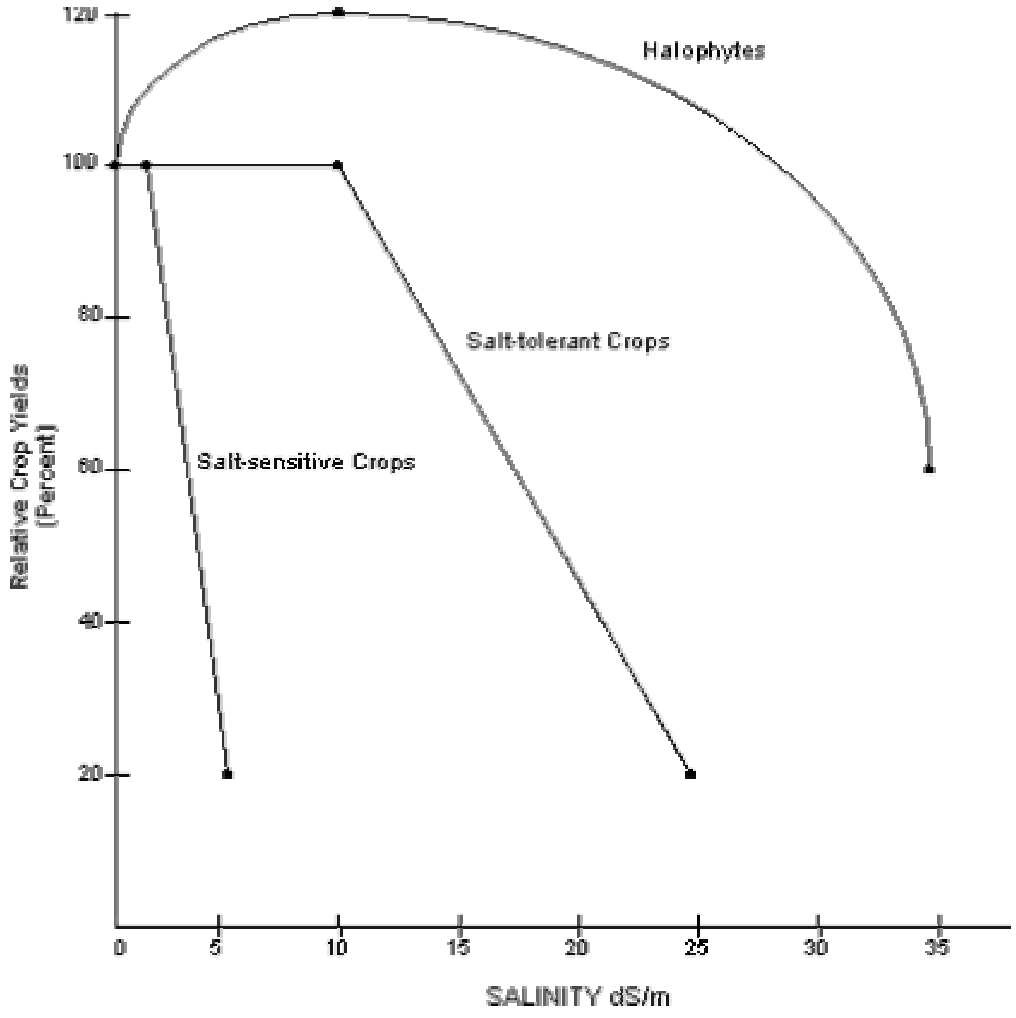
SOIL AND SALT ... A DEADLY MIXTURE - PART 2

There are some species of plant that can grow well in salty soils. They are called Halophytes. Why?

Because Halophytes can adjust their hormone balance so that they maintain function. Most Halophytes, however, are not commercially acceptable (profitable).

If one wants to grow commercial non-Halophytes, the hormones can be synthetically balanced.



Salty Soil Affects

Hormone Balance

Auxins: Are decreased under salty conditions. Growth responses occur when auxins are applied to seed or early growth stages.

Gibberellins: Are greatly decreased under salt stress. Major growth responses occur where they were applied to crops under salt stress.

Cytokinins: Levels in the leaves drop rapidly under salt stress. It is critical for control of ethylene.

Ethylene: Increases rapidly under salt stress. This will predispose the plant to tissue "break down" and disease susceptibility.

Abscisic Acid: Increases rapidly under salt stress. Although this helps the transfer of sugars, it can contribute to early dying. Increases rapidly with drought stress. It inhibits growth of both tops and roots.

Adaptation of Plants

To Environmental Conditions

Adaptation of plant cells occurs during the first 5 to 10 days after germination. This adaptation will continue for the growing season.

It appears that during this period, the plant will readjust its hormone balance. This "new balance" appears to last all year long ... under normal conditions.

Implications:

1. Crops planted in salty soil must have **"Aqua Cal 5"** present during the period of germination ... for maximum adaptation.
2. **"Aqua Cal 5"** should be available to the crop during germination and shortly thereafter.
3. For plants to be drought tolerant, it must be in drier soil during 15 days after germination.

All plants may not be able to adapt.

Hypothetical Schema of the Sequence of Events Occurring During Adaptation

Stress applied while developmental window is opened

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Modification of hormonal balance (ABA↗ , CK↘ , GA modified)

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Short-term response: synthesis of stress proteins

Long-term response: modification of repetitive DNA

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Changes in repetitive DNA affect DNA conformation

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Changes in genome expression

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Improvement of the physiology of the plant, decrease in ABA, increase in CK (or of sensitivity toward CK), restoration of GA (or change in sensitivity toward GA)

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Adaptation: the environment is no longer stressing