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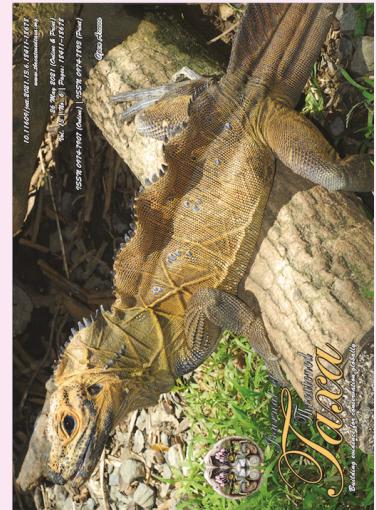
NOTE

REAPPEARANCE OF DHOLE *CUON ALPINUS* (MAMMALIA: CARNIVORA: CANIDAE) IN GUJARAT AFTER 70 YEARS

A.A. Kazi, D.N. Rabari, M.I. Dahya & S. Lyngdoh

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

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Dhole *Cuon alpinus* (Pallas, 1981) is a pack hunting, highly social canid and the only species of this genus (Pocock 1936; Cohen et al. 1978; Johnsingh 1982; Alfred 2000). Dholes are also known as Wild Dogs or Whistling Dogs, but the terms are misnomers since they are taxonomically more closely related to jackals than wolves and correctly termed as Dhole – the Asian origin term meaning recklessness and daring (Mivart 1890). In the past, Dholes were the most widely spread canids in the oriental region, distributed from around 50°N and 70°E over the continental Asia (Pocock 1936; Ellerman & Morrison-Scott 1966; Johnsingh & Acharya 2013; Selvan et al. 2013). Due to loss of forests and thereby the prey base (Gopi et al. 2010; FAO 2020), Dholes were extirpated from more than 75% of their global historic range with the remaining estimate of 949 to 2,215 individuals (Kamler et al. 2015). Looking to this scattering trend, IUCN categorized Dholes from Vulnerable to Endangered (Kamler et al. 2015), and are placed in Schedule II of Indian Wildlife (Protection) Act 1972, and in Appendix II of CITES (2019).

India lost around 60% of Dholes in the last 100 years (Karanth et al. 2010) and less than 1,500 individuals are left in Indian forests (Johnsingh & Acharya 2013; Kamler et

al. 2015), surviving majorly in Western and Eastern Ghats, Terai, Kumaon, Himalayan region, northeastern states, and relatively larger population in central India (Srivastava & Singh 2003; Durbin et al. 2004; Iyengar et al. 2005; Jhala et al. 2008; Karanth et al. 2009; Gopi et al. 2010; Johnsingh & Acharya 2013; Kamler et al. 2015). Although the population disappeared from former range (Johnsingh 1985; Kamler et al. 2015), the recent rediscoveries in newer areas have raised the hope in Sikkim (Bashir et al. 2014), western Himalaya (Pal et al. 2018), Tso Kar, Ladakh (Kamler et al. 2015), and in different parts of Nepal (Khatiwada et al. 2011; Thapa et al. 2013; Lamichhane et al. 2018; Yadav et al. 2019). These discoveries indicate that the species is moving out to ensure fewer competition and less disturbance, which in future may foster resilience and expand its range.

In Gujarat, many claim to have sighted dhole in Dangs, Shoolparneshwar, Bharuch, Surat, Ratanmahal, and even in northern Gujarat (Singh 1998, 2001, 2013; Alfred 2000; GFD 2013; Kumar & Pathan 2016); however, no authentic evidence could ever be produced to ensure the certainty of the species in these areas, and therefore, the literatures endorsed Dhole as an exterminated species

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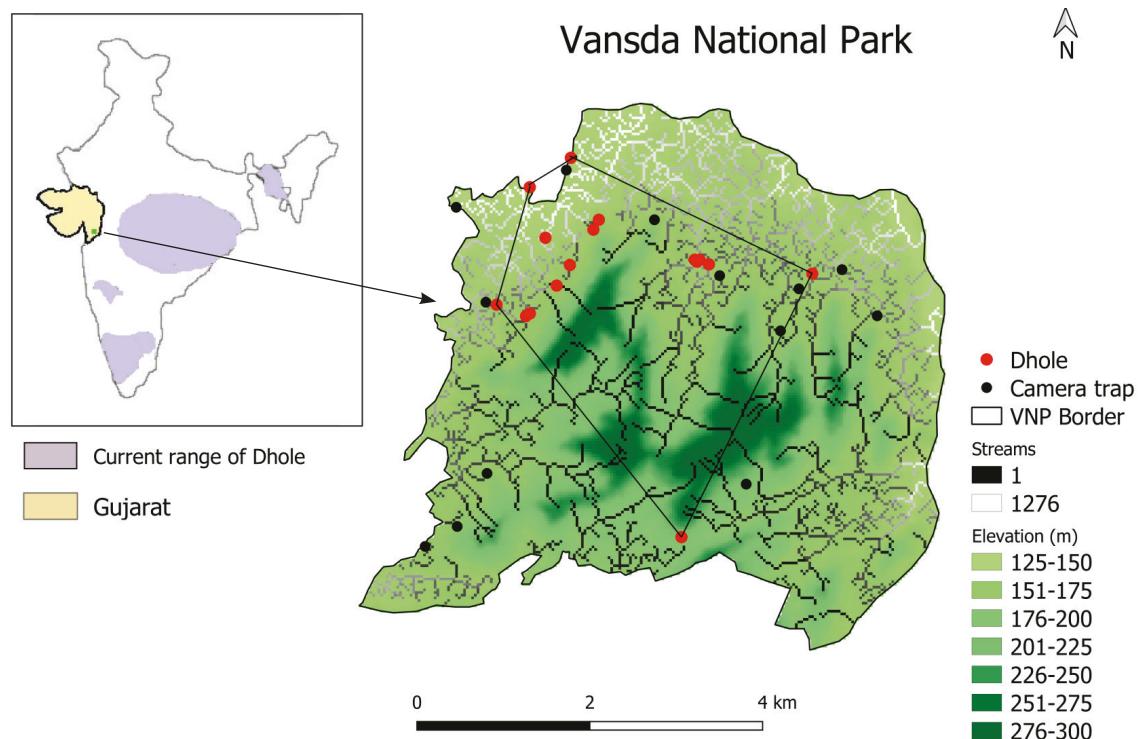


Figure 1. Current distribution of Dhole *Cuon alpinus* in India; camera trap locations (black dots) and Dhole capture locations (red dots) in Vansda National Park, Gujarat; and minimum convex polygon for the Dhole pack.



Image 1. The historic photo of Dhole *Cuon alpinus* from Vansda National Park, Gujarat clicked on 4 October 1949. Photo: Digveerendrasinhji Solanki



Image 2. The diurnally active Dhole *Cuon alpinus* in Vansda National Park, Gujarat.

from Gujarat (Johnsingh 1985; Ginsberg & Macdonald 1990; Singh 1998, 2001, 2013; GFD 2013; Kumar & Pathan 2016). In the Bharuch District Gazette (Gol 1961) Wild Dogs were reported from Dediapada, Sagbara, and Gora range. The then Maharaja of Vansda State Shri Digveerendrasinhji Solanki states to have observed Dhole packs in Vansda National Park (VNP) in 1970 (Singh 2013). Authentic sighting records from 1949 and 1970 are known, but without confirmed presence thereafter

(Jayveerendrasinhji Solanki pers. comm. 2020). In the middle of all the ambiguity on Dhole's historic presence, the only reliable source is Digveerendrasinhji's photo of 4 October 1949 from Vansda forest of present day Vansda National Park. This is the only historic sighting record of Dhole from Gujarat (Image 1).

To confirm the presence of Dhole, from January–May 2020 camera traps were laid at 30 sampling locations in VNP along the select trails, waterpoints and crossings where Dhole movements were anticipated (Table 1). GPS coordinates, elevation, and habitat type were recorded at each sampling location. Camera trap photo/video

Table 1. Details of camera trap locations to confirm the presence of Dhole *Cuon alpinus* in Vansda National Park (VNP) during January to May 2020.

| Trap location Code | VNP Beat | Altitude (m) | Trap duration | No. of trap days | No. of photos | No. of videos | Activity | Sex | Other species captured |
|--------------------|-----------|--------------|---------------|------------------|---------------|---------------|------------|------|---|
| L1 | Kevdi | 139 | II | 45 | 3 | 1 | Dr | M | LE, CH, CL, BD, WB, BPC, RM, GL |
| L2 | Kevdi | 141 | I | 15 | 1 | - | Pa | UJ | LE, CL, WB, SIC, BPC, RM |
| L3 | Tadada | 160 | I | 15 | - | - | - | - | CL, BD, WB, RM |
| L4 | Tadada | 155 | I | 15 | - | - | - | - | CL, BD, WB, RM |
| L5 | Tadada | 156 | I | 15 | - | - | - | - | RM, GL |
| L6 | Kevdi | 145 | I | 15 | 1 | - | Ru | - | LE, CH, CL, BD, WB, BPC, RM, GL |
| L7 | Kevdi | 144 | II | 45 | 25 | 14 | Dr, Pa, Ru | M, F | LE, CH, CL, BD, WB, BPC, SIC, RM, GL |
| L8 | Kevdi | 151 | I | 15 | 2 | - | Pa | UJ | CL, BD, WB, BPC, SIC, RM, GL |
| L9 | Tadada | 168 | I | 15 | - | - | - | - | - |
| L10 | Tadada | 167 | I | 15 | - | - | - | - | CL, BD, WB |
| L11 | Kala-amba | 173 | II, V | 56 | 27 | 3 | Dr, Pa, Ru | M, F | LE, CH, CL, BD, WB, BPC, SIC, RM, GL, ICP, GM |
| L12 | Kala-amba | 110 | III | 15 | - | - | - | - | LE, CL, WB, SIC, RM |
| L13 | Kala-amba | 160 | III | 15 | 1 | 1 | Ea | M | LE, CL, WB, SIC, RM |
| L14 | Navtad | 169 | III | 15 | - | - | - | - | CL, WB, SIC, RM |
| L15 | Navtad | 187 | III | 15 | - | - | - | - | CL, WB, SIC, RM |
| L16 | Kevdi | 136 | III | 15 | 1 | - | Pa | UJ | LE, CL, WB, SIC, RM, GL |
| L17 | Kevdi | 140 | III | 15 | 2 | - | Pa | M | LE, CL, BD, WB |
| L18 | Kevdi | 132 | III | 15 | 1 | - | Pa | UJ | LE, CL, WB, SIC, RM, GL |
| L19 | Kala-amba | 163 | II, V | 56 | 80 | 2 | Pa, Ru | M | LE, CL, WB, SIC, BPC, RM |
| L20 | Kevdi | 157 | III | 15 | 1 | - | Pa | M | CL, WB, RM |
| L21 | Navtad | 143 | IV | 8 | - | - | - | - | RM, GL |
| L22 | Kevdi | 153 | IV | 8 | 1 | - | Pa | UJ | WB, RM, GL |
| L23 | Kevdi | 161 | IV | 8 | 1 | - | Pa | UJ | CL, WB |
| L24 | Navtad | 195 | IV | 8 | - | - | - | - | RM, GL |
| L25 | Kala-amba | 164 | IV | 8 | 1 | - | Pa | F | CL, BD |
| L26 | Kilad | 118 | IV | 8 | - | - | - | - | RM, GL |
| L27 | Kilad | 126 | IV | 8 | - | - | - | - | CL, WB, SIC |
| L28 | Navtad | 156 | IV | 8 | - | - | - | - | RM, GL |
| L29 | Kala-amba | 123 | IV | 8 | - | - | - | - | CL, WB, SIC, GL |
| L30 | Kevdi | 161 | IV | 8 | 1 | 1 | Pa, Dr | M | RM, GL |

I—30 January–14 February 2020 | II—30 January–14 March 2020 | III—15 February–1 March 2020 | IV—17–24 April 2020 | V—15–25 May 2020

Dr—Drinking | Pa—Passing by | Ru—Running | Ea—Eating | M—Male | F—Female | UJ—Unidentified.

LE—Leopard *Panthera pardus* | CH—Chousingha *Tetracerus quadricornis* | CL—Chital Axis axis | BD—Barking Deer *Muntiacus vaginalis* | WB—Wild Boar *Sus scrofa* | SIC—Small Indian Civet *Viverricula indica* | BPC—Brown Palm Civet *Paradoxurus jerdoni* | RM—Rhesus Macaque *Macaca mulatta* | GL—Gray Langur *Semnopithecus hypoleucus* | ICP—Indian Crested Porcupine *Hystrix indica* | GM—Indian Grey Mongoose *Herpestes edwardsii*.

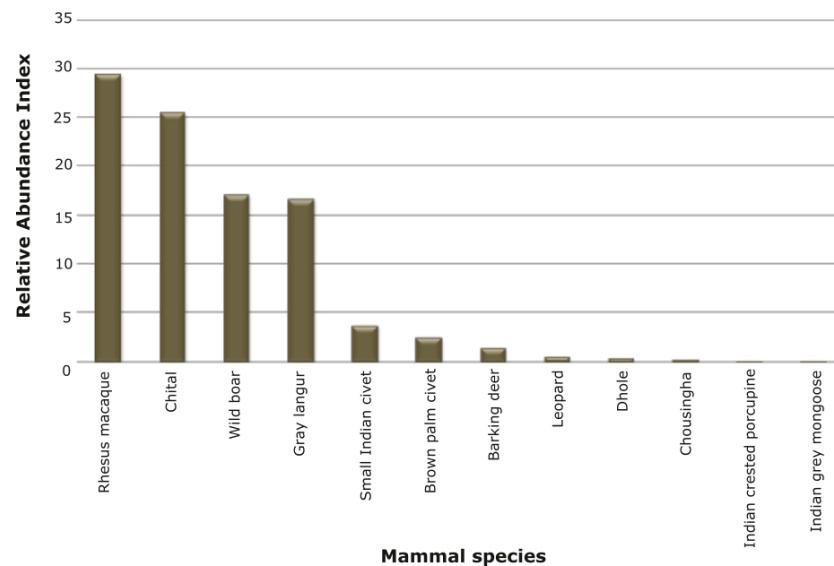


Figure 2. Relative abundance index of mammals of Vansda National Park, Gujarat.

captures were monitored on regular basis, at least once a week. From 15,660 trap nights, we derived 34,206 photos and 481 videos, which included 149 photographs and 22 videos of Dhole. The highest number of photographs ($n=132$) and videos ($n=19$) of Dhole were from Kevdi beat (L7) and Kala-amba beat of VNP (L11 and L19). Through minimum convex polygon from 16 locations, the minimum home range of Dhole pack was 13.7 km^2 in VNP. Minimum distance between Dhole's current extent in central India and VNP is 367km (Figure 1). We recorded 11 other mammals during the study and calculated their relative abundance index (RAI). The maximum photographed species was Rhesus Macaque *Macaca mulatta* (RAI= 29.52), followed by Chital *Axis axis* (RAI= 25.52). The minimum was for Indian Grey Mongoose *Herpestes edwardsii* (RAI= 0.05). The RAI of Leopard and Dhole were 0.67 and 0.43, respectively (Figure 2).

Dhole prefers to live in tropical moist and dry deciduous forests (Kamler et al. 2015), avoid hunting in the same area for a long time and keep changing forest patches time to time to ensure hunting success (Venkataraman et al. 1995). They are hypercarnivore (Van Valkenburgh 1991; Kamler et al. 2015) and their preferred prey is Chital *Axis axis* and Sambar *Rusa unicolor* (Cohen 1978; Johnsingh 1992; Karanth & Sunquist 1995; Venkataraman et al. 1995; Acharya 2007; Ramesh et al. 2012; Johnsingh & Acharya 2013; Selvan et al. 2013; Hayward et al. 2014; Dar & Khan 2016). They have also been reported to prey on buffalo, birds, insects, lizards (Fox 1984), Mouse Deer (Kawanishi & Sunquist 2008; Dar & Khan 2016), Gaur, Mithun (Lyngdoh et al. 2014), sheep, goats (Sosnovskii 1967; Cohen et al. 1978), Wild Boar, hare (Dar & Khan 2016) and even plant matter such as grass, fruits, and leaves (Fox 1984; Gopi

et al. 2010). Depending upon prey biomass, interspecific competition and capture efficiency, the Dhole pack size varies from 2 to 40 individuals (Cohen 1978; Johnsingh 1982; Venkataraman et al. 1995; Johnsingh & Acharya 2013) with home range varying from $23\text{--}199\text{ km}^2$ (Johnsingh 1982; Venkataraman et al. 1995; Karanth & Sunquist 2000; Acharya 2007; Acharya et al. 2010; Kamler et al. 2015). Southern Gujarat is the potential habitat for Dhole since it has 28.60% (5228.85 km^2) of moist deciduous forest distributed in seven districts with three protected areas covering 792.53 km^2 (Champion & Seth 1968; GoG 2019).

We confirm the reoccurrence of Dhole from Gujarat after 70 years in Vansda National Park. We recommend concerted management efforts in the area to ensure long term survival and conservation of the species in the Park and initiation of scientific studies on species ecology and population for effective management and conservation planning.

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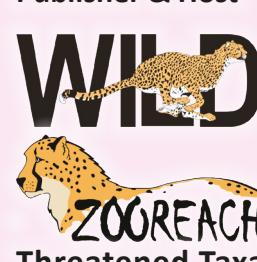
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