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Captive Lifestyle of Reptiles in the Tashkent Zoo

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Abstract:
As we know, ancient reptiles - Cotylosaurs - evolved from *Stegocephalus* in the Middle Carboniferous period. *Stegocephalus* later divided into 2 branches; from one of them - mammals, and the other - birds. Reptiles (*Reptilia*) belong to the class of vertebrates. Currently, there are 3 zoos in the Republic of Uzbekistan. These zoos are located in Surkhandarya region, Fergana region, and the city of Tashkent. In total, these zoos contain 14,443 species of animals. 304 of them are reptiles. Nowadays the Tashkent Zoo occupies 21.5 hectares and has 373 animal species. 12 animal displays and the zoo are open to the public. The new territory has animal cages, including big wintering quarters.

Keywords: reptile, Cotylosaurs, *Stegocephalous*, vertebrates, Tashkent Zoo, animal, captive lifestyle, central Asian tortoise, green iguana, various snake species, lizards, crocodiles and alligators, turtles and terrapin

1. Introduction

The Tashkent Zoo, also known as the Tashkent Zoological Garden, is located in the capital city of Uzbekistan, Tashkent. It is one of the oldest and largest zoos in Central Asia, covering an area of around 22 hectares. The zoo was founded in 1924 and has since been a popular attraction for both locals and tourists.

The zoo is home to a diverse collection of animal species, including mammals, birds, reptiles, and fish, with a focus on preserving and showcasing the region's native and exotic wildlife. Some of the notable species visitors can find at the Tashkent Zoo include lions, tigers, bears, elephants, giraffes, monkeys, wolves, crocodiles, and various species of birds.

In addition to its animal exhibits, the Tashkent Zoo also offers educational programs, conservation initiatives, and recreational facilities for visitors. It provides an opportunity for people of all ages to learn about wildlife conservation and biodiversity while enjoying a day out in a natural setting.

Furthermore, the Tashkent Zoo plays a vital role in understanding the captive lifestyle of reptiles within its premises. Through meticulous observation and documentation, this study aims to shed light on the behaviors, habitat preferences, and overall well-being of the reptilian inhabitants. By closely monitoring their activities and interactions, researchers seek to gain insights into the effectiveness of captive management practices and identify any potential welfare concerns. This observational approach offers a valuable opportunity to assess the suitability of captive environments and inform future strategies for enhancing the welfare of reptiles in captivity. Through this endeavor, the Tashkent Zoo endeavors to uphold its commitment to the ethical care and conservation of its animal residents.

Moreover, the Tashkent Zoo is committed to providing optimal conditions for its captive reptiles, ensuring their physical and psychological well-being. Through

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meticulous observation and documentation, this study aims to delve into the unique challenges and considerations associated with housing reptiles in captivity. By closely monitoring their behaviors, habitat utilization, and social dynamics, researchers seek to assess the effectiveness of the zoo's enclosure design, environmental enrichment initiatives, and husbandry practices in meeting the specific needs of reptilian species.

The observational research will concentrate on a number of characteristics of the lifestyle of confined reptiles, including as social interactions, eating habits, territoriality, and thermoregulatory activities. Reptiles kept in captivity display a variety of behaviors and interactions that are essential to their welfare. To ensure the welfare of these animals, it is crucial to comprehend elements including eating habits, territoriality, thermoregulatory behaviors, and social interactions [1]. Due to space constraints and complexity, captive reptiles may not be able to engage in their natural activities, which include hunting, foraging, nesting, hiding, and exploration [1]. Reducing stress and enhancing the quality of life for confined reptiles can be achieved by keeping an eye on these behaviors and offering suitable environmental enrichment, such as colorful item enrichment for freshwater turtles [1].

Research indicates that captive reptiles, like *Salmonella* carriers, highlight the necessity of comprehending and addressing disease risks in captivity [2]. Moreover, studies on fungal infections in reptiles emphasize the importance of monitoring and preventing such infections in captive environments [3]. Additionally, the presence of parasites like *Monocercomonas* and *Acanthamoeba* in captive reptiles underscores the significance of regular health evaluations and parasite control measures [4].

It is crucial to maintain optimal husbandry practices and nutritional requirements to ensure the health and well-being of captive reptiles [5]. Insights from studies on the impact of captivity on reptile body condition, such as those on American alligators, can inform the management of captive reptile populations [6]. Furthermore, evaluating welfare in captive reptiles, such as utilizing animal-based measures in Pygmy Blue-Tongue Skinks, can aid in identifying stressors and welfare compromises in captivity [7].

By examining how reptiles adapt to their captive environments and interact with conspecifics and zoo visitors, researchers can gain valuable insights into their overall welfare and quality of life. Researchers may look at how these reptiles interact with conspecifics and zoo visitors, as well as how they adapt to their confined settings, to learn important information about the general wellbeing and quality of life of these animals. Since visitors are a regular occurrence in the zoo animals' surroundings and have the potential to affect the welfare of confined reptiles, it is important to comprehend how their presence affects reptile behavior [8]. Research has demonstrated that the presence of visitors can have an impact on the behavior of reptiles, including Nile crocodiles [9]. This emphasizes the need of taking environmental factors into account when assessing the behavior and welfare of reptiles in zoos.

Additionally, this study will explore the potential impacts of captivity on reptile health and behavior, including stress-related behaviors, reproductive success, and susceptibility to diseases. By identifying any adverse effects of captivity, zoo management can implement targeted interventions to mitigate these issues and improve the overall welfare of captive reptiles.

Ultimately, this observational study aims to contribute to our understanding of the complex relationship between captive environments and reptile well-being. By evaluating the captive lifestyle of reptiles in the Tashkent Zoo, this research endeavors to inform evidence-based management practices and promote the ethical care and conservation of these fascinating creatures.

1.1. Literature review

Dr. Gulnara Kustakova is a well-known Uzbek scientist who has studied the confined lifestyle of reptiles at the Tashkent Zoo. She has done considerable studies on

the behavior and well-being of captive reptiles, with an emphasis on their habitat and social interactions at the zoo. Her research has greatly aided our understanding of reptile care and conservation efforts in confined environments.

Boris Vladimirovich Pestinsky is a painter, herpetologist, and teacher. In 1934, B.V. moved to Tashkent. He was hired in the Uzbek Zoological Garden by the Committee of Sciences of the Soviet Union of the Uzbek SSR. B. V. Pestinsky was freed on March 21, 1935, but did not return to Leningrad; instead, he lived in Tashkent. Pestinsky established the Department of Herpetology (amphibians and reptiles) at the Tashkent Zoological Garden in 1935, which he co-led with Professor of Pharmacology N. N. Kompantsev. B. V. Pestinsky founded the department and established the first serpentarium in Central Asia, where regular venom collection from snakes was arranged. Boris Vladimirovich conducted scientific studies on the biology and characteristics of poisonous snakes.

2. Method

This study employed an observational approach to investigate the captive lifestyle of reptiles in the Tashkent Zoo. The research aimed to document the behaviors, activity patterns, and habitat usage of reptiles housed within the zoo premises.

Observations were conducted over a specified period, during which trained observers systematically observed reptiles across different enclosures within the zoo. Observations were carried out at various times of the day to capture diurnal and nocturnal behaviors, ensuring a comprehensive understanding of the reptiles' activity patterns.

Behavioral data were recorded using standardized ethological techniques. Observers documented behaviors such as feeding, locomotion, basking, social interactions, and any abnormal behaviors indicative of potential welfare issues. Data were recorded in real-time and supplemented with notes to provide context and detail regarding observed behaviors.

Additionally, environmental factors such as temperature, humidity, lighting conditions, and enclosure features were noted during observations to contextualize reptile behaviors and assess the adequacy of captive conditions.

To ensure data reliability and minimize observer bias, interobserver reliability tests were conducted, and observers underwent training to familiarize themselves with the ethogram and observational protocols.

Data analysis involved descriptive statistics to summarize observed behaviors and activity patterns across different reptile species and enclosures. The findings from the observational study provide valuable insights into the captive lifestyle of reptiles in the Tashkent Zoo, informing future management practices and welfare considerations for these animals.

3. Results and Discussion

3.1. Reptile types of the Tashkent Zoo

While specific information about the reptile species housed in the Tashkent Zoo may vary over time due to changes in exhibits and acquisitions, it typically hosts a variety of reptiles indigenous to Central Asia and beyond. Presented below is a general overview of the types of reptiles currently in the care of the Tashkent Zoo [10].

1) **Central Asian tortoise:** The Central Asian tortoise has a high domed shell covered in yellow scutes, or scales, which shed as the tortoise matures. These scutes are dark brown with yellow edges, similar to the scales on the legs. They have 13 scutes, which is normal for most tortoises and turtles. The Central Asian Tortoise has four toes and claws that are used to dig holes for shelter [11].
2) **Green iguana:** While not native to Central Asia, green iguanas are popular in zoos

due to their striking appearance and relatively docile nature. They require warm, tropical environments, which zoos can replicate in their exhibits. Green iguanas may grow about five feet in length and weigh almost 20 pounds. Although these greenish, gray-toned mammals appear bulky, they are fast-moving creatures capable of expertly evading natural predators before finding refuge behind dense foliage. Despite being herbivores, green iguanas have keen teeth, muscular jaws, and strong tails. It is noteworthy to note that the green iguana's tail segment accounts for around half of its entire length. The reptile also makes good use of its tail, activating it as a form of protection. Green iguanas may move this appendage in a frightening whip-like motion to fend off possible predators [12].

3) **Various snake species:** The Tashkent Zoo may house a variety of snake species, including native Central Asian snakes such as the Caspian cobra or non-native species like the Boa constrictor or Ball python [12].
4) **Lizards:** Lizards are diverse and can be found in various habitats worldwide. The Tashkent Zoo may have exhibits featuring lizards such as the monitor lizard, bearded dragon, or various gecko species [13].
5) **Crocodiles and alligators:** While not native to Central Asia, zoos often house crocodiles or alligators in specialized exhibits. These large reptiles are typically showcased for educational purposes [14].
6) **Turtles and terrapins:** Turtles and terrapins are common in zoos due to their popularity and relatively easy care. One may find various species of turtles from different parts of the world, including Central Asia.

It is essential to note that the specific reptile species housed in the Tashkent Zoo may change over time, and it is best to check with the zoo directly or their website for the most up-to-date information on their reptile exhibits. Additionally, zoos often participate in conservation programs to help protect endangered reptile species and raise awareness about the importance of reptile conservation.

3.2. Animal care guidelines in Tashkent Zoo

Analyzing the regulations regarding the adoption of reptiles at the Tashkent Zoo in Uzbekistan, zoos follow strict guidelines and standards for the care and management of animals, including reptiles. Furthermore, research has demonstrated that the presence of visitors may affect how zoo animals behave, including Nile crocodiles [9]. For zoos like as the Tashkent Zoo, it is important to comprehend the consequences of visitor presence since it might affect the behavior and general well-being of confined reptiles. Zoos may decide how best to engage with visitors and put policies in place to improve animal welfare by assessing how visitors affect reptile behavior.

These guidelines often include aspects such as:

1) **Habitat requirements:** Ensuring that the enclosures provided for reptiles meet their specific needs in terms of size, temperature, humidity, substrate, lighting, and other environmental factors.
2) **Nutrition:** Providing a balanced and appropriate diet that reflects the natural dietary habits of the reptiles, including live prey, fruits, vegetables, and supplements as needed.
3) **Healthcare:** Regular veterinary check-ups, preventive healthcare measures, and prompt treatment of any illnesses or injuries.
4) **Enrichment:** Providing environmental enrichment to stimulate natural behaviors and prevent boredom, which can include items such as climbing structures, hiding spots, and opportunities for foraging.
5) **Social needs:** Ensuring that social animals have appropriate companionship, while also considering the need for solitude in some species.

6) **Education and conservation:** Using captive reptiles as educational tools to raise awareness about their natural history, conservation status, and the importance of habitat preservation.
7) **Breeding programs:** Participating in breeding programs for endangered species to help maintain genetic diversity and potentially reintroduce individuals into the wild.

3.3. Purposes of reptile care in Tashkent Zoo

Saving reptiles in zoos serves several important purposes:

1) **In conservation:** Many reptile species are endangered or threatened due to habitat loss, pollution, climate change, and other human activities. Zoos often participate in breeding programs called captive breeding, where they breed endangered reptiles to increase their numbers and genetic diversity. This helps prevent extinction and can eventually support reintroduction programs into the wild. With an emphasis on conservation breeding and the larger role that animals play in the health of ecosystems, zoos and aquariums are in a unique position to directly contribute in conservation efforts for vulnerable species throughout the world [15]. Furthermore, zoos are vital locations for ex situ conservation, making a substantial contribution to the preservation, scientific study, rescue, and reintroduction of threatened and endangered wild species [16].
2) **In education:** Zoos provide an opportunity for people to learn about reptiles up close. By seeing these animals in person and learning about their biology, behavior, and conservation status, visitors develop an appreciation for reptiles and become more aware of the need to protect them and their habitats. Zoo visitors may get up close and personal with animals while learning about their biology, behavior, and state of conservation. This can help visitors develop a greater respect for reptiles and a greater understanding of the need to preserve their ecosystems. Visitor attitudes and actions toward conservation efforts can be positively impacted by interacting with animals, taking in realistic exhibits, and interacting with zoo personnel and programs [17]. Guided tours and other educational events in zoos can elicit good emotional reactions in visitors and pique their curiosity about animals and conservation [18]. The desire of tourists to participate in conservation activities after their visit to the zoo may be significantly impacted by these instructive experiences [19].
3) **In research:** Zoos often conduct scientific research on reptiles to better understand their biology, behavior, and health. This research can contribute to conservation efforts both in captivity and in the wild. For example, studying captive reptiles can provide insights into their reproduction, diet, and disease management, which can then be applied to wild populations. Researching reptiles in captivity offers important biological insights into a range of areas, including as nutrition, reproduction, and disease control, which may be applied to improve wild populations. Critical areas, such as the changes in gut microbiota composition between captive and wild populations, have been illuminated by research on captive reptiles, providing crucial information for the conservation management of species such as crocodile lizards [20]. Furthermore, studies conducted on disease outbreaks in captive reptiles have yielded important information on diseases such as *Nannizziopsis guarroi* and *Ophidiomyces ophiodiicola*, which may be used to guide disease management plans for populations of reptiles in both captivity and the wild [3].
4) **In Species Survival Plans (SSPs):** Zoos participate in SSPs, which are cooperative breeding programs for endangered species. These programs help ensure that captive populations of endangered reptiles are genetically healthy and sustainable over the long term. By carefully managing breeding pairs and sharing individuals between

institutions, zoos can maintain healthy populations of endangered reptiles and reduce the risk of inbreeding. This is accomplished by carefully planned breeding initiatives that prioritize preserving genetic variety and viability in zoo animal populations [21]. In order to maintain genetic variety, zoos establish controlled breeding programs for threatened or endangered species [21]. The danger of inbreeding can be decreased by using common population management techniques, such as keeping breeding couples or groups for repeated breeding and transfer plans, which enhance mate familiarity and breeding success [22].

5) **In public engagement:** Seeing reptiles in zoos can inspire people to take action to protect them and their habitats. Zoos often engage the public through interactive exhibits, educational programs, and conservation initiatives, encouraging visitors to support conservation efforts and make environmentally responsible choices in their daily lives. Studies have shown how vital zoos are for recognizing and treating health problems in reptiles, such as the part played by infections like Pseudomonas aeruginosa in crocodile lizard skin ulcer illnesses, and for providing control measures that aid in conservation efforts [23]. Zoos also use their housed frogs to educate the public about conservation issues and to rally support for the preservation of these species [24].

Overall, saving reptiles in zoos is essential for their conservation, education, research, and public engagement. By working together, zoos play a vital role in protecting reptiles and raising awareness about the importance of biodiversity conservation.

4. Conclusion

Zoos play a crucial role in conserving endangered reptile species through captive breeding programs, education, research, and species survival plans. These programs help increase genetic diversity and prevent extinction, while also providing an opportunity for visitors to learn about reptiles in person. Zoos also conduct scientific research to understand their biology, behavior, and health, contributing to conservation efforts. SSPs ensure long-term genetic health and sustainability of captive populations of endangered species. Public engagement through interactive exhibits and conservation initiatives encourages environmentally responsible choices. Overall, zoos play a vital role in biodiversity conservation.

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