

# REDLEGGED EARTH MITE

## BEST MANAGEMENT PRACTICE GUIDE

**SOUTHERN**



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## BACKGROUND

Overuse of insecticides, particularly the repeated applications of chemicals from the same mode of action (MOA) group, has led to the evolution of resistance in redlegged earth mite (RLEM). Resistance has been detected within the western and southern regions of Australia and it is expected that the areas of known resistance will continue to increase (2019). Resistance includes the two main chemical groups: synthetic pyrethroids (MOA Group 3A) and organophosphates (MOA Group 1B). These chemicals are routinely applied against this pest in both the grains and grazing industries. Ultimately, the use of broad spectrum insecticides to control RLEM places strong selection pressure on the evolution of resistance.

## HOW TO USE THIS GUIDE

- 1** Become familiar with RLEM biology and identification  

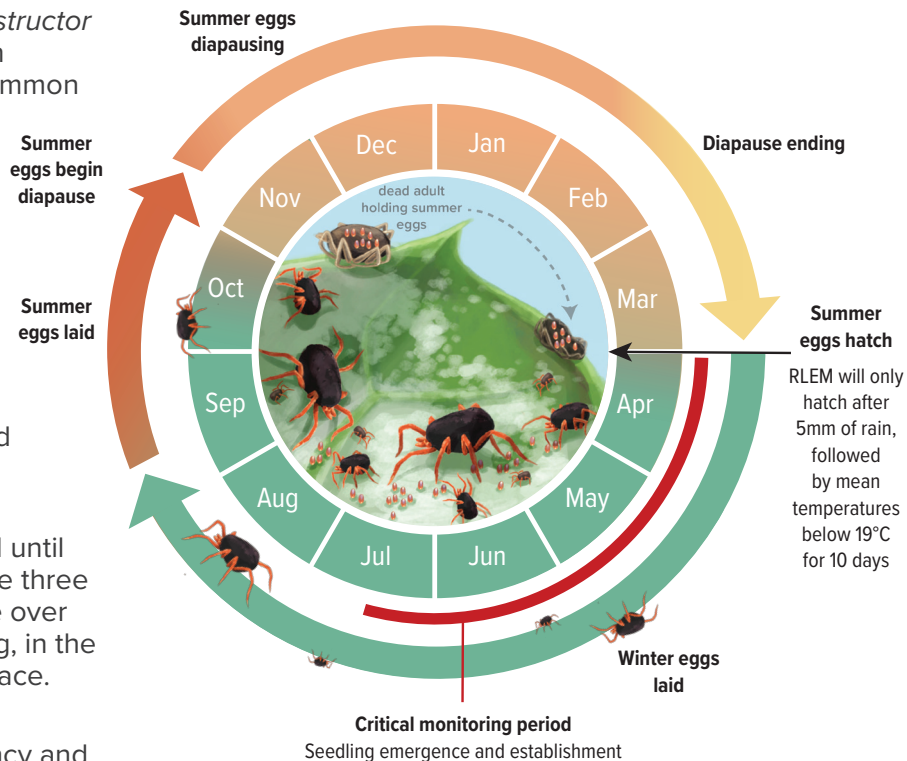
- 2** Determine your risk for the season and follow the recommendations  

- 3** Consider seasonally based best management practices and actions  

- 4** Note key considerations for each season

Redlegged earth mite (*Halotydeus destructor* – RLEM) is widespread in the southern cropping region and is a major and common pest of pastures and grain crops. Mites are particularly damaging during seedling establishment (when the crop stage is most vulnerable) resulting in the potential for considerable economic losses. The impact of RLEM varies across years, but is generally most significant in canola. While RLEM are less of a concern in cereal crops and in some pulses (such as lentils and chickpeas), they can cause damage in these crops.

RLEM are usually active from late April until early November and typically complete three generations per season. RLEM survive over summer as a diapausing (dormant) egg, in the body of a dead female on the soil surface.

Autumn rainfall, accompanied by cool temperatures, breaks summer dormancy and triggers egg hatch.



RLEM are approximately one millimetre in length with a velvety black body and eight orange-red coloured legs. They mostly form and feed in clusters, attracted by plant volatiles emitted at the site of injury. RLEM are sometimes accompanied by other mites that can be more tolerant of insecticides such as blue oat mite (red spot on their back), Balaustium mite (larger ~2mm and slower) and Bryobia mite (flattened body and feed singularly). Other mite species require quite different approaches to management.

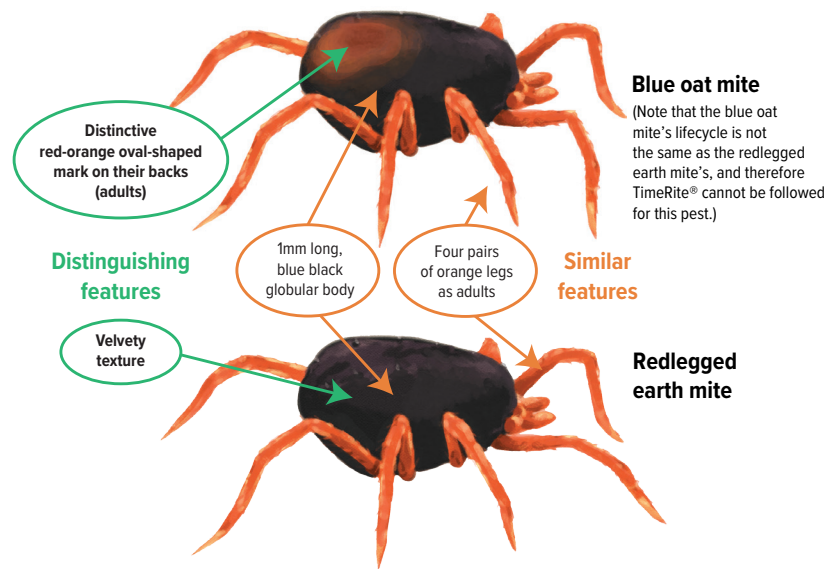


PHOTO: cesar  
Balaustium mite.

Mites are not true insects but are, in fact, arachnids belonging to the spider family.



Bryobia mite.

## SCENARIO: LAST YEAR THE Paddock WAS IN PASTURE OR FALLOW

| YEAR                      | ASSESSMENT OF:      | AGRONOMIC COMPONENT   | OPTION 1   | W* | ✓ | OPTION 2   | W* | ✓ | OPTION 3   | W* | ✓ |
|---------------------------|---------------------|---|--|----|---|--|----|---|--|----|---|
| LAST YEAR'S PASTURE PHASE | Last year's pasture | 1. Pasture type   | No pasture, or perennial or annual grass dominated     | -2 |   | Mixed grasses, few legumes   | 0  |   | Legume dominant  | 2  |   |
|                           |                     | 2. Weed status  | No or few (<5%) broadleaf weeds                        | -2 |   | Modest amount of broadleaf weeds (5–20%)   | 0  |   | Broadleaf weeds common, particularly capeweed >20%   | 2  |   |
|                           |                     | 3. Pasture density  | Thin/sparse  | -1 |   | Moderate ground cover; mid-season finish   | 0  |   | High density/thick canopy; late season finish  | 1  |   |
|                           | Last autumn         | 4. Autumn RLEM numbers  | RLEM absent or in very low numbers                     | -2 |   | Moderate RLEM numbers (below threshold)  | 0  |   | High numbers of RLEM   | 2  |   |
|                           |                     | 5. Insecticide used for any pest (seed treatment, bare earth, foliar spray) & impact on beneficials | Insecticide not required                               | -1 |   | Used diafenthiuron or other 'soft' insecticide   | 0  |   | Used broad spectrum insecticides such as synthetic pyrethroid (SP) or organophosphate (OP)                         | 1  |   |
|                           | Last spring         | 6. Removal of herbage through grazing   | Grazed to low available herbage (<1.4t/ha) in Sept–Oct | -2 |   | Medium herbage (1.4–2.8t/ha) available in Sept–Oct   | 0  |   | Heavy pasture canopy; minimal herbage removal (>2.8–4.0t/ha) in Sept–Oct   | 2  |   |
|                           |                     | 7. Was insecticide used for RLEM or another pest?   | Yes; sprayed on TimeRite® date or 2 weeks before       | -3 |   | RLEM uncommon; no spring insecticide; or insecticide used more than 2 weeks before, or any time after TimeRite® date | 0  |   | RLEM common; no spring insecticide; or insecticide used more than 2 weeks before, or any time after TimeRite® date | 3  |   |
| THIS YEAR                 | This autumn         | 8. Proposed crop type   | Chickpeas/lentils/grass dominated pastures             | -3 |   | Cereals/other pulses   | 0  |   | Canola/medic   | 3  |   |

Column score (add ticked weightings)

| RISK RATING (add column scores) | <0 = Low | 0-5 = Medium | >5 = High |
|---------------------------------|----------|--------------|-----------|
|---------------------------------|----------|--------------|-----------|

\*W – weighting

HOW TO USE: tick appropriate option for each agronomic component, negative values indicate reduction in risk, positive values indicate increase in risk.

## SCENARIO: LAST YEAR THE Paddock WAS CROPPED

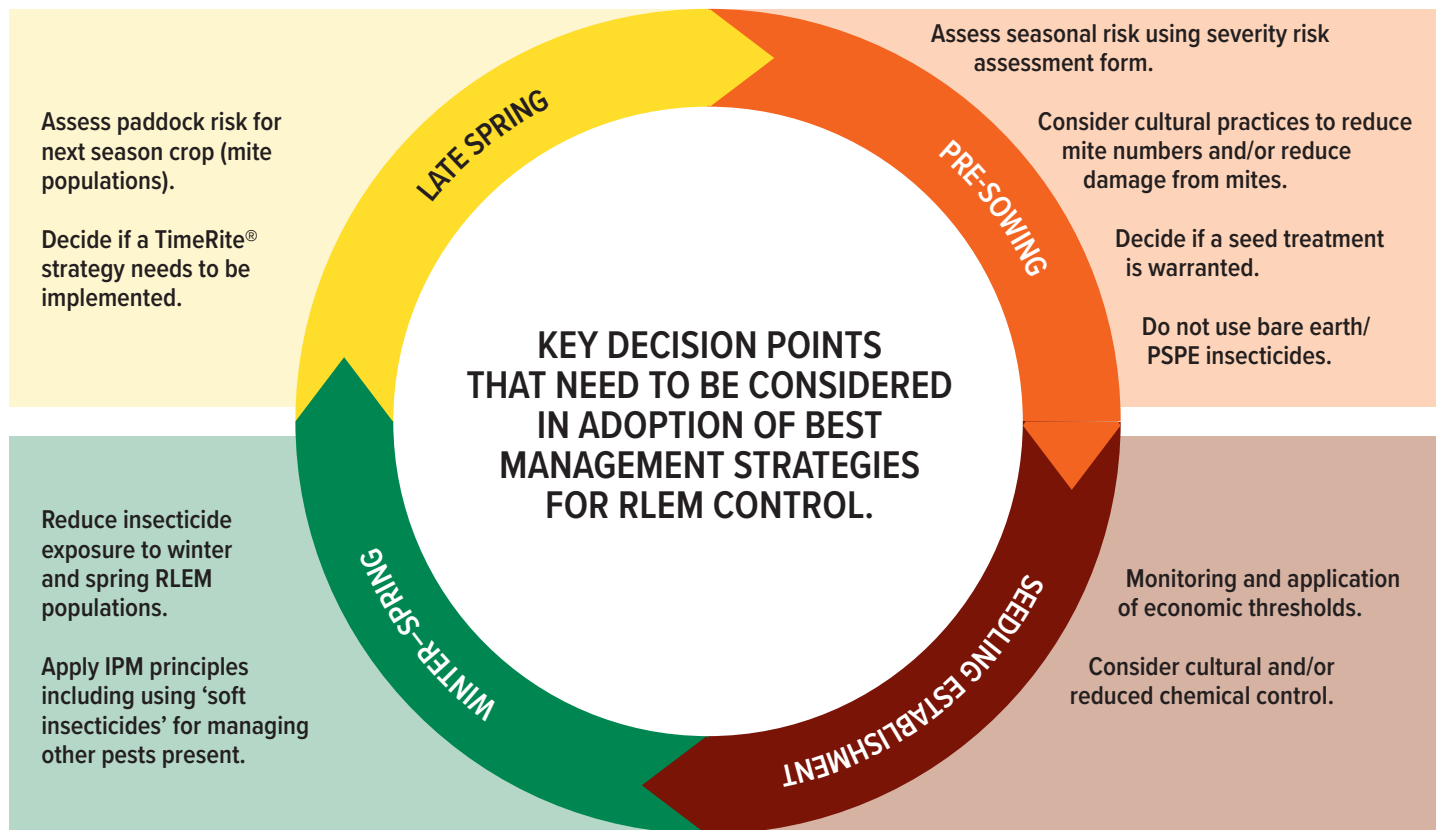
| YEAR                      | ASSESSMENT OF:      | AGRONOMIC COMPONENT   | OPTION 1   | W* | ✓ | OPTION 2   | W* | ✓ | OPTION 3   | W* | ✓ |
|---------------------------|---------------------|---|--|----|---|--|----|---|--|----|---|
| LAST YEAR'S PASTURE PHASE | Last year's pasture | 1. Crop type  | Lentils/chickpeas/canola                           | -2 |   | Cereals/other pulses   | 0  |   | Any crop type, but under sown with clover or lucerne   | 2  |   |
|                           |                     | 2. Weed status  | No or few broadleaf weeds or pasture lengths (<5%) | -2 |   | Modest amount of broadleaf weed or pasture legume component (5–20%)  | 0  |   | Broadleaf weeds and/or pasture (legumes common >20%)   | 2  |   |
|                           |                     | 3. Crop density   | Thin/sparse  | -1 |   | Moderate canopy and/or early season finish   | 0  |   | High density/thick canopy growing actively late into spring  | 1  |   |
|                           | Last autumn         | 4. Autumn RLEM numbers  | RLEM absent or very low numbers                    | -2 |   | Moderate RLEM numbers (below threshold)  | 0  |   | High numbers of RLEM   | 2  |   |
|                           |                     | 5. Insecticide used for any pest (seed treatment, bare earth, foliar spray) & impact on beneficials | Insecticide not required                           | -1 |   | Use diafenthiuron or other 'soft' insecticide  | 0  |   | Used broad spectrum insecticides such as synthetic prethroid (SP) or organophosphate (OP)                            | 1  |   |
|                           | Last spring         | 6. Was insecticide used for RLEM or another pest?   | Yes; sprayed on TimeRite® date or two weeks before | -1 |   | RLEM uncommon; no spring insecticide; or insecticide used more than two weeks before, or any time after TimeRite® date | 0  |   | RLEM common; no spring insecticide, or insecticide used more than two weeks before, or any time after TimeRite® date | 3  |   |
| This year                 | This autumn         | 7. Proposed crop type   | Chickpeas, lentils, grass dominated pastures       | -3 |   | Cereals/other pulses   | 0  |   | Canola   | 3  |   |

Column score (add ticked weightings)

|                                 |          |              |           |
|---------------------------------|----------|--------------|-----------|
| RISK RATING (add column scores) | <0 = Low | 0-5 = Medium | >5 = High |
|---------------------------------|----------|--------------|-----------|

\*W – weighting

HOW TO USE: tick appropriate option for each agronomic component, negative values indicate reduction in risk, positive values indicate increase in risk.



## Key actions

- 1 Assess paddock risk for next season's crop (mite populations).
- 2 Decide if a TimeRite® strategy needs to be implemented.

### LOW RISK RLEM

- Do not use TimeRite®.

### MODERATE RISK RLEM

- Use stock grazing to reduce pasture feed-on-offer.
- Use TimeRite® if planting canola, otherwise use alternative strategies if possible (see below).

### HIGH RISK RLEM

- Apply TimeRite® strategy on correct date, ensuring that RLEM is the dominant mite species. Always rotate MOA groups across the season following RMS guidelines.
- Keep pastures short prior to TimeRite® date. Use stock grazing to reduce pasture feed-on-offer.

## Considerations

- Where applicable graze to <1.4t/ha feed on offer. A shorter pasture with exposed soil will limit growth in mite populations.
- Apply TimeRite® on correct date and ensure RLEM are the dominant mite species – it will not work on other mites.

Systems with stock grazing can help manage RLEM populations.



PHOTO: BCG

## Key actions

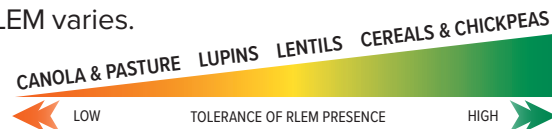
- 1 Assess seasonal risk using risk assessment chart.
- 2 Use risk rating to decide action plan.

### LOW RISK RLEM

- Do not apply preventative insecticides.
- If using retained seed requiring seed treatment:
  - do not use a seed treatment for RLEM; and
  - assess risk of other pests.
- If high risk of other pests:
  - Apply insecticide treatments (seed/PSPE), selecting MOA group consistent with RLEM chemical rotation options (see RMS).
  - Where possible, apply 'soft' insecticides (less disruptive on beneficial insects) early in the cropping season.

## Considerations

- RLEM risk is reduced if paddocks and fencelines are kept weed-free for at least two weeks prior to sowing.
- Crop tolerance to RLEM varies.



### MODERATE RISK RLEM

- Use a seed treatment (choose the most appropriate insecticide based on resistance levels and RMS rotations).

### HIGH RISK RLEM

- Plant a less susceptible crop (wheat/chickpeas).
- Rotate with a non-preferred crop (for example, weed-free lentils) – to reduce risk for subsequent years.
- Sow earlier (keeping in mind other pests such as green peach aphid).
- Increase seeding rates to compensate for possible seedling loss.
- Use a seed treatment (choose the most appropriate insecticide seed treatment based on resistance levels and RMS rotations).
- Do not apply post-sowing pre-emergent (PSPE) insecticides against RLEM.

## Key actions

- 1** Monitor crop closely for the first 3 to 5 weeks after sowing/emergence.
- 2** Only spray when economic thresholds are reached.
- 3** Manage fenceline and crop weeds, especially capeweed.

### LOW RISK RLEM

- Do not spray.

### MODERATE RISK RLEM

- Use strategic spraying to target where RLEM are present rather than blanket sprays – such as fenceline sprays.

### HIGH RISK RLEM

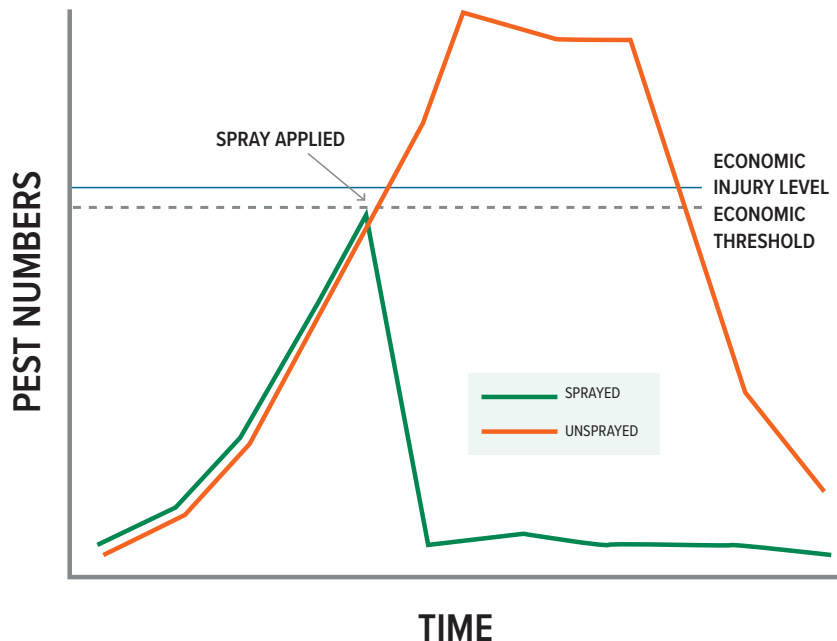
- Where populations exceed economic thresholds (dependent on crop type) apply sprays to delay the build-up of RLEM.
- Use soft insecticide option to preserve beneficial species.
- If below thresholds, continue to monitor populations.

## Considerations

- Once canola reaches four true leaves, feeding damage is unlikely to result in yield loss.



PHOTO: cesar



Only spray when economic thresholds are reached.

## MONITOR AT LEAST 10 POINTS IN A Paddock

Use visual monitoring, preferably in the morning or when it is overcast.

## THRESHOLDS:

### CANOLA

**Cotyledon:** mite damage (silvering) affects 20%+ of plants and mites are present

**1 true leaf:** >10 mites/plant

**2 true leaves:** when plant numbers are low <30/m<sup>2</sup> and mites are present

**More than 3 true leaves:** only when plants are under severe stress and >2000 mites/m<sup>2</sup>

### OTHER CROPS

**Wheat/barley:** 50 mites/m<sup>2</sup>

**Linseed:** 100 mites/m<sup>2</sup>

**Pulses:** 50 mites/m<sup>2</sup>

**Establishing medic pasture:**  
20 to 30 mites/m<sup>2</sup>

## Key actions

- 1** Assess risk of other pests based on monitoring, weather and crop conditions.
- 2** Apply integrated pest management principles.
- 3** Rotate chemicals to avoid successive MOA groups for RLEM.
- 4** Avoid SPs/OPs for control of pests other than RLEM.

### CURRENTLY REGISTERED PRODUCTS FOR RLEM MANAGEMENT

- Organophosphates (OPs), Group 1B, e.g. dimethoate
- Synthetic Pyrethroids (SPs), Group 3A, e.g. alpha-cypermethrin
- Neonicotinoids, Group 4A, e.g. imidacloprid
- Phenylpyrazoles, Group 2B, e.g. fipronil
- Diafenthiuron, Group 12A

## Considerations

- Use 'soft insecticides' to control aphid and caterpillar pests during vegetative, flowering and grain fill stages
- **Target versus non-target pests:**  
Controlling one pest can affect other pests that may be in low numbers in the crop. This creates unintentional selection for resistance and needs to be considered with all insecticide applications.



PHOTO: cesar

**Cultural control** – farm practice aimed at controlling pest populations without insecticide.

May include practices such as weed management to reduce green bridge, sowing time or sowing rate

**Economic injury level** – pest density at which the cost of yield loss is equal to the cost of control

**Economic threshold** – thresholds help to rationalise insecticide use by indicating when control actions should be taken in order to prevent a population from reaching the economic injury level

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

**PSPE** – post-sowing pre-emergent. A timing used for application of some chemicals

**RLEM** – redlegged earth mite

**RMS** – resistance management strategy. Directs timing and type of integrated pest control approaches with the aim of limiting risk of insecticide resistance from evolving or persisting

**Seed treatments** – chemical productions applied to seed prior to sowing for management of establishment pests

**Soft insecticide** – an insecticide that has fewer impacts on non-target organisms. Also called ‘selective insecticides’

**TimeRite®** – a strategy used for targeting RLEM based on a calculated spray date that is specific to a location. Supports targeted control of RLEM before laying of diapausing (dormant) eggs that will survive over summer



[illegible]

## References / Further resources

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Crop and pasture mite identification (video) – <https://www.youtube.com/watch?v=y02DKvGfOkQ&feature=youtu.be>.

Crop mites (2012) GRDC Back Pocket Guide, Grains Research and Development Corporation, Canberra. Available from URL: <https://grdc.com.au/resources-and-publications/all-publications/publications/2012/06/bpg-cropmites>.

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Redlegged earth mite – resistance evolution (video) – <https://www.youtube.com/watch?v=OlGolokmwEs&t=35s>.

RLEM PestNote – [cesaraustralia.com/sustainable-agriculture/pestnotes](https://cesaraustralia.com/sustainable-agriculture/pestnotes).

RLEM Resistance Management Strategy – [www.grdc.com.au/FS-RLEM-Resistance-strategy](http://www.grdc.com.au/FS-RLEM-Resistance-strategy).

Science behind the RMS – [www.ipmguidelinesforgrains.com.au](http://www.ipmguidelinesforgrains.com.au).

TimeRite® – <http://www.wool.com/land/timerite>.

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