READ SAFETY DIRECTIONS BEFORE OPENING OR USING

ReTain®

PLANT GROWTH REGULATOR SOLUBLE POWDER

ACTIVE CONSTITUENT: 150g/kg AMINOETHOXYVINYLGLYCINE PRESENT AS THE HDYROCHLORIDE SALT (AVG)

A naturally occurring plant growth regulator for use in Cherries and Almonds for enhanced flower life which may improve fruit set.

For use in Avocados to improve fruit retention after flowering.

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

For use in Apples and Stonefruit (except cherries) which can improve harvest management, fruit quality and enhance storage potential.

GENERAL INSTRUCTIONS

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 – 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.

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 cherries:	1000 to 1500 L/ha
for walnuts:	1000 to 1500 L/ha
for almonds:	1000 to 1200 L/ha
for avocados:	500 to 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 when required 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:

If using foil mulch or reflective films - apply ReTain® first THEN lay down the foil mulch or reflective films AFTER the ReTain® application.

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.

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 elbow-length PVC gloves. Clothing must be laundered after each day's use.

PROTECTION OF WILDLIFE, FISH, CRUSTACEANS AND ENVIRONMENT:

Very toxic to aquatic life. **DO NOT** contaminate wetlands or watercourses with this product or used containers.

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. 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. Wash hands after use. After each day's use wash gloves and contaminated clothing.

FIRST AID:

If poisoning occurs, contact a doctor or the Poisons Information Centre. Phone Australia 13 11 26, New Zealand 0800 764 766.

SDS:

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 registered trademark of Valent BioSciences LLC, USA

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

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APVMA Approval No. 52453/143102

THIS PRODUCT IS NOT CONSIDERED TO BE A DANGEROUS GOOD UNDER THE AUSTRALIAN CODE FOR THE TRANSPORT OF DANGEROUS GOODS BY ROAD AND RAIL	
IN A TRANSPORT EMERGENCY **DIAL 000** **POLICE OR FIRE BRIGADE**	**SPECIALIST ADVICE IN EMERGENCY ONLY** **ALL HOURS - AUSTRALIA WIDE** **PHONE 1800 033 111**

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USE SITUATIONS:

CROP	COMMENTS
	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, apple and nut 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 • Enhanced flower life which may improve fruit set and yield
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.
Cherries	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. 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.
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. <u>In general:</u> 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.
Walnuts	ReTain® can be used to increase fruit (nut) set in walnut cultivars susceptible to pistillate flower abortion. 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. A second application in walnuts may be needed if flowers are uneven within the same tree (eg 50% of flowers are between 5-30% pistillate flower bloom but others have not yet flowered).
Almonds	ReTain® can be used to increase fruit (nut) set in almonds by delaying flower and stigmatic senescence, thereby offering a better chance for pollination by bees and enhanced fertilization which may result in increased fruit (nut) set. Timing of ReTain® application may impact results as applications too early (<20% bloom) or too late (full bloom or later) will reduce efficacy of the treatment. Application must be made between 30 – 90% flowering/bloom of the main almond varieties in the orchard. An increase in irrigation and nutrition to trees throughout the growing season may be required to enable a higher crop load to be maintained. Young trees (< 4 years old) may not be able to hold an increased crop load. Use of ReTain® may increase the number of double kernel almonds.

CROP	COMMENTS
Avocados	ReTain® can be used to increase fruit set and retention in Avocado by inhibiting ethylene production at the end of the flowering period. Avocados can have an extended flowering period (as a guide the florets could be 10 - 20% pre opening, 60 - 80% fully open and 10 - 20% post opening/petal fall). As more fruit will be retained on the tree, the tree needs to be managed through the season to maintain this crop load to harvest and prevent a later major fruit drop. An increase in irrigation and nutrition may be required, so measurement of soil moisture and soil and foliar nutrient analysis during the season is important. Application of plant growth regulators that block gibberellin production and thereby divert nutrients from vegetative growth to fruit growth may also assist in maintaining the higher crop load without significantly increasing fruit size. Insect pests and fungal diseases also need to be controlled to maximise fruit retention. Although fruit drop will still occur over the season, careful management of the tree can help to minimize this. Younger - smaller trees (2-6 m tall) tend to be easier to manage and achieve good results with.

DIRECTIONS FOR USE

Restraints:

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.

DO NOT apply ReTain® to fruit within 7 days of any calcium spray.

DO NOT apply by aircraft.

DO NOT apply if heavy rains or storms are forecast within 3 days.

DO NOT irrigate to the point of runoff for at least 3 days after application.

DO NOT apply ReTain® to more than 14 hectares per day when spraying in Walnut.

DO NOT apply more than two applications per season in Avocado.

SPRAY DRIFT RESTRAINTS

Specific definitions for terms used in this section of the label can be found at apvma.gov.au/spraydrift.

DO NOT allow bystanders to come into contact with the spray cloud.

DO NOT apply in a manner that may cause an unacceptable impact to native vegetation, agricultural crops, landscaped gardens and aquaculture production, or cause contamination of plant or livestock commodities, outside the application site from spray drift. The buffer zones in the relevant buffer zone table/s below provide guidance but may not be sufficient in all situations. Wherever possible, correctly use application equipment designed to reduce spray drift and apply when the wind direction is away from these sensitive areas.

DO NOT apply unless the wind speed is between three and 20 kilometres per hour at the application site during the time of application.

DO NOT apply if there are hazardous surface temperature inversion conditions present at the application site during the time of application. Surface temperature inversion conditions exist most evenings one to two hours before sunset and persist until one to two hours after sunrise.

DO NOT apply by a vertical sprayer unless the following requirements are met:

- Spray is not directed above the target canopy.
- The outside of the sprayer is turned off when turning at the end of rows and when spraying the outer row on each side of the application site.
- For dilute water rates up to the maximum listed for each type of canopy specified, minimum distances between the application site and downwind sensitive areas are observed (see the following table titled ‘Buffer zones for vertical sprayers’).

Buffer zones for vertical sprayers

Type of target canopy and dilute water rate	Mandatory downwind buffer zones (m)				
	Bystander areas	Natural aquatic areas	Pollinator areas	Vegetation areas	Livestock areas
2 metres tall and shorter, maximum dilute water rate of 1000 L/ha	0	10	0	0	0
Taller than 2 metres (not fully-foliated), maximum dilute water rate of 1500 L/ha	15	25	0	0	0
Taller than 2 metres (fully-foliated), maximum dilute water rate of 1500 L/ha	5	20	0	0	0

USE	TIMING	RATE	CRITICAL COMMENTS
STONEFRUIT (except cherries):			
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. Use the lower rate in hot, dry growing conditions where the surfactant and other products such as calcium may persist longer on the fruit.
CHERRIES:			
DO NOT 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. Use the lower rate in hot, dry growing conditions where other products such as calcium may persist longer on the fruit.
APPLES:			
DO NOT 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. **(see attached chart to determine index)**	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. For Gala, Royal Gala, Jazz, Envy and related varieties (includes all crosses and sports): use Maxx at a final concentration o 50 mL/100 L in the spray tank.

APPLES (continued)**:**			
USE	**TIMING**	**RATE**	**CRITICAL COMMENTS**
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. **(see attached chart to determine index)**	830 g/ha in 800-1200 L/ha	For all other varieties: use Maxx™ at a final concentration of 50 mL – 100 mL/100 L 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. 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. For Gala, Royal Gala, Jazz, Envy and related varieties (includes all crosses and sports): use Maxx at a final concentration of 50 mL/100 L in the spray tank. For all other varieties: use Maxx™ at a final concentration of 50 mL – 100 mL/100 L 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			
WALNUTS (*Juglans regla*):			
Increase fruit (nut) set in cultivars affected by pistillate flower abortion (PFA)	Apply single applications at onset of pistillate flower bloom (5-30% pistillate flower receptivity). If a second application is required, apply at 45-60% pistillate flower receptivity. Flower receptivity occurs around late September to early October, depending on area and variety.	83g/100L in 1000-1500 L/ha water	Apply in at least 1000 L water/hectare, using high volume spraying equipment. Use higher water volume for larger, more mature trees. If the flowering period is extended, two applications (first at 5-30% pistillate flower bloom and the second at 45-60% pistillate flower bloom) may be required to ensure all flowers are treated with ReTain. Applications too early (pre-bloom) or too late (full bloom or later) will significantly reduce efficacy of the treatment. Refer to Use Situations section for additional information. The use of surfactants is not recommended.
ALMONDS (*Prunus dulcis*)			
Increase fruit (nut) set	Apply when the main almond varieties in the orchard are from 30% to 90% flower bloom, usually in August depending on area and variety	830 g/ha in 1000-1200 L/ha water	Apply in at least 1000 L water/hectare using high volume spraying equipment to ensure thorough coverage of flower buds and blooms. Use 1200 L water/hectare for mature trees 5m+ in height. **DO NOT** apply more than once per season. Ensure adequate irrigation and nutrition throughout the growing season to treated trees so that an increased crop load can be carried.

AVOCADO – QLD ONLY			
Increase fruit set and retention	End of flowering period. (As a guide florets could be: 0 - 20% pre opening, 60 - 80% fully open and 10 - 20% post opening/petal fall)	125 g/100 L in 500 -1000 L/ha depending on tree size.	Avocado trees grow quickly so can vary in size from about 2m to 12m tall. Apply sufficient water to cover all flowers and inflorescence stems only. It is not necessary to soak the whole tree. The amount of water required is largely dependent on tree size, with 500 - 1000 L/ha suitable for small to moderate trees. **DO NOT** apply to trees taller than 8m. Apply with a tree crop safe non- ionic surfactant such as Pomade at 50 mL/100 L. Ensure adequate soil moisture and nutrition throughout the growing season to treated trees so that an increased crop load can be carried. It is also important to adequately control insect pests and fungal diseases. Application of plant growth regulators that block gibberellin production and thereby divert nutrients from vegetative growth to fruit growth may also assist in maintaining the higher crop load. Large old trees that have a high level of internal shading or have had recent limb removal may be less responsive.

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

WITHHOLDING PERIODS:

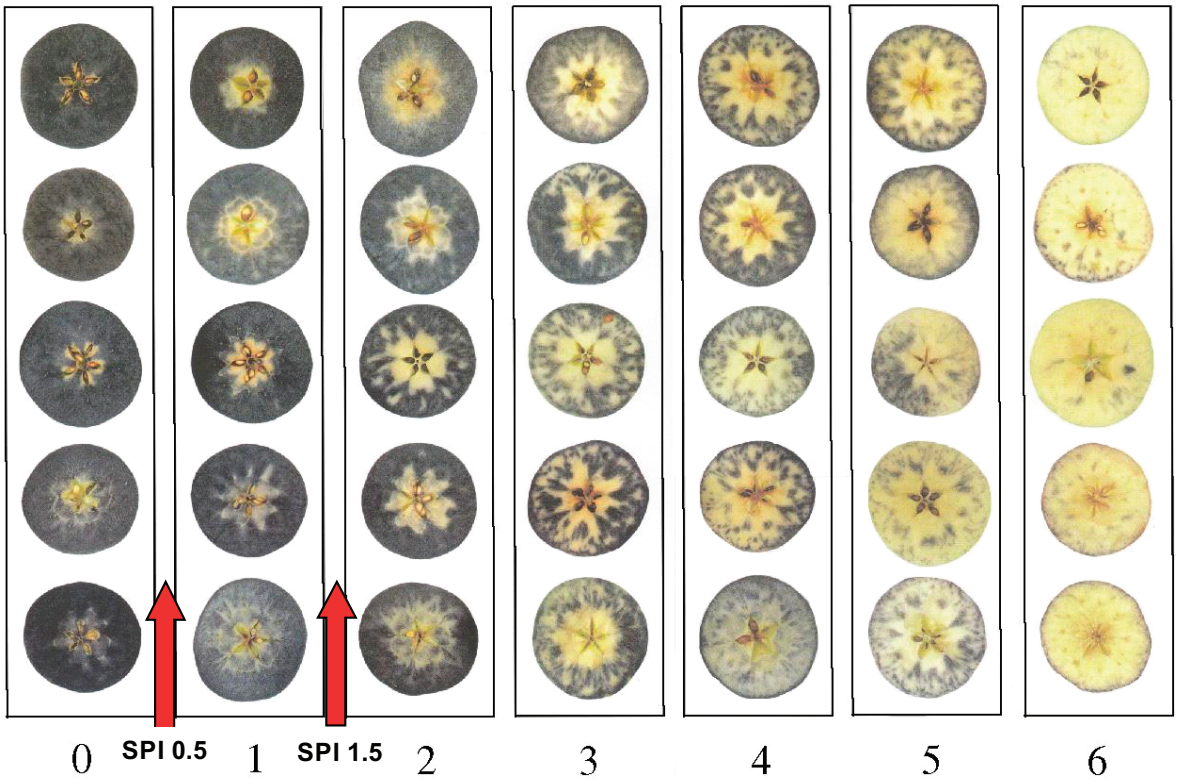
HARVEST (Apples/Stonefruit (except Cherries)): DO NOT HARVEST FOR 7 DAYS AFTER APPLICATION

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

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

ReTain®
Plant Growth Regulator

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



VALENT BIOSCIENCES®

SPI Chart used with permission of Turners and Growers/ENZA

Turners & Growers