



Integrated Pest Management pilot workshop for advisors

Pastures & Lucerne



Sub clover Narrikup
Photo: DAFWA



Our Journey ahead

- Pre-season planning
 - Paddock selection
 - Cultivar selection
- Autumn - Winter
 - Know the pests' ID
 - Monitoring & thresholds
 - Natural & chemical control
- Spring – reducing egg carry-over
 - Grazing management
 - Timerite®

Know the
signals

Know the
pest

Cultural
Control

Informed
decisions

Natural
regulation

Pesticide
strategy



Key Pests: pastures & lucerne

Crop stage/ Pest	Autumn (Emergence)	Winter	Spring	Summer (Perennials inc Lucerne)
Mites				
Lucerne flea				
Scarabs/cockchafers				
Caterpillars				
Aphids				
Weevils (Sitona, White fringed)				
Crickets/ Grasshoppers				



Pre-season planning

Cultural control options

- Paddock selection
- Cultivar selection

Paddock selection: role of shelterbelts



Structurally complex

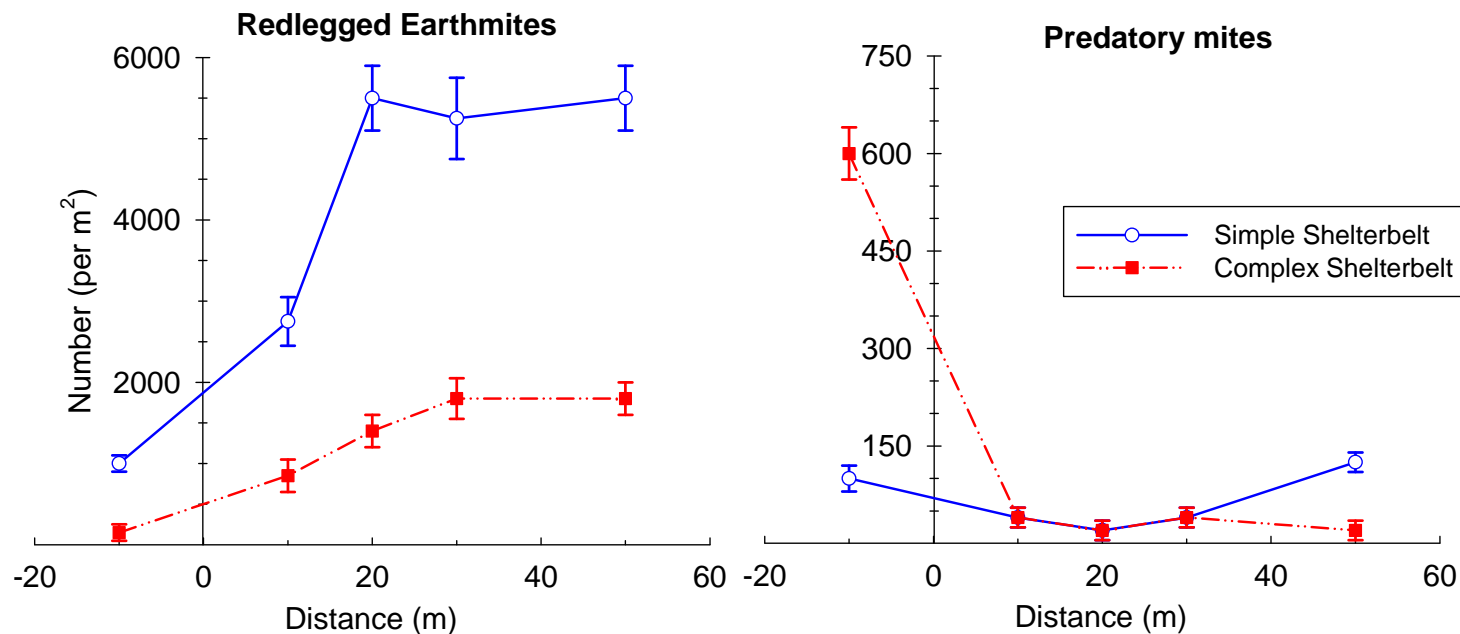


Structurally simple

Know the signals	Know the pest	Informed decisions	Cultural Control	Natural regulation	Pesticide strategy
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Paddock selection: role of shelterbelts

Structural diverse shelterbelts provide sources of predators to control pests



Adapted from Tsitsilas et al 2006 and 2011

Paddock selection: role of shelterbelts

Optimal system:

Windbreaks with an under cover of diverse plants, particularly grasses (height ranging from 12 to 40 cm).

This groundcover structure and litter

- encourages predators (native and introduced mites, spiders, parasitoids)
- discourages earth mites and LF
- results in reduced pest incidence for at least 50m into pastures



From Tsitsilas et al 2006 and 2011

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Plant selection - Resistant cultivars

A few options

–Pasture legume cvs with pest resistance

- Lucerne & Medics – most varieties are aphid resistant; SARDI Seven & TenA have highest levels
- Subterranean clover RLEM resistant varieties eg. Bindoon, Narrikup and Rosa Brook
- Other legumes eg. Prima Gland clover (RLEM and aphid) & Biserrula var. Casbah (Lucerne flea)

–Pasture grasses (cockchafer)

- Perennials less affected than annuals



Photo: Dept of Agric and Food WA

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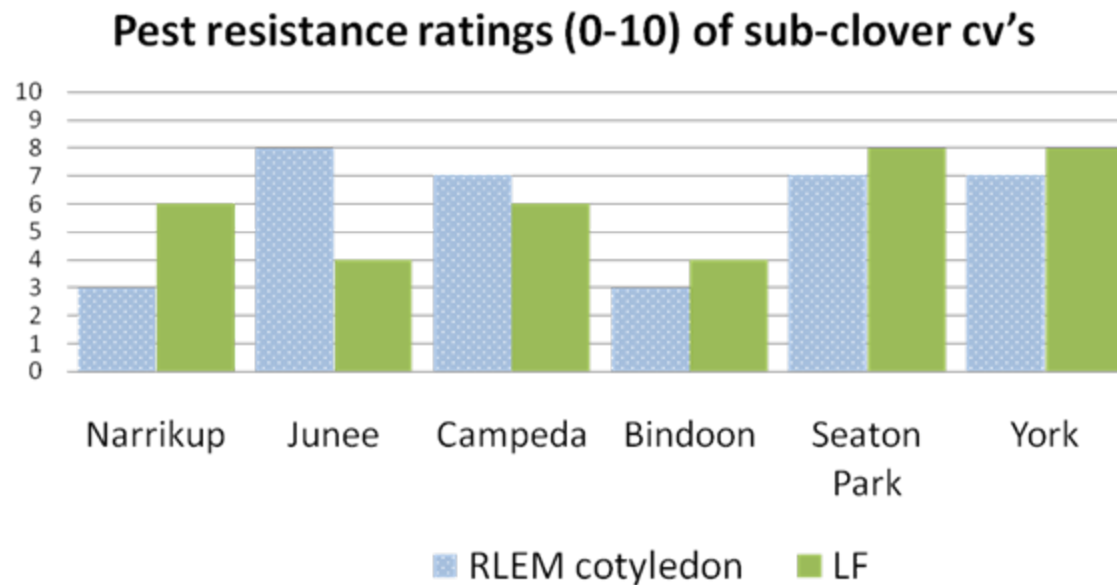
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Plant selection - Resistant cultivars

Sub-clover cotyledon resistance to RLEM



Adapted from DAFWA Farmnote 481, 2011

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Autumn and Winter

Know the pest (scarabs)

Monitoring and thresholds

Distinguishing scarabs



Blackheaded pasture
cockchafer (BPC)



Redheaded pasture
cockchafer (RPC)

Yellowheaded cockchafer
(YC) (mixed species)



African Black Beetle (ABB)

Distinguishing scarabs

Scarab/ cockchafer	Larval size (mm)	Larval head capsule	Generations per year	Damage		Insecticide control?
				When	Where	
Black-headed	2-15	Black	1	May-Aug (larvae)	Surface feeding	Y
Red-headed	5-30	Dark brown red & pitted	2	Jan- May (larvae)	Root feeding	N*
Yellow headed	3-25	Yellow (!!)	1 – 2 (several sp)	May-Sep (larvae)	Root feeding	N
African black beetle	3-25	Light brown, orange, smooth	1	Oct- Mar (adults & larvae)	Roots & organic matter	Y

* Chafer Guard™ no longer available

Monitoring and Thresholds

- scarabs

Scarab/ cockchafer	Symptoms	Monitoring technique	Action threshold	Action
Black-headed	Bare patches; tunnels	Spade*, visual (NB Timing is critical)	6 per spade (150/m ²)	Spray - evenings before adult activity
Red- and yellow headed	Yellowing patches; bird damage	Spade (partic. in pastures > 3yrs)	4 per spade (100/m ²)	Light till, and/or resow oats, lucerne, perennial grasses
African black beetle	Plant decline partic. in new pastures	Spade; visual	3 adults/m ² establishing pastures	Spray (surface or incorporation) or seed treatment

* Ten samples to about 5-10 cm depth with about 20x 20 cm spade (25/m²)

Scarab damage



Figure 4. Pasture damage as result of cock-chafers

Photos: Vic DPI

Monitoring and Thresholds



Mites and Lucerne flea

- Weigh up the risk!
- Monitor carefully after germination
- Thresholds relate to plant density and rate of seedling growth




Photo - Dep't Agric. & Forestry WA.


Lucerne flea

- Can be patchy
 - Heavier soil types
 - Aggregation on weeds in previous seasons



Autumn risk calculator (earth mites, LF)

Risk factor	Risk reduced	Risk increased
Previous spring pest control	Controlled 	Not controlled (Score = 2)
Autumn break	Early	Late (Score = 2)
Legume density	Good (>500/m ²)	Poor (<200/m ²) (Score = 1)
Pasture growth rate	Excellent	Poor (Score = 1)
Feed supply	Surplus	Short supply (Score = 1)

 Strategies will vary for RLEM, BOM, LF

Adapted from P. Taverner SARDI, in
Casey et al 1996 – Pastures Plus

Autumn risk calculator (earth mites, LF)

Risk factor	Risk reduced	Risk increased
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Autumn break	Early	Late ✓ (Score = 2)
Legume density	Good (>500/m ²) ✓	Poor (<200/m ²) (Score = 1)
Pasture growth rate	Excellent	Poor ✓ (Score = 1)
Feed supply	Surplus ✓	Short supply (Score = 1)

Score	Action
0-2	Re-assess in two weeks
3-4	Re-assess in one week
5-7	Monitor now

Monitoring and Thresholds

- earth mites

Monitoring for RLEM (other mites and LF) in autumn and spring

- Monitor 10 pasture plants in 4 locations
- Record pest damage

Damaged plants (from 40)	Feed loss	Action
>8	20%	Spray
20+	30%	Spray

After P. Taverner SARDI



TIME RITE + **australian wool innovation limited**

Redlegged Earth Mite Pasture Check

Use this tool to check whether your pastocks have RLEM. The information you collect can then be used to help you work out your risk of RLEM damage next autumn and then how you can manage for RLEM control, including whether you need to spray for RLEM or not.

What You'll Need

- ✦ Print a copy of this sheet for each paddock.
- ✦ Reading glasses if needed.
- ✦ Magnifying glass if you have one.

The instructions are on the reverse of this page.

Observations

Date: _____

Weather: _____

Sun Cloud Cover Rain Wind

Paddock	Leaf Silvering	Mites Present	Comments
Location 1	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	
Location 2	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	
Location 3	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	
Location 4	Y <input type="checkbox"/> N <input type="checkbox"/>	Y <input type="checkbox"/> N <input type="checkbox"/>	

Other Comments: _____

Use the Pasture check form at AWI Ltd

http://images.wool.com/pub/PastureCheck_1007.pdf



Autumn and Winter

Insect control

- Natural regulation (beneficials)
- Pesticide strategies

Beneficials / Natural enemies

Overview

- Pastures : a potential stable ‘sink’ for natural enemies
- Natural enemies might include spiders, predatory mites (endemic and introduced), predatory beetles
- Aim to preserve their activity

From James 1995

Know the signals	Know the pest	Informed decisions	Cultural Control	Natural regulation	Pesticide strategy
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Beneficials / Natural enemies

LF predators

- Spiny snout mite (*Neomulgus capillatus*)
- Pasture snout mite (*Bdellodes lapidaria*)



Spiny snout mite
Photo: Tas DPIIME



Pasture snout mite

Earth mite predators

- The Anystis mite (*Anystis wallacei*)
- A number of generalist native predators, including mesostigmata mites



Anystis mite
Photo: SARDI



Mesostigmata mite

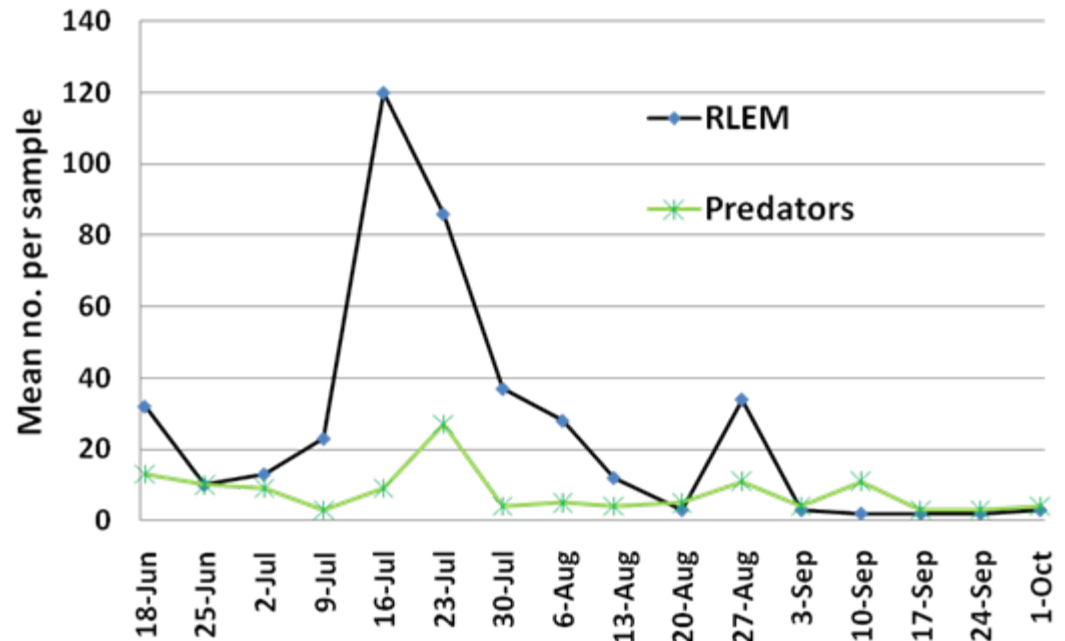


Beneficials / Natural enemies

Effectiveness

- Native predator complex suppress spring RLEM peak (James 1995)
- Anystis (RLEM) and Spiny snout (LF) mites most effective
 - 80% (RLEM) and 60% (LF) control (Michael 1995)
 - 93% LF in autumn with >25/m² (Ireson 2006)
- But effectiveness is patchy!!

RLEM and native predators in a Leeton pasture

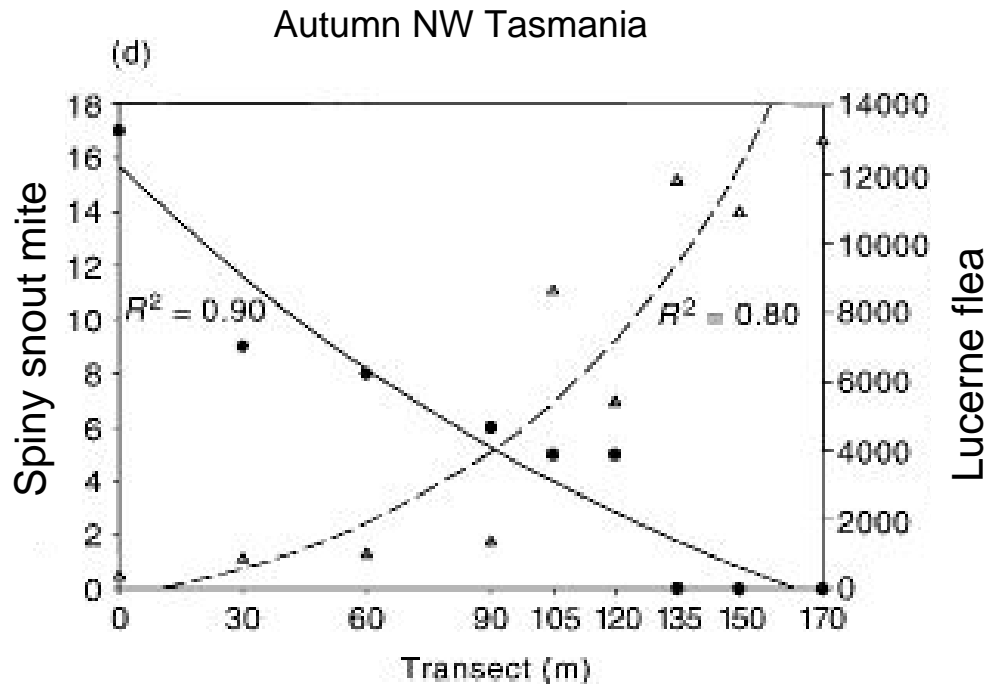


From James 1995



Beneficials / Natural enemies

Lucerne flea & spiny snout mite



From Ireson et al 2002

Strategic use of pesticides

Insecticide strategies

- Choice of chemicals that are softer on natural enemies (eg systemic omethoate & dimethoate)
- Border and spot sprays are a key IPM tools, particularly with LF, BPC and ABB 'hot spots'
- For earth mites, spray within 3 weeks of egg hatch (timing is critical)

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Spring

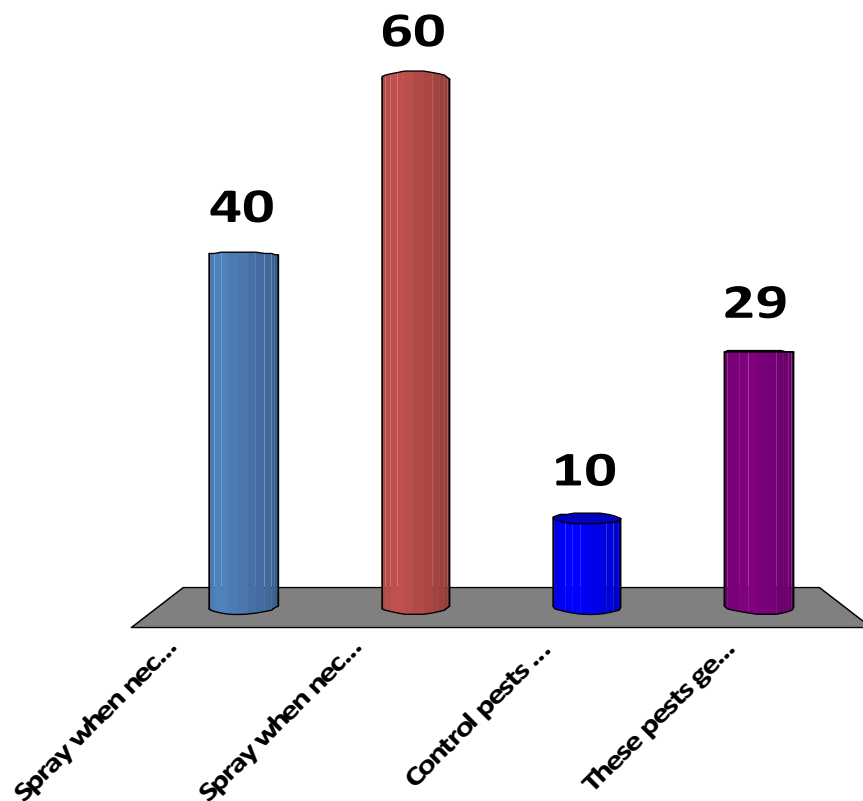
Managing pests to reduce the carry-over of pest eggs into the following autumn

- cultural control
- strategic pesticide choices

What is your preferred approach to control earth mites in pastures in spring?

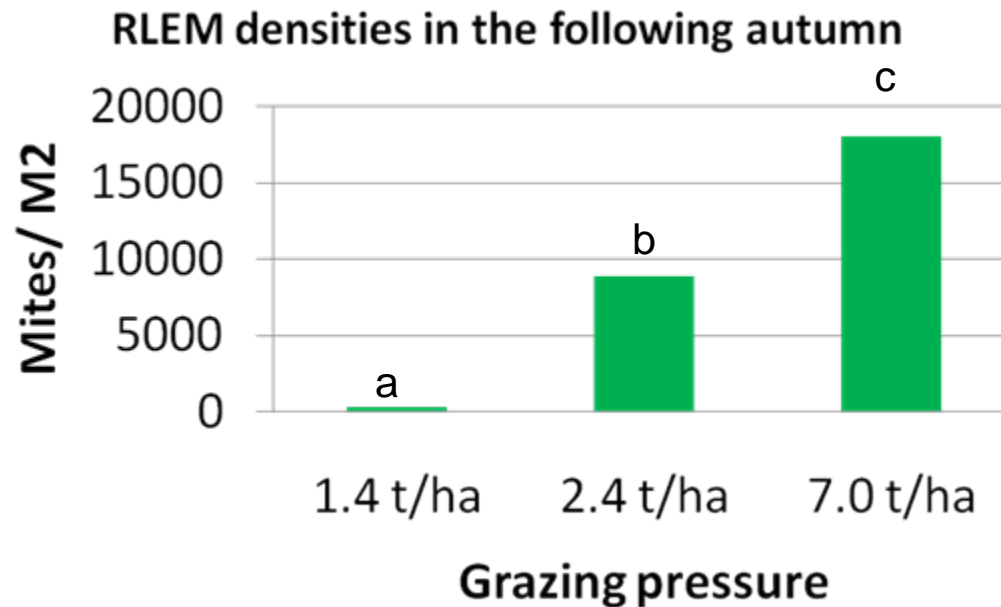
(Enter preferred approach first, then other options in order (if used))

1. Spray when necessary
2. Spray when necessary on the Timerite[®] date
3. Control pests using grazing management
4. These pests generally don't warrant control



Reducing the carry-over of pest eggs

1. Grazing management



Adapted from Michaels et al 1995 International Grasslands Conference

Reducing the carry-over of pest eggs

1. Grazing management

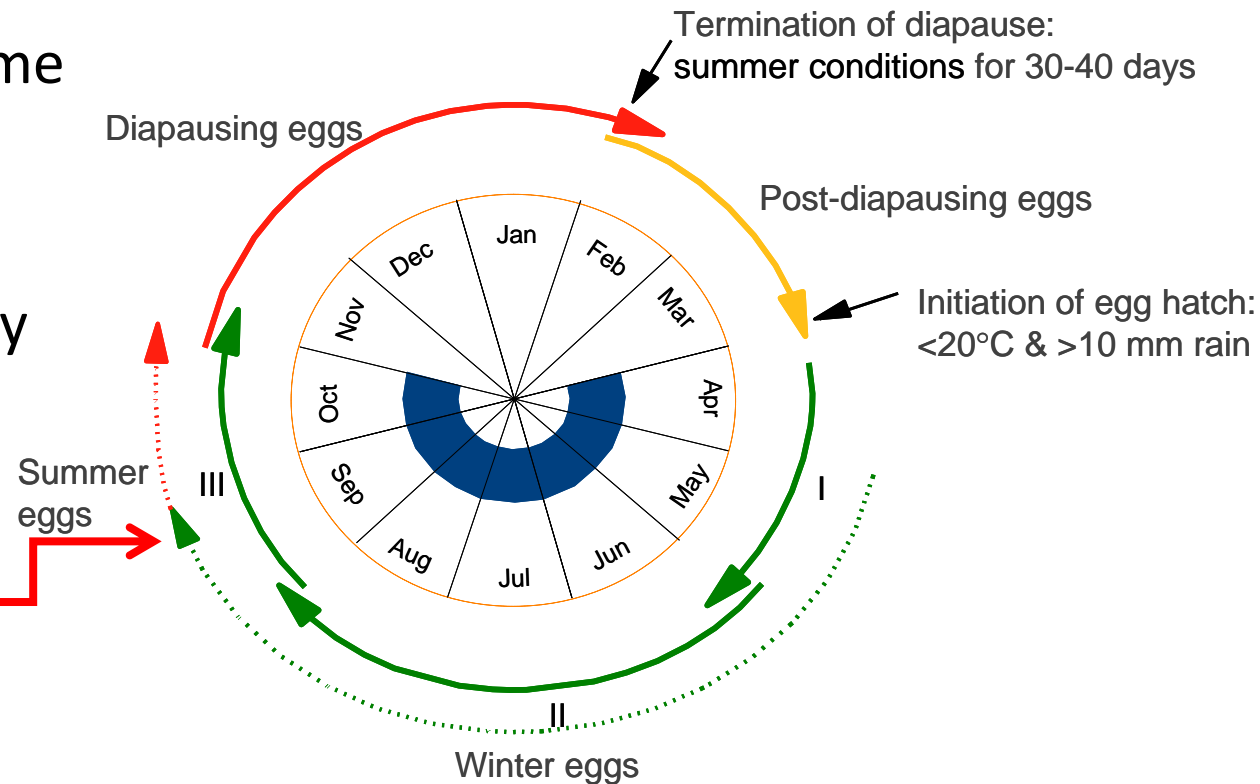
- Principle: control of pest immatures!
- Excellent control of RLEM (and probably BOM)
- Adverse impacts on predator populations
- Implications for LF? – unresolved



Reducing the carry-over of pest eggs

2. TIMERITE®

- Provides optimum time for spraying
- Free from AWI
- For RLEM control only
- Reduce diapause or “summer-safe” eggs
- Timing is critical



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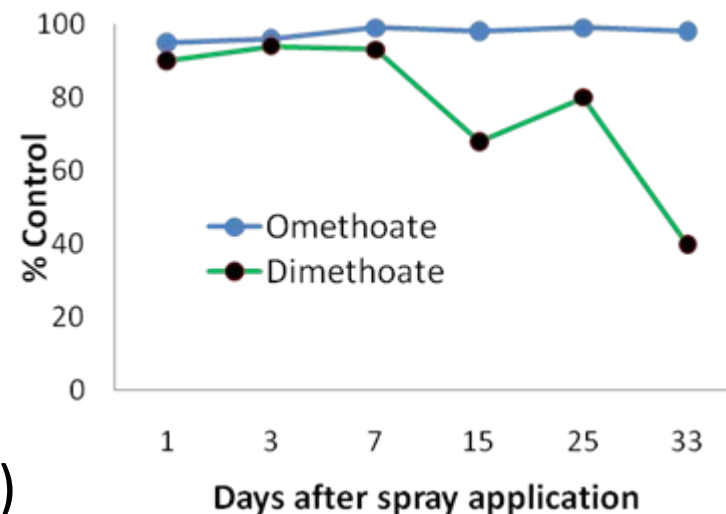
Pesticide
strategy

Reducing the carry-over of pest eggs

2. TIMERITE®

Optimum spray date obtained for each your property:

- AWI Ltd Helpline on 1800 070 099 or www.timerite.com.au
- Provide property name, nearest location or Long/Latitudes
- Residual chemicals (e.g. omethoate) needed to target later emerging eggs (2 weeks)



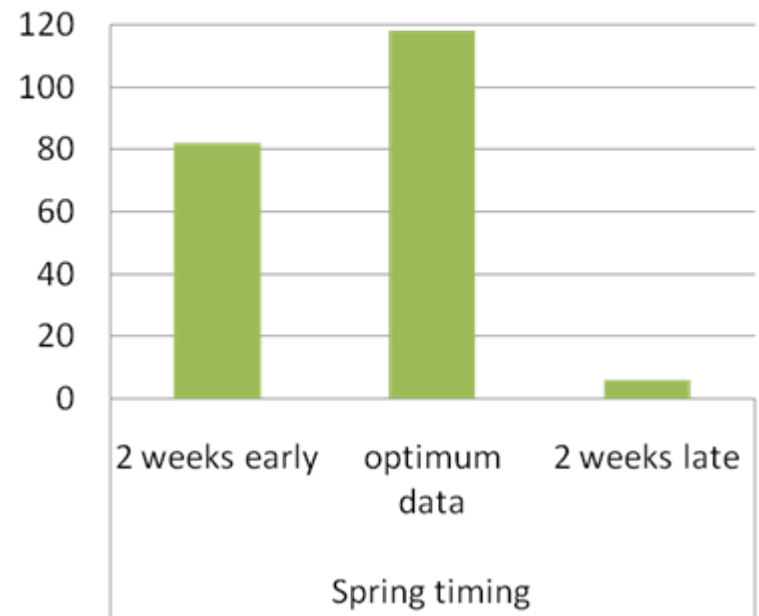
Adapted from AWI Ltd: Timerite© Information Package (sourced from Bayer)

Reducing the carry-over of pest eggs

2. TIMERITE®

- TIMERITE provides excellent control of RLEM mites in Autumn
- Spraying after the optimum date does not achieve good control the following Autumn
- Control of RLEM does not reliably carry through into Spring
- Control of BOM and LF is partial, at best
- Impact on Bryobia and Snout mites is inconsistent

% increase in canola seedlings in Autumn



Key messages

for successful IPM in pastures & lucerne

- Planning ahead is important
- Knowing your pest identity is critical
- Good prospects for biocontrol in pasture systems (less disturbed, more stable)
- There are excellent tools available to reduce pest pressures and pesticide applications



Question

Legume-based pastures are often used in a regenerative capacity in cropping systems (soil carbon, soil nitrogen, weed breaks, etc.).

How can pastures that are managed using IPM principles play a similar role in suppressing pests in the cropping phase?