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SHORT COMMUNICATION

DISTRIBUTION AND POPULATION STATUS OF SAMBAR *RUSA UNICOLOR* (MAMMALIA: CETARTIODACTYLA: CERVIDAE) FROM ARAVALLI LANDSCAPE WITH A NOTE ON ITS FIRST RECORD FROM ARAVALLI HILLS OF HARYANA, INDIA

Paridhi Jain, Anchal Bhasin, Gautam Talukdar & Bilal Habib

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DISTRIBUTION AND POPULATION STATUS OF SAMBAR *RUSA UNICOLOR* (MAMMALIA: CETARTIODACTYLA: CERVIDAE) FROM ARAVALLI LANDSCAPE WITH A NOTE ON ITS FIRST RECORD FROM ARAVALLI HILLS OF HARYANA, INDIA

Paridhi Jain¹ , Anchal Bhasin² , Gautam Talukdar³ & Bilal Habib⁴

^{1,2,3,4} Wildlife Institute of India, Chandrabani, Dehradun, Uttarakhand 248001, India
¹ paridhi.jain1234@gmail.com, ² anchalbhasin1310@gmail.com, ³ gautam@wii.gov.in, ⁴ bh@wii.gov.in (corresponding author)

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Abstract: Sambar is the most widespread deer in Southeastern Asia and is listed as Vulnerable in the IUCN Red List. In this communication, we report the results of an extensive literature review and camera trapping to present the historic and current distribution of Sambar in Aravalli Mountain region. The records state that the species is nearly exterminated in the protected areas of Gujarat Aravalli and bordering areas of Rajasthan, although a sizable population still survives in northern and central Aravalli (Pali-Rajasamand-Udaipur & Alwar-Sawai Madhopur region). We also report the first record of Sambar from the Aravalli Hill region of Haryana.

Keywords: Aravalli, Sambar, distribution, population.

Rusa unicolor was listed as Vulnerable in 2008 by IUCN due to rapid declines in several of its populations (Timmins et al. 2015). The Wildlife (Protection) Act, 1972 lists this species in Schedule III. The main reasons for its declining populations are attributed to habitat loss and poaching (Timmins et al. 2015).

Distribution in southeastern Asia and India

Rusa unicolor is native to southern and southeastern Asia and its distribution extends to India (Menon 2009), Sri Lanka (Eisenburg & Lockhart 1972), southern Nepal (Mishra 1982), Myanmar (Tun Yin 1967), southern China (Smith et al. 2010), Indonesia, Philippines (Prater 1971), and the islands of Borneo, Taiwan, and Hainan (Hsu & Agoramorthy 1997). Its distribution, however, has decreased substantially and it is now rare in Malaysia (Timmins et al. 2015), Thailand (Ngampongsoi 1987), Vietnam (Khun & Kan 1991), Bangladesh (Basbar et al. 2001), and Laos (Timmins & Evans 1996).

Sambar has been reported from several protected areas of India and has been intensively studied in Sariska (Chatterjee et al. 2014), Mundanthurai (Johnsingh & Sankar 1991), Rajaji National Park (Bhatnagar 1991), Ranthambore Tiger Reserve (Goswamy 2011), Corbett National Park (Pant et al. 1999), Gir National Park (Jhala et al. 2004), Periyar Tiger Reserve (Harikumar et al. 1999), Kanha National Park (Porwal et al. 1996), Bandipur

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Competing interests: The authors declare no competing interests.

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National Park (Johnsingh 1983), Nagarhole National Park (Karanth & Sunquist 1992), and Pench Tiger Reserve (Biswas & Sankar 2002) in India.

MATERIALS AND METHODS

Study area description

Aravallis extend from -Gujarat and Rajasthan in the southwest and to Haryana and Delhi in the northeast. The study area selected was the Aravalli region of the Haryana landscape, which lies between 28.58°N–27.65°N & 75.91°E–77.16°E (Fig. 1). Haryana is bound by Aravalli in the south-west region. The northern point of the range continues as isolated hills and rocky ridges into Haryana State, ending in Delhi. The famous Delhi Ridge is the last leg of the Aravalli range, which traverses through southern Delhi and terminates in central Delhi where Raisina Hill is its last extension. Sites in five divisions, namely, Mahendragarh, Rewari, Faridabad, Gurgaon, and Mevat, were extensively surveyed for mapping land use area/ land cover pattern and the status of key wildlife species.

Field data collection

Sign surveys and line transects were conducted in

51 sampling sites spread over five forest divisions for a period of four months (January–April 2016). Vegetation variables like floral diversity were also recorded to compare the habitat characteristics of each site. Opportunistic camera trapping was later conducted in October 2016 in two districts: Gurgaon and Faridabad. To get basic insights into the presence of mammalian species in the region, 360 camera trap nights (12 cameras for 30 days) were deployed. The sites selected to put cameras were Bhondsi (one), Gamroj (one), Manger (four), Bandhwari (two), Wazirabad (two), Gothda (one), and Anagpur (one).

There is currently no reliable and detailed information on the distribution of Sambar from the entire extent of Aravalli hill range. In the absence of such ecological information, proper research and management is difficult. Hence, to fill the information gap, records on the distribution of Sambar in three states, Rajasthan, Gujarat, and Haryana, were collected and compiled. No records of the natural population from Delhi NCR have been reported as of now. Though there are occasional records of Sambar sightings and rescue operations from Delhi NCR (Anonymous 2016), these do not confirm the areas where they actually occur. Present numbers

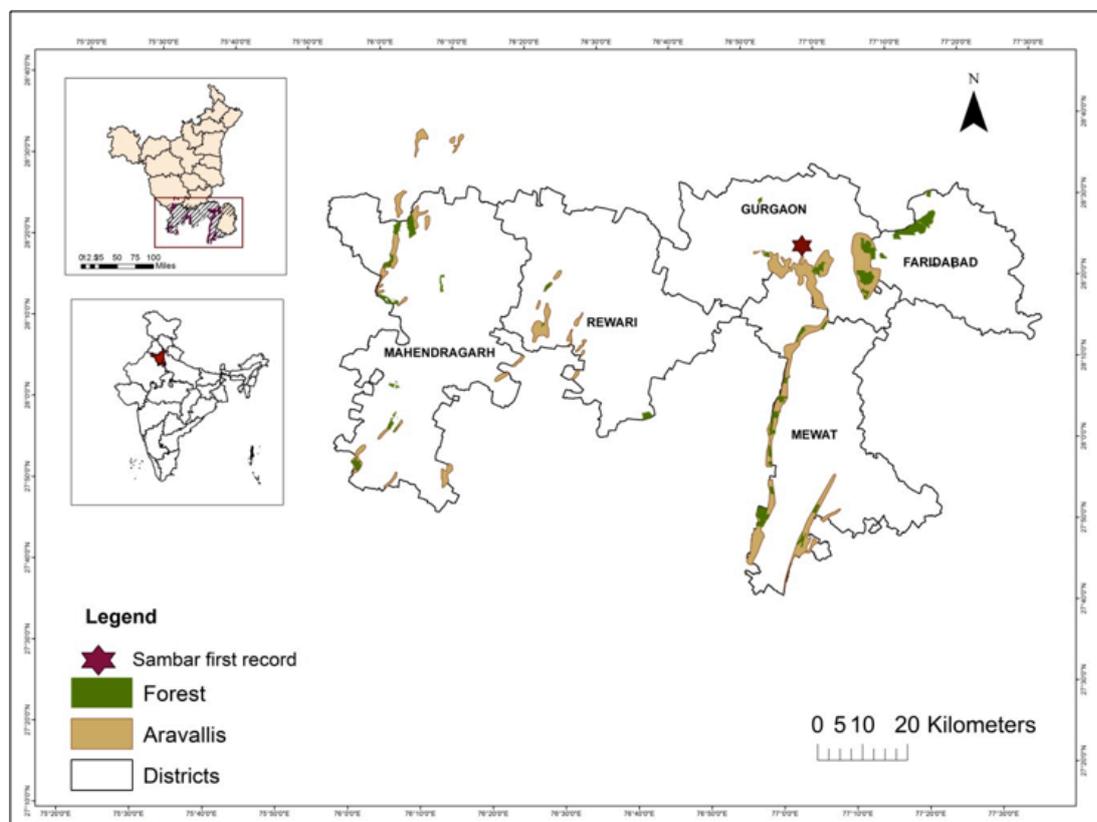


Figure 1. Map showing first record of Sambar from Aravallis in Gurgaon District, Haryana

and early records were collected from census records of respective forest departments, state gazetteers, and available publications.

RESULTS

First record of Sambar from Aravallis Haryana in Gurgaon District

Images of *Rusa unicolor* on two consecutive days in October were recorded from Bhondsi Village in Sohna (Fig. 1 & Image 1). Bhondsi in Gurgaon District has an extremely rich forest habitat which still remains ignored by conservationists. Until now, *Rusa unicolor* in Haryana had been reported only from the Shivallik ranges (northern Haryana). They are known to occur in Morni Hills in Panchkula District (Anonymous 1892) and Kalesar National Park in Yamunanagar District (Habib et al. 2015). This postulates for more intensive monitoring of the species and its distributional status.

Distribution range from Aravalli Hill range

The Aravalli extends its northeastern portion to Gujarat covering the districts Banaskantha, Sabarkantha, Aravalli, Dahod, Panchmahal, and Vadodra. *Rusa unicolor*, although present in large numbers earlier, has disappeared from this region of Aravalli Hills. Jumbugodha Wildlife Sanctuary abounded in Sambar but now they have gone extinct. Jumbugodha area was managed by an old state ruler. Tigers, panthers, sambars, deer, bears, wild boars, and antelopes were present here (Mehta et al. 2002). Earlier records have been reported

from districts Banaskantha (Ryley 1914), Sabarkantha (Rajyagaor 1974), Panchmahal (Patel 1972), and Vadodra (Anonymous 1979). Description of Sambar from Jessore Wildlife Sanctuary in the faunal list has been described in a booklet released by Gujarat Forest Department (Anonymous 1984).

The Aravalli mountain range in Rajasthan is spread across districts Ajmer, Alwar, Bhilwara, Dungarpur, Jaipur, Jhunjhunu, Nagaur, Pali, Rajsamand, Sawai Madhopur, Sikar, Sirohi, Chittorgarh, Pratapgarh, Banswara, and Udaipur (Fig. 2). This is the most studied region in Aravalli in terms of the ecology of *Rusa unicolor*. Records of Sambar exist in several protected areas of the state and in some places they have been intensively studied by biologists. Currently, a healthy population exists in Ranthambore National Park, Sariska Wildlife Sanctuary, Keoladeo National Park, Darrah Wildlife Sanctuary, Mount Abu Wildlife Sanctuary, Kumbalgadh Wildlife Sanctuary, Sitamata Wildlife Sanctuary, Nahargarh Wildlife Sanctuary, Jamwa Ramgarh Wildlife Sanctuary, Todgarh-Raoli Wildlife Sanctuary, Mrigwan Chittorgarh Forest, Sawai Mansingh Wildlife Sanctuary, Sajjangarh Wildlife Sanctuary, National Chambal Wildlife Sanctuary, Ramgarh Vishdhari Wildlife Sanctuary, Kaila Devi Wildlife Sanctuary, and Jawahar Sagar Wildlife Sanctuary (Table 1).

In certain protected areas, however, the population of Sambar has been locally exterminated. Fauna of protected areas of Rajasthan and Gujarat by Zoological Survey of India (Kumar 2012) stated its presence in



Image 1. Camera trap photos of Sambar from Bhondsi, Gurgaon. © Paridhi Jain

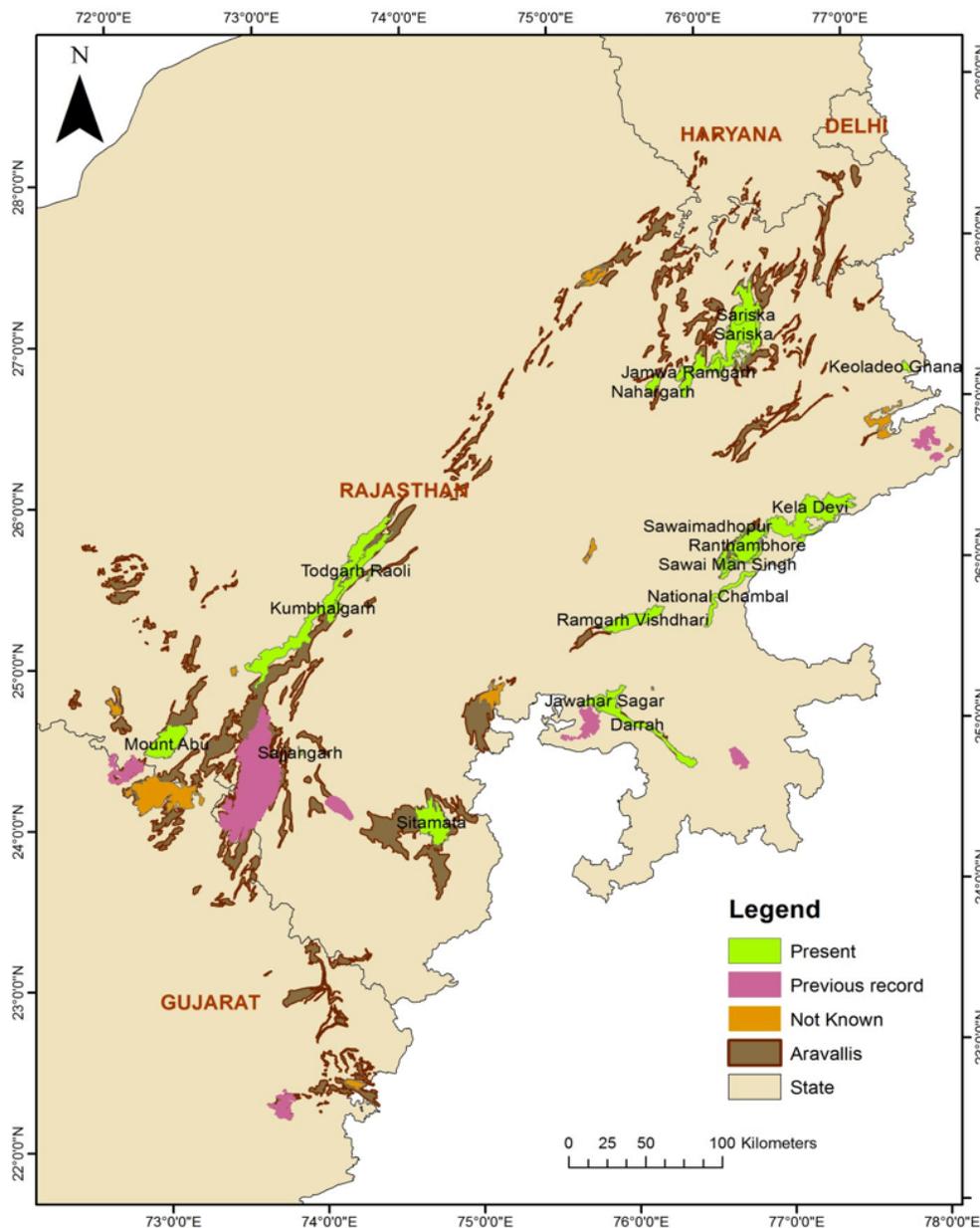


Figure 2. Current and historic range of Sambar from protected areas of Aravalli landscape

sanctuaries such as Bhainsrodgarh, Shergarh, Ramsagar, and Van Vihar (Table 1). Wildlife census of Rajasthan records (2011–2017) suggests this species is now absent from these areas. According to census records, Sambar was last recorded in Bhainsrodgarh in 2010 (n=2) and in Ramsagar (n=29), Shergarh (n=36), and Van Vihar (n=23) in 2007. Although the census record states that Sambar is extinct from Phulwari Ki Nal Wildlife Sanctuary, one record exists in biodiversity assessment survey by FES in 2010 (Anonymous 2010b). Sambar once also existed in Jaisamand Wildlife Sanctuary and got exterminated around 1997 (Dubey 2011). The last record of Sambar in

Jaisamand as per wildlife census is of 1995 (n=5).

Aravalli region of Haryana exists in districts Gurgaon, Faridabad, Mewat, Mahendargarh, Rewari; some remnants of the range also exist in Bhiwani. The habitat in this region is declining rapidly due to rapid deforestation and development activities. The forests in the state are the least studied in the entire extent of the Aravalli hills. So far no records of any sighting of Sambar exist in this region. The record -stated above (Image 1) is the only present record from Aravalli region of Haryana.

Table 1. Records of Sambar from Aravallis extent

Rajasthan (Aravallis)					
	Protected area	District	Present status	Current population estimate	Literature cited
1	Bhainsrodgarh WS	Chittaurgarh	Extinct (PR)*	0	Kumar 2012; Forest dpt. Census (Anonymous 2010a)
2	Darrahs WS	Kota	Exist	96	Forest dpt. Census 2013 (Anonymous 2011-2017)
3	Jaisamand WS	Udaipur	Extinct (PR)*	0	Forest dpt. Census (Anonymous 1995)
4	Jamwa Ramgarh WS	Jaipur	Exist	15	Forest dpt. Census 2016 (Anonymous 2011-2017)
5	Jawahar Sagar WS	Kota	Exist	2	Forest dpt. Census 2013 (Anonymous 2011-2017)
6	Kaila Devi WS	Sawai Madhopur	Exist	28	Forest dpt. Census 2013(Anonymous 2011-2017)
7	Keoladeo Ghana NP	Bharatpur	Exist	81	Forest dpt. Census 2016 (Anonymous 2011-2017)
8	Kumbalgadh WS	Rajsamand, Pali, & Udaipur	Exist	337	Forest dpt. Census 2016(Anonymous 2011-2017)
9	Mount Abu WS	Sirohi	Exist	90	Forest dpt. Census 2016 (Anonymous 2011-2017)
10	Mrigwan Chittorgarh Forest	Chittaurgarh	Exist	14	Forest dpt. Census 2016(Anonymous 2011-2017)
11	Nahargarh WS	Jaipur	Exist	15	Forest dpt. Census 2016(Anonymous 2011-2017)
12	National Chambal WS	Kota	Exist	11	Forest dpt. Census 2016 (Anonymous 2011-2017)
13	Phulwari Ki Nal WS	Udaipur	Extinct (PR)*	0	FES (Anonymous 2010b)
14	Ramgarh Vishdhari WS	Bundi	Exist	10	Forest dpt. Census 2016 (Anonymous 2011-2017)
15	Ramsagar WS	Dhaulpur	Extinct (PR)*	0	Kumar 2012; Forest Dept. Census (Anonymous 2007)
16	Ranthambore NP	Sawai Madhopur	Exist	25.67 (D) [#]	Jhala et al. 2015
17	Sajjanganh WS	Udaipur	Exist	10	Forest dpt. Census 2016 (Anonymous 2011-2017)
18	Sariska NP	Alwar	Exist	13.86 (D) [#]	Jhala et al. 2015
19	Sawai Mansingh WS	Sawai Madhopur	Exist	764	Forest dpt. Census 2012 (Anonymous 2011-2017)
20	Shergarh WS	Baran	Extinct (PR)*	0	Kumar 2012; Forest Dept. Census (Anonymous 2007)
21	Sitamata WS	Chittaurgarh, Udaipur	Exist	6	Forest. dpt. Census 2016 (Anonymous 2011-2017)
22	Todgad Raoli WS	Ajmer, Pali, Rajsamand	Exist	102	Forest dpt. Census 2016(Anonymous 2011 -2017)
23	Van Vihar WS	Dholpur	Extinct (PR)*	0	Kumar 2012; Forest dpt. Census (Anonymous 2007)
Gujarat (Aravallis)					
1	Jessore WS	Banaskantha	Extinct (PR)*	0	Gujarat Forest Dept. (Anonymous 1984)
2	Not known	Banaskantha	Extinct (PR)*	0	Ryley 1914
3	Not known	Vadodara	Extinct (PR)*	0	Gujarat State Gazetteer (Anonymous 1979)
4	Jambugodha WS	Panchmahal	Extinct (PR)*	0	Mehta et al. 2002; Patel 1972
5	Not known	Sabarkantha	Extinct (PR)*	0	Rajyagor 1974
Haryana (Aravallis)					
1	Bhonds	Gurgaon	Present	Not known	Present study

(PR)* = previously recorded; (D)[#] = density per sq.km

DISCUSSION

Aravalli in Haryana still remains one of the least studied landscapes. It has been recognized as a potential habitat for diverse species of biodiversity. It has been facing massive deforestation and denudation over the last decades. The forests of Aravalli range in Haryana are now the most degraded forests in India — most of the indigenous plant species here have disappeared; however, these areas are biologically rich and support

unique elements of flora and fauna. The presence of Sambar in Aravalli landscape of Haryana signifies that the area still harbours important wildlife species that warrants immediate protection. It gives direction for future research studies to systematically monitor and identify the still undiscovered mammalian biodiversity. These ancient mountains hold several threatened species (Habib et al. 2017) that need urgent conservation programs.

REFERENCES

- Anonymous (1892).** Reprint of Ambala District Gazetteer, 1892. Revenue Department, Chandigarh, India, 155pp.
- Anonymous (1979).** Gujarat State Gazetteers. Vadodara District. Govt. Printing, Stationary and Publications, Ahmadabad, India, 413pp.
- Anonymous (1984).** Sanctuaries and National Parks of Gujarat. Wildlife Wing, Gujarat Forest Department, India, 14pp.
- Anonymous (1995).** Wild Animals Census Year 1995. Rajasthan Forest Department, Jaipur, India, 2pp.
- Anonymous (2007).** Wildlife Census Year - July 2007. Inside Protected areas vs. Outside Protected Areas. Rajasthan Forest Department, Jaipur, India, 6pp.
- Anonymous (2010a).** Wildlife Census Year-2010 Inside Protected areas. Compiled under Rajasthan Forest Department, Jaipur, India, 3pp.
- Anonymous (2010b).** Assessment of Biodiversity in Phulwari Ki Nal Wildlife Sanctuary: a conservation perspective, Foundation for Ecological Security, 79pp.
- Anonymous (2011-2017).** Wild Animal Census Year 2011-2017. Rajasthan Forest Department, Jaipur, India, 5pp.
- Anonymous (2016).** Sambar deer rescued in Delhi, presence surprises experts December 1 2016. Downloaded on 5 March 2018; Retrieved from <http://www.punjabtribune.com/news/14801-sambar-deer-rescued-in-delhi-presence-surprises-experts.aspx>
- Basbar, M.A., F. Begum & K.K. Mondal (2001).** Sambar deer breeding in captivity in Dulahazra Safari (Managed National Reserve), Bangladesh. *Tigerpaper* 28: 21–23.
- Bhatnagar, Y.V. (1991).** Habitat preference of sambar (*Cervus unicorn*) in Rajaji National Park. MSc Dissertation. Saurashtra University, Rajkot, 51pp.
- Biswas, S. & K. Sankar (2002).** Prey abundance and food habit of tigers (*Panthera tigris tigris*) in Pench National Park, Madhya Pradesh, India. *Journal of Zoology* 256(3): 411–420; <https://doi.org/10.1017/S0952836902000456>
- Chatterjee, D., K. Sankar, Q. Qureshi, P.K. Malik & P. Nigam (2014).** Ranging pattern and habitat use of sambar (*Rusa unicorn*) in Sariska Tiger Reserve, Rajasthan, western India. *DSG Newsletter* 26: 60–71.
- Dubey, S. (2011).** The study of biodiversity of Jaisamand Wildlife Sanctuary, its conservation problems and solutions. Ph.D. Thesis. Mohanlal Sukhadia University, 518pp.
- Eisenberg, J.F. & M. Lockhart (1972).** An ecological reconnaissance of Wilpattu National Park, Ceylon. *Smithsonian Contribution to Zoology* 101: 1–118.
- Goswamy, A. (2011).** Habitat and food resources use in relation to sex, age and group size in Sambar (*Rusa unicorn*) during winter in dry tropical deciduous habitat of Ranthambhore Tiger Reserve, India. M.Sc. dissertation. Saurashtra University, Rajkot, 94pp.
- Habib, B., G. Talukdar, S. Lyngdoh, B. Pandav, P. Nigam, A. Kaur, P. Ghaskadbi & R.M. Zaffar (2015).** Ecological status of the leopard (*Panthera pardus*) in Kalesar National Park, Haryana, India. Project Completion Report. Haryana Forest Department & Wildlife Institute of India, 52pp.
- Habib, B., G. Talukdar, P. Jain, & A. Bhasin (2017).** Mapping landuse/landcover patterns in Aravallis Haryana with special reference to key wildlife species. Project Completion Report. Wildlife Institute of India, Dehradun & Haryana Forest Department, 97pp.
- Harikumar, G., B. Thomas, K.J. Joseph & V.J. Zacharias (1999).** Population dynamics of Sambar *Cervus unicorn*, in Periyar Tiger Reserve. *Indian Forester* 125(10): 995–1003.
- Hsu, M.J., & G. Agoramoorthy (1997).** Wildlife conservation in Taiwan. *Conservation Biology* 11: 834–836.
- Jhala, Y.V., K.S. Chauhan & S. Mukherjee (2004).** Monitoring age and sex composition, group size and condition of chital and sambar, pp36–43. In: Jhala, Y.V. (ed.). *Monitoring of Gir: a technical report submitted to the Gujarat Forest Department under GEF-India Eco-development Program*. Wildlife Institute of India, Dehradun, India.
- Jhala, Y.V., Q. Qureshi & R. Gopal (2015).** The status of tigers in India 2014. National Tiger Conservation Authority, New Delhi and Wildlife Institute of India, Dehradun, 28pp.
- Johnsingh, A.J.T. (1983).** Large mammalian prey-predators in Bandipur. *Journal of the Bombay Natural History Society* 80: 1–57.
- Johnsingh, A.J.T. & K. Sankar (1991).** Food plants of chital, sambar and cattle on Mundanthurai Plateau, Tamil Nadu, south India. *Mammalia* 55(1): 57–66.
- Karanth, K.U. & M.E. Sunquist (1992).** Population structure, density and biomass of large herbivores in the tropical forests of Nagarhole, India. *Journal of Tropical Ecology* 8(1): 21–35.
- Khun, D.Z. & L.S. Kan (1991).** Populations of some mammals in the sclerophyllous evergreen tropic forests near Konhkanyng (South Vietnam). *Zoologicheskii Zhurnal* 70: 114–118.
- Kumar, S. (2012).** Fauna of the Protected Areas of Rajasthan and Gujarat. The Director, ZSI, Kolkata, 14pp.
- Mehta S.K., A.K. Varshney, M. Aggarwal, R.N. Tripathi & G.A. Patel (2002).** Management Plan Jambughodha Wildlife Sanctuary 2002–2011. Forest Department, Gujarat, India, 75pp.
- Menon, V. (2009).** *Mammals of India*. Princeton University Press, Princeton, New Jersey, 200pp.
- Mishra, H.R. (1982).** The ecology and behaviour of Chital (*Axis axis*) in the Royal Chitwan National Park, Nepal (with comparative studies of Hog Deer (*Axis porcinus*), Sambar (*Cervus unicorn*) and Barking Deer (*Muntiacus muntjak*)). Ph.D. Thesis. University of Edinburgh, Edinburgh, 282pp.
- Ngampongsai, C. (1987).** Habitat use by the Sambar (*Cervus unicorn*) in Thailand: a case study for Khao- Yai National Park, pp. 289–299. In: Wempe, C.M. (ed.). *Biology & Management of the Cervidae*. Smithsonian Institution Press, Washington D.C., U.S., 577pp.
- Pant, A., S.G. Chavan, P.S. Roy & K.K. Das (1999).** Habitat analysis for sambar in Corbett National Park using remote sensing and GIS. *Journal of the Indian Society of Remote Sensing* 27(3): 133–139; <https://doi.org/10.1007/BF02991566>
- Patel, G.D. (1972).** Gujarat District Gazetteers. PanchMahal. Directorate of Government Printing, Stationery and Publications, Ahmedabad, India, 400pp.
- Porwal, M.C., P.S. Roy & V. Chellamuthu (1996).** Wildlife habitat analysis for ‘sambar’ (*Cervus unicorn*) in Kanha National Park using remote sensing. *International Journal of Remote Sensing* 17(14): 2683–2697; <https://doi.org/10.1080/01431169608949100>
- Prater, S.H. (1971).** *The Book of Indian Animals Vol. 2*. Bombay Natural History Society, Bombay, India, 324pp.
- Rajyagar, S.B. (1974).** Gujarat State Gazetteers, Sabarkantha District. Gujarat Government Publishing Depot, Ahmedabad, India, 315pp.
- Ryley, K.V. (1914).** Bombay Natural History Society’s Mammal Survey of India, Burma and Ceylon, Report No. 12.1. *Journal of the Bombay Natural History Society* 22: 684–699.
- Sankar, K. (1994).** The ecology of three large sympatric herbivores (Chital, Sambar, Nilgai) with special reference to reserve management in Sariska Tiger Reserve, Rajasthan. PhD Thesis. University of Rajasthan, Jaipur, 190pp.
- Smith, A.T., Y. Xie, R.S. Hoffmann, D. Lunde, J. MacKinnon, D.E. Wilson & W.C. Zozencraft (eds.) (2010).** *A guide to the mammals of China*. Princeton University Press. New Jersey, 451–480pp.
- Timmins, R.J. & T.D. Evans (1996).** *A Wildlife and Habitat Survey of the Nakai-Nam Theun National Biodiversity Conservation Area, Khammouan and Bolikhamsai Provinces*. Wildlife Conservation Society, Vientiane, LaoPDR, 59pp.
- Timmins, R., K. Kawanishi, B. Gimán, A. Lynam, B. Chan, R. Steinmetz, H.S. Baral & N.S. Kumar (2015).** *Rusa unicorn*. In: The IUCN Red List of Threatened Species 2015: e.T41790A85628124. Downloaded on 11 January 2018; <https://doi.org/10.2305/IUCN.UK.2015-2.RLTS.T41790A22156247.en>
- Tun Yin, U. (1967).** *Wild Animals of Burma*. Rangoon Gazette Limited, Rangoon, Burma, 301pp.





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