

# The myths associated with pines

## Forests NSW Planted Forests Operations

### Do pines damage soils?

One of the most common myths associated with growing pines is that they greatly acidify soils. Research undertaken by Forests NSW during a 20-year period has shown that this is not so. In fact, in some instances it can be demonstrated that pine trees have less of an acidifying effect on soils than either eucalypts or improved pasture.

Pine plantations do not significantly deplete soil nutrient reserves, even after several rotations (crops), because pine trees are deep feeders, and they recycle nutrients after the tree crowns interlock (crown closure) at about age eight. However, changes in the nature of surface soil organic matter are still likely with pines because of the high carbon to nitrogen ratio in the needle litter under pine plantations.

By comparison, agricultural practices such as pasture improvement greatly modify soil properties. Soil organic matter and nutrient levels increase through the application of fertiliser. In particular, the level of available phosphorus increases as a result of regular applications of superphosphate.

In some circumstances, long-term pasture improvement with legumes produces a substantial increase in nitrogen levels and an increase in the acidity of the soil, through the accumulation and rapid turnover of organic matter and high rates of nitrogen mineralisation and nitrate production.

These processes also promote leaching of exchangeable cations, and therefore reduce the fertility of the surface soil. Generally, soluble aluminium and manganese quantities also increase as a consequence of regular pasture fertilisation, and may even reach levels harmful to plant growth.

By comparison, the effect of pine trees on the soil is relatively uncomplicated. Pine trees go through two distinct phases in their nutrient use development:

1. the establishment phase (0 to 8 years), when crowns rapidly expand and trees accumulate nutrients at rates comparable with pastures
2. the closed canopy phase (8 to 30 years), when tree crowns interlock and stabilise, and nutrient cycling commences.

In the long term, this results in radiata pine plantations accumulating less nutrients than agricultural crops. Nutrient cycling under radiata pine may also slowly reverse the trend in nitrogen mineralisation and nitrate production caused by pasture improvement, and even reverse soil acidification.

The location of nutrients within a pine tree is also an important factor to consider. In pines, the component which is harvested (the trunk) typically constitutes around 70% of the above-ground biomass, yet it contains only a small proportion of the nutrients. On the other hand, the crown and litter components of pine trees, which are not usually removed from the site, contain between 50% and 70% of the total nutrients in the biomass. By contrast, the bulk of nutrients in pastures and crops is removed when they are grazed or harvested.

While some changes in soil nutrient status will occur under pines, the soils will remain suitable for alternative forms of land use, such as pasture, after the trees are harvested. This point has been demonstrated at Mannus Correctional Centre, where 325 hectares (825 acres) of land formerly under mature pine plantation have been returned to highly productive pasture.

## Are pine forests biological deserts?

While it is true that radiata pine forests, like most other agricultural crops, are monocultures (single species), many species of wildlife have adapted readily to living in or adjacent to pine forests.

Surveys in Forests NSW Hume Region have shown that of the 214 species of birds recorded in State forests, 110 are sighted in pine plantations, and nine of the 31 native mammals recorded are also found in pine plantations.

In Forests NSW Macquarie Region, about 50% of all bird species recorded in State forests were within or closely associated with pine plantations; 12 species of birds in the area have been observed nesting within plantations.

Animal life in plantations is often highly visible but lacks diversity. In particular, those animals that are dependent on the foliage of native vegetation for food or hollow branch stubs for nesting or roosting are usually low in number.

The number of animals and diversity of animal species present in pine plantations is influenced by the proximity of native forest and water, both of which are usually found in filter strips or other retention areas within or adjacent to pine plantations.

There are some animal species which have adapted particularly well to living in pine plantations, including the larger mammals, such as the eastern grey kangaroo, red-necked wallaby, swamp wallaby, common wombat and echidna.

## Further reading

### Soils references

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