

## Nutrients and Such

### Summary

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#### The Moral of the Story:

- Test your soil
- Add compost during soil preparation
- Use organic fertilizers

#### 16 ESSENTIAL NUTRIENTS

Major nutrients needed in large quantities

Minor nutrients needed in small quantities

The lack of any nutrient can become a limiting factor for growth

#### MAJOR NUTRIENTS (aka macronutrients)

##### Primary major nutrients

Carbon                      Plants get from air and water  
Hydrogen  
Oxygen

*www.njaes.rutgers.edu/pubs*

Nitrogen                      Plants need these in large quantities  
Phosphorus                      the soil is often short of them  
Potassium

*plants use inorganic form*

*high insoluble → out to bay*

*leeches out of soil - promotes winter hardiness*

##### Secondary major nutrients

Calcium                      Plants get from lime  
Magnesium                      Soiltesting  
Use calcitic lime for low Ca  
Dolomitic lime if need Mg

Sulfur                      Get from air pollution & organic materials  
S fertilization becoming more necessary as industrial  
pollution is cleaned up

#### MINOR NUTRIENTS (aka micronutrients) BCCIMMZ

Boron  
Chlorine                      Need minors in minute quantities; too much toxic  
Copper                      Proper liming keeps minors available but not toxic  
Iron  
Manganese                      Organic matter is a source of micronutrients  
Molybdenum  
Zinc

# Nutrients and Such (Missing pages)

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See RCRE website [www.rcre.rutgers.edu/pubs](http://www.rcre.rutgers.edu/pubs) for fact sheets

MAJOR NUTRIENTS Nitrogen, Phosphorus, Potassium

## NITROGEN

- Large quantities needed, especially by turfgrasses
- Exists in the soil in multiple forms, many of them unavailable to plants
- Inorganic forms leach rapidly & volatilize into the air

Organic N is converted by microbes into inorganic N before plants can use

Natural and synthetic organic fertilizers release N slowly

- Increase time of N availability to plants
- Prevent water pollution
- Use fertilizers with at least 50% slow release N

## PHOSPHORUS

- Regularly fertilized soil often has too much
- Won't hurt plants
- Becomes water pollutant

## POTASSIUM

- Leaches out of the soil      Often low in sandy soil
- Promotes winter hardiness
- But maintain adequate levels year round

## CALCIUM AND MAGNESIUM

Supplied through proper liming

## NPK RATIO

- Law says all fertilizer must tell how much actual nutrients are in bag
  - 5-10-10 contains 5% nitrogen, 10% phosphate, 10% potash
- Also tells ratio of nutrients in the bag
  - 5-10-10 fertilizer has NPK ratio of 1 part N to 2 parts each of P and K
  - The ratio is 1-2-2
  - 15-30-30 is same 1-2-2 ratio
  - Can use either fertilizer to put on the same amount of nutrients
  - Use three times as much 5-10-10 as you would of 15-30-30
- Close ratios considered equivalent      Soil can buffer small differences
  - Example, 10-6-4 is close to a 2-1-1 ratio
  - 10-6-4 same ratio as 20-10-10
  - Use half as much 20-10-10 as 10-6-4

## FERTILIZER TIMING

Organics need warm, moist soil      Inactive in cold soil  
 November application supplies spring nutrients  
 Utility turf—if fertilize once a year, fertilize in September

Avoid early spring fertilization

TURF-- 3 times a year schedule: Memorial Day, Labor Day and Thanksgiving

4 times a year schedule: add in October

Avoid summer fertilization

Use low rate if must fertilize

Irrigate to maintain constant moisture in soil

BROADLEAFED—Late spring-mid summer

When roots in active growth

## BORON

Leaches out of sandy soil      Often deficient

What boron does for the plant:

Essential for cell division as the plant grows

Good pollination, fruit set and seed development

Translocation of sugars and starches

Synthesis of amino acids and proteins

Nodule formation in legumes so they can fix nitrogen

Regulation of carbohydrate metabolism

Easy to induce boron toxicity with excessive application

Boron availability influenced by:

Soil texture      Leaches from sandy soil

Organic matter releases boron

Soils with low OM may be low in boron

Soil pH above 7.0, boron becomes less available

Drought stress induces boron deficiency because microbes less active

Sandy soil with high boron, B can become toxic in a drought

## GYPSUM

Calcium sulfate       $\text{CaSO}_4$

Three ways you might use gypsum

1. If pH is ok, but calcium is low

Gypsum does not change pH

2. To flocculate clay

Increases pore space and improves drainage

3. To remove salt from soil

Proper liming will lower iron availability

## Recommendations

### Lime

30 lbs of lime per 1000 sq ft to raise pH to 6.0 – 6.5

Split into spring and fall applications if pH is below 5.5

Repeat pH test in a year

Sample top 1-2" separately from lower 4-6"

Test with pH meter or \$2 at the local RCRE office

Whitesville Rd, Toms River

### Fertilizer recommendations

No phosphorus

Amounts are small, hard to spread evenly

Could look for mixed fertilizer to supply same amount of nutrients

Also gives you recommendations for BMPs in care of turf