NATIONAL

GREEN PEACH APHID

Best management practice guide

GRDC

The green peach aphid (*Myzus persicae*, GPA) has evolved resistance to a large number of insecticides globally – more than 80 active ingredients across a range of mode of action (MOA) groups.

Within Australia, high levels of resistance to carbamates and synthetic pyrethroids, and low levels of resistance to organophosphates and neonicotinoids, are widespread. Additionally, some populations have evolved resistance to sulfoxaflor and spirotetramat.

For now, afidopyropen and flonicamid remain effective chemistries for GPA control in Australia and need to be used judiciously.

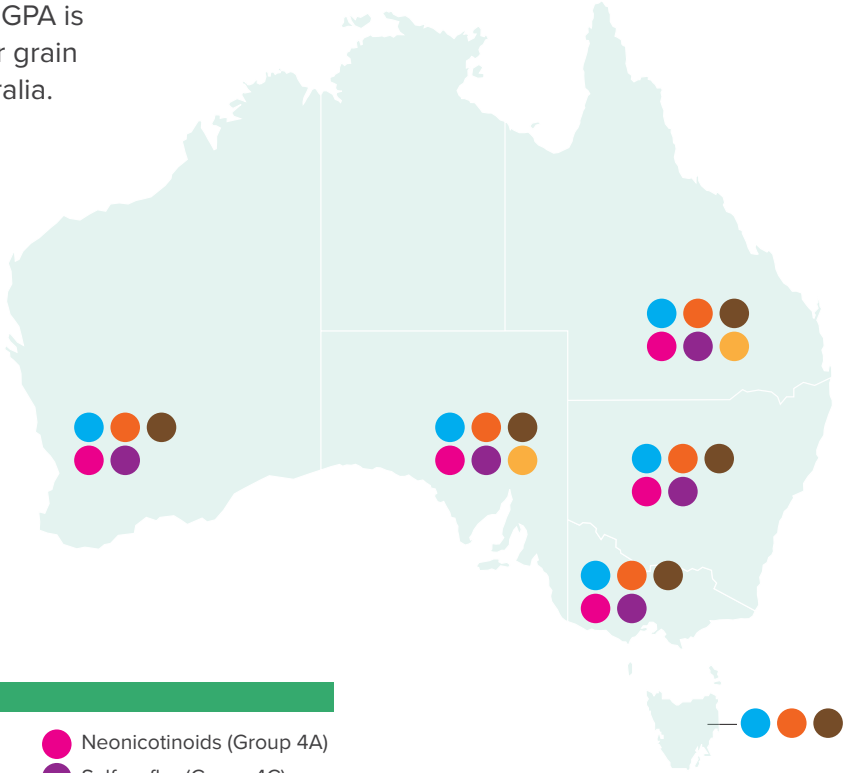
Ultimately, the use of insecticides to control GPA in canola, pulses and horticultural crops places strong selection pressure on the evolution of resistance. A chemical windowing strategy has been developed for GPA in canola (page 14), which aims to minimise the selection pressure for further resistance issues in this pest.

This guide covers best management practice of GPA in canola and strategies to reduce the risk of insecticide resistance evolution.

HOW TO USE THIS GUIDE

1. **Become familiar with GPA biology and identification**
2. **Determine your risk for the season and follow the recommendations**
3. **Consider seasonally based best management practices and actions**
4. **Follow the chemical windowing strategy**

Insecticide resistance in GPA is common across all major grain growing regions of Australia.



Known resistances

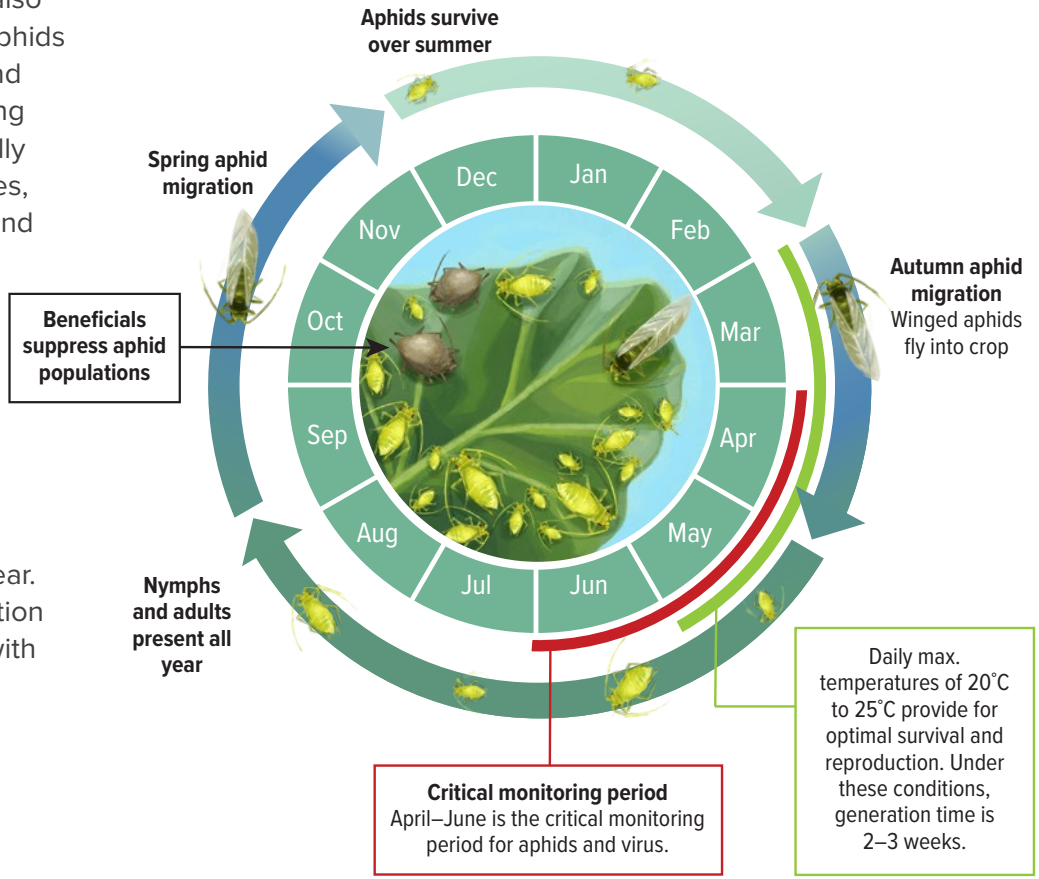
- Carbamates (Group 1A)
- Organophosphates (Group 1B)
- Synthetic pyrethoids (Group 3A)
- Neonicotinoids (Group 4A)
- Sulfoxaflor (Group 4C)
- Spirotetramat (Group 23)

SOURCE: CESAR AUSTRALIA, MAY 2024

GPA is a major pest of canola and also attacks a number of pulse crops. Aphids feed by sucking sap from leaves and flower buds. In canola, direct feeding damage caused from GPA is typically less severe than other aphid species, unless populations become large and crop plants are moisture stressed. GPA's ability to vector plant viruses poses a greater threat than damage from direct feeding.

GPA is found all year round, with populations typically peaking in autumn and spring in southern and western grain growing regions.

GPA has many generations each year. Under ideal conditions, the generation time can be less than two weeks, with females producing live young.



GPA can transmit more than 100 plant viruses, including turnip yellows virus (TuYV). Aphids acquire TuYV by feeding on infected plants and they spread the virus to healthy plants through subsequent feeding. Severe virus epidemics can occur when virus-infected aphids enter crops in autumn.

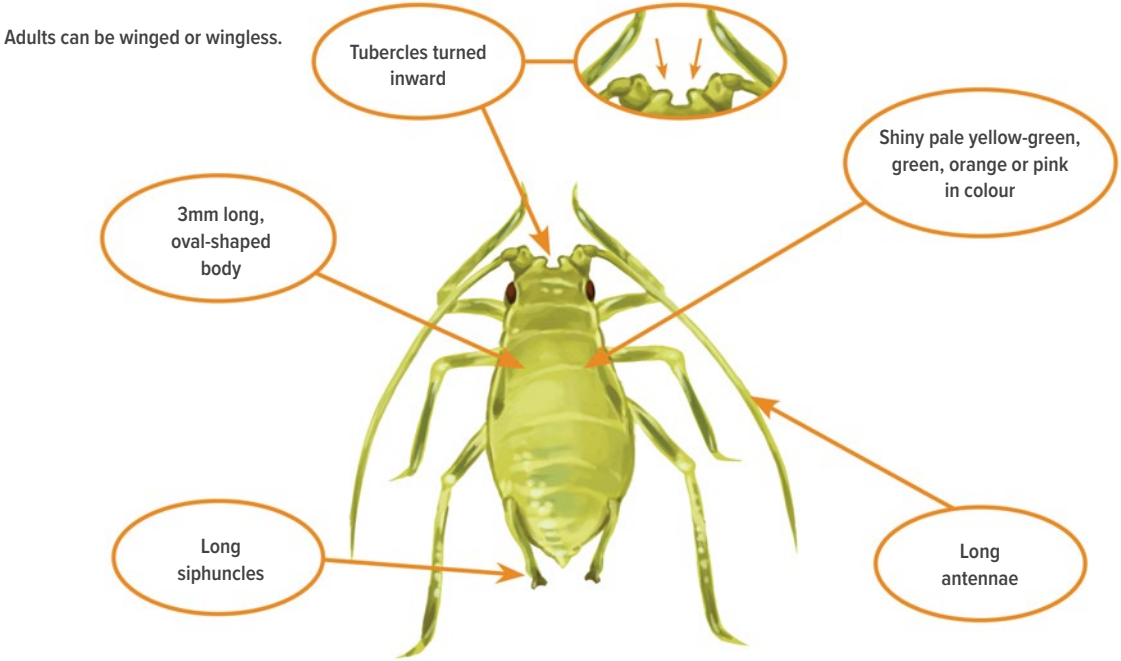
However, in any given year, many aphids will not be infected and the presence of GPA does not necessarily mean virus will be present.

Relatively few GPA individuals are required to transmit TuYV. Transmission can occur before GPA populations are noticed in the field.

PHOTO: JOOP VAN LEUR

Turnip yellows virus in canola.

GPA grow up to three millimetres long, have an oval-shaped body and vary in colour from shiny pale yellow-green, green, orange or pink. Adults are oval-shaped. Winged adults have a dark patch on the abdomen, while wingless adults are usually quite uniform in colour and are easier to identify in the field. Nymphs are similar to wingless adults but smaller in size.



The most common aphids found in canola crops are GPA, cabbage aphid and turnip aphid. In addition to having a different appearance to GPA, cabbage and turnip aphids tend to form dense colonies and are most common in spring. Unlike other species, GPA is mostly found on the underside of the lower leaves of canola plants.


Green peach aphid.


Cabbage aphid.

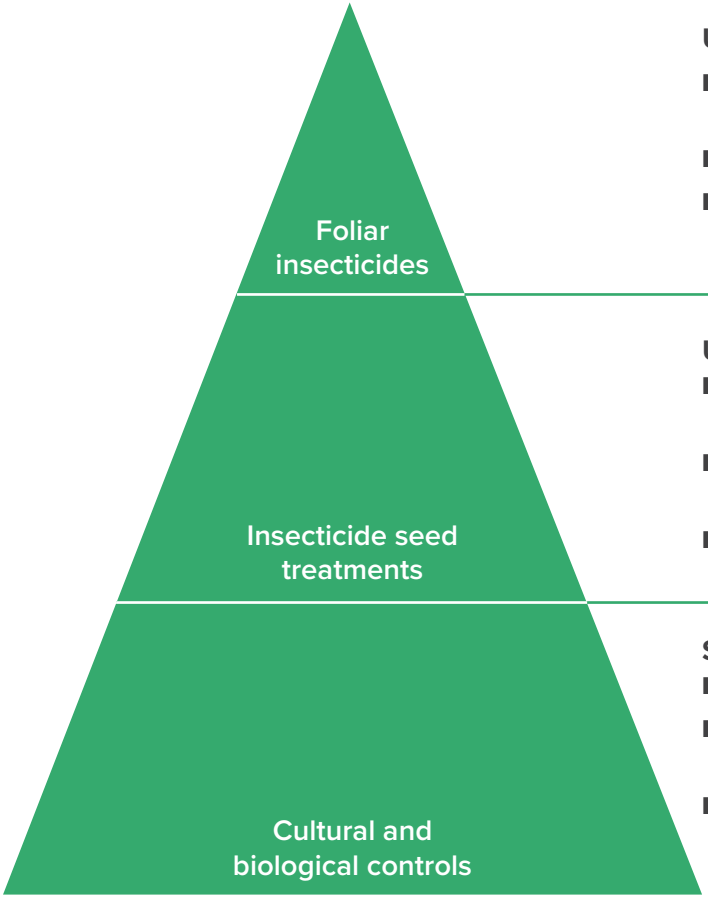

Turnip aphid.

PHOTOS: CESAR AUSTRALIA

Understanding your risk is key to best management practice. The table below is a guide to assessing GPA and TuYV risk from pre-season to crop establishment.

NB: For each row, risk can be considered 'normal' level if not 'low' or 'elevated'. Overall risk assessment should be based on the balance of low vs. elevated risk factors.

Risk factor	Low risk	Elevated (mod. to high) risk	Explanatory notes
Average annual rainfall in your cropping zone	Low-rainfall zone (<400mm per year)	Medium to high-rainfall zone (>550mm per year)	High-rainfall areas support a greater abundance of GPA/TuYV reservoirs.
Proximity to dual-purpose canola, irrigated crops or weedy patches	>3km from such areas	Adjacent (<3km) to such areas	Semi-permanent GPA host reservoirs increase your localised risk.
Summer rainfall (December–February)	Less than 100mm rainfall	Greater than 150mm rainfall	High rainfall supports greater abundance of GPA/TuYV plant hosts and faster build-up of aphid numbers.
Seasonal vegetation response (March–April)	Relatively little or short-lived green bridge	Substantial green bridge	Where and when rainfall falls is important; prolonged green bridge increases risk.
Seasonal temperatures during autumn (April–May)	Average maximum daily temperatures <15°C	Average maximum daily temperatures >18°C and <30°C	High temperatures promote aphid development and flight activity.
Presence of viruliferous GPA	None	Aphids entering the paddock	Involves laboratory assessment that is not always accessible. Where inaccessible, use above methods to assess risk.



Use foliar insecticides only as necessary

- Base spray decisions on aphid and virus risk – refer to page 8
- Rotate modes of action (MOA) – refer to page 14
- Follow all label instructions and do **not** cut rates

Use seed treatments strategically

- Apply canola seed treatments unless GPA and TuYV risk is low
- Ensure proper application and coverage when applying seed treatments
- Monitor crops post-emergence to ensure seed treatment efficacy

Start with a solid foundation

- Eliminate the 'green bridge' prior to sowing
- Do not sow early and sow into standing stubble where possible
- Support the build up of beneficial insects – refer to page 16

Key actions

1. Assess regional and seasonal GPA and TuYV risk pre-season (February–April) before making control decisions.
2. Eliminate green bridge (at least within target paddocks) a minimum of 14 days before sowing.

LOW RISK
- Continue monitoring.

MODERATE RISK
- Ensure green bridge is managed to reduce risk to crop when sown.

HIGH RISK
- Area-wide management of green bridge will be important to manage risk leading into sowing.
- Consider crop rotation choices if risk of outbreak is difficult to manage. Cereal crops are not impacted by GPA as they are not a preferred host.

Considerations

- Dual-purpose canola and weeds that host GPA and are close to crops will be the greatest source of aphid and TuYV risk.
- GPA colonises a wide range of broadleaf weeds and crops, including dual-purpose canola, radish, capeweed, volunteer canola, mallow and turnipweed.

Volunteer canola.

PHOTO: LILIA JENKINS, CESAR AUSTRALIA

Key actions

1. Decide whether an insecticide seed treatment is warranted close to sowing, based on risk.
2. Use agronomic practices to minimise bare ground at crop establishment.

LOW RISK

- Do not apply seed treatments where this is in your control.
- Sow earlier to reduce risks from other pests (e.g. slugs, weevils, mites).

MODERATE RISK

- Apply seed treatments – consider leaving untreated strip to observe differences.

HIGH RISK

- Apply seed treatments.
- Delay sowing to avoid exposure of establishing canola in line with peak aphid flights.

Considerations

- Insecticide coatings are standard on canola seed purchased commercially. This makes withholding seed treatments challenging where risk is low, but it should be considered when using retained seed.
- To delay resistance, insecticides should only be used in higher-risk scenarios.
- Where possible, sow into standing stubble and select hybrid varieties that achieve early crop establishment and canopy closure.
- Aphids are more attracted to canola seedlings with bare earth visible between crop rows.

Stubble retention and establishing canola crop.

PHOTO: BCG

Key actions

1. Monitor to decide if insecticide sprays are warranted.
2. If insecticide use is warranted, rotate chemical MOA groups according to the windowing strategy on page 14.
3. Maintain local patches of native vegetation to encourage beneficials.

LOW RISK
- Do not spray.

MODERATE RISK
- Consider a border spray with an insecticide to delay the build up of GPA and maintain beneficial insects.

HIGH RISK
- Choose most appropriate insecticide based on resistance levels and rotational strategy.
- Do not use the same MOA group more than once a season.

Considerations

- Seed treatments may protect emerging seedlings from early GPA colonisation; however, their effectiveness will vary depending on seasonal conditions, resistance and product used.
- Apply foliar insecticides during the early stages of GPA colonisation if TuYV is also present. Although, note that if TuYV has already reached high levels, foliar sprays are no longer effective.
- Virus impact on yield is highest when transmission occurs before stem elongation.
- Ensure spray applications achieve good coverage by using correct nozzles, high water volumes and appropriate ground speeds.

Key actions

1. Only spray for GPA if risk is high.
2. If spraying for other pests, use target-specific 'selective' insecticides (for example, chlorantraniliprole for caterpillars).

LOW RISK
- Do not spray for GPA.

MODERATE RISK
- Do not spray for GPA.

HIGH RISK
- If applying foliar insecticides, use selective products to minimise the impacts on beneficial insects.

Considerations

- Although GPA is often present in crops at later stages, numbers are usually insufficient to cause yield loss through feeding, and virus transmission at this stage is unlikely to impact seed quality and crop yield.
- Consider the impact of sprays to target and non-target species. All insecticides have unintended impacts that add to resistance selection pressure. Selective insecticides are available for GPA and other crop pests (page 16).
- In most situations, beneficial insects will suppress GPA populations in spring if they have not been killed by chemical sprays.

GPA colony on the undersurface of leaf and a mummified aphid from parasitic wasp.

PHOTO: BCG

Pre-season

Insecticide recommendations

Do not apply insecticides

Rationale

There is rarely an economic benefit of controlling GPA prior to sowing. Unnecessary sprays will select for further resistance.

Sowing

Insecticide recommendations

Apply a single seed treatment of: **imidacloprid (4A)**, or **lambda-cyhalothrin + thiamethoxam (3A+4A)**, or **clothianidin + imidacloprid (4A+4A)**, or **thiamethoxam (4A)**

Rationale

Use of a seed treatment when GPA and/or virus risk is moderate or high may protect canola from feeding damage and early TuYV infection.

Post-emergence to stem elongation

Insecticide recommendations

Apply a single application of: **flonicamid (29)**, or **afidopyropen (9D)**, or **sulfoxaflor (4C)***, or **pirimicarb (1A)***

If multiple sprays are required, ROTATE among the above four MOA groups

Rationale

Rotating among different chemical groups will delay the evolution of resistance.

Avoid SPs and OPs due to widespread resistance.

* Be aware of resistances to sulfoxaflor and pirimicarb, and alter local management decisions accordingly.

Post-stem elongation

Insecticide recommendations

Insecticides are rarely warranted. If needed, apply: **paraffinic oil (suppression only)**, or **flonicamid (29)**, or **afidopyropen (9D)**, or **sulfoxaflor (4C)**, or **pirimicarb (1A)**

Do not use a chemical if it has already been sprayed earlier in the season

Rationale

In medium and high rainfall areas, GPA is rarely in sufficient numbers to cause significant yield loss through direct feeding; and TuYV transmission is unlikely to reduce crop yield and seed quality post stem-elongation.

Insecticide	IRAC MOA group	Considerations
Pirimicarb (e.g. Pirimor® WG)	1A	Carbamate (e.g. pirimicarb) resistance is commonplace in many areas. Growers should test the response of GPA in a small area first. Best control is achieved when applied between 20°C to 30°C. Use highest label rate if temperatures are below 20°C.
Organophosphates	1B	Not registered to control GPA in canola. Resistance to organophosphates is commonplace. Toxic to many beneficial insects of GPA, including ladybird beetles, parasitoid wasps, hoverflies and lacewings.
Synthetic pyrethroids	3A	Not registered to control GPA in canola. Resistance to pyrethroids is commonplace. Toxic to many beneficial insects of GPA, including ladybird beetles, parasitoid wasps, hoverflies and lacewings.
Neonicotinoids (e.g. Gaucho®)	4A	Registered as seed treatments only. Low-level resistance commonplace in GPA; the efficacy of canola seed treatments is likely to be reduced, particularly the length of protection.
Sulfoxaflor (Transform®)	4C	Low-level resistance in some GPA in Australia. Always use the high label rate when targeting GPA in canola crops where spray coverage may be compromised.
Afidopyropen (Versys®)	9D	No resistance in Australian GPA. Stops aphid feeding and virus transmission within a few minutes of exposure and causes mortality after two to five days.
Flonicamid (Mainman®)	29	No resistance in Australian GPA. Acts via direct contact and ingestion, with cessation of feeding and virus transmission within one hour of exposure and mortality after two to five days.
Paraffinic oil (e.g. Parachute®)	N/A*	Provides aphid suppression only. Best used when targeting low GPA populations and seeking to prevent the build-up to damaging levels.

NB: Comply with all directions for use on product labels, ensure spray rigs are properly calibrated and sprays achieve good coverage, particularly in canola crops with a bulky canopy. * Not a member of IRAC group

There are many beneficial insects (also known as 'natural enemies') that attack GPA. Parasitoid wasps, ladybird beetles, lacewings and hoverflies are particularly effective at controlling GPA. They exert good levels of control when low to moderate numbers of GPA are present, particularly during spring. Because of this, GPA should be rarely targeted with insecticides in spring, which helps to preserve beneficial insects and lowers the selection pressure for insecticide resistance.

Beneficial insects can also be supported through the careful use of insecticides. Avoid the use of broad-spectrum chemicals wherever possible, as they are detrimental to beneficial insects that attack GPA. Refer to the Beneficials Chemical Toxicity Table, available at cesaraustralia.com/resources/beneficials-toxicity-table.

Active ingredient	Mode of action	Rate (g/ha)	Aphid parasitoids	Ladybird beetles	Lacewings	Hoverflies
Flonicamid	29	50	L	L	L	L
Afidopyropen	9D	5	L	L-M	L	L
Paraffinic oil	–	1584	L-VH	M	L	L
Pirimicarb Low	1A	75	M-VH	L	L	L
Pirimicarb High	1A	500	M-VH	L-M	L	L
Sulfoxaflor	4C	50	H-VH	L	L	L
Synthetic pyrethroids (excl. Gamma-cyhalothrin)	3A	Variable	L-VH	VH	VH	VH
Organophosphates	1B	Variable	VH	VH	M-VH	H

Mortality to beneficial insects							
L	<30%	M	30–79%	H	80–99%	VH	>99%

SOURCE: CESAR AUSTRALIA, APRIL 2024

GPA – green peach aphid

Green bridge – presence of green plant material in the non-cropping phase of broadacre farming that can be host to out-of-season pests and diseases

IRAC – Insecticide Resistance Action Committee

MOA – mode of action; how a chemical compound works within the target species and the biological pathway(s) it disrupts

Nymph – an immature form of an insect that does not change greatly as it grows

Seed treatments – chemical products applied to the seed prior to sowing for management of establishment pests

Selective insecticide – an insecticide that has fewer impacts on non-target organisms. Also called 'soft insecticides'

TuYV – turnip yellows virus

Viruliferous GPA – virus-carrying green peach aphid. These aphids have the potential to transmit the virus to host plants

What is the likelihood I will have a spray failure?

This depends on past pest management practices and whether insecticide resistance is present in the target pest population. If you suspect resistance in GPA, collect a sample of the aphids for resistance testing after consulting an entomologist or your local agronomist.

How do I prevent spray failures into the future?

Avoid the practice of 'insurance' sprays at all costs. Using a broad range of integrated pest management (IPM) strategies is the best way to avoid future spray failures and prevent or delay the evolution of insecticide resistance. Regularly assess aphid and beneficial insect populations to determine if chemical control is necessary. Follow the windowing strategy on page 14, ensuring insecticides across different chemical groups are rotated within a cropping season.

Further resources

Cesar Australia:
GPA identification video.

Cesar Australia:
Getting to know the beneficials in your crops.

Cesar Australia:
GPA PestNotes –
Green peach aphid.

GRDC publication: McDonald G, Umina P, Lye J, Maino J, Perry K and Baker G (2019) *Insecticide resistance in the southern region: current status, future risk and best management practices*, GRDC Research Report, Grains Research and Development Corporation, Canberra.

IPM guidelines for grains: Umina P et. al. (2024) *Science behind the Resistance Management Strategy for the green peach aphid (Myzus persicae) in Australian canola*, National Insecticide Resistance Management working group, Grains Pest Advisory Committee, Grains Research and Development Corporation, Canberra.

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