

Deep root aeration, also called vertical mulching, is a technique long used by arborists to address the common urban problem of compacted soils. Plant roots require oxygen and water-delivered minerals to survive. Further, unhealthy gases often become trapped in heavy soils to the detriment of plant health. Deep root aeration is a way to address this common plant problem. The problem is an almost universal one in our Bay Area because of the heavy adobe soils that most of us have.

Besides letting oxygen into soils and letting the bad gasses out, deep root aeration offers many benefits. Roots can grow deeper, so they won't need to be watered as often. Deeper roots also mean less interference with paving. Deep root aeration allows to better make use of limited soil areas such as in the case of trees surrounded by pavement. And deep root aeration helps mitigate root diseases such as *Phytophthora* and *Armillaria*, which seem to thrive in low oxygen soils.

So what is deep root aeration, or vertical mulching? As the name implies, it means making holes or trenches in the soil and filling it with organic or inorganic matter. Of the two, [we strongly recommend organic matter](#) under the theory that as soil organisms feed on the organic matter, they make pore space out from the holes. There are any number of ways one might make such holes and any number of substances that might be placed in the holes and all have been used and all might be called deep root aeration. We are partial to the technique we have used for the past 30 years to good effect and so we will outline our method here.

Over the years, we have deep root aerated literally dozens of species and thousands of individual trees. In our experience it can be highly effective on most trees, but especially those in obviously compacted soils, which are showing signs of stress as a result. Roughly 90% of the trees we have aerated over the years have shown visible signs of improvement with perhaps 30-50% showing dramatic improvement. Deep root aeration should benefit almost any plant, although we have seen the most dramatic improvement in non-conifers, which are not near the end of their natural life span, such as, for example, Coast Live Oaks.

While tree companies will happily aerate your trees for you, the average homeowner can easily do it himself or herself

..... and here is how to do it our way:

Purchase a deep root aerator, available in many local nurseries or hardware stores with large garden tool selections (costs about \$20) (Don't use the Ross Root Feeder for this purpose.)



Purchase a bag of course compost. We most often use fir bark + 15% chicken manure which is available in nearly any corner nursery (Gold Rush brand, typically). It must be fine enough to get down the small hole made by the deep root aerator, but course enough to allow air to easily penetrate.

Attach the deep root aerator to your hose and turn on the hose full blast and then make the holes by leaning down on the tool, letting your body weight do the work as you lightly jiggle and twist the tool to let it go down.

Leave the tool in the ground just long enough to make the hole or until you hear the hissing sound that indicates that water is freely moving. Once you have made the hole and as you are pulling the tool out, swivel it around to make the top of the hole bigger, which will come in handy as you are trying to get compost down that small diameter hole.

Make holes roughly 18” apart throughout the area under the canopy of the average round-headed mature tree. If it’s a leaning tree, imagine where that canopy might be. If it’s a tall skinny tree, go out at least half the height of the tree. Thus you are making hundreds of holes on the average large mature tree. If pavement or other obstructions do not allow for many holes, make the holes perhaps 12 inches apart and go out further, because as a general rule the roots of trees go out at least twice the height of the tree, as long as there is no obstruction. (varies by species of course).

If the soil is so hard, you can’t get the deep root aerator down, that’s a sign that your tree really needs it. The next step is to perhaps drill the soil. (Some few soils are so rocky, that effective deep root aeration is nearly impossible, such as many lots in the Thousand Oaks neighborhood of Berkeley).

After you make the holes, fill each with compost. We often add “rock dust” to the mix to add an abundance of minerals to the soil that might be missing. Grab a handful of compost, form your hand into a kind of funnel and pour the compost into the hole. It takes about 2 heaping handfuls to fill one hole. Keep a 3’ small diameter straight stick handy to poke the compost down if it gets hung up in the small diameter hole.

..... There are a few tricks we haven’t mentioned. First, its almost impossible to get the tool to penetrate bone dry soil, meaning that winter or spring is a good time to do this, or if you are trying it in the summer, poke the tool in as far as you can and let it soak for a while (15 minutes?) so that you can then penetrate the soil.). Second, if you meet an obstruction, it’s probably a root or a rock. Just try another hole a little bit away.

Are there any downsides to this procedure? Yes, but few that don’t mean that the benefits don’t greatly outweigh the costs. If your tree has a root disease, such as Phytopthera (spelling) or Oak root fungus (Armillaria)

caused by overwatering, the additional water you are giving in the process is short-term detriment, but the improved Oxygen levels will improve conditions such that the tree will more easily fight off the disease. Yes, you may break a plastic irrigation pipe if you hit it dead center. You might want to reason out where those pipes are below ground before you try this and look for any possible leaks later if you guessed wrong.

Over the years of discussing deep root aeration in the field, clients have offered a lot of questions, which we will try to answer here. Will you injure roots if you hit them? . . . hardly at all to not at all. Is it possible to break a gas pipe in the process? . . . perhaps if you are using a drill but I don't see how if you are using the deep root aerator as the pressure you are exerting should not be enough to penetrate a steel pipe unless it was almost rusted through and about to go anyway. Is there a bad time to do aeration? . . . I wouldn't do it in situations where the soil is already saturated with water, such as after weeks of rain. I'd wait until the soil dries out a bit so you aren't making a bad situation even worse.

The average homeowner can deep root aerate their own trees as we have described above. If you expect you will never get around to it, feel free to call us to perform this service

If you want to learn more about the subject, Google "vertical mulching". "Deep root aeration" will also give you some information, but they are mostly commercial sites.

Below are links to a few articles we found:

[Vertical Mulch for Healthier Trees and Shrubs](#)

[Growth of Planted Yellow-Poplar After Vertical Mulching and Fertilization on Eroded Soils](#)

[Filling aeration holes with perlite is not effective](#)