An Old World Newly Discovered

REVEALING THE MYSTERIOUS AND IMPERILLED BIODIVERSITY OF THE GREATER MEKONG

Text & Photos Dr Jodi Rowley
Australian Museum Research Institute

The rivers, valleys, mountains and forests surrounding Southeast Asia's Mekong River are home to an amazing diversity of plants and animals, and much of this diversity is only just being revealed. Between 2012 and 2013, biologists working in the area discovered an incredible 367 new species, highlighting just how little we really know about the biodiversity of the region.

The mighty Mekong River flows through Cambodia, Laos, Myanmar, Thailand, Vietnam and parts of southern China. This region, the Greater Mekong, is known for iconic wildlife such as the tiger, Asian elephant and Irrawaddy dolphin, but the newly-discovered species are as mysterious as they are unusual. Among the 290 plants, 24 fishes, 21 amphibians, 28 reptiles, one bird and three mammals just discovered are a blind huntsman spider, a giant squirrel, a rainbow lizard, a salmon-coloured orchid, a flying frog and a hunchbacked bat.

These fantastic discoveries are the result of ongoing research by biologists from around the world striving to document the Greater Mekong's unique biodiversity. Many of the discoveries were made during recent expeditions into previously

Between 2012 and 2013, biologists working in the area discovered an incredible 367 new species...

The edge of the Nui Ong Nature Reserve: The major vegetation types at the nature reserve are evergreen forest, semi-evergreen forest and deciduous forest. The most common forest type is lowland evergreen

The continued survival of species is threatened by further habitat loss and degradation due to encroachment (e.g., livestock grazing and collection of forest products) and habitat isolation

biologically unexplored areas. They involved days of hiking through rugged terrain, along winding rivers and up steep mountains.The discoveries often involve blood (from leech, mosquito and other invertebrate bites), sweat and possibly even a few tears.

To discover the tiny brown Botsford's leaf-litter frog *(Leptolalax botsfordi)*, my colleagues and I climbed the dizzying, mist-shrouded peak of the highest mountain in Vietnam and spent nights searching through the leaf litter in the mud and rain. To discover other frog species, we had to walk for days through the forest, sink up to our knees in mud, wade through swamps and scale slippery, wet waterfalls miles from the nearest village. Similar adventures lie behind many of the other new discoveries.

However, not all of the newly-discovered species were found in the most remote reaches of the region. The Cambodian tailorbird *(Orthotomus chaktomuk)*, a small, grey bird with a reddish tuft on its head, was discovered on the outskirts of Cambodia's capital city, Phnom Penh. Concealed in dense scrub, the tiny bird had, until recently, evaded biologists. Helen's flying frog *(Rhacophorus helenae)*, a large, green frog adapted for life in the trees was also discovered near a city, its forest home criss-crossed with trails and a road running nearby. Other species weren't discovered in the wild at all; the Laotian giant flying squirrel *(Biswamoyopterus laoensis)* was discovered at a local bush-meat market.

The discoveries often involve blood (from leech, mosquito and other invertebrate bites), sweat and possibly even a few tears.

RIGHT *Leptolalax botsfordi* occurs at higher elevations than any other species in the genus. If this species is truly restricted to a narrow, high-elevation band, it is likely to be particularly vulnerable to the effects of climate change

FAR RIGHT Helen's tree frog (*Rhacophorus helenae*) is a flying frog found in low-lying forests of southern Vietnam, from Nui Ong Nature Reserve, Bình Thuan Province to jungle in Tân Phú District, Đang Nai

Regardless of where a species is found, how does a biologist know when they've come across a new species? Sometimes, it can be pretty obvious. For example, when I first saw a Botsford's leaf-litter frog, I was almost certain that I held an unnamed species in my hand. I'd never seen such a plump leaf-litter frog before, nor had I heard anything like the chirping of the males (like birds, each frog species has a different call). So it didn't come as a surprise to me when I compared this tiny brown frog to all other closely related species and confirmed that it was indeed new to science. But not all species discoveries are so immediate.

Sometimes, it's not until biologists return from the wilds and spend months, or even years, examining the species and comparing it with related species, that they uncover its true identity. Subtle differences in the shape of its toes or the pattern on its thighs, or in its DNA or behaviour can also provide vital evidence.

The first time I saw Helen's flying frog, I actually mistook it for a related species, the black-webbed flying frog (*Rhacophorus kio*). I was excited to see the animal, but I didn't think we'd just made a scientifically important discovery. It wasn't until an entire year later, when I found the real black-webbed flying frog in northern Vietnam, that I realised I may have made a mistake with my initial identification.

Although the black-webbed flying frog looks very similar to Helen's flying frog, there were a couple of small differences that made me think again. Unlike the black-webbed flying frog, which has a yellow belly and thighs, Helen's flying frog has a white belly and greenish thighs. To confirm our suspicions, we compared the appearance and DNA of Helen's flying frog to other large, green flying frogs throughout the region, and only then published a scientific paper to officially describe, and name, the new species.

Unfortunately, biologists such as my colleagues and I are racing against time to document species in the Greater Mekong before they are lost. Many, or perhaps most, of the newly described species are under serious threat from extinction. The greatest threat is habitat loss – although collection for the wildlife trade, introduced species, hydropower development, disease, pollution and climate change all pose significant threats to the biodiversity of the Greater Mekong. While some plant and animal species are capable of living in human-modified habitats, many species require relatively undisturbed habitats to survive. It goes without saying that species adapted for life in the trees, such as Helen's flying frog and the Laotian giant flying squirrel, for example, can't live without trees.

Simply knowing a species exists is a vital first step towards its conservation, and these species discoveries will hopefully enable much-needed conservation actions to be directed towards the species most in need. While rapid social and economic development continues in the region, I just hope these 367 new species have been discovered in time to protect them. ◆ AG

DR JODI ROWLEY, a biologist with a focus on Australasian amphibian diversity, ecology and conservation, has conducted 22 expeditions in Southeast Asia (mainly Vietnam) in search of amphibians. She joined the Australian Museum in 2008, and her research continues to uncover and document amphibian biodiversity, assess conservation status and inform conservation decisions.