PRECISION MANAGEMENT OF APPLE NUTRITION IN POOR AND VARIABLE SOIL FOR INCREASED YIELDS AND QUALITY

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CONTENT

- Introduction
- Poor performing patches in apple orchards
- Discussion of limiting factors
- Managing nutrition
- Summary
Three main apple growing areas in South Africa:

- Elgin Villiersdorp – 9700 ha
- Ceres – 6850 ha
- Eastern Cape – 5200 ha

Total – 23000 ha
Poor performing patches within the orchard and even trees that does not yield at optimum level will keep the average income down.
EFFECT OF NUTRIENT REGIMES ON FRESH ROOT WEIGHT OF SITKA SPRUCE TREES

MP COUTS & J.J. PHILIPSON, 1980 (Roslin, UK)
1. Factors influencing nutrition

- Cultivar
- Rootstock
- Plant Spacing
- Production
- Quality
- Climate:
  - Wind
  - Rainfall
- Soil type (Sand vs. Loam vs. Clay)
2. Factors influencing nutrition

- Stone content
- Soil conditions:
  - Temperature (Low and High)
  - Water content (Oxygen, Mass flow)
  - Soil preparation/mixing of fertilizers
  - Bulk density (Compaction)
  - pH / CE
- Irrigation:
  - Schedule
  - Type of system (drip vs. Flood)
3. Factors influencing nutrition

- Root density (Element mobility)
- Root distribution
- Root diseases/plaques:
  - Crown gall
  - *Phytophthora*
  - *Marcharodes*
  - Specific Replant Diseases
  - Nematodes
- Viruses – poor affinity
4. Factors influencing nutrition

- Soil analysis
- Leaf analysis
- Fruit analysis
- Foliar nutrition program
- Aspect (North vs. South)
- Type of fertilizer:
  - Urea
  - Ammonium nitrate
  - Organic source (mineralization)
5. Factors influencing nutrition

- Fertilizer placement
- Timing of fertilization
- Inter row management:
  - Cover crop (permanent or winter)
  - Chemical weed control
  - Mulching
- Mineralization/Fixation
FIRST ACTION IS TO IDENTIFY AND LIST THE REASONS FOR POOR TREE PERFORMANCE AND THEN TO PLAN THE MODE OF ACTION FOR ALEVIAION
SAMLPE WORK ROW AND TREE ROW IN REPLANT SITUATIONS
Compaction
Uneven chemical availability due to poor soil preparation
Nematodes have huge impact on nutrient and water uptake
PROTECT WHITE ROOT TIPS AGAINST NEMATODES
Affect of Soil moisture on nutrient uptake

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<th>CONDITION</th>
<th>UPTAKE (mg/tree)</th>
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<tr>
<td></td>
<td>K</td>
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<td>Saturated</td>
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WETNESS & TEXTURAL LAYERING WILL ALSO AFFECT NUTRIENT UPTAKE