Reducing the impact of late season rainfall

CY12000

TASMANIAN INSTITUTE OF AGRICULTURE

Substantial advances have been made in understanding the underlying mechanisms involved in fruit cracking in recent years. Management strategies to lessen the impact of rainfall late in the growing season have been developed and validated. However, there is little known about the cracks associated with scar tissue at the apical-end of the cherry fruit, and indeed few studies have investigated the formation of that scar tissue.

Observations in orchards around Australia highlighted the prevalence of scar formation in regions that experience cooler spring weather. Spring temperature is known to significantly impact on a number of fruit developmental stages; flowering biology, pollination, fruit set and yield. The rate of early fruit development could also impact on the formation of an intact cuticle, and complete shedding of floral tissue. Later shedding of floral parts, such as the style at the apical-end of the fruit could contribute to scar development.

Fruit growth and apical-end scarring

This study provides some preliminary investigations of promoting faster development of fruit early in the season with the use of the plant growth regulator Cytolin. Cytolin has been used to promote development and elongation of apple fruit, and it has been shown to induce cell division, cell elongation, fruit size and fruit setting in other studies; however when applied at a high rate fruit thinning has also resulted.

The aims of this study were to investigate the potential use of Cytolin in advancing fruit development in cherry, to build resilience into fruit by ensuring timely fruit development and preventing apical scar tissue. Results show that there is potential to reduce apical-end scarring, and the associated cracking, by encouraging shedding of floral structures from the developing fruit in cooler regions.

This project has been funded by HIA using the cherry industry levy and matched funds from the Australian Government (CY12000). It is a 3 year project that will conclude in 2015

Horticulture Innovation Australia

CHERRY GROWERS AUSTRALIA INC.

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Six trials all using Lapins were conducted over three years. Lapins is prone to apical end scarring and cracking. A split application of Cytolin (at 50% bloom, full bloom (FB) and 2 weeks after full bloom (waFB)) was made in each trial and compared to trees without Cytolin.

Floral development and early fruit growth

Without Cytolin, floral parts retained for longer in 3 trials. More flowers were still open, and time taken to reach 100% shuck fall was extended. At 3 waFB small increases were seen in fruit length with Cytolin (8.2mm compared to 7.6mm). Style retention was greater without Cytolin application in 4 trials (Figure 1), in the other 2 trials there was no style retention with, or without Cytolin.

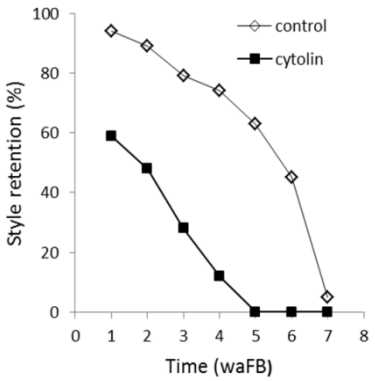

Figure 1. Style retention in fruit from trees treated with Cytolin compared to control trees.

Cytolin and fruit quality

Cytolin applications had negligible effects on most fruit quality parameters; brix, firmness, acidity. However, in 3 of the 6 trials in Lapins there was a small but significant increase in size (Table 1). Microscopic investigation of the fruit cuticle showed that the cuticle was thicker with Cytolin application, but there was no difference in scar size.

Table 1. Size of fruit from 6 trials

Trial		Width [mean ± SE (mm)]
1	Control	**29.14 ± 0.47**
	Cytolin	**30.58 ± 0.37**
2	Control	**30.85 ± 0.27**
	Cytolin	**31.60 ± 0.09**
3	Control	**26.04 ± 0.30**
	Cytolin	**27.77 ± 0.12**
4	Control	26.17 ± 0.21
	Cytolin	26.67 ± 0.14
5	Control	25.22 ± 0.20
	Cytolin	24.90 ± 0.20
6	Control	25.63 ± 0.27
	Cytolin	25.20 ± 0.26

Cytolin and fruit cracking

The application of Cytolin reduced the level of both apical end-scarring, and apical-end cracking in 4 trials that had rainfall, and subsequent cracking. In control trees, a greater proportion of scarred fruit went on to develop apical-end cracks. Results from trials 2, 3 and 5 are shown in Figure 2. Trials 2 and 3 experienced less than 20mm of rainfall, but trial 5 experienced an extreme rainfall event of 100+mm and the effect of Cytolin application was still apparent.

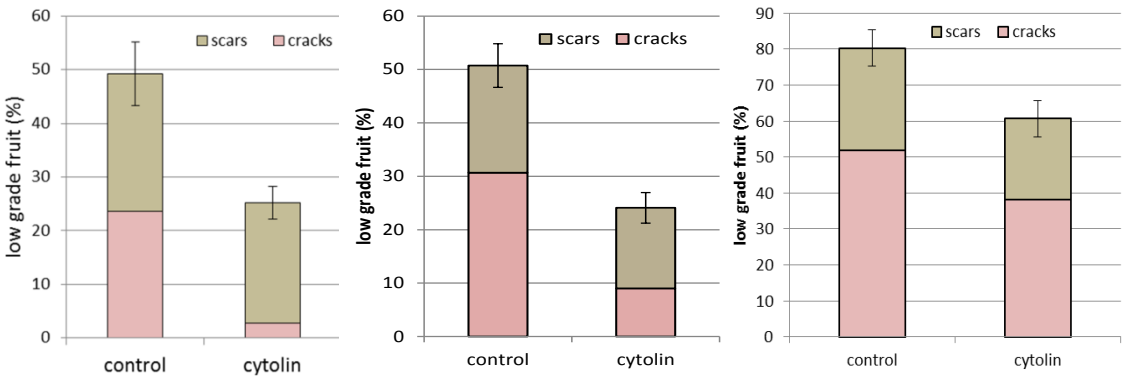

Figure 2. Percentage of fruit with apical-end scarring and the proportion of those fruit additionally showing apical-end cracking from control trees and trees treated with Cytolin in trials 2, 3 and 5.

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