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JOHN'S CORNER

ORGANIC FERTILIZERS AND NUTRIENTS - 26: MINERAL SAND Part-2

by John Ferguson

There are many types of mineral sands (sometimes called rock dusts) used in horticulture and gardening. Each offers different nutrients and benefits. Today I want to look at another mineral sands of igneous or volcanic origin. The most common in the Gulf Coast region is granite sand, basalt sand, and lava sand to a lesser degree. This week we will look at basalt sand.

Basalt Sand - This sand comes from the breakdown of basalt. It can be produced naturally through weathering of the basalt rock or from the crushing of basalt to create a gravel product. Crushed basalt is often used on railroad tracks to create a base to support the trains.

Basalt is a smoother looking homogenous rock that is dark in color and composed primarily of minerals we call calcic plagioclase, augite, titaniferous magnetite and many other minerals. It is lower in quartz like minerals than granite and richer in minerals that contain magnesium (Mg) and iron (Fe). The molten magmas that form basalt cool very quickly hence large mineral grains do not have time to grow as compared to granite where the magma cools very slowly which allows lots of mineral grains to grow. A huge deposits of basalt is located just West of San Antonio near the town of Knippa. Basalt varies from dark grey to black in color depending on the source (basalt from Texas is grey). Many of the black sands associated with volcanic islands are often basalt. Basalt is the most common volcanic rock on earth. Basalt rock are more common in the oceans and granites are more common on the continents.

The minerals (elements) in basalt vary a little depending on the source and are richer in the heavier elements than granite.

Some average values are:

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45-55%	SiO ₂	Silicon dioxide (quartz mineral)
14%	Al ₂ O ₃	Aluminum oxide
10%	CaO	Calcium oxide
5-14%	FeO	Iron oxide
4-12%	K ₂ O	Potassium oxide
3.7%	NaO	Sodium oxide
5-12%	MgO	Magnesium oxide
0.5-2.0%	TiO	Titanium oxide
0.12%	P ₂ O ₅	Phosphorous oxide
0.05%	MnO	Manganese oxide

Basalts tend to be much higher in barium (Ba) and rare earths minerals than granite. They are other elements in basalt that vary that are in quantities of just a few parts per million or even parts per billion. I am sure many of you recognize the plant nutrients in basalt such as potassium, calcium, iron, magnesium, manganese, etc. As basalt breaks down these nutrients are quickly released by microbes in the soil and by chemical and physical weathering. Since basaltic magmas cooled quickly, mineral grains that are resistant to weathering did not have a chance to form hence basalts weather quickly as compared to granite. They often form brown to reddish colors as they weather due to the high iron content.

We use basalt sand in gardening for several reasons. The sand size particles can add structure to many soil types increasing aeration and infiltration of moisture. Also as the particle size becomes smaller there is an increase in surface area that allow more processes to act on it and release the nutrients quicker. Due to the higher quantity of certain nutrients basalt sand helps buffer the soil against becoming too acidic. The silicon (Si) in the basalt minerals weathers and hydrolyzes to a plant available form called silicic acid that strengthen plants.

Due to the minerals in basalt it has a higher Paramagnetic value. All materials of volcanic origin have varying degrees of this property. From observational data all over the world and thousands of samples, it was found soils that are paramagnetic tend to be more fertile, have higher productivity and have less weed, insect and disease pressure than soils that are not paramagnetic. This will be discussed in future articles.



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SUMMARY:

Basalt sand is another tool in a gardeners tool box. It is often occasionally used as an ingredient in high quality soil blends to increase the soils mineral content.

PROS:

- source of a few major nutrients
- good source of iron and magnesium
- small amounts of minor and trace elements
- releases nutrients moderately fast
- aerates heavy tight clay soils
- improves soils structure for many soils
- may be a source of Paramagnetism
- available in different sizes from dust to fine gravel
- fine sizes are often added to vermi-compost bins to use as grit
- buffers soils against acidity
- a few studies shows that it helps plants resist insects and disease better

CONS:

- very heavy in weight hence shipping charges are high
- releases some nutrients quickly
- may be dusty when dry
- may weather and stain concrete or other rocks reddish brown
- more expensive than other nutrients sources
- benefits are relatively unknown hence not widely available (low availability)