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Tree Survival Strategies

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Opinion Article

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INTRODUCTION

80% of trees will never make it to full maturity. Imagine if that was the case for humans or indeed of any animal species imminent extinction would certainly be inevitable. Despite this problem trees thrive because they have very interesting survival strategies.

We can begin by considering replication, the ability to reproduce by pollen dissemination. Gymnosperms such as conifers are anemophilous which means they use wind dissemination. Angiosperms produce flowers and are entomophilous, which means they use insects to distribute pollen. Trees produce pollen in the trillions; it never breaks down over time and has a unique structure individual to each species. It is from pollen analysis data that we can say for certain that gymnosperms are more ancient than angiosperms and we can discern which species of tree was dominant at any time in history to the point where it is possible to place our native trees in order of arrival.

Next we can consider evolutionary dynamic ecologists have termed “the arms race”. Trees actively compete for light and there are two distinct strategies one is to penetrate the forest canopy as quickly as possible the other is to shade out the competition. The morphology of a tree its shape and structure, can be divided into two categories, Monopodial and Sympodial. The monopodial trees strategy is to get as tall as possible as quickly as possible to penetrate the forest canopy thus dominating other species. If you look closely at the twig of an Ash or Sycamore in winter you will notice that the bud at the top is bigger than the other buds lower down. This is called the primary or apical bud it contains a greater concentration of the growth hormone auxin as a result it grows bigger and faster than the other secondary buds this is known as apical dominance. Sympodial trees don’t have this auxin concentration in the apical bud and it can die or flower, dependent on species. A sympodial tree will endeavour to shade out competition.

The factors causing the trees demise are called Biotic and Abiotic. Abiotic factors include air pollution (acid rain) de-icing salt from roads, can be weather related floods and drought. Biotic factors are include pathogens, (any microorganism bacterium or virus that causes disease) pandemics such as Dutch elm disease, Ash dieback, sudden oak death, fungi, insects and animals, especially humans.

From my point of view I would say that the greatest pathogen of them all is Honey fungus (Armillaria mellea) it is the most common form of tree death I know of. I would go further and suggest that we called this fungus the” natural predator”. It is truly awesome; it reproduces sexually through fruiting bodies releasing billions of basidiospores and more importantly asexually through rhizomorphs. Another common name for A. mellea is bootlace fungus; this refers to the rhizomorph simply because it looks like a black bootlace. A useful aid to identification, it is present all year round and is distinguished from all other fungi.

We can divide the fugal kingdom into three categories; Parasites- fungi that digest living tissue, Saprophytes- fungi that digest dead tissue and Facultative parasites with digest both. Our old friend funny fungus is a facultative parasite. It can kill a tree within one growing season. It invades the xylem cells of a tree with microscopic hyphae the trees defence system blocks xylem vessels with a gum deposit called tylosis as each cell is relentlessly invaded so the tree blocks more cells to a point when it can no longer draw water and dies. The tree becomes a food base for the fungus, creating exponential growth.

When I was studying arboriculture at college I was told of a single fungus that covered 15 hectares weighed 10,000 kgs and was estimated to be about 1,000 years old, I have since heard of one that exceeds this. As an aboriculturalist, arborist, tree surgeon, urban forester, (I prefer Tree surgeon) I see my role as being interface between humans/ trees, I see my goal as creating a synergy between humans/trees.