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Horn anomalies in the blackbuck antelope *Antilope cervicapra* (Linnaeus, 1758) (Mammalia: Bovidae)

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Abstract

The blackbuck *Antilope cervicapra* (Linnaeus) is a grassland antelope widely distributed in Pakistan, Nepal, and India. Here we present a review of the known horn anomaly in the species followed by two new examples: a male with an abnormal right 'curled' horn and a female with a horn at the Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat State, India. We also provide a photographic record of a female with horns in captivity.

Key words: Antelope, captivity, deformity, horns, nature

The blackbuck *Antilope cervicapra* (Linnaeus) is native to Pakistan, Nepal, and India (Long, 2003). Once widespread throughout the whole Indian subcontinent, it declined during the 20th century and became nearly extinct in the wild (EW) in Bangladesh, Nepal, and Pakistan (Bashistha et al., 2012). This species has been assessed as Near Threatened (NT) by the IUCN (Mallon, 2008), but now it considered as a Least Concern (LC) by the IUCN SSC Antelope Specialist Group (2017). Furthermore, blackbuck populations were introduced to Texas, USA (Mungall, 1978), Argentina (Novillo and Ojeda, 2008), Australia, and the UAE (Mallon and Kingswood, 2001). Two subspecies of *Antilope cervicapra* are recognized: *A. c. cervicapra* (Linnaeus) from Pakistan and northwest India and *A. c. rajputanae* Zukowski, 1927 from Rajasthan, Gujarat, and part of Madhya Pradesh, India (Groves, 1980; Groves and Grubb, 2011).

The coat of the head, back, and outer legs is blackish in males and tawny or yellowish in females while the eye rings, chin patches, chest, belly, and inner legs are white in both sexes (Csurhes and Fisher, 2016; Meena and Saran, 2018). Herds range from 5 to 50 individuals of various ages and consist of an adult male and numerous females with their offspring (Isvaran, 2007). Usually, a typical blackbuck herd is led by an older female and resembles a harem in its structure (Mungall, 1978). The foraging activity pattern depends on the seasons and temperatures of the area (Jhala and Isvaran, 2016). In the winter, blackbucks are diurnal, while during the hot season, they spend most of the day resting in shady areas, being mainly active in the morning and late afternoon (Isvaran, 2007; Jhala and Isvaran, 2016).

Male blackbucks present horns while females are devoid of them (Menon, 2014). The horns are ringed, unbranched, and corkscrew-shaped; they rise above the head in a 'V' shape (Fig. 1) and usually grow up to 79 cm long (Ranjitsinh, 1989). Horn size determines dominance rank and mating success in adult males of cervids and antelopes (Lincoln, 1994; Douhard et al., 2017). Horns are used for defense against predators and in intraspecific fights (i.e., rank fights and competition for females) (Simon et al., 2022). Among blackbucks, males with bigger horns have more chances of mating with females than males with smaller horns (Mungall, 1978; Ranjitsinh, 1989; Behera and Mohanta, 2019).

Although rare, horn abnormalities in this species have been reported since the late 19th century and it was proposed they were due to testicular injuries, and there are speculations that such horn abnormalities develop due to hormone imbalance (Jerdon, 1874). Similarly, abnormalities in the antlers of cervids often result from testicular lesions and decreased testosterone levels, inhibiting regular cycles of antler

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growth (Fox et al., 2015). Mungall (1978) described six categories of horn abnormality in *A. cervicapra*: grooved tips, broken horns, compressed spiral, extended spiral, single curl, and castrated subject. Furthermore, cases of females presenting horns were recorded (Mungall, 1978). Krumbiegel (1955) stated that horned females could be fertile or sterile or hermaphrodites, depending on the hormonal levels.

Two skulls (ZSI 194; ZSI 197) with deformed horns (Fig. 2) held in the Museum of Zoological Survey of India (Kolkata, India) were described by Mandal (1964). Both skulls feature a curved right horn; their origin and history are unknown. Earlier, four cases of females possessing horns were recorded in India. Mungall (1978) provided a brief account of records based on Jerdon (1874), including a horned female near Nagpur, Maharashtra; a skull (skull no. 1912.10.31.26) at the British Natural History Museum, London; and an anonymous record from an Indian village. In 1984, an adult female with curved horns was recorded in the Blackbuck National Park, Velavadar, Bhavnagar, Gujarat (Chauhan, 1985). Broken horns with single curl categories were recorded twice in Texas (USA) and once in India (Mungall, 1978). Horn abnormalities were also observed in a captive stock in Gujarat, India. In 1985, the Sayajibaug Zoo in Vadodara held a blackbuck herd featuring a male with compressed spiral horns and a female with a right normal straight horn and a curved left horn (Fig. 3). Both animals were equally involved in social activities, courtship, and meetings, and the female also bred on different occasions.

More recently, on 22 March 2020 a female individual of *A. cervicapra* with a right horn devoid of spirals (Fig. 4) was sighted in the area of Kanatalav (22°4'30.92" N; 72°1'38.96" E; 35 to 40 meters a.s.l.) at the Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat by a local tourist guide (Anil K. Monpariya, personal communication). On 2 February 2023, at the Blackbuck National Park (21°56' N; 71°10' E; 38 m a.s.l.) we encountered an adult male with unusual horns separate from his group (Fig 5A). The left horn had an approximately 30 cm long broken anterior part while the right one was bent with its anterior part pointing at the ground (Fig 5B). We believe this could result from a lost battle and domination from a competitor, ultimately affecting the animal's separation from the group. Such animals survive separately without any companions and do not participate in breeding with any females.

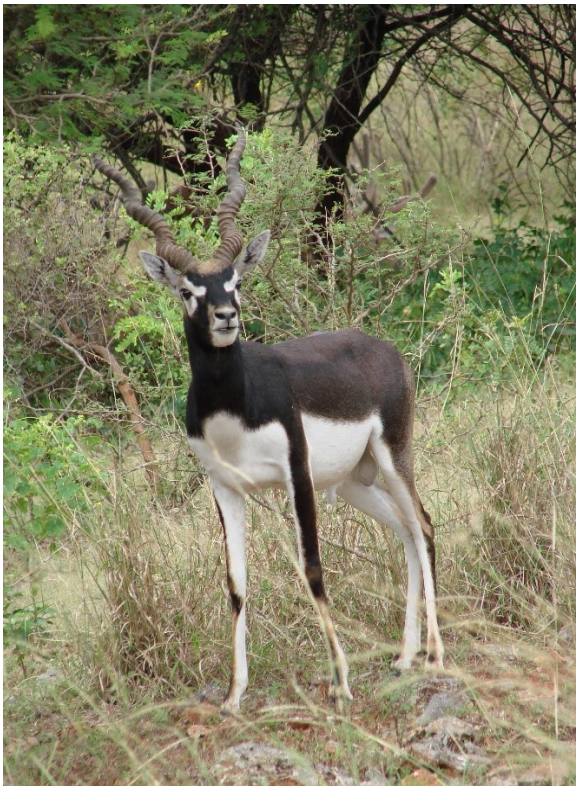

Figure 1: An adult male blackbuck (*Antilope cervicapra*) with standard 'V' shape ringed, unbranched corkscrew horns from the Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat. (Photo Credit: Kartik Upadhayay).

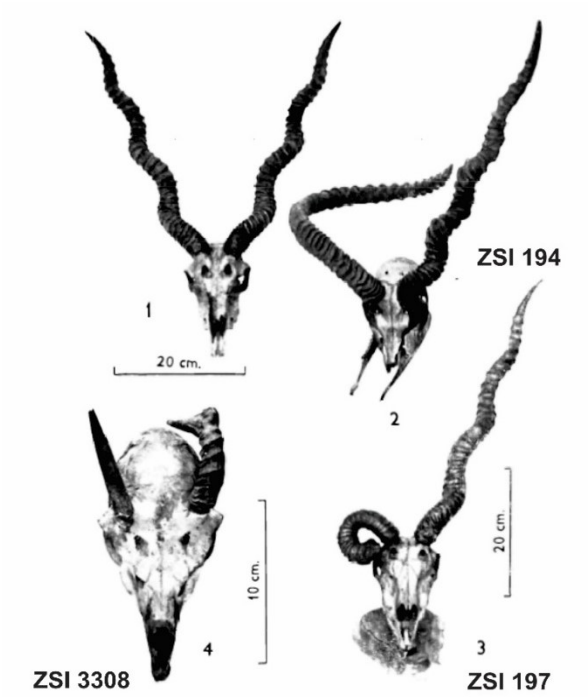

Figure 2: Blackbuck (*Antilope cervicapra*) skulls in the possession of the Museum of Zoological Survey of India, Kolkata, India. 1) Blackbuck skull with typical horns; 2) Blackbuck skull with a right abnormal horn (ZSI 194); 3) Blackbuck skull with a right curled horn (ZSI 197); 4) Skull of Indian chinkara gazelle. (Museum tregistration number ZSI: after Mandal, 1964).

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Figure 3: A captive female blackbuck (*Antilope cervicapra*) with horns: image archives from the Sayajbaug Zoo, Vadodara, Gujarat. (Photo Credit: Ramchandrasinji Gohil).

Figure 4: Female blackbuck (*Antilope cervicapra*) with horn from Kanatalav, the Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat. (Photo Credit: Anil K. Monpariya, Tourist Guide).

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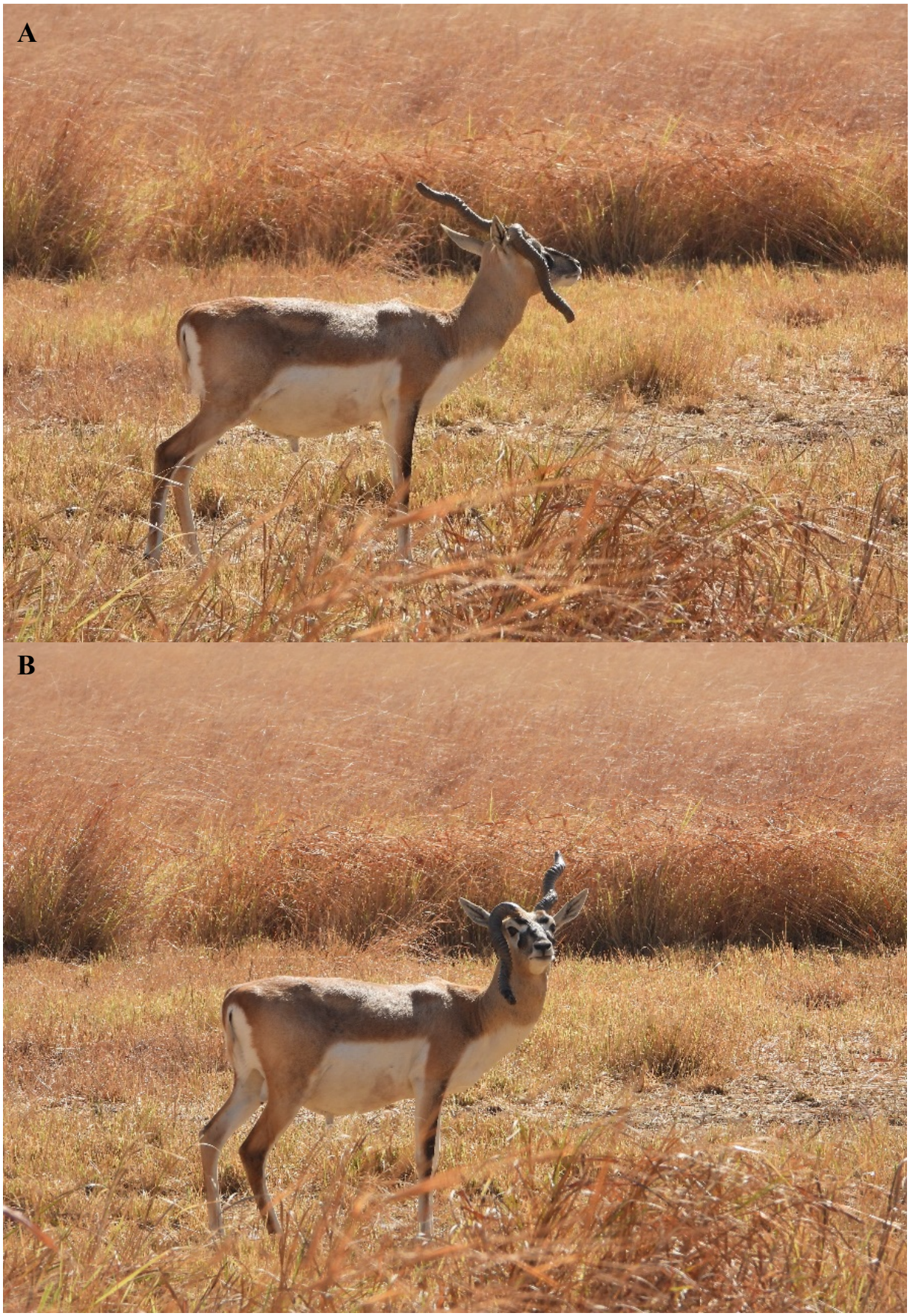

Figure 5: The same male of *Antilope cervicapra* with abnormal horns from the Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat: the left side horn is broken (A), the right side horn is bent (B). (Photo Credit: Kartik Upadhayay).

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Author contributions

RV: Data review and analysis, draft preparation. KU: Field data collection from Blackbuck National Park, Velavadar, Bhavnagar District, Gujarat State, India.

Conflict of interest

The authors declare that there are no conflicting issues related to this short communication.

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