1) **Arsenic (As)** is not translocated into fruit parts. High Phosphorus levels may be an indicator of additional As available in the soil. Stone fruit trees are less tolerant than pome fruit. Ornamentals have a very low tolerance to As. Grass is unaffected.

2) **Calcium & Magnesium (Ca & Mg)** should be interpreted relative to each other, therefore, a ratio should be used. This ratio is usually dependent on soil type and organic matter. Optimal ratios for *Calcium and Magnesium*.

   - Coarse or Sandy soils \( \text{Ca: Mg} = 2:1 \)
   - Medium or Loam soils \( \text{Ca: Mg} = 5:1 \)
   - Heavy or Clay soils \( \text{Ca: Mg} = 10:1 \)

Magnesium (Mg) or Potassium (K) should never exceed Calcium. A soil with low pH, low % organic matter and a coarse soil texture can be expected to have low Calcium and Magnesium levels. If Potassium levels are excessive then a Mg or Ca deficiency could occur. If K:Mg ratio exceeds 3:1 a deficiency may occur.

Convert Mg to ppm: \( \text{Mg meq/100g} \times 120 = \text{ppm Mg} \).

3) **Nitrate Nitrogen (NO3N)** levels are dependent on time, rate and type of fertilizer last applied. Additional variables include rate and frequency of irrigation schedule as well as soil type and level of organic matter. This element should be maintained at moderate levels, excessive nitrate root zone has the potential for groundwater contamination once it leaves the root zone. Drinking water cannot exceed 10 ppm. Under a low pH regime residual Nitrate Nitrogen may be held unavailable due to an unfavorable atmosphere for beneficial bacteria to continue nitrogen breakdown activities. Lime applications may release residual NO3N as the soil pH becomes more favorable for biological processes, in some cases with the addition of lime additional N fertilizers can be reduced or eliminated for a period of time.

4) **Manganese (Mn)** as well as other metals are pH dependent in their occurrence. Low pH (<4.5) will significantly increase the availability of these metals. An excessive Mn in apples may result in an disorder which blisters the bark.

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