



Differential expression of the lethal gene *Luteus-Pa* in cacao of the Parinari series

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ABSTRACT. The recessive lethal character *Luteus-Pa* is found in cacao (*Theobroma cacao*) genotypes of the *Parinari* series (Pa) and is characterized by expression of leaf chlorosis and seedling death. Several genotypes of the Pa series are bearers of the gene responsible for the expression of the *Luteus-Pa* character, which can be used as a tool for determining relationships between genotypes of this group. To evaluate this phenomenon, we analyzed the differential expression of genes between mutant seedlings and wild-type hybrid Pa 30 x 169 seedlings, with the aim of elucidating the possible lethal mechanisms of the homozygous recessive character *Luteus-Pa*. Plant material was harvested from leaves of wild and mutant seedlings at different periods to construct a subtractive library and perform quantitative analysis using real-time PCR. The 649 sequences obtained from the subtractive library had an average length of 500 bp, forming 409 contigs. The probable proteins encoded were grouped into 10 functional categories. Data from

ESTs identified genes associated with Rubisco, peroxidases, and other proteins and enzymes related to carbon assimilation, respiration, and photosystem 2. Mutant seedlings were characterized by synthesizing defective PsbO and PsbA proteins, which were overexpressed from 15 to 20 days after seedling emergence.

Key words: Gene expression; Lethal factor; Natural mutation;
Theobroma cacao