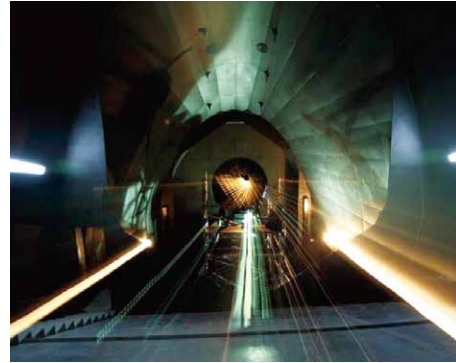


In This Issue

Headline | CAS Issues “Ten Articles of Basic Research”

CAS has long taken basic research as the foundation and source of S&T innovation, and the cornerstone for its own development. As a natural response to the nation’s requirements and the demands from the country’s social and economic development in the new era, recently, CAS revamped its layout in this field, and adopted a guideline document to strengthen basic research at its institutions. In this issue, *BCAS* gives an overview of this document dubbed as the “Ten Articles of Basic Research”.

Please turn to page 132 for detail.



Special | Biodiversity Preservation

Despite the uncertainties imposed by Covid-19, COP15, the 15th Conference of the Parties to the UN *Convention on Biological Diversity* (CBD), is set to occur in two sessions: The part I of the COP15 will be held virtually from October 10 to 15, and the part II to happen face-to-face from April 25 to May 8, 2022 in Kunming, China, setting a stage for the stake holders worldwide to agree on a new post-2020 global biodiversity framework. To highlight the COP15 theme “Ecological Civilization: Building a Shared Future for All Life on Earth”, *BCAS* is presenting a group of special reports here to illustrate the efforts by Chinese scientists to balance the preservation of biodiversity and the development of human society, and the role of environmental DNA metabarcoding in monitoring biodiversity and beyond.

To Balance Mangroves Protection and Local People’s Livelihoods

As one of the niches hosting incredible biodiversity, mangroves guard the coastline and are home to many living things; however, global mangroves have been taking blunt from the aquaculture industry and shrinking rapidly in the last two decades. It is becoming increasingly urgent to balance the need for economic development and ecological protection of mangrove forests. In this issue, Dr. FAN Hangqing from the Guangxi Mangrove Research Center (GMRC), Guangxi Academy of Sciences, presents a successful paradigm of mangrove eco-farming that goes easy on the local dwellers and helps mangrove restoration.

Please turn to page 138 for more detail.



Photo by SU Bo

To Keep the Smile of Yangtze Finless Porpoise

At debate has been the effectiveness of *ex situ* preservation of wildlife species, particularly higher mammals like cetaceans, which are believed to be of extraordinary intelligence, and hence would suffer from the arranged settings if put into artificial environments. Therefore, *in situ* preservation was favored by the scientific community over *ex situ* preservation in tradition.



Image by courtesy of IHB

A team at the CAS Institute of Hydrobiology, however, groped their way out after decades' efforts to save the lives of the Yangtze finless porpoise, which was once seriously endangered, via *ex situ* preservation. When the population of this species declined to a critical point, the team had no choice but to shelter the individuals at an experimental base for *ex situ* preservation, and fought to research and develop a set of technologies to secure the survival of the species, and maintain/recover the captive individuals' fertility. Now the *ex situ* populations are thriving and some individuals have been reintroduced to their native habitats.

For detail, please see page 144.

Follow the Trail of Environmental DNA

With years of accumulated experience, a good hunter can tell what animals are around from the tracks or traces left by them. Now, a well-trained molecular biologist can do equally well, or even better, by interrogating a subtler trail – the environmental DNA, or shortly eDNA, that can be from feces, mucus, skin cells,

or gametes (sperms or eggs). Using a new method known as eDNA metabarcoding, scientists now can recognize what animals are in the neighborhood by sequencing and analyzing these DNA fingerprints after sampling eDNA from various environments (*e.g.*, water, soil, the core of sediment or ice). More recently, scientists have shown how they use the vacuum to pluck DNA from the air near the zoos and accurately reveal what animals are around. To find out how it works and the many interesting things that eDNA can tell, please turn to page 151.

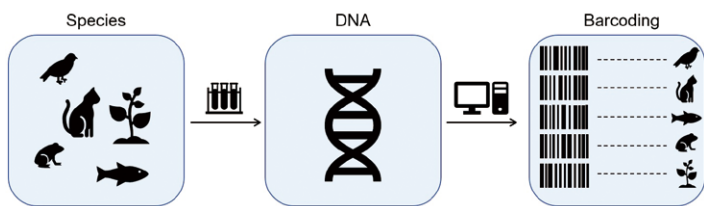


Image by YAN Fusheng

Carbon Policy | Exploring Pathways to Carbon Neutrality

During the general debate of the 75th United Nations General Assembly, Chinese President XI Jinping announced that China would strive to have its CO₂ emissions peak by 2030, and achieve carbon neutrality by 2060. To meet the dual target for carbon emission control, China faces with great challenges in incorporating its commitment to tackling climate change with its economic, social development and environmental goals. Towards that end, scientists have made great efforts to explore and identify feasible pathways. Here we present the results from the CAS Research Group on Sustainable Development, which has been working to explore policy options and establish mechanisms oriented towards a comprehensive transformation to a green, low-carbon circulation and high-quality development in various fields in an orderly manner.

The article, entitled *Carbon Neutrality-oriented Approach to Mid- and Long-term Low-Carbon Transition Towards the New Climate Change Goals* is a chapter extracted from the *China Sustainable Development Report 2020: Exploring Pathways towards Carbon Neutrality* (in Chinese) drafted by the Research Group and released by the Institutes of Sciences and Development (CASISD) under the Chinese Academy of Sciences (CAS). With permit from the Research Group, we are honored to translate this leading chapter into English, and publish it here to give the readership the team's analysis of the opportunities and challenges faced by China in addressing this dilemma, and the approach they proposed. Please refer to page 156 for detail.