Decision Making
for Insect Management
in Grain Crops

Pest Management in Canola

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Key canola pests

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

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Canola spring pests

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Canola aphids

Cabbage aphid

- Powdery, greyish colonies
- Dense on growing tips

Turnip aphid

- Yellow/green colonies
- Dense on growing tips
- More common early

Green peach aphid

- Sparsely distributed on the underside of lower leaves - vegetative

Aphid impact/damage

- Direct feeding injury (bud formation – late flowering)
  - wilting
  - flower abortion
  - reduced pod set
- BWY virus transmitted persistently by GPA

Cabbage aphid colony on the main raceme

Risk factors

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

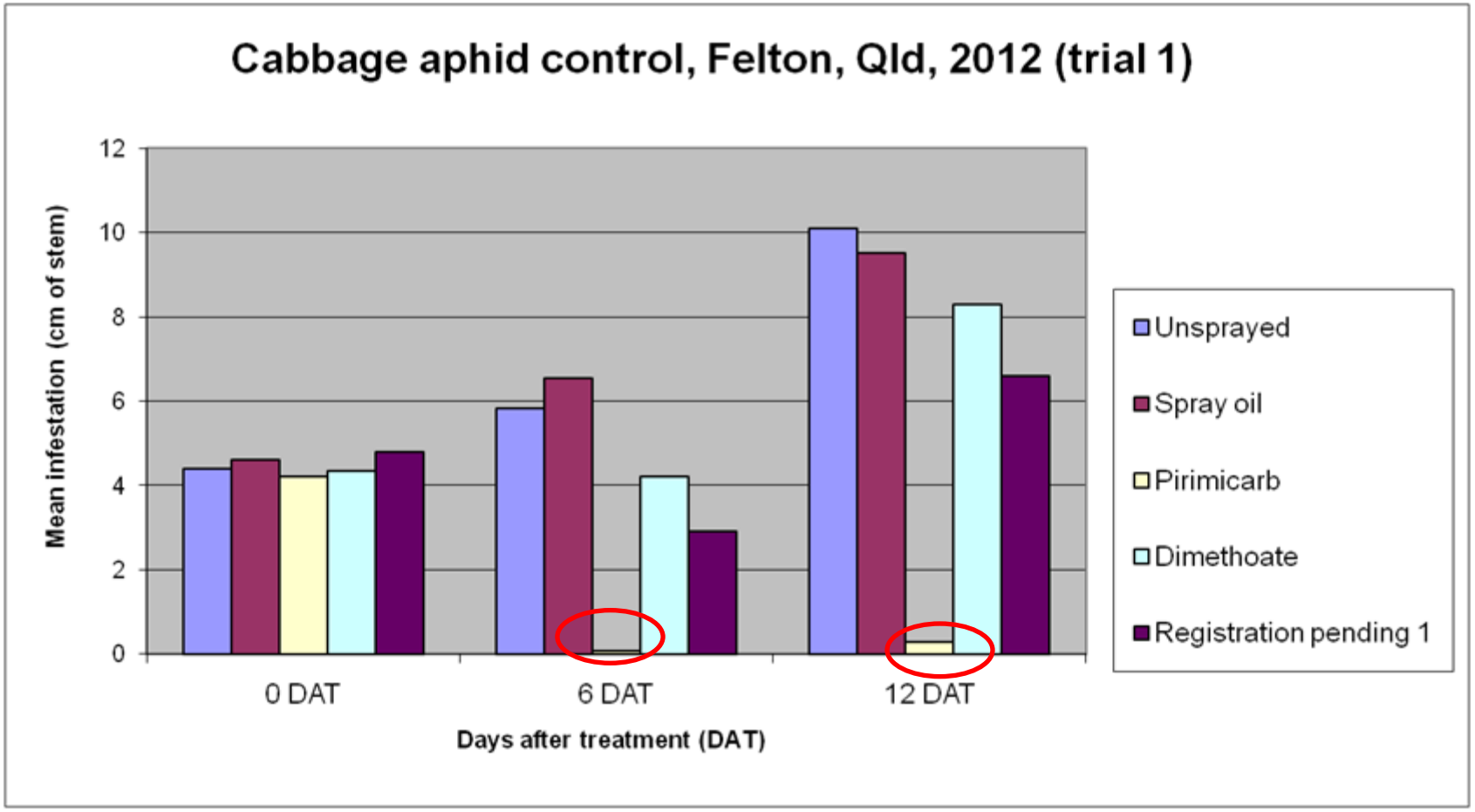
Yield impact / thresholds

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

Few demonstrated examples of yield loss in Australian literature

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

Insecticides for aphids



N.B. dimethoate is not registered for control of aphids in canola

Best bet table – options for management and control

Spring	Monitor trends in aphid and beneficial populations in crops over time. Use thresholds to guide spray decisions, considering crop stage (% flowering) and moisture stress. High risk where • 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). If spraying: • 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.

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

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Risk factors for DBM

High risk	Reduced risk	Low risk
• High summer rainfall creates *Brassica* green bridge • Warm and dry conditions July through spring • No significant rainfall events (>10mm)	• Significant heavy rainfall (<10mm) dislodges and drowns larvae • High beneficial activity and/or DBM parasitism	• Cool, moist conditions late winter through spring • Epizootics of fungal disease (e.g. *Zoophthera radicans*)

Lincoln weed
Perennial DBM host

Diadegma semiclausum
Key DBM parasitoid

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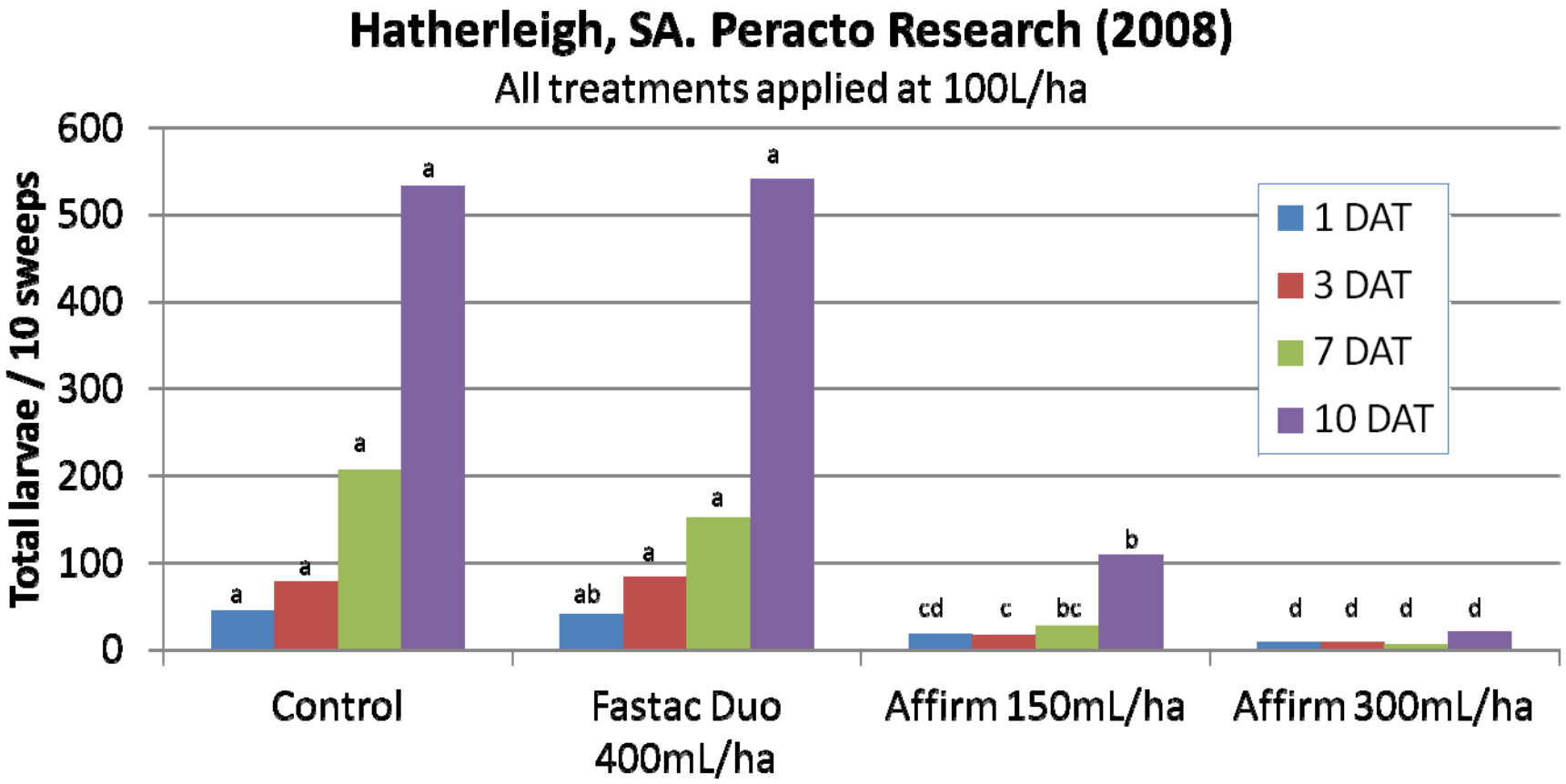
Insecticide efficacy for DBM



Source: Syngenta, SARDI (G. Baker)

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

Helicoverpa in canola

- ***Sweep net*** from flowering/podding
- Dynamic thresholds
- *Bt* or NPV for small larvae (< 7-8mm)

Mature budworm larva
burrowing into a canola pod

Other species – foliage feeders

Cabbage white butterfly

Loopers

***Apantales* cocoons (CWB larva)**

Rutherglen bug (RGB)

- Highly sporadic
  - weather dependent
- Suck sap from leaves, stems, flowers, pods
  - wilting, reduced seed yield/oi quality
- Highly mobile
  - long distance migration
- Multiple life-stages

Risk factors for RGB

High risk	Reduced risk	Low risk
• Moisture stressed plants **Autumn** • Weeds drying off in/near crops • Warm conditions in late summer/autumn **Spring** • Hot/dry spring and early summer • Long distance migration into cropping areas	• Plants not moisture stressed (autumn & spring) • High egg parasitoid activity (e.g. *Telenomus* sp.)	**Autumn** • Later germinating crops (after nymphs disappear) **Spring** • Cool/wet conditions • No long distance migration (best monitored locally)

Thresholds in spring canola

Flowering to grain fill	
Cabbage aphid	25mm, or more, of stem infested in >20% plants
Turnip aphid	25mm, or more, of stem infested in >20% plants
Rutherglen bug	10 adults (or 20 nymphs) per plant
Native budworm	5-10 per m2 (larvae 10mm or longer)*
Diamond back moth	Unstressed Pre-flowering crops – 50 larvae per 10 sweeps
	Stressed Pre-flowering crops – 30 larvae per 10 sweeps
	Unstressed Flowering crops – 100-200 larvae per 10 sweeps

Source: VicDPI, Insectopedia, SARDI

** Dynamic threshold developed by DAFWA*

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Insecticide selection in canola

MOA		Canola aphids	DBM	Native budworm	Rutherglen Bug	Beneficial toxicity
11	*Bt*		<8mm	<8mm		Very Low
	NPV			<7mm		Very Low
	Petroleum spray oils	(s)	Mix *Bt*	(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

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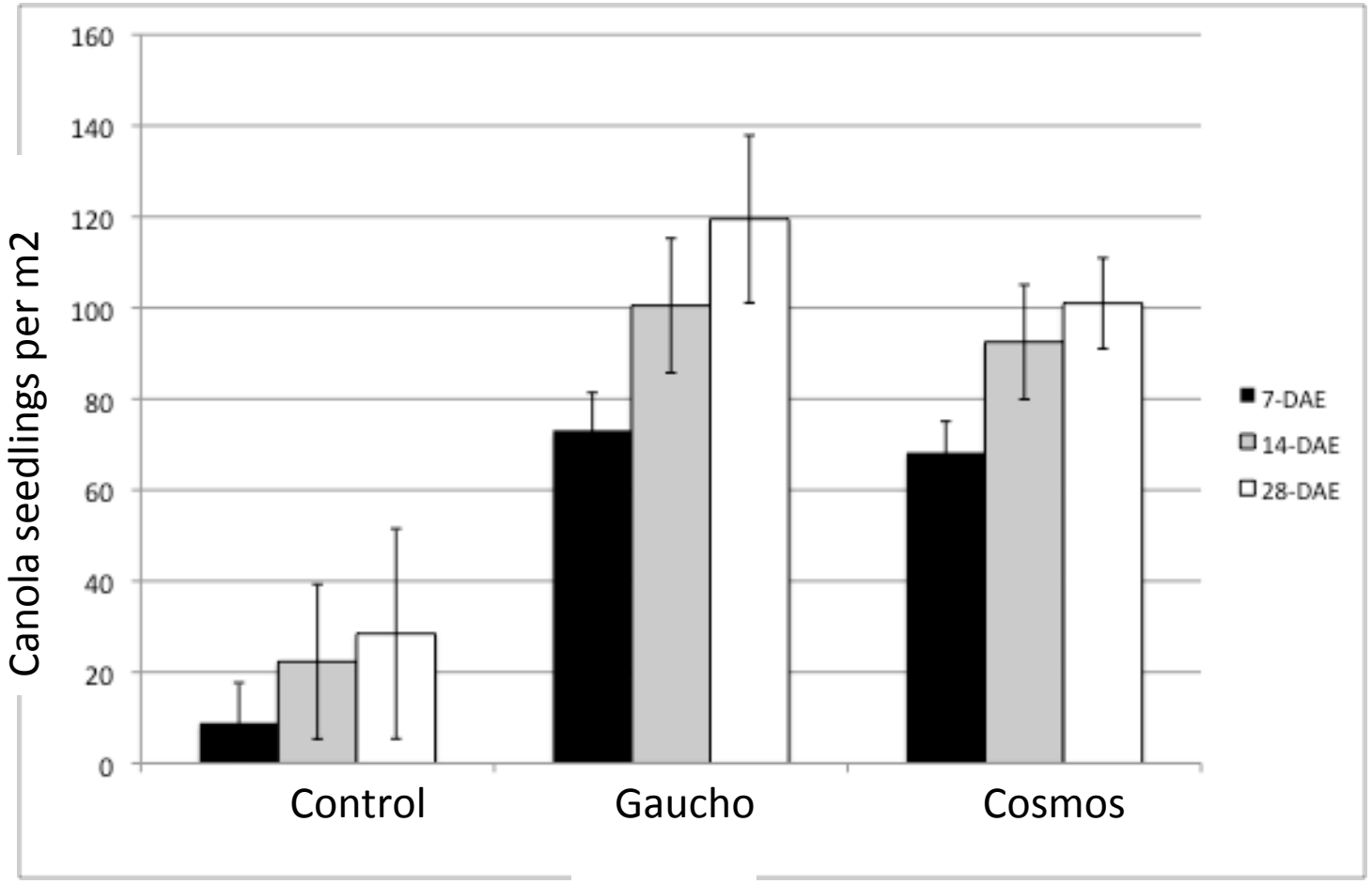
Canola establishment

Sowing tactics

Can reduce pest impact:

- Early sowing
- High vigour varieties
- Slightly higher seeding rates

Seed treatments



Seed treatments can protect canola seedlings from mites

McColl & Umina. *Unpublished data*