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IRRI launches AI-powered global digital platform for hybrid rice breeding and parental selection

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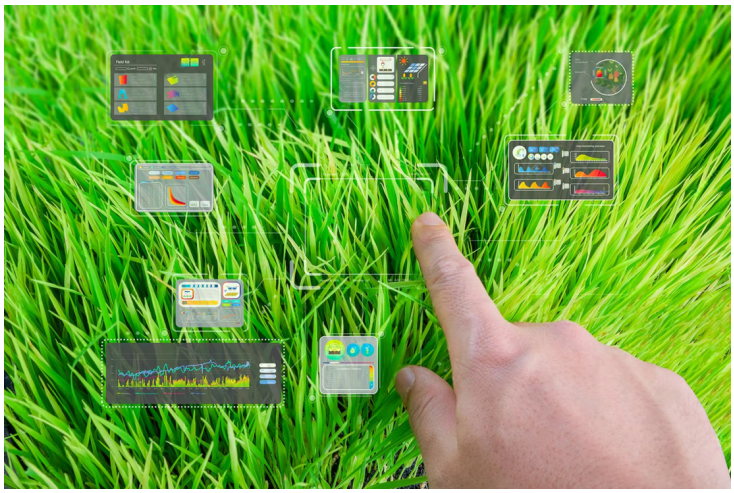

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Called theÂ Global AI-Hybrid Rice Platform (GAI-HRP), the platform was developed by the IRRI Hybrid Rice Unit with the Hybrid Rice Development Consortium (HRDC). The system utilizes advanced artificial intelligence and machine learning models to interrogate datasets across decades of research and trials, and to provide swift and precise identification of optimal hybrid rice combinations based on specific parameters.

Hybrid rice is a type of rice bred from two different parents across rice lines. The combination of parental lines often produces rice plants with â??hybrid vigorâ?? or increased yields of up to 30% or more. Many hybrids also showcase various beneficial traits, such as greater tolerance for water stress, shorter maturity, or less reliance on fertilizers. However, the discovery and identification of ideal parental combinations for targeted traits in various ecologies can be slow and tedious, requiring many man-hours and painstaking research.

With the GAI-HRP system, the AI will be able to quickly and accurately predict the highest-yielding F1 rice hybrid combinations using SNP genotypic data of the male and female parental lines, while also considering the various market segments and available historical hybrid datasets. This can significantly help breeders, researchers, and seed companies to

determine the best combinations for hybrid rice development by specific traits, environments, and markets.

In addition to optimizing yield potential, GAI-HRP also indirectly contributes to sustainable agriculture by identifying low-carbon footprint rice hybrids. This is achieved by considering high-yielding and early-maturing hybrid rice varieties, which require fewer resources and reduce greenhouse gas emissions. Furthermore, the platform is being developed and enhanced to predict the most significant gene panels for targeted hybrid rice traits, helping to improve breeding efficiency and precision.

â??The AI platform is utilized to accelerate and take the guesswork out of selecting the most productive and sustainable hybrid combinations for different market segments,â?• shared Dr. Seyed Mahdi Hosseiniyan Khatibi, IRRI Postdoctoral Fellow and lead developer of GAI-HRP. â??In the future we hope to expand the platform, adding other AI-driven applications useful for different hybrid rice programs.â?•

â??GAI-HRP would help hybrid rice breeders and scientists to identify potential high-yielding hybrid combinations without the need to make thousands of crosses and grow them in the field,â?• said Dr. Jauhar Ali, Research Unit Leader for IRRI Hybrid Rice Technology for Industry and Head of HRDC. â??This will reduce the amount of work and costs for breeding and contribute to increased global hybrid rice productivity.â?• *GAI-HRP is currently accessible to interested collaborators.Â*