Abstract

Apple bloom has been widely studied, particularly from the phenological point of view. Nevertheless, there is scarce information about changes associated with metabolism in the different phenophases. Red Delicious and Golden Delicious (Malus domestica Borkh) flower buds were characterized during bloom by calorimetry for two consecutive years. Bloom stages studied were ecodormancy, silver tip, green tip, half-inch green and tight cluster. The study was done by isothermic calorimetry (IC) at 25 oC, evaluating metabolic activity (q), respiration rate (RCO2), metabolic efficiency (q/RCO2) and growth rate (RSGDHB). It was also carried out by differential scanning calorimetry (DSC) in a range of 5 to 65 oC, estimating activation energy in a 10 to 20 oC range and respiration coefficients from 10 to 50 oC at 10 oC intervals. As an average of two years, significant increase in q during bloom was found in both varieties, from 6.8 to 17.3 mW mg dry weight (dw)-1 in Red Delicious and from 1.4 to 9 mW mg dw-1 in Golden Delicious. Bud respiration rate showed a similar pattern depending on phenological stages. Both varieties followed an indefinite pattern, which may indicate the activation of an alternative respiratory pathway. Activation energy decreased 15 and 7 Joules mol-1 oK-1 mg dw-1 in Red Delicious and Golden Delicious, respectively as a function of bud development. Bud respiration coefficient showed the highest response (Q10=2) at 10 to 20 oC interval and it decreased at higher temperatures.

Keywords

Malus domestica, bloom, metabolism, respiration.