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# Diversity of snakes rescued at Chennai, Tamil Nadu, India

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### Abstract
In spite of rapid urbanization of Chennai city, there exists a population of herpetofauna especially snakes. This reptilian fauna is one of the targeted faunas facing trouble due to anthropogenic developments and habitat degradation is the primary cause of its population decline and increase in conflict between snakes and man. In India, snake rescue practices occur in a few states and cities. The present study has recorded and analyzed the rescue and release of snakes in Chennai city from January 2010 to December 2015.

Keywords: Snakes, rescue, Chennai, 2010-2015

### 1. Introduction
Chennai, formerly known as Madras, is the fourth largest metropolitan area in India and the capital city of the Indian state of Tamil Nadu. Located on the Coromandel coast of the Bay of Bengal, Chennai has an estimated population of 4.9 million, with an area that has grown from 176 to 426sq.km. after an expansion from the year 2011. The urban agglomeration, which includes the city and suburbs, has a population estimated at nine million. This makes it the fourth most populous metropolitan area in India and the 31st largest urban area in the world [1]. Chennai is plagued with haphazard development and rapid urbanization of its ever expanding suburbs. In spite of such rapid urbanization of Chennai city, there exists a population of herpetofauna especially snakes. Generally, there are more than 3000 species of snakes in the world and they live in both terrestrial and aquatic ecosystems and are predatory carnivores with wide range of prey species [2, 3]. India harbours 518 species of reptiles which include 279 species of snakes belonging to 28 families [4]. Reptiles have seen consistent population declines throughout the world, which are attributed to a variety of factors [5]. They also play a significant role in the ecosystem sustenance as links in food chains, biomonitors in controlling many pests and also as excellent ecological indicators owing to their high degree of sensitivity to even a minor change in the environment [6-8].

The reptilian fauna is one of the targeted faunas facing trouble due to anthropogenic developments [5]. Reptiles and amphibians face numerous challenges for coexistence in the urbanized world [9-11] and habitat degradation is the primary cause of population decline for both these groups and a number of taxa are experiencing severe range reductions and declines in abundance [5, 12]. Most of the herpetofauna are threatened and are declining more rapidly compared to birds and mammals [13]. It is unfortunate that conservation strategies are mostly based on glamorous taxa such as birds and mammals, which may neglect smaller and less conspicuous vertebrates such as herpetofauna [14]. There are frequent incidents where a snake enters a house or a garden and the sight of any snake is a frightening situation for a common man. The observer immediately panics and either gets rid of it or kills it. A few sensible people act wisely instead of panicking, believing that the snake should not be hurt and should be safely moved out of their property. They immediately call for the snake rescuers, either from the Fire Brigade, Forest Department or from some local Non-government organization (NGO) [15]. In India, snake rescuing practices occurred in a few cities, such as Bongaigaon in Assam [16, 17], Bhavnagar, Ahmedabad and Surat in Gujarat [18-25], Ujjain in Madhya Pradesh [26], Shimoga in Karnataka [27] and Chennai in Tamil Nadu [28]. The present study recorded and analyzed the rescue and release of snakes in Chennai city from January 2010 to December 2015.

### 2. Materials and Methods
The Tamil Nadu Forest Department in Chennai, Tamil Nadu, India responds swiftly to the phone calls and direct requests of the people of Chennai whenever there is an incidence of a snake entering their residences or premises.

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The data pertaining to the rescue operations from different locations of Chennai city *viz.*, date of rescue, species of snakes rescued, locality of rescue and the location of release were obtained from the Forest Department, Government of Tamil Nadu, India, which were then analyzed and presented. The obtained data was for six years from January 2010 to December 2015.

## 3. Results

A total number of 6772 individuals of snakes belonging to five families, 15 genera and 16 species were rescued during the six year study period of which 2485 belonging to five species were venomous and 4287 belonging to eleven species were non-venomous (Table 1; Figure 1, 2 and 3). Among the venomous species, Indian cobra-*Naja naja* was the most abundant (69.5%) followed by Indian krait-*Bungarus careuleus* (13.2%), saw scaled viper-*Echis carinatus* (9.7%), Russell's viper-*Daboia russelii* (6.8%) and slender coral snake-*Calliophis melanurus* (0.8%) (Figure 1). The non-

venomous species rescued were Indian rat snake-*Ptyas mucosa* (34.24%) followed by checkered keelback-*Xenochrophis piscator* (22.83%), common vine snake-*Ahaetulla nasuta* (16.25%), common trinket-*Coelognathus helena* (7.83%), striped keelback-*Amphiesma stolatum* (5.9%), common wolf snake-*Lycodon aulicus* (4.08%), barred wolf snake-*Lycodon striatus* (3.47%), common bronze back tree snake-*Dendrelaphis tristis* (3.26%), red sand boa-*Eryx johnii* (1.70%), olive keelback- *Atretium schistosum* (0.34%) and brahminy worm snake-*Ramphotyphlops braminus* (0.04%) (Figure 1). The rescued snakes were released by the forest department officials in suitable habitats in and around the outskirts of Chennai within a radius of 50km. The places of release are given in alphabetical order: Ambur, Allikuzhi, Appur, Gingee, Kozhiyalam, Maduranthakam, Mambakkam, Nemmeli, Oragadam, Ponneri, Sithamoor, Sothupakkam, Tada, Thiruporur, Thiruvadisoolam, Thaiyur, Vandalur and Vengal.

**Table 1:** List of species of snakes rescued from January 2010 to December 2015 in Chennai city

| Sl. No | Family | Common name | | Scientific name | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total snakes | Average | (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Elapidae | Indian cobra | Venomous | *Naja naja* | 335 | 362 | 520 | 221 | 162 | 127 | 1727 | 287.83 | 69.50 |
| 2 | Elapidae | Indian krait | | *Bungarus caeruleus* | 20 | 28 | 175 | 54 | 48 | 3 | 328 | 54.67 | 13.20 |
| 3 | Viperidae | Saw scaled viper | | *Echis carinatus* | 9 | 11 | 144 | 37 | 39 | 2 | 242 | 40.33 | 9.70 |
| 4 | Viperidae | Russell's viper | | *Daboia russelii* | 11 | 12 | 69 | 20 | 49 | 7 | 168 | 28.00 | 6.80 |
| 5 | Elapidae | Slender coral snake | | *Calliophis melanurus* | - | - | - | - | 13 | 7 | 20 | 3.33 | 0.80 |
| | | **Total Venomous** | | | **375** | **413** | **908** | **332** | **311** | **146** | **2485** | **414.17** | **36.70** |
| 6 | Colubridae | Indian rat snake | Non-Venomous | *Ptyas mucosa* | 301 | 219 | 334 | 218 | 202 | 194 | 1468 | 244.67 | 34.24 |
| 7 | Colubridae | Checkered keelback | | *Xenochrophis piscator* | 153 | 184 | 314 | 122 | 105 | 101 | 979 | 163.17 | 22.83 |
| 8 | Colubridae | Common vine snake | | *Ahaetulla nasuta* | 121 | 109 | 196 | 125 | 85 | 61 | 697 | 116.17 | 16.25 |
| 9 | Colubridae | Common trinket | | *Coelognathus helena* | 23 | 60 | 113 | 53 | 57 | 30 | 336 | 56.00 | 7.83 |
| 10 | Colubridae | Striped keelback | | *Amphiesma stolatum* | 49 | 33 | 72 | 35 | - | 64 | 253 | 42.16 | 5.90 |
| 11 | Colubridae | Common wolf snake | | *Lycodon aulicus* | 35 | 2 | 70 | 48 | 17 | 3 | 175 | 29.17 | 4.08 |
| 12 | Colubridae | Barred wolf snake | | *Lycodon striatus* | 13 | 20 | 52 | 34 | 28 | 2 | 149 | 24.83 | 3.47 |
| 13 | Colubridae | Common bronze back tree snake | | *Dendrelaphis tristis* | 24 | 14 | 33 | 23 | 17 | 29 | 140 | 23.33 | 3.26 |
| 14 | Boidae | Red sand boa | | *Eryx johnii* | 21 | 14 | 14 | 13 | 7 | 4 | 73 | 12.17 | 1.70 |
| 15 | Colubridae | Olive keelback | | *Atretium schistosum* | - | - | - | - | 15 | - | 15 | 2.50 | 0.34 |
| 16 | Typhlopidae | Brahminy worm snake | | *Ramphotyphlops braminus* | - | - | - | - | 2 | - | 2 | 0.33 | 0.04 |
| | | **Total Non-venomous** | | | **740** | **655** | **1198** | **671** | **534** | **488** | **4287** | **714.50** | **63.30** |
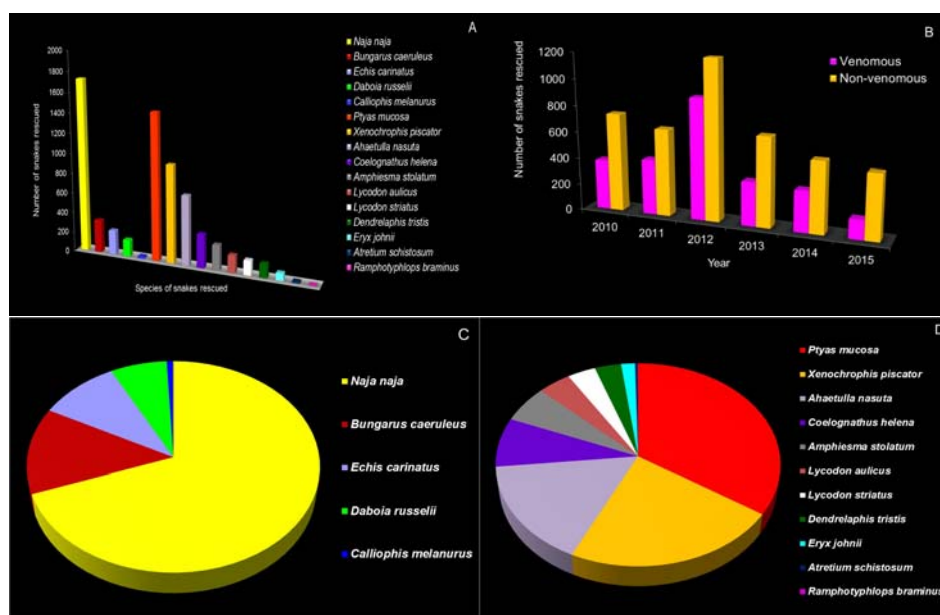


**Fig 1:** Graph showing A: Species and number of snakes rescued; B: Number of venomous and non-venomous snakes rescued;
C: Percentage among venomous snakes and D: Percentage among non-venomous snakes
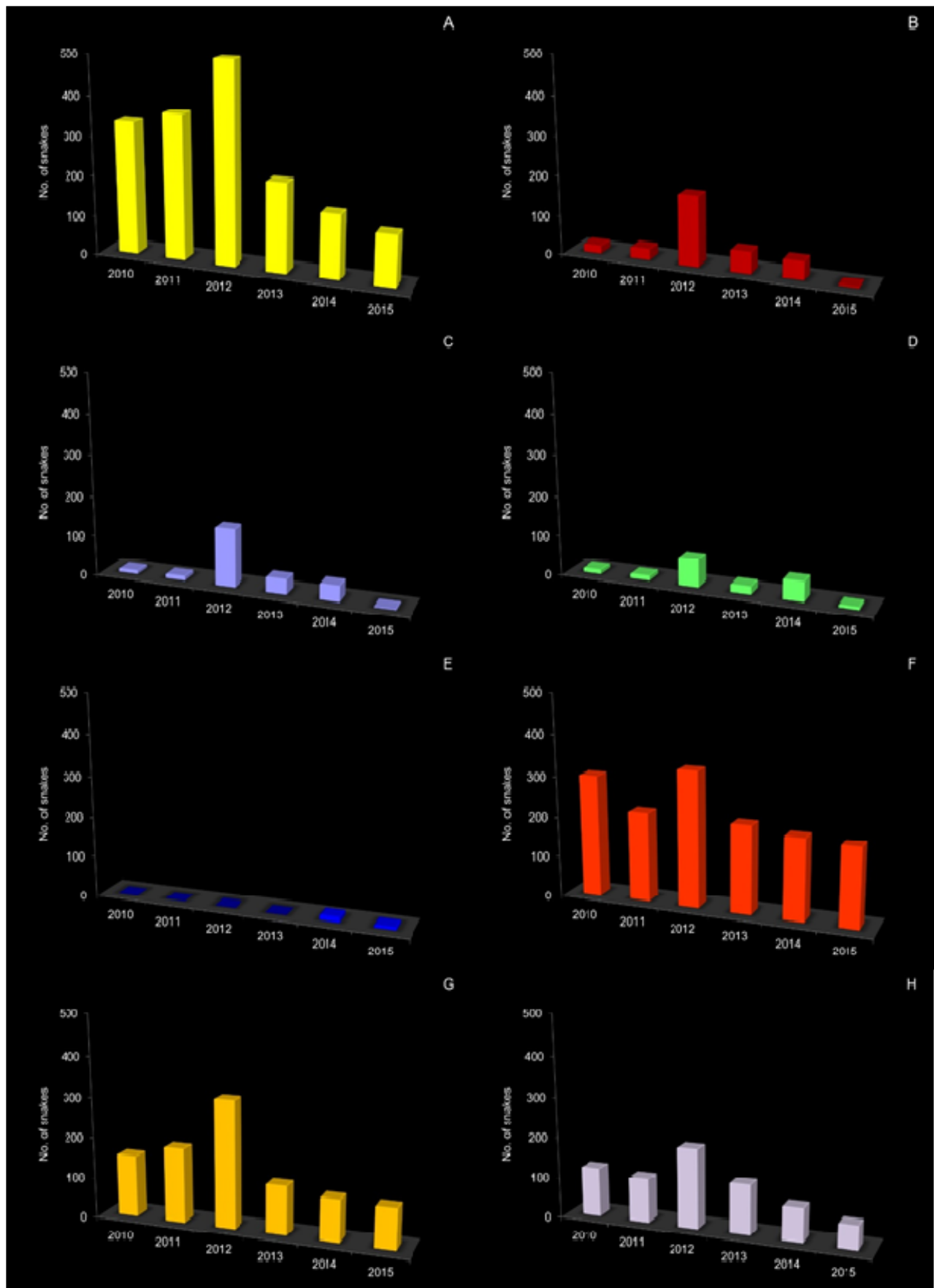
**Fig 2:** Year wise rescue of snakes: A: *Naja naja*; B: *Bungarus careuleus*; C: *Echis carinatus*; D: *Daboia russelii*;
E: *Calliophis melanurus*; F: *Ptyas mucosa*; G: *Xenochrophis piscator* and H: *Ahaetulla nasuta*
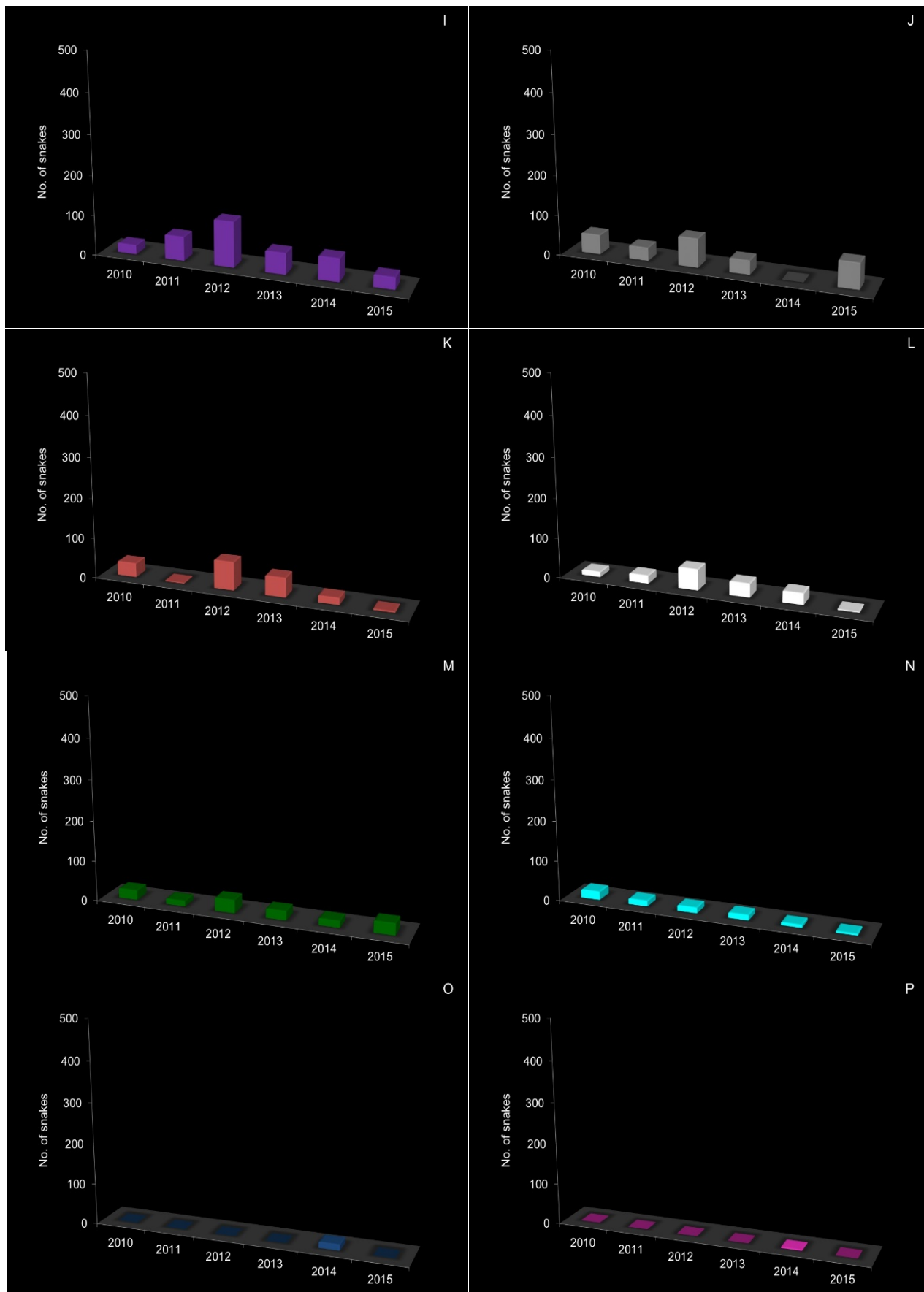
**Fig 3:** Year wise rescue of snakes I: *Coelognathus helena*; J: *Amphiesma stolatum*; K: *Lycodon aulicus*; L: *Lycodon striatus*; M: *Dendrelaphis tristis*; N: *Eryx johnii*; O: *Atretium schistosum* and P: *Ramphotyphlops braminus*

## 4. Discussion

It is expected that the world population growth in the next thirty years will be mostly concentrated in the urban areas [29]. An urban development or expansion victimizes reptiles firstly, ultimately resulting in the deterioration of the fauna by habitat destruction or alteration. The 21st century has brought many conservation challenges to the fore. One very important and significant challenge that has evoked considerable scientific interest is the fragmentation of wildlife habitat. In recent decades, habitat fragmentation created naturally or artificially has led to changes in structure of landscape [30]. Such situation ends up with too many reptilian species co-existing with the urban world [10]. Owing to urbanization, species with specific habitat preferences often experience either decreased density or extirpation, which can result in an increase in opportunistic species [31]. Reptilian species face similar suites of problems and a number of taxa are experiencing severe range reductions and declines in abundance [5, 12]. Most of the herpetofauna are threatened and are declining more rapidly compared to birds and mammals [13]. It is unfortunate that conservation strategies are mostly based on glamorous taxa such as birds and mammals, which may neglect smaller and less conspicuous vertebrates such as herpetofauna [14].

Human-wildlife interaction that always leads to conflict is a major concern of most people living next to protected areas or when wild animals come in direct contact with humans. Conflict is here defined as any interaction between humans and wildlife that results in negative impacts on human, social, economic or cultural life, and on the conservation of wildlife populations, or on the environment [32]. Human snake encounters with negative results such as animal death, habitat destruction, injuries to people, injuries to wildlife and the like are common [33]. All snake species are legally protected under Indian Wildlife Protection Act, 1972 from Schedule I to Schedule IV [34]. In spite of this legal protection, many snake species are killed brutally, especially in the rural areas of India. The layman kills snakes due to ignorance regarding environmental conservation, laws regarding protection of snakes and the significance of snakes in nature. Snakes co-exist with humans in homes, gardens and outhouses but their presence usually goes unnoticed. Snakes are beneficial to humans by killing unwanted insects and rodents in food stores and crops. A few sensible people act wisely, instead of panicking, believing that the snake should not be hurt and have to be safely moved out of their property, immediately call for the snake rescuers, either from the Fire Brigade, Forest Department or from some local NGOs. Today, a number of NGOs are working dedicatedly towards conserving snakes. These NGOs run awareness and education programs, along with the service of rescuing wild animals and in particular snakes, especially in the developed cities of Gujarat. These NGOs work day and night (24x7) and rescue a large number of animals. In addition to rescuing snakes, they also translocate animals from urban areas to the 'suitable habitats' [35].

The species diversity was found to be fairly high in Chennai with the Indian rat snake being the most abundant among the non-venomous species that were rescued and the Indian cobra being high in number among the venomous species. Snake rescue studies under normal climatic conditions have produced similar results wherein high numbers of cobra and rat snake indicate their common habitat and adaptability. This can also be attributed to the occurrence of prey species *viz.*,

rodents and toads near human habitations [36]. The cobra is worshipped from ancient times [37] by the people and is rarely killed compared to the other species. The reptilian fauna is one of the targeted faunas facing trouble due to anthropogenic developments globally [5]. An urban development or expansion victimizes reptiles firstly, ultimately resulting in the deterioration of the fauna by habitat destruction or alteration. Such situation ends up with too many reptilian species co-existing with the urban world [10]. Rapid urbanization of a city and its suburbs has raised the numbers of reptilian species in the newly developed urban areas located in the outskirts of the city, including numbers of snake species [38] as evident in Chennai city. A few species of snakes have adapted to human habitation, especially in the suburban backyards, urban gardens, roofed houses and open sewages. Thus, urban habitation acts as advantageous habitat for few snake species, in terms of food and shelter while it is a disadvantage for the other species. It is strongly believed that the released snakes adapt to the similar habitats as evidenced by Vyas [34].

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