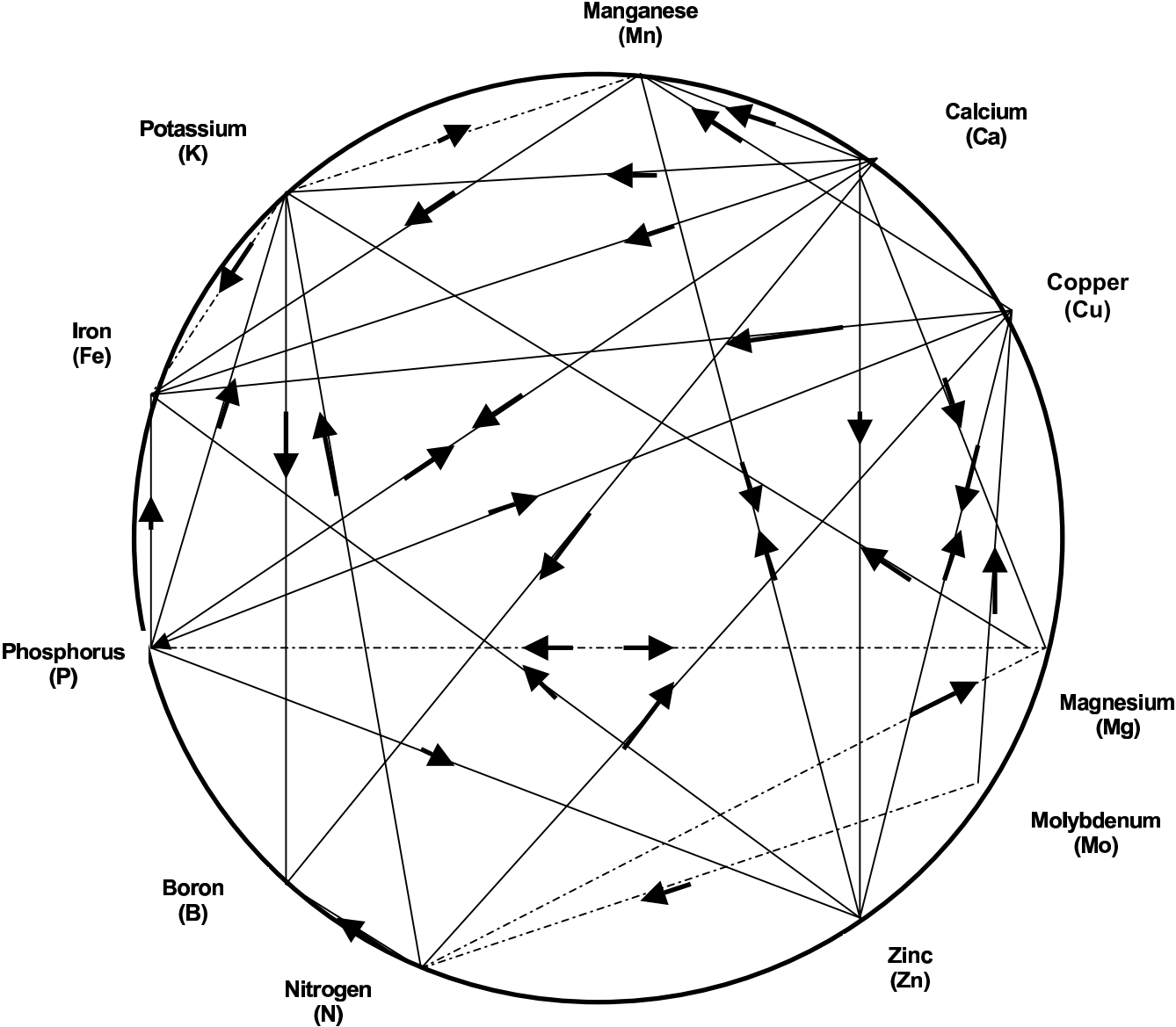


SOIL ANTAGONISM AND INTERACTION CHART



----- Interaction
 _____ Antagonism

NUTRIENT ANTAGONISM AND INTERACTION

NITROGEN

When high levels of Nitrogen induce accelerated growth rates, levels of micronutrients that would normally be marginal can become deficient.

High soil levels of Nitrogen can assist Phosphorus, Calcium, Boron, Iron and Zinc but an excess can dilute these elements.

Low soil levels can reduce Phosphorus, Calcium, Boron, Iron and Zinc uptake.

Ammonium Nitrogen can make Molybdenum deficiency appear less obvious.

PHOSPHORUS

High levels of Phosphorus reduce Zinc and, to a lesser degree, Calcium uptake. It is antagonistic to Boron in low pH soils.

POTASSIUM

High levels of Potassium reduce Magnesium and to lesser extent Calcium, Iron, Copper, Manganese and Zinc uptake. Boron levels can either be low or toxic.

Low levels can accentuate Iron deficiency.

CALCIUM

High levels of Calcium can accentuate Boron deficiency. Liming can decrease the uptake of Boron, Copper, Iron, Manganese and Zinc by raising soil pH.

COPPER

High levels of Copper can accentuate Molybdenum and to a lesser degree Iron, Manganese and Zinc deficiency.

IRON

Iron deficiency can be accentuated by liming, low Potassium levels or high levels of Copper, Manganese or Zinc.

MANGANESE

High levels of Copper, Iron or Zinc can accentuate Manganese deficiency – especially repeated soil applications of Iron. Uptake can be decreased by liming or increased by Sulfur applications (because of the effects on pH)

MOLYBDENUM

Deficiencies can be accentuated by high levels of Copper and to a lesser degree Manganese. Uptake can be adversely affected by sulfates. Uptake can be increased by phosphates and liming.

Molybdenum can increase Copper deficiencies in animals.

ZINC

Uptake can be decreased by high Phosphorus levels, liming or high levels of Copper, Iron or Manganese. Zinc deficiencies are often associated with Manganese deficiencies, especially in citrus.