Brassica information kit

Reprint – information current in 2004

REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website www.deedi.qld.gov.au

This publication has been reprinted as a digital book without any changes to the content published in 2004. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest www.infopest.qld.gov.au
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website www.deedi.qld.gov.au or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

This publication was last revised in 2004. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

This information has been made available to assist users to identify issues involved in brassica production. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.

Queensland Government

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Chapter 6

Chemical Handy GUIDES

The ***Chemical Handy Guides*** *list common pests and diseases of brassicas and the chemicals registered or on permit for their control in Queensland. A handy guide for brassica herbicides is also included. Withholding periods are indicated for individual chemicals.*

The ***Chemical Trade Name Handy Guide*** *lists the trade names and the registration status in the different states of Australia of chemicals listed in the Chemical Handy Guides.*

These registrations and APVMA permits are current in August 2004, but are subject to continuous change. Always check the label or permit before purchase or use of a product to ensure that the product complies with regulations in your state and to ensure it endorses use on your brassica crop. Note that before using a chemical under APVMA permit, you must hold a copy of that permit and follow its directions.

Disclaimer

This is a guide only. The product label is the official authority—use it to confirm all data relating to use of a chemical. In no event shall the authors or their respective organisations be liable for any damages whatsoever resulting from use of the data in this handy guide.

Chemical handy guide—broccoli pests

WHP	NR	NR	1	1	1	2	2	2	2	3	3	5	7	7	7	7	7	14	14	14	70
	Bacillus thuringiensis var. aizawai (Bta)	*Bacillus thuringiensis* var. kurstaki (Btk)	alpha-cypermethrin	cypermethrin	methomyl	deltamethrin	esfenvalerate	permethrin 40:60	pirimicarb	emamectin as benzoate	spinosad	chlorpyrifos	chlorfenapyr	fipronil	indoxacarb (25:75)	methidathion	mevinphos	prothiofos	acephate	diazinon	pymetrozine	phorate
African black beetle												✓										
Aphids																						✓
Black field cricket												✓										
Budworms (Heliothis)			✓	✓	✓						✓	✓						✓	✓			
Cabbage aphid							✓	✓	✓							✓			✓	✓	✓	
Cabbage cluster caterpillar		✓	✓		✓		✓	✓	✓		✓			✓				✓		✓		
Cabbage white butterfly			✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓		✓		✓		
Cabbage-centre grub			✓		✓	✓	✓				✓				✓			✓		✓		
Cluster caterpillar			✓		✓		✓	✓							✓			✓		✓		
Corn earworm/cotton bollworm			✓				✓					✓			✓				✓			
Cutworms												✓										
Diamondback (Cabbage) moth		✓	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓				
Field crickets												✓										
Green peach aphid								✓	✓							✓			✓	✓	✓	
Jassids																						
Looper caterpillar					✓					✓										✓		
Mole crickets												✓										
Native budworm			✓		✓		✓					✓			✓				✓			
Thrips																					✓	
Tomato grub			✓																			
Two-spotted (Red spider) mite																					✓	
Vegetable weevil												✓										

✔ indicates that a trade product containing the active ingredient is registered or under APVMA permit in Queensland.

For a list of trade products and their registration in all states see the Chemical trade name handy guide.

ALWAYS check the label before use, follow the directions and wear protective clothing.

Note that different trade products can have different withholding periods.

* pre-transplant or seedling drench

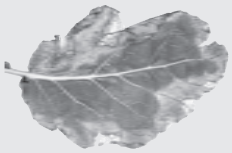
** seedlings in nurseries

NR = not required

NA = not required when used as directed

PH = Postharvest

Chemical handy guide—broccoli diseases

	copper oxychloride	chlorothalonil	mancozeb	metalaxyl	metalaxyl-M	metiram	triadimenol	quintozene	fluazinam*	phosphorous acid**	iodine
WHP	1	7	7	7	7	7	7	28	NA	NA	PH
Alternaria spot			✔								
Bactericide											✔
Black rot								✔			
Club root								✔	✔		
Damping off				✔	✔						
Downy mildew			✔			✔				✔	
Fungi											✔
Papery leaf spot			✔								
Phytophthora soil fungus				✔							
Rhizoctonia rot								✔			
Ring spot		✔	✔			✔	✔				
White blister	✔										
Wirestem								✔			

Chemical handy guide—cabbage pests

Withholding period	*Bacillus thuringiensis* var. *aizawai* (Bta) NR	*Bacillus thuringiensis* var *kurstaki* (Btk) NR	alpha-cypermethrin 1	cypermethrin 1	methomyl 1	deltamethrin 2	endosulfan 2	esfenvalerate 2	permethrin 40:60 2	pirimicarb 2	acephate 3	emamectin as benzoate 3	maldison 3	spinosad 3	chlorpyrifos 5	chlorfenapyr 7	fipronil* 7	indoxacarb (25:75)* 7	methidathion 7	mevinphos 7	prothiofos 7	diazinon 14	pymetrozine 14	phorate 70
28-spotted potato ladybird													✓											
African black beetle					✓										✓									
Aphids					✓		✓						✓	✓										✓
Black field cricket															✓									
Budworms (Heliothis)				✓	✓		✓				✓			✓	✓						✓			
Cabbage aphid									✓	✓	✓								✓			✓		
Cabbage cluster caterpillar		✓			✓				✓					✓			✓				✓	✓		
Cabbage white butterfly			✓	✓	✓	✓	✓	✓	✓			✓		✓		✓	✓	✓	✓		✓	✓		
Cabbage-centre grub				✓	✓	✓	✓	✓						✓					✓		✓			
Caterpillars							✓																	
Cluster caterpillar			✓	✓	✓				✓												✓	✓		
Corn earworm/cotton bollworm			✓					✓			✓				✓			✓						
Cutworms							✓								✓									
Diamondback (Cabbage) moth		✓	✓	✓		✓		✓	✓			✓		✓		✓	✓	✓	✓	✓	✓	✓		✓
Field crickets															✓									
Green peach aphid									✓	✓									✓			✓	✓	
Green vegetable bug							✓						✓											
Jassids							✓						✓									✓		✓
Leafhoppers													✓											
Looper caterpillar					✓		✓							✓								✓		
Mole crickets															✓									
Native budworm			✓		✓			✓			✓			✓	✓			✓						

	Redlegged earth mite	Rutherglen bug	Thrips	Tomato grub	Two-spotted (Red spider) mite	Vegetable weevil
			↘		↘	
						↘
	↘	↘				
		↘	↘			
				↘		

✔ indicates that a trade product containing the active ingredient is registered or under APVMA permit in Queensland.

For a list of trade products and their registration in all states see the Chemical trade name handy guide.

ALWAYS check the label before use, follow the directions and wear protective clothing.

Note that different trade products can have different withholding periods.

* registered for closed head varieties only

** pre-transplant or seedling drench

*** seedlings in nurseries

NR = not required

NA = not required when used as directed

PH = Postharvest

Chemical handy guide—cabbage diseases

	chlorothalonil	mancozeb	metalaxyl	metalaxyl-M	metiram	thiram	triadimenol	zineb	quintozene	fluazinam**	phosphorous acid***	iodine
Withholding period	7	7	7	7	7	7	7	7	28	NA	NA	PH
Alternaria spot		✔										
Bactericide												✔
Black rot									✔			
Cercospora leaf spot								✔				
Club root									✔	✔		
Damping off			✔	✔		✔						
Downy mildew		✔			✔			✔			✔	
Fungi												✔
Papery leaf spot		✔										
Phytophthora soil fungus			✔									
Rhizoctonia rot									✔			
Ring spot	✔	✔			✔		✔					
Wirestem									✔			

Chemical handy guide—cauliflower pests

Withholding period	*Bacillus thuringiensis* var. aizawai (Bta) NR	*Bacillus thuringiensis* var. kurstaki (Btk) NR	alpha-cypermethrin 1	cypermethrin 1	methomyl 1	deltamethrin 2	endosulfan 2	esfenvalerate 2	permethrin 40:60 2	pirimicarb 2	tau-fluvalinate 2	acephate 3	emamectin as benzoate 3	maldison 3	spinosad 3	chlorpyrifos 5	chlorfenapyr 7	fipronil 7	indoxacarb (25:75) 7	methidathion 7	mevinphos 7	prothiofos 7	diazinon 14	pymetrozine 14	phorate 70
28-spotted potato ladybird														✓											
African black beetle																✓									
Aphids							✓							✓											✓
Black field cricket																✓									
Budworms (Heliothis)			✓	✓	✓	✓	✓				✓	✓			✓	✓									
Cabbage aphid						✓			✓	✓		✓								✓			✓		
Cabbage cluster caterpillar		✓			✓				✓						✓			✓				✓	✓		
Cabbage white butterfly	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓	✓	✓	✓			✓		
Cabbage-centre grub	✓		✓		✓	✓	✓	✓							✓								✓		
Caterpillars			✓			✓	✓																		
Cluster caterpillar			✓		✓				✓														✓		
Corn earworm/cotton bollworm			✓			✓		✓			✓	✓				✓	✓		✓						
Cutworms							✓									✓									
Diamondback (Cabbage) moth		✓	✓	✓		✓		✓	✓		✓		✓		✓		✓	✓	✓	✓	✓				
Field crickets																✓									
Green peach aphid					✓				✓	✓										✓			✓	✓	
Green vegetable bug							✓							✓											
Jassids							✓							✓											✓
Leafhoppers														✓											
Looper caterpillar					✓		✓								✓								✓		
Mole crickets																✓									
Native budworm			✓		✓			✓			✓	✓				✓			✓						
Redlegged earth mite													✓												

	Rutherglen bug	Thrips	Tomato grub	Two-spotted (Red spider) mite	Vegetable weevil
		↘		↘	
					↘
	↘				
	↘	↘			
			↘		

✔ indicates that a trade product containing the active ingredient is registered or under APVMA permit in Queensland.

For a list of trade products and their registration in all states see the Chemical trade name handy guide.

ALWAYS check the label before use, follow the directions and wear protective clothing.

Note that different trade products can have different withholding periods.

* pre-transplant or seedling drench

** seedlings in nurseries

NR = not required

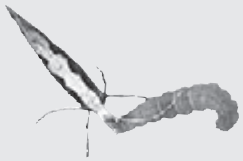
NA = not required when used as directed

PH = Postharvest

Chemical handy guide—cauliflower diseases

	copper oxychloride	chlorothalonil	mancozeb	metalaxyl	metalaxyl-M	metiram	triadimenol	zineb	quintozene	fluazinam*	phosphorous acid**	iodine
Withholding period	1	7	7	7	7	7	7	7	28	NA	NA	PH
Alternaria spot			4									
Bactericide												4
Black rot									4			
Cercospora leaf spot								4				
Club root									4	4		
Damping off				4	4							
Downy mildew			4			4		4			4	
Fungi												4
Papery leaf spot			4									
Phytophthora soil fungus				4								
Rhizoctonia rot									4			
Ring spot		4	4			4	4					
White blister	4											
Wirestem									4			

Chemical handy guide—brassica (crucifer *)pests



	Bacillus thuringiensis var. aizawai (Bta)	*Bacillus thuringiensis* var. kurstaki (Btk)**	methomyl	deltamethrin	endosulfan	trichlorfon	chlorpyrifos	dimethoate	imidacloprid	methamidophos	methidathion	prothiofos	thiodicarb	beta-cyfluthrin	chlorpyrifos (grain bait)	fenamiphos
Withholding period	**NR**	**NR**	**1**	**2**	**2**	**2**	**5**	**7**	**7**	**7**	**7**	**7**	**7**	**Var**	**NA**	**PP**
African black beetle							✔									
Aphids					✔			✔		✔						✔
Black field earwig															✔	
Budworms (Heliothis)					✔		✔			✔				✔		
Bugs								✔								
Cabbage aphid									✔		✔					
Cabbage cluster caterpillar	✔		✔							✔		✔	✔	✔		
Cabbage white butterfly		✔		✔	✔					✔	✔		✔			
Cabbage-centre grub				✔	✔					✔						
Caterpillars		✔			✔											
Cutworms					✔	✔	✔									
Diamondback (Cabbage) moth		✔		✔						✔	✔			✔		
Field crickets							✔									
Green peach aphid											✔					
Green vegetable bug					✔			✔								
Insects - sucking																✔
Jassids					✔			✔								
Leafhoppers								✔								
Looper caterpillars		✔			✔											
Mites								✔								
Mole crickets							✔									
Native budworm		✔					✔									
Rutherglen bug					✔											
Silverleaf whitefly									✔							
Spider mites (Red spider)								✔								
Thrips					✔			✔								✔
Tomato russet mite								✔								
Turnip aphid									✔							
Vegetable weevil							✔									
Wingless grasshopper								✔								

✔ indicates that a trade product containing the active ingredient is registered or under APVMA permit in Queensland.

For a list of trade products and their registration in all states see the Chemical trade name handy guide.

ALWAYS check the label before use, follow the directions and wear protective clothing.

Note that different trade products can have different withholding periods.

* refers to flowerhead type crucifers/ cole crops only

** Includes general vegetable registrations

*** seedlings in nurseries

Var = 1 day withholding period except broccoli 3 days

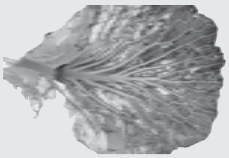
NR = not required

NA = not required when used as directed

PP = Preplant

PH = Postharvest

Chemical handy guide—brassica (crucifer*) diseases



	chlorothalonil	Copper as ammonium acetate	copper hydroxide	copper oxide	copper oxychloride	Copper sulfate (tribasic)	Copper hydroxide+mancozeb	mancozeb	triadimenol	zineb	quintozene	phosphorous acid****	fenamiphos	metham sodium	sodium hypochlorite	iodine
Withholding period	1	1	1	1	1	1	7	7	7	7	28	NA	PP	PP	PH	PH
Alternaria spot					✔		✔	✔								
Bactericide																✔
Base rot (Rhizoctonia)											✔					
Black rot		✔	✔	✔	✔	✔	✔									
Club root														✔		
Downy mildew		✔	✔	✔	✔	✔	✔	✔		✔		✔				
Fungi																✔
Grey mould	✔															
Nematodes													✔			
Papery leaf spot							✔	✔								
Peppery leaf spot		✔	✔	✔	✔	✔										
Ring spot		✔	✔	✔	✔	✔	✔	✔	✔							
Soft rot															✔	
Sclerotium base rot											✔					

Chemical handy guide—herbicides

	Withholding period	Broccoli	Cabbage	Cauliflower
Grass herbicides				
clethodim	7		✔	
fluazifop-P as butyl	42	✔	✔	✔
sethoxydim	42	✔	✔	✔
quizalofop-P-ethyl	63/14		✔	✔
quizalofop-P-tefuryl	63/14		✔	✔
Pre-emergence herbicides				
chlorthal-dimethyl*	NA/NS	✔	✔	✔
metolachlor**	NS	✔	✔	✔
oxyfluorfen**	NA	✔	✔	✔
pendimethalin**	NA/NS	✔	✔	✔
propachlor**	NS	✔	✔	✔
S-metolachlor**	NA	✔	✔	✔
trifluralin*	NA	✔	✔	✔

✔ indicates that a trade product containing the active ingredient is registered for use in Queensland.

For a list of trade products and their registration in all states see the Chemical trade name handy guide.

ALWAYS check the label before use, follow the directions and wear protective clothing.
Note that different trade products can have different withholding periods.

Pre-emergent herbicides must be applied just before or just after planting depending on the product - check the label for specific directions
* seeding or transplanting
** transplanting only

63/14 = 63 days cabbage, 14 days cauliflower
NA = not required when used as directed
NS = not supplied on label

Chemical trade names

Chemical	Trade name	Qld	NSW	Vic	SA	WA	NT	Tas	ACT	Chemical class
acephate	Lancer 750 DF, Orthene Xtra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Group 1B Insecticide
alpha-cypermethrin	Alpha 100, Alpha duop 100, Alpha-cyp 100 duo, Alpha-cypermethrin 100, Alpha-cypermethrin 100 EC, Alphamax 100 EC, Alpha-scud Elite, Alphasip Duo, Astound Duo, Buzzard, Dictate 100, Dictate Duo 100, Dominex 100, Dominex 100 EC, Dominex Duo, Fastac Duo, Ken-tac 100, Unialphacyper 100, Alpha - Cyp ULV, Alphamax 16 ULV, Alpha-scud ULV, Dominex 16 ULV, Fastac ULV, Fastac Xcel	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
beta-cyfluthrin	Bulldock 25 EC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
Bacillus thuringiensis var. aizawai (Bta)	Bacchus, Xentari WG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 11C Insecticide
Bacillus thuringiensis var. kurstaki (Btk)	Full-Bac WDG, DiPel DF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 11C Insecticide
Bacillus thuringiensis var. kurstaki (Btk)	APVMA Permit	Yes	No	No	No	No	No	No	No	Group 11C Insecticide
chlorfenapyr	Secure 360 SC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 13A Insecticide
chlorothalonill	Check-Out 500 SC, Chlorothalonil 500 SC, Echo 500 SC, Fung-o-nil 500, Hurrah Fungicide, Whack 500, Applonil 720 Fungicide, Barrack 720, Bravo, Check-Out 720, Cheers 720, Chlorothalonil 720, Clash 720, Echo 720 Fungicide, Unite 720, Whack Fungicide, Echo 900	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
chlorothalonil	APVMA Permit	Yes	No	No	No	No	No	No	No	Group Y Fungicide
chlorpyrifos	Agricultural Insecticide, Bar 500 EC, Chlorpyrifos, Chlorpyrifos 500, Chlorpyrifos 500 EC, Chlorpyrimax 500, Fortune 500, Generifos 500 EC, Kensban 500, Lorsban 500 EC, Pest Controller 500, Profos 500, Protector 500 EC, Strike-Out 500 EC, Voodoo 500	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
chlorpyrifos	APVMA Permit	Yes	No	No	No	No	No	No	No	Group 1B Insecticide
chlorthal-dimethyl	Chlorthal Dimethyl 750 WG, Dacthal, Warrant 750 WP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group D Herbicide
clethodim	Select	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group A Herbicide
copper as ammonium acetate	Liquicop	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide

Chemical	Trade name	Qld	NSW	Vic	SA	WA	NT	Tas	ACT	Chemical class
copper hydroxide	Kocide Blue, Kocide Blue Xtra, Kocide Liquid Blue, Champ Dry Prill, Blu-Cop 400DF, Coppit-oh Dry Flowable, Blue Mantel, Blue Shield DF, Copper Hydroxide 500 WP, Coppit-oh, Kocide, Flo-Bordo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
copper hydroxide + mancozeb	Mankocide DF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
copper oxide	Flocop, Norshield, Nordox 500, Norshield 750 WP, Norshield WG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
copper oxychloride	Copper fungicide, Brycop (Agric. Fungicide), Copper oxychloride, Copper oxychloride 50% WP, Copper oxychloride 500 WP, Copper oxychloride WP, Copperoxy 500 WP, Coppox, Oxydul DF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
copper oxychloride	APVMA Permit	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
copper sulfate (tribasic)	Tri-Base Blue	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
cypermethrin	Cypermethrin 200, Cypermethrin 200 EC, Cypershield, Ken-cyper 200, Scud 200 EC, Scud Elite, Sonic 200 EC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
deltamethrin	Assign, Ballistic EC, Ballistic Elite, Decis Options, Deltamethrin Duo, Deltashield 27.5, D-sect EC, Hornet	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
diazinon	Diazinon, Diazinon 800	Yes	Yes	Yes	Yes	Yes	No	No	No	Group 1B Insecticide
dimethoate	Dimethoate, Dimethoate 400, Dimethoate Insecticide, Dimethomax, Rogor, Romethoate, Stalk, Unidime 400	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
emamectin as benzoate	Proclaim Insecticide	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 6A Insecticide
endosulfan	APVMA Permit	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 2A Insecticide
esfenvalerate	Sumi-Alpha Flex Insecticide	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Group 3A Insecticide
fenamiphos	Nemacur 100 G, Assassinator 400, Nemacur 400	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
fipronil	Regent 200 SC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 2C Insecticide
fluazifop-P as butyl	Fusilade	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Group A Herbicide
fluazinam	Shirlan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
imidacloprid	Confidor 200 SC, Confidor Nursery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 4A Insecticide
imidacloprid	APVMA Permit – renewal pending at time of publication	Yes	No	No	No	No	No	No	No	Group 4A Insecticide

Chemical	Trade name	Qld	NSW	Vic	SA	WA	NT	Tas	ACT	Chemical class
indoxacarb (25:75)	Avatar	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 22A Insecticide
iodine	Biomaxa Iodine Granules	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	fungicide, bactericide
maldison	Hy-Mal, Maldison 500	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Group 1B Insecticide
mancozeb	Dithane DF, Dithane Rainshield, Kencozeb 750 DF, Mancozeb 750 DF, Mancozeb DF, Mancozeb DG, Manzate DF, Penncozeb 750 DF, Dithane M-45, Mancozeb 800, Mancozeb 800 WP, Mancozeb Fungicide	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
metalaxyl	Axiom 50G, ZEE-MIL 50G	Yes	Yes	No	No	No	No	No	No	Group D Fungicide
metalaxyl-M	Ridomil Gold 25G	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Group D Fungicide
metham sodium	Metham, Metham Sodium	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1A Insecticide
methamidophos	Monitor, Nitofol	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
methidathion	Supracide 400, Suprathion 400 EC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
methomyl	Electra 225, Lannate L, Marlin, Marlin 225, Nudrin, Nudrin 225	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1A Insecticide
methomyl	APVMA Permit	Yes	No	No	No	No	No	No	No	Group 1A Insecticide
metiram	Polyram DF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
metolachlor	Bouncer Herbicide, Clincher, Hook 720 Herbicide, Hook 720 Herbicide, Metal 720, Metoken 720, Metolachlor 720, Metolachlor 720 Herbicide, Metolachlor Herbicide, Support Herbicide	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Group K Herbicide
mevinphos	Phosdrin	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Group 1B Insecticide
oxyfluorfen	Cavalier, Goal, Oxen Herbicide, Point Herbicide, Striker	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group G Herbicide
pendimethalin	Charger 330 EC, Cyclone 330 EC, Fist 330, Gazelle, Pendimethalin 330, Pendimethalin 330 EC, Pennant 330, Rebel 330 EC, Rifle 330, Stomp 330E, Cyclone 440 EC, Stomp Xtra	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group D Herbicide
permethrin 40:60	Ambush, Axe Insecticide, Hellfire 500 EC, Perma 500 EC, Permasect 500, Permerid 500 EC, Pounce, Stakeout	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
phorate	Phorate 100, Thimet 100G, Umet 100G, Phorate 200, Zeemet 200G	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
phosphorous acid	APVMA Permit	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide

Chemical	Trade name	Qld	NSW	Vic	SA	WA	NT	Tas	ACT	Chemical class
pirimicarb	Aphidex 500, Pirimicarb 500 Insecticide, Pirimor WG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1A Insecticide
propachlor	Ramrod^ Flowable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group K Herbicide
prothiofos	Tokuthion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1B Insecticide
prothiofos	APVMA Permit	Yes	No	No	No	No	No	No	No	Group 1B Insecticide
pymetrozine	Chess 250 WP, Chess	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 9A Insecticide
pymetrozine	APVMA Permit	Yes	No	No	No	No	No	No	No	Group 9A Insecticide
quintozene	Chloroturf DG, Quintozene 750, Terraclor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide
quintozene	APVMA Permit	Yes	No	No	No	No	No	No	No	Group Y Fungicide
quizalofop-P-ethyl	Targa Bolt, Targa Forte, Atomic, Elantra, Leopard, Quizalofop-P-Ethyl, Quizalofop-P-Ethyl 100 EC, Savvy, Targa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group A Herbicide
quizalofop-P-tefuryl	Buzzard, Pantera	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group A Herbicide
sethoxydim	Sertin Plus, Sertin 186 EC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group A Herbicide
S-metolachlor	Dual Gold	Yes	Yes	Yes	No	No	Yes	Yes	No	Group K Herbicide
sodium hypochlorite	APVMA Permit	Yes	No	No	No	No	No	No	No	inorganic
spinosad	Success Naturalyte, Entrust Naturalyte	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 5A Insecticide
tau-fluvalinate	Mavrik Aquaflow	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 3A Insecticide
thiodicarb	Larvin 375, Showdown 375, Larvin 800 WG	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group 1A Insecticide
thiram	Thiram, Thiram DG, Thiram WP	Yes	No	No	No	No	No	No	No	Group Y Fungicide
thiram	APVMA Permit	Yes	No	No	No	No	No	No	No	Group Y Fungicide
triadimenol	Bayfidan 250 EC, Triadimenol 250 EC, Tridim 250 EC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group C Fungicide
trichlorfon	Dipterex 500 SL, Lepidex 500	Yes	No	No	No	No	Yes	No	No	Group 1B Insecticide
trifluralin	Crew, Treflan 480, Tricon 480, Trifluasip 480, Trifluralin 480, Trifluramax 480, Triflurx	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group D Herbicide
zineb	Zineb	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Group Y Fungicide

Chapter 5

Contacts and REFERENCES

Want more information? This section helps direct you to other important providers and sources of brassica information. The Contacts directory contains the names and contact details of people and organisations serving the brassica industry. The References section contains a list of information that is useful reading for anyone involved in the industry.

Contacts

The Department of Primary Industries and Fisheries and the authors give no warranty as to the quality or suitability of goods or services provided by companies and businesses listed in this book.

Names are provided solely for helping readers to make contact with individuals and organisations serving the brassica industry. Inclusion of a person or organisation does not constitute an endorsement by the Department of Primary Industries and Fisheries or the authors, nor does it endorse a particular person or organisation over others not mentioned. The authors regret any omissions.

Grower associations

Queensland associations

Growcom
Floor 1, St Pauls Terrace
PO Box 202
FORTITUDE VALLEY QLD 4006
Ph: (07) 3620 3844; Fax: (07) 3620 3880
Members hotline: 1800 654 222
E-mail: info@growcom.com.au
Web: www.growcom.com.au

Vegetable Industry Development Officer (Queensland)
Mathew Dent
Floor 1, St Pauls Terrace
PO Box 202
FORTITUDE VALLEY QLD 4006
Ph: (07) 3620 3844; Fax: (07) 3620 3880
Mobile: 0408 135 042
E-mail: mdent@growcom.com.au
Web: www.growcom.com.au

National associations

AUSVEG
RMB 5307
STRATHBOGIE VIC 3666
Ph: (03) 5790 5247; Fax: (03) 5790 5259

Horticulture Australia Limited
Level 1, 50 Carrington Street
SYDNEY NSW 2000
Ph: (02) 8295 2300; Fax: (02) 8295 2399
E-mail: info@horticulture.com.au
Web: www.horticulture.com.au

Organic grower associations

Note: These organisations do not have the resources to provide a general advisory service about organic production. Their main function is to provide information about certification standards and processes. Special services are also provided to members after joining. Kits containing information on membership and certification standards and processes are available for purchase.

Bio-Dynamic Research Institute
c/- Post Office
POWELLTOWN VIC 3797
Ph: (03) 5966 7333; Fax: (03) 5966 7433

Biological Farmers of Australia (BFA)
PO Box 530
CHERMSIDE QLD 4032
Ph: (07) 3350 5716; Fax: (07) 3350 5996
E-mail: info@bfa.com.au
Web: www.bfa.com.au

National Association for Sustainable Agriculture Australia Ltd
(NASAA)
PO Box 768
STIRLING SA 5152
Ph: (08) 8370 8455; Fax: (08) 8370 8381
E-mail: enquiries@nasaa.com.au
Web: www.nasaa.com.au

Organic Federation of Australia
(Australia's Organic Industry Peak Body)
Suite 502 'Park Place'
3 Waverly Street
Bondi Junction
SYDNEY NSW 2022
Ph: (02) 9340 7808; Fax: (02) 9340 7807
Email: info@ofa.org.au
Web: www.ofa.org.au

Organic Food Chain Pty Ltd
PO Box 2390
TOOWOOMBA QLD 4350
Ph: (07) 4637 2600; Fax: (07) 4696 7689
E-mail: ofc@organicfoodchain.com.au

Seed suppliers

Bejo Seeds Pty Ltd
PO Box 5627
CRANBOURNE VIC 3977
Ph: (03) 9782 2811; Fax: (03) 9782 2445

Charlcon Seeds
220 Eighth Drive
AUSTRAL NSW 2171
Ph: (02) 9606 0522; Fax: (02) 9606 9817
E-mail: charlcon@hotkey.net.au

Fairbanks Selected Seed Company Pty Ltd
542 Footscray Road
FOOTSCRAY VIC 3011
Ph: (03) 9689 4500; Fax: (03) 9687 7089
Web: www.fairbanks.com.au

Henderson Seeds
PO Box 118
BULLEEN VIC 3105
Ph: (03) 9850 2266; Fax: (03) 9850 6794

Lefroy Valley (Queensland)
PO Box 7506
Toowoomba Mail Centre
TOOWOOMBA QLD 4352
Ph: (07) 4635 2099; Fax: (07) 4635 2138
Web: www.lefroyvalley.com.au

Rijk Zwaan Australia Pty Ltd
PO Box 284
DAYLESFORD VIC 3460
Ph: (03) 5348 9000; Fax: (03) 5348 5530
E-mail: vegieseeds@rijkzwaan.com.au

Seminis Vegetable Seeds
Suite 3, upstairs
77 Upper Heidelberg Road
IVANHOE VIC 3077
Ph: (03) 9499 9800; Fax: (03) 9499 9199
Web: www.seminis.com

South Pacific Seeds
102 Andrew Street
WYNNUM QLD 4178
Ph: (07) 3393 3766; Fax: (07) 3893 1522
E-mail: infoupdate@spseed.com.au
Web: www.southpacificseeds.com.au

Syngenta Seeds
Locked Bag 1335
DANDENONG SOUTH VIC 3164
Ph: (03) 9706 3033; Fax: (03) 9706 3182

Terranova Seeds Pty Ltd
13/19 Chifley Street
SMITHFIELD NSW 2164
Ph: (02) 9725 1088; Fax: (02) 9725 1066

Seedling nurseries

In south-east Queensland, there are two major seedling nurseries servicing the brassica industry. Check the yellow pages for seedling nurseries in your local area.

Quickstart Seedlings
811 Tenthill Creek Road
GATTON QLD 4343
Ph: (07) 5462 7227; Fax: (07) 5462 7377

Withcott Seedlings
PO Box 9145
WITHCOTT QLD 4352
Ph: (07) 4630 3372; Fax: (02) 4630 3551
Web: www.wseedlings.com.au

Farm chemicals

AVCARE Ltd
National Association for Crop Protection & Animal Health
Locked Bag 916
CANBERRA ACT 2601
Ph: (02) 6230 6399; Fax: (02) 6230 6355
E-mail: info@avcare.org.au
Web: www.avcare.org.au

Australian Pesticides & Veterinary Medicines Authority
(The APVMA is the National Registration Authority for Agricultural and Veterinary Chemicals)
PO Box E240
KINGSTON ACT 2604
Ph: (02) 6272 5852; Fax: (02) 6272 4753
E-mail: contact@apvma.gov.au
Web: www.apvma.gov.au

ChemClear
(A collection and disposal service for unwanted rural chemicals)
GPO Box 816
CANBERRA ACT 2601
Ph: 1800 008 182; Fax: (02) 6230 6710
E-mail: info@chemclear.com.au
Web: www.chemclear.com.au

drumMUSTER (national office)
GPO 816
CANBERRA CITY ACT 2601
Ph: (02) 6230 6712; Fax: (02) 6230 6713
E-mail: drummuster@drummuster.com.au
Web: www.drummuster.com.au

John Whitehead
Farm chemicals consultant
172 Bourbong Street
CHAPEL HILL QLD 4069
Ph: (07) 3378 6552

ChemCert Australia

For training in pesticide application contact ChemCert to find your nearest accredited trainer.

ChemCert Training Qld Inc
Ph: (07) 5460 1295
E-mail: chemcertqld@bigpond.com.au

ChemCert Australia National Office
E-mail: national@chemcert.org.au
Web: www.chemcert.org.au

Farm chemical supplies

Check the yellow pages for suppliers of chemicals/fertilisers in your local area.

Farm safety

For information on workplace health and safety and the Managing Farm Safety Program:

Farmsafe Queensland
The Queensland head office is located in Townsville
PO Box 785
THURINGOWA QLD 4817
Ph: (07) 4774 0522; Fax: (07) 4774 0289
Freecall: 1800 818 006
E-mail: jcupples@farmsafe.com.au
Web: www.farmsafe.com.au

Farmsafe Australia
The national head office is located in Moree, NSW
Ph: (02) 6752 8218
E-mail: mail@farmsafe.org.au
Web: www.farmsafe.org.au

Pest animal, bird and vermin control

Environmental Protection Agency/Queensland Parks and Wildlife
Central Office
160 Ann Street
BRISBANE QLD 4000
Ph: 07 3227111
Web: www.env.qld.gov.au

For information on controlling native animals and wildlife permits:
Ecoaccess Customer Service Unit
Ph: 1300 868 326

Department of Natural Resources, Mining and Energy (NRM&E)
For information on pest animal and weed control.
Ph: (07) 3896 3111
Web: www.dpi.nrme.qld.gov.au

Diagnostic services

Biological Crop Protection
Dr G. Stirling
3601 Moggill Road
MOGGILL QLD 4070
Ph: (07) 3202 7419; Fax: (07) 3202 8033
Mobile: 0412 083 489
E-mail: biolcrop@powerup.com.au

Crop Health Services
Institute for Horticultural Development
DPI Victoria
Private Bag 15
KNOXFIELD VIC 3176
SOUTH EASTERN MAIL CENTRE
Ph: (03) 9210 9356; Fax: (03) 9800 3521

GrowHelp Australia
PO Box 327
CLEVELAND QLD 4163
Ph: (07) 3824 9526; Fax: (07) 3286 3094
E-mail: growhelp@dpi.qld.gov.au
Web: www.dpi.qld.gov.au

Plant Health Diagnostic Services
Forest Road
ORANGE NSW 2800
Ph: (02) 6391 3843; Fax: (02) 6391 3899
E-mail: www.dpi.nsw.gov.au

Suppliers of beneficial insects, traps and lures

Australasian Biological Control (ABC), the association of beneficial arthropod producers, maintains a list of suppliers of beneficial insects on their website:
www.goodbugs.org.au

Beneficial Bug Co.
PO Box 436
RICHMOND NSW 2753
Ph: (02) 4570 1331; Fax: (02) 4578 3979
E-mail: info@beneficialbugs.com.au
Web: www.beneficialbugs.com.au

Biological Services
PO Box 501
LOXTON SA 5333
Ph: (08) 8584 6977; Fax: (08) 8584 5057
E-mail: fruitdrs@sa.ozland.net.au

Bio-Protection
PO Box 384
KILMORE VIC 3764
Ph: (03) 5781 0033; Fax: (03) 5781 0044
E-mail: rcoy@hyperlink.com.au

BioResources Pty Ltd
PO Box 578
SAMFORD QLD 4520
Ph: (07) 3289 4919; Fax: (07) 3289 4918
E-mail: richard@bioresources.com.au
Web: www.bioresources.com.au

BioWorks Pty Ltd
PO Box 203
NAMBUCCA HEADS NSW 2448
Ph: (02) 6568 3555
E-mail: bioworks@tsn.cc

Bugs for Bugs
Bowen Street
MUNDUBBERA QLD 4626
Ph: (07) 4165 4663; Fax: (07) 4165 4626
E-mail: info@bugsforbugs.com.au
Web: www.bugsforbugs.com.au

Horticultural Crop Monitoring
PO Box 3725
CALOUNDRA QLD 4551
Ph/Fax: (07) 5491 4662
E-mail: pjones@hotkey.net.au

IPM Technologies
PO Box 600
HURSTBRIDGE VIC 3099
Ph: (03) 9710 1554; Fax: (03) 9710 1354
E-mail: ipmtechnologies@bigpond.com

Traps and lures

Entosol (Australia) Pty Ltd (AgriSense agent)
Roger Allanson
PO Box 28
ROSELANDS NSW 2196
Ph: (02) 9758 4552; Fax: (02) 9758 4882
E-mail: sales@entosol.com.au
Web: www.entosol.com.au

Texas (Scentry traps)
Web: www.scentry.com

Soil, plant, water and product testing services

The National Association of Testing Authorities (NATA) is the Government-endorsed provider of accreditation for laboratories and similar testing facilities. Contact NATA for assistance with choosing an accredited laboratory.

National Association of Testing Authorities (NATA)
Brisbane Office
80 Jephson Street
TOOWONG QLD 4066
Ph: (07) 3870 3844; Fax: (07) 3870 4570
Web: www.nata.asn.au

Soil, plant and water testing

Casco Agritech Laboratory Services
PO Box 549
214 McDougall Street
TOOWOOMBA QLD 4350
Ph: (07) 4633 0599; Fax: (07) 4633 0711
E-mail: info@casco.com.au
Web: www.casco.com.au

Crop Tech Laboratories Pty Ltd
410 Langbeckers East Road
BUNDABERG QLD 4670
Ph: (07) 4155 6344; Fax: (07) 4155 6656
E-mail: croptech@croptech.au
Web: www.croptech.com.au

Incitec Pivot Ltd
GPO Box 1322L
MELBOURNE VIC 3001
Ph: (03) 8694 4400; Fax: (03) 8695 4419
Toll free: 1800 803 453
Web: www.incitecpivot.com.au

Simmonds & Bistow Pty Ltd
40 Reginald Street
ROCKLEA QLD 4106
Ph: (07) 3710 9100; Fax: (07) 3710 9199
E-mail: david@simmondsbristow.com.au

Microbial and chemical testing—product and water

Casco Agritech Laboratory Services
PO Box 549
214 McDougall Street
TOOWOOMBA QLD 4350
Ph: (07) 4633 0599; Fax: (07) 4633 0711
E-mail: info@casco.com.au
Web: www.casco.com.au

Centre for Food Technology
19 Hercules Street
HAMILTON QLD 4007
Ph: (07) 3406 8555; Fax: (07) 3406 8665
Web: www.dpi.qld.gov.au/food

Crop Health Services
Institute for Horticultural Development
DPI Victoria
Private Bag 15
KNOXFIELD VIC 3176
SOUTH EASTERN MAIL CENTRE
Ph: (03) 9210 9356; Fax: (03) 9800 3521

Food and Agriculture Laboratories of Australia Pty Ltd
41 Rosedale Street
COOPERS PLAINS QLD 4108
Ph: (07) 3345 4566; Fax: (07) 3345 4871

Queensland Health Scientific Services
39 Kessels Road
COOPERS PLAINS QLD 4108
Ph: (07) 3274 9111; Fax: (07) 3274 9119
Web: www.health.qld.gov.au

Simmonds & Bistow Pty Ltd
40 Reginald Street
ROCKLEA QLD 4106
Ph: (07) 3710 9100; Fax: (07) 3710 9199
E-mail: david@simmondsbristow.com.au

Symbio Laboratories
47 Manilla Street
EAST BRISBANE QLD 4169
Ph: (07) 3391 7558; Fax: (07) 3391 6160
E-mail: symbio@powerup.com.au

Quality assurance and environmental management

Enviroveg
National Program Manager
Ph: 03 9544 8098
Web: www.enviroveg.org

Mailing address:
AUSVEG
Suite 9
756 Blackburn Road
CLAYTON NORTH VIC 3168

EurepGAP
Contact the Department of Agriculture, Fisheries and Forestry
Ph: 02 6272 3317
E-mail: eurepgap@daff.gov
Web: www.eurep.org

Farmcare Code of Practice
Growcom (previously Queensland Fruit and Vegetable Growers)
Floor 1, St Pauls Terrace
PO Box 202
FORTITUDE VALLEY QLD 4006
Ph: (07) 3620 3825; Fax: (07) 3620 3880
Members hotline: 1800 654 222
E-mail: info@growcom.com.au
Web: www.growcom.com.au

Food Operations
7 Leeds Street
RHODES NSW 2138
Ph: (02) 9736 8266
E-mail: training@foodoperations.com.au
Web: www.foodoperations.com.au

Freshcare Ltd
PO Box 247
SYDNEY MARKETS NSW 2129
Ph: (02) 9764 3244; Fax: (02) 9764 2776
E-mail: freshcare@freshmarkets.com.au
Web: www.freshcare.com.au

ISO 9002 and ISO 14001
Contact Standards Australia
Ph: 1300 654 646
Web: www.standards.com.au

SQF 2000^{CM} and SQF 2000^{CM}
Contact the Australian Information Desk
Ph: 1800 77 33 77
E-mail: info@sqfi.com
Web: www.sqfi.com

Woolworths Quality Assurance Standard (WQA)
Contact a Woolworths buyer or merchandise manager.
Web www.woolworths.com.au

Market information

Ausmarket Consultants

The **Ausmarket Consultants** group offers historic and current fruit and vegetable market price information, market intelligence, outturn reporting and product assessment. Participants in the network operate separate businesses within Australia's major markets. Details can be found on their web site:
Web: www.ausmarket.net.au
Individual members of the network are:

Brisbane
Market Information Services
PO Box 229
BRISBANE MARKET QLD 4106
Ph: (07) 3379 4576; Fax: (07) 3379 4103
Mobile: 0417 712 427
E-mail: info@ausmarket.net.au

Recorded market reports
Infocall: 1902 262 580 ($2.75 per minute, covers faxed reports from Adelaide, Brisbane, Melbourne, Perth and Sydney).

Brisbane Market Produce Surveyors
PO Box 229
BRISBANE MARKET QLD 4106
Ph: (07) 3379 4576; Fax: (07) 3379 4103
Mobile: 0418 713 688
E-mail: info@ausmarket.net.au

Adelaide
SAFF Market Intelligence Pty Ltd
PO Box 6014
ADELAIDE SA 5000
Ph: (08) 8349 6480; Fax: (08) 8349 5894
Mobile: 0419 868 265
E-mail: bbishop@saff.com.au

Melbourne
Melbourne Market Reporting Service (DataFresh)
Box 170 Melbourne Markets
FOOTSCRAY VIC 3011
Ph: (03) 9689 3444; Fax: (03) 9689 3411
Mobile: 0411 117 578
E-mail: info@datafresh.com.au

Rudge Produce Systems Pty Ltd
Box 177 Melbourne Markets
WEST MELBOURNE VIC 3003
Ph: (03) 9689 1234; Fax: (03) 9689 1232
Mobile: 0419 335 802
E-mail: administration@rudgeproduce.com.au

Perth
West Coast Produce Consultants
c/- Perth Market Authority
Mail Point 1, Market City
280 Bannister Road
CANNING VALE WA 6155
Ph: (08) 9455 2900; Fax: (08) 9455 2902
Market reports: 1900 983 304 (recording); 75c per minute

Sydney
The Sydney Market Reporting Service & Sydney Produce Surveyors Pty Ltd
PO Box 350
FRENCHS FOREST NSW 2086
Ph: (02) 9746 3437; Fax: (02) 9746 1075
Mobile: 0416 108 639
E-mail: cqs@accsoft.com.au

Resolving payment and other disputes

If you have a disagreement about payment for produce, or other matters relating to the retail grocery industry, the Retail Grocery Industry Ombudsman (RGIO) may be able to help.

The RGIO is funded by the Commonwealth Department of Industry, Tourism and Resources and is responsible for assisting industry participants in the retail grocery sector resolve commercial disputes. The industry includes fruit and vegetables, dairy, meat, eggs, flowers, fish, cotton, grains etc. Common disputes are over payment and/or contractual terms between growers, packers, transporters, wholesalers, retailers and/or exporters.

The RGIO and his staff may be telephoned for advice and will formally respond to all queries and dispute notifications within five working days of a written application being lodged. Contact details for the Ombudsman are:

Retail Grocery Industry Ombudsman (RGIO)
GPO Box 1422
SYDNEY NSW 2001
Ph: 1800 004 444 (Free call)
Fax: 1300 760 220
E-mail: ombudsman@rgio.com.au
Web: www.rgio.com.au

Wholesaler information

If you want a list of registered farm produce commercial sellers the following contacts should be helpful.

Australian Chamber of Fruit and Vegetables Ind.
PO Box 6
SYDNEY MARKETS NSW 2129,
Ph: (02) 9764 3244; Fax: (02) 9764 2776
E-mail: thechamber@freshmarkets.com.au
Web: www.freshmarkets.com.au
(lists the contact details for the Chamber in each market)

Adelaide
Adelaide Produce Markets Ltd
Diagonal Road
POORAKA SA 5095
Ph: (08) 8349 4493; Fax: (08) 8349 6574
E-mail: apml@adelaidemarkets.com.au
Web: www.adelaidemarkets.com.au

South Australian Chamber of Fruit and Vegetables Industries
c/- Adelaide Produce Markets Ltd
Diagonal Road
POORAKA SA 5095
Ph: (08) 8349 4528; Fax: (08) 8260 5922

Brisbane
Brisbane Markets Ltd
PO Box 80
BRISBANE MARKETS QLD 4106
Ph: (07) 3379 1062; Fax: (07) 3379 4903
Marketline: 1800 631 002
E-mail: admin@brisbanemarkets.com.au
Web: www.brisbanemarket.com.au

Brismark
PO Box 70
BRISBANE MARKETS QLD 4106
Ph: (07) 3379 3061; Fax: (07) 3379 3792
E-mail: brismark@brismark.com.au
Web: www.brismark.com.au

Melbourne
Melbourne Market Authority
Box 1
WEST MELBOURNE VIC 3003
Ph: (03) 9258 6100; Fax: (03) 9687 7714
Email: info@melbournemarkets.com.au
Web: www.melbournemarkets.com.au

Victorian Chamber of Fresh Produce Wholesalers Inc.
(Trading as Fresh State)
PO Box 113
FOOTSCRAY VIC 3011
Ph: (03) 9689 3233; Fax: (03) 9689 9223
E-mail: vicchamber@freshstate.com.au
Web: www.freshmarkets.com.au

Perth
Perth Market Authority
Mail Point 1, Market City
CANNING VALE WA 6155
Ph: (08) 9455 2900; Fax: (08) 9455 2902
E-mail: pma@perthmarket.com.au
Web: www.perthmarket.com.au/produceinfoframe.htm

West Australian Chamber of Fruit and Vegetables Industries
PO Box 1464
CANNING VALE DC WA 6970
Ph: (08) 9455 2742; Fax: (08) 9455 4923

Sydney
Sydney Markets Ltd
PO Box 2
SYDNEY MARKETS NSW 2129
Ph: (02) 9325 6200; Fax: (02) 9325 6288
E-mail: info@sydneymarkets.com.au
Web: www.sydneymarkets.com.au

NSW Chamber of Fruit and Vegetable Industries Inc.
PO Box 6
SYDNEY MARKETS NSW 2129
Ph: (02) 9764 3244; Fax: (02) 9764 2776
E-mail: nswchamber@freshmarkets.com.au

Export associations

Australian Horticultural Exporters Association
Institute of Horticultural Development
Private Bag 15
FERNTREE GULLY DELIVERY CENTRE
VIC 3156
Ph: (03) 9210 9380; Fax: (03) 9210 9381
E-mail: ahea@ahea.com.au
Web: www.ahea.com.au

AQIS offices

For information on exporting brassicas contact an export inspector at the closest office of the Australian Quarantine and Inspection Service, Department of Agriculture, Fisheries and Forestry.

The address and contact numbers for state offices are listed below, or
Freecall 1800 020 504

Adelaide
PO Box 63
Port Adelaide SA 5015
Ph: (08) 8305 9700; Fax: (08) 8305 9825

Brisbane
GPO Box 778
BRISBANE QLD 4000
Ph: (07) 3246 8755; Fax: (07) 3839 9313

Canberra
GPO Box 7193
FYSHWICK ACT 2609
Ph: (02) 6239 7979; Fax: (02) 6230 7986

Darwin
GPO Box1970
BERRIMAH NT 0828
Ph: (08) 8999 2075; Fax: (08) 8999 2108

Hobart
PO Box 347
NORTH HOBART TAS 7002
Ph: (03) 6233 3626; Fax: (03) 6234 6785

Melbourne
PO Box 1006
TULLAMARINE VIC 3043
Ph: (03) 8318 6700; Fax: (03) 8318 6701

Perth
WA AQIS
PO Box 1410
CANNING VALE WA 6970
Ph: (08) 9311 5333; Fax: (08) 9455 3052

Sydney
PO Box 657
MASCOT NSW 1460
Ph: (02) 8334 7444; Fax: (02) 8334 7555

Information on interstate movement provisions

Interstate Certification Assurance (ICA) and Inspections for interstate produce shipments

For the names of local inspectors and information on interstate requirements, contact the DPI&F Animal and Plant Health Services.

Senior Operational Support Officer
Animal and Plant Health Services
Department of Primary Industries and Fisheries
GPO Box 46
BRISBANE QLD 4001
Ph: (07) 3239 3330; Fax: (07) 3211 3293

Information on interstate requirements

Requirements change regularly. To check on latest requirements, here are the contacts for each state.

New South Wales

Regulatory Operations Coordinator (Plants)
Locked Bag 21
ORANGE NSW 2800
Ph: (02) 6391 3583; Fax: (02) 6391 3605

Australian Capital Territory

Quarantine & Inspection Officer
Environment ACT
PO Box 1038
TUGGERANONG ACT 2901
Ph: (02) 6207 2265; (02) 6207 2268

Victoria

Supervisor Plant Standards
Department of Primary Industries
Private Bag 15
Ferntree Gully Delivery Centre
KNOXFIELD VIC 3156
Ph: (03) 9687 5627: Fax: (03) 9687 6746

Tasmania

Senior Quarantine Officer
Quarantine
Macquarie Wharf Number 1
Hunter Street
HOBART TAS 7000
Ph: (03) 6233 3352; Fax: (03) 6234 6785

South Australia

Program Leader—State Quarantine Inspection Service
Pest Eradication Unit
46 Prospect Road
PROSPECT SA 5082
Ph: (08) 8344 1203; Fax: (08) 8344 6033

Western Australia
Senior Inspector
Western Australian Quarantine & Inspection Service
PO Box 1410
CANNING VALE WA 6970
Ph: (08) 9311 5333; Fax: (08) 9455 3052

Northern Territory
Senior Inspector (Interstate Quarantine)
Primary Industry and Fisheries
Department of Business, Industry and Resource Development
PO Box 990
BERRIMAH NT 0801
Ph: (08) 8999 2138; Fax: (08) 8999 2111

Government services

National

CSIRO Australia—Scientific and Industrial Research
Web: www.csiro.au

Department of Agriculture, Fisheries and Forestry (DAFF)
Web: www.affa.gov.au

FarmBis Australia
This program provides financial assistance to primary producers to undertake business and natural resource management training.
Web: www.farmbis.gov.au

State

Queensland
Department of Primary Industries and Fisheries (DPI&F)
GPO Box 46
BRISBANE QLD 4001
E-mail: callweb@dpi.qld.gov.au
Web: www.dpi.qld.gov.au

Call Centre. Helps you access DPI&F's information services and products. Queenslanders can ring 13 25 23 from 8 a.m. to 6 p.m. Monday to Friday, excluding public holidays, for the cost of a local call. Interstate callers can phone (07) 3404 6999.

GrowSearch. An information service for producers of horticultural crops. Fee-for-service.

Ph: (07) 3821 3784; Fax: (07) 3286 7618
E-mail: growsearch@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/growsearch

Department of Natural Resources, Mining and Energy (NRM&E)
Ph: (07) 3896 3111
Web: www.dpi.nrme.qld.gov.au

For information on natural resource management for example soil, water, vegetation, erosion, salinity etc.

Environmental Protection Agency/Queensland Parks and Wildlife
Ph: (07) 3227111
Web: www.env.qld.gov.au

For information on environmental planning, technical services and management of parks, forestry and wildlife.

New South Wales
NSW Department of Primary Industries (NSWDPI)
Locked Bag 21
ORANGE NSW 2800
Ph: (02) 6391 3100; Fax: (02) 6391 3336
E-mail: nsw.agriculture@agric.nsw.gov.au
Web: www.dpi.nsw.gov.au

Victoria
Department of Primary Industries (DPI)
E-mail: customer.service@dpi.vic.gov.au
Web: www.dpi.vic.gov.au

Department of Sustainability and Environment (DSE)
E-mail: customer.service@dse.vic.gov.au
Web: www.dse.vic.gov.au

Call Centre. Helps you access information services and products, from DPI and DSE ring 136 186 from within Australia.

Tasmania

Department of Primary Industries, Water and Environment (DPIWE)
GPO Box 44
HOBART TAS 7001
Ph: 1300 368 550 (toll free in Australia)
E-mail: FAF.Enquiries@dpiwe.tas.gov.au
Web: www.dpiwe.tas.gov.au

South Australia

Department of Primary Industries and Resources (PIRSA)
GPO Box 397
Adelaide 5001 S A
E-mail: pirsa.sardi@saugov.sa.gov.au
Web: www.pir.sa.gov.au

Western Australia

Department of Agriculture (DAWA)
Locked Bag 4
BENTLEY DELIVERY CENTRE WA 6983
Ph: (08) 9368 3333
Email: enquiries@agric.wa.gov.au
Web: www.agric.wa.gov.au

Northern Terriority

Primary Industry and Fisheries—part of the Department of Business, Industry and Resources Development (DBIRD)
GPO Box 3000
DARWIN NT 0801
Ph: (08) 8999 2292; Fax: (08) 8999 2049
Web: www.nt.gov.au/dbird/dpif

Agricultural booksellers

These booksellers specialise in agricultural books.

DA Information Services
648 Whitehorse Road
MITCHAM VIC 3132
Ph: (03) 9210 7777; Fax: (03) 9210 7788
E-mail: service@dadirect.com.au
Web: www.dadirect.com.au

DPI&F Publications
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Fax: (07) 3239 6509
E-mail: books@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/shop

Granny Smith's Bookshop
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E-mail: grannysmith@iinet.net.au
Web: www.aoi.com.au/granny

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Ph: (02) 9541 4791; Fax: (02) 9543 1710
E-mail: madhu@johima.com.au
Web: www.johima.com.au

Landlinks Press
PO Box 1139
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Ph: (03) 9662 7666; Fax: (03) 9662 7555
Orders–Freecall 1800 645 051
E-mail: publishing@csiro.au
Web: www.publish.csiro.au

Morescope Publishing
36 Bridge Street
RICHMOND TAS 7025
Ph: (03) 6260 2094

DPI Information Centre
PO Box 500
EAST MELBOURNE VIC 3002
Ph: (03) 9637 8325; Fax (03) 9637 8150
E-mail: customer.service@dpi.vic.gov.au
Web: www.dpi.vic.gov.au

NSW Department of Primary Industries
Bookshop
Orange Agricultural Institute
ORANGE NSW 2800
Ph: (02) 6391 3994;
Orders–Freecall: 1800 028 374
Fax: 1800 642 065
E-mail: bookshop@agric.nsw.gov.au
Web: www.agric.nsw.gov.au

Contacts through the Yellow Pages

The following Yellow Pages headings cover the main topics for which contacts may be needed. Check the listings under the appropriate heading.

Seedlings and seed

Nurseries
Seedsmen

Chemicals/fertilisers

Chemicals, agricultural
Chemical suppliers
Fertilisers
Insecticides, herbicides and fungicides
Lime
Soil conditioners and treatments

Consultants

Farm and agricultural advisory services
Quality Assurance Services
Horticultural consultants

Economics and marketing

Fruit and vegetable wholesalers
Grain and produce
Transport services

Equipment, irrigation, machinery

Agricultural machinery
Engineers
Farm contracting services
Farm equipment and supplies
Instruments–scientific
Irrigation

Pesticides and spraying

Aerial spraying
Fertiliser and/or insecticide spreading
Protective clothing
Spray equipment and/or supplies

Postharvest handling and packaging

Boxes and cartons
Cold room builders/designers
Cold stores
Food processing and/or packing machinery
Fruit and vegetable packing and/or packs
Labels
Polystyrene products
Grain and produce packaging materials
Refrigerated transport trucks and equipment
Scales and weighing equipment

References

This is not an exhaustive list of references for brassicas. It consists of references and internet sites which the authors recommend as useful sources of information and reading for the brassica grower. If you require more detailed information on a subject, use the literature search facilities available from most libraries.

DPI&F information products

Books

Crop weeds of northern Australia, Wilson, B.J., Hawton, D. & Duff, A.A. (1995), Department of Primary Industries and Fisheries, Queensland.

Diseases of vegetable crops, Persley, D. M. & Cooke, A.W. (eds) (1994), Department of Primary Industries and Fisheries, Queensland.

Forced air cooling, (2nd edn). Watkins, J.B. (1990), Department of Primary Industries and Fisheries, Queensland.

Insect pests of fruit and vegetables (2nd edn), Swaine, G., Ironside, D.A. & Corcoran, R.J. (1992), Department of Primary Industries and Fisheries, Queensland

Pesticide application manual (3rd edn), Banks, A.G., Broadley, R.H., Collinge, M. & Middleton, K. (1990), Department of Primary Industries and Fisheries, Queensland.

Poisonous plants: a field guide, Dowling, R. & McKenzie, R., (1993), Department of Primary Industries and Fisheries, Queensland.

Suburban weeds (3rd edn), Kleinschmidt, H., Holland, A. & Simpson, P. (1997), Department of Primary Industries and Fisheries, Queensland.

Water it right—irrigation using tensiometers, Daniels, J.L., Banks, A.G. & Jamieson, G.I. (1994), Department of Primary Industries and Fisheries, Queensland.

DPI&F notes and web pages

Broccoli development, yield and quality—importance of temperature, http://www.dpi.qld.gov.au/horticulture/5293.html

Emerging plant pests—melon thrips, http://www.dpi.qld.gov.au/health/2774.html

Exotic plant pests—white blister of broccoli, http://www.dpi.qld.gov.au/health/10290.html

Interstate Certification Assurance (ICA), http://www.dpi.qld.gov.au/health/4056.html

Diamondback moth in selected brassica vegetable crops, http://www.dpi.qld.gov.au/horticulture/1885.html

Managing weeds in broccoli, cauliflower and cabbage, http://www.dpi.qld.gov.au/horticulture/4743.html

Soil compaction, www.dpi.qld.gov.au/fieldcrops/9424.html

Soil insects in Queensland, identification and management, www.dpi.qld.gov.au/fieldcrops/3689.html

Using conductivity meters in agriculture, http://www.dpi.qld.gov.au/horticulture/3096.html

Asian leafy brassica vegetables

Chinese broccoli, http://www.dpi.qld.gov.au/horticulture/5313.html

Chinese mustard, http://www.dpi.qld.gov.au/horticulture/7917.html

Choy sum, http://www.dpi.qld.gov.au/horticulture/5312.html

Komatsuna, http://www.dpi.qld.gov.au/horticulture/5308.html

Mizuna and mibuna, http://www.dpi.qld.gov.au/horticulture/5305.html

Mustard greens, http://www.dpi.qld.gov.au/horticulture/5303.html

Pak choy, http://www.dpi.qld.gov.au/horticulture/5300.html

Tatsoi, http://www.dpi.qld.gov.au/horticulture/7922.html

DPI&F notes are available on the Internet at:
www.dpi.qld.gov.au
or on *Prime notes on CD-ROM*

DPI&F information products are available from:
DPI&F Publications
Department of Primary Industries and Fisheries
GPO Box 46
BRISBANE QLD 4001
Ph: (07) 3239 3163; Freecall: 1800 816 541;
Fax: (07) 3239 6509
E-mail: books@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/shop

Other DPI&F products

Crop weeds of northern Australia CD Rom, Wilshire, B. et al (2003), Department of Primary Industries and Fisheries, Queensland.

Infopest—Agvet CD-ROM and Infopest—MSDS CD-ROM

Available from:
Infopest
Animal & Plant Health Services
Department of Primary Industries and Fisheries
GPO Box 46
BRISBANE QLD 4001
Ph: (07) 3239 3967; Fax: (07) 3239 3510
E-mail: infopest@dpi.qld.gov.au
Web: www.dpi.qld.gov.au/infopest

Other books

Australian soil fertility manual—Revised edition, Glendinning J.S., (ed), (1999), Fertilizer Industry Federation of Australia, CSIRO Publishing, Collingwood, Victoria.

CSIRO Handbook of Australian weeds, Lazarides, M., Cowley, K. & Hohnen, P. (1997), CISRO Publishing, Australia.

Plant analysis—an interpretation manual, (2nd edn), Reuter, D.J. & Robinson, J.B. (1997), CSIRO Publishing, Collingwood, Victoria.

Available from:
CSIRO Publishing
PO Box 1139,
COLLINGWOOD, VIC 3066
Ph: 1300 788 000 (to order)

Australian farmers guide to the internet—second edition, RIRDC

The New Rural Industries—a handbook for farmers and investors, Hyde, K. (ed) (1997), RIRDC

Available from:
Rural Industries Research and Development Corporation
Level 1, 10 Macquarie Street
BARTON ACT 2600
Ph: (02) 6272 4539; Fax: (02) 6272 5877
Web: www.rirdc.gov.au/farmersguide

Export control (fresh fruit and vegetables) orders, Schedule 4, 5 and 25, (1988) Commonwealth of Australia, Canberra, Australia.
Available from:
Australian Government Printing Service
GPO Box 84
CANBERRA ACT 2601

Field guide to pests, diseases and disorders of vegetable brassicas, Donald, C., Endersby, N., Ridland, P., Porter, I., Lawrence, J. & Ransom, L., (2000), Department of Natural Resources and Environment, Victoria.

Quality description language:
- *broccoli,* O'Donnell, D.
- *cauliflower,* Vujovic, S. et. al.
- *cabbage,* Vujovic, S. et. al.
- *Chinese broccoli,* Morgan, W. and Chew, M.
- *Chinese cabbage,* Morgan, W. and Chew, M.
- *Chinese chard,* Morgan, W. and Chew, M.
- *Shanghai Chinese chard,* Morgan, W. and Chew, M.

Available from:
DPI Information Centre
PO Box 500
EAST MELBOURNE VIC 3002
Ph: (03) 9637 8325; Fax (03) 9637 8150
E-mail: customer.service@dpi.vic.gov.au
Web: www.dpi.vic.gov.au

Australian weed management systems, Sindel, B.M. (ed), (2000), R.G. and F.J. Richardson, Meredith, Victoria.

Integrated pest management for cole crops and lettuce, Flint, M.L. (ed) (1992), Division of Agriculture and Natural Resources, University of California, USA.

National Standard for Organic and Bio-Dynamic Produce, Department of Agriculture, Fisheries and Forestry, Canberra.

Organic agriculture—getting started, Madge, D. (1995), Agmedia, Melbourne.

Oriental vegetables, Waters, C.T., Moragan, W.C. & McGeary, D.J. (1992), Victorian Department of Food and Agriculture.

Plant nutrient disorders 3, vegetable crops, Weir, R.G., & Cresswell, G.C. (1994), NSW Agriculture, Inkata Press, Sydney NSW.

The Australian vegetable growing handbook, Salvestrin, J. (ed)(1998), Scope Publishing, Frankston, Victoria.

The good bug book (2nd edn), Llewellyn, R. (ed) (2002), Integrated Pest Management for Australasian Biological Control Inc., New South Wales.

Weeds—An illustrated botanical guide to the weeds of Australia, Auld, B.A. & Medd, R.W. (1992), Inkata Press, Australia.

Reports

Asian vegetable industry—a situation assessment, Hassall and Associates (2003) RIRDC, Publication No 02/168

The above report and a number of other reports on Asian vegetables are available at:

Rural Industries Research and Development Corporation
Level 1, 10 Macquarie Street
BARTON ACT 2600
Ph: (02) 6272 4539; Fax: (02) 6272 5877
Web: www.rirdc.gov.au/farmersguide

Guidelines for implementing EUREGAP for Australian fresh fruit and vegetable producers, McBride, W. (2004), Australian Department of Agriculture Fisheries and Forestry, Canberra.

Guidelines for on-farm food safety for fresh produce, Working group on Safety and Quality Systems' Equivalence, (2001), Department of Agriculture, Fisheries and Forestry, Canberra.

Available at:
Department of Agriculture, Fisheries and Forestry (DAFF)
For the EUREGAP guidelines
Ph: (02) 6272 3317
For the On-farm food safety guidelines
Ph: (02) 6272 4161
E-mail: foodinfo@affa.gov.au
Web: www.daff.gov.au

Annual publications

Brisbane markets business directory
Available from:
Brisbane Market Authority
PO Box 8
BRISBANE MARKETS QLD 4106
Ph: (07) 3379 1062; Fax: (07) 3379 4903
Web: www.brisbanemarket.com.au

Prices and throughput for the Brisbane market
Available from:
Market Information Services
PO Box 229
BRISBANE MARKET QLD 4106
Ph: (07) 3379 4576; Fax: (07) 3379 4103;
Mobile: 0417 712 427
E-mail: info@ ausmarket.net.au
Web: www.ausmarket.net.au

Melbourne markets business directory
Available from:
Melbourne Market Authority
PO Box 1
542 Footscray Road
FOOTSCRAY VIC 3011
Ph: (03) 9258 6100; Fax: (03) 9687 7714
E-mail: info@mma.vic.gov.au
Web: www.melbournemarkets.com.au

Sydney markets users guide
Available from:
Sydney Market Ltd
PO Box 2
SYDNEY MARKETS NSW 2129
Ph: (02) 9325 6200; Fax: (02) 9325 6288
E-mail: sydma@sydneymarkets.com.au
Web: www.sydneymarkets.com.au

The Sydney markets yearly prices for fresh fruit & vegetables
Available from:
The Sydney Market Reporting Service
PO Box 350
FRENCHS FOREST NSW 2086
Ph: (02) 9746 3437; Fax: (02) 9746 1075;
Mobile: 0416 108 639
E-mail: cqs@accsoft.com.au

Journals and magazines

American Vegetable Grower
Available from:
American Vegetable Grower
37733 Euclid Avenue
WILLOUGHBY OHIO 44094 USA

Good Fruit & Vegetables
Available from:
Good Fruit & Vegetables
PO Box 160
PORT MELBOURNE VIC 3207
Ph: (03) 9287 0900; Fax: (03) 9287 0999
Subscriptions: Ph: 1800 035 351

Useful internet sites

Brassica sites

UC IPM Online—Cole Crops—University of California
http://www.ipm.ucdavis.edu/PMG/selectnewpest.cole-crops.html

Brassica projects—Department of Primary Industries Victoria
www.dpi.vic.gov.au/agvic/ihd/projects/veg-keyproject.htm
Includes club root project

Diamondback moth management

Department of Primary Industries, Victoria
http://www.dpi.vic.gov.au/agvic/ihd/projects/dbm.htm
For the DBM sampling plan, contact the project team or follow the pest & diseases link

South Australian Research and Development Institute http://www.sardi.sa.gov.au/entomology/index.html

National DBM resistance management strategy Avcare
http://www.avecare.org.au

International working group for diamondback moth
http://www.nysaes.cornell.edu/ent/dbm/

Asian vegetables

Access to Asian vegetables—Department of Primary Industries Victoria
www.nre.vic.gov.au/trade/asiaveg/

Australian New Crops web site—University of Queensland
http://www.newcrops.uq.edu.au/

The New Rural Industries—RIRDC handbook
www.rirdc.gov.au/pub/handbook/contents.html

Asian Foods Research Program - Rural Industries Research and Development Corporation
http://www.rirdc.gov.au/programs/af.html

Other sites

AGRIFOR—The UK's Gateway to Internet Resources in Food, Agriculture and Forestry
Web: www.agrifor.ac.uk

Austrade—Australia's export and investment facilitation agency:
Web: www.austrade.gov.au

Australasian Biological Control:
Web: www.goodbugs.org.au

Australian Centre for Agricultural Health and Safety—the University of Sydney
Web: www.acahs.med.usyd.edu.au

Australian Farm & Rural OHS Resources:
Web: www.worksafe.gov.au/OHSInformation/Agriculture

Australian Government Agricultural Portal:
Web: www.agriculture.gov.au/index.cfm

Australian Pesticides and Veterinary Medicines Authority (APVMA):
Web: www.apvma.gov.au

Australian Quarantine & Inspection Service (AQIS):
Web: www.aqis.gov.au

AQIS—export conditions database (phyto):
Web: www.aqis.gov.au/phyto

Avcare, National Association of Crop Production and Animal Health:
Web: www.avcare.org.au

ChemClear—Farm chemicals:
Web: www.chemclear.com.au

Cool chain, South Australian Research and Development Institute:
Web: www.sardi.sa.gov.au/coolchai/index.htm

Crop Protection, The Official Journal of the International Association for the Plant Protection Sciences:
Web: www.elsevier.com/locate/cropro

Department of Agriculture, Fisheries and Forestry:
Web: www.affa.gov.au

Department of Agriculture Western Australia
Web: www.agric.wa.gov.au

Department of Natural Resources, Mines and Energy—Fact Sheets:
Web: www.nrm.qld.gov.au/factsheets

Department of Primary Industries and Resources South Australia
Web: www.pir.sa.gov.au

Department of Primary Industries Victoria - Notes information series Web: www.dpi.vic.gov.au/notes

drumMUSTER:
Web: www.drummuster.com.au

Entosol (Australia) Pty Ltd (AgriSense agent):
Web: www.entosol.com.au

Enviromental Protection Agency/ Queensland Parks and Wildlife Service
Web: www.env.qld.gov.au/

Enviroveg:
Web: www.enviroveg.org

EUREPGAP:
Web: www.eurep.org

Farmsafe Australia:
Web: www.farmsafe.org.au

Farmsafe Queensland:
Web: www.farmsafe.com.au

Food Info Australia—Department of Agriculture, Fisheries and Forestry
Web: www.affa.gov.au/foodinfo

Food Operations
Web: www.foodoperations.com.au

Freshcare
Web: www.freshcare.com.au

Growcom:
Web: www.growcom.com.au

Horticulture Australia Limited:
Web: www.horticulture.com.au

Integrated Crop and Pest Management Guidelines for Commercial Vegetable Production—Cornell university:
Web: www.nysaes.cornell.edu/recommends

International Federation of Organic Agriculture Movements (IFOAM)
Web: www.ifoam.org

ISO 9002 and ISO 14001
Web: www.standards.com.au

NSW Department of Primary Industries
Web: www.agric.nsw.gov.au

Organic Federation of Australia
Web: www.ofa.org.au

Postharvest technology, University of California, Davis:
Web: http://postharvest.ucdavis.edu

Queensland Parks and Wildlife Service - Enviromental Protection Agency
Web: www.env.qld.gov.au/

Queensland Rural Adjustment Authority:
Web: www.qraa.qld.gov.au

Rural Industries Research and Development Corporation:
Web: www.rirdc.gov.au

Rural Water Use Efficiency - Department of Natural Resources, Mines and Energy:
Web: www.nrme.qld.gov.au/rwue/factsheets.htm#horticulture; www/nrme.qld.gov/rwue/pdf/factsheets/brassica.pdf

Rural Safety Links:
Web: www.whs.qld.gov.au/subject/rural.htm#links

SQF 2000^{CM} and SQF 2000^{CM}
Web: www.sqfi.com

Standards Australia:
Web: www.standards.com.au

Sustainable Agriculture Resources—Australian and New Zealand:
Web: www.une.edu.au/agronomy/weeds/organic/links/aust-nz.html

Sustainable practices for vegetable production in the south, North Carolina State University:
Web: www.cals.ncsu.edu/sustainable/peet/index.html

Sydney Postharvest Laboratory
Web: www.postharvest.com.au

Texas (Scentry traps)—USA home page:
Web: www.scentry.com

University of California—Vegetable Research and Information Centre:
Web: http://vric.ucdavis.edu

University of Florida, Institute of Food and Agricultural Sciences:
Web: http://edis.ifas.ufl.edu

United States Department of Agriculture:
Web: www.usda.gov/Agriculture/

Woolworths Quality Assurance Standard (WQA)
www.woolworths.com.au

Workplace health and safety—Queensland:
Web: www.whs.qld.gov.au

Chapter 1

Before you START

If you have never grown cabbage, cauliflower or broccoli before, then you will find this section very useful. It is a brief checklist of the essential things you need to know before you start. It will help you make the right decisions. The information here is brief and to the point. We provide more detail on important areas in other sections of the book. Symbols on the left of the page will help you make these links.

Contents

A brief overview of the Queensland brassica industry

Official statistics suggest that the Queensland brassica industry is relatively static, although supply tends to fluctuate from year to year. In 2001–02, around 40 000 tonnes of cabbage, cauliflower and broccoli were produced from about 2 800 hectares. Table 1 shows the industry had a farm gate value of about $21 million and a gross value of around $32 million.

Table 1. The Queensland brassica industry

Crop	Area (ha)	Production (tonnes)	Farm gate value ($ millions)	Gross value ($ millions)
Cabbages	366	13,148	2.7	4.7
Cauliflower	693	15,058	4.1	8.2
Broccoli	1758	11,569	14.3	18.8
Totals	**2817**	**39,775**	**21.1**	**31.7**

Source: *Australian Bureau of Statistics* 2001–02 estimates

Most Queensland brassicas are grown in the south-eastern corner of the State in the Lockyer Valley, Eastern Darling Downs and the Granite Belt. Small growing areas exist in coastal areas and other horticultural production districts of the state.

The industry primarily supplies the domestic fresh market, either through the central market system or direct to supermarket chains which account for the majority of sales. There are small markets for semi-prepared or semi-processed product (coleslaw, salad and vegetable mixes).

Brassicas from Queensland are sold throughout Australia. Fresh cabbage, cauliflower or broccoli can be sourced from Queensland at any time of the year but the main supply period is from May to September when the Lockyer Valley and Eastern Darling Downs are in full production. During the warmer months, production is centred in the cooler highland areas of the Granite Belt and around Toowoomba.

Returns can vary greatly. Prices are often low during peak production in winter. Summer prices are often high. In regions with warm or hot summers such as the Lockyer Valley, lows yields, reduced head quality and pest and disease problems are often not offset by these higher summer prices.

Some larger brassica growers have actively pursued export markets for a number of years with some success. The major overseas markets for Queensland brassicas are south-east Asia and Japan, with $5.7 million of broccoli, $1.8 million of cauliflower and smaller quantities of cabbage exported during 2002–03 (Source: *Australian Bureau of Statistics*).

Know what you are getting into

The average price for broccoli, cauliflower and cabbage varies between seasons, making profitability and cash flow inconsistent and hard to estimate. The market is often oversupplied, particularly during winter and early spring, when returns may be below costs of production.

Consistent yields and quality can be difficult to achieve due to insect pests (for example, diamondback moth), disease problems (for example, head rots) and climatic factors. These include frosts, heat wave conditions or wet weather during harvest. Varieties also perform differently in various growing areas and under different growing conditions.

Growing brassicas is labour intensive, particularly at planting and harvest times, and there can be problems getting a good, reliable labour force.

Successful production requires cool to mild growing conditions, a well-drained soil and reliable irrigation. Capital costs can be high depending on arrangements for harvesting and packing of product. Access to rapid pre-cooling and cold storage facilities is essential for broccoli and highly desirable for cauliflower. Cabbage can be cooled and stored in a conventional cold room.

IMPORTANT
Do a marketing and business plan. This will give you a more accurate picture of what you are getting into.

Table 2 lists the some of the strengths, weaknesses, opportunities and threats (SWOT) affecting the brassica industry.

Table 2. Factors affecting the brassica industry of Queensland

Strengths	Weaknesses	Opportunities	Threats
Staple, well known products	Not suited to warm weather production	Value adding and semi-processing	Overproduction
High nutritional value	Cabbage and cauliflower not fashionable	Health aspects of the product	Lack of irrigation water (drought)
Versatile product	Generic promotions	Targeted promotion	Substantial price fluctuations
Value for money	Competition from southern states in domestic markets	New varieties	Club root
Convenient	Strong competition in export markets	Niche markets, organics, eco-labelling	Insecticide resistance problems
Reliable crop to grow in season with good management	Highly perishable product (broccoli, cauliflower)	New export markets	Labour, packaging and freight costs

What can you expect to make?

Yields vary considerably, depending on climatic conditions, pests and diseases, variety, season and planting density. Prices vary greatly, depending on supply and quality.

Cabbages are usually supplied in bulk bins and sold on a per head basis. Sugarloaf cabbages are often sold in waxed fibreboard cartons. Cauliflowers are sold either on a per head basis or, more commonly, in 78L cartons that hold 10 or 12 heads. Broccoli is usually sold in icepacks holding 8 kg of heads or in waxed fibreboard cartons holding 10 kg of product.

Production and marketing costs for cabbages, cauliflower and broccoli vary, depending on yields achieved, the size and efficiency of the operation and the cost structure of the business. Each farm is different. The estimates given in the following sections are intended only to illustrate the level of costs involved for growing, harvesting and marketing the different brassica crops.

IMPORTANT
Estimate costs for your situation. See *Economics of production* in Chapter 4, Key issues.

Of the three crops, cauliflower is by far the riskiest crop to grow as production costs are high and yields can vary substantially. Cauliflowers also require a fair amount of agronomic and management expertise to grow successfully. Cabbage and broccoli are easier to grow. However, since broccoli is the more perishable of the three products, timeliness of harvest and access to adequate cooling facilities complicate crop management.

Cabbage yields and prices

Marketable yields commonly range from 14 000 to 18 000 heads per hectare.

Market prices
Chapter 6 page 282

Price can range from $0.20 to $4.00 or more per cabbage head, but is usually in the $0.60 to $2.00 range. Figures 1 to 3 show average prices for ballhead cabbages on the Brisbane and Sydney markets and throughput of all cabbages at the Brisbane market for 2001 to 2003. The bigger the variation above or below the average price, the greater the opportunity or risk involved.

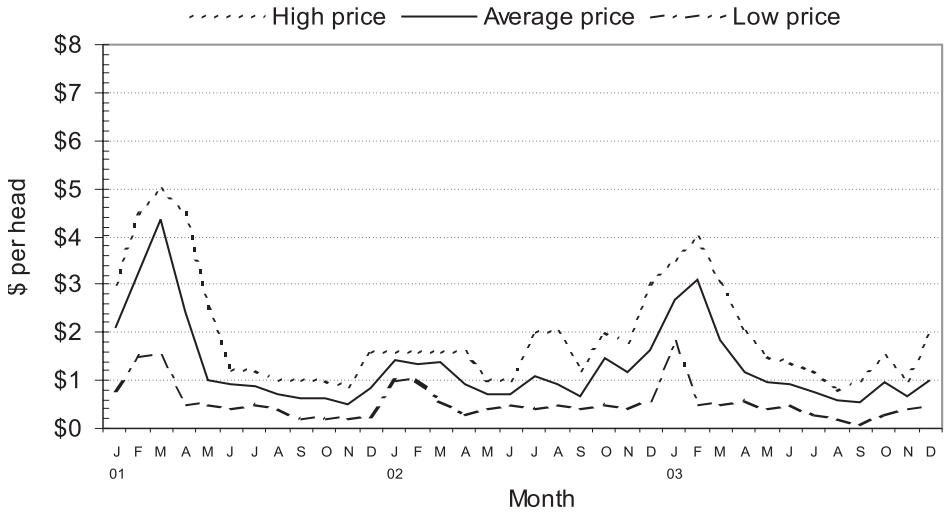

*Figure 1. Average monthly price for ballhead cabbage on the **Brisbane** market 2001 to 2003*

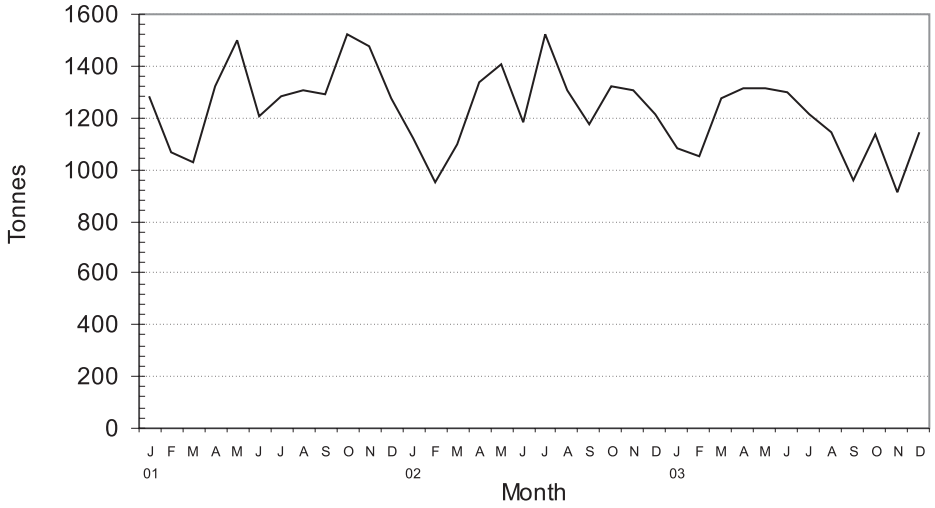

*Figure 2. Throughput of cabbage on the **Brisbane** market 2001 to 2003*

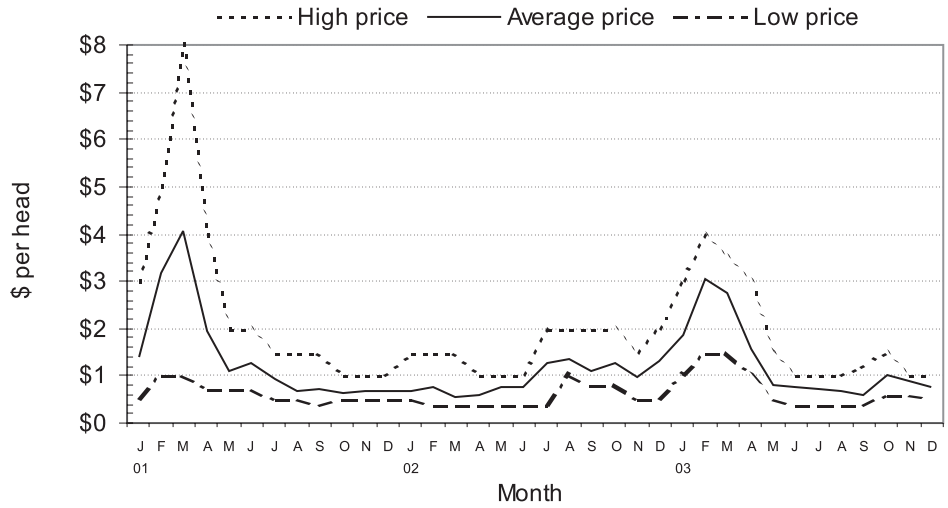

*Figure 3. Average monthly price for ballhead cabbage on the **Sydney** market 2001 to 2003*

Production costs for cabbage

Production and marketing costs in southern Queensland are at least $0.70 per head. Variable growing, harvesting and marketing costs range from $10 000 to $16 000 or more per hectare.

Table 3 shows the estimated average costs of a southern Queensland crop yielding 16 000 heads per hectare sold in fibreboard bulk bins at $1.00 per head on the Brisbane market.

Table 3. Example costs of producing and marketing a cabbage crop grown in southern Queensland

Costs	$ per head	$ per hectare
Growing	0.22	3 520
Harvesting (pick, pack & bin)	0.37	5 920
Marketing (freight and commission)	0.25	4 000
Total variable costs	**0.84**	**13 440**

Gross margin

At an average yield of 16 000 heads per hectare and an average price of $1.00 per head, the gross return would be $16 000/ha. The gross margin (income after deducting growing, harvesting and marketing costs) for the yield, price and cost averages used here would be $2560/ha. To determine your net income, deduct fixed and capital costs such as rates, vehicle registration, insurance, electricity, administration, interest and living expenses.

Cabbage gross margin
Chapter 4 page 87

Cauliflower yields and prices

Marketable yields commonly range from 1 500 to 2 000 cartons per hectare. Yields can be substantially lower during unfavourable growing conditions.

Price can range from $2.00 to $50.00 per carton, but is usually in the $8.00 to $18.00 range. Figures 4 to 6 show average prices and throughput at the Brisbane market and prices at the Sydney market for 2001 to 2003. The bigger the variation above or below the average price, the greater the opportunity or risk involved.

Market prices
Chapter 6 page 282

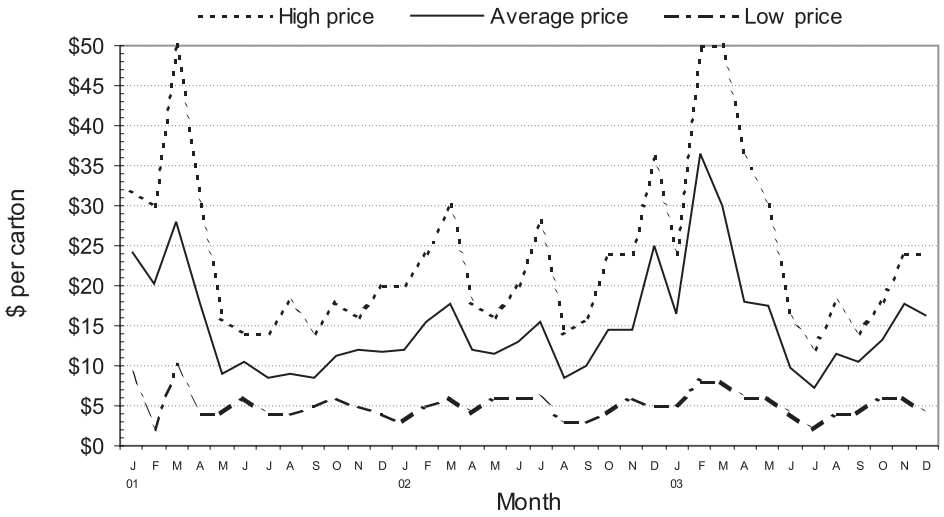

*Figure 4. Average monthly price for cauliflower on the **Brisbane** market 2001 to 2003*

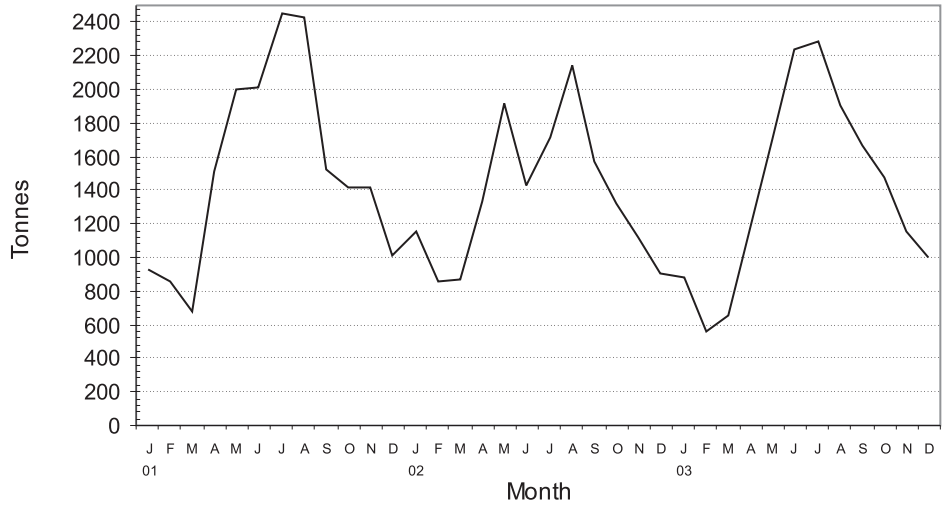

*Figure 5. Throughput of cauliflower on the **Brisbane** market 2001 to 2003*

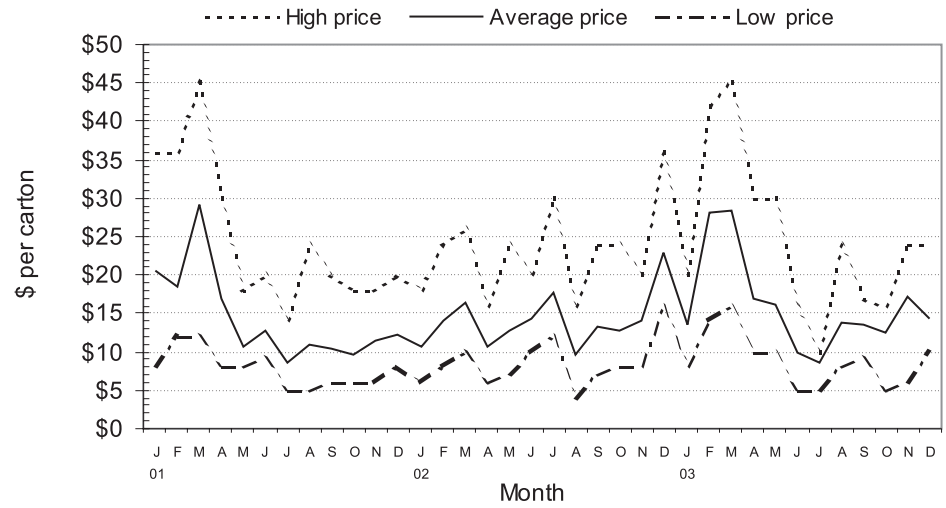

*Figure 6. Average monthly price for cauliflower on the **Sydney** market 2001 to 2003*

Production costs

Production and marketing costs in southern Queensland are at least $9.50 per carton. Variable growing, harvesting and marketing costs are at least $14 000/ha, but can be $20 000 or more per hectare. The evenness of crop maturity will have a significant impact on harvesting costs.

Table 4 shows the estimated average costs of a southern Queensland crop yielding 1 700 cartons per hectare sold at $12 per carton on the Brisbane market.

Table 4. Example costs of producing and marketing a cauliflower crop grown in southern Queensland

Costs	$ per carton	$ per hectare
Growing	2.77	4 709
Harvesting (pick, pack & carton)	5.61	9 537
Marketing (freight and commission)	2.35	3 995
Total	**10.73**	**18 241**

Gross margin

Cauliflower gross margin
Chapter 4 page 90

At an average yield of 1 700 cartons per hectare and an average price of $12 per carton, the gross return would be $20 400/ha. The gross margin (income after deducting growing, harvesting and marketing costs) for the yield, price and cost averages used here would be $2159/ha. To determine your net income, deduct fixed and capital costs such as rates, vehicle registration, insurance, electricity, administration, interest and living expenses.

Broccoli yields and prices

Marketable yields commonly range from 700 to 1000 icepacks per hectare.

Market prices
Chapter 6 page 282

Price can range from $3.00 to $40.00 per icepack, but is usually in the $12.00 to $22.00 range. Figures 7 to 9 show average prices and throughput at the Brisbane market and prices at the Sydney market for 2001 to 2003. The bigger the variation above or below the average price, the greater the opportunity or risk involved.

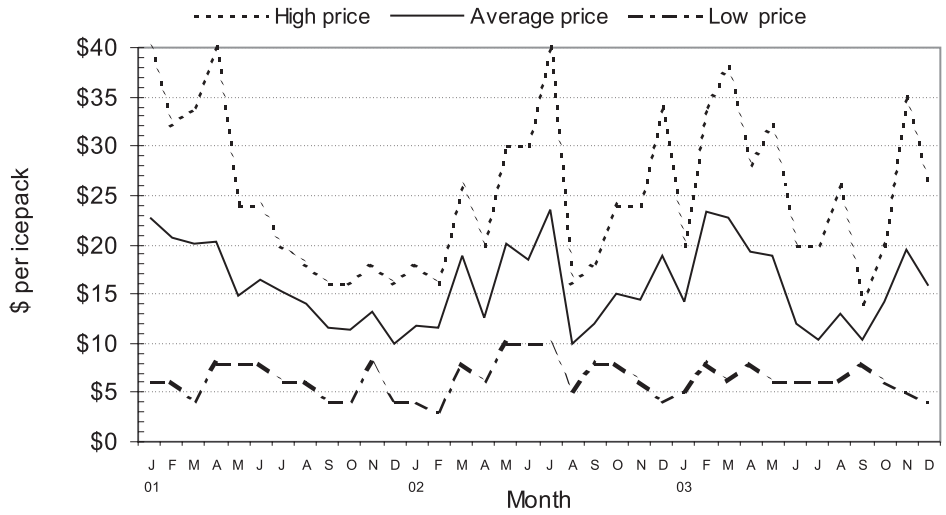

Figure 7. Average monthly price for broccoli on the ***Brisbane*** *market 2001 to 2003*

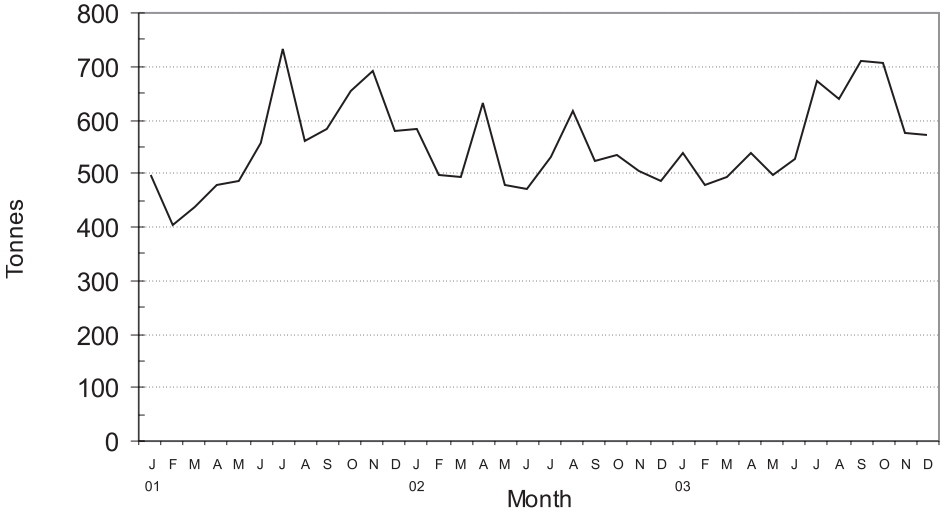

Figure 8. Throughput of broccoli on the ***Brisbane*** *market 2001 to 2003*

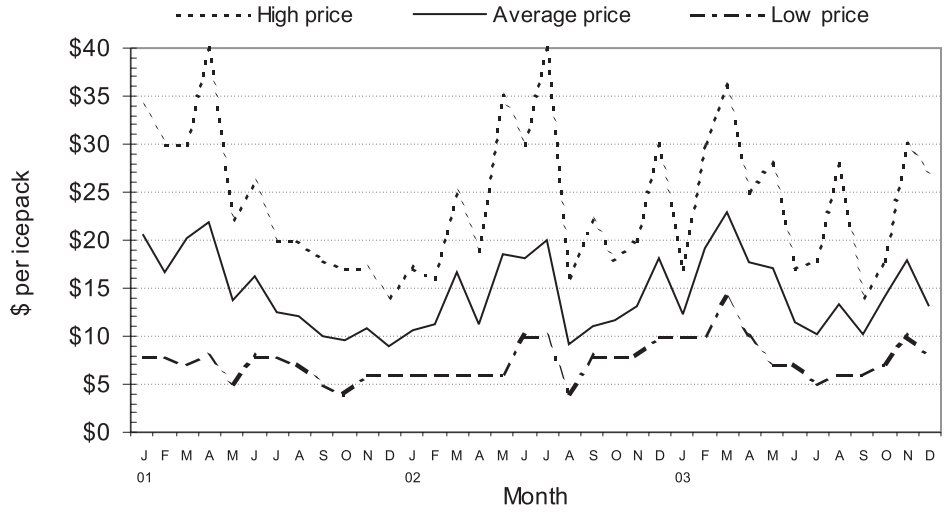

Figure 9. Average monthly price for broccoli on the ***Sydney*** *market 2001 to 2003*

Production costs

Production and marketing costs in southern Queensland are at least $13.00 per icepack. Variable growing, harvesting and marketing costs range from $11 000 to $15 000 or more per hectare.

Table 5 shows the estimated average costs of a southern Queensland crop yielding 900 icepacks per hectare sold at $16.00 per icepack on the Brisbane market.

Table 5. Example costs of producing and marketing a broccoli crop grown in southern Queensland

Costs	$ per icepack	$ per hectare
Growing	4.75	4 275
Harvesting (pick, pack & icepack)	6.66	5 994
Marketing (freight and commission)	2.50	2 250
Total	**13.91**	**12 519**

Gross margin

Broccoli gross margin
Chapter 4 page 93

At an average yield of 900 icepacks per hectare and an average price of $16 per icepack, the gross return would be $14 400/ha. The gross margin (income after deducting growing, harvesting and marketing costs) for the yield, price and cost averages used here would be $1881/ha. To determine your net income, deduct fixed and capital costs such as rates, vehicle registration, insurance, electricity, administration, interest and living expenses.

Capital required

Assuming that you own or have access to suitable land, it would cost around $250 000 to $300 000 to buy the minimum amount of new machinery, plant and equipment needed to set up a 20 to 30 hectare brassica enterprise. This will depend on which crop you grow and what harvesting and packing arrangements you use. Cabbage would generally be less capital intensive than broccoli or cauliflower.

To reduce capital outlays, you could lease or borrow equipment and contract harvesting and packing operations. Second-hand equipment prices are normally about half that of new equipment, depending on condition and age.

You will also need to finance production and marketing of the crop. Brassicas are usually planted on a weekly schedule over a number of months. You may be looking at investing $100 000 to $200 000 in variable growing, harvesting and marketing costs before receiving a gross return from the first harvest.

The farm you need

Soil

Getting the crop started
Chapter 3 page 34

Brassicas will grow on most soil types but the crop needs at least 300mm of friable, well-drained topsoil. Poorly drained soils or heavy clay soils become waterlogged after rain or irrigation, making crop management more difficult. Brassicas prefer a slightly acid soil (pH 6.0 to 6.5) but will tolerate a slightly alkaline soil, up to pH 7.5.

Climate

Brassicas grow best under cooler temperatures. Mild, sunny days with temperatures between 15° and 25°C and cool nights with temperatures between 10° and 15°C are considered ideal. Heavy winter frost (below –4°C) can damage heads and will kill young seedlings. Some varieties will tolerate hot conditions but high temperatures will reduce both head quality and yields. Cauliflower is particularly sensitive to temperature extremes.

During extended rainy weather, plants are more likely to become infected with diseases such as black rot and bacterial head rots. These are difficult to manage once the disease is established in the field. Rainfall will also restrict machinery operations, particularly on heavy soils.

Brassica crops are attacked by a range of butterfly and moth larvae (caterpillars). These can be difficult to control, particularly in the warmer months.

Slope

Ideally slopes should be no more than 3%. A slight slope will provide better drainage while still allowing for efficient irrigation and use of machinery. Steep slopes will be more difficult and expensive to work. Uniform slopes are desirable but not essential. Soil erosion can be a problem on steep slopes while depressions can result in waterlogging.

Prepare the land
Chapter 3 page 41

Slopes above 5% require recognised soil conservation practices. Slopes above 8% make machinery operations hazardous and it can be difficult to maintain uniform irrigation.

Water

An adequate water supply is essential to ensure economic yields of high quality product. Each crop will require 2.5 to 4 megalitres (ML) of water per hectare, depending on season, soil type and crop type. This is equivalent to 250 to 400 mm of total rain and/or irrigation over one hectare of land.

When surface water, for example dams, is your main source of irrigation water, a storage capacity of 6 to 8 ML will be required for each hectare of crop grown. This will ensure that you have adequate water supplies to meet peak irrigation demands even in unseasonably dry conditions.

Brassicas are usually watered with overhead irrigation systems although some growers are switching to drip (trickle) irrigation.

Irrigation management
Chapter 4 page 168

The crop is moderately sensitive to poor quality water. Electrical conductivity is a measure of water salinity. Table 6 shows the water conductivity threshold for different soil types at which yield reductions may occur.

Table 6. Water conductivity threshold for different soil types

	Sandy	Loam	Clay
Cabbage	3.5 dS/m	2.0 dS/m	1.2 dS/m
Cauliflower	3.2 dS/m	1.8 dS/m	1.1 dS/m
Broccoli	4.9 dS/m	2.8 dS/m	1.6 dS/m

Source: *NRM Facts, water series W55*

Until recently water conductivity was reported in microSiemens per centimetre (µS/cm), however it is now reported as deciSiemens per metre (dS/m).

To convert from µS/cm to dS/m use the following formula.

microSiemens per centimetre (µS/cm) divided by 1000 = deciSiemens per metre (dS/m)

Example: 1200 µS/cm divided by 1000 = 1.2 dS/m

To convert from deciSiemens per metre to microSiemens per centimetre multiply by 1000.

Example: 1.2 dS/m x 1000 = 1200 µS/cm

The machinery and equipment you need

The machinery and equipment required will depend on the size of the enterprise and crop grown. Table 7 lists the machinery and equipment considered essential for brassica production on a small scale (20 to 30 hectare). Machinery, plant and equipment listed as desirable would make management easier by increasing flexibility and would be considered essential in a larger enterprise.

The prices listed in the table are estimates only. Rather than buying new machinery you could lease, borrow or buy second-hand equipment to reduce capital outlays. Harvesting, cooling and packing can be contracted out in most major vegetable production districts.

Table 7. Estimated cost of new machinery and equipment

Equipment	New price $
Essential	
Tractor (26 kW) for planting, cultivation, spraying, harvest	30 000
Tractor (45 to 60 kW) for discs, ripper, rotary hoe	60 000
Truck or tractor and trailer	10 000–40 000
Cultivation equipment	20 000–25 000
Bed-former	2 000
Transplanter	4 000
Fertiliser spreader	10 000
Spray equipment for crop	10 000
Irrigation equipment	80 000
Tractor mounted forklift	10 000
Pallet jack	700
Desirable	
Power harrows (1.5m width with bed-former)	17 000
Spray equipment for herbicides	4 000
Harvest aid	26 000
Shed forklift	30 000
Slasher/pulveriser	3 000–6 000
Sorting/packing tables and equipment	10 000
20 pallet coldroom	35 000
Forced air cooling facilities (8 pallet room)	50 000

The labour you need

One person could grow 10 to 15 hectares of crop over a six-month period with additional labour to help with transplanting, harvesting and packing. Cabbage production is less labour-intensive than cauliflower and broccoli growing.

Three people plus a driver are required for planting. This team could plant out around 5000 to 7000 transplants per hour.

A team of four can cut around three half-tonne bins of cabbage per hour. Six to eight people are needed to operate a harvest aid efficiently. Using a harvest aid, a team of eight could pick and pack between 40 to 50 icepacks of broccoli per hour or 60 to 80 cartons of cauliflower per hour. Cutting and packing rates would slow considerably when more than two or three passes are needed to harvest the crop.

Transplanting, harvesting, cooling and packing operations can be contracted out for all three crops; this reduces problems associated with managing a large number of staff.

Other considerations

Growing brassica crops involves hard, physical work. This includes land preparation, planting, spraying for weed, pest and disease control, fertilising, irrigating, harvesting and packing. There is a high labour requirement for transplanting, picking and packing, particularly for product sold in cartons or icepacks.

Management skills or access to consultants with these skills are required for managing finances, administration, staff and the crop. Good communication skills, or staff with these skills, are essential for successfully managing labour and organising markets. Skills in machinery operation and maintenance, the ability to read and understand chemical labels, and skill in observing and fixing problems in their early stages, are essential. Careful attention to detail is necessary to be a successful brassica grower.

Quality of the end product is most important in successful cabbage, cauliflower or broccoli growing. This starts with good land preparation, careful selection of varieties to suit the district and season and continues through the growing of the crop, harvesting, cooling, packing and marketing.

Organic production
Chapter 4 page 260

Brassica crops may be grown organically. However, it can be difficult to achieve adequate weed, pest and disease control.