



From 2013-2016, the ND Corn and Soybean Councils have funded research on how soil salinity influences crop plants and the pest insects that feed on those plants. The overall goal of the pest work is to predict if soil salinity further harms crops by making them more vulnerable to pests. This can also help us improve scouting efforts while benefiting pest management and yield in saline soils.



The pests in this study are the two-spotted spider mite (below left) and the soybean aphid (below right). Both are occasional pests that can damage plants and cause yield reductions when populations are high. Mites feed on many crops including corn and soybean, while the aphid specializes on soy.



PEST RESPONSE TO SALINITY IN CORN AND SOYBEAN

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What does salinity do to pests?

As salinity increases...

Spider mites

- lay more eggs
- have populations that grow faster and larger

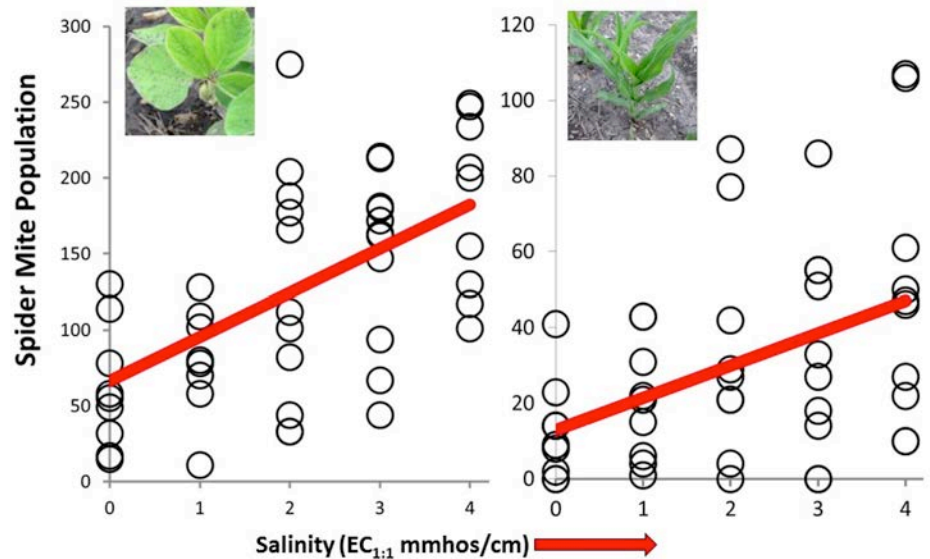
Soybean aphids

- have more babies
- live longer
- make babies for longer
- move towards plants in saline soil
- have populations that grow faster and larger

Taken together this means that **if** these pests reach plants grown in saline soil, they will do better, grow more, and reproduce more compared to when on other plants. This means:

Crop plants grown in saline soils have a higher risk of pests

Our greenhouse research has continuously shown that when plants are grown in saline soil, pests do better compared to when the plants are grown in less saline soils (two examples below and broader list of results in the box to the left). We have seen that this is a continuously positive relationship, the more saline the soil, the better the pests do. Even at fairly low salt concentrations, pests can get a boost compared to healthier soils without salts.



Our field research has agreed with the predictions made in the greenhouse, pests can perform better on plants grown in saline soils (example below). However, our field results have gotten different results in different fields. This suggests that there are other conditions that can alter how strongly pests respond.

