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The family Scincidae is the largest group among lizards, comprising more than 1558 species (Uetz & Hosek 2014). Of the seven subfamilies recognized, the subfamily Lygosominae contains over 52 species in five genera (Uetz & Hosek 2014). The genus *Lygosoma* Hardwicke & Gray, 1827 has a long and complicated nomenclatural history (see Geissler et al. 2011). In India, the genus *Lygosoma* is represented by nine species, of which five are endemic (Datta-Roy et al. 2014), including Günther's Supple Skink *Lygosoma guentheri* (Peters, 1879) and the Lined Supple Skink *Lygosoma lineata* (Gray, 1839). These are less studied, terrestrial, insectivorous and diurnal supple-skinks (Molur & Walker 1998). Both these species are found in peninsular India and are classified 'Least Concern' species by the IUCN Red List of Threatened Species (Srinivasulu & Srinivasulu 2013a, b).

Reserved forest and degraded areas of the northern ends of the Western Ghats, especially the border areas of Vyara and Dang districts (Gujarat) and Nasik District (Maharashtra) were explored during 2012 and 2013, and a small number of specimens of supple-skinks studied. Two fresh skink specimens of *L. lineata* and *L. guentheri* were collected from the outskirts of Vadodara

## NOTES AND COMMENTS ON THE DISTRIBUTION OF TWO ENDEMIC *LYGOSOMA* SKINKS (SQUAMATA: SCINCIDAE: LYGOSOMINAE) FROM INDIA

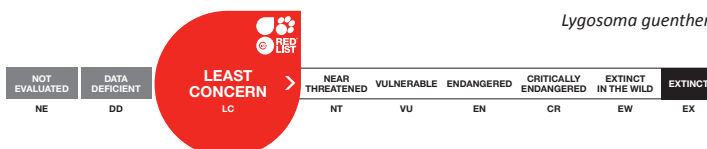
Raju Vyas

505, Krishnadeep Tower, Mission Road, Fatehgunj, Vadodara, Gujarat 390002, India  
razoovyas@hotmail.com

City, Vadodara District and after examination both the skinks were released in the nearby riverine habitat of Vishwamitri River within the limits of the city area.

***Lygosoma guentheri*:** On 12 December 2013, a large adult specimen of *Lygosoma* (Image 1) was captured by a local rescue group from a garden in Vadodara City, Gujarat. The specimen was identified as *L. guentheri* with the help of the literature (Boulenger 1890; Smith 1935). The morphometric data and other information of the specimen are mentioned in Table 1.

The *Lygosoma guentheri* is closely allied to *Lygosoma punctata* (Gmelin, 1799), but distinctly differs as follows (*L. guentheri* vs *L. punctata*): the distance between the axilla and groin measures three to three-and-a-half times the length between snout to fore-limb (vs.



*Lygosoma guentheri*



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Image 1. The *Lygosoma guentheri* from urban habitat of Vadodara City, Gujarat, India.

distance between the axilla and groin measures two to two and three-quarter times the length between snout to fore-limb); the ear-opening is small without lobules (vs. ear-opening is half of the eye-opening with one or two small lobules anteriorly); 24–26 scales round the body and 87–100 scales on mid-dorsal region (vs. 24–28 scales round the body and 62–76 scales on mid-dorsal region); the ad-pressed limbs fail to meet by three to four times the length of the fore-limb (vs. ad-pressed limbs fail to meet by twice the length of the fore-limb) (Boulenger 1890; Smith 1935).

The largest specimen of *Lygosoma guentheri* measured 250mm long (105mm snout to vent + 145mm tail) (Boulenger 1886). The present specimen measured 255mm in length (Image 2) (10.9cm snout to vent + 14.6cm tail), which is a little larger than the previous

Table 1. Morphometry of *Lygosoma guentheri* based on a specimen from Vadodara City, Gujarat, India.

Particulars	Measurements (in mm*)
Head	9.2 width & 11.8 length
Eye diameter	1.82
Distance between nostril & eye	3.62
Distance between eye & ear	5.24
Ear opening	2.14 width & 1.1 length
Neck	6.76
Abdomen	9.2
Fore limb length	4.62 femur & 4.4 tibia
Hind limb length	7.3 femur & 5.6 tibia
Fore limb digits length (Starting: inner to out digits)	0.7 (1): 1.66 (2): 2.28 (3): 2.16 (4): 1.48 (5)
Lamellae (Starting: inner to out digits)	3(1): 8 (2): 13 (3): 12 (4):5 (5)
Hind limb digits length (Starting: inner to out digits)	1.72 (1): 2.0 (2): 3.68 (3): 4.80 (4): 4.0 (5)
Lamellae (Starting: inner to out digits)	5 (1): 7 (2): 14 (3): 15 (4): 8 (5)
Distance between axilla and groin	82
Snout to vent length	109
Tail Length	146
Tail width at base	6
Total Body Length	255
<b>Sacliation</b>	
Supra labials R/L	7/7
Infra labials R/L	6/6
Scales- down the middle of the dorsal side	96
Scales- down the middle of the ventral side	100
Scale Rows at mid body	24

\*All measurements were taken by standard vernier calipers

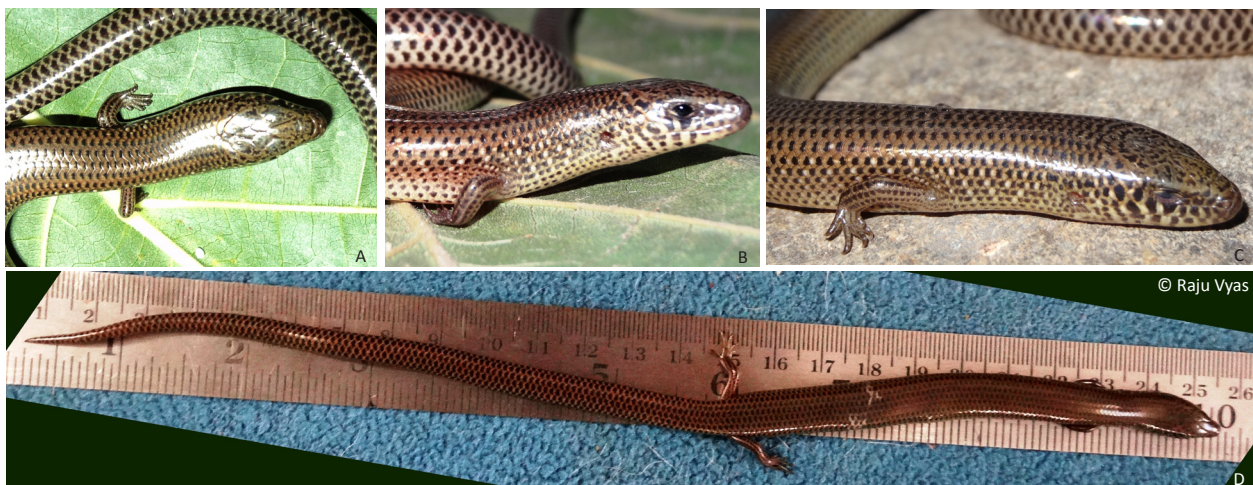


Image 2. The largest ever recorded specimen of *Lygosoma guentheri*.

A - dorsal view of head; B - lateral view of head; C - lateral view with transparent lower eyelid; D - the 255mm long specimen.



Image 3. A typical habitat of *Lygosoma guentheri*: Second highest tabletop Mulher Hill, northern Western Ghats, Maharashtra, India.



Image 4. A live sub adult specimen of *Lygosoma lineata* from Neno, Shoolpaneshwar Wildlife Sanctuary, Gujarat.

records, but the snout to vent length is smaller than the specimen collected by Vyas (2006) from Gamadi Village, Chanod, Vadodara District (BNHS specimen no. 1561, total length 818mm with 127mm snout to vent +691mm tail length).

This species inhabits a wide range of habitats; forests to scrub lands and agricultural fields to urban gardens. The species is common at most of the tabletop mountains (plateaus) of the northern Western Ghats, found in areas with sparse grass and shrubs on a rocky terrain (Image 3). It is most often found under large boulders and in loose soil during the rainy season. This species is found, less-common to rare, in low elevated plain areas of forests, agriculture lands and urban gardens, too.

***Lygosoma lineata*:** The *L. lineata* (Image 4) was originally described as *Chiamela lineata* from India without any specific locality. Boulenger (1887) allocated the species to the genus *Lygosoma*. On 25 November 2013, a sub-adult specimen of *Lygosoma* was captured by a local rescue group from the outskirts of Vadodara City, Gujarat. The specimen was identified as *L. lineata* with the help of literature (Boulenger 1890; Smith 1935). Earlier, a few specimens were studied from various locations within Gujarat State (Table 2), except the Kutch and northern Gujarat.

The *L. lineata* body is long, thin and very slender. This skink is differentiated from other co-members by having four fingers in the limbs (vs. five fingers). It is very similar to its closely allied species *L. vosmaerii* (taxonomically debatable species, see Vyas 2010, Srinivasulu & Seetharamaraju 2010). *L. lineata* has four fingers and four toes, whereas *L. vosmaerii* has five

fingers and four toes (Smith 1935; Seetharamaraju et al. 2009; Srinivasulu & Seetharamaraju 2010). The body is very slim, the distance between the axilla and groin measures three to four times the length between the snout and fore-limb.

This species occurs in various types of habitats, including wet deciduous to dry, thorny deciduous, scrub and rocky to saline grasslands and agricultural fields to urban gardens. It is usually found under boulders, rotten logs and layers of dry leaf litter. Its subterranean life style, habits and habitat are entirely special, and they contribute to its rarity (Molur & Walker 1998).

*Lygosoma guentheri* is distributed in Gujarat (Acharya 1949; Daniel 1962; Vyas 2006), Maharashtra (Chopra 1964; Vyas & Prjapati 2010), Goa (Sharma 2002), Karnataka (Ali et al. 2006; Datta-Roy et al. 2014), Andhra Pradesh and Telangana (Rao et al. 2005; Srinivasulu & Das 2008; Javed et al. 2010) in India. The occurrence of the species in Kerala (Sharma 2002) was questioned by Javed et al. (2010) with a statement 'needed to confirm the occurrence of this species in Kerala', though there are three specimens (ZSI No. 4371, 4374 & 4375) from the Travancore Coast in the museum of Zoological Survey of India (Sharma 1982). The species is more widely distributed in seven Indian states, namely, Gujarat, Maharashtra, Goa, Karnataka, Kerala, Telangana and Andhra Pradesh. The 'Catalogue of specimens of reptiles in the collection of the Natural History Museum of Stanford University' (California Academy of Science, Herpetology Collections, USA) shows there are a few Indian reptiles in the collection. This collection was deposited by A.W. Herre (13 December 1940) and

Table 2. Details of specimens of *Lygosoma lineata* collected and examined from Gujarat State, India

	Location	Date of collection	BNHS NO.	Habitat	Micro habitat	Remarks (reference)
1	Near Velavader, Velavader National Park, Bhavnagar District	2.x.2000	1453	Saline grassland	Under construction debris	Adult, with five digits in right fore limb (Vyas 2001)
2	Nr. Kaliyar Bhavan, Velavader National Park	2.x.2000	1454	Saline grassland	Under construction debris	Adult (Vyas 2001)
3	Samot, Shoolpaneshwar Wildlife Sanctuary, Dediypada, Narmada District	6.x.2007	1882	Open agricultural fields	Under large boulders	Sub-adult (Vyas 2009)
4	Samot, Shoolpaneshwar Wildlife Sanctuary, Dediypada, Narmada District	6.x.2007	1883	Open agricultural fields	Under large boulders	Sub-adult (Vyas 2009)
5	Kalali, Vadodara City, Vadodara District	25.x.2007	1884	River side scrublands	Urban garbage and under dry leaf litters	Sub-adult (Vyas 2009)
6	Ninoy, Shoolpaneshwar Wildlife Sanctuary, Dediypada, Narmada District	5.vii.2008	2096	Mix deciduous forest	Under rocks and rotten wooden logs	Juvenile (Vyas 2009)
7	Ambli Dam, Reserved Forest, Umerpada, Surat	31.viii.2009	2095	Dry scrublands	Under rocks	Present study, Juvenile
8	Outskirt of Vadodara City, Vadodara District	25.xi.2013	--	Urban garden	Under loose soil	Present study, Sub-adult

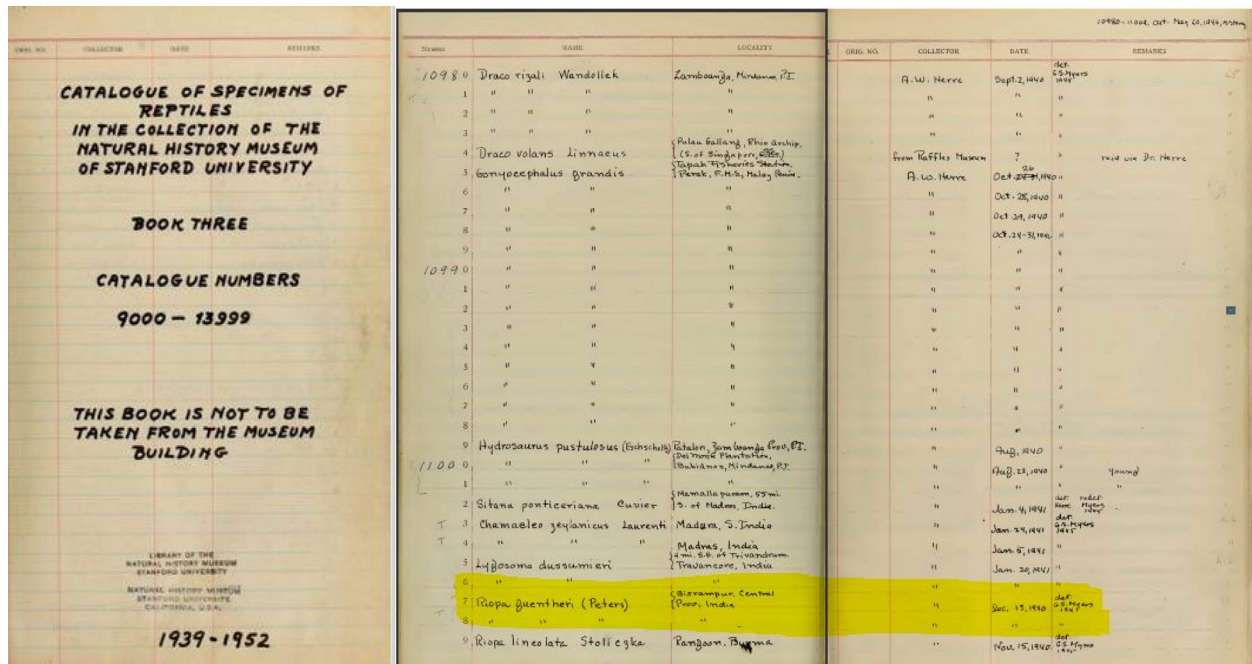


Figure 1. The evidence page of the catalogue showing *Lygosoma guentheri* specimens in the collection of the Natural History Museum of Stanford University' (California Academy of Science, Herpetology Collections, USA).

specimens were collected from Bisarampur, Central Province, (before 2000, the area was a part of Bihar, now lies in Palamau District, Jharkhand, India), including two specimens of *L. guentheri* (CAS-SU-Rep No. 11007 and 11008, Fig. 1), but none of the publications mentioned the distribution of the species from Jharkhand, India (see Sharma 2002; Vyas 2006; Javed et al. 2010). The collection site Bisarampur, Jharkhand is about 100km from the closest known southern locality of Bhimaram,

Telangana (Javed et al. 2010). The forest types and habitat areas lying in between these two localities are potential and similar, especially the forest areas of Chhattisgarh State. Surprisingly, no records from Chhattisgarh and Madhya Pradesh have yet been published (Chandra & Gajbe 2005).

*Lygosoma lineata* also occurs in Jharkhand. The 'Catalogue of specimens of reptiles in the collection of the Natural History Museum of Stanford University'

NUMBER	NAME	LOCALITY	ORIG. NO.	COLLECTOR	DATE	REMARKS
1365	<i>Mabuaya rudis</i> <sup>multifasciata</sup>	Camp lookout, above Dumaguete, Negros Oriental, Philippine Is.		A. W. Herre	July, 1948	det. A. Leviton Jan., 1951 alt. 1500' R.B.
1	<i>Mabuaya rugifera</i>	Tapak Fabieria Station Perak, Malaya		"	Oct. 24, 1940	det. P.M. Snow Dec. 30, 1950
2	"	"		"	Oct. 31, 1940	det. A. Leviton Jan., 1951
3	<i>Riopa lineata</i>	Bisrampur, Central Province, India		"	Dec. 13, 1940	"
4	<i>Sphenomorphus fasciatus</i> Gray 1845	Mercedes, Samar, Philippine Islands	# 35	Ralph F. Anneraus	Aug. 6, 1945	det. P.M. Snow Dec. 5, 1950
5	"	Zamboanga, Mindanao, Philippine Islands		A. W. Herre	Sept. 2, 1940	det. A. Leviton + J. Savage, 1950
6	"	"		"	"	"
7	<i>Sphenomorphus jagorii</i> <sup>abdictus aquilonius</sup> <i>jagorii</i> <i>latens</i>	Yamot, Zambales Prov., Luzon, Philippine Islands		R. B. Fox	July, 1947	" Paratype
8	"	Villar, Zambales Prov., Luzon, P.I. Mt. Pinatubo near G.H. Lake Sentanis, Hollandia, Dutch New Guinea		"	"	det. P.M. Snow Dec. 1, 1950 alt. 1000 ft Paratype
9	<i>Tribolonotus gracilis</i>	"		Earl S. Herald	Dec. 44-Jan 45	det. A. Leviton April, 1951

Figure 2. The evidence page from the catalogue shows note on collection of a specimen of *Lygosoma lineate* in the Natural History Museum of Stanford University' (CAS, Herpetology Collections, USA).

(CAS, Herpetology Collections, USA) includes a specimen of *L. lineata* (CAS-SU-Rep No. 13653, Fig. 2) collected by A.W. Herre (13 December 1940) from Bisrampur, Central Province (now in Palamau District, Jharkhand, India). The collection site Bisrampur, Jharkhand is at a distance of 600km north from the closest known locality Nagpur, Maharashtra from where *L. lineata* is reported. The forest types and habitat areas in between these two localities have similar topography, climate and forest type, and are potential habitats, especially the forest areas of Chhattisgarh and Madhya Pradesh. Surprisingly, there have been no records of the species from Madhya Pradesh (Chandra & Gajbe 2005), excepting the comments of Chari (1960). The species was conspicuously missing from the species lists of Madhya Pradesh (including Chhattisgarh State) and Bihar (including Jharkhand) (see Chari 1960; Sharma 2002; Vyas 2009; Mirza et al. 2010). Bisrampur, Jharkhand locality marks the northern most point of the species in its range.

The hitherto literature survey indicates, distribution of the species being very wide and scattered in peninsular India, with the most western distribution limits marked at Rajkot, Gujarat (Vyas 2009), southern distribution limits in Chidambaram, Tamil Nadu (Chari 1960) and the northern end limit in Bisrampur, Jharkhand. But, as yet there is no report from the states of Chhattisgarh (Chandra & Gajbe 2005) and Andhra Pradesh (Rao et al. 2004; Srinivasulu & Das 2008), even though a similar forest habitat structure is prevalent in both the states. Vyas (2009) suggested the possible occurrence of this species in Madhya Pradesh, on the basis of *L. lineata* population available in Shoolpaneshwar Wildlife Sanctuary, Gujarat and similar potential habitat tracks

existing on the entire interstate boundary of Gujarat, Maharashtra and Madhya Pradesh, and a preserved specimen (no specific locality) from Madhya Pradesh in the museum of Zoological Survey of India (Chari 1960). The specimen from Bisrampur, Jharkhand strongly supports the species occurrence in Chhattisgarh and Madhya Pradesh. The habitat and forests areas of Telangana and Andhra Pradesh are most potential and climatically similar with the adjoining states, from where *L. lineata* is reported. The forest habitat in Andhra Pradesh also, supports other members of *Lygosoma*, including *L. vosmaerii* (Seetharamaraju et al. 2009).

The altitude distribution of the *L. guentheri* is observed from 15m (Valsad Town, Gujarat) up to 1600m (Kalsubai, Maharashtra), in the Western Ghats. The altitude distribution of *L. lineata* is from 2m at the saline grasslands of Velavadar National Park, Bhavnagar District, Gujarat (Vyas 2001) up to an elevation of 630m in the mix deciduous forest of Melghat Tiger Reserve, Satpura mountain, Maharashtra (Narasimmarajan & Mahato 2013). The published literature and present information indicate that *L. guentheri* and *L. lineata* seem to be much more widely distributed than currently known (Figs. 3 & 4).

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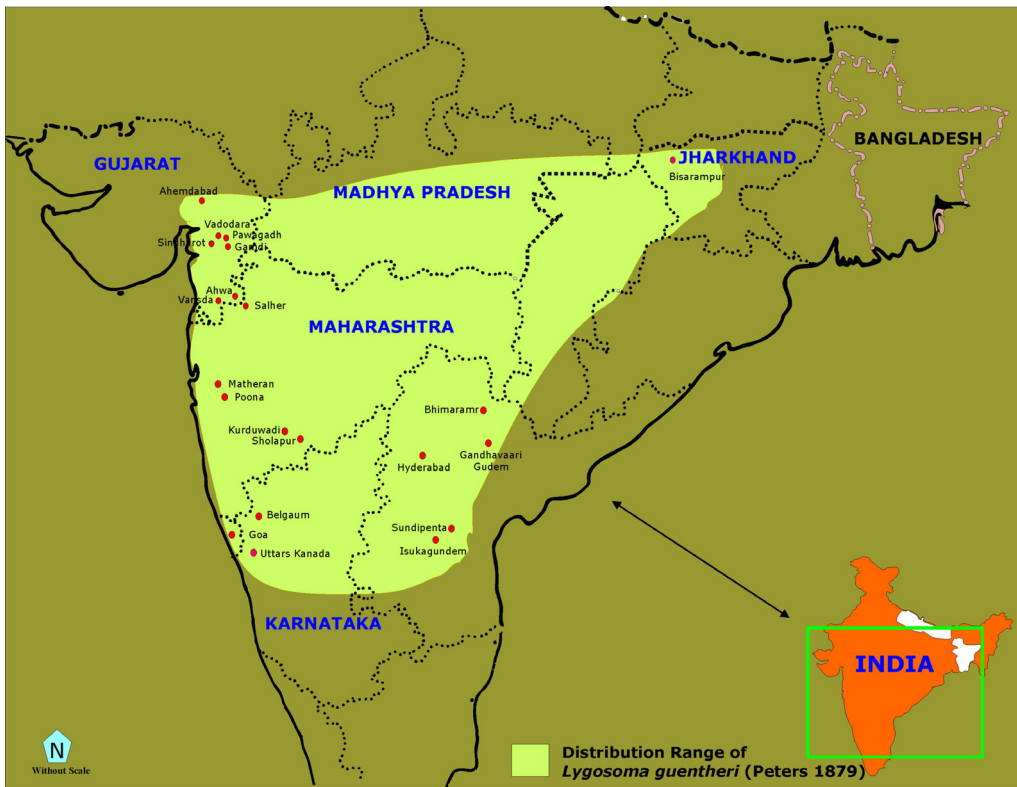


Figure 3. Distribution range and recorded collection sites of *Lygosoma guentheri*.

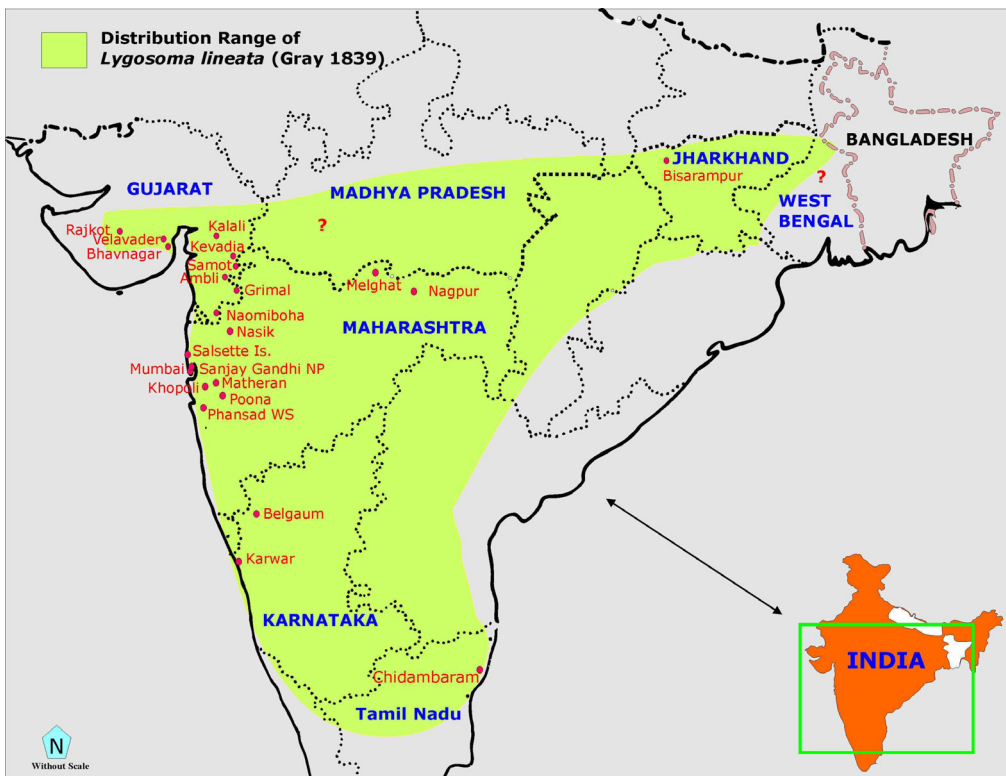


Figure 4. Collection sites and possible distribution range of *Lygosoma lineata*.

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