

Title Investigation and manipulation of the onion skin formation process
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Citation Abstracts of 27th International Horticultural Congress & Exhibition (IHC 2006), August 13-19, 2006, COEX (Convention & Exhibition), Seoul, Korea. 494 pages.
Keywords onion; *Allium cepa* L.; skins; skinning

Abstract

In Australia onions with poor skin quality account for the largest proportion of all onion bulbs that fall below premium export grade. Despite the importance of skin quality of the onion to its marketability there is a lack of understanding about the skin formation process and the potential to manipulate this in the field. This study sought to address these deficiencies by monitoring skin formation processes during onion development and evaluating agronomic factors influencing skin quality in growing seasons 2003/04 and 2004/05. The 4th to the 9th leaves to develop often became the skin forming leaves. Plant that development more leaves were more likely to produce more skins and less likely to have skin disorders. Fructan concentration in the scales at key stages of bulb development and skin formation (lifting and curing) were determined. Fructan levels prior to leaf formation contributed up to 30% of the dry weight of skin forming leaf bases and decreased to near zero levels once the skin was formed. Agronomic studies examined included; nutrition, irrigation, disease, pesticide usage, evenness of crop maturation, and time of lifting based on stage of development. In all agronomic trials onion were lifted, cured, harvested, stored for approximately 6 weeks (consistent with commercial operations), before they were subjected to standard mechanical impact, graded and skin quality assessed. This study showed that disorders in commercial crops were largely influenced at the time of skin forming leaves were development (for example, by a high incidence of downy mildew (*Peronospora destructor*), and also when lifting was delayed.