



Expression of genes associated with the biosynthetic pathways of abscisic acid, gibberellin, and ethylene during the germination of lettuce seeds

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ABSTRACT. Seed germination and dormancy are complex phenomena that are controlled by many genes and environmental factors. Such genes are indicated by phytohormones that interact with each other, and may cause dormancy or promote seed germination. The objective of this study was to investigate gene expression associated with the biosynthetic pathways of abscisic acid (ABA), gibberellic acid (GA), and ethylene (ET) in dormant and germinated lettuce seeds. The expressions of *LsNCED*, *LsGA3ox1*, and *ACO-B* were evaluated in germinating and dormant seeds from the cultivars Everglades, Babá de Verão, Verônica, Salinas, Colorado, and Regina 71. The expressions of *LsNCED*, *LsGA3ox1*, and *ACO-B* were related to the biosynthesis

of ABA, GA, and ET, respectively; therefore, the presence of these substances depends on genotype. *LsNCED* expression only occurred in dormant seeds, and was connected to dormancy. *LsGA3ox1* expression only occurred in germinated seeds, and was connected to germination. The *ACO-B* gene was involved in ET biosynthesis, and was expressed differently in germinated and dormant seeds, depending on the genotype, indicating different functions for different characteristics. Furthermore, sensitivity to phytohormones appeared to be more important than the expression levels of *LsNCED*, *LsGA3ox1*, or *ACO-B*.

Key words: *Lactuca sativa*; Dormancy; Genetic analysis