

# Lenticels and apple fruit transpiration

Bishnu P. Khanal, Yiru Si and Moritz Knoche

Postharvest Biology and Technology, Volume 167, September 2020, 111221

---

## Abstract

Lenticels are sites of preferential gas exchange and water loss. Here we quantified the water vapor permeance of lenticels and their contribution to total transpiration in different regions of the apple (*Malus × domestica* Borkh.) fruit skin. Along the transect pedicel to calyx, lenticel area decreased (smaller lenticels), while lenticel density per unit area and cumulative lenticel area both increased. Lenticel density was highest in ‘Renoirciv’ ( $13.6 \pm 0.5 \text{ cm}^{-2}$  in the cheek region) followed by ‘Wellant’ ( $6.9 \pm 0.5 \text{ cm}^{-2}$  in the cheek region) apple. About 10 % of lenticels had microcracks as indexed by infiltration by a solution containing a silicone surfactant. There was no infiltration in the absence of the surfactant. In ‘Wellant’ the relative contribution of lenticellular water loss to the total was lower in the pedicel region (14 %) than in the calyx region (25 %). The contribution of lenticels differed among cultivars averaging in the cheek region 19 % in ‘Wellant’ and 8 % in ‘Pinova’ apple. The permeance of the periderm of a lenticel exceeded that of a russeted fruit skin 5.8-fold in ‘Wellant’ and 5.2-fold in ‘Pinova’. Skin permeance was positively and significantly related to both lenticel density and cumulative lenticel area within a region or between regions in ‘Wellant’. Across nine apple cultivars, permeance was significantly and positively related to lenticel density ( $r^2 = 0.52^*$ ) and to cumulative lenticel area ( $r^2 = 0.84^{***}$ ). The mechanistic basis for the increased water vapor permeability of lenticels is discussed.