





*Plantago fengdouensis* (Z.E. Chao & Yong Wang) Yong Wang & Z. Yu Li in Jiangnan County. Photo: Xuyan Chen.

was considered the only herb that became extinct as a result of the construction of the Three Gorges Dam. The Shenzhou XIII manned spacecraft carried seeds of the species for mutation breeding in November 2021, but the seeds returned from space had a low germination rate.

In January 2024, we discovered two previously unknown populations of *P. fengdouensis*, comprising a total of c. 100 individuals, on two islands 5 km apart in the Yangtze River, in Jiang'an County. Local authorities need to protect these two small populations, and further surveys are needed to locate any other wild populations.

We collected 400 seeds from the two islands and planted them in a greenhouse at Yibin University, for ex situ conservation. We have also collected DNA material from both populations, for genetic investigation, and we will perform propagation experiments to support potential reintroduction.

We thank the Natural Science Foundation of China (32001390) for their support.

GANG GAO  ([gaogang870522@163.com](mailto:gaogang870522@163.com)) and XUYAN CHEN   
Faculty of Agriculture, Forestry and Food Engineering, Yibin University, Yibin, Sichuan, China

This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/).

### Alliance of protected areas for better landscape conservation outcomes in northern Saudi Arabia

Managing vast arid and sparsely populated landscapes for multiple objectives such as wildlife conservation and nature-based tourism presents unique challenges. Five organizations in northern Saudi Arabia manage a single or several large protected areas totalling c. 298,000 km<sup>2</sup>: Imam Turki Bin Abdullah Royal Nature Reserve Development Authority, King Salman Bin Abdulaziz Royal Reserve, NEOM, Prince Mohammed Bin Salman Royal Reserve and the Royal

Commission for AlUla. A network of the protected area managers of these big five reserves (B5R) was formed to exchange ideas on management and explore collaborations in rewilding initiatives, habitat restoration, transboundary conservation planning, research and law enforcement. Several of the protected areas have rewilding plans involving large ungulates, birds (e.g. Asian houbara *Chlamydotis macqueenii*) and apex predators (e.g. Arabian leopard *Panthera pardus nimr*).

The first B5R meeting, hosted by the Royal Commission for AlUla, was held in September 2022 and the second meeting on 29–30 November 2023 in Sharma, Tabuk Province, hosted by NEOM. On the first day of the recent meeting, the c. 30 participants were updated on the planning/approval frameworks, conservation programmes and tourism initiatives of the reserves. Breakout groups reviewed key alignment issues such as compliance, ecological connectivity between the five reserves, protected area zoning and tour operator engagement. The day finished with a visit to various NEOM initiatives: a re-greening site, a plant nursery, and a large pre-release enclosure holding various species of free-roaming ungulates and common ostriches *Struthio camelus*.

On the second day, to ensure a consistent approach to conservation management across the five reserves, there was discussion of global certification instruments for protected areas such as the IUCN Green List of Protected and Conserved Areas, The Global Biodiversity Standard and Dark Sky certification. Research, data collection and long-term ecological monitoring were also deliberated, and consensus reached with regard to research priorities and data collection methods.

Finally, there was an agreement to establish working groups on climate change, law enforcement and compliance, research, habitat restoration and rewilding. Each B5R member will take turns to host future meetings and the group is open to additional nature reserves joining the network, to share best practices in protected area management involving arid landscapes.

BENJAMIN P. Y.-H. LEE<sup>1</sup>  ([b.yihann@rcu.gov.sa](mailto:b.yihann@rcu.gov.sa)),  
EMMA GALLACHER<sup>1</sup> , JOSH KEMPINSKI<sup>1</sup> , LOURENS VAN ESSEN<sup>1</sup>,  
MOHAMMED A. ZAAAROUR<sup>1</sup>, A. CHRISTY WILLIAMS<sup>2</sup>,  
PAUL A. MARSHALL<sup>2</sup> , DUARTE FIGUEIREDO<sup>3</sup>, PETER LEITNER<sup>4</sup>,  
YEHYA K. SHEHADEH<sup>5</sup> and STEPHEN J. BROWNE<sup>1</sup>  
<sup>1</sup>Royal Commission for AlUla, AlUla, Saudi Arabia.  
<sup>2</sup>NEOM Nature Reserve, Tabuk, Saudi Arabia.  
<sup>3</sup>King Salman Bin Abdulaziz Royal Reserve, Riyadh, Saudi Arabia.  
<sup>4</sup>Prince Mohammed Bin Salman Royal Reserve, Al Wajh, Saudi Arabia.  
<sup>5</sup>Imam Turki Bin Abdullah Royal Nature Reserve Development Authority, Riyadh, Saudi Arabia

This is an Open Access article, distributed under the terms of the Creative Commons Attribution licence [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/).