

Summerfruit Fungicide Resistance Management Guidelines, September 2015

Fungal and bacterial plant pathogens can develop resistance to certain fungicides or bactericides applied for their control. Resistance management guidelines are needed to delay resistance development for products that have a high likelihood of selecting resistant pathogen strains. If resistance develops to a particular product, then other products containing active ingredients in the same mode of action (MOA) group will also be affected. MOA Group Codes appear on all product labels to allow different products with the same resistance risk to be easily identified.

New Zealand, resistance management guidelines are developed by the NZ Committee on Pesticide Resistance (NZCPR; <http://resistance.nzpps.org/>), in consultation with the Agricultural Chemicals and Veterinary Medicines (ACVM) group of MPI and the NZ agricultural chemical industry (AGCARM). They are developed using information from publications, the Fungicide Resistance Action Committee (FRAC) and from local monitoring.

This table provides fungicide and bactericide resistance management guidelines prepared for Summerfruit New Zealand from the above sources, including information from fungicide resistance testing of botrytis (Central Otago) and brown rot (Hawke's Bay) during the SummerGreen Futures SFF project (12/048). **Refer to the Summerfruit New Zealand spray charts for NZ and export pre-harvest intervals (PHIs).**

FRAC ^a Code	MOA GROUP NAME AND CODE	ACTIVE INGREDIENT	TRADE NAME EXAMPLES	KEY CROPS and DISEASES	MAXIMUM RECOMMENDED USE PER SEASON	RECOMMENDATIONS (from http://resistance.nzpps.org/ and/or product labels)
	FUNGICIDES					It is critical to apply the correct dose to reduce risk of resistance development. Follow label application rates and check equipment calibration and spray coverage.
1	Methyl benzimidazole carbamate (MBC) [GROUP 1]	carbendazim	Prolific [®] , Protek [®] , Chief [®] , Goldazim [®]	All stone fruit - blossom blight, brown rot and peach scab.	2	Use during the blossom period only. MBC resistance in <i>Botrytis cinerea</i> has been detected in some cherry blocks in Central Otago. Before using MBCs against botrytis, especially in cherries, carry out a fungicide resistance test. See footnote for details*.
2	Dicarboximide (DCA) [GROUP 2]	iprodione	Rovral [®] , Defence [™] , Ippon [®] , Osprey [®] , Rapid [™]	All stone fruit - blossom blight and brown rot.	3	Use only when conditions favour disease, but when disease incidence is low. Do not use where disease has become well established. Before using DCAs against botrytis, especially in cherries, carry out a fungicide resistance test. See footnote for details*.
3	Demethylation inhibitor (DMI) [GROUP 3]	triforine	Saprol [®]	All stone fruit - blossom blight and brown rot. rust for some products.	3	Use in only one part of the growing season, either during flowering or pre-harvest. Apply with an effective **protectant fungicide. Reduced DMI sensitivity in the brown rot pathogen has been reported, so do not use DMIs against brown rot if resistance is suspected.
		cyproconazole (triazole)	Alto [®]			
		tebuconazole (triazole)	Folicur [®] , Corona [®] , Hornet [™]			
		flusilazol (triazole)	MegaStar [™] , Novall [®]			
7	Succinate dehydrogenase inhibitor (SDHI) [GROUP 7]	boscalid	Pristine [®] (note Pristine [®] also contains pyraclostrobin)	Apricot, cherry, nectarine, peach and plum - blossom blight/brown rot, rust & botrytis	3	Preferably use in a mixture, e.g., with captan for cherries. In cherries, only, may be applied pre-harvest. Check market PHI requirements. If used alone, apply in strict alternation with an effective **protectant fungicide. If used in a mixture, do not make more than two consecutive applications of SDHI-containing products. Restrict use to one part of the growing season.
11	Quinone outside inhibitor (QoI) also known as strobilurin [GROUP 11]	pyraclostrobin	Pristine [®] (note Pristine [®] also contains boscalid)	Pristine see SDHI. Trifloxystrobin - brown rot except in cherries	3	Apply from pink to petal fall in a mixture with an effective **protectant fungicide. Use a maximum of two consecutive QoI applications.
		trifloxystrobin	Flint [®] , Protiva [®]			
9	Anilinopyrimidine (AP) [GROUP 9]	cyprodinil	Chorus [®] , Mirano [®]	Peaches & nectarines - blossom blight.	4	Use during the blossom period. Alternate each application with an effective **protectant fungicide.
M7	Guanidine [GROUP U12]	dodine	Dodine, Syllit [®] Plus	Peaches & nectarines – leaf curl.	3	Apply dodine preventatively when disease incidence is low, but disease risk is high. Alternate each application with an effective protectant fungicide, or one fungicide from a different MOA group.
	BACTERICIDES					
25	Glucopyranosyl antibiotic [GROUP 25]	streptomycin	KeyStrepto [™]	All stone fruit – blast and bacterial spot.	3	Use no more than three times over the period from green tip to mid-December. Do not apply if streptomycin resistance is suspected in the orchard.

*Please contact SummerFruit NZ for the contact details of a recommended diagnostic laboratory that can carry out fungicide resistance testing

**PROTECTANT FUNGICIDES available for use in summerfruit:

ACTIVE INGREDIENT	TRADE NAME EXAMPLES	RESISTANCE RISK
copper (various salts)	Blue Shield [®] , Champ [®] , Kocide [®] , Nordox, Copper Oxychloride, Copper Sulphate	Instances of reduced pathogen sensitivity to copper, particularly at low application rates, have been recorded in New Zealand for peach leaf curl and bacterial diseases. **Generally considered to be at low risk from fungicide resistance development Note: chlorothalonil has been returned to the Summerfruit programme for the coming season. For export cherries the PHI has been changed to Petal fall.
sulphur	Kumulus [®] , Headland Sulphur, Nimbus, Sulclean	
ziram	Mizar [®]	
thiram	Thiram	
mancozeb	Mancozeb, Manzate, Dithane*	
captan	Captan, Captor [™] , Merpan, Orthocide	
chlorothalonil	Bravo [®] , Balear [®] , Barrack [®] , Barrachlor [™] , Cavalry [®]	

Disclaimer: Unless agreed otherwise, The New Zealand Committee on Pesticide Resistance, The New Zealand Plant Protection Society, The New Zealand Institute for Plant & Food Research Limited, Summerfruit NZ Limited, Heinz Wattie's Limited or the Ministry for Primary Industries do not give any prediction, warranty or assurance in relation to the accuracy of or fitness for any particular use or application of, any information or scientific or other result contained on this chart. Neither the New Zealand Committee on Pesticide Resistance, New Zealand Plant Protection Society, The New Zealand Institute for Plant & Food Research Limited, Summerfruit NZ Limited, Heinz Wattie's Limited or the Ministry for Primary Industries nor any of their members or employees shall be liable for any cost (including legal costs), claim, liability, loss, damage, injury or the like, which may be suffered or incurred as a direct or indirect result of the reliance by any person on any information contained on this chart.