

97/V05



# **Producer Research Support**

Earthworms to Increase Pasture Productivity Central Hopkins Land Protection Association

### The project

Acidification is estimated to cost Australian agriculture \$300 million a year in suppressed production and lime to raise soil pH.

CSIRO research, funded by Sustainable Grazing Systems partner Land and Water Australia, has shown that earthworms, especially the deep burrowing European species *Aporrectodea longa*, can help bury broadcast lime down to 20cm within one winter.

CSIRO also recorded improvement by as much as 60% in soil structure, fertility and increased pasture production.

But the desirable *A. longa*, which is among the many earthworms imported in flower pots over the past 200 years, is restricted to Tasmanian agricultural soils. It has not invaded native habitats there.

While 72% of all grasslands earthworms are deep burrowing, Australia has none of these worms because of its nutrient-poor, shallow soils. Soil acidification is a major issue in the higher rainfall zone.

The Central Hopkins Land Protection Association set out to:

- determine the numbers and range of earthworm populations in its region;
- identify the rate of establishment and spread of introduced worms;
- evaluate the effect of worms on pasture production; and
- demonstrate the influence of earthworms on leaching and surface run-off of nitrogen and phosphorus from pastures.

#### **Objectives**

- Survey earthworm populations in grazing land in the Central Hopkins Region to determine the current status of the earthworm fauna on a range of soil types;
- 2. Establish two field trials near Mortlake at which the Tasmanian deepburrowing earthworm *Aporrectodea longa*, will be introduced in replicated plots;
- 3. Measure the survival, rate of spread and influence of *A. longa* on soil properties and pasture production at these sites; and
- 4. Publicise the aims and results of the trials through the media, field days, scientific publication and oral presentation at farmer-oriented conferences.

Through improved management of soil fauna, in particular earthworms, the Central Hopkins Land Protection Association set out to increase soil fertility and pasture production, thereby improving meat and wool production and quality in the Central Hopkins Catchment in Western Victoria.

Those who believe earthworms can make a low-cost long-term contribution to improved productivity say climate matching and extensive field trials suggest *A. longa* can colonise agricultural soils across much of southern Australia's higher rainfall (above 600mm) zone.

### **Key points**

- Pasture dry matter increases of 10–17% have been recorded on plots seeded with deep burrowing earthworms in Western Victoria.
- Matching introduced earthworms to climate suggests desirable earthworms can colonise agricultural soils across much of southern Australia's higher rainfall (above 600mm) zone and make a low-cost long-term contribution to improved productivity.

### **Contact details**

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## **Producer Research Support**

MLA Producer Research Support offers support funding of up to \$15,000 over three years for groups of producers keen to be active in on-farm research and demonstration trials.

These activities include:

- Producer Initiated Research and Development
- More Beef from Pastures
  demonstration trials
- Prime Time Wean More Lambs
  demonstration trials
- Sustainable and productive grazing grants.

Contact Stephen Feighan - MLA Project Manager, Producer Delivery and Adoption. Tel (02) 9463 9245 or sfeighan@mla.com.au

#### What was done

In 1997 group members (including Dr Geoff Baker of CSIRO) travelled to Woolnorth in northwest Tasmania to capture large numbers of *A. longa*. The earthworms were taken back to the mainland for field and laboratory trials to determine optimal environmental conditions – soil moisture, pH, temperature, soil and food types and worm density. *A. longa* was chosen for its vertical burrowing activities.

The worms were then released at 16 sites around Mortlake to determine rate of establishment and spread.

#### Discussion

Pasture dry matter increases of 10–17% have been recorded on plots seeded with deep burrowing earthworms in Western Victoria. This result was below expectation because of the dry seasons during the trial that started in 1997.

Earlier seeding trials on Woolnorth (the source of the earthworms) recorded dry matter productivity improvements as high as 67% in the first year before settling back to a consistent 25%.

While the results were below expectation, Tania Rogers, of the Watershed 2000 project and who helped coordinate the producer research support trial, believed that in a normal season, the plots would be expected to demonstrate greater nutrient cycling and further increase pasture production.

Ms Rogers said earthworms are known to increase pasture productivity through their ability to improve soil structure, moisture infiltration, aeration and nutrient cycling.

Matching introduced earthworms to climate suggests desirable earthworms can colonise agricultural soils across much of southern Australia's higher rainfall (above 600mm) zone and make a low-cost long-term contribution to improved productivity.

At the last survey and despite three dry years, worms were found at each site, although in lower than ideal numbers.

The good news, according to trial participants, was that an average 10% pasture dry matter increase was recorded on two seeded plots recorded for pasture production.

Ms Rogers said a 10–17% increase in pasture production is statistically significant but below expectation when compared with results from Tasmania and New Zealand.



#### MLA also recommends EDGEnetwork

EDGEnetwork offers practical field-based workshops to improve productivity and profitability for the long-term.

Workshops cover breeding, nutrition, grazing management, marketing and selling.

Call MLA on 1800 993 343 or www.edgenetwork.com.au

#### **Towards Sustainable Grazing**

The Towards Sustainable Grazing package is the culmination of MLA's highly successful Sustainable Grazing Systems (SGS) project.

There are three parts to the package:

- 1. The professional producer's guide www.mla.com.au or call 1800 675 717;
- 2. EDGEnetwork workshops; and
- 3. SGS Tips & Tools downloadable PDFs from www.mla.com.au

#### **Meat and Livestock Australia**

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