

# Dung beetles of the Tweed

## Dung beetles work wonders for farm productivity and the environment.

To better understand the Tweed's dung beetles, Southern Cross University and Council's Sustainable Agriculture Program collaborated on a shire-wide monitoring project that assessed the effects of seasonal variability and animal husbandry management on dung beetle populations.

## Recommendations for producers

Farmers can take a number of steps to enhance dung beetle populations and improve pasture health:

- Be clear about what parasite you're targeting and ensure the correct chemicals are used. Ask yourself, is there a dung beetle friendly alternative?
- Ensure the method of application reduces chemical contamination of dung. Back-rubbers, dust bags, over sprays or ear tags are preferred methods. Ear tags are the most dung beetle friendly. Moxidectin pour-ons are not known to affect dung beetles.
- Attempt to only treat the animals that are hosting the parasite. This will help build herd immunity and delay resistance among pest populations.
- Avoid the use of chemicals that are toxic to dung beetles, such as synthetic pyrethroids and avermectins, during peak beetle activity (October – June).
- Delay insecticide application in spring to avoid impacting newly emerged juvenile beetles.
- Monitor beetle populations on your property to understand the species present and to develop strategies to increase populations of beneficial beetles.

## Benefits of dung beetles

Dung beetles provide biological control of cattle dung by burying and dispersing it for their nutritional and reproductive needs. This has numerous benefits for graziers, including:

- **Reduced pest fly and parasite numbers.** By removing dung from the paddock, dung beetles remove the breeding habitat of many pests and parasites.
- **Enhanced soil fertility and structure.** Dung is buried by beetles in a network of underground tunnels where nutrients are recycled and soil aeration and water infiltration increases.
- **Increased pasture production.** Nutrient rich dung is concentrated below the root zone and plant roots easily penetrate the soil renovated by beetles. Fouling of pasture from undecomposed dung is also reduced.
- **Decreased pollution of waterways.** Dung burial and dispersal reduces the risk of nutrient-rich soil run-off, which can cause a loss of nutrients from areas of agricultural production and can pollute aquatic ecosystems.



Species of *Onitis* and *Onthophagus* were common in Tweed Shire.



A single *Bubas bison* egg found inside a brood ball at Whian Whian.

## Expanding diversity

Since 1970, more than 50 species of dung beetles have been introduced into Australia by the CSIRO to complement the activity of indigenous species. Approximately 23 of these introduced species have successfully established. However, most populations have been slow to build up and colonise new areas because of farm management practices and unfavourable environmental conditions.

## Project trial

Seven farms from three livestock industries (beef, dairy and alpaca) were surveyed across the Tweed from September to December to determine the effect of seasonal variation on species diversity.

The study used the simple flotation method of shovelling a one to two-day-old cow pat and 5–10cm of top soil into a large bucket of water. Beetles float to the surface, where they can be quickly counted and identified. Farmers also provided information about the types of insecticides and parasiticides used and their application regimes, to better understand their effects on dung beetle presence and abundance.

## Results

- 14 dung beetle species were recorded in the survey. The most common species were *Aphodius fimetarius*, *Aphodius lividus* and *Onthophagus sagittarius*. These species are typically small in size but large in numbers. Anecdotal observations suggested dung burial was limited in pats where these species were abundant because their larvae live and feed within the pat.
- Dung beetle populations and diversity increased as temperature increased in spring and summer.
- There was no clear relationship between chemical use and dung beetle diversity and abundance (more studies and trials are required).
- Trial releases of *Bubas bison* at two sites in the Northern Rivers found *Bubas bison* eggs and larvae four months after release, indicating the species might be a suitable species to fill the current winter gap (more studies and trials are required).



Southern Cross University intern student Lucas Hopkins (left) and Tweed Shire Council Project Officer – Biodiversity Aiden Sloman counting and identifying dung beetles using the flotation method.

**For further information or to participate in future projects, contact Council's Program Leader – Sustainable Agriculture on (02) 6670 2400.**

