

# Synergy

the TerraCottem® advantage

**TerraCottem® is the worlds first and leading soil conditioning technology**

Future: We are proud that the integration of TerraCottem into LA designs provides a sustainable platform for plant well-being. The role of TerraCottem is neither organically transient (like importing humus into a sandy profile) nor physically transient (like a structural foam). TerraCottem works in synergy with the plant for long term transformation.

So what kinds of conversations do we find ourselves in?

We are increasingly drawn into the critical work of co-designers of sustainable solutions.

LA's are under pressure — sustainability and water are now genuine measurable issues in developments, not the lip service issues of past years. TerraCottem has a track record in the harshest environments in every state of Australia — delivering on plant establishment with 50% less water.

LA's are asked to at retain the integrity of the sites they are assigned, if not substantially improve them. TerraCottem has been used in sensitive environments where no organic materials could be considered due to the quarantine threat they represent.

Federal and regional "Greening" initiatives have to be served while the urban sprawl continues. TerraCottem delivers robust reforestation and tree planting solutions with low maintenance and high survival rates.

Coastal developments to satisfy the appetite of "sea-changers" string the eastern seaboard — TerraCottem provides an economic and ecologically responsible way of transforming sandy soils without importing organics.

TC Advantage is in for the long haul. Our reputation rides with the reputation of the LA's who set out to build precincts they can be proud of in years to come. Talk to us about your next challenge.

## Welcome to Kylie Hartberg

If you ring TC Advantage in business hours, the voice you are most likely to hear first is that of Kylie Hartberg. Kylie joined the team as our Office Administrator and PA to Russell in early May.

Kylie's association with the firm goes back some years — she did her work experience with our then Agriturf business in 1999, and has been snapped up to help out whenever she's been available since then. Her studies have harvested Certificates IV in Business (Administration) and in Business (Property Management), and Certificate III in Business (Legal Services).

Her resume claimed she was "a highly organised person with the ability to follow through and complete work efficiently, prioritising work when needed, loves working within a team environment... determined, committed and loyal." She also had the track record — awarded Best Legal Assistant of the Year for 2003 — and now we are pleased to say we agree with her resume!

We hope you enjoy the quality service you will encounter when you call our Kylie!



➤ Always a friendly smile from our Kylie.

## What is Synergy?

What does it take to make an aeroplane fly?

...or an orchestra to sound amazing?

...or the Socceroos to produce a world class World Cup performance?

These are all examples of *Synergy* — a bunch of individual components working together to produce something far bigger than each component part added together!

With this first edition of our newsletter *Synergy* we wanted to help you understand what is behind the name we've chosen.

You see, for the last eight years we've produced the newsletter "Seasons" detailing the best of agricultural and horticultural amendments, ...and their success stories. During that time, TerraCottem has featured again and again — we haven't been able to ignore it. Across many years of experience in seeking out and working with products that continually performed for our clients, ...TerraCottem stood out!

The continued excellent results across Australia (and the world) finally convinced us! TerraCottem is worth hanging our hats on, ...and the word *synergy* is central to that.

TerraCottem is a technology based on the biological concept of *synergy* — of one agent working with another to achieve outcomes bigger than either could achieve alone.

A key question behind the design of TerraCottem was "what *synergies* exists that transform the roots of a plant, ...that then transforms the plant, ...and that ultimately transform the soil?"

The initial and ongoing research of TerraCottem is a research for *synergies!* ...not a case of just sticking 2 (or any number) of things together just so we can claim to have the right goodies (1 + 1 = 2). NO WAY!!

*Every component in TerraCottem, is measured to deliver a greater combined effect or (1 + 1 = 3)!*

...and the business of **TC Advantage** embodies the concept of *synergy* too! Working alongside all the stakeholders in the TerraCottem value chain so they can all deliver their best!

*Synergy* with LA's in the co-design of planting solutions  
*Synergy* with Installers, providing support, like training, to get the job right first time  
*Synergy* with Clients, providing evaluation feedback about their predictable and measurable results.

Welcome to the world of "*Synergy*".



➤ TerraCottem's components have a synergetic effect on plant growth.

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TC Advantage Pty Ltd supplies TerraCottem®

and supports it's methodology across Australia, New Zealand and South Pacific.



TC Advantage Pty Ltd



# Synergy – the TerraCottem® advantage

## The role of synergy in TerraCottem ingredients

### The context:

TerraCottem's unique niche in the world of soil conditioning comes from its research based origins. At the heart of the product design was the search for "something more" than putting a bunch of compatible or even optimal amounts of single ingredients into a mix. The original research found some plant behaviours that were only explained by interactions greater than the sum of the component effects — and all TerraCottem research in the subsequent 20 years has been directed toward further enhancing that synergy.

This is good for plants, and good for TerraCottem users. But it makes selling TerraCottem a problem sometimes. Because our scientifically minded customers sometimes want *evidence for how one or another of the TerraCottem benefits is achieved* eg. "How long does TerraCottem last?" "Show me the data on how TerraCottem extends roots?"

Here we explain why such questions are not as easy to answer as they are to ask.

### What is "synergy"?

"Synergy" comes from the Greek word "synergos", meaning "working together". It refers to the well known fact that sometimes two or more things working together can have a greater effect that either alone. Wind and water together can create erosion at speeds that neither will accomplish alone.

In biology, synergism refers to the effect caused when exposure to two or more chemicals at the same time has a cumulative effect far greater (or sometimes even not possible) with the individual chemicals on their own. The main studies of synergism have been made in the attempt to understand "bad" synergies in humans— such as the three separate chemical exposures which together caused "Gulf War Syndrome" in ten's of thousands of US veterans.

Closer to our experience with TerraCottem, here is a classic study from botany.

In an amusing paradox, the tobacco plant is known to be very sensitive to air pollution! Because the crop is economically significant, numerous studies have resulted in a clear picture of the synergy required for damage to occur from two common air pollutants — nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>):

	NO <sub>2</sub> (ppm)	SO <sub>2</sub> (ppm)	Injury to tobacco?	Interpretation
1	2.0	0	No	Exposure to NO <sub>2</sub> at up to 2 parts per million causes no harm.
2	0	0.7	No	Exposure to SO <sub>2</sub> at up to 0.7 parts per million causes no harm.
3	0.1	0.1	<b>Yes</b>	Exposure to a mixture of NO <sub>2</sub> and SO <sub>2</sub> , each at a much lower concentration, is damaging.

### So how do we answer questions about TerraCottem?

Here is a classic one: "Show me the data on how TerraCottem extends roots?" So what can we say about TerraCottem in this context?

At one end of the spectrum — scientific analysis — the kind of science that pulls things apart into little bits — it seems there is sometimes not much we can say to satisfy determined cynics.

At the other end of the spectrum — experience has plenty of commentary — in terms of experienced horticulturists observing TerraCottem-enhanced plant growth across the world in many different plant types and widely varying conditions for the last 20 years. We have an impressive library of photographic case studies.

And sometimes we can say some pretty impressive things that fall in the middle ground — quantitative studies.

Take for example this study of what is perhaps a classic example of "root growth" — the carrot!

800,000 carrot plants (*Daucus carota* L cv. 'Nantes') were planted in 5 litre pots to generate a surface area of 1 hectare in controlled (greenhouse and plastic tunnel) conditions. Half the pots were treated with TerraCottem at a rate of 6 kg/m<sup>3</sup> dune sand.

10 weeks after sowing, fresh and dry root weights were measured:

parameter	av. fresh root weight (g/pot) after 10 weeks		av. dry root weight (g/pot) after 10 weeks (105°C for 24 h)		
	Control	TC	Control	TC	%
greenhouse	13.388	64.616	1.216	5.816	+378%
plastic tunnel	18.068	147.821	1.650	13.218	+701%

The positive effects of TerraCottem are very pronounced for vegetables where root production is important. Root biomass can be increased from 5 to 8 times in sandy or poor soils. Even when compared with routine horticultural contexts, the yield increase is impressive — 118.3 ton/ha (Belgian average is 43.6 ton/ha).

### Conclusions

TerraCottem research was based around the search for good synergies — synergies between plant growth requisites that would together have a greater effect than each individually. This research was successful.

However our urge to understand any cause and effect relationship by just one piece at a time is deeply ingrained in us. Our experience of science drives us to search for just one cause, and use methods where every variable is controlled except the one we are testing. This deep urge persists despite our acknowledgement that the phenomena that often matter most in the world — like life — like human love — or like plant growth — are clearly not so simple.

Considering that, it is still not known how plant root growth hormones actually stimulate cell division, and only partially understood how they stimulate cell extension, ...it is just as well we are not waiting for scientific studies to validate what we all know — that a big carrot feeds more people than a little one!

*Article submitted by David Jones of Just Knowledge. David is a fan of sustainable systems that add to human well-being, ...in every part of life.*

## Transplanting existing trees

Our recent involvement at IFLA 06, with its theme of "TIME" reminded us of TerraCottem successes working with mature trees.

Partly it was to do with our location. The international get together was held at the Sydney Conference and Exhibition Centre at Darling Harbour. Darling Park, just near the Centre, has trees that are amongst some of the most high profile mature tree transplants TerraCottem has helped. Large ficus and elms were planted without loss or shock.

But partly it was the theme of TIME that had us reflecting on one of our favourite TerraCottem success stories. While not an Australian story, it is about the successful transplantation of notoriously un-relocatable trees — and the preservation of some history — in an environment every bit as harsh as ours

Fifty-six (56) Cork trees (*Quercus suber*) aged between 80-100 years were targeted for destruction in the path of a highway development near Benalup (Casas Viejas, Spain).

Meanwhile, TerraCottem was being used extensively on the nearby Benalup Golf & Country Club. The owner heard about the cork trees at risk, and placing a high value on the history the trees represented, asked if he could have them. His idea to transplant them to the golf course was treated with scorn. Poor survivors at planting establishment, let alone transplanting, these trees were to be transplanted in the height of the northern hemisphere summer (September 1st 2000) without the required preparation. The growing conditions are severe: unpredictable rainfall, sometimes strong winds, and high temperatures (e.g. 40-45°C). The owner was banking on the results he had seen TerraCottem deliver with other transplants and with his greens and fairways.

To the delight of the owner, and the pride of the neighbourhood, fifty (50) trees survived as of July 30th 2001 — a survival rate of 89.3%.



➤ Hundred-year old cork tree on the 17th hole October 2000: 5 months after transplantation.



➤ Same tree in October 2004.

(The trees in the background were also transplanted using TerraCottem):

- 900 Olive trees (*Olea europea*) 20-25 years of age, survival rate 95.6%
- 189 Pine trees (*Pinus pinea*) 5 years of age; survival rate 92.1% (most mortality due to insect problem)

By surrounding a plant's roots with water, nutrients and growth stimulating elements, TerraCottem provides transplanted trees with a significantly higher chance to survive the critical period just following transplanting, and for many years after.

## TerraCottem at IFLA 06

A TerraCottem stand, and our attendance at the Conference events, gave TC Advantage staff the chance for some excellent conversations at the recent International Federation of Landscape Architects Eastern Region Conference 2006. (Darling Harbour 25-27 May).



➤ The TerraCottem stand at IFLA 2006. MORE GROWTH, LESS WATER is only part of the story.

Mark Fuller, the President of AILA, hosting the conference said: "The challenge of our conference title — "Time" — lies in how we embed lasting value in our work for the future, based on a sincere understanding of how the past creates the social and cultural framework within which we work".

TC Advantage is always working deliberately and mindfully in that historical framework of responsibility.

Past: We are proud that TerraCottem was and is a tool for social change in humanitarian contexts. Food cultivation and greening in the face of desertification remain primary TerraCottem applications.

Present: We are proud that TerraCottem is an environmentally intelligent technology. The plants we use to sculpt our environment are the very agents by which TerraCottem is metabolised and "bootstrap" up their own vigour.