow vertebral stripe (lemon yellow or yellowish-brown in life), edged on each side with a much wider dark greyish-brown or tan blackish-brown paravertebral stripe (brown edged with yellow in life), intersected with small black or dark brown subrectangular blotches every 4 or 5 scales (interstitial skin yellow in life); another lateral dark brown stripe on each side, narrower than paravertebral stripes, extends on DSR 3–4 from the neck to the vent; these dorsolateral stripes are more or less regular or broken into spots but are present in all specimens. The tail resembles the upper body surface but the vertebral stripe widens and is only edged on each side with a dark brown stripe which does not reach the tip of the tail; a dark brown lateral stripe on each side at the limit with subcaudals; there are never large dark blotches on upper surface of the tail.

The head is brownish-grey or mid grey or greyish-brown, darker than body; supralabials paler (cream in life), more or less variegated with dark brown; a total of five main markings above, as follows: a transverse dark brown marking on the snout, just in front of eyes, extends downwards obliquely backwards across the eye down to SL 5–6; a short, narrow, water drop or arrow shaped, longitudinal streak on the frontal; on each side, a large, oblique dark brown or blackish-brown bar, not in contact with the opposite other one on the top of the head, extends on frontal, anterior part of parietals, posterior temporals, side of the neck behind the corner of the mouth, then, downwards, reaches (in 55/105 specimens; 52.4%) or not (in 50/105; 47.6%) the corresponding ventral (in contrast to Campen-Main's [1969] statement); lastly, a large conspicuous, arrow or heart-shaped, dark brown nuchal blotch, pointing forward, with two short horizontal branches pointing backwards in between which starts the vertebral stripe. Infralabials, chin and throat uniformly creamish-yellow (ivory), or sometimes infralabials with a few dark brown spots.

The venter is creamish-yellow or light grey (pink or bright coral red in life, cream on ventral tips), with, on most ventral scales, an irregular black subrectangular blotch near one or both tips; lower tail surface as venter, with subrectangular blotches in the anterior half of the tail, uniform posteriorly (white in life). Juvenile specimens are coloured and patterned like adults, with a brighter and better defined pattern. The vertebral stripe is bright yellow.

Hemipenis (*in situ*). – According to Smith (1943) and our material, the hemipenis is long, forked opposite the 5th or 6th SC and reaches SC 14–16. On approximately its proximal third, up to the point of bifurcation, it is covered with calyces and a few folds; the distal parts are smooth, covered with flounces and entirely devoid of spines. However, at the most distal part of each fork originates a very large smooth papilla, included in a membranous sheath; each papilla, of equal length, is free and its anterior end, when adpressed, reaches forward to the proximal part of the hemipenis, well beyond the point of bifurcation anteriorly. From the proximal part, the sulcus spermaticus extends backwards on each papilla up to the end of this organ.

Sexual dimorphism. – Clearly visible in the two following characters: (1) difference in the ratio TaL/TL: males: 0.165–0.204 ($x = 0.184$, $s = 0.009$), females: 0.128–0.151 ($x = 0.139$, $s = 0.006$); and (2) Difference in the number of subcaudals: males: 38–48 ($x = 42.7$, $s = 2.0$); females: 31–39 ($x = 34.7$, $s = 1.8$).

Distribution. – This species is known from: **Thailand.** Centre, east and southeast of the country: provinces or region of Ayuthaya (Ayuthaya), Bangkok, Chaiyaphum (Phu Khieo), Chachoengsao (Chachoengsao), Chonburi (Bo Thong), Nakhon Ratchasima (Khorat), Nonthaburi (no locality), Prachinburi (between Kabinburi and Prachinburi), Sa Kaew (near Watthana Nakhon), Saraburi (no locality), Si Sa Ket (Bung Bun), and Ubon Ratchathani (Nong Wa, near Ubon Ratchathani) (Taylor, 1965 [as *O. quadrilineatus*]; Nabhitabhata et al., 2004 [as *O. quadrilineatus*]; examined material). – **Cambodia.** In the South and Centre of the country: provinces of Koh Song (Kirirom), Kompong Chhnang (Trapeang Chan), Phnom Penh, and Siem Reap (Angkor) (Saint Girons, 1972; examined material); probably throughout the country but precise locality lacking. – **Laos.** Definitely known only from the south of the country: Champasak Province (Paksé). – **Vietnam.** Known from throughout the country (see below): provinces or regions of An Giang (Long Xuyen), Bac Kan (Ba Be), Bà Rịa-Vung Tàu (Côn Dao), Cao Bằng (Nguyễn Bình), District of Hồ Chí Minh (Ho Chi Minh City), Đông Nai (Dinh Quan), Hải Dương (Chí Linh), Khánh Hòa (Nha Trang), Lam Dong (Da Lat), Minh Hải (Bac Lieu), Nghê An (Vinh), Ninh Bình (Cúc Phương), Sóc Trăng (Soc Trang), Tây Ninh (Tây Ninh, Xa Mat), Tiên Giang (My Tho), Vinh Long (Tra On), and Vinh Phúc (Tam Dao) (Campden-Main, 1970; Nguyễn et al., 2005; examined specimens). This distribution calls for several comments, arranged by countries:

Myanmar. Several specimens of “*Oligodon quadrilineatus*” were recorded by Zug et al. (1998: 113, 117) from Chatthin Wildlife Sanctuary, Sagaing Division, in the centre west of that country. Such a record far west from the known range of *O. taeniatus* was surprising. O.S.G. Pauwels kindly examined one of these specimens (USNM 520624, from Burma: Sagaing; Kanbalur Township; Chatthin, ca. 2 km WNW of Chatthin Wildlife Sanctuary, San Myaung Camp, 360 ft, 23°34'46"N, 095°44'26"E; the other one, USNM 520625, could not be traced; collection numbers appearing in Zug et al. [1998] were erroneous). Its main characters are: Sex unknown; round pupil; SVL 116 mm; TaL 16 mm; 17-17-15 DSR, smooth, without apical pit; VEN: 159 (no preventrals), slightly angulated; SC: 35; anal divided; SL 8/8, 4+5 entering orbit; 1/1 PreOc, 2/2 PostOc; 1+2 / 1+2 Tem; 9 / 9 IL, 1–5 in contact with anterior chin shields. Body light brown, with indistinct black fasciatures; 3 light stripes (1 vertebral and 2 paravertebral stripes) running from the head to the vent; the vertebral stripe runs on the tail; 6 symmetrical blotches under the head; 2 nuchal collars on sides of the neck; venter pale ivory with dark quadrangular blotches, more numerous on its posterior part; only six blotches beneath the anterior part of the tail.

By all evidence this specimen is referable to *Oligodon theobaldi* (Günther, 1868), a striped species (see Boulenger, 1894: Pl. 3) that differs from *O. taeniatus* by a divided anal scale, 17 MSR, a higher number of ventrals, and a dorsal pattern made of three light stripes. Thus we exclude *Oligodon taeniatus* from the fauna of Myanmar.

Thailand. Specimens cited by Nabhitabhata et al. (2004) from Pattani and Songkhla, in southern Peninsular Thailand, were initially referred by Taylor (1965) to *O. taeniatus* sensu Smith (1943), namely now *Oligodon mouhoti* (see below). Furthermore, some specimens cited from Nakhon Ratchasima might be referable to *Oligodon pseudotaeniatus* **spec. nov.** (see below). *Oligodon taeniatus* is still unknown from the northern part of Peninsular Thailand.

Laos. We have seen other specimens previously identified as *Oligodon taeniatus*. They in fact belong either to *O. mouhoti* or *O. deuvei* **spec. nov.** (Teynié & David, 2007).

Vietnam. We have examined only two specimens from North Vietnam, MHL 42006375 (“Tonkin”) and IEBR A.0755 (Field Number LM 24) (Lung Minh, Ba Be, Bac Kan Province). Both are typical specimens of *Oligodon taeniatus*. We hence assume that all records cited by Nguyễn et al. (2005) are based on correctly identified specimens, in spite of the wide gap between populations of northern and southern Vietnam.

China. Yang et al. (1980) mentioned “*Oligodon taeniatus*” from the Chinese province of Yunnan. On this basis, this species was also included by Zhao (2006) in the snake fauna of China. However, this latter author

followed Smith (1943) and cited values of 17 and 15 dorsal scale rows. We cannot identify this specimen, which may be referable to *Oligodon deuvei*.

Biology. – Although this species is widespread, little is known of its biology. This small species is terrestrial and rather secretive. According to Manthey & Grossmann (1997), it remains hidden during the day under stones, pieces of wood and fallen leaves and becomes active at dusk. It feeds on frogs, lizards and their eggs. When aroused, this species raises and curls its tail, showing the red colour of its ventral side (see Manthey & Grossmann, 1997: 372). *Oligodon taeniatus* is oviparous but very little is known about its reproduction.

Discussion. – *Oligodon taeniatus* is a well defined species with a constant number of 19 dorsal scale rows. However, we examined four specimens from central eastern Thailand that show several characters of *O. taeniatus*, especially the dentition and the general pattern, but with only 17 scale rows at midbody as well as other differences. The number of dorsal rows excludes the validity of the specific nomen *quadrilineatus* for these specimens. They are also different from all other taxa with 17 MSR. As these specimens are clearly identifiable, we refer them to a new species described as:

***Oligodon pseudotaeniatus* spec. nov.**

(Figs. 10–14)

Holotype. – BMNH 1938.8.7.37 (adult male), from “Khorat”, Khorat Plateau, Nakhon Ratchasima Province, Thailand. Collected and deposited by Malcolm A. Smith, October 1916.

Paratypes (3 specimens). – BMNH 1938.8.7.38 (adult male), “Khorat, near Bangkok”; BMNH 1969.1838 (adult male), “Bangkok”; BMNH 1969.1828 (adult female), “Siam”; all collected and deposited by Malcolm A. Smith. All examined material belongs to the type series.

Diagnosis. – A species of the genus *Oligodon*, characterized by (1) deeply forked hemipenes, not spinose but fitted with two large papillae; (2) 17 dorsal scale rows at midbody, 15 before vent; (3) 15 maxillary teeth, the last two strongly enlarged; (4) anal plate single; (5) head scalation complete, including a presubocular in all available specimens; (6) 8 supralabials; (7) 8 or 9 infralabials; (8) a reduced pattern, with two darker longitudinal paravertebral stripes edging a faint, paler vertebral stripe, and on each side a poorly distinct dorsolateral stripe; and (9) only 3 major blotches on upper head surface: one anterior transverse marking, one frontal, and one large, straight nuchal butterfly-shaped marking across the neck, of which the lateral branches directed downwards do not reach the ventral scales.

Oligodon pseudotaeniatus spec. nov. differs from all other members of the *taeniatus*-group by the combination of the vertebral pattern of *Oligodon taeniatus* but with a more subdued dorsal colour pattern, the absence of dorsolateral stripes and blotches on the tail, and only 17 dorsal scale rows at midbody.

The four type specimens do not fit either with *O. taeniatus* (unless specimens with 17 DSR and a reduced pattern occur in this species) or with *O. mouhoti* (unless specimens without tail blotches and a much longer tail exist in this species). Referring these four specimens to any known species would alter their diagnoses established on the basis of several tens of specimens. We hence consider these specimens with 17 DSR to belong to a distinct taxon. Smith (1943: 210), under his “*Oligodon taeniatus*”, stated that one or both blotches of the tail may be absent, obviously referring to specimens of *Oligodon pseudotaeniatus*.

Etymology. – The specific nomen is a Latin adjective formed on the basis of the adjective *taeniatus*, meaning striped, by allusion to the overall similarity of this new species to *Oligodon taeniatus*.

Description of the holotype (Figs. 10–13). – Body elongated but not especially thin; head ovoid, short, thick, barely distinct from the poorly defined neck; snout projecting over the lower jaw, long, rounded, amounting to 30.8 % of HL, or 1.9 times as long as diameter of eye; eye rather small, with a round pupil; tail thick and tapering. SVL: 236 mm; TaL: 61 mm; TL: 297 mm; HL: 11.70 mm; ratio TaL/TL: 0.205.

Dentition. 15 maxillary teeth, the last two being strongly enlarged and blade-like.



FIGURE 10. *Oligodon pseudotaeniatus* **spec. nov.** Specimen BMNH 1938.8.7.37, holotype. General view of body. Photograph by Patrick David.

Body scalation. DSR: 17–17–15 rows, all smooth; scales small, ovoid. VEN: 143 (plus 2 preventrals), slightly angulated; SC: 46, all paired; anal plate entire.

Head scalation. Rostral thick, curved onto the upper snout surface, well visible from above, separating internasals by about one half of their length; nasals slightly “butterfly-shaped”, about 1.5 times as long as high, vertically divided, with the posterior part distinctly smaller than anterior one; nostril crescentic, piercing middle of nasal just in front of the division; internasals subrectangular, in broad contact, shorter than prefrontals; prefrontals subrectangular, distinctly wider than long; frontal hexagonal, ogive-like, 1.3 times as long as wide; a supraocular on each side, distinctly longer than wide, about as wide as prefrontals; two very large subtriangular parietals, much longer than the frontal, in broad contact; 1/1 very small, elongate loreal scales, in contact with the nasal; 8/8 supralabials, 1st SL small, 2nd and 3rd in contact with the loreal, 4th and 5th entering orbit, 6th and 7th largest; 1/1 preocular, high and narrow; 1/1 small presubocular; 2/2 small postoculars; 1+2/1+2 temporals, anterior ones elongated; 8/8 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 5th IL the largest.

Colour and pattern in alcohol. The upper surface is brownish-grey, with scales narrowly edged with dark brown; a narrow, greyish-brown vertebral stripe, edged on each of its sides with a wider darker brown (dark tan) paravertebral stripe, with only scattered black spots on its edge, extends back from the neck before fading

progressively; the paravertebral stripes reach the tail; a faint but wide, greyish brown dorsolateral stripe with some scattered black dots extends up to the vent on DSR 3–4. The tail is above as the upper body surface, with a very faint vertebral stripe formed by the merging of the paravertebral stripes of the body, not edged with black; no other markings.



FIGURE 11. *Oligodon pseudotaeniatus* **spec. nov.** Specimen BMNH 1938.8.7.37, holotype. Dorsal view at midbody. Photograph by Patrick David.



FIGURE 12. *Oligodon pseudotaeniatus* **spec. nov.** Specimen BMNH 1938.8.7.37, holotype. Head, left side. Photograph by Patrick David.



FIGURE 13. *Oligodon pseudotaeniatus* **spec. nov.** Specimen BMNH 1938.8.7.37, holotype. Ventral view. Photograph by Patrick David.

The head is brownish-grey, slightly darker than body, with small scattered dark dots; supralabials paler, yellowish-brown, SL 1–4 brown on their lower half; a faint, irregular, barely darker transverse marking on the snout in front of eyes, not reaching the internasals, extending downwards and backwards across the eye then downwards, to produce a short, dark, conspicuous oblique streak on SL 4 (top) and 5–6; another dark brown spot on SL 7; a short, elongated, longitudinal streak, constricted in its middle, on the frontal; one large darker marking straight across the neck, with the shape of a butterfly with four long “wings”, the two upper ones less distinct, reaching the middle of the parietals, the lateral ones directed straight downwards (not oblique) on the side of the neck, without reaching the ventral scales; infralabials, chin and throat uniformly pale yellow ochre.

The venter is pale yellow, with two (rarely one) irregular blackish-brown blotches near the tips of the ventrals, small, rounded and even often absent in the first quarter of the body, then progressively larger, subrectangular and more conspicuous in the posterior half. Tail below with strong blotches on its anterior half, disappearing abruptly from the middle of the tail.

Description and variation (on the basis of 4 specimens). – The most important characters of the available specimens, all belonging to the type series, appear in Table 5. All other morphological characters agree well with those described for the holotype and are not repeated here. A specimen identified by Taylor (1965: p. 776: Fig. 40) as *Oligodon barroni* most likely belongs to *O. pseudotaeniatus*. The few characters given for this specimen agree well with our data.

Morphology. Snout amounting to 28.5–30.8 % ($x = 29.5$ %, $s = 0.8$) of HL, or 1.6–1.9 ($x = 1.7$, $s = 0.1$) times as long as diameter of eye. The maximal total length known is 320 mm (SVL 254 mm, TaL 66 mm) for a male (BMNH 1969.1838). The sole examined female is 258 mm long (SVL 222 mm, TaL 36 mm). Ratio TaL/TL: 0.140–0.206, with a strong sexual dimorphism (see Table 5).

Dentition. 15 maxillary teeth in all specimens, the last two being strongly enlarged and blade-like.

Body scalation. All scales are smooth. DSR: 17–17–15, without exception; scales small, ovoid. VEN: 137–156 (plus 1–2 preventrals), slightly angulate; SC: 34–46, all paired (with a strong sexual dimorphism); anal plate entire.

Head scalation. Generally as for holotype; nasals about 1.6–1.8 times as long as high; internasals much shorter than prefrontals; prefrontals subrectangular, distinctly wider than long; frontal 1.25–1.35 times as long as wide ($x = 1.30$, $s = 0.04$); 1/1 small, elongate, subrectangular loreal scale, about 1.4–1.5 times as long as high; 8/8 supralabials, 2nd and 3rd in contact with loreal, 4th and 5th entering orbit, 6th and 7th largest; 1/1 preocular, high and narrow; 1/1 small presubocular; 2/2 small postoculars in all examined specimens; 1/1 elongated anterior temporal in all specimens, 2/2 posterior temporals; 8/8 (in 2 specimens) or 9/9 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields.

TABLE 5. Data for *Oligodon pseudotaeniatus* **spec. nov.** Abbreviations explained in Table 1.

Number	Sex	Paravertebral stripes	SVL (mm)	TaL (mm)	Ratio TaL/TL	VEN	SC
BMNH 1938.8.7.37	♂	faint	236	61	0.205	143	46
BMNH 1938.8.7.38	♂	absent	251	63	0.201	137	44
BMNH 1969.1838	♂	absent	254	66	0.206	138	45
BMNH 1969.1828	♀	absent	222	36	0.140	156	34



FIGURE 14. *Oligodon pseudotaeniatus* **spec. nov.** Specimens BMNH 1969.1828 (top) and BMNH 1969.1838 (bottom). Photograph by Patrick David.

The colouration and pattern are more or less as described in the holotype (see Fig. 14). In BMNH 1946.8.7.38 the pattern is similar to that of *Oligodon taeniatus*, with distinct but subdued paravertebral stripes.

Hemipenis (*in situ*). – It is similar to the *Oligodon taeniatus* organ.

Distribution. – **Thailand.** Currently endemic to this country and known from the provinces of Nakhon Ratchasima (Khorat), Bangkok (examined material), and Saraburi (Muak Lek; Taylor [1965: 776, as *O. barroni*]).

Biology. – No data but presumed to be similar to *Oligodon taeniatus*.

***Oligodon mouhoti* (Boulenger, 1914)**

(Figs. 15–18)

Simotes [taeniatus] var. *mouhoti* Boulenger, 1914: 70. – **Type locality.** Cambodia. Type locality not given in the original description; implicitly Cambodia because the description was based on the specimen depicted by Günther (1864: Pl. 20: Fig. A) that we have identified here. – **Holotype, by present identification:** BMNH RR 1946.1.3.32 (adult male), from Cambodia (see below). Collected by Henri Mouhot.

Material (25 specimens). – **THAILAND.** Bangkok Province and region. BMNH 78.2.14.11, BMNH 1969.1822 (2 males), BMNH 63.9.29.12, BMNH 97.10.8.27, BMNH 1914.5.11.7, BMNH 1969.1834–1837 (7 females), “Bangkok”; MNHN 1991.1817 (male), MNHN 1991.1818 (female), “Bang-kok (Siam)”, now Bangkok. Nakhon Ratchasima Province. BMNH 1969.1827 (male), “Korat”. Nakhon Sawan Province. BMNH 1969.1839–1840 (2 females), “Patnampo”, now Pat Namphau, just east of Nakhon Sawan. Phetchaburi Province. BMNH 1969.1833 (female), “Petchaburi”, now Phetchaburi; IRSNB 16553 (male), Khao Nakwang, Nayang subdistrict, Cha-am District; IRSNB 16554 (female), MNHN 1999.7635 (male), Ban Salakern, Ban Lat District; MNHN 1998.0572 (male), Ban Ton Kaet, Kaeng Krachan District. Prachuap Khiri Khan. BMNH 1969.1830 (male), “Huey Sak, Peninsular Siam”, now Ban Huai Sak (or Ban Huai Sak Bon); BMNH 1969.1832 (female), “Hua Hui”, most likely a lapsus from Hua Hin. **No locality.** BMNH 1969.1829 (female), “Siam”. – **CAMBODIA.** BMNH RR 1946.1.3.30–31 (2 males), BMNH RR 1946.1.3.32 (male; holotype), “Cambodia”.

Taxonomic comments. – The BMNH catalogue lists three syntypes for this species, BMNH RR 1946.1.3.30–32, all collected by H. Mouhot in “Cambodia”. However, the description of Boulenger (1914) was rather succinct. Boulenger understood the confusion created by Günther (1864), who had mixed specimens with 17 and 19 scale rows. As a consequence, Boulenger (p. 70) proposed a new name for specimens with 17 rows, as follows: “... with 17 rows of scales and a blackish spot at the base of the tail and another at the end has been figured by Günther (Rept. Brit. Ind., pl. XX. Fig. A). (...) ... a new name (...) for the snake figured in the Reptiles of British India.” In so doing, Boulenger established the type of his description as the sole specimen depicted on Günther’s plate, which indeed has 17 rows and the black spots on the tail. The depicted specimen could have been selected only among four specimens: BMNH RR 1946.1.3.30–32, long regarded as the “syntypes”, collected by H. Mouhot in 1860–1861, and possibly another specimen with 17 rows available at Günther’s time, BMNH 1863.9.29.12, from “Bangkok”. A note added by Malcolm Smith at the end of Boulenger’s text (p. 70) mentioned the availability of 25 specimens of *Simotes taeniatus* var. *mouhoti*, but this note does not belong to Boulenger’s description and these specimens cannot be considered to be syntypes.

The drawing in Günther’s plate shows a specimen with a long tail and a single anterior temporal, which excludes the Bangkok specimen (a female with only 29 subcaudals) and BMNH RR 1946.1.3.30 (2 anterior temporals). According to the scalation data and head colour that can be determined from Günther’s plate, we identify without any ambiguity BMNH RR 1946.1.3.32 as the animal depicted on Günther’s plate. This specimen thus stands out as the holotype of *Simotes [taeniatus]* var. *mouhoti* Boulenger, 1914.

Two other specimens with 19 dorsal scale rows collected by Henri Mouhot are referable to *Oligodon taeniatus* (see above). The confusion between *Oligodon taeniatus* and *O. mouhoti* has been discussed above.

Taylor (1965: 781) mentioned, under the name *Oligodon taeniatus*, specimens from Pattani Province and Songkhla Province, in southern Peninsular Thailand. We did not examine these specimens and we cannot assign them to any species. Nevertheless, the pattern as described by Taylor does not agree with that of *Oligodon mouhoti*.

Diagnosis. – A species of the genus *Oligodon*, characterized by: (1) an average size for the group, up to about 340 mm in total length; (2) deeply forked hemipenes, not spinose but bearing two large papillae; (3) 17 dorsal scale rows at midbody, 15 before vent; (4) 14–16 maxillary teeth, the last two strongly enlarged; (5) full complement of head scales, rarely including a presubocular; (6) 8 (rarely 7) supralabials; (7) anal plate single; (8) the presence of two dark longitudinal paravertebral stripes edging a pale (yellow in life) vertebral stripe, and two narrower dorsolateral stripes; (9) two large rounded, dark brown or black blotches on the upper surface of the tail, one at its base, the other one near the tip; (10) five major markings on upper head surface: one anterior across the snout, one small longitudinal, frontal marking, two central, oblique streaks directed posteriorly downwards, and one broad, arrow-shaped nuchal blotch; and (11) base of oblique central streaks reaching the ventral scales in all examined specimens.

Oligodon mouhoti differs from all other species of the group by the combination of (1) 17 scale rows at midbody, (2) the presence of a pattern similar to that of *Oligodon taeniatus*, namely two dark, conspicuous paravertebral and two dorsolateral stripes, and (3) two dorsal blotches on the upper surface of the tail, which are present in all examined specimens.

Campden-Main (1969) discussed the differences between *O. taeniatus* and *O. mouhoti*. This author rightly referred specimens with 19 DSR to *O. taeniatus* and those with 17 rows plus a pair of blotches on the upper tail surface to *O. mouhoti*. Campden-Main also noticed differences in the length of the oblique streaks behind the corner of the mouth. According to Campden-Main (1969), the lower end of each streak reaches ventral scales in *O. mouhoti*, whereas it stops short of ventrals in *O. taeniatus*. Our data do not agree fully with this statement. The streaks do reach a ventral scale in 55 out of 105 specimens (52.4% in *O. taeniatus*). In *O. mouhoti*, the streaks reach a ventral scale in all examined specimens. This character should not be considered to be fully diagnostic to separate these two species.

Description and variation (based on Campden-Main [1969] and 25 examined specimens). – *Morphology.* Body rather elongated but not especially thin; head short, thick, barely distinct from the poorly defined neck; snout projecting forward of the lower jaw, long, amounting to 28.0–32.4 % ($x = 29.5$ %, $s = 1.8$) of HL, or 1.6–2.1 ($x = 1.8$, $s = 0.2$) times as long as diameter of eye; eye rather small, with a round pupil; tail rather short, thick, tapering.

Maximal total length known is 339 mm (SVL 277 mm, TaL 62 mm) for a male (BMNH 1969.1827). The largest examined female is 311 mm (SVL 270 mm, TaL 41 mm; BMNH 1969.1833). In our sample, males reach a larger size than females. Ratio TaL/TL: 0.122–0.185, with a strong sexual dimorphism (see below).

Dentition. 14–16 maxillary teeth ($x = 15.0$, $s = 0.7$), the last two strongly enlarged and blade-like.

Body scalation. DSR: 17–17–15, without exception; scales small, ovoid, all smooth.

VEN: 145–163 (plus 1–2 preventrals), slightly angulate; SC: 29–43, paired (with a strong sexual dimorphism); anal plate entire.

Head scalation. Rostral thick, curved onto the upper snout surface, well visible from above, separating internasals by up to one half of their length; nasals subrectangular, about 1.6–2.0 times as long as high, vertically divided, with the posterior part distinctly smaller than anterior one; nostril crescentic, piercing middle of the nasal just forward of the division; internasals subrectangular, in broad contact, much shorter than prefrontals; prefrontals subrectangular, much wider than long; frontal hexagonal, ogive-like pointing backwards, 1.30–1.45 times as long as wide ($x = 1.40$, $s = 0.05$); an undivided supraocular on each side, much longer than wide, as wide as prefrontals; two very large, subtriangular parietals, much longer than the frontal, in broad

contact; 1/1 small, elongate subrectangular loreal scale in 18 specimens, absent on both sides in 5 out of 23 specimens, and missing on one side of a sixth specimen, about 1.1–1.5 times as long as high, in broad contact with the nasal; 8/8 supralabials (7/7 in only 1/23 specimens), 1st SL small, 2nd and 3rd in contact with loreal in all specimens, 4th and 5th entering orbit in all specimens, 6th and 7th largest; 1/1 preocular, high and narrow in all examined specimens; a small presubocular present (in 33/46 occurrences) or absent (13/46); 2/2 small postoculars in all examined specimens; 1/1 (in 44/46 specimens) or 2/2 (in 2/46) elongated anterior temporals, 2/2 posterior temporals; 9/9 (in 13/23 specimens), 9/10 (in 2/23) or 10/10 (in 8/23), first pair in contact, IL 1–4 (in 14/23 specimens) or 1–5 (9/23) in contact with anterior chin shields, 5th IL the largest.



FIGURE 15. *Oligodon mouhoti*. Specimen BMNH 1969.1833. General view of body. Photograph by Patrick David.

Colour and pattern in alcohol and in life. The upper surface is brownish-grey or greyish-tan, with dorsal scales finely edged with dark brown (same in life); from the nape up to the tip of the tail, a conspicuous yellow, tan or light brown vertebral stripe, wider than in *O. taeniatus*, edged on each of its side with a wider dark greyish-brown or tan blackish-brown paravertebral stripe (ochre brown in life); both paravertebral stripes are scattered or intersected with small black or dark brown irregular spots every 4 or 5 scales; an irregular dark brown stripe, narrower than paravertebral stripes, extends on each side on DSR 3–4 from the neck to the vent; these dorsolateral stripes are more or less regular or scattered with dark dots but are present in all specimens. The tail is similar to the upper body surface, with a wide and conspicuous vertebral stripe (not reaching tail tip), edged on each side with another diffuse brownish-grey stripe; two large, dark or blackish-brown vertebral blotches, more or less hexagonal or butterfly shaped, reaching down to the middle of the lateral surface of the tail; the first blotch is located at the level of subcaudals 1–5, its anterior tip reaching the level of the anal plate; the posterior blotch, much smaller than the anterior one, extends on 15–10 subcaudals before the tail tip; a faint, narrow dark brown lateral stripe on each side at the limit with subcaudals.



FIGURE 16. *Oligodon mouhoti*. Specimen BMNH 1969.1833. Dorsal view of the tail. Photograph by Patrick David.



FIGURE 17. *Oligodon mouhoti*. Specimen BMNH 1969.1833. Head, left side. Photograph by Patrick David.



FIGURE 18. *Oligodon mouhoti*. Specimen BMNH 1969.1833. Ventral view. Photograph by Patrick David.

The head is brownish-grey or greyish-brown, darker than body; supralabials paler than upper head surface, cream more or less finely variegated with dark brown (same in life); five major markings above, as follows: a broad transversal dark brown marking on the snout (reddish-brown in life), just in front of eyes, extends downwards obliquely backwards across the eye down to SL 6–7; a short, narrow, arrow shaped, longitudinal streak on the frontal; on each side, a large, oblique dark brown or blackish-brown marking, not in contact on the top of the head, extends onto frontal, anterior part of parietals and posterior temporals, side of neck side behind corner of the mouth, then downwards, reaches in all examined specimens the corresponding ventral; lastly, a conspicuous, dark brown, heart-shaped, nuchal blotch, pointing forward with two short posterior branches in between which starts the vertebral stripe. Infralabials, chin and throat uniformly creamish-yellow or pale ochre brown; sometimes infralabials with a few dark brown spots.

The venter is creamish-yellow or greyish-yellow (cream anteriorly, then bright pink red or coral red in life), with, on most ventral scales, an irregular black subrectangular blotch near one or both tips; lower tail surface as venter, with subrectangular blotches in the anterior half of the tail, uniform behind.

Hemipenis (*in situ*). – The hemipenis is very similar to that of *Oligodon taeniatus* but longer; it is forked opposite the 7th SC and reaches SC 18–19. On its proximal third it is covered with calyces and a few faint folds; the distal parts are smooth. The very long papillae, all smooth, are present as in *O taeniatus*.

Sexual dimorphism. – Clearly present in the three following characters: (1) difference in the ratio TaL/TL: males: 0.172–0.185 ($x = 0.180$, $s = 0.004$); females: 0.122–0.131 ($x = 0.127$, $s = 0.004$); (2) difference in the number of ventrals: males: 145–152 ($x = 148.0$, $s = 2.5$); females: 154–163 ($x = 157.8$, $s = 3.1$); (3) difference in the number of subcaudals: males: 39–43 ($x = 40.8$, $s = 1.1$); females: 29–33 ($x = 31.0$, $s = 1.4$).

Distribution. – **Thailand.** Centre and east of the country, in provinces or region of Bangkok, Nakhon Ratchasima (Khorat), Nakhon Sawan (Pat Nampheu, east of Nakhon Sawan), Phetchaburi (Ban Salakern, Ban Lat District; Ban Ton Kaet, Kaeng Krachan District; Khao Nakwang, Cha-am District; Phetchaburi, Muang District), and Prachuap Khiri Khan (Ban Huai Sak; Hua Hin) (Taylor, 1965 [as *O. taeniatus*]; Nabhitabhata et al., 2004 [as *O. taeniatus*]; Pauwels et al., 2003; examined material). – **Cambodia.** No precise locality (Saint Girons, 1972). Reading H. Mouhot (1864a–b) does not provide any clue because this naturalist travelled Cambodia from East to West.

As stated above, Taylor (1965: 781) mentioned specimens of “*Oligodon taeniatus*” from Pattani Province (Na Pradoo) and Songkhla Province (Songkhla), in southern Peninsular Thailand. These provinces were again listed by Nabhitabhata et al. (2004) in the account of *O. taeniatus* sensu Smith (1943). On the basis of the short description of their pattern, these specimens do not agree with *Oligodon mouhoti*.

The occurrence of this species in Vietnam is questionable. It has been cited from this country only by Campden-Main (1970), from Thu Dau Mot, Province of Binh Duong, and by Nguyễn et al. (2005), from Nam Đà, Province of Dak Nông. Campden-Main’s specimen could not be traced in the collections of the USNM (S. Gotte, pers. comm., 20 December 2007), but we received pictures of another Vietnamese specimen of “*O. mouhoti*”, USNM 166984 (Bien Hoa, Province of Dong Nai) that is actually a typical *Oligodon deuvei* **spec. nov.** (see below). Because there are only two, unverified records of *Oligodon mouhoti* in Vietnam, we delete for the present time this species from the snake fauna of this country.

Biology. – This small species is terrestrial, rather secretive and both diurnal and nocturnal. It is not uncommon. As far as is known, its biology is quite similar to *Oligodon taeniatus*. Taylor (1965: 780) collected specimens under piles of recently cut grasses. In Phetchaburi, specimen IRSNB 16553 was seen in mid afternoon on a sandy path near a rice field; specimen MNHN 1998.0572 was collected at night on a road in secondary forest. Two other specimens were caught inside a house, either by day (IRSNB 16554) or at night (MNHN 1999.7635) (Pauwels et al., 2003). A wild caught specimen imported through the pet trade laid in a night of June 2005 two eggs, measuring 2.6 x 0.9 and 2.8 x 0.9 cm. The eggs were stuck together.

Discussion. – *Oligodon mouhoti* is the sole member of the group of *O. taeniatus* to display the twin blotches on the upper tail surface, these being present in all examined specimens. We came across other specimens with 17 dorsal scale rows but with a rather, often conspicuous vertebral stripe and usually no tail blotches. An analysis of their variation shows that they are referable to a distinct species, which we describe here as:

***Oligodon deuvei* spec. nov.**

(Figs. 19–24)

Holotype. – MNHN 1974.1366 (adult male), from “Arboretum de Trang Bôm”, now Arboretum of Bien Hoa, Dong Nai Province, Vietnam. Collected by Sergent Poilane, July 1932.

Paratypes (11 specimens). – BMNH 1938.8.7.35 (adult male), BMNH 1938.8.7.36 (juvenile female), BMNH 1969.1810, BMNH 1696.1817, BMNH 1969.1831 (3 adult females), “Saigon”, now Ho Chi Minh City, Vietnam; deposited by Malcolm A. Smith; BMNH 1912.5.11.1 (adult female), “Laos”, deposited by F.

Guitel. – MNHN 1974.1266–1267 (2 adult females), “Vietnam Sud, Région de Saïgon”, now the vicinity of Ho Chi Minh City, southern Vietnam; deposited by Sergent Poilane, no date; MNHN 1974.1367 (adult female), “Arboretum de Trang Bôm”, now Arboretum of Bien Hoa, Dong Nai Province, southern Vietnam. Collected by Sergent Poilane, July 1932; MNHN 1985.0395 (adult female), “Laos: Vientiane”, collected (August 1961) and deposited by Jean Deuve. – LSUHC 07883 (adult female), Che Teal Chrum Village, Pursat Province, Cambodia.

Material (12 + 5 specimens). – All specimens examined by us belong to the type series. We also examined unpublished notes of Deuve (1985) and we consider that 5 out of the 8 specimens referred by this author to “*Holarchus taeniatus* Günther” indeed belong to *Oligodon deveui* **spec. nov.**: SRL 43 (9 km South of Vientiane), SRL 65 and SRL 195 (Tha Ngon, 25 km North of Vientiane, Vientiane Prefecture), SRL 218 (Wattai, 5 km West of Vientiane, Vientiane Prefecture) (4 males) and SRL 63 (Vientiane; 1 female). These specimens were included here in the variation of characters.

Diagnosis. – A species of the genus *Oligodon*, characterized by (1) deeply forked hemipenes, not spinose but bearing two large papillae; (2) 17 dorsal scale rows at midbody, 15 before vent; (3) 12–14 maxillary teeth, the last two strongly enlarged; (4) anal plate single; (5) head scalation complete but presubocular absent in all available specimens but one; (6) 7 (rarely 8) supralabials; (7) 8 or 9 infralabials; (8) a conspicuous, broad vertebral stripe orange, bright rusty red or pale yellow, edged with two darker faint paravertebral stripes or with more or less numerous dark dots in the paravertebral region; (9) no dorsolateral stripe or a series of dark dots; (10) 4 or 5 major markings on upper head surface: one anterior transverse blotch across the snout, sometimes a small sagittal blotch on upper head surface, often reduced to spots, two oblique streaks, directed posteriorly downwards, and one broad nuchal, arrow-shaped; and (11) branches of the oblique central streaks not reaching the ventral scales in all examined specimens.

This species differs from other species of the *O. taeniatus*-group by the combination of (1) 17 dorsal scale rows, (2) usually 7 supralabials, (3) a broad, often bright vertebral stripe not or barely edged with dark stripes, (4) no dorsolateral stripes, (5) body often strongly fasciated, and (6) usually no blotches on the tail.

Oligodon deveui **spec. nov.** is quite close to *O. barroni* in scalation. It differs from the latter one by the combination of some morphological characters (see below), a higher mean number of maxillary teeth, the lack of large dorsal blotches and the presence of a broad vertebral stripe (vertebral stripe absent in *O. barroni*). Specimens with a “conspicuous yellow vertebral stripe and no dorsal spots on tail” mentioned by Smith (1943: 210) under *Oligodon taeniatus* sensu Günther (1864), namely with 17 DSR (*Oligodon mouhoti*), are referable to this species.

In our sample, 13 specimens show the orange or rusty brown vertebral stripe, four others, all large females from southern Vietnam and Laos, have a more subdued yellowish-brown stripe with darker dots. Only one specimen, the holotype, shows two blotches on the upper tail surface similar to those of *Oligodon mouhoti*. However, we could not find any other character to separate these two morphs and we consider the colour of the stripe to be variable. Specimens with the subdued yellowish-brown vertebral stripe are quite similar in pattern to *Oligodon formosanus* (Günther, 1872), but these two species are easily separated by the number of MSR (19 in *O. formosanus* vs. 17), the number of ventrals and subcaudals (more than 160 and 45 respectively in *O. formosanus*) and different hemipenes.

Etymology. – For his major contributions to the herpetology of Laos, this species is named in honour of Mr. Jean Deuve (1918–2008). Mr. Deuve spent about 20 years in Laos where he carried out several political and military duties and conducted researches on its wildlife, especially the snakes (Deuve, 1970).

Description of the holotype (Figs. 19–22). – Body elongated but not especially thin; head ovoid, typical of the *O. taeniatus* group, short, thick, barely distinct from the thick neck; snout projecting over the lower jaw, long, rounded, amounting to 28.8 % of HL, or 1.7 times as long as diameter of eye; eye rather small, with a round pupil; tail short, thick, tapering.

SVL: 241 mm; TaL: 48 mm; TL: 289 mm; HL: 11.7 mm; ratio TaL/TL: 0.166.



FIGURE 19. *Oligodon deuvei* **spec. nov.** Specimen MNHN 1974.1366, holotype. General view of body. Photograph by Patrick David.

Dentition. 14 maxillary teeth, the last two being strongly enlarged and blade-like.

Body scalation. DSR: 17–17–15; scales small, ovoid, all smooth. VEN: 146 (plus 2 preventrals), slightly angulated; SC: 36, all paired; anal plate entire.

Head scalation. Rostral thick, curved onto the upper snout surface, well visible from above, separating internasals by about one half of their length; nasals slightly “butterfly-shaped”, about 1.4 times as long as high, vertically divided, with the posterior part distinctly smaller than anterior one; nostril crescentic, piercing middle of nasal just in front of the division; internasals subrectangular, in broad contact, shorter than prefrontals; prefrontals subrectangular, much wider than long; frontal hexagonal, ogive-like, broad, 1.1 times as long as wide; a supraocular on each side, distinctly longer than wide, about as wide as prefrontals; two very large, subtriangular parietals, much longer than the frontal, in broad contact; 1/1 small, elongate loreal scale, in contact with the nasal; 7/7 supralabials, 1st SL small, 2nd and barely 3rd in contact with the loreal, 3rd and 4th entering orbit, 5th and 6th largest; 1/1 preocular, high and narrow; no presubocular; 2/2 small postoculars; 1+2/1+2 temporals, anterior ones elongated; 8/8 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 5th IL the largest.



FIGURE 20. *Oligodon deuvei* **spec. nov.** Specimen MNHN 1974.1366, holotype. Dorsal view at midbody. Photograph by Patrick David.

Colouration and pattern in alcohol. The upper surface is dark reddish brown, with dorsal scales strongly edged with dark brown; a broad (vertebral row + about 1/3 of each adjacent row), pale yellow vertebral stripe extends from the neck to the tip of the tail; on each side of the vertebral stripe, numerous dark brown irregular spots every 4 to 6 scales, more rounded anteriorly; irregular blackish-brown spots scattered on the sides, not forming a stripe. Dorsally, the tail is similar to the upper body surface, with a broad and conspicuous vertebral stripe; a few scattered dark brown dots; two small, dark brown transversal vertebral blotches, one just after the level of the vent, the other one about 5 SC before the tip of the tail respectively.

The head is brownish-grey, darker than body, with small scattered dark dots; supralabials pale yellowish-brown, SL 1–4 largely dotted with brown; an irregular dark brown marking on the snout, in front of eyes, not reaching the internasals, extending downwards and backwards across the eye then downwards, to produce a short, dark, conspicuous oblique streak on SL 4; another oblique dark brown spot on SL 6; several irregular

dark brown spots on the frontal and parietals; one large and broad subrectangular nuchal blotch; one large, oblique dark brown lateral streak on the side of the neck, not reaching the ventral scales; infralabials, chin and throat pale yellow ochre strongly dotted with dark brown.



FIGURE 21. *Oligodon deuvei* spec. nov. Specimen MNHN 1974.1366, holotype. Head, left side. Photograph by Patrick David.

The venter is pale yellow, with a row of large irregular blackish-brown blotches near the tips of the ventrals, becoming progressively larger and sometimes in contact medially in the posterior half of the body. Tail below with strong blotches, disappearing abruptly at the posterior first part of the tail.

Description and variation. – Based on 12 specimens plus 5 specimens described by Deuve (1985) which are positively identifiable. Characters are as described for the holotype, with the following variation or differences:

Morphology. Snout long, amounting to 27.3–32.1 % ($x = 29.3$ %, $s = 1.4$) of HL, or 1.7–1.9 ($x = 1.8$, $s = 0.1$) times as long as diameter of eye; tail rather short and thick.

Maximal total length known is 530 mm (SVL 460 mm, TaL 70 mm) for a female (SRL 63; not seen). The longest specimen examined by us is 353 mm long (SVL 302 mm, TaL 51 mm; female; MNHN 1985.0395). The largest examined male is 333 mm long (SVL 275 mm, TaL 58 mm; BMNH 1938.8.7.35). Ratio TaL/TL: 0.132–0.172, with a strong sexual dimorphism (see below).

Dentition. 12–15 maxillary teeth ($x = 13.6$, $s = 1.1$), the last two strongly enlarged and blade-like.

Body scalation. DSR: 17–17–15 rows in all specimens; scales small, all smooth. VEN: 142–163 (plus 1–2 preventrals), slightly angulate; SC: 31–47, all paired (with a weak sexual dimorphism); anal plate entire.

Head scalation. Rostral barely separating the internasals; nasals about 1.6–1.8 times as long as high, vertically divided; internasals in broad contact and much shorter than prefrontals; frontal hexagonal, 1.25–1.35 times as long as wide ($x = 1.30$, $s = 0.03$); a supraocular on each side, distinctly longer than wide, about as

wide as prefrontals; 1/1 small, subrectangular loreal scale, about 1.3–1.7 times as long as high; 7/7 (in 16/17 specimens) or 8/8 (1/17) supralabials, 1st SL small, usually only the 2nd SL (in 18/34 occurrences) or 2nd + 3rd (in 16/34) in contact with loreal, 3rd + 4th entering orbit in all specimens, 5th and 6th largest; 1/1 preocular, high and narrow; presubocular absent in 33/34 occurrences, present but small in only 1 specimen; 2/2 small postoculars in all examined specimens; 1 (in 33/34 occurrences) or 2 (1/34) elongated anterior temporal, 2 posterior temporals; 8/8 (in 11/17 specimens) or 9/9 infralabials (6/17), first pair in contact, IL 1–4 in contact with anterior chin shields, 5th IL the largest.



FIGURE 22. *Oligodon deuvei* **spec. nov.** Specimen MNHN 1974.1366, holotype. Ventral view. Photograph by Patrick David.

Colouration and pattern in alcohol (data in life according to Deuve, 1985). The upper surface is reddish-brown, reddish-grey or dark yellowish-grey (greyish-brown, reddish-brown or reddish-tan in life), with dorsal scales usually narrowly but distinctly edged with dark brown producing faint, irregular crossbars, quite strong in some specimens; scattered dark brown dots on the body; usually a broad, conspicuous pale yellow, orange, rusty red or yellowish-brown vertebral stripe (orange, rusty red or red ochre in life), sometimes dull yellowish-grey, subdued and spotted with greyish-brown in larger specimens (Figs. 23–24), extends from the neck up to the tip of the tail; vertebral stripe edged on each of its sides either with scattered dark brown, more or less rounded spots, or, sometimes, with a faint wider dark brown or dark tan paravertebral stripe (ochre or dark reddish-brown in life) with scattered black spots on its edge, no dorsolateral stripes on the body, sometimes a series of aligned dark brown dots (dark reddish-brown in life). Tail is similar to upper body surface, with a broad vertebral stripe, sometimes edged on each side with a diffuse dark stripe which reaches the tip of the tail, often only with dark brown spots; usually no large blotches on upper surface of the tail, but present in the holotype.

The head is brownish-grey or brown, darker than the body; supralabials ivory (cream in life), edged with brown (dark brownish-red in life) or variegated with dark brown (greyish-brown in life); a total of 4 to 5 major markings on upper head surface, as follows: a more or less narrow transversal dark brown marking on the snout, just in front of eyes, extends downwards obliquely backwards across the eye down to SL 4; a short, narrow, water drop shaped, longitudinal streak on the frontal, sometimes absent or reduced to disjunct dots in some specimens; on each side, a large, oblique dark brown or blackish-brown (dark brownish-red edged with ochre in life) sagittal marking on frontal, not in contact each with the other, anterior part of parietals and posterior temporals, reaches the neck side behind the corner of the mouth but does not reach the ventral scales in all specimens; a broad, subrectangular, arrow- or heart-shaped, dark brown nuchal blotch, pointing forward. Infralabials, chin and throat cream spotted with brown or sometimes uniformly ochre-yellow with a few dark brown spots.



FIGURE 23. *Oligodon deuvei* **spec. nov.** Specimen MNHN 1985.0395, with a subdued pattern. General view. Photograph by Patrick David.

The venter is creamish-yellow or light grey (cream then bright pink then red posteriorly red in life), nearly uniform with a few rectangular scattered spots, or usually with a numerous, large blackish-brown subrectangular spots near both tips of ventrals; lower tail surface as venter, uniform or with subrectangular blotches in its anterior half, uniform behind.



FIGURE 24. *Oligodon devei* spec. nov. Specimen MNHN 1985.0395, with a subdued pattern. Dorsal view at midbody. Photograph by Patrick David.

Hemipenis (*in situ*; based on MNHN 1974.1366). – The hemipenis is similar to that of *Oligodon taeniatus* in morphology, forked opposite the 5th or 6th SC and reaching SC 12. On its proximal part, it is covered with calyces and with a few folds; the distal parts are smooth and entirely devoid of spines. On each branch a long, smooth papilla is present as in *O. taeniatus*.

Sexual dimorphism. – Clear in the three following characters: (1) difference in the ratio TaL/TL: males: 0.158–0.172 ($x = 0.165$, $s = 0.007$); females: 0.132–0.149 ($x = 0.142$, $s = 0.004$); (2) difference in the number of ventrals: males: 140–147 ($x = 144.7$, $s = 3.3$); females: 147–155 ($x = 152.1$, $s = 4.3$); (3) difference in the number of subcaudals: males: 36–47 ($x = 41.5$, $s = 5.0$); females: 31–38 ($x = 34.6$, $s = 2.3$). Lastly, all specimens with a broad but yellowish-brown, subdued vertebral stripes are large females, although some also have a colourful stripe.

Distribution. - Vietnam. Known only from the south of the country: provinces or district of Dong Nai (Bien Hoa; our data and specimen USNM 166984) and Ho Chi Minh District (Ho Chi Minh). – **Laos.** Known only from Vientiane Prefecture (Vientiane and its vicinity, Tha Ngon, and Wattai). – **Cambodia.** Known only from Pursat Province (Che Teal Chrum Village). This species has been confused with *O. mouhoti* and its distribution is surely still largely unrecorded. We expect it to occur also in northeastern Thailand.

Biology. – This small species is terrestrial and secretive. Deuve (1970) encountered his specimens of “*Oligodon taeniatus*”, which turned out to be mostly *Oligodon devei*, during all seasons. Juvenile specimens appeared during the rainy season (July to October). According to Deuve (1985), specimens were collected at day time on the ground, under various vegetal scrapes, or in gardens. Its biology is presumed mostly similar to *O. mouhoti*.

***Oligodon barroni* (Smith, 1916)**

(Figs. 25–28)

Simotes barroni Smith, 1916: 46. – **Type locality.** “Hup Bon, E. of Sriracha, S. E. Siam”, now Hup Bon, east of Si Racha, Chon Buri Province, southeastern Thailand. – **Syntypes.** Three specimens according to the original description: BMNH 1946.1.3.21 (adult male; ex BMNH 1917.5.14.16), BMNH 1946.1.3.22 (adult male; ex BMNH 1917.5.14.16), and BMNH 1946.1.3.26 (adult male; ex BMNH 1917.5.14.16). Collected by Mr. P. A. R. Barron.

Holarchus taeniatus caudaensis Bourret, 1934: 173. – **Type locality.** “Cauda” now Cau Da, near Nha Trang, Khánh Hoa Province, Vietnam. – **Syntypes.** Three specimens, K. 333 and M. 152 (both juvenile; R. Bourret’s collection number; neither traced, probably in Hanoi), and MNHN 1938.0134 (juvenile, probably male); Collected by Mr Krempf, deposited (MNHN) by René Bourret. – **Synonymized** with *Oligodon barroni* by Smith (1943: 210).

Material (20 specimens). – **THAILAND.** Chanthaburi Province. BMNH 1969.1784 (female), “Khao Sebab, S.E. Siam”, now Khao Sabap, near Chanthaburi. Chon Buri Province. BMNH 1946.1.1.20, BMNH 1946.1.1.93 (both ex BMNH 1921.4.1.16; 2 males), BMNH 1946.1.3.21–22 (both ex BMNH 1917.5.14.5; 2 males), BMNH 1946.1.3.26 (ex BMNH 1917.5.14.16) (1 male), Hup Bon, E. of Sriracha, S. E. Siam”, now Hup Bon, east of Si Racha; BMNH 1946.1.3.37 (ex BMNH 1921.4.1.18; female), BMNH 1969.1780, BMNH 1969.1782–1783, BMNH 1969.1786 (4 females), BMNH 1969.1781 (male), Sriracha, now Si Racha; BMNH 1969.1779 (male), “Koh Lam, S.E. Siam”, now Ko Lam. Saraburi Province. BMNH 1946.1.3.36 (ex BMNH 1921.4.1.17; female), “Muak Lekquo, Dong Rek Range, E. Siam”, now Muak Lek; BMNH 1969.1778, BMNH 1969.1785 (2 males), “Pak Jong”, now Pak Chong. – **LAOS.** Champasak Province. MNHN 2003.3329 (male), Xe pian NBCA; MNHN 2003.3330 (female), Huay Saoe (Saoe Stream), near Taong. – **VIETNAM.** Gia Lai Province. MNHN 1973.0143 (female), “Choreo, prov. de Phu-Bôn”, now Cheo Reo (13°25'N 108°30'E). Khanh Hoa Province. MNHN 1938.0134 (juvenile), “Cauda: près de Nha Trang, S. Annam”, now Cà Dá, near Nha Trang; MNHN 1958.0458 (male), Nha Trang.

Taxonomic comments. – Two other specimens from the same locality are identified as syntypes in the catalogue of the BMNH, but the original description of *Simotes barroni* was based only on the three specimens listed above. We have no hesitation about the synonymy of *Holarchus taeniatus caudaensis* Bourret, 1934 with *Oligodon barroni*.

Diagnosis. – A species of the genus *Oligodon*, characterized by: (1) a large size for the group, up to about 400 mm in total length; (2) deeply forked hemipenes, not spinose but fitted with two large papillae; (3) 17 dorsal scale rows at midbody, 15 before vent; (4) 10–13 maxillary teeth, the last two strongly enlarged; (5) head scalation complete, never including a presubocular (see below); (6) 7 (rarely 8) supralabials; (7) anal plate single; (8) the presence of 10–14 dark brown or black blotches on the upper surface of body + 2–3 on the tail; (9) five major markings on upper head surface: one anterior transverse blotch across the snout; one longitudinal, frontal marking; one pair of paramedian central, oblique streaks, directed posteriorly downwards; and one arrow-shaped nuchal blotch; and (10) branches of the oblique central streak not reaching the ventral scales.

Oligodon barroni differs from all other species of the *O. taeniatus*-group in the combination of (1) 17 scale rows at midbody, (2) the presence of large, dark hexagonal or butterfly-like dorsal blotches on the body and the tail, (3) the absence of a vertebral stripe, and (4) a low number of maxillary teeth. With its dorsal blotches, this species cannot be really confused with any other species of *O. taeniatus*-group.

Description and variation (based on Smith [1943] and Saint Girons [1972], and 20 examined specimens). – **Morphology.** Body rather elongated but not especially thin; head short, thick, barely distinct from the poorly defined neck; snout projecting forward of the lower jaw, long, amounting to 27.1–33.6 % ($x = 30.4$ %, $s = 4.6$) of HL, or 1.7–1.8 ($x = 1.8$, $s = 0.1$) times as long as diameter of eye; eye rather small, with a round pupil; tail thick and tapering. The maximal total length known is 401 mm (SVL 346 mm, TaL 55 mm)

for a female (MNHN 1973.0143). The largest examined male is 367 mm long (SVL 298 mm, TaL 69 mm; BMNH 1946.1.3.21). Ratio TaL/TL: 0.137–0.189, with a strong sexual dimorphism (see below).



FIGURE 25. *Oligodon barroni*. Specimen BMNH 1969.1780. General view of body. Photograph by Patrick David.

Dentition. 10–13 maxillary teeth ($x = 11.4$, $s = 0.9$), the last two being strongly enlarged and blade-like.

Body scalation. DSR: 17–17–15, without exception; scales small, ovoid, all smooth.

VEN: 136–160 (plus 1–2 preventrals), slightly angulate; SC: 28–48, paired (with a sexual dimorphism); anal plate entire.

Head scalation. Rostral thick, curved onto the upper snout surface, well visible from above, separating internasals by about one half of their length; nasals subrectangular, about 1.6–1.8 times as long as high, vertically divided, with the posterior part distinctly smaller; nostril crescentic, piercing middle of nasal just forward of the division; internasals subrectangular, in broad contact, much shorter than prefrontals; prefrontals subrectangular, much wider than long; frontal hexagonal, ogive-like pointing backwards, 1.10–1.25 times as long as wide ($x = 1.20$, $s = 0.05$); an undivided supraocular on each side, much longer than wide, as wide as prefrontals; 2 very large, subtriangular parietals, much longer than the frontal, in broad contact; 1/1 small loreal, about 1.1–1.2 times as long as high, in broad contact with nasal; 7/7 (in 17/20 specimens), 7/8 (in 2/20) or 8/8 (in only 1/20) supralabials, 1st SL small, 2nd (in 14/40 occurrences) or 2nd and 3rd (in 26/40) in contact with loreal, 4th and 5th entering orbit in all specimens, 5th and 6th largest; 1/1 preocular, high and narrow in all examined specimens; no presubocular; 2/2 small postoculars in all examined specimens; 1/1 elongated ante-

rior temporals, 2/2 posterior temporals; 7/8 (in 1/20 specimens), 8/8 (in 8/20), 8/9 (in 1/20) or 9/9 (in 10/20) infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 4th IL the largest.



FIGURE 26. *Oligodon barroni*. Specimen BMNH 1969.1780. Dorsal view at midbody. Photograph by Patrick David.



FIGURE 27. *Oligodon barroni*. Specimen BMNH 1969.1780. Head, left side. Photograph by Patrick David.



FIGURE 28. *Oligodon barroni*. Specimen BMNH 1969.1780. Ventral view. Photograph by Patrick David.

Colouration and pattern in alcohol and in life. The upper surface is brownish-grey or greyish-tan, with many dorsal scales finely edged with dark brown, more distinctly in their lower part, producing a strongly dotted pattern; two parallel series of irregular white elongated dots or streaks extend from the nape mark up to the tip of the tail along the vertebral row; these white streaks result from the yellow interstitial skin and the white (yellow in life) edges of some scales or the two rows adjacent to the vertebral row but do not form a defined vertebral stripe; on the back, between 10 and 14 large, dark brown or blackish-brown blotches (dark purplish-brown in life), more or less hexagonal or “butterfly-like”; these blotches are 2 to 3 scales long and 4 or 5 scales wide; some are nearly broken at the level of the vertebral stripe (according to Campden-Main [1970], specimens from southern Vietnam have fainter dorsal blotches); 2 or 3 oblique fasciatures on the sides of the body between each dorsal blotch; a series of lateral dark brown spots on dorsal scale rows 3–4, forming an irregular lateral dark brown stripe on each side. The tail is as the upper body surface, with the vertebral stripe

paler than the background colour and 3 vertebral blotches similar to but smaller than those of the body; the first blotch is located at the level of subcaudals 1–5, its anterior tip reaching the level of the anal plate; last one about 5 SC before the tip; some lateral dark brown dots but no conspicuous lateral stripe.

The head is brownish-grey or greyish-brown, darker than body on its upper surface; supralabials light brown (cream in life), more or less finely variegated with dark brown; 5 major markings dorsally, as follows: a broad transverse dark brown marking on the snout, just in front of eyes, extends downwards obliquely backwards across the eye down to SL 4–5; a short, narrow, arrow or water drop shaped, longitudinal streak on the frontal; a pair of paramedian large, oblique dark brown or blackish-brown marking on frontal (not in contact with each other), anterior part of parietals and posterior temporals, reaching side of neck behind the corner of the mouth, then, downwards, do not reach the corresponding ventral (in close contact on one side in two specimens from Laos); lastly, a conspicuous, dark brown, ogive- or heart-shaped, nuchal blotch, pointing forward. Infralabials, chin and throat uniformly creamish-yellow, sometimes infralabials finely edged with greyish-brown.

The venter is creamish-yellow (pink or red in life), dotted with an irregular black subrectangular blotch near both tips of ventrals; some ventrals have only one blotch, especially in the anterior third of body where blotches are smaller; lower tail surface as venter, with subrectangular blotches only on the anterior half of the tail.

Hemipenis (*in situ*). – The hemipenis is similar to that of *Oligodon taeniatus* but slightly shorter; it is forked opposite the 5th SC and reaches SC 10–12. On its proximal part it is covered with calyces; the distal parts are smooth. The very long papillae, all smooth, are as in *O. taeniatus*.

Sexual dimorphism. – Clearly present in the two following characters: (1) difference in the ratio TaL/TL: males: 0.170–0.189 ($x = 0.180$, $s = 0.007$); females: 0.137–0.150 ($x = 0.143$, $s = 0.006$); (2) difference in the number of subcaudals: males: 36–48 ($x = 40.8$, $s = 3.4$); females: 28–35 ($x = 32.6$, $s = 2.4$). The difference in the number of ventrals is not well defined: males: 136–147 ($x = 143.1$, $s = 3.3$); females: 141–153 ($x = 147.3$, $s = 4.8$); values according to examined specimens; up to 160 VEN according to Smith, 1943).

Distribution. – **Thailand.** Centre and Southeast of the country, in the provinces of Bangkok, Chanthaburi (Khao Sabap, near Chanthaburi), Chon Buri (Sriracha, Koh Lam Island), Rayong (Muang), and Saraburi (Muak Lek, Pak Chong) (Taylor, 1965; Nabhitabhata et al., 2004; examined material). – **Cambodia.** Cardamom Mountains (Daltry & Dany, 2000); no other precise locality (Saint Girons, 1972). – **Laos.** South: Champasak Province (Xepian; Saoe, near Taong) (Teynié et al., 2004). – **Vietnam.** Only known from the Centre and South: provinces of Bình Duong (ex Sông Bé) (Lai Khê), Gia Lai (Cheo Reo), and Khanh Hoa (Cầu Đá, near Nha Trang) (Campden-Main, 1970; Nguyễn et al., 2005; examined material).

A specimen from Saraburi Province in Thailand mentioned by Taylor (1965: 776) is here referred to *Oligodon pseudotaeniatus* **spec. nov.** Nguyễn et al. (2005) cited localities from the Vietnamese provinces of Cao Bang (Nguyễn Bình) and Hai Duong (Chí Linh) respectively. These provinces being in the extreme North of the country, we suspect misidentifications.

Biology. – Nothing is known but it presumed to be similar to *O. mouhoti*.

***Oligodon moricei* spec. nov.**

(Figs. 29–34)

Holotype. – MNHN 1919.0137 (adult female), from “Nha-Trang, Annam”, now Nha Trang, Khanh Hoa Province, Vietnam. Collected by Mr. Krempf. We describe this new species solely on the basis of the holotype.

Diagnosis. – A species of the genus *Oligodon*, characterized by (1) 17 dorsal scale rows at midbody, 15 before vent; (2) 12 maxillary teeth, the last two strongly enlarged; (3) anal plate single; (4) a high number of ventral scales, reaching at least 175; (5) head scalation complete, without presubocular; (7) 8 supralabials; (8) a strong dorsal pattern, with body scales dark greyish-brown strongly edged with black producing a distinct reticulate pattern, a broad, rusty-brown vertebral stripe edged on each side with a broad continuous black

stripe; (9) no dorsolateral stripes; (10) only 4 major blotches on upper head surface: one frontal, one large, subrectangular blotch on each parietal, and an inverted U-shaped nuchal marking across the neck; and (11) a largely dark brown venter.

This species can be recognized by the combination of the conspicuous vertebral and paravertebral stripes, the overall dark colour, 17 dorsal scale rows and a high number of ventrals. Comparisons with other species of the *taeniatus*-group appear below in the Discussion.



FIGURE 29. *Oligodon moricei* **spec. nov.** Specimen MNHN 1919.0137, holotype. General view of body from above. Photograph by Patrick David.

Etymology. – We name this species in honour of the French naval physician, traveller, ethnographer and naturalist Dr. (Jean Claude) Albert Morice (28 May 1848–18 October 1877). He was on duty in Saigon, now Ho Chi Minh City, during two stays in 1872–1874 and 1875–1877. Morice wrote a general account on his travels in Cochinchina, at present southern Vietnam, with a strong emphasis on the people and the area's wild-life (Morice, 1875a–b; reprinted and translated in 1997), various medical papers, and published the first detailed memoir on the fauna of this region (Morice, 1875c–d). Interested readers will find a detailed biography of Dr. Morice (in French) on the website of his descendant Michel Morice:

(<http://pagesperso-orange.fr/mike.morice/MichelHTML/fiches/fiche262.htm#f5241>) (accessed on July 28th, 2008).



FIGURE 30. *Oligodon moricei* spec. nov. Specimen MNHN 1919.0137, holotype. General, oblique view of body. Photograph by Patrick David.

Description of the holotype. – Body not especially thin, laterally compressed, subrectangular in section; head ovoid, quite elongated, flat, barely distinct from the poorly defined neck; snout projecting over the lower jaw, long, rounded, amounting to 28.6 % of HL, or 1.8 times as long as diameter of eye; eye with a round pupil; tail thick and tapering. SVL: 384 mm; TaL: 59 mm; TL: 443 mm; HL: 14.70 mm; ratio TaL/TL: 0.133.

Dentition. 12 maxillary teeth, the last two strongly enlarged and blade-like.

Body scalation. DSR: 17–17–15 rows, all smooth; scales quite large. VEN: 175 (plus 2 preventrals), slightly angulated; SC: 41, all paired; anal plate entire.

Head scalation. Rostral thick, strongly curved on the upper snout surface, well visible from above, separating internasals by about one half of their length; nasals slightly “butterfly-shaped”, elongate, about 2.0 times as long as high, vertically divided, with the posterior part smaller than anterior one; nostril oval, piercing the nasal just in front of the division; internasals subrectangular, distinctly oblique; contact between internasals narrow but slightly longer than contact between prefrontals; prefrontals more or less pentagonal, oblique, distinctly wider than long, in contact along a short distance, shorter than the contact between internasals; frontal hexagonal, ogive-like, 1.2 times as long as wide; a supraocular on each side, distinctly longer than wide, about as wide as prefrontals; two pentagonal parietals, longer than the frontal, in contact on a distance shorter than prefrontals; 1/1 small loreal scale, 1.2 times longer than high, in large contact with the nasal; 8/8 supralabials, 1st SL small, 2nd and 3rd in contact with the loreal, 4th and 5th entering orbit, 6th and 7th largest; 1/1

preocular, high and narrow; no presubocular; 2/2 small postoculars; 1+2/1+2 temporals, anterior ones elongated, with a minute scale above the anterior corner of each anterior temporal; 9/9 infralabials, first pair in contact, IL 1–4 in contact with anterior chin shields, 5th IL the largest.



FIGURE 31. *Oligodon moricei* **spec. nov.** Specimen MNHN 1919.0137, holotype. Dorsal view at midbody. Photograph by Patrick David.

Colouration and pattern in alcohol. The upper surface is dark brownish-grey with scales, especially those of the 4th and 5th rows, strongly edged with black producing an overall irregular reticulation; a broad rusty brown vertebral stripe, covering also the inner half of adjacent rows, edged on each side with a wide black paravertebral stripe, 1.5 scale broad, extends from the neck to the tip of the tail; the vertebral row is irregularly mottled with darker brown; the paravertebral stripes also reach the tail but vanish before its tip; no dorsolateral stripe. The tail is as the upper body surface above, with the conspicuous vertebral stripe; paravertebral stripes broad on the anterior part of the tail, progressively vanishing on its posterior quarter.

The head is dark greyish-brown, slightly darker than body, and more or less uniform; supralabials paler, more or less faintly mottled with dark brown, without dark edges; a narrow transverse black line across the anterior part of the frontal; an oblique dark brown streak on SL 5–6; a short, elongated, blotch, constricted in

its middle, on the frontal; a dark brown, black edged subrectangular blotch on the posterior part of each parietal, descending a short distance and faintly down onto the upper side of the neck; infralabials, chin and throat uniformly dark yellowish-brown. Eye black.



FIGURE 32. *Oligodon moricei* spec. nov. Specimen MNHN 1919.0137, holotype. Lateral view at midbody. Photograph by Patrick David.



FIGURE 33. *Oligodon moricei* spec. nov. Specimen MNHN 1919.0137, holotype. Head, left side. Photograph by Patrick David.



FIGURE 34. *Oligodon moricei* **spec. nov.** Specimen MNHN 1919.0137, holotype. Ventral view. Photograph by Patrick David.

The venter is pale yellow, with one or two rectangular greyish-brown blotches near the tips of each ventral, heavily speckled with dark greyish-brown in between these blotches on the anterior half of body; on the posterior half, the greyish-brown blotches are united and make the belly entirely dark with the exception of a narrow line near the tip of each ventral. Tail strongly mottled with dark greyish brown on its anterior half, less strongly on its posterior half with a faint median dark brown line.

Hemipenis. – Unknown.

Distribution. – **Vietnam.** Currently endemic to the type locality in southern Vietnam: Khanh Hoa Province (Nha Trang).

Biology. – No data available.

Comments. – This species is tentatively referred to the *O. taeniatus*-group solely on the basis of its striped pattern. A male specimen will be necessary to ascertain its position within the genus *Oligodon*. Nevertheless, the scalation and pattern make this species quite easy to recognize.

Discussion

Comparisons with other species of the genus *Oligodon*. A summarized comparison among species of the *Oligodon taeniatus*-group is given in Table 6. These species share the same hemipenial structure, with the possible exception of *O. moricei* for which it is unknown, and a striped pattern, although it is blotched and not striped in *O. barroni*.

The possibility that specimens referred to *Oligodon deuvei* **spec. nov.** are in fact specimens of *Oligodon mouhoti* with a faint pattern and the lack of tail blotches, or specimens of *Oligodon barroni* without dorsal blotches was considered. Although the numbers of maxillary teeth do not agree with such an hypothesis, we tested the significance of morphometry and scalation differences between these three species. There is no or barely no overlapping in the values of the ratio TaL/TL in both sexes between *O. mouhoti* and *O. deuvei* **spec. nov.** Although there is no difference in females, there is also a significant difference in this ratio between males of *O. deuvei* and *O. barroni*: 0.158–0.172 ($n = 3$, $x = 0.165$, $s = 0.007$) in *O. deuvei* vs. 0.170–0.189 ($n = 12$, $x = 0.180$, $s = 0.007$) in *O. barroni* ($U = 1.0$, $P^{**} < 0.01$). In the number of ventrals, there is no difference between males of *O. mouhoti* and *O. deuvei*, but there is barely an overlapping in females (see Table 6). There is no difference in either sex between *O. deuvei* and *O. barroni*. Lastly, we tested the significance of the differences in maxillary teeth numbers between *O. deuvei* and *O. barroni*: 12–15 ($n = 10$, $x = 13.6$, $s = 1.1$) in *O. deuvei* vs. 10–13 ($n = 17$, $x = 11.4$, $s = 0.9$) in *O. barroni* ($U = 52.0$, $P^{**} < 0.05$). Considering the additional differences in pattern, we are not in presence of phenotypes, but of distinct taxa that we regard as full species.

TABLE 6. Summary of main morphological characters in the *Oligodon taeniatus* group. Abbreviation: see Table 1. Conditions or values of rare occurrence (in less than about 1/10 examined specimens) are placed within brackets; conditions of exceptional occurrence (about 1/25 specimens) are not mentioned.

Characters	<i>Oligodon</i>					
	<i>taeniatus</i>	<i>pseudotaeniatus</i>	<i>mouhoti</i>	<i>deuvei</i>	<i>barroni</i>	<i>moricei</i>
TL max (mm)	447	320	339	530	401	442
TaL / SVL ♂	0.165–0.204	0.201–0.205	0.172–0.185	0.158–0.172	0.170–0.189	---
TaL / SVL ♀	0.128–0.151	0.14	0.122–0.131	0.132–0.149	0.137–0.150	0.133
ASR	19	17	17	17	17	17
MSR	19	17	17	17	17	17
VEN ♂	142–159	137–143	145–152	140–147	136–147	---
VEN ♀	151–165	156	154–163	147–155	141–160	175
SC ♂	38–48	44–46	39–43	36–47	36–48	---
SC ♀	31–39	34	29–33	31–38	28–35	41
SL	8	8	8	7 (8)	7–8	8
SL-Eye	4–5	4–5	4–5	3–4 (4–5)	3–4 / 4–5	4–5
PreSubOc	0–1	1	0–1	0 (1)	0	0
IL	9	8–9	9–10	8–9	(7) 8–9	9
Dorsal blotches	-	-	-	-	+	-
Vertebral stripe	Narrow	Narrow	Narrow	Broad, bright	Absent	Broad
Paravertebral stripes	Present	Present	Present	Faint	Absent	Broad
Dorsolateral stripe	Present	Faint or absent	Present	Absent or dots	Absent	Broad
Maxillary teeth	(14)15–18	15	14–16	12–15	10–12(13)	12

Five of the six members of the *O. taeniatus*-group are striped and cannot be confused with any other species of their range and adjacent regions. The only unstriped member of this group, *Oligodon barroni*, may superficially be confused with blotched specimens of the *Oligodon cyclurus*-group, although the hemipenes of members of this group (long, deeply forked, thin, not papillate) are very different from those of the *O. taeniatus*-group. *Oligodon barroni* is easily distinguished by its low number of dorsal scale rows, namely 17 vs. 21

or 23 in *Oligodon fasciolatus* (Günther, 1864), and 19 in both *Oligodon cyclurus* (Cantor, 1839) and *Oligodon ocellatus* (Morice, 1875). *Oligodon chinensis* (Günther, 1888) has 17 DSR at midbody and is blotched. However, the blotches in the latter species are smaller than those of *O. barroni*. Furthermore, *O. chinensis* differs readily by a much higher number of ventral scales (175–196). *Oligodon analepticos* has 19 rows on the anterior third to nearly half of its body and also a higher number of ventrals (170–185).

Specimens of *Oligodon deuvei* with a subdued, pale yellow vertebral stripe, as seen in some Laotian specimens, are quite similar to *Oligodon formosanus* (Günther, 1872). The two species differ in the morphology of the hemipenes, in the number of DSR (19–19–15 in *O. formosanus*) and in a much higher number of ventrals in *O. formosanus* (160–182; Smith [1943] and our data).

Lastly, *O. deuvei* may be morphologically similar to some members of the *Oligodon cinereus*-group with 17 DSR. The taxonomy of this group is far from being resolved and is currently under investigation. The only taxa of this group more or less similar to the weakly patterned *O. deuvei* are *Oligodon cinereus cinereus* (Günther, 1864), *Oligodon macrurus* (Angel, 1927) and *Oligodon joynsoni* (Smith, 1917), these three being uniform or more or less fasciated but without stripes. All these taxa differ from *O. deuvei* in hemipenis morphology and some scalation characters, namely more ventrals in *O. cinereus cinereus* (at least 160 in males) and *O. joynsoni* (187), and a much longer tail in *O. macrurus* (ratio TaL/TL: 0.175–0.310) (Smith, 1943; our data).

Key to the *Oligodon taeniatus*-group

These species are better identified on the basis of the number of dorsal rows, then by their dorsal and tail pattern:

- 1 19 DSR at neck and at midbody *Oligodon taeniatus*
- 17 DSR at neck and at midbody 2
- 2 Dorsal pattern with 10–14 dark brown or black butterfly-like blotches on the upper surface of body + 2–3 on the tail; no vertebral stripe *Oligodon barroni*
- Dorsal pattern striped, without large blotches on the body 3
- 3 At least 175 ventrals in females; vertebral and black paravertebral stripes broad and very conspicuous; venter largely dark *Oligodon moricei* **spec. nov.**
- Not more than 165 ventrals in both sexes; paravertebral stripes weak; venter pale with well defined sub-rectangular blotches 4
- 4 Two conspicuous, large blotches on the tail *Oligodon mouhoti*
- No, or small blotches on the tail 5
- 5 A narrow, faint vertebral stripe edged with two dark longitudinal paravertebral stripes; a poorly distinct dorsolateral stripe; 14–15 maxillary teeth; presubocular present; 8 supralabials; ratio TaL/TL in males at least 0.20 *Oligodon pseudotaeniatus* **spec. nov.**
- A broad vertebral stripe, orange, rusty red or pale yellow, edged with faint paravertebral stripes; dorsolateral stripes reduced to a line of dots; 12–14 maxillary teeth; no presubocular; 7 (very rarely 8) supralabials; ratio TaL/TL in males below 0.175 *Oligodon deuvei* **spec. nov.**

This revision of the *Oligodon taeniatus*-group should be considered to be a first step in the understanding of this group of species. Obviously, additional material is mandatory to define the distribution of recognized species, especially in Laos and Vietnam.

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