Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Journal of Natural Product and Plant Resources, 2022, 12 (2): 20-21

(http://www.scholarsresearchlibrary.com)

ISSN:: 2231-3184

Decision-Making Tools in the Cloud Platform for Golden Seed Breeding Enable Intelligent Plant Breeding

Stuart Anderson*

Managing Editor, Journal of Natural Product and Plant Resources, United Kingdom

***Corresponding Author:** Stuart Anderson, Managing Editor, Journal of Natural Product and Plant Resources,UK*

E-Mail: robertwilliam40@aol.com

Received: 17 March, 2022, Manuscript no. Jnppr-22-80114; **Editor assigned:** 21 March, 2022, Pre QC no. Jnppr-22-80114 (PQ); **Reviewed:** 28 March, 2022, QC no. Jnppr-22-80114 (Q); **Revised:** 6 April, 2022, Manuscript no. Jnppr-22-80114 (R);**Published:** 16 April, 2022.

ABSTRACT

Information technologies are excellent means to enhance plant variety improvement, but plant breeding is an effective guarantee of agricultural production and food security. Breeding information technologies offer a practical and scientific way to breed, but they also create a challenge for huge data processing with multidimensional breeding data at various granularities over generations. Therefore, it is essential and crucial to have decision support tools that assist breeders in gathering pertinent and valuable information. The decision support tools of the cloud-based golden seed breeding platform are introduced in this work on three different levels: graphical user interfaces, statistical tools, and intelligent decision support tools. In more than 150 breeding institutes in China, the benefits have significantly increased breeding efficiency as well as data management and application skills. Our system's successful implementation demonstrates the value of our research and offers information and support for upcoming studies.

Keywords: Environment, Agronomy, and Plant breeding

INTRODUCTION

The strain of global environmental change, such as land degradation and water contamination, climate change, and sociocultural advances, makes ensuring food security for the several billion people on this planet a severe task on a global scale. The primary drivers of agricultural development are variety and agronomic advancements. The primary drive behind the innovation and development of the seed industry is the breeding and promotion of high-yield and stable-yield varieties. Crop breeding techniques have increasingly changed from yield-based approaches to complete consideration of yield, quality, stress resistance, and even the worldwide sustainability targets in order to adapt to environmental pressures, food production conditions, and consumer preferences. This change has resulted in new demands for the collection and thorough use of multi-omics data, and significant advancements in associated technologies have been made.

Modern breeding technology and the emblem of breeding are biotechnology and molecular breeding. Because of their low cost, high read accuracy, and competing sequencing techniques, applications of marker-assisted selection, the most widely used molecular technology, have made significant progress in producing cultivars in rice, maize, legume, horticulture crops, and numerous long juvenile species. Genome-wide prediction uses genetic and phenotypic data to forecast an individual's phenotype, and genomic selection uses those predictions to decide which offspring to breed. By speeding up the breeding cycles, these techniques can significantly lower the cost of phenotype testing while also increasing genetic gain. Future crop variety innovation is thought to be significantly influenced by genetic modification because it can produce novel variations beyond those that naturally occur.

Using cutting-edge technology including new sensors, cameras, and robotics, high-throughput phenotyping platforms provide effective, adaptable, high-throughput, and affordable options for gathering field phenotypic data. Unmanned aerial vehicle, ground, and conveyor-based indoor platforms make up the majority of typical unmanned platforms. These platforms have been used to gather data from various sensors and analyse it using a variety of machine learning techniques in order to assess the field performance and adaptability of crops. These comprehensive and numerous phenotypic data offer an excellent opportunity to close the genotype-phenotype gap and investigate genome-wide associations.

Massive amounts of new data are constantly being produced by these developments in phonemics and genomics. This not only offers data assistance for breeders to research agricultural systems and develop new cultivars, but it also presents challenges for data processing and storage.

Thankfully, the quick evolution of breeding management systems has made it easier to gather and use a vast amount of breeding-related data via information technology. Plant breeding in the contemporary seed industry is based on extensive multi-omics research and large-scale breeding operations, encompassing both field and laboratory studies. Numerous breeding management systems have been developed in order to collect and use the enormous amounts of breeding data that have been generated. They support breeders by designing planting plans, managing fields, gathering data, and analyzing that data across the many crop life cycles.

Artificial intelligence powered by big data is thought to be crucial for the shift from Breeding 3 to Breeding 4. In genomics and phonemics, big data has become a reality, but the existing AI systems still have issues with interpretability and are unable to efficiently produce knowledge from massive and disordered data. Future AI methods are designed to gradually address these issues, effectively utilize extremely heterogeneous and complex data, close the genotype-phenotype gap, and advance breeding practises continuously. It seems sense that breeding management systems may incorporate these technologies to support the intelligent modernization of the seed industry. To support plant breeding and selection, AGROBASE links genotypic and phenotypic data. PRISM offers statistical analysis tools to help decision-makers decide which lines to advance. BMS connects an intuitive user interface to a statistical analysis package for quick phenotypic and genotypic analysis of field trial observations. The system also generates reports of analysis in the form of graphs and spreadsheets.

Our newly released breeding management system, breeding cloud platform, has 150 institutional users in China. Due to the ease of data recording, data querying, and data analysis, it provides breeding process and breeding data management support in numerous dimensions for both hybrid and self-bred crops. Nevertheless, as it moves from Breeding 3 to Breeding 4, it also has an urgent upgrade requirement. At three different levels graphical user interfaces, statistical tools, and intelligent decision support the upgrading detail will be introduced.

Snippets of sections

User interfaces with graphics: Breeding is a data-driven science by nature. In addition to making it possible to make breeding decisions that are more scientifically sound and successful, the collection of a lot of genotypic and phenotypic data can also make it difficult to see and understand data in the absence of an intuitive representation. Graphical user interfaces that are easy to use can assist hide unimportant details, offer clear data visualization, and offer practical decision support.

Tools for statistics

Breeders typically perform field tests and evaluate data using statistical theory, assess the genetic gain or combining ability of cultivars, and make evaluation and cultivar selection judgments. This is why breeding is based on statistical science. Data analysis and experiment design are demanding, expert tasks that need for statistical expertise and familiar tools. Experiment design can be automatically generated with the use of GSBCP's statistical tools.

CONCLUSION

This paper introduces our investigation into and application of GSBCP'S intelligent upgrading. In three ways, a variety of decision-support technologies have benefited plant breeding: Graphical user interfaces make it simple to spot and comprehend trends, patterns, and meanings in data, and statistical tools make it simple to run experiments and analyses data, which may lessen the need for breeders to have strong statistical abilities. smart decision-support tools offer. At key sites, we have suggested a number of cutting-edge agricultural management techniques that could support rice terracing in the area. The long-term viability of both hybrid rice terracing and slope agriculture for substance mountain farming could be enhanced by increasing biodiversity, agroforestry intensity, intercropping of various rice breeds, alternative cropping, and affirming local ecological knowledge as a resource. It was also announced that more effort was needed to track the effectiveness of these measures.