



Pest Management in Canola





Contents

- [Canola aphids](#)
- [Diamondback moth \(DBM\)](#)
- [Native budworm](#)
- [Insecticide options in canola](#)
- [Key messages](#)



Key canola pests

Pest group	Emergence	Vegetative	Flowering – Grain fill
Earth mites			
Lucerne flea			
Caterpillars (cutworms, loopers)			
Beetles (weevils, false wireworms)			
Slugs			
Earwigs, millipedes, slaters			
Snails			
Aphids			
Diamondback moth			
Native budworm			
Rutherglen bug			



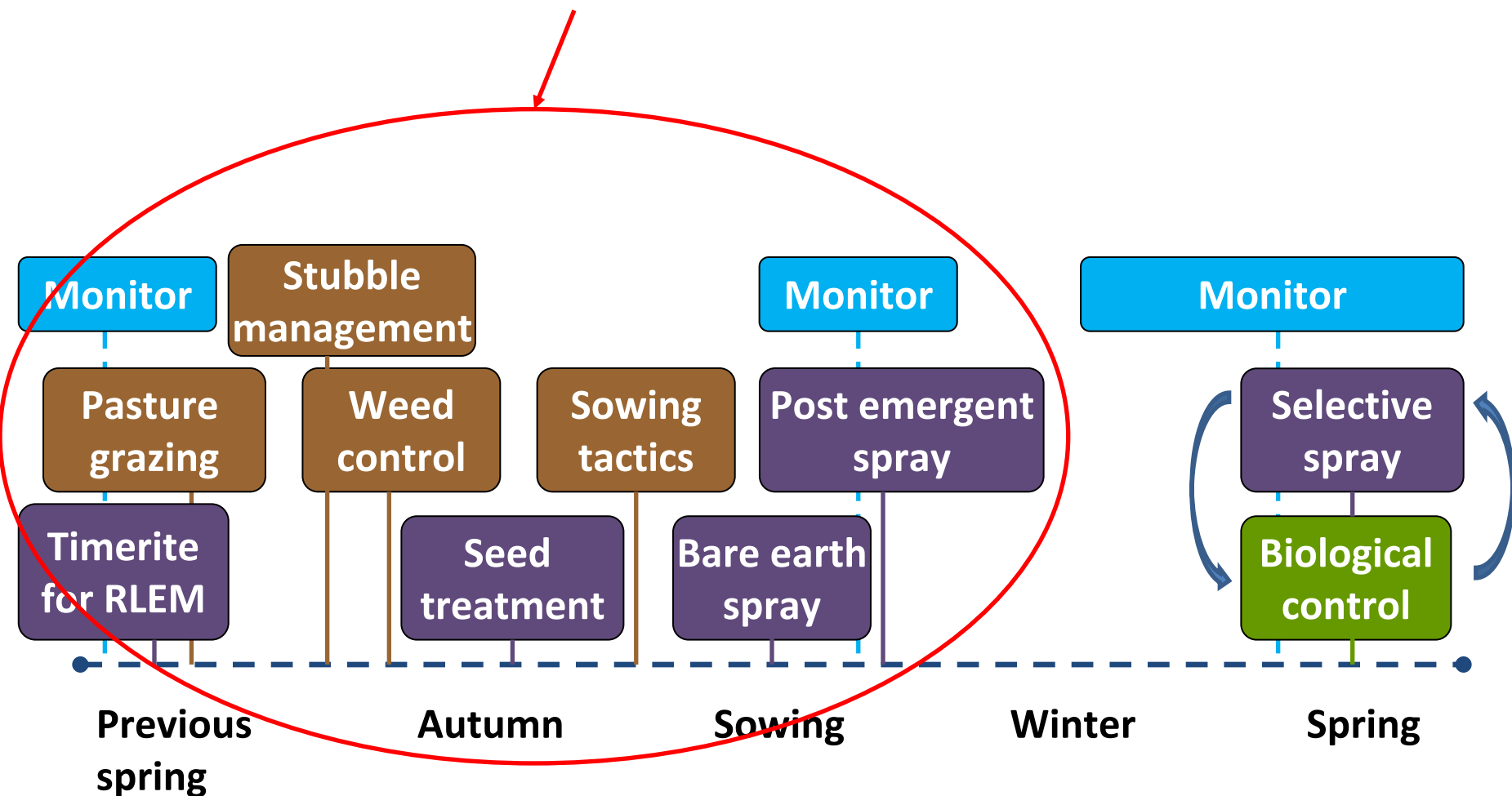
Canola establishment



Decision timeline



Planning ahead gives you more options

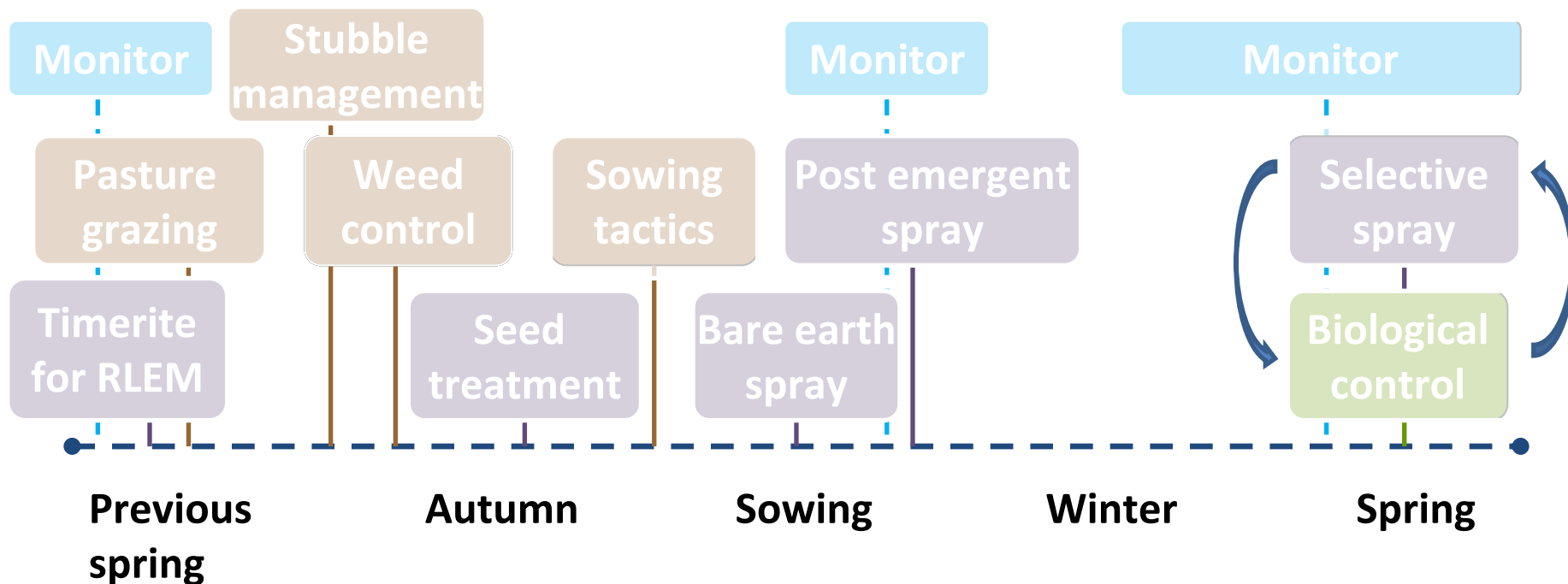


Decision timeline

What are the risks?

Mites, lucerne flea, Slugs, snails, earwigs,
millipedes, slaters

Aphids
Diamondback moth
Native budworm



Cultural

Biological

Chemical



Canola Aphids





Canola aphids



Cabbage aphid

- Greyish colonies on growing tips
- Thick powdery wax covering



Turnip aphid

- Yellow/green colonies on growing tips
- Finer wax covering
- More common in drier years



Green peach aphid

- Sparse colonies on the underside of lower leaves
- Important vector of BWY Virus



Aphid damage

Direct feeding – high populations

- Sucking, removal of nutrients
 - wilting, flower abortion, reduced pod set
- Impact on the crop depends on:
 - timing (early vs late)
 - severity (intensity and duration)
 - plant stress (compensation, aphid growth)

Virus spread – few individuals needed

- Beet Western Yellows Virus spread by green peach aphid



Cabbage aphid colony on the main raceme



Risk factors

- *Brassica* green bridge (virus)
- Weather
- Low beneficial activity
- 'Hard' chemistry (any pest)



Mitigating factors

- Weather
- Beneficials



Lacewings



Hoverflies



Nabids



Ladybirds



Parasitoids





Yield impact / thresholds

- Estimating infestation – plants/stems
- Crop stage & stress
- Predicted weather
- Potential for compensation?

**Few demonstrated examples of
yield loss in Australian literature**



- Thresholds: 10-50% infestation + limited compensation capacity



Simulated aphid damage trial. Allora, 2013.



Treatment	Yield (t/ha)
Control	2.07 a
10% of terminals removed	1.93 a
50% of terminal removed	1.98 a
90% of terminal removed	2.01 a

Treatments followed by the same letter are not significantly different ($P < 0.05$).



Best bet table – options for management and control

Spring	<p>Monitor <u>trends</u> in aphid and beneficial populations in crops over time. Use thresholds to guide spray decisions, considering crop stage (% flowering) and moisture stress.</p> <p>High risk where</p> <ul style="list-style-type: none"> • Infestation rapidly increasing during early flowering to bud formation • Forecast is for warm and dry conditions to continue • Low/no parasitism and beneficial activity (note: this can also happen if SPs/OPs are used to control DBM/native budworm). <p>If spraying:</p> <ul style="list-style-type: none"> • Consider border sprays with a selective aphicide (pirimicarb) to prevent/delay build-up and retain beneficials • Use soft products (pirimicarb or petroleum spray oils) to retain beneficials • Rotate insecticide MOAs to reduce resistance selection in green peach aphid.
--------	--

Green peach aphid: Insecticide options

Managing GPA in canola and pulses

- Possible resistance to imidacloprid?
- Implement resistance management strategies, such as rotating chemicals, avoid 'insurance sprays' and apply chemicals only after monitoring and correctly identifying pest species
- Report chemical control failures; don't necessarily assume application issue (includes imidacloprid!)
- Reduce the availability of alternative plant hosts and consider border sprays
- Consider role of beneficials; over time





Economics of spraying

Expected yield x price

Crop Value per ha	Control costs per hectare (chemical + application)						
	\$10	\$15	\$20	\$25	\$30	\$35	\$40
\$500	2 (%)	3	4	5	6	7	8
\$750	1.3	2	2.7	3.3	4	4.7	5.3
\$1000	1	1.5	2	2.5	3	3.5	4
\$1250	0.8	1.2	1.6	2	2	2.8	3.2
\$1500	0.7	1	1.3	1.7	2	2.3	2.7
\$2000	0.5	0.8	1	1.3	1.5	1.8	2
\$2500	0.4	0.6	0.8	1	1.2	1.4	1.6

Table values: % future yield loss before spraying is economically justified





Diamondback moth (DBM)








Diamondback moth (DBM)


- Periodic outbreaks in canola
 - every 3-4 years in SA and NSW, Victoria
- Larvae feed on leaves, buds, flowers and pods
 - defoliation, reduced seed number & size





Risk factors for DBM

High risk	Reduced risk	Low risk
<ul style="list-style-type: none"> • High summer rainfall creates <i>Brassica</i> green bridge • Warm and dry conditions July through spring • No significant rainfall events (>10mm) 	<ul style="list-style-type: none"> • Significant heavy rainfall (<10mm) dislodges and drowns larvae • High beneficial activity and/or DBM parasitism 	<ul style="list-style-type: none"> • Cool, moist conditions late winter through spring • Epizootics of fungal disease (e.g. <i>Zoophthora radicans</i>)
		<p style="text-align: center;">↓</p> 

 Lincoln weed
Perennial DBM host

Diadegma semiclausum
Key DBM parasitoid



Insecticidal control challenges

- Overlapping generations
- Larvae distributed throughout canopy
- Spray penetration
- Rapidly evolves insecticide resistance
- Product selection, good coverage critical



Treated under an emergency
permit in 2007

Treated with a
synthetic pyrethroid





DBM management

- Manage *Brassica* green bridge
- Frequently monitor DBM numbers and risk of exceeding thresholds
- If spraying:
 - Bt (<8mm larvae)
 - New chemistry
 - Rotate MOA across seasons
 - Avoid SPs



Parasitised DBM pupa
– note capsule shape



DBM monitoring and thresholds

- Plant moisture status is key
- Minimum of 5 sets of 10 sweeps
- Calculate larvae per 10 sweeps



Crop stage	Moisture stressed?	Spray threshold
Pre-flowering	Yes	> 30 larvae / 10 sweeps
	No	> 50 larvae / 10 sweeps
Majority in flower	Yes	< 100-200 larvae per 10 sweeps
	No	>100-200 larvae / 10 sweeps





Native budworm





Native budworm in canola

- Sweep net from flowering/podding until late maturity
- Dynamic thresholds based larvae per 10 sweeps
- SPs may impact DBM/aphids
- *Bt* or NPV for small larvae (< 7-8mm)



Mature native budworm larva burrowing into a canola pod



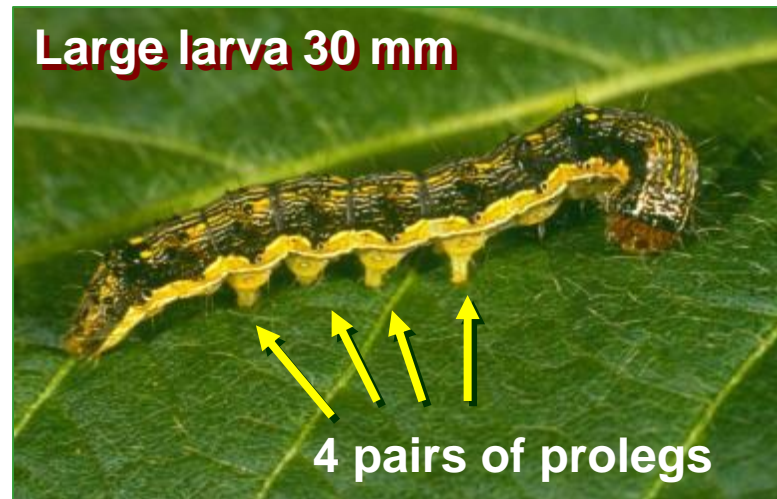
Native budworm life stages



Helicoverpa punctigera

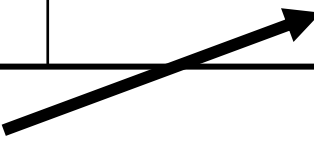


Eggs: fresh, **brown**
ring, about to
hatch **Only 0.6**
mm diameter



Helicoverpa size categories			
Very small	Small	Medium	Large
1-3 mm	4-7 mm	8-23 mm	24-30+ mm

90 % of damage caused by these larvae



Monitoring budworm

Early warning – moth activity

- Pheromone traps



In-crop monitoring

- Sweep net



Dynamic thresholds for native budworm

	K – grain loss kg/larva/ha	P – grain price \$/tonne	C – cost of control \$/ha	ET – larvae per 10 sweeps
Field peas	50	350	10	0.6
Lentils	60	435	10	0.4
Faba bean	90	335	10	0.3
Chickpeas - desi	30	275	10	1.2
Canola	6	580	10	2.9
Lupins	7	300	10	4.8
Field peas	50	350	10	0.6

$$ET = (C \times 1000) / (K \times P)$$

**Developed in Western Australia: Source: DAFWA*





Insecticide options in canola



Insecticide options in canola



MOA		Canola aphids	DBM	Native budworm	Rutherglen Bug	Beneficial toxicity
11	<i>Bt</i>		<8mm	<8mm		Very Low
	NPV			<7mm		Very Low
	Petroleum spray oils	(s)	Mix <i>Bt</i>	(s)		Very Low
1A	Pirimicarb					Very Low
6	Emamectin					Mod
5	Spinetoram					Mod
1A	Methomyl		R?	WA		High
1B	OPs		R			High
3A	Pyrethroids		R			Very High

 Registered R = resistance (s) = suppression



Key messages

- **Planning ahead** gives you more options
- **Assessing risk** (establishment pests, aphids/DBM) helps decide which management approach to take
- **Manage resistance** in DBM by rotating MOAs across seasons
- Avoid using hard chemistries (SPs/OPs) in spring canola
 - Resistance management
 - Aphid flares





Supporting research organisations



Queensland Government
Department of Agriculture, Fisheries and Forestry



Department of
Primary Industries



Financial workshop support



Dow AgroSciences



Workshop facilitation

