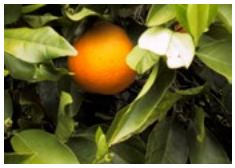
CITRUS



› **Think**
Innovation

› **Trust**
Quality

› **Expect**
Performance

This booklet contains practical information to assist in the use of SACOA products in Citrus orchards.

ABOUT THIS BOOKLET

This booklet provides practical information to assist in the effective and safe use of SACOA products in Citrus fruit orchards.

A FOCUS ON SACOA

SACOA Pty Ltd is a leading developer and supplier of spray oils and adjuvants in Australia.

Since our inception in 1991 we have grown to become an international Australian-owned company supported by active partnerships with world-leading manufacturers and research and development groups.

QUALITY AND SERVICE

As a committed industry leader SACOA delivers a range of assurances and services to our reseller clients including QA production facilities, ongoing research programs and extensive marketing support via brochures, guides, manuals and presentations - available in print and online.

SUSTAINABLE FARMING

Conscious of the importance of sustainable farming practices, SACOA offer a range of products perfectly suited to use in Integrated Pest Management (IPM) programs.

INNOVATIVE SOLUTIONS

Beyond their sustainable farming benefits, our range of spray oil and adjuvant products provide reliable and economically proven solutions for modern farming's many challenges.

More information on our company and our products is available at **www.sacoa.com.au**

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SACOA

SACOA'S CITRUS PRODUCTS

SACOA offers a range of products suitable for orchard Integrated Pest Management (IPM) programs:

ALLOWED INPUT 11392AI
BFA REGISTERED PRODUCT

SACOA BIOPEST® PARAFFINIC OIL

SACOA BIOPEST® paraffinic oil (BIOPEST®) is a highly refined iso-paraffinic oil designed for use as a fungicide, insecticide, to manage certain aphid-transmitted viruses and as a premium carrier / adjuvant.

Independent trials conducted in New South Wales and Queensland indicated BIOPEST® to be the most effective petroleum spray oil (when used in conjunction with Integrated Pest and Disease Management programs) available in Australia.

With an unmatched level of purity BIOPEST® represents the most advanced attempt yet to provide orchards with an IPM product capable of controlling multiple, unrelated pests and fungal diseases simultaneously.

As a spray oil, BIOPEST® is ideally suited to organic farming. Organic registration for BIOPEST® with BFA was obtained in 2012.

SACOA SUMMER INSECTICIDAL OIL

SACOA SUMMER Insecticidal Spray Oil (SUMMER) is a high quality horticultural spray oil. SUMMER offers an effective, proven formulation that you can be confident using in your orchard. With increasing pressure to reduce the use of chemicals in the environment, spray oils such as pest & disease management programs. SUMMER is an important part of Citrus fruit.

SACOA PLANTOCROP® SPRAY ADJUVANT

SACOA PLANTOCROP® Spray Adjuvant (PLANTOCROP®) is the result of a commitment by SACOA to drive the development of vegetable based products to complement their existing mineral-based range of spray oils and adjuvants.

This commitment has involved years of research, and trial work to ensure that environmental responsibility and sustainability could be packaged alongside product effectiveness and superior crop safety.

QUALITY = EFFECTIVENESS + SAFETY

The quality of the spray oil you use will define two things:

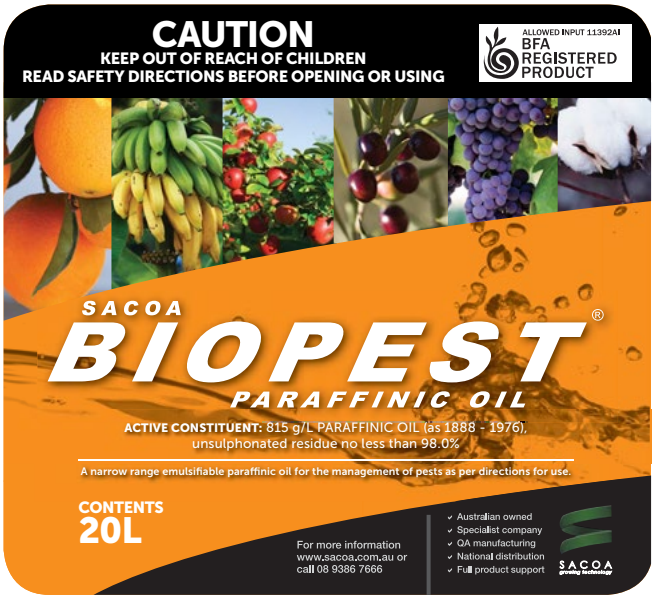
- How effective it is in controlling pests.
- How safe it will be to the fruit and tree.

IT'S CLEAR

BIOPEST® is a revolution in spray oil quality. Formulated with food-grade paraffinic oil, BIOPEST®'s clarity is a clear sign of its quality and purity. The next time you open a drum of oil, check its clarity.
Is it 'water clear'?

AND PURE

BIOPEST® has a unsulphonated residue of 98% - the highest practical level achievable with current refining technology and one of the highest available in the market. This is a higher purity than any other spray oil product on the market (based on published USR levels).



HOW DO WE MEASURE PURITY?

By USR - USR stands for Un-Sulphonated Residue and measures the absence of potentially damaging impurities called aromatics. The lower the USR %, the higher the risk of plant damage.

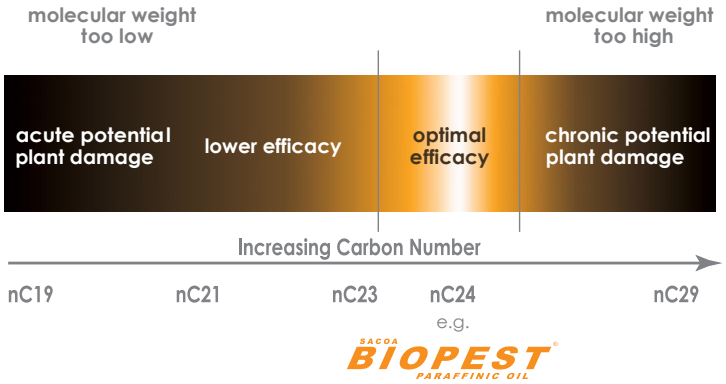
The 'impurities' are generally a grower's worst enemy when applying spray oils. Impurities, when exposed to sunlight, oxidise and form acids on the leaf and fruit surfaces and in certain conditions 'burn' the plant.

THE TRADE-OFF BETWEEN EFFICACY AND PLANT SAFETY

The general rule with mineral spray oils has been that heavier oils offer the best insecticidal properties but carry a greater risk of plant and fruit damage. Until now.

USING CARBON NUMBER TO COMPARE OILS

Carbon number measures the number of carbon atoms in each molecule of oil and is used to indicate an oil's 'weight'. This is a key measure of an oil's potential efficacy and an indicator of the potential for plant damage (other factors also apply).



OPTIMAL EFFICACY + SAFETY

A lighter oil has less potential to damage the plant as a lighter oil volatilises (evaporates) more rapidly, because of this they are less effective in killing pests.

BIOPEST® is rated as an nC24 oil which provides greater efficacy when compared to other summer oils. Due to its unique purity it does not provide any increased risk of plant damage. BIOPEST® may in fact offer reduced damage potential when compared to lower quality, lighter oils.

PARAFFIN CONTENT

Spray oils are composed essentially of hydrocarbons - compounds containing hydrogen and oxygen. There are three types of these molecules found in spray oils that are important in understanding how spray oils work, or don't work. The three types of hydrocarbons found in spray oils are:

The Paraffinic Chains: These have the highest insecticidal value and plant safety. Spray oil should comprise at least 62% paraffinic chains to be regarded as paraffinic oil.

The Naphthalene Rings: These have a lower pesticidal efficacy than the paraffinic chains.

The Aromatic Rings: These are the toxic structures that can cause plant damage.

In terms of phytotoxic potential, the amount of aromatics in the oil is a primary influence on the potential for plant damage as the aromatic oxidise when in contact with sunlight, creating acidic compounds that are common causes of plant burn and damage. BIOPEST® has almost untraceable aromatic content.

WHY IS UNDERSTANDING THESE THREE CLASSES IMPORTANT?

Because the percentage of paraffinic chains in a spray oil is a primary influence on how effective it will be in assisting pest and disease control. BIOPEST® has the highest paraffinic content of any Horticultural Mineral spray oil currently available in Australia, meaning it has the least phytotoxic potential.

Paraffinic type hydrocarbons contained in spray oils are particularly effective in modifying the protective surface wax of plant tissue and insects. BIOPEST® is a optimised paraffinic based spray oil, which extensive independent research also proven that it acts as a nerve poisons in some soft shelled insects such as aphids, killing them as quickly as synthetic contact pesticides.

WHY DOES BIOPEST® WORK BETTER?

BIOPEST® offers a uniquely pure, optimal weight oil without the potential plant damage trade-off.

HERE'S WHY.

A Pure Oil - USR over 98%
Impurities cause damage the longer they stay on the plant surface. BIOPEST's USR rating of over 98% means it can stay on the plant surface and keep working without damaging the plant or restricting growth.

Optimal Weight - nC24
BIOPEST persists on the leaf or fruit surface longer. This means more pests and disease are killed and a significantly greater effectiveness in modifying the behaviour of pests.

Quality Surfactant - Biodegradable
Improves the sticking and spreading properties of the oil in a rapidly biodegradable formula.

Efficacy + Safety
More pest control per spray and for longer with less risk of plant or fruit damage.

BIOPEST® - A REVOLUTION IN SPRAY OIL TECHNOLOGY

SACOA BIOPEST® Paraffinic Oil is a highly refined food-grade iso-paraffinic oil formulation designed for use on a wide range of crops.

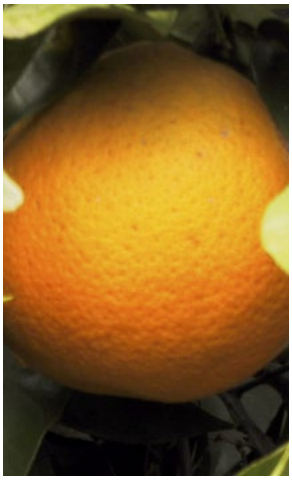
BIOPEST® is registered in Citrus fruit for the management of a range of sucking pests and for use as an adjuvant to improve coverage and kill. Full registration details are available on page 15.

With an unmatched level of purity, BIOPEST® represents the most advanced attempt yet, to provide growers with an IPM compatible product capable of controlling multiple, unrelated pests and fungal diseases simultaneously.

AN ESSENTIAL IPM SOLUTION

BIOPEST®, as an advanced biorational pesticide and adjuvant, is an essential component of integrated pest disease management and has proven effectiveness in disease and pest control by Simultaneous Management of a range of fungal diseases and pests.

- Ability to modify pest behaviour
- Minimal impact on beneficial insects
- Not persistent in the environment
- Low toxicity to animals and grower
- Safe to handle
- No pest resistance
  As mineral oils work at the physical level and not at the biochemical level, they do not invite resistance to develop. This valuable trait is supported by almost a century of mineral oil use in insect and disease control.
- Won't stimulate pest outbreaks like conventional pesticides



AS A CARRIER OR ADJUVANT

BIOPEST® provides a unique combination of functions as a carrier for chemical and biological pesticides in grapes.

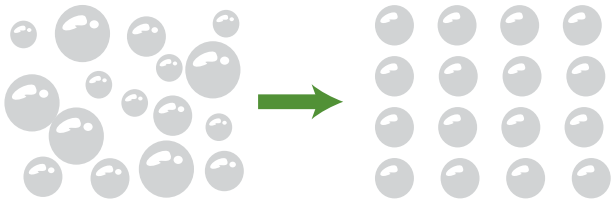
These all work to:

- Get more of the chemical or biological active evenly onto the vine and fruit; and
- Protect the active and keeping it working longer by slowing down volatilisation.

COVERAGE

UNIFORM DROPLETS

Improves spray coverage and reduces loss through drift (small droplets) and runoff (large droplets).



Improves potential contact with pest and improves uptake in plant surface.

STICKING

Improves spray rain fastness.

SPRAY CONDITIONS

Evaporation
Reduces spray loss from evaporation.

Wind Drift
Reduces spray loss from wind drift reducing pesticide spray loss, cost and disruption of beneficials.

BIOPEST® - THREE KEY MODES OF ACTION

As a biorational pesticide, BIOPEST® has three key uses in pest and disease management:

- Insecticide
- Fungicide
- Plant Virus Management

AS AN INSECTICIDE

BIOPEST® effectively manages certain insect pests in three ways:

1. BEHAVIOUR MODIFICATION

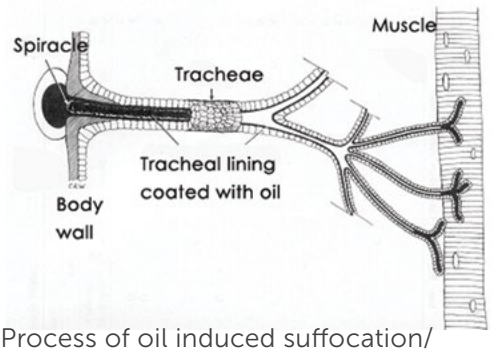
BIOPEST® deters the feeding and egg laying of pest insects. How this occurs is covered in more detail in the section on behaviour modification.

2. SUFFOCATION / DROWNING

BIOPEST® blocks the air holes (spiracles) and lines the breathing tubes (tracheae) through which insects and mites breathe.

3. POISON

In some cases, BIOPEST® may also act as a 'poison', interacting with the fatty acids of the pest and interfering with normal metabolism.



Process of oil induced suffocation/ drowning: oil moves into tracheae by capillary movement.

AS A FUNGICIDE

BIOPEST helps manage a number of different fungi in two ways:

1. HOST PLANT PROTECTION

It is believed that BIOPEST® may protect the host plant by interfering with the attachment of the fungi to the plant.

2. ERADICATION OF FUNGI

It is believed that BIOPEST® may help eradicate existing fungi by targeting and breaking down the fungi's cell walls.

AS A PLANT VIRUS MANAGER

BIOPEST® is useful in managing non-persistent viruses transmitted by sucking pests such as winged aphids by interfering with their feeding behaviour and hence disrupting the virus transmission process. As the viruses are generally transferred via the pests' stylet (the piercing and sucking mouthpart) it is prevented from inoculating healthy plants and transmitting the virus from diseased ones.

"So significant are the behavioural effects of mineral oils that they should be regarded as the most important mode of action against arthropods." Prof. Andrew Beattie et al, 2000

NEW LEARNINGS = NEW OPPORTUNITY

Extensive research by the University of Western Sydney over many years, has opened the door to a new understanding of how a high quality horticultural mineral oil affects insects by modifying certain key insect behaviours such as feeding and egg laying.

INSECTS SHOWN TO BE POTENTIALLY VULNERABLE			
Whitefly	Codling Moth	Leafminer	Grape Leafhopper
Mites	Leafrollers	Aphids	Thrips
Fruit Fly	Psyllids	Budworm	Bollworms
Helicoverpa spp.	Lace bugs	Source: University of Western Sydney	

HOW BEHAVIOUR MODIFICATION OCCURS

1. In order to feed or lay eggs on a host plant, insects and mites must first detect a host plant at the chemical level. This is done through tiny, hollow hairs (sensillae) located on their mouthparts, feet and abdomen.
2. Inside the sensillae are nerve endings which sense specific chemicals produced by the host plant and are detected in the process of probing. Contact with these chemicals can trigger or stimulate an insect to feed or lay eggs at specific locations within the plant.
3. BIOPEST plugs these sensillae. This effectively 'blinds' the insect from identifying food sources or oviposition sites.

Small hairs called sensillae

BENEFICIAL INSECTS ARE MINIMALLY AFFECTED

As beneficial insects are insect-attacking rather than plant-attacking they have evolved a different set of host detection mechanisms and are minimally affected.

SPRAY OIL RESEARCH

Two years of independent research assessing the control of red scale (Aonidiella Aurantii - refer image below) in citrus using spray oils has been completed with valuable learnings coming out of the results.

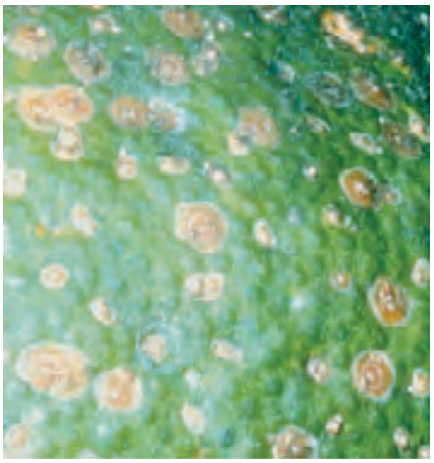
In each year of the trials SACOA's BIOPEST® was the leading spray oil with consistent control of almost 90%. This represents almost 40% more control than any other spray oil tested under the trial spraying approach of two sprays at 0.6% each.

These are significant results given the pest pressure during the trials, the large differences recorded in performance between the popular spray oils and the consistency of BIOPEST®'s performance.

In fact even when the rates of the other oils tested were increased to 1% and the number of sprays increased to three none of these products matched BIOPEST®'s performance when used in two sprays at 0.6%.

TRIAL OVERVIEW

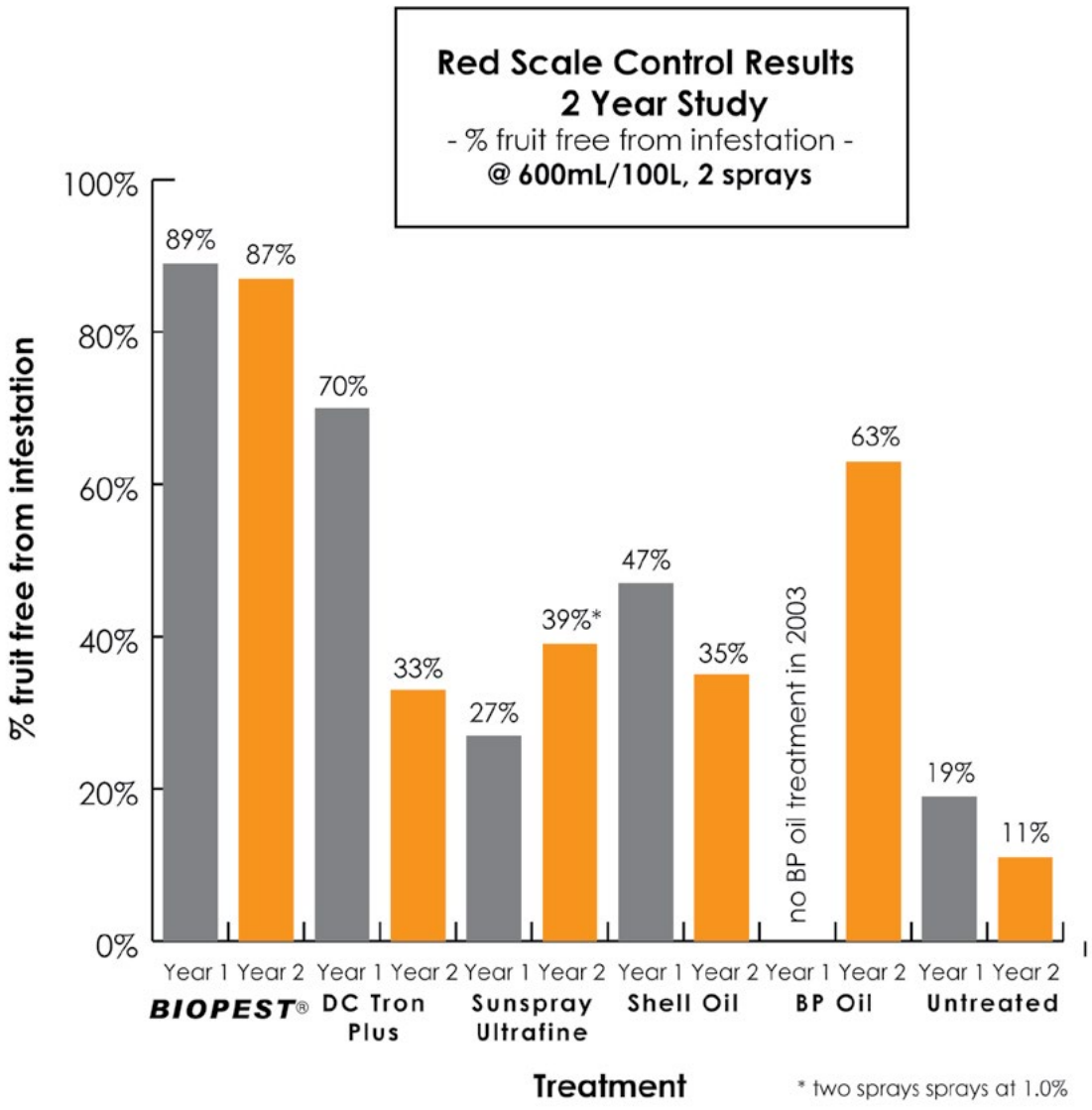
- **Coordinator:** Dan Smith (QLD DPI)
- **Pest focus:** Red scale (Aonidiella Aurantii - refer to figure on the right)
- **Location:** Glenellen Orchard, Gayndah, QLD; 2PH orchards, Emerald, QLD
- **Crop:** Citrus - heavily infested Imperials
- **Spray method:** Using 20L water per tree and applied with hand-held sprayer applied to point of run-off.
- **Spray Timings:** Nov-Dec
- **Treatments:** One, two and three sprays at trial rates of 0.6% and 1.0% for the following spray oils:
  - **BIOPEST®**
  - **Sunspray Ultrafine**
  - **Caltex DC Tron Plus**
  - **Shell spray oil**



Red scale on an immature orange

RESULTS

Control was determined by assessing the level of fruit free from infestation. Results for each treatment are provided in the graph below.



NO IMPACT ON FRUIT MATURITY

This research also supports our confidence that BIOPEST® offers no adverse impact on fruit maturity, with trial results stating:

"Results on mature Imperials in this trial are reassuring (particularly for BIOPEST®) where many of the maturity parameters appeared little different from the control even when the oil was applied up to four times."

This confirms to SACOA, and to the many growers who have used BIOPEST® safely over recent years, that BIOPEST® is a uniquely safe and effective citrus IPM tool..

SUPERIOR CONTROL AND SAFETY

BIOPEST® delivers on all fronts:

1. Consistently better control
2. Reduced risk of plant and fruit damage
3. Reduced costs
4. No impact on fruit maturity

A PROACTIVE APPROACH IS BEST

Proactive spraying is essential to IPM programs and when using BIOPEST®. Set pest thresholds, monitor and spray when necessary. This will avoid the expense of having to manage high or extreme pest levels.

If mite pressure is still medium at harvest, an additional application might be required post harvest with hygiene sprays of copper or other fungicides.

In using BIOPEST® as a standalone insecticide there are five key principles:

- High water volumes
- Rates of between 0.5% - 1%
- Ideally, multiple applications
- Thorough coverage of the plant
- Constant agitation in the tank

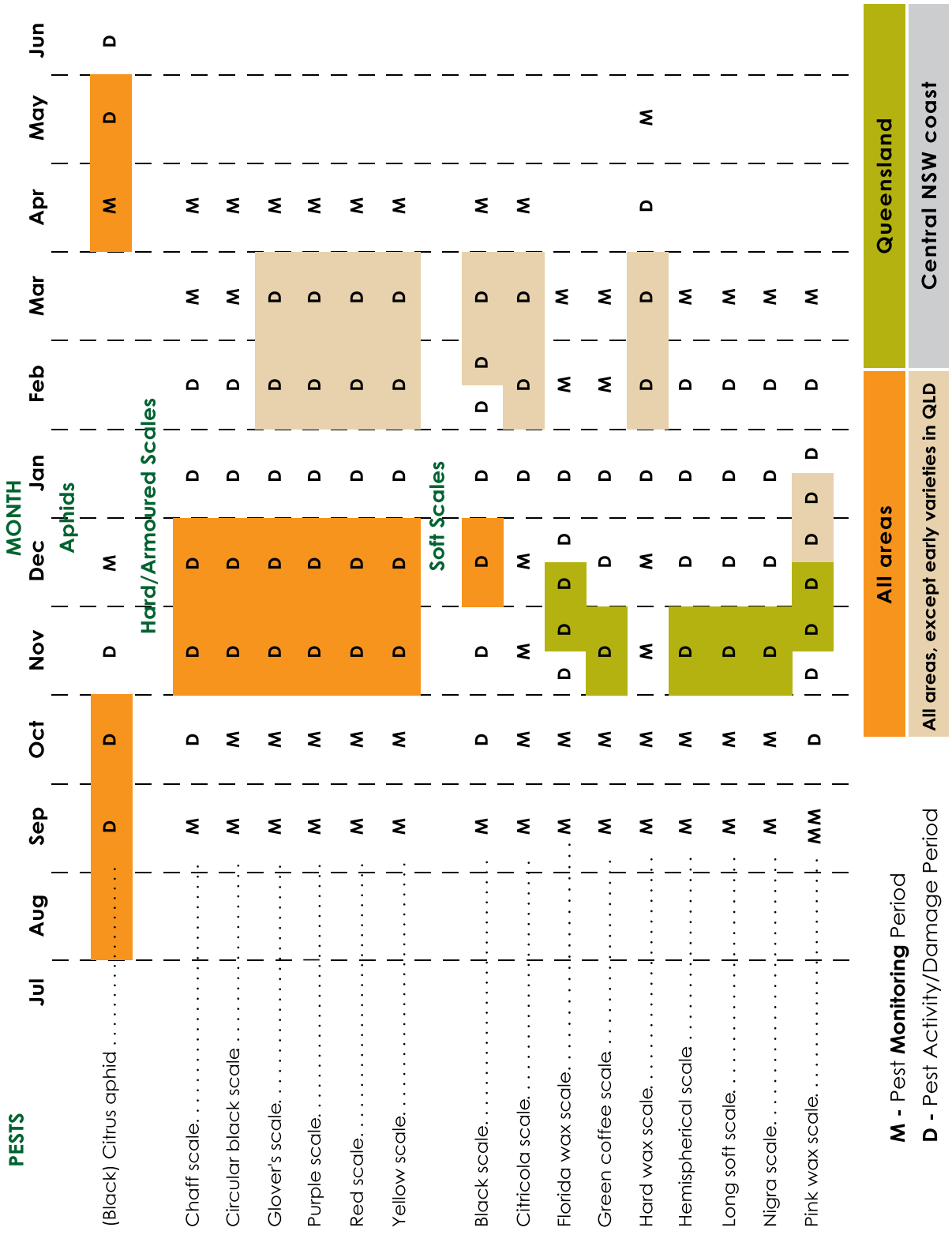
The following provides further detail on using BIOPEST® effectively.

RATES	For multiple applications - 0.25% - 0.6%. For single applications - 0.5% - 1%.	Specific levels will be influenced by: • Target pest • Planting density • Tree height • Canopy density
WATER VOLUME	For small to medium sized trees (i.e. to 3m) - 2,000 - 8,000L per Hectare. For large trees (i.e. 3m +) - 8,000 - 15,000L per Hectare.	
SPRAY PRESSURE	As a general rule spray for coverage of the upper leaf surface. Spray pressure will vary depending on the type of sprayer used.	We do not recommend adjusting spray pressure to change the litreage as this will affect the size of the spray droplet and possibly compromise coverage.
COVERAGE	All parts of the tree and fruit must be completely covered in spray.	
APPLICATIONS	A multiple application approach is generally recognised as providing maximum pest control.	Single applications may also be used though may not provide adequate control on certain pests such as citrus leafminer and others.
SPRAY FREQUENCY	Multiple applications, at recommended rates at crucial times of the year are recommended.	Will depend on pest pressure and predefined pest threshold levels.
SPRAY TIMING	Refer to Spray Timing Chart section for details.	

EQUIPMENT	Recommended: • Oscillating boom with a horizontal outrigger • Will work adequately: • Air-blast sprayers with towers • Rotary atomisers on towers	
	Not Recommended: • Low profile air-blast sprayers • Mist Blowers • Electrostatic sprayers	Mist Blowers and electrostatic sprayers are generally unsuitable, as coverage will be compromised from lack of dilute spray volume.
TRACTOR SPEED	Adjust tractor speed to achieve thorough spray coverage to the point of runoff. This may be 2-3kmh/h on large trees.	
RE-ENTRY INTERVAL	Four hours.	
PRE-HARVEST INTERVAL	Twenty four hours.	
RESIDUE TOLERANCE	BIOPEST® has no residue tolerance.	
A PRECAUTION ON RATES	SACOA does not recommend rates above 1% as fruit size may be affected	

This chart shows recommended timing of sprays - refer to the 'How To Use BIOPEST® section for details on rates etc.

Note: This is a guide only. Status of each pest varies regionally and monitoring is critical to avoid unnecessary or poorly timed sprays. Source: Citrus Pests and Their Natural Enemies, Smith et all 1997 and "Orchard Pest and Disease Management guide Ag WA Bulletin No 4313", amended.



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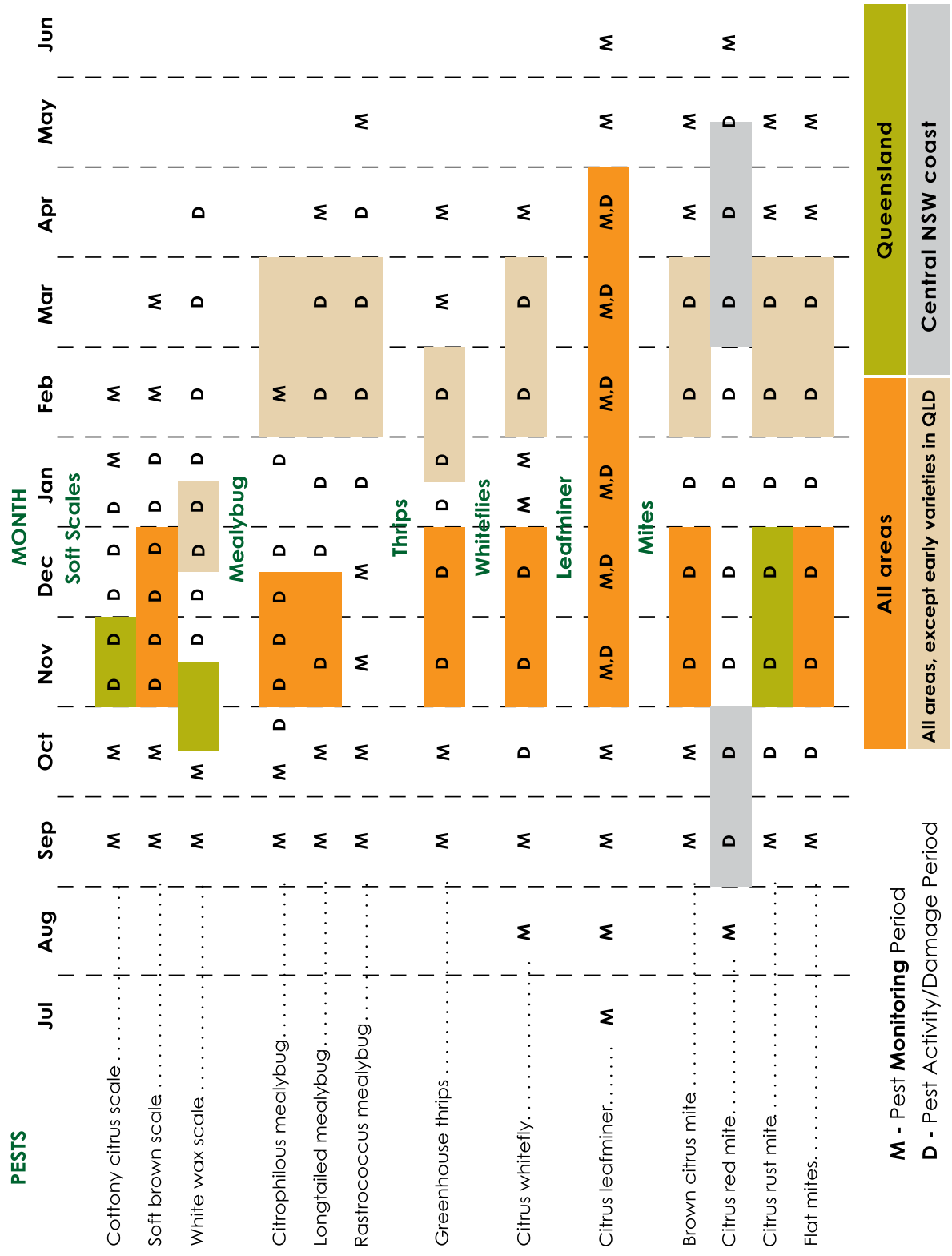

MIXING INSTRUCTIONS

- Add water to the mixing tank to allow proper agitation by pump or paddles.
- If BIOPEST® is being used as an adjuvant, add other pesticides as follows:
  - If a wettable powder formulation - mix water and powder thoroughly so that powder is totally suspended in the water before the oil is added.
  - If an emulsifiable formulation, do so after the oil and water has been thoroughly mixed.
- Add oil under agitation when tank is half full. Top off with water to form a milky solution.
- Maintain agitation until solution is completely used.
- In small equipment lacking agitators, stir or shake diluted spray frequently during applications.
- Read and follow all instructions on the labels of the proposed tank mix.
- Flush fluid in sprayer hose lines back into tank reservoir if fluid is allowed to stand for more than 20 minutes.

Note: *Do not use BIOPEST®, or any other spray oil with Dimethoate, Propargite, or any other product containing sulphur.*

THREE IMPORTANT POINTS

In addition to following the correct mixing order three considerations are always critical to tank mixing:

1. **Refer to Product Label**: Always read the product label prior to use to determine individual product compatibility options and to confirm correct mixing orders.
2. **Perform a Jar Test:** It is always advisable to perform a premix jar test to confirm physical compatibility. Physical compatibility does not always ensure biological compatibility.
3. **Agitation:** Use constant agitation in the spray tank. Use either mechanical or bypass agitation to ensure the oil remains an emulsion in the tank. Never leave a spray tank of oil + water overnight to be sprayed out the next day.

APPLICATION INSTRUCTIONS

- The target must be completely covered in spray solution.
- Oil residue on the plants surface often acts as a feeding and oviposition deterrent. However, the primary target is the pest itself as oil is a contact pesticide.
- Dilute applications. (Greater than 1400L spray per hectare) in most cases ensure best cases.
- Speed of travel is extremely important, tractor speed from 1.6kph to 5.4 kph is recommended, depending on crop size and target pest.
- Do not spray when shade temperatures are or exceed 32°C.

COMPATIBILITY

- Do not use spray oil with Dimethoate, or any other product containing sulphur.
- If possible, either keep the spray equipment used for these compounds separate from the equipment used for BIOPEST® i.e. Paraffin Oil, or make sure that the sprayer is thoroughly cleaned, so that no residue from these compounds remain.
- Do not use with Carbaryl on deciduous fruit trees.

MIXING COMPATIBILITY

The following table provides an indicative guide to popular chemical used in citrus that can be mixed with BIOPEST® (and possibly other mineral oils). Those that should not be mixed are highlighted.

CHEMICAL	COMPATIBLE
Abamectin	yes
Azinphos-Methyl	no
BTS	yes
Benomyl	yes
Bifenthrin	yes
Buprofezin	yes
Carbaryl	no
Copper Oxychloride	yes
Copper Hydroxide	yes
Chlorpyrifos	yes
Diazinon	yes
Dimethoate	yes
Endosulfan	no
Fenamiphos	no
Fenbutatin-Oxide	yes
Lime-Sulphur	no
Maldison	yes
Mancozeb	yes
Metaldahyde	no
Methidathion	no
Methomyl	no
Methiocarb	no
Omethoate	yes
Parathion-Methyl	yes
Permethrin	yes
Pirimicarb	yes
Propargite	no
Pyrethroids	yes

A CAUTION ON MULTIPLE MIXES

Tank mixes involving multiple chemicals should be avoided where possible due to the difficulty in calculating their combined effect on pests, plant, soil and environment.

AVOIDING PLANT OR FRUIT DAMAGE

The following paragraphs cover some important notes concerning crop safety when using BIOPEST® in citrus.

APPLICATION OF METHIDATHION (SUPRACIDE®)

Do not apply Methidathion with, or closely following, a fungicide containing lime, as it will negate the insecticide's effectiveness. Methidathion is highly toxic to humans, mammals, aquatic life, and the environment, and should only be used when Scales are at heavy infestation levels, or all other treatments have been exhausted. Further to this, methidathion should not be necessary if using IPM programs based on natural enemies and quality oils such as BIOPEST® .

BENLATE®

Do NOT apply Benlate® with BIOPEST® on citrus when temperatures exceed 28°C or after mid-November, or first cover spray.

ENSURE MAXIMUM SOIL MOISTURE

Soil moisture should be at a maximum level before application. Spray as soon after an irrigation as the ground will permit operation of the equipment. Be sure to maintain adequate soil moisture from spring throughout the entire irrigation season.

HIGH RATES OF OIL

Rates of oil above 1% may reduce fruit size and/or delay ripening on early maturing trees. There is no evidence of any such issue with two sprays of BIOPEST® at rates of 0.6%.

AVOIDING PLANT OR FRUIT DAMAGE

AVOID EXTREME TEMPERATURES

Do not spray oils if temperatures will exceed 35°C during the day or relative humidity falls to 20% or below (in coastal regions, do not spray if the temperature will exceed 28°C to 32°C or the relative humidity goes below 30%). Do not use = oil sprays immediately before, during, or following an unusually cold weather period.

AVOID INSOLUBLE POWDERS

When mixing with an oil spray, use liquid or water-soluble formulations of insecticides instead of insoluble powders whenever possible; insoluble powder affects interfacial surface relations and stability of dilute spray mixtures as well as the spreading and availability of oil in the spray deposit. If unavoidable, do not add more than 750g of insoluble powders per 100L of dilute oil spray mixture (as per the product label). Also, do not put the powders into the tank until the dilute mixture is above the three quarter level.

AVOIDING LEAF OR FRUIT DROP

Problems of leaf drop and fruit drop can be minimised, in general, by adding Fruit Set (2,4-D) to the oil spray mixture. Be careful not to apply 2,4-D within 2 miles of sensitive crops such as tomatoes, cotton, and grapes and do not use 2,4-D during spring to avoid phytotoxicity problems.

AVOIDING WATERSPOT

If navel orange orchards are treated with oil sprays when oranges begin to reach maturity, generally from May until harvest, protection against water spot may be obtained by using gibberellic acid.

ENSURE COMPLETE SPRAY COVERAGE

Complete coverage of the tree with an oil spray provides more effective control than increased dosage. If spraying is done by ground, equip the rig with a tower capable of elevating a sprayer one metre above the tallest trees.

SODA ASH

The use of Soda Ash and oil for the control of some severe infestations and hard to kill citrus scale insect pests has been recommended. The correct rates of application in these instances is 750g/100L (as per the product label).

SACOA BIOPEST® PARAFFINIC OIL

BIOPEST® is registered for the control of mites and scale in Citrus.

ALLOWED INPUT 11392AI
BFA REGISTERED PRODUCT

CROP	PEST	STATE	RATE	CRITICAL COMMENTS
Citrus	Redscale	VIC, SA, WA	0.6L to 1L	Apply in December and / or February — March
		NSW, ACT		Apply late November/early December and late January/early February if required — apply in combination with Methidathion 50mL/100L
		QLD		
	White Wax Scale, Pink Wax Scale	VIC, WA	0.5L to 1L	Apply in December / early January Period.
		NSW, ACT		Apply late November/early December and late January/early February if required. Apply in combination with Methidathion 50mL/100L, Carbaryl 70g/100L, Promecarb 50g/100L, Soda Ash 500-750g/100L or Washing Soda 500-750g/100L. Apply mid December / early January. Repeat in February.
		QLD		
	White Wax Scale, Pink Wax Scale, Black Scale	TAS, WA	0.5L to 1L	Apply December / early January. Repeat in February.
	Soft Brown Scale	TAS, WA	0.5L to 1L	Apply in January / April.
	Circular Black Scale	QLD	0.5L to 1L	Apply between August — December. A second application may be necessary for heavy infestations.
		WA		Apply in December/ early January. A second application may be necessary for heavy infestations.
	Citrus Leaf-miner	ALL STATES	250mL to 1L (for Citrus Leaf-miner Control only) 500mL to 1L (when combining with Scale & Black Spot Control)	Apply thoroughly and evenly to flush growth, wetting both sides of all immature leaves to point of run-off. Spray every 5 to 14 days during flush periods, commencing as soon as pest's silvery mites are observed on young leaves. The interval will be shorter during summer and early autumn. Cease spraying when leaves become mature. Four sprays in one year should be sufficient to achieve control and no more than 8 sprays should be applied.
CAUTION: Spray no more than 4 times during growing season with two weeks minimum application interval. Do not spray when buds are fully opened and shoot elongation is occurring. Do not spray when there is no obvious moisture in the leave or the plant is under stress. Avoid spraying open blooms. Bleaching and spotting has been observed with open blooms of certain plants. Do not spray walnut foliage.				

BIOPEST® has now been registered with Biological Farmers Australia (BFA) for use on organic orchards, vineyards and farms.

SACOA SUMMER *Insecticidal Spray Oil*

SUMMER is registered for the control of mites and scale in Citrus.

CROP	PEST	STATE	RATE	CRITICAL COMMENTS
Citrus fruit	Citrus Leafminer	NSW, QLD, VIC, SA, WA, TAS	250 to 500mL/100L for control of citrus leafminer 500mL to 1L/100L if application coincides with need to control pests such as red scale	Spray every 5 to 14 days during each flush cycle: spray will be required more frequently during summer and early autumn than in mid to late Autumn. Apply sprays thoroughly - spray must be deposited on both sides of susceptible leaves. Precautions: If petroleum spray oil is applied more that once from spring to autumn, either alone or in combination with their materials, the total strength of oil used in commercial orchards should not exceed 2L of oil in Queensland and South Australia, and 2.5L of oil in NSW and Victoria. Do not spray citrus with sprays containing 1 to 1.2L product/100L water before October or after April, or with sprays containing 2L product/100L water before mid November or after mid March. Do not spray when soil is dry, trees must not be suffering from moisture stress when sprayed. Ensure that oil-water mixtures held in spray tanks or containers during application are continually and effectively agitated or stirred to prevent the oil separating from the water. Petroleum oil sprays greater than 250ml product/100L water should not be applied for at least one month after spraying with sulphur, as severe injury may occur, especially if the oil is applied in hot weather.
	Red Scale	VIC, SA, WA	1.2L/100L	Apply in December and/or February - March.
		NSW	1.3 to 2L/100L	
		QLD	1 to 1.7L/100L	Apply late November/early December and late January/early February if required. Apply in combination with methidathion 50g/100L.
	White Wax Scale, Pink Wax Scale	VIC, SA, WA	1.2L/100L	Apply in December/early January Period.
		NSW	2L/100L	
		QLD	1L/100L	Apply late November/early December and late January to early February if required. Apply in combination with methidathion 50g/100L, carbaryl 70g/100L, Promecarb 50g/100L, Soda Ash 500 to 750g/100L or Washing Soda 500 to 750g/100L.
	Black Scale	TAS, WA	1.8 to 2.5L/100L	Apply mid December/early January. Repeat in February.
	Soft Brown Scale	TAS, WA	1.8 to 2.5L/100L	Apply January/April.

SACOA

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CITRUS

A FOCUS ON SACOA

SACOA Pty Ltd is a leading developer and supplier of spray oils and adjuvants in Australia.

Since our inception in 1991 we have grown to become an international Australian-owned company supported by active partnerships with world-leading manufacturers and research and development groups.

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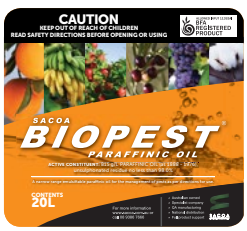
Conscious of the importance of sustainable farming practices, SACOA offer a range of products perfectly suited to use in Integrated Pest Management (IPM) programs

INNOVATIVE SOLUTIONS

Beyond their sustainable farming benefits, our range of spray oil and adjuvant products provide reliable and economically proven solutions for modern farming's many challenges.



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