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COMMUNICATION

Nurturing orphaned Indian Grey Wolf at Machia Biological Park, Jodhpur, India

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Abstract: The Indian Grey Wolf *Canis lupus pallipes* is an iconic species of grassland in India. It is a Schedule 1 species according to the Wildlife Protection Act, 1972 and CITES Appendix 1 species. In the absence of parental care, five wolf pups were rescued from Baavarla on 26 November 2020 and brought into Machia Biological Park for hand rearing. In the absence of colostrum, a milk replacer formula (PetLac) was provided to the pups. The pups were kept at an ambient room temperature of 101°F as an adjustment to their natural surroundings. Gripe water, Vitamin A, and multivitamins were administered orally. The temperature and body growth parameters were measured and recorded weekly. Rabies vaccine was administered in the 26th week from the date of rescue. The diet of the wolf was gradually changed and from the 37th week, raw meat was included in their diet. Antibiotics Ciplox-TZ (ciprofloxacin and tinidazole tablet) Brand-Cipla and SPORLAC-DS (lactic acid bacillus tablets 120M) Brand-sanzyme Ltd. were given periodically to restore the gut fauna of the pups.

Keywords: Captive, conservation, ex-situ, hand rearing, rehabilitation, rescue, Thar Desert, veterinary care, wolf, zoo.

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Author contributions: Research design, concept & supervision—Hemsingh Gehlot Data collection and hand rearing—Mahendra Gehlot & Hemsingh Gehlot. Data analysis, literature search and manuscript preparation—Tapan Adhikari, Gaurav, Prakash Suthar & Hemsingh Gehlot.

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INTRODUCTION

A total of eight wolves are in captivity in the Machia Biological Park, Jodhpur. Out of the total, five wolves are nurtured. Hand rearing wild animals is very demanding and should be performed in extraordinary circumstances. Infants require hand-rearing only if the mother dies or is unable to feed them. Similarly, in the absence of the mother, orphan, feral, sick, injured, or rescued infants need human intervention to grow and sustain themselves (Mohapatra et al. 2019). Hand-rearing varies from species to species. Five wolf cubs were rescued from Baavarla village on 26 November 2020. This paper puts forward an elaborative explanation for nurturing an Indian Grey Wolf pup. It also explains the veterinary assistance required from the neonatal stage to adulthood. Distributed widely across Eurasia and North America, the Grey Wolf *Canis lupus* is an iconic grassland species. The Indian Grey Wolf *Canis lupus pallipes* and the Mongolian/Himalayan Wolf *Canis lupus chanco* are among the subspecies of Grey Wolf distributed in India (Anonymous 2023). The Indian Peninsular Wolf or the Indian Grey Wolves *Canis Lupus pallipes* exhibit a wide distribution, ranging from India in the east to Turkey in the west, with populations reported from Pakistan, Iran, Syria, and Israel (Wildlife Institute of India 2017). The Indian Grey Wolves evolved to occupy diverse habitats and are the top predators of the arid, semi-arid, and Deccan plateau region (Jhala & Giles 1993; Singh & Kumara 2006). Andhra Pradesh, Karnataka, Maharashtra, Madhya Pradesh, Gujarat, Rajasthan, Orissa, Bihar, West Bengal, Uttar Pradesh, and Haryana are said to have isolated areas of Indian Grey Wolves (Singh & Kumara 2006). The wolf population in Asia is data deficient, endangered, and evolutionarily distinct (Hamid et al. 2019). Several attempts were made to assess the population and occupancy of Indian Grey Wolves (Jhala & Giles 1991; Kumar & Rahmani 1997; Singh & Kumara 2006; Karanth & Chellam 2009; Srivathsa et al. 2020). Estimates of earlier wolf populations, wolf ecology, and their habitat assessment were primarily based on surveys and local-level information from pastoralists (Jhala & Giles 1991; Kumar & Rahmani 1997). A recent study using camera traps and a review of literature have suggested the presence of 3,170 Grey Wolves across the Indian subcontinent (Jhala et al. 2022). The number of Indian Peninsular Wolves in the wild is equivalent to that of the royal Bengal Tigers *Panthera tigris* making it an Endangered species (Azad 2022). The Grey wolf is the least concerned species as per the IUCN Red List, CITES Appendix 1, and Schedule 1 species under the Wildlife Protection Act, 1972. Despite the decreasing population of the Indian Peninsular Wolves, residents surrounding the habitat of the same don't share a good bond with the species (Aggarwal 2003). Livestock depredation is the root cause of human-wolf conflict over the Indian subcontinent (Krithivasan et al. 2009). India has 87 Grey Wolves in captivity (Wildlife Institute of India 2017).

MATERIAL AND METHODS

The villagers from the Baavarla had called and reported the presence of a wolf den with orphaned cubs to the Machia Rescue and Rehabilitation Centre. Team members from the centre rushed to the den site and kept the wolf pups under observation. After 72 hours, when confirmed that the mother was nowhere to be seen the rescued wolves were brought to the veterinary unit of Machia Biological Park. Separate units are available for treating different species groups like canid, avian felid, ungulate, primate, etc. The orphaned pups were quarantined for 15 days in the rescue ward of Machia Biological Park. Adjacent to the canid centre is a kraal which provides the pups for playing and recreation and natural bedding was provided to the growing pups. In the absence of colostrum, a milk replacer formula (PetLac) with 33% crude protein, 18% crude fat, 0.5% crude fiber, and 5% moisture commercially available closest to mothers' milk was provided to the pups. The composition of wolf milk is 23.6% solid, 9.6% fat, 9.2% protein, and 3.4% carbohydrate (Das et al. 2013; Mohapatra et al. 2019). Available literature on canids with special emphasis on wolves regarding housing, feeding schedules, diet, and veterinary needs were consulted and utilized for nursing and management of the pups. Body measurements and other physiological parameters are recorded weekly to ensure whether the pups were showing proper growth as per their age. Environmental parameters, viz., humidity, temperature, and moisture were maintained as required for the species using an air conditioner (Gehlot et al. 2020) and hygiene and biosafety measures were taken as much as possible as this is crucial while raising orphaned young animals. An assistant was appointed round the clock to look after pups in case emergency or complications arise. The assistant and the veterinary staff alongside the doctor were advised to keep off-hand until it is extremely necessary because excessive human habituation can cause behavioral issues during release into the wild (Palmer & Malone 2018; Hansen et al. 2022).

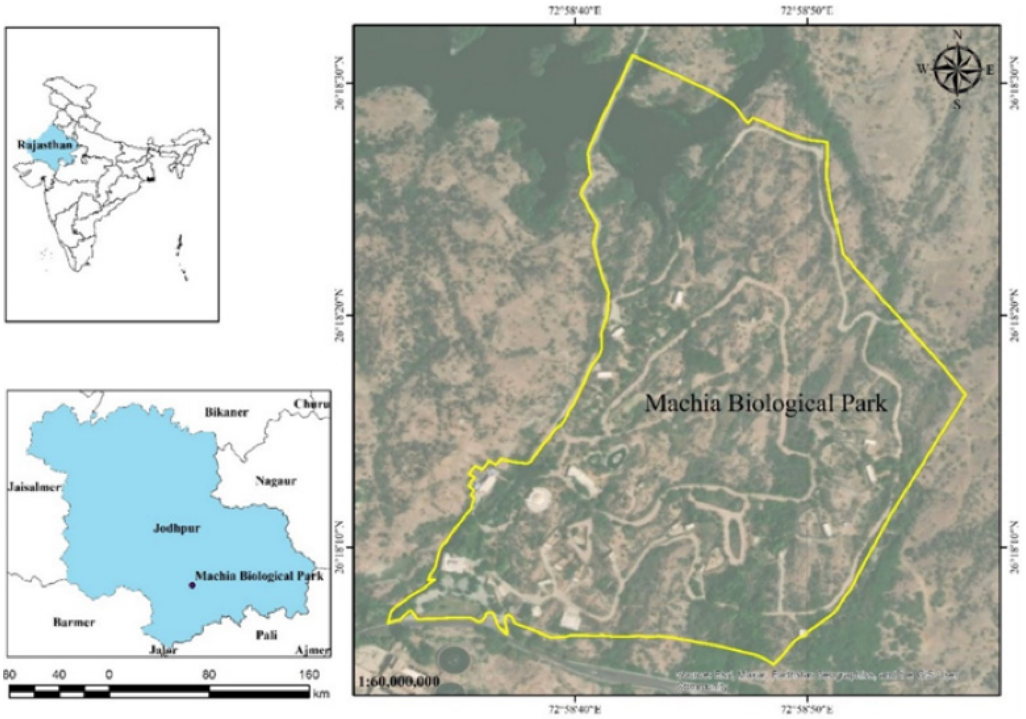

Image 1. Machia Biological Park.

Study Area

The Machia Biological Park is located on the western outskirt at the bank of Kaylana Lake of Jodhpur city at 26.3000 N & 72.9778 E. The park was founded on 13 February 2011 and subsequently old heritage zoo of Jodhpur was shifted here. The park encloses 41 ha of Machia forest block (680 ha), Jodhpur forest division. Under the Rajasthan Forest Act 1953, Machia forest block is protected as forest, notified vide notification number II 9(6), forest/90, dated 01/07/1990. The study area is undulating and the substratum is made of Rhyolite. The vegetation of the area consists of dry scrub forest with scanty tree cover of species like *Acacia senegal, Prosopis cineraria, Prosopis juliflora, Capparis decidua, Zizyphus nummularia,* and *Commiphora wightii*. The forest department has also planted several native species to increase tree cover inside the park. The park has 24 enclosures inhabited by several species of wild animals. Out of 24 enclosures, four are dedicated for big cats and canids, three for ungulates and deer, three for reptiles and avian species, two for bears and civets, and one each for porcupine, Jungle Cat, and Star Tortoises. Alongside the conservation, the park is well known for rescue and treatment of wildlife species under the wild animal rehabilitation program. "Recognition of Zoo Rules, 2009," also stated that zoos serve as an ideal place for nurturing the young of wild animals. From tourists' viewpoint, tiger, lion, leopard, Sloth Bears, Himalayan bears, Indian Peninsular wolves, and Desert Cats are the major attractions of the Machia Biological Park.

RESULTS

Five wolf cubs were rescued on 26 November 2020 from an unattended den site on the outskirts of Baavarla village near the forest Boundary. The den resembles a step-less stair structure with a depth of 14 feet. The upper portion of the den is 1 m deep and the base of the den is 3.5 m deep. The den is a complex maze in the upper part. Two pups were residing in the upper part, and the rest were on the floor. The male-to-female ratio of the litter was 2:3. Observations of only one male and one female from the litter were recorded. All the pups were raised with identical conditions and procedures. The wolf pups were kept under observation in their den site for 72 hours prior to hand rearing. During the rescue, the pups were estimated to be around a month old. The pups were observed to have no apparent infection or injury, however, they were dehydrated and malnourished which could be attributed to the absence of mother's milk. The first day in the rescue centre is very critical as the cub has to adjust to its new surroundings. The cub was kept at an ambient room temperature of

101°F as an adjustment to their natural surroundings. 0.5 g of Rintose electrolyte diluted in 10 ml of water was provided twice in 24 hours to prevent dehydration on the day of rescue. Petlac, Hampshire, USA was bottle fed to the pups. From the date of rescue till the seventh week, 2 g in 10 ml of water was fed every day to the pups, subsequently after the 7th week till the 12th week, 4 g in 20 ml water was fed daily. The initial frequency of feeding was four times in 24 hours and was reduced to two times from 28th week. Along with petlac powder, 0.2 ml gripe water which serves as an antacid was also given to the pups. To supplement vitamins in the diet, Intavita syrup, and a Mecovet xl syrup was availed to the pups at 0.2 ml and 0.5 ml QD, respectively. Physical parameters of growth were recorded. Along with the multivitamin supplement, Caldipet syrup was given to the pups from the 15th week to the 33rd week, initially starting with 1 ml per day and subsequently increasing the dosage to 3 ml from the 27th week till the 33rd week. During the initial time of rescue, the temperature of the male was recorded to be 99.8ºF and female 99.9ºF. The temperature variation has also remained almost identical over 42 weeks. Similarly, at the initial time of rescue, the male weighed 600 g and female weighed 585 g. The mean weight and mean temperature of the litter during the initial time of rescue were 587.94 ± 11.10 g and 99.7 ± 0.05 °F respectively. Successive weekly variation in body weight was measured, recorded (Figure 1).

Combined vaccine Megvec-7 against leptospirosis, canine distemper, and parvovirus was administered in the mid of 20th week. Boiled eggs were introduced into the diet after the 08th week along with petlac powder for adjusting to new dietary habits. The weaning is progressive. In the mid of the 12th week, petlac powder was removed from the diet and two boiled eggs along with 25 ml chicken soup were introduced to the diet. This diet was maintained till the 17th week. On the 18th week, with three boiled eggs and 50 ml carabeef soups dietary increment was followed. The pups were responding very well to the dietary increment. From the 21st week, gripe water was removed from the diet because gastritis issues relating to feeding liquid food were over by then. In the 25th week, two tablets of Sporlac DS (1/4th) and Ciflox TZ (1/8th) were given once a day for three consecutive days to combat gastro-intestinal disorders. Sporlac DS helps in restoring normal microbial fauna of the intestine as it contains lactic acid Bacillus which is a probiotic. In the mid of the 26th week, the Rabigen mono vaccine was availed to the pups as a countermeasure for rabies. From the 34th week, the pups were given a kilo of boiled meat once a day during morning hours at 0930 h and in the

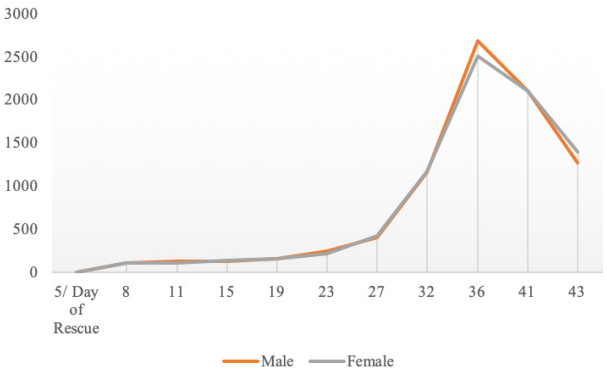

Figure 1. Weekly rate of change in weight of pups (in g). The successive change in weight shows exponential growth till the first 36th week and gradually decreases after it.

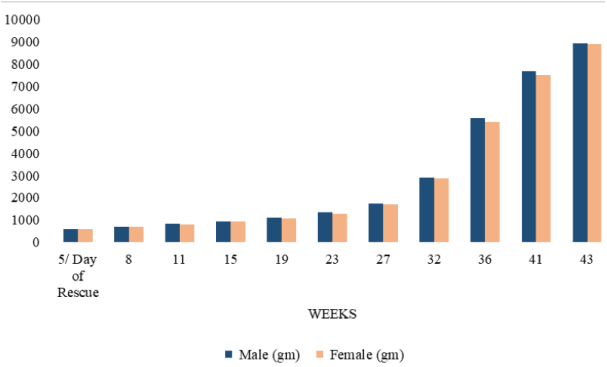

Figure 2. Weekly weight record of rescued pups.

37th week, boiled meat was replaced by raw carabeef. Along with feeding regime and schedule weekly body growth parameters *viz.* height, chest girth, cervical length, tail length, etc. were also recorded (Figures 2–4).

DISCUSSION

Literature on hand raising orphaned canids has been studied and followed to raise wolf pups into an adult. Hand-raising has been done in zoos in instances where the mother is unwilling to rear the young one or in circumstances in the wild where pups are being abandoned by the mother (Dhoot et al. 2003; Gehlot et al. 2020). Indian Peninsular Wolf or the Grey Wolf is the only sub-species of wolf that mates in winter (Jhala 2013). It has a gestation period of 62–63 days. The average litter size of pups ranges from four–six individuals (International Wolf Center 2022). In previous studies, pups were provided electrolytes to prevent dehydration as electrolytes are a great source of energy

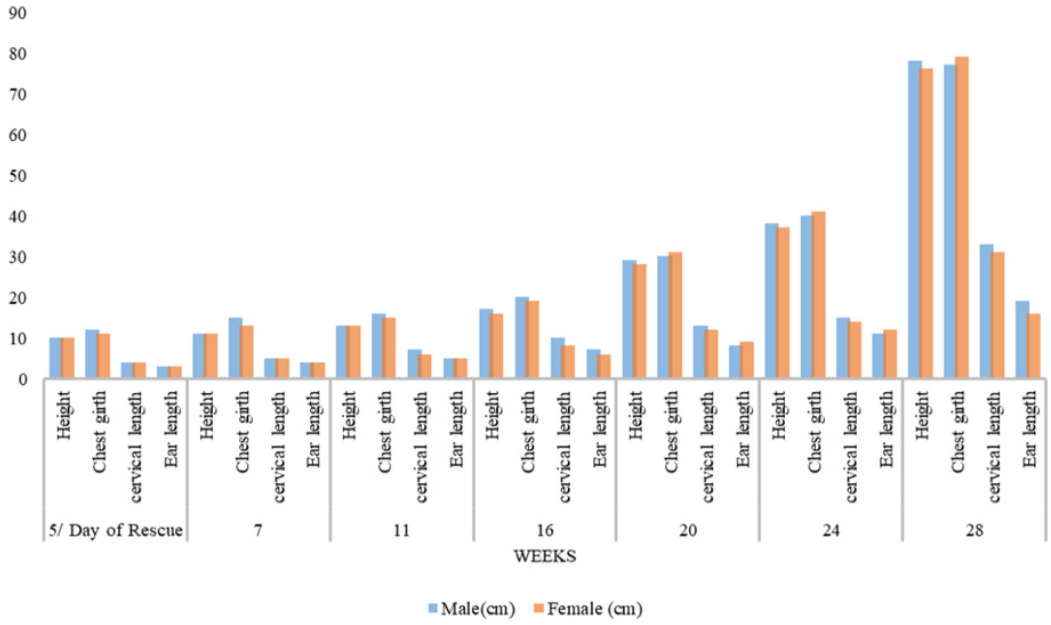

Figure 3. Weekly record of body growth parameters of rescued wolf pups.

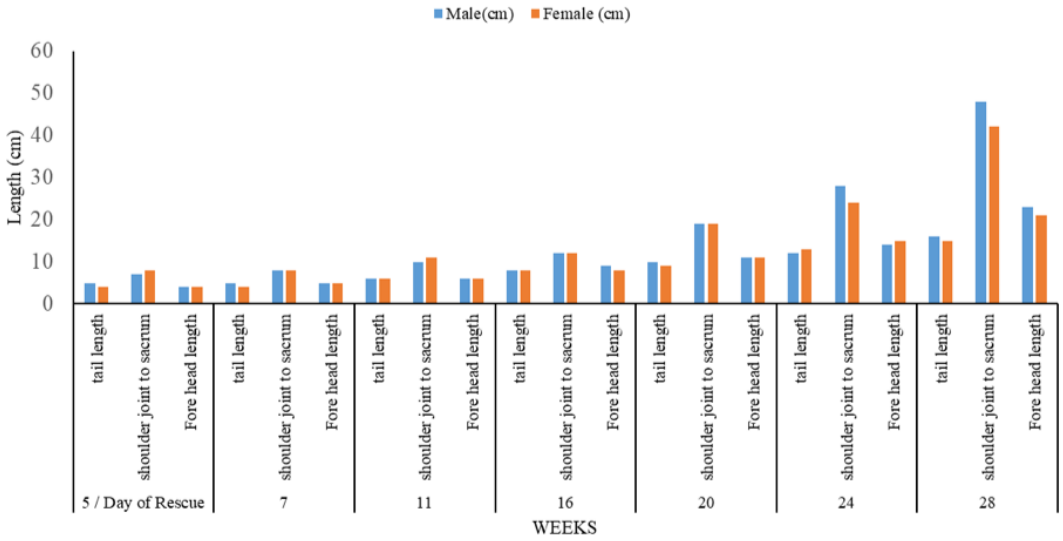

Figure 4. Weekly record of body growth parameters of rescued wolf pups.

and are easily digestible at any temperature. Commercial milk replacers were given and daily intake did not exceed 20% of body weight/day and was divided into frequent feedings (Nijboer 2020). Daily food intakes were recorded and changed progressively in hand-rearing (Dhoot et al. 2000). The Jackal *Canis aureus* shows a very close affinity to the Grey Wolf *Canis lupus* (Viranta et al. 2017). Four jackal pups were hand-reared at Maharajbag Zoo. The pups were given 30 ml of milk in the 1st week and 60 ml in the 6th week of growth. The amount was reduced to 25 ml at the end of the 10th week of growth. From the 4th week, a boiled egg was introduced to the feeding schedule. From the 8th week, two raw eggs and 30 g of raw kheema were introduced to their diet. The raw kheema was increased to 100 g in the 11th week (Dhoot et al. 2003). The weaning should be progressive and adjustable for wild cubs (Dhoot et al. 2003; Rivas et al. 2009). To restore gut fauna, tab Sporlac was introduced to the diet of leopard cubs at the Maharajbag Zoo (Dhoot et al. 2000). To combat vitamin and calcium deficiency, Ciflox TZ, Caldipet, Intavita syrup, and Mecovet XL syrup were used as supplementary diets (Gehlot et al. 2020).

Image 2. Rescue, feeding, housing, and morphological parameters of rescued Indian peninsular wolves. © Hemsingh Gehlot & Mahendra Gehlot.

In ex situ programs, mate selection should be carefully chosen for reproduction to maintain genetic variability within the wolf species. Field studies are very important for the conservation and relocation of captive animals in ex situ programs (Maia & Gouveia 2002).

CONCLUSION

Hand rearing involves the meticulous handling of premature wolf puppies that are only a few days old. They lack an efficient immune system. They can be nurtured carefully in a proper environment. The most important factor in nurturing an animal is its purpose, viz., captive breeding, reintroduction, and public display. Preserving natural behavior is an important aspect if an animal needs reintroduction. A good amount of time should be devoted to hand-rearing. The time, energy, and knowledge of the veterinarian and team who constantly efforts in the development of puppies relate to the success and failure in growth and reintroduction. The pups are now matured and thriving well in the captivity of Machia Biological Park of Jodhpur.

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