

#### Abstract:

In the Japanese melon market, the long shelf life of some melon (*Cucumis melo*) cultivars, such as the well-known Honeydew (*C. melo* var. *inodorus*), is an essential trait. In order to use this cultivar as a source for this trait, its genetic basis must be clarified. In this study, we analyzed ethylene production in Honeydew melons, a key factor for determining the shelf life of melon fruit. Honeydews (H) harvested at different developmental stages produced no detectable ethylene, suggesting that a lower level of ethylene production results in a longer shelf life. We then produced F1 and F2 plants by crossing Honeydew and Vedrantaïs (*C. melo* var. *cantaloupensis*) (V) and evaluated their ethylene production. Vedrantaïs is a cultivar with a short shelf life, and it produces ethylene in a climacteric manner. F1 fruits of reciprocal cross combinations (H x V and V x H) also produced ethylene in a climacteric manner. The F2 population showed a bimodal distribution of ethylene production in mature fruits; such a distribution is typical of a single gene trait. These results indicate that a single recessive gene that codes for ethylene biosynthesis regulates long shelf life in Honeydew melon.