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Presence of Indian Star Tortoise in Jambughoda Wildlife Sanctuary, Gujarat, India

On 26 September 2021, we were exploring the forests of Jambughoda Wildlife Sanctuary, Panchmahal, Gujarat, India, during one of our periodic visits. We came across a large specimen of Indian Star Tortoise *Geochelone elegans* while exploring the thickets around the Bhat region. We observed the tortoise's movement as it walked down hill (22.409 N; 73.623 E) and entered an agricultural field. Upon close examination, we discovered that it was an adult female and then recorded its body measurements and weight (Table 1). The tortoise's age was then assessed based on the number of growth rings marked on carapacial shields (Vyas 2011). We also



A large female Indian Star Tortoise *Geochelone elegans* from Bhat, Jambughoda Wildlife Sanctuary, Gujarat, India. © Mital R. Patel

noted that the Bhat forest is located on the eastern edge of the sanctuary, towards the reserved forest areas of Pavagadh Hills. The Indian Star Tortoise

(IST) is a medium-sized, herbivorous terrestrial diurnal tortoise widely distributed across the Indian subcontinent. The species is primarily found in dry



The western population of Indian Star Tortoise *Geochelone elegans* can be distinguished by its size and radial markings of the dorsal shell; the dorsal aspect (A), ventral aspect (B), and lateral aspect (C). © Mital R. Patel

deciduous scrub forests, grasslands, coastal scrub lands, and arid to semi-arid regions. The geographical distributional pattern of the species clearly illustrates that it is discretely distributed into three sub-populations, i.e., two separate populations on the mainland and the third endemic to the

island of Sri Lanka. The mainland population is further differentiated into two separate populations.

Tortoises found in the northern regions of the subcontinent are relatively larger in size and darker. Comparatively, the southern counterparts are smaller with an evitable contrast and sharper patterns (Frazier 1992). At the same time, the third sub-population from Sri Lanka features specimens that mostly resemble the southern “type” but are much bigger. They also show brighter yellowish radiating lines in their carapacial markings compared to the Indian variants (De Silva 2003; D’cruze et al. 2018).

The published literature suggests that IST’s northwestern population is confined between the western limit of Nagar Parkar,

Table 1. Morphometric measurements (cm), body weight (kg) and age of Indian Star Tortoise *Geochelone elegans* from Jambughoda Wildlife Sanctuary.

CL	SCW	CCL	CCW	PL	PW	SH	BW	G	Age (year)
21.5	18.8	37.5	34.5	22.5	19.2	17.5	9.500	Female	~17–20

SCL—Straight carapace length | SCW—Straight carapace width | CCL—Curved carapace length |
CCW—Curved carapace width | PL—Plastron Length | PW—Plastron width | SH—Shell height |
BW— Body Weight | G — Gender



Thar Desert, Pakistan, and the eastern limit of Sariska Wildlife Sanctuary, Rajasthan, India. The north of Pavagadh Hills, Panchmahal District, Gujarat (Vyas 2010) marks the southern limit of this population. There is only one published report of the species occurrence from Mandsapur District, Madhya Pradesh.

This habitat sits between the Chambal River and the adjoining state of Rajasthan (Vyas 2010). However, the northwestern population of IST has been recorded from a total of 31 protected areas (one in Sindh Province, Pakistan and 30 in three states of India (Rajasthan–14, Gujarat–15 and Madhya Pradesh–1)). All these PAs fall under the extent of the distribution range of the northwestern population of IST (Vyas 2010).

In terms of the legal status of the species in India, IST is legally protected under Schedule IV of the Wildlife Protection Act (1972; amended 2005), listed in the CITES Appendix I, and considered ‘Vulnerable’ (VU) in the IUCN Red List (Choudhury et al. 2020). Currently, the species faces various threats in most of its natural habitat (Vyas 2010, 2015).

The published literature indicates 29 reptilian species belonging to three orders currently inhabiting the Jambughoda Wildlife Sanctuary, including one species of crocodile, two species of turtles, 12 species of lizards, and 14 species of snakes (Vyas 2006). Thus, the Jambughoda Wildlife Sanctuary is one of the important protected areas in central Gujarat, located between

22.20–20.33 N and 73.35–73.45 E, in the Panchmahal and Vadodara districts of Gujarat State, India (Vyas 2006). The terrain is hilly and undulated, covered with forests and bordered by cultivated lands around villages in the valley. Pavagadh Hills are the southern-most extension of the Aravalli Hills, forming the Vindhya Mountains’ western fringe.

The sanctuary encompasses 130.38 km² of forest cover at altitudes ranging 230–354 m (Pandya & Oza 1998). This forest classifies as the ‘southern tropical dry deciduous type’, further classified into four sub-types, i.e., 5A/C 1b dry teak forest, 5A/C 2 southern dry mixed deciduous forest, 5/E 9 dry bamboo breaks, and 3B/C 2 southern moist mixed deciduous forest (Champion & Seth 1968).

Conclusively, none of the previous research findings (Pandya & Oza 1998; Vyas 2006) enlist and determine IST presence from the Jambughoda Wildlife Sanctuary. However, Vyas (2006) made a statement indicating the possibility of species occurrence from the sanctuary. The former statement was based on the shared habitat structure and an IST record from the reserved forest of Champaner, Panchmahal, situated 20 km away from the sanctuary (Vyas & Parasharya 2000; D’cruze et al. 2018).

Although the sanctuary is geographically connected with the Pavagadh Hills, further northwards by a region of reserved dry deciduous teak forest, implying that the entire region shares a similar habitat and



forest type. Therefore, the record of an adult *Geochelone elegans* female from Bhat forests becomes the first record from the Jambughoda Wildlife Sanctuary.

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