Retraction

Retraction: Advances in Plant Genetic Engineering Based on the Analysis of Big Data from the Perspective of Biological Mechanism (*J. Phys.: Conf. Ser.* **1744** 022086)

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The authors of the article have been given opportunity to present evidence that they were the original and genuine creators of the work, however at the time of publication of this notice, IOP Publishing has not received any response. IOP Publishing has analysed the article and agrees there are enough indicators to cause serious doubts over the legitimacy of the work and agree this article should be retracted. The authors are encouraged to contact IOP Publishing Limited if they have any comments on this retraction.

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Advances in Plant Genetic Engineering Based on the Analysis of Big Data from the Perspective of Biological Mechanism

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Abstract. By exploring the in-depth understanding of biological mechanism and plant genetic engineering and its application in production and life in recent decades, this paper briefly describes the concept, research contents and significance of plant genetic engineering based on the analysis of big data, puts forward the important role of priming factors in plant genetic engineering induction, and introduces the latest research results of plant genetic engineering.

Keywords: Biological Mechanisms, Plants, Genetic Engineering, Big Data

1. Introduction
Plant genetic engineering began to emerge in the 1980s. After entering the 20th century, with the rapid development of science and technology and information technology, people attach importance to the protection of ecological environment, especially the urgent need for the acceleration of urbanization process to improve the efficiency of agricultural production. People have extensively and deeply studied the biological mechanism, and used it for in-depth research and wide application of plant genetic engineering. The production and development of plant genetic engineering has its unique advantages, and it is because of the total potency of plants that it provides a wide range of possibilities for plant genetic manipulation from the relevant data we can see. Plant genetic engineering is gradually developed on the basis of the improvement of modern molecular biology theory and technology, and is playing an increasingly important role in people's daily life and production.

At present, our research in plant genetic engineering has made gratifying achievements, and these scientific research results have also successfully realized the transformation from scientific research results to real products. In the field of saline-alkali resistance of crops, two main measures are adopted: one is to improve the saline-alkali soil through engineering measures; the other is biological treatment, to cultivate salt-tolerant crop varieties through agricultural biotechnology or to develop and utilize economically valuable halophyte resources to improve the soil [1]. Although the former has achieved certain results, but because of the huge cost, it is difficult to maintain long-term, so people hope that the latter, through biotechnology means, ultimately achieve the purpose of improving the use of saline-alkali land, the premise of biotechnology research is to carry out plant salt-resistant physiology research. On the other hand, the loss of crops caused by drought is the first of all abiotic stresses, second only to the loss caused by biological stress diseases and pests. To adapt to drought stress, some plants have evolved a set of adaptation mechanisms and strategies during long-term evolution.
However, many important crops such as rice, tobacco, potatoes and so on are very sensitive to drought, lack of effective drought tolerance mechanism, and often cause serious yield losses due to drought. As a result, countries are working to cultivate new varieties of drought-tolerant crops. In recent years, with the rapid development of molecular biology and the maturation of transgenic technology, the improvement of crop drought tolerance by genetic engineering technology has appeared a good momentum. In addition, with the continuous progress of industrialization and urbanization in China, the problems of imperfect management system in the process of mineral development, electroplating smelting, sewage irrigation, agricultural fertilization and so on lead to serious heavy metal pollution in soil. At present, the common remediation techniques of heavy metal pollution in soil mainly include physical remediation, chemical remediation, bioremediation, phytoremediation in bioremediation are widely accepted by the academic circles and the environmental protection departments of various countries and regions because of the advantages of low technical cost, simple operation, wide application range, no secondary pollution and the ability to recover heavy metals in plants. In recent years, the United States, France and so on have invested a lot of money in phytoremediation research, with the rapid development of economy, the application prospect of phytoremediation will be more and more extensive. The key of phytoremediation technology is the screening of ultra-rich plants, but the application of phytoremediation in soil heavy metal pollution remediation is seriously hindered because of the disadvantages of time-consuming and laborious process, short obtained plants and poor environmental adaptability. Therefore, the use of genetic engineering to strengthen phytoremediation of heavy metal pollution in soil has become the focus and focus of scholars today, and has a broad potential for development [2].

2. Overview of plant genetic engineering

2.1. Concept of plant genetic engineering
Plant genetic engineering is similar to engineering construction, according to the pre-designed blueprint, using molecular biology and cytology advanced technology and methods, through the appropriate vector to introduce foreign genes or DNA fragments into plant cells and make it transform, so that the latter directional acquisition of new traits, to produce special products of transformed cells or transgenic plants. Agrobacterium tumefaciens was discovered in the 1970s and early 1980s. Along with the rapid development of molecular biology, the discovery of Agrobacterium tumefaciens in soil developed with the development of gene cloning technology, DNA recombination technology and plant tissue and cell culture technology.

2.2. Significance of plant genetic engineering research
First of all, plant genetic engineering has led to the overall innovation of traditional plant sexual hybridization technology and asexual reproduction technology. Typically, sexual hybridization takes 4-8 years to get a new breed, and plant genetic engineering has the potential to shorten the cycle in a considerable range. At the same time, plant gene manipulation can also overcome the barrier that cannot be crossed by conventional breeding and make inter-species hybridization possible, thus increasing the diversity of plant resources in the world. Plant genetic engineering can also create new crop varieties with drought resistance, pest resistance, salt tolerance, high quality and high yield [3]. In addition, plant genetic engineering is of great significance for the production of new drugs of medical value, the cultivation of new flower varieties, the increase of the length of plant fibers of economic value and the development of plant resources, which can open up new ways to solve the serious problems facing the world, such as energy, food, population, resources and pollution.

2.3. Research on plant genetic engineering
Beneficial target genes were isolated from a wide variety of plant gene populations. To find or construct cloning vectors that can withstand the characteristics of foreign gene insertion and genetic transformation. The recombinant vector was introduced into plant receptor cells or tissues by in vitro
transformation and integrated into the genome of parasitic chromosomes. A plant cell or tissue DNA with a recombinant vector with a foreign target gene is obtained and regenerated into a healthy plant with normal morphology [4]. Ideally, enable these plants to pass on exogenous target genes continuously to offspring through sexual processes.

2.4. Plant transgenic technology

Plant transgenic research is a systematic project, the success of transformation mainly depends on several important technical links of plant genetic engineering: separation and modification of target genes, construction of plant expression vectors and genetic transformation of receptors, screening, identification and safety evaluation of genetically engineered cells and plants.

3. Initiating factors and their role in plant genetic engineering

The use of artificial promoters can increase the intensity of foreign gene expression in specific parts, enhance the efficiency of foreign gene expression, but also reduce the burden of foreign gene overexpression on host plants, reduce the adverse effects on crop agronomic traits, thus improve crop quality, improve crop resistance to adversity and disease resistance, etc.

Promoter is a DNA sequence that regulates gene transcription and is also the most critical factor in gene transcriptional regulation mechanisms and expression patterns. The study of plant promoters is helpful to understand the mechanism of gene transcription regulation and expression pattern, and it can be effectively applied to improve or improve the expression of exogenous genes in genetic engineering. Previous studies have focused on the structure, function and classification of natural promoters. Now, the focus of promoter research has shifted to the study of artificial promoters, i.e., the free combination of different promoter elements, the replacement or redesign of the sequence to construct artificial promoters, in order to expect stronger expression of regulatory levels of promoters. The target gene is regulated by artificial promoter to realize the accurate expression of the gene, so as to realize the accurate expression of the gene's tissue and organ specificity, developmental stage specificity, external environment and internal hormone induction specificity [5]. Figure 1 is a schematic diagram of the initiation factors of plant artificial synthesis.
4. Advances and related achievements in plant genetic engineering based on biological mechanisms

4.1. Advances in chloroplast genetic engineering

At present, the Japanese laboratory has measured the whole sequence structure of the DNA of various plants, which lays a good foundation for the study of gene localization and function. Genetic engineering has also been demonstrated. The promoter regions of large subunit genes and some other light system genes are subject to light regulation and tissue specificity.

4.2. To improve the resistance of crops to environmental stress factors through gene manipulation

In the field of pest and disease resistance: the insect-resistant engineering corn constructed by researchers of several companies in the United States is mainly resistant to corn borer, its control rate is 80%, and the chemical control rate is only half. The anti-insect engineering cotton is mainly resistant to cotton bollworm, tobacco aphids and so on, and has now entered the practical stage. At present, some companies are carrying on the genetic operation to the wing pest, is still in the research stage.

4.3. Improve crop quality and create new traits to obtain good varieties

Some scientists in the United States have found a protein from Brazilian nuts with a methionine content of up to 25% and have obtained corresponding genes. This gene is being used to modify the genetic composition of soybeans to improve the quality of their stored proteins.

In recent years, plant genetic engineering technology has been improved and developed. By changing the sequence of DNA base pairs encoding protein genes, we can modify the properties of proteins or create completely new proteins to meet human needs [6-7]. Figure 2 is the basic strategy
obtaining transgenic crops resistant to abiotic stress.

Figure 2. Basic strategies for obtaining transgenic crops resistant to abiotic stress

5. Conclusion
Due to the limitation of knowledge and technology level, there are still many genes related to the ability of plants to adapt to the environment and nutritional value have not been isolated and identified, and many transgenic plants show abnormal morphology and slow growth in non-coercive environment. In addition to the lack of a complete understanding of plant biological mechanisms, this may also involve many potential problems in the expression of exogenous genes in higher plants. Therefore, how to coordinate the relationship between exogenous and endogenous genes, control the expression time and amount of genes, and how to accurately locate cells to avoid the negative effects on crops has been a lot of research, and has reached a certain breadth and depth, but because the plant's own attribute is a complex quantitative trait controlled by multiple genes, it is affected by plant species, variety genotypes, morphological traits and internal physiological and biochemical reactions. China is a big agricultural country, from this national conditions, highlight the main direction of attack, focus on excellent scientific and technological forces, organize division of labor and cooperation, strengthen the basis of plant genetic engineering, application and development of research, plant genetic engineering in China will be greatly developed.

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