

PATTERN OF DISEASE DEVELOPMENT IN LATE SEASON FRUIT

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ABSTRACT

Sequential harvests of fruit were taken from a single orchard block to investigate the pattern of disease development in late season fruit. Harvests commenced at the end of the USA export season in November 2000 and carried through to mid January 2001. Samples of 100 fruit were collected at fortnightly intervals and placed into coolstorage at 5-7 °C for 4 weeks. Fruit were ripened at 20 °C and quality assessed when fruit reached a hand firmness of 85-100. The incidence of stem-end rots increased significantly for fruit harvested in January, although there was no change in the mean severity of stem-end rots over this period. Body rot incidence also increased over this period, as did the severity.

Keywords: maturity, dry matter, post-harvest rots

INTRODUCTION

The cut-off point for the end of the export season to the USA over the past 3 seasons has been the end of October. It is widely considered that fruit harvested beyond this period does not have the storage life required for prolonged periods of coolstorage, that is a requisite for export to the USA. This applies particularly to the development of ripe rots.

The pattern of disease development in late season harvested fruit needs to be determined to establish the boundaries of the USA export season and to determine acceptable shipping and storage times for late season fruit to Australia. This was investigated by sequentially harvesting fruit from a single orchard block.

MATERIALS AND METHODS

Fruit were harvested from a single orchard block in the Bay of Plenty (Katikati) at fortnightly intervals from November 2000 to January 2001. The sample of 100 fruit harvested at each two weekly interval were placed into coolstorage at 5 to 7°C for a period of 4 weeks. Fruit were removed from coolstorage and ripened at 20 °C. Individual fruit were assessed at a hand firmness of 85-100, based on a firmometer with a 300g weight. Fruit quality was assessed using the AIC fruit assessment manual. An additional sample of 20 fruit was collected at the last harvest for dry matter determination.

RESULTS AND DISCUSSION

Ripe fruit quality of each harvest is summarized in Table 1. Average dry matter content of the sample collected at the final harvest was 34.6%. The days to ripen after fruit were removed from coolstore did not decrease significantly over the harvest period. The shelf-life of late season fruit was similar to that for fruit harvested during the USA export season where fruit uniformly took 4-6 days to ripen following 4 weeks coolstorage. There was no significant change in either incidence or severity of vascular browning in ripe fruit. For fruit harvested from December onwards there was a significant increase in the incidence of diffuse flesh discolouration, but no trend was evident for the severity of this disorder.

Body rot incidence increased significantly between 20 November and 8 December. Beyond this period, body rots were effectively present on all fruit harvested. However, the severity of body rots increased steadily over the season. This steady increase in body rot severity and stem-end rot incidence suggests that maturity may be driving an increase in susceptibility of fruit to infection.

The limiting factor to the marketability of late season fruit appears to be increased susceptibility to rots. Based on these results two strategies exist to extend the boundaries of the USA export season into January. Firstly improved disease control, possibly through additional fungicide applications, may combat the increased rot levels in late season fruit, ultimately allowing the boundaries of the USA export season to be extended. Secondly, fruit may be preferentially selected from orchards with low inoculum pressure (Everett & Pak, 2001). Library tray data is one method by which packing shed staff may be able to select suitable orchards with low inoculum levels.

SUMMARY

Fruit quality gradually declined over the period from early December to mid January. This is in large part due to an apparent increase in the susceptibility of fruit to infection. However, the shelf life of the fruit did not deteriorate over this period. It would appear that fruit harvested from late November to December would still have had acceptable quality had they been exported to the USA, at least for fruit from this orchard.

REFERENCES

- Everett, K and Pak, H.A. (2001) Orchard survey: effect of pre-harvest factors on post-harvest rots. *New Zealand Avocado Growers Association Annual Research Report Vol 1*: 12 -17

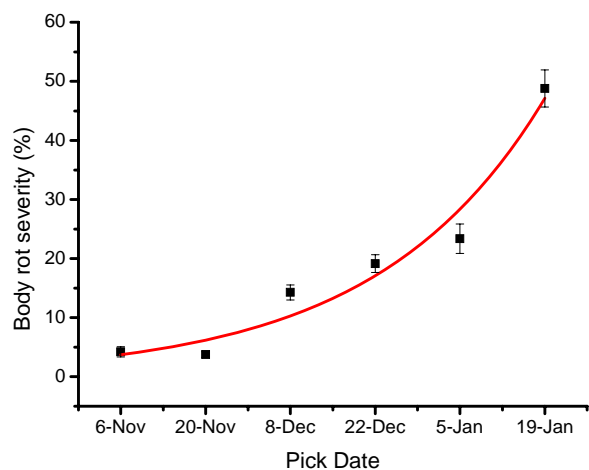
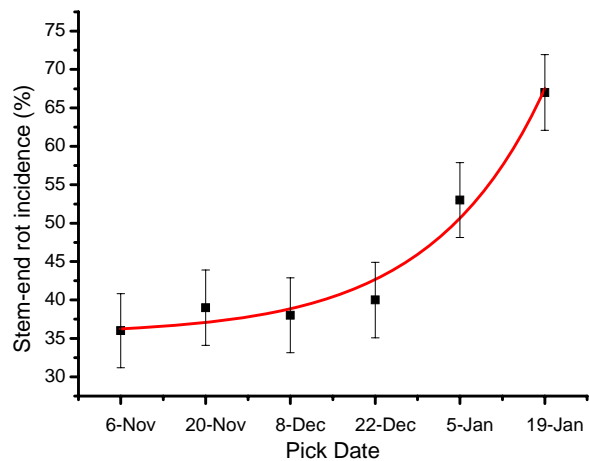
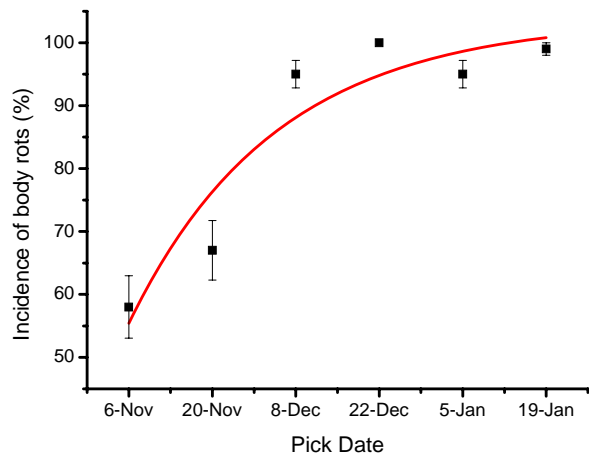


Figure 1. Incidence of a) body rots and b) stem-end rots and c) severity of body rots in relation to harvest date. Points are averages based on a 100 fruit sample \pm standard error. Red line is curve of best fit.

Table 1. Ripe fruit quality for sequential harvests from a single orchard block in Katikati. Values are averages of 100 fruit sample \pm standard error.

Harvest date	Days to ripen	Brown patches		Stem-end rots		Vascular browning		Diffuse discolouration	
		Incidence	Severity	Incidence	Severity	Incidence	Severity	incidence	severity
6 Nov 2000	5.1 \pm 0.02	58 \pm 5.0	4.2 \pm 0.86	36 \pm 4.8	0.36 \pm 0.09	53 \pm 5.0	2.9 \pm 0.49	34 \pm 4.8	2.7 \pm 0.56
20 Nov 2000	6.6 \pm 0.10	67 \pm 4.7	3.7 \pm 0.49	39 \pm 4.9	0.44 \pm 0.15	26 \pm 4.4	1.2 \pm 0.35	29 \pm 4.6	1.4 \pm 0.31
8 Dec 2000	5.0 \pm 0.01	95 \pm 2.2	14.3 \pm 1.28	38 \pm 4.8	0.33 \pm 0.07	32 \pm 4.7	2.4 \pm 0.52	71 \pm 4.6	6.5 \pm 0.92
22 Dec 2000	5.0 \pm 0.05	100 \pm 0	19.2 \pm 1.50	40 \pm 4.9	0.41 \pm 0.10	39 \pm 4.9	2.1 \pm 0.43	60 \pm 4.9	4.5 \pm 0.69
5 Jan 2001	5.0 \pm 0.01	95 \pm 2.2	23.4 \pm 2.50	53 \pm 4.9	1.19 \pm 0.27	42 \pm 5.0	1.7 \pm 0.27	90 \pm 3.0	10.4 \pm 1.78
19 Jan 2001	5.7 \pm 0.10	99 \pm 1.0	48.8 \pm 3.13	67 \pm 4.9	0.52 \pm 0.12	17 \pm 3.8	1.8 \pm 0.82	67 \pm 4.7	2.0 \pm 0.23