Pineapple

Strategic Agrichemical Review Process (SARP)

December 2024

Hort Innovation
Project – MT23001

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MT23001 – Strategic Agrichemical Review Process (SARP) - Updates

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AGK Services

Purpose of the report:
This report was funded by Hort Innovation to investigate the pest problem, agrichemical usage and pest management alternatives for the pineapple industry across Australia. The information in this report will assist the industry with its agrichemical selection and usage into the future.

Date of report:
December 2024

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1. Summary

The strategic levy investment project Strategic Agrichemical Review Process (SARP) - Updates (MT23001) is part of the Hort Innovation Pineapple Fund. A Strategic Agrichemical Review Process (SARP), through the process of a desktop audit and industry liaison; Assesses the importance of the diseases, insects and weeds (plant pests) that can affect a horticultural industry;

(i) Assesses the importance of the diseases, insects and weeds (plant pests) that can affect a horticultural industry;
(ii) Evaluates the availability and effectiveness of fungicides, insecticides and herbicides (pesticides) to control the plant pests;
(iii) Determines any gaps in the pest control strategy and
(iv) Identifies suitable new or alternatives pesticides to address the gaps.

Alternative pesticides should ideally be selected for benefits of:

- Integrated Pest Management (IPM) compatibility
- Improved scope for resistance management
- Sound biological profile
- Residue and trade acceptance domestically and for export

The results of this process will provide the Pineapple Industry with sound pesticide usage for the future that the industry can pursue for registration with the manufacturer, or minor-use permits with the Australian Pesticide and Veterinary Medicines Authority (APVMA).

1.1 Diseases

The high priority diseases are:

Disease	Priority
Root and Heart Rot (*Phytophthora cinnamomi, P. nicotianae*)	H
Peduncle Mould / Post-Harvest (*Fusarium* spp., other fungal pathogens)	H
Penicillium Fruit / Core Rot	H

1.2 Insects and other pests

The high priority insects and other pests are:

Insects and Other Pests	Priority
Root Knot Nematode (*Meloidogyne* spp.)	H
Root Lesion Nematode (*Pratylenchus* spp.)	H
Pineapple Flat (Red) Mite (*Dolichotetranychus floridanus*)	H
Symphylids (*Scutigerella* spp., *Hanseniella* spp.)	H
Pineapple Mealybugs (*Pseudococcus* spp., *Dysmicoccus brevipes*)	H
White Grubs (Scarabaeidae)	H

1.3 Weeds

The high priority weeds are:

Weeds	Priority
Blue Billygoat Weed / Bluetop (*Ageratum houstonianum*)	H
Billygoat Weed / Bluetop (*Ageratum conyzoides*)	H
Praxelis (*Praxelis clematidea*)	H
Pigweed (*Portulaca oleracea*)	H
Goat Weed / Licorice Weed / Sweet Broom (*Scoparia dulcis*)	H
Carrot Weed / Common Cotula (*Cotula australis*)	H
Nut Grass / Sedge (*Cyperus rotundus*)	H
Giant Paspalum / Vasey Grass (*Paspalum urvillei*)	H
Green Panic / Guinea Grass (*Megathyrsus maximus var. maximus*)	H

1.4 Plant Growth Regulators

The high priority Plant Growth Regulator issues are:

PGR Issue	Priority
Initiation of flowering and fruit ripening	H
Increase the multiplication rate of planting material	H
De-greening (fruit ripening)	H

2. The Australian Pineapple Industry

The majority of pineapple production in Australia occurs in Queensland, with key growing regions of South East Queensland, Wide Bay, Yeppoon and the Atherton Tablelands. Processing accounts for 35% of total production, with the majority of this volume either tinned or juiced.

Total production for the year ending June 2023 was 72,178 tonnes. The value of production was $76 million with a wholesale value of fresh supply of $72.2 million. Production volume is stable from year to year and the pineapple industry is a well-established, mature industry in Australia.

Fresh Pineapple Seasonality by State[1]

State	22/23 Tonnes	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Queensland	72,178												
Availability Legend			High			Medium			Low			None	

There are no fresh exports of fresh pineapples. Exports are relatively small for processed pineapples and are far exceeded by import volumes. For the year ending June 2023, an additional 21,243 tonnes of preserved pineapples were imported, while 91 tonnes were exported. Australia also imported 5,662 kilolitres of pineapple juice, while exporting 732 kilolitres of pineapple juice.

[1] Hort Innovation (2024). Australian Horticulture Statistics Handbook 2022/23. [online] Available at: https://www.horticulture.com.au/growers/help-your-business-grow/research-reports-publications-fact-sheets-and-more/australian-horticulture-statistics-handbook/

3. Introduction

3.1 Background

Growers of some horticultural crops suffer from a lack of legal access to crop protection products (pesticides). The problem may be that whilst a relatively small crop area is valuable in an agricultural sense, it may not be of sufficient size for Agrichemical companies to justify the expense of registering a product use on that crop. Alternately, the disease, pest, or weed problem may be regional or spasmodic, making Agrichemical companies unwilling to bear the initial high cost of registering suitable pesticides.

Growers may face severe losses from diseases, pests and weeds due to a lack of registered or approved (via a permit) chemical control tools.

Environmental concerns, consumer demands, and public opinion are also significant influences in the marketplace related to pest management practices. Industry IPM practitioners must strive to implement best management practices and tools to incorporate a pest management regime where strategies work in harmony with each other to achieve the desired effects while posing the least risks.

In combination with cultural practices, pesticides are important tools in pineapple production and respective IPM programs. They control the various diseases, insects and weeds that affect the crop and can cause severe economic loss in modern high intensity growing operations. Pesticides are utilised during establishment and development, and to maximise quality and customer appeal.

As a consequence of the issues facing the pineapple industry regarding pesticide access, Hort Innovation has undertaken the current project to update the Strategic Agrichemical Review Process (SARP) for pineapples.

The SARP process identifies diseases, insect pests and weeds of major concern to the pineapple industry. Against these threats, available registered or permitted pesticides are evaluated for overall suitability in terms of IPM, resistance, efficacy, trade, human safety and environmental issues. Where tools are unavailable or unsuitable the process aims to identify potential future solutions. Potential new risks to the industry are also identified.

The results will provide the pineapple industry with a clear outlook of gaps in existing pest control options. This report is not a comprehensive assessment of ALL pests and control methods used in pineapples but attempts to prioritise the major problems.

Exotic plant pests, not present in Australia, are not addressed in this document. Biosecurity plans have been developed for the Pineapple Industry in consultation with industry, government and scientists. The Biosecurity Plan outlines key threats to the industry, risk mitigation plans, identification and categorisation of exotic pests and contingency plans. High priority exotic pests have been assessed based on their potential to enter, establish, and spread in Australia (e.g. environmental factors, host range, vectors) and the cost to industry of control measures. More information is available at this link[2].

[2] https://www.planthealthaustralia.com.au/industries/

3.2 Minor use permits and registration

From a pesticide access perspective, the APVMA classifies pineapples as a minor crop. They fit within the APVMA Crop Group 006: Assorted tropical and sub-tropical fruits – inedible peel, and in the Subgroup 006C, Assorted tropical and sub-tropical, inedible, rough or hairy peel - large. Access to minor use permits can be achieved as long as a reasonable justification is provided in accordance with the APVMA's minor use guidance[3]. Possible justification for future permit applications could be based on:

- New disease, insect or weed identified as a cropping issue
- No pesticide approved for the problem
- Insufficient options for resistance management
- Current pesticides ineffective due to resistance
- Trade risk - current pesticides unsuitable where crop commodities will be exported
- IPM, environment or OH&S issues
- Loss of pesticides due to removal from market or chemical review restrictions
- Opportunity to extrapolate a use pattern when a new, effective pesticide is registered in another crop
- Alternate pesticide has overseas registration or minor use permit
- Market failure – insufficient return on investment for registrant.

With each of these options, sound, scientific argument is required to justify any new permit applications. Another option for the pineapple industry is for manufacturers to register new pesticides uses in the crop.

3.3 Methods

The current version of the Pineapple Strategic Agrichemical Review Process (SARP) is the first report for the industry and was conducted by desktop audit and included an online industry survey. The process included gathering, collating and confirming information. The steps in the process were:

Process of Review	Activity / Date
Industry survey	Preparation and circulation of online industry survey to update priority pests and identify priority control gaps. Survey released: 6 November 2023 Survey closed: 30 June 2024
SARP data updated via a desktop audit	Updated registrations and permits Updated MRL tables Updated available and potential pesticides against low, moderate and high priority pests, including an assessment of their suitability Included information on regulatory risks from MT20007
Captured industry input	Collated and analysed survey results Online meeting facilitated on 19 June 2024 to refine industry priorities Consolidated and incorporated industry needs and insights

[3] https://apvma.gov.au/node/10931

3.4 Results and discussions

3.4.1 Detail

Results and discussions are presented in the body of this document.

3.4.2 Appendices

Refer to additional information in the appendices:

Appendix 1. Products available for disease control in pineapple
Appendix 2. Products available for control of insects and other pests in pineapple
Appendix 3. Products available for weed control in pineapple
Appendix 4. Plant Growth Regulators available in pineapple
Appendix 5. Current permits for use in pineapple
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4. Diseases, pests and weeds of Pineapples

Resistance management: To manage the risk of resistance development, integrated disease/pest/weed management (IDM/IPM/IWM) strategies should be adopted. The general principle is to integrate diverse chemical and non-chemical strategies; maximise efficacy; not rely on singular tools and rotate between different modes of action. It is always essential to follow all the label instructions. Specific resistance management strategies may apply. These can be found, along with other useful information, on the CropLife Australia website[4].

Information on regulatory risk derived from project MT20007 (Chapter 4) - Regulatory support and coordination (Appendix 7) has been incorporated. Some of the suggested options have no overseas MRLs (see Appendix 6). If treated fruit is to be exported nil residues at harvest would be needed for these options. While care has been taken to ensure the accuracy of the information provided in this document the APVMA registered label and where relevant the APVMA approved permit must always be followed.

[4] https://www.croplife.org.au/resources/programs/resistance-management/

4.1 Diseases of Pineapples

4.1.1 Disease priorities

Disease	Priority
Root and Heart Rot (*Phytophthora cinnamomi, P. nicotianae*)	H
Peduncle Mould / Post-Harvest (*Fusarium* spp., other fungal pathogens)	H
Penicillium Fruit / Core Rot	H
Base (Butt) Rot (*Chalara paradoxa*)	M
Water Blister (*Thielaviopsis paradoxa*)	M
Bacterial Soft Rot Bacteria (*Dickeya* spp.)	L

Root & Heart Rot, Post-Harvest Mould on Peduncles and Penicillium Fruit / Core Rot were identified as high priority disease in our industry consultation. Base (Butt) Rot and Water Blister were identified as moderate priority. Disease management for pineapples is focussed on post-harvest controls, including the use of good packing shed hygiene, careful handling of fruit during harvest and packing, and post-harvest fungicides during periods of high infection risk.

It is recommended that an Integrated Disease Management Strategy is implemented for pineapples, including a range of cultural practices to support fungicides, and potentially reduce the reliance on fungicides for disease control.

Cultural controls include:

- Biosecurity measures to prevent importing infections from other farms.
- Promoting good drainage and avoid waterlogging through irrigation.
- Avoid crop stress through good nutrition and water management.

In controlling fungal and bacterial diseases, the industry should be mindful of resistance management. In addition to cultural controls, it is important to include a range of fungicide groups in a foliar spray program, including the use of protectant fungicides. Fungicide programs should be planned at the start of the season to ensure that effective disease control is achieved in conjunction with appropriate product rotation.

CropLife Australia have a resistance management strategy specifically related to the control of Post-Harvest Diseases[5] in fruit, and users must refer to this before using any product.

[5] https://www.croplife.org.au/resources/programs/resistance-management/fruit-post-harvest-diseases/

4.1.2 Available and potential products for priority diseases

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability		Regulatory risk (refer to Appendix 7)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required

Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Root and Heart Rot (*Phytophthora cinnamomi, P. nicotianae*) **Priority: High**							
Rated as a high priority. Phytophthora is a widespread soil-borne pathogen that thrives in poorly drained soil and warm temperatures. Root Rot is a more widespread problem than Heart Rot, although they both have significant impacts on production if not managed. Infection can lead to severe necrosis of roots and subsequent yellowing and wilting of above ground plant parts. Plants can eventually die. Management includes site selection to ensure good drainage, improving soil organic matter, careful irrigation management and fungicide treatments.							
Chloropicrin + 1,3-Dichloropropene (Telone C-35)	8B	Soil Fumigant	NR	A	ALL	Registered as a soil fumigant prior to planting for control of soil-borne diseases (including *Fusarium* & *Verticillium Wilts*, *Rhizoctonia*, *Pythium*). Restricted chemical. ***For use by professional and registered fumigators only.***	-
Fosetyl-Aluminium	P07	Protectant & Curative	7	A	QLD, NSW & WA	Registered in pineapples for control of **Heart Rot** (*Phytophthora cinnamomi*) and **Root Rot** (*Phytophthora nicotianae var. parasitica*). Apply as a soil drench along the plant row immediately after planting and then as a foliar spray at 6-week intervals from late summer to early winter. Maximum number of treatments per season not specified.	-
Metalaxyl-M (Ridomil Gold 480SL)	4	Protectant & Curative	28	A	ALL	Registered in pineapples for control of **Heart Rot** and **Root Rot** caused by *Phytophthora*. Apply as a foliar spray immediately after planting and repeat at 4-8 week intervals during summer, autumn and winter. Maximum number of treatments per season not specified.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Phosphorous Acid	P07	Protectant & Curative	NR	A	QLD & WA	Registered in pineapples for control of **Phytophthora Root & Heart Rot** (*Phytophthora* spp.) Apply to crop 2 weeks before harvest for pre-treatment of pineapple tops for protection of planting material against initial Phytophthora infestations.	-
Phosphorous Acid PER83873	P07	Protectant & Curative	NR	A	QLD, NSW, WA & NT	Permitted in pineapple for control of **Phytophthora Heart & Root Rot** (*Phytophthora cinnamomi*, *P. nicotianae*). Apply as a pre-plant dip by fully immersing planting material in the dip solution for 2 minutes. Maximum of 1 application per crop.	-
Streptomyces lydicus (Actinovate) Novozymes BioAg	BM02	Biological	NR	P-A	ALL	Registered in all crops as a biological soil amendment to stimulate soil organisms to make nutrients more available for plant growth. Registered for control of **Phytophthora** in strawberries and tomato.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM01	Biological	NR	P		Available in fruit crops for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Mandipropamid (Revus) Syngenta	40	Curative / Protectant		P		Registered for control of Downy Mildew in grapes, lettuce, leafy vegetables and oilseed poppies. US registration for control of **Phytophthora** in various crops, including as a foliar application for protection of citrus from Phytophthora Root Rot.	-
Oxathiopiprolin (Zorvec Enicade) Corteva	49	Protectant & Curative		P		Registered for control of Downy Mildew in bulb vegetables, brassicas, cucurbits, leafy vegetables and poppies. Permitted for control of **Phytophthora Root Rot** in raspberries and blackberries. US registration for control of **Phytophthora** Canker and Brown Rot in citrus.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Peduncle Mould / Post-Harvest (*Fusarium* spp., other fungal pathogens) **Priority: High**							
Rated as a high priority. Pineapple is susceptible to growth of unsightly mould on the broken end of the peduncle, which can cause marketing problems including rejection of fruit for sale. A range of pathogens are thought to be implicated in this condition. Strict hygiene during harvest and during post-harvest processing is critical to reduce the impact of this disease.							
Bromo Chloro Dimethyl Hydatoin (BCDMH)	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi by post-harvest surface sterilisation of fruit using spray or dip. Minimum contact 60 seconds.	-
Chlorine	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi as a post-harvest spray. Minimum contact 30 seconds.	-
Didecyl Dimethyl Ammonium Chloride	-	Sanitiser	NR	A	ALL	Registered in tropical and sub-tropical fruit (inedible peel) for control of post-harvest decay and diseases. Dip fruit for 3 minutes.	-
Fludioxonil (Scholar)	12	Protectant	NR	A	ALL	Registered in pineapples (fresh production only) for control of Post-Harvest Moulds (*Penicillium* spp.) Apply as either a dip or high volume drench spray immediately after harvest. Ensure minimum contact time of 30 seconds.	R3
Iodine	-	Sanitiser	NR	A	ALL	Registered in Tropical & Sub-Tropical Fruit (Inedible Peel) for sanitation of **post-harvest decay and diseases**. Dip fruit for a minimum of 1 minute.	-
Prochloraz	3	Protectant	NR	P-A	QLD, NSW & WA	Registered in pineapples for control of Water Blister (*Ceratocystis paradoxa*).	R3
Streptomyces lydicus (Actinovate) Novozymes BioAg	BM02	Biological	NR	P-A	ALL	Registered in all crops as a biological soil amendment to stimulate soil organisms to make nutrients more available for plant growth. Registered for control of **Fusarium** in tomato, cyclamen and as a seed treatment for vegetables.	-
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-harvest treatment		P		Registered for control of side rot caused by Anthracnose and Botryosphaeriaceous fungi in avocado.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Penicillium Fruit / Core Rot (*Penicillium* spp.) **Priority: High**							
Rated as a high priority. Penicillium Rot occurs as a result of in-field infection but manifests post-harvest in pineapples. Infection is favoured by cool temperatures during the 5 weeks after flower initiation. Fruitlets may fail to colour, and in sever cases there is internal browning of fruitlets which can sometimes extend to the core. In field treatments are not available. Strict hygiene during harvest and during post-harvest processing is critical to reduce the impact of this disease.							
Bromo Chloro Dimethyl Hydatoin (BCDMH)	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi by post-harvest surface sterilisation of fruit using spray or dip. Minimum contact 60 seconds.	-
Chlorine	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi as a post-harvest spray. Minimum contact 30 seconds.	-
Didecyl Dimethyl Ammonium Chloride	-	Sanitiser	NR	A	ALL	Registered in tropical and sub-tropical fruit (inedible peel) for control of post-harvest decay and diseases. Dip fruit for 3 minutes.	-
Fludioxonil (Scholar)	12	Protectant	NR	A	ALL	Registered in pineapples (fresh production only) for control of Post-Harvest Moulds (***Penicillium* spp.**) Apply as either a dip or high volume drench spray immediately after harvest. Ensure minimum contact time of 30 seconds.	R3
Iodine	-	Sanitiser	NR	A	ALL	Registered in Tropical & Sub-Tropical Fruit (Inedible Peel) for sanitation of **post-harvest decay and diseases**. Dip fruit for a minimum of 1 minute.	-
Prochloraz	3	Protectant	NR	P-A	QLD, NSW & WA	Registered in pineapples for control of Water Blister (*Ceratocystis paradoxa*).	R3
Fludioxonil + Azoxystrobin (Graduate A+) Syngenta	12+11	Protectant / Post-harvest treatment		P		Registered for control of side rot caused by Anthracnose and Botryosphaeriaceous fungi in avocado.	R3

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Base (Butt) Rot (*Chalara paradoxa*) **Priority: Moderate**							
Rated as a moderate priority. Base Rot causes poor plant establishment and commonly infects plants through fresh wounds occurring where the planting material has been detached from the parent plant and destroys the soft tissue at the base of the plant. A sporadic disease it is generally well controlled through dipping and careful treatment of planting material. Losses are reduced greatly by curing the planting material base by storing it on top of plant rows in a single layer with the butts exposed to the sun or laid on the ground in a similar manner. In prolonged wet weather upturned butts should be sprayed or dipped with a fungicide within 5 hours of harvesting. Improve soil drainage and avoid planting during wet weather.							
Propiconazole	3	Protectant	NR	A	QLD, WA & NT	Registered in pineapples for control of Base Rot (*Thielaviopsis paradoxa*). Apply as a pre-plant seedling dip.	R3
Streptomyces lydicus (Actinovate) Novozymes BioAg	BM02	Biological	NR	P-A	ALL	Registered in all crops as a biological soil amendment to stimulate soil organisms to make nutrients more available for plant growth.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Prime Soil Ameliorant and Biofungicide) Bayer	BM01	Biological	NR	P		Available for application to soil to improve bioavailability of soil resources to horticultural crops. Registered for suppression of soil-borne diseases such as Black Scurf in potatoes and Pineapple Disease in sugarcane.	-
Acibenzolar-S-Methyl (Bion) Syngenta	P01	Protectant / Seed Treatment		P		Registered for suppression of Black Root Rot **(*Thielaviopsis* sp.**) and Fusarium Wilt in cotton.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant		P		Registered for control of Grey Mould, Hull Rot and Powdery Mildew in almonds, apples, berries and grapes. US registration for control of ***Thielaviopsis* sp.** in herbs, spices and ornamentals.	-
Thiophanate-Methyl + Etridiazole (Banrot)	1+14	Protectant / Soil Treatment		P		Registered for control of Thielaviopsis (***Chalara***) in container grown seedlings, cuttings, transplants and in-ground bedding plants.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Water Blister (*Thielaviopsis paradoxa*) **Priority: Moderate**							
Rated as a moderate priority. Water Blister is a seasonal problem that can be severe under the right conditions. It causes a soft, watery rot of the fruit flesh and causes the overlaying skin to become glassy, water-soaked and brittle. Infection occurs through broken fruit stalks and is most severe in warm, wet weather. Fruit should be handled carefully during harvest to avoid bruising and scuffing. A harvester sanitiser should be used if conditions are conducive for the disease. Maintain good general hygiene in the packing shed. Occurs more in cannery fruit than fresh.							
Bromo Chloro Dimethyl Hydatoin (BCDMH)	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi by post-harvest surface sterilisation of fruit using spray or dip. Minimum contact 60 seconds.	-
Chlorine	-	Sanitiser	NR	A	ALL	Registered in fruit & vegetables for control of bacteria and fungi as a post-harvest spray. Minimum contact 30 seconds.	-
Didecyl Dimethyl Ammonium Chloride	-	Sanitiser	NR	A	ALL	Registered in tropical and sub-tropical fruit (inedible peel) for control of post-harvest decay and diseases. Dip fruit for 3 minutes.	-
Fludioxonil (Scholar)	12	Protectant	NR	A	ALL	Registered in pineapples (fresh production only) for control of Post-Harvest Moulds (*Penicillium* spp.) Apply as either a dip or high volume drench spray immediately after harvest. Ensure minimum contact time of 30 seconds.	R3
Iodine	-	Sanitiser	NR	A	ALL	Registered in Tropical & Sub-Tropical Fruit (Inedible Peel) for sanitation of **post-harvest decay and diseases**. Dip fruit for a minimum of 1 minute.	-
Prochloraz	3	Protectant	NR	A	QLD, NSW & WA	Registered in pineapples for control of **Water Blister** (*Ceratocystis paradoxa*). Apply as a post-harvest dip. Ensure immersion of fruit for 1 minute.	R3
Streptomyces lydicus (Actinovate) Novozymes BioAg	BM02	Biological	NR	P-A	ALL	Registered in all crops as a biological soil amendment to stimulate soil organisms to make nutrients more available for plant growth.	-
Polyoxin D Zinc Salt (Intervene) Nufarm	19	Protectant		P		Registered for control of Grey Mould, Hull Rot and Powdery Mildew in almonds, apples, berries and grapes. US registration for control of ***Thielaviopsis* sp.** in herbs, spices and ornamentals.	-

Disease / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Regulatory risk
Bacterial Soft Rot Bacteria (*Dickeya* spp.) **Priority: Low**							
Rated as a low priority. Bacterial Soft Rot cause urea burn syndrome. It is not currently a major problem in pineapples but has the potential to become more severe. Tends to be seasonal occurrence, with regular use of products added to urea when conditions are favourable. No fungicides are currently available.							
Copper	M1	Protectant	1	P-A	ALL	Registered in tropical fruit for control of Phytophthora Stem Canker. Registered for control of various bacterial diseases in various vegetable crops, ornamentals, tobacco, stone fruit, mangoes, macadamias and walnuts.	-
Acibenzolar-S-Methyl (Actigard Plant Activator) Syngenta	P01	Protectant	NR	P		US registration for control of various bacterial diseases in brassica leafy vegetables, citrus, cucurbits, low growing berries, bulb onions, pepper and tomato.	-
Bacillius amyloliquefaciens (Serifel) BASF	BM02	Biological	NR	P		Registered for control of Botrytis in grapevines and berries. US registration for control of bacterial disease in berries & small fruits, fruiting vegetables, leafy vegetables, stone fruit, tobacco and tree nuts.	-
Bacillus amyloliquefaciens Strain QST 713 (Serenade Opti) Bayer	BM02	Biological	NR	P		Registered for control of Botrytis in grapevines and strawberries, suppression of Bacterial Spot in tomatoes, capsicum and chillies, and control of Anthracnose and suppression of Stem End Rot in avocado and other tropical fruit (excluding banana). US registration for control of bacterial disease in berries, cucurbits, fruiting vegetables and stone fruit.	-

4.2 Insect and other pests of Pineapples

4.2.1 Insect and other pest priorities

Insects and Other Pests	Priority
Root Knot Nematode (*Meloidogyne* spp.)	H
Root Lesion Nematode (*Pratylenchus* spp.)	H
Pineapple Flat (Red) Mite (*Dolichotetranychus floridanus*)	H
Symphylids (*Scutigerella* spp., *Hanseniella* spp.)	H
Pineapple Mealybugs (*Pseudococcus* spp., *Dysmicoccus brevipes*)	H
White Grubs (Scarabaeidae)	H
African Black Beetle (*Heteronychus arator*)	M
Ants (Formicidae)	M
Rutherglen Bug (*Nysius vinitor*)	M
Armyworm (*Spodoptera* spp.)	L
Pineapple Scale (*Diaspis bromeliae*)	L
Queensland Fruit Fly (*Bactrocera tryoni*)	L

Pineapples are impacted by a wide variety of insect and other pests, with Root Knot Nematode, Root Lesion Nematode, Pineapple Flat (Red) Mite, Symphylids, Pineapple Mealybugs and White Grubs rated as high priority pests.

It is important to take an Integrated Pest Management (IPM) approach to pest control in pineapples. The diversity of insects that will attack crops mean that a planned, strategic approach is required. A range of control measures should be used, including cultural controls, biological controls and insecticides. Beneficial insects such as predators, parasitoids and pollinators should be encouraged and can be introduced artificially if required. Insecticide choice should be made with regard to preserving the beneficial insects that play an important role in the crop.

The diverse range of insect and mite pests in pineapples necessitates careful planning with resistance management. Growers should refer to resistance management strategies listed on the CropLife website[6] when planning their pest management programs.

[6] https://www.croplife.org.au/resources/programs/resistance-management/

4.2.2 Available and potential products for priority insects and other pests

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability		Regulatory risk (refer to Appendix 7)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG
IPM – indicative overall impact on beneficials (based on the Cotton Pest Management Guide 2019-20 and cotton use patterns)			
VL – Very low; L – Low; M – Moderate; H – High; VH – Very High; - not specified			

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Root Knot Nematode (*Meloidogyne* spp.) **Root Lesion Nematode** (*Pratylenchus* spp.) **Priority: High**								
Rated as a high priority. Root-Knot Nematodes produce distinct terminal swellings on the roots, stopping further root development. The Root Lesion Nematode invades the outer root tissues, causing black areas of dead or injured plant cells on the root surface. Nematodes are common in all pineapple growing regions and can cause major yield loss. Populations will decline rapidly in weed-free or host-free fallow periods but this period needs to be more than 6 months to be effective. Nematicides should be used if soil-testing indicates levels that require treatment.								
1,3-Dichloropropene	-	Soil Fumigant	NR	A	ALL	Registered as a soil fumigant prior to planting for control of plant-parasitic nematodes. Restricted chemical. ***For use by professional and registered fumigators only.***	-	-
Chloropicrin + 1,3-Dichloropropene (Telone C-35)	8B	Soil Fumigant	NR	A	ALL	Registered as a soil fumigant prior to planting for control of plant-parasitic **nematodes**, Symphylans and Wireworms. Restricted chemical. ***For use by professional and registered fumigators only.***	-	-
Abamectin (Tervigo) Syngenta	6	Contact		P		Registered for control of **Root Knot Nematode** in fruiting vegetables, cucurbits, potato and sweet potato.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Cadusafos (Rugby)	1B	Contact		P		Registered for control of various nematodes in banana, citrus, ginger, sugarcane, tobacco and tomato.	H Bee:H	
Cyclobutrifluram (Tymirium)	N-3	Contact		P		Nematicide in development from Syngenta.	-	-
Fenamiphos (Nemacur)	1B	Contact		P		Registered for control of nematodes in aloe vera and banana.	H Bee:H	
Fluazaindolizine (Salibro Reklemel) Corteva	N-UN	Contact		P	ALL	Registered in for control of nematodes in cucurbits, fruiting vegetables, root & tuber vegetables and sweet potato.	-	-
Fluensulfone (Nimitz) Adama	N-UN	Contact		P	ALL	Registered for control of **Root Knot Nematode** in cucurbits, fruiting vegetables, carrots, potato, sweet potato and sugarcane.	-	-
Fluopyram (Velum Prime) Bayer	N-3	Contact		P		Hort Innovation is generating data to support registration for control of nematodes in strawberries. US registration for control of nematodes in brassica leafy vegetables, bulb vegetables, cucurbits, fruiting vegetables, hops, legume vegetables, pome fruit, potato, sweet potato, small berries, sorghum, stone fruit, strawberries and other low-growing berries, sunflower, tobacco and tree nuts.	-	-
Oxamyl (Vydate) Corteva	1A	Contact		P		Registered for control of nematodes in banana, capsicum / pepper, sweet potato and tomato.	H Bee:H	-
Pineapple Flat (Red) Mite (*Dolichotetranychus floridanus*) **Priority: High**								
Rated as a high priority. Pineapple Flat Mite causes damage at all stages of pineapple production, including to the leaves and fruit. Mite feeding on fruit provides infection entry points for various diseases that can cause issues post-harvest. Current chemical options are limited and the implementation of an IPM friendly mite management regime would be advantageous. Other measures include preserving predatory mites populations through avoiding the use of disruptive chemistry, keeping dust levels down and maintaining good general farm hygiene.								
Abamectin PER81805	6	Ingestion	112	A	NT & QLD	Permitted in pineapples for control of **Pineapple Flat Mite** (*Dolichotetranychus floridanus*). Apply as a foliar spray before mite population reaches economic threshold. Use a retreatment interval of 14-20 days. Maximum of 2 applications per season.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Dimethoate PER94586	1B	Contact	35 G:35	A	ALL	Permitted in pineapple for control of **Pineapple Red Mite** / **Flat Mite**. Apply as foliar sprays at days 0,7, 21 and 42, once plants are actively growing. At induction stage, apply a further 4 applications starting at days 0, 7, 21 and 42. Prior to harvest, apply a further 4 applications starting at days 0, 7, 21 and 42, with the last spray applied 35 days prior to harvest. Maximum of 12 applications per year.	H Bee:H	R2
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	P-A	ALL	Registered in fruit for control of aphids, thrips, mealybug, spider mite and whitefly.	L Bee:L	-
Beauveria bassiana (Velifer) BASF	UN	Ingestion		P		Biological currently registered in protected vegetables and ornamentals, with activity on mites.	L Bee:L	-
Bifenazate (Acramite) Arysta	20D	Contact & Ingestion		P		Registered for control of various mites in apples, pears, apricots, nectarines, peaches, plums, almonds, fruiting vegetables, cucurbits, papaya and strawberries.	L Bee:H	-
Clofentezine (Apollo)	10A	IGR / Contact		P		Registered for control of various mites in apples, stone fruit, pears, hops, bananas and ornamentals.	L Bee:L	-
Cyflumetofen (Danisaraba) BASF	25A	Contact		P		Registered for control of various mites in pome fruit, almonds, citrus, grapes, strawberries, fruiting vegetables and ornamentals.	L Bee:L	
Fenbutatin Oxide (Torque)	12A	Contact		P		Registered for control of various mites in apples, pears, peaches, nectarines, hops, avocados, bananas, citrus, strawberries and ornamentals.	L Bee:L	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Isocycloseram (Simodis) Syngenta	30	Ingestion		P		Registered for control of Diamond Back Moth, Cabbage White Butterfly and suppression of Heliothis in brassica vegetables and brassica leafy vegetables, suppression of Onion Thrips and Plague Thrips in bulb vegetables, control of Two Spotted Mite and Cucumber Moth and suppression of Broad Mite, Bean Red Spider Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in cucurbits, and control of Two Spotted Mite and Broad Mite and suppression of Tomato Russet Mite, Western Flower Thrips, Tomato Thrips, Melon Thrips, Plague Thrips and Heliothis in fruiting vegetables.	H Bee:VH	-
Pyridaben (Sanmite)	21A	IGR / Contact		P		Registered for control of various mites in apples, stonefruit, pears, bananas, grapes (not wine) and roses.	H Bee:H	-
Spiromesifen (Oberon) Bayer	23	Ingestion		P		Registration pending for control of mites in various crops. Hort Innovation is undertaking data generation projects across multiple commodities for a new label registration in Australia.	M Bee:VL	-
Symphylids (*Scutigerella* spp., *Hanseniella* spp.) **Priority: High**								
Rated as a high priority. Symphylids are an occasional soil borne pest that can cause extensive crop damage, particularly in new plantings. They cause damage to the roots through direct feeding. Pre-plant soil fumigation is the only control measure currently available for controlling symphylids.								
Bifenthrin (Astral)	3A	Contact	90 G:42	A	QLD	Registered in pineapples for control of **Symphylids** (*Hanseniella* spp.)	VH Bee:H	R3
Chloropicrin + 1,3-Dichloropropene (Telone C-35)	8B	Soil Fumigant	NR	A	ALL	Registered as a soil fumigant prior to planting for control of plant-parasitic nematodes, **Symphylans** and Wireworms. Restricted chemical. ***For use by professional and registered fumigators only.***	-	-
Fipronil (Regent)	2B	Contact		P		Registered for control of **Symphylids** in ginger.	M Bee:VH	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Pineapple Mealybugs (*Pseudococcus* spp., *Dysmicoccus brevipes*) **Priority: High**								
Rated as a high priority. Mealybugs cause a wilt condition (virus) that is associated with presence of mealybug in the floral cavity and causes most impact in hybrid varieties. This could be a potential impact on fruit marketability in the future. Ants move the mealybugs around in the crop and the insecticides historically used for mealybug have also controlled ants.								
Potassium Salts of Fatty Acid (Natrasoap)	-	Contact	NR	A	ALL	Registered in fruit for control of Aphids, Thrips, **Mealybug**, Two-Spotted Mite, Spider Mite and Whitefly. Apply as a cover spray when pests are evident. Retreatment interval and maximum number of treatments per season not specified.	L Bee:L	-
Spirotetramat (Movento) Bayer	23	Ingestion	14	A	ALL	Registered in pineapples for control of **Pineapple Mealybug** (*Dysmicoccus brevipes*). Apply as a foliar spray once local pest thresholds are reached. Use a retreatment interval of 14-21 days. Maximum of 2 treatments per crop.	M Bee:L	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	A	ALL	Registered in pineapple for control of **Pineapple Mealybug** (*Dysmicoccus brevipes*). Apply as a foliar spray targeting crawlers when they are exposed and before they are protected under the fruit calyces or established between touching fruit. Apply 2 applications at a retreatment interval of 14-21 days.	M Bee:H	-
Sulfoxaflor (Transform) Corteva PER81901	4C	Contact & Ingestion	14	A	QLD & NT	Permitted in pineapple for control of **Pineapple Mealybug** (*Dysmicoccus brevipes*). Apply as a foliar spray during periods of active vegetative and/or root growth. Use a minimum retreatment interval of 14 days and do not use consecutive applications. Maximum of 2 treatments per crop.	M Bee:H	-
Acetamiprid + Novaluron (Cormoran) Adama	4A+15	Contact & Ingestion		P		Registered for control of Longtailed Mealybug in apples and pears.	M Bee:M	R2
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion		P		Registered for control of **Mealybugs** in citrus, grapevines and macadamias.	M Bee:M	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Buprofezin (Applaud)	16	Ingestion		P		Registered for control of **Mealybugs** in citrus, grapes and pears.	L Bee:L	-
Clothianidin (Shield) Sumitomo	4A	Contact		P		Registered for control of **Mealybug** in apples, pears, table grapes and wine grapes.	M Bee:VH	R2
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of **Mealybug** in apples and pears.	M Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes. US registration for control of **Mealybug** in citrus and small fruit vine climbing (except Fuzzy Kiwifruit).	L Bee:L	-
White Grubs (Scarabaeidae) **Priority: High**								
Rated as a high priority. White Grubs are a seasonal pest that will feed on the roots of newly establishing plants. They can cause extensive damage including loss of whole plants in extreme infestations. Chemical options are limited but keeping clean fallows and good farm hygiene in and around fields will assist in reducing populations of this soil-borne pest.								
Bifenthrin (Astral)	3A	Contact	90 G:42	P-A	QLD	Registered in pineapples for control of Symphylids (*Hanseniella* spp.) Registered for control of various beetle / weevil species in banana, canola, stone fruit, citrus and grapes.	VH Bee:H	R3
Fipronil (Regent)	2B	Contact		P		Registered for control of various beetle / weevil species in asparagus, banana, grapevines, potatoes, sweet potatoes and sugar cane.	M Bee:VH	R3
African Black Beetle (*Heteronychus arator*) **Priority: Moderate**								
Rated as a moderate priority. Associated with White Grub but tend to be more sporadic and generally have less impact on the crop. Cultural management options used for White Grub will assist in reducing populations of African Black Beetle.								
Bifenthrin (Astral)	3A	Contact	90 G:42	P-A	QLD	Registered in pineapples for control of Symphylids (*Hanseniella* spp.) Registered for control of various beetle / weevil species in banana, canola, stone fruit, citrus and grapes.	VH Bee:H	R3

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Fipronil (Regent)	2B	Contact		P		Registered for control of various beetle / weevil species in asparagus, banana, grapevines, potatoes, sweet potatoes and sugar cane.	M Bee:VH	R3
Indoxacarb (Avatar) FMC	22A	Ingestion		P		Registered for control of various weevil pests in asparagus, celery, pome fruit, stone fruit, strawberries, grapes and macadamias.	L Bee:H	R3
Tetraniliprole (Vayego 200SC) Bayer	28	Ingestion		P		Registered in macadamias for control of Macadamia Seed Weevil (*Kushelorhynchus macadamiae*).	L-M Bee:VH	-
Ants (Formicidae) **Priority: Moderate**								
Rated as a moderate priority. Ants play an important role by moving mealybugs around which in turn spreads the Mealybug Wilt virus.								
Pyriproxyfen (Distance Ant Bait) Sumitomo	7C	IGR / Bait	NR	A	ALL	Registered in fruit crops for control of invasive and nuisance ants. Apply baits in early spring or summer at first sign of ant activity. Do not exceed 3 applications per year and a minimum of 3 months between each treatment.	VL Bee:L	
Broflanilide (Vedira) BASF	30	Contact & Ingestion		P		Registered for control of ants in non-crop situations.	-	-
Metaflumizone (Siesta Ant Bait) BASF	22B	Ingestion		P		Registered for control of ants in non-crop situations.	-	-
Rutherglen Bug (*Nysius vinitor*) **Priority: Moderate**								
Rated as a moderate priority. Rutherglen Bug are a sporadic pest that cause internal blemishes by feeding directly on the fruit. They are difficult to control with insecticides.								
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in pineapple for control of Pineapple Mealybug (*Dysmicoccus brevipes*). Registered for control of **Rutherglen Bug** in cotton, cucurbits, fruiting vegetables, leafy vegetables, root & tuber vegetables, brassica vegetables, cane berries and strawberries.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion		P		Registered for control of Fruit Spotting Bugs in avocado, citrus, macadamia and mangoes.	M Bee:H	R2
Flonicamid (Mainman) UPL	29	Ingestion		P		Registered for control of mirids in cotton, strawberries and nursery stock.	M Bee:VL	-
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of various sucking pests in macadamias, avocados, mangoes, papaya, cucurbits, eggplant, peppers, tomatoes, green beans, potatoes and sweet potatoes.	L Bee:L	-
Armyworm (*Spodoptera* spp.) **Priority: Low**								
Rated as a low priority. Infrequent pest of pineapples but can infest crops in large numbers and cause extensive leaf damage.								
Bacillus thuringiensis subsp Kurstaki Strain HD-1 (DiPel)	11	Biological / Ingestion	NR	A	ALL	Registered in fruit for control of **Armyworm** (*Spodoptera* spp.), Cotton Bollworm (*Helicoverpa armigera*), Native Budworm (*Helicoverpa punctigera*), Cabbage Moth (*Plutella xylostella*), Cabbage White Butterfly (*Pieris rapae*), Green Looper (*Chrysodeixis eriosoma*), Light Brown Apple Moth (*Epiphyas postvittana*), Pear Looper (*Ectropis excursaria*), Soybean Looper (*Thysanoplusia orichalcea*), Vine Moth (*Phalaenoides glycinae*, *Agarista agricola*) and Tobacco Looper (*Chrysodeixis argentifera*). Time spraying to coincide with egg hatch. Treatments per season not limited.	VL Bee:VL	-
Spinetoram (Success Neo) Corteva	5	Ingestion	NR NG	P-A	ALL	Registered in tropical & sub-tropical fruit (inedible peel) for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar.	M Bee:VH	-
Spinosad (Entrust Organic) Corteva	5	Ingestion	NR G:14	P-A	ALL	Registered in tropical & sub-tropical fruit (inedible peel) for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar.	L Bee:H	-
Amorphous Silica (Abrade)	-	Contact		P		Registered for control of various caterpillar pests in cotton, brassica vegetables, capsicums, canola and mustard.	-	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Chlorantraniliprole (Coragen)	28	Ingestion		P		Registered for control of ***Spodoptera* sp.** in brassica vegetables, brassica leafy vegetables and strawberries.	L Bee:VL	-
Emamectin (Proclaim Opti) Syngenta	6	Ingestion		P		Registered for control of ***Spodoptera* sp.** in brassica vegetables, root & tuber vegetables (except potato), leafy vegetables, brassica leafy vegetables, sweet corn, strawberries, cucurbits, legume vegetables and fruiting vegetables.	M Bee:H	-
Flubendiamide (Belt) Bayer	28	Ingestion		P		Registered for control of ***Spodoptera* sp.** in brassica vegetables, brassica leafy vegetables, herbs, root & tuber vegetables and strawberry.	L-M Bee:L	-
Indoxacarb (Avatar eVo) FMC	22A	Ingestion		P		Registered for control of ***Spodoptera* sp.** in brassica vegetables, fruiting vegetables and cucurbits.	M Bee:H	R3
Methoxyfenozide (Prodigy) Corteva	18	Ingestion		P		Registered for control of various lepidopteran pests in pome fruit, blueberries, citrus, grapevines, kiwifruit, almonds, avocado, coffee, custard apple, eggplant, longan, lychee, peppers, okra, macadamia and tomatoes.	VL Bee:VL	-
Tebufenozide (Mimic) Corteva	16A	Ingestion / IGR		P		Registered for control of various lepidopteran pests in apples, pears, citrus, grapevines, avocado, custard apple, kiwifruit, longan, lychee, macadamia and eucalyptus.	L Bee:L	-
Pineapple Scale (*Diaspis bromeliae*) **Priority: Low**								
Rated as a low priority. Scale is frequently observed in pineapples but is usually controlled incidentally by broad spectrum insecticides used for control of other pests. Potential for scale to increase in significance as these older insecticides are phased out.								
Spirotetramat (Movento) Bayer	23	Ingestion	14	P-A	ALL	Registered in pineapples for control of Pineapple Mealybug (*Dysmicoccus brevipes*). Registered for control of **Scale** in blueberries, citrus, grapes, mangoes, passionfruit, pome fruit and stone fruit.	M Bee:L	-
Sulfoxaflor (Transform) Corteva	4C	Contact & Ingestion	1	P-A	ALL	Registered in pineapple for control of Pineapple Mealybug (*Dysmicoccus brevipes*). Registered for control of **Scale** in cane berries, citrus, lychee, papaya, passionfruit, persimmon, pome fruit and nursery stock.	M Bee:H	-

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion		P		Registered for control of scale insects in citrus, grapes, macadamia and mango.	M Bee:H	R2
Flupyradifurone (Sivanto Prime) Bayer	4D	Contact & Ingestion		P		Registered for control of Black Scale in olives.	L Bee:L	-
Buprofezin (Applaud) Corteva	16	IGR / Ingestion		P		Registered for control of Scale Insects in citrus, custard apples, grapes, mangoes, passionfruit and persimmons.	M Bee:L	-
Queensland Fruit Fly (*Bactrocera tryoni*) **Priority: Low**								
Rated as a low priority. Treatment protocol only relevant for fruit being sent to WA.								
Dimethoate PER13859	1B	Contact	NR	A	ALL	Permitted in fruit fly host crops for orchard clean-up of **Fruit Fly** following harvest. Do not apply more than 2 applications per host crop. Apply as a foliar and/or ground spray to both fallen and retained fruit. Produce treated must not be harvested, collected or supplied for human or animal consumption.	H Bee:H	R2
Spinosad (Naturalure) Corteva	5	Bait / Ingestion	NR	A	ALL	Registered in fruit crops for control of Fruit Flies including **Queensland Fruit Fly** and Mediterranean Fruit Fly. Apply as either a band or a spot spray to the lower canopy of fruiting plants. Begin applications as soon as monitoring traps indicate flies are present and fruit is at a susceptible stage. Repeat applications every 7 days, re-applying sooner if rain washes off the deposit. Avoid spraying the fruit as phytotoxicity may occur.	L Bee:H	-
Trichlorfon PER12450	1B	Contact	7 G:7	A	ALL (excl. VIC & TAS)	Permitted in Pineapple for control of **Queensland Fruit Fly** (*Bactrocera tryoni*) and Mediterranean Fruit Fly (*Ceratitis capitata*). Apply as a cover spray. Repeat at half concentration every 7-10 days. Apply a maximum of 4 applications per season.	H Bee:H	R2

Pest / Active Ingredient (Trade Name)	Chemical group	Activity	WHP, days	Availability	States	Comments	Impact on beneficials	Regulatory risk
Abamectin PER81805	6	Ingestion	112	P-A	NT & QLD	Permitted in pineapples for control of Pineapple Flat Mite (*Dolichotetranychus floridanus*). Registered for control of **Queensland Fruit Fly** in citrus, blueberries, blackberries and raspberries.	M Bee:H	-
Spinetoram (Success Neo) Corteva	5	Ingestion	NR NG	P-A	ALL	Registered in tropical & sub-tropical fruit (inedible peel) for control of Flower-Eating Caterpillars, Leafrollers, Loopers, Yellow Peach Moth, Red-Banded Thrips and Sorghum Head Caterpillar. Permitted for suppression of **Queensland Fruit Fly** and **Mediterranean Fruit Fly** in berries, pome fruit and stone fruit.	M Bee:VH	-
Acetamiprid + Pyriproxyfen (Trivor) Adama	4A+7C	Contact & Ingestion		P		Registered for control of **Fruit Fly** in avocados, citrus and mango.	M Bee:H	R2
Tetraniliprole (Vayego) Bayer	28	Ingestion		P		Registered for control of **Mediterranean Fruit Fly** in stone fruit.	L-M Bee:VH	-

4.3 Weeds of Pineapples

4.3.1 Weed priorities

Weeds	Priority
Blue Billygoat Weed / Bluetop (*Ageratum houstonianum*)	H
Billygoat Weed / Bluetop (*Ageratum conyzoides*)	H
Praxelis (*Praxelis clematidea*)	H
Pigweed (*Portulaca oleracea*)	H
Goat Weed / Licorice Weed / Sweet Broom (*Scoparia dulcis*)	H
Carrot Weed / Common Cotula (*Cotula australis*)	H
Nut Grass / Sedge (*Cyperus rotundus*)	H
Giant Paspalum / Vasey Grass (*Paspalum urvillei*)	H
Green Panic / Guinea Grass (*Megathyrsus maximus var. maximus*)	H
Pretty Boy / Dwarf Poinsettia / Painted Spurge (*Euphorbia cyatophora*)	M
Thickhead (*Crassocephalum crepidioides*)	M
Giant Sedge (*Cyperus exaltatus*)	M
Giant Rat's Tail Grass (*Sporobolus pyramidalis*)	M

Weed management is a major focus in pineapples, with a large number of problem weeds requiring management on plantations. Our industry consultation identified Blue Billygoat Weed, Billygoat Weed, Praxelis, Pigweed, Goat Weed, Carrot Weed, Nut Grass, Giant Paspalum and Green Panic as high priorities.

The risk of herbicide resistance should also be considered in devising a weed management program. Specific resistance management strategies for high resistance risk (1 and 2) and moderate resistance risk (3, 4, 6, 9, 10, 12, 13, 14, 15, 18, 19, 22, 23, 27, 29, 30 and 31) herbicide modes of action are available on the CropLife Australia webpage[7].

[7] https://www.croplife.org.au/resources/programs/resistance-management/

4.3.2 Available and potential products for weed control

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability			
A	Available via either registration or permit approval		
P	Potential – a possible candidate to pursue for registration or permit		
P-A	Potential, already approved in the crop for another use		
Resistance risk		**Regulatory risk (refer to Appendix 7)**	
		R1	Short-term: Critical concern over retaining access
**	Moderate resistance risk	R2	Medium-term: Maintaining access of significant concern
***	High resistance risk	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Blue Billygoat Weed / Bluetop (*Ageratum houstonianum*) **Billygoat Weed / Bluetop** (*Ageratum conyzoides*) **Priority: High**							
Rated as a high priority. Broadleaf, annual weed that competes aggressively with the crop, especially in the cooler months. It is difficult to control once the size exceeds 3 leaf stage and herbicide options are very limited.							
Bromacil	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Billygoat Weed / Bluetop**. Apply as a blanket spray prior to weed emergence immediately after planting or before planting material begins to grow. If needed, apply as a directed interrow spray prior to flower differentiation. Maximum of 9 kg/ha/year.	NR	A	QLD, NT	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Bromacil + Diuron	5*	Pineapple	Registered in pineapples for control of various grass and broadleaf weeds, including **Billygoat Weed**. Apply as a blanket spray prior to weed emergence immediately after planting or before planting material begins to grow. If needed, apply as a directed interrow spray prior to flower differentiation. Maximum of 1 application per calendar year.	NR	A	QLD	R3
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Isoxaflutole (Balance)	27**	Pineapples / Plant crop only	Registered in pineapples for control of various grass and broadleaf weeds, including **Bluetop**. Apply as a broadcast spray prior to weed emergence immediately after planting or before planting material begins to grow. Maximum of 1 application in the plant crop.	NR	A	QLD, NT	-
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Metribuzin (Sencor)	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Bluetop**. In plant crop, apply a single broadcast spray prior to weed emergence immediately after planting and before planting material begins to grow roots or new leaves. In ratoon crop, apply as a single directed or broadcast spray within 30 days of the plant crop harvest, maximising contact of the herbicide with the soil. Incorporate by rain or irrigation within 7 days for best results. Maximum of 1 application in the plant or ratoon crop.	NR G:14	A	QLD, NT	-
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds, including **Bluetop**, in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds, including **Bluetop** in sugar cane.		P		-
Praxelis (*Praxelis clematidea*) **Priority: High**							
Rated as a high priority. Broadleaf, annual weed which can grow and spread rapidly. Herbicide control options are limited.							
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Pigweed (*Portulaca oleracea*) **Priority: High**							
Rated as a high priority. Prostate, broadleaf annual weed that is difficult to control with herbicides past the seedling stage.							
Bromacil + Diuron	5*	Pineapple	Registered in pineapples for control of various grass and broadleaf weeds, including **Pigweed**. Apply as a blanket spray prior to weed emergence immediately after planting or before planting material begins to grow. If needed, apply as a directed interrow spray prior to flower differentiation. Maximum of 1 application per calendar year.	NR	A	QLD	R3
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Diuron PER81856	5**	Pineapples	Permitted in pineapples for control of grass and broadleaf weeds, including **Pigweed**. Apply after planting and before weed emergence. To prevent phytotoxicity, apply before fruit differentiation or flower bud formation. After flower bud formation, treat inter-row spaces only. Maximum of 1 application per calendar year.	NR	A	QLD, NT	R3
Isoxaflutole (Balance)	27**	Pineapples / Plant crop only	Registered in pineapples for control of various grass and broadleaf weeds, including **Pigweed**. Apply as a broadcast spray prior to weed emergence immediately after planting or before planting material begins to grow. Maximum of 1 application in the plant crop.	NR	A	QLD, NT	-
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Metribuzin (Sencor)	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Pigweed**. In plant crop, apply a single broadcast spray prior to weed emergence immediately after planting and before planting material begins to grow roots or new leaves. In ratoon crop, apply as a single directed or broadcast spray within 30 days of the plant crop harvest, maximising contact of the herbicide with the soil. Incorporate by rain or irrigation within 7 days for best results. Maximum of 1 application in the plant or ratoon crop.	NR G:14	A	QLD, NT	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds, including **Pigweed**, in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
Norflurazon (Zoliar)	12**	Pre-emergence weed control	Registered for control of **Pigweed** in citrus, grapes, almonds, pome fruit and stone fruit.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds, including **Pigweed**, in sugar cane, sweet potatoes, brassica vegetables, beans and sweet corn.		P		-
Goat Weed / Licorice Weed / Sweet Broom (*Scoparia dulcis*) **Priority: High**							
Rated as a high priority. Broadleaf, annual weed that grows rapidly and competes aggressively with the crop.							
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Carrot Weed / Common Cotula (*Cotula australis*) **Priority: High**							
Rated as a high priority. Broadleaf herb that can be annual or perennial and is challenging to control with herbicides.							
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Nut Grass / Sedge (*Cyperus rotundus*) **Priority: High**							
Rated as a high priority. Prefers damp, water-logged soils but the nuts can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
Ametryn	5**	Pineapples	Registered in pineapples for control of Crowsfoot Grass, Pretty Boy, **Sedges**, Summer Grass and Thick Head. Apply when weeds are actively growing and soil is moist. Maximum of 12.5 kg/ha per plant crop.	98	A	QLD, NSW	-
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass & broadleaf weeds, and **Nutgrass**. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Cyhalofop-Butyl + Florpyrauxifen-Benzyl (Agixa Rinskor) Corteva	1*** + 4**		Registered for control of **Nutgrass** in rice.		P		-
Dimethenamid-P (Outlook) BASF	15**		Registered for control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha. Permitted in bulb onions for suppression of **Nutgrass** and other *Cyperus* species in bulb onions.		P		-
Halosulfuron-Methyl (Sempra)	2***		Registered for control of **Nutgrass** in turf and sugarcane.		P		-
Norflurazon (Zoliar) AgNova	12**		Registered for control of **Nutgrass** in asparagus.		P		-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Giant Paspalum / Vasey Grass (*Paspalum urvillei*) **Priority: High**							
Rated as a high priority. Giant Paspalum is a tall, perennial grass that is highly invasive and broadly adapted across cropping regions.							
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Fluazifop-P (Fusilade)	1***	Pineapples	Registered in pineapples for control of grass weeds, including **Giant Paspalum**. Apply as a foliar spray to small, actively growing weeds.	14	A	QLD, NT	-
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Pineapple	Registered in pineapples for control of grass weeds, including ***Paspalum* spp**. Apply as a foliar spray to small, actively growing weeds.	NR	A	ALL	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Metribuzin (Sencor)	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Paspalum**. In plant crop, apply a single broadcast spray prior to weed emergence immediately after planting and before planting material begins to grow roots or new leaves. In ratoon crop, apply as a single directed or broadcast spray within 30 days of the plant crop harvest, maximising contact of the herbicide with the soil. Incorporate by rain or irrigation within 7 days for best results. Maximum of 1 application in the plant or ratoon crop.	NR G:14	A	QLD, NT	-
Quizalofop-P-Ethyl	1***	Pineapple	Registered in pineapples for control of various grass weeds.	7	P-A	ALL	R3
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Green Panic / Guinea Grass (*Megathyrsus maximus var. maximus*) **Priority: High**							
Rated as a high priority. Green Panic is a tall, perennial grass that is highly invasive and broadly adapted across cropping regions.							
Ametryn	5**	Pineapples	Registered in pineapples for control of Crowsfoot Grass, **Pretty Boy**, Sedges, Summer Grass and Thick Head. Apply when weeds are actively growing and soil is moist. Maximum of 12.5 kg/ha per plant crop.	98	A	QLD, NSW	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Fluazifop-P (Fusilade)	1***	Pineapples	Registered in pineapples for control of grass weeds, including seedlings of **Green Panic**. Apply as a foliar spray to small, actively growing weeds.	14	A	QLD, NT	-
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Pineapple	Registered in pineapples for control of grass weeds, including **Green Panic**. Apply as a foliar spray to small, actively growing weeds.	NR	A	ALL	-
Metribuzin (Sencor)	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Green Panic**. In plant crop, apply a single broadcast spray prior to weed emergence immediately after planting and before planting material begins to grow roots or new leaves. In ratoon crop, apply as a single directed or broadcast spray within 30 days of the plant crop harvest, maximising contact of the herbicide with the soil. Incorporate by rain or irrigation within 7 days for best results. Maximum of 1 application in the plant or ratoon crop.	NR G:14	A	QLD, NT	-
Quizalofop-P-Ethyl	1***	Pineapple	Registered in pineapples for control of various grass weeds.	7	P-A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Pretty Boy / Dwarf Poinsettia / Painted Spurge (*Euphorbia cyatophora*) **Priority: Moderate**							
Rated as a moderate priority. Broadleaf, annual weed which prefers sandy soils and is difficult to control with herbicides.							
Ametryn	5**	Pineapples	Registered in pineapples for control of Crowsfoot Grass, **Pretty Boy**, Sedges, Summer Grass and Thick Head. Apply when weeds are actively growing and soil is moist. Maximum of 12.5 kg/ha per plant crop.	98	A	QLD, NSW	-
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
Isoxaflutole + Terbuthylazine (Palmero) Adama	27**+ 5**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds, including **Painted Spurge**, in sugarcane.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Thickhead (*Crassocephalum crepidioides*) **Priority: Moderate**							
Rated as a moderate priority. Broadleaf, annual weed which has a tall growth habit. It is widely naturalised and common in coastal districts of South East Queensland.							
Ametryn	5**	Pineapples	Registered in pineapples for control of Crowsfoot Grass, Pretty Boy, Sedges, Summer Grass and **Thick Head**. Apply when weeds are actively growing and soil is moist. Maximum of 12.5 kg/ha per plant crop.	98	A	QLD, NSW	-
Bromacil	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Thick Head**. Apply as a blanket spray prior to weed emergence immediately after planting or before planting material begins to grow. If needed, apply as a directed interrow spray prior to flower differentiation. Maximum of 9 kg/ha/year.	NR	A	QLD, NT	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Bromacil + Diuron	5*	Pineapple	Registered in pineapples for control of various grass and broadleaf weeds, including **Thick Head**. Apply as a blanket spray prior to weed emergence immediately after planting or before planting material begins to grow. If needed, apply as a directed interrow spray prior to flower differentiation. Maximum of 1 application per calendar year.	NR	A	QLD	R3
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Isoxaflutole (Balance)	27**	Pineapples / Plant crop only	Registered in pineapples for control of various grass and broadleaf weeds, including **Thick Head**. Apply as a broadcast spray prior to weed emergence immediately after planting or before planting material begins to grow. Maximum of 1 application in the plant crop.	NR	A	QLD, NT	-
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Metribuzin (Sencor)	5**	Pineapples	Registered in pineapples for control of various grass and broadleaf weeds, including **Thick Head**. In plant crop, apply a single broadcast spray prior to weed emergence immediately after planting and before planting material begins to grow roots or new leaves. In ratoon crop, apply as a single directed or broadcast spray within 30 days of the plant crop harvest, maximising contact of the herbicide with the soil. Incorporate by rain or irrigation within 7 days for best results. Maximum of 1 application in the plant or ratoon crop.	NR G:14	A	QLD, NT	-
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-
Giant Sedge (*Cyperus exaltatus*) **Priority: Moderate**							
Rated as a moderate priority. Prefers damp, water-logged soils but the nuts can survive for years underground during dry times. Herbicide options are limited and unreliable. Improve soil drainage if possible.							
Ametryn	5**	Pineapples	Registered in pineapples for control of Crowsfoot Grass, Pretty Boy, **Sedges**, Summer Grass and Thick Head. Apply when weeds are actively growing and soil is moist. Maximum of 12.5 kg/ha per plant crop.	98	A	QLD, NSW	-
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass & broadleaf weeds, and **Nutgrass**. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Cyhalofop-Butyl + Florpyrauxifen-Benzyl (Agixa Rinskor) Corteva	1*** + 4**		Registered for control of Nutgrass in rice.		P		-
Dimethenamid-P (Outlook) BASF	15**		Registered for control of grass and broadleaf weeds in sweet corn, beans, peas, pumpkins and kabocha. Permitted in bulb onions for suppression of Nutgrass and other *Cyperus* species in bulb onions.		P		-
Halosulfuron-Methyl (Sempra)	2***		Registered for control of Nutgrass in turf and sugarcane.		P		-
Norflurazon (Zoliar) AgNova	12**		Registered for control of Nutgrass in asparagus.		P		-
Giant Rat's Tail Grass (*Sporobolus pyramidalis*) **Priority: Moderate**							
Rated as a moderate priority. Giant Rat's Tail Grass is a widespread, aggressive weed that is difficult to control once it has established. It is a restricted plant meaning that landholders are required to take all reasonable and practical measures to minimise the biosecurity risks of infestations on their land.							
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+ 10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3
Carfentrazone + Glyphosate (Broadway) FMC	14**+ 9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:14	A	ALL	R3
Glufosinate	10**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR G:8	A	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use / Weed	WHP (days)	Availability	States	Regulatory risk
Glyphosate	9**	Pineapple / Directed Spray	Registered in pineapple as a directed spray to control grass and broadleaf weeds. Do not allow spray to contact any part of the crop.	NR	A	ALL	R3
Haloxyfop (Verdict)	1***	Pineapple	Registered in pineapples for control of grass weeds, including **Giant Rats Tail Grass**. Apply as a foliar spray to small, actively growing weeds.	NR	P-A	ALL	-
Quizalofop-P-Ethyl	1***	Pineapple	Registered in pineapples for control of various grass weeds.	7	P-A	ALL	R3
Aclonifen (Emerger) Bayer	32**	Pre-emergence weed control	Bayer is expected to seek registration for pre-emergent control of grass and broadleaf weeds in various vegetable crops. Registered in Europe for use in potatoes, legume vegetables and cereals.		P		-
Flumioxazin (Chateau) Sumitomo	14**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in grapevines, pome fruit, stone fruit, citrus, tree nuts, olives, avocados and blueberries.		P		-
S-Metolachlor (Dual Gold) Syngenta	15**	Pre-emergence weed control	Registered for control of grass and broadleaf weeds in Brassica vegetables, Brassica leafy vegetables, sweet potatoes, spring onions, shallots, spinach, silverbeet, rhubarb, culinary herbs and beans.		P		-

4.4 Plant Growth Regulators in Pineapples

4.4.1 Plant Growth Regulator Priorities

PGR Issue	Priority
Initiation of flowering and fruit ripening	H
Increase the multiplication rate of planting material	H
De-greening (fruit ripening)	H

Our industry consultation identified initiation of flowering and fruit ripening, increase the multiplication rate of planting material and de-greening as plant growth regulator priorities for pineapples. The use of Plant Growth Regulators is standard practice in pineapple plantations.

4.4.2 Available and Potential Plant Growth Regulators

TABLE KEY: Note that blank fields in the table indicate no information has been provided.

Availability		Regulatory risk (refer to Appendix 7)	
A	Available via either registration or permit approval	R1	Short-term: Critical concern over retaining access
P	Potential - a possible candidate to pursue for registration or permit	R2	Medium-term: Maintaining access of significant concern
P-A	Potential, already approved in the crop for another use	R3	Long-term: Potential issues associated with use - Monitoring required
Withholding Period (WHP) – Number of days from last treatment to harvest (H) or Grazing (G)			
Harvest	H	Not Required when used as directed	NR
Grazing	G	No Grazing Permitted	NG

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use	WHP (days)	Availability	States	Regulatory risk
Initiation of flowering and fruit ripening **Priority: High**							
Rated as a high priority. PGRs are used to force flowering in pineapples which can be induced to flower at any time of year. This ensures that fruit production is synchronised, and uniform-sized fruit can be supplied to the market year-round.							
Ethephon	PGR	Pineapple	Registered in pineapple for **initiation of flowering** and fruit ripening. Apply with urea to plant crop, or to ratoon crop without urea.	7	A	QLD & WA	-
Increase the multiplication rate of planting material **Priority: High**							
Rated as a high priority. Commercial propagation of pineapples occurs using vegetative material. It is common practice in pineapples to apply a treatment to stimulate the development of propagules in place of flowers and fruitlets. This is used approximately one week after flower induction treatments are applied.							
Chlorflurenol-Methyl (Maintain)	PGR	Pineapples	Registered in pineapples to **increase the multiplication rate of pineapple planting material**. Apply at the following treatment intervals after late April / early May flower induction: North Qld 2-4 days (North of Mackay) Central Qld 5-10 days (Bundaberg to Yeppoon) South Qld 7-14 days (Brisbane to Gympie)	NR	A	QLD & NT	-

Active ingredient (Trade Name)	Chemical Group	Crop/ Situation	Comment / Use	WHP (days)	Availability	States	Regulatory risk
De-greening (fruit ripening) **Priority: High**							
Rated as a high priority. De-greening is used in pineapples to control harvest timing and to ensure even fruit size.							
Ethephon	PGR	Pineapple	Registered in pineapple for initiation of flowering and **fruit ripening**. Should only be used on even crops that have been successfully induced for flowering with ethephon. Treat when the forced fruit are beginning to show the first colour break. Do not use on fruit intended for the fresh market. Not suitable for use on summer crops.	7	A	QLD & WA	-
Ethephon PER14953	PGR	Pineapples / Intended for fresh market	Permitted in pineapple for **fruit ripening**. Should only be used on even crops that have been successfully induced for flowering with ethephon. Treat when the forced fruit are beginning to show the first colour break. Not suitable for use on summer crops.	2	A	QLD & NT	-

5. References

5.1 Information:

AgChem Access Priority Access Forum	https://www.agrifutures.com.au/national-rural-issues/agvet-chemicals/
Australian Pesticide and Veterinary Medicines Authority	www.apvma.gov.au
APVMA Chemical review	https://apvma.gov.au/chemicals-and-products/chemical-review/listing
APVMA MRLs	www.legislation.gov.au/F2023L01350/latest/text
APVMA Permit search	Agricultural And Veterinary Permits Search - portal.apvma.gov.au
APVMA Product search	Public Chemical Registration Information System Search - portal.apvma.gov.au
Codex MRL database	http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/
Cotton Pest Management Guide 2023-24	https://www.cottoninfo.com.au/publications/cotton-pest-management-guide
CropLife Australia	https://www.croplife.org.au/
Hort Innovation	www.horticulture.com.au

5.2 Abbreviations and Definitions:

APVMA	Australian Pesticides and Veterinary Medicines Authority
IPM	Integrated pest management
LOQ	Limit of quantification
MRL	Maximum residue limit (mg/kg or ppm)
Pesticides	Plant protection products (fungicide, insecticide, herbicide, nematicides, rodenticides, etc.).
Plant pests	Diseases, insects, nematodes, rodents, viruses, weeds, etc.
SARP	Strategic Agrichemical Review Process
TBC	To be confirmed
WHP	Withholding Period

5.3 Acknowledgements:

Thanks go to the many industry people who contributed information and collaborated on the review of this report.

6. Appendices

Appendix 1. Products available for disease control in pineapple
Appendix 2. Products available for control of insects and other pests in pineapple
Appendix 3. Products available for weed control in pineapple
Appendix 4. Plant Growth Regulators available in pineapple
Appendix 5. Current permits for use in pineapple
Appendix 6. Pineapple Maximum Residue Limits (MRLs)
Appendix 7. Pineapple regulatory risk assessment

Appendix 1. Products available for disease control in pineapples

Active Ingredient (Trade Name)	Chemical Group	Situation	Diseases / Comments	States	WHP Days	Regulatory Risk
Bromo Chloro Dimethyl Hydatoin (BCDMH)	-	Sanitiser / Post-Harvest Treatment	External Rot Causing Organisms	ALL	NR	-
Chlorine	-	Sanitiser / Post-Harvest Treatment	Bacteria and Fungi	ALL	NR	-
Chloropicrin + 1,3-Dichloropropene (Telone C-35)	8B	Soil Fumigant	Soil-borne diseases (including *Fusarium* & *Verticillium* Wilts, *Rhizoctonia*, *Pythium*)	ALL	NR	-
Copper as Cupric Hydroxide	M1	Tropical Fruit	Phytophthora Stem Canker	QLD & NSW	1	-
Copper as Tribasic Copper Sulphate				ALL		
Copper as Copper Ammonium Acetate						
Copper as Cuprous Oxide						
Didecyl Dimethyl Ammonium Chloride	-	Sanitiser / Tropical & Sub-Tropical Fruit (inedible peel) / Post-Harvest	Control of post-harvest diseases	ALL	NR	-
Fludioxonil (Scholar)	12	Pineapples / Post-Harvest / Fresh Production Only	Post-Harvest Moulds (*Penicillium* spp.)	ALL	NR	R3
Fosetyl-Aluminium	P07	Pineapples	Heart Rot (*Phytophthora cinnamomi*) Root Rot (*Phytophthora nicotianae var. parasitica*)	QLD, NSW & WA	7	-
Iodine	-	Sanitiser / Pineapple	Bacteria & Fungi	ALL	NR	-

Active Ingredient (Trade Name)	Chemical Group	Situation	Diseases / Comments	States	WHP Days	Regulatory Risk
Metalaxyl-M (Ridomil Gold 480SL)	4	Pineapples	Heart Rot / Root Rot (*Phytophthora* spp.)	ALL	28	-
Peroxyacetic Acid	-	Sanitiser / Post-Harvest Treatment	Bacteria	ALL	NR	-
Phosphorous Acid	P07	Pineapple	Phytophthora Root & Heart Rot (*Phytophthora cinnamomi*)	QLD & WA	NR	-
Phosphorous Acid PER83873	P07	Pineapple	Phytophthora Heart & Root Rot (*Phytophthora cinnamomi*, *P. nicotianae*)	QLD, NSW, WA & NT	NR	-
Prochloraz	3	Pineapples / Post-Harvest	Water Blister (*Ceratocystis paradoxa*)	QLD, NSW & WA	NR	R3
Propiconazole	3	Pineapples / Pre-Plant Seedling Dip	Base Rot (*Thielaviopsis paradoxa*)	QLD, WA & NT	NR	R3
Streptomyces lydicus (Actinovate) Novozymes BioAg	BM02	All Crops	Biological soil amendment to stimulate soil organisms to make nutrients more available for plant growth	ALL	NR	-

Appendix 2. Products available for control of insects and other pests in pineapples

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory Risk
1,3-Dichloropropene	-	Soil Fumigant	Plant parasitic nematodes	ALL	NR	-
Abamectin PER81805	6	Pineapples	Pineapple Flat Mite (*Dolichotetranychus floridanus*)	NT & QLD	112	-
Bacillus thuringiensis subsp Kurstaki Strain HD-1 (DiPel)	11	Fruit	Armyworm (*Spodoptera* spp.) Cotton Bollworm (*Helicoverpa armigera*) Native Budworm (*Helicoverpa punctigera*) Cabbage Moth (*Plutella xylostella*) Cabbage White Butterfly (*Pieris rapae*) Green Looper (*Chrysodeixis eriosoma*) Light Brown Apple Moth (*Epiphyas postvittana*) Pear Looper (*Ectropis excursaria*) Soybean Looper (*Thysanoplusia orichalcea*) Vine Moth (*Phalaenoides glycinae*, *Agarista agricola*) Tobacco Looper (*Chrysodeixis argentifera*)	ALL	NR	-
Bifenthrin (Astral)	3A	Pineapples	Symphylids (*Hanseniella* spp.)	QLD	90 G:42	R3
Chloropicrin + 1,3-Dichloropropene (Telone C-35)	8B	Soil Fumigant	Plant Parasitic Nematodes Symphylans Wireworms	ALL	NR	-
Dimethoate PER94586	1B	Pineapple	Pineapple Red Mite / Flat Mite	ALL	35 G:35	R2
Dimethoate PER13859	1B	Orchard Cleanup – Fruit Fly host crops following harvest	Fruit Fly	ALL	NR	R2
Ethyl Formate	8A	Pineapple / Post-Harvest Fumigant	Mites (*Dolichotetranychus floridanus*) Mealybugs (*Dysmicoccus neobervipes*) Scale (*Diaspis bromiliae*)	ALL	NR	-

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory Risk
Metaldehyde	-	Horticultural Crops	Snails & Slugs	ALL	7	-
Potassium Salts of Fatty Acid (Natrasoap)	-	Fruit	Aphids Thrips Mealybug Two-Spotted Mite Spider Mite Whitefly	ALL	NR	-
Pyriproxyfen (Distance Ant Bait) Sumitomo	7C	Tropical Fruit	Invasive & Nuisance Ants	ALL	NR	-
Spinetoram (Success Neo) Corteva	5	Tropical & Sub-Tropical Fruit (inedible peel)	Flower-Eating Caterpillars Leafrollers Loopers Yellow Peach Moth Red-Banded Thrips Sorghum Head Caterpillar	ALL	NR NG	-
Spinosad (Entrust Organic) Corteva	5	Tropical & Sub-Tropical Fruit (inedible peel)	Flower-Eating Caterpillars Leafrollers Loopers Yellow Peach Moth Red-Banded Thrips Sorghum Head Caterpillar	ALL	NR G:14	-
Spinosad (Naturalure) Corteva	5	Tree, Fruit, Nut, Vine & Vegetable Crops / Fruit Fly Bait	Queensland Fruit Fly (*Bactrocera tryoni*) Mediterranean Fruit Fly (*Ceratitis capitata*)	ALL	NR	-
Spirotetramat (Movento) Bayer	23	Pineapples	Pineapple Mealybug (*Dysmicoccus brevipes*)	ALL	14	-

Active Ingredient (Trade Name)	Chemical group	Situation	Pests / Comments	States	WHP Days	Regulatory Risk
Sulfoxaflor (Transform) Corteva	4C	Assorted Tropical & Sub-Tropical Fruit (inedible peel)	Banana Spotting Bug Fruit Spotting Bug	ALL	1	-
		Pineapple	Pineapple Mealybug (*Dysmicoccus brevipes*)			
Sulfoxaflor (Transform) Corteva PER81901	4C	Pineapple	Pineapple Mealybug (*Dysmicoccus brevipes*)	QLD & NT	14	-
Trichlorfon PER12450	1B	Pineapple	Queensland Fruit Fly (*Bactrocera tryoni*) Mediterranean Fruit Fly (*Ceratitis capitata*)	ALL (excl. VIC & TAS)	7 G:7	R2

Appendix 3. Products available for weed control in pineapples

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory Risk
Ametryn	5**	Pineapples	Crowsfoot Grass, Pretty Boy, Sedges, Summer Grass, Thick Head	98	QLD, NSW	-
Bromacil	5**	Pineapples	Barnyard Grass, Billygoat Weed / Bluetop, Cobbler's Pegs, Crowsfoot, Guinea Grass, Red Natal Grass, Sourgrass, Stinking Roger, Summer Grass, Thickhead	NR	QLD, NT	-
Bromacil + Diuron	5*	Pineapple	Asthma Plant, Barnyard Grass, Billygoat Weed, Cobbler's Pegs, Crowsfoot Grass, Fat Hen, Guineas Grass, Pigweed, *Physalis* spp., Red Natal Grass, *Sonchus* spp., Sourgrass, Stinking Roger, Summer Grass, Thickhead	NR	QLD	R3
Carfentrazone (Hammer)	14**	Tropical & Sub-Tropical Fruit	Australian Crassula / Stonecrop (*Crassula* sp.), Bifora (*Bifora testiculata*), Capeweed (*Arctotheca calendula*), Chickweed (*Stellaria media*), Common Storksbill (*Erodium cicutarium*), Spiny Emex (*Emex australis*), Marshmallow (*Malva parviflora*), Paterson's Curse (*Echium plantagineum*), Sub Clover (*Trifolium subterraneum*), Wild Radish (*Raphanus raphanistrum*)	NR G:14	ALL	-
Carfentrazone + Glufosinate (Hellcat) AgNova	14**+10**	Pineapple	Grass & Broadleaf Weeds	NR G:8	ALL	R3

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory Risk
Carfentrazone + Glyphosate (Broadway) FMC	14**+9**	Tropical & Sub-Tropical Fruits	Australian Crassula / Stonecrop (*Crassula* spp.), Capeweed (*Arctotheca calendula*), Chickweed (*Stellaria media*), Common Storksbill (*Erodium cicutarium*), Spiny Emex (*Emex australis*), Marshmallow (*Malva parviflora*), Paterson's Curse (*Echium plantagineum*), Sub Clover (*Trifolium subterraneum*), Wild Radish (*Raphanus raphanistrum*)	NR G:14	ALL	R3
Diuron PER81856	5**	Pineapples	Grass & Broadleaf Weeds	NR	QLD & NT	R3
Fluazifop-P (Fusilade)	1***	Pineapples	Barnyard Grass, Crowsfoot Grass, Liverseed Grass, Rhodes Grass, Stinkgrass, Summer Grass (Crabgrass), Carpet Grass, Couch Grass, Giant Paspalum, Johnson Grass, Kikuyu Grass, Paspalum, Water Couch Seedlings of: Giant Paspalum, Green Panic	14	QLD & NT	-
Glufosinate	10**	Tropical & Sub-Tropical Fruits – Inedible Peel	Grass and Broadleaf Weeds	NR G:8	ALL	R3
Glyphosate	9**	Tropical & Sub-Tropical Fruits	Grass and Broadleaf Weeds	NR	ALL	R3
Haloxyfop (Verdict)	1***	Pineapple	Couch Grass, Rhodes Grass, Slender Rats Tail Grass, Buffel Grass, Green Panic, Johnson Grass, Kikuyu, *Paspalum* spp., *Setaria* spp., Annual Ryegrass, Barley Grass, Barnyard Grass, Brome Grass, Crowsfoot Grass, Lesser Canary Grass, Liverseed Grass, Mossman River Grass, Paradoxa Grass, Summer Grass, Volunteer Cereals, Wild Oats	NR	ALL	-

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use / Weed	WHP (days)	States	Regulatory Risk
Isoxaflutole (Balance)	27**	Pineapples / Plant Crop Only / Pre-Weed Emergence	Amaranth, Barnyard Grass, Bluetop, Blackberry Nightshade, Crowsfoot Grass, Feathertop Rhodes Grass, Fleabane, Green Summer Grass, Guinea Grass, Needle Burr, Pigweed, Sowthistle, Summer Grass, Thick Head, Turnip Weed	NR	QLD, NT	-
Metribuzin (Sencor)	5**	Pineapples / Pre-Weed Emergence	Amaranth, Apple of Peru, Awnless Barnyard Grass, Balloon Cotton Bush, Black Pigweed, Bluetop, Caltrop, Coastal Button Grass, Cobbler's Peg, Crowsfoot Grass, Fat Hen, Gooseberry, Green Panic, Green Summer Grass, Guinea Grass, *Ipomoea* spp., Needle Burr, Noogoora Burr, Paspalum, Phasey Bean, Pigweed, Potato Weed, Round-Leaf Cassia, Shepherds Purse, Sowthistle, Summer Grass, Thick Head	NR G:14	QLD, NT	-
Quizalofop-P-Ethyl	1***	Pineapples	Awnless Barnyard Grass (*Echinochloa colona*), Barnyard Grass (*Echinochloa crusgalli*), Couch Grass (*Cynodon dactylon*), Dinebra (*Dinebra retroflexa*), Crowsfoot Grass (*Eleusine indica*), Foxtail Millet (*Setaria italica*), Columbus Grass (*Sorghum x almum*), Johnson Grass (*Sorghum halepense*), Liverseed Grass (*Urochloa panicoides*), Rhodes Grass (*Chloris gayana*), Stink Grass (*Eragrostis cilianensis*), Queensland Blue Grass (*Dichanthium sericeum*), Summer Grass (*Digitaria ciliaris*)	7	ALL	R3

Chemical Group Resistance Risk: ** Moderate, *** High

Appendix 4. Plant Growth Regulators available in pineapples

Active ingredient (Trade Name)	Chemical Group	Situation	Comment / Use	WHP (days)	States	Regulatory risk
Chlorflurenol-Methyl (Maintain)	PGR	Pineapple	To increase the multiplication rate of pineapple planting material	NR	QLD & NT	-
Ethephon (Ethrel)	PGR	Pineapples	Initiation of flowering Fruit ripening	7	QLD & WA	-
Ethephon PER14953	PGR	Pineapples	Fruit ripening	2	QLD & NT	-

Appendix 5. Current permits for use in pineapples

Permit ID	Description	Date Issued	Expiry Date	Permit holder
PER94586	Dimethoate / Pineapple / Pineapple Red Mite & Flat Mite	8-Apr-24	31-Oct-24	Hort Innovation
PER14953	Ethephon / Pineapples / Fruit Ripening	18-Dec-14	25-Dec-24	Growcom
PER13859 Version 3	Dimethoate / Orchard cleanup - fruit fly host crops following harvest / Fruit Fly	9-Feb-15	30-Jun-25	Hort Innovation
PER81805 Version 2	Abamectin / Pineapples / Pineapple Flat Mite	2-Aug-16	31-Jul-25	Hort Innovation
PER12450 Version 7	Trichlorfon / Pineapple / Fruit Fly	6-Oct-11	30-Nov-25	Hort Innovation
PER83873 Version 2	Phosphorous Acid / Pineapple / Phytophthora Root & Heart Rot	22-Feb-18	28-Feb-26	Hort Innovation
PER81856 Version 5	Diuron / Pineapples / Grass & Broadleaf Weeds	16-Jun-16	31-Jul-27	Growcom
PER81901 Version 3	Sulfoxaflor (Transform) / Pineapple / Pineapple Mealybug	24-Aug-16	31-Dec-27	Hort Innovation

Appendix 6. Pineapple Maximum Residue Limits (MRLs)

CODEX commodity groupings of pineapple and subgroups:

	Fruits
FI 0030	Assorted tropical & sub-tropical fruits – inedible peel
FI 2023	Assorted tropical & sub-tropical, inedible, rough or hairy peel - large
FI 0353	Pineapple

Note: There is no export of fresh pineapples and is a minor component of processed volumes as well. Available information indicates that in the absence of specific limits in legislation, that some countries defer to Codex, followed by EU MRL standards, or apply a 0.01ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

Chemical	Codex Code	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Abamectin	FI 0353	Pineapple	T*0.002	*0.002
Acetamiprid	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	0.2	-
Aldrin & Dieldrin		Fruits	E0.05	-
Ametryn	FI 0353	Pineapple	*0.05	-
Bifenthrin	FI 0353	Pineapple	*0.01	-
Bromacil	FI 0353	Pineapple	*0.04	-
Carbendazim	FI 0353	Pineapple	-	5
Carfentrazone-ethyl	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	*0.05	-
Chlordane	FI 0353	Pineapple	E0.02	-
Chlorpyrifos	FI 0353	Pineapple	T0.5	-
Clothianidin	FI 0353	Pineapple	-	*0.01
DDT		Fruits	E1	-
Diazinon		Fruits {except citrus fruits, grapes, olives, peach}	0.5	-
Dicofol		Fruits {except strawberry}	5	-
Didecyl Dimethyl Ammonium Chloride	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	20	-
Dimethoate	FI 0353	Pineapple	0.07	-
Dimethomorph	FI 0353	Pineapple	-	*0.01
Diphenylamine		Fruits {except apple, pear}	0.5	-
Diquat		Fruits	*0.05	-
Disulfoton	FI 0353	Pineapple	-	0.1
Dithianon		Fruits {except blueberries}	2	-
Dithiocarbamates	FI 0353	Pineapple	0.5	-
Ethephon	FI 0353	Pineapple	2	1.5
Fenbutatin Oxide	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	5	-
Fipronil	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel {except banana, custard apple}	T*0.01	-
Fluazifop-p-butyl	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel {except avocado, banana}	0.05	-
Fludioxonil	FI 0353	Pineapple	5	Po5

Chemical	Codex Code	Description	APVMA MRL mg/kg	Codex MRL mg/kg
Fluometuron	FI 0353	Pineapple	*0.1	-
Flupyradifurone	FI 0353	Pineapple	-	0.3
Fosetyl	FI 0353	Pineapple	5	15
Glufosinate and Glufosinate-ammonium	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	0.2	-
		Assorted Tropical & Sub-Tropical Fruits – Inedible Peel {except banana, kiwifruit}	-	0.1
Haloxyfop	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	*0.05	-
Heptachlor	FI 0353	Pineapple	E0.01	E0.01
Inorganic Bromide		Fruits {except avocado, citrus fruits, dried fruits, strawberry}	20	-
Isoxaben	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	*0.01	-
Isoxaflutole	FI 0353	Pineapple	*0.02	-
Lindane	FI 0353	Pineapple	0.5	-
Malathion / Maldison		Fruits {except berries & other small fruits, citrus fruits, dried fruits, stone fruits}	2	-
Metalaxyl	FI 0353	Pineapple	0.1	0.1
Metaldehyde		Fruits	1	-
Methiocarb		Fruits {except citrus fruits, grapes}	T0.1	-
Methyl bromide		Fruits {except jackfruit, litchi, mango, papaya}	T*0.05	-
Metribuzin	FI 0353	Pineapple	*0.01	-
Omethoate	FI 0353	Pineapple	0.03	-
Oryzalin		Fruits	0.1	-
Oxyfluorfen	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	*0.01	-
Paclobutrazol	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel {except avocado, mango}	*0.01	-
Paraquat		Fruits {except olives}	*0.05	-
	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	-	*0.01
Pendimethalin	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	*0.05	-
Phosphine	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	T*0.01	-
Phosphorous Acid	FI 0353	Pineapple	T20	
Piperonyl butoxide		Fruits	8	-
Pirimicarb		Fruits {except blackberries}	0.5	-
Prochloraz	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	-	Po7
	FI 0353	Pineapple	2	-
Propiconazole	FI 0353	Pineapple	0.05	Po2
Pyraclostrobin	FI 0353	Pineapple	-	0.3
Pyrethrins		Fruits	1	-
Pyriproxyfen	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	0.3	-

Chemical	Codex Code	Description	APVMA MRL mg/kg	Codex MRL mg/kg
	FI 0353	Pineapple	-	0.01
Quizalofop-ethyl	FI 0353	Pineapple	*0.05	-
Quizalofop-P-tefuryl	FI 0353	Pineapple	*0.05	-
Simazine		Fruits	*0.1	-
Spinetoram	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	0.3	-
Spinosad	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	0.3	-
Spirotetramat	FI 0353	Pineapple	*0.02	-
Sulfoxaflor	FI 0353	Pineapple	0.2	-
Tetraniliprole	FI 0353	Pineapple	T*0.01	-
Thiamethoxam	FI 0353	Pineapple	-	*0.01
Triadimefon	FI 0353	Pineapple	-	Po5
Triadimenol	FI 0353	Pineapple	-	Po5
Trichlorfon	FI 0030	Assorted Tropical & Sub-Tropical Fruits – Inedible Peel	T3	-
Trifluralin		Fruits	*0.05	-

NOTE: MRLs are constantly under review and subject to change. Check for current MRLs and do not rely on the values stated above.
Note: Available information indicates that in the absence of specific limits in legislation, some countries defer to Codex, followed by EU MRL standards or apply a 0.01ppm default value. Food exported to New Zealand from Australia may be legally sold if it complies with Australian requirements. MRLs and legislation are subject to change; the values presented should not be relied on.

* Indicates that an MRL is at the Limit of Quantitation (LOQ)
T = Temporary MRL
E = The MRL is based on extraneous residues
Po = The MRL accommodates post-harvest treatment of the commodity
Sources:
APVMA MRLs: Agricultural and Veterinary Chemicals Code (MRL Standard) Instrument 2023. Compilation 4. Prepared 6 July 2024.
CODEX MRLs: CODEX Alimentarius International Food Standards database (January 2024), http://www.fao.org/fao-who-codexalimentarius/codex-texts/dbs/pestres/en/

Appendix 7. Pineapple regulatory risk assessment

Pineapple
Agrichemical Regulatory
Risk Assessment

March 2024

Regulatory pressures on agrichemicals are increasing globally, with many being either restricted or withdrawn from use. For older agrichemicals these pressures are often the result of reconsiderations involving new or refined risk assessment methodologies that requiring the generation of new data. A consequence of which can be that many of these agrichemicals are not meeting contemporary risk assessment standards as the necessary data is unavailable, or where data is available, the risk posed is considered unacceptable.

The use of agrichemicals can also be impacted through differences in standards between trading partners. The lack of an appropriate pesticide maximum residue limit (MRL) in an importing country can, for practical purposes, effectively prohibit use in the exporting country so as to ensure compliance, as a MRL breach would adversely affect market access.

The effects of the above are greater regulatory pressure placed on the use of individual agrichemicals or chemical groups. As a consequence it is possible that the number of approved agrichemical options could be adversely impacted.

To assist strategic planning, with respect to future pest management options, the following tables have been developed to highlight the regulatory threats to agrichemicals currently approved for the management of the pests and diseases in almonds as well as current initiatives aimed at addressing identified pest management deficiencies.

Pineapple Agrichemical Regulatory Risk Assessment

R1	**Short-term: Critical concern over retaining access**
R2	**Medium-term: Maintaining access of significant concern**
R3	**Long-term: Potential issues associated with use - Monitoring required**

Active Constituents	Chemical group	Problem	Comments
1,3-dichloropropene	-	Nematodes	EU/UK: No authorisation
Abamectin	**6**	Pineapple flat mite (PER81805)	APVMA: Nominated for spray drift label review Canada: Uses amended EU: Use restricted to permanent greenhouses
Bifenthrin	**3A**	Symphylids	Canada: Not authorised EU/UK: Not authorised
Dimethoate	**1B**	Pineapple flat mite(PER87066)	Codex: No MRL EU/EU: Not authorised
		Pineapple red mite(PER87066)	
Ethyl formate (Po)		Pineapple flat mite	EU/EU: No authorisation in place
		Pineapple scale	
Spinetoram	**5**	Leafroller, Loopers	EU: Approval expiry September 2024
Spirotetramat	**23**	Pineapple Mealybug/Mealybug	EU: Approval expiry June 2024
Sulfoxaflor	**4C**	Banana spotting bug	USA: Pollinator concerns EU: Restricted to permanent glasshouses only
		Fruit spotting bug	
		Pineapple Mealybug/Mealybug (PER81901)	
Trichlorfon	**1B**	Fruit fly (PER12450)	APVMA: nominated for review Codex: No MRLs EU/UK: No authorisations USA: No MRLs

Active Constituents	Chemical Group	Problem	Comments
		DISEASES	
Fludioxonil	**12**	Blue & green moulds	EU: Under review & Candidate for substitution
Fosetyl-Al	**33**	Phytophthora heart & root rot	Canada: Under review
Iodine	**M**	Bactericide	
Metalaxyl/metalaxyl-M	**4**	Phytophthora heart & root rot	Metalaxyl EU: Candidate for substitution

			Metalaxyl-M EU: Restricted use approval
Phosphorous acid	**33**	Phytophthora heart & root rot (PER83873)	
Prochloraz	**3**	Water blister	Codex: Periodic re-evaluation scheduled EU/UK: No authorisation
Propiconazole	**3**	Base or butt rot	APVMA: nominated for review EU/UK: No authorisations USA: Under review
WEEDS			
Ametryn	**5**	EU/UK: No authorisation in place	
Bromacil	**5**	EU/UK: No authorisation in place	
Carfentrazone-ethyl	**14**		
Diuron (PER81856)	**5**	EU/UK: No authorisation in place USA: Under review revocation proposed	
Fluazifop-P	**1**		
Fluometuron	**5**	EU/UK: Candidate for substitution	
Glufosinate	**10**	Canada: Review proposed EU/UK: No authorisation in place	
Glyphosate	**9**	Ongoing issues internationally	
Haloxyfop-P	**1**	EU/UK: No authorisation in place	
Isoxaflutole	**27**		
Metribuzin	**5**	Canada: Under review EU: Candidate for substitution	
Quizalofop-P	**1**	Canada: Under re-evaluation EU: Candidate for substitution	
PLANT GROWTH REGULATORS			
Ethephon (PER14953)			
Chlorflurenol-methyl		EU/UK: No authorisation	

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Pineapple Agrichemical Regulatory Risk Assessment

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