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On the occurrence of *Trimeresurus albolabris* (GRAY 1842) on Sumatra Island, Indonesia

(Reptilia, Serpentes, Viperidae, Crotalinae)

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Abstract

Two specimens cited in the literature as *Trimeresurus albolabris*, collected at Lake Ranau by the Deutsche Limnologische Sunda-Expedition (1928–29), are still the sole known record of the species from Sumatra with a precise locality. They are redescribed and compared with specimens from other parts of the range of this species, and with specimens of *Trimeresurus popeiorum*. Their identification confirms the occurrence of *T. albolabris* on Sumatra. Other Sumatran records for this species are reviewed. Possible causes to the scarcity of *T. albolabris* on Sumatra are discussed.

Introduction

The White-lipped pitviper, *Trimeresurus albolabris* (GRAY 1842), is the most widely distributed species in the genus *Trimeresurus* LACEPÈDE 1804. It is currently known from India (north and north-east), Nepal (south), Bangladesh, Myanmar, Laos, China (southern provinces, including Hainan Island), Vietnam, Cambodia, Thailand, and Indonesia (REGENASS & KRAMER 1981, DAVID & INEICH 1998). However, this species is definitely unknown from West Malaysia (WÜSTER in DAVID & INEICH 1998; according to this author, its old record from Penang Island, near the peninsula, should definitely be regarded as erroneous). This species just fails to reach the Thailand/Malaysia border, in spite of seemingly suitable biotopes in this region.

In Indonesia, *Trimeresurus albolabris* has a wide but discontinuous distribution. It has been reported from the following islands (from West to East): Sumatra, Bangka, Java, Madura, Sulawesi (subspecies *T. albolabris albolabris* [GRAY 1842]), Bali (subspecies undetermined), and the islands of Lombok, Sumbawa, Sumba, Komodo, Rinca, Flores, Adonara, Lembata, Pantar, Alor, Roti, Semau, Timor, Wetar, Kisar and Romang (subspecies *T. albolabris insularis* KRAMER 1977) (REGENASS & KRAMER 1981, DAVID & VOGEL 1996, HOW et al. 1996, HOW & KITCHENER 1997). This systematic arrangement was recently challenged by MALHOTRA & THORPE (1996), who showed that variation in mtDNA-bases among *T. albolabris* populations did not correlate with their morphological variations. These authors accordingly refused the currently accepted subspecific division of this species, but we provisionally retain the interpretation of REGENASS & KRAMER (1981), pending proposal of an alternative classification.

Although the presence of *Trimeresurus albolabris* on Java has long been known, its occurrences on the two other Greater Sunda Islands, Borneo and Sumatra, have always been controversial. The status of Bornean specimens referred to as *T. albolabris* will be discussed elsewhere. The occurrence of *T. albolabris* on Sumatra has uncritically been accepted in the literature (see, for example, DE HAAS 1950, WELCH 1988). However, it was essentially based on only three specimens: two listed in MERTENS (1934: 696), as being collected by the Deutsche Limnologische Sunda-Expedition (1928–1929) at Lake Ranau (Danau Ranau, 4°50′ S, 103°55′ E, on the border between the provinces of Sumatera Selatan and Lampung), and one specimen (BMNH 84.3.7.5) without precise lo-

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cality, cited by REGENASS & KRAMER (1981: 170). DAVID & VOGEL (1996) unambiguously included *T. albolabris* in Sumatran fauna on the basis of MERTENS (1934) records and of the picture of a living specimen. Unfortunately, however, MERTENS just listed specimens collected during the German expedition, and did not provide any description of the animals.

Trimeresurus albolabris was recognized as a distinct species only after the revision of POPE & POPE (1933). Thus, the literature published before this work is of little help to determine the specific allocations of the green *Trimeresurus* populations on the Greater Sunda Islands. Beside *T. albolabris*, four other green species of pitviper, *Tropidolaemus wagleri* WAGLER 1830 (juvenile and adult male specimens only, adult females being not green), *Trimeresurus hageni* (VAN LIDTH DE JEUDE 1886), *T. sumatranus* (RAFFLES 1822) and *T. popeiorum* (SMITH 1937), inhabit Sumatra. The first three species differ from *T. albolabris* in head scalation and body pattern. Only *T. popeiorum* was likely to be confused with *T. albolabris* on Sumatra, but this confusion has obviously been extensive in the literature (see chresonymies listed in DAVID & VOGEL 1996).

It is clear that MERTENS was aware of POPE's & POPE's (1933) revision. Moreover, as this author was familiar with specimens from Java and the Lesser Sunda islands, it is unlikely that he confused these two taxa. The obvious paucity of records of *T. albolabris* on Sumatra, a species otherwise usually common in suitable biotopes throughout most of its range, led WÜSTER (in DAVID & INEICH 1998) to question the occurrence of *T. albolabris* on this island. In order to solve this problem, we examined the specimens cited in MERTENS (1934), deposited in the Natur-Museum und Forschungsinstitut Senckenberg (Frankfurt am Main), which seem to be the sole available representatives of *T. albolabris* from Sumatra with a precise locality. Taxonomic status and accuracies in sampling data of other Sumatran specimens referred to as *T. albolabris* in the literature are discussed.

Materials and methods

The two specimens, both males, collected by the Deutsche Limnologische Sunda-Expedition (SMF 37833 and SMF 37834), were examined for coloration, and morphometric and meristic characters. Both specimens are here fully described. We then compared these Sumatran specimens with 15 male specimens of *T. albolabris* (13 *T. albolabris albolabris* and two *T. a. insularis*) from other parts of its range, plus eight male specimens of *Trimeresurus popeiorum* from the Asian mainland and Sumatra. Many other specimens of *T. albolabris* were examined, but were not retained for comparisons, as they did not show differences in values with our voucher specimens. A total of 17 characters for coloration, measurements and meristical characters were examined for each specimen. The list of examined specimens is given as Appendix.

Measurements, taken with a slide-caliper to the nearest 0.05 mm, are:

SVL: snout-vent length (in mm).
tL: tail length (in mm).
TL: total length (in mm).
HL: head length (in mm).

Meristic characters are:

VEN: the number of ventral scales (counted sensu Dowling 1951).
SC: the number of subcaudal scales (not including terminal scute).
Co: the numbers of dorsal scale rows (counted at one head length behind head; at midbody [Co(m); i.e. at the level of the ventral plate corresponding to a half number of the total ventrals]; and at one head length before vent, respectively).
Nas: nasals.
InN: internasals.
SpL: supralabials.
InL: infralabials.

Museum abbreviations:

BMNH: The Natural History Museum (formerly British Museum [Natural History]), London
MNHN: Muséum National d'Histoire Naturelle, Paris
NMBE: Naturhistorisches Museum Bern, Bern
SMF: Natur-Museum und Forschungsinstitut Senckenberg, Frankfurt am Main

Results

In the following description, the first and second values given for each character refer to those in SMF 37833 (Figs. 1–4) and SMF 37834 (Figs. 5–8), respectively; values for symmetric head characters are given in right-left order. When nothing is mentioned, state of a given character is shared by both specimens.

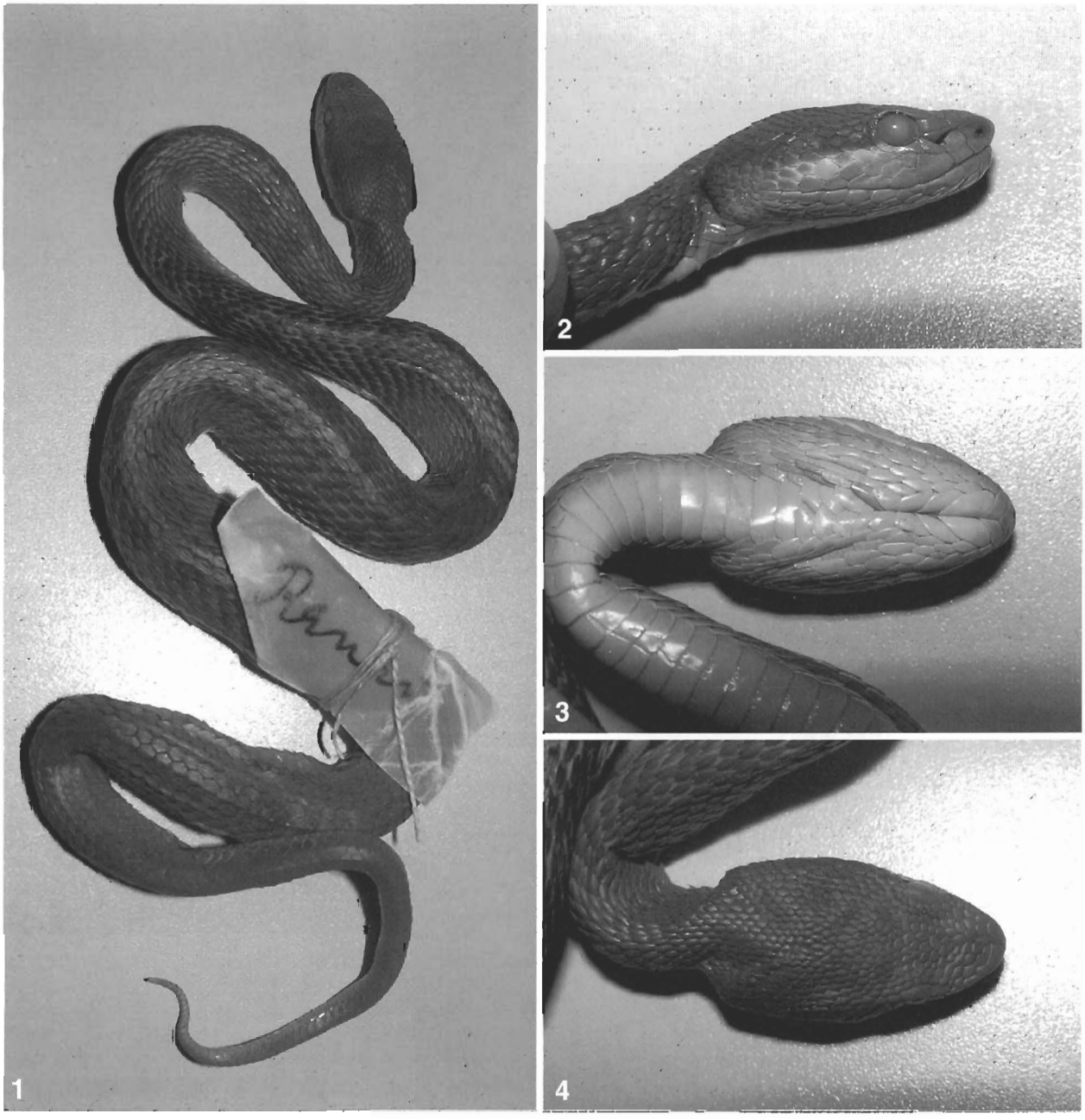
Body rather stout, cylindrical; head triangular, thick but flattened, rather short and wide at its base, 1.75/1.55 times as long as wide, clearly distinct from neck; snout rather elongated, 2.09/1.94 times as long as diameter of eye, flattened, rounded and narrow when seen from above, angulous and rectangular when seen from lateral side, with a distinct but not sharp *canthus rostralis*; eye rather large (juvenile), eye diameter/distance between lower margin of eye and upper lip border ratio 0.85/0.91 (mean values of both sides); nostril-loreal pit distance/nostril-eye distance ratio 0.63/0.61 (mean values of both sides); tail cylindrical, tapering, prehensile.

SVL: 367 mm/349 mm; tL: 94 mm/88 mm; TL: 461 mm/437 mm; HL: 20.85 mm/20.60 mm; Ratio tL/TL: 20.43/20.14 %.

VEN: 156/159; SC: 69/71, paired, plus one terminal scale; anal entire.

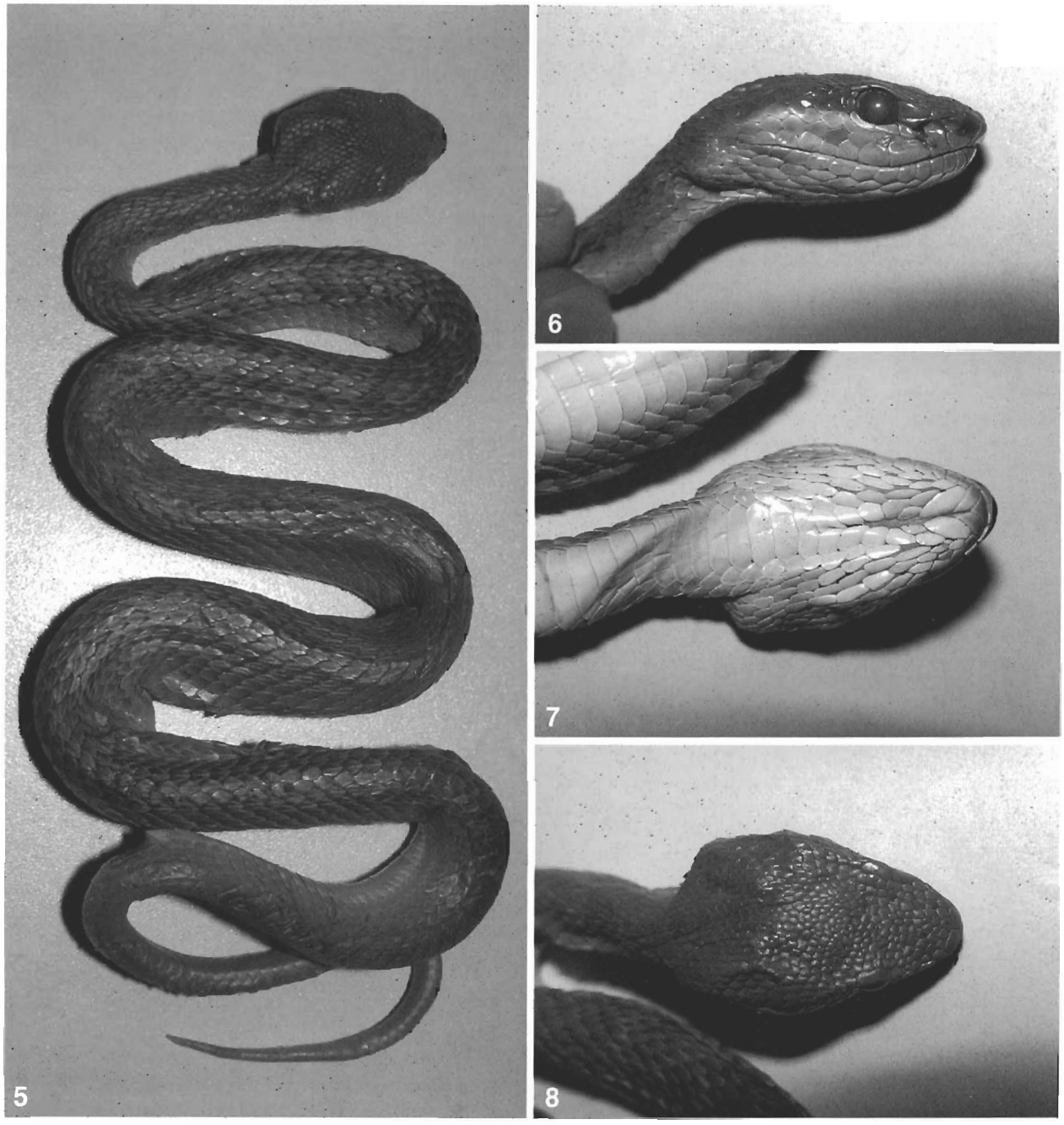
Co: 21–21–15/21–21–15 scales, rhomboid, strongly keeled, with the exception of those in outermost row, smooth.

Rostral broader than high, triangular, well visible from above, nasal triangular, undivided, with nostril in its middle; one pair of enlarged, rectangular internasals, broadly in contact with each other, about twice as long as and about 1.2 time as wide as adjacent upper snout scales; 4–4/3–3 subequal canthal scales bordering the canthus rostralis between internasal and corresponding supraocular, enlarged compared with adjacent snout scales; one small triangular loreal between upper preocular and



Figs. 1–4. SMF 37833, *Trimeresurus albolabris*, Lake Ranau. – 1) Dorsal view; 2) Lateral view of the head; 3) Ventral view of the head; 4) Dorsal view of the head.

nasal; two upper preoculars above loreal pit, lower one bordering the upper margin of loreal pit, upper one visible from above, both elongated and in contact with loreal; lower preocular forming lower margin of loreal pit; 2–2/3–3 postoculars; one supraocular, entire, elongated and narrow, about four times as long as wide, not wider than the adjacent upper head scales and narrower than internasals, not indented by upper head scales; scales on dorsal surface of head relatively small, smooth, juxtaposed, irregular in shape, larger on snout than in frontal-parietal region; 10/10 scales on a line between supraoculars; temporals rather small, in three rows, smooth; one thin, elongated, crescent-like subocular; 10–9/10–10 SpL; 1st SpL and nasal partly fused on both sides in SMF 37833, partly united (right)-fused (left) in SMF 37834; 2nd SpL high, forming the anterior border of loreal pit; 3rd SpL largest, elongated, approximately 1.4 time as long as high, in contact with subocular in both specimens; 4th SpL distinctly lower than third one, separated from subocular by one small scale in both specimens; 5th and other posterior SpL slightly smaller than 4th one, separated from subocular by one to two rows of scales and in contact with first row of temporals; InL 12–11/13–13, first pair in contact with each other, first and second pairs in contact with chin shields; 8/7 rows of smooth gular scales; chin shields regularly arranged.



Figs. 5–8. SMF 37834, *Trimeresurus albolabris*, Lake Ranau. – 5) Dorsal view; 6) Lateral view of the head; 7) Ventral view of the head; 8) Dorsal view of the head.

Dorsal and upper tail surfaces mixture of dark deep reddish-blue and reddish brown, slightly paler and more tainted in bright blue on flank, with an ill-defined pattern of faint, diffuse, 3–4 scales wide, dark transversal bands due to the presence of dark brown skin between scales.

Venter uniformly pale yellowish white on anterior part of body, becoming rather yellowish blue posteriorly; outer parts of ventrals bluish yellow, with their extreme tips marked with whitish yellow spots on anterior and posterior one third of body (i. e., in 10th–40th and 110th–last one) forming an irregular, well-defined ventrolateral stripe; such stripe absent on middle one third of body; end of tail dark greyish brown, faintly distinct from overall back colour.

Head deep bluish green in dorsal and temporal regions; supralabials bluish-yellow, rather pale behind eye, darker anteriorly, but always distinctly paler than the upper head surface; rather diffuse white temporal streak running on 1st and 2nd rows of temporals from postero-ventral corner of eye to neck; mental and infralabials bluish yellow, remaining lower head surface pale yellowish white.

Discussion

The morphological data for the two Sumatran specimens are compared with those for specimens of *T. albolabris albolabris*, *T. albolabris insularis* (sensu REGENASS & KRAMER 1981), and *Trimeresurus popeiorum* from Thailand and Sumatra. Literature data used here were taken from REGENASS & KRAMER (1981). Examinations of preserved specimens, including Sumatran specimens of *T. popeiorum* not seen by these authors, provided additional data for characters used to discriminate these species by the previous authors, and for characters not found in literature. We retained 17 characters that are seemingly diagnostic of *albolabris* and *popeiorum*, as follows:

Coloration: presence of faint dark transversal bands on dorsum; presence of postocular streak; difference in coloration of supralabials and upper head surface.

Morphometric characters: tL/SVL ratio in males; HL/SVL ratio; distance eye-nostril/HL ratio; snout length/eye diameter ratio; eye diameter/distance lower eye margin-upper lip margin ratio; contact/separation of InN; 1st SpL/Nas separation; presence/absence of keels on dorsal scales.

Meristic characters: VEN; SC; Co(m); number of SpL; number of intersupraoculars; number of InL.

Results of comparisons in coloration and body morphology are presented in Table 1; those on head morphology in Table 2. Values written in brackets must be regarded as of rare occurrence.

The two SMF specimens are immediately separated from *T. popeiorum* by the following characters (value or state for *T. popeiorum* in brackets): presence of postocular streaks (absent), lower part of head distinctly paler than dorsal surface (nearly similar), a lower value of tL/TL ratio, dorsal scales strongly keeled (feebly keeled), shorter head, smaller eye, as determined by eye diameter/lower eye margin-upper lip margin distance ratio being lower than 1.0 (as large as or greater than 1.0), InN separated by a scale (usually in contact), and 1st SpL separated from nasal only by a shallow groove, or entirely fused with the latter (two scales totally distinct).

We further compared the SMF snakes with other conspecific specimens from different populations currently assigned to the subspecies *albolabris* and *insularis*. Although *T. albolabris* is quite variable, the Sumatran animals are referable to *T. albolabris albolabris* by the following characters: presence of postocular streaks (usually absent in *T. albolabris insularis*), tail length/total length ratio, distance eye-nostril/head length ratio, snout length/eye diameter ratio and number of supralabials. Other characters are shared by both subspecies.

By most characters, the two SMF specimens are undoubtedly typical *Trimeresurus albolabris*. They differ slightly from other *T. albolabris* by the higher head length/body length ratio, which means a proportionally longer head. According to the characters given by REGENASS & KRAMER (1981), the SMF specimens seem to be referable to the nominal subspecies. Both specimens still bear their field tag of the Deutsche Limnologische Sunda-Expedition. We therefore consider that these specimens, confirmed as of *T. albolabris*, actually originated from Sumatra. This further confirms the occurrence of *T. albolabris* on Sumatra.

REGENASS & KRAMER (1981: 170) listed a third specimen of *T. albolabris* from Sumatra, BMNH 84.3.7.5, presented by H. O. FORBES without precise locality. C. J.

Table 1. Comparison of morphological data and body scalation between Sumatran specimens and 3 *Trimeresurus* taxa.

Tbb: presence of faint dark transversal bands of the body: 1 present, 0 absent. – CoL: difference in coloration of supralabials and upper head surface: 1: distinctly much paler, 0: similar or just slightly paler. – Pos: postocular streak: 1 present, 0 absent. – tL/TL: ratio tail length/total body length in males (× 100). – HL/BL: ratio head length/body (snout-vent) length (× 100). – Ven: number of ventrals. – Sc: number of subcaudals. – Co (m): number of dorsal scale rows at midbody. – KCo: dorsal scale rows at midbody keeled: 0 smooth, 1 weakly keeled, 2 strongly keeled. – *: data from the literature (see above).

Specimen	Tbb	CoL	Pos	tL/TL (%)	HL/BL (%)	Ven (♂♂)	Sc (♂♂)	Co (m)	KCo
SMF 37833	1	1	1	20.39	5.68	156	69	21	2
SMF 37834	1	1	1	20.14	5.90	159	71	21	2
T. a. albolabris	1	1	1/0	19.04–24.37 (x = 21.99) (n = 13)	4.97–5.66 (x = 5.39) (n = 13)	151–169 (*)	61–78 (*)	21 (23) (*)	2
T. a. insularis	1	1	0 (1)	21.42–22.37 (x = 21.90) (n = 2)	5.02–5.29 (x = 5.16) (n = 2)	156–164 (*)	70–75 (*)	21 (*)	2
T. popeiorum	0/1	0	0	21.58–24.13 (x = 22.28) (n = 8)	5.22–5.78 (x = 5.48) (n = 10)	142–157 (*)	62–72 (*)	19/21 (17/18) (*)	1/2

Table 2. Comparison of head scalation and features between Sumatran specimens and 3 *Trimeresurus* taxa.

ENH: ratio distance eye-nostril/head length (x 100). – RSE: ratio snout length (from anterior eye margin to snout tip)/eye diameter. – EDL: ratio eye diameter/distance lower eye margin-upper lip margin. – CIn: internasals in contact: 1 yes, 0 no. – SpL: number of supralabials. – Ssn: separation of the 1st supralabial with the corresponding nasal: 1: both scales totally differentiated, 2: scales partly separated by a shallow furrow, 3: scales completely fused. – ISo: number of intersupraoculars. – InL: number of infralabials. – *: data from the literature (see above).

Taxon	ENH	RSE	EDL	CIn	SpL	Ssn	ISo	InL
SMF 37833	20.98	2.09	0.85	0	9/10	2/2	10	11/12
SMF 37834	20.02	1.94	0.91	0	10/9	2/3	10	13/13
T. a. albolabris	18.25–22.22 (x = 20.80) (n = 13)	1.57–2.39 (x = 2.01) (n = 13)	0.78–0.95 (x = 0.90) (n = 13)	0 (1) (*)	9–12 (7–13) (*)	2–3 (*)	10–12 (8–13) (*)	11–14 (6–16) (*)
T. a. insularis	24.07–24.26 (x = 24.17) (n = 2)	1.96–2.06 (x = 2.01) (n = 2)	0.85–0.88 (x = 0.87) (n = 2)	0 (1) (*)	11–12 (7–10) (*)	2–3 (*)	9–12 (*)	11–14 (*)
T. popeiorum	21.21–25.74 (x = 22.30) (n = 8)	1.54–2.08 (x = 1.86) (n = 8)	1.03–1.18 (x = 1.12) (n = 8)	1 (0) (*)	9–11 (*)	1 (*)	10 (*)	11–14 (*)

McCarthy (Natural History Museum, London) kindly examined this specimen (pers. comm., December 1997), and sent us the following data:

SVL 493 mm; tL 143 mm; TL 636 mm; tL/TL ratio 22.48 %

VEN 161; SC 74; Co (m) 21

1st SpL fused with nasal on the left, appearing separated on the right (possibly an artifact according to C. J. McCarthy); InN in contact; intersupraoculars 10.

Ventrolateral pale stripes absent.

According to McCarthy, this specimen is most probably a *Trimeresurus albolabris*. He also informed us that H. O. Forbes is usually regarded as a reliable collector, and there is no reason to suspect a non-Sumatran origin of this specimen. This would raise the number of specimens recorded from the island to three.

David & Vogel (1996: 159) listed Labuan (at present Belawan, near Medan) as another locality for *T. albolabris* on Sumatra, on the basis of Hagen (1890; as *Bothrops erythrurus*). We did not see the specimen cited by this author, and, at present, we just regard it as doubtful at best. Furthermore, David & Vogel (1996: 199) included a colour plate of a living specimen reported as being from Sumatra, but without any precise locality. This animal was obtained from an Indonesian animal dealer. After examination, it proved to be a typical *T. albolabris albolabris*, which excludes an origin east of Java. Although its exact origin cannot be proven, we have some evidence to regard the origin as reliable. It is interesting to note that this specimen differed from most *T. albolabris* specimens from the Asian mainland in having narrower head and deep red eyes. The two SMF specimens also have comparatively narrow heads.

We also examined another specimen in SMF collection (SMF 21226), which is labelled as *Trimeresurus albolabris* from "Bungar Bondar", now Bungur (1°06′ N, 102°554′ E), Riau Province, in western-central Sumatra. This specimen turned out to be a typical *Trimeresurus popeiorum*, with a dorsal scale rows formula 21-19-15. It extends notably eastwards the range given by Regenass & Kramer (1981) for *Trimeresurus popeiorum*. It is worth noting that Regenass & Kramer (1981: 189) described the subspecies *T. popeiorum barati* on the basis of a number of dorsal scale rows at midbody that ranges between 17 and 19 (vs. 21 rows in the other subspecies). Of the four Sumatran specimens of *T. popeiorum* examined by us, only one had 19 scale rows at midbody, whereas the remaining had 21 rows. Thus the validity of the subspecies *barati* seems to be very doubtful, and will be investigated in a forthcoming paper on the basis of material not cited by Regenass & Kramer.

Whereas *Trimeresurus albolabris* is regarded as a common species in most of its range, it seems indeed rare or, at best, very localised on Sumatra. According to the comparatively extensive literature dealing with this snake, *T. albolabris* is found from sea level up to at least 1200 m. It may inhabit lowland tropical wet forests, especially their clearings, but it rather occurs in more open biotopes, such as tropical dry forests (monsoon forests), shrublands, bushy savannahs, cultivated areas, and the vicinity of human habitations where it is often found in wood piles and gardens (Smith 1943, Saint Girons 1972, Auffenberg 1980, Zhao 1990, Cox 1991). This species is frequently discovered on low trees, thick bushes, hedges and tall grasses. *T. albolabris* seems to be rare in subtropical montane wet forests, which makes a sharp contrast to *T. popeiorum*, which is a typical inhabitant of such forests between 600 and 2000 m.

Unfortunately, Mertens (1934) did not provide ecological data which would allow us to assume the habitat environments of *T. albolabris* on Sumatra. Lake Ranau is a volcanic lake with water level at 540 m above sea level (Anonymous 1971, 1990). It is located on the eastern slope of a narrow, elevated ridge of the Barisan Range,

which it partly dissects. The area is in a region of rain shadow to the western and south-western wet winds due to high mountains, situated respectively, just west (1679 m and 1532 m) and south (1964 m) of Lake Ranau (ANONYMOUS 1971, 1990). The lake is bordered on its west, south and east sides by the steep and rugged slopes of the Barisan Range. To the contrary, its north and north-west shores slowly rise from the water level as gentle rolling hills, which generally do not much exceed 600 m. On the north-west of the lake, a valley on the slope of the range is at about 450 m above sea level.

We do not have accurate climatic data from this area. According to LAUMONIER (1997: 33, fig. 10) and LAUMONIER et al. (1995), Lake Ranau is at the limit between two climatic regions defined as "superhumid" (yearly rainfall quantity between 2500 and 3000 mm) and "hyperhumid" (rainfall above 3000 mm). The superhumid bioclimate is typical of eastern slopes of the Barisan Range. According to the same authors, Lake Ranau is surrounded mostly by two vegetation types. The first one, nearly entirely encircling the lake shore, is a mosaic of degraded vegetation and coffee plantations. But on the northern and north-western banks of the lake, on low hills and an adjacent valley, there is a comparatively small patch of a dryer vegetal formation classified as "savannah and shrub savannah", belonging, according to these authors, to the vegetation category defined as "vegetation of the eastern slopes at low elevations (300–1000 m)". In the vicinity of Lake Ranau, the "superhumid" climate matches nearly exactly this zone of savannah, whereas all other surrounding areas belong to the wetter "hyperhumid" climate.

This area of savannah in a region of rain shadow might be well suited for such a species as *T. albolabris* that are typical for regions with a marked dry season, like Indochina and the Lesser Sunda Islands. Similar lower montane open vegetal formations are found farther north in the Barisan, north of Tanjungraja or in the region of Mt. Kaba. However, they always cover relatively small surfaces, and must be regarded as rare compared with other vegetation found on Sumatra. From data at hand, we regard the north-western vicinity of Lake Ranau as suitable for *T. albolabris*. It is interesting to note that lowland shrub savannahs cover an extensive part of southern Sumatra. These savannahs, largely mixed with plantations, might also constitute a very suitable biotope for *T. albolabris*. However, collections from such environments in the provinces of Lampung, Sumatera Selatan and Jambi failed to contain any specimen of this species.

One may assume that *T. albolabris* recently reached Sumatra from the neighbouring island of Java, and inhabited only the areas (1) close to Java, and (2) subject to seasonal rains found in the shadow of mountains. Such a scenario would be consistent with the distribution of this species in extreme south-eastern Sumatra. In Java, *T. albolabris* has been collected near Jakarta and Bogor (DE ROOIJ 1917, REGENASS & KRAMER 1981). According to VAN HOESEL (1959), the species is common throughout the island in bushes and hedges from sea level up to about 1000 m. In Sumatra, *T. albolabris* should be looked for in similar hill savannahs on the relatively dry eastern slopes of the Barisan Range, which remains poorly explored by herpetologists.

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Appendix

Specimens examined

Trimeresurus albolabris albolabris: MNHN 8618, Asia. – MNHN 1893.416, Bhamo, Kachin State, Myanmar. – MNHN 1911.103, "Cochinchine", now southern Vietnam. – MNHN 1970.588-590, 595-596, 598, Cambodia. – MNHN 1986.1503, unknown origin, probably Thailand (through the pet trade). – MNHN 1987.1091, Cambodia. – MNHN 1988.3980, Cambodia. – MNHN 1995.9449, Cambodia.

Trimeresurus albolabris insularis: MNHN 4056, Timor Island, Indonesia. – SMF 76353, Flores Island, Indonesia.

Trimeresurus popeiorum: MNHN 1987.3836, Doi Inthanon, Chiang Mai Province, Thailand. – MNHN 1990.4247, Thailand (through the pet trade). – MNHN 1990.4283-4284, Thailand (through the pet trade). – MNHN 1991.296, Thailand (through the pet trade). – NMBE 1018072-3, Mts. Battak, at present the Toba Massif, Sumatera Utara Province, Sumatra. – SMF 21226, Bungur, Riau Province, Sumatra.