

### البحث رقم ( 3 )

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| <b>Title:</b>                                                         | Comparison of the Morpho-Physiological and Molecular Responses to Salinity and Alkalinity Stresses in Rice             |
| <b>عنوان البحث:</b>                                                   | مقارنات الاستجابات المورفولوجية والفسيولوجية والجزيئية لاجهادات الملوحة والقلوية في الأرز                              |
| <b>اسم المجلة<br/>ومعلومات النشر<br/>(السنة، العدد،<br/>الصفحات):</b> | Plants<br>13, 60 (2024)<br><a href="https://doi.org/10.3390/plants13010060">https://doi.org/10.3390/plants13010060</a> |

#### Background

Rice is a major food crop that has a critical role in ensuring food security for the global population. However, major abiotic stresses such as salinity and alkalinity pose a major threat to rice farming worldwide. Compared with salinity stress, there is limited progress in elucidating the molecular mechanisms associated with alkalinity tolerance in rice. Since both stresses coexist in coastal and arid regions, unravelling of the underlying molecular mechanisms will help the breeding of high yielding stress-tolerant rice varieties for these areas.

#### Results

This study examined the morpho-physiological and molecular response of four rice genotypes to both salinity and alkalinity stresses. Geumgangbyeon was highly tolerant and Mermentau was the least tolerant to both stresses, while Pokkali and Bengal were tolerant to only salinity and alkalinity stress, respectively. A set of salinity and alkalinity stress-responsive genes showed differential expression in the above rice genotypes under both stress conditions. The expression patterns were consistent with the observed morphological responses in these rice genotypes, suggesting the potential role of these genes in regulating tolerance to these abiotic stresses.

#### Conclusion

Overall, this study suggested that divergence in response to alkalinity and salinity stresses among rice genotypes could be due to different molecular mechanisms conferring tolerance to each stress. In addition to providing a basis for further investigations into differentiating the molecular bases underlying tolerance, this study also emphasizes the possibilities of developing climate-resilient rice varieties using donors that are tolerant to both abiotic stresses.