



# 中国转基因新品种培育研究进展 以及困境

## Current Status of GM Crop R&D in China

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**抗虫转基因水稻新品种培育**

**Development of Insect Resistant GM Rice**

- Rice is one of the most important food crops in the world
- Face various abiotic and biotic stresses
- Providing enough healthy food for people everywhere is a challenge

# Why Insect Resistance Rice

- Rice is
- pests
- Insect
- Stemb
- Direct



Striped stemborer  
(*Chilo suppressalis*  
(Walker))



Yellow stemborer  
(*Scirpophaga incertulas*  
(Walker))

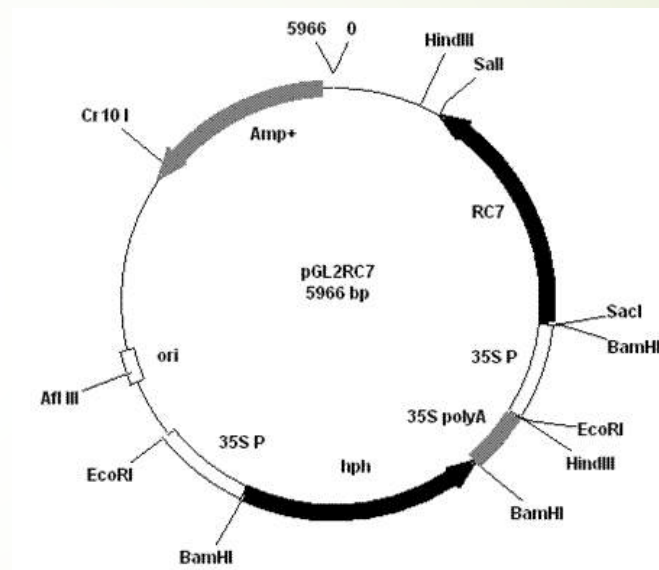
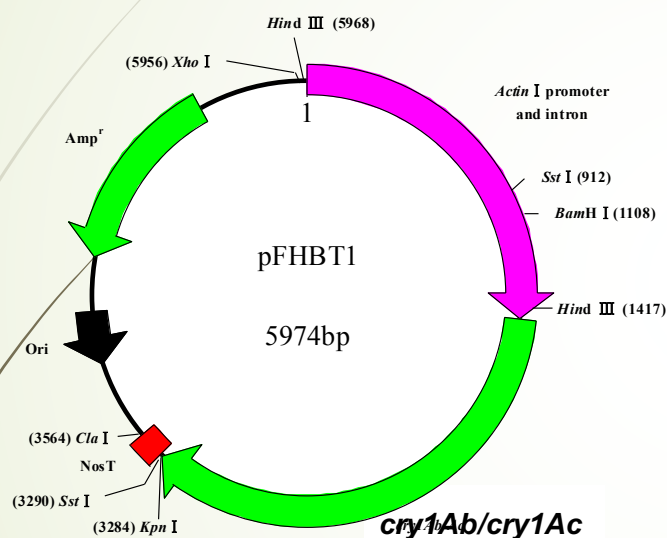
Damage by Stiped stemborer  
(Hubei, 2001.9.)

Pink stemborer  
(*Sesamia inferens* (Walker))



Rice leaffolder  
(*Cnaphalocrocis medialir*  
(Guene))

## 华恢1号及其抗虫衍生组合的培育 Huahui No.1 and its Derived Hybrids



- **Bt gene:** *cry1Ab/cry1Ac*
- **Recipient variety:** Minghui 63 (restorer line)
- **Transformation method:** Particle Bombardment
- **Marker-free**



## Insect bioassays ---- against YSB



原品种对照



*Bt*转基因茎段

接种昆虫培养5天后的*Bt*纯合转基因植株和原品种对照植株的茎段被取食情况

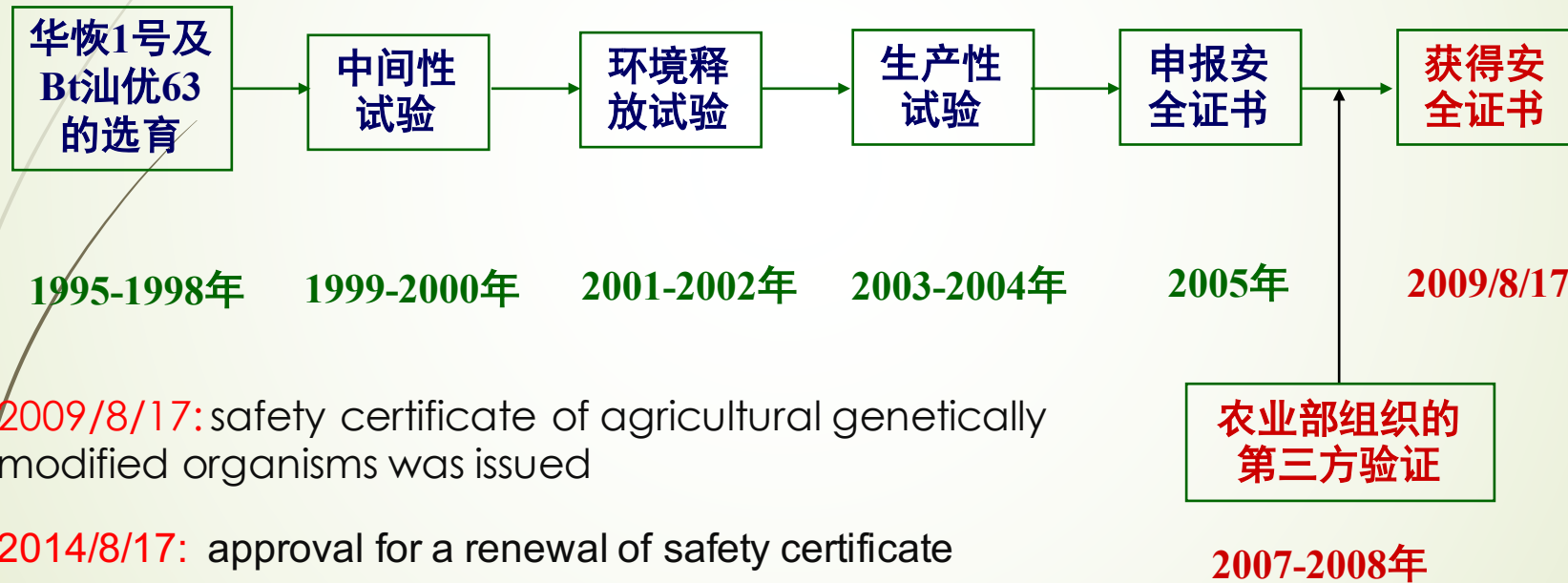
Laboratory assay using artificial infestation of first-instar larvae of yellow stem larvae, after 5 days of incubation

Lepidopteran insect-resistance

**Reaction of Huahui No.1 (right) and Minghui 63 control (left) against yellow stem borer in field**

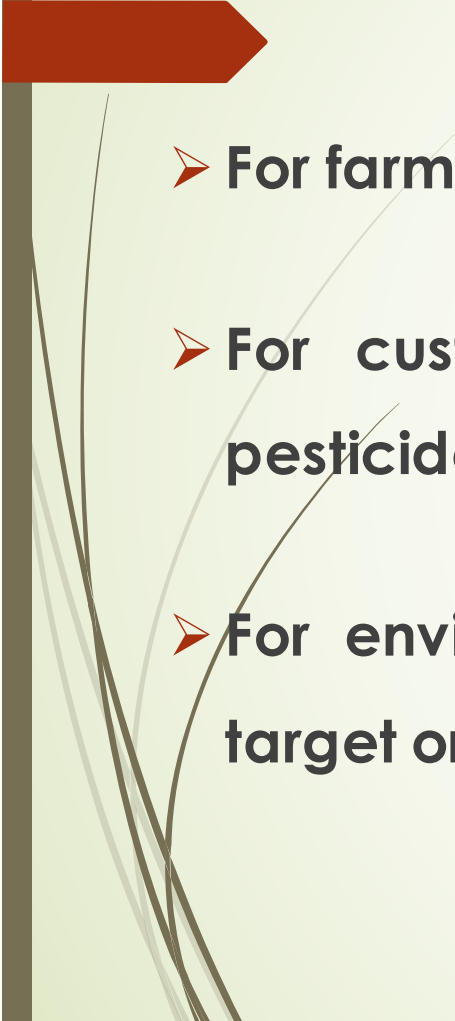


## Safety Evaluation of Huahui No.1 and Bt Shanyou 63





## **With Bt Rice--Use less chemical insecticides**

- 
- **For farmers: less production cost, much safer for health**
  - **For customer: less living cost, less chance of having pesticides overdose food, more health food**
  - **For environment: Cause no harmful side-effects on non-target organisms, Less pollute**



## Large-scale production of functional human serum albumin from transgenic rice seeds

Yang He<sup>a</sup>, Tingting Ning<sup>a</sup>, Tingting Xie<sup>a</sup>, Qingchuan Qiu<sup>a</sup>, Liping Zhang<sup>a</sup>, Yunfang Sun<sup>a</sup>, Daiming Jiang<sup>a</sup>, Kai Fu<sup>a</sup>, Fei Yin<sup>b</sup>, Wenjing Zhang<sup>b</sup>, Lang Shen<sup>c</sup>, Hui Wang<sup>c</sup>, Jianjun Li<sup>d</sup>, Qishan Lin<sup>e</sup>, Yunxia Sun<sup>f</sup>, Hongzhen Li<sup>f</sup>, Yingguo Zhu<sup>a</sup>, and Daichang Yang<sup>a,1</sup>

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### 水稻胚乳细胞生物反应器

Large-scale production of OsrHSA generated protein with a purity >99% and a productivity rate of 2.75 g/kg brown rice (2011)

- 转基因水稻品系， OsrHSA表达量达9.6克 / 公斤糙米，蛋白纯度99.9999%，每亩可实现经济效益20万元

## ➤ Pest Resistant

- Disease Resistant
- Stress Tolerance & Herbicide Tolerance
- Health & Nutrition
- Nutrient Use Efficiency
- Increasing Yields

However---  
from the internet





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### [怎样辨别转基因食品 百度经验](#)

- 1、大豆 非转基因大豆：为椭圆形状，有点扁。肚脐为浅褐色。豆大小不一。打出来的豆...
2. 胡萝卜 非转基因胡萝卜：表面凸凹不平，一般不太直，从头部到尾部是从粗到细的...
3. 土豆 非转基因土豆：样子比较难看，一般颜色比较深，表面坑坑洼洼的，同时表皮...

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### [一张图教你如何分辨转基因食品](#)

2013年6月27日 - 一张图教你[如何分辨转基因食品](#) 2013-06-27 | 阅: 转: | 分享 點擊進入更多閱讀>>> 献花(0) +1 (本文系還舊樓主.首藏) ...

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### [中国在售转基因生物共17种 看看怎样鉴别转基因与非转基因食品\(组图\)](#)



2013年10月27日 - 欧盟对[转基因食品](#)实施定量标识制度,即规定食品中某一成分的转基因含量达到该成分的0.9%时须标识。据悉,中国进口用作加工原料的转基因作物有大豆、玉米...

[www.sxdaily.com.cn/n/2...](#) - [V3](#) - 百度快照

## From website----How to distinguish transgenic crop

- Anti-season
- Different color
- Different size
- Different smell
- No insect
- High yield



Truth: They are non-GM crop





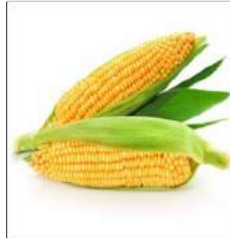
# Truth:





# Truth

✓进口，限于加工原料

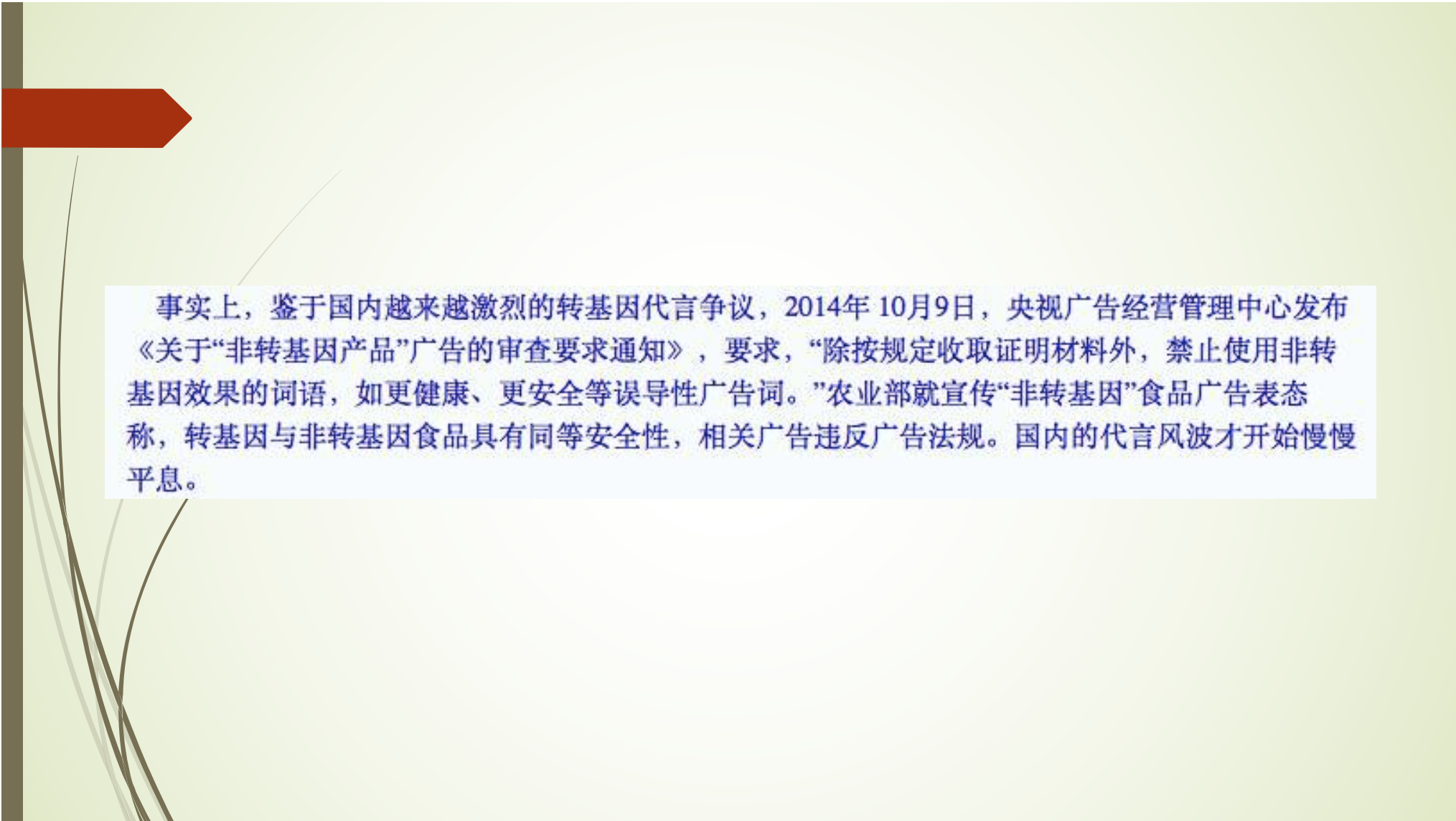


✓进口，种植





明星代言非转基因



事实上，鉴于国内越来越激烈的转基因代言争议，2014年10月9日，央视广告经营管理中心发布《关于“非转基因产品”广告的审查要求通知》，要求，“除按规定收取证明材料外，禁止使用非转基因效果的词语，如更健康、更安全等误导性广告词。”农业部就宣传“非转基因”食品广告表态称，转基因与非转基因食品具有同等安全性，相关广告违反广告法规。国内的代言风波才开始慢慢平息。







FAQ: Bt crop can even kill insect, so can it also kill human?



- in the natural state, the protoxin is cleaved in the insect midgut by:
  - protease activity
  - alkaline pH
- Bt toxins have been used as biopesticides since the 1960s

### 虫子吃了会死的抗虫转基因作物，人能吃吗？

目前商业化种植的抗虫转基因作物只对部分昆虫有作用，对其他生物，包括人类都没有毒性。

Due to the specificity of Bt protein, it can only specifically kill one kind of insect

Even not all the insect can be killed by Bt crop, therefore Bt won't kill people



## FAQ: Will transgenic crop transfer gene to human body, will it also change our gene

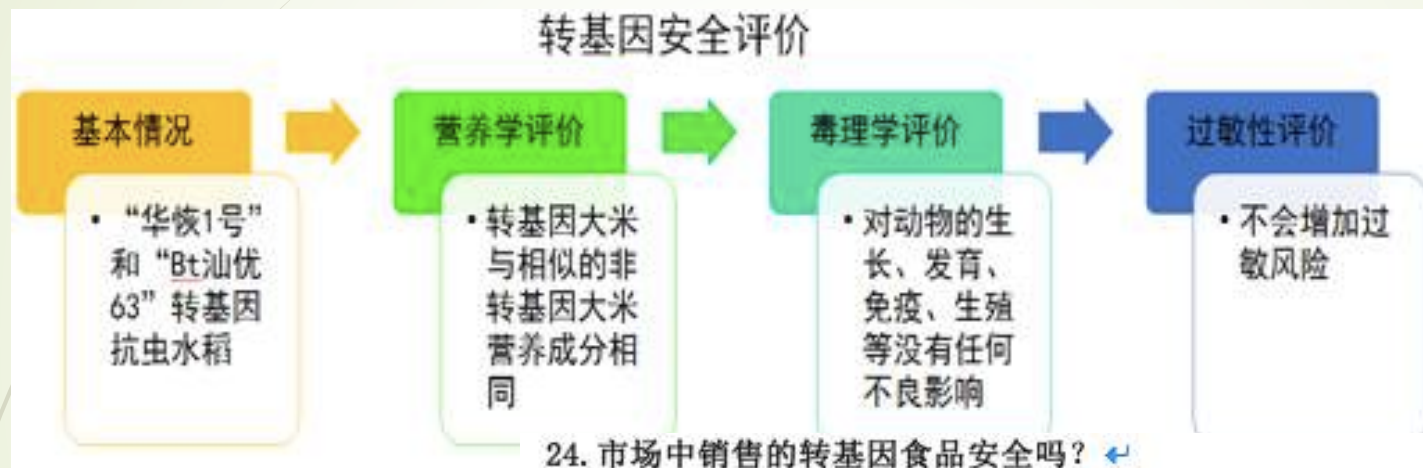


### 动物或人在食用转基因食品后，自身基因会改变吗？

所有食品，不论是转基因还是非转基因的，都含有基因。基因通过食物进入动物体或人体后，会在消化系统的作用下降解成小分子，而不会以基因的形态进入动物体或人体的细胞中，更不会影响动物或人体的基因。

All the food, non-transgenic and transgenic food both contain gene. When entering the digest system, all the food will be digested into small molecular. It will not enter into human cell, and it won't change our gene

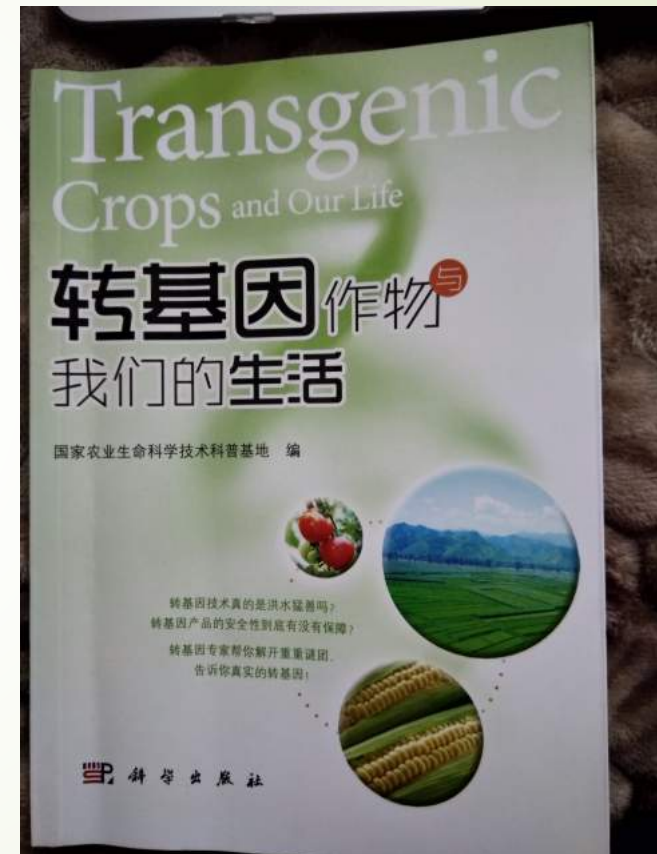
## FAQ: Is GMO food safe?



我国规定凡是原料采用进口的或者我国批准种植的转基因农产品及其直接加工品的食品都是转基因食品。对于转基因食品，其安全性是通过安全评价得出的，即通过安全评价，获得安全证书的转基因产品是安全的，可以放心食用。



Efforts have been made:



## Popularization of science– to citizens



# Popularization of science— primary school pupil





# Future scientists program

- since 2010
- Public service activity
- No cost, for free





# Popularization of science --- teacher training school







## But, still, key problem

- ▶ Some people doesn't want to listen, or know what is GMO food
- ▶ Some people choose to believe that you never know what will happen in future, they always ask what about next generation, what about 100 years later, what about 1000 years later.....
- ▶ It is not only a scientific question



# Thanks