

## **Anatomical aspects of avocado fruit abscission**

Taib, R. (1978) Unpublished MSc Thesis, The Hebrew University of Jerusalem, Israel

The anatomical changes occurring at the abscission zones of young and mature 'Hass' avocado fruits, after induction by ethylene, were followed. Samples of the abscission zones were fixed and prepared according to standard methods for observation by light microscope, scanning electron microscope, and transmission electron microscope.

The beginning and the rate of response to ethylene changes with fruit maturation in the two abscission zones. Young fruit abscises with the pedicel attached, the separation occurring between the pedicel and the peduncle. This occurs about 120 hours after the beginning of ethylene treatment. Abscission between the pedicel and the fruit occurs several days later. In more mature fruit, abscission occurs between the pedicel and the fruit only, and takes place about 72 hours after the beginning of ethylene treatment

Gradual anatomical changes were observed in the pedicel-peduncle abscission zone before abscission. The changes were very rapid, the distance between intact tissue and tissue where cells were completely separated, being a few cells only. However, there was great variability in the rate of changes between the fruit replicates. In some abscission zones, advanced stages of separation occurred already 24-36 hours after the beginning of ethylene induction; in others the first stages of separation were observed only 84-96 hours after the beginning of treatment. However, all treated fruits dropped at almost the same time.

The two abscission zones in avocado differ greatly. In the fruit-pedicel abscission zone, the separation occurs in a definite zone consisting of 6-10 rows of parenchymatous cells. Separation of the parenchymatous cells of the cortex in the fruit-pedicel abscission zone involves dissolution of the middle lamella, and therefore the cell separates intact. At the pedicel-peduncle abscission zone, two sites of cell separation can generally be observed. Only at one of them does complete separation across the fruit stalk take place, whereas at the other site the separation is incomplete. Abscission occurs, of course, at the first site, which we called the main abscission site. It is located in the pedicel or in the peduncle.

Separation of cells can take place at one or several places across the fruit's stalk, and advance in different directions which, at the end, are omega-shaped. In the main abscission zone, cells in the cortex separate intact, by dissolution of the middle lamella only; in the second abscission zone, in the cortex, the cells rupture. Cell wall rupture takes place also in the cells of the stele.

It was found that the separation of the vascular system is not passive, caused by mechanical force, but is active like other tissues in the pedicel. Separation occurred also in picked fruits, with no influence of gravity, and in some fruits separation began in the stele and only later advanced to the cortex.

Differentiation of a specific abscission layer as the time for fruit drop approached could not be observed, nor could "target cells" which differ anatomically.