

In-Service Training 2012: The Second Generation (G2) of Best Management Practices (BMPs) for Crop Production

pH management via nitrogen fertilization

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How to lower soil pH?

- **Sulfur fertilization:**

1. Effective time, only a few months
2. Extra cost
3. Organic mercury

- **Peat moss application:**

1. Need tons of peat moss
2. Extra cost

- **N fertilizer selection:**

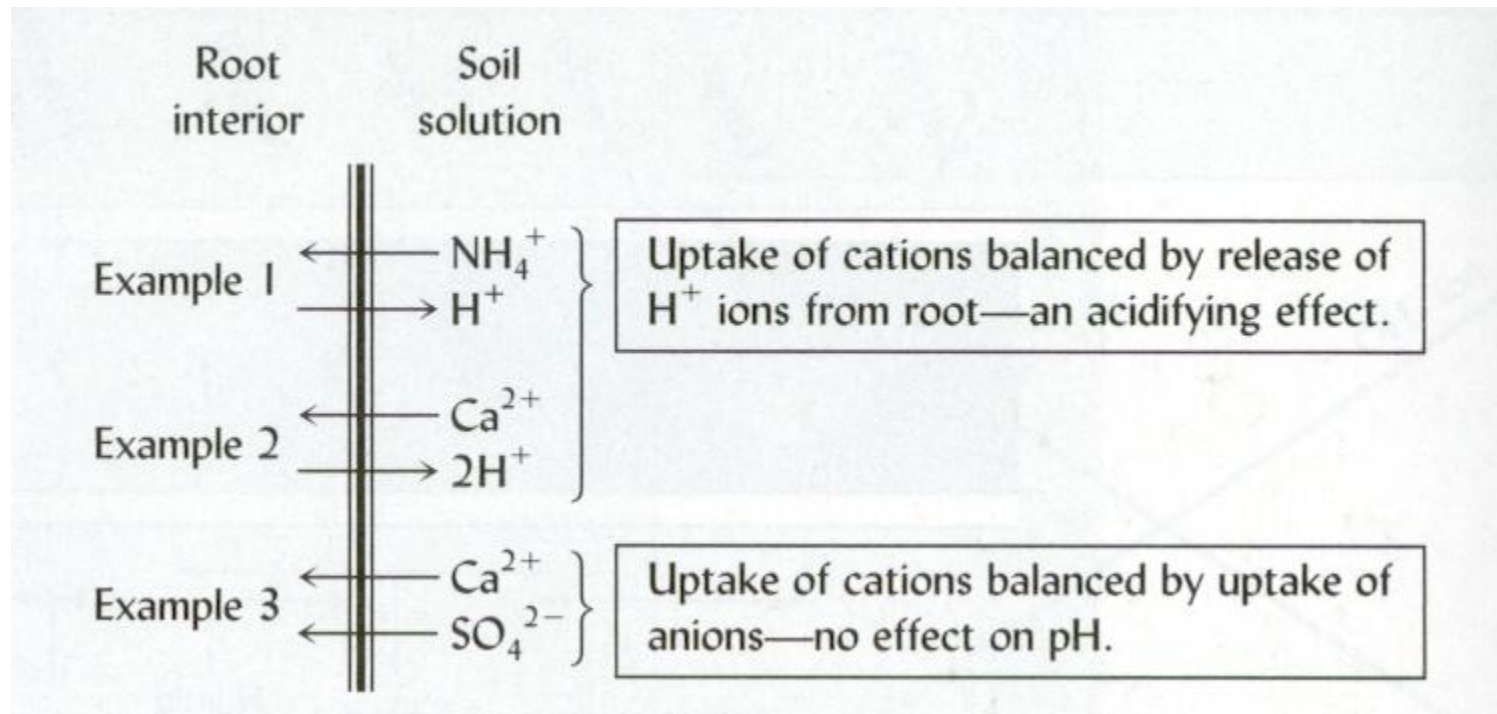
1. No extra cost
2. Easy to perform

How to select a right N fertilizer?

- Two N types:
 1. Highly oxidized: NO_3^- , negatively charged
 2. Highly reduced: NH_4^+ positively charged
- Plant cells need to keep electronically neutral:
 1. Exchange NO_3^- ions with hydroxides (OH^-)
 2. Trade NH_4^+ ions with protons (H^+)

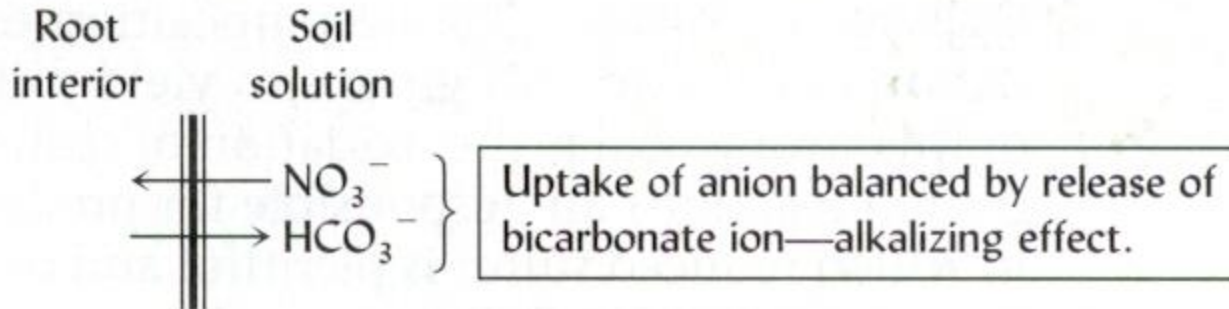
pH-lowering N fertilizers

- Ammonium sulfate
- Ammonium phosphate
- Urea



pH-increasing N fertilizers

- Sodium nitrate
- Calcium nitrate
- Potassium nitrate



Soil pH management

- Management of root zone pH rather than plough layer pH
- Selection of fertilizer type
- Fertilization method
- Irrigation method

Yellow: pH5.2
Red: pH6.0



NO_3^- : soil pH ↑
 NH_4^+ : soil pH ↓



Demonstration of pH management

- Qualitative demonstration:
 1. pH in situ mapping on snap bean roots with the two types of N fertilizers
- Quantitative demonstration:
 1. pH quantification of acidification or alkalization with of snap bean roots with the two types of N fertilizer

Results of the demonstration

Three hours later, show the results

1. pH in situ mapping
2. pH quantification

