

ReTain®

Plant Growth Regulator

Harvest the Potential



Optimize Harvest Management with ReTain®

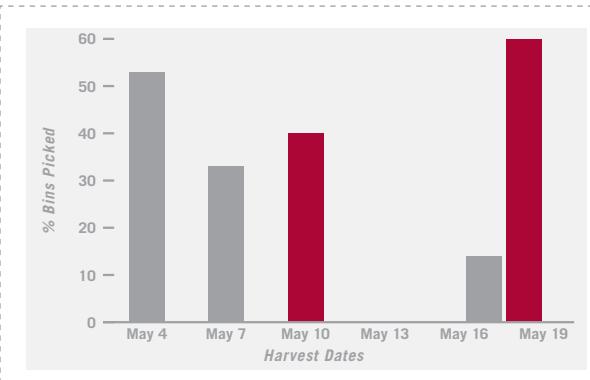
By extending the harvest time, ReTain® Plant Growth Regulator allows growers to reduce the total number of pickers. For example, by picking the untreated block in one week and the ReTain®-treated block the next week, this grower was able to reduce the number of pickers by nearly half over the same area and was better able to manage operations over this extended harvest period.



OPTIMIZING HARVEST CREWS

	Untreated Control	ReTain®
Bins	40	40
Total Bins	1,200	1,200
Harvest Days	8	15
Bins/Day to Harvest	150	80
Picking Rate (Bins/Day)	5	5
Number of Pickers	30	16

HARVEST MANAGEMENT – Pink Lady Yarra Valley, Vic., Australia



Four weeks before harvest, your apple crop has tremendous potential. Now, how do you harvest that potential?

ReTain® is a harvest management tool that helps you manage fruit maturation so you can harvest your crop at just the right time for optimum quality (firmness, starch rating, soluble solids, size, color and reduced physiological disorders). It essentially gives you more time to harvest higher-quality fruit. The logistics of picking large blocks at their best is difficult, and labor availability is always a key concern. If you don't make sure you are harvesting your apples at optimum quality, your considerable investment in production, harvest and post-harvest technology will be lost. ReTain® helps with all of these issues and eases your mind.



ReTain® – Four Weeks of Benefits and More

ReTain® is based on a naturally occurring active ingredient, aminoethoxyvinylglycine HCl, which inhibits ethylene biosynthesis in plants. Ethylene affects plant processes such as fruit maturation, ripening and drop.

ReTain® Delivers All These Benefits

When you apply ReTain® four weeks before harvest, your apple crop benefits in several ways:

- More flexible harvest management
- Reduced fruit drop
- Maximized fruit size
- Improved fruit quality and color
- Reduced physiological defects
- Improved post-harvest value

All these benefits add up to significant improvements over short-lived stop-drop agents...and even more significant economic advantages.

ReTain® Helps with Fruit Size

Maximize Fruit Size with ReTain® (Indirect)

Application of ReTain® four weeks before harvest allows fruit to reach their maximum size potential. Fruit that would normally mature and drop continue to grow, resulting in improved packout.

RETAIN® ECONOMICS – Size Increase Gala, Washington

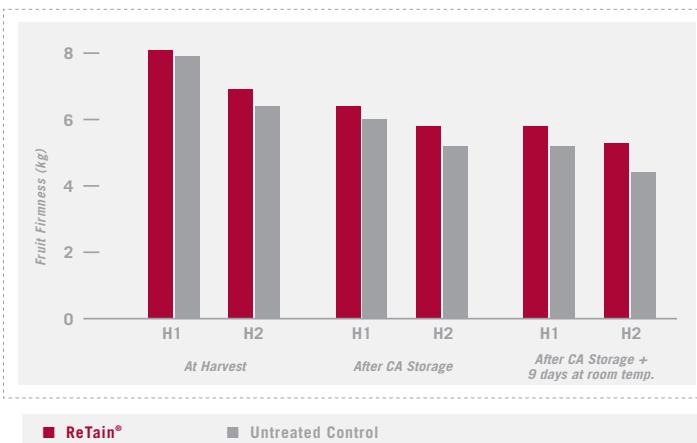
Box Size	Price/Box	Number of Boxes	ReTain® \$	Untreated Number of Boxes	Untreated \$
56	\$30.00	5	\$150	1	\$30
64	\$28.50	56	\$1,596	8	\$228
72	\$26.00	160	\$4,160	48	\$1,240
80	\$24.50	224	\$5,488	128	\$3,136
88	\$23.00	192	\$4,416	200	\$4,600
100	\$21.50	120	\$2,580	240	\$5,160
113	\$20.00	32	\$640	124	\$4,480
125	\$18.50	12	\$222	44	\$814
138	\$17.00	2	\$34	16	\$272
			TOTAL	\$19,286	\$17,968
			BENEFIT	\$1,318/Acre or \$3,255/Hectare	

ReTain® Improves Fruit Quality and Color

Maintain Fruit Firmness with ReTain®

ReTain® improves fruit quality by maintaining fruit firmness and also enhances storage and market shelf life potential.

GOLDEN DELICIOUS – Storage Potential South Tyrol, Italy



Improve Red Color with ReTain® (Indirect)

ReTain® delays fruit maturation, which allows for longer hanging time and potentially more favorable weather conditions to improve color development.



RED COLOR AT HARVEST – Pink Lady Elgin, South Africa



*Beginning of harvest period for ReTain®-treated fruit



Maintain Green Color and Reduce Fruit Drop

Applying ReTain® four weeks before harvest delays fruit maturation, resulting in the maintenance of green background color. It also provides the maximum amount of protection against premature fruit drop, especially when unfavorable weather conditions, such as high winds, excessive heat and drought, occur before the harvest period. Even if only a few fruit per tree are lost, it can mean a significant loss of profit by the end of the season.

FOR EXAMPLE:

If only five more apples fall off each tree in an average orchard of 1,000 trees/acre, it could mean a loss of \$450–\$750 per acre.

FRUIT LOSS ECONOMICS

Number of Trees	1,000
Fruit Lost per Tree	5
Bushels of Apples Lost	30 to 50
Value per Bushel	\$15
Revenue Loss	\$450–\$750/Acre
	\$1,110–\$1,850/Hectare

RETAIN® ECONOMICS – Drop Control Benefit McIntosh, New York

	Yield Boxes/Acre	% Drop	Fresh Mkt Boxes/Acre	Fresh Mkt \$18.25/Box	Juice Number/Boxes	Juice \$5.00/Box	Total (\$)
ReTain®	1,046	13.5	904	\$16,498	142	\$710	\$17,208
Untreated	1,406	52.0	502	\$9,162	525	\$2,625	\$11,787

ReTain® benefit is \$5,421/Acre or \$13,385/Hectare

Note: Other benefits not included.



Reduce Physiological Disorders – Watercore & Stem-Bowl Cracking

Watercore and stem-bowl fruit cracking are common physiological disorders that develop in susceptible apple varieties as they mature during the final weeks before harvest. Unlike late-season "stop-drop" agents, application of

ReTain® four weeks before harvest significantly reduces the incidence of these disorders... leading to improved packout and quality.

EFFECT OF RETAIN® ON WATERCORE – Fuji

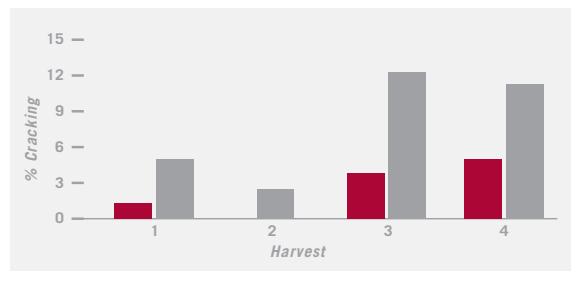
	Untreated Control	ReTain®
% Incidence of Watercore	75	15
Average Severity of Watercore (1 – 6 scale: 1 = low)	5.3	3.0

Nelson, New Zealand, 2001

EFFECT OF RETAIN® ON WATERCORE – Red Delicious

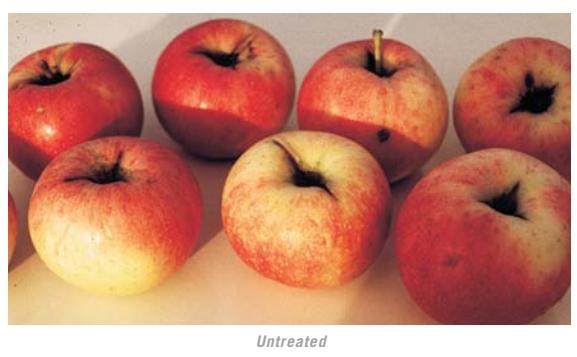


EFFECT OF RETAIN® ON STEM-BOWL CRACKING – Gala



East Malling, UK, 2002

STEM-BOWL CRACKING – Royal Gala



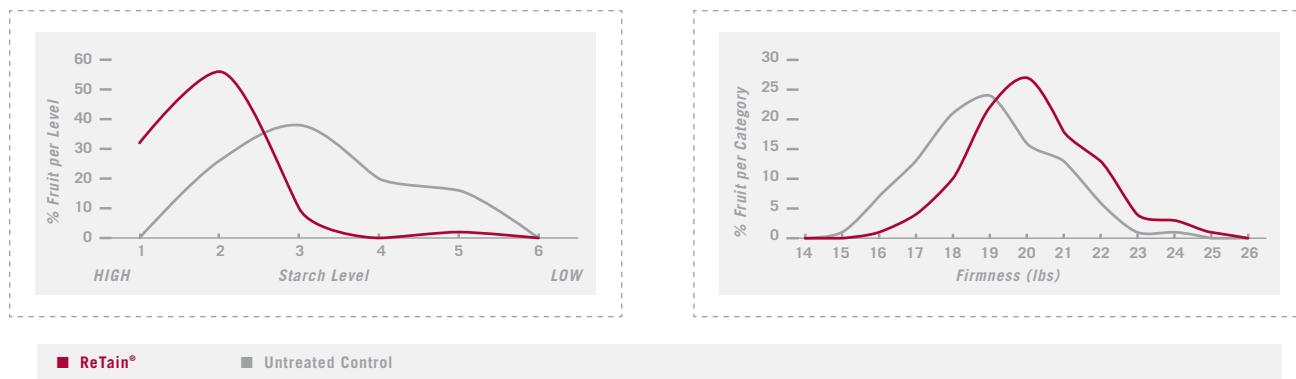
More Consistent Quality at Harvest

Fruit within an individual tree mature at different times depending on many factors such as the length of the bloom period, the specific variety and location of the fruit within the tree. Applied four weeks before harvest, ReTain® slows the fruit maturation process, allowing for more uniform fruit maturity within each pick. **Greater uniformity** within each pick provides growers, packers and consumers

fruit with **more consistent quality** of starch content and firmness.

As these data suggest, application of late-season stop-drop agents just prior to harvest (1 – 7 days before harvest) will not allow for effective management of firmness and starch at harvest because the fruit maturation process has already begun.

RETAIN®: EFFECT ON STARCH AND FIRMNESS – 1st Commercial Harvest Gala, Washington



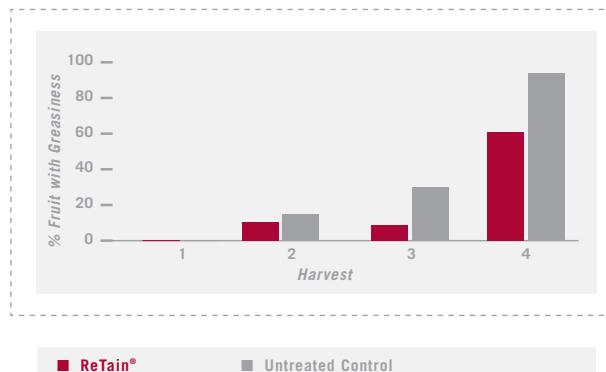
Note: Uniform range of starch levels (graph 1) and higher fruit firmness (graph 2) in Retain-treated fruit and harvest

EFFECT OF RETAIN® ON APPLE MATURITY – Golden Delicious Mas Badia, Spain



Retain® also has a positive effect on apple maturity. Note that the starch conversion of Retain®-treated fruit is more consistent in appearance than untreated fruit.

GREASINESS AT HARVEST – Pink Lady Elgin, South Africa





Leader in the Apple Industry

Valent BioSciences Corporation offers a broad line of research-backed plant growth regulator and biological insect management products that help growers produce the high-quality apples consumers demand.

Use Promalin® Plant Growth Regulator at bloom for typier, larger apples; and post-bloom for improved fruit finish — significantly improving packout. ProVide® Plant Growth Regulator and Regulex® Plant Growth Regulator applications— starting at late bloom or petal fall — significantly improve fruit finish, fruit size and packout. As part of a thinning program, MaxCel® Plant Growth Regulator helps produce larger apples. Applying DiPel® insecticide at bloom or petal fall controls leaf rollers, and DiPel® can be tank-mixed with Promalin®, ProVide® or MaxCel®.

ReTain® is a time-proven harvest management tool that helps you optimize fruit quality at harvest and also gives your crop greater storage potential. Bringing you new and proven apple products demonstrates our commitment to helping you increase the marketability and profitability of your apple crop.

RETAIN® USE RECOMMENDATIONS

Refer to the approved ReTain® label for each country for the exact use recommendation (rate, timing, water volume, surfactant use, etc.).

ReTain® is used globally on a range of varieties: Red Delicious, Golden Delicious, Royal Gala, McIntosh, Empire, Pink Lady, Braeburn, Fuji, Granny Smith, Honey Crisp and many others. Consult your local ReTain® representative/technical advisor for specific information about varieties.

For more information about ReTain® and our full line of apple production products, visit our Web site at www.valentbiosciences.com.



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