

Introduced Dung Beetles

The lack of dung beetle species able to process cattle dung was noticed by CSIRO scientist, George Bornemissza. He and his team developed methods to safely import suitable species, mostly from Africa, into Australia in the 1970s.

There are now 23 species of introduced dung beetles that are well established in Australia, and in many places the problems with flies and disrupted nutrient cycles have been almost eliminated.

There are still areas, however, that do not have well established dung beetle populations, partly because some species are slow to spread naturally. Also, dung beetles are quite fussy about the climatic and soil conditions they prefer. The cooler regions of Australia, such as the Northern Tablelands of NSW, around Canberra and Tasmania are geographically isolated from each other, and so it is impossible for dung beetles to move between these regions by themselves. Another problem is the use of drenches and other farm chemicals that can kill dung beetles.

Dung Beetles and Climate Change

Strong, healthy populations of introduced dung beetles are essential if we are to rebuild the soil carbon levels in Australian pastures. Increasing soil carbon levels can make a very significant contribution to controlling climate change.

Dung beetles return the carbon and nitrogen in cattle and sheep dung to the soil, so that the nutrient cycles can be maintained.

Strong healthy populations of introduced dung beetles mean that there is decreased need for artificial fertilisers and farm chemicals. Most fertilisers and farm chemicals are made from fossil fuels and they are transported to farms using fossil

fuels. So, dung beetles can contribute to reducing Australia's dependence on, and use of, fossil fuels.

Dung beetles are an essential tool in developing environmentally sustainable agricultural practices in Australia. They complement farm management practices such as holistic farming, grazing management, and organic farming.

For more information

The Northern Tablelands Dung Beetle Express is a community-based group that has been active for since 1998. Our activities include:

- Raising awareness of dung beetles and farm management practices to look after dung beetle populations.
- Releasing new colonies of beetles on farms.
- Monitoring beetle populations.
- Research into the effects of dung beetle activity on sheep parasites.

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This brochure has been made possible with funding assistance from:



Northern Tablelands



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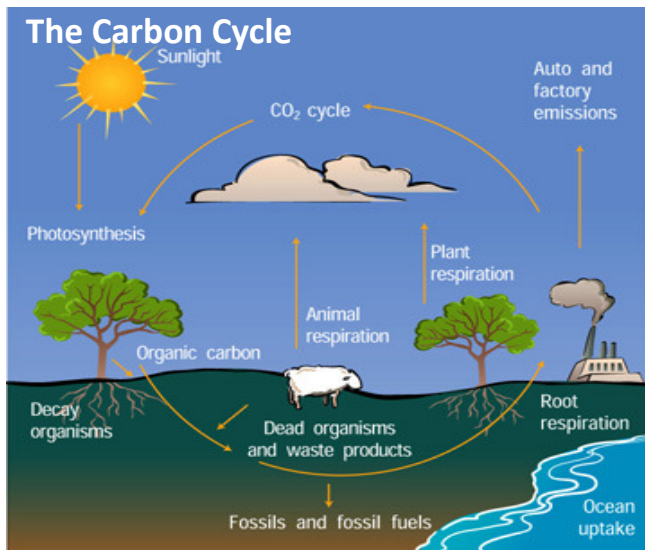
Dung beetles & climate change

Climate Change

Global warming is causing climate change that threatens the future of human civilization as we know it. At present there are 387 ppm (parts per million) of CO₂ in the atmosphere. This must be reduced to below 350 ppm to achieve a safe climate.

Global warming is caused by the build up of greenhouse gases in the atmosphere, which prevent more of the sun's heat from escaping back into space.

Two of the most important greenhouse gases are carbon dioxide (CO₂) and methane (CH₄). Fossil fuels are very rich in carbon and when they are burnt, most of the carbon is converted into CO₂ and CH₄, which are released into the atmosphere.



Carbon Stores

There are 2300 Gigatons (Gt) of carbon stored in the earth's soils. This is three times the amount of carbon in the atmosphere. Tilling and ploughing the soil have led to massive decreases

in soil carbon levels. To rebuild this the amount of carbon stored in soils, would remove most of the CO₂ that humans have emitted into the atmosphere since the industrial revolution.

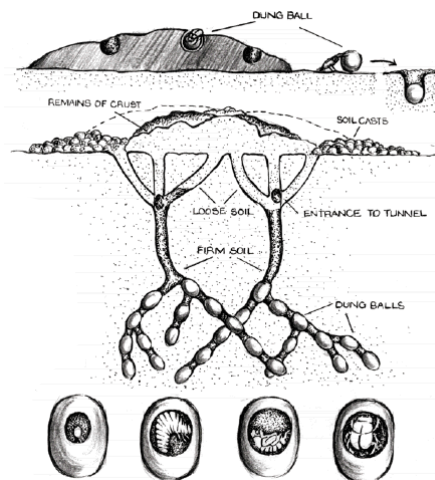
Increasing soil carbon levels world-wide will reduce CO₂ levels by 50 ppm. This will buy us more time to phase out the use of fossil fuels and move to a low carbon future.

Dung Beetle Biology

Throughout the world wherever there are substantial populations of large herbivores (cattle, horses, bison, sheep), there are dung beetle species adapted to eat their dung. Adult dung beetles find the dung pads using smell, and rapidly burrow into them.

The adult beetles squeeze mouthfuls of the dung and eat the juices. Many species also form the dung into balls that are then buried at the end of tunnels beneath the pad (up to 1 m deep), or the dung balls are rolled away from the pad. The eggs are then laid in the centre of the dung balls. When the eggs hatch, the larvae eat the dung ball surrounding them.

The activities of the adults and larvae mean that the dung pads are quickly broken up and dried out, so they cannot harbour pests such as fly larvae.



Dung Beetles in Australia

There are several hundred species of native dung beetles in Australia, however, they are mostly adapted to process the small, dry dung pellets of marsupials. When cattle and sheep were introduced to Australia the native dung beetles could not cope with the much larger, wetter dung pads of the introduced animals.

With nothing to disturb them, dung pads sit on the surface of paddocks, gradually drying out and can often be found still in place after a year. This led to huge plagues of bush flies and buffalo flies, whose larvae develop in the pads.

It is now known that when dung pads are left on the paddock:

- Most of the carbon and nitrogen in the dung ends up as gases, such as CO₂ and nitrogen dioxide (NO₂), another greenhouse gas.
- The nutrient cycles are disrupted, as the valuable carbon and nitrogen are not returned to the soil.
- There is an increased need for artificial fertilisers as the soils are depleted.
- There is an increased need for farm chemical use to combat the pest problems.
- Pasture growth around old dung pads is rank and unpalatable to stock.
- Runoff during rain events is more polluted.
- Water infiltration rates into the soil are reduced as the soils lose their structure and ability to retain moisture.