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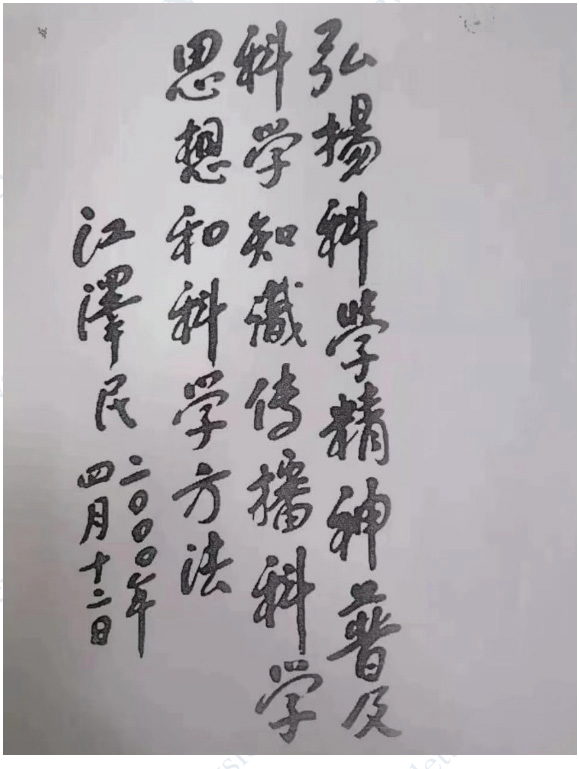
Headlines

Article Highlights

Remembering President Jiang Zemin's legacy in science and technology

On the afternoon of November 30, 2022, former Chinese President Jiang Zemin passed away at the age of 96. He spent most of his life advancing the great cause of the Communist Party of China (CPC) and steered the country from difficulties to promise in the last decade of the 20th century.

At a young age, Jiang Zemin acquired first-hand experience of the deepening national crisis and made up his mind to search for ways to revitalize the country. He joined the CPC in 1946. After the founding of the People's Republic of China in 1949, he worked as an engineer at various posts in Shanghai before he was transferred to Changchun and later received further technical training in the Soviet Union. Upon his return to China, he worked briefly in Shanghai, Wuhan, and Beijing before heading back to Shanghai as mayor of the city. In 1989, he was elected General Secretary of the CPC Central Committee. Jiang Zemin served the country with tremendous dedication and energy, and his presence will be greatly missed.



The inscription written by President Jiang Zemin for the second exhibition hall of the China Science and Technology Museum

Jiang Zemin served as General Secretary of the CPC Central Committee, Chairman of the CPC's Central Military Commission, President of China, and Chair-

man of the Central Military Commission of the People's Republic of China. Jiang was an outstanding leader enjoying high prestige acknowledged by the whole Party, the entire military and the Chinese people of all ethnic groups. He was a great Marxist, a great proletarian revolutionary, a statesman, a military strategist, a diplomat, a weathered communist fighter, and an outstanding leader in the great cause of socialism with Chinese characteristics. He was the core of the CPC's third generation of central collective leadership and the principal founder of the Theory of Three Represents.

While in office, President Jiang was especially supportive of building China's science and technology museums. On April 12, 2000, he wrote the inscription for the newly-built second exhibition hall of the China Science and Technology Museum, which reads: "We must promote the spirit of science, popularize scientific knowledge, and spread science and scientific methodology." Under his leadership, China's science and technology museums experienced rapid development.

Guided by President Jiang Zemin's vision, the China Science and Technology Museum has been working to increase the interactive science elements in its exhibits, educational campaigns, videos, and films to improve Chinese people's science literacy. The museum has received over 60 million visits so far. Nationwide, China's science and technology museums have also made remarkable progress in science popularization. By some estimates, the Chinese people's science literacy rate had risen from 0.3% in 1996 to 3.27% in 2010, and to 10.56% by 2020. Most notably, since the 18th CPC National Congress, the country's science and technology museums have coordinated development, improved their popular science capabilities, and increased access to popular science services. Together, they have registered a total of over 850 million visits, injecting strong impetus into the high-quality development of popular science.

(Sources: Xinhua News Agency, Official website of CAST)

20th CPC National Congress calls on young Chinese scientists to scale new heights

In his report to the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping declared, "We will accelerate efforts to build a contingent of personnel with expertise of strategic importance and cultivate greater numbers of master scholars, science strategists, first-class scientists and innovation teams, young scientists, outstanding engineers,

master craftsmen, and highly-skilled workers." He placed high expectations on China's younger generation and asked the Party to take youth work as a strategic task. His words reflect how important young talent development and training are to the CPC Central Committee and General Secretary Xi Jinping.

CAST Executive Vice President Zhang Yuzhuo urges young people to use science and technology for the common good

A special CPC training workshop focused on young Chinese scientists was recently organized by the Department of Strategic Development of CAST and the National Academy of Innovation Strategy (NAIS). Zhang Yuzhuo, Executive Vice President of CAST, attended the workshop and delivered a speech. He said that in today's world, scientific and technological innovations are playing an increasingly important role in the sustainable development of mankind. Young people have big responsibilities to build a global community of shared future. It is their mission to answer the call of the times and use science and technology for the common good through open cooperation. CAST will do all it can to prepare them for global challenges, encourage new innovations, and develop a dynamic and productive workforce. CAST will continue to create opportunities for young scientists from different countries, with different backgrounds, and from different fields to collaborate, build a mutually beneficial innovation ecosystem, and cultivate an open, trustworthy, and inclusive community for young scientists. CAST will also work to build a positive culture for the common good, promote the spirit of science and scientists, uphold high standards of research integrity and ethics, respect cultural and research diversity, and guide young scientists to build a better world.

World Digital Economy Forum opens in Chengdu

On November 28, 2022, the World Digital Economy Forum opened in Chengdu, Sichuan Province under the theme "Contributing to the world with China's solution." The event was co-hosted by CAST, the Chinese Academy of Sciences (CAS), the Chinese Academy of Engineering (CAE), and the Sichuan Provincial Government. Zhang Yuzhuo, Executive Vice President of CAST, delivered a video speech and called on participants to jointly promote digital transformation, bridge the digital divide, and expand digital cooperation.

The forum was organized under four broad topics: "Changes and

Opportunities," "Scientific and Technological Empowerment," "Development and Governance," and "Transformation and Innovation." It brought together over 200 world-renowned experts, scholars, and industry representatives to participate on site and more than 9.4 million to attend online.

The World Digital Economy Forum
Photo credit: *People's Daily*

The World Digital Economy Forum has been successfully held three times. Based in China, it seeks to find global solutions for building a global community of shared future. It pools top intellectual resources from the global digital economy to solve development issues plaguing the international community. It serves as a global digital economy exchange and cooperation platform to discuss how digital technology can empower global sustainability development, promote global digital economic cooperation, and contribute to the recovery of the global economy and the sustainable development of the digital economy.

(Source: *People's Daily*)

4th World Science and Technology Development Forum held in Chengdu

On November 27, 2022, the 4th World Science and Technology Development Forum kicked off in Chengdu under the theme "Openness, Trust, and Cooperation." The Forum was jointly hosted by CAST, CAS, CAE, and the People's Government of Sichuan Province. Participants discussed technological innovation and sustainable development in key fields of basic science, climate change, the digital economy, and green innovation and proposed innovative solutions for the challenges of the times. The forum also announced the Top 10 Scientific Issues of the Year in Human Social Development in 2022, seeking to address the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) from fields of climate, urban

management, and manufacturing.

(Source: *Science and Technology Daily*)

Opening ceremony of the 4th World Science and Technology Development Forum
Photo credit: Official website of CAST

2022 Open Science and Open Source Innovation and Development Forum in Chengdu

The 2022 Open Science and Open Source Innovation and Development Forum
Photo credit: Official website of CAST

On November 28, 2022, the 4th World Science and Technology Development Forum – Open Science and Open Source Innovation and Development Forum was held in Chengdu in hybrid mode under the theme "Practicing Open Science and Enabling High Quality Development." Jointly hosted by CAST, CAS, CAE, and the People's Government of Sichuan Province, the forum pooled global wisdom to respond to multiple risks and challenges hindering technological development.

Yang Wei, a member of CAS, delivered a keynote speech. He offered a systematic review of China's open science roadmap and supporting policies from the perspective of research frameworks, research topics, theoretical constructs, roadmap planning, and open science maturity indicators and compared various development policies. He also shared plans and suggestions for funding open access data services.

In his keynote speech, Du Jiangfeng, also a CAS member, discussed open innovations and future forms of quantum computing, quantum precision measurement, and quantum instruments. He proposed building an ecosystem

to offer more policy and financial support to advance the industrial application of quantum technology.

(Source: Official website of CAST)

China-ASEAN Roundtable of Engineer Exchanges held online

On December 2, 2022, the China-ASEAN Roundtable of Engineer Exchanges was held online.

Luo Hui, Director General of the Department of International Affairs of CAST and Vice President and Joint Secretary General of the Chinese Society of Engineers (CSE), commended the roundtable's role in establishing a long-term mechanism for China-ASEAN engineering exchange, dialogue, and cooperation and in promoting flow of engineers for common progress and prosperity.

Mohd Khir Bin Muhammad, Secretary-General of the ASEAN Federation of Engineering Organizations (AFEO), noted that globalization brings many opportunities and challenges to engineering, and stressed AFEO's enthusiasm to work closely with its partners in the ASEAN region and beyond to jointly improve engineering capabilities and explore effective ways for engineers to work across borders.

(Source: Official website of CAST)

CIIT/CAST organizes special side event for the 17th Annual Meeting of the Internet Governance Forum

On November 30, 2022, the CAST UN Consultative Committee on Information Technology held a special side event at the 17th Annual Meeting of the Internet Governance Forum (IGF) themed "joint efforts to build a responsible and sustainable Metaverse."

Horst Kremers, CODATA-Germany Secretary General, Yan Li, vice-chair of the Blockchain Association Singapore (BAS) and a professor at Nanyang Technological University (NTU), Sun Wen, a professor at Northwestern Polytechnical University and deputy director of the Blockchain Branch of the Chinese Institute of Electronics (CIE), Daisy Selematsela, a professor at University of the Witwatersrand in South Africa, and Ricardo Israel Robles Pelayo, a professor at Anahuac University Mexico, held in-depth discussions on the challenges of building a responsible and sustainable metaverse, methods to strengthen supervision and governance of the metaverse, and ways to build more cooperation mechanisms between different regions and stakeholders.

(Source: Official website of CAST)

2022 Tengchong Scientists Forum opens in Yunnan

On December 1, 2022, the 2022 Tengchong Scientists Forum, co-hosted by the People's Government of Yunnan Province and CAST, opened in Tengchong, Yunnan Province.

At the forum, scientists and industry representatives shared research findings and insights on the applications of scientific and technological achievements in areas of industrial development, higher education, biomedicine and general health, medical materials, and biodiversity. By pooling global innovation resources, the forum promoted exchange and cooperation between eastern and western regions of China and kindled technology-empowered high-quality development. It also helped foster innovations to accelerate the economic and social development of Yunnan Province.

(Sources: *Science and Technology Daily*, Official website of CAST)

The 2022 Tengchong Scientists Forum
Photo credit: *Science and Technology Daily*

Local Events

3rd Sichuan Chongqing Science and Technology Academic Conference & Sichuan Science and Technology Academic Conference held in Chengdu

The 3rd Sichuan Chongqing Science and Technology Academic Conference & Sichuan Science and Technology Academic Conference
Photo credit: *Science and Technology Daily*

The 3rd Sichuan Chongqing Science and Technology Academic Conference & Sichuan Science and Technology Academic Conference were recently held

in Chengdu under the theme "Concentrating on Academic Research and Leading Scientific and Technological Innovations." The event was jointly organized by CAST and the Chongqing Association for Science and Technology.

The event presented a series of awards at the opening ceremony including 184 best research papers, the top 20 STM journals based in Sichuan and Chongqing, the top 20 most influential academic events, and the top 20 science and technology societies in the area.

List of the top 20 STM journals based in Sichuan and Chongqing:

1. *Materials Reports (MR)* from Chongqing Southwest Information Limited Company

2. *Journal of Civil and Environmental Engineering* from Chongqing University

3. *Surface Technology* from the 59th Research Institute of China Ordnance Industry

4. *Nano Materials Science from* Chongqing University

5. *Journal of Ordnance Equipment Engineering* from the Chongqing Ordnance Society and Chongqing University of Technology

6. *Journal of Human Settlements in West* China from Chongqing University

7. *Applied Mathematics and Mechanics* from Chongqing Jiaotong University

8. *Journal of Functional Materials* from the Chongqing Materials Research Institute

9. *Chinese Journal of Underground Space and Engineering* from the Chinese Society for Rock Mechanics & Engineering and Chongqing University

10. *China Pharmacy* from the Chinese Hospital Association and Chongqing University Cancer Hospital

11. *Chinese Journal of Applied and Environmental Biology* from the Chinese Academy of Sciences and Chengdu Institute of Biology of the Chinese Academy of Sciences

12. *Advanced Engineering Sciences* from China's Ministry of Education and Sichuan University

13. *Journal of Southwest Petroleum University (Science & Technology Edition)* from Southwest Petroleum University

14. *Nuclear Power Engineering* from Nuclear Power Institute of China

15. *International Journal of Stomatology* from China's Ministry of Education and Sichuan University

16. *Journal of Sichuan University (Medical Sciences)* from China's Ministry of Education

and Sichuan University

17. *Southwest China Journal of Agricultural Sciences* from Sichuan Provincial Department of Agriculture and Rural Affairs and Sichuan Academy of Agricultural Sciences

18. *Opto-Electronic Advances* from the Chinese Academy of Sciences and the Institute of Optics and Electronics of the Chinese Academy of Sciences

19. *Photonic Sensors* from China's Ministry of Education and the University of Electronic Science and Technology of China

20. *MedComm* from the Sichuan International Medical Exchange & Promotion Association

In the keynote speech session, four recipients of the best research paper award shared their research findings including Chen Hao from Southwest University, Gao Peng from the Department of Endocrinology at the Army Medical Center of PLA, Zhou Zhuo from the Chinese Academy of Agricultural Sciences (CAAS), and Li Jiajie from the West China School of Stomatology (WCSS) of Sichuan University.

Awards ceremony for best research papers
Photo credit: Official website of CAST

"It is important to compare notes with the experts and scholars in the field to select a good research topic," said Chen Liangyin, a professor at the College of Computer Science of Sichuan University. The paper his team recently published, *A Survey of Decentralizing Applications via Blockchain: The 5G and Beyond Perspective*, benefited tremendously from insights from Chinese and international colleagues.

Chen Meihua was among those to receive the first prize best research paper award for "Triboelectric nanogenerator and artificial intelligence to promote precision medicine for cancer." Upon seeing the full list of the award recipients, she realized her brother Chen Tao also won first prize. The siblings both studied medicine in Sichuan. After graduation, Chen Meihua went to work at Sichuan Cancer Hospital & Institute, while Chen Tao joined the Stomatological Hospital of Chongqing Medical University. "He gives me a lot of advice and inspiration not only in life,

but also in research," said Chen Meihua. Their research teams have also carried out frequent exchange and cooperation. In Chen's opinion, this form of collaboration reflected the fruitful exchange taking place between Sichuan and Chongqing.

Since its inception in 2020, the annual Sichuan Chongqing Science and Technology Academic Conference & Sichuan Science and Technology Academic Conference has been held three times. It provides a comprehensive, interdisciplinary, open, and high-level platform for scientists in Sichuan and Chongqing to network and collaborate.

(Sources: Official website of CAST, www.scol.com.cn)

9th Annual Meeting of Young Scientists of Jiangsu Province opens in Changzhou

On November 30, 2022, the 9th Annual Meeting of Young Scientists of Jiangsu Province opened in Changzhou under the theme "Using digital technology to lead the future." Co-hosted by the Jiangsu Association for Science and Technology and the Changzhou Municipal Government, the event aimed to boost Jiangsu's strength in the digital economy with special focus on industrial digitalization and digital industrialization. It also provided a high-level academic exchange and service platform for science and technology workers in the province, especially young scientists.

The 9th Annual Meeting of Young Scientists of Jiangsu Province
Photo credit: Official website of CAST

The opening ceremony awarded winners of the 18th Jiangsu Youth Science and Technology Award and the "Top Ten Young Science and Technology Stars" in Jiangsu. It also announced a decision to build a consortium headed by the Jiangsu Association for Science and Technology. Representatives from the Jiangsu Association for Science and Technology then signed strategic special cooperation agreements with the China Land Science Society (CLSS), the China Renewable Energy Society (CRES), the Chinese Nursing Association (CAN), the China Energy Research Society (CERS), the Chinese Society of

Biomedical Engineering (CSBME), the Chinese Society for Environmental Sciences (CSES), the China Institute of Communications (CIC), and the China Science Writers Association (CSWA). The annual meeting also gave the participants a summary of progress on "Innovation China," a platform that seeks to accelerate the industrial application of scientific and technological achievements piloted in Changzhou. The executive committee of the meeting called on young scientists to "promote the spirit of scientists and strive to be the vanguard in achieving self-reliance and self-improvement in science and technology." Finally, Li Feng, a senior engineer at CSR Qishuyan Locomotive & Rolling Stock Technology Research Institute, shared his reflections on work as a young scientist.

(Source: Official website of CAST)

Academic Exchange

8th International Conference on High Strength Low Alloy Steels

Main venue of HSLA Steels 2022 in Beijing
Photo credit: Official website of the Chinese Society for Metals

On November 9-11, 2022, the 8th International Conference on High Strength Low Alloy Steels (HSLA Steels 2022) was held online. Hosted by the Chinese Society for Metals (CSM), participants held in-depth discussions on the latest developments in physical metallurgy, construction steels, marine engineering steels, shipbuilding steels, pipeline steels, low temperature steels, pressure vessel steels, automobile steels, special steels, welding, and metallurgical technology.

Tian Zhiling, Executive Vice President of CSM, gave a presentation on the research, application, and prospects of high strength low alloy steels.

The conference also organized sub-forums on physical metallurgy, niobium micro alloyed steels used in construction, construction steels, low-temperature steels, steels for marine engineering and pressure vessels, pipeline steels and welding, automotive steels, and special steels. Many internationally renowned experts and scholars met online to share

knowledge on the latest industry developments, scholarly work, research hotspots, and future trends of high-strength low-alloy steels.

Tian Zhiling making a presentation at HSLA Steels 2022
Photo credit: Official WeChat account of the Chinese Society for Metals

On site venue of HSLA Steels 2022
Photo credit: Official WeChat account of the Chinese Society for Metals

The International Conference on High Strength Low Alloy Steels has been held seven times and grown into an influential academic platform. It plays an important role in advancing high-strength steel technology and production in China and globally, particularly to upgrade high-strength steel bars, pipeline steels, micro-alloy steels, third-generation automotive steels, high-speed railway steels, and shipbuilding and marine steels. To help the world steel industry develop more sustainably, high-strength low-alloy steels are widely expected to play a big part in achieving lightweight manufacturing, better safety, lower energy consumption, and lower CO2 emissions.

(Source: Official WeChat account of the Chinese Society for Metals)

Recommended Case

◎ China Power Supply Society

Founded in 1983, the China Power Supply Society (CPSS) works to promote progress of the power supply technology and development of the power supply industry in China.

中国电源学会
CHINA POWER SUPPLY SOCIETY

Photo credit: Official website of the China Power Supply Society

CPSS builds multiple international exchange platforms with international organizations

In recent years, CPSS has established a comprehen-

sive cooperative relationship with the Power Electronics Society (PELS) of the Institute of Electrical and Electronics Engineers (IEEE). The two sides are committed to building an international exchange platform for professionals in the field to advance the rapid development of power electronics technology.

In 2014, CPSS launched the first IEEE International Power Electronics and Application Conference and Exposition (PEAC). Held every four years, the event is the first of its kind founded and hosted by China. The first IEEE PEAC attracted 450 participants from 14 countries and regions and accepted 284 papers out of 455 submissions. In 2018, the second IEEE PEAC achieved new success by bringing together 800 participants from 31 countries and regions. It received 723 papers and accepted 479.

CPSS publishes high impact English journal and book series for academic exchange and discipline development

CPSS publishes CPSS *Transactions on Power Electronics and Applications (CPSS TPEA)*, China's first English academic journal targeting power electronics. The journal seeks to disseminate the latest advancements in basic theoretical research and engineering applications. As of August 2022, it had published 187 papers from 21 countries and regions on 23 issues, with papers by international authors and funded research accounting for 50% and 55% respectively. According to IEEE Xplore, the journal has recorded a total of 210,000 downloads.

In 2015, CPSS partnered with Axel Springer SE to publish the CPSS Power Electronics Series. CPSS developed the editorial board for the first series in 2015 and the second series in 2019. So far, seven monographs of the series have been published, and six more are on the way. Total downloads of published books have exceeded 70,000, with the most downloaded book receiving 21,000 downloads.

(Source: Selected cases on CAST international cooperation and exchange for the 13th Five-Year Plan)

Explainer

Chinese scientists identify high-protein gene in wild maize

Corn contains 8% to 10% protein, although its ancient ancestor, teosinte, can produce up to 30% protein.

Two research teams in China have recently identified a gene that doubled the seed protein content of whole corn plants to 14%

through artificial planting. The research, led by Wu Yongrui from the Chinese Academy of Sciences (CAS) Center for Excellence in Molecular Plant Science and Wang Wenqin from Shanghai Normal University, was published in the journal Nature on November 17, 2022, under the title "THP9 enhances seed protein content and nitrogen-use efficiency in maize."

THP9 enhances seed protein content and nitrogen-use efficiency in maize

Yongcai Huang, Haihai Wang, Yidong Zhu, Xing Huang, Shuai Li, Xingguo Wu, Yao Zhao, Zhigui Bao, Li Qin, Yongbo Jin, Yahui Cui, Guangjin Ma, Qiao Xiao, Qiong Wang, Jiechen Wang, Xuerong Yang, Hongjun Liu, Xiaoduo Lu, Brian A. Larkins, Wenqin Wang ✉ & Yongrui Wu ✉

Nature (2022) | Cite this article

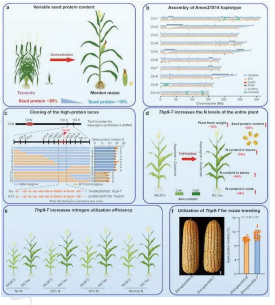
Abstract

Teosinte, the wild ancestor of maize (*Zea mays* subsp. *mays*), has three times the seed protein content of most modern inbreds and hybrids, but the mechanisms that are responsible for this trait are unknown[1,2]. Here we use trio binning to create a contiguous haplotype DNA sequence of a teosinte (*Zea mays* subsp. *parviglumis*) and, through map-based cloning, identify a major high-protein quantitative trait locus, *TEOSINTE HIGH PROTEIN 9* (*THP9*), on chromosome 9. *THP9* encodes an asparagine synthetase 4 enzyme that is highly expressed in teosinte, but not in the B73 inbred, in which a deletion in the tenth intron of *THP9-B73* causes incorrect splicing of *THP9-B73* transcripts. Transgenic expression of *THP9-teosinte* in B73 significantly increased the seed protein content. Introgression of *THP9-teosinte* into modern maize inbreds and hybrids greatly enhanced the accumulation of free amino acids, especially asparagine, throughout the plant, and increased seed protein content without affecting yield. *THP9-teosinte* seems to increase nitrogen-use efficiency, which is important for promoting a high yield under low-nitrogen conditions.

Screenshot of the paper published by Chinese scientists in Nature
Photo credit: Official website of *Nature*

The mechanism that produces high protein in wild maize has been a mystery for centuries, with the key genes controlling the total protein content and efficient usage of nitrogen still unknown. The two teams used trio binning to create a contiguous haplotype DNA sequence of a teosinte and, through map-based cloning, identified a major high-protein quantitative trait locus, called TEOSINTE HIGH PROTEIN 9 (THP9), on chromosome 9.

The teams successfully cloned the first major gene, THP9, which controls the high protein content of wild maize. "The enzymes produced by THP9 are responsible for the synthesis of asparagine, an important raw material in plant protein," wrote Wu Yongrui. As THP9 mutated into THP9-B in modern maize, its asparagine synthesis function declined, "However, after we introduced THP9-T from wild maize into modern maize, we found that the seed protein content rose by about 35%, while the nitrogen content in the roots, stems, and leaves increased by about 54%, 94%, and 18% respectively…" "THP9 is a high-protein 'factory'!" concluded Wu Yongrui.



Screenshot of the paper published by Chinese scientists in Nature
Photo credit: Official website of Nature

The researchers also found that THP9 can raise nitrogen efficiency. Corn carrying the gene can produce the same yield as conventional plants but with less nitrogen fertilizer. This makes THP9 "a green gene" that can reduce production costs and environmental pollution.

Wu Yongrui returns from the farm with students and harvested corn
Photo credit: CAS Center for Excellence in Molecular Plant Science

The teams conducted a large-scale field experiment at the National South China Seed Breeding Base in Sanya and injected the high-protein gene through hybridization methods into "Zhengdan 958," the most widely grown corn variety in China. The results showed that Zhengdan 958 not only registered a significant increase in protein content, with some inbred plants reaching 14%, but also effectively maintained its biomass and nitrogen content under low nitrogen conditions.

The successful cloning of the wild maize mutant gene Thp9-T outlined in the paper is of great significance for raising the protein content in modern corn, reducing usage of chemical fertilizers, and protecting the environment.

(Sources: gmw.cn, thepaper.cn, *Xinmin Evening News*)

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