Sodium Induced Wilt Program

EARTHWORKS NATURAL ORGANIC PRODUCTS, INC.

Sodium induced wilt occurs within plants when sodium moves into cells at a higher concentration level than potassium, causing desiccation of cell walls and ultimately wilt. Potassium can regulate the movement of sodium into the cell, if available in enough volume. The potential for this problem can be identified on both the standard and soluble paste extract soil tests by comparing the percentages of potassium in relation to sodium. The key indicator is ~ potassium should never fall below sodium on the base saturation portion of the standard soil test or as a percentage of concentration on the water soluble paste extract. A word of caution here ~ often the base saturation levels can be in proper balance on the standard test, while the paste extract test will actually indicate an undesirable balance. Often the paste extract will show sodium is at a higher concentration level than potassium, a clear indication of an increased risk for sodium induced wilt, a very subtle problem in the field, and often misdiagnosed as environmental or water related wilt. A very good indication of this problem in the field is when wilt occurs at times in the day when wilt should not normally occur, such as early morning or late afternoon. Identifying the problem both in the field, and with help of comprehensive soil testing, can help reduce a significant amount of plant stress that can often lead to other problems such as disease attack. Removing the sodium from the soil will make a significant difference in the health of soil microbial populations, allowing for better nutrient uptake, improved checks and balances for the control of pathogens, and a better soil physical structure.

Key management steps that will improve soil conditions to prevent sodium induced wilt include; increasing potassium (and often calcium solubility) levels, and removing sodium ~ all of which will improve the environment for soil biology to proliferate.

See reverse for a suggested program.

SYMPTOMS:

Unexplained Wilt

Weak Grass

High Sodium

SOLUTIONS:

Remove Sodium

Stimulate Biology

Add Potassium

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Sodium Induced Wilt *Program*

Sodium Removal:

1) **Cal Vantage** – 2-6 ounces/1000 per week depending on the severity of the sodium load. This will provide an immediately available form of calcium to help remove sodium from the root zone and help to prevent bicarbonates from sealing the soil surface ~ helping to improve water movement through the soil.
This product will also help to strengthen cell walls, resulting in reduced plant stress.
2) **Kick** – 2 ounces/1000 per week. The humic acid fraction of this product will work as a sequestering agent by locking up the sodium, preventing it from moving into the plant. It will also help to stimulate microbial populations that will further assist in sequestering sodium.
3) **Gypsum** – 5 lbs/1000 per month. This is a soluble calcium-based amendment, and one of the best to quickly knock sodium off the soil colloid.
4) **Limestone** – Use only if called for on the soil test (follow rates suggested by soil test). This is a very sustainable form (low solubility) of calcium and will replace sodium slowly over a long period of time.

Potassium:

1) **Base One** – 2-4 ounces/1000 per week. This will provide an immediately available form of potassium to the plant cells, along with phosphorus and a host of needed trace nutrients.
2) **Potassium Sulfate** – One pound of product/1000 sq. ft. per month depending upon the severity of the deficiency (based on soil test results). This provides an available form of potassium over a short period of time.
3) **Ecolite** – 25-50 lbs/1000 in aerification holes at least twice a year. Light, frequent top dressings of 10 lbs/1000 can also be very advantageous. This mineral will provide a sustainable form of potassium, while holding soluble forms of potassium and ammonium to limit leaching losses and improve release rates.

Biological Stimulation:

1) **Potent Sea Plus** – 2-6 ounces/1000 per month depending on severity of sodium and time of year. This product is a rich food source for beneficial bacteria and a powerful heat stress reducer. Excessive sodium in the soil will negatively affect the activity of beneficial microbes in the soil, and improving their activity will help to sequester the sodium. Increasing rates in the hottest months is suggested to enhance biological activity when high soil temperatures are most damaging.
2) **Replenish 5-4-5** – 40 lbs of product applied over 3 to 4 applications per year. This will provide the most sustainable food source for microbes available, as well as help to re-mineralize the soil. Helping to reintroduce micro-organisms that were damaged by the excessive sodium, using this product will provide a better environment for air and water movement though the soil.

Cultural Practices:

1) **Frequent spiking & aerification** – This will help to increase oxygen levels in the root zone and provide a better environment for beneficial bacteria. Oxygen is the most important nutrient to the soil plant matrix, and frequent spiking will assure that air is properly moving through the soil.
2) **Deep and infrequent watering** – Often sodium problems are associated with water quality, and shallow watering practices will allow sodium to accumulate in the root zone where it can do the most damage. Deep, flushing watering practices are very important to help remove sodium, and should be used with gypsum to further improve the ability of the soil to remove sodium from the root zone.

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