



Short Communication

The Captive Roe Deer Successfully Bred Naturally after Being Released into the Wuling Mountain Nature Reserve in Beijing

Feng Gao^{1*}, Xin Min Fang², Zhi Hong Ma², Dehuai Zhang³¹Beijing Wildlife Rescue Center, Beijing, 101300, China²Miyun District Wuling Mountain Nature Reserve Management Office (Beijing Miyun District Wuling Mountain Forest Farm), 101500, China³Miyun district landscaping Bureau, 101500, China

Article Information

Received 27 September 2024

Revised 10 October 2024

Accepted 21 October 2024

Available online 07 March 2025

(early access)

Authors' Contribution

GF conceived the project, responsible for the field animal survey and data analysis, and wrote the first draft. All authors have read and endorsed the final version.

Key words

Roe deer, Reintroduction, Wuling mountain nature reserve

ABSTRACT

Reintroduction is an important wildlife conservation method, through artificial methods to reintroduce some endangered animals to their extinction places, form stable populations, and save endangered or extinct precious wildlife. In the past 20 years, reintroduction has become a common way to restore local natural ecosystems and improve the food chain. In order to enrich the wild population of roe deer and regulate the population structure, we carried out the reintroduction project of roe deer. This paper recorded the survival and natural reproduction of roe deer in Wuling mountain nature reserve.

Reintroduction of wild animals is one of the means to protect biodiversity and plays an indispensable role in saving and protecting rare and endangered species. According to the International Union for Conservation of Nature (IUCN, 1998), the global reintroduction success rate for captive-born wild animals is approximately 44%, and for ungulates approximately 64% (Beck *et al.*, 1994). Since the 1990s, China has achieved success in the reintroduction of rare wild animals such as Père David's Deer, crested ibis and Chinese alligator. In the past 20 years, the reintroduction project has included birds, mammals, amphibians and reptiles, and gradually realized that the goal of restoring the ecosystem can be achieved through the reintroduction of wild animals. Carnivores are stewards of ecosystems, and reintroduction of carnivores is also considered an important step in restoring ecosystem integrity (Noss *et al.*, 1996; Miller *et al.*, 1999; Terborgh *et al.*, 2001). With the process of urbanization in Beijing, the animal's habitat was continuously destroyed, and

the North China leopard completely disappeared from Beijing in the 1990s. Beijing's wildlife authorities are trying to restore key mountain habitats and connect separated habitats together, with the goal of luring North China leopards back to Beijing from Shanxi and Hebei provinces. Roe deer is one of the important foods (49.56%) of North China Leopard (Yin, 2023). Roe deer are medium-sized deer prevalent across Eurasia, serving as an essential component of the food web. In Beijing, conservation efforts have largely focused on understanding the deer's habitat preferences, activity patterns, and spatial distribution. In Beijing, Beijing Wildlife Rescue Center has been instrumental in captive breeding and reintroduction efforts for several endangered species, including roe deer.

Materials and methods

In September 2020, Beijing Wildlife Rescue Center launched the reintroduction study of captive roe deer in the "Beijing Fasting Artificial breeding site Wildlife Disposal" project. Subsequently, 10 roe deer were released to Wuling Mountain Nature Reserve in two batches on June 22, 2021 and August 17, 2021. Beijing Wuling Mountain Nature Reserve is located in the east of Miyun District of Beijing (40°34' ~ 40°38' N, 117°19' ~ 117°25' E), with a total area of 41.5 km². There are 167 species of terrestrial vertebrates of 22 orders, 65 families, including 7 orders, 18 families and 32 species of mammals found in the area.

The satellite positioning signal transmitter (Hunan Global Trust, solar and battery dual power supply,

* Corresponding author: radio6182000@163.com
0030-9923/2025/0001-0001 \$ 9.00/0



Copyright 2025 by the authors. Licensee Zoological Society of Pakistan.

This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

HQAN40S animal collar, 160g) was used to monitor animal activity track and field status.

Results and discussion

Post-release monitoring revealed that the reintroduced roe deer predominantly stayed near the release site within the reserve. Out of the ten reintroduced deer, two deaths were reported one due to poaching and another from unknown causes and one deer went missing, resulting in a 70% survival rate. Notably, on June 22, 2023, a female roe deer with two fawns was observed in the reserve (Fig. 1), indicating successful breeding of the reintroduced population (Fig. 2).

Through direct field observation, infrared camera monitoring and tracking satellite launcher monitoring, it was found that reintroduced roe deer mainly moved 36 km² in the protection area and surrounding area near the wild release site of Wuling Mountain Nature Reserve.



Fig. 1. Reintroduced roe deer activities in winter.

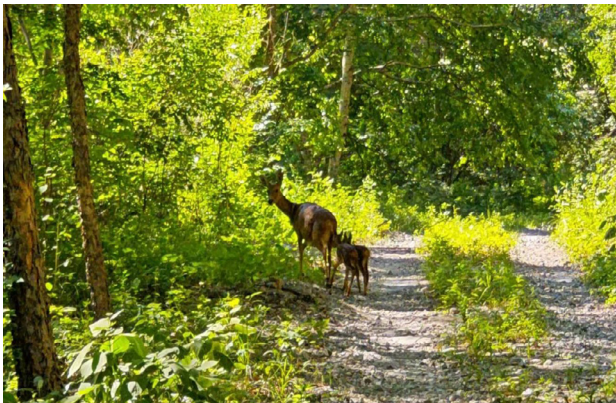


Fig. 2. Successful breeding of re-introduced Roe deer (left

1, ♀) in Wuling mountain nature reserve.

Conclusion

The ultimate goal of wildlife reintroduction is to establish self-sustaining wild populations (Fischer *et al.*, 2000). The wild release of captive animals is a systematic project that costs a lot of money, time and manpower. The process of release cannot be separated from the participation of biologists, the policy support of relevant authorities and the effective organization and management of the release project. The success of reintroduction programs is difficult to assess because it requires long-term data and generally accepted criteria for success. The results of the release of captive roe deer in Wuling Mountain Nature Reserve show that the project is feasible, and long-term monitoring after release is the key to evaluate the success of the project.

DECLARATIONS

Acknowledgments

We would like to thank the Beijing Miyun District Landscaping Bureau and the Beijing Miyun District Wuling Mountain Nature Reserve Management Office (Beijing Miyun District Wuling Mountain Forest Farm) for their help in carrying out the project. Thanks to Dehuai Zhang, Xinmin Fang, Zhihong Ma, Guoqing Zhao and other staff members for their warm hospitality and contribution to the data recording. Finally, we would like to thank the anonymous reviewers for their constructive comments on this paper.

Funding

This research was supported by a financial project of Beijing Terrestrial Wildlife Rescue Breeding Daily Operation and Maintenance Project (11000022T000000430317) and Beijing Municipal Bureau of Landscaping.

Animal ethics Declaration

The experiment was approved by Beijing Municipal Bureau of Landscape and Afforestation in advance, passed the review of animal ethics, and was in line with the Wildlife Protection Law of the People's Republic of China.

Statement of conflict of interest

The authors have declared no conflict of interest.

References

- Beck, B.B., Rapaport, L.G., Stanley, P.M.R. and Wilson, A.C., 1994. Reintroduction of captive-born animals. In: *Creative conservation: Interactive management of wild and captive animals* (eds. P.J.S. Olmey, G.M. Mace and A.T.C. Feistner).

- London: Chapman and Hall, pp. 265-286. https://doi.org/10.1007/978-94-011-0721-1_13
- Fischer, J.D. and Lindenmayer, B., 2000. *Biol. Conserv.*, **96**: 1–11. [https://doi.org/10.1016/S0006-3207\(00\)00048-3](https://doi.org/10.1016/S0006-3207(00)00048-3)
- IUCN, 1998. *Guidelines for reintroductions*. IUCN, Gland, Switzerland and Cambridge, UK. <http://www.iucn.org/hemes/ssc/publications/policy/reinte.htm>
- Miller, B., Ralls, K., Reading, R.P., Scott, J.M. and Estes, J., 1999. *Anim. Conserv.*, **2**: 59–68. <https://doi.org/10.1017/S1367943099000360>
- Noss, R.F., Quigley, H.B., Hornocker, M.G., Merrill, T. and Paquet, P.C., 1996. *Conserv. Biol.*, **10**: 949–963. <https://doi.org/10.1046/j.1523-1739.1996.10040949.x>
- Terborgh, J., Lopez, L., Nunez, P., Rao, M., Shahabuddin, G., Orihuela, G., Riveros, M., Ascanio, R., Adler, G.H., Lambert, T.D. and Balbas, L., 2001. *Science*, **294**: 1923–1926. <https://doi.org/10.1126/science.1064397>
- Yin Q Q., 2023. *Genetic status, feeding habits and human-animal conflict of North China leopard population in fragmented habitat in the Loess Plateau*. Master's thesis, Qufu Normal University, Qufu, China.

Online First Article