Preharvest factors affect the quality of broccoli after storage

P.S. Cornish and S.C. Morris

NSW Agriculture & Fisheries Horticultural Research and Advisory Station, P.O. Box 581, Gosford, NSW, 2250

Long storage times are needed for export of vegetables by sea. The storage life of broccoli is improved by chilling immediately after harvest but the effects of pre-harvest management and environment on storage life are not known. This paper reports the effect of some pre-harvest conditions on the quality of broccoli in cool storage. Effects were generally small, even when the effect on yield was large. However, enclosing plots in plastic tunnels reduced quality in storage more so than failure to remove field heat.

Methods

The treatments in Table 1 were applied during head development to cv. Shogun grown at Somersby, near Gosford NSW. Each treatment comprised 3 replicates, each of 35 plants. Seedlings were transplanted on April 28, 1988 and harvested between July 22 and August 1. Yields were recorded. Twenty uniform heads per plot were selected, 10 appraised for quality, and 10 placed in a "Thermofresh" coolroom at >95% humidity and 1?C.

After 65 and 91 days of storage 15 heads (5 per replicate) were removed, held at 20?C for 2 days and scored (1-5) for presence of rots, colour and turgidity. These scores were combined to give an acceptability score which was analysed to give a kLSD; 2.5 or greater was judged unacceptable for export markets. Sampling times were based on results from a concurrent experiment on cultivars and storage life: the first sampling followed first signs of deterioration of cv. Shogun in the cultivar experiment.

Results and discussion

Table 1. Treatment	Yield (kg/plot)	Acceptability Score (1-5)[1] 65 days	91 days
Control	12.54[2]	1.90	3.07
Water "stress" - covered from 10d before heading	12.90	2.10	3.28
Shade (50% shade cloth)	7.82*	2.17	3.27
Heated - Plots enclosed in plastic tunnel (temp raised c. 3°.)	13.29	3.47*	4.23*
Added sulphur (50kg/ha)	10.09	1.97	3.13
Field heat not removed	14.27	2.00	3.43*
Water-logged	6.92*	2.23*	3.10
-N,K. No N,K application during head development	8.36*	1.90	3.17
Added calcium (48 kg/ha)	12.05	2.10	3.15

1. Greater scores are less acceptable (1 is prime condition).
2. Star indicates significantly different from control.

All treatments yielded high quality heads except for waterlogging in which heads had a purple tinge. There were few rots in any treatment, at any time. Market acceptability was not greatly affected by management or environmental factors, even where yield was greatly reduced. However, enclosing plots in plastic tunnels to raise the temperature (by c.3?C) had a striking effect on quality after storage, much more so than retention of field heat (Table 1). Relative humidity under the plastic remained high throughout the day and we are investigating the possibility that this, rather than the increased temperature, reduced quality during storage.