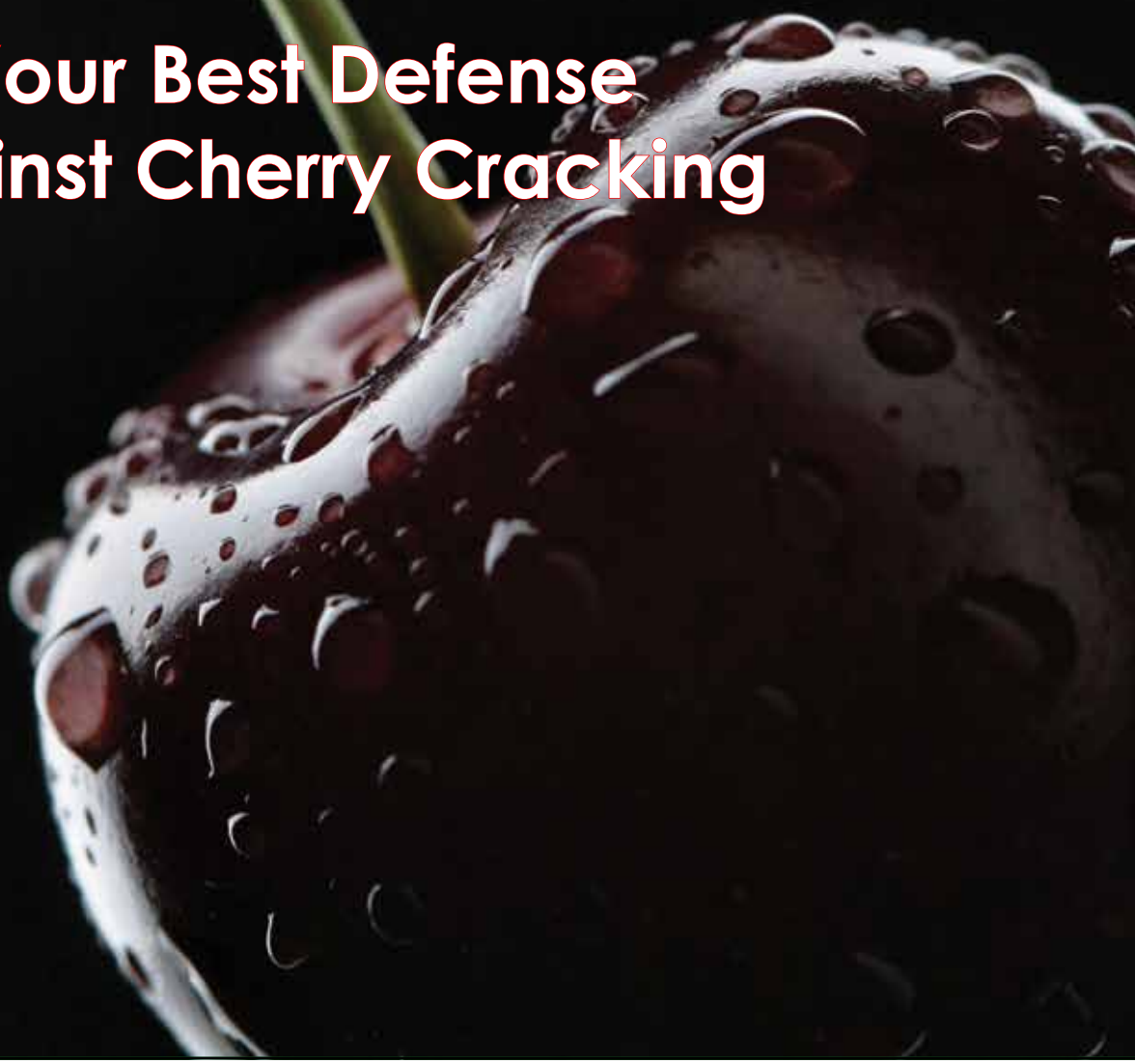




# RainGard™

Your Best Defense  
Against Cherry Cracking



**COLIN CAMPBELL (CHEMICALS) PTY LTD**

100% Australian owned & operated. Established 1940

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## RainGard™ Features and Benefits

RainGard™ is a patented preharvest treatment developed by Washington State University. RainGard is an emulsion of different vegetable oils that creates a hydrophobic film on the fruit.

RainGard is applied as a protective film on cherries to decrease uptake of rain water by the fruit. RainGard™ helps maintain cuticle integrity throughout the final stages of fruit growth, thus reducing cracking susceptibility.

### Features of RainGard:

- Tested extensively in the US on all cherry varieties. 4 years of Australian trials and 3 years of semi commercial use
- It can be tank mixed with most commonly used pesticides.
- Leaves no unsightly residues/marks on the fruit surface- **it does not dull the fruit**
- Application of treatments is not restricted to the occurrence of rain.
- RainGard™ does not induce fruit dehydration nor does it hinder the natural process of photosynthesis hence the cherry will grow naturally.
- RainGard is rainfast as soon as it has dried (usually within 2 hours depending on weather conditions)
- RainGard does not interfere with use or effectiveness of pesticides.
- No export restrictions, no residues

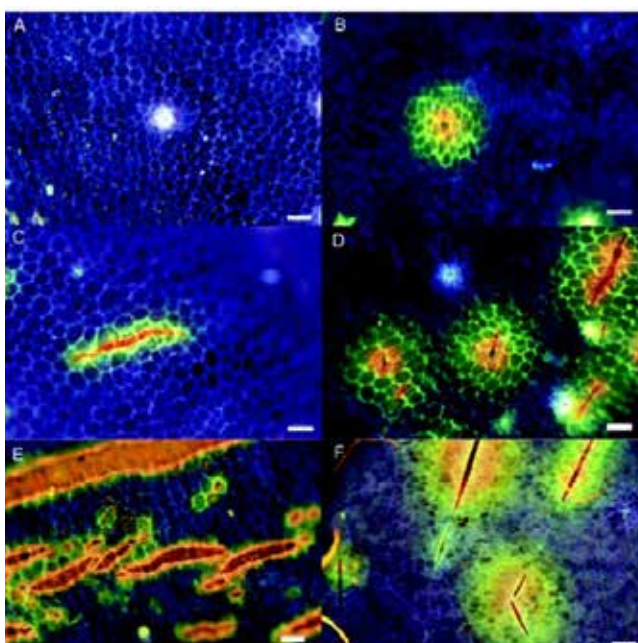


Figure 1. Fluorescence micrographs of sweet cherry fruit surface. (A) Intact fruit surface with stoma. (B-C) Small microcracks; typical of fruit in early stages of development. (D-F) More and bigger microcracks; typical of fruit in the latest stages of development (Stage III).

Source: Adapted from Peschel and Knoche (2005) J. Amer. Soc. Hort. Sci., 130:487-495.

### Why do Sweet Cherries Crack?

Rain cracking is one of the main limiting factors for production of high quality cherries worldwide. A number of factors have been implicated as contributors to cherry rain cracking. Rapid uptake of rain water absorbed through the fruit surface, rapid change in water status of the whole tree, and even high relative humidity have all been recognized as factors causing cherry rain cracking.

The natural barrier to water uptake is the fruit's cuticle. The presence of microcracks in the cuticle that develop during rapid fruit expansion in stage III ("final swell") has been reported to be a crucial element in cherry cracking susceptibility.

As cherries grow, fruit skin gets progressively thinner and both number and size of microscopic cracks on the cuticle increase. This makes the fruit more susceptible to rain cracking (Figure 1).

Multiple applications of RainGard™ can increase the integrity of the cherry cuticle and have been proven to reduce susceptibility to cracking during rain events.

RainGard Sp

Start at straw (approx

Application program - 4 applications every 7-10 day

If rain event is forecasted

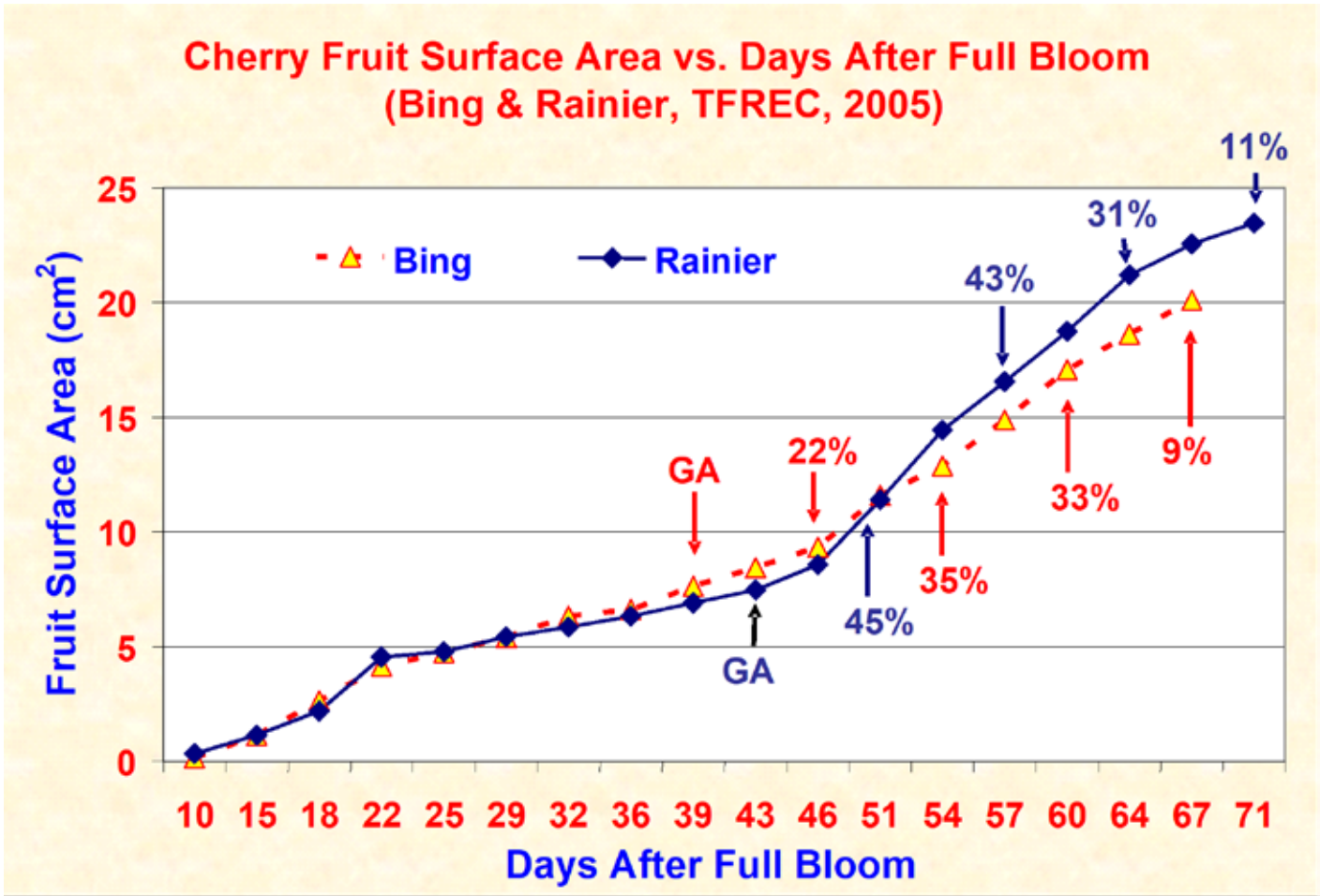
Rate: 8L RainGard in 10

### Why 4 spray program

Maintaining cuticle integrity during the last stage of fruit growth will help reduce the incidence of rain cracking.

Surface area of a cherry increases rapidly from straw approx (5 weeks before harvest for Australian conditions) Surface area of the cherry increases in excess of 3 times for 'Bing' and 'Rainier' varieties during this time (as seen below in the graph). This rapid increase on surface area together with a low elasticity rate of the protective hydrophobic film, explains why a program of 4 applications would be needed.

*Please note a number of factors contribute to split cherries and RainGard will aid in reducing cracking caused by osmotic movement through the cherry skin as distinct from the uptake of water through the roots - as was the experience in Australia during the 2010 season.*



**RainGard is available in 24L buckets**

**Spray Program:**

5 weeks from harvest)

days (if no rain is forecast longer interval can be used.

use at shorter intervals)

100L water per hectare



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## YOUR BEST DEFENCE AGAINST CHERRY CRACKING

RainGard adds only a small cost to production even with low yielding trees

Yield Per Hectare (tonnes)	RainGard \$ per spray	Cost of RainGard per kg fruit 1 spray	Cost of RainGard per kg fruit 2 spray	Cost of RainGard per kg fruit 3 spray	Cost of RainGard per kg fruit 4 spray
10	\$216	\$0.02	\$0.04	\$0.06	\$0.09
15		\$0.01	\$0.03	\$0.04	\$0.06
20		\$0.01	\$0.02	\$0.03	\$0.04

UTAS trial 2010		Cracking %	Marketable Fruit (tonnes)		
			At 10 tonnes yield per hectare	At 15 tonnes yield per hectare	At 20 tonnes yield per hectare
RainGard (4 spray program)		23%	7.7	11.6	15.4
Untreated		47%	5.3	7.95	10.6
Turnover @ market price of \$3/kg RainGard treated			\$23,100	\$34,800	\$46,200
Turnover @ market price of \$3/kg untreated			\$15,900	\$23,850	\$31,800
Increase in profit with RainGard (including cost of RainGard program)			<b>\$7,200</b>	<b>\$10,950</b>	<b>\$14,400</b>
Information taken from HAL project CY9002 by UTAS page 44					

UTAS trial 2011		Cracking %	Marketable Fruit (tonnes)		
			At 10 tonnes yield per hectare	At 15 tonnes yield per hectare	At 20 tonnes yield per hectare
RainGard (4 spray program)		27%	7.3	10.95	14.6
Untreated		34%	6.6	9.9	13.2
Turnover @ market price of \$3/kg RainGard treated			\$21,900	\$32,850	\$43,800
Turnover @ market price of \$3/kg untreated			\$19,800	\$29,700	\$39,600
Increase in profit with RainGard (including cost of RainGard program)			<b>\$1,236</b>	<b>\$2,286</b>	<b>\$3,336</b>
Information taken from HAL project CY9002 by UTAS page 45					

Even with a 20% reduction in cracking (@\$3/kg return) using RainGard still puts you well ahead



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## A BIG BENEFIT DURING 2014-2015 EXPORT SEASON (VIC)

UTAS trial 2010	Cracking %	Marketable Fruit (tonnes)		
		At 10 tonnes yield per hectare	At 15 tonnes yield per hectare	At 20 tonnes yield per hectare
RainGard (4 spray program)	23%	7.7	12.7	15.4
Untreated	47%	5.3	7.95	10.6
<i>Export prices are taken from HAL report MT12009</i>				
Turnover Victoria average export price of <b>\$13.28/kg</b> RainGard treated		\$115,500	\$168,656	\$204,512
Turnover Victoria average export price of <b>\$13.28/kg</b> untreated		\$79,500	\$1105,576	\$140,768
Increase in profit with RainGard (including cost of RainGard program)		<b>\$35,136</b>	<b>\$62,216</b>	<b>\$62,880</b>
Information taken from HAL project CY9002 by UTAS page 44				

UTAS trial 2011	Cracking %	Marketable Fruit (tonnes)		
		At 10 tonnes yield per hectare	At 15 tonnes yield per hectare	At 20 tonnes yield per hectare
RainGard (4 spray program)	27%	7.3	10.95	14.6
Untreated	34%	6.6	9.9	13.2
<i>Export prices are taken from Fresh Intelligence Consulting Report May 2015</i>				
Turnover Victoria average export price of <b>\$13.28/kg</b> RainGard treated		\$96,944	\$145,416	\$193,888
Turnover Victoria average export price of <b>\$13.28/kg</b> untreated		\$87,648	\$131,472	\$175,296
Increase in profit with RainGard (including cost of RainGard program)		<b>\$8,432</b>	<b>\$13,080</b>	<b>\$17,728</b>
Information taken from HAL project CY9002 by UTAS page 45				

Even with a 20% reduction in cracking (@ 2014-2015 export price of \$13.28/kg return) using RainGard still puts you well ahead



## Cherry Cracking Susceptibility Testing

Developed By WTFRC

### EQUIPEMENT NEEDED

- RainGard tub or equivalent
- Distilled water
- Paper bag
- 50 cherries in total

### INSTRUCTIONS

- 1) Record following sampling information:
  - Date
  - Time
  - Block/ variety
  
- 2) Collect 10 representative cherries at shoulder height from 5 representative trees for each block/variety.
  
- 3) Gently transfer the cherries from the paper bag into the corresponding tub
  - Fill the tub about half way with distilled water, so the cherries are submerged (not all will sink though this is ok). *Note you cannot reuse the distilled water once its been used*
  - Record what time the cherries were submerged and let sit for two hours.
  
- 4) After two hours, empty out the water, using the lid as a strainer.
  - Count how many cherries cracked – Record on worksheet
  - Calculate % Cracking (Cracked cherries/ Total cherries in sample) x 100)

Cracking Amount	Susceptibility	Action to be taken
No cracks	0% (non susceptible)	Can wait to apply RainGard
1-5 cracks	1-10% (susceptible)	Start RainGard Applications
5+ cracks	10%+ (Highly susceptible)	Should have at least 2 applications of RainGard applied



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**Did you have an uneven flowering last season on your cherries? The solution:**

# **Armobreak** & **Armogan**

**Gives earlier bud break & even flowering**

**Lower cost with new lower rate for cherries\***

\* Lower rate can only be used in conjunction with Du-Wett®. Ask your local distributor or for more information



*campbell*

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**CHERRY PRODUCT REFERENCE GUIDE**  
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PRODUCT	DISEASE / PEST CONTROLLED	RATE PER 100L	RESISTANCE GROUP	MODE OF ACTION
<b>PRE HARVEST</b>				
<i>Insecticide</i>				
<b>Apollo</b> 500g/L <i>Chlofentozine</i>	Twospotted mite ( <i>Tetranychus urticae</i> ), European red mite ( <i>Panonychus ulmi</i> ) Bryobia mite	<b>EITHER</b> 30mL/100L <b>OR</b> 30mL/100L in a tank mix with the registered rate of a knockdown miticide.	10A	contact
<b>Bacchus</b> <i>Bacillus thuringiensis Berliner subsp. aizawai strain GC-91</i>	Various <i>Lepidoptera</i> spp,	50g-200g	11C	stomach
<i>Fungicides</i>				
<b>Cheers WeatherShield</b> 720g/L <i>Chlorothalonil</i>	Brown Rot – Fruit Blossom Blight Shot-hole Stone Fruit Rust Transit Rot	160mL	M5	contact
<b>Ippon</b> 500g/L <i>Iprodione</i>	Blossom Blight Brown Rot	50mL-75mL	2	Systemic
<i>Other</i>				
<b>RainGard</b>	Cherry Cracking Suppressant	8L/ha in 1000L water	n/a	n/a
<b>24/7</b> 905 g/L DI-1-P-MENTHENE	Cherry Cracking Suppressant	5L/ha in 2000L water	n/a	n/a
<b>Armobreak &amp; Armogan</b>	Dormancy Breaker use 3-5 weeks before bud-break	2L/100L Armobrak + 20L/100L Armogan in 800L-1300L water/ha	n/a	n/a
<b>POST HARVEST</b>				
<b>Fludy</b> 500g/L <i>Iprodione</i>	Brown rot ( <i>Monolinia</i> spp), Grey mould ( <i>Botrytis cinerea</i> ), Rhizopus rot ( <i>Rhizopus stolonifer</i> )	130 to 260mL in 100L water	14	Contact
<i>This is only a guide always read the label for more information and other registrations</i>				



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