



# Soggy Bottoms: Helping our Plants deal with Too Much Water

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# Too much water.....

- Short term and/or long term problem
- Creates stress for all plants, even if somewhat adapted to variable water tables in the soil
- River bottom plants are the best at getting past the effects of flooding or waterlogged soils, but even they cannot take it for too long.





# Direct effects on plants

- Most significant issue is too little oxygen
- This causes many different direct effects, leading to many different symptoms.
- Roots are impacted most directly. Root hairs die, many fine roots die relatively quickly. Nutrient and water uptake significantly reduced.
- Thus, the symptoms which will be expressed – looks like drought and nutrient deficiencies. Obviously, not a lack of water and probably not a lack of nutrients, but induced issues.
- Root systems lose stability.

# Worst case: Instability



# Roots can make it for awhile

- Some species actually have special adaptations that allow oxygen to be pumped from above water level down into roots.
- Others have adaptations that allows them to get oxygen out of the water.
- These are the ones which are true water or water's edge plants.
- Most can't do anything like this and end up slowly dying.
- OR dying back and having openings that end up with root rot fungi in them when the water levels do recede.











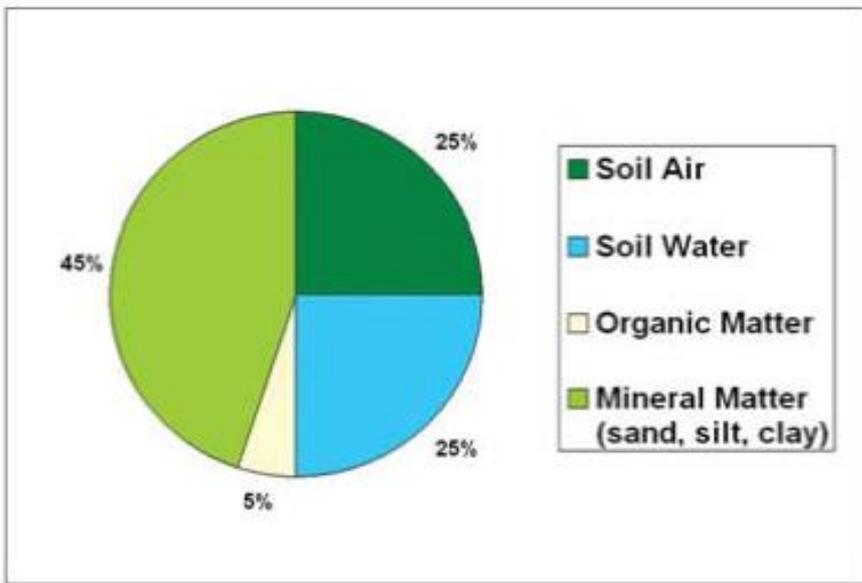


Figure 2.2: Composition of a natural soil, by weight.

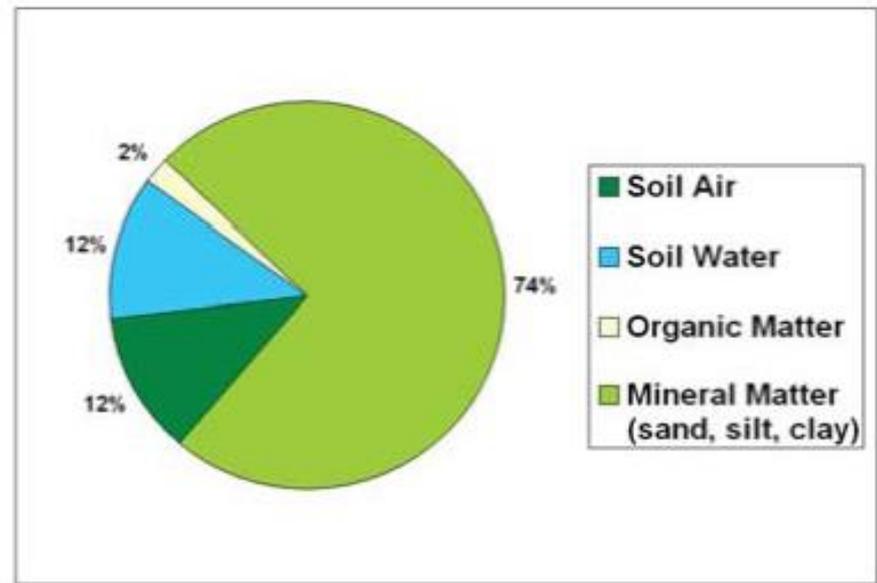
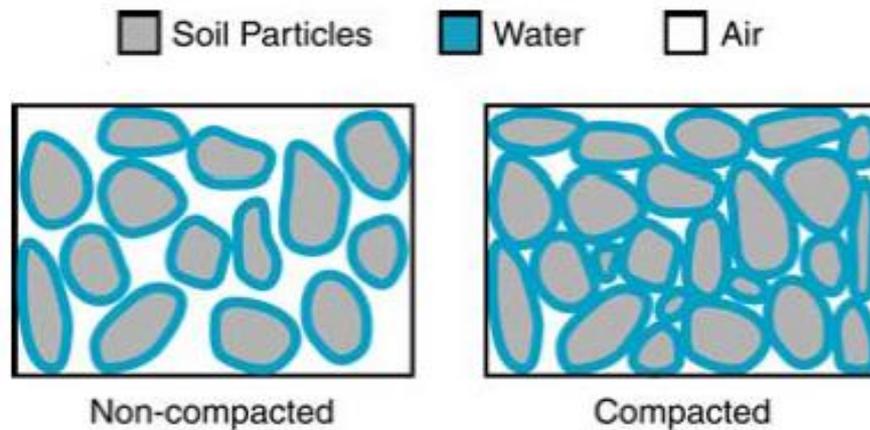


Figure 2.3: Composition of a compacted soil, by weight.



# Compaction is real, but not predictable

- Compacted soil has less pore space due to compression of the soil particles.
- Takes more strength for roots to get through these layers of compaction, some plants simply can't do so.
- Impacted roots less able to take up nutrients and water, smaller root systems cannot support normal plant growth.





# Effects and Options

- Symptoms can be poor/slow germination; slower growth; stunting; higher likelihood of drought or nutrient deficiency symptoms; and others.
- Vertical Tillage
- Roots – a mix of deep rooted plants with large fibrous root system plants will usually have the most effect.
- <https://marinette.extension.wisc.edu/crops-and-soils-resources/>

# Fixes for compaction

- Roots!
- Plant deep rooted, sturdy taproot crops either as main crop or as cover crop. Alfalfa, oilseed radishes, many other choices.
- Plant mix of root growth crops to achieve maximum effect. May be a year to consider cover crop mixes in marginal fields to get penetration of compaction zone with taproots and lots of fibrous roots to get through the entire zone, over some time.

# Many Resources available

- Listing that is linked below will be e-mailed to registrants of this webinar.
- Has all the UW resources, as well as ones from other universities.
- Helps with identification, understanding of it, and mitigation.
- <https://marinette.extension.wisc.edu/crops-and-soils-resources/>
- If want this as a word document, contact Scott Reuss, [scott.reuss@wisc.edu](mailto:scott.reuss@wisc.edu)



Okay, water causes lots of various problems, what do we try to do about it?

- Move
- Move the plants
- Prevent Further Stress
- Accept whatever is going to happen and then start over for the next cycle?

# Some realities

- Climate effects on our plants have changed, but we don't know if this is a temporary or a permanent situation.
- Likely that we will see more short term flooding or excess water situations, so is something we should prepare our plants/landscapes for a bit better.
- Improving drainage in our primary landscape areas is likely a good idea.
- Planning planting patterns to utilize plants more water level adaptable also good.

# Adapted species

- Not talking water plants, but water's edge plants. Many natives and non-natives that are better adapted to this situation.
- Be careful with hardiness selection, though, and make sure you understand their overwintering needs – some can handle water much better during the growing season than during dormancy.

# Moisture tolerant species

- Joe pye weed and Swamp (red) milkweed
- Marsh marigold
- Chelone (turtlehead)
- Lobelia (red or blue)
- Spiderwort
- Some ferns
- Bottle gentian

# Other moisture tolerant options

- Louisiana iris
- Japanese iris (*ensata*) – an example of one that can be in water some during growth, but not dormant.
- *Pseudacorus* iris – does well, but very invasive – can actually be in water.
- *Pseudata* irises – cross, vigorous, options.
- Obedient plant
- Rose mallow
- Toad lilies
- Anemone
- *Astrantia*

# Go to Raised Beds

- A valid option to change drainage, but then you also need to pay very close attention to water availability – i.e. water a lot more consistently.
- Not containers, but raised beds – so construct properly.
- Containers also an option, but not so much for perennials – plan more on annuals then.

# Shade – Raised bed options

- Ligularia
- Hostas
- Astilbe
- Pelargonium (perennial geraniums)
- Oenothera (part sun)

# Sun – raised bed options

- Penstemon
- Tall garden phlox
- Asiatic lilies (probably need mulching)
- Bearded irises
- Coneflower, purple best
- Sedums
- Sempervivums
- Nepeta, Russian Sage, & most herbs
- Tiger lilies & Daylilies
- Salvias



# Expect and manage diseases

- Inoculum management
- Airflow
- Consider fungicides, leaf pruning, etc...





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<https://marinette.extension.wisc.edu/horticulture/>

