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### Rediscovery of the Critically Endangered *Rhododendron auritum* in Tibet

With the support of the Second Qinghai-Tibetan Plateau Integrated Scientific Expedition Project (2017QZKK0502), field investigations were conducted in June 2021 and June 2022 for *Rhododendron auritum* Tagg, which is categorized as Critically Endangered on *The Red List of Rhododendrons* (Gibbs et al., 2011, Botanic Gardens Conservation International). The type specimen of *R. auritum* was collected by Frank Kingdon-Ward in 1924 in Pemako Chung in Milin County, south-east Tibet, and was deposited in the Royal Botanic Garden Edinburgh in 1932. Since then, no more information on this species had been recorded in the wild. Although we were unable to explore the type location because Pemako Chung was seriously damaged during an earthquake that occurred in 1950, we have discovered two additional sites with the species, in Medog County, Tibet.

In June 2022, we discovered a previously unknown population of *R. auritum*, comprising < 100 individuals, in Gedang, at the edge of a fir forest. This population is exposed to disturbance from anthropogenic activities, including road construction. With a population comprising 29 individuals discovered in Lage in 2021, there are now two known populations of *R. auritum* in Medog county, 43 and 62 km from the type location.

Local authorities need to take action to conserve these two small populations. We have collected seedlings from Lage and planted them in the Kunming Botanical Garden, for ex situ conservation. We have also collected DNA material from both populations, for investigation of the species'



Flowers of *Rhododendron auritum* Tagg. Photo: Zi Wang.

conservation genetics. Further investigations are needed to locate any other potential wild populations. In addition, we will perform propagation experiments once seeds are mature in the autumn, and some seeds will be preserved in the Germplasm Bank of Wild Species in Kunming Institute of Botany.

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### In vitro conservation of *Paphiopedilum wenshanense* at Kunming Botanical Garden, China

The orchid *Paphiopedilum wenshanense* Z. J. Liu & J. Yong Zhang is categorized as a Plant Species with Extremely Small Populations and a grade I national key protected plant. As a result of overexploitation for its beautiful flowers, *P. wenshanense* has extremely small populations, and its natural distribution range is limited. Additionally, its habitat is fragmented by urbanization. Only 431 wild individuals of *P. wenshanense*, in three populations, are known, in Shiping and Yanshan Counties in Yunnan Province, China. The three populations are not located within a protected area.

Many threatened plants, including *P. wenshanense*, have weak reproductive capacity in the wild. Tissue culture is an efficient way to multiply such threatened orchid species for conservation purposes. In June 2022, with the support of a conservation programme (grant number: 2021SJ14X-09) of Yunnan Forestry and Grassland Bureau, aseptic seed germination protocols for *P. wenshanense* were successfully developed in Kunming Botanical Garden, Kunming Institute of Botany, Chinese Academy of Sciences. Germination began after 30 days, with a germination rate of 70%, and root development after an additional 30 days. Seedlings could be planted after a further 2 months of growth, and survival rate was c. 95%.

Following this success, population reintroduction or reinforcement measures can be used to assist the recovery of this threatened species in the wild. We are planning to establish a near situ conservation population of *P. wenshanense* within the Wenshan Laojun Mountains National Nature Reserve through working with the local forestry and grassland bureau. In addition, conservation of the remaining wild

populations and their habitats is required. Public education is also necessary, particularly for local residents, to prevent further exploitation of this plant species. To encourage the legal use or commercialization of this beautiful but threatened species, we will be sharing our knowledge and expertise with local farmers and planting enterprises.

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### Conserving *Cypripedium forrestii*, an orchid species endemic to China

The flora of the Hengduan mountains of China includes the lady's slipper orchids, *Cypripedium* spp., many of which are endemic to China. Over-collected by plant enthusiasts, used medically by local people and disturbed by natural disasters, many *Cypripedium* species are threatened. *Cypripedium forrestii* was first collected on Yulong Snow Mountain near Lijiang in north-west Yunnan. This sacred mountain for the Naxi people has long been a famous scenic spot and the only known habitat of *C. forrestii*. Later, another habitat was found in Haba Mountain of Diqing, c. 20 km away. *Cypripedium forrestii* has a narrow distribution and extremely small population, and is categorized as Critically Endangered on the IUCN Red List and on the threatened species list of China's higher plants. The absence of systematic field surveys and the small number of herbarium records of *C. forrestii* have hampered conservation of this species.

In July 2022, as a part of the conservation project Plant Species with Extremely Small Populations supported by Yunnan Forestry and Grassland Bureau (2021SJ14X-09), we surveyed the potential habitat of *C. forrestii* in north-west Yunnan to update knowledge of this threatened species. We found the species in four locations. The population on Yulong Snow Mountain comprises c. 60 individuals and is threatened by potential landslides and tourism. On Haba Snow Mountain of Diqing Tibetan Autonomous Prefecture, we found several populations, with a total of > 1,000 individuals. We also found the species in two locations, with c. 100 individuals in each, near Bitu Lake and beside a country road near Shangri-la city.

Anthropogenic disturbance and habitat degradation are the main threats to *C. forrestii*. Most of the populations on Haba Mountain are large in size, little disturbed, healthy and self-sustainable. These populations will be valuable for artificial propagation and reintroduction projects. Preliminary conservation work for the species, both in situ and ex situ (artificial pollination and tissue culture), is being carried out by Kunming Institute of Botany and Lijiang Alpine Botanic Garden. We plan to carry out further research on *C. forrestii*, especially on population dynamics, genetic structure and pollination ecology, to guide future conservation of the species.

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### Remarkable range expansion of the black woodpecker *Dryocopus martius* in Spain

The black woodpecker *Dryocopus martius* has a large Eurasian range, occurring in temperate and boreal forests, and is categorized as Least Concern on the IUCN Red List. Along the southern fringes of its range, populations tend to be fragmented and rely on remnant mature forest patches, usually in highlands. This was the situation in Spain in the 1980s and 1990s, when the species was only known from two small populations, separated by 150 km: the Pyrenean and the Cantabrian.

But in the 2010s, monitoring revealed an unexpected range expansion. The black woodpecker was recorded breeding far from its former known range, leading to coalescence of the Pyrenean and Cantabrian sub-ranges. Previously considered a typical mountain and remote forest dweller, the species has colonized lowland, secondary forests and commercial plantations, and can even be found at sea level. This expansion is ongoing, with news of the species' establishment in Central-Mediterranean Spain, c. 250 km south of the previously known range. Surveys in February–June of 2021 and 2022 in this area have inventoried occupied territories and breeding cavities.

The biological or demographic causes are unknown, but the species' range expansion was simultaneous with the maturation and encroachment of forests as a result of a reduction