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## COMMUNICATION

### A LOOMING EXOTIC REPTILE PET TRADE IN INDIA: PATTERNS AND KNOWLEDGE GAPS

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## A looming exotic reptile pet trade in India: patterns and knowledge gaps

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**Abstract:** Commercial trade of exotic reptiles through CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) in India is relatively recent (<2 decades). Social media platforms and web portals are known to be used for pet trade. Exotic pet trade is not legally regulated within India. Therefore, little is known on the scale at which this trade is carried out in India. We conducted a two-year study between 2018 and 2020 gathering information of exotic reptile pet trade online and summarized CITES documentation of the yearly import export records from 1976 to 2018 by CITES secretariat. This manuscript provides a baseline for the extent of the trade, invasive species and the species traded in mainland India. We found that there is an extensive trade of exotic reptiles in the country, comprising 84 species including the highly venomous species such as *Bitis gabonica*. According to CITES records of 1976–2018, 98.6% of the reptile imports into India have not been reported to the CITES management authorities in India. We also found some evidence of trade in protected native species through the exotic pet trade network. Furthermore, some highly threatened reptile species including many listed in Appendix I of CITES are traded in India.

**Keywords:** CITES, disease, exotic reptiles, IUCN, social media, trade.

**Abbreviations:** CITES—The Convention on International Trade in Endangered Species of Wild Fauna and Flora | IUCN—International Union for Conservation of Nature.

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**Author contributions:** AP and VD conceived the idea. AP and MST compiled the data. AP, VD, HVG and MST evaluated, validated the data and contributed in drafting. All authors reviewed, edited and approved the submission of the final version of the manuscript.

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## INTRODUCTION

Globally, the exotic pet trade has increased over the years and human induced translocation of species has substantially increased during the last few decades (Pimentel et al. 2008; Seebens et al. 2017). Live trade in exotic reptiles is no exception to this increasing trend (Auliya et al. 2016; Hierink et al. 2020). Trade of live animals and plants is identified as a major pathway of biological invasions (Mooney & Cleland 2001; Krishnakumar et al. 2009; Engeman et al. 2011; Lockwood et al. 2019; Mohanty & Measey 2019) and in some cases it also leads to the spread of infectious diseases to other native flora and fauna including humans (Karesh et al. 2005; van Borm et al. 2005; Pavlin et al. 2009; Falcón et al. 2013; Mendoza-Roldan et al. 2020). Invasive species have wreaked havoc on native ecosystems in different parts of the world and have led to the extinction of several native species (Savidge 1987; Mooney & Cleland 2001; Jones et al. 2008; Gurevitch & Padilla 2004; Shine 2010; Simberloff & Rejmanek 2010; Willson et al. 2011; Dorcas et al. 2012).

The international trade in wildlife is estimated to be worth hundreds of billions of dollars annually and has steadily increased in value (Engler 2008; Roe 2008). A virtual display of exotic animals on the internet attracts customers and it is a major outlet for trade in wildlife (Lavorgna 2014). This medium (internet and social media) has also been identified as a useful source to document the scale at which the trade is carried out (Vaglica et al. 2017; Jensen et al. 2019).

Approximately, 5,800 species of animals and 30,000 species of plants are covered by CITES in order to protect them from over-exploitation by trade. India has been a party to CITES since 1976. Currently, 897 species & subspecies and populations of reptiles are included in Appendices I (87 species), II (749), and III (61), which is ~8% of the 11,050 reptile species in the world (<http://www.cites.org>; Uetz et al. 2020). Reptiles are one of the extensively traded groups of vertebrates in the exotic pet trade. Approximately, 8% of the reptile species traded in the world are regulated by CITES (Auliya et al. 2016; <http://www.cites.org>). India is high in reptilian diversity (~619 species in mainland India) (Uetz et al. 2020) and there is a serious threat to native fauna due to exotic pets as trade increases the likelihood of invasion and spread of diseases. Furthermore, information on the extent of globally threatened species in exotic pets traded in India is not available. Thus, there is an urgent need to document what proportion of the reptiles traded into India are CITES listed and their International

Union for Conservation of Nature (IUCN) Red List status. The aim of the present study is to assess the exotic reptile pet trade in India to determine: i) the extent, in terms of traded species and trade volume, ii) associated discrepancies in the CITES records, iii) potential invasive species, and iv) discuss key challenges and provide recommendations for monitoring.

## MATERIALS AND METHODS

### Online sale data

To understand the scale of trade (legal and illegal) of exotic reptiles in India, information was gathered from the internet including four social networking applications (Facebook, Instagram, Telegram, and WhatsApp) and websites listing exotic animals for sale. During the course of two years (April 2018–March 2020), we monitored 75 WhatsApp groups, 26 pet networking groups on Facebook, 18 groups on Telegram, 11 groups on Instagram, and 20 websites selling exotic reptiles. The groups were selected based on their activity and posts related to buying and selling of various reptiles. Each selected group was monitored on a daily basis and websites listing exotic species for sale were surveyed weekly; additionally, photos and advertisements were collected as evidence of trade and for the purpose of species identification by subject experts. We followed the guidelines on ethical decision making and internet research (Markham & Buchanan 2012). All exotic species were identified to the species level. These species were categorized into four groups: lizards, snakes, turtles, and crocodiles. The IUCN Red List and CITES Appendix status of the listed species were considered to assess threat levels. During the monitoring of social networking platforms, efforts were made to access information about the original regions/states from which particular photos or advertisements were posted with the help of the open-source intelligence tools (OSINT). The number of traders recorded by us in the reptile pet trade ranged from 1 to 27 in each state. We categorized the online trading frequency as Low (1–9), Medium (10–18), and High (19–27). Bar plots and pie chart were prepared in R 3.2.0 (R Core Development Team 2017) using package ggplot2 (Wickham 2016) and a map was prepared using QGIS 3.10 (QGIS.org 2020).

### Seizure data

To assess the illegal import of exotic reptiles through different customs entry and exit points, information related to the seizure of exotic animals was collected

from multiple media sources including news reports, seizure reports by enforcement agencies such as Customs, Directorate of Revenue Intelligence (DRI), and Wildlife Crime Control Bureau (WCCB) over a period of two years (March 2018–March 2020).

### CITES trade data

To assess legal imports of exotic reptiles into India we accessed import data from 1976 to 2018 from the CITES Trade Database (<https://trade.cites.org/> last accessed on 20.vi.2020). Only imports with the purpose codes B (breeding in captivity or artificially propagation) and T (commercial) were considered as only these two codes clearly indicate specimens which were imported for the purpose of trade. We cross-checked published CITES trade data with the Wildlife Crime Control Bureau, New Delhi annual report (<http://wccb.gov.in/Content/CITES.aspx>).

## RESULTS

In total we recorded 84 species of reptiles in trade, many are categorized as threatened by the IUCN Red List, viz: five Critically Endangered (CR), nine Endangered (EN) species, and nine Vulnerable (VU) species (Appendix 1 and Appendix 3).

### Online trade

There is an extensive virtual market for exotic reptiles in India through social media; our findings show WhatsApp, Facebook, Telegram, Instagram, and web portals are the key media (Figure 1a). Websites often advertised fewer species for sale than that of social media platforms (Figure 1a).

In total, 70 reptile species were identified to be traded via the various social media platforms, including 31 species of lizards, 12 species of snakes, and 27 species of turtles; no crocodile species were found in online trade (Figure 1b, Table 1, Appendix 1). Among lizards, varanids (Varanidae) were found to be the most frequently traded species followed by iguanids (Iguanidae), and agamids (Agamidae). Twelve species of exotic snakes (Appendix 1) were found to be traded online. *Python regius* is the most commonly traded snake species. We also found highly venomous snakes such as *Bitis gabonica* and *Drysdalia coronoides*. We found 27 species of exotic turtles and tortoises in trade. Apart from *Trachemys scripta elegans* which are traded in large numbers (Appendix 2), we also found some rare and threatened species of turtles including *Astrochelys*

**Table 1. Number of exotic reptile species in trade found by this study in mainland India. See Appendices 1–2 for complete list of species.**

	Listed for sale by exotic pet traders	Seizures by enforcement authority	
	No. of Species	No. of Species	No. of Individuals
Crocodiles	0	1	21
Lizards	31	12	45
Snakes	12	6	22
Turtles	27	3	12417

*radiata* and *Malacochersus tornieri* in trade (Appendix 1). Among the three groups found in online trade, more species of lizards were traded compared to snakes and turtles (Table 1).

We found five species listed in Appendix I of CITES in the Indian pet trade: *Cyclura lewisi*, *Cyclura cornuta*, *Shinisaurus crocodilurus*, *Astrochelys radiata*, and *Malacochersus tornieri* (Appendix 1). Additionally, 31 species in trade were found to be listed under Appendix II, and four species under Appendix III.

Furthermore, we found seven posts (5 species) related to live reptile species which are protected under the Indian Wildlife (Protection) Act 1972. These posts led to the seizure/rescue of *Geochelone elegans* (N= 11), *Geoclemys hamiltonii* (N= 7), *Pangshura tecta* (N= 71), *Varanus bengalensis* (N= 1), and *Python molurus* (N= 1) from pet traders by the enforcement authorities.

Our study shows that Tamil Nadu (10%), Maharashtra (9.7%), and West Bengal (9.3%) holds the major proportion of traders dealing with live exotic reptiles, followed by Kerala (8.5%), Delhi (7.3%), and Uttar Pradesh (7%) (Figure 2). Most traders are based in large metro cities (Chennai, Mumbai, Pune, Kolkata, Delhi, Lucknow, and Hyderabad).

### Seizure data

Fifteen seizures of illegally imported reptiles were conducted by enforcement agencies, and a total of 12,505 individuals belonging to 22 species were confiscated (Appendix 2). The seized individuals belonged to species ranging across four reptile groups; including twelve species of lizards, six species of snakes, three testudines, and one crocodile species (Table 1, Appendix 2). Lizards were the most smuggled group; 12 species were seized by enforcement authorities in India.

During the two years period (2018–2020), enforcement authorities successfully seized individuals of five species listed in Appendix I of CITES: *Cyclura stejnegeri*, *C. pinguis*, *C. lewisi*, *Testudo kleinmanni*,



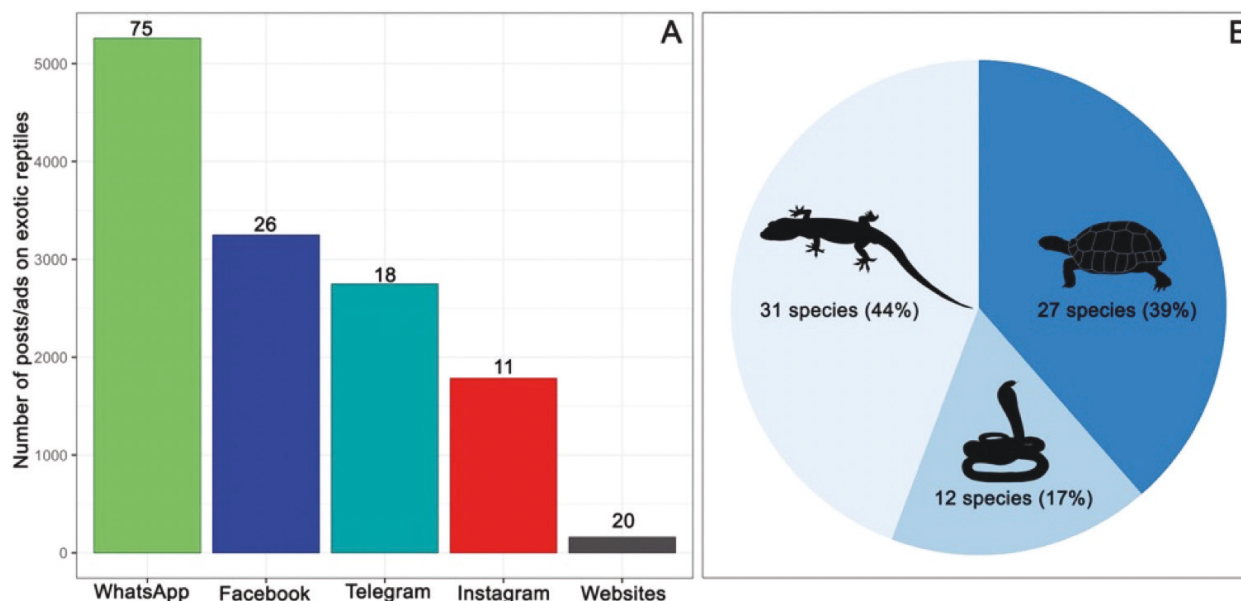


Figure 1. Summary of exotic reptile pet trade detected online, between 2018–2020: A—Number of posts/ads in various social media platforms and trade websites, number of groups monitored in each platform are labelled on top of each bar | B—Proportion of species in different groups (snakes, lizards & turtles) of reptiles recorded. Silhouettes are from PhyloPic.org contributed by Alex Slavenko (Lizard), V. Deepak (Snake) & Andrew A. Farke & Yan Wong (Tortoise).

Table 2. Summary of species recorded in online trade, seizures and import data listed in CITES website. Categorized by CITES Appendices (I–III); NA—Not available.

Appendix	No. of species found on sale by pet traders in India				No. of species seized by enforcement authority in India				No. of species imported to India via CITES from 1976 to 2018		
	I	II	III	NA	I	II	III	NA	I	II	III
Crocodiles	0	0	0	0	1	0	0	0	2	5	0
Lizards	3	18	0	10	3	7	0	2	1	2	0
Snakes	0	5	0	7	0	3	0	3	0	2	0
Turtles	2	8	4	13	1	1	0	1	0	4	1

*Crocodylus siamensis* and nine species listed under Appendix II including *Centrochelys sulcata* and *Varanus prasinus*.

### CITES trade

We found that between 1976 and 2018 there were 25 different consignments of live import of reptiles into India from other countries for breeding in captivity (B) and commercial (T) purposes. This included 1,293 individuals belonging to 17 species including seven species of crocodiles (63 individuals), three species of lizards (208 individuals), two species of snakes (406 individuals), and five species of turtles (616 individuals) (Appendix 3). These imports comprised of three species from Appendix I, 13 species from Appendix II and one species from Appendix III (Table 2). The import data shows that between 1976 and 2018 only 18 individuals

of four species of crocodiles were reported to the CITES Management Authority in India (Appendix 3). This information was reported only for the year 2000 and the remaining 1,275 individuals were never reported (Appendix 3).

CITES data revealed that between 2000 and 2017, seven *Mecistops cataphractus* and three *Cyclura cornuta* were imported into India for the purpose of breeding in captivity from Netherlands and Denmark. These are species listed in Appendix I; however, there are no captive breeding operations registered with the CITES Secretariat for these species.

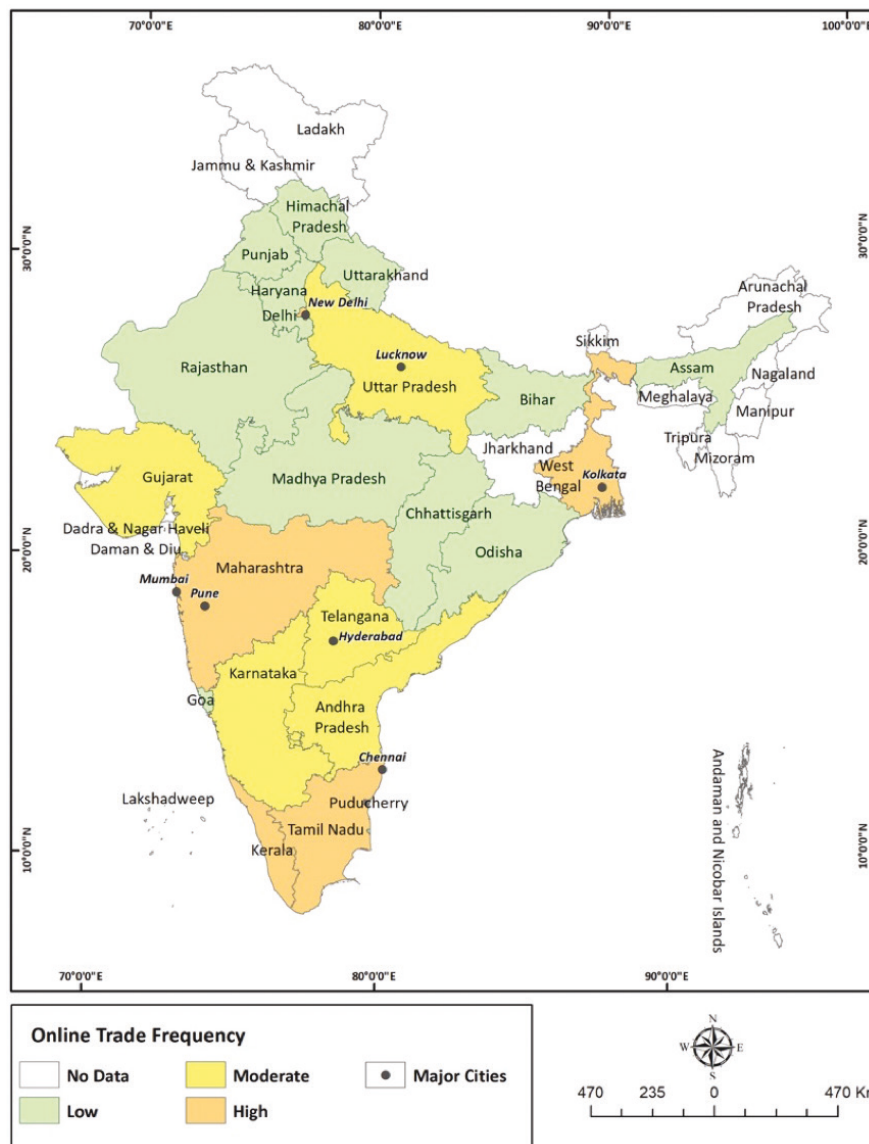


Figure 2. State wise distribution of traders selling live exotic reptiles in different Indian states documented during this study. Online trading frequency: low (1–9), medium (10–18) and high (19–27). Cities with high trade records are labelled in italics.

## DISCUSSION

This study reveals an extensive trade of exotic reptiles in India for the first time, which includes many threatened species. We recorded a total of 84 species of exotic reptiles in the pet trade many of which are highly likely to have entered India illegally. Twelve species were seized by Customs Authorities at different entry points (while attempting to smuggle into India) before it reached the market for sale (Appendix 1–3).

Cities like Bengaluru, Chennai, New Delhi, Hyderabad, Kolkata, Lucknow, Mumbai, Pune, Thiruvananthapuram, and Vadodara in 12 Indian states have been historically associated with illegal sale of Indian Star Tortoises and people who kept them as pets (Moll 1983; WWF

1994; Sekhar et al. 2004; Anand et al. 2005; D’Cruze et al. 2015). We found similar results with high levels of exotic reptiles being traded in most of these cities (Chennai, Hyderabad, Kolkata, Lucknow, Mumbai, New Delhi, and Pune) listed above (Figure 2). Extensive trade and export of endemic Indian fish species through exotic species traders was uncovered by Raghavan et al. (2013). Similarly, we found that traders who sell exotic reptiles are to some extent involved in illegal trade of Indian reptile species as pets. This mainly includes turtles (*Pangshura tecta*, *Geoclemys hamiltonii*, and *Geochelone elegans*) and sometimes other reptiles (*Varanus bengalensis* and *Python molurus*) which are protected species in India, listed on the Schedules of The Wildlife (Protection) Act, 1972. However, we did



not find any evidence of native species being exported during this study.

Social media platforms provide a safe medium for trading exotic animals by maintaining anonymity of the seller and forming closed networks controlled by group administrators. On Instagram, traders were found to display exotic reptiles by posting photographs, without specific mention of prices for sale. On the contrary, on open platforms like websites, very few exotic reptile species and individuals were on display. The displayed species (e.g., *Iguana* spp. or *Trachemys scripta*) were usually available in large quantities for low prices (between ₹120–160) and there were some species which were sold for a higher price range (between ₹4,500–40,000) per individual.

Among lizards, *Varanus* species were found to be the most smuggled species followed by iguanids, agamids, chamaeleonids, and scincids (Appendix 2). In March 2018, Guwahati police and forest authority conducted a seizure of four Gaboon Vipers *Bitis gabonica*, among several other wild animals. The consignment's suspected origin was Aizawl in Mizoram, reportedly, it was planned to be sold to a trader in New Delhi. In another case, the Chennai Customs Authority (CCA) detained a person at the Chennai International Airport and confiscated several exotic animals including a Horned Pit Viper *Cerastes cerastes*, which was allegedly smuggled into India from Thailand. Published reports on exotic reptile pet trade in India are sparse (Soundararajan et al. 2015). While the trade of live reptiles in India has been recorded since 1983, extensive trade is only recorded in the last two decades (Appendix 2–3; Ramsay et al. 2007) and CITES import/export data shows an increase in the number of traded species and individuals in the past decade (Appendix 3). Undocumented import/export of species and individuals is much higher than the reported numbers.

Bush et al. (2014) reported globally a large number of Appendix I listed captive-bred mammals and birds and wild-caught birds and reptiles in legal international trade. Seven species of exotic reptiles listed in Appendix I (*Cyclura cornuta*, *C. lewisi*, *Shinisaurus crocodilurus*, *Astrochelys radiata*, *Malacochersus tornieri*, *Crocodylus siamensis*, and *Mecistop scataphractus*) and found to be in the pet trade, but were not reported to the CITES authorities in India. CITES trade data shows that until 2000 there were only eight species of reptiles imported into India (Appendix 3). Only more recently the trade has intensified in both number of species and individuals (Appendix 3). Discrepancies in the number of import and export in CITES data have been reported in the

past (Blundell & Mascia 2005; Russo 2015; Robinson & Sinovas 2018) and we also found similar pattern in this study (Appendix 3). Species listed in Appendix I of CITES are threatened with extinction and in general no international commercial trade is allowed. International trade in species listed in Appendix II and Appendix III for commercial purposes is permitted, but only with the relevant permits required by the convention. The domestic online trade of CITES listed species in such large quantities raises concerns about illegal imports into the country especially given that 98.6% of the imports into India have not been reported to the CITES management authorities in India. Apart from the fact that these imports were not reported to Indian CITES Management Authority, they indicate a lack of compliance with CITES Resolution Conf. 12.10 (Rev. CoP15) by the parties involved.

### Regulations for exotic species in India

In India, the import of exotic live reptiles is regulated by CITES and Customs Act 1962 with the “Policy Conditions”. The importer has to apply for a license to import live animals (including their parts and products) to the director general of foreign trade along with the recommendation of the concerned chief wildlife warden of the state which is to be furnished at the time of custom clearance at “Exit” point. On June 2020, the Indian Government (Ministry of Environment forest & climate change (Wildlife Division) released an advisory for dealing with import of exotic live species in India and declaration of stock (<http://environmentclearance.nic.in/writereaddata/om/30052020WildlifeAdvisorySpecies.pdf>).

### Threatened species in trade

Already threatened wild populations of species such as *Chelodina mccordi*, *Astrochelys radiata*, *Carettochelys insculpta*, and *Malacochersus tornieri* if over exploited for the pet trade, may be decimated in their native range. The former two tortoises were identified among the 25 most endangered turtles and tortoises in the world (Rhodin et al. 2011). India as a signatory to CITES should take serious preventive measures to avoid trade of threatened species. As per the CITES Article VII, Paragraph 4, specimens of an animal species included in Appendix I bred in captivity for commercial purposes, may be deemed to be specimens of species included in Appendix II. While some species imported in pet trade into India are reported to have been bred in captivity (Appendix 3) many other threatened species in trade do not have this information. This is another reason to have

a proper record for import and export of exotic species. Lyon & Natusch (2011) showed that 80% of *Morelia viridis* exported from Indonesia annually are illegally wild-caught. Population declines have been reported in some reptile species due to heavy exploitation for pet trade (Parusnath et al. 2017).

### Invasive species in the exotic pet trade

The Red-eared Slider *Trachemys scripta elegans* is classified by the IUCN's Invasive Species Specialist Group as one of the 'World's Worst Invasive Alien Species' (Lowe et al. 2000; ISSG 2010). A species native to the Mississippi River in the United States, the Red-eared Slider is now an invasive species in 75 countries or overseas territories (Vyas 2019; Uetz et al. 2020). They are often sold as small hatchlings but upon reaching adulthood, these turtles are much larger and more aggressive (Cadi & Joly 2004). This is often the case for many other reptiles (Stringham & Lockwood 2018). Thus, they are often discarded into local waterways (Cadi & Joly 2004). Young Red-eared Slider turtles are carnivorous; they undergo a shift in diet as they mature to become omnivores (Ligon 2007; Boyer & Scott 2019) and predate on native species of turtles (Vyas 2020). They prey on local fish species and may compete for food and nesting space with the native turtle populations (Girondot et al. 2007).

In India, Red-eared Sliders were reported from 35 water bodies in the state of Gujarat which is also the natural habitat for one or more of the four native species of turtles (*Pangshura tecta*, *Nilssonina gangetica*, *Lissemys punctata*, and *Melanochelys trijuga*) (Vyas 2019). Apart from Gujarat, Red-eared Slider has also been reported from Karnataka, West Bengal, Punjab, Hyderabad, Rajasthan, and Goa (Jadhav et al. 2018; Chaudhuri et al. 2018; Vyas 2019). Until recently (2007), there were no records of Red-eared Slider from India (Ramsay et al. 2007) but now it is considered to be an invasive species in India which if not tackled may pose a serious threat to native turtles.

Red-eared Sliders are often traded in large quantities. In the two-year period, 12,385 individuals were seized by the custom authorities from Chennai and Trichy international airports. Our monitoring of online traders suggest that these turtles were sold at low prices (₹30 to ₹40 per individual) from exporting countries, due to high availability, better survival rate, and small size suitable for transporting in large quantities.

### Zoonotic diseases and fatal snake bites associated with pet reptiles

Snake fungal diseases caused by *Ophidiomyces ophiodiicola* have been documented in the pet trade and are identified as responsible for the population decline of free ranging snakes in North America (Allender et al. 2015). Multiple disease outbreaks in chelonians due to ranavirus infections have been described in North America, Europe, and Asia (Duffus et al. 2015; Marschang et al. 2016). Global trade of reptiles and amphibians in combination with the wide host range of ranaviruses are suspected to have increased the emergence of these infections (Stöhr et al. 2013; Marschang et al. 2016).

*Iguana iguana* as pets have been identified as a source of Salmonella infections in humans (Sanyal et al. 1997; Warwick et al. 2001). Furthermore, several zoonotic diseases with high risk to humans such as neuroangiostrongyliasis, pentastomiasis, and sparganosis are transmitted from reptiles (Mendoza-Roldan et al. 2020). Annually, an estimated 50,000 people die of snake bites in India (Mohapatra et al. 2011). Importing venomous exotic pets and the danger of snake bites from these exotic species impose an unnecessary additional burden to the medical community.

### Key challenges and recommendations

We identify six main challenges arising from exotic reptile pet trade in India: 1. introduction of invasive species, 2. spread of diseases from exotic pets to native reptiles, 3. spread of zoonotic disease from exotic reptile pets to humans, 4. trade of highly threatened species poses serious conservation challenges, 5. trade of protected species in India under the cover of exotic pet trade, and 6. trade of highly venomous reptiles. Thus, it is essential to introduce corrective measures to stop illegal trade and regulate legal trade of exotic reptiles. Systematic monitoring of the pet trade online will be crucial to understand the extent of trade. India currently lacks systematic information on even the relatively better-known invasive reptiles; for example, the Red-eared Slider turtles is not listed as invasive species in India by the Global Invasive Species Database and there is only one record of this species in India Biodiversity Portal (IBP; Vattakaven 2016). Global citizen science initiative iNaturalist have 395 observations of this species in Singapore since September 2016 but only 34 records from India during the same time period (accessed on 17 February 2021). We need better documentation of introduced species in India and citizen science initiative like IBP and iNaturalist can be a useful platform to record and map distribution of such species. The general public





also need to be made aware of the damage inflicted to the native fauna and environment by releasing exotic reptiles (e.g., turtles). International trade of threatened species listed in Appendix I of CITES needs to be eradicated in India with more cyber patrolling.

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**Appendix 1.** List of exotic reptiles found in online trade in mainland India during our surveys (2018–2020). Note out of the total 70, 12 species are listed as threatened and seven species are vulnerable by the IUCN Red List. NA= Not available, IUCN Red List: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Least Concerned (LC).

Group	Family	Common Name	Scientific name	Native Country/region	IUCN Redlist category	CITES
lizards	Agamidae	Friiled dragons	<i>Chlamydosaurus kingii</i>	Australia	LC	NA
lizards	Agamidae	Flying lizard	<i>Draco</i> sp.	Unknown	LC	NA
lizards	Agamidae	Bearded dragon	<i>Pogona vitticeps</i>	Australia	LC	NA
lizards	Agamidae	Egyptian spiny-tailed lizard	<i>Uromastyx aegyptia</i>	North Africa/Middle east	VU	Appendix II
lizards	Anguillidae	Legless glass lizard	<i>Ophisaurus attenuatus</i>	United States	LC	NA
lizards	Chamaeleonidae	Chamaeleon	<i>Chamaeleo</i> sp.	Unknown	NA	Appendix II
lizards	Cordylidae	East African spiny-tailed lizard	<i>Cordylus tropidosternum</i>	East Africa	NA	Appendix II
lizards	Eublepharidae	Leopard gecko	<i>Eublepharis macularius</i>	Asia	NA	NA
lizards	Gekkonidae	Giant day gecko	<i>Phelsuma grandis</i>	Madagascar	LC	Appendix II
lizards	Iguanidae	Basilisk lizard	<i>Basiliscus basiliscus</i>	Colombia	LC	NA
lizards	Iguanidae	Spiny tail iguana	<i>Ctenosaura oaxacana</i>	Mexico	VU	Appendix II
lizards	Iguanidae	Rhinoceros Iguana	<i>Cyclura cornuta</i>	Caribbean Island of Hispaniola	EN	Appendix I
lizards	Iguanidae	Blue Iguana	<i>Cyclura lewisi</i>	Grand Cayman Island	EN	Appendix I
lizards	Iguanidae	Green Iguana	<i>Iguana iguana</i>	America, Brazil	LC	Appendix II
lizards	Agamidae	Chinese water dragon	<i>Physignathus cocincinus</i>	SE Asia	NA	NA
lizards	Scincidae	Monkey tailed skink	<i>Corucia zebrata</i>	Solomon Islands	NA	Appendix II
lizards	Scincidae	Axanthic blue-tongued skink	<i>Tiliqua gigas</i>	New Guinea and surrounding islands	LC	NA
lizards	Scincidae	Red-eyed crocodile skink	<i>Tribolonotus gracilis</i>	Papua New Guinea	LC	NA
lizards	Shinisauridae	Chinese crocodile lizard	<i>Shinisaurus crocodilurus</i>	China	EN	Appendix I
lizards	Teiidae	Rainbow whiptail	<i>Cnemidophorus lemniscatus</i>	Central & south America, Caribbean islands	LC	NA
lizards	Teiidae	Caiman lizard	<i>Dracaena guianensis</i>	Central & south America	LC	Appendix II
lizards	Teiidae	Argentine black and white tegu	<i>Salvator merianae</i>	South America	LC	Appendix II
lizards	Teiidae	Red tegu lizard	<i>Tupinambis rufescens</i>	South America	LC	Appendix II
lizards	Varanidae	Ridgetail monitor	<i>Varanus acanthurus</i>	Australia	LC	Appendix II
lizards	Varanidae	Savannah monitor lizard	<i>Varanus exanthematicus</i>	Africa	LC	Appendix II
lizards	Varanidae	Finsch's monitor lizard	<i>Varanus finschi</i>	New Guinea and Australia	LC	Appendix II
lizards	Varanidae	Mangrove monitor lizard	<i>Varanus indicus</i>	Papua New Guinea, Indonesia and Australia	LC	Appendix II
lizards	Varanidae	Peach-throated monitor lizard	<i>Varanus jobiensis</i>	Papua New Guinea, New Guinea and Indonesia	LC	Appendix II
lizards	Varanidae	Quince monitor lizard	<i>Varanus melinus</i>	Indonesia	LC	Appendix II
lizards	Varanidae	Argus monitor lizard	<i>Varanus panoptes</i>	Papua New Guinea, Indonesia and Australia	LC	Appendix II
lizards	Varanidae	Dampier peninsula goanna	<i>Varanus sparnus</i>	Australia	LC	Appendix II
Snakes	Boidae	Red tailed boa	<i>Boa constrictor</i>	South America	LC	Appendix II
Snakes	Boidae	Emerald tree boa	<i>Corallus caninus</i>	South America	LC	NA

Group	Family	Common Name	Scientific name	Native Country/region	IUCN Redlist category	CITES
Snakes	Boidae	Kenyan sand boa	<i>Eryx colubrinus</i>	Horn of Africa & NE Africa	LC	NA
Snakes	Boidae	Yellow anaconda	<i>Eunectes notaeus</i>	South America	NA	Appendix II
Snakes	Colubridae	Indonesian paradise gliding snake	<i>Chrysopeltes paradisi</i>	Southeastern Asia	LC	NA
Snakes	Colubridae	California kingsnake	<i>Lampropeltis getula californiae</i>	United States and Mexico	LC	NA
Snakes	Colubridae	Corn snake	<i>Pantherophis guttatus</i>	North American	NA	NA
Snakes	Elapidae	White lipped snake	<i>Drysdalia coronoides</i>	Australia and Tasmania	LC	NA
Snakes	Pythonidae	Bismarck ringed python	<i>Bothrochilus boa</i>	Papua New Guinea	LC	Appendix II
Snakes	Pythonidae	Blood python	<i>Python curtus</i>	Sumatra	LC	Appendix II
Snakes	Pythonidae	Ball Python	<i>Python regius</i>	West Sub Saharan Africa	LC	Appendix II
Snakes	Viperidae	Gaboon viper	<i>Bitis gabonica</i>	Central and West Sub Saharan Africa	LC	NA
Turtles	Carettochelyidae	Pig-nosed turtle	<i>Carettochelys insculpta</i>	Papua New Guinea	EN	Appendix II
Turtles	Chelidae	Swamp turtle	<i>Acanthochelys</i> sp.	South America	NA	NA
Turtles	Chelidae	Snake neck turtle	<i>Chelodina mccardi</i>	East Timor and Indonesia	CR	Appendix II
Turtles	Chelidae	Red matamata	<i>Chelus fimbriata</i>	South America	NA	NA
Turtles	Chelidae	Pink-bellied side-necked turtle	<i>Emydura subglobosa</i>	Australia and Papua New Guinea	LC	NA
Turtles	Chelydridae	Common snapping turtle	<i>Chelydra serpentina</i>	North America	LC	Appendix III
Turtles	Chelydridae	Alligator snapping turtle	<i>Macrochelys temminckii</i>	North America	VU	Appendix III
Turtles	Emydidae	Painted turtle	<i>Chrysemys picta</i>	North America	LC	NA
Turtles	Emydidae	Ornate wood turtle	<i>Glyptemys insculpta</i>	North America	EN	Appendix II
Turtles	Emydidae	Diamondback terrapin	<i>Malaclemys terrapin</i>	North America	VU	Appendix II
Turtles	Emydidae	Coastal plain cooter	<i>Pseudemys concinna floridana</i>	North America	NA	NA
Turtles	Emydidae	Eastern box turtle	<i>Terrapene carolina</i>	North America	VU	Appendix II
Turtles	Emydidae	Red eared slider	<i>Trachemys scripta elegans</i>	North America	LC	NA
Turtles	Emydidae	Yellow-bellied slider	<i>Trachemys scripta scripta</i>	North America	NA	NA
Turtles	Geoemydidae	Yellow-headed temple turtle	<i>Heosemys annandalii</i>	South East Asia	EN	Appendix II
Turtles	Geoemydidae	Spiny turtle	<i>Heosemys spinosa</i>	Indo-Burma, South East Asia	EN	Appendix II
Turtles	Geoemydidae	Reeve's turtle	<i>Mauremys reevesii</i>	China, Burma, South Korea, Japan	EN	Appendix III
Turtles	Geoemydidae	Chinese stripe-necked turtle	<i>Mauremys sinensis</i>	China, Laos and Vietnam	EN	Appendix III
Turtles	Kinosternidae	Razor back musk turtle	<i>Sternotherus carinatus</i>	North America	LC	NA
Turtles	Kinosternidae	Loggerhead musk turtle	<i>Sternotherus minor</i>	North America	LC	NA
Turtles	Kinosternidae	Musk turtle	<i>Sternotherus odoratus</i>	North America	LC	NA
Turtles	Testudinidae	Radiated tortoise	<i>Astrochelys radiata</i>	Madagascar	CR	Appendix I
Turtles	Testudinidae	African spurred tortoise	<i>Centrochelys sulcata</i>	Africa	VU	Appendix II
Turtles	Testudinidae	Red-footed tortoise	<i>Chelonoidis carbonaria</i>	South America	NA	NA
Turtles	Testudinidae	Pancake tortoise	<i>Malacochersus tornieri</i>	East Africa	CR	Appendix I
Turtles	Testudinidae	Leopard tortoise	<i>Stigmochelys pardalis</i>	East, South and horn of Africa	LC	NA
Turtles	Trionychidae	Chinese softshell turtle	<i>Pelodiscus sinensis</i>	China	VU	NA





Appendix 2. List of exotic reptiles seized by Customs/Enforcement Authority between March 2018– February 2020 arranged chronologically. NA= Not available, IUCN Red List: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Least Concerned (LC).

Date	Place of seizure	Group	Family	Common name	Scientific name	Native Country/region	Quantity	IUCN Redlist category	CITES
24-Mar-18	Guwahati, Assam	Snakes	Viperidae	Gaboon viper	<i>Bitis gabonica</i>	Sub-Sahara Africa	4	LC	NA
24-Mar-18	Guwahati, Assam	Snakes	Pythonidae	Reticulated pythons (Albino)	<i>Malayopython reticulatus</i>	South-east Asia	2	LC	Appendix II
24-Mar-18	Guwahati, Assam	Snakes	Colubridae	Corn Snakes	<i>Pantherophis</i> sp.	North America	13	NA	NA
24-Mar-18	Guwahati, Assam	Turtles	Testudinidae	African spurred tortoise	<i>Centrochelys sulcata</i>	Africa	2	VU	Appendix II
24-Mar-18	Guwahati, Assam	lizards	Agamidae	Central bearded dragon lizard	<i>Pogona vitticeps</i>	Australia	1	LC	NA
25-Mar-18	Chennai airport, Tamil Nadu	Snakes	Viperidae	Horned pit viper	<i>Cerastes cerastes</i>	Northern Africa	1	LC	NA
25-Mar-18	Chennai airport, Tamil Nadu	lizards	Iguanidae	Rhinoceros iguana	<i>Cyclura stejnegeri</i>	Hispaniola	2	EN	Appendix I
25-Mar-18	Chennai airport, Tamil Nadu	lizards	Iguanidae	Rock iguana	<i>Cyclura pinguis</i>	West Indies	3	CR	Appendix I
25-Mar-18	Chennai airport, Tamil Nadu	Turtles	Testudinidae	Egyptian tortoise	<i>Testudo kleinmanni</i>	Egypt & Libya	22	CR	Appendix I
25-Mar-18	Chennai airport, Tamil Nadu	lizards	Scincidae	Blue-tongued skink	<i>Tiliqua</i> sp.	Australia	4	LC	NA
6-Oct-18	Chennai, Tamil Nadu	Turtles	Testudinidae	African spurred tortoise	<i>Centrochelys sulcata</i>	Africa	2	VU	Appendix II
10-Oct-18	Chennai airport, Tamil Nadu	Turtles	Emydidae	Red eared slider turtle	<i>Trachemys scripta elegans</i>	North America	2300	NA	NA
28-Nov-18	Indore, Madhya Pradesh	Turtles	Testudinidae	African spurred tortoise	<i>Centrochelys sulcata</i>	Africa	6	VU	Appendix II
5-May-19	Malharganj, Indore, Madhya Pradesh	lizards	Iguanidae	Iguana	<i>Iguana iguana</i>	South & Central America	NA	LC	Appendix II
5-May-19	Malharganj, Indore, Madhya Pradesh	Turtles	Emydidae	Red eared slider turtle	<i>Trachemys scripta elegans</i>	North America	NA	NA	NA
21-Jul-19	Mumbai, Maharashtra	Crocodiles	Crocodylidae	Siamese crocodile	<i>Crocodylus siamensis</i>	Indonesia Thailand	21	CR	Appendix I
10-Oct-19	Chennai, Tamil Nadu	Snakes	Pythonidae	Green tree python	<i>Morelia viridis</i>	New Guinea	1	LC	Appendix II
10-Oct-19	Chennai, Tamil Nadu	Snakes	Pythonidae	Scrub python	<i>Morelia amethystina</i>	Australia	1	LC	Appendix II
10-Oct-19	Chennai, Tamil Nadu	lizards	Varanidae	Black tree monitor lizard	<i>Varanus beccarii</i>	Indonesia	2	DD	Appendix II
10-Oct-19	Chennai, Tamil Nadu	lizards	Varanidae	Emerald tree monitor lizard	<i>Varanus prasinus</i>	Australia & Indonesia	5	LC	Appendix II
10-Oct-19	Chennai, Tamil Nadu	lizards	Varanidae	Blue spotted tree monitor lizard	<i>Varanus macraei</i>	Indonesia	2	EN	Appendix II
10-Oct-19	Chennai, Tamil Nadu	lizards	Varanidae	Reisinger tree monitor lizard	<i>Varanus reisingeri</i>	Indonesia	1	DD	Appendix II
10-Oct-19	Chennai, Tamil Nadu	lizards	Agamidae	Salfin lizard	<i>Hydrosaurus pustulatus</i>	Philippine	4	VU	Appendix II
24-Nov-19	Trichy, Tamil Nadu	Turtles	Emydidae	Red eared slider turtle	<i>Trachemys scripta elegans</i>	North America	2829	NA	NA

Date	Place of seizure	Group	Family	Common name	Scientific name	Native Country/region	Quantity	IUCN Redlist category	CITES
8-Dec-19	Trichy, Tamil Nadu	Turtles	Emyidae	Red eared slider turtle	<i>Trachemys scripta elegans</i>	North America	4856	NA	NA
11-Dec-19	Thane, Maharashtra	lizards	Iguanidae	Iguana	<i>Iguana iguana</i>	South & Central America	2	LC	Appendix II
19-Dec-19	Chennai, Tamil Nadu	Turtles	Emyidae	Red eared slider turtle	<i>Trachemys scripta elegans</i>	North America	2400	NA	NA
22-Dec-19	Chennai, Tamil Nadu	lizards	Iguanidae	Blue Iguana	<i>Cyclura lewisi</i>	Cayman Islands	5	EN	Appendix I
20-Jan-20	Chennai, Tamil Nadu	lizards	Iguanidae	Blue Iguana	<i>Cyclura lewisi</i>	Cayman Islands	12	EN	Appendix I
20-Jan-20	Chennai, Tamil Nadu	lizards	Iguanidae	Green Iguana	<i>Iguana iguana</i>	South & Central America	NA	LC	Appendix II
20-Jan-20	Chennai, Tamil Nadu	lizards	Iguanidae	Yellow Iguana	<i>Iguana iguana</i>	South & Central America	NA	LC	Appendix II
30-Jan-20	Chennai, Tamil Nadu	lizards	Chamaeleonidae	Chameleon	<i>Chamaeleo</i> sp.	Africa	1	NA	Appendix II
31-Jan-20	Chennai, Tamil Nadu	lizards	Iguanidae	Green Iguana	<i>Iguana iguana</i>	South & Central America	1	LC	Appendix II



Appendix 3. Live reptiles imported into India for commercial and breeding purposes from 1976–2018 reported by CITES arranged chronologically. IUCN Red List: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) and Least Concerned (LC); NA= Not available; C= Animals bred in captivity: bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5, of the Convention; R= Ratched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood, W= Specimens taken from the wild, B= breeding in captivity, and T=c commercial purposes. Note there were no trade reported to CITES from 1976–1983 for commercial and breeding purposes.

Year	Group	Family	Common name	Scientific name	IUCN Redlist category	CITES	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Purpose	Source
1983	Crocodiles	Crocodylidae	Siamese Crocodile	<i>Crocodylus siamensis</i>	CR	Appendix I	United States of America	NA	0	6	T	NA
1983	Crocodiles	Alligatoridae	American Alligator	<i>Alligator mississippiensis</i>	LC	Appendix II	United States of America	NA	0	1	T	NA
1987	lizards	Iguanidae	Green Iguana	<i>Iguana iguana</i>	LC	Appendix II	Australia	NA	0	5	T	C
2000	Crocodiles	Crocodylidae	African Slender-Snouted Crocodile	<i>Medistaps cataphractus</i>	CR	Appendix I	Netherlands	NA	7	7	B	C
2000	Crocodiles	Alligatoridae	Spectacled Caiman	<i>Caiman crocodilus</i>	LC	Appendix II	Denmark	Netherlands	3	3	T	C
2000	Crocodiles	Alligatoridae	Dwarf Caiman	<i>Paleosuchus palpebrosus</i>	LC	Appendix II	Denmark	NA	6	6	T	C
2000	Crocodiles	Crocodylidae	Johnstone River Crocodile	<i>Crocodylus johnstoni</i>	LC	Appendix II	Denmark	Germany	2	3	T	C
2000	Turtles	Pelomedusidae	Helmeted Turtle	<i>Pelomedusa subrufa</i>	LC	Appendix III	Ghana	NA	0	50	T	W
2004	Turtles	Testudinidae	Bell's Hingeback Tortoise	<i>Kinixys belliana</i>	VU	Appendix II	Togo	NA	0	50	T	R
2004	Turtles	Testudinidae	Home's Hingeback Tortoise	<i>Kinixys homeana</i>	VU	Appendix II	Togo	NA	0	10	T	R
2010	Crocodiles	Alligatoridae	American Alligator	<i>Alligator mississippiensis</i>	LC	Appendix II	United Arab Emirates	United States of America	0	4	T	W
2011	Crocodiles	Alligatoridae	American Alligator	<i>Alligator mississippiensis</i>	LC	Appendix II	United Arab Emirates	United States of America	0	5	T	W
2012	Crocodiles	Alligatoridae	American Alligator	<i>Alligator mississippiensis</i>	LC	Appendix II	United Arab Emirates	United States of America	0	1	T	W
2013	Crocodiles	Alligatoridae	American Alligator	<i>Alligator mississippiensis</i>	LC	Appendix II	United Arab Emirates	United States of America	0	24	T	W
2014	Turtles	Testudinidae	Aldabra Giant Tortoise	<i>Aldabrachelys gigantea</i>	NA	Appendix II	Seychelles	NA	0	6	T	C
2016	Snakes	Pythonidae	Ball Python	<i>Python regius</i>	LC	Appendix II	Togo	NA	0	200	T	R
2017	lizards	Iguanidae	Rhinoceros Iguana	<i>Cyclura cornuta</i>	EN	Appendix I	Denmark	Spain	0	2	B	C
2017	lizards	Iguanidae	Rhinoceros Iguana	<i>Cyclura cornuta</i>	EN	Appendix I	Denmark	United Kingdom	0	1	B	C
2017	Snakes	Boidae	Green Anaconda	<i>Eunectes murinus</i>	NA	Appendix II	Denmark	NA	0	3	B	C
2017	Crocodiles	Crocodylidae	Nile Crocodile	<i>Crocodylus niloticus</i>	LC	Appendix II	Denmark	NA	0	3	B	C
2017	Snakes	Pythonidae	Ball Python	<i>Python regius</i>	LC	Appendix II	Denmark	Germany	0	3	B	C
2017	Snakes	Pythonidae	Ball Python	<i>Python regius</i>	LC	Appendix II	Ghana	NA	0	200	T	R
2017	Turtles	Testudinidae	African Spurred Tortoise	<i>Centrochelys sulcata</i>	VU	Appendix II	Ghana	NA	0	200	T	C
2017	lizards	Varanidae	Savannah Monitor	<i>Varanus exanthematicus</i>	LC	Appendix II	Ghana	NA	0	200	T	W
2018	Turtles	Testudinidae	African Spurred Tortoise	<i>Centrochelys sulcata</i>	VU	Appendix II	Ghana	NA	0	300	T	C





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#### Conservation Application

##### First attempt at rehabilitation of Asiatic Black Bear cubs to the wild in Thailand

– Robert Steinmetz, Worrapan Phumane, Runnappa Phoonjampa & Suthon Weingdow, Pp. 18411–18418

#### Communications

##### Status of Sumatran Tiger in the Berbak-Sembilang landscape (2020)

– Tomi Ariyanto, Yoan Dinata, Dwiyanto, Erwan Turyanto, Waluyo Sugito, Sophie Kirklin & Rajan Amin, Pp. 18419–18426

##### The diversity of small mammals in Pulau Perhentian Kecil, Terengganu, Malaysia

– Aminuddin Baqi, Isham Azhar, Ean Wee Chen, Faisal Ali Anwarali Khan, Chong Ju Lian, Bryan Raveen Nelson & Jayaraj Vijaya Kumaran, Pp. 18427–18440

##### Patterns, perceptions, and spatial distribution of human-elephant (*Elephas maximus*) incidents in Nepal

– Raj Kumar Koirala, Weihong Ji, Yajna Prasad Timilsina & David Raubenheimer, Pp. 18441–18452

##### Assessing spatio-temporal patterns of human-leopard interactions based on media reports in northwestern India

– Kaushal Chauhan, Arjun Srivathsa & Vidya Athreya, Pp. 18453–18478

##### Bat diversity in the Banpale forest, Pokhara, Nepal during spring season

– Prabhat Kiran Bhattarai, Basant Sharma, Anisha Neupane, Sunita Kunwar & Pratyush Dhungana, Pp. 18479–18489

##### A patho-microbiological study of tissue samples of the Greater Adjutant *Leptoptilos dubius* (Aves: Ciconiiformes: Ciconiidae) that died in Deeporbeel Wildlife Sanctuary, Assam, India

– Derhasar Brahma, Parikshit Kakati, Sophia M. Gogoi, Sharmista Doley, Arpita Bharali, Biswajit Dutta, Taibur Rahman, Saidul Islam, Arfan Ali, Siraj A. Khan, Sailendra Kumar Das & Nagendra Nath Barman, Pp. 18490–18496

##### Vaduvur and Sitheri lakes, Tamil Nadu, India: conservation and management perspective

– V. Gokula & P. Ananth Raj, Pp. 18497–18507

##### A new species of shieldtail snake (Squamata: Uropeltidae: Uropeltis) from the Bengaluru uplands, India

– S.R. Ganesh, K.G. Punith, Omkar D. Adhikari & N.S. Achyuthan, Pp. 18508–18517

##### A looming exotic reptile pet trade in India: patterns and knowledge gaps

– A. Pragatheesh, V. Deepak, H.V. Girisha & Monesh Singh Tomar, Pp. 18518–18531

##### Legal or unenforceable? Violations of trade regulations and the case of the Philippine Sailfin Lizard *Hydrosaurus pustulatus* (Reptilia: Squamata: Agamidae)

– Sarah Heinrich, Adam Toomes & Jordi Janssen, Pp. 18532–18543

##### Conservation breeding of Northern River Terrapin *Batagur baska* (Gray, 1830) in Sundarban Tiger Reserve, India

– Nilanjan Mallick, Shailendra Singh, Dibyadeep Chatterjee & Souritra Sharma, Pp. 18544–18550

##### Discovery of two new populations of the rare endemic freshwater crab *Louisea yabassi* Mvogo Ndongo, von Rintelen & Cumberlidge, 2019 (Brachyura: Potamonautidae) from the Ebo Forest near Yabassi in Cameroon, Central Africa, with recommendations for conservation action

– Pierre A. Mvogo Ndongo, Thomas von Rintelen, Christoph D. Schubart, Paul F. Clark, Kristina von Rintelen, Alain Didier Missoup, Christian Albrecht, Muriel Rabone, Efole Ewoukem, Joseph L. Tamesse, Minette Tomedi-Tabi Eyango & Neil Cumberlidge, Pp. 18551–18558

##### Checklists of subfamilies Dryptinae and Panagaeinae (Insecta: Coleoptera: Carabidae) from the Indian subcontinent

– V.A. Jithmon & Thomas K. Sabu, Pp. 18559–18577

##### Mantids (Insecta: Mantodea) of Uttar Pradesh, India

– Ramesh Singh Yadav & G.P. Painkra, Pp. 18578–18587

##### An assessment of genetic variation in vulnerable Borneo Ironwood *Eusideroxylon zwageri* Teijsm. & Binn. in Sarawak using SSR markers

– Siti Fatimah Md.-Isa, Christina Seok Yien Yong, Mohd Nazre Saleh & Rusea Go, Pp. 18588–18597

#### Review

##### Termites (Blattodea: Isoptera) of southern India: current knowledge on distribution and systematic checklist

– M. Ranjith & C.M. Kalleshwaraswamy, Pp. 18598–18613

#### Short Communications

##### Population status and distribution of Ibisbill *Ibidorhyncha struthersii* (Vigors, 1832) (Aves: Charadriiformes: Ibidorhynchidae) in Kashmir Valley, India

– Iqam Ul Haq, Bilal A. Bhat, Khurshed Ahmad & Asad R. Rahmani, Pp. 18614–18617

##### A new fish species of genus *Garra* (Teleostei: Cyprinidae) from Nagaland, India

– Sophiya Ezung, Bungdon Shangningam & Pranay Punj Pankaj, Pp. 18618–18623

##### Occurrence of Tamdil Leaf-litter Frog *Leptobrachella tamdil* (Sengupta et al., 2010) (Amphibia: Megophryidae) from Manipur, India and its phylogenetic position

– Ht. Decemson, Vanlalsiammawii, Lal Biakzuala, Mathipi Vabeiryureilai, Fanai Malsawmdawngliana & H.T. Lalremanga, Pp. 18624–18630

##### Further additions to the Odonata (Insecta) fauna of Asansol-Durgapur Industrial Area, Paschim Bardhaman, India

– Amar Kumar Nayak & Subhajit Roy, Pp. 18631–18641

##### A note on the ecology and distribution of Little Bloodtail *Lyriothemis acigastra* Brauer, 1868 (Insecta: Odonata: Libellulidae) in Kerala, India

– Jeevan Jose, Muhamed Sherif & A. Vivek Chandran, Pp. 18642–18646

#### Viewpoint

##### A unique archetype of conservation in Himachal Pradesh, western Himalaya, India

– Rupali Sharma, Monika Sharma, Manisha Mathela, Himanshu Bargali & Amit Kumar, Pp. 18647–18650

#### Notes

##### A camera trap record of Asiatic Golden Cat *Catopuma temminckii* (Vigors & Horsfield, 1827) (Mammalia: Carnivora: Felidae) in State Land Forest, Merapoh, Pahang, Malaysia

– Muhamad Hamirul Shah Ab Razak, Kamarul Hambali, Ainaa Amir, Norashikin Fauzi, Nor Hizami Hassin, Muhamad Azahar Abbas, Muhammad Firdaus Abdul Karim, Ai Yin Sow, Lukman Ismail, Nor Azmin Huda Mahamad Shubli, Nurul Izzati Adanan, Ainur Izzati Bakar, Nabihah Mohamad, Nur Izyan Fathiah Saimhe, Muhammad Syafiq Mohamad Nor, Muhammad Izzat Hakimi Mat Nafi & Syafiq Sulaiman, Pp. 18651–18654

##### Reappearance of Dhole *Cuon alpinus* (Mammalia: Carnivora: Canidae) in Gujarat after 70 years

– A.A. Kazi, D.N. Rabari, M.I. Dahya & S. Lyngdoh, Pp. 18655–18659

##### Mating behavior of Eastern Spotted Skunk *Spilogale putorius* Linnaeus, 1758 (Mammalia: Carnivora: Mephitidae) revealed by camera trap in Texas, USA

– Alexandra C. Avrin, Charles E. Pekins & Maximillian L. Allen, Pp. 18660–18662

##### Record of Indian Roofed Turtle *Pangshura tecta* (Reptilia: Testudines: Geoemydidae) from Koshi Tappu Wildlife Reserve, Nepal

– Ashmita Shrestha, Ramesh Prasad Sapkota & Kumar Paudel, Pp. 18663–18666

##### Additional distribution records of *Zimiris doriae* Simon, 1882 (Araneae: Gnaphosidae) from India

– Dhruv A. Prajapati, Pp. 18667–18670

##### Notes on new distribution records of *Euspa motokii* Koivaya, 2002 (Lepidoptera: Lycaenidae: Theclinae) from Bhutan

– Jigme Wangchuk, Dhan Bahadur Subba & Karma Wangdi, Pp. 18671–18674

##### New distribution records of two little known plant species, *Hedychium longipedunculatum* A.R.K. Sastry & D.M. Verma (Zingiberaceae) and *Mazus dentatus* Wall. ex Benth. (Scrophulariaceae), from Meghalaya, India

– M. Murugesan, Pp. 18675–18678

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