

**Title** Investigating structural and physiological differences between radial and diffuse types of flesh browning in cripps pink apples

**Author** Hannah J. James, Jenny Jobling, and David Tanner

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### **Abstract**

The Flesh Browning (FB) disorder of Cripps Pink apples can be divided into two distinct disorders, Radial and Diffuse FB, based on a number of structural and physiological differences. The type of FB observed appears to be determined by climatic conditions during fruit growth and development. The Incidence and severity of symptoms of both types of FB during storage are influenced by a combination of pre and postharvest factors. A high risk of developing Radial FB occurs in seasons with low temperature during the first 50 days after full bloom which may be related to fruit density and gas diffusivity. Radial FB is also exacerbated following low diurnal temperature differences during the 60 days prior to harvest maturity; this climatic situation results in delayed harvest in order to maximise blush colour development required for marketing the fruit under the Pink Lady<sup>TM</sup> trademark in export markets. Postharvest factors which influence the development of Radial FB include storage temperature and concentration of CO<sub>2</sub> in the storage atmosphere. A high risk of developing Diffuse FB occurs in seasons or districts experiencing < 1300 growing degree days from full bloom to harvest. It is suggested that cool growing seasons desynchronize fruit ripening processes and result in fruit which are susceptible to chilling injury during storage. The primary postharvest factor influencing incidence and severity of Diffuse FB is storage temperature. Fruit stored at 3°C showed a significantly lower incidence of both types of FB than those stored at 0°C. Transmission and Scanning Electron microscopic analysis was carried out to determine structural differences between the two expressions of FB.