

Soil Compaction – Number One Urban Tree Stressor

Excerpts and figures below are from [here](#).

Soil compaction is the most prevalent of all soil constraints on shade and street tree growth. Every place where humans and machines exist, and the infrastructures which support them are built, soil compaction is present. There are few soil areas we see without some degree of soil compaction. Soil compaction is a fact of life for trees and for tree health care providers.

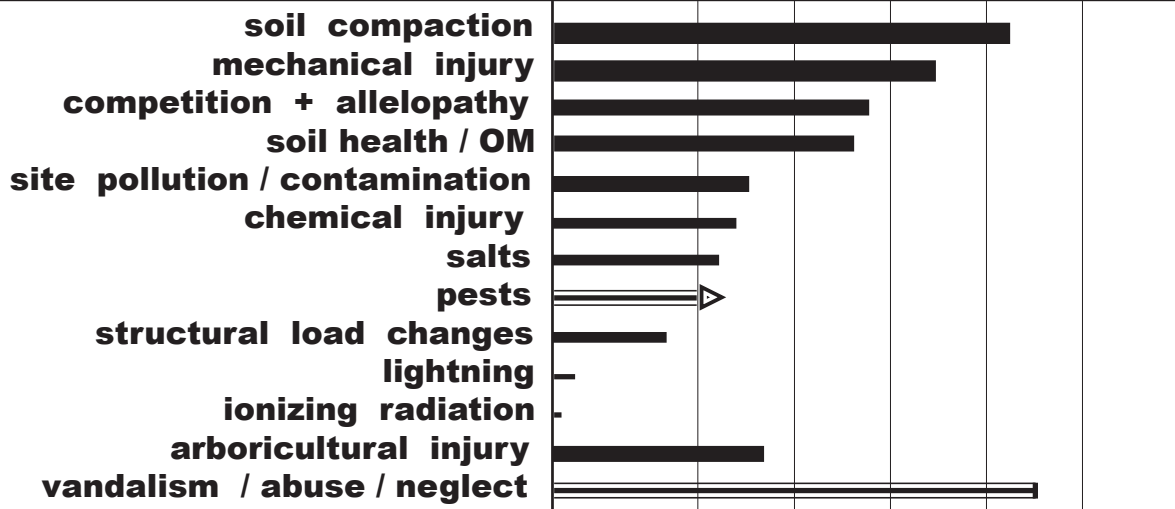
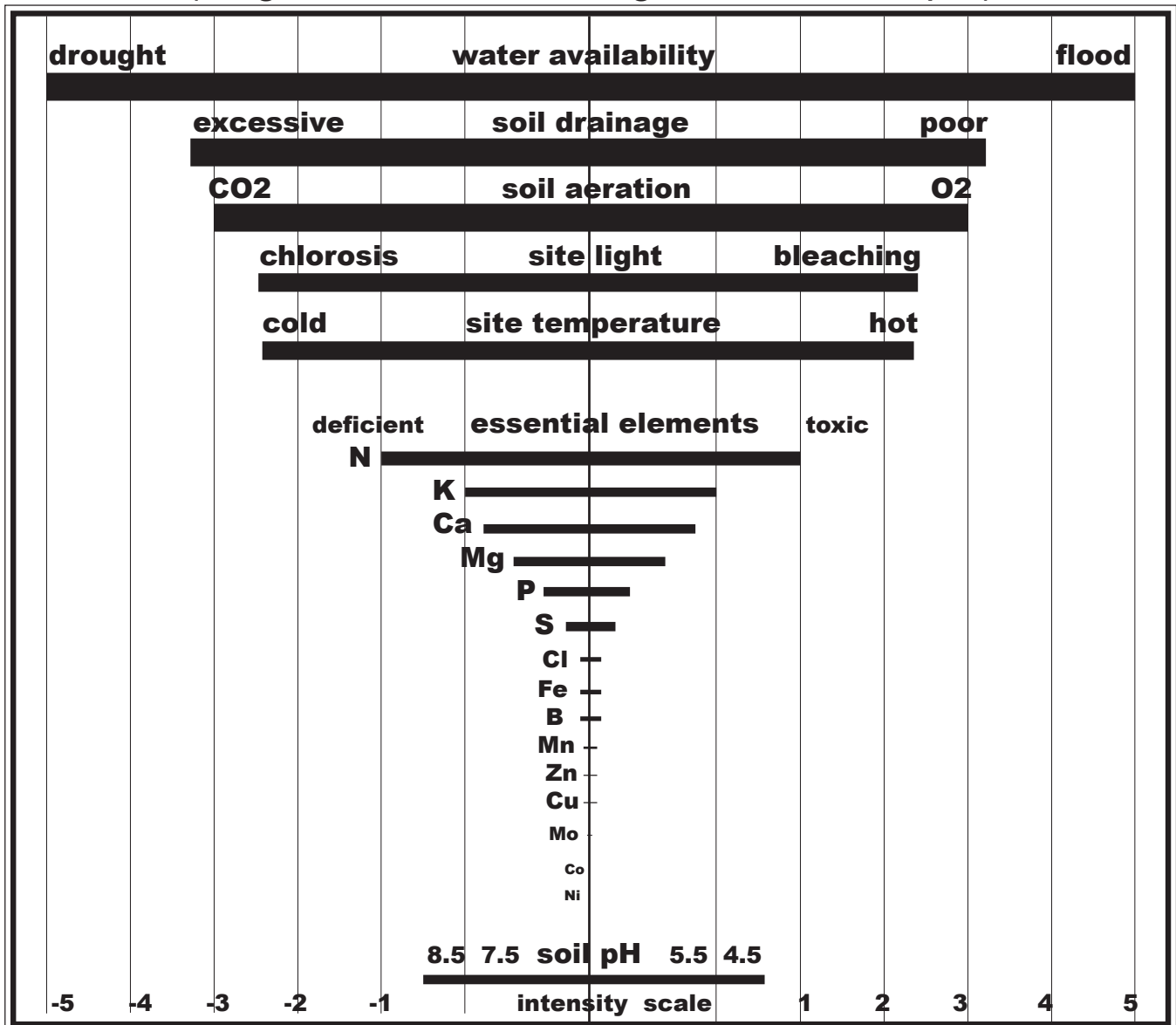
There are many environmental constraints on tree survival and growth. All limitations for trees have impacts on daily and seasonal growth which can be measured and prioritized. **Many people become obsessed by small constraints on trees while major life-altering impacts are ignored.** Soil compaction is one of those major problems causing significant tree stress and strain, and whose impacts are usually blamed on other things.

Figure 1 shows the individual items causing the greatest growth limitations for tree growth. **The top three things (by far!) are soil water availability, soil aeration, and soil drainage -- all three greatly disrupted by site compaction.** Tree care providers must help people understand soil compaction influences on tree growth and the need for soil renovation.

The second study (**Figure 45**) provides is a field-usable comparison between penetration resistance and relative root penetration percent. Remember, extremely large penetration resistances in soil allow for root growth **only** along fractures (cracks), along the soil surface, and along infrastructures boundaries.

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Figure 1: Occurrence priority of stress in trees.
 (longer & thicker bars = greater tree impact)



**relative
tree root
penetration
percent**

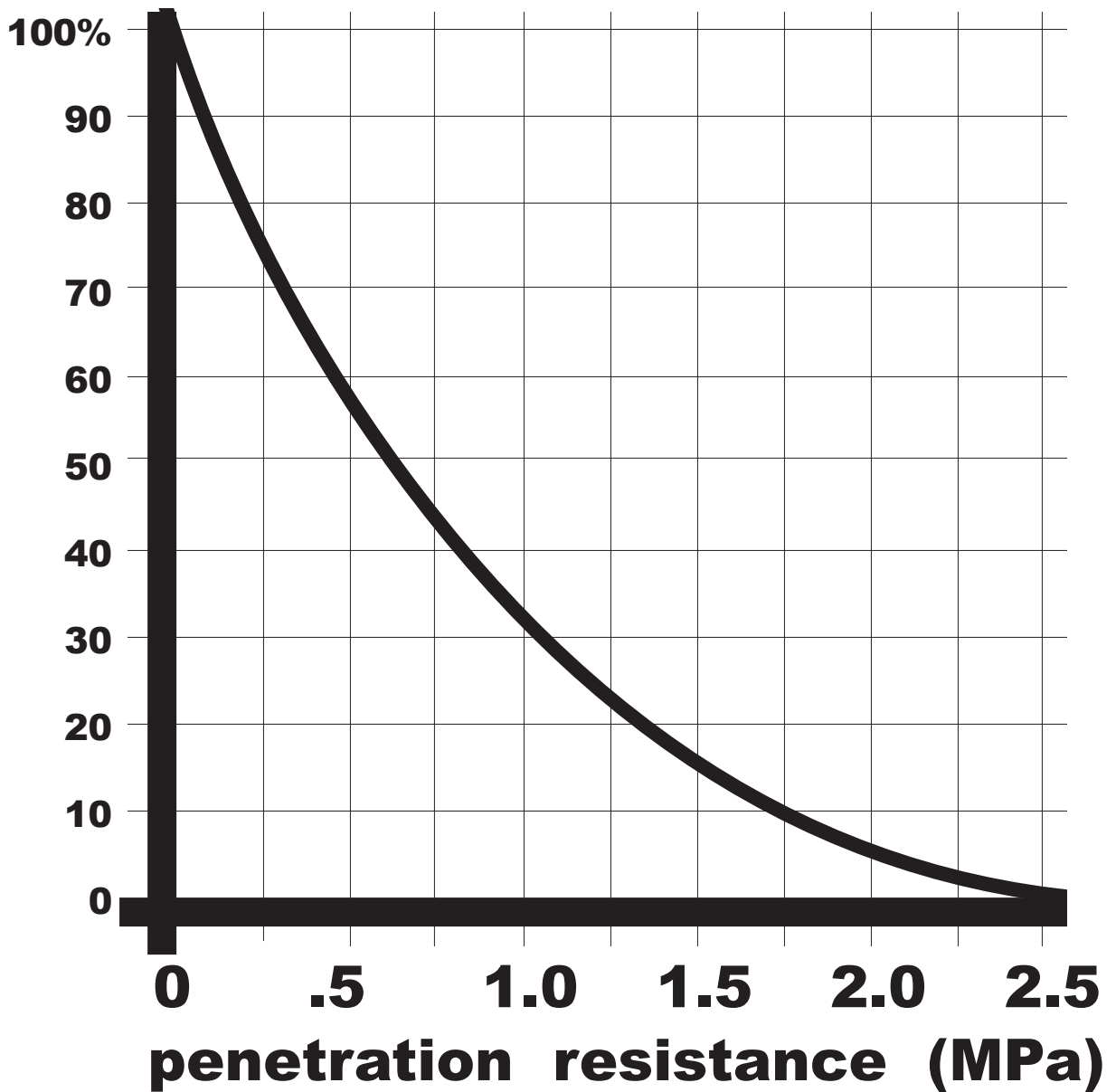


Figure 45: Comparison of relative tree root penetration percentages with penetrometer resistance (MPa).