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Usefulness of infra-red thermography as a high-throughput tool for rice heat tolerant selection

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Rice (*Oryza sativa L.*) is sensitive specie to extreme temperatures, especially at reproductive phase. Although their genome has been completely sequenced opening wide opportunities for large-scale studies in mapping and functional genomics, physiological phenotyping under field condition still is the major bottleneck to associate a specific genotype to a phenotypic trait. Thus, a set of 182 accessions involving subspecies indica, japonica and indica/japonica cross were evaluated under field conditions in two sowing date representing contrasting environments temperatures for rice growth. At second time sowing the occurrence of supra-optimal temperatures at the reproductive phase decreased significantly the mean grain yield (12%). A hierarchical clustering analysis highlighted that Cluster VI had outperforming LTB 14033 genotype; the grain per panicle and grain yield per square meter were the most closely related traits by principal components analysis (PCA); the thermography analysis highlighted that this genotype showed lower leaves temperatures, approximately 1°C less than mean shown by set of evaluated genotypes. In addition, PCA revealed an important role for leaves dissipation capability of thermal energy and its association with grain yield and that the use of non-invasive phenotyping approach via thermography correlated negatively and significantly with grain yield of set evaluated accessions.

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