Soil
FACTSHEET

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SOIL pH

WHAT IS SOIL pH?

Soil pH refers to the degree of acidity or alkalinity of the soil. Figure 1, the pH scale, shows how pH numbers relate to acidity or alkalinity. The scale ranges from 1 to 14, pH 7.0 being the neutral point. A reading below 7.0 indicates the degree of acidity; a reading above pH 7.0 indicates the degree of alkalinity.

Soil pH is normally determined on all agricultural soil samples sent to soil testing laboratories in British Columbia.

Materials are available which when applied to the soil will change the pH to a point more favourable for crop production. These materials are referred to as soil amendments.

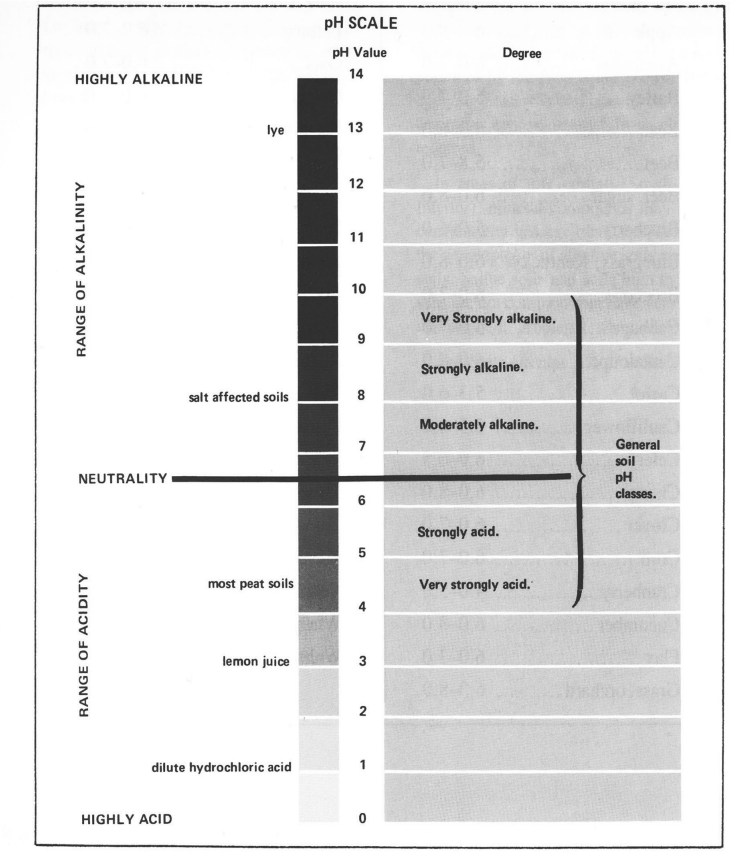

Figure 1 pH SCALE

SOIL pH PREFERENCE OF CROPS

Most crops will grow under a wider range of soil pH than is indicated by their preference. Table 1 indicates the typical pH ranges preferred by many crops grown in British Columbia. The addition of a soil amendment which changes the soil reaction to a more favourable range for a specific crop will result in better production, providing other good soil management practices are followed.

Lime or lime compounds (ground limestone, marl, hydrated lime) are the soil amendments used to raise the pH or reduce the acidity of the soil. Sulphur is used to lower pH or increase the acidity of the soil. In cases of extreme soil pH, response will not be great from the application of plant nutrients until an amendment has changed the pH more closely to that preferred by the plant. Growers are usually concerned with reducing acidity by applying lime.

In areas of high total rainfall (Lower Fraser Valley and Vancouver Island), elements such as calcium and magnesium tend to be washed from the soil resulting in an acid soil. The use of lime on such soils replaces the lost calcium and raises the pH to a range preferred by the crop being grown. Before applying lime, the soil should be tested to determine approximately how much will be required.

In areas of low rainfall (South Central Interior), mineral compounds may become concentrated in large quantities, leading to the development of alkaline soils and saline soils. Saline soils and soils high in sodium salts are not common, but have very serious management problems when they occur.

Table 1 SOIL pH PREFERENCE OF VARIOUS CROPS

Berry Crops: Strawberry, Blueberry, Raspberry	5.0-6.0
Cereal Grains: Barley, Flax, Oats, Rye, Wheat	6.0-7.0
Cole Crops: Broccoli, Cabbage	6.0-7.0
Cauliflower	5.5-6.6
Cranberry	4.0-5.0
Forage Grasses: Redtop, Timothy	6.0-7.0
Kentucky Bluegrass, Orchard Grass	6.0-8.0
Forage Legumes: Alfalfa, Alsike Clover, Clover, Vetch	6.0-7.0
Tree Fruits and Grapes: Apple, Peach, Pear, Plum, Cherry	6.0-8.0
Vegetables: Lettuce, Asparagus, Onion, Tomato, Corn	6.0-7.0
Spinach	6.5-7.0
Celery	6.0-6.5
Bean, Carrot	5.3-6.0
Potato	4.8-5.4
Cantaloupe, Cucumber, Common Pea, Kale, Parsnip, Turnip, Sugar Beet	6.0-8.0
Beet	5.8-7.0
Walnut	6.0-8.0

SOIL pH INFLUENCE ON AVAILABILITY OF NUTRIENTS

Another very important effect of soil pH is in relation to the availability of plant nutrients. The pH of the soil solution governs the solubility and therefore the availability of plant nutrients. The element may be present in the soil in relatively large amounts but due to the unfavourable pH is "tied up" or unavailable. Figure 2 illustrates the relationships established between pH and the availability of the various plant nutrients elements considering both direct and indirect effects.

Each element is represented by a band as labelled. The width of the band at any particular pH value indicates the relative favourability of this pH value to the presence of the elements in readily available forms; the wider the band, the more favourable the influence. The total amount present is not necessarily indicated by additional factors, such as cropping, fertilization and the chemical composition of soil minerals.

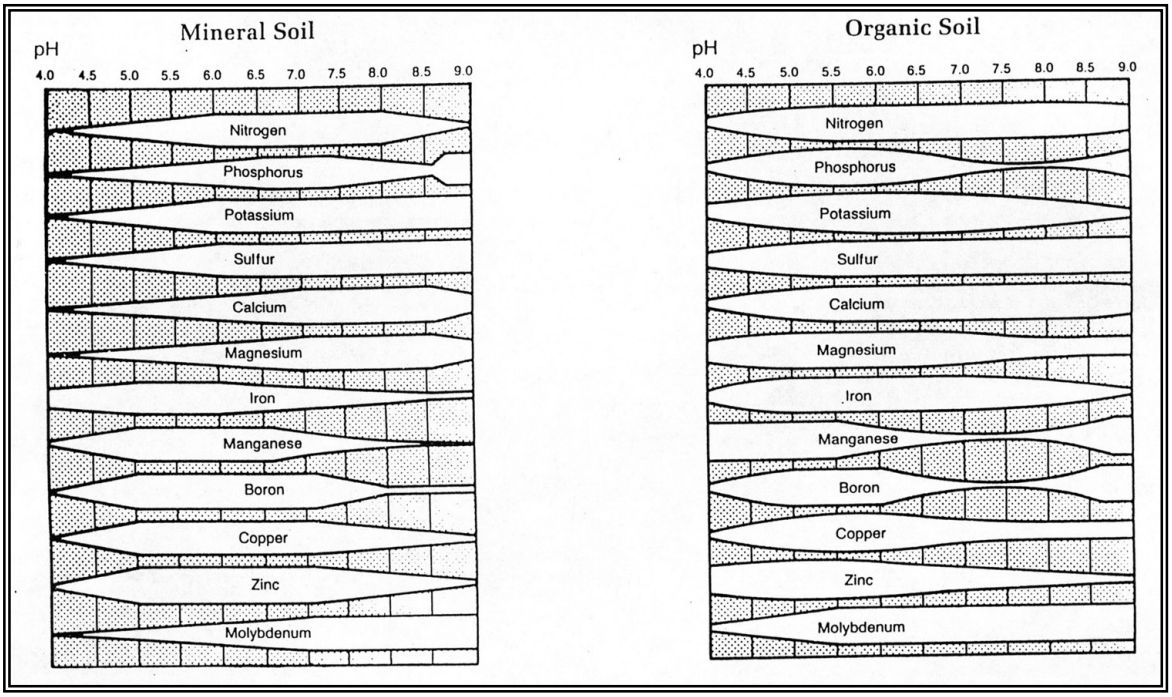

Figure 2 HOW SOIL pH AFFECTS AVAILABILITY OF NUTRIENTS

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