

# Cattle to do environmental business

Cattle roaming the world's grasslands and savannas may become important environmental sentinels by doing what comes naturally – excreting. An Australian scientist has found that dietary evidence contained in cattle dung may be a useful indicator of overgrazing and the effects of global warming in these regions.

David Coates of CSIRO Tropical Agriculture believes cattle dung has much to tell about the quality and state of pastures. Basically, what the cattle eat and excrete becomes a chemical snapshot of pasture health, and in open grazing situations such as northern Australia, the dung may also warn of adverse changes to the pasture resource.

Coates says with ruminant animals such as cattle, a high proportion of food is not digested, so the properties of undigested plant material in the dung contain information about the cattle's diet and even the health of the landscape where they are grazing.

Before all this information becomes a useable tool, however, graziers must embrace the idea of collecting fresh dung.

'Sampling laboratories would need dollops from five to 10 cowpats, mixed in a suitable container such as a plastic bucket to get a reasonable herd average, then, if the wife doesn't mind, put in a suitable sized sub-sample in the refrigerator to chill,' Coates says straightfaced. 'If it's not kept cool it may start to ferment and ooze under pressure. Postal services probably wouldn't take kindly to such a parcel.'

Assuming safe arrival at a laboratory, the dung would be dried then ground through a fine screen for scanning by a Near-Infrared Reflectance Spectroscopy (NIRS), and instrument which determines the chemical characteristics of substances that absorb and reflect light in the near-infrared region (an area invisible to humans). These include molecular bonds between hydrogen, carbon, oxygen, nitrogen, and, to a lesser extent, sulfur and phosphorus.

Coates says the scan produces information on factors such as the protein levels of the forage eaten, forage digestibility, and the proportion of grass and non-grass components in the diet. Low digestibility is a particular problem for cattle in tropical and sub-tropical areas.



David Coates with a handful of fresh environmental evidence.

The application of NIRS technology to dung samples collected across the country would enable diet quality and composition to be mapped and related to vegetation, soils, seasonal conditions and climate. This information would help graziers monitor their land's capacity to provide a productive, sustainable diet. It would also provide land managers with early warning signals of land stress. For example, higher than normal proportions of non-grass matter would be a danger signal, warning that cattle were being forced to eat other vegetation.

Environmental effects caused by climate change, and increased carbon dioxide levels resulting from global warming, are also likely to exert pressures on grassland vegetation. Coates says some of the effects should show up in the botanical and chemical composition of the diet of domestic ruminants. Provided sufficient information is gathered under present conditions, the consequences of future climate changes on the diet and potential productivity of cattle should be able to be determined.

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understand how particular landowners operate,' he says.

Such groups would seek to establish a partnership with landholders, entering into what are called management agreements. These might be non-binding, such as those used by the highly successful Land for Wildlife scheme in Victoria. This program allows landholders to register their property if areas within it are managed actively for nature conservation. Or agreements might be legally binding: landholders and funding bodies agree to a legal covenant that commits the landholder to the

management of vegetation remnants for conservation and the funding body to the provision of financial assistance.

All states have programs of this nature. The most successful, whether binding or not, are those in which management agreements are built in a true spirit of partnership and cooperation. Binning and Young advocate the expansion of successful programs within a nationally agreed framework and a bureaucracy that motivates, not hampers. And more money will be needed. 'A billion dollars is nothing, it's a drop in the ocean,'

Binning says. 'The natural resource problems faced by Australia are on a huge scale, but the urgency of the problem has not been well publicised.'

Delivering such money effectively is a monumental challenge to the bureaucracy. But it will pay to get it right.

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