Storability of sweet onions in relation to defoliation at harvest and storage atmospheres

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Abstract

Three intermediate day-length cultivars of sweet onions were lifted by hand when 70% of the necks of each cultivar had collapsed in 2009 and either 1) field cured on the ground for two weeks and thereafter dried in a ventilated and heated store at 25°C for two weeks or 2) defoliated 8 cm above the bulb and dried at 25°C for four weeks. Subsequently the onions were transferred to a cold store and kept at a temperature of 1°C and approximately 70% RH. In addition, one field-cured cultivar was stored at various storage-atmosphere conditions: a) ambient atmosphere (20.9% O_2 and 0.04% CO_2), b) ambient atmosphere enriched with 0.8 ppm ozone, c) ambient atmosphere enriched with volatile mustard essential oil liberated from a 1% allyl isothiocyanate solution, or d) controlled atmosphere (3% O_2 and 5% CO_2). The onions were evaluated three times with a three-week interval. The first evaluation took place 6-9 weeks after lifting. Compared to field curing, defoliation did not improve the storability of sweet onions. Defoliation increased the development of rotting. At the end of storage, 12-15 weeks after lifting, the proportion of onions discarded due to rotting increased to 29% in defoliated onions, but 17% in field-cured onions. In comparing various storage conditions, controlled atmosphere reduced the development of rotting resulting in 75% marketable onions measured 12 weeks after lifting compared to 56% marketable onions stored at ambient atmosphere. Sweet onions are softer and less pungent compared to long-day onions, and therefore, more susceptible to mechanical impact and fungal diseases, and this makes sweet onions only suited for short-term storage.