

Onion leaf desiccation processes and implications for skin quality

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Abstract

Although onion skins play an important role in the life of an onion their development is poorly understood. The skins not only protect the onion bulb from disease and moisture loss but are fundamental to a customer's perception of bulb quality. This study has increased the understanding of leaf desiccation and the formation of skins. A detailed phenological study across 32 commercial crops ('Creamgold') revealed that the scale of the 6th true leaf was the most common tissue to form the outermost entire skin on the onion bulb. A positive correlation was recorded between bulb diameter and the leaf number (where leaf 1 is the first true leaf) that formed the most-outer skin on the bulb. Skins that are forming but that are not yet completely dry are highly extensible which appears to enable them to withstand the rapid radial expansion of the bulb. Skin tensile strength was positively correlated with skin thickness and skin specific dry weight. Skin specific dry weight was higher in skins that developed from younger leaves, largely due to a higher number of cells in the cross sectional plane. It was posited that conditions that impair early leaf development, and limit the number of cells in the leaf, and therefore the amount of structural tissue in the scale, are responsible for skins that are easily torn and dislodged during handling operations. The importance on the timing of the events may explain the lack of consistency in findings associated with agronomic treatments and the variability in skin disorders between crops.