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INTERNATIONAL COOPERATION

Joint Biodiversity Study

A study team, led by FANG Jingyun, a CAS academician with Peking University College of Urban and Environmental Sciences, and Prof. James Brown at University of New Mexico, reported their new findings of biodiversity distributions in the recent issue of *PNAS*.

Researchers investigated the species richness of plants grown in 60 major mountainous areas across China, and established a database showing the distribution of some 11,000 woody plants, in collaboration with local botanists. Not long ago, they studied two extensive databases of tree species in eastern Asia and North America, and found that species richness increases with environmental temperature and spatial scale. In particular,

they found that the number of species increases exponentially with environmental temperature, as predicted by the Metabolic Theory of Ecology (MTE) proposed by a research group led by James Brown at the University of New Mexico.

The findings suggest that the latitudinal trend of biodiversity is a consequence of MTE — one observes higher species richness close to the equator where the temperature is warmer, and lower species richness close to the poles where the temperature is colder. Further analysis also revealed interesting yet subtle differences between the two continents: Asia has higher species richness in warmer regional climates, whereas North America has higher species richness in colder climates.

Rhinovirus Recombination

Researchers at Institut Pasteur in Shanghai and in Paris discovered multiple and independent recombination occurrences between different types of rhinovirus separated from children with acute respiratory syndromes, which contribute to a high genetic variability. They also separated a large number of recombinant rhinoviruses among the viruses identified in the rhino-pharynx samples collected from the children with bronchitis and pneumonia.

Through the systematic study of the viruses responsible for acute respiratory infections, and in collaboration with the pediatric department of a Nanxiang district hospital in Shanghai, researchers from the Unit of Emerging Viruses have measured a prevalence of more than 50% for HRV-C. Among those, more than half include a variable length gene fragment belonging to rhinovirus-A in their 5' untranslated region. Such a ratio leads to the proposal of a new classification of HRV-C in two subspecies. By sequencing the complete genome of such viral subspecies, other recombination spots have been discovered. In addition, the discovery in the analyzed samples of concomitant HRV-A and HRV-C presence suggests that co-infection may generate recombination events in patients.

Chinese Scientists Study Amazon Rainforests

With the approval of the Chinese Academy of Sciences, the South China Botanic Garden, part of the Chinese Academy of Sciences, has recently launched a project to study the biodiversity in Peru. In collaboration with the National Agriculture University in Peru, Chinese scientists will collect species samples from Amazon rainforests. Meanwhile, China will invite Peruvian researchers to study in China, and stage joint seminars to discuss the transboundary protection of the biodiversity of tropical and subtropical rainforests, raising the research level of Peruvian researchers, and create a solid foundation for long term cooperation between the two countries.

The initiative will strengthen the collaborative research between China and Peru and

associated capacity building in biodiversity. The baseline investigation of the biodiversity of tropical rainforests in the upper reaches of the Amazon River will create a ground for studying the impacts of global change on regional biodiversity. The efforts will eventually result in the establishment of a biodiversity database that can be shared with Peruvian scientists, raising Peruvian scientists' research capability, and strengthening friendly relations between the two countries.

RESEARCH AND DEVELOPMENT

Gender Controlled Production of Red Deer



Researchers at Mongolian Pedigree Cattle Breeding Co. Ltd., Inner Mongolia Jianyuan Deer Industry, and Inner Mongolia University have harvested 108 male red deer from 284 female deer using gender control techniques, with a 100% success rate. The development is important for raising the quality and performance of red deer, and for reducing costs as well.

Researchers developed a process able to tell X semen from Y semen, and established a technical procedure for controlling the gender of frozen semen in a non-surgical manner. The gender controlled artificial insemination process has resulted in a conceiving rate of 67.5%. Researchers have also established an industrial standard for separating X/Y semen and producing gender controlled frozen semen for 5 major red deer species in the country.

According to a briefing, the gender control technique is able to prepare red deer X/Y semen for long distance low temperature shipping, with a purity as high as 90%, and a frozen semen vitality at 0.45. Three collaborators have also staged a large scale breeding demonstration in the country, and developed the needed capacity for producing gender controlled red deer semen at an industrial scale.

Capsule Like Robot

ZHANG Yongshun and coworkers at Dalian University of Technology have recently developed a capsule-like robot that can move vertically in intestines. The finding was reported in the 7th issue of *China Science E-edition: Technology Science*.

The robot is operated through the external magnetic field. Tests in pig intestines showed that the robot is able to move vertically in intestines with the help of external control, without causing injuries to the intestines. ZHANG said he and coworkers are now working on the key technologies that will make the robot work in a twisting environment possible. The new technology will eventually allow the robot to move freely in intestines, snapping shots, taking samples, and assisting doctors to make diagnosis. Currently with a size of 40mm x 15mm, the capsule-like robot will be further downsized for easy swallow.

Authenticating Traditional Medicines Using Fingerprint Spectrum

Multi-dimensional fingerprint spectrum for traditional medicines, jointly developed by CAS Changchun Institute of Applied Chemistry, Jilin University, and the Chinese Academy of Agricultural Sciences Institute of Special Products, has recently passed an approval check. Researchers have worked on the multi-dimensional fingerprint spectrums for five selected traditional Chinese medicines, including Radix Gentianae, starting from 2006. They established a liquid chromatograph based quality control process and associated mass spectrum analysis system for traditional Chinese medicines, along with a fingerprint spectrum based analysis system. The new techniques can be applied to identify the traditional medicinal herbs grown in different areas and associated chemical components. Researchers also rolled out near-infrared fingerprint spectrums and applied spectrum metrology to analyze authentic medicinal herbs in a quick manner, desirable for telling the origins and age of medicinal plants.

Scientific experiments and application results show that comparing with traditional fingerprint spectrum techniques, the new technique enjoys numerous merits, including easy operation, high sensitivity, and short analysis time.

Wind Watch Network into Operation

JIAO Meiyun, Deputy Head of China Meteorological Administration, said on August 3, 2009 that a nationwide wind watch network made up of 400 watch towers with a height ranging from 70m to 120m has been put into operation. China Meteorological Administration started to build the network in 2004, in an attempt to improve the collection of solar radiation and wind intensity data, and make the survey and assessment of wind and solar energy resources across the country possible. At the request of the State Development and Reform Commission and Ministry of Finance, China Meteorological Administration launched wind energy resource survey and associated assessment at the end of 2007. Thanks to many-year efforts, China has enjoyed a doubled growth of its installed capacity of wind power for four consecutive years, with 12.17 million kilowatt hours of electricity in 2008, ranking 4th place in the world.

Eco-watch System for River Origins

LI Xiaonan, Deputy Director of River Origin Office in Qinghai Province, recently told reporters that as of the end of July, 2009, the local authorities has invested RMB 21.65 million to establish an eco-watch system to monitor the original sources of three major rivers in the province. The eco-watch system is connected to 14 eco-watch stations, 496 watch spots, 3 soil moisture monitoring areas, 2 mobile hydrological and water resources monitoring stations, and 2 automatic weather stations. The efforts have resulted in an integrated monitoring network that is able to watch environmental changes of river sources at different scales, and provide important scientific evidences and data for scientific research and associated protection.

Proprietary Control System for High End Machine Tools

Shenyang Machine Tool announced on August 1, 2009 that it has developed a proprietary Feiyang digital control system for medium to high end programmed machine tools. Shenyang Machine Tool will soon equip its medium to high end programmed machine tools with the Feiyang digital system, allowing Chinese made programmed machine tools being operated under Chinese made digital control system.

It takes three years for Shenyang Machine Tool to import, digest, absorb, and re-innovate the core technologies for the digital system, including real-time control technology, server control algorithms, and digital bus technology. The digital control system has been made available for FOM and FOT product lines.

Yellow River Lakes Surveyed

CAS Nanjing Institute of Geography and Limnology has recently completed its investigation of the water depth and quality of the lakes sitting in the origins of the Yellow River. With the help of GPS technology, researchers performed high density and high precision measurement of the water quality and flow of the Eling Lake, Zhaling Lake, and Donggeicuona Lake in the origins, and collected abundant first hand scientific data. The data will become part of China Lake Database, along with the data of other major lakes in the Qinghai-Tibet Plateau.

The survey also landed some corrections to the past inaccurate description of the lakes. For example, previous studies showed that the Zhaling Lake had an averaged depth of 9m. However, researchers found through a complete monitoring process at an interval of 10-30 seconds/time that the lake has an averaged depth at 20m or more, with the deepest part at 33m.

World Largest LOCA Test Platform

Dayawan Nuclear Power Station, part of China Guangdong Nuclear Power, completed the manual tuning of three LOCA furnaces at the world's largest LOCA test platform. Dayawan Nuclear Power Station has three LOCA furnaces. Of them, No. 3 Furnace is the largest of its kind in the world for an impressive volume of 20.8cubic meters. The test platform, the only experimental facility to test nuclear island equipment and 3G LOCA in the country, has made a successful thermal shock test on No. 3 Furnace. China Guangdong Nuclear Power organized researchers to develop proprietary schemes, procedures, and dedicated equipment to make the platform a success.

Safe and Reliable H1N1 Vaccine

Chinese Ministry of Health says Chinese made H1N1 vaccine has produced no serious adverse reactions or events since clinical vaccination trials. The preliminary safety analysis also shows that Chinese made H1N1 vaccine is safe and reliable.

China started to test its H1N1 vaccine in clinical environment in July 2009. All the clinical trials were placed under the strict guidance of China Diseases Prevention and Control Center. H1N1 vaccines produced by ten domestic vaccine makers, including Beijing Kexing and Hualan Biotech, have entered clinical trials, with more than 13,300 volunteers having received vaccination. After the first safe injection, recipients are now receiving the second injection for further test.

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