



BP-01: Artificial Intelligence-Based Classification of Cereal Species Using ITS Sequences

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Subject description: This study explores the application of artificial intelligence (AI) in classifying cereal species by utilizing Internal Transcribed Spacer (ITS) sequences. Cereals like wheat, barley, oats, and rice are vital components of global agriculture, making accurate classification crucial for crop management and genetic research.

Objectives: The primary objective of this research is to utilize AI techniques for precise cereal species classification based on ITS sequences. We aimed to:

- Develop a machine-learning model using the Random Forest classifier (RF).
- Evaluate the model's accuracy in predicting cereals based on ITS sequences.

Methods: Morphological characteristics of cereal species were analyzed to establish initial parameters. ITS sequences were collected and aligned. A Random Forest classifier was employed to build a classification model. The model was rigorously tested and its accuracy assessed.

Results and discussion: The developed AI model achieved an exceptional accuracy rate of 98% in predicting the genera of cereals based on ITS sequences. This indicates the capability of AI in discriminating between closely related species, such as different cereal genera. Such precision can significantly benefit agriculture by aiding in crop management and breeding programs.

Conclusion: This study highlights the potential of AI in cereal species classification. The high accuracy achieved proves its practicality for real-world applications. Moreover, this research contributes to a better understanding of cereal diversity, which is vital for ensuring global food security.

Keywords: Artificial Intelligence, Cereal Species Classification, Internal Transcribed Spacer (ITS), Random Forest Classifier (RF), Genetic Diversity