

# Dwindling Population of a Scincid Lizard *Mabuya Carinata* (SCHNEIDER, 1801) in Nellore District of Andhra Pradesh, South India

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**Abstract:** *Mabuya carinata* (Schneider, 1801) is the keeled grass skink, commonly observed in our surroundings. This scincid lizard is of least concern according to the Wild Life (Protection) Act, 1972. But it is alarming that population of this species is fast dwindling in different parts of the country. *Mabuya* is an efficient bio-indicator and plays an important role in food web of terrestrial ecosystems. The present study aims at assessment of population dynamics of this precious animal in Nellore district of Andhra Pradesh. Line transect and direct counting methods were adopted. Statistical analysis was done by using MS Office Excel 2007. The results show that there is drastic decline in the population of *Mabuya* from 2011 to 2015 at an alarming rate. Threats for the conservation of this animal are examined and remedial measure suggested.

**Keywords:** *Mabuya*, Bio-indicator, Scincids

## 1. Introduction

As on 4<sup>th</sup> November 2017, there are 6263 species of lizards inhabiting different habitats across the globe. Of these, 1634 species belong to the family Scincidae of infraorder Scincomorpha, belonging to order Squamata. The mabuyid skinks include only 201 species belonging to 26 genera [1]. These are highly diverse, worldwide in distribution, though less in number (3619) of species described so far [1], ophidians received greater attention of wildlife biologists, conservationists, ecologists, and molecular biologists, lizards could not attract much of their attention, though they play an important role in ecosystem dynamics. PubMed database displays 38535 research articles related to reptiles, out of which 11511 can be accessed as abstract or full text article from a public network. 15285 articles are published on snakes, out of which 4444 can be accessed as abstract or full text. 10854 articles are related to lizards as a whole, 3530 can be accessed. While agamids are represented by 169 articles, only 65 can be accessed. 259 articles were published about skinks, only 145 can be accessed. The genus *Mabuya* is poorly represented in literature, only by 111 articles, while only 24 can be accessed [2].

Sl. No	Subject of Research	Total number of papers published	Total number of papers which can be accessed from a public network
1	Reptiles (general)	38535	11511
2	Snakes	15282	4444
3	Lizards	10854	3530
4	Agamids	169	65
5	Skinks	259	145
6	<i>Mabuya</i>	111	24

Skinks are highly diverse and known to be present worldwide. The diversity of mabuyine lizards was earlier attributed to only one genus *Mabuya*, but four new monophyletic genera which have well-defined geographical distribution are proposed [3]. These genera include the

African and Madagascan species *Trachylepis*, the Asian species *Eutropis*, the Cape Verde island species *Chioninia* and the new world skink *Mabuya*. The systemic position of mabuyid skinks is debated [4,5,6].

The genus *Mabuya* is circumtropical in distribution. It consists of about 30 described species. The generic rearrangement of this genus assigning the members of *Mabuya* to *Eutropis* [7,8] has been much debated. Phylogenetic studies based on the sequences of nuclear and mitochondrial genes [9] confirm the monophyly of the tropical Asian *Eutropis*. An endemic Indian radiation of members of the genus *Mabuya* was revealed by the nuclear and mitochondrial trees. An initial dispersal of *Eutropis* around 5.5-17 million years ago, from South East Asia into India was also suggested by these studies. This was followed by two back dispersals from India. These events are thought to give rise to the extant members of the genus *Mabuya*, which include 8 species endemic to India [10].

Members of genus *Mabuya* from Africa and Asia are interesting for researchers of biogeography of Peninsular India. About 200 million years ago (mya), the Peninsular Indian plate was geologically part of the Gondwanaland. It is established that around 160 mya, the Peninsular India plate, together with Madagascar and Seychelles got separated from Africa. Subsequent events led to separation of Madagascar about 80mya, which later drifted across the Indian Ocean and finally collided with the Eurasian plate about 55-42 mya [11]. Then the Peninsular India plate merged with Eurasian plate, with the concurrent exchange of organisms between the two land masses [12]. With this possibility, Gondwanan fauna got scattered out of India [13]. Simultaneously, fauna of Asia and Africa entered the Indian land [14,15]. It is suggested that origin of *Mabuya* took place in the Asian mainland and it dispersed to other parts of the globe [16].

In the light of these facts, we started exploring the biogeography of the common Indian skink *Mabuya carinata*

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(Schneider, 1801). An extensive survey was undertaken in Andhra Pradesh, South India.

## 2. Materials and Methods

SPS Nellore district is selected for this study, because of the fact that it hosts a variety of habitat- rupicolous, forest, grass land and marine. This is selected because species of *Mabuya* are known to exist in all these ecosystems. But we focussed on *Mabuya carinata* only.

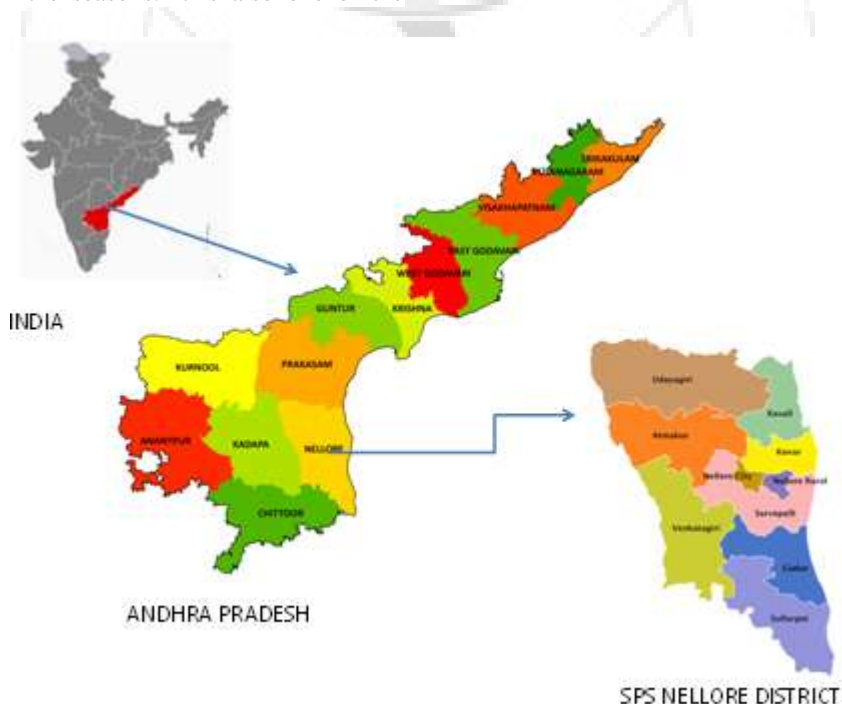
Nellore District is the Southernmost Coastal District of Andhra Pradesh. Located between between 13-30' and 15-6' of the Northern latitude and 70-5' and 80-15' of the Eastern Longitudes, the district has occupied a crucial place in the economy of Andhra Pradesh state. It is bound on the north by Prakasam District, on the East by Bay of Bengal, on the South by Chittoor District and Tiruvallur District of Tamilanadu and on the West by Velikonda Hills which separate it from Kadapa District. The eastern half of the District which lies adjacent the coast is fairly fertile and the western half of the district has low elevation towards west with large track of low shrub jungles diversified with rocky, will stony plains. The district has a coastal line of 169 km (Image 1). The maximum temperature is 36 to 46 °C (97 to 115 °F) during summer and the minimum temperature is 23 to 25 °C (73 to 77 °F) during winter. The rainfall ranges from 700 to 1,000 mm (28 to 39 in) through South West and North East Monsoons. Nellore is subject both to droughts and to floods based on the seasons. It is also one of the

hottest cities in India with at least 35 super hot days in a year.

Direct counting method was used to arrive at population count of *Mabuya carinata* in the areas surveyed. Conventional distance sampling method was adopted for this survey.

Opportunistic searches comprised of slow walking among the habitat suitable for existence of *Mabuya carinata*. These were carried out over a vast area.

Line transect method was used, where *Mabuya* population is presumed to be high. Transect lines were marked during day time with fishing line for every 5 metres, prior to each attempt. When required, survey was held at dusk, using power full head mounted 6 v spotlights and hand torches. Every potential habitat was searched for the presence of skinks and number of skinks observed was noted down. A noose was used to catch the gecko live. Gecko was released after taking morphometric details as given by Daniel *et.al* [17]. Population analysis was carried out by direct counting. Habitat analysis was done, as described by Kotwal [18]. Sympatric reptiles were identified using the key provided by Smith [19], and Boulenger[20]. No invasive method was used. No animal was either harmed or killed while doing morphometric analysis in the field and no sample was collected for any other purpose. Statistical analysis was done by using Microsoft Office Xcel 2007.



**Image 1:** Map of the Study area

## 3. Results and Discussion

### Animal Description and Habitat:

We describe the animal, as spotted in the Penusila Wildlife Sanctuary, Nellore. *Mabuya* has an obtusely pointed snout, which is longer than the orbit (Images 2). Frontal is variable in length. *Mabuya* has well-developed

frontoparitals and interparietal. As a characteristic feature, 5<sup>th</sup> or 6<sup>th</sup> supralabial is found to be subocular, and also equal in length to the preceding labials. Of the four supraoculars observed, second supraocular is the largest and is in contact with the frontal. 5-7 supraciliaries are observed, the first being the largest. Temporal scales are small, almost identical to those upon the rest of the body.

Dorsal scales are keeled, which are in 5 rows in many of the animals noticed. Occasionally 7 rows are found. Pre-anal scales and median subcaudal scales are small. Subconical tubercles are found on the ventral surface of palms and soles. Larger tubercles are present on the heels. *Mabuya carinata* can be identified in the field by scaly lower eyelid, numerous small scales on the underside of 4<sup>th</sup> toe, 30-34

scales round the body, legs reaching the elbow and absence of post-nasal. These observations are coinciding with those of earlier authors [19,20].

Typically, *Mabuya carinata* is found under litter, logs and abandoned places covered with scrub vegetation.



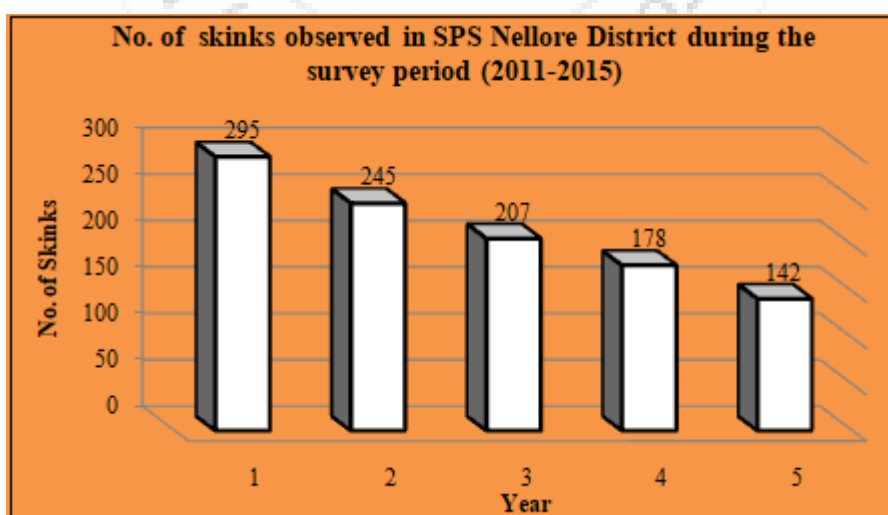
**Image 2:** Common Indian Skink in its natural habitat

**Population of *Mabuya* in SPS Nellore district during the study period**

Sl. No	Year	No. of animals observed	% increase or decrease with reference to previous year
01	2011	295	--
02	2012	245	-16.94
03	2013	207	-15.51
04	2014	178	-14.00
05	2015	142	-20.93

skink population in the study locations by -16.94% during the next survey year. In the next survey year, i.e., 2013, skink population in the surveyed locations recorded a fall by 15.51%. During the next survey year also, there was a decline by 14.00%. During the survey year 2015, there was a negative growth of skink population in the surveyed locations by -20.93%. Altogether, there was a reduction in skink population by 51.86% from the year 2011 to the year 2015. As skinks are very much sensitive to environmental changes, if this decline is continued in the present scale, it is estimated that by 2020 skink population will become very much minimal, and they may face extinction.

In the year 2011, during the survey period, 295 skinks were observed in all the study locations. There was a reduction in



Keeping in view the recent changes in the global warming profile and anthropogenic interference in herpetofaunal habitat, it is very much needed to safeguard this important genus in food chains.

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