CASE

Curriculum for Agricultural Science Education

Principles of Agricultural Science – Plant

A Dash of Salinity

Unit 2 – Mineral Soils
Lesson 2.2 Soil Chemistry

Rainfall and Soil Chemistry

High rainfall, over time, causes soils to become acidic as water leaches hydroxyl ions (OH-) away.

However, in arid regions the lack of rainfall can cause the other extreme in soil chemistry: salinity.

Salting of the Earth

Soil salts combine with common soil elements:

- Magnesium
- Calcium
- Chloride
- Sulfates

and of course…

- Sodium

How Salt Accumulates

- Salts naturally appear through weathering processes in parent material.
- Dry conditions allow salt to accumulate because salt is not leached downward by rainfall.
- Poor drainage causes water to gather close to the soil surface where it will evaporate, leaving salts behind.

Greenhouse Salts

Fertilizer and some irrigation water contain salt compounds.

A greenhouse manager needs to:

- Monitor wick or other bottom watering systems for salt content
- Inspect for dried salts around the drainage holes of greenhouse pots

Doesn’t salt taste better?

Not to plants.

Plants have varied tolerances to salt levels based on species.

High salt content can effect:

- Water uptake
- Availability of nutrients

How can you fix the problem?

Farmland is very difficult and expensive to restore because of the size of area requiring treatment.

Four solutions exist:

- Improve drainage
- Supply ample irrigation
- Apply gypsum
- Add mulches

A Greenhouse Solution

For the greenhouse, salinity is easier to manage if you:

- Monitor salinity levels.
- Use overhead irrigation methods.
- Neutralize salinity in potting media at the time of mixing.
- Use organic fertilizers.

Monitoring Salinity

- Salinity can be monitored by measuring the electrical conductivity of a soil.
- Special meters determine conductivity in units of deciSiemens per meter (dS/m).

Plant Response to Salinity	
Salinity (dS/m)	**Plant response**
0–2	Few problems
2–4	Some sensitive plants have trouble
4–8	Most plants have trouble
8–16	Only some plants will survive
above 16	Very few plants will survive

References

Plaster, E. J. (2003). *Soil science and management* (4th ed.). Clifton Park, NY: Delmar.

Redding, K., & Masterman, D. (2007). *Biology with Vernier*. Beaverton, OR: Vernier Software & Technology.