

## Dung beetles – working for you

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### Introduction

By rapidly burying dung pads, dung beetles reduce fly breeding sites and therefore fly numbers. Dung burial also reduces the infective stages of gastrointestinal parasites of livestock. Dung beetles can also clean up pastures and replace nutrients in the soil. The beetles' tunnels result in greater water retention and less run-off and they improve root penetration and soil aeration.

This Primefact has been written to help farmers to increase dung beetle activity on their farms.

### Background

Australia's native dung beetle species do not cope very well with the dung of introduced ruminants such as cattle. As a result, cattle dung is not well broken down by native dung beetles, staying on the soil surface as a breeding site for many fly species, including buffalo flies.

CSIRO introduced dung beetle species into Australia from Africa and Europe in an attempt to improve dung burial and so reduce fly numbers. The introduced dung beetles were distributed widely throughout Australia during the 1970s and early 1980s but did not establish successfully at all sites, particularly the NSW Far North Coast. This may have been due to the extensive use of insecticides to control ticks in the region, as these insecticides leave residues in the dung which are toxic to dung beetles.

It may be possible, however, for stockowners to increase dung beetle activity on their properties by introducing the most appropriate species and by avoiding practices which are known to reduce dung beetle numbers.

### North Coast dung beetle trials

A dung beetle project was run on the NSW North Coast and in south-eastern Queensland from 1996

to 1999. The project was initiated by the Northern Co-operative Meat Company, Casino, and Norco Pty Ltd, and funded by Meat and Livestock Australia (formerly the Meat Research Corporation). The project involved five clusters of farming families, who recorded information on dung beetle and buffalo fly numbers, climatic factors and chemical use on their farms.

Findings from the project were as follows.

- Warmer weather was associated with more dung beetles.
- Dung beetles were in highest numbers when buffalo flies were most numerous. Presumably both species flourish under similar climatic conditions. Note that the dung beetle population in the trial did not build up to a size that was large enough to increase the rate of dung burial to the extent required to reduce the buffalo fly population.
- Treating cattle with synthetic pyrethroid insecticides was associated with reduced dung beetle activity.
- Treating cattle with macrocyclic lactone and organophosphate insecticides did not appear to reduce dung beetle activity.

### Increase your dung beetle species

You need a number of dung beetle species to get the most dung buried over the longest possible period. Because each species is highly active for only a part of the year, you need a variety of species that are active at different times of the year.

### Monitor beetle activity

By monitoring the dung beetle population on your farm you can determine if you are having any impact, either positive or negative, on the local dung beetle population. Remember, though, that climate has a huge impact on dung beetle populations. Most species are more active in warm moist conditions, so changes you see may relate to climatic changes, not to anything you have done.



Monitoring dung beetle populations involves assessing both dung beetle activity and the diversity of species present.

### Suggested monitoring program

- Monitor the dung beetle population once a month. This should be sufficient for you to understand what is happening on your property.
- Rate dung beetle activity as 'nil', 'low', 'medium' or 'high'. 'Nil' means that no activity is seen in dung pads, and 'high' means that most pads are rapidly dispersed.
- To estimate the number of each species of dung beetle present, proceed as follows:
  - Look for dung pads 1–2 days old and preferably showing evidence of dung beetle activity, such as disturbed soil at the edge of the pad ('yesterday's' dung is fine – this is to ensure that day-fliers and night-fliers will be present). Approach quietly, as dung beetles are sensitive to vibrations and will quickly descend down their tunnels.
  - Shovel up two dung pads into a bucket, taking about 25 mm of soil from under the pad.
  - Fill the bucket with water and stir well with the shovel to break up the dung. The dung beetles will float to the top – skim them off with a sieve. Stir again, skim again, and continue until you get no more beetles. You can collect more dung pads and repeat the procedure if you like.
  - Count the number of each species of dung beetle present.

You could do less detailed monitoring and still get an idea of what is happening on your property.

### Identify your dung beetle species

- The book *Common Dung Beetles in Pastures of South-Eastern Australia*, by Marina Tyndale-Biscoe, costs \$44.95 including GST, plus \$9 postage, and is available through:
  - CSIRO Publications  
Phone 1800 645 051
- Dung beetles can be sent for identification to:
  - John Feehan  
3 Prell Place  
Hackett ACT 2602  
Phone 02 6248 0376

You need to kill the beetles by placing them in hot water and then drying them for 2–3 days on a sheet of newspaper or paper towel. Place the beetles in a matchbox (without any cotton wool, or sticky tape around the matchbox) and label the box with the date and location of collection. Also send a stamped self-addressed envelope and your

telephone number so that John can give you an identification.

### Introducing dung beetles

Dung beetles do not necessarily stay where they have been released. Beetles released on your property could well fly to your neighbours' properties. Consequently, it is often community groups, such as Landcare groups, which buy dung beetle colonies and release them.

It is worthwhile knowing which dung beetle species are already present in the area if you are considering introducing additional species – there is no point bringing in more of a species which has already established itself in the area. Paul Flower (phone 02 6632 3333) can undertake a survey of the species present in your area. The cost will depend on your locality.

Colonies of dung beetles can be purchased from John Feehan (3 Prell Place, Hackett, ACT 2602, phone 02 6248 0376 preferably in the evening). Costs vary depending on the species required but start from around \$400 for a starter colony of around 1500 beetles. Species that are difficult to harvest are more expensive. (At the time of publishing, this supplier is the only known supplier of dung beetles in NSW.)

### Don't kill your beetles

Little is known about techniques for increasing dung beetle populations, but we do know that the use of some chemicals will reduce populations. Many synthetic pyrethroid chemicals used for external parasite control on cattle are toxic to dung beetles feeding on the dung of treated animals. Some macrocyclic lactone chemicals, in particular the avermectins, have an adverse effect on the development and survival of dung beetle larvae and can reduce egg laying in newly emerged adults. Avoid using such chemicals on cattle, especially in spring, when dung beetles are first emerging.

#### Summary

- By burying dung pads, dung beetles reduce buffalo fly breeding sites.
- Stockowners can monitor the level of dung beetle activity and the species present on their farms.
- To increase the level of dung beetle activity on your farm you can buy a starter colony of 1500 beetles for around \$400.
- To keep the beetles you already have, avoid using, on your cattle, chemicals that are toxic to dung beetles. Such chemicals include most synthetic pyrethroid chemicals and some macrocyclic lactones, in particular the avermectins.

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