

Excessive Chinese concerns over genetically engineered food safety are unjustified

To the Editor — Over 20 years of genetically engineered (GE) crops have boosted agricultural productivity and improved the agroecological environment^{1,2}. Although great economic, ecological and social benefits have been realized with the adoption of *Bacillus thuringiensis* (*Bt*) cotton in China^{3–5}, this experience has not facilitated adoption of GE food crops because of excessive concern over the safety of GE food⁶. For example, although two *Bt* rice lines, *Bt* Shanyou 63 and Huahui No. 1, were issued biosafety certificates in 2009, and Huahui No. 1 was approved for consumption by the US Food and Drug Administration in 2018, the lines have not yet been planted commercially in China⁴.

Social surveys suggest that opposition to GE crops is largely attributed to extensive concern regarding their safety as food and fodder, rather than concern regarding environmental risks^{6,7}. For example, a survey in 2018 by Cui and Shoemaker showed over 46% of respondents having a negative view of GE food⁶. Although massive scientific literature and multiple international authorities have confirmed the food safety of approved GE food¹, consumers appear more willing to believe non-scientific misinformation and even illogical rumours that are easily accessed from the internet and other media, such as WeChat⁶. With past food safety scandals, including milk powder tainted with melamine and rice with dangerous levels of cadmium, the Chinese public has little faith in food safety authorities⁷. Instead of once again emphasizing the safety of GE food using scientific data, we present two contexts illuminating how delays in approval of GE crop lines for commercial cultivation because of excessive food safety concerns are unjustified.

Those against GE foods in China believe that consumption of GE food will impair human health, and that people from the USA and Europe do not consume GE foods. However, 144 GE events distributed among 15 edible crops have been approved in the USA⁸. GE crops are widely produced, and the average American annually consumes large quantities of GE food products, including beet sugar (31 kg), corn syrup (26 kg), soybean oil (17 kg) and corn-based products (13 kg), as well as

smaller quantities of canola oil, cottonseed oil, papaya, yellow squash and other soy products⁹. Americans also consume GE crops indirectly by eating meat derived from animals raised using GE fodder crops. Genetically engineered crops are presently produced in 26 countries, and more than 60 countries import and consume them^{8,10}. In 2016, a National Academies of Science, Engineering and Medicine committee examined epidemiological data on incidence of cancers and other human-health problems over time and found no substantiated evidence that foods from GE crops were less safe than foods from non-GE crops¹. Additionally, long-term data on livestock health before and after the introduction of GE crops showed no adverse effects associated with GE crops.

While biosafety certificates have been issued for GE strains of cotton, rice, corn and papaya, only cotton and papaya can be commercially planted in China¹¹. Consumers' concerns on GE food safety have made the Chinese government cautious in decision-making regarding commercialization of GE crops, resulting in ongoing delays of approval of GE staple crops, such as corn, rice and soybean¹². Meanwhile, China imports large quantities of GE grains from other countries; import certificates have been issued for GE lines of soybeans, corn, rape, cotton and beets, allowing them to be imported as raw materials for domestic processing¹¹. For example, imports of soybean have increased year-by-year, reaching 83.9 million tons by 2016, 98% of which is GE soybean. The Chinese Minister of Agriculture confirmed to reporters in 2014 that soybean oil produced in China is derived from imported GE material and is safe¹³. Considerable GE corn is also imported. These developments have resulted in the ironic situation that, as the result of the public's 'food safety' concerns, GE food can be consumed, but most GE crops are not approved for production, in China.

Excessive concerns on GE food safety by Chinese consumers are unjustified, and the current situation of 'being allowed to eat, but not to plant' is irrational. To address this situation, China should develop a comprehensive program to

improve public understanding of GE technology and its benefits¹⁴, and a more evidence-based approach should be taken in regulatory decision-making regarding commercialization of GE crop lines, rather than bowing to pressure from anti-GE groups¹⁵. □

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Competing interests

The authors declare no competing interests.