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SPECIAL ISSUES

Enhanced Animal Disease Control

The Veterinary Bureau, and China Animal Diseases Prevention

and Control Center, both under the Ministry of Agriculture, have jointly established six major information platforms for collecting and analyzing animal diseases data, providing warning and prediction, making code based tracking, ensuring lab biosecurity, setting off emergency response, and providing vet information statistics and analysis.

The reporting system for epidemic animal diseases has been put into a full-fledged operation. More than 2800 animal quarantine agencies at the county level are able to provide routine report of the local occurrences of 53 animal diseases, on a timely and accurate basis, which makes a nationwide collection and analysis possible.

An online reporting system is also introduced. Surveillance data from 460 animal diseases monitoring stations and border quarantine labs, and from 37 animal disease labs at the national or provincial levels, are shared through network platforms.

In addition, an online lab biosecurity platform is established to supervise the use and storage of pathogenic organisms for lab applications. Authorities concerned review, supervise, and check the use and storage of pathogenic organisms through the online system.

Code based animal quarantine tracking system has been put into a trial operation in four provinces or cities. People can detect any abnormal links from birth to slaughter of animals, through electronic codes,. It makes a full and dynamic tracking of animal diseases possible.

Researchers also established a platform to response to major animal pandemics, using information network and computer technologies. The platform collects epidemic data through both the fixed and mobile networks, and provides a scientific decision making process based on satellite and geographic data. The disease control and commanding data can be shown on computer screens, perfectly matching with the geographic coordinates, using GPS technology. The system allows an interaction between the field control efforts and the distant commanding system, by displaying evidences directly on the platform.

10% Renewable in Energy Pie

China will strive to raise the proportion of renewable energy in its energy pie, possibly to 10% in 2020, said recently XU Dingming, Director of Energy Bureau, a part of the State Development and Reform Commission.

According to XU, while striving to protect both ecology and environment, China will develop small hydropower over a number of river basins, including Jinsha River, Yalong River, Dadu River, Lancang River, and Nujiang River. The scale of small hydropower will reach 180 million kilowatts in 2010, and 300 million kilowatts in 2020. By that time, hydropower will take up 30% of the nation's power generation capacity.

In 2005, China has established more than 60 windmills, with a capacity of 1.26 million kilowatts. In the coming years, China plans to construct a number of large wind power plants, which will eventually raise the installed capacity to 5 million kilowatts in 2010, and 30 million kilowatts in 2020.

As of the end of 2005, China has completed 1500 large methane gas projects, with an annual output of 1.5 billion cubic meters of methane gas. China has also established a well-functioned service system for the methane gas industry. Facing a strong market call, Chinese industries will upscale the production of biofuel to 10 million tons in 2020.

In the area of solar energy, China has developed an annual capacity of 70,000 kilowatts, mostly in remote areas and some applicable sectors.

Enhanced Poverty Mitigation

During the 11th Five-year period(2006-2010), Chinese authorities in charge of poverty mitigation will practice a strategy to combine S&T oriented poverty mitigation with other efforts for the same purpose, including village advancement as a whole, poverty mitigation through industrial efforts, and farmers training, said recently LIU Jian, Director of Poverty Mitigation Office, a part of the State Council. China will also enhance appropriation and low-interest loan support for S&T oriented poverty mitigation projects.

LIU points out that financial support shall be secured to support poverty mitigation activities at different levels, and a number of role models be created, including demonstration bases, projects,

and farmers. It is critically important to establish an operational mechanism for S&T oriented poverty mitigation activities, and a line of supporting mechanisms for screening poverty communities, enhancing the benefits of poverty mitigation funds, and securing incentives. It is also necessary to arouse people's enthusiasm to be part of the efforts, through innovative mechanisms, in an attempt to bring up more benefits. According to incomplete figures, since the establishment of the poverty mitigation fund by the state treasury in 1999, China has invested some RMB 1 billion in S&T oriented poverty mitigation activities. The amount is augmented to RMB 2 billion, with the matching support of local authorities. The earmarks have financed some 3000 projects that brought benefits to 60 million poverty stricken populations. It also resulted in a line of special industries, and spurred up the economic development at the county level.

500 Million for Proprietary Innovations

In 2010, high-tech products will take up 55%, and proprietary innovative products 20% of the nation's total export volume for mechanic and electronic products, said WEI Jianguo, Chinese Vice Minister of Commerce, at a national meeting held on June 27, 2006 to discuss commercial applications of S&T findings in the fields of machinery and electronics.

In 2005, China's high-tech export has reached USD 218.3 billion, or 8 times that of 1999, or 28.6% of the nation's total export volume, with an increase of 16%.

The Ministry of Commerce has made "rejuvenating trade with science and technology" one of the major projects initiated this year, said WANG Qinhua, Director, Department of Mechanic, Electronic, and High-Tech Industry, under the Ministry of Commerce. An earmark worth RMB 500 million will be made available to support industrial proprietary innovations. The Ministry will also accelerate the construction of export oriented innovation bases, in an attempt to establish high-tech agglomerates of strong innovation capability and international competitiveness. The efforts will eventually lead to the birth of 160 proprietary brandname products, covering a range of areas, including electronics and information, major equipment, biology, pharmaceuticals, and fine chemicals.

Erosion Control

According to statistics published by the Chinese Ministry of Water Resources, as of the end of 2005, China has placed 920,00 km² of erosion stricken areas under control, on a combined basis. The efforts also solved food problems for some 12 million people in the areas, and helped some of them become rich.

In addition to the major national efforts for soil erosion control over the upper reach of the Yangtze River, and the middle reach of the Yellow River, a range of new initiatives were kicked off by the Chinese government during the 10th five-year period, including Capital Water Resources Conservation, and Loess Plateau Dam, said E Jingping, Vice Minister of Water Resources at a forum held on June 29, 2006 in honor of the 15th anniversary of the enforcement of a national law for water and soil conservation. As a result, the annual soil erosion control area in the country has extended from 20,000 km² in the early 1990s, to current 40,000 km² or 50,000 km². Each year China enjoys a reduced soil erosion by 1.5 billion tons, an enhanced water holding capacity over 25 billion m³, and an increased grain yield of 18 billion kg.

RESEARCH AND DEVELOPMENT

Plants' Self-fertilization Strategy

LIU Kewei, a student of School of Life Sciences under the University of Science & Technology of China, reported his findings in the June 22 issue of the journal *Nature*, under a title "Pollination: self-fertilization strategy in an Orchid". The paper reveals for the first time in the world a new pollinating process unassisted by any of the external agents. Conventional wisdom believes that mating in flowering plants normally relies on animals, wind, gravity or secretion to convey pollen grains from the male (anther) to the female (stigma) organ. However, people have long wondered a possible pollinating process that a plant may have, once the change of ecological environment leads to the total destruction of the required external agents, though without a conclusion.

As early as in 2002, LIU Kewei, a then middle school student, discovered an abnormal phenomenon at the National Orchid Conservation Center in Shenzhen. He observed a self-pollination

mechanism in the tree-living orchid *Holcoglossum amesianum*, in which the bisexual flower turns its anther against gravity through 360° in order to insert pollen into its own stigma cavity — without the aid of any pollinating agent or medium.

Other Chinese scientists and LIU furthered LIU's observation through a 4-year long experiment and study, and confirmed that the self-pollinating process is the only approach for orchid *Holcoglossum amesianum* surviving the evolution process. The finding also reveals a completely new process that allows some special plants to achieve reproductive success in harsh conditions, without assistance of traditional pollinating medium such as winds and insects.

Earliest Fossilized Animals

Not long ago, Chinese scientist CHEN Junyuan and his collaborators published a paper named "Phosphatized Polar Lobe-Forming Embryos from the Precambrian of Southwest China" in the recent issue of the journal *Science*. The finding has advanced the date of earliest fossilized animals by 50 million years to 580 million years, from the previous 530 million years. It also provides a strong evidence to eliminate the doubt "why animals appear suddenly" that questions the Darwin's evolution theory.

On February 5, 1998, CHEN, a research fellow at the Nanjing Institute of Geology and Paleontology, and his collaborators published their findings in the journal of *Science*, revealing a fossilized multi-cell animal dated back to 580 million years ago, unearthed at Weng'an County, Guizhou Province. In 2003, they visited the county again, and collected ten fossilized animals with well preserved symmetrical structures. CHEN named the animal "Guizhou Xiaochunchong" (tiny small spring insects in Guizhou) to herald the birth of tiny living creatures, after the long period of cold spell that Earth has experienced. These fossilized animals make the earliest animals discovered so far by humans.

After examining the animals' internal structures using synchronous radiation technology at the Institute of High Energy Physics, a part of the Chinese Academy of Sciences, scientists confirm that the fossilized animals unearthed at Weng'an County, including Guizhou Xiaochunchong, bear a kinship with contemporary living creatures. This indicates that Guizhou Xiaochunchong is the earliest forefather of contemporary

animals. The finding also thawed up the doubts for a sudden appearance of the Precambrian animals, and provides a strong evidence for the Darwin's evolution theory.

Industrialized Bio-Oil Refining

Biomass Clean Energy Lab, a part of the University of Science and Technology of China, announced on June 27, 2006 that it has successfully converted sawdust, rice hull, corn stalk, and cotton stalk into bio-oil, through pyrolysis and re-processing. The technology has registered an oil producing capability of 60% for sawdust, and 50% for stalks, with a thermal value ranging between 16-18 MJ /kg. The effort has resulted in a self-heating pilot pyrolysis unit that can handle 120 kilograms of raw materials an hour.

China enjoys rich agricultural residues amounting to 700 million tons a year, including stalks and hulls. The new technology makes converting raw biomasses into bio-oil possible. Bio-oil can be used as a direct fuel for oil-burning boilers or industrial kilns and furnaces. It also can serve as a substitute fuel for auto application after refining, or be made into a high value added chemical through separation and extraction. According to a briefing, the new technology allows a best single-unit handling capacity of 2 tons/hour for stalks (desirable for a stalk collection radius of 10km), and it takes about RMB 790 to produce a ton of bio-oil. A simple enhancement can raise the thermal value to 18-20 MJ /kg. If sold at RMB 1000 a ton, bio-oil makes a price only 43.2% of diesel oil, or 63.1% of heavy oil, though producing the same thermal value.

Advanced Hydrographic Mapping

According to a briefing issued not long ago by the China Marine Safety Administration, China's has developed a range of hydrographic equipment of an internationally advanced level, and a same-level capability for comprehensive hydrographic activities. Up to date, China hydrographic authorities has deployed 20 differential GPS reference stations, a GPS control network, and a tidal level observation network along the nation's coastlines. The effort has led to the birth of a Chinese version of marine geographic information system. Data collection has been further enhanced from line mapping and astronomical positioning to multi-wave sonar scanning and GPS positioning at a decimeter level. The volume of data collected is also

augmented from a limited volume per minute to automatic storing and processing at a megabyte level. Unlike only providing limited observed information in the past, the upgraded system is able to provide diverse electronic marine maps to meet the real-time, interactive, and comprehensive needs for marine safety

According to a briefing, the special electronic sea maps derived from the system can accommodate diverse needs of ship navigation, surveillance, route control, marine bridge construction, and fishery. It also provides hydrographic support for the construction of numerous national projects, including the development of Major & Minor Yangshan Mount, East Sea Bridge across the Hangzhou Bay, and a railway linking Guangdong and Hong Kong.

Moon Satellite Tracking

Not long ago, Chinese scientists made a successful tracking of a moon satellite, using four radio telescopes. The event marks China's proven technological capability of tracking and monitoring the moon circling satellites. Separately located in Beijing, Shanghai, Kunming, and Urumqi, the said four radio telescopes constitute the major ground facilities for China's moon probe program.

According to a briefing, the tracking target is a satellite launched by the European Space Agency to fly around the moon. With the permit of the operator, Chinese scientists made a 5-day tracking observation of the satellite, which makes a tour around the moon every four hours, using a vast interference network made up of a 50-m radio telescope in Beijing (the antenna dish covers an area as large as the combined size of five basketball courts), a 40-m radio telescope in Kunming, and 25-m radio telescopes respectively in Shanghai and Urumqi. Scientists also made a round-o'clock tracking observation of other objects circling the moon.

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