

# ReTain™

PLANT GROWTH REGULATOR SOLUBLE POWDER

**ACTIVE CONSTITUENT: 150 g/kg AVIGLYCINE PRESENT AS THE HYDROCHLORIDE SALT (AVG)**

**A naturally occurring plant growth regulator for apples and stonefruit (except cherries) which can improve harvest management, fruit quality and enhance storage potential.**

**For use in Cherries for enhanced flower life which may improve fruit set.**

**For use in walnuts to increase fruit (nut) set in cultivars affected by pistillate flower abortion (PFA).**

## GENERAL INSTRUCTIONS

### USE SITUATIONS:

ReTain inhibits the production of ethylene in plant tissues. Ethylene affects plant processes such as fruit maturation, ripening, and fruit drop. Inhibiting ethylene production with ReTain can provide several benefits for stonefruit and apple growers, including one or more of the following:

- Improved harvest management
- Managing rapid maturation and over-maturation of fruit in the orchard
- Reduction of preharvest fruit drop
- Natural enhancement in fruit size (when taking advantage of the harvest delay)
- Maintenance or increase in fruit firmness
- Improved fruit quality (e.g., reduced incidence and/or severity of fruit disorders)
- Enhanced storage potential

### Stonefruit (except cherries)

ReTain significantly enhances firmness over the harvest and storage periods and can delay maturity by about 3 days (depending on variety) leading to larger fruit. This delay will be seen as a shift in the colour development of the fruit and will either shift the entire harvest period by about 3 days or will alter the amount of fruit harvested at each pick (that is, more fruit is likely to be picked later in the harvest period). Even after a 3 day maturation delay, ReTain treated fruit is generally firmer than untreated fruit, and growers could delay the harvest further by taking advantage of the increased fruit firmness.

Responses vary between different varieties. Some varieties naturally produce low levels of ethylene and the effect of ReTain is likely to be less than in varieties which produce high levels of ethylene. In general the varieties that soften most quickly tend to respond best to ReTain treatment.

### Apples

ReTain can be used to manage the maturation of apples in the orchard and to increase fruit size and storage potential.

Benefits are dependent on apple variety and application timing. In order to apply ReTain at the correct timing it is important that growers use starch index testing to determine maturity. More details are provided under the section General Instructions and a starch index chart is attached.

In general:

Varieties differ in the levels of ethylene produced during harvest and storage. Varieties that produce a lot of ethylene (such as Red Delicious, Gala, Royal Gala, Pink Lady, etc) are more responsive than low ethylene-producing varieties (such as Fuji, Granny Smith).

Timing of ReTain application influences whether there is a delay in maturation of the treated crop and how the maturation of later harvests/picks is controlled. These timings are detailed in the Directions for Use table.

### STARCH PATTERN INDEX CHART

Starch pattern index (SPI) is most commonly used to determine the maturity of the apples in a block. It is important that growers wanting to use ReTain monitor their SPI prior to harvest as it gives the best indication of timing for ReTain application. There are various methods and before treating the user should consult with their local Department of Agriculture or Sumitomo Chemical Australia representative to obtain a detailed method. In general however a representative sample of at least 20 apples is collected from the block and sliced in half. One half of each of the apples is treated with an iodine solution and this reacts with starch in the apples to produce dark staining. Where there are areas on the apple section that do not stain, this indicates starch has been converted to sugars. The larger these areas, the more advanced is maturity. The chart provided with this label covers a range of varieties and is intended to be used as a guide to application timing. We regard the earliest time fruit can be harvested for long-term storage to be when a representative sample of fruit has an average SPI score of 1.5.

In the case of the earlier ReTain application of 21 to 28 days before an average SPI of 1.5, growers will need to consider the harvest timing and maturity of previous crops and progress of the current crop.

### MIXING AND APPLICATION:

Prepare spray material by cutting open the foil packs and removing the inner water soluble bags of ReTain. Add the required number of water soluble bags to a clean spray tank containing clean water with a pH of 6 to 8. Two 415 g bags are sufficient to treat one hectare.

Total spray volume per hectare should be calculated to achieve good coverage, but not run-off and is dependent on tree size and spacing (for apples: 800 to 1200 L/ha; for stonefruit (except cherries):

1000 to 1500 L/ha, for walnuts: 1000 L/ha. Use of higher water volumes will reduce efficacy. Ensure appropriate calibration of your equipment to achieve the labelled rates. Use the correct concentration of Maxx Organosilicone Surfactant as detailed in the Directions for Use table.

To minimise foaming, add the surfactant last and minimise agitation. ReTain is very soluble and agitation is not usually required during application. Discard any unused spray material at the end of each day by placing in a disposal pit specifically marked and set up for this purpose, clear of waterways, desirable vegetation and tree roots.

#### **SPECIAL CONSIDERATIONS:**

Apply when drying conditions are slower, such as in the early to mid-morning period, in order to ensure adequate absorption.

**DO NOT** apply ReTain in the late afternoon or early evening if the fruit is still warm.

Allow a 24 hour interval between application of ReTain and application of any other sprayed agricultural product, or overhead irrigation.

Keep water pH between 6 and 8 for best results.

If using foil mulch or reflective films - apply ReTain at 21 to 28 days before harvest, THEN lay down the foil mulch or reflective films AFTER the ReTain application.

**DO NOT** lay down the foil mulch before ReTain application.

#### **COMPATIBILITY:**

**DO NOT** tank-mix ReTain with agricultural products other than Maxx Organosilicone Surfactant. Compatibility data for ReTain with other agricultural products are limited.

**EXPORT OF TREATED PRODUCE :** Growers should note that suitable MRLs or import tolerances may not be established in all markets for produce treated with ReTain, and are advised to check the requirements of the importing country.

#### **PRECAUTIONS:**

##### **RE-ENTRY PERIOD:**

**DO NOT** allow entry into treated areas for 7 days after treatment. When prior entry is necessary, wear chemical resistant clothing buttoned to the neck and wrist and a washable hat and chemical resistant clothes. Clothing must be laundered after each day's use.

#### **PROTECTION OF CROPS, NATIVE AND OTHER NON-TARGET PLANTS:**

**DO NOT** contaminate ponds, waterways or drains with the product or used packets.

#### **STORAGE AND DISPOSAL:**

Store in original packaging in a safe, well ventilated area as cool as possible. **DO NOT** expose to extremes of temperature. ReTain is supplied in a water soluble bag packaged inside a metallised polyester pouch. Once the pouch is opened, the entire contents of the bag must be used. Dispose of outer foil pack in garbage.

#### **SAFETY DIRECTIONS:**

Will irritate the eyes. Avoid contact with eyes. Wash hands after use. When mixing and using the prepared spray wear chemical resistant clothing buttoned to the neck and wrist and a washable hat and elbow-length PVC gloves. After each day's use wash gloves and contaminated clothing.

#### **FIRST AID:**

If poisoning occurs, contact a doctor or the Poisons Information Centre. Phone 13 11 26.

#### **SAFETY DATA SHEET**

Additional information is listed in the Safety Data Sheet (SDS) available from Sumitomo Chemical Australia Pty Ltd.

#### **IMPORTANT NOTICE**

These goods are to be used only for the purpose and as specified on the label, and are not suitable for any other purpose. To the fullest extent permitted by law, we do not accept or bear any liability on any basis for any loss, damage, cost or expense, arising in any way, directly or indirectly, in connection with the goods.

ReTain™ is a trademark of Valent BioSciences Corporation, USA

Maxx Organosilicone Surfactant is a tradename of Sumitomo Chemical Australia Pty Ltd, NSW, Australia

© Valent BioSciences, 2016

APVMA Approval No.: 52453/102972

Suspected of damaging fertility or the unborn child.

## USE SITUATIONS:

CROP	COMMENTS
	<p>ReTain inhibits the production of ethylene in plant tissues. Ethylene affects plant processes such as fruit maturation, ripening, and fruit drop. Inhibiting ethylene production with ReTain can provide several benefits for stonefruit and apple growers, including one or more of the following:</p> <ul style="list-style-type: none"> <li>• Improved harvest management</li> <li>• Managing rapid maturation and over-maturation of fruit in the orchard</li> <li>• Reduction of preharvest fruit drop</li> <li>• Natural enhancement in fruit size (when taking advantage of the harvest delay)</li> <li>• Maintenance or increase in fruit firmness</li> <li>• Improved fruit quality (e.g., reduced incidence and/or severity of fruit disorders)</li> <li>• Enhanced storage potential</li> </ul>
Stonefruit (except cherries)	<p>ReTain significantly enhances firmness over the harvest and storage periods and can delay maturity by about 3 days (depending on variety) leading to larger fruit. This delay will be seen as a shift in the colour development of the fruit and will either shift the entire harvest period by about 3 days or will alter the amount of fruit harvested at each pick (that is, more fruit is likely to be picked later in the harvest period). Even after a 3 day maturation delay, ReTain treated fruit is generally firmer than untreated fruit, and growers could delay the harvest further by taking advantage of the increased fruit firmness.</p> <p>Responses vary between different varieties. Some varieties naturally produce low levels of ethylene and the effect of ReTain is likely to be less than in varieties which produce high levels of ethylene. In general the varieties that soften most quickly tend to respond best to ReTain treatment.</p>
Cherries	<p>ReTain can be used to extend flower viability in cherries by delaying flower and stigmatic senescence, thereby offering a better chance for pollination and fertilization under poor set conditions which may result in better fruit set.</p> <p>Timing of ReTain application may impact results as applications too early (pre-bloom) or too late (full bloom or later) will significantly reduce efficacy of the treatment. Application must be made between 30-60% flowering/bloom.</p>
Apples	<p>ReTain can be used to manage the maturation of apples in the orchard and to increase fruit size and storage potential</p> <p>Benefits are dependent on apple variety and application timing. In order to apply Retain at the correct timing it is important that growers use starch index testing to determine maturity. More details are provided under the section General Instructions and a starch index chart is attached.</p> <p>In general:</p> <p>Varieties differ in the levels of ethylene produced during harvest and storage. Varieties that produce a lot of ethylene (such as Red Delicious, Gala, Royal Gala, Pink Lady, etc) are more responsive than low ethylene-producing varieties (such as Fuji, Granny Smith).</p> <p>Timing of ReTain application influences whether there is a delay in maturation of the treated crop and how the maturation of later harvests/picks is controlled. These timings are detailed in the Directions for Use table,</p>
Walnuts	<p>ReTain can be used to increase fruit (nut) set in walnut cultivars susceptible to pistillate flower abortion.</p> <p>Timing of ReTain application may impact results as applications too early (pre-bloom) or too late (full bloom or later) will significantly reduce efficacy of the treatment.</p>

## DIRECTIONS FOR USE:

### Restraints - general:

DO NOT apply if rain is expected within 8 hours of ReTain application.

DO NOT apply products containing either 1-naphthylacetic acid or ethephon after treatment of blocks with ReTain.

DO NOT apply ReTain when trees may be nutrient, water, insect or disease stressed.

DO NOT apply ReTain if fruit have been treated with kaolin clay.

USE	TIMING	RATE	COMMENTS
<b>STONEFRUIT (except cherries):</b>			
Increase fruit firmness and size, and increase fruit quality and storage potential	7-14 days before 'Harvest'	830 g/ha in 1000-1500 L/ha	'Harvest' refers to the first pick of fruit for the current season and should be determined by the timing of previous seasons and progress of the crop in the current season. ReTain will delay the harvest of most stonefruit varieties by about 3 days. Increase in fruit size is a consequence of taking advantage of this delay in maturation To ensure good coverage ReTain must be used with Maxx™ Organosilicone Surfactant at 50-100 mL/100L in the spray tank.
<b>CHERRIES:</b>			
<b>DO NOT</b> apply to cherry trees after 60% flowering.			
Extend flower life	30-60% flowering	830 g/ha in 1000-1500 L/ha	ReTain will extend flower life which may increase fruit set under poor pollination conditions or in varieties with low natural fruit set. The use of surfactants is not recommended.
<b>APPLES:</b>			
<b>DO NOT</b> apply ReTain to apples within 7 days of any calcium spray.			
<b>DO NOT</b> use ReTain with management tools that affect apple maturity such as girdling, etc.			
Delay fruit maturation (delay the harvest period) and increase fruit size, improve fruit quality and storage potential	Apply 21-28 days before the average starch pattern index (SPI) of the block is 1.5  An average SPI of 1.5 is generally regarded as the earliest possible time fruit can be harvested for long term storage.  <b>(see attached chart to determine index)</b>	830 g/ha in 800-1200 L/ha	ReTain will delay responsive varieties (eg. Pink Lady, Gala) by 7-14 days ReTain will delay less responsive varieties (eg. Fuji, Granny Smith) by 2-5 days Increase in fruit size is a consequence of taking advantage of the delay in maturation To ensure good coverage ReTain must be used with Maxx Organosilicone Surfactant. <u>For Gala, Royal Gala, Jazz, Envy and related varieties (includes all crosses and sports):</u> use Maxx at a final concentration of 50mL/100L in the spray tank. <u>For all other varieties:</u> use Maxx™ at a final concentration of 50mL – 100 mL/100L in the spray tank. Use the lower rate in hot, dry growing conditions where the surfactant and other products such as calcium may persist longer on the fruit.
Improve fruit quality and storage potential of later picks in the normal harvest period	Apply 7 days before the average starch pattern index of the block is 1.5. This is when the average SPI of the block is 0.5 and occurs about 7 days before the earliest possible time fruit can be harvested for long term storage.  <b>(see attached chart to determine index)</b>		Slows the rapid maturation of later pick fruits of multiple-pick varieties such as Pink Lady and Gala (eg. 2nd, 3rd, 4th picks) increasing harvest quality and storage potential. Will NOT delay the start of harvest. To ensure good coverage ReTain must be used with Maxx Organosilicone Surfactant. <u>For Gala, Royal Gala, Jazz, Envy and related varieties (includes all crosses and sports):</u> use Maxx at a final concentration of 50mL/100L in the spray tank. <u>For all other varieties:</u> use Maxx™ at a final concentration of 50mL – 100 mL/100L in the spray tank. Use the lower rate in hot, dry growing conditions where the surfactant and other products such as calcium may persist longer on the fruit.
Retain can be applied to apples at both timings if the benefits of both are required			
<b>WALNUTS (<i>Juglans regia</i>):</b>			
Increase fruit (nut) set in cultivars affected by pistillate flower abortion (PFA)	Apply at onset of pistillate flower bloom (5-30% pistillate flower receptivity), around late September to early October, depending on area and variety.	830 g/ha in 1000 L/ha	DO NOT apply more than once per season. Apply in at least 1000 L water/hectare, using high volume spraying equipment. Applications too early (pre-bloom) or too late (full bloom or later) will significantly reduce efficacy of the treatment. The use of surfactants is not recommended.

**NOT TO USED FOR ANY PURPOSE, OR IN ANY MANNER CONTRARY TO THIS LABEL UNLESS AUTHORISED UNDER APPROPRIATE LEGISLATION.**

### WITHHOLDING PERIODS:

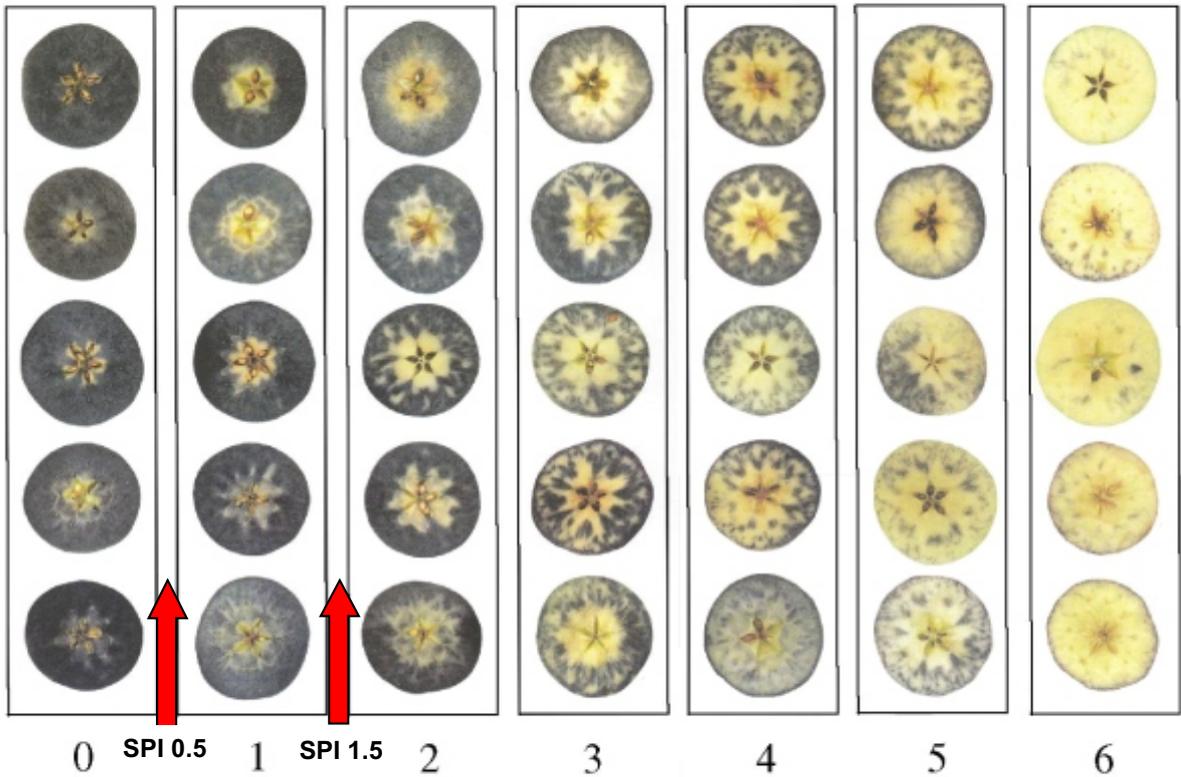
**HARVEST (Apples/Stonefruit (except Cherries)): DO NOT HARVEST FOR 7 DAYS AFTER APPLICATION**

**HARVEST (Walnuts/Cherries): NOT REQUIRED WHEN USED AS DIRECTED**

**GRAZING: DO NOT GRAZE TREATED VEGETATION, OR CUT FOR STOCK FOOD FOR 14 DAYS AFTER APPLICATION.**



## Starch Pattern Index (SPI) chart for helping to determine apple maturity



SPI Chart used with permission of Turners and Growers/ENZA  Turners & Growers