A REVISION OF THE GENUS *SCINCELLA* (REPTILIA: SAURIA: SCINCIDAE) OF ASIA, WITH SOME NOTES ON ITS EVOLUTION

by

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Key words: Scincidae; *Scincella,* keys; new species; numerical analysis; evolution; Asia; zoogeography.

Of the genus *Scincella* Mittleman, 1950 (sensu Greer, 1974) 337 specimens from Asia were examined for 74 characters, which were treated in a numerical-taxonomic way. The dendrogram resulting from this analysis was not stringently adhered to. Because of the wide variation in certain numerical scale characters within one taxon or even within one population, these characters (used by many authors as key characters to separate taxa) are not regarded as very important. For sympatric and parapatric species other characters, including relative size of head, body and limbs, are regarded as very important, because these characters are influenced by the way of life (niche separation). For the separation of allopatric species scale-numbers, but many other characters as well, were used.

Twelve species, *S. ladacensis* (Günther, 1864), *S. sikimmensis* (Blyth, 1853), *S. capitanea* spec. nov., *S. victoriana* (Shreve, 1940), *S. travancorica* (Beddome, 1870), *S. bilineata* (Gray, 1846), *S. doriae* (Boulenger, 1887), *S. reevesii* (Gray, 1838), *S. melanosticta* (Boulenger, 1887), *S. punctatolineata* (Boulenger, 1893), *S. barbouri* (Stejneger, 1925) and *S. modesta* (Günther, 1864), and two subspecies, *S. ladacensis himalayana* (Günther, 1864) and *S. melanosticta kohtaoensis* (Cochran, 1927), are recognized and described. *S. capitanea* is a newly described species characterized by its large body size and relatively small head.

The speciation in the genus is thought to have occurred in wet forest refugia, the size and distribution of which were determined by wet and dry geological periods.

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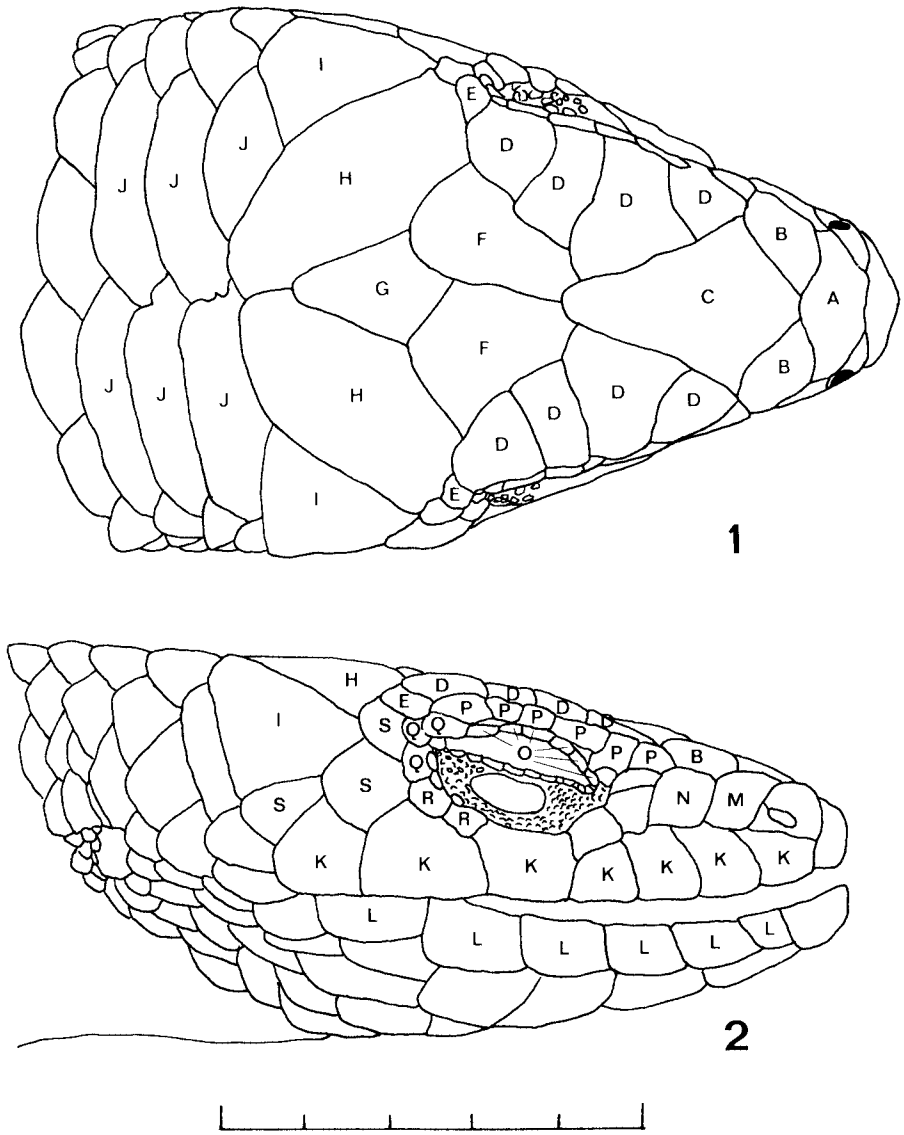
CONTENTS

INTRODUCTION

The classification of the Scincidae, and especially of the Lygosomine skinks, has always presented many difficulties. Boulenger (1887c) was the first who tried to arrange them into large groups. This arrangement is useful as a classification only. It tells nothing about relationships and is worthless when dealing with phylogenetic and zoogeographic questions. Smith (1937) improved the Boulengerian arrangement of the lygosomes, but his system of sections, subgenera and genera still has no bearing on phylogeny and is not very practical. Mittleman (1952) assembled the lygosomes in the subfamily Lygosominae and tried to give his classification a phylogenetic basis. According to Greer (1974), the most recent reviewer of the Lygosominae, Mittleman failed in providing a tight phylogenetic framework. Without doubt Greer's arrangement of the *Leiolopisma* assemblage at the moment is the best there is, with a reasonably strong phylogenetic foundation, since it is based on an analysis of primitive and advanced characters. However, it also assumes that *Mabuya* is the most primitive genus in the subfamily (which Greer did not define). For this study I have accepted this hypothesis, because no better one is available.

One of the main causes for the difficulties in the classification of the Lygosominae was stated by Smith (1935), when he dealt with the genus



Figs. 1, 2. Dorsal (1) and lateral (2) view of the head of *Scincella sikimmensis* (RMNH 20422), showing head-shield nomenclature. A: frontonasal; B: prefrontals; C: frontal; D: supraoculars; E: small posterior supraocular; F: frontoparietals; G: interparietal; H: parietals; I: supratemporal; J: enlarged nuchals; K: supralabials; L: infralabials; M: anterior loreal; N: posterior loreal; O: ciliars; P: supraciliars; Q: postoculars; R: postsuboculars; S: temporals. Scale bar represents 5 mm.

No.	Character	Definition
	Multistate	
1	Sex	
2	Head width	measured just in front of the ear
3	Head heigth	measured between eye and ear
4	Head length	rostral up to and including parietals
5	Snout-vent length (S-V length)	
6	Tail length	
7	Length in front of forelegs	up to a line connecting the middle of the forelegs
8	Length between fore- and hindlegs	from a line connecting the middle of the forelegs up to a line connecting the middle of the hindlegs
9	Length forelegs	including the fingers
10	Length hindlegs	including the toes
11	Width frontonasal	
12	Shortest distance between prefrontals	
13	Length frontonasal	
14	Length prefrontals	
15	Length common suture prefrontals	
16	Length frontal	
17	Length parietals + interparietal	
18	Length common suture parietals	
19	Length parietals	
20, 21	Number of enlarged nuchals (left, right)	
22	Length anterior loreal	
23	Length posterior loreal	
24	Width anterior loreal	
25	Width posterior loreal	
26, 27	Number of supraciliars (left, right)	
28, 29	Number of postoculars (left, right)	
30, 31	Number of postsuboculars (left, right)	head-shields bordering the eye posteriorly, which are in touch with a supralabial (usually the sixth)
32, 33	Number of ciliars (left, right)	
34	Length upper postocular	
35	Length transparent disc	
36	Length eye	
37	Mean length primary and secondary temporal	
38	Number of scales between secondary temporal and ear	
39	Width ear	mean of heigth and length
40, 41	Number of projecting lobules on the anterior margin of the ear (left, right)	
42	Number of gulars	scales between the posterior touching submaxillars and a line connecting the middle of the forelegs
43	Number of gulars + ventrals	scales between the posterior touching submaxillars and the preanals
44	Length preanals	
45	Width dorsals	

46	Width laterals	
47	Scalerows between parietals and thighs	up to a line connecting the middle of the thighs
48	Number of scales around midbody	
49	Number of subdigital lamellae fourth finger	
50	Number of subdigital lamellae fourth toe	
	B i n a r y	
51	Palpebral disc present	
52	Palpebral disc divided	
53	Ciliars thickened	
54	Ciliars slightly thickened	
55, 56	Frontal touching third supraocular (left, right)	
57	Upper postocular wide	about as wide as long
58, 59	Fourth supralabial under eye (left, right)	
60, 61	Fifth supralabial under eye (left, right)	
62, 63	Sixth supralabial under eye (left, right)	
64	Scale(s) between fifth supralabial and granules of lower eyelid	
65	Two temporals between sixth supralabial and supratemporal	
66	Ear round	
67	Tympanum deeply sunk	
68	Tympanum slightly sunk	
69	Dorsal scales keeled	
70	Lamellae under fingers keeled	
71	Lamellae under fingers slightly keeled	
72	Lamellae under toes keeled	
73	Lamellae under toes slightly keeled	
74	Eye visible through supraoculars	

Table 1: Characters used in the numerical taxonomic analysis.

Leiolopisma (now mainly *Scincella*): "They are, perhaps, species in the making, and until we have a more exact conception of what a species is they will continue to confound us". Consequently perhaps the best thing to do is to start on the level of species (and subspecies). For this I have chosen the genus *Scincella.* The purpose of my study was to re-examine its taxonomy and to try and explain its distribution and speciation, in the hope of throwing more light on the problems of the evolution of the Lygosominae as a whole.

MATERIAL AND METHODS

I have followed Greer's (1974) redefinition of the genus *Scincella,* and also studied some species not listed by him.

The specimens examined were caught by myself (now in the collection of RMNH*, part of the *S. sikimmensis* and *S. ladacensis himalayana* material) or borrowed from several museums (see material listed under the respective species, as well as the Acknowledgements). Because of the limited time available for this study I confined myself to the species of mainland Asia. Therefore I did not examine specimens from Ryu Kyu Islands and Tsushima Island, but based on their descriptions I included them in the present revision. In order to contribute to the discussion on the relationships between the Chinese and the American *Scincella,* I included some specimens of *S. lateralis* as well.

Of all specimens 74 characters were examined. These characters are listed and (where necessary) defined in table 1. Head-shield nomenclature is shown in figs. 1 and 2. Measurements of head-shields and body scales were made with an ocular micrometer, correct to 0.1 mm. All other measurements were made with a vernier callipers, correct to 0.2 mm.

Not all characters proved to be of equivalent importance. Size-characters (characters 2-19, 22-25, 34-37, 39, 44-46 in table 1) mostly were expressed as ratios. Ratios and mean snout-vent length were calculated for adults only.

All former authors who worked on *Scincella* used the number of scales, especially around midbody, as the main character to separata taxa. I do not think it correct to distinguish between species only on the basis of numbers of scales, because these vary considerably between adjacent populations of one taxon or even within one population: in *S. l. himalayana* from Dhorpatan (Nepal) the number of scales around midbody varied from 24 to 30 and in adjacent clearings in a forest area around Ghorapani (Nepal) the following numbers of scales around midbody were counted: Ulleri: 22-26, Ghorapani: 26-28, Sikha: 22-28. According to previous authors (e.g. Smith, 1935) Himalayan *Leiolopisma* (*Scincella*) with 22-24 scales around midbody belong to *sikkimense,* those with 26-30 scales around midbody to *himalayanum.* Consequently, specimens from the same population, which are similar in most characters, would belong to two different species when using the old classification based only on numbers of scales. Another example is a population of *S. modesta* (formerly *potanini*) from Songpan (China), in which the number of scales around midbody was rather constant, but lengthwise varied considerably: dorsals between parietals and thighs: 62-83, gulars + ventrals: 66-84.

In most cases it is possible to find less variable characters, with less overlap

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between different but closely related taxa. Important characters used here are the relative size of the head, the elongation of the body and the development of the limbs. According to Boulenger (1887c) and Smith (1937) these characters have no bearing on phylogeny. With regard to higher taxa, or taxa which are distributed over large areas, these authors may be right. Different species living far apart could, under certain conditions, easily develop convergent relative size characters. On a small scale and with closely related species, it is quite different. In that case species will have to avoid competition by adapting themselves to different niches, e.g. a burrowing as opposed to a terrestrial way of life or different foodpreferences. For closely related species living more or less sympatrically character displacement instead of convergence is more likely to occur. Lizards that forage in open spaces usually have longer hindlegs than lizards that forage in bushes, grass etc. (Pianka, 1969; Pianka & Parker, 1972; Pianke & Pianka, 1976) and lizards eating larger prey have a greater headlength than lizards that eat small foot-items (Schoener, 1968; Pianka, 1969; Pianka & Pianka, 1976). Thus characters involving shape are much more influenced by the way of life than characters involving numbers of scales (also see remarks under *S. sikimmensis*). Characters involving shape are less variable within one species (see tab. 2), especially when a species has a narrow ecological amplitude, as probably is the case in most *Scincella* species.

Colours and colour patterns have not been included in the 74 characters studied, but sometimes have been used additionally, especially the state of the dark lateral band (see diagnosis of the genus).

All 74 characters were treated in a numerical-taxonomic way. Cluster analysis was performed with the computer program BIOPAT, developed by P. Hogeweg and B. Hesper (P. Hogeweg, Bio-informatics Group, University of Utrecht, The Netherlands). The continuous (30) and meristic (19) characters were first standardized to zero mean and unit standard deviation. As size turned out to be an important factor for the distribution of the specimens among clusters, this was removed from the continuous character set by standardization of the specimens. The pairwise calculation of the overall dissimilarity between the specimens was done with the Mean Square Distance after which a dendrogram was obtained using Unweighted Pairgroup Mean Average (UPGMA) and Ward's cluster criterion (Sneath & Sokal, 1973).

Originally the survey was started with the three Himalayan forms of *Scincella* only. During the research period a visit was made to the Annapurna-Dhaulagiri area in Nepal from April to July 1981 in order to study the distribution, habitat selection and thermoregulation of *S. sikimmensis* and *S. ladacensis himalayana*. For body temperature measurements of lizards a

Yellow Springs Instrument Tele-Thermometer (YSI Model 42) was used with a Probe no. 511. Preferred body temperature (PBT) of *S. sikimmensis* was determined in active specimens that were captured by hand. If catching lasted longer than about one minute no measurement was made. Because of the complex habitat in which they lived, it was not possible to catch active specimens of *S. l. himalayana* within reasonable time. Therefore, inactive specimens were collected during rain and were released in an outdoor cage at a distance of about 100 to 500 m from the place where they were caught. PBT was then determined in active lizards during sunshine.

TAXONOMIC PART

Genus **Scincella** Mittleman

Tiliqua Gray, 1838: 292 (in part); Günther, 1860: 153 (in part).
Mocoa Gray, 1846: 430; Blyth, 1853: 651; Jerdon, 1853: 477; Stoliczka, 1872: 126; Theobald, 1876: 56 (in part); Anderson, 1878: 797; Blanford, 1878: 19.
Eumeces Günther, 1864: 85 (in part); Anderson, 1871: 158 (in part).
Euprepes Steindachner, 1869: 45 (in part).
Lygosoma Bocourt, 1878: 2; Boulenger, 1887a: 620 (in part); Boulenger, 1887b: 479 (in part); Boulenger, 1887c: 257 (in part); Boulenger, 1890: 193 (in part); Boulenger, 1893: 320 (in part); Günther, 1896: 6; Alcock, 1898: 36; Annandale, 1907: 154; Zugmayer, 1909: 488; Annandale, 1912: 46; Smith, 1916a: 45 (in part); Smith, 1916b: 56 (in part); Hora, 1927: 4 (in part); Brongersma, 1935: 451; Shreve, 1940: 17 (in part); Constable, 1949: 102.
Leiolopisma Van Denburgh, 1912: 235; Smith, 1923: 200; Stejneger, 1925: 150; Schmidt, 1926: 169; Cochran, 1927: 187; Schmidt, 1927a: 423; Schmidt, 1927b: 496; Barbour, 1927: 95; Cochran, 1931: 18 (in part); Smith, 1935: 293 (in part); Smith, 1937: 223 (in part); Taylor & Elbel, 1958: 1119; Swan & Leviton, 1962: 111; Taylor, 1963: 1025 (in part); Romer, 1975: 9.
Leiolepisma Smith, 1951: 728; Smith & Battersby, 1953: 703.
Scincella Mittleman, 1950: 19 (in part); Mittleman, 1952: 13 (in part); Shannon, 1956: 41; Minton, 1966: 105; Greer, 1974: 7; Gruber, 1981: 148.

Diagnosis. — Small to medium-sized lacertiform lizards, with an alpha palate (Greer, 1974) and nine premaxillary teeth. The postorbital bone is present, usually long and thin (Greer, 1974). The movable lower eyelid has a transparent window. Normally this window is undivided, but in one specimen of *S. reevesii* (BMNH 1933.12.3.14) it is divided on the left side of the head. Supranasals absent. Median pair of preanals enlarged. Rostral usually in contact with the frontonasal, which is broader than long. The nostrils are situated in the nasals. Prefrontals usually separated, except in *S. reevesii* and *S. melanosticta*. Four large supraoculars, followed by a small one. First and second supraocular in contact with the frontal, except in *S. ladacensis*, which

usually has the third supraocular touching the frontal as well. In the Himalayan species-group, containing *S. ladacensis, S. sikimmensis, S. capitanea* and *S. victoriana*, the upper postocular is quite narrow, in all other species it is usually wide and situated between the most posterior supraciliar and the small fifth supraocular. Seven supralabials and six infralabials, but exceptions can be found in every species and even on different sides of the head in one specimen. Usually the fifth supralabial is situated under the eye. Parietals in contact behind the interparietal. All body scales smooth, except the dorsals of *S. victoriana*. In all species the limbs are present and pentadactyle. The median series of scales under the tail is transversely enlarged.

Dorsum grayish or greenish to bronze-brown. Usually with a dark brown lateral band starting from the rostral or the nostrils, running backwards through the eye and ear and above the forelegs, very distinctly between the fore- and hindlegs, fading away on the tail. This lateral dark band is dorsally usually bordered by a white to grey dorsolateral stripe.

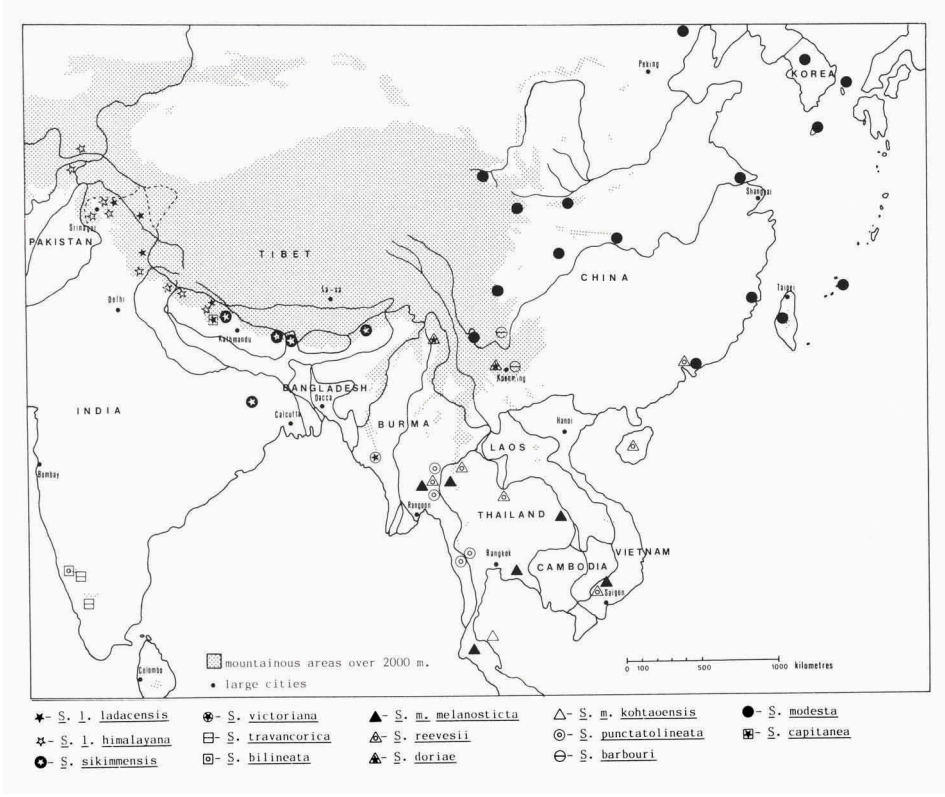


Fig. 3. Distribution of the genus *Scincella* in Asia.

	lad n=115 101 ad.	sik n=115 105 ad.	cap n=9	vic n=2
Snout-vent length	43.8± 9.3	39.1± 8.7	68.2±10.0	49.3±11.6
Supraciliars	5.8± 0.8	5.8± 0.6	6.1± 0.4	5.7± 1.1
Ciliars	8.5± 0.8	8.7± 0.9	9.0± 0.9	8.7± 1.1
Postoculars + postsuboculars	4.2± 0.7	5.0± 0.3	4.9± 0.2	5.2± 0.4
Projecting lobules	2.8± 1.1	0.9± 1.2	0.9± 1.5	0.5± 0.7
Pairs of enlarged nuchals	3.5± 1.0	3.1± 0.8	3.3± 0.6	3.0± 0
Scalerows between parietals and thighs	61.2± 5.3	53.9± 4.2	63.8± 1.7	52.0± 2.8
Gulars + ventrals	71.1± 8.6	58.6± 4.3	65.4± 3.2	54.5± 2.1
Scales around midbody	30.3± 3.6	24.7± 1.5	31.0± 1.0	26.0± 0
Subdigital lamellae fourth finger	13.9± 2.0	10.7± 1.0	11.0± 1.0	11.0± 0
Subdigital lamellae fourth toe	18.6± 2.4	15.1± 1.1	15.7± 0.9	15.0± 0
Ratio S-V length/head width	6.8± 0.6	6.7± 0.6	8.0± 0.7	6.5± 0.6
Ratio S-V length/head length	5.3± 0.6	5.3± 0.7	6.5± 0.6	6.1± 0.9
Ratio length between fore- and hindlegs/ length in front of forelegs	1.5± 0.2	1.6± 0.2	1.8± 0.2	1.7± 0.3
Ratio S-V length/length forelegs	3.5± 0.4	3.8± 0.4	4.1± 0.2	3.7± 0.1
Ratio S-V length/length hindlegs	2.6± 0.3	2.7± 0.3	2.7± 0.2	2.8± 0.1
Ratio length frontal/length parietals + interparietal	1.2± 0.9	1.1± 0.8	1.4± 0.4	1.3± 0.1
Ratio length post. loreal/ length ant. loreal	1.3± 0.2	1.3± 0.3	1.3± 0.4	1.4± 0.1
Ratio width dorsals/width laterals	1.6± 0.2	1.4± 0.2	1.3± 0.1	1.0± 0.1
Ratio S-V length/length transparent disc	37.8± 6.7	42.0± 7.6	51.3± 5.2	46.7± 7.9
Ratio S-V length/length eye	20.8± 3.1	20.6± 2.9	24.5± 1.6	20.4± 2.4
Ratio S-V length/width ear	67.9±18.3	74.5±21.6	92.8±47.1	58.1± 0.9

Table 2: Mean and standard deviation of some important characters for all 12 Asian *Scincella* species recognized. Snout-vent length in mm.

trav	bil	dor	ree	mel	punc	bar	mod
n=11 10 ad.	n=6 5 ad.	n=4 2 ad.	n=17	n=16 15 ad.	n=2	n=4	n=22
50.6± 6.1	49.0± 3.1	56.2± 3.4	47.4± 5.4	43.8± 7.8	37.8± 0.3	42.7± 5.6	43.6± 6.1
7.0± 0	6.0± 0	6.9± 0.3	6.9± 0.6	7.7± 0.7	6.5± 0.7	5.9± 0.2	6.1± 0.5
9.6± 0.9	8.2± 0.1	11.0± 0	10.7± 1.5	12.2± 1.6	9.7± 0.4	8.9± 0.9	8.6± 0.9
5.3± 0.6	5.2± 0.5	5.0± 0	6.0± 0.3	6.3± 0.5	5.0± 0	5.0± 0	5.1± 0.5
1.7± 1.9	2.1± 0.5	0	0.4± 1.9	0.1± 0.3	1.2± 1.8	0	0
3.5± 0.7	3.4± 0.5	4.5± 0.7	1.8± 1.7	1.0± 0.6	1.5± 0.7	4.6± 0.5	3.3± 0.8
63.9± 6.6	64.2± 7.1	70.0± 3.9	66.1± 3.2	66.0± 5.4	63.5± 7.8	74.2± 4.9	68.3± 8.9
68.9± 5.8	65.5± 2.6	72.7± 3.6	66.9± 3.9	66.2± 3.8	63.5± 7.8	75.8± 4.2	73.3± 8.5
25.8± 2.2	23.5± 1.8	31.2± 0.8	31.2± 1.1	33.7± 2.9	25.0± 4.2	26.5± 1.0	27.3± 2.0
12.2± 1.2	10.2± 0.7	12.7± 1.9	9.9± 0.9	10.3± 0.7	8.5± 0.7	9.2± 0.5	9.3± 1.3
19.5± 1.5	16.7± 0.9	16.7± 1.1	16.5± 1.5	17.1± 1.6	14.0± 1.4	15.7± 1.0	13.3± 1.9
7.3± 0.5	8.0± 0.4	7.5± 0.1	7.9± 0.7	6.9± 0.4	8.1± 0.4	8.8± 0.6	7.9± 0.9
6.0± 0.4	6.6± 0.5	6.1± 0.4	6.2± 0.6	5.4± 0.6	6.3± 0.5	6.9± 0.4	6.1± 0.8
1.6± 0.1	1.8± 0.1	1.6± 0.1	1.7± 0.2	1.4± 0.1	2.0± 0.1	2.1± 0.3	1.8± 0.3
4.2± 0.3	4.9± 0.4	3.8± 0.7	4.5± 0.4	4.0± 0.6	5.6± 0.4	5.5± 0.6	4.6± 1.2
3.0± 0.3	3.5± 0.2	2.8± 0.5	3.1± 0.3	2.8± 0.3	3.8± 0.8	3.9± 0.7	3.4± 0.8
1.1± 0.6	1.0± 0.2	1.1± 0.3	1.0± 0.2	1.1± 0.2	0.9± 0.2	1.0± 0.3	1.1± 0.3
1.9± 0.6	1.6± 0.2	1.6± 0.3	1.4± 0.2	1.3± 0.2	1.1± 0.2	1.4± 0.3	1.2± 0.3
1.5± 0.1	1.3± 0.2	1.5± 0.1	1.2± 0.1	1.1± 0.2	1.2± 0.3	1.4± 0.1	1.3± 0.1
51.7± 4.1	58.9± 6.5	59.2± 0.8	57.6± 7.2	52.3±10.6	54.1± 0.5	68.5± 8.6	57.6±10.1
23.4± 1.2	25.8± 0.8	23.0± 2.0	22.0± 2.5	17.8± 1.8	24.4± 0.9	28.6± 3.7	23.1± 3.7
67.7±10.8	78.0±28.5	46.8± 2.8	53.7±11.7	47.8± 9.1	50.7± 4.3	53.7±15.2	54.3±10.8

Habitat. — As far as we know these skinks are mostly terrestrial, living in rather humid conditions in forest clearings. Only *S. ladacensis* is known to live in a drier habitat.

Natural history. — Probably most species are oviparous. The only exception known is *S. ladacensis*, of which most populations, but not all, are viviparous.

Range. — Central, Eastern and Southeastern Asia (fig. 3) and Northern and Central America.

Remarks. — This genus was established by Mittleman in 1950; it then contained 59 species with a rather strange distribution. Greer (1974) removed some species from the genus, mainly because they did not possess a postorbital bone, a primitive character only present in *Scincella* and *Ablepharus* Lichtenstein, 1823. The species removed were either placed in the genus *Lipinia* Gray, 1845 (arboreal, no postorbital bone, dorsal colour pattern of striking light and dark longitudinal stripes) or in the newly created genera *Lobulia* Greer, 1974 (no postorbital bone) or *Prasinohaema* Greer, 1974 (arboreal, no postorbital bone, blood plasma and other tissues green, prehensile tail with glandular scales on the ventral tip). The 32 species that remain in the list presented by Greer (including three American species) look very similar and their distribution is confined to the range presented above, but the taxonomic position of some of these species is still rather puzzling. Here only the taxa listed in figs. 14 and 15 are recognized as species, including most of the forms described by previous authors, which are sometimes recognized as subspecies. Means and standard deviation of the most important characters are listed in table 2.

Key to the Asian species of *Scincella*

1. Upper postocular narrow (fig. 2); hindlegs quite long ($\bar{x}$ ratio S-V length/length hindlegs between 2.6 ± 0.3 and 2.8 ± 0.1); transparent disc rather large ($\bar{x}$ ratio S-V length/length transparent disc between 37.8 ± 6.7 and 51.3 ± 5.2) 2
– Upper postocular wide; hindlegs moderately sized or short ($\bar{x}$ ratio S-V length/length hindlegs 2.8 or more); transparent disc moderately sized or small ($\bar{x}$ ratio S-V length/length transparent disc more than 51.5) . 5
2. Dorsal scales keeled; 53-56 gulars + ventrals; dorsal and lateral scales equal in size. Mt. Victoria (Burma) ..... *victoriana*
– Dorsal scales smooth; usually more than 57 gulars + ventrals; dorsals distinctly larger than laterals. Himalayas 3

3. Frontal often touching the third supraocular; palpebral disc very large; ear with distinct projecting lobules; ciliars thickened (fig. 4); 14-24 subdigital lamellae under the fourth toe ($\bar{x}$ = 18.6). Western Himalayas ..... *ladacensis*
– Frontal not touching the third supraocular; palpebral disc medium-sized; ear without distinct projecting lobules; ciliars not thickened; 12-18 subdigital lamellae under the fourth toe ($\bar{x}$ = 15.3) 4
4. Very large *Scincella*, maximum snout-vent length 78.5 mm ($\bar{x}$ = 68.2 mm); 30-32 scales around midbody; head small, neck wider than head; ear very small, slit-shaped. Central Nepal ..... *capitanea*
– Snout-vent length small, maximum 56 mm ($\bar{x}$ = 39.1 mm); 21-29 scales around midbody; head large, wider than neck; ear small, round. Eastern Himalayas, west to Central Nepal, Chota Nagpur ..... *sikimmensis*
5. Lateral dark band distinctly broken up by whitish spots; usually more than 30 scales around midbody (exceptionally 29); large number of ciliars ($\bar{x}$ between 10.7 ± 1.5 and 12.2 ± 1.6) 6
– Lateral dark band not or only on the lower flanks broken up by lighter spots or very indistinct; usually less than 30 scales around midbody; smaller number of ciliars ($\bar{x}$ 9.7 or less)..... 8
6. Prefrontals forming a suture; always some scales between the fifth supralabial and the granules of the lower eyelid; usually the eye is visible through the supraoculars as a dark area; black spots on the back often concentrated in the vertebral region 7
– Prefrontals usually separated or just meeting in a point; rarely scales between the fifth supralabial and the granules of the lower eyelid; eye not visible through the supraoculars; black spots on the back usually not concentrated in the vertebral region. N. Burma, Yunnan ..... *doriae*
7. Body somewhat elongated; head rather small ($\bar{x}$ ratio S-V length/head width 7.9 ± 0.7); 29-33 scales around midbody. SE. Asia, except S. Thailand ..... *reevesii*
– Body and head robust ($\bar{x}$ ratio S-V length/head width 6.9 ± 0.4); 32-38 scales around midbody in all mainland specimens (specimens from the island Koh Tao 29-31). E. Burma, Thailand, S. Vietnam ..... *melanosticta*
8. Body distinctly elongated; limbs short: forelegs less than 18%, hindlegs less than 26% of the S-V length; lateral band only consisting of two scalerows with dark brown spots, sometimes very indistinct 9
– Body not or only slightly elongated; limbs moderately sized: forelegs usually more than 20%, hindlegs more than 28% of the S-V length; lateral band wide, distinct or indistinct 10

9. Four or five pairs of enlarged nuchals; ears without projecting lobules; large number of body scales: 70-79 scalerows between the parietals and the thighs, 70-80 gulars + ventrals; head, eye and transparent disc very small. Yunnan ..... *barbouri*
– One or two pairs of enlarged nuchals; some projecting lobules on the anterior margin of the ear; 58-69 scalerows between the parietals and the thighs, 58-69 gulars + ventrals; head small, eye and transparent disc moderately sized. Burma ..... *punctatolineata*
10. Robust lizard with well-developed limbs; frontoparietals often partly or completely united; seven supraciliars; usually a distinct light dorsolateral stripe is present. S. India: Travancore, Anaimalai and Palni Hills . ..... *travancorica*
– Body somewhat elongated, limbs moderately sized; frontoparietals always separated; usually six supraciliars; light dorsolateral stripe absent or indistinct 11
11. Four enlarged preanals; ear small with two or three projecting lobules. S. India: Nilgiri Hills ..... *bilineata*
– Two enlarged preanals; ear quite large, without projecting lobules. China ..... *modesta*

Species accounts

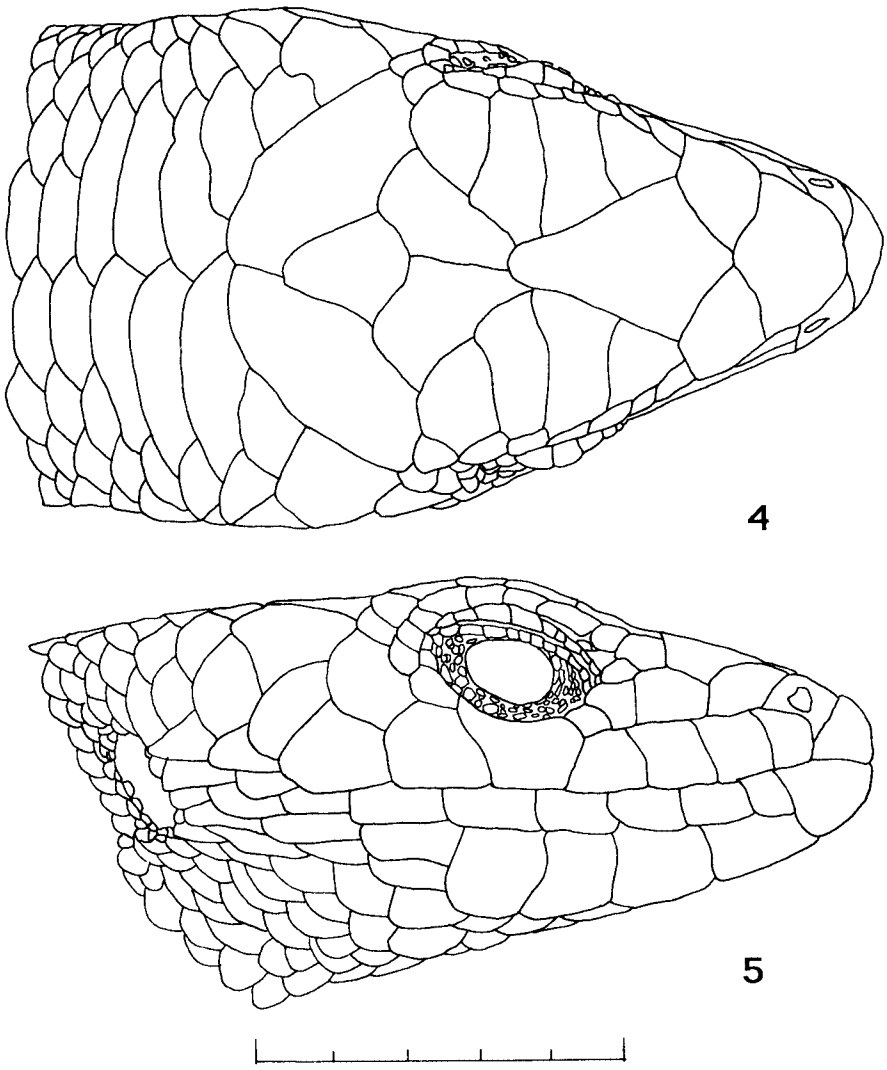
Scincella ladacensis (Günther, 1864)
(figs. 3-8, 14-16; tables 2-4)

Diagnosis. — Ciliars distinctly thickenend. Palpebral disc very large ($\bar{x}$ ratio snout-vent length (S-V length)/length transparent disc: 37.8). Frontal often thouching the third supraocular. Usually distinct projecting lobules on the anterior margin of the ear; ear slit-shaped. 57-90 gulars + ventrals; 24-38 scales around midbody. Ventral surface usually greenish-blue.

Key to the subspecies of *Scincella ladacensis*

1. Large number of body scales: 71-90 gulars + ventrals; 58-77 scalerows between the parietals and the thighs; 30-38 scales around midbody. Large number of subdigital lamellae: 13-18 under the fourth finger; 17-24 under the fourth toe. Back usually grey, heavily spotted with black and white spots. Dry regions north of the main Himalayan chain .... *ladacensis*

Smaller number of body scales: 57-75 gulars + ventrals; 51-62 scalerows between the parietals and the thighs; 24-30 (exceptionally 31 or 32) scales around midbody; 9-16 subdigital lamellae under the fourth finger, 14-22 under the fourth toe. Back usually bronze-brown with black spots, sometimes with white spots as well. Coniferous forests and alpine



Figs. 4, 5. Dorsal (4) and lateral (5) view of the head of *Scincella ladacensis ladacensis* (ZSM 127/77/2). Scale bar represents 5 mm.

meadows south of the main Himalayan chain, east to Central Nepal . ..... *himalayana*

Scincella ladacensis ladacensis (Günther, 1864)
(figs. 3-5, 7, 8, 16; tables 3, 4)

Eumeces ladacensis Günther, 1864: 88, pl. X fig. I (type loc. Ladak); Anderson, 1872: 375.
Euprepes stoliczkai Steindachner, 1869: 45 (type loc. Spiti-Fluss, Himachal Pradesh).
Euprepes kargilensis Steindachner, 1869: 46 (type loc. Kargil, Ladakh).
Mocoa stoliczkai: Theobald, 1876: 59; Blanford, 1878: 20.
Mocoa kargilensis: Theobald, 1876: 60.
Lygosoma ladacense: Boulenger, 1887c: 258, pl. XVII fig. 3; Boulenger, 1890: 201; Brongersma, 1935: 451.
Leiolopisma ladacense: Schmidt, 1926: 169; Smith, 1935: 300; Swan & Leviton, 1962: 111.
Lygosoma (Leiolopisma) ladacense: Constable, 1949: 103.
Leiolepisma ladacense: Smith & Battersby, 1953: 703.
Scincella ladacense: Minton, 1966: 105.
Scincella ladacensis: Greer, 1974: 7; Gruber, 1981: 148.

Material. — INDIA. Ladakh, NW. India (n = 30). 1 ex., BMNH 1946.8.16.28 (holotype), leg. Schlagintweit; 2 ex., BMNH 70.11.29.8A-B, leg. Jerdon. Hemis, 3700 m: 1 ♂, ZSM 123/1977, leg. U. Gruber. Bod Kharbu, 3200 m: 3 ♀, 6 ♂, 4 juvs., ZSM 122/77, leg. U. Gruber. Kargil, 2710 m: 2 ♀, 1 ♂, 1 juv., NMW 16643.1-4, leg. Stoliczka, 1866. Suru Valley, 3300 m: 2 ♀, 1 juv., ZSM 120/77, leg. U. Gruber. Dras-Zojila, 3200 m: 1 ♀, 3 ♂, 2 juvs., ZSM 127/77, leg. U. Gruber.

Himachal Pradesh, NW. India (n = 10). Spiti Valley, 3660-4270 m: 6 ♀, 3 ♂, 1 juv., NMW 16644.1-10, leg. Stoliczka, 1866.

NEPAL (n = 6). Balangra pass, Tibrikot, 3500 m: 1 ♀, 2 ♂, BMNH 1953.1.1.55-57, leg. Polunin, Sykes, Williams, 1952. Phoksumdo Tal, Tibrikot, 4270 m: 1 ♀, BMNH 1953.1.1.58, leg. Polunin, Sykes, Williams, 1952. Pemringgaon, Barbung Khola, 4880 m: 1 ♀, BMNH 1953.1.1.54, leg. Polunin, Sykes, Williams, 1952. Kahajeng Khola, near Mohala Bhajang, Chharkabhot, 5490 m: 1 ♀, BMNH 1953.1.1.59, 17-VI-1952, leg. Polunin, Sykes, Williams.

Diagnosis. — A robust *Scincella*, with long limbs. Transparent disc large. Ciliars distinctly thickened. Frontal touching the first three supraoculars in nearly all specimens (97%). Distinct projecting lobules on the anterior margin of the ear. High numbers of body scales. Dorsum usually grey and heavily spotted with black and white spots.

Description. — In 97% of the specimens the frontal touches the third supraocular as well as the first and second. Rather few scales around the eye: supraciliars 5-8 ($\bar{x}$ = 6.2 ± 0.7); ciliars 7-10 ($\bar{x}$ = 8.6 ± 0.7); postoculars + postsuboculars 3-5 ($\bar{x}$ = 3.8 ± 0.5). The upper postocular is small and rather narrow. The ciliars are usually distinctly thickened. The last but one ciliar is very narrow. Only the fifth supralabial is situated under the eye. Transparent disc very large ($\bar{x}$ ratio S-V length/length transparent disc: 35.0 ± 5.9). Ear slit-shaped, usually with some distinct projecting lobules ($\bar{x}$ =

3.0 ± 1.1); tympanum deeply sunk. Some pairs of enlarged nuchals ($\bar{x}$ = 3.7 ± 0.9). A large number of body scales: scalerows between the parietals and the thighs 58-77 ($\bar{x}$ = 66.3 ± 4.0); gulars + ventrals 71-90 ($\bar{x}$ = 80.2 ± 4.5); scales around midbody 30-38 ($\bar{x}$ = 34.1 ± 1.7). Lateral scales much smaller than dorsals ($\bar{x}$ ratio width dorsals/width laterals: 1.7 ± 0.2). The number of subdigital lamellae is large as well: under the fourth finger 13-18 ($\bar{x}$ = 15.4 ± 1.5); under the fourth toe 17-24 ($\bar{x}$ = 20.6 ± 1.6). Body and head robust ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 1.4 ± 0.2; $\bar{x}$ ratio S-V length/head width: 6.7 ± 0.5; $\bar{x}$ ratio S-V length/head length: 5.1 ± 0.6). Limbs long ($\bar{x}$ ratio S-V length/length limbs: 3.2 ± 0.3 and 2.5 ± 0.2, resp., for fore- and hindlegs). Maximum snout-vent length 53.7 mm.

Dorsum grey to greenish brown. Back with numerous black spots, sometimes edged with white anteriorly and/or laterally. Lateral band very dark brown, with some small whitish spots, sometimes becoming vague posteriorly. In most populations a rather broad dorsolateral grey stripe is present. Ventral surface and lower flanks greenish to blue; scales sometimes edged with black. Belly possibly red in spring (see Brongersma, 1935).

Habitat. — The only *Scincella* living in a rather dry habitat: the arid, high altitude steppes north of the main Himalayan chain. But even here it is only found in the wettest places at the borders of cultivated (and irrigated) land. These areas are covered with sparse bushes and grass vegetation, the soil consists of rock-rubble (Gruber, 1981).

Natural history. — These lizards are apparently adapted to dry and cold surroundings. The thickened ciliars probably offer protection against dust and the large, highly transparent disc allows the lizards to see even in dust storms. The aridity of the area makes it possible to live at a high altitude since cloud-cover is rare and so the number of available sun hours, and thus opportunities for basking, large. Snow is limited to the coldest months (November till February) and often absent on south slopes. Matthiessen (1978) found these lizards active at Shey Gompa in November at an altitude of 4500 m. They are viviparous, as could be expected.

Range. — Ladakh and the dry northwestern regions of Nepal (fig. 3). All localities known at the moment are in the intermediate zone between the main Himalayan chain and the Tibetan Plateau (Zanskar, Indus Valley, Tibetan marginal mountains). Not yet reported from Tibet.

Remarks. — See under *S. sikimmensis*.

	S. l. lad n=47 38 ad.	S. l. him n=68 63 ad.	Total n=115 101 ad.
Snout-vent length	40.8± 8.3	45.8± 9.5	43.8± 9.3
Supraciliars	6.2± 0.7	5.5± 0.8	5.8± 0.8
Ciliars	8.6± 0.7	8.5± 0.9	8.5± 0.8
Postoculars + postsuboculars	3.8± 0.5	4.5± 0.6	4.2± 0.7
Projecting lobules	3.0± 1.1	2.7± 1.1	2.8± 1.1
Pairs of enlarged nuchals	3.7± 0.9	3.5± 1.0	3.5± 1.0
Scalerows between parietals and thighs	66.3± 4.0	57.8± 2.8	61.2± 5.3
Gulars + ventrals	80.2± 4.5	65.2± 4.5	71.1± 8.6
Scales around midbody	34.1± 1.7	27.8± 1.9	30.3± 3.6
Subdigital lamellae fourth finger	15.4± 1.5	12.9± 1.5	13.9± 2.0
Subdigital lamellae fourth toe	20.6± 1.6	17.2± 1.9	18.6± 2.4
Ratio S-V length/head width	6.7± 0.5	6.9± 0.7	6.8± 0.6
Ratio S-V length/head length	5.1± 0.6	5.5± 0.6	5.3± 0.6
Ratio length between fore- and hindlegs/ length in front of forelegs	1.4± 0.2	1.6± 0.2	1.5± 0.2
Ratio S-V length/length forelegs	3.2± 0.3	3.7± 0.4	3.5± 0.4
Ratio S-V length/length hindlegs	2.5± 0.2	2.7± 0.3	2.6± 0.3
Ratio length frontal/length parietals + interparietal	1.2± 0.7	1.2± 0.7	1.2± 0.9
Ratio length post. loreal/ length ant. loreal	1.3± 0.2	1.3± 0.2	1.3± 0.2
Ratio width dorsals/width laterals	1.7± 0.2	1.6± 0.2	1.6± 0.2
Ratio S-V length/length transparent disc	35.0± 5.9	39.8± 6.6	37.8± 6.7
Ratio S-V length/length eye	19.5± 2.6	21.6± 3.2	20.8± 3.1
Ratio S-V length/width ear	60.1±14.1	73.1±19.0	67.9±18.3

Table 3: Mean and standard deviation of some important characters for the subspecies of *S. ladacensis*. Snout-vent length in mm.

Scincella ladacensis himalayana (Günther, 1864)
(figs. 3, 6-8, 16; tables 3, 4)

Eumeces himalayanus Günther, 1864: 86, pl. X fig. H (type loc. Kashmir, Garhval (= Garhwal) and Simla).
Euprepes blythi Steindachner, 1869: 46 (type loc. Wangu-Thale, Kashmir/Ladakh).
Mocoa himalayanus: Stoliczka, 1872: 127.
Mocoa himalayana: Theobald, 1876: 57; Blanford, 1878: 19.
Mocoa blythii: Theobald, 1876: 59.
Lygosoma himalayanum: Boulenger, 1887c: 257, pl. XVII fig. 2; Boulenger, 1890: 200; Alcock, 1898: 36; Zugmayer, 1909: 488; Wall, 1911: 133; Hora, 1927: 4.
Leiolopisma himalayanum: Schmidt, 1926: 169; Smith, 1935: 299 (in part); Acharji & Kripalani, 1952: 181; Swan & Leviton, 1962: 111 (in part).
Lygosoma (Leiolopisma) himalayanum: Constable, 1949: 102.
Leiolepisma himalayanum: Smith & Battersby, 1953: 703.
Scincella himalayanum: Minton, 1966: 105; Sharma & Sharma, 1976: 51.
Leiolopisma (Scincella) himalayana: Mertens, 1969: 48.
Scincella himalayana: Greer, 1974: 7; Gruber, 1981: 148.

Material. — INDIA. Kashmir, NW. India (n = 23). Ladak?: 1 ♀, BMNH 70.11.29.8A, leg. Jerdon. Kashmir: 2 ex., BMNH 1946.8.16.24-25 (formerly 60.3.19.1388)(syntypes), leg. Schlagintweit; 3 ♀, BMNH 70.11.29.14B & 14F, 70.11.29.17A, leg. Jerdon. Lidder Valley, 3660 m: 5 ♀, 1 ♂, 2 juvs., BMNH 1919.8.11.36-42 & 43A, leg. Boulenger. Wangu Valley: 4 ♀, 1 ♂, NMW 16633.1-5, leg. Stoliczka, 1865. Gulmarg, 1520-2740 m: 2 ♀, 2 ♂, BMNH 96.11.20.1-4, leg. J.E.T. Aitchison.

Himachal Pradesh, NW. India (n = 19). N. of Darcha, Lahoul, 3140 m: 1 ♂, ZSM 118/77, leg. U. Gruber. Kyelang, Lahoul, 3140 m: 1 ♀, 1 ♂, BMNH 1931.12.6.1-2, leg. C.H. Stockley. Dibibokri Nal, Kulu distr.: 1 ♀, 1 ♂, BMNH 1953.1.6.8 & 10, leg. E.A. Schelpe. Simla, 2160 m: 9 ♀, 5 ♂, RMNH 4082A-B, 4084A-L, leg. Dary.

NEPAL (n = 28). Duhli, Bajang distr., 2590 m: 2♂, BMNH 1957.1.14.79-80, 10-VIII-1954, leg. J.J. Murray. Ingul Divar, SE. ridge of Kapkot, near Duhli, 3660 m: 1 ♀, 1 ♂, BMNH 1957.1.14.87-88, 13-VIII-1954, leg. J.J. Murray. Saipal, Bajang distr., 4570 m: 5 ♀, 1 ♂, BMNH 1957.1.14.81-86, 20-VIII-1954, leg. J.J. Murray. Garanphu, Bajang distr., 4270 m: 2 ♀, 1 ♂, 1 juv., BMNH 1957.1.14.89 & 91-93; 4880 m: 1 ♂, BMNH 1957.1.14.90, all 6-IX-1954, leg. J.J. Murray. Salimor Khola, Bajang distr., 3960 m: 2 juvs., BMNH 1957.1.14.77-78, 8-IX-1954, leg. J.J. Murray. Jumla, 2320 m: 2 ♀, 1 ♂, BMNH 1953.1.1.60-62, leg. Polunin, Sykes, Williams, 1952. Dhorpatan, S. Dhaulagiri region, 2950-3440 m: 4 ♀, 4 ♂, RMNH 20445-52, 11/13-VII-1981, leg. P.E. Ouboter, L.M.R. Nanhoe & K.B. Shah.

Diagnosis. — A robust *Scincella*. Limbs strong, but somewhat shorter than in *S. l. ladacensis*. Transparent disc large. Ciliars from normal to thickened. In most specimens (64%) the frontal is in contact with the first three supraoculars. A medium number of body scales. Dorsum usually bronze-brown, spotted with black, sometimes with white spots as well.

Description. — As *S. l. ladacensis*, from which it differs in the following points: In only 64% of the specimens studied, the frontal touches the third supraocular as well as the first and second. Usually more scales around the eye: supraciliars 3-7 ($\bar{x}$ = 5.5 ± 0.8); postoculars + postsuboculars 3-5 ($\bar{x}$ = 4.5 ± 0.6). In only 47% of the specimens the ciliars are distinctly thicken-

ed, in 32% slightly thickened. Transparent disc large, but somewhat smaller than in *S. l. ladacensis* ($\bar{x}$ ratio S-V length/length transparent disc: 39.8 ± 6.6). A medium number of body scales: scalerows between the parietals and thighs 51-62 ($\bar{x}$ = 57.8 ± 2.8); gulars + ventrals 57-75 ($\bar{x}$ = 65.2 ± 4.5); scales around midbody 26-30, exceptionally 24, 25, 31 or 32 ($\bar{x}$ = 27.8 ± 1.9). Dorsals about one and a half times as wide as the laterals. Number of subdigital lamellae: 9-16 under the fourth finger ($\bar{x}$ = 12.9 ± 1.5) and 14-22 under the fourth toe ($\bar{x}$ = 17.2 ± 1.9). Head robust but smaller than in *S. l. ladacensis* ($\bar{x}$ ratio S-V length/head width: 6.9 ± 0.7; $\bar{x}$ ratio S-V length/head length: 5.5 ± 0.6). Limbs long, but shorter than in *S. l. ladacensis* ($\bar{x}$ ratio S-V length/length limbs: 3.7 ± 0.4 and 2.7 ± 0.3, resp., for fore- and hindlegs). Maximum snout-vent length 66.8 mm.

Dorsum dark to bronze-brown, usually with black spots, which are sometimes associated with white as in *S. l. ladacensis*. These black spots sometimes form a vertebral stripe (e.g. in specimens from Simla) or even a vertebral band (e.g. in specimens from western Nepal). The lateral dark band is always distinct, usually without lighter spots. In some populations the dorsolateral grey to yellow-golden stripe is hardly visible (e.g. some West Nepal and Kashmir populations), in other populations it is a very obvious character (e.g. Gulmarg population). Usually there is a white stripe, starting below the eye, separating the lateral dark band from the lower flanks, which are somewhat darker (grey) again. In some populations this white stripe and the subcaudal region become orange to red in spring; in other populations, instead of these areas the belly becomes orange to red (see remarks under *S. sikimmensis*). The ventral parts are greenish blue during the rest of the year. In some specimens the ventral scales are edged with black. Dorsally the limbs have the same colour as the back, sometimes with some indistinct black and/or whitish markings.

Habitat. — According to Zugmayer (1909) and Gruber (1981) most abundant at higher altitudes, between 2600 and 3800 m. Usually living in stony places above the forest or in clearings. They hide in burrows (Alcock, 1898; Gruber, 1981). In Dhorpatan I found them hiding under isolated stones during bad weather. *S. l. himalayana* occupies a niche comparable to that of *Lacerta vivipara* in Europe (see Arnold et al., 1978; Dely & Böhme, 1984).

Natural history. — Annandale (1907) reported that this species avoids the sun at Simla and Naina Tal. According to Gruber (1981) it uses every glimmer of sun for raising its temperature. This agrees with my own observations at Dhorpatan, where this lizard was clearly heliotherm. Here the lizards were active at a body temperature between 24 and 31°C (fig. 6), which was several degrees above the mean air temperature.

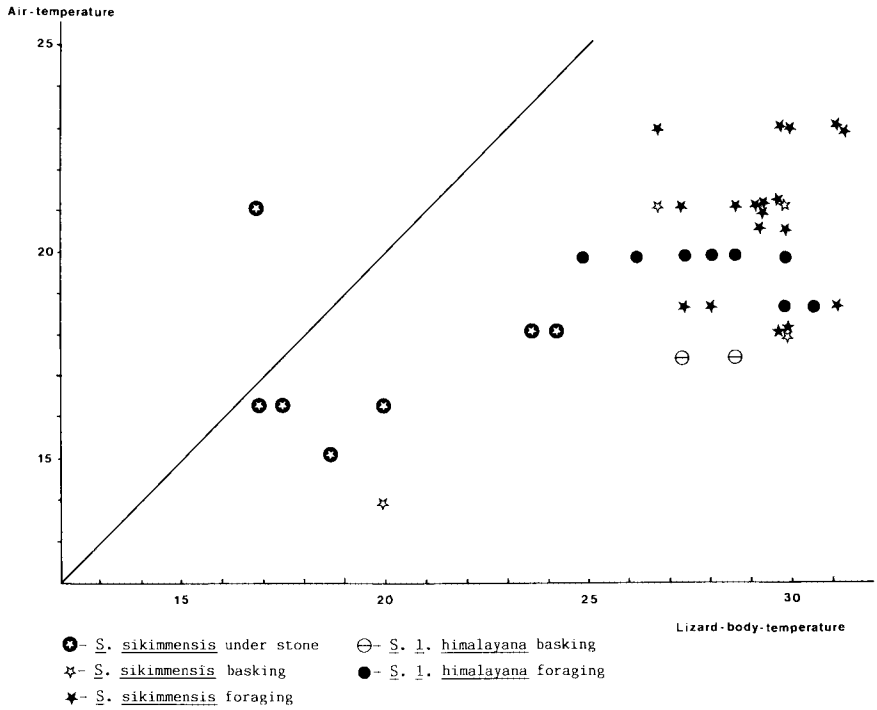


Fig. 6. Lizard body temperature as a function of air temperature, for *S. sikimmensis* and *S. l. himalayana.*

In some localities the same specimen was repeatedly seen basking in its usual basking-place; in localities with dense lizard populations many lizards were seen together, sometimes ignoring each other, sometimes fighting. It seems that true territories do not exist.

Most populations are reported to be viviparous (see remarks under *S. sikimmensis*), but at Dhorpatan I found four different clutches of eggs under flat stones, one consisting of one egg, one of two eggs and two of four eggs. These eggs must have been of *S. l. himalayana*, since no other lizard species were found in this area.

Range. — Southern side of the Karakoram and the Western Himalayas: Pamir, N. Pakistan, Kashmir, Himachal Pradesh and the Himalayan region of Uttar Pradesh, W. Nepal, in the east up to the Dhaulagiri region (figs. 3, 6).

Remarks. — See under *S. sikimmensis.*

	S.lad/S.sik	S.sik/S.l.him	S.l.lad/S.l.him	S.sik/S.sik.An
Supraciliars	0.41	7.80	14.62	36.64
Postoculars + postsuboculars	71.26	25.62	26.47	0.12
Projecting lobules	83.26	56.99	1.60	10.52
Pairs of enlarged nuchals	11.61	5.76	2.54	0.37
Scales between secondary temporal and ear	28.91	19.31	0.21	0.29
Scalerows between parietals and thighs	89.08	38.81	68.06	45.69
Gulars + ventrals	121.93	71.07	74.34	29.83
Scales around midbody	133.90	83.68	76.47	30.70
Lamellae under fourth finger	119.10	69.04	50.49	0.67
Lamellae under fourth toe	103.61	52.18	53.12	0.49
Snout-vent length	14.30	20.56	7.59	1.50
Ratio S-V length/length transparent disc	15.47	2.70	14.93	0.55
Ratio length frontal/length parietals + interparietal	27.39	23.71	1.53	6.25
Ratio width dorsals/width laterals	39.10	19.40	5.19	0.02
Frontal touching third supraocular	58.86	27.14	16.23	14.74
Ciliars thickened	71.64	52.00	4.19	0.00

Table 4: Significance of the most important characters differentiating *S. l. ladacensis, S. l. himalayana* and *S. sikimmensis*. The fourth column compares two groups of populations of *S. sikimmensis* (S. sik. An stands for populations in Annapurna area as opposed to those from other areas). Significance according to Chi-square (for last two characters) and Krustan-Wallis: χ^2 = 6.64 at P = 00.1.

Scincella sikimmensis (Blyth, 1853)
(figs. 1-3, 6-8, 14-16; tables 2, 4)

Mocoa sikimmensis Blyth, 1853: 652 (type loc. Sikim).
Tiliqua schlegelii: Günther, 1860: 153, pl. XXV fig. C (type loc. Sikkim).
Eumeces schlegelii: Günther, 1864: 86.
Eumeces sikimensis: Anderson, 1871: 158.
Mocoa sacra: Stoliczka, 1871: 195 (type loc. Parésnath Hill, Chota Nagpur); Stoliczka, 1872: 128, pl. IV fig. 4; Theobald, 1876: 57; Annandale, 1910: 201.
Mocoa sikkimensis: Stoliczka, 1872: 126, pl. V fig. 2; Theobald, 1876: 56.
Lygosoma sikkimense: Boulenger, 1887c: 257; Boulenger, 1890: 199; Annandale, 1907: 154, pl. VI fig. 4; Annandale, 1910: 201; Annandale, 1912: 46; Hora, 1927: 4.
Leiolopisma sikkimense: Smith, 1935: 301; Swan & Leviton, 1962: 111.
Lygosoma (Leiolopisma) sikkimense: Constable, 1949: 104.
Leiolepisma sikkimense: Smith, 1951: 728.
Scincella sikkimensis: Greer, 1974: 7; Gruber, 1981: 149.

Material. — NEPAL (n = 87). Gurjakhani, Murigurja Gad, NW. tributary of Mayangdi Khola, Dhaulagiri region, 2590 m: 3 ♀, BMNH 1955.1.13.36-38, leg. K.H. Hyatt, 1954. Siwang,

Mayangdi Khola, Dhaulagiri region, 1780 m: 1 ♂, RMNH 2044, 8-VII-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Lete, Kali Gandaki, 2450 m: 1 ♀, 1 ♂, RMNH 20438-39, 21-V-1981, leg. Dhanbahadur Gurung, P.E. Ouboter & L.M.R. Nanhoe. Taglung, southern side of W. ridge of Nilgiri, 2900 m: 1 juv., BMNH 1955.1.13.68, leg. K.H. Hyatt, 1954. 1 km N. of Taksang, W. ridge of Nilgiri, 2870 m: 1 juv., RMNH 20437, 19-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. 3 km N. of Choklopani, Kali Gandaki, 2610 m: 1 ♀, 1 ♂, RMNH 20435-36, 17-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Sikha, Annapurna region, 2440 m: 8 ♀, 2 ♂, 2 juvs., BMNH 1955.1.13.45-56, leg. K.H. Hyatt, 1954. 1 km NW. of Ghorapani pass, Annapurna region, 2750 m: 2 ♀, RMNH 20440-41, leg. P.E. Ouboter & L.M.R. Nanhoe. Poon Hill, SW. of Ghorapani, Annapurna region, 3000-3200 m: 3 ♀, RMNH 20442-43, 20458, 26-V-1981 & 24-VII-1981, leg. P.E. Ouboter & L.M.R Nanhoe. Ghorapani, Annapurna region, 2850 m: 3 ♀, 1 ♂, RMNH 20453, 20455-57, 23 & 24-VII-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Ulleri, Annapurna region, 1830-2130 m: 5 juvs., BMNH 1955.1.13.63-67, leg. K.H. Hyatt, 1954. Chumro Khola, western tributary of Modi Khola, Annapurna region, 1950 m: 1 ♀, 1 ♂, RMNH 20410-11, 12 & 13-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Dhampus forest, 3 km NW. of Dhampus, Annapurna region, 1990-2100 m: 1 ♀, 4 ♂, RMNH 20408-09, 20460-61, 20420, 6-IV-1981; 2 ♀, 1 ♂, RMNH 20412-14, 18-IV-1981, all leg. P.E. Ouboter & L.M.R. Nanhoe. Bhurjungkhola-Chipli, Annapurna region, 1970-2370 m: 3 ♀, 2 ♂, RMNH 20415-19, 21-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Tang Ting forest, 5 km E. of Tang Ting, Madi Khola, Annapurna region, 2070 m: 3 juvs., RMNH 20561-63, 28-IX-1978, leg. P.E. Ouboter & H.M. van Meeuwen; 3 ♂, RMNH 20421-23, 25-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Tang Ting forest, 9 km E. of Tang Ting, Madi Khola, Annapurna region, 2390 m: 1 ♀, RMNH 20424, 25-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. 2 km S. of Telbrung Danda, ridge N. of Ghanpokhara, Annapurna region, 2530 m: 2 ♀, 1 ♂, RMNH 20425-27, 29-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Ghanpokhara, 2130 m: 1 juv., BMNH 1955.1.13.57, leg. K.H. Hyatt, 1954. 2 km S. of Chamce, Marsyandi, 1340 m: 1 ♀, RMNH 20428, 2-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Tal, Marsyandi, 1640 m: 1 ♀, 1 juv., RMNH 20429-30, 3-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. 1 km W. of Bagarchap, Marsyandi, 2080 m: 1 ♀, RMNH 20431, leg. P.E. Ouboter & L.M.R. Nanhoe. 3 km SE. of Bradang, Marsyandi, 2800 m: 2 ♀, 1 ♂, RMNH 20432-34, 5-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe. Thangjet, Rasua Garhi distr., 1520 m: 1 juv., BMNH 1950.1.5.58, leg. O. Polunin, 1949. Sanghu, Maewa Khola, E. Nepal, 1830-2440 m: 1 ♂, 3 juvs., BMNH 1962.1025-28; 4 ♀, 9 ♂, BMNH 1962.1030-42, all leg. K.H. Hyatt.

BANGLADESH. Bengal (n = 1). Rangpur, N. Bengal: 1 ♂, BMNH 1934.11.2.28.

INDIA. Sikkim/Darjeeling (n = 26). Sikkim: 1 ex., BMNH 1946.8.16.79 (holotype), leg. Schlagintweit; 5 ♀, 1 ♂, BMNH 70.11.29.14A-F, leg. T.C. Jerdon. Darjeeling: 1 ♂, BMNH 74.4.29.1226, leg. Beddome; 1 ♀, 2 ♂, BMNH 80.11.10.48-50; 1 ♂, BMNH 89.1.28.3; 6 ♀, 7 ♂, BMNH 1925.3.12.1-13, all 8 to 21-III-1924, all leg. Mount Everest Expedition. Kalimpong, 1220 m: 1 ♂, BMNH 1925.3.12.16, 27-III-1924, leg. Mount Everest Expedition.

Assam, NE. India (n = 2). 2 ♀, RMNH 4762.

Diagnosis. — A rather small *Scincella*, maximum snout-vent length 55.7 mm, but usually much smaller ($\bar{x}$ = 39.1 mm). Only 21-29 ($\bar{x}$ = 24.7) scales around midbody. Ear round and very small, without projecting lobules; tympanum deeply sunk. Ciliars not thickened.

Description. — The number of scales above the eye is about the same as in *S. ladacensis:* supraciliars 4-8 ($\bar{x}$ = 5.8 ± 0.6); ciliars 6-11 ($\bar{x}$ = 8.7 ± 0.9); the number of scales posterior to the eye is greater: postoculars + postsuboculars 4-6 ($\bar{x}$ = 5.0 ± 0.3). The upper postocular is usually quite small and narrow. Only the fifth supralabial is situated under the eye.

Transparent disc large, but much smaller than in *S. ladacensis* ($\bar{x}$ ratio S-V length/length transparent disc: 42.0 ± 7.6). Ear round and very small ($\bar{x}$ ratio S-V length/width ear: 74.5 ± 21.6), especially in eastern specimens. In western specimens from the Annapurna region, the ear is sometimes oval or even slit-shaped. There are no distinct, projecting lobules, but sometimes there are some small granules on the anterior margin of the ear. Tympanum deeply sunk. Some pairs of nuchals usually are distinctly enlarged ($\bar{x}$ = 3.1 ± 0.8). The number of body scales is rather small: scalerows between the parietals and the thighs 45-66 ($\bar{x}$ = 53.9 ± 4.2); gulars + ventrals 50-71 ($\bar{x}$ = 58.6 ± 4.3); scales around midbody 21-29 ($\bar{x}$ = 24.7 ± 1.5). A number of scales around midbody higher than 25 is only found rarely in some specimens of the eastern populations, but is normal in some of the western populations. Dorsal scales about one and a half times as wide as the laterals. Number of subdigital lamellae: under the fourth finger 9-13 ($\bar{x}$ = 10.7 ± 1.0); under the fourth toe 12-18 ($\bar{x}$ = 15.1 ± 1.1). Maximum snout-vent length 55.7 mm.

Dorsum bronze-brown, usually with some irregularly arranged dark brown to black spots. These are sometimes (e.g. Annapurna population) arranged in a vertebral band. The dark spots are very seldom associated with white spots as in *S. ladacensis*. Lateral dark band distinct, with a straight dorsal edge. A row of small white spots is situated just at the ventral edge of this band. Sometimes as indistinct gold-coloured dorsolateral line is present. Lateral band bordered below by a white line, which, between fore- and hindlegs, becomes orange to red in spring (in both males and females). Lower flanks grey to dark brown, with several whitish and black spots. Ventral parts white to greenish white, yellow or greyish. In spring the chin and the subcaudal region become orange. Upper side of the legs dark brown, spotted with bronze-brown.

Habitat. — Rather damp places, often near small streams, at the lower edge of the forest or in clearings. Most abundant in a habitat where mosses and dead leaves cover the ground. Not reported from above 3200 m or below 1200 m. Numerous on the southern slopes of the high Himalayas, rare in the Midlands (hills south of the main Himalayan chain), probably as a result of deforestation by man. In the high Himalayas thinning of the forest, due to cattle-grazing and leave-cutting, on the contrary has extended this lizard's habitat considerably.

Since the species does not live in the forest, its dispersal from one clearing to a newly created one is difficult. The most likely hypothesis for its dispersal is that adults and/or eggs are accidentally transported in porter-loads. This is not as strange as it looks, as all clearings are connected by a series of footpaths and are often visited by people carrying wood, leaves, grass and other

things. Dispersal along footpaths by the lizards themselves is not very likely, since these are mostly devoid of sunshine, as is the forest-floor. I never saw *S. sikimmensis* on such footpaths.

Natural history. — In the Dhampus forest population, studied by me in April and May 1981, activity was limited to a small part of the day. Sunshine reached the population at about 9 a.m. During sunshine activity increased rapidly. The dead leaves were used by the lizards as camouflage and cover. They often warmed themselves not directly in the sun, but underneath dead, dry leaves, which could reach high temperatures. After their body temperatures had reached about 29°C (see fig. 6), which was several degrees higher than the air temperature at the time, they started foraging. When two lizards met, display was quite similar to that in many other lizards: they bent their back and head and flattened themselves laterally as much as possible.

Despite the enormous number of leeches always present in their habitat, only once one was found on a lizard, sucking its blood.

This species is oviparous; eggs are probably laid in June-July, under moss and stones. According to Annandale (1912) this lizard lays its eggs in wet moss on tree trunks during the rainy season. Juveniles are numerous in the beginning of September.

Range. — Eastern Himalayas, from the Annapurna region in the west to Assam in the east. Also reported from Chota Nagpur (Stoliczka, 1872; Annandale, 1912) and Rangpur (fig. 3). Unfortunately only very few collections have been made in Bhutan, the Khasi Hills and the hills on the Indian-Burmese border. Probably it will turn out that either *S. sikimmensis* or a close relative lives there.

Remarks on the Himalayan species. — Several authors (Jerdon, 1870; Anderson, 1871; Blanford, 1878) have questioned the separation of *"sikkimense"* and *"himalayanum"*, but only few (Gruber, 1981) have questioned the separation of *"himalayanum"* and *"ladacense"*. Using the old key-characters (number of scales around midbody and colour), this is easy to understand, since *sikimmensis* and *l. himalayana* are quite similar in coloration and there is a gradual increase in scale-numbers between Sikkim and NW. India. At first sight the similarities between *himalayana* and *ladacensis* are less distinct and the Himalayas constitute a natural barrier for these forms. Still, a number of transitional populations between these two taxa is known (e.g., the Wangu population and several populations in Lahoul).

Actually the three Himalayan taxa form a cline, in which the far ends, *ladacensis* and *sikimmensis*, are distinctly different. Within this cline not all characters change gradually. In the Annapurna region for instance, the number of scales around midbody increases suddenly from south to north and

from east to west, while most other characters do not change and have the same values as those in *sikimmensis* from more eastern localities; in Kashmir size is greater. Any classification of these skinks will depend largely on the characters or combination of characters used to define the different species. The number of scales increases in the dry areas of the Marsyandi and Kali Gandaki and seems to be associated with decreasing humidity (with the exception of the population in the wet Ghorapani forest, which too has many scales) (fig. 7). Going west the humidity decreases in the Himalayas, because of the waning influence of the monsoon, and the number of scales increases (fig. 8). Actually this clinal increase is even better expressed than is shown in fig. 8, since it is not only east-west, but south-north as well. The correlation between number of scales (scale-size) and humidity was also noted by Soulé & Kerfoot (1972), but they dealt with lizards with heavily keeled scales, in which the total surface of the animal increases with scale-size. So, it seems that in an area where evaporation is restricted, scale-size will be small and the number of scales large. It is the question whether this applies to smooth scales as well,

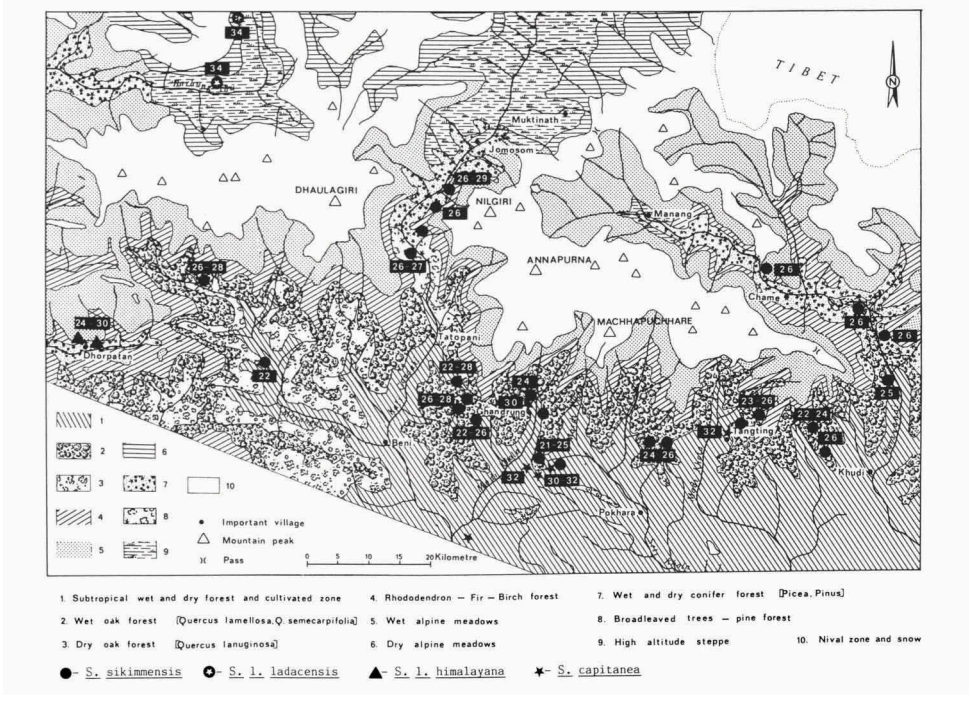


Fig. 7. Vegetation map of the Annapurna-Dhaulagiri area (Nepal) and the distribution of the genus *Scincella* in this area. The number of scales around midbody is given for most populations.

as in this case the total surface may not be dependent on scale-size, but also be influenced by the overlap of scales.

I do not attach much value to the character of the number of scales around midbody (see material and methods). When using much more characters, the close relationship between the former *"ladacense"* and *"himalayanum"* becomes clear; all characters that are important to separate the three Himalayan taxa discussed here, are listed in table 4. For ten of the sixteen characters *himalayana* more resembles *ladacensis* than *sikimmensis.* The limited importance of three (supraciliars, scalerows between parietals and thighs, gulars + ventrals) of the six remaining characters is demonstrated by a comparison of two groups of populations of *S. sikimmensis* in the fourth column. The number of postoculars + postsuboculars and the number of lamellae under the fourth toe seem to differ equally between the three taxa. The conclusion is that *himalayana* more resembles *ladacensis* than *sikimmensis* and should be regarded as conspecific with *ladacensis.* This of course is also demonstrated by the dendrogram (see p. 56), where all specimens of *himalayana* and *ladacensis* are placed into one group, apart from *sikimmensis.*

Still, every classification of Himalayan *Scincella* remains highly artificial. Because of the isolation in which most populations live (see habitat), "splitters" might call almost every population a different species because of slight differences. Specimens of the Spiti Valley population of *S. ladacensis* (called *Euprepes stoliczkai* by Steindachner in 1869) for instance, have eight instead of seven supralabials, with the sixth under the eye. In the populations of *S. l. himalayana,* living at lower altitudes, some of the *ladacensis* characters, like the large palpebral disc and the thickened ciliars, are less pronounced. Thus, it seems that not only humidity has some influence on the clinal change, but altitude as well. On the other hand, aberrant specimens, with too many or too few scales for the (sub)species concerned, can be found in most populations.

Not only the morphological characters, but some physiological characters as well, make *S. l. himalayana* a difficult taxon. Most previous authors reported it to be viviparous, but Gruber (1981) found the Gulmarg population to be oviparous. The Dhorpatan population is also oviparous, but the more western and higher populations from Saipal and Garanphu are viviparous. Some confusion about the courtship colours still exists. Stoliczka (1872) reported these for the first time. According to him the ventral part of the tail is red in some seasons. Alcock (1898), Brongersma (1935) and Gruber (1981) found the belly to be red. According to Annandale (1907) only males have a red lateral stripe below the dark band and they only have it in spring. I found the majority of the Dhorpatan population, males as well as females, to have

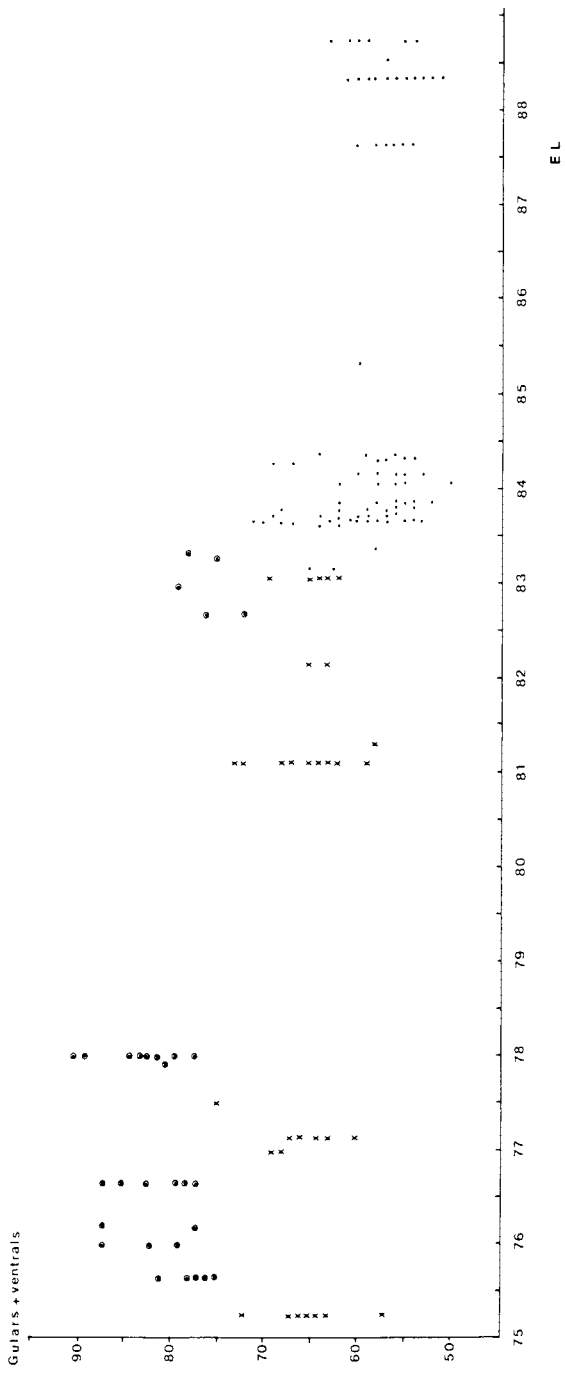


Fig. 8. Numbers of gulars + ventrals for *Scincella ladacensis* and *S. sikimmensis* according to latitude. Dots in circle — *S. l. ladacensis*; crosses — *S. l. himalayana*; dots — *S. sikimmensis*.

a red lateral stripe, a red chin and a ventrally red tail, the belly was cream-coloured. Only one specimen, a female, had a red-coloured belly and no red lateral stripe, red subcaudals or red chin.

Scincella capitanea spec. nov.
(figs. 3, 7, 9-11, 14-16; table 2)

? *Lygosoma himalayanum* Annandale, 1907: 154, pl. VI.

Holotype. — ♀, RMNH 20464, 3 km W. of Dhampus, 1850 m, Annapurna region, Central Nepal, 29-V-1981, leg. P.E. Ouboter & L.M.R. Nanhoe.

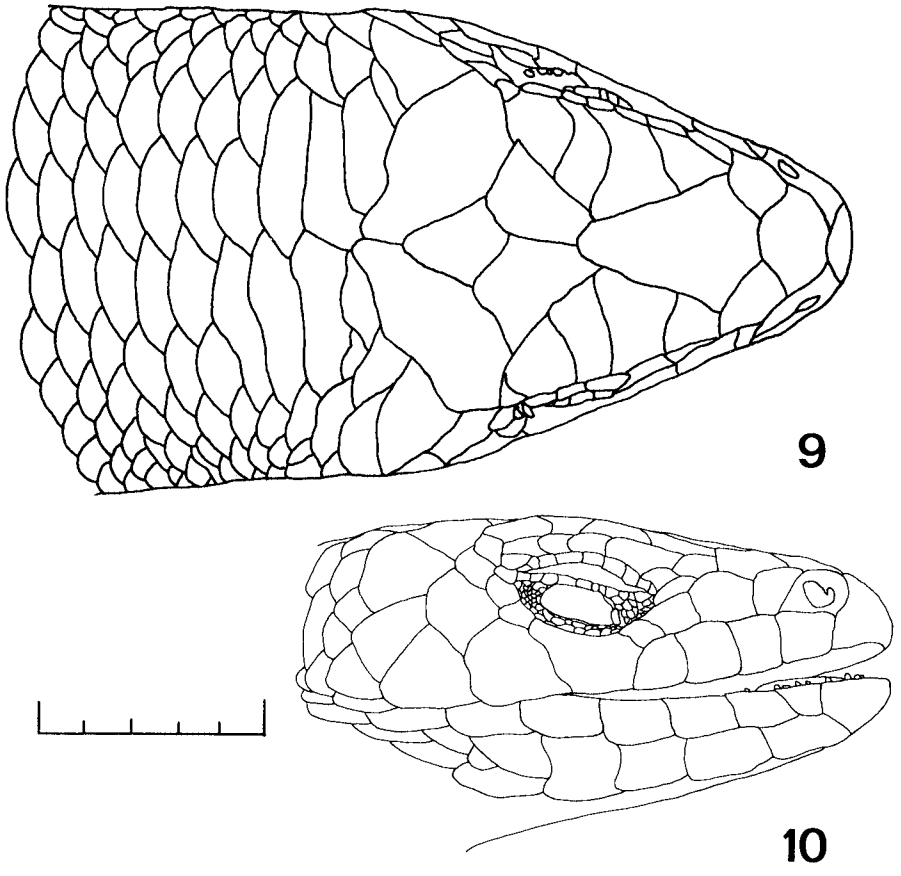
Paratypes. — Annapurna region, Nepal (n = 8). Gandrung, 2100 m: 1 ♀, ZSM 56/73, 24-V-1973, leg. U. Gruber. Lumle, 1550 m: 1 ♀, ZSM 130/82, 2-V-1979, leg. U. Gruber. Dhampus, 1400 m: 3 ♀, 1 ♂, ZSM 129/82, 16-III-1974, leg. U. Gruber; 1770 m: 1 ♂, RMNH 20462, 18-IV-1981, leg. Dhanbahadur Gurung, P.E. Ouboter & L.M.R. Nanhoe. Tang Ting, Madi Khola, 1680 m: 1 ♀, RMNH 20463, 24-IV-1981, leg. P.E. Ouboter & L.M.R. Nanhoe.

Diagnosis. — A very large and robust *Scincella*, with a maximum snout-vent length of 78.5 mm ($\bar{x}$ = 68.2 ± 10.0 mm) and well-developed limbs. Head small; neck wider than the head. Thirty to 32 scales around midbody. Ciliars not thickened. Palpebral disc rather small. Ear very small, slit-shaped, without projecting lobules on the anterior margin.

Description (values for holotype between brackets). — The most striking difference between this species and all other *Scincella* is its size. Only some specimens of *S. l. himalayana* from Kashmir approach this size, but with a maximum snout-vent length of 66.8 mm are still considerably smaller. Except from being large, *S. capitanea* with a maximum snout-vent length of 78.5 mm (72.1 mm), is rather robust as well, with the neck and the body much wider than the small head ($\bar{x}$ ratio S-V length/head width: 8.0 ± 0.7; $\bar{x}$ ratio S-V length/head length: 6.5 ± 0.6) (7.7 and 6.3 in holotype). Hindlegs strong and long ($\bar{x}$ ratio S-V length/length hindlegs: 2.7 ± 0.2) (2.9). Frontal rather long, about one and a half times as long as the parietals and interparietal together. The number of scales around the eye is quite similar to that of the other Himalayan species: supraciliars 5-7 ($\bar{x}$ = 6.1 ± 0.4) (6/5); ciliars 8-11 ($\bar{x}$ = 9.0 ± 0.9) (10/9); usually five postoculars + postsuboculars, but in the holotype only four on the right side of the head. Upper postocular usually not wide. The fifth supralabial is situated under the eye, sometimes the sixth as well. Ear very small ($\bar{x}$ ratio S-V length/width ear: 92.8 ± 47.1) (72.1); it is usually slit-shaped as in *S. ladacensis*, but lacks distinct, projecting lobules. Tympanum deeply sunk. Three to four pairs of enlarged nuchals ($\bar{x}$ = 3.3 ± 0.6) (3). The number of body scales is intermediate between that of

S. sikimmensis and *S. ladacensis*: scalerows between the parietals and the thighs 62-67 ($\bar{x}$ = 63.8 ± 1.7) (64); gulars + ventrals 61-72 ($\bar{x}$ = 65.4 ± 3.2) (66); scales around midbody 30-32 ($\bar{x}$ = 31.0 ± 1.0) (31). Also the number of subdigital lamellae under the fourth finger, 10-12 (12), and under the fourth toe, 15-17 (17), is intermediate between the values for these two mentioned species.

Dorsal greyish brown to light brown, usually with small black spots. These are arranged irregularly and not in a distinct vertebral band as in some populations of *S. sikimmensis* and *S. l. himalayana*. The lateral bronze-brown band is always present, starting at the rostral, running backwards through the eye and ear and above the forelegs, very distinctly between the fore- and hindlegs, fading away on the tail. Contrary to the situation in *S. sikimmensis* and *S.*



Figs. 9, 10. Dorsal (9) and lateral (10) view of the head of the holotype of *Scincella capitanea* (RMNH 20464). Scale bar represents 5 mm.

l. himalayana its dorsal edge is not straight, but irregular. Dorsally it is bordered by a rather broad, but indistinct, greyish dorsolateral stripe, which is only slightly lighter in colour than the back. Some small white spots may be present on the lateral band. Below, the lateral band is bordered by a white to grey line. Lower flanks with some small brown spots. Ventral parts greyish or yellowish white. A male collected in April had an orange-coloured belly. Dorsal parts of the legs light brown spotted with white and bronze-brown.

Habitat. — Two specimens were collected in damp forests, but a third one was found underneath a stone on a bare field, quite distant from any forest. A specimen, probably belonging to this species, was seen more to the south near the Kali Gandaki gorge, on a slope overgrown with bushes and ferns, also some hundred meters distant from forest. *S. capitanea* probably is a for-

Fig. 11. Holotype of *Scincella capitanea* (RMNH 20464). A: dorsal view; B: lateral view. Snout-vent length 72.1 mm.

est species, but it apparently manages to survive for some time when the forest has been cut down.

Natural history. — Females collected in April and May contained eggs; females collected in March showed no visible development of eggs.

Range. — Only known from the area south of the Annapurna range (fig. 3, 6). If the *Lygosoma himalayanum* reported by Annandale (1907) from Chitlang (S. of Kathmandu Valley) really belongs to this species, then its range extends much further east.

Etymology. — From Latin *capitaneus,* meaning large.

Remarks. — The first specimens were already collected in 1973/74 by U. Gruber. Although much larger, this species considerably resembles the other Himalayan species. Young specimens are difficult to distinguish from *S. sikimmensis* at first sight. Only the greater number of scales and the irregular dorsal edge of the lateral dark band serve to distinguish the species. In colour *S. capitanea* is quite similar to *S. l. himalayana,* with the exception of the dorsolateral stripe bordering the dark lateral band, which is usually more pronounced in *himalayana.* Another difference is that the head is distinctly separated from the body by a narrower neck in *himalayana.* In *capitanea* the head is small and narrower than the neck. The number of scales around the body usually is higher in *capitanea,* but some specimens of *himalayana* have 31 or 32 scales as well. *S. capitanea* probably is closely allied to the other Himalayan species.

The specimen of *L. himalayanum* reported by Annandale (1907) from Chitlang, according to him was not quite typical; it was larger (S-V length 60 mm), had 30 scales around midbody and lacked projecting lobules in the ear. Therefore, it could have belonged to this species.

Scincella victoriana (Shreve, 1940)
(figs. 3, 14-16; table 2)

Lygosoma victorianum Shreve, 1940: 17 (type loc. Mt. Victoria, Pokokku-Chin Hills, Burma). *Scincella victoriana:* Greer, 1974: 7.

Material. — BURMA (n = 2). Mt. Victoria, Chin Hills, 2800 m: 1 ex., MCZ 44738 (holotype), 30-V-1938, leg. G. Heinreich; 2600 m: 1 ♂, MCZ 44739 (paratype), 22-V-1938, leg. G. Heinreich.

Diagnosis. — The only *Scincella* with distinctly keeled dorsal scales. A robust lizard with well developed limbs. A small number of body scales. Dorsal and lateral scales about equal in size.

Description. — Frontal rather long ($\bar{x}$ ratio length frontal/length parietals

+ interparietal: 1.3 ± 0.1). The number of scales around the eye is normal: supraciliars 5-7 ($\bar{x}$ = 5.7 ± 1.1); ciliars 8-10 ($\bar{x}$ = 8.7 ± 1.1); postoculars + postsuboculars 5-6 ($\bar{x}$ = 5.2 ± 0.4), of which two are postsuboculars. Upper postocular narrow. Only the fifth supralabial is situated under the eye. Ear round, sometimes bearing a small granule on the anterior margin; tympanum deeply sunk. Three pairs of enlarged nuchals. The number of body scales is small: scalerows between the parietals and the thighs 50-54 ($\bar{x}$ = 52.0 ± 2.8); gulars + ventrals 53-56 ($\bar{x}$ = 54.4 ± 2.1); 26 scales around midbody in both specimens examined. Dorsals and laterals about equal in size. Dorsal scales distinctly keeled: in front of the forelegs four longitudinal scalerows with bicarinate scales, between the fore- and hindlegs six longitudinal scalerows with tricarinate scales, on the tail the scales become bicarinate again and only four scalerows are keeled. There are 11 subdigital lamellae under the fourth finger and 15 under the fourth toe. Fore- and hindlegs well-developed and rather long ($\bar{x}$ ratio S-V length/length limbs: 3.7 ± 0.1 and 2.8 ± 0.1 for fore- and hindlegs resp.). Maximum snout-vent length 57.5 mm.

Colour in preservative: Above light brown, with some golden and dark brown spots. Dark brown lateral band dorsally bordered by an indistinct whitish line. On the back, adjacent to this line some dark brown spots. A grey lateral streak on the lower flanks, more distinct and whiter anteriorly. Below greyish or whitish.

Range. — Only known from the type locality (fig. 3).

Remarks. — Allied to *S. sikimmensis*, as already suggested by Shreve (1940). The number of scales, the narrow upper postocular and the colours are quite similar in both species, but they mainly differ in the keeled dorsal scales and the equal size of dorsals and laterals in *S. victoriana*.

Scincella travancorica (Beddome, 1870)
(figs. 3, 12, 14-16; tables 2, 5)

Mocoa travancorica Beddome, 1870: 34 (type loc. Travancore Hills, S. India) (in part); Theobald, 1876: 58.

Lygosoma travancoricum: Boulenger, 1887c: 261, pl. XVIII fig. 4; Boulenger, 1890: 204; Hora, 1927: 5.

Lygosoma laterimaculatum Boulenger, 1887c: 260, pl. XVIII fig. 2 (type loc. Top of Sivagherry Ghat, Wala Ghat, Nilgherries and Travancore, S. India); Boulenger, 1890: 202 (**new synonym**).

Lygosoma (Leiolopisma) travancoricum var. *palnica* Boettger, 1892: 72 (type loc. Kodaikanal, Palni Hills, S. India) (**new synonym**).

Leiolopisma travancoricum: Smith, 1935: 304.

Leiolopisma palnicum: Smith, 1935: 305.

Leiolopisma laterimaculatum: Smith, 1935: 305.

Lygosoma (Leiolopisma) travancoricum: Constable, 1949: 104.

Lygosoma (Leiolopisma) bilineatum laterimaculatum: Constable, 1949: 104.
Scincella travancoria: Greer, 1974: 7.
Scincella laterimaculata: Greer, 1974: 7.

Material. — INDIA. SW. India (n = 14). 1 ♀, MCZ 4782. Madras ?: 2 ♀, 1 ♂, 1 juv., MCZ 162303-06, leg. Beddome. Top of Sivagherry Ghat: 3 juvs., BMNH 1946.8.17.53-55, leg. Beddome. Palni Hills: 3 ♀, 1 ♂, BMNH 82.5.22.114-17, leg. Beddome. Kodaikanal, Palni Hills: 1 ♂, BMNH 1934.10.9.8. Coimbatore, Madras distr.: 1 ♀, BMNH 1934.3.4.2.

Diagnosis. — A robust *Scincella,* with well-developed limbs. In some populations the frontoparietals are partly or completely united. Upper postocular wide. There is always a more or less distinct light dorsolateral stripe present.

Description. — The frontoparietals either are separated, partly or completely united (fig. 12); sometimes they are even united with the interparietal. The number of scales around the eye is normal: seven supraciliars (without ex-

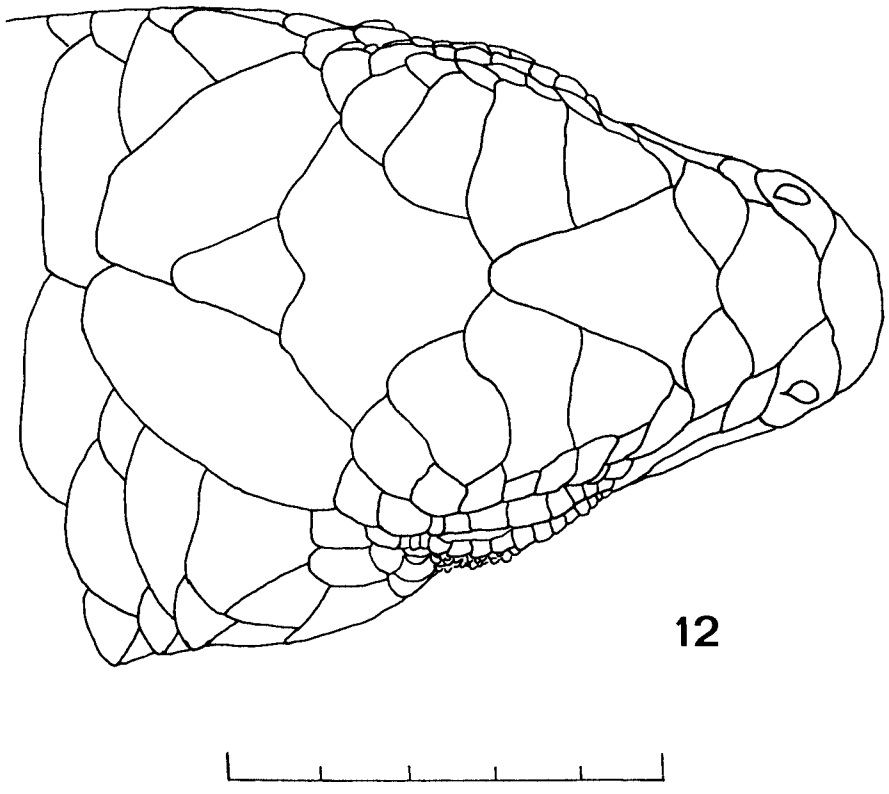


Fig. 12. Dorsal view of the head of *Scincella travancorica* (MCZ 4782). Scale bar represents 5 mm.

ception); ciliars 8-12 ($\bar{x}$ = 9.6 ± 0.9); postoculars + postsuboculars 4-6 ($\bar{x}$ = 5.3 ± 0.6). Upper postocular wide. As in most members of the genus usually the fifth supralabial is situated under the eye, but in *S. travancorica* occasionally both the fifth and the sixth supralabial are. The ear is round or oval, sometimes with some small projecting lobules; the tympanum is deeply sunk. Two to five pairs of enlarged nuchals ($\bar{x}$ = 3.5 ± 0.7); scalerows between the parietals and the thighs 53-75 ($\bar{x}$ = 63.9 ± 6.6); gulars + ventrals 60-77 ($\bar{x}$ = 68.9 ± 5.8); scales around midbody 22-30 ($\bar{x}$ = 25.8 ± 2.2). The dorsal scales are about one and a half times as wide as the laterals. There are 10-14 subdigital lamellae under the fourth finger ($\bar{x}$ = 12.2 ± 1.2) and 17-22 under the fourth toe ($\bar{x}$ = 19.5 ± 1.5). Body robust ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 1.6 ± 0.1). The limbs are well-developed and long ($\bar{x}$ ratio S-V length/length limbs: 4.2 ± 0.3 and 3.0 ± 0.3 resp. for fore- and hindlegs). Maximum snout-vent length 60.2 mm.

Colour in preservative: Dorsum grey-brown. Usually a very distinct grey to creamy stripe, starting behind the supraoculars, fading away on the tail. This dorsolateral stripe is dorsally bordered by a black line (sometimes only existing of a series of spots), ventrally by the dark lateral band. This band has a straight upper margin, towards the lower flanks it becomes broken up into many spots. These spots cover the lateral parts of neck and head as well. The supra- and infralabials are edged with dark brown. The ventral surface and the lower flanks, between the spots, are grey to white-coloured. Limbs dorsally brown with black spots.

Range. — SW. India: Travancore, Anaimalai and Palni Hills (fig. 3).

Remarks. — As all other *Scincella*, the South Indian species were classified by previous authors using the number of scales around midbody as the main character. In a continuous series of numbers of scales every division is possible, but highly artificial when no other important characters are used (see for instance Constable, 1949). Using relative size of head, body and limbs (see material and methods), a different arrangement is reached (tab. 5), in which *L. laterimaculatum* and *L. palnicum* become synonyms of *S. travancorica*. Thus, I consider these taxa synonymous with *S. travancorica*.

Scincella bilineata (Gray, 1846)

(figs. 3, 14-16; tables 2, 5)

Mocoa bilineata Gray, 1846: 430 (type loc. summit of Nilgiris); Jerdon, 1853: 477; Theobald, 1876: 58.

Eumeces bilineatus: Günther, 1864: 85.

Lygosoma bilineatum: Boulenger, 1887c: 259, pl. XVIII fig. 1; Boulenger, 1890: 202.

	Scincella travancorica				Scincella bilineata		
	travan-corica	lateri-maculata	palnica	Total	bili-neata	beddomi	Total
	n=4	n=5 4 ad.	n=2	n=11 10 ad.	n=5 4 ad.	n=1	n=6 5 ad.
Snout-vent length	48.6± 8.2	49.8± 3.9	56.2± 1.8	50.6± 6.1	48.5± 3.4	50.7	49.0± 3.1
Supraciliars	7.0± 0	7.0± 0	7.0± 0	7.0± 0	6.0± 0	6.0	6.0± 0
Ciliars	9.5± 0.4	9.5± 0.9	10.2± 0.4	9.6± 0.9	7.9± 0.5	9.0	8.2± 0.1
Postoculars + postsuboculars	5.1± 0.3	5.5± 0.6	5.2± 1.1	5.3± 0.6	5.3± 0.5	5.0	5.2± 0.5
Projecting lobules	2.9± 1.9	0.9± 1.8	0.8± 1.1	1.7± 1.9	2.1± 0.3	2.0	2.1± 0.5
Pairs of enlarged nuchals	3.5± 0.8	3.5± 0.8	3.5± 0.7	3.5± 0.7	3.2± 0.3	4.0	3.4± 0.5
Scalerows between parietals and thighs	55.2± 2.6	69.2± 1.5	72.0± 4.2	63.9± 6.6	68.5± 3.5	51.0	64.2± 7.1
Gulars + ventrals	62.7± 3.0	73.7± 1.5	77.0± 0	68.9± 5.8	66.5± 1.0	60.0	65.5± 2.6
Scales around midbody	23.0± 1.2	26.7± 1.5	29.0± 1.4	25.8± 2.2	24.5± 1.0	20.0	23.5± 1.8
Subdigital lamellae fourth finger	12.0± 1.2	11.0± 0.8	12.5± 0.7	12.2± 1.2	10.2± 1.0	10.0	10.2± 0.7
Subdigital lamellae fourth toe	19.7± 1.5	18.2± 1.0	20.0± 2.8	19.5± 1.5	17.0± 0.8	15.0	16.7± 0.9
Ratio S-V length/head width	7.3± 0.2	7.4± 0.5	7.1± 1.2	7.3± 0.5	8.0±0.5	8.3	8.0± 0.4
Ratio S-V length/head length	6.1± 0.4	6.0± 0.4	6.0± 0.7	6.0± 0.4	6.6± 0.5	6.4	6.6± 0.5
Ratio length between fore- and hindlegs/ length in front of forelegs	1.6± 0.2	1.6± 0.2	1.6± 0.1	1.6± 0.1	1.8± 0.1	1.7	1.8± 0.1
Ratio S-V length/length forelegs	4.0± 0.2	4.3± 0.3	4.5± 0.4	4.2± 0.3	4.9± 0.4	4.6	4.9± 0.4
Ratio S-V length/length hindlegs	2.9± 0.2	3.0± 0.3	3.3± 0.1	3.0± 0.3	3.4± 0.1	3.9	3.5± 0.2
Ratio length frontal/length parietals + interparietal	1.0± 0.1	1.1± 0.1	1.1± 0	1.1± 0.6	1.0± 0	1.2	1.0± 0.2
Ratio length post. loreal/ length ant. loreal	2.5± 0.1	1.4± 0.2	1.5± 0.2	1.9± 0.6	1.5± 0.2	1.8	1.6± 0.2
Ratio width dorsals/width laterals	1.4± 0.1	1.4± 0.2	1.6± 0.2	1.5± 0.1	1.3± 0.2	1.2	1.3± 0.2
Ratio S-V length/length transparent disc	52.4± 6.1	51.2± 2.9	51.1± 1.6	51.7± 4.1	60.9± 5.3	50.7	58.9± 6.5
Ratio S-V length/length eye	22.8± 1.1	24.0± 1.3	23.4± 0.7	23.4± 1.2	25.9± 0.9	25.3	25.8± 0.8
Ratio S-V length/width ear	69.5± 8.4	59.5± 8.8	80.4± 2.5	67.7±10.8	65.8± 9.7	126.7	78.0±28.5

Table 5: Mean and standard deviation of some important characters for *S. travancorica* and *S. bilineata* and nominal taxa which are now placed in synonymy of these.

? *Lygosoma beddomii* Boulenger, 1887c: 261, pl. XVIII fig. 3 (type loc. Travancore Hills and Wynad, S. India); Boulenger, 1890: 203; Annandale, 1905: 146 **(new synonym)**.
Leiolopisma beddomei: Smith, 1935: 305.
Leiolopisma bilineatum: Smith, 1935: 306.
Scincella beddomi: Greer, 1974: 7.
Scincella bilineata: Greer, 1974: 7.

Material. — INDIA. Nilgiri Hills, SW. India (n = 6). 1 ♀, 1 juv., MCZ 4130, 162302, leg. E. Gerrard; 2 ♂, BMNH 67.8.11.18-19, leg. F. Day. Kotagiri: 1 ♀, BMNH 91.11.27.5, leg. Dr. Henderson. Coonor: 1 ♀, BMNH 1934.3.4.1.

Diagnosis. — A *Scincella* with a somewhat elongated body and small limbs. The toes are short with a small number of subdigital lamellae: 9-11 under the fourth finger, 15-18 under the fourth toe. A small number of scales above the eye: six supraciliars, 7-9 ciliars. Four preanals are enlarged (the central pair more than the lateral pair). The light dorsolateral stripe is absent or hardly visible.

Description. — Frontoparietals always separated. Number of scales above the eye small: supraciliars 6; ciliars 7-9 ($\bar{x}$ = 8.1 ± 0.7). Postoculars + postsuboculars 5-6 ($\bar{x}$ = 5.2 ± 0.5). Upper postocular wide. The fifth as well as the sixth supralabial are situated under the eye. Ear round, usually with two or three projecting lobules; tympanum slightly sunk. Three or four pairs of enlarged nuchals; scalerows between the parietals and the thighs 51-72 ($\bar{x}$ = 64.2 ± 7.1); gulars + ventrals 60-67 ($\bar{x}$ = 65.5 ± 2.6); scales around midbody 20-26 ($\bar{x}$ = 23.5 ± 1.8). Limbs rather short ($\bar{x}$ ratio S-V length/length limbs: 4.9 ± 0.4 and 3.5 ± 0.2 resp. for fore- and hindlegs), as well as the toes, which bear a small number of subdigital lamellae: 9-11 under the fourth finger ($\bar{x}$ = 10.2 ± 0.7) and 15-18 under the fourth toe ($\bar{x}$ = 16.7 ± 0.9). This lizard has a much more enlongated body than *S. travancorica* ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 1.8 ± 0.1, against 1.6 ± 0.1 in *travancorica*). There are two pairs of enlarged preanals (central pair larger than lateral pair). In some of the males these preanals are pointed. Maximum snout-vent length 53.2 mm.

Colour in preservative: Dorsum brown. Dark brown lateral band much broken up by small whitish spots, sometimes hardly visible. Temporals and labials edged with dark brown. No distinct dorsolateral stripe. Ventral parts white to brown. Limbs dorsally brown.

Range. — Nilgiri Hills (SW. India), up to the summit at 2600 m (fig. 3).

Remarks. — I provisionally have placed *S. beddomi* in the synonymy of *S. bilineata*, mainly because of their resemblance in relative size (tab. 5) and coloration. Other characters are similar as well, i.e. the number of supraciliars and enlarged preanals.

Scincella doriae (Boulenger, 1887)
(figs. 3, 14-16; table 2)

Lygosoma doriae Boulenger, 1887a: 620 (type loc. Kakhien Hills, Burma); Boulenger, 1890: 201.
Leiolopisma doriae: Schmidt, 1927b: 502; Smith, 1935: 302; Suvatti, 1950: 486; Taylor, 1963: 1048.
Scincella doriae: Greer, 1974: 7.

Material. — BURMA (n = 1). Kakhien Hills: 1 ex., BMNH 89.3.25.26 (holotype), leg. L. Fea. CHINA (n = 3). Koenming (Yunnan Fu), Yunnan: 1 ♀, 1 juv., BMNH 1905.5.30.7-8; 1 juv., MCZ 112235, all leg. J. Graham.

Diagnosis. — A large *Scincella* with a mean snout-vent length of 56 mm (in adults) and strong legs. The prefrontals are narrowly separated or just touching each other. More than ten ciliars and four to five pairs of enlarged nuchals. The lateral dark band is much broken up by whitish spots.

Description. — Prefrontals narrowly separated or just touching each other. Scales around the eye: supraciliars 6-7 ($\bar{x}$ = 6.9 ± 0.3); usually eleven ciliars. Upper postocular wide. Fifth and sixth supralabial under the eye. Ear round and quite large ($\bar{x}$ = 1.2 mm in adults), without projecting lobules; tympanum scarcely sunk. Enlarged nuchals 3-5 pairs; scalerows between the parietals and the thighs 66-76 ($\bar{x}$ = 70.0 ± 3.9); gulars + ventrals 70-79 ($\bar{x}$ = 72.7 ± 3.6); scales around midbody 30-32 ($\bar{x}$ = 31.2 ± 0.8). Dorsals about one and a half times as wide as the laterals. Number of subdigital lamellae: 10-15 under the fourth finger ($\bar{x}$ = 12.7 ± 1.9) and 15-18 under the fourth toe ($\bar{x}$ = 16.7 ± 1.1). Fore- and hindlegs rather long ($\bar{x}$ ratio S-V length/length limbs resp. 3.8 ± 0.7 and 2.8 ± 0.5). Maximum snout-vent length 58.6 mm.

Colour in preservative: Dorsum caramel-brown, with some small brown spots, not forming a vertebral band. Lateral dark brown band starting behind the nostril, continuing through the eye and above the ear, to behind the hindlegs; not very broad and much broken up by whitish spots. Flanks and upper surface of limbs heavily spotted with small dark brown spots. Margins of supra- and infralabials edged with brown. Ventral surface and tail yellowish-white.

Range. — N. Burma and Yunnan (fig. 3).

Scincella reevesii (Gray, 1838)
(figs. 3, 13-16; tables 2, 6)

Tiliqua reevesii Gray, 1838: 292 (type loc. China).
Eumeces reevesii: Günther, 1864: 87, pl. X fig. K.

Lygosoma nigropunctatum Bocourt, 1878: 2 (type loc. Whampoa, Canton Province).
Lygosoma kakhiensis Boulenger, 1887a: 621 (type loc. Kakhien Hills, Burma).
Lygosoma laterale: Boulenger, 1887c: 263 (in part); Smith, 1916a: 56.
Leiolopisma laterale: Mell, 1922: 114; Smith, 1923: 200.
Leiolopisma reevisii: Schmidt, 1927a: 423.
Leiolopisma eunice Cochran, 1927: 187 (type loc. Pak Jong, Dong Paya Fai Mts., Thailand); Cochran, 1931: 18, fig. 3; Taylor & Elbel, 1958: 1121, fig. 19; Taylor, 1963: 1033, fig. 91; Campden-Main, 1969: 842.
Leiolopisma reevesi reevesi: Smith, 1935: 295; Suvatti, 1950: 486; Romer, 1975: 8.
? *Leiolopisma ochraceum* Bourret, 1937 (type loc. Indochine Française); Bourret, 1943: 15, 20, 31.
Leiolopisma smithi Cochran, 1941: 238, fig. 1 (type loc. Khun Tan, Lampang Prov., Thailand); Taylor, 1963: 1035; Campden-Main, 1969: 842 **(new synonym)**.
? *Leiolopisma pootipongi* Taylor, 1962: 244 (type loc. Sanoi River, Ubon Prov., Thailand); Taylor, 1963: 1027 **(new synonym)**.
Scincella eunicis: Greer, 1974: 7.
Scincella ochracea: Greer, 1974: 7.
Scincella reevesi: Greer, 1974: 7.

Material. — THAILAND (n = 10). Khun Tan Mts., N. Thailand: 1 ex., USNM 94536, 2-III-1932, leg. H.M. Smith. Krabin: 1♂, BMNH 1916.3.27.29, leg. M.A. Smith. Muak Lek: 1♂, BMNH 1916.3.27.28, leg. M.A. Smith. Pak Jong (= Pakchong), Dong Paya Fai Mts., 2♀, BMNH 1916.3.27.26-27, leg. M.A. Smith; 1 ex., USNM 81881, leg. H.M. Smith, 1929. Bang Suk, near Pak Jong: 1 ex., 1 juv., USNM 72180, 70271, 19-VIII-1926, leg. H.M. Smith, Loei Dawsai, Naphung, Namlang Mt.: 1♀, 1♂, KU 51469-70.

S. VIETNAM (n = 4). Pulo Condor, Cochin: 1 ♂, BMNH 1935.11.5.4, leg. M.A. Smith. Camby, Langbian Plateau: 1 ♀, 2 ♂, BMNH 1933.12.3.12-14, leg. M.A. Smith.

CHINA (n = 3). Kachek, Hainan: 2 ex., UMMZ 78815. Five-Finger Mt., Hainan: 1 ex., UMMZ 78817.

HONG KONG (n = 4): 3♀, 1♂, BMNH 1956.1.12.39-42, leg J.D. Romer.

Diagnosis. — A medium-sized, somewhat elongated *Scincella,* with a rather small head ($\bar{x}$ ratio S-V length/head width more than 7.8; $\bar{x}$ ratio S-V length/head length more than 6.0). Usually the prefrontals form a broad suture. Some small scales between the fifth supralabial and the granules of the lower eyelid. Usually the eye is visible through the supraoculars as a dark spot. 29-33 scales around midbody. Lateral dark band broken up by whitish spots.

Description. — Prefrontals large, usually forming a broad suture (fig. 13). The number of scales surrounding the eye is normal: supraciliars 6-8 ($\bar{x}$ = 6.9 ± 0.6); ciliars 8-14 ($\bar{x}$ = 10.7 ± 1.5); postoculars + postsuboculars 5-7 ($\bar{x}$ = 6.0 ± 0.3). The upper postocular is wide. Fifth and sixth supralabial under the eye, separated from it by some small scales. In most specimens the eye is visible through the supraoculars as a dark area. Ear round, without distinct projecting lobules, sometimes there are a few granules on the anterior margin; tympanum scarcely sunk. Enlarged nuchals in 0-3 pairs, a specimen from Krabin had 5/8 enlarged nuchals. A medium number of body scales: scalerows between the parietals and the thighs 60-71 ($\bar{x}$ = 66.1 ± 3.2);

gulars + ventrals 57-73 ($\bar{x}$ = 66.9 ± 3.9); scales around midbody 29-33 ($\bar{x}$ = 31.2 ± 1.1). Dorsals rather small ($\bar{x}$ = 1.2 ± 0.2 mm in adults). Subdigital lamellae under the fourth finger 8-12 ($\bar{x}$ = 9.9 ± 0.9); under the fourth toe 14-21 ($\bar{x}$ = 16.5 ± 1.5). The body is, compared to *S. melanosticta*, somewhat elongated ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 1.7 ± 0.2); the head is rather small ($\bar{x}$ ratio S-V length/head width: 7.9 ± 0.7; $\bar{x}$ ratio S-V length/head length: 6.2 ± 0.6); the limbs are moderately sized. Maximum snout-vent length 57.4 mm.

Dorsum yellowish to bronze-brown, usually with some small dark brown, irregularly arranged spots. Sometimes the vertebral spots are enlarged. The lateral dark brown band starts, as a very narrow stripe, on the rostral; it continues through the eye and above the ear, up to the hindlegs and the tail, where it fades away. Behind the forelegs it is broken up by whitish spots; sometimes only a band of dark brown spots is left. The ventral surface and the lower

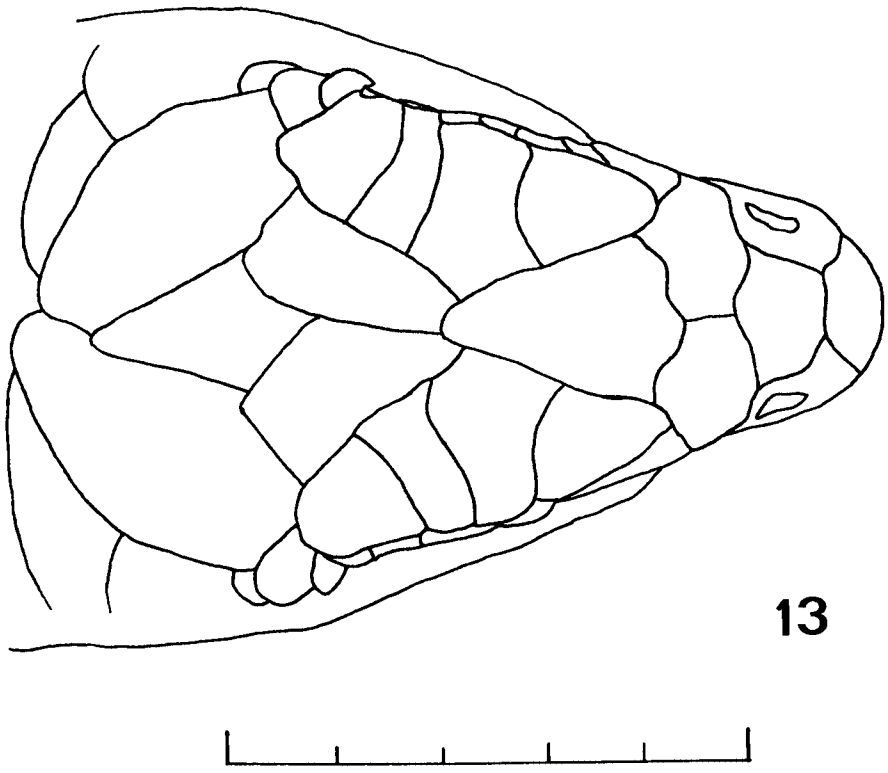


Fig. 13. Dorsal view of the head of *Scincella reevesii* (BMNH 1916.3.27.27). Scale bar represents 5 mm.

flanks are white to creamy yellow coloured. The flanks, the neck and the temporal region below the lateral band are more or less covered with small brown spots. The sutures of the supra- and infralabials are edged with brown. The upper surface of the fore- and hindlegs is light brown, reticulated with a darker brown colour.

Habitat. — There is very little information available about the habitat and the natural history of the SE. Asian skinks. According to Smith (1935) this species is mostly found in hilly country, up to 1500 m.

Range. — NE. and SE. Burma, Thailand (except the southwest), S. Vietnam, Laos? (*ochraceum*), Hainan, S. China, in the northeast up to Fukien (fig. 3). Future research may show this species to be distributed throughout the whole of SE. Asia, including Cambodia and N. Vietnam.

Remarks. — Cochran (1927), when describing *Leiolopisma eunice,* only compared it with *Leiolopisma laterale,* not with closely related species from the same area. Smith (1935) noticed the resemblance between *eunice* and *reevesii.* Taylor (1963) did not believe that *eunice* was a synonym of *reevesii,* on account of the larger subcaudals in *reevesii.* As there is much variation in size of the subcaudals in other species of *Scincella* (e.g. *S. sikimmensis*), even within a single population, I do not attach much value to this character and I again consider *L. eunice* a synonym of *S. reevesii* (also see tab. 6).

Unfortunately only one specimen of *Leiolopisma smithi* Cochran, 1941 was available to me. This specimen did not completely resemble *S. reevesii* in the relative size of body and limbs, but it resembled this taxon in much more characters: number of supraciliars and ciliars, number of scales around midbody and relative size of head and eye (see tab. 6), so I tentatively consider it synonymous with *reevesii.* Cochran (1941) compared *L. smithi* only with *L. doriae.* Campden-Main (1969) pointed out the resemblance between "*smithi*" and "*eunice*", but neglected to compare them with "*reevesii*". After comparing all Thai species of *Scincella* it became clear to me, that "*smithi*" resembles "*reevesii*" better in coloration than "*eunice*". But since there is an uninterrupted series in variation between a continuous lateral band ("*reevesii*") and a series of brown spots ("*eunice*") and since both *L. eunice* and *L. smithi* are placed in synonymy with *S. reevesii,* this point is only academical.

I did not examine specimens of *Leiolopisma ochraceum* Bourret, 1937, and I could not get hold of its original description. From the characters mentioned in the key published by Bourret in 1943, it appears to be identical to *S. reevesii,* with which it has the following characters in common: prefrontals form a suture, 3-6 pairs of nuchals, 32 scales around midbody, 15-20 lamellae under fourth toe, dorsals larger than laterals, limbs short, the adpressed limbs fail to meet or just overlap. Bourret's statement, that *L. reevesi* has few

	Scincella reevesii				Scincella melanosticta				
	reevesii	eunice	smithi	Total	melanosticta	rupicola	siamensis	kohtaoensis	Total
	n=12	n=4	n=1	n=17	n=4	n=8 7 ad.	n=1	n=3	n=16 15 ad.
Snout-vent length	48.4± 5.7	44.6± 4.8	46.3	47.4± 5.4	48.1± 6.8	42.8± 9.1	48.0	39.1± 5.0	43.8± 7.8
Supraciliars	7.0± 0.5	6.9± 0.2	6.0	6.9± 0.6	7.8± 0.5	7.9± 0.6	8.0	6.7± 0.3	7.7± 0.7
Ciliars	10.9± 1.5	9.8± 0.7	11.0	10.7± 1.5	13.4± 1.6	12.0± 1.3	14.0	10.5± 0.6	12.2± 1.6
Postoculars + postsuboculars	6.0± 0.2	6.2± 0.5	6.0	6.0± 0.3	6.5± 0.6	6.3± 0.6	6.5	6.0± 0	6.3± 0.5
Projecting lobules	0.6± 1.0	0	0	0.4± 1.9	0.2± 0.5	0	0	0	0.1± 0.3
Pairs of enlarged nuchals	1.7± 1.9	1.9± 1.3	3.0	1.8± 1.7	1.1± 0.2	0.7± 0.5	3.0	1.3± 0.8	1.0± 0.6
Scalerows between parietals and thighs	65.7± 3.5	68.0± 1.4	62.0	66.1± 3.2	70.7± 2.6	66.8± 2.5	67.0	57.7± 3.5	66.0± 5.4
Gulars + ventrals	65.6± 3.5	69.0± 3.7	74.0	66.9± 3.9	68.5± 3.0	67.4± 2.6	67.0	61.0± 1.7	66.2± 3.8
Scales around midbody	31.2± 1.3	31.0± 1.0	29.0	31.2± 1.1	37.0± 1.2	33.0± 1.3	36.0	30.0± 1.0	33.7± 2.9
Subdigital lamellae fourth finger	9.9± 1.0	10.0± 0.8	10.0	9.9± 0.9	10.5± 0.6	10.6± 0.5	11.0	9.3± 0.6	10.3± 0.7
Subdigital lamellae fourth toe	16.6± 1.9	16.3± 1.0	17.0	16.5± 1.5	17.7± 1.5	17.3± 1.4	19.0	15.3± 1.5	17.1± 1.6
Ratio S-V length/head width	7.9± 0.7	7.9± 0.7	7.8	7.9± 0.7	6.7± 0.3	7.0± 0.5	6.6	6.9± 0.6	6.9± 0.4
Ratio S-V .ength/head length	6.2± 0.6	6.3± 0.5	5.9	6.2± 0.6	5.5± 0.4	5.5± 0.6	5.0	5.3± 0.7	5.4± 0.6
Ratio length between fore- and hindlegs/ length in front of forelegs	1.7± 0.3	1.7± 0.1	1.5	1.7± 0.2	1.4± 0.1	1.5± 0.1	1.4	1.5± 0.1	1.4± 0.1
Ratio S-V length/length forelegs	4.5± 0.5	4.6± 0.2	4.1	4.5± 0.4	3.8± 0.6	3.9± 0.4	3.7	4.7± 0.5	4.0± 0.6
Ratio S-V length/length hindlegs	3.1± 0.3	3.1± 0.1	2.8	3.1± 0.3	2.6± 0.3	2.7± 0.2	2.7	3.3± 0.4	2.8± 0.3
Ratio length frontal/length parietals + interparietal	1.0± 0.1	0.9± 0.1	1.0	1.0± 0.2	1.2± 0.2	1.1± 0.1	1.3	0.9± 0.1	1.1± 0.2
Ratio length post. loreal/ length ant. loreal	1.4± 0.3	1.3± 0.1	1.4	1.4± 0.2	1.4± 0.2	1.2± 0.2	1.4	1.3± 0.2	1.3± 0.2
Ratio width dorsals/width laterals	1.2± 0.1	1.2± 0.1	1.4	1.2± 0.1	1.1± 0.1	1.1± 0.1	1.1	1.3± 0.2	1.1± 0.2
Ratio S-V length/length transparent disc	59.7± 6.5	51.6± 7.5	57.9	57.6± 7.2	51.9± 4.8	54.4±13.6	60.0	45.5± 8.8	52.3±10.6
Ratio S-V length/length eye	22.0± 2.9	21.8± 1.5	23.1	22.0± 2.5	18.0± 2.0	17.6± 1.9	17.1	18.4± 2.3	17.8± 1.8
Ratio S-V length/width ear	55.1±12.5	53.3± 8.7	38.6	53.7±11.7	52.3± 9.3	46.1±10.7	43.6	47.1± 7.0	47.8± 9.1

Table 6: Mean and standard deviation of some important characters for *S. reevesii* and *S. m. melanosticta* and *S. m. kohtaoensis* and nominal taxa which are now placed in synonymy of these.

enlarged nuchals and has the laterals equal in size to the dorsals, is usually not true.

I did not see specimens of *Leiolopisma pootipongi* Taylor, 1962, but I provisionally referred this taxon to *S. reevesii,* because its description, apart from the united frontoparietals, completely agreed with *reevesii.* This description is based on one specimen only, probably a juvenile. In *S. travancorica* united frontoparietals usually are present, but in some specimens they may be separate. Thus, I do not consider this character alone sufficient for recognising a new species, especially not when only a single specimen with this character is known.

Scincella melanosticta (Boulenger, 1887)

(figs. 3, 14-16; tables 2, 6)

Diagnosis. — A medium-sized, rather robust *Scincella,* with a robust head ($\bar{x}$ ratio S-V length/head width less than 7.0; $\bar{x}$ ratio S-V length/head length less than 5.6) and rather long limbs. Usually the prefrontals form a broad suture. Some small scales between the fifth supralabial and the granules of the lower eyelid. Usually the eye is visible through the supraoculars as a dark area. Thirty two to 38 scales around midbody in mainland specimens. Lateral dark band broken up by whitish spots.

Key to the subspecies of *Scincella melanosticta*

1. Large number of body scales: 32-38 scales around midbody; 63-73 scalerows between the parietals and the thighs; 64-72 gulars + ventrals; 10-11 subdigital lamellae under the fourth finger, 16-20 under the fourth toe. Limbs well-developed. Burma, Thailand, S. Vietnam . . . *melanosticta*
– Smaller number of body scales: 29-31 scales around midbody; 54-61 scalerows between the parietals and the thighs; 59-62 gulars + ventrals; 9-10 subdigital lamellae under the fourth finger, 14-17 under the fourth toe. Limbs rather short. Koh Tao Island, Gulf of Thailand .... *kohtaoensis*

Scincella melanosticta melanosticta (Boulenger, 1887)

(fig. 3; table 6)

Lygosoma melanostictum Boulenger, 1887c: 479, pl. VII fig. 2 (type loc. Pla-poo, 6 miles W. of Mt. Mooleyit, Burma); Boulenger, 1890: 199; Boulenger, 1893: 320; Schenkel, 1901: 190.

Lygosoma rupicola Smith, 1916a: 45, fig. 3 (type loc. Chong Kae, near Paknampo, C. Thailand); Smith, 1916b: 56 **(new synonym)**.
Lygosoma melanosticum (sic!): Smith, 1916b: 56.
Leiolopisma reevesi melanostictum: Smith, 1935: 296.
Leiolopisma rupicola: Smith, 1935: 297; Suvatti, 1950: 487; Taylor & Elbel, 1958: 1119, fig. 18.
Leiolopisma siamensis Taylor & Elbel, 1958: 1123, fig. 20 (type loc. Phu Kho Mt., Kan Luang, Na Kae distr., Thailand); Taylor, 1963: 1039, fig. 92 **(new synonym)**.
Leiolopisma rupicolum: Taylor, 1963: 1045, fig. 94.
Leiolopisma melanostictum: Taylor, 1963: 1042, fig. 93.
Scincella melanosticta: Greer, 1974: 7.
Scincella rupicola: Greer, 1974: 7.
Scincella siamensis: Greer, 1974: 7.

Material. — BURMA (n = 2). Mt. Mooleyit: 1♀, MSNG 27871, leg. L. Fea. Taok Plateau, Tenasserim: 1♀, BMNH 1924.5.20.25, leg. A.S. Vernay.

THAILAND (n = 7). Huey Tapan, Upper Mekong: 1 juv., MCZ 39247, leg. M.A. Smith. Hin Lap, Long Paya Fai Mts.: 1 ex., MCZ 39246, leg. M.A. Smith. Huey Sapon, NE. Thailand: 2♀, BMNH 1933.12.1.10-11, leg. M.A. Smith. Nakon Sritamarat, Peninsular Thailand: 1♀, 1♂, BMNH 1916.3.27.24, X-1915, leg. M.A. Smith, Khao Sabob, Chantabun, SE. Thailand: 1♂, BMNH 1933.12.3.17, leg. M.A. Smith.

S. VIETNAM (n = 4). Suikat, Langbian Plateau: 1♀, MCZ 39248, leg. M.A. Smith. Daban, Langbian Plateau: 1 ex., 1♀, 1♂, MCZ 39249-50, BMNH 1935.11.5.8, all leg. M.A. Smith.

Diagnosis. — A robust *Scincella,* with a large number of scales. Limbs well-developed and rather long.

Description. — Prefrontals large, usually forming a broad suture. Eye large; surrounded by a high number of scales: supraciliars 7-9 ($\bar{x}$ = 7.8 ± 0.5); ciliars 10-16 ($\bar{x}$ = 12.5 ± 1.4); postoculars + postsuboculars 5-7 ($\bar{x}$ = 6.3 ± 0.6). Upper postocular wide. Some small scales separate the fifth supralabial from the granules of the lower eyelid. The fifth and the sixth supralabial are situated under the eye. In 38% of the specimens two temporal scales can be found between the sixth supralabial and the supratemporal. In most specimens the eye is visible through the supraoculars as a large blue or dark area. The ear is large and round, without projecting lobules or granules; tympanum scarcely sunk. Not more than one pair of enlarged nuchals. A large number of body scales: scalerows between the parietals and the thighs 63-73 ($\bar{x}$ = 68.2 ± 2.8); gulars + ventrals 64-72 ($\bar{x}$ = 67.6 ± 2.3); scales around midbody 32-38 ($\bar{x}$ = 34.5 ± 2.2). The dorsal scales are very small ($\bar{x}$ = 1.0 ± 0.2 mm in adults) and about equal in size to the laterals. Subdigital lamellae under the fourth finger 10-11 ($\bar{x}$ = 10.6 ± 0.5), under the fourth toe 16-20 ($\bar{x}$ = 17.5 ± 1.3). It is a robust *Scincella* ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 1.4 ± 0.1), with robust head and rather long fore- and hindlegs ($\bar{x}$ ratio S-V length/length limbs is resp. 3.9 ± 0.6 and 2.7 ± 0.3). Maximum snout-vent length 57.4 mm.

Coloration the same as in *S. reevesii.* Some specimens have very large

brown spots on the middle of the back. In some populations from E. and SE. Thailand the pattern is very vague.

Range. — E. Burma, the whole of Thailand, S. Vietnam (fig. 3). Probably also occurs in Laos and Cambodia.

Remarks. — I have placed both *Lygosoma rupicola* Smith, 1916 and *Leiolopisma siamensis* Taylor & Elbel, 1958 in the synonymy of *S. melanosticta,* because I could not find distinct differences in scalation or shape between these forms (tab. 6). Here also a uninterrupted series of specimens with a continuous lateral band and small dark spots on the back (*L. melanostictum*) to specimens with a discontinuous lateral band and large vertebral spots (*L. rupicola*) is found. The limbs of *L. rupicola* are not longer than those of *L. melanostictum,* as stated by Smith (1916a) (see tab. 6).

These synonymisations provide a simple explanation of the similarity between a patternless specimen of *L. melanostictum* present in the British Museum collection (BMNH 1933.12.3.17) coming from Chantabun and the holotype of *L. siamensis,* collected at exactly the same locality as specimens of *rupicola* (see Taylor & Elbel, 1958).

Scincella melanosticta kohtaoensis (Cochran, 1927)
(fig. 3; table 6)

Leiolopisma kohtaoensis Cochran, 1927: 188 (type loc. Koh Tao, Gulf of Thailand); Cochran, 1931: 20, fig. 5; Smith, 1935: 296; Suvatti, 1950: 486; Taylor, 1963: 1038.
Scincella kohtaoensis: Greer, 1974: 7.

Material. — THAILAND (n = 3). Koh Tao, Gulf of Thailand: 3 ex., USNM 72282-84 (holotype and two paratypes), 31-XII-1926, leg. H.M. Smith.

Diagnosis. — A robust *Scincella,* with rather short limbs. Fewer body scales than *S. m. melanosticta.* Lateral dark band much broken up by lighter spots.

Description. — As *S. m. melanosticta,* from which it differs in the following points: Number of scales above the eye: supraciliars 6-7 ($\bar{x}$ = 6.7 ± 0.3); ciliars 10-11 ($\bar{x}$ = 10.5 ± 0.6). Low number of body scales: scalerows between the parietals and the thighs 54-61 ($\bar{x}$ = 57.7 ± 3.5); gulars + ventrals 59-62 ($\bar{x}$ = 61.0 ± 1.7); scales around midbody 29-31 ($\bar{x}$ = 30.0 ± 1.0). Number of subdigital lamellae: 9-10 under the fourth finger ($\bar{x}$ = 9.3 ± 0.6), 14-17 under the fourth toe ($\bar{x}$ = 15.3 ± 1.5). The elongation of the body is the same as in *S. m. melanosticta,* but the limbs are shorter ($\bar{x}$ ratio S-V length/length limbs: 4.7 ± 0.5 and 3.2 ± 0.4 resp., for fore- and hindlegs. Maximum snout-vent length 44.1 mm.

The coloration of this lizard is exactly the same as that of some specimens of *S. reevesii* and *S. m. melanosticta*. The dorsum is very light brown, with some small, dark brown spots, which are irregularly arranged, but concentrated in the vertebral region. Sometimes these vertebral spots are enlarged. The lateral brown band is distinct; on the body it is recognizable as a series of spots, separated by cream-coloured areas, on the tail only a series of indistinct brown spots is present. The lower flanks, sides of the head and ventral parts are cream-coloured, with some very small brown spots (belly immaculate). Upper surface of limbs light brown, reticulated with darker brown.

Range. — Only known from the island Koh Tao in the Gulf of Thailand (fig. 3).

Remarks. — Smith (1935) treated *L. kohtaoensis* under the head of *Leiolopisma reevesii melanostictum,* suggesting that it might be very close to this subspecies. This idea was quite right, as proved by examination of the type specimens of *S. m. kohtaoensis*. The main characters used here to separate *reevesii* and *melanosticta* are the elongation of the body and the relative size of the head. According to these characters *kohtaoensis* distinctly belongs to *S. melanosticta,* but differences in other characters (the size of the limbs and the number of body scales) suggest that it differs subspecifically from the mainland form. *S. m. kohtaoensis* is also distinctly allopatric to the nominate form, which occurs on the mainland, whereas *S. m. kohtaoensis* is restricted to the island Koh Tao. Cochran (1927) already suggested a close relationship of this taxon with *L. melanostictum* and *L. rupicola*.

Scincella punctatolineata (Boulenger, 1893)
(figs. 3, 14-16; tables 2, 7)

Lygosoma punctatolineatum Boulenger, 1893: 321 (holotype MSNG 28501 B, type loc. Bia-po, Karin Hills, Burma).

Leiolopisma punctatolineatum: Smith, 1935: 297.

Leiolopisma tavesae Smith, 1935: 298 (type loc. Bong Tee Valley, W. of Kanburi, C. Thailand); Suvatti, 1950: 487; Taylor, 1963: 1036 (**new synonym**).

Material. — BURMA (n = 1). Thaò (Bia-po), Karin Hills, E. Burma: 1 ex., MSNG 28501 B (holotype), leg. L. Fea, 1888.

THAILAND (n = 1). Tasan?, Peninsular Thailand: 1♀, BMNH 1933.12.1.5.

Diagnosis. — A small *Scincella* ($\bar{x}$ snout-vent length 37.8 mm), with an elongated body and short limbs; forelegs less than 18% of S-V length, hindlegs less than 26% of S-V length. Small number of subdigital lamellae, maximum nine under the fourth finger and 15 under the fourth toe.

	Scincella punctatolineata		
	punctato-lineata	tavesae	Total
	n=1	n=1	n=2
Snout-vent length	38.1	37.6	37.8± 0.3
Supraciliars	6.0	7.0	6.5± 0.7
Ciliars	10.0	9.0	9.7± 0.4
Postoculars + postsuboculars	5.0	5.0	5.0± 0
Projectings lobules	0	2.5	1.2± 1.8
Pairs of enlarged nuchals	1.0	2.0	1.5± 0.7
Scalerows between parietals and thighs	58.0	69.0	63.5± 7.8
Gulars + ventrals	58.0	69.0	63.5± 7.8
Scales around midbody	22.0	28.0	25.0± 4.2
Subdigital lamellae fourth finger	8.0	9.0	8.5± 0.7
Subdigital lamellae fourth toe	13.0	15.0	14.0± 1.4
Ratio S-V length/head width	8.5	7.8	8.1± 0.4
Ratio S-V length/head length	6.7	6.0	6.3± 0.5
Ratio length between fore- and hindlegs/ length in front of forelegs	2.0	1.9	2.0± 0.1
Ratio S-V length/length forelegs	5.9	5.3	5.6± 0.4
Ratio S-V length/length hindlegs	4.4	3.3	3.8± 0.8
Ratio length frontal/length parietals + interparietal	0.9	0.9	0.9± 0.2
Ratio length post. loreal/ length ant. loreal	1.0	1.2	1.1± 0.2
Ratio width dorsals/width laterals	1.4	1.0	1.2± 0.3
Ratio S-V length/length transparent disc	54.4	53.7	54.1± 0.5
Ratio S-V length/length eye	23.8	25.1	24.4± 0.9
Ratio S-V length/width ear	47.6	53.7	50.7± 4.3

Table 7: Mean and standard deviation of some important characters for *S. punctatolineata* and a nominal taxon (*S. tavesae*) which is now placed in synonymy of this species.

Decription. — Frontal rather short ($\bar{x}$ ratio length frontal/length parietals + interparietal: 0.9 ± 0.2). Posterior loreal quite short ($\bar{x}$ ratio length posterior loreal/length anterior loreal: 1.1 ± 0.2). Supraciliars 6-7 ($\bar{x}$ = 6.5 ± 0.7); ciliars 9-10 ($\bar{x}$ = 9.7 ± 0.4); five postoculars + postsuboculars. Upper postocular wide. Usually the fourth as well as the fifth and sixth supralabials are situated under the eye (in most members of the genus only the fifth or fifth and sixth). Eye visible from above through the supraoculars. Ear round, sometimes with some small projecting lobules; tympanum scarcely sunk. One or two pairs of enlarged nuchals. Number of body scales rather low: scalerows between the parietals and the thighs 58-69 ($\bar{x}$ = 63.5 ± 7.8); gulars + ventrals 58-69 ($\bar{x}$ = 63.5 ± 7.8); scales around midbody 22-28 ($\bar{x}$ = 25.0 ± 4.2). Number of subdigital lamellae very small: 8-9 under the fourth finger ($\bar{x}$ = 8.5 ± 0.7), 13-15 under the fourth toe ($\bar{x}$ = 14.0 ± 1.4). Body distinctly elongated ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 2.0 ± 0.1). Limbs short, forelegs less than 18% of the S-V length, hindlegs less than 26%. Maximum snout-vent length 38.1 mm.

Light brown above, with dark brown longitudinal streaks, consisting of small spots, one on each scale. Six longitudinal streaks on the back. Dark lateral band consisting of two scalerows with somewhat larger dark brown spots. Streaks on the lower flank vague. Whitish below.

Range. — SE. Burma and W. Thailand (fig. 3).

Remarks. — I have placed *Leiolopisma tavesae* Smith, 1935 in the synonymy of *S. punctatolineata,* because of the similarity in relative size (tab. 7) and coloration of these two nominal taxa. From table 7 there appear to be large differences in the number of body scales (e.g. scales around midbody: *punctatolineata:*22; "*tavesae*": 28). Most likely this is caused by the small number of specimens examined, as Smith (1935) mentioned the following numbers of scales around midbody: *punctatolineata:* 24 and 26; *tavesae:* 26 and 28, so, there might be a continuous series as regards this character.

Scincella barbouri (Stejneger, 1925)
(figs. 3, 14-16; table 2)

Leiolopisma barbouri Stejneger, 1925: 150 (holotype MCZ 7261, type loc. Yunnan-fu, China); Schmidt, 1927b: 499.
Scincella barbouri: Greer, 1974: 7.

Material. — CHINA (n = 5). Koenming (Yunnan-fu), Yunnan: 2♀, MCZ 7261 (holotype) and 18975, leg. J. Graham; 1♀, AMNH 22695. Wuting Chow distr., Yunnan: 1♂, AMNH 12803. W. Szechwan: 1♀, MCZ 110315, leg. H. Steven.

Diagnosis. — A rather elongate *Scincella,* with a small head. High number of body scales: 70-79 scalerows between the parietals and the thighs; 70-80 gulars + ventrals; 26-28 scales around midbody. Four or five pairs of enlarged nuchals. No projecting lobules.

Description. — Supraciliars 5-6 ($\bar{x}$ = 5.9 ± 0.2); ciliars 8-10 ($\bar{x}$ = 8.9 ± 0.9); five postoculars + postsuboculars. Upper postocular wide. Only fifth supralabial under the eye. Eye visible through the supraoculars as a dark area. Ear usually round, without projecting lobules; tympanum slightly sunk. Four of five pairs of enlarged nuchals. Number of body scales large: scalerows between the parietals and the thighs 70-79 ($\bar{x}$ = 74.2 ± 4.9); gulars + ventrals 70-80 ($\bar{x}$ = 75.8 ± 4.2); scales around midbody 26-28 ($\bar{x}$ = 26.5 ± 1.0). Subdigital lamellae under the fourth finger 9-10 ($\bar{x}$ = 9.2 ± 0.5), under the fourth toe 15-17 ($\bar{x}$ = 15.7 ± 1.0). The body is elongated ($\bar{x}$ ratio length between fore- and hindlegs/length in front of forelegs: 2.1 ± 0.3). Head very small ($\bar{x}$ ratio S-V length/head width: 8.8 ± 0.6), with the neck being wider than the head. The eye and the transparent disc are relatively small as well ($\bar{x}$ ratio S-V length/length eye: 28.6 ± 3.7; $\bar{x}$ ratio S-V length/length transparent disc: 68.5 ± 8.6). Limbs short, forelegs less than 18% of the snout-vent length, hindlegs less than 26%. Maximum snout-vent length 47.3 mm.

Dorsum brown, with five indistinct dark brown longitudinal streaks. Lateral band somewhat broader than these streaks, but not very distinct as well. Some very vague streaks on the lower flanks and the ventral surface, which are whitish.

Range. — Yunnan and W. Szechwan, China (fig. 3).

Remarks. — In coloration and shape quite similar to *S. punctatolineata.* In other characters (scalation) resembling *S. modesta* (see tab. 2).

Scincella modesta (Günther, 1864)
(figs. 3, 14-16; tables 2, 8)

Eumeces modestus Günther, 1864: 87, pl. X fig. G (type loc. Ningpo, Chekiang, China).
? *Mocoa exigua* Anderson, 1878: 797 (type loc. Momein, Yunnan).
Lygosoma laterale: Boulenger, 1887c: 263 (in part).
Lygosoma potanini Günther, 1896: 6 (type loc. Ta-tsien-lu, Kansu) **(new synonym)**.
Leiolopisma laterale reevesii: Van Denburgh, 1912: 237.
Leiolopisma laterale formosensis Van Denburgh, 1912: 238 (type loc. Kanshirei, Formosa (= Taiwan)) **(new synonym)**.
Leiolopisma laterale boettgeri Van Denburgh, 1912: 238 (type loc. Tshigaki shima, Loo Choo Islands (= Ryu Kyu Islands)) **(new synonym)**.
Leiolopisma schmidti Barbour, 1927: 95 (type loc. Mt. Washan, W. Szechwan) **(new synonym)**.

Leiolopisma vandenburghi Schmidt, 1927a: 425 (type loc. Tsushima Island, Japan) **(new synonym)**.
Leiolopisma monticola Schmidt, 1927b: 496 (type loc. Snow Mountain Village, Likiang, Yunnan) **(new synonym)**.
Leiolopisma modestum: Schmidt, 1927b: 497; Pope, 1929: 384; Smith, 1935: 303, Romer, 1975: 8.
Leiolopisma septentrionale Schmidt, 1927b: 498 (type loc. Hsing Lung Shan, Eastern Tombs, Chihli Province, Hopeh) **(new synonym)**.
Leiolopisma reevesii: Pope, 1935: 483.
Scincella reevesi: Shannon, 1956: 41.
Lygosoma reevesii: Webb, Jones & Byers, 1962: 163.
Leiolopisma tsinlingensis Hu & Djao, 1966: 89 (type loc. Lao hsien-cheng, Chouchih Hsien, Shensi) **(new synonym)**.
Scincella boettgeri: Greer, 1974: 7.
Scincella modesta: Greer, 1974: 7.
Scincella monticola: Greer, 1974: 7.
Scincella potanini: Greer, 1974: 7.
Scincella schmidti: Greer, 1974: 7.
Scincella septentrionalis: Greer, 1974, 7.
Scincella tsinlingensis: Greer, 1974, 7.
Scincella vandenburghi: Greer, 1974: 7.
Scincella formosensis: Greer, 1974: 7.

Material. — CHINA. Yunnan (n = 3). Snow Mt., Li-Chiang, 2740 m: 2♂, AMNH 20996, 20998; 3960 m: 1♀, AMNH 20995, all XI-1916, leg. R.C. Andrews, E. Heller.

Szechwan (n = 7). 1♂, BMNH 70.1.14.19, leg. R. Swinhoe. Ngan Yang Ba?: 1♀, MCZ 46958, leg. D.E. Graham. Mt. Washan: 1♂, MCZ 7966, leg. W.R. Zappey, 1908. Songpan (= Sungpan), Min Chiang river: 2♀, USNM 68802-03, 12 and 25-VII-1924; 1♀, USNM 71617, 20-VII-1934, all leg. D.C. Graham. 80 km S. of Songpan: 1♂, USNM 68804, 1-VIII-1924, leg. D.C. Graham.

Kansu (n = 3). Titao, 80 km SSW. of Lan-chou: 1♀, MCZ 46959; 1♂, USNM 69091, all leg. R.B. Ekvall, 1924; 1♂, USNM 68547, 2-IX-1923, leg. F.R. Wulsin.

Hupeh (n = 2). Ichang: 1♀, 1♂, BMNH 89.6.25.3a-3b, leg. A.E. Pratt.

Fukien, SE. China (n = 1). Kuantun, NW. Fukien: 1♂, BMNH 99.4.24.19, leg. J.D. La Touche.

Chekiang, E. China (n = 1). Ningpo: 1♀, BMNH 86.12.8.6, leg. J.H. Leech.

Kiangsu, E. China (n = 3). Nanking (Nan-ching): 2 ex., UMMZ 71231-32. Soochow (Su-chou): 1 ex., UMMZ 71224, leg. D. Reeves.

Hopeh, NE. China (n = 3). N. coast of China?: 1♀, RMNH 2423. Hsing Lung Shan: 1 ex., 1♀, AMNH 21450-51, VIII-1921, leg. C.H. Pope.

KOREA (n = 2). W. slope of Halla San, Cheju Island, 910 m: 1 ex., UMMZ 113445, 6-IX-1954, leg. G.W. Byers. E. slope of Halla San, Cheju Island, 460 m: 1 ex., UMMZ 113446, 9-IX-1954, leg. G.W. Byers.

HONG KONG (n = 1). 1♂, BMNH 92.8.4.8., leg. J.J. Walker.

Diagnosis. — A moderately sized *Scincella*. Body slightly elongated. No projecting lobules. Small number of subdigital lamellae under the fourth toe. Lateral dark band distinct, usually not bordered by a lighter dorsolateral stripe and not broken up by lighter spots.

Description. — Prefrontals usually separated, but sometimes touching or with a suture. Supraciliars 5-7 ($\bar{x}$ = 6.1 ± 0.5); ciliars 7-11 ($\bar{x}$ = 8.6 ± 0.9);

	Scincella modesta						Scincella lateralis
	modesta	monticola	schmidti	potanini	septen-trionalis	Total	lateralis
	n=7	n=4	n=2	n=7	n=2	n=22	n=8
Snout-vent length	42.2± 3.3	50.4± 6.7	46.8± 1.7	44.5± 7.1	50.5± 6.0	43.6± 6.1	40.8± 6.0
Supraciliars	6.4± 0.5	5.9± 0.3	6.2± 0.4	6.0± 0.6	6.0± 0	6.1± 0.5	7.2± 0.5
Ciliars	9.1± 0.8	8.5± 0.5	8.5± 0	7.9± 0.7	9.0± 0.7	8.6± 0.9	8.8± 0.6
Postoculars + postsuboculars	4.9± 0.5	5.1± 0.2	5.2± 0.4	5.3± 0.5	5.2± 1.1	5.1± 0.5	5.1± 0.2
Projecting lobules	0	0	0	0	0	0	0
Pairs of enlarged nuchals	4.2± 0.6	3.0± 0	2.0± 0	3.1± 0.7	3.2± 0.4	3.3± 0.8	2.8± 0.4
Scalerows between parietals and thighs	62.7± 6.6	71.0± 8.9	65.0±18.4	73.3± 7.7	67.0± 0	68.3± 8.9	66.1± 5.2
Gulars + ventrals	67.7± 7.8	75.2± 4.3	71.0±11.3	79.6± 9.5	75.5± 2.1	73.3± 8.5	67.2± 4.3
Scales around midbody	27.9± 1.9	24.8± 1.5	26.0± 0	28.7± 1.2	28.0± 0	27.3± 2.0	27.7± 1.8
Subdigital lamellae fourth finger	9.4± 0.8	7.8± 1.0	8.0± 0	9.9± 0.7	11.5± 0.7	9.3± 1.3	10.0± 0.5
Subdigital lamellae fourth toe	14.1± 1.7	11.0± 0.8	11.5± 0.7	14.3± 1.5	14.0± 1.4	13.3± 1.9	15.2± 0.7
Ratio S-V length/head width	7.3± 0.5	8.7± 0.4	8.4± 1.7	7.6± 1.0	8.4± 0.2	7.9± 0.9	7.8± 0.6
Ratio S-V length/head length	5.6± 0.6	6.5± 0.8	6.6± 1.1	6.0± 0.9	6.3± 0.4	6.1± 0.8	6.0± 0.6
Ratio length between fore- and hindlegs/ length in front of forelegs	1.6± 0.2	2.0± 0.2	2.2± 0.7	1.7± 0.3	1.8± 0.3	1.8± 0.3	1.8± 0.3
Ratio S-V length/length forelegs	4.0± 0.5	6.2± 1.6	5.2± 1.4	4.2± 0.6	4.3± 0.7	4.6± 1.2	4.7± 0.6
Ratio S-V length/length hindlegs	3.1± 0.6	4.2± 1.1	3.9± 1.3	3.2± 0.6	3.5± 0.3	3.4± 0.8	3.4± 0.4
Ratio length frontal/length parietals + interparietal	1.1± 0.1	1.0± 0.1	1.0± 0.1	1.1± 0.2	1.0± 0.1	1.1± 0.3	1.1± 0.1
Ratio length post. loreal/ length ant. loreal	1.2± 0.2	1.2± 0.2	1.2± 0.3	1.3± 0.4	1.3± 0	1.2± 0.3	1.3± 0.2
Ratio width dorsals/width laterals	1.3± 0.1	1.2± 0.1	1.3± 0.1	1.3± 0.1	1.2± 0.1	1.3± 0.1	1.2± 0.1
Ratio S-V length/length transparent disc	56.1±10.7	61.0± 6.6	62.6± 3.6	51.4± 8.4	72.8± 6.1	57.6±10.1	52.9± 8.0
Ratio S-V length/length eye	20.6± 2.3	25.6± 3.6	26.4± 5.1	22.6± 3.6	25.9± 0.3	23.1± 3.7	21.2± 2.7
Ratio S-V length/width ear	48.2± 6.9	57.6± 9.8	47.5±17.6	59.4±12.6	59.4± 2.1	54.3±10.8	41.0± 6.2

Table 8: Mean and standard deviation of some important characters for *S. modesta* and *S. lateralis* and nominal taxa which are now placed in synonymy of *S. modesta*.

postoculars + postsuboculars 4-6 ($\bar{x}$ = 5.1 ± 0.5). Upper postocular wide. Usually the fifth and the sixth supralabial under the eye, sometimes the fourth as well. Ear round, without projecting lobules; tympanum slightly or scarcely sunk. Two to five pairs of enlarged nuchals. Scale-numbers very variable: scalerows between the parietals and the thighs 52-83 ($\bar{x}$ = 68.3 ± 8.9); gulars + ventrals 58-91 ($\bar{x}$ = 73.3 ± 8.5); scales around midbody 23-30 ($\bar{x}$ = 27.3 ± 2.0). Subdigital lamellae under the fourth finger 7-12 ($\bar{x}$ = 9.3 ± 1.3), under the fourth toe 10-17 ($\bar{x}$ = 13.3 ± 1.9). Maximum snout-vent length 56.9 mm.

Dorsum light to bronze brown, sometimes with black spots, which can be irregularly arranged, sometimes arranged in four indistinct longitudinal rows. The lateral dark brown band usually is distinct, but sometimes not much darker than the back; not broken up by lighter spots. In eastern specimens the dorsal edge of the lateral band is usually lobed and an indistinct lighter dorsolateral stripe may border it. Ventral parts yellowish, grayish or white.

Habitat. — No data available!

Natural history. — According to Pope (1929) oviparous in Fukien.

Range. — The whole of southern and eastern China, in the north up to Kansu in the west and Hopeh in the east. Also Korea, Tsushima Island, Cheju Island, the southern Ryu Kyu Islands, Taiwan and Hong Kong. Absent on Hainan (fig. 3).

Remarks. — In China several *Leiolopisma* species have been described. The differences between them are very small and usually only scale-numbers and the distinctness of some markings are used as key characters for a new species. Since only relatively few specimens of each nominal taxon are known, it is impossible to say something about the variation existing within the nominal taxa, or even the populations. Considering the variation found in the few specimens examined (also see SD's in tab. 8) (e.g. ♀ from Ichang: 62 dorsals, 72 gulars + ventrals; ♂ from Ichang: 57 dorsals, 65 gulars + ventrals; ♀ from Songpan: 83 dorsals, 84 gulars + ventrals, 30 scales around midbody; other ♀ from Songpan: 64 dorsals, 66 gulars + ventrals, 28 scales around midbody), I do not dare to divide these lizards into several species or even subspecies. That is also the reason why I consider *S. boettgeri, monticola, potanini, schmidti, septentrionalis, tsinlingensis, vandenburghi* and *formosensis* to be synonyms of *S. modesta,* which they largely resemble in body shape and coloration. Maybe some of these taxa will turn out to be subspecies of *S. modesta.* First, however, much more material should be examined before further reliable decisions can be made. Immunological and ecological studies could provide useful additional data. Probably the situation will turn out to be just as, or even more complex than in the Himalayas, because the isolation

of populations by high mountain ridges and low cultivated valleys is sometimes complete, while on the other hand several clinal changes are possible.

There has been much confusion about the names *L. laterale, L. reevesii* and *L. modestum*. Boulenger (1887c) started this by stating that he could not find differences between *Lygosoma laterale* Say, 1823 (an North American species), *Hinulia reevesi* Gray, 1838, *Eumeces reevesii* Günther, 1864, *Eumeces modestus* Günther, 1864, *Lygosoma nigropunctatum* Bocourt, 1878 and *Mocoa exigua* Anderson, 1878. Van Denburgh (1912) followed Boulenger by calling the skinks of Tsushima Island *Leiolopisma laterale reevesii*. Smith (1923) named the Hainan skinks *L. laterale*. Schmidt (1927a) was the first one to point out the differences between two of the species: *L. reevesii* can be distinguished from *L. modestum* by its greater number of scales, its prefrontals being in contact, light spots in its lateral dark band and the scattered dark spots on the lower flanks. Many authors continued to use the name *reevesii* for *L. modestum* (Barbour, 1927; Pope, 1935; Shannon, 1956; Webb et al., 1962). As already stated by Romer (1975) specimens having characters of both species (usually *modesta* scale-characters and *reevesii* coloration) occur, especially near Hong Kong and on the southeast coast of mainland China.

According to Schmidt (1927a), *L. laterale* is closely related to *L. modestum*, but he does not discuss the differences and/or the similarities between the two, and until now no one else did, as far as I am aware. In the dendrograms (figs. 14 and 15) and in the scatterplot (fig. 16) they are placed very close together. Fifteen specimens of *S. lateralis* from Louisiana (ITZ 11718) and Missouri (UMMZ 68888, 77420, 76864, 84178, 90458 (2), 95277-79 (4), 95817 (2), 100253) differ from *S. modesta* in the following characters: a larger number of supraciliars (7-8 against 5-7 in *S. modesta*) and a larger number of subdigital lamellae under the fourth toe (14-16 ($\bar{x}$ = 15.2) against 10-17 ($\bar{x}$ = 13.3) in *S. modesta*). Ear very large ($\bar{x}$ ratio S-V length/width ear: 41.0 ± 6.2; in *S. modesta*: 54.3 ± 10.8). No scales between the fifth supralabial and the granules of the lower eyelid; in *S. modesta* these scales are present in 82% of the specimens examined. Therefore, I consider *S. modesta* and *S. lateralis* to be different but closely related taxa.

DISCUSSION

The cluster analysis

Sphenomorphus is included in the analysis because of Greer's (1974) statement that the recent genera *Sphenomorphus* and *Scincella* are developed from

a Southeast Asian *Sphenomorphus*-like ancestor. The Southeast Asian species *Scincella reevesii, S. melanostica* and *S. doriae* indeed very much resemble species of *Sphenomorphus* in characteristics of the scales and coloration.

As the cluster analysis using Ward's criterion clearly showed the various clusters, the dendrogram obtained was used for the following description of the grouping. Because in some instances sufficient characteristic information about the distinctness of the species was lacking, the specimens belonging to a species are not always distributed within the same cluster. However, this is not considered a serious problem here, because most groups can still be clearly distinguished by their composition. In the dendrograms two main clusters are visible, one containing specimens from the Himalayas and the Western Burmese hills, and the other containing forms from South India, Eastern Asia (Eastern Burma and Indo-China) and North America. This first-mentioned main cluster contains *Scincella ladacensis, S. capitanea, S. sikimmensis* and *S. victoriana,* which I will call the *sikimmensis* species group. In this main cluster, the grouping of *S. ladacensis* is most distinct; however, the clusters of the other groups overlap. Specimens of the subspecies *S. ladacensis himalayana* are clustered with *S. ladacensis ladacensis.* In the other main cluster, specimens of *Sphenomorphus* and most *Scincella melanosticta* are clustered together with the Vietnamese specimens of *S. reevesii; S. travancorica* with *S. bilineata; S. doriae* and the Thai and Hongkong specimens of *S. reevesii* with *S. lateralis,* a few *S. melanosticta* and *S. modesta* and a single *S. punctatolineata;* most *S. modesta* are grouped with *S. barbouri,* some *S. lateralis* and a single *S. punctatolineata.* A cluster analysis (discarding size) of

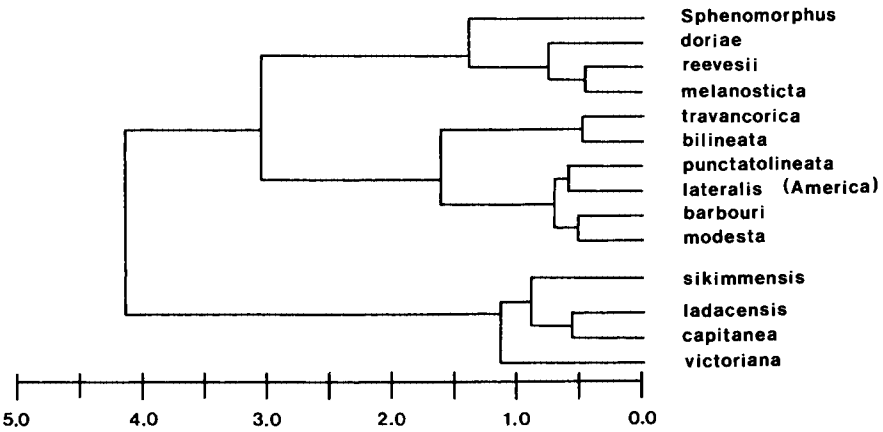


Fig. 14. Dendrogram of the Mean Square Distance between the centroids of the various species, using Ward's criterion.

the centroids of the various species using Ward's criterion is given in fig. 14).

Principal Component Analysis

Furthermore a Principal Component Analysis (PCA) was executed on the data set transformed in the same way as when performing the cluster analysis. The main factors (represented in fig. 16 by axes), responsible for overall variation, which are revealed by this analysis each represent a specific linear combination of all characters used. From the entire data set size was removed preliminary to the PCA. Because of this the first main axis explains only 18% of the total variation and its eigenvector contains about half of the characters showing negative signs. The second principal axis explains 12%, the third one only 6%.

A scatterplot of the specimens of the various species according the their position along the first two main axes shows that the differentiation in two geographic groups is mainly caused by the first axis (fig. 16). The relations between the dendrogram and the distribution of the specimens in the PCA shows that the cluster analysis using Ward's criterion (fig. 14) is sensitive to high density groups occurring in the centre of the PCA scatterplot (fig. 16). In the dendrogram these groups have a very small within-cluster variation of dissimilarities, and they are clustered first, like *S. modesta, S. barbouri* and *S. lateralis*. The widespread groups, like *S. melanosticta* and *S. ladacensis* are clustered last. The cluster analysis using UPGMA (fig. 15), however, is not

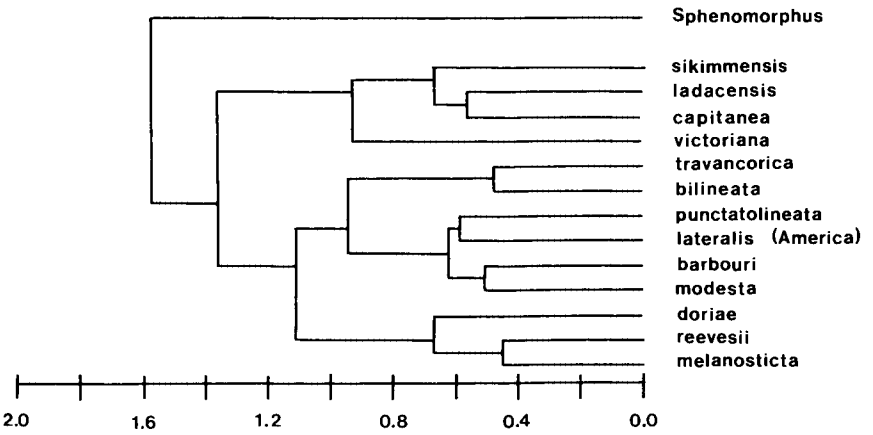


Fig. 15. Dendrogram of the Mean Square Distance between the centroids of the various species, using UPGMA.

sensitive to the within-cluster variation. This last dendrogram, in which *Sphenomorphus* is placed as an outgroup of the other two main clusters, is used in the rest of the analysis as a paradigm for the classification of the various species.

Statistical conclusions

An univariate analysis between *Sphenomorphus* and the other clusters, using the Kruskal and Wallis index for the multistate and a chi square test for the binary characters (Siegel, 1956), shows that the main difference is the

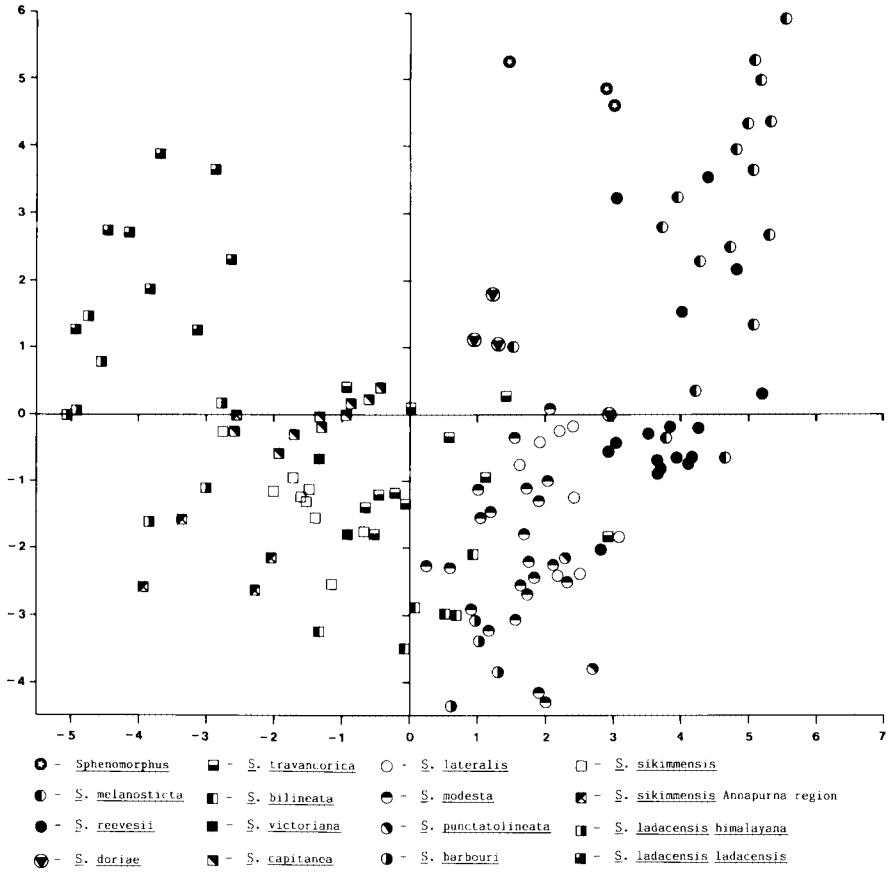


Fig. 16. Scatterplot of the first two principal axes of a PCA. For *Scincella* (= S.) and the outgroup *Sphenomorphus*. The abscissa shows the first principal axis which explains 18% of the total variation, the ordinate shows the second principal axis explaining 12%.

absence of the palpebral disc, which is one of the generic differences between *Sphenomorphus* and *Scincella*.

An univariate analysis between the two main groups shows a significant heterogeneity in the distribution of the character states for about half of the characters (df = 1, P = 0.1%, $\chi^2 \geqslant 10.83$). Of these significantly differing characters a few also have a high factor loading on the first main axis of the PCA; these characters are: upper postocular high, sixth supralabial situated under eye (left, right), scale(s) present between fifth supralabial and granules of lower eyelid, tympanum deeply sunk, eye visible through skin of head, length of hindlegs, length of frontal and length, width and height of head.

The clinal changes as described before for *S. ladacensis* and *S. sikimmensis* are demonstrated in the plot of the PCA as well (fig. 16). Uni- and multivariate (PCA) analysis of the members of this first main cluster shows that *S. ladacensis* differs from the other three species by characters such as: number of suboculars (left and right), number of ventral scales, number of subdigital lamellae under fourth finger and toe, thickened ciliars, frontal touching third supraocular (left and right), length of palpebral disc and width of lateral scales. *S. capitanea* could be recognized by its size. However, as the overall size factor was eliminated by standardization of the specimens, the differentiation of this species from the other three of its group is now mainly caused by differences in relations between snout-vent length, length in front of forelegs and length of hindleg.

The second main cluster is divided into three smaller clusters, one containing the South Indian *S. travancorica* and *S. bilineata* (which I will call the *travancorica* species group), the second containing the Burmese *S. punctatolineata,* the Chinese *S. barbouri* and *S. modesta* and the American *S. lateralis* (the *modesta* species group), the third containing the Southeast Asian *S. doriae, S. reevesii* and *S. melanosticta* (the *reevesii* species group). A similar uni- and multivariate analysis reveals that *S. reevesii, S. melanosticta* and *S. doriae* are separated from the other six species mainly by the characters: small number of nuchals, high number of ciliars and supraciliars, high number of scalerows around midbody and width of dorsal and lateral scales. *S. travancorica* and *S. bilineata* are distinguished from the other species by the characters: high number of projecting lobules (left and right) and high number of subdigital lamellae under fourth toe.

Differentiating characters between the groups and species found by these uni- and multivariate analyses, have been incorporated into the description of the various species.

Zoogeography and evolution

As already stated above, the genus *Scincella* is supposed to have originated in Southeast Asia (Greer, 1974). Whether there already existed more than one species in southern Asia before India was joined to the mainland of Asia in the Miocene, is hard to tell, but not unlikely, considering the distance (in similarity) (figs. 14, 15) between the Chinese, the Thai and the South Indian species on the one hand and the Himalayan species on the other.

The ancestor of the Himalayan species probably resembled *S. doriae* and presumably lived in the same area of northern Burma and Yunnan where *S. doriae* lives today. This area, the Yunnan refugium, is supposed (on the basis of concentrations of species) to be an important dispersal centre for several groups (e.g. *Japalura, Scutiger, Amolops;* also see Liu, 1950). After India was joined to the mainland of Asia, this ancestor (or two ancestral species) dispersed over the Indian subcontinent during favourable (humid) times (interglacials). During pleistocene glacial periods the climate became drier and as a result of this and of subsequent deforestation by man, which perhaps already was brought about by people of the Indus culture (4000 years before present) (Singh, 1971), the distribution area was divided into several refugia, in which the recent species still survive. These refugia are the higher mountainous parts of India, where rainfall is higher. Here, the last remains of more or less "undisturbed" forests survive: Himalayan region, Chota Nagpur and Nilgiri Hills. The occurrence of *S. sikimmensis* in Chota Nagpur, south of the Ganges plain (Stoliczka, 1872; Annandale, 1912), makes it likely that there has been a forest connection between Chota Nagpur and the Eastern Himalayas until quite recently (also see Swan & Leviton, 1962).

The South Indian species resemble *S. sikimmensis* less, but seem to be closer to the *modesta* species group (see figs. 14 and 15). This is quite remarkable, considering the distance separating their distribution areas. This distance makes it likely that they have been isolated for a longer period than the skinks of the *sikimmensis* species-group. It is difficult to explain why the South Indian species did not reach Sri Lanka, which is quite similar in habitat to the hills of southern India and was connected to the Indian mainland in the last glacial period, only 14,000 years ago. A possible explanation is that in Sri Lanka the niche of these skinks (as far as we know terrestrial lizards, living in humid forest clearings at rather high altitudes) is occupied by endemic Agamid lizards like *Ceratophora*.

The division of the Himalayan species (*sikimmensis* species group) coincides with the division of the Himalayas into several climatic and vegetational zones (see for instance Stainton, 1972; Dobremez & Jest, 1971; Dierl &

Gruber, 1979; Nanhoe & Ouboter, in prep.): *S. l. ladacensis* in the dry regions north of the Himalayas, *S. l. himalayana* in the slightly wetter, coniferous regions south of the main chain of the Western Himalayas and *S. sikimmensis* in the wet oak forest regions south of the main chain of the Eastern Himalayas. In spite of numerous zoological expeditions, especially in the Everest region and Arun Valley, the last-mentioned species has not been found between Kathmandu Valley and Tamur Valley, which is remarkable. A possible explanation is the lower amount of precipitation in the area between the Annapurna/Manaslu and Nepal east of Arun Valley (see the distribution of the wet *Quercus lamellosa* forest in Dobremez & Jest, 1971). Only in some places in this region relic populations of *S. sikimmensis* have survived (i.e. Balaju in Kathmandu Valley, Chitlang (Annandale, 1907), Thangjet (Smith, 1951)).

The occurrence of *S. capitanea* in the distribution area of *S. sikimmensis* is difficult to explain historically. Possibly a population of *Scincella* remained in isolation on the wet southern side of the Annapurna in unfavourable, dry circumstances and diverged from the ancestral stock; the Annapurna population of *S. sikimmensis* must have arrived in the area in more recent times.

Except for the keeled dorsal scales, *S. victoriana* closely resembles *S. sikimmensis*. It seems likely that other *sikimmensis*-like skinks occur in the rather unexplored mountains of the Indian-Burmese border, which are not very distant from the type locality of *S. victoriana*.

The division of the eastern species probably can be explained by climatic changes and climatic differences as well. Unfortunately, too little is known of the ecological requirements of most species. Judging from the distribution of the Southeast Asian species, *S. melanosticta* might be a lowland species and *S. reevesii* a species from hilly areas, but the available data do not permit an unequivocal interpretation.

S. barbouri and *S. modesta* probably originated from the Yunnan refugium too. Considering the occurrence of several forest refugia during glacial periods (de Lattin, 1957), it seems quite likely that *S. modesta* can be divided into subspecies that originated in these refugia. At this moment insufficient material and data are available to do so.

Although there are some differences, *S. lateralis* of North America is very similar to *S. modesta*. *S. lateralis* is said to have reached North America over the Bering land bridge (Greer, 1970). Since no fossil records are available, it is not known when this occurred. *S. modesta* is found in the southern Ryu Kyu Islands, which were connected to Taiwan and to mainland Asia during glacial periods. The northern Ryu Kyu Islands remained separate from the southern ones, but were connected to Japan and mainland Asia in

the north (Inger, 1950). The occurrence of *S. modesta* in the southern Ryu Kyu Islands, and its absence in the northern ones and Japan, makes it likely that the climate in these glacial periods prevented *Scincella*-like lizards to disperse as far north as Korea and Japan. When the climate improved, they were able to disperse to Korea and some of the islands near its coast, where they now reach their northern distribution limit (Greer, 1974). This makes it very unlikely that they could have crossed the Bering land bridge in glacial periods, since this area was covered with tundra in those times. Two alternative possibilities remain: either they already crossed the Bering land bridge in the Tertiary, or they were accidentally transported to Northern or Central America by man. The latter alternative hardly seems realistic, but considering the similarity between *S. lateralis* and *S. modesta,* not improbable.

Many taxonomic problems in *Scincella* and in the subfamily Lygosominae (see introduction) must remain open for the time being, due to lack of material and data on ecological requirements, immunology, etc. Moreover, by the extreme isolation of populations in the mountains of Southeast Asia geographic variation within species is often strong, making it difficult to decide whether two populations are still or no longer conspecific. The picture is complicated by clinal variation.

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