Editorial

Due to advent in technology the plant breeding methods are surging towards identification of the superior genes with accurate precision. Classical and mutational breeding have resulted in significant improvements in agronomic traits, with certain limitations in terms of labour, time and precise knowledge of selection. Marker-aided selection with the help of already identified markers assisted the breeders in accurate selection for those superior traits. Under new breeding techniques (NBTs) CRISPR/Cas (cluster regularly interspaced short palindromic repeats /CRISPR-associated proteins) for genome editing (GE) has great potential for crop improvement. CRISPR has become one of the most powerful gene editing tools today. Unlike other genetic engineering tools, CRISPR is cheap, relatively easy to use and precise. Genome editing has the potential to alter any DNA sequence, almost in plant, bacterium, animal or human being; it has an almost limitless range of possible applications in living things. Traditional breeding already extensively exploited the existing diversity in the crop native gene pool and contributed eminence in boosting crop production of the world. The genome edited plant can be used as a donor parent unconventional plant breeding to improve the desired trait. This is the fastest way to improve local varieties for desired traits. Cross-incompatibility and hybrid sterility are some of the major limitations of traditional plant breeding which affects exploitation of available allelic and genetic diversity. Knock out of genes involved in cross compatibility and hybrid sterility by GE can help to overcome these problems. GE not only helps in improving crops by altering traits, but also has been playing a tremendous role in functional genomics. Till date, GE is employed for improvement of single trait, but there is a great scope for improving multiple traits in a way to develop designer crops. There is a need to put more concerted efforts to address concerns like minimizing the off-site targeting, increasing rate of recombination frequency and developing high-throughput protocols for commercial crops. There is a need to formulate an international consortium to develop genome edited lines of important crops (e.g., rice, maize, wheat) covering the whole genome. Huge data of SNPs can be used in defining the QTLs, and their use in crop improvement by GE. Overall, GE possesses the ability to boost next-generation plant breeding and plant genomic research. The regulatory considerations in case of GE differ from that for genetically modified crops. Regulations can be drafted in a case dependent manner to handle genome edited crop plants. The changes brought through GE are very similar to natural mutations and may be put outside the purview of biosafety regulations. Worldwide reforms are made for regulations governing GM crops to accommodate the latest advances. Many researchers have opinion that GE is likely to be less controversial than GM because of its precision. Additionally, such plants are free from any selectable marker. Although this technology offers a better alternative to GM that could be much more acceptable to consumers, there are issues to be solved. As GE is liable to off-site targeting, it’s probable side-effects need to be analyzed. Some off-targets can cause unknown nucleotide changes associated with unknown phenotypes Regulatory agencies need to consider how best to foster responsible use of GE without inhibiting research and development. Further, licensing of technology and issues of intellectual property rights (IPRs) need to be taken care in case of commercial applications of GE in crop plants.