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APPROPRIATE FERTILIZERS FOR CEMETERIES

Nitrogen may be added to the soil as one of three forms: (1) synthetic inorganic, (2) natural organic, or (3) synthetic organic. Each type has advantages and disadvantages from a landscape maintenance perspective. From a conservation or preservation point of view, however, there is one critical issue – the salt index.

Soil scientists have known for years that high concentrations of soluble salts added to soil will increase the osmotic pressure and can damage plants through decreased water availability. High salt concentrations will cause what is called physiological drought. As a result a salt index was proposed as a means of expressing the effects of various fertilizers on the soil solution. Technically the salt index is the ratio of the increase of osmotic pressure produced by a fertilizer to that produced by the same weight of sodium nitrate (NaNO_3), based on a salt index of 100. Simply put, lower numbers are better than higher numbers.

The table below compares the salt index numbers for a variety of possible fertilizers. Clearly the organic, slowly available nitrogen fertilizers have very low salt indices and are likely to cause the least salt damage. In contrast, many of the “modern” synthetic inorganic fertilizers have very high salt indices.

As salt is placed in the soil it not only affects (and damages) the vegetation, but it will also be absorbed into stone, especially sandstones and marbles, through moisture movement (chemicals move from areas of high concentrations to areas of low concentrations). Once in the stone, these salts will migrate to the stone surface through periodical wetting and drying episodes. And the salts have the tendency to cause spalling or flaking of the stone.

This is why, as conservators, we recommend that you use only natural organic fertilizers in your cemetery. Use of synthetic inorganic fertilizers – even if swept off stones after application – will cause long-term damage to your monuments.

Material	Analysis	Salt Index	Effect on soil pH
Synthetic Inorganic			
ammonium nitrate	33.5-0-0	105	Acidic
sodium nitrate	16-0-0	100	Alkaline
potassium nitrate	14-0-0	74	Alkaline
ammonium sulfate	20.5-0-0	69	Acidic
calcium nitrate	15.5-0-0	52	Alkaline
diammonium phosphate	18-46-0	34	Acidic
Natural Organic			
cotton seed meal	7-3-2	3.5	
dried blood	13-2-1	3.5	
cattle manure, dried	2-1.5-2	3.5	
Synthetic Organic			
Urea	45-0-0	75	Acidic
Cyanamide	26.6-0-0	31	Alkaline

The other constituents in fertilizers – primarily phosphorus and potassium – may also endanger your cemetery's stones. The list below provides information on the salt index for a few of the major materials.

Material	Analysis	Salt Index	Effect on soil pH
Phosphorus			
superphosphate	P ₂ O ₂ – 20%	8	Neutral
monoammonium phosphate	P ₂ O ₂ – 48%	30	Acidic
diammonium phosphate	P ₂ O ₂ – 46%	34	Acidic
Potassium			
potassium chloride	K – 50-52%	116	Neutral
potassium sulfate	K – 42-44%	46	Neutral
potassium nitrate	K – 36-38%	74	Alkaline
potassium Mg-sulfate	K – 17-22%	43	Neutral

When anticipating fertilization, appropriate stone care will include two critical issues:

- Selecting the fertilizer least likely to cause salt damage to your monuments, and
- Ensuring that the landscape maintenance contractor carefully sweeps, brushes, or blows off all stones after the application to remove any fertilizer that might have landed on the monuments.

Using these procedures you have the best chance for ensuring the health of your cemetery's turf grass, while also ensuring the preservation of the irreplaceable markers. If you need additional assistance call one of Chicora's conservators for additional information.