



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*

Manures , Fertilizers and Soil Fertility Management

08. Micronutrient fertilizer

Edited by Monisankar Bera



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

08.1 Micronutrient fertilizers

Beyond the basic three essential nutrients, Nitrogen, Phosphorous and Potassium (NPK), other requirements for plant growth and soil health are the secondary nutrients (S, Ca, Mg) and also micronutrients, which include iron, manganese, zinc, boron, molybdenum and copper.



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

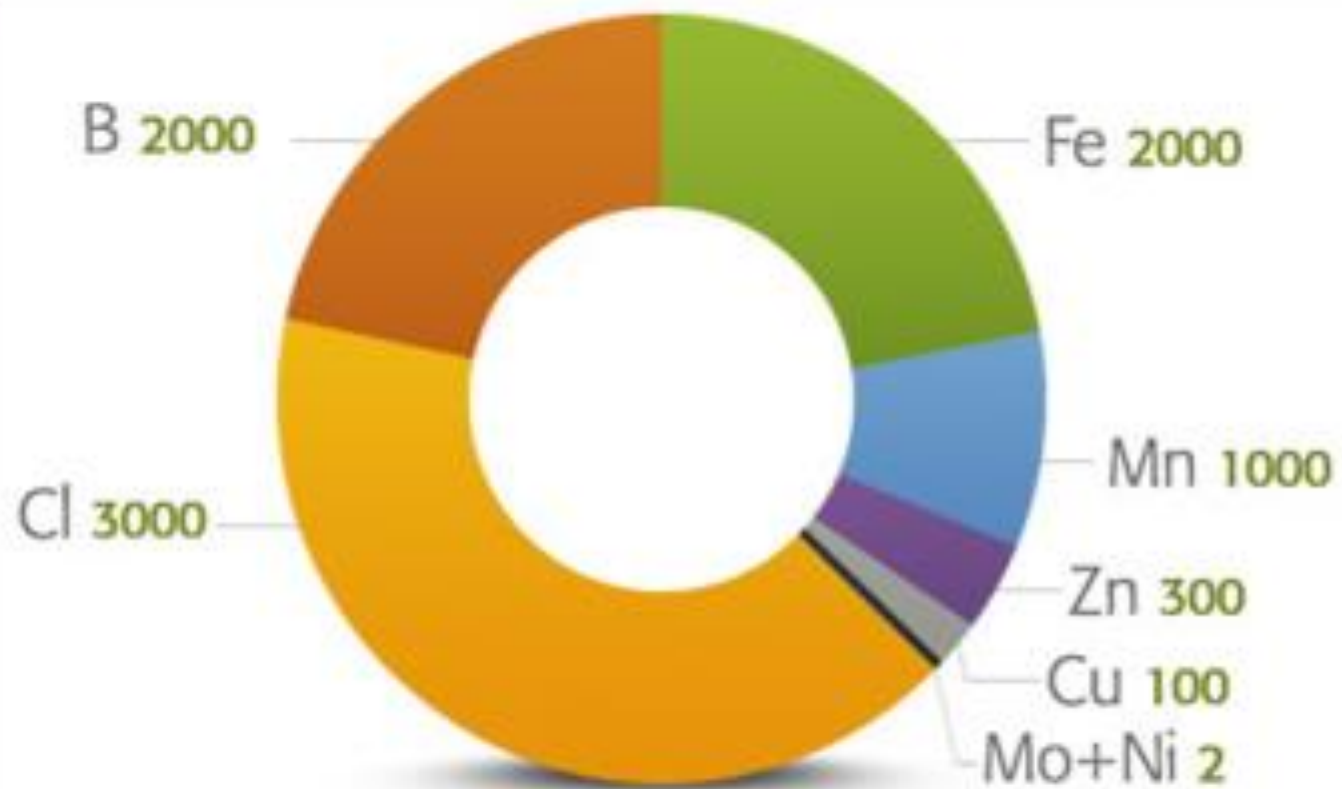
08.2 MICRONUTRIENT NUTRITION

- Through increased use of soil testing and plant analyses, micronutrient deficiencies have been verified in many soils. Some reasons limiting the incidental additions of micronutrients include:
- High-yield crop demands remove micronutrients from the soil
- Increased use of high-analysis NPK fertilizers containing lower quantities of micronutrient contaminants
- Advances in fertilizer technology reduce the residual addition of micronutrients.



Centurion
UNIVERSITY

*Shaping Lives...
Empowering Communities...*



Values are relative concentrations.

Micronutrients are just as important as macronutrients, but the amount required is very small.

Source: IPNI



Centurion
UNIVERSITY

08.3 Iron fertilizers

These are generally water soluble substances, predominantly sprayed as foliar nutrients on the crops.

Plants absorb iron in the form of Fe^{2+} .

Commonly used iron fertilizers are as follows.

Ferrous sulphate
($FeSO_4 \cdot 7H_2O$)

It is a water soluble fertilizer containing 20 %
Fe

Fe-
Chelates

Fe-EDTA
Fe-EDDPA

Suitable for application as foliar nutrients



Centurion
UNIVERSITY
*Shaping Lives...
Empowering Communities...*

08.4 Manganese fertilizers

The manganese (Mn) fertilizers are as follows:

Manganous Sulphate
($\text{MnSO}_4 \cdot 7\text{H}_2\text{O}$)

It is the well known water soluble Mn fertilizer.

It is pink salt containing 24 % Mn.
It dissolves in water and is suitable for foliar application.

Mn – chelates (Mn – DTA)

It contains 13 % Mn.
It plays an important role in the crop fertilization.



08.5 Zinc fertilizers

Zinc (Zn) fertilizers play an important role in Zn deficient areas.

Zinc sulphate
($\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$)

It is water soluble whitish salt containing 23 % Zn.

It is applied as 0.5% foliar nutrient.

Its acidic action causes corrosion damage to plants

Zinc-oxide(ZnO)

It contains 70 % Zn.

It is slightly soluble in water

It is used as slow acting foliar nutrient



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

08.6 Copper Fertilizers

Copper fertilizers have been used to correct copper (Cu), deficiencies

Copper sulphate
($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)

It containing 25 % Cu.

Copper sulphate
($\text{CuSO}_4 \cdot \text{H}_2\text{O}$)

It containing 36 % Cu.



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

08.7 Boron Fertilizers

Boron fertilizers have been used to correct boron (B), deficiencies

Borax ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$)

It contains 11 % B

It is water soluble white salt

It can be applied as a soil dressing or foliar application

Boric acid
(H_3BO_3)

It contains 18 % B

It is a white crystalline powder

It is applied as a foliar nutrient



Centurion
UNIVERSITY
*Shaping Lives...
Empowering Communities...*

08.8 Molybdenum Fertilizers

Mo fertilizers have been used to correct molybdenum deficiencies

Sodium
molybdate
($\text{Na}_2\text{MoO}_4 \cdot 2\text{H}_2\text{O}$)

It contains 40 % Mo

Ammonium
molybdate
($\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$)

It contains 54 % Mo

1. These are water soluble salts which contain Mo
2. They are suitable for soil application and foliar application as well



Centurion
UNIVERSITY

Shaping Lives...
Empowering Communities...

Thank you