

**Solutions Organic
forensic arboricultural & environmental consultants
& Landscape Planners**

347 McKenzie Road, GLEN FORBES Vic. 3990

Telephone: (03) 5678 8777 Facsimile: (03) 5678 8558

email: njr@rivett.biz

Tree Age – A Dog's Life Calculation
ONE HUMAN'S YEAR EQUALS ABOUT ONE MONTH FOR A TREE.

All living organisms have a life expectancy. For example: the life average expectancy of a dog is 11 years. The life expectancy of the average Australian male person is 80 years. Trees also have a range of average life expectancies. For example, some Wattles, and other pioneer species, only have a life expectancy of 15-25 years. Cypress trees in the Melbourne Botanic Gardens are about 200 years old. A Eucalyptus viminalis at Coldstream is between 500-800 years old, while a River Red Gum tree at Sale in eastern Victoria is between 700-1200 years of age. On the other hand there is the 5000 year old American Bristlecone pine, which has an increasing growth due to climate change or the 9,550 year old Norway Spruce in Sweden. The oldest tree is reputed to be 10,000 years old, a Huon pine in Tasmania.

All living organisms go through three stages of life: Growth, Plateau and Decline. In the average Australian male it is about 20 years growing (Growth), 40 years maturity (Plateau) and 20 years of Old Age (Decline).

We know that trees also have the same three basic stages; **Growth, Plateau, Decline**. When I studied arboriculture in England in 1973-4 an eminent forester and tree man with the Forest Department, Dr. Alan Mitchell, stated that the life expectancy of the English Oak was between 700-1200 years. He also suggested that, the **Growth** phase of a tree was a quarter of the life expectancy, the **Plateau** phase was half of the life expectancy, and the **Decline** phase the remaining quarter. Thus, a tree with a life expectancy of say 600 years would have 150 years **Growth**, 300 years **Plateau** and 150 years **Decline**.

My observations over the last 40 years as a consulting Arborist and Nurseryman, looking at trees ranging over these age groups, is that this theory holds true for trees in Australia, both native and exotic. Further, it holds true for trees with different lengths of life expectancies. Thus, I conclude that, this theory is substantially consistent across all tree species.

Trees have also to be categorised into three succession groups: **Pioneer, Intermediate and Climax**.

Pioneer: Pioneer species are trees that grow readily in mineral and/or disturbed soil types. These are fast growing short-lived genera or species whose root system often has a nitrogen fixing capacity, e.g. wattles. They also often grow prolifically with large numbers per hectare with dense closed canopy, thus shading out other competing plants. These stands are often almost monocultures or in combination with one or two other genera or species.

In Europe the principal example of a pioneer species is the Silver Birch. In Victoria the common examples are Black Wattle (*Acacia mearnsii*), Coastal Tea Tree (*Leptospermum laevigatum*) or Sweet Pittosporum (*Pittosporum undulatum*). Through the growth, shedding and ultimate death and decay of these plants their decayed parts build the organic matter in the soil to a level that is required by Intermediate species.

Intermediate: The Intermediate group normally has a greater diversity of plants. The canopies of these plants are less dense than Pioneer species, thus allowing light to reach the woodland floor. Light encourages and sustains ground cover, low and middle level shrubs. The life and death process of these plants further increases the fertility, water and nutrient holding capacity as well as the biological diversity of the soil. This allows the establishment of the climax vegetation species.

Climax: These are always long-lived trees. For example: Australian natives such as *Eucalyptus camaldulensis* River Red Gums; *Eucalyptus regnans* (Mountain Ash), *Eucalyptus viminalis*, (Manna Gum) and *Eucalyptus radiata* (Narrow Leafed Peppermint). Exotic trees such as *Quercus robur* (English Oak), *Sequoia sempervirens* (Coastal Redwood) and *Taxus bacata* (European Yew). Climax woodlands are always full of diversity, containing a wide range of macro, meso and micro flora and fauna.

Age: The Tree – Human time frame: Determining the age relationship of a species with that of a human is important to understand time frames. It is generally accepted that a dog year is equal to 11 human years. So we see dogs up to 2-3 years old as a teenager or adolescent, a 3–8 year old dog as an adult and a 9–11 year old dog as old. Obviously the life expectancy differs from breed to breed and dog to dog within the breed. This observation is based on the “Average Man” living to 75–80 years, thus the dog that dies at 11 years is about 77 man-years old.

To understand age for a climax vegetation tree, and for ease of mathematics, taking the average human life as 100 years and a climax vegetation life expectancy as 1000 years. We can see that.

10 Human years equates to 1 Tree year, or put another way 1 human year is about 1 month of tree life.

It is this difference in 'TIMING' that must be understood when imposing changes on trees.

The art of bonsai proves that you can do almost anything to a tree provided it is done in a timely manner. Often human disturbance of a tree's environment is very rapid in comparison to the tree's time frame. Root damage from excavation, compaction and changes in water table often occur in human time frame of only one minute, which is micro seconds to a tree's time frame.

Consequences of rapid changes to a trees environment: Disturbing or degrading soils, such as the removal of organics from on and in soil, reduces the soil from organic to mineral state. When this occurs, the woodland canopy opens allowing the fast growing pioneer species to reinvade. These plants out-compete the climax vegetation for scarce resources. The disturbance changes the balance of Macro, Meso and Micro flora and fauna within the woodland soil and environment. This changes soil structure and modified soil hydrology so that the climax vegetation is no longer able to win the required resources to sustain it.

The net result is that such trees sustain themselves by utilising their stored energy “Starch” reserves. Trees respond and manage both their energy supply and demand requirements, by manipulating their crown size and density. In times of reduced conditions crown sections **Dieback**. If conditions do not improve then the crown goes into **Decline**. As its reserves continue to diminish, the tree has insufficient energy to respond to new growth opportunities so it becomes committed to death and eventually dies. I will look at **Decline** and **Dieback** in detail in a future article.

You have to understand how a tree processes wounds and compartmentalises, or isolates, unproductive tissues to understand tree death. Tree death will take different lengths of time, as it all depends on the initial health and starch reserve levels of the tree at the time of disturbance or environmental change. It is important to understand that the only way a tree dies is through starvation. I will look at how trees produce, store and utilise starch in a future article.

So remember, go slowly with changes around mature trees. Yes, you can make changes but they need to be made slowly. The older the tree the slower the rate of change should be. The life expectancy of old trees may be prolonged, by providing new root space. This can be achieved by carefully excavating some quadrants of the root plate and replacing the excavation with fresh soil. The new soil provides new root space for new roots to colonise. Trees grow new roots on the outside of old trees with each growth cycle. If space is available then a tree could live forever. Think about trees propagated by vegetative means (cuttings). Every cutting is a new tree, for many tree species the process has been continuing for centuries, even though the species may have a life expectancy of only decades.

© Nicholas J Rivett 2010

REPORT PREPARED BY:

Nicholas J Rivett

NICHOLAS J. RIVETT

Principal Consultant

Dip. Hort. (Burn.), Cert. Arb. (Eng.), R.F.S. Cert. Arb. (Eng.), Member IPPS,

Member of the Australian Institute of Horticulture (AIH) Register Horticulturalist 31 - RH31.

