

Table 10.1: Summary of plant protection products mentioned in the recommendations based largely on information published in 2002. Household pack registrations have been omitted.

Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Abate		temephos	organophosphate	EC 500 g/l	IV	B1
Acarol		bromopropylate	dibrome hydrocarbon derivative	EC 500 g/l	IV	S5
Agri-mec	Abamec Plus Agromectin Biomectin Sanamectin	abamectin	avermectins	EC 18 g/l	II	S5 R1 S2 V2 D2
Akito		Beta-cypermethrin	pyrethroid	EC 100 g/l	II	S1
Aliette	Aliette Ca	fosetyl-Al	phosphonate	WP 800 g/kg AL 100 g/l	IV	B2 B2
Alsystin	Triflumuron	triflumuron	benzoyl urea	SC 480 g/l	IV	B2 R1
Amdro Ant Bait		hydramethylnon	hydrazone compound	RB 7.3 g/kg	IV	B1
Ant barriers	Ant-bar + Bidim Plantex Protector	ant barriers	-	-	IV	S5 S5 M2
Aphox		pirimicarb	carbamate	WG 500 g/kg	IV	S5
Applaud		buprofezin	thiadiazine	WP 500 g/kg	IV	A4
Bac oil		heavy grade NR oil	mineral spray oil	EC 835 g/l	IV	B2
Bavistin	Bendazil Knowin	carbendazim	benzimidazole	SC 500 g/l	IV	B1 P1 P1
Benlate	Spotless	benomyl	benzimidazole	WP 500 g/kg	IV	D3 U2
Bordeaux	Copflo Super	copper sulphate/lime	copper and lime	WP 420/560 g/kg SC 320 g/l	II	P1 A2
BP medium		medium grade NR oil	mineral spray oil	EC 850 g/l	IV	B3
Cabrio		pyraclostrobin	strobilurin	EC 250 g/l	IV	B1
Calypso		thiacloprid	chloronicotinyl	SC 480 g/l	II	B2
Capilure		trimedlure	attractant	RB 1.8 g/capsule	IV	Q1
Cipron		heavy grade NR oil	mineral spray oil	EC 835 g/l	IV	D2
Citrimet	Sanastem	methamidophos	organophosphate	AL 500 g/l AL 585 g/l	Ib	P1 D2
Citrole 100		medium grade NR oil	mineral spray oil	EC 810 g/l	IV	T1

Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Confidor		imidacloprid	chloronicotinyl	SC 350 g/l	II	B2
Copper oxychloride	Cupravit Demildex Cuprox Super Koperchlor Supercup Viricop	copper oxychloride	Inorganic copper compound	WP 850 g/kg	III	C2 C5 S4 U2 U1 W2 B2 D1 S1 W1 S1 E2
Copstar		copper hydroxide	Inorganic copper compound	SC 185 g/l	IV	A2
Counter	Terbufos	terbufos	organophosphate	GR 100 g/kg	Ib	B1 U2
Cypermethrin	Doodskoot Parashoot Ripcord Sherpa	cypermethrin	pyrethroid	EC 200 g/l	II	U2 D2 W2 E2 B1 A4
Deccomone		2,4-D sodium salt	plant growth regulator	SC 25 g/l	II	C2
Deccotine		guazatine	guanidine	SL 200 g/l	II	C2
Deccowax		guazatine	guanidine	AL 3 g/l	II	C2
DDVP	Dedevap Devipan Dichlorvos Divos Nogos	dichlorvos	organophosphate	EC 1000 g/l	Ib	D2 B2 M1 S5 U2 P1 U3
Dicarzol		formetanate	carbamate	SP 500 g/kg	Ib	A4
Dipel	DiPel 2X Biobit Dipel Thuricide	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>	bacterial toxin	WP 32 000 IU/mg WP 16 000 IU/mg	IV	V1 V1 U2
Dipterex	Trichlorfon	trichlorfon	organophosphate	SP 950 g/kg	III	B2 S1
Dithane M45	Mancozeb Sancozeb Tridex Vondazeb Dithane Penncozeb	mancozeb	dithiocarbamate	WP 800 g/kg	IV WG 750 g/kg	U2 C5 S1 D2 A4 S1 E2 A4

Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Dursban	Agropyriphos Avi-Klorpirifos Chlorpyrifos Lirifos Pyrinex Pyrifos	chlorpyrifos	organophosphate	WG 64 g/l EC 480 g/l	Ib	D2 D2 S1 A5 E2 M1 C5 D2 S2 U2 P1 M1 P1
Dyant	Lindane	gamma-BHC	chlorinated hydrocarbon	EC 200g/l	Ib	A1 D2
Elsan		phenthoate	organophosphate	EC 500 g/l	II	D2
Endosulfan	Endoflo Thioflo Thionex Thiosulfan Endosulfan Thionex	endosulfan	chlorinated hydrocarbon	SC 475 g/l WP 475 g/kg	Ib	S1 D2 A4 M1 U2 D2 U2 M1
Envidor		spirodiclofen	Ketoenole	SC 240 g/l	III	B2
Fastac	Concord Fastac	alphacypermethrin	Pyrethroid	EC 100 g/l SC 100g/l	II	B1 B1, S5 B1
Flint		trifloxystrobin	strobilurin	WG 250 g/l	IV	S5
Fly-tac		acrylic adhesive	adhesive	-	IV	S5
Folicur		tebuconazole	triazole	EC 250 g/l	IV	B2
Folimat		omethoate	organophosphate	SL 800 g/l	Ib	B2
Fungazil	Magnate Sanazil Fungazil Magnate sulphate Sanazil sulphate	imazalil imazalil sulphate	imidazole	EC 800g/l SP 750g/kg	II III	C1 M1 S5 J1 C1 M1 S5
Hunter		chlorfenapyr	pyrrole	SC 360 g/l	II	B1
Hym lure	Hym lure ready for use Buminal	protein hydrolysate	attractant	CB 750 g/kg CB 425 g/l CB 580 g/l	IV	A1 A1 B2
Kaptan		Captab	phthalimide	WP 500 g/kg	IV	P1 S5

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Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Kelthane		Dicofol	chlorinated hydrocarbon	WP 185 g/kg	IV	S3
Klartan		tau-fluvalinate	Pyrethroid	EW 240 g/l	II	M1
Kocide		copper hydroxide	inorganic copper compound	WP 770 g/kg	III	U2 P1
Lannate	Methomex Methomyl Methosan	Methomyl	Carbamate	SP 900 g/kg	lb	D3 P1 M1 U2 D2
	Lannate Methomex Methomyl			SL 200 g/l	lb	D3 P1 M1 D2
Lime sulphur		polysulphide sulphur	sulphur compound	SL 320 g/l	IV	E2 S3
M3 bait station		protein hydrolysate & plant extract alpha-cypermethrin	attractant & pyrethroid	RB 666 g/l RB 2 g/l	IV II	Q1
Malathion	Avigard Datathion Malasol Avi-Merkaptotoks Malafly Mercaptothion Merkaptotoks	Mercaptothion	organophosphate	EC 500 g/l	III	E2 A5 P1
				UL1130 g/l	III	E2 A5
				WP 250 g/kg	IV	D2 D2 A5
Meothrin		Fenpropathrin	Pyrethroid	EC 200 g/l	lb	D2
Mesurool		Methiocarb	Carbamate	WP 800 g/kg	II	B2
Metasystox	Demeton	demeton-S-methyl	organophosphate	EC 250 g/l	lb	C5 S1 U2 A5
	Demetox					
Methyl bromide		methyl bromide / chloropicrin	halide gas	GA 980/20 g/kg	la	U2
Mevinphos		Mevinphos	organophosphate	EC 150 g/l	la	D2 U2
Mikal M		fosetyl-Al / mancozeb	Phosphonate/ dithio carbamate	WP 800 g/kg	IV	U2 C5
Miral		Isazofos	organophosphate	GR 25 g/kg	IV	S5
Mitac		Amitraz	triazapentadiene	EC 200 g/l	II	A4
Mocap		Ethoprophos	organophosphate	EC 200 g/l	la	A4

Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Monostem	Azodrin	monocrotophos	organophosphate	SL 400 g/l	Ia	D2 B1
Mospilan		acetamiprid	chloronicotinyl	SL 222 g/l SP 200 g/kg	III	M3 M3
Nemacur	Nemacur	fenamiphos	organophosphate	EC 400 g/l GR 100 g/kg	Ia II	B2 B2
Nemesis		pyriproxyfen	juvenile hormone analogue	EC 100 g/l	IV	D2
Nomolt		teflubenzuron	benzoyl urea	SC 150g/l	IV	B1
Omite		propargite	organosulphite	WP 300 g/kg	III	C3
Orchex		medium grade narrow distillation range oil	mineral spray oil	EC 835 g/l	IV	S1
Ortiva		azoxystrobin	strobilurin	SC 250 g/l	IV	S5 B2
Parathion		parathion	organophosphate	EC 500 g/l	Ia	A5 D2 P1 U2
Phosdrin		mevinphos	organophosphate	SL 500 g/l	Ia	U2
Phytex		potassium phosphonate	phosphonate	SL 200 g/l SL 400 g/l	IV	H1
Pomarsol		thiram	disulphide	WP 750 g/kg	III	S5
Previcur N	Proplant	propamocarb-HCl	carbamate	SL 722 g/l	IV	B1 S1
Pride		fenazaquin	quinazoline	SC 200 g/l		D2
Questlure		protein hydrolysate & plant extract	attractant	RB 598 g/l	IV	Q1
Regent		fipronil	phenyl pyrazole	SC 200 g/l	II	B1
Ridomil		metalaxyl	acylalanine	GR 50 g/kg	III	S5
Rogor	Dimet Dimeto Dimethoate Fetron Perfekthion Rogor	dimethoate	organophosphate	EC 400 g/l	Ib	P1 D2 A5 C5 S1 U2 W1 P1 B1 P1
Rovral Flo		iprodione	dicarboximide	SC 255 g/l	IV	B2
Rugby		cadusaphos	organophosphate	GR 100 g/kg EW 100 g/l	Ib	F1 F1
Score		difenoconazole	triazole	EC 250 g/l	IV	S5
Selecron		profenofos	organophosphate	EC 500 g/l	II	S5

Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Sipcatin		cyhexatin	organotin	SC 500 g/l	II	C2
Snail bait	Avisnail Sluggem Snail Killer Snailban	carbaryl + metaldehyde	carbamate + tetramethyl	RB 20 + 30 g/kg	IV	A5 O1 A4 D2
	Scatter snail kill	metaldehyde	tetramethyl	RB 30 g/kg	IV	E1
	Mesurol snail & slug killer Mesurol	Methiocarb	carbamate	RB 5 g/kg WP 800 g/kg	IV II	B2 B2
Sulphur	Kumulus Striker Sulgran Thiovit Jet Microthiol special Wettable sulphur	sulphur	sulphur compound	WG 800 g/kg	IV	B1 C1 S4 S5
				WP 800 g/kg	IV	A4 S4
Sumisclex		procymidone	dicarboximide	SC 250 g/l	IV	S5
Tartar emetic	Agrotox Tartar Emetic	tartar emetic	antimony compound	SP 995 g/kg	II	A3 U2
Tecto Flowable		thiabendazole	benzimidazole	SC 450 g/l	IV	S5
Tecto 100		thiabendazole	benzimidazole	SP 985 g/kg	IV	S5
Tedion	Redspidercide Tedion	tetradifon	chlorinated hydrocarbon	EC 81 g/l	IV	E2 P1 A5 S1 C3
Temik	Sanacarb	aldicarb	carbamate	GR 150 g/kg	lb	A4 D2
Terraclor	Kynocol PCNB Bactozene	quintozene	chlorinated hydrocarbon	WP 750 g/kg	IV	C3 P1 P1 P1
Thiulin		thiram	organic sulphur compound	DS 500 g/kg	III	S5
Thuricide	DiPel DiPel 2x Biobit DiPel ES Dipel	Bacillus thuringiensis var. kurstaki	bacterial toxin	WP 16 000 IU/mg	IV	U2 V1
				WP 32000 IU/mg		V1 V1
				WG 32000 IU/mg		V1 V1
Tokuthion		prothiofos	organophosphate	EC 960 g/l	II	B2
Topsin Flo		thiophanate-methyl	benzimidazole	SC 480 g/l	IV	P1
Torque	Mitrus	fenbutatin-oxide	organotin compound	SC 550 g/l	IV	B1 S1

	Fenbutatin			SC 500 g/l		C2
Toxona	Toxona Clear	heavy grade NR oil	mineral spray oil	EC 844 g/l	IV	B1

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Trade name used in text	Other trade names	Common name of plant protection product	Pesticide group	Formulation	Poison group*	Co. reference no.
Tracer		spinosad	naturalyte	SC 480 g/l	III	D2
Trimangol	Manager Vondac	maneb/zinc oxide	dithiocarbamate	SC 435/4.7 g/l	IV	S1 P1 B2
Ultracide	Suprathion Suprathion Suprathion	methidathion	organophosphate	EC 420 g/l WP 200 g/kg WP 400 g/kg	Ib II	S5 M1 D2 S5 M1 M1
Wenfinex		ultra-light grade NR oil	mineral spray oil	EC 790 g/l	IV	W2
Xanbac D		dichlorphen	organophosphate	EC 200 g/l	III	P1
Zineb		zineb	dithiocarbamate	WP 700 g/kg	IV	P1 S5

* Group Ia is the most toxic and group IV the least toxic to humans.

Formulation abbreviations

AL	=	Liquid applied undiluted
CB	=	Bait concentrate
DS	=	Powder for dry seed treatment
EC	=	Emulsifiable concentrate
EW	=	Emulsion, oil in water
GR	=	Granule, ready for use
RB	=	Ready-for-use bait
SC	=	Suspension concentrate
SL	=	Water soluble concentrate
SP	=	Water soluble powder
UL	=	Ultra low volume formulation
VP	=	Vapour releasing product
WG	=	Water dispersible granules
WP	=	Wettable powder

Table 10.2: Main suppliers of plant protection products to the citrus industry

Reference no.	Company	Head office	Telephone no.
A1	Adcock Ingram Health Care	Alrode	(011) 864 2717
A2	AgChem	Silverton	(012) 803 0145
A3	Atlas Consolidated Industries	Edenvale	(011) 609 8732
A4	Aventis Pharmaceutica	Pretoria	(012) 842 1000
A5	Avima (Pty) Ltd.	Kenmare	(011) 769 1300
B1	BASF SA	Halfway House	(011) 314 2900
B2	Bayer CropScience	Isando	(011) 921 5911
B3	BP Southern Africa	Roggebaai	(021) 408 2149/083 636 2149
B4	Brenn-o-kem	Wolseley	(023) 231 1060
C1	Cash Chemicals	Nelspruit	082 878 1671
C2	Chempack	Suider Paarl	(021) 874 1055
C3	Citrashine	Johannesburg	(011) 8352646
C4	Crompton Chemicals	Kempton Park	(011) 397 4336
C5	CropChem	Bredell	(011) 963 1280
D1	Delta Chemicals	Meyerton	(016) 3620707
D2	Dow Agrosociences	Pretoria	(012) 842 0200
D3	Du Pont SA	Johannesburg	(011) 315 3880
E1	Effecticide	Booyens	(011) 839 1636
E2	Efekto	Pretoria	(012) 842 0200
F1	FMC	Cape Town	(021) 794 8566
H1	Horticura	Pretoria	(012) 329 2439
M1	Makhteshim-Agan SA	Durbanville	(021) 975 1532
M2	Myfo Manufacturing	Edenvale	(011) 452 1700
M3	Mitsui & Co. Ltd.	Benmore	(011) 290 2073
O1	Orchard Suppliers	Worcester	(023) 347 2646
P1	Plaaskem Applied Chemical Products	Boksburg	(011) 826 6441
Q1	Quest Developments	Brits	(012) 258 0122
R1	RT Chemicals	Pietermaritzburg	(033) 386 9384
S1	Saadchem Uniek/Hyper Chemicals	Dunnotar	(011) 738 1205
S2	Shaik-Agchem	Mt. Edgecombe	(031) 502 4231
S3	Starke Ayres (Pty) Ltd.	Cape Town	(021) 534 3231
S4	Sunwood Chemicals	Sandton	(011) 803 3393
S5	Syngenta	Sandton	(011) 541 4000
T1	Total SA	Saxonworld	082 569 5034
U1	Unisun	Nigel	(011) 814 6526
U2	Universal Crop Protection / Villa Crop Protection	Kempton Park	(011) 396 2233
V1	Valent BioSciences	Somerset West	(021) 581 4163
V2	Virbac RSA (Pty) Ltd.	Halfway House	(011) 314 5399
W1	Wenkem	Midrand	(011) 315 0358
W2	WP Kooperatief	Malmesbury	(0224) 22951

Table 10.3: Usage range of plant protection products for IPM

Proprietary name	Pest					
Abate	Thrips					
Acarol	Bud mite	Flat mite	Grey mite	Red mite	Rust mite	Silver mite
Agrimec	Thrips					
Alsystin	False codling moth					
Ant-Bar ¹	Ants	Fullers rose beetle				
Applaud (+oil)	Red scale	Mealybug				
BP Medium spray oil	Red mite	Red scale ²	Soft scales ²			
Calypso	Thrips	Aphids				
Citrimet ¹	Aphids	Bud mite	Oriental mite	Psylla	Rust mite	Soft brown scale
	Thrips ³	Orange dog				
Confidor	Red scale	Aphids				
Dicarzol	Thrips					
Dipel	Bollworm	Leafroller	Orange dog			
Dipterex ¹	Fruit fly ²					
Dithane M45 ¹	Rust mite	Silver mite				
Dursban ¹	Bollworm	Aphids	Mealybug	Orange dog	Psylla	Red scale ⁴
Elsan	Thrips ²					
Endosulfan ¹	Bollworm	Aphids	Bud mite	Orange dog	Psylla	
Envidor	Lowveld mite	Flat mite	Red mite	Rust mite		
Fastac ¹	Protector ant barrier					
Folimat (+ oil)	Aust. bug	Mealybug	Red scale			
Hunter	Thrips					
Hymlure ¹	Fruit fly ²					
Kelthane ¹	Flat mite	Grey mite	Red mite			

Proprietary name	Pest					
Lannate ¹	Bollworm	Aphids	Mealybug	Orange dog ²	Soft green scale ²	Waxy scale
	Red scale					
Lime sulphur	Bud mite	Flat mite	Grey mite	Rust mite	Thrips	



10.3

TABLE

Proprietary name	Pest						
M3	Fruit fly						
Malathion ¹	Aust. bug	Fruit fly ²	Mealybug	Red scale ⁴	Soft brown scale	Thrips	
Malathion UL	Fruit fly ²						
Meothrin + Elsan	Bollworm	Bud mite	Red mite	Thrips	Red spider		
Mesurool + sugar	Thrips						
Mevinphos/Phosdrin	Bollworm	Aphids	Psylla				
Mitac	Budmite	Flat mite	Red mite				
Monostem	Bollworm	Aphids	Bud mite	Leafhopper	Psylla	Thrips ³	
Mospilan	Leafminer	Mealybug	Red scale	Thrips			
Nemesis (+oil)	Red scale						
Nomolt	False codling moth						
Omite	Lowveld mite	Red mite	Flat mite	Bud mite	Silver mite	Grey mite	
Orchex spray oil	Red scale						
Regent	Thrips						
Rogor ¹	Aphids	Psylla	Soft brown scale ²	Red scale ^{2 4}			
Selecron	Mealybug	Thrips	Aphids	Bollworm	Rust Mite	Psylla	Red mite
Snail bait ¹	Snails						
Sulphur ¹	Flat mite	Grey mite	Rust mite	Silver mite	Thrips		
Sunspray oils	Red scale						
Tartar emetic ¹	Thrips ²						
Tedion ¹	Red mite						
Temik	Aphids	Bud mite	Nematodes	Rust mite			
Thuricide ¹	Leafroller ²	Orange dog	American bollworm				
Tokuthion	Mealybug	Red scale ⁴					

Torque	Red mite	Oriental mite	Flat mite	Rust mite		
Ultracide ¹	Mealybug	Red scale ⁴	Waxy scale	Soft green scale		
Wenfinex	Red scale					

¹ Consult list of alternative proprietary names in Table 10.1.

² For use in mixtures with other materials. Consult the list of plant protection products registered against the various pests discussed in Chapter 3.

³ Use only for foliage protection.

⁴ Where red scale is still susceptible to OPs.

10.4
Table 10.4: Parts of tree infested by the various pests and their status in different areas

Popular name of pest	Part of plant infested				Pest Status					
	Blossom	Foliage	Wood	Fruit	Limpopo	Mpumalanga	North West	KwaZulu-Natal	Cape	
									West	East
Ants					G	G	G	G	G	G
Aphids					G	G	G	G	G	G
Australian bug					S	S	S	S	S	S
Fruit flies					G	G	G	G	G	G
Fullers Rose Beetle					G	G	G	G	G	G
Leafhoppers										
Mealybugs					G	G	G	G	G	G
MITES Bud mite					G	G	G	G	G	G
Flat mite					G	G	G	G	S	S
Grey mite							S			
Lowveld mite										
Red mite					G	G	G	G	G	G
Red spider mite									S	
Rust mite					G	G	S	G		S
Silver mite					S	S	S	S		S
MOTHS AND BUTTERFLIES										
Bollworm					S	S	S	S	S	S
Carob moth					S	S	S	S	S	S
Citrus flower moth					S	S	S	S	S	S
False codling moth					G	G	G	G	G	G
Fruit piercing moths						S	S	S	S	S
Leafminer					G	G	G	G	G	G
Leafrollers					S	S	S	S	S	S
Lemon borer moth									S	S
Looper (Measuring worm)					S	S	S	S	S	S
Orange Dog (Citrus butterflies)					G	G	G	G	G	G
Psylla										
Powdery scale					S	S		S		
Red scale					G	G	G	G	G	G
Soft scales					S	S	S	S	S	S
Waxy scales					S	S	S	S	S	S
Snails & slugs					S				S	S
Thrips					G	G	G	G	G	G

G = General problem, S = Sporadic problem

10.5

Table 10.5: Summary of the most important periods* during which citrus pests occur

Popular name of pest	Seasonal occurrence											
	SPRING		SUMMER				AUTUMN		WINTER			
	S	O	N	D	J	F	M	A	M	J	J	A
Ants												
Aphids												
Australian bug												
Fruit Flies												
Fullers Rose Beetle												
Leafhoppers												
Mealybugs												
MITES Bud mite												
Flat mite												
Grey mite												
Lowveld mite												
Red mite												
Red spider mite												
Rust mite												
Silver mite												
MOTHS AND BUTTERFLIES												
Bollworm												
Carob moth												
Citrus flower moth												
False codling moth												
Fruit piercing moths												
Leafminer												
Leafrollers												
Lemon borer moth												
Looper (Measuring worm)												
Orange Dog (Citrus Butterflies)												
Psylla												
SCALES Circular Purple scales												
Mussel scale												
Powdery scale												
Red Scale												
Soft scale												
Waxy scale												
Snails & Slugs												
Thrips												

* The listed periods of pest activity, as well as the susceptibility of different cultivars to a certain pest, can differ and

should not be taken for granted in any particular area.

10.6

Table 10.6: Summary of periods during which orchard diseases must be controlled.

DISEASE/PEST	REMARKS	SPRING			SUMMER			AUTUMN			WINTER		
		S	O	N	D	J	F	M	A	M	J	J	A
<i>Alternaria</i>	Summer rainfall region												
<i>Alternaria</i>	Winter rainfall region												
Blight													
Black spot													
Greening	Psylla control												
Nematodes	Summer rainfall region												
Nematodes	Winter rainfall region												
Nursery diseases													
<i>Phytophthora</i>	Summer rainfall region												
<i>Phytophthora</i>	Winter rainfall region												
Tristeza	Aphid control in non-bearing trees												

Table 10.7: Summary of soil-borne diseases and the plant protection products used for their control.

Disease	Product	Dosage	Application instructions
Nematodes	aldicarb (Temik)	12,5 g/m ²	Only transplants and interplants (Young non-bearing trees): Apply evenly to soil 3 months after transplanting and annually thereafter in spring. Will also control bud mite.
		12,5 g/m ² OR 7,5 g + 5 g/m ²	Bearing trees except lemons (Single treatment): Apply evenly to soil annually in early spring after harvest. Will also control bud mite and rust mite. (Split treatment): The first application in early spring (after harvest) followed by a second application six weeks later. Will also control bud mite and rust mite.
		12,5 g/m ²	Bearing lemon trees: Apply annually in early spring after harvest. DO NOT apply to lemon trees bearing any fruit (including immature fruit).
	cadusaphos (Rugby)	15 - 25 g/m ²	Apply in spring, mid and late summer. Apply evenly in tree basin. Incorporate granules immediately into the top layer of soil using at least 25 mm irrigation water.
	ethoprophos (Mocap)	7,5 ml/m ²	By tractor mounted sprayer: apply at least 300 l spray mix/ha as a coarse droplet spray to soil in drip area at peak nematode activity. Through irrigation system: only drip and microjet system. Apply mid-way through irrigation cycle at peak nematode activity.
	fenamiphos (Nemacur)	5 ml/m ²	Apply evenly to the soil in the tree basin and irrigate immediately with at least 25mm water. Repeat annually in spring after crop has been harvested.
		20 g/m ²	DO NOT exceed 30 litre/ha or 100 ml/basin (EC) or 120 kg/ha (SG) in any of the above treatments. The EC may also be applied through a micro-jet irrigation system at the same rate.
Methyl bromide	1 kg/ 10m ²	Apply under gas proof cover for 48 hours. Allow soil to aerate for 30 days before planting.	
terbufos (AC92-100) (Counter)	20 g/m ²	Bearing Trees: Orange trees ONLY. Apply evenly to the soil in the drip zone of each tree during spring after crop has been harvested and irrigate with at least 25 mm water after application. DO NOT exceed a dosage of 260 kg/ha.	
<i>Phytophthora</i>	fosetyl-AI (Aliette)	250 g/100 litre water	Corrective treatment: Root rot ONLY. Apply a light cover foliar spray at spring flush. Repeat application at 6 week intervals until April. Continue this programme the following year. Maintenance and preventive treatment: Apply as above with every new growth flush (usually 3 per season). Nursery trees: Apply every six weeks as soil drench or foliar spray.
		300 g/litre water	Collar rot ONLY. Apply suspension by painting the stem completely for 20 cm above and below area of infection. Repeat every 4-6 months until lesion is completely calloused over.
	metalaxyl (Ridomil)	40 g/m ²	Spread granules evenly on the soil within the drip zone and wash into root zone by means of irrigation. Apply just prior to onset of rainy season and repeat 8-10 weeks later. Application should be alternated on a seasonal basis.
	methyl bromide	1 kg/10m ²	See nematodes
	potassium-phosphonate (Phytex 200 SL)	Concentrated	Apply by painting the whole trunk from ground level upwards for about 35 cm. Applications should commence just before the rainy season and should be repeated at 8 weekly intervals during the rainy season. Ideally treatment should be applied before first visual signs of decline occur.
	Phytex 400 SL	500 ml/100 litre water	Apply as a light cover spray (1500-2000l/ha) at the start of the rainy season and repeat 8 weeks later. For optimal results application should be made at first visual signs of decline, or earlier if <i>Phytophthora</i> infection is diagnosed in roots or soil or irrigation water.

* Minimum time between last application and harvest

Table 10.8: Summary of nursery diseases and their control.

Disease	Product (active ingredient)	Dosage*	Application instructions
Albinism	Hot water treatment		Treat seed @ 52°C for 10 min
	thiram	1,5 g/kg seed	Mix thoroughly to ensure even coating of fungicide on seed
Algae	copper oxychloride	2 g	Apply as foliar spray when necessary
<i>Alternaria</i> brown & leaf spot	copper oxychloride cupric hydroxide mancozeb	2 g 2 g 2 g	Apply at 5 weekly intervals. If overhead irrigation is used apply more frequently. Apply at 4 weekly intervals. If overhead irrigation is used apply more frequently.
Bacterial spot	copper oxychloride cupric hydroxide	2 g 2 g	Apply during prolonged, wet, cool conditions
Damping-off caused by <i>Phytophthora</i> or <i>Pythium</i>	copper sulphate/lime	3 g	Apply as a soil drench @ 2 litre/m ²
	copper oxychloride	2,5 g	Apply as a soil drench @ 1,5 litre/m ²
	captab	4 g	Apply to seedbed prior to sowing @ 2 litre/m ²
	thiram	4 g	Apply every 7 days before and after emergence of seedlings @ 1 litre/m ²
	propamocarb-HCl + benomyl or thiophanate methyl	2,5 ml + 0,5 g or 0,5 g	Apply as a soil drench directly after sowing @ 3 litre/m ²
	cupric hydroxide	2 g	Apply as a soil drench @ 1,5 litre/m ²
	dichlorphen	2 ml	Apply as a pre- and post emergence drench at 7 - 10 day intervals @ 1 litre/m ²
Damping-off caused by <i>Rhizoctonia</i>	quintozene	1,25 g	Work into seedbed @ 1 litre/m ² . Keep moist.
Root rot	fosetyl-Al	2,5 g	Apply immediately symptoms are observed. Follow up with two more applications at 6 weekly intervals. Follow first application of Aliette with soil drench of captab as for damping-off diseases.
Sooty mould	copper oxychloride	2 g	Apply when necessary. Control honeydew-producing insects with spray oil.
Twig die-back	benomyl + procymidone/ iprodione or difenoconazole/ tebuconazole	0,5 g + 2 g 0,8 ml	Remove dead wood including 40 mm healthy tissue before spraying.

* Unless otherwise stated, all dosages are expressed on a per litre of water basis.