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REVIEWER'S REPORT

Manuscript No.: IJAR-54098 ***Date: 29.09.2025***

Title:

CRISPR-Cas9 and Emerging Genome Editing Strategies in Rice: A Dataset-Driven Roadmap for Future Breeding

Recommendation:

Accept after MINOR revision

Rating	Excel.	Good	Fair	Poor
Originality			✓	
Techn. Quality	✓			
Clarity			✓	
Significance		✓		

Reviewer Name: **Dr. S. KARTHIK** Date: **29.09.2025**

Reviewer's Comment for Publication.

(*To be published with the manuscript in the journal*)

The reviewer is requested to provide a brief comment (3-4 lines) highlighting the significance, strengths, or key insights of the manuscript. This comment will be displayed in the journal publication alongside with the reviewer's name.

Significance:

- More than half of the world's population is fed by rice (*Oryza sativa* L.), but yield demands, illnesses, and climate change are becoming more problems.
- Compared to traditional breeding, genome editing—especially CRISPR-based tools—offers quicker and more accurate solutions.
- Advances in Cas9, base/prime editors, and Cas12a are curated in this paper, which identifies target genes (OsSWEET14, IPA1, and DEP1) and promoter selection as crucial for benefits in yield, stress, and disease.
- Predictive editing techniques are made possible by combining machine learning with datasets, opening the door to more resilient and sustainable rice breeding.

Strength:

- The economic and health benefits of CRISPR-edited rice are substantial: traits like OsSWEET14 reduce pesticide use by 20–40% at the farm level, while yield gains from Gn1a, DEP1, GS3, and IPA1 lower production costs and improve food security; nutritional and detoxification edits increase market value and stabilize prices globally; and health-focused edits, like lowering glycemic index via SBEIIb, reducing arsenic with OsLsi2, and biofortifying with OsNAS2, position rice as a functional food for improved long-term health.

Key Insight:

- CRISPR and machine learning together are revolutionizing rice improvement, enabling precise, predictive, and efficient breeding.
- These innovations are vital for ensuring resilient, nutritious, and sustainable rice to secure global food futures.

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Additional Comments:

1. Excess Keywords
2. Many of the references are present in the TABLE only
3. More references can be added in Results and Discussion.
4. Check the formatting of the journal format.
5. Suggest a Minor revision.