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Fertilizer Salt Index

Virtually all fertilizer materials are salts. When they dissolve in ht soil, they increase the salt concentration of the soil solution. An increase in salt concentration increases the osmotic potential of the soil solution. The higher the osmotic potential of a solution, the more difficult it is for seeds or plants to extract soil water they need for normal growth.

Renewed interest in placing fertilizer in or close to the seed row makes it important to remember that an increase in salt concentration in the fertilizer band can cause seed and seedling injury. Placing fertilizer at least two inches away from the seed can usually prevent injury. Excess fertilizer application in a starter band can still produce injury, especially under dry conditions.

A salt index is calculated by comparing the increase in osmotic potential brought about by addition of a fertilizer material compared to the increase in osmotic potential when an equivalent weight of sodium nitrate is added to water. The salt index of a mixed fertilizer containing N, P, & K is the sum of the salt index values of its components.

The salt index of sodium nitrate is defined as 100. Fertilizer materials with salt indices greater than an equal weight of sodium nitrate. Fertilizers with a salt index value less than 100 produce an osmotic potential less than an equal weight of sodium nitrate. Fertilizers with a salt index value greater than 100 produce an osmotic potential greater than an equal weight of sodium nitrate.

The salt index does not predict the amount of material that will produce injury to crops in a particular soil. It classifies fertilizer materials relative to each other and shows which is most likely to cause injury. It is possible to formulate similar grades of mixed fertilizers from different materials that have significantly different salt indices.

Crop tolerances vary widely to increased osmotic potential from fertilizer near the seed. Wheat is moderately tolerant of high-salt conditions while soybeans are very sensitive. Corn is intermediate in tolerance. Dry soil conditions as well as fertilizers that produce free ammonia (urea, UAN, DAP, etc.) will significantly increase seed and seedling stress leading to injury or possible death. Be aware of the salt index of your starter fertilizer and don't over-stress your young crop.

Sources: *Salt Index of Fertilizers*, Pm-1274d, Iowa State University.

Fertilizer Application & Technology, 1999, Meister Publishing.

Western Fertilizer Handbook, 1985, The Interstate Publishers & Printers.