

Recycled Organic Matters

Centre for Recycled Organics in Agriculture (CROA)

The official bulletin from the NSW Department of Primary Industries

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We welcome your enquiries and feedback related to the Centre for Recycled Organics in Agriculture and this Newsletter. For more information please contact:

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**NSW DEPARTMENT OF
PRIMARY INDUSTRIES**

Introduction

Welcome to the first issue of Recycled Organic Matters for 2006. The past 12 months have been a busy time at CROA with the continuation of several projects and the establishment of some new ones. This issue provides an update on a selection of these projects and other activities.

Compost for the vegies and mulch for the vines

This four year project, which was officially launched by NSW Primary Industries Minister, Ian McDonald in April 2005, aims to quantify the agronomic, soil and environmental benefits of using composted garden organics (CGO) in agricultural cropping systems in NSW. The first phase of the project involved identifying which markets have the greatest potential to consume CGO products. This study identified that vegetable growing areas within the Sydney Basin could benefit from soil conditioners made from CGO, whilst vineyards in the Hunter Valley and Central West NSW could be good markets for CGO mulches.

The second phase of the project has involved establishing an experiment at CROA, as well as field trials in vineyards in Central West NSW, to quantify the respective benefits of CGO soil conditioner and mulch on crop productivity and soil physical, chemical and biological characteristics.

Two vegetable crops - broccoli and eggplants have been grown at CROA and a third crop of cabbage was planted in May 2006. Vegetable production data so far, suggest the compost treated plots are producing similar yields to those using conventional farmers' practice – a combination of poultry manure and inorganic fertilisers.



Ilan McMaster harvesting eggplant from the field experiment at CROA.



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However, compost has increased organic carbon concentrations and improved soil structural stability, as well as increased soil microbial biomass - an indicator of soil health.

Six field experiments were also established in September 2006 in vineyards across central west NSW to examine the effect of applying composted mulch under grape vines. The first season's data indicates that mulch has the potential to increase grape production in areas of the vineyard which were previously low yielding.



Darren Fahey applying composted mulch under vineyard experiments in Central West NSW

Both series of experiments will be monitored for a range of agronomic and soil parameters over the next two years, with the results used to construct a cost/benefit analysis.

Dr Yin Chan (02-4588 2108)

Restaurant oils to soils

As part of a grant from NSW Treasury, a new field experiment has been established at CROA to assess the agronomic performance and soil conditioning effects of a selection of recycled

organics products, whilst determining any potential risks associated with using them in agriculture.

The field experiment is evaluating two types of grease trap waste (GTW) and one type of municipal solid waste compost (MSW compost). GTW was selected because large volumes (~200,000 L/wk) of oily food waste derived from restaurants and food processing are currently being applied to agricultural land. Similarly, increasing interest is being shown in extracting the organic component of municipal solid waste using alternative waste technologies, composting it and applying it to agricultural land to utilise the nutrients and organic matter contained within it.

The GTW was applied at 100, 200 and 300 t/ha, whilst the MSW Compost was applied at 25, 75 and 150 t/ha. Two additional treatments - an "unfertilised control" and "Optimum NPKS nutrition" - have also been included to determine the relative contribution each type and rate of recycled organics makes to the crop's nutrient requirement and yield.



The effects of Grease Trap Waste collected from restaurants on crop growth and soil properties are being evaluated at CROA.

Sorghum and wheat were planted in December 2005 and 2006, respectively to evaluate treatment effects

on crop growth, yield, nutrient uptake and removal over two full cropping seasons. In addition, soil samples have been collected post application and after the first crop to measure treatment effects on nutrient cycling, soil structure and other soil physical, chemical and biological properties.

The outcomes from this research will be used to develop guidelines to maximise the benefits from using these recovered resources in agriculture, whilst ensuring that soil and water quality is protected.

Composted aquatic weed field day – 28 July 2006

Over the past twelve months the NSW DPI has been working with the Department of Environment and Conservation (NSW) and Hawkesbury Nepean CMA to look at the potential to use compost to improve degraded land in the catchment.

As part of this, the DPI has assessed the risks associated with compost prepared from aquatic weed (Salvinia, alligator weed and Egeria) harvested from the Hawkesbury-Nepean River. This has involved monitoring the composting process and assessing the quality of the final product. In addition, the ability of aquatic weed compost to control surface

runoff and soil erosion has also been evaluated using rainfall simulations at CROA.



Lyn Muirhead monitoring the temperature of compost windrows containing harvested aquatic weed.

The final project report is currently being written up and a field day is planned at Belgenny Farm on Friday 28 July 2006 to promote project outcomes. Why not come along to find out more?

Guidelines for RO in Catchment Mgt

Previous research at CROA and a field site near Bungonia (*See ROM Issue 1*) has shown that composted mulches and soil conditioners derived from source separated green waste are effective in reducing sediment and nutrient export from catchments and promoting re-vegetation.

As a continuation of this work, tube stocks of native shrub and tree species were planted in March 2005 to further stabilise the watercourse at Bungonia. A second rainfall simulation is also planned for Bungonia in the coming months to assess the longer term performance of composted mulches in controlling runoff and soil erosion.



Over 500 native tube stock were planted at the Bungonia trial site in March 2006 as the next phase in the RO in Catchment Management project.

The outcomes from this and related projects are being used to develop guidelines for promoting the efficient use of RO products in catchment management. The guidelines are scheduled for release in December 2006.

SRORT Workshop

In November 2005 a two-day workshop was held at Belgenny Farm to showcase the research being undertaken by the Soils, Recycled Organics and Remediation Technologies (SRORT) group within the NSW DPI.

The workshop was a mix of presentations outlining research projects and strategic directions, as well

as facilitated workshops aimed at identifying new opportunities for collaborative research. Examples of some of the papers presented are listed below.



Dr Peter Slavich (Research Leader - SRORT) at the recent Belgenny Farm workshop.

Staff updates

Simon Eldridge has enrolled part-time in a PhD at Griffith University to study how nitrogen cycling is influenced by different types recycled organics.

Darren Fahey has enrolled in a Masters Degree at Charles Sturt University to examine the use of recycled organics mulch in vineyards and its effect on berry and wine quality.

Warwick Dougherty has recently returned from study leave in South Australia where he undertook a PhD at the University of Adelaide examining phosphorus runoff from dairy pastures. Welcome back Warwick.

Mark Whatmuff is currently on a 12 month secondment to CSIRO Land and Water in Adelaide as part of the National Biosolids Research Program.

Dr Motiul Quader and Mitchell Bruce have spent the last few months working at CROA to provide temporary technical assistance. Motiul is a nematologist by training and has identified some interesting effects of recycled organics treatments on the incidence of beneficial and antagonistic nematodes in the soil.

Recent publications

Chan, K.Y. (2005) Overview of soil structure and soil physical fertility research. *Proceedings of the NSW DPI Soils Recycled Organics and Remediation Technology Workshop*, 29-30 November 2005, Belgenny Farm, Camden NSW.

Dorahy, C. (2005) Fertiliser or Waste? – an overview of research at the Centre for Recycled Organics in Agriculture (CROA). *Proceedings of the NSW DPI Soils Recycled Organics and Remediation Technology Workshop*, 29-30 November 2005, Belgenny Farm, Camden NSW.

Dorahy, C.G., Chan, K.Y., Gibson, T.S. and Tyler, S. (2005) Identifying potential agricultural and horticultural markets for Recycled Organics in New South Wales. A report prepared for the Department of Environment and Conservation NSW, June 2005.

Dorahy, C.G., and Chan, K.Y. (2006) Closing the loop - Developing agricultural markets for recycled

organics in NSW through targeted scientific research, *Proceedings of Enviro '06*, 9-11 May 2006, Melbourne Exhibition Centre, Melbourne, VIC, Australian Water Association/ Waste Management Association of Australia.

Dorahy, C.G., Chan, K.Y., McMaster, I., Muirhead, L.M., Pirie, A.D. (2006). Evaluating the characteristics and agronomic performance of municipal solid waste (MSW) compost. *Proceedings of Biosolids Specialty Conference III*, 7-8 June 2006, Eden on the Park, Melbourne, VIC. Australia Water Association.

Dougherty, W.J. (2005) Phosphorus and water quality management in the Australian dairy industry. *Proceedings of the NSW DPI Soils Recycled Organics and Remediation Technology Workshop*, 29-30 November 2005, Belgenny Farm, Camden NSW.

Eldridge, S. and Chan, K.Y. (2005) Nitrogen mineralisation in recycled organic wastes. *Proceedings of the NSW DPI Soils Recycled Organics and Remediation Technology Workshop*, 29-30 November 2005, Belgenny Farm, Camden NSW.

Eldridge, S.M., Chan, K.Y., Barchia, I, Katupitiya, S., Davis, J. (2006) Research on granulated biosolids in New South Wales. *Proceedings of Biosolids Specialty Conference III*, 7-8 June 2006, Eden on the Park, Melbourne, VIC. Australia Water Association.

Jackson, M., Wong, P., and Dorahy, C. (2006). Repairing Degraded Land in

Water Catchments – The Untapped Potential. *Proceedings of Enviro '06*, 9-11 May 2006, Melbourne Exhibition Centre, Melbourne, VIC, Australian Water Association/ Waste Management Association of Australia.

Whatmuff, M., Warne, M., McLaughlin, M. Langdon, K., Harvey, D. Broos, K. and Heemsbergen, D. (2005). 'The National Biosolids Research Program: Evaluation of benefits and risks from lime stabilised biosolids'. Final report to Sydney Water Corporation.

Wong, P.T.W., Gilmour, M.A. and Pengelly, P.K. (2005). 'Recycled Organics in Catchment Management'. Final Report (Project 02/371) Prepared for the Department of Environment and Conservation (NSW).