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Expression of genes responsible for nitrogen assimilation in rice plants and red rice in competition

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Real-time reverse transcription (qRT-PCR) is an important technique to analyze the differences in gene expression due to their sensitivity, accuracy and specificity. Thus, the aim of this study was to evaluate the expression levels of genes involved in nitrogen assimilation (*OsAMTs*, *OsGS2* and *OsNADH-GOGAT2*) in rice and red rice in competition under different levels of nitrogen. The experiments were performed using different combinations of the rice cultivar IRGA 424 and a red rice biotype by varying the relative proportions of plants per pot (without (100:0) and (50:50) competition) and consisted of nitrogen added to the soil (0, 120 and 240 kg ha^{-1} of nitrogen). The genes selected to gene expression were *OsAMT1;1* and *OsAMT3;1* (genes encoding ammonium transporters); *OsGS2* (glutathione synthetase 2) *OsNADH-GOGAT2* (glutamine 2-oxoglutarate aminotransferase) and *OsUBC-E2* (E2 ubiquitin-conjugated enzyme)used as reference gene . The amplification conditions were in accordance with the manufacturer's instructions for the LightCycler 480 system (Roche Applied Science). The relative levels of expression were quantified using the "CT comparison method" (comparative cycle threshold method) and the equation QR= $2^{-\Delta\Delta CT}$. The rice cultivation results demonstrate that the AMTs did not differ between the proportions and nitrogen levels examined, but the *OsGS2* gene increased at 240 kg ha^{-1} independent of interspecific or intraspecific competition and *OsNADH-GOGAT2* gene expression increased under interspecific competition independent of the nitrogen dose. For red rice, *OsAMT3;1* exhibited differential expression under interspecific competition and at 120 Kg ha^{-1} of nitrogen, and *OsGS2* exhibited differential expression under intraspecific competition and at 240 Kg ha^{-1}.

Palavras-chave: *Oryza sativa*, red rice, reverse transcriptase real-time.

Apoio: CAPES, CNPQ, FAPERGS