Soil Health - pH

Crop Yields Relative to pH

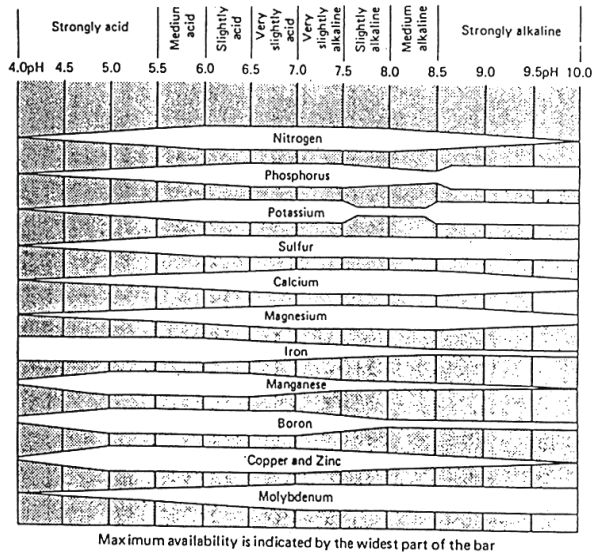
Crop	Soil pH				
	4.7	5.0	5.7	6.8	7.5
	Relative Yield				
Corn	34	73	83	100	85
Wheat	68	78	89	100	99
Soybeans	65	79	80	100	93
Oats	77	93	99	98	100
Barley	0	23	80	95	100
Alfalfa	2	9	42	100	100
Timothy (grass)	31	47	66	100	95

Soil pH is an excellent indicator of the suitability of a soil for plant growth. For most crops, pH of 6 to 7.5 is optimal.

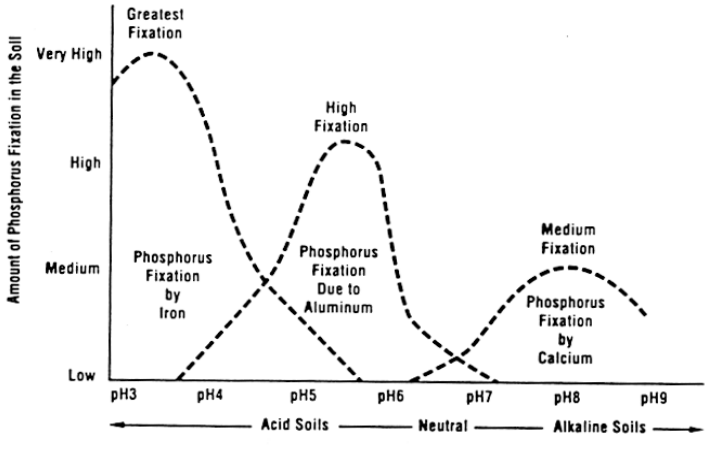
Soil pH levels that are too high or too low lead to a deficiency of many nutrients, decline in microbial activity, decrease in crop yields, and deterioration of soil health.

Reaction (pH)

Descriptive Term	pH Range
Ultra Acid	< 3.5
Extremely Acid	3.5 to 4.4
Very Strongly Acid	4.5 to 5.0
Strongly Acid	5.1 to 5.5
Moderately Acid	5.6 to 6.0
Slightly Acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly Alkaline	7.4 to 7.8
Moderately Alkaline	7.9 to 8.4
Strongly Alkaline	8.5 to 9.0
Very Strongly Alkaline	> 9.0



Relationship between the availability of plant nutrients and soilpH (National Soil Survey Manual, USDA, NRCS).



Availability of phosphorus relative to pH (California Fertilizer Association, 1995).

Soil Health - pH

Measuring Soil pH

Materials needed:

Soil Probe and plastic container
1/8 cup (29.5 mL) measuring scoop
Squirt bottle
Distilled water or rainwater
Calibrated 120mL vial with lid
Roll of pH test strips
Pen, notebook, permanent marker
Resealable plastic bags

Procedure - In-Field Hand Test:

1. Using a soil probe, gather at least 10 small samples to a depth of 8 inches or less randomly from an area that represents a particular soil type and management history. Place samples in the plastic container. Do not include large stones and plant residue. Repeat this step for each sampling area.

2. Neutralize hands by rubbing moist soil across palms. Discard soil.

3. Place a scoop of the mixed soil in palm, and saturate with “clean” water (distilled water or rainwater).

4. Squeeze hand gently until a soil and water slurry forms.

5. Touch tip of piece of pH test strip 1 inch long to the soil and water slurry. Leave until the liquid is drawn up at least 1/4 to 1/2 inch beyond the area covered by the soil.

6. Compare the color approximately 1/3 up the strip to the color chart on the test strip dispenser. Record soil pH and interpretations.

Procedure - 1:1 Soil to Water Test:

1. Soil sampling should be completed as instructed in Step 1 under “In-field hand test.”

2. Fill scoop (29.5 mL) with the mixed soil, tamping down during filling by carefully striking scoop on a hard, level surface. Place soil in vial. Add one scoopful (29.5 mL) of water to the vial, resulting in a 1:1 ratio of soil to water, on a volume basis.

3. Tightly cap the vial and shake 25 times. Let settle for 1 minute. Remove lid, and carefully decant 1/16 inch of soil and water slurry into lid. Allow to settle for 2 to 3 minutes.

4. Immerse tip of piece of pH test strip 1 inch long into soil and water slurry. Leave until liquid is drawn up at least 1/4 to 1/2 inch beyond area covered by soil.

5. Compare the color approximately one-third up the strip to the color chart on the test strip dispenser (fig. 5). Record soil pH and interpretations (table 2).

Considerations:

Electrical conductivity should always be measured on a sample before measuring pH. Soil pH levels can be measured using the steps in the above paragraphs.