HOW TO GROW HONEYCRISP™ APPLES FOR SUCCESS POSTHARVEST ASPECTS

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Introduction

Honeycrisp™ apple comes from the apple breeding programme at the University of Minnesota. The cross was made in 1960 and the cultivar was commercially released in 1991. According to C. Tong (Pers. Comm., 2003) the parents were first named as Macoun x Honeygold but it is now believed that one parent was possibly 'Keepsake' and the other parent is unknown. This cultivar is well adapted to northern apple growing regions and it is receiving up to four times the price of other apple cultivars. The postharvest characteristics were described in the promotional literature on this cultivar as "stores well, even without CA". The commercial experience has been less positive. Honeycrisp™ can develop soft scald, low-temperature breakdown, rots, bitter pit and watercore. The severity of these disorders singly or in combination can exceed 80%. This level of severity is threatening the commercial success of this new cultivar.

The potential factors affecting quality loss in Honeycrisp™ fruit (based on NS observations since 1999) are numerous and include one or more of the following factors:

- pre-harvest conditions, e.g. chilling, crop load
- harvest time (fruit maturity)
- fruit size
- presence of fungal organisms (rots)
- delayed cooling
- storage time
- storage temperature
- use of CA

The purpose of this study was to examine the effect of the following four factors on soft scald and other quality-related problems in Honeycrisp™ apples: Delayed cooling, harvest time, storage temperature and storage atmosphere.

Materials and Methods

Three commercial 7-year old Honeycrisp™ orchards in the Annapolis Valley in 2002 were used. Delayed cooling consisted of no delay and delayed cooling of 7 days at 20° C. Harvest time was Early (30 Sept) and Late (10 Oct). The storage temperatures were 3°C and 5°C and the storage atmospheres were air and CA (2.5 kPa O_2 + 1-1.5 kPa CO_2).

Results and Conclusions

The effects of the four factors on soft scald, low-temperature breakdown [LTB (a.k.a. soggy breakdown in New York state] after 6 months storage are presented in Table 1. In addition, weight loss of the fruit after 0 days cooling (given as 0% weight loss in Table 1) and 7 days delayed cooling are included in Table 1.

The conclusions from these results are as follows:

1. A cooling delay, e.g. 7 days at 20°C, controlled soft scald and low-temperature breakdown with no detrimental effects.
2. Measuring weight loss may be useful in determining appropriate amount of cooling delay.
3. Rots are still a concern.

Table 1. Effect of cooling delay, harvest time, storage temperature and storage atmosphere on storage disorders after 6 months. Weight loss values represent weight loss measured immediately after 0 or 7 days of cooling delay.

		Storage		Soft scald	LTB	Rot	Weight Loss
Cooling Delay	Harvest	Temp.(°C)	Atmos.	%	%	%	%
None	Early	3	air	2[1]	0[1]	3[1]	0
			CA	3	1	3	0
		5	air	1	0	3	0
			CA	1	1	2	0
	Late	3	air	4	2	4	0
			CA	4	2	4	0
		5	air	3	2	4	0
			CA	3	2	4	0
7 d @ 20 °C	Early	3	air	1	0	3	ca. 1.2
			CA	0	1	3	ca. 1.2
		5	air	0	0	3	ca. 1.2
			CA	0	0	3	ca. 1.2
	Late	3	air	1	1	4	ca. 1.2
			CA	0	1	4	ca. 1.2
		5	air	1	1	4	ca. 1.2
			CA	0	1	4	ca. 1.2

[1] 0 = 0%, 1 = 1-5%, 2 = 6-10%, 3 = 11-20%, 4 = 21-35%