

A SPECIAL ST MANAGER PULL-OUT SECTION



Turf Jargon

Soil Science Terminology from A-Z.

HELMUT SPIESER, OMAF

There are many strange-sounding words used in the world of sports turf. Although most of these words may have originated from the 'Ivory Towers,' they often end up as commonly used lingo amongst practitioners. To ensure we are all speaking the same language, and as a means of refreshing our understanding of sports turf terminology, we will attempt in this article to define some of the more commonly used scientific terms.

Acids. Ions which lower the soil pH, such as hydrogen (H^+) and aluminium (Al^{3+}).

Acid soil. A soil with a pH below neutral (neutral pH = 7.0). Most turf soils are somewhat acidic.

Alkaline soil. A soil with a high pH, above pH 7.

Anaerobic soil. A soil lacking in oxygen. Under such conditions only some species of organisms, such as anaerobic bacteria, can function. Anaerobic soils often appear discoloured (mottled) and have a pungent (rotten eggs) odour.

Anion. A negatively charged ion or nutrient, such as chloride (Cl^-) and nitrate (NO_3^-)

Air-filled porosity. The proportion of a soil's volume that is filled with air at a given time; a low air-filled porosity indicates poor aeration and restricted drainage.

Amendment. Any substance added to a soil/sand medium for the purpose of altering the soil characteristics (e.g. peat or gypsum).

Base. Ions which raise the soil pH, such as calcium (Ca^{2+}) and magnesium (Mg^{2+}).

Base saturation. The extent to which the nutrient holding sites in a soil are occupied (saturated) by bases. Usually expressed as a percentage of the total cation exchange capacity. Total Base Saturation = $Ca + Mg + K + Na/CEC$.

Bulk density (soil). The mass (weight) of dry soil per unit volume of soil. A high bulk density generally means less pore space.

Calcareous soil. A soil with a high calcium carbonate level. These soils usually have a high pH that is difficult to lower.

Calcined clay. Clay/soil minerals that have been 'fired' at high temperatures to produce stable, granular particles.

Cations. Any positively charged nutrient, such as potassium (K^+), calcium (Ca^{2+}) or magnesium (Mg^{2+}).

→ page 12

Cation Exchange Capacity (CEC). A measure of the exchangeable (potentially plant available) cations that a soil can hold against leaching. Sands typically have a low CEC, which means they have only a small nutrient supply store. CEC is generally expressed in milli equivalents per 100g of soil.

Cleavage plane. (*Sorry to disappoint here...*) A separation layer in a soil, often resulting from using topdressing material of different texture to the base soil.

Field capacity. The amount of water held in a soil at the point where drainage ceases; represents the upper limit of water available to the plant.

Gleying. The development of greyish colours and reddish stains (mottles) under anaerobic (poor drainage) soil conditions.

Humus. The stable organic fraction in a soil; it is an advanced stage of decomposition and is unrecognisable as being of plant origin.

Infiltration rate. The rate at which water enters the soil surface. The rate of infiltration can be measured using an infiltrometer.

Leaching. The removal of nutrients and other materials through the soil in drainage water.

Loam. A textural class of soil which has a relatively similar sand, silt and clay content, such that no one fraction dominates.

Macronutrient. A chemical (e.g. N or P) that is used in relatively large amounts (usually >500 ppm in a plant).

Mat. A tightly intermingled layer of roots, stems and other living and dead plant material at or near the surface.

Micronutrient. A chemical (e.g. Cu, Fe)



that is used in very small amounts (<50 ppm in a plant).

Mineralisation. The conversion of an element from an organic form to an inorganic state, as part of microbial breakdown.

Mycorrhiza. Literally means “fungus root” and is a specific fungi associated with the roots of certain plants.

Nitrification. The biological oxidation of inorganic nitrogen (as ammonium) to form nitrate nitrogen ($\text{NO}_3 - \text{N}$). An important process in the production of plant available nitrogen.



Nitrogen and nitrogen cycle. Nitrogen is the most significant nutrient in the turf system; there are different forms of nitrogen in a soil system, including nitrate, ammonium and organic nitrogen forms. The nitrogen cycle refers to the changes that occur with the form of nitrogen as it moves between the soil, plant and atmosphere.

Nutrient. A substance required and taken up by the plant (or any other organism) for growth, such as the essential elements (N, P K, S, etc.).

Organic matter. Any matter in the soil system that is in the organic form, generally arising from the debris of plants or animal residues. Thatch and mat are major components of soil organic matter in turf systems.

Organisms. The living fraction in a soil,

including fungi, bacteria, actinomycetes and larger groups such as earthworms.

Pan. Any layer or horizon in the soil that impedes downward movement of water, air or root development. Pans can be created naturally with fine-textured or layered profiles, or can be artificially created, such as cultivation or core pans.

Parent material. The relatively unaltered substrate located below the sub-soil from which the soil profile has developed by weathering and other processes.

Peat. A soil high in undecomposed (or slightly decomposed) organic matter, which accumulates under conditions of excessive moisture (no air for microbial activity and organic breakdown).

Ped. A soil aggregate or unit of soil structure (e.g. crumb nut or block).

Percolation. Another term for drainage, or the downward movement of free water through the soil profile.

Permeability. The ease with which water, air and plant roots can move down through the soil profile. Is a more subjective term for drainage than “hydraulic conductivity.”

PH. A measure of the amount of hydrogen (H^+) ions in a soil, which in turn determines soil acidity or alkalinity.

Pores. The holes or voids in a soil that give rise to the soil drainage (macropores) and water retention (micropores) characteristics.

Porosity. The percentage volume of a soil that is not occupied by solid particles (will be occupied by water or air).

Rhizobia. Bacteria able to live symbiotically (in a mutually beneficial relationship) with roots of legumes and which are capable of using (“fixing”) atmospheric nitrogen.

Rhizosphere. The biologically active zone of soil containing the bulk of plant roots and soil microorganisms.

Saline soil. A soil with a high soluble salts level. Under such conditions plants struggle to extract water and as such suffer "dry wilt."

Self-mulching soil. A soil that when rewetted tends to swell and break down to defined, stable aggregates. Applicable to clay soils and is relevant to cricket clay selection.

Sodic soil. A soil with a high sodium (Na⁺) level relative to the level of divalent (++) cations, such that plant growth (and soil drainage rate) is impaired.

Sodium Absorption Ratio (SAR). An index to express the relationship between the level of sodium ions and the divalent cations in a soil..

$$SAR = \frac{\sqrt{Na}}{Ca+Mg}$$

Structure (soil). How the individual soil particles are bound together to form aggregates or peds. Structure is described in terms of aggregate shape, size and strength (e.g. moderately developed, fine crumb).



Texture (soil). The relative proportions of particle sizes (sand, silt or clay) in a soil sample (e.g. silt loam, fine sandy loam).

Tensiometer. A device for measuring the availability of soil water (or matric potential). It consists of a porous ceramic cup connected to a vacuum gauge.

Tilth. The physical condition of a soil as it relates to the ease of tillage (cultivation) and the impedance to seedling emergence.



Trace elements. Another term for micronutrients, or essential nutrients used in only small quantities by the plant.

Transpiration. Loss of water by the plant to the atmosphere via the stomata in the leaf.

Waterlogging. Excessive soil moisture to the point where the soil tends to an anaerobic condition.

Weathering. The aging of a rock or soil by natural processes, such as wind, rain and microbial activity.

Wilting point. The soil moisture content at which the plant starts showing symptoms of moisture stress. ♦

— Keith McAuliffe, CEO, NZ Sports Turf Institute, Palmerston North

Acknowledgement

Reprinted from the *New Zealand Turf Management Journal*, February, May and November 2005.

THE SPORTS TURF ASSOCIATION HAS MANY PRIME ADVERTISING OPPORTUNITIES THROUGHOUT THE YEAR. CALL US!



Red and grey clay products designed for baseball, cricket and tennis, along with groundskeeping tools and accessories.

MAR-CO CLAY PRODUCTS INC.

Tel. 519-684-7591 Fax: 519-684-7457

www.marcoclay.com



JOHN BLADON

Technical Sales Representative

Tel: 519.757.0077

Cell: 519.574.2013

E-mail: jbladon@nu-gro.ca

Nu-Gro Professional Turf

10 Craig Street

Brantford, Ontario N3R 7J1

Product Info Line: 1.800.461.6471



Box 171
Harriston, Ontario
N0G 1Z0
Phone (519) 338-3840
Fax (519) 338-2510

**Edward J. Seifried
J. Robert Dippel**

SEEDS



PLANT PRODUCTS

Turf MVP • Grass Seed
Turf & Tree Fertilizers
Pest Control Products

Plant Products Co. Ltd.

Brampton, Ontario

905-793-7000 or 1-800-387-2449

Fax 905-793-9632 • plantprod.com