Soil Conductivity
A Current Topic

What Is Soil Conductivity?
Conductivity (EC) is a measurement of the soil's ability to conduct an electrical current and is influenced by the presence of soluble salts. It can provide direct insight into soluble salts and indirect insights into soil fertility, microbial life, and nutrient availability. This is sometimes known as “the heartbeat of the soil”. Low EC indicates a lack of life and a lack of nutrients. Too high of an EC and the plant will struggle due to high concentrations of soluble salt.

Why Measure Conductivity?
Living organisms in the soil, such as microbes, plants, and their root exudates, release various ions and compounds which can increase the soil's EC. While some increase in EC due to biological activity and nutrient presence is beneficial, excessively high EC levels can be detrimental and lead to salt stress, toxicity and/or nutrient imbalance. Discovering the conductivity levels of your soil is a valuable tool to gain insights into how your soil is behaving. It is a great way to quickly compare different areas of your crop, especially areas where something appears to be amiss.

How to Measure Soil Conductivity
To test the conductivity of soil, you will need a conductivity meter. These meters possess probes that can be inserted into the soil to obtain an EC reading.

General Test
Slowly push the probe down into the soil. Watch to see if the numbers change as the probe enters deeper into the soil. Check to see what units the reading is in; it will be either in µs (micro siemens) or ms (milli siemens). If it is in ms, then multiply by 1000 to get µs.

Plant Test
Check the reading next to the plant. Try to measure at the root ball. Take a reading slightly farther away, and then take another reading a few more inches away. If EC is low at the roots and gets higher as you test further out, then microbes are low and depleted around the roots.

Salinity Test
Test anywhere you suspect there may be high salinity. Readings that get higher than 1200 µs may indicate high salinity.

Important EC Ranges

- 200 µs and below → plants will struggle and there might be low microbiology.
- 200 µs - 600 µs → vegetative state (roots, stems, leaves)
- 400 µs - 1000 µs → reproductive state
- 1000 µs → green beans will suffer.
- 1200 µs → soil does not get higher than this naturally. Good organic salts can get this high.
- 1200 µs - 2500 µs → uncomfortable zone for plants
- 2500+ µs → dead zone

For Further Information

- How Does Electrical Conductivity Affect Plant Growth? (Blog)
- What Can Electrical Conductivity Tell Us About Our Soil? (Blog)
- Mastering Crop Steering through Electrical Conductivity (Blog)
- A Detailed Crop Steering plan using Electrical Conductivity (EC) (Blog)
- Soil Electrical Conductivity & Measuring a "Heartbeat" (Video)
- Electrical Conductivity: The Silent Regulator of Plant Growth (Blog)
- Soil Analysis via Remote Sensing and Artificial Intelligence for Precision Regenerative Agriculture (Article)