# Bringing carbon down to earth at Heronswood

***Clive Blazey explains the six-fold improvement in organic carbon since 1983***

***Heronswood perennial border. Organic levels have risen to 25.5% - or an increase of 1% each year for 24 years.***

Solving climate change by bringing $CO_2$ down to earth (i.e. sequestering carbon) has seemed like a Utopian idea until we tested our soils this year. Most of the experts agree that Australian soils on average have less than 1% organic matter when 5% is generally regarded as an optimum level for good fertility.

## Why Australian soils are so low

The low organic level of our soils is caused by many factors apart from low rainfall and high temperatures. Firestick farming by Aborigines destroys soil biota as well as exposing soils to direct sunlight. Removal of trees by pastoralists reduces rainfall and increases soil temperature and eliminates havens for stock and wildlife to supply manure. Repeated tilling of soils to plant wheat and other cereals exposes soils to sunlight which destroys micro-organisms.

Application of quick release fertilises might stimulate plant growth but it also kills micro-organisms on which the organic basis of long term fertility depends. Soil carbon is created by bugs and microbes living and dying. They need 365 days of cover from perennial plants or mulches to multiply and whilst this may be difficult for farmers it is very easy for gardeners.

**ANALYSIS OF SOIL SAMPLES 2007, 2008**

| | Organic content % | Moisture % | Carbon % | Nitrogen % |
|---|---|---|---|---|
| **HERONSWOOD** | | | | |
| Unimproved garden | 4.1 | 5.6 | 1.7 | .007 |
| Herbaceous border - Improved over 25 years | 25.5 | 32.1 | 14.1 | .91 |
| Vegetable parterre - Annuals | 21.8 | 32.8 | 11.9 | 1.24 |
| Lawn | 12.4 | 13.6 | 4.9 | .33 |
| **ST ERTH** | | | | |
| Unimproved bush garden | 15.9 | 18.7 | 7.4 | .32 |
| Perennial border - Improved over 30 years | 21.7 | 35.9 | 10.4 | .89 |
| Lawn | 11.6 | 18.7 | 5.1 | .45 |

HRL Technology, Mulgrave

So we shouldn't have been so amazed when our soil tests returned showing a six-fold improvement in 25 years reaching between 22 - 26% even for our vegetable patch despite having taken 40 crops from the soil. *(See table below)*

## How did we do that?

Twice a year before planting we have applied blood and bone and either compost, poultry manure or mushroom compost. After planting and seed emergence we generally spread pea straw or lucerne hay so that our continuous application of organic matter could be as high as 4 applications of 3.5 kilos/square metre.

The benefits are extra-ordinary. Our soils now hold 5 to 6 times a much water and yet we have never bought fertilisers. But our humus contents would be able to maintain good yields for 50 years or more.

## What does it mean for climate change?

The quickest way to solve climate change is not to change to renewable energy like solar or wind power because that just holds our current $CO_2$ atmospheric imbalance at its current level, which is already too high. The only quick solution is to bring the $CO_2$ back to earth by growing trees or sequestering carbon in our soils. Whilst the arguments are complex a simplified answer is contained in the proposition that if we could increase our organic carbon levels by 1.6% across all the planet's cultivated lands then that would bring so much $CO_2$ back to earth we would be in equilibrium again. From our experience as gardeners in a one-hectare garden this seems really quite simple and would only take 2.2 years because we have already increased our carbon levels from 4.1% in our improved garden to 24.5% in our perennial garden. That's a 21.4% carbon increase in 25 years or 0.86% each year.

But can farmers spread between 72 and 144 tonnes of compost per hectare to hundreds, if not thousands, of hectares? Raising organic content in grazing lands from 1% to 5% is incredibly slow taking 25 – 50 years based on a 10% improvement each year; so that in year 2 soil levels would be 1.1% or 1.2% thereby taking 5 to 10 years to rise to 2%. Results would be slower in low rainfall zones.

***Heronswood vegetable parterre. Even after 40 crops organic levels have risen to 21.8% and are holding nearly seven times as much moisture***

## Can we afford not to do it?

Dr. Christine Jones, agronomist, estimates that for every 1% increase in organic soil content we conserve 14.4 litres of water/metre. Our vegetable garden needs 1200 litres/metre to grow fruit and vegetables of which 570 litres (48%) is supplementary water needed from November to April. By raising our soil carbon level in our vegetable garden from 4.1% to 21.8% we have potentially saved (14.4 litres x 17.7% organic content) 255 litres – some 45% of surplus needs.

***Heronswood lawn, organic content 12.4%. Perennial kikuyu lawn is cut and clippings are not removed, which raises moisture and carbon levels***