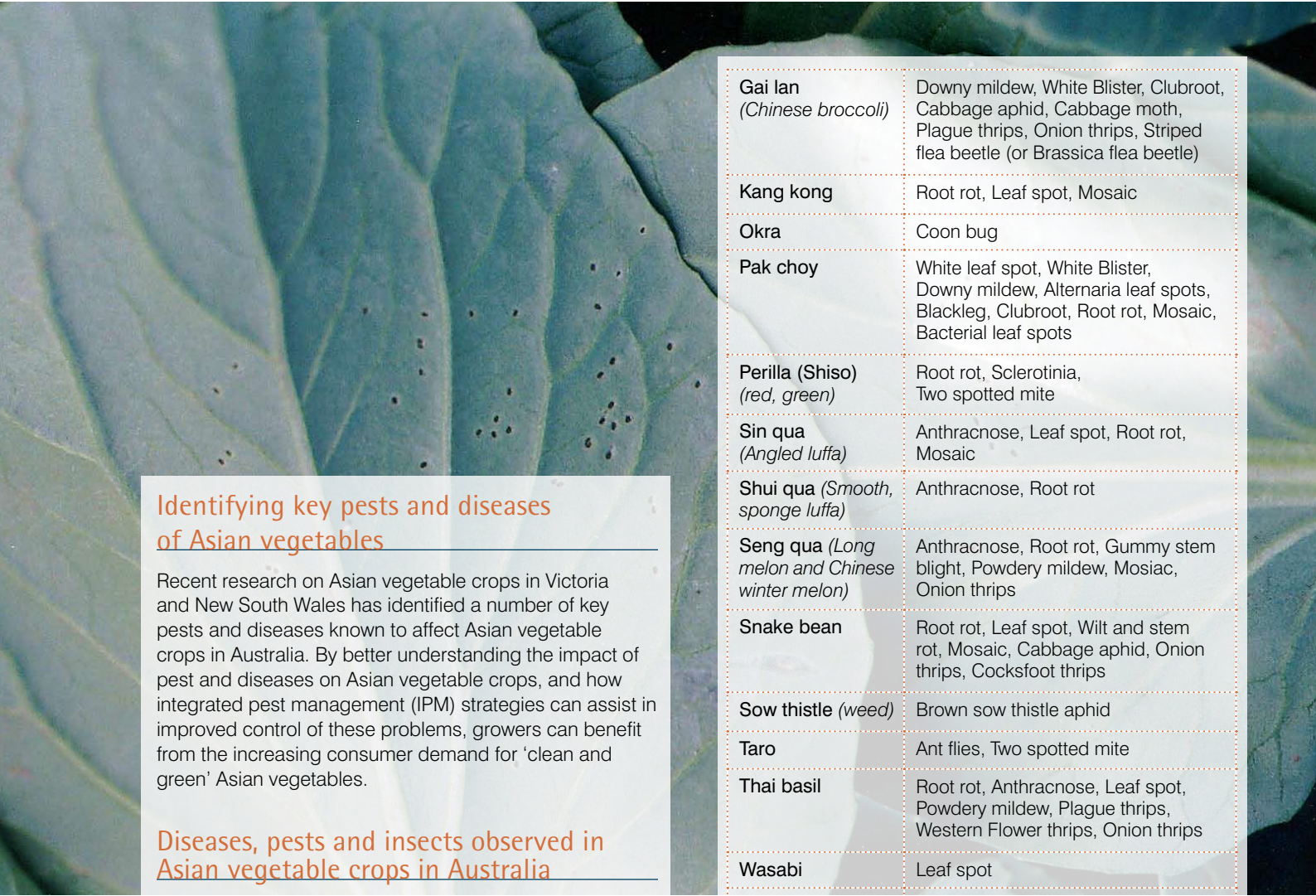


Identifying Key Pests and Diseases of Asian Vegetables

The popularity of Asian vegetables has increased in recent years amongst consumers with a range of uses, including salad and baby leaf mixes. With increased demand has come the need to manage losses caused by pests and disease. Critical to the successful management of pest and diseases in any vegetable crop, is an understanding of the main pests and diseases known to affect each crop.

The bottom line

- ▶ There are limited options available in using chemicals to control pest and diseases in Asian vegetable crops. Therefore it is encouraged that an IPM strategy for effective control of Asian crops, is implemented.
- ▶ IPM methods discourage the use of broad-spectrum chemical pesticides, and instead, recommend growers employ a combination of plant protection strategies, such as best-practice farm hygiene, biological controls and a targeted application of selective chemicals.
- ▶ Regular surveillance of crops is an effective way of monitoring any beneficial insects (such as natural predators) that may be present within the crop and is a sure way that an IPM program is working effectively.



Identifying key pests and diseases of Asian vegetables

Recent research on Asian vegetable crops in Victoria and New South Wales has identified a number of key pests and diseases known to affect Asian vegetable crops in Australia. By better understanding the impact of pest and diseases on Asian vegetable crops, and how integrated pest management (IPM) strategies can assist in improved control of these problems, growers can benefit from the increasing consumer demand for 'clean and green' Asian vegetables.

Diseases, pests and insects observed in Asian vegetable crops in Australia

Gai lan (<i>Chinese broccoli</i>)	Downy mildew, White Blister, Clubroot, Cabbage aphid, Cabbage moth, Plague thrips, Onion thrips, Striped flea beetle (or Brassica flea beetle)
Kang kong	Root rot, Leaf spot, Mosaic
Okra	Coon bug
Pak choy	White leaf spot, White Blister, Downy mildew, Alternaria leaf spots, Blackleg, Clubroot, Root rot, Mosaic, Bacterial leaf spots
Perilla (Shiso) (<i>red, green</i>)	Root rot, Sclerotinia, Two spotted mite
Sin qua (<i>Angled luffa</i>)	Anthrachnose, Leaf spot, Root rot, Mosaic
Shui qua (<i>Smooth, sponge luffa</i>)	Anthrachnose, Root rot
Seng qua (<i>Long melon and Chinese winter melon</i>)	Anthrachnose, Root rot, Gummy stem blight, Powdery mildew, Mosaic, Onion thrips
Snake bean	Root rot, Leaf spot, Wilt and stem rot, Mosaic, Cabbage aphid, Onion thrips, Cocksfoot thrips
Sow thistle (weed)	Brown sow thistle aphid
Taro	Ant flies, Two spotted mite
Thai basil	Root rot, Anthrachnose, Leaf spot, Powdery mildew, Plague thrips, Western Flower thrips, Onion thrips
Wasabi	Leaf spot
Wombok (<i>Chinese cabbage</i>)	White leaf spot, White Blister, Downy mildew, Alternaria leaf spots, Blackleg, Clubroot, Mosaic, Bacterial leaf spot, Bacterial soft rot

(Source: Tesoriero et al, 2008)

IPM in Asian vegetables

The impact on Asian vegetables from insect and disease can vary according to the type of crop being grown, the cultivar selected, the method of production, as well as factors such as weather, climate, geographical location of the crop and the time of year.

For many Asian vegetable crops, there are limited options for the chemical control of pests and diseases due to lack of registrations and a short crop life. Industry encourages the use of IPM strategies for the effective and responsible control of pest and diseases across all vegetable crops, including Asian vegetables and culinary herbs. IPM methods discourage the use of broad-spectrum chemical pesticides, and instead, recommend growers employ a combination of plant protection strategies. These include the use of best-practice farm hygiene, biological controls where available, and the targeted application of selective chemicals, if and when necessary.

Crop name	Known diseases / key pests / insects affecting crop
Buk choy	White leaf spot, White Blister, Downy mildew, Alternaria leaf spots, Blackleg, Clubroot, Root rot, Mosaic, Bacterial leaf spots
Chi qua (<i>Hairy melon</i>)	Anthrachnose, Onion thrips, Cocksfoot thrips
Choy Sum	White leaf spot, White Blister, Downy mildew, Alternaria leaf spots, Blackleg, Clubroot, Root rot, Mosaic, Bacterial leaf spots, Western Flower thrips, Onion thrips, Plague thrips
Chrysanthemum	Rutherglen bug
Daikon (white) radish	Leaf spot, White blister, Mosaic, Clubroot, Root rot
Fu qua (<i>Bitter melon</i>)	Gummy stem blight, Powdery mildew, Mosaic, Bacterial leaf spot, Western Flower thrips, Plague thrips, Onion thrips, Banded thrips
Gai choy (<i>Chinese mustard</i>)	Downy mildew, White Blister, Clubroot, Mosaic

Insect pests

IPM strategies are particularly effective for the management of key pests in Asian leafy vegetable crops. For example, in the Sydney Basin, management of two-spotted mites and Diamondback moth can be achieved without synthetic pesticides.

Frequent scouting for insect pests in the field is recommended, as it allows growers to recognise any changes in insect activity in their crop, as well as identifying any new pests. Regular surveillance also provides information regarding any beneficial insects (such as natural predators) that may be present within the crop. The presence of beneficial insects is a positive indication of effective pest management.

Research has demonstrated that the timed release of biological controls (beneficial insects) in protected cropping environments (polyhouse operations) can have a significant effect on the successful management of insect pests.

Growers may also consider planting a 'trap crop' within proximity of their vegetables crops. A trap crop is designed to attract pests away from the commercial crop, while potentially being a breeding ground for beneficial insects. For example, recent research has demonstrated that growing a chrysanthemum crop close to Asian Brassica crops, such as Tat soy, Pak choy and Mizuna can successfully draw Rutherglen bugs and thrips away from the commercial crop.

Foliar diseases

Foliar diseases, such as White leaf spot and Downy mildew, are found to affect most production areas, particularly in Asian baby leaf and Chinese broccoli. New disease forecasting models can improve management of foliar diseases particularly for leafy brassicas with a short production cycle. New management strategies incorporating weather-based disease prediction, spray scheduling and irrigation will be required to improve control of diseases such as Downy mildew in leafy brassicas and spring onions.

Root diseases

Root diseases are found to be primarily on farms with a long production history in the Sydney Basin. Clubroot has been found to be the most important disease of leafy brassicas. Currently there are few management options other than liming. By contrast, hydroponically grown crops are found to be less susceptible to Clubroot. Growers may consider converting to hydroponic systems for the production of leafy brassicas as a means of avoiding Clubroot.

Viruses

Viruses such as Turnip mosaic virus, Cucumber mosaic virus and Alfalfa mosaic virus have been detected in Asian vegetable crops. Aphid activity and surrounding weed reservoirs are linked to the occurrence of some viruses such as Turnip and Watermelon mosaic. Growers should recognise the importance of weed management, whole farm and crop hygiene as preventative measures against mosaic viruses.



Managing pests in Asian baby leaf crops

With the popularity of baby leaf products growing over recent years, many producers have found that Asian baby leaf crops can be susceptible to damage by a variety of pests, with rates of damage up to 60 per cent in some circumstances. These high value, labour-intensive crops are commonly grown for the pre-packaged baby leaf salad market when continuity of supply is important.

The use of broad-spectrum insecticides for Asian baby leaf crops is variable, and often ineffective. Due to the short growing period's of baby leaf crops (as short as four weeks from seed to harvest in the summer, and up to six or seven weeks in winter months) a preventative approach to pest management is more likely to result in success. The use of an IPM strategy can better provide pest control rather than reliance on chemicals.

Like other Asian vegetable crops, baby leaf crops should be regularly monitored for insect activity. Due to the dense nature of meadow plantings, it is necessary to scout quadrants at multiple sites, rather than to scout individual plants to determine the extent of activity.

Observed key pests and beneficial insects for Asian baby leaf crops (Pak choy and Tat soy)

Pests	Beneficials
Diamondback moth Cabbage Centre Grub Aphids Thrips Leaf Miner Rutherglen Bug Cabbage white butterfly	Wasps Spiders Lacewings Hover fly Lady beetles
Minor Pests	Minor Beneficials
<i>Helicoverpa</i> spp Jassids Flea beetle Shore Flies Fungus gnats Green Mirid Cabbage Cluster Moth Mites Carabid beetle	Pirate bugs Soldier Beetle Tachinid flies Rove beetle Soldier Beetle Red and blue beetle Assassin Bug Damsel Bug Big Eyed Bug

(Source: Tesoriero et al, 2008)

Perimeter or border planting of trap crops, such as chrysanthemum, has been found to be a potentially useful management strategy in baby leaf plantings for pests such as Rutherglen bugs.

Managing chemical use

Chemical management of pests and disease of Asian vegetables may be limited due to a number of reasons. As it is a relatively new area of cultivation in Australia, there is still a great deal to understand about how Asian vegetable crops grow, the types of pests and diseases that affect them, and their responsiveness to chemical pesticides. Many are also minor crops, and consequently there are limited pesticide registrations. It is for this reason, that very few chemical compounds are registered for specific use on Asian vegetable crops.

It is equally as important to understand which chemicals are suitable for managing a particular pest or disease, as it is important to know when to apply the chemical. Mis-use of broad-spectrum chemical pesticides is a major concern to industry, as it may lead to increased resistance in insect pests, crop residues, as well as having broader implications on the surrounding environment.

Growers should regularly monitor their crops for insect or disease activity, and should apply chemicals in response to the actual need, rather than according to a fixed calendar schedule.

Growers are encouraged to seek assistance from their local Department of Primary Industries if they require further information regarding chemical selection and use.

Further reading and acknowledgements

Robert Dimsey, VIC Department of Primary Industries, VG04032 – *Integrated management strategies for pests and diseases of Asian vegetables*, robert.dimsey@dpi.vic.gov.au, (03) 5152 0619

Len Tesoriero, NSW Department of Primary Industries, VG04032 – *Integrated management strategies for pests and diseases of Asian vegetables*, len.tesoriero@dpi.nsw.gov.au or len@tesoriero.com, (02) 4640 6406

Tesoriero, L., Scanes, M., Terras, M., and Gorrie, B. (2005). *Surveys for Asian vegetable diseases in the Sydney Basin. Poster and expanded abstract in: The 15th Biennial Australasian Plant Pathology Society Conference Handbook*, Geelong 26-29 September, 340.

Vujovic, S. (2005). *NESB vegetable growers successfully complete FCU course*. Access to Asian Foods, Issue 81 June 2005.

Dimsey, R. and Tesoriero, L. (2005). *Developing integrated management strategies for diseases and pests of Asian vegetables*. Access to Asian Foods, Issue 83, August 2005.
Vujovic, S. (2005). *Visit to Sydney market by Victorian growers*. Access to Asian Foods, Issue 84, September 2005.

Vujovic, S. (2005) *Grower seminar at Lara*. Access to Asian Foods, Issue 86, November 2005.

Vujovic, S. (2005) *Gotu Kola – Pennywort*. Access to Asian Foods, Issue 83, August 2005.

Dimsey, R and Zirnsak, L. *Types of Leaf Damage on Asian Baby Leaf Crops*. Issue N.o. 94 November 2006.

Dimsey, R and Zirnsak, L. *Key Pests and Beneficials in Asian Baby Leaf Vegetables*. Asian Foods Newsletter February 2007, Issue No. 95.

Vujovic, S. (2007). *Integrated Management System project assists Asian vegetable growers with response to the drought*. Asian Foods Newsletter April 2007, Issue No.97.

Image: Quadrant and hand.

Cover image, Chewing mass; p.2 Piercing; p.3 DBM and yellow. Images courtesy of Victorian Department of Primary Industries.

ISSN: 1449 – 1397

Copyright© AUSVEG Ltd & HAL 2009

No part of this publication can be copied or reproduced without the permission of the original authors.

vegenotes is produced by: AUSVEG Ltd

PO Box 563, Mulgrave VIC 3170

T: 03 9544 8098 | F: 03 9558 6199

This project has been funded by HAL using the National Vegetable Levy and matched funds from the Australian Government.

DISCLAIMER: Every attempt is made to ensure the accuracy of all statements and claims made in vegenotes. However, due to the nature of the industry, it is impossible for us to know your precise circumstances. Therefore, we disclaim any responsibility for any action you take as a result of reading vegenotes.

AUSVEG

HAL

Know-how for Horticulture™