EDITORIAL

Highlights of special issue "Genome Editing in Agriculture: Technology, Applications and Regulations"

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Development of a green and sustainable agriculture is one of the greatest challenges for the globe to feed the increasingly growing human population. Among the multiplicity of factors that contribute to highly efficient agriculture, animal and crop breeding have always been regarded as a top priority in the agricultural practice of all agriculturally developed nations. Modern animal and crop breeding, following the theories of Mendel and Darwin, are mainly based on systematic selection of individuals with more desirable traits from the germplasm resources that are either already existing or created by cross hybridization, or other approaches such as induction of polyploidy and mutagenesis with chemicals or radiation. Although these breeding strategies have made great contributions to the global production of food, fibre and pharmaceuticals over the last hundred of years, it seems obvious that these established approaches are not sufficient to support sustainable agriculture globally due to their inherent technical limitations.

With the recent advent of genome editing technologies centered on sequence-specific nucleases such as zinc-finger nucleases (ZFNs), transcription activator-like effector nucleases (TALENs) and clustered, regularly interspaced short palindromic repeat-associated endonucleases (CRISPR/Cas), we are fortunate to see the dawn of a new era of revolutionary breeding technology—genome editing breeding (GEB). Compared to established and transgenic breeding approaches, GEB provides unique opportunities to develop new breeds with novel traits far more precisely, predictably and quickly, and at much lower cost.

Realizing the vital importance of GEB for future agriculture globally, *Frontiers of Agricultural Science and Engineering* is launching a special issue "**Genome Editing in Agriculture: Technology, Applications and Regulations** ". We are keen to hear diverse voices from all over the globe on how the genome editing technologies can be applied in agricultural breeding, and particularly on whether or not the genome edited animals and crops should be regulated.

As the guest editors for this special issue and researchers in the area, we three strongly believe that GEB will be a key driving force for global sustainable agriculture, and it is now time for policymakers to make decisions.

Prof. Yaofeng Zhao, received his PhD degree in Animal Genetics and Breeding at China Agricultural University in 1998. From 1998 to 2006, he undertook his postdoctoral study in Karolinska Institute, Sweden. He returned to China Agricultural University in 2006 to continue independent academic studies focusing on Animal Immunogenetics. Until now, he has published more than 100 papers in peer-reviewed international journals. He is an Associate Editor-in-Chief of the journal *FASE*.

Prof. Caixia Gao, Principal Investigator of the Institute of Genetics and Developmental Biology (IGDB), Chinese Academy of Sciences. Prior to joining IGDB in 2009, she served as Research Scientist of DLF's biotechnology group in Denmark, where she worked in plant genetic transformation and molecular biology. She completed her PhD in Plant Genetics from China Agricultural University. Her current research area focuses on developing novel technologies to achieve efficient and specific genome engineering, and applying them to study the function of genes and modify plant traits for high-quality, disease resistance and stress tolerance in crop species.

Prof. Sen Wu, Biochemist of China Agricultural University. He obtained his PhD degree in neurobiology from the University of Utah in 2006. Both his PhD and postdoctoral studies were mentored by the 2007 Nobel Laureate, Dr. Mario Capecchi. Since being employed by China Agricultural University as a professor in 2010, he has made important contributions in the establishment of genetic engineering technology platforms for farm animals. His recent researches have been published in journals such as *Nature Genetics* and *PNAS*. He is also an Editorial Board member of the journal *FASE*.