Abstract

Environmental variance components associated with year, tree, and harvest date were estimated for fruit softening after harvest in apple (*Malus × domestica* Borkh.) to determine their relative importance and design optimum sampling strategies to discriminate genotypes in apple breeding. Fruit were stored after harvest under 20± 2 °C and 80± 5%RH. Softening was evaluated by adapting the change in firmness during storage to a linear regression and defining the regression coefficient as the softening rate. Environmental variances associated with genotype × year interaction, among trees, year × tree interaction, and among harvest dates were all very small, namely, 2.7, 0.1, 5.2, and 5.7%, respectively, to the total variance obtained from the analysis of variance for the softening rate. The variance associated with genotype, at 57.3%, was very large. On the basis of the number of fruit necessary for firmness measurements, two times harvest is an efficient strategy to determine a genotype mean for the softening.