

Biotechnology and life science research in China

Presented by Dr. LIU, Shuang-Jiang

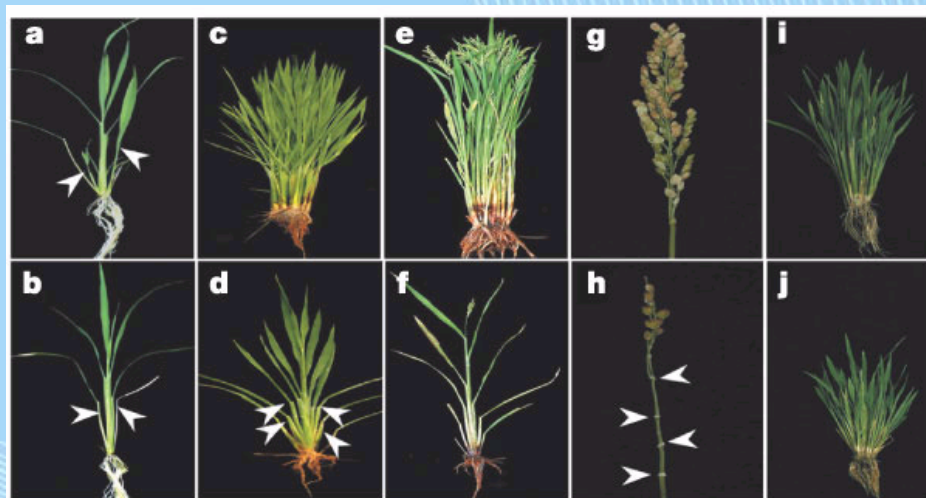
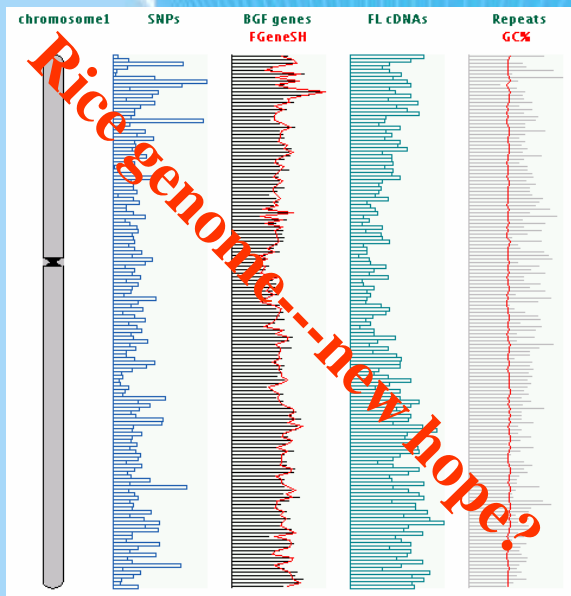
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Agriculture



Nature 422, 618 - 621 (10 April 2003); **Control of tillering in rice**



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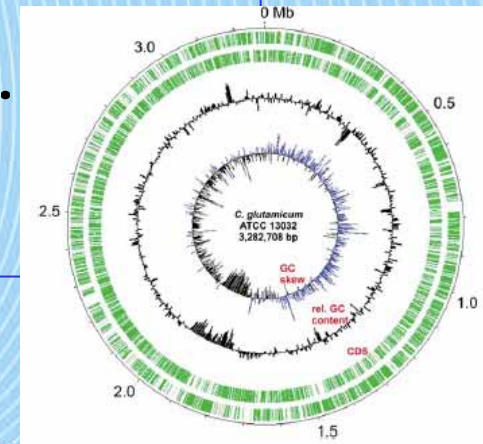
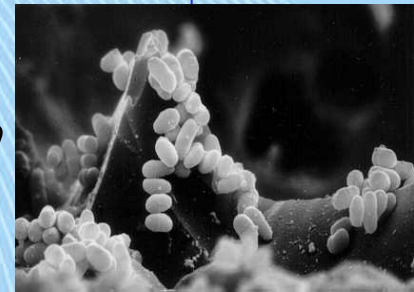
Biotechnology for industry

- Amino acids and antibiotics fermentation
- Bio-energy, bio-hydrogen, biogas (methane), Bio-diesel, bio-ethanol
- Bio-based chemical products
- Bio-mining for high value metals



Corynebacterium industry

1. *C. glutamicum*: G^+ , extensively studied for its ability to produce amino acids. Isolated 1957 by Kinoshita Max. doubling rate 0.35 /h
2. The complete genome of *C. glutamicum* ATCC 13032 was finished in 2002 and 2003 by German and Japanese scientists, independently.
3. Chinese fermentation industry uses *C. pekinense* and *C. crenatum* for lysine and glutamic acid production.



Bio-gas (Ethanol)

- **China is putting more and more efforts to promote the use of ethanol as substitute for gasoline.**
- **Two productive plants (>100, 000 tons per year) to produce ethanol from corn starch are in operation: one is in Jilin province, the other is in Henan province.**
- **10% of ethanol in gasoline is recommended, in some regions of China.**



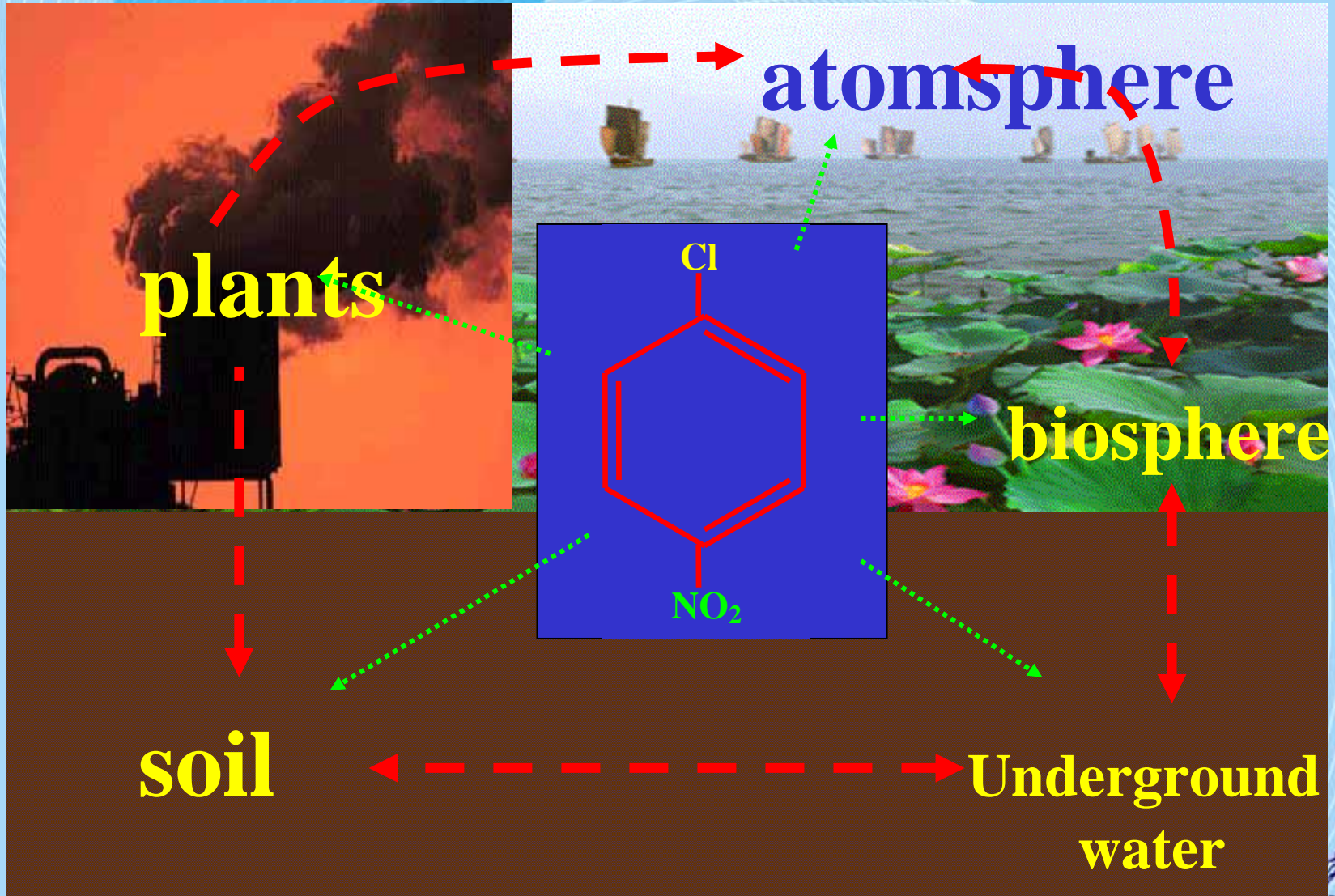
Biotechnology for environmental protection and sustainable development

- 经济快速发展（II）。国内生产总值比上年增长9.1%，达到11.67万亿元；按现行汇率计算，人均国内生产总值突破1000美元，跨上一个重要台阶。 - - - 温家宝《2004年政府工作报告》

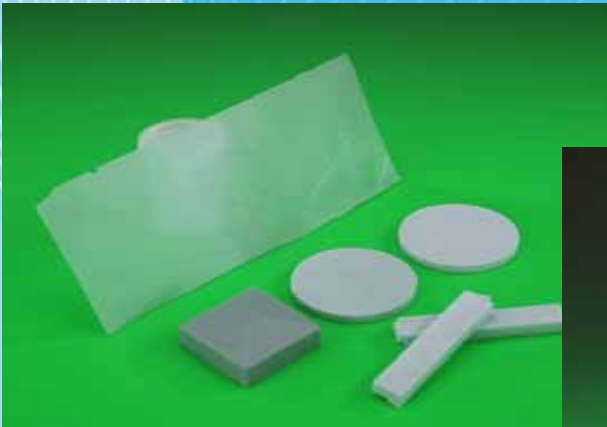


2003年，中央连续第七次在“两会”期间召开人口资源环境工作座谈会，胡锦涛总书记明确指出：“环境保护工作，要着眼于让人民喝上干净的水、呼吸上清洁的空气、吃上放心的食物，在良好的环境中生产生活”

Biological control and remediation of pollutants from agriculture and industry



Biodegradable plastics (polyhydroxyalkanoates)

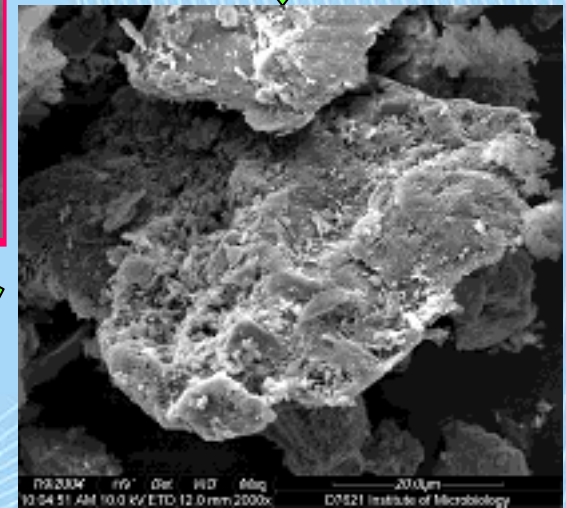
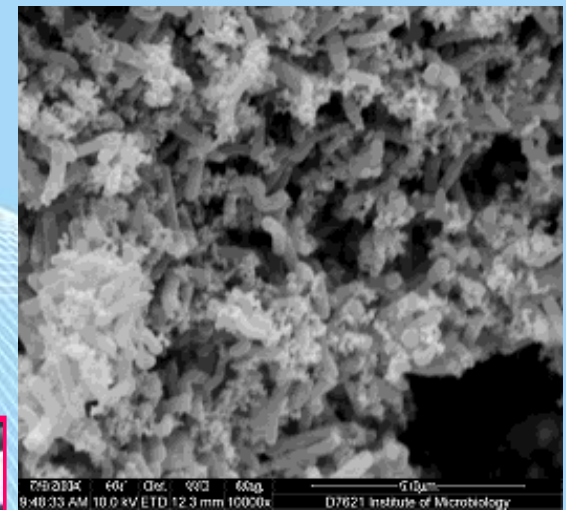


production capability
1000 tons per year.



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Low-grade and tailing ores is refined with biological technology



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IM/CAS

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More efforts will be put on...

- Replacement of old-fashioned technology by newly developed environment-friendly processes



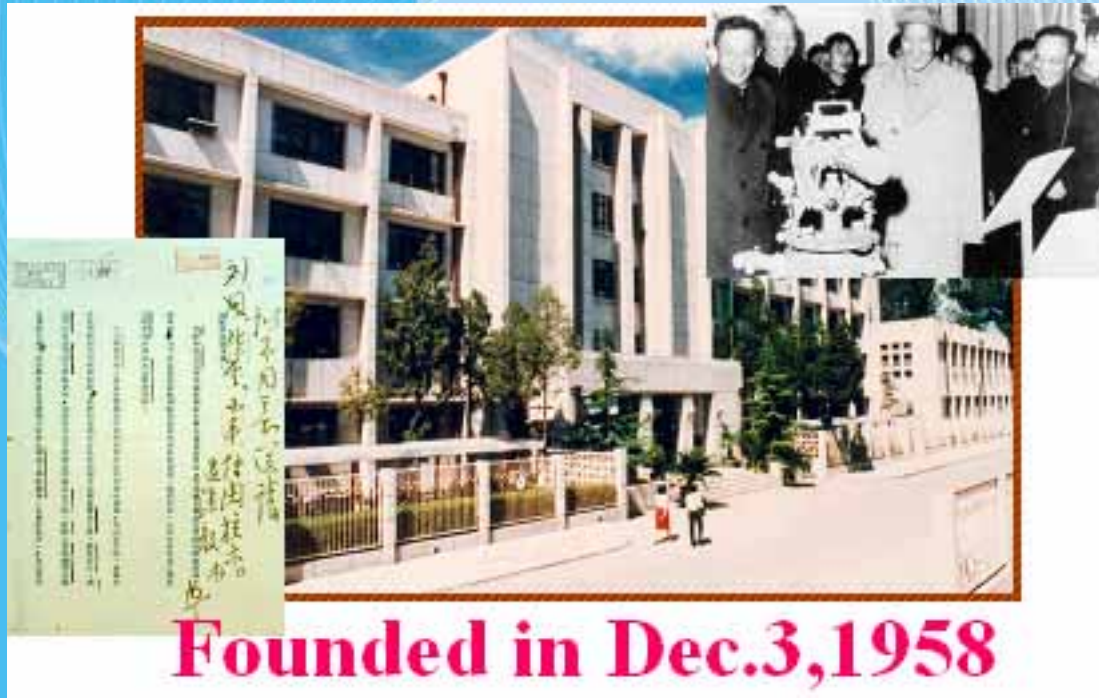
Who are doing the research and development?



- Institutes relating biological science at CAS
 - Institutes of Microbiology, Zoology, Botany, hydrobiology, etc., located in Beijing and other cities;
 - Institute of Biochemistry, Genetics, developmental biology etc.
- Universities, Tsinghua Univ.,
- Enterprises: fermentation of alcohols, and food additives



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The CAS Young Talented Award and NSFC Award



谭华荣



何朝族



姚一建



唐宏



刘双江



高光侠



刘杏忠



黄力



东秀珠



郭惠珊



高福



刘文军



王琳



Organization Chart



Research Center of Microbial Resources

Research Center of Molecular Microbiology

Research Center of Microbial Biotechnology

Current research areas:

- Environmental microbiology
- Microbial metabolic engineering of carbohydrates
- Microbial products of amino acids and derivatives
- Microbial enzyme and enzyme products
- Plant biotechnology

Nisin produced by *Lactococcus lactis*

native food
preservative



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Who are funding the research activities

- Ministry of Science and Technology (MOST)



中华人民共和国科学技术部

Ministry of Science and Technology of the People's Republic of China

- Chinese Academy of Sciences (CAS) ←



中国科学院
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- National Natural Science Foundation of China (NSFC)



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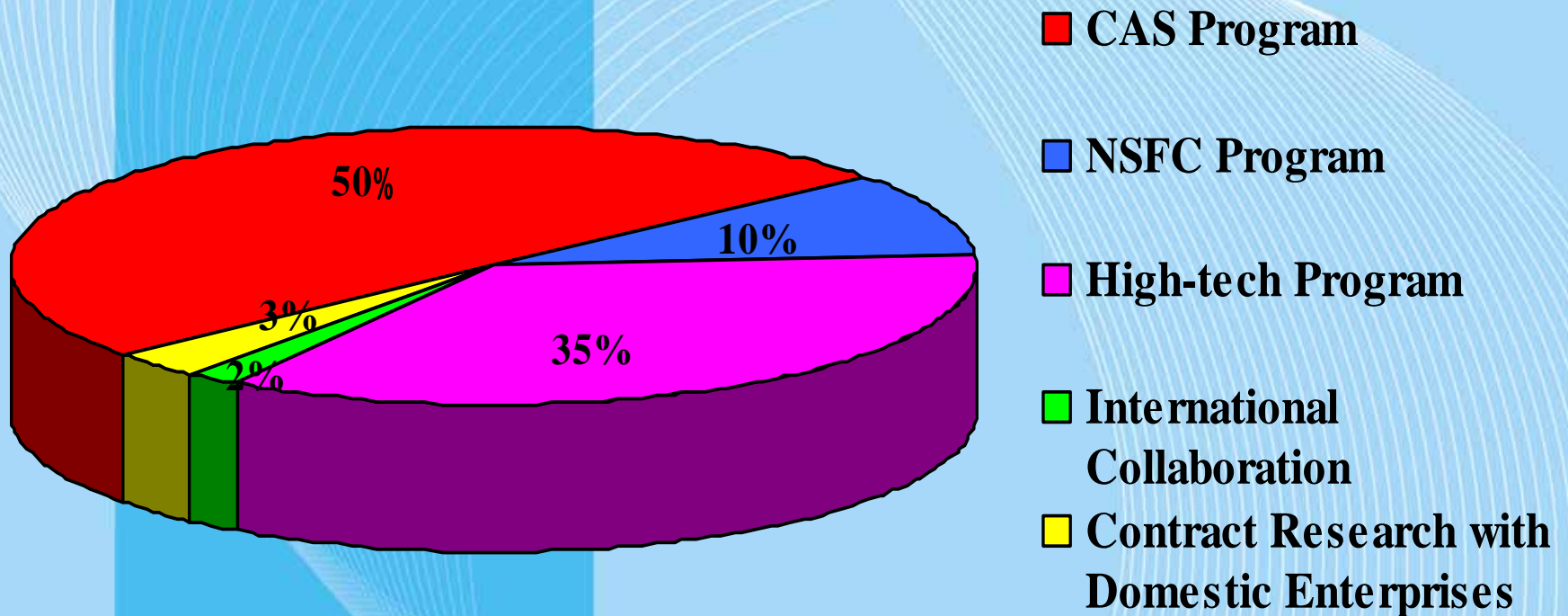
National Natural Science Foundation of China

- Others: industry, local governments



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Thanks for your attention!



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