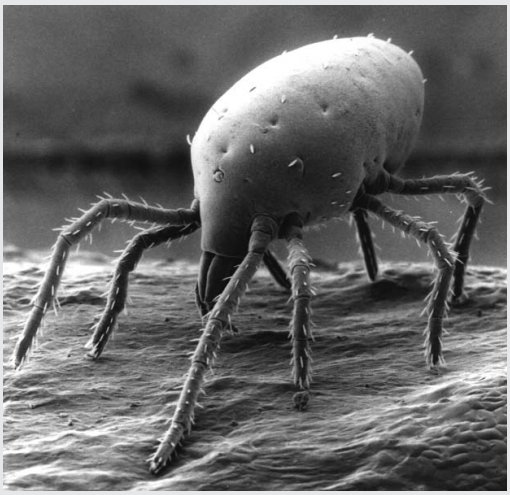
CONTROLLING THE REDLEGGED EARTH MITE

Louise Lawrence outlines work being done at CSIRO in Australia to control the red-legged earth mite (RLEM) with a single spray in the spring

ABOUT THE MITE

In Australia, redlegged earth mites (1mm long) are active from May to October (winter), emerging from oversummering eggs in autumn at the break of season. Eggs are laid on the underside of leaves or in leaf litter. Late stage juveniles and adults cause most of the damage and, in favourable conditions, populations build rapidly. Numbers can peak in autumn or spring or both. During spring, the mites stop laying winter eggs and start producing diapause eggs that are retained in the dead female's body in the soil over summer. They hatch when exposed to a combination of cooler weather and moisture after hot weather.

RLEM thrive in southern Australian regions with hot, dry summers and cool, moist winters. They feed on all parts of the plant and crawl into soil cracks to feed on germinating seedlings. Silvery patches on the leaves are characteristic signs of RLEM damage.



RLEM – a major pest in Australia

The redlegged earth mite (RLEM) has been a major pest of pastures, crops and vegetables in winter rainfall areas of southern Australia since its introduction from South Africa in 1917 and causes an estimated $200 million annual loss in production.

RLEM feeds on all stages of the plant but causes most damage to seedlings in autumn. Historically, the only method of control has been with chemicals and, in pastures, farmers usually spray in autumn. However, mite populations increase enough over winter to again cause damage in spring.

CSIRO research showed that mite control in spring would be better as it could prevent production of oversummering eggs (see box). For a short period in spring, after the mites have finished laying winter eggs and before they start producing oversummering diapause eggs, there are no eggs present. This is the ideal opportunity to control RLEM as the eggs are impervious to chemicals. Controlling mites in spring would also benefit seed yield and production as fewer oversummering eggs would mean fewer mites emerging in the following autumn to damage seedlings.

Prediction model and computer package

CSIRO scientists developed a model to predict when RLEM will produce diapause eggs. They found that the date when 90% of eggs were diapause eggs was constant across years for each site but varied between sites, even quite close ones. Using their model, they developed a map which showed the optimum date for a spring spray (with a window of

Spraying in tall pasture in the spring for the control of redlegged earth mite. Photo courtesy of CSIRO Entomology.

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opportunity of about three days on either side) in winter rainfall areas of southern Australia.

This model was tested in Western Australia, South Australia, Victoria and New South Wales. At 85% of the sites, the date of diapause was within a week of the predicted date. With the single spring spray, subclover seed yield increased by around 43% and seedling density by 78%. Mite population was reduced by >90%, in the following autumn. The latter information is particularly important when a high value crop such as canola is being grown after pasture.

A package, TIMERITE®, containing biological information on the mites, the benefits of spring spraying and a spray date specific to their property, is now available to farmers. This date does not vary from year to year for individual farmers but does vary between farms as close as 10 km apart. A fixed date allows farmers to move away from monitoring RLEM numbers in autumn and applying several sprays after damage has been noticed. By the time mites were visible, they could already have caused significant damage.

Progress so far

Control of non-target species such as blue oat mite (BOM), lucerne flea, aphids and the pasture snout mite (a predator) the following autumn was lower than for RLEM and varied between species. BOM was the only other species with significant control (around 78%).

There has been significant uptake of TIMERITE® and researchers are addressing issues raised by users, such as the effect of spraying outside the window of opportunity when farmers miss their allotted time due to issues such as bad weather. RLEM control the following autumn was good if the spray was applied on the optimum date or up to two weeks earlier. Two commonly used chemicals, omethoate and dimethoate were also compared. Both are classified as systemic insecticides but omethoate is the more persistent and was shown to be more effective. Control was poor if either were applied two weeks late.

In response to feedback, a follow up trial comparing TIMERITE®'s efficacy in short and tall pasture showed TIMERITE® correctly predicted the date for 90% diapause eggs in both. However, the much larger populations of mites in tall pastures meant that, even with around 99% control from the single spray, there were considerable numbers of mites left to produce oversummering eggs. It is possible in this situation that an early spray to reduce numbers would be useful where there is excessive feed on offer.

This research is lead by Dr James Ridsdill-Smith and funded by Australian Wool Innovation Ltd and the TIMERITE® package is available through an agricultural information provider, the Kondinin Group.

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