Mulching fact sheet

The key question in veteran tree management is: “Is management really necessary?” If so, consider if this is for biomechanical reasons or because of physiological decline. In the latter case, often the necessary management will not be on the tree itself, but rather in its surroundings. A decline in the physiological condition of veteran trees often relates, at least partly, to soil degradation: compaction, lack of organic matter, waterlogging, drying out, …

In many cases soil compaction is one of the main reasons or drivers of soil degradation. Often it is unintentional. Soil compaction alters soil structure, soil hydrology, aerobic conditions and also directly impact the soil ecosystem. It only takes minutes to compact soil, but it can take ages to (naturally) decompact. So avoiding soil compaction is better than alleviating it.

One of the ways to restore soil quality is mulching. A mulch is a layer of material applied to the surface of the soil. Reasons for mulching around trees include conservation of soil moisture and soil health, kick starting soil ecosystems, and sometimes also enhancing the visual appeal of an area. Weed suppression is not considered a valid objective of mulching, at least not in veteran tree management. Strictly speaking, mulch material can also be purely mineral or artificial (plastic sheeting), but the only mulch material capable of restoring soil health and thus acceptable for application in the rooting area of a veteran tree is organic matter. Potential mulch materials include leaves, compost, wood chip, …

Note that we still have a lot to learn about mulching and its impact on soil ecosystems and on tree health. This fact sheet aims at listing the key points of attention when mulching.

1. Soil improvement?

Soil management for veteran trees is never aimed at creating ‘ideal’ soil, as it might be for example in agriculture. Veteran trees grow in balance with their environment and can reach great age even in ‘poor’ sandy soil or in challenging environments like rocky cliffs. What they need is long term stability, natural mineral cycling and healthy soil ecosystems. Soil management around veteran trees should be focussed on avoiding or alleviating soil degradation or changes in their environment, threatening the stability of the soil ecosystem. Often soil management (e.g. mulching) is only used to kick start natural processes. The soil ecosystem can then take over and do the hard work.

2. Mulch material

The most common natural mulch materials for use in the rooting area of veteran trees are leaves (fresh or composted), wood, wood chip and compost. For specific reasons additional soil amendment materials can be mixed in the mulch layer like biochar, ground rock or lava, limestone, …

A point of attention is how fresh the mulch material is. Fresh organic matter applied to the soil can have a high oxygen demand (the soil ecosystem kicks into action to start decomposing, so oxygen

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uptake increases), can temporarily alter mineral availability (e.g. fixation of nitrogen by carbon rich organic matter) and can later on leach minerals when decomposing (e.g. leading to excess nitrogen). On the other hand, fresh organic matter can add readily available sugars and compounds that have a positive impact on tree health and the soil ecosystem. The extent and impact of al l the above processes are still under discussion, so to date the impact of applying fresh mulch material in the rooting area of veteran trees is unclear. But because of the high value of veteran trees, their potentially lower resilience and their need for stability, it might be better to err on the side of caution and only use stable, (partially) decomposed organic matter. When looking at wood chip as a mulch material for example, it might be recommended to let it decompose for a couple of months before applying it to the rooting area of veteran trees. Indicators of stability for mulch material are constant temperature (no temperature boosts when stirring and adding oxygen) and the presence of large soil biota like earthworms.

Also consider using tree species specific mulch material: mulch material from the same tree species as the veteran tree. This will contribute to kick starting the species specific soil ecosystem, including saprotrophic and mycorrhizal fungi species. This can be expanded to mulch material from tree species that naturally share the same ecosystem (e.g. for oak also hazel, hornbeam, etc. could be added). It is not a good idea to add for example cypress mulch material under oak or beech trees.

Be aware that adding additional soil amendment materials is only advisable after careful investigation and consideration, to tackle a specific problem that was detected prior soil analysis. Don't be a 'sorcerer's apprentice', creating a magical mix without knowing what the impact on the soil ecosystem might be.

3. Mulching area

When considering which area to mulch: aim as large as possible. Ancient Tree Forum guidance on the root protection area of veteran trees is a radius of 15x the diameter of the tree or 5m beyond the canopy (whichever is greatest). This is also the area that can be considered when mulching. You do not necessarily have to aim at mulching this whole area at once. Often, it is even better to work gradually and mulch in stages or in patches (see below).

But even when only a smaller area can be mulched, this can be very beneficial. Root development is a dynamic process, which is less predictable than above-ground development and often opportunistic. Trees, and especially veteran trees, rely on the formation of new adventitious roots to explore their rooting environment. So even when only a smaller part of the total rooting area is mulched, this can have a more than proportionate impact on the health of the tree, as the tree will probably redirect its root growth towards the improved area. However, be aware of the fact that resilience (the ability to react) might decrease in veteran trees.

Fig. : even when not mulching the complete root area of a veteran tree, the result can be disproportionately beneficial.

4. Mulch application

Remember veteran trees need stability. Even if soil management is deemed necessary, a sudden massive intervention in the rooting area of a veteran tree can have negative effects. So it might be better to apply mulch in spots, quadrants, wedges or random patches rather than mulching the entire rooting area.

The appropriate depth of mulching is 5-10 cm. Certainly do not mulch any deeper, as this might lead to oxygen depletion and in some cases also rodent outbreaks (e.g. voles). In any case, avoid volcano mulching: never pile up mulch against the stem. Rather mulch like a donut: a ring of mulch material away from the stem. Volcano mulching will lead to rot of the root collar.

Fig. : volcano mulching is not done. This will lead to root collar rot.

Never use weed control fabric when mulching. The point of mulching is to restore natural cycling processes, so the mulch material should be in direct contact with the soil. Sometimes cardboard is used when mulching for the first time to suppress the growth of grass or herbs.

In some cases it is advisory to use organic matter in underground applications (which is strictly speaking not mulching): e.g. one could dig holes in the ground to be filled with organic matter. Carefully consider the need and impact of such interventions.

Where appropriate, it might be possible to plant or stimulate a natural herb layer, appropriate to the specific ecosystem on the site. Do not just focus on the tree and the soil, 'think ecosystem'.

5. Pneumatic soil excavation

In modern arboriculture, compressed air is used for mechanical excavation of soil without root damage. This can be beneficial when alleviating soil compaction or can be used for mixing organic mulch material with the top soil. However, be cautious when using this technique around veteran trees. It is quite invasive and inflicts sudden changes in the soil ecosystem. The impact on veteran tree roots is still under discussion, so use with moderation.

Fig. : pneumatic soil excavation around a veteran tree