



Pest Management in Canola





Key canola pests

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



Canola establishment

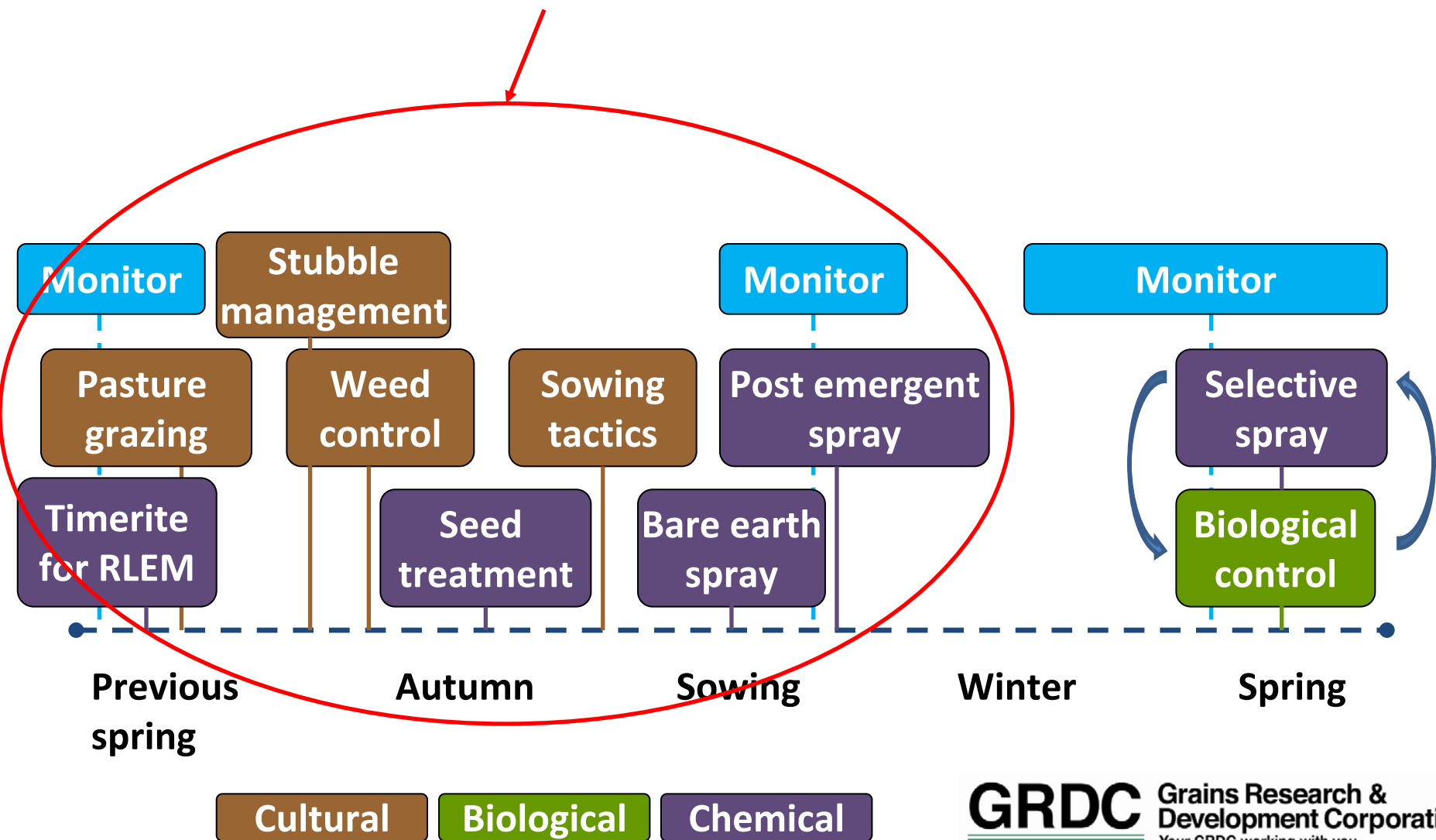




Decision timeline



Planning ahead gives you more options





Decision timeline

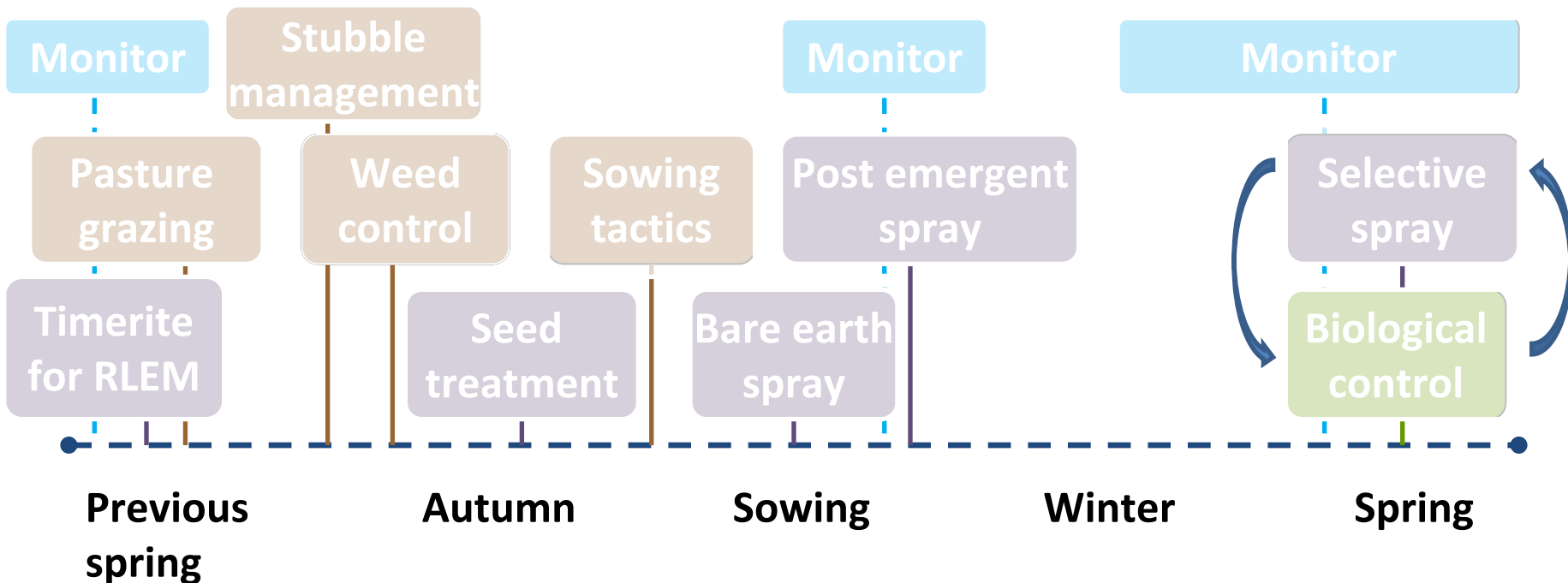
What are the risks?

Mites, lucerne flea

Slugs, snails, earwigs,
millipedes, slaters

Aphids

Diamondback moth
Native budworm



Cultural

Biological

Chemical



Canola spring pests





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



Canola aphids: 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



Canola aphids: risk factors



High risk	Reduced risk
<p>Late summer/autumn:</p> <ul style="list-style-type: none">• High rainfall leads to <i>Brassica</i> green bridge and early aphid flights into crops (virus) <p>Winter:</p> <ul style="list-style-type: none">• Mild conditions <p>Spring:</p> <ul style="list-style-type: none">• Aphids building up early during bud formation and flowering• Warm and dry conditions• Stressed plants• Low beneficial activity (can occur where SP/OPs are used for other pests)	<p>Late summer/autumn:</p> <ul style="list-style-type: none">• Dry summer, lack of <i>Brassica</i> green bridge (reduces aphids and virus) <p>Winter:</p> <ul style="list-style-type: none">• Rainfall, cold temperatures <p>Spring:</p> <ul style="list-style-type: none">• Late infestations• Cool/mild spring, rainfall• High beneficial activity



Integrated management

Cultural control

- Early **weed control** (*Brassicas*)
- **Sow early** to promote flowering before aphids peak

Biological control

- Factor in **predators, parasitoids**

Chemical control

- **Seed treatments** can reduce virus spread
- ✓ **Selective** pirimicarb
- New chemistries
 - sulfoxaflor (Transform)
 - cyantraniliprole (Exirel)



Lacewings



Ladybirds



Hoverflies



Nabids



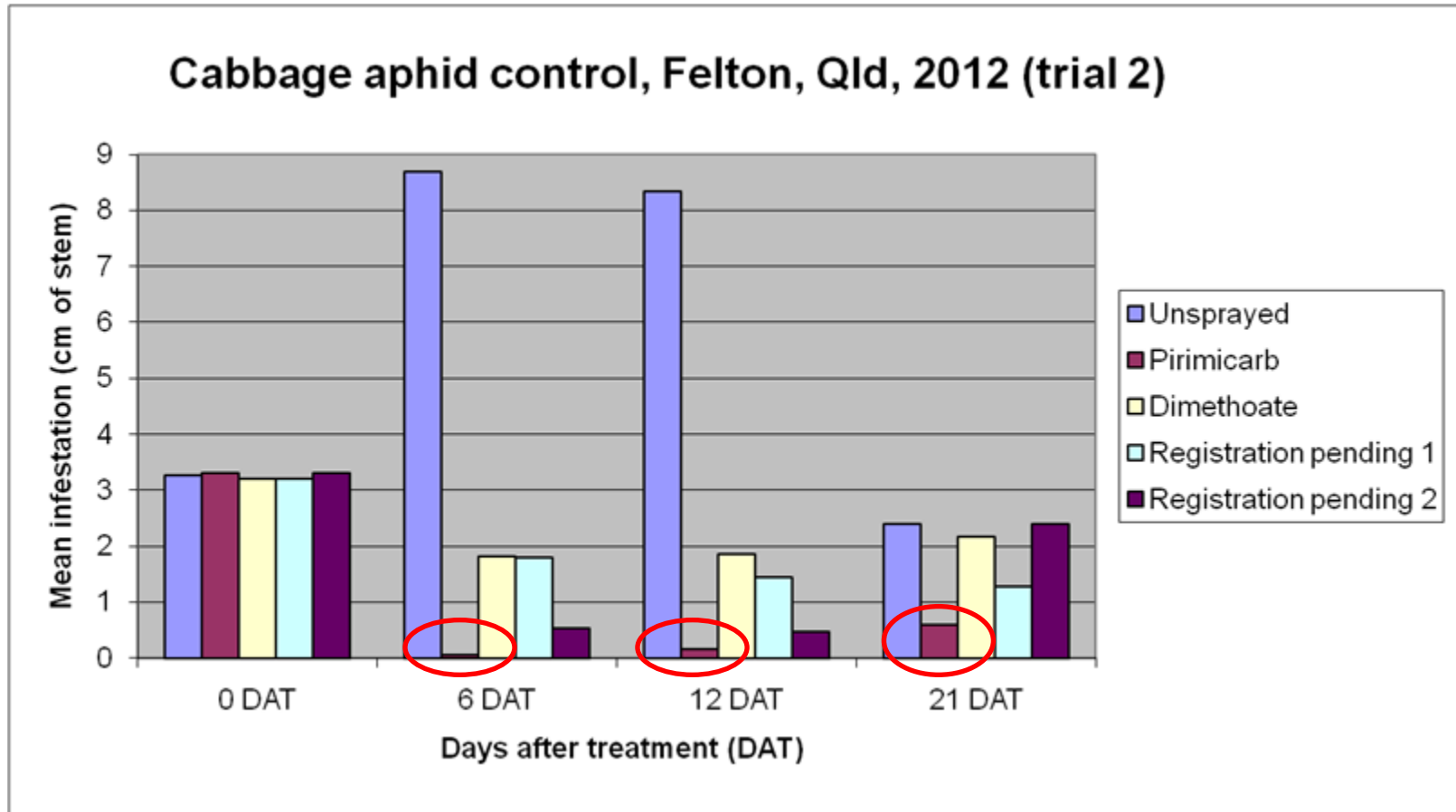
Parasitoids



'Mummies'



Aphids: Insecticide options





When to intervene?



Making an informed judgment

- What is the potential for **future** damage?
- How many plants are actually infested?
- Is the aphid population increasing, stable or declining?
- Weather/beneficials
- How vulnerable is the crop?
 - development stage
 - stress





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)

- 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>) 

Lincoln weed
Perennial DBM host

Diadegma semiclausum
Key DBM parasitoid



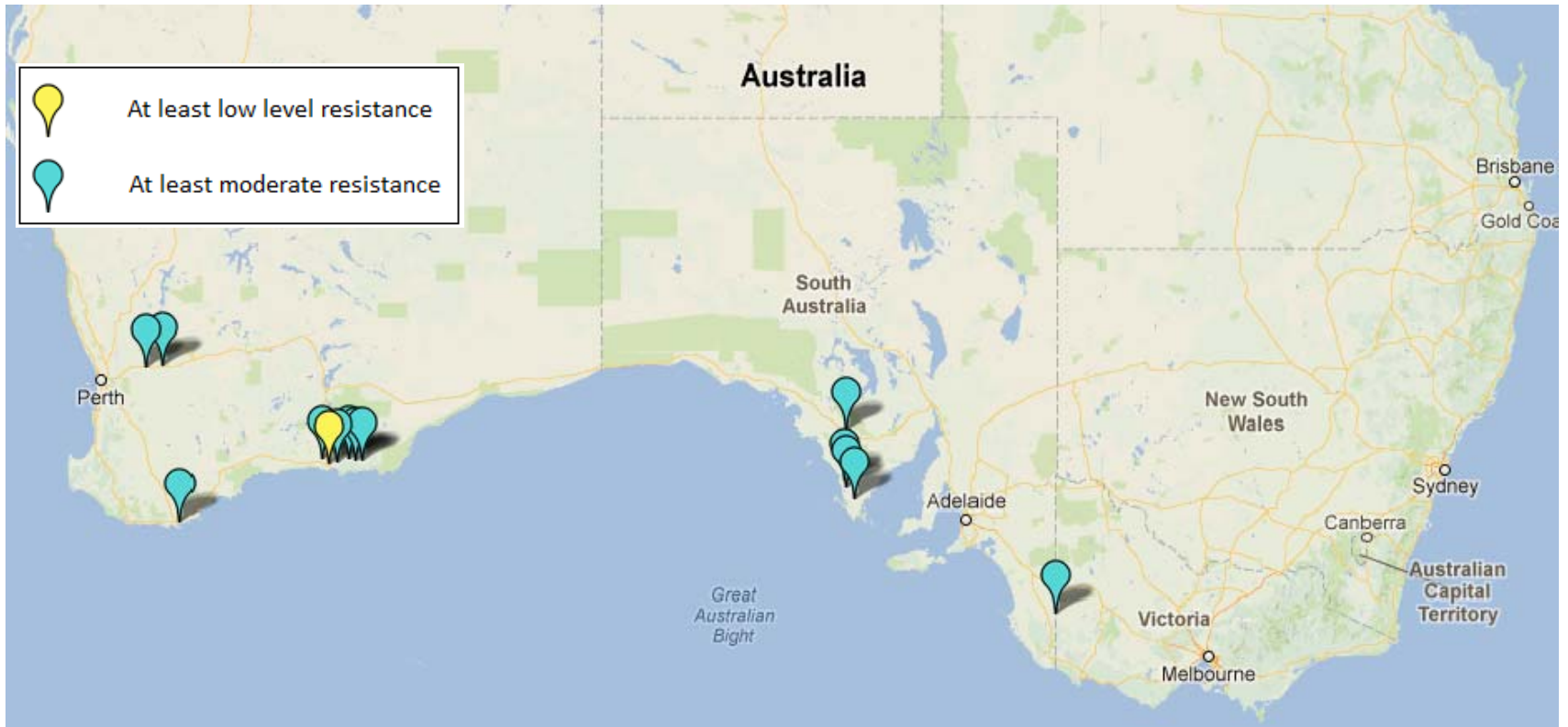
Insecticidal control challenges

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



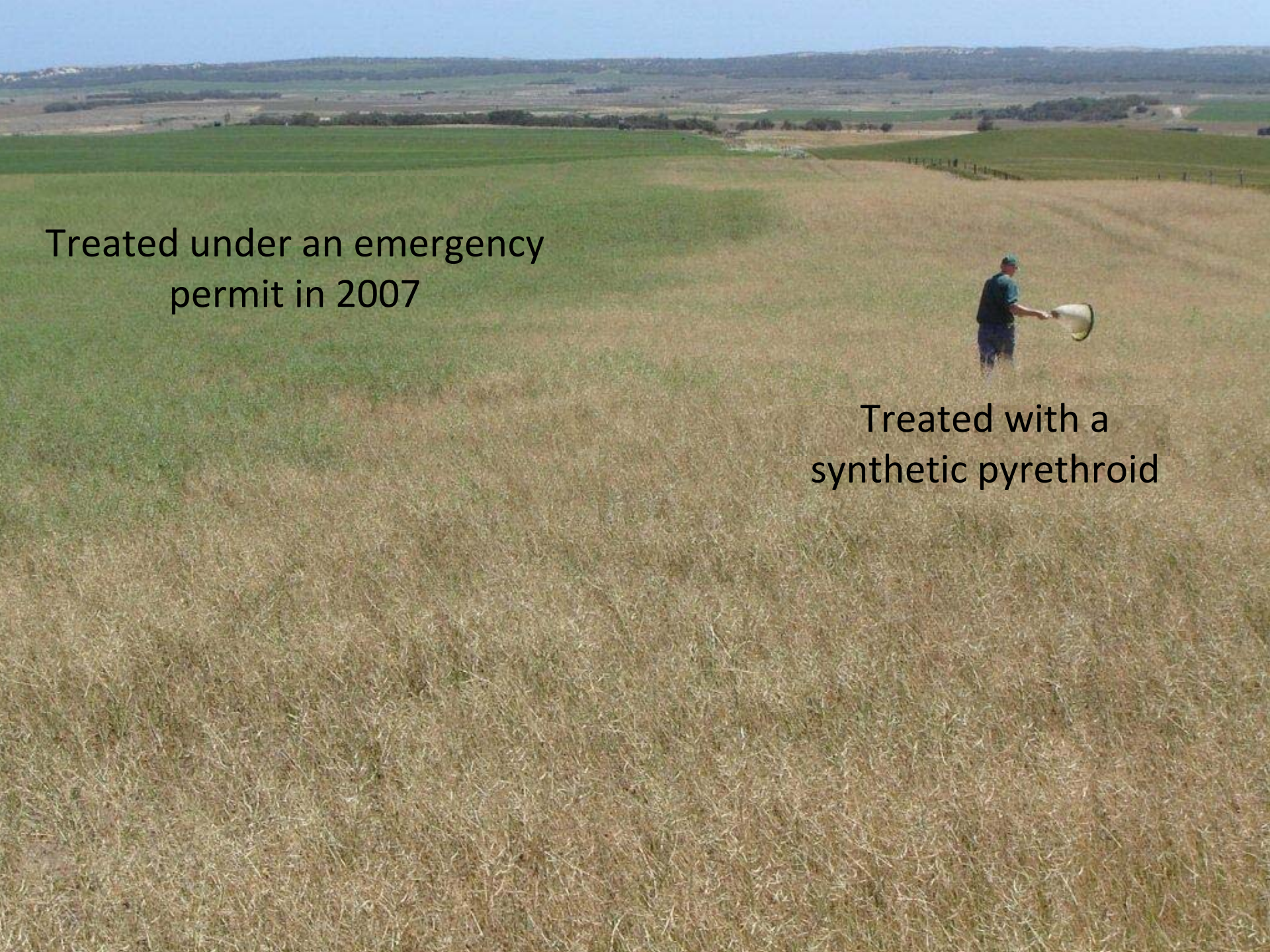


Insecticide resistance in DBM



Alpha-cypermethrin resistance in DBM collected from canola crops (2006-11)
Powis & Baker, 2012. *Unpublished data*

Similar story with organophosphates



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

- 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 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

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

