Advanced Horticulture – Pest Management, Soil and Water Management

Potato

Potato – Plant Considerations

- Cool Season Vegetable
- Shallow Rooted, Sparse Fibrous Root System
- Vegetatively Propagated
- Disease Free Seed Necessary

Potato – Plant Considerations

- Moderate Total Water Needs
- Low Tolerance to Non-uniform Soil Moisture
- Poor Tolerance to Drought
- Medium Tolerance to Humidity
- Medium to High N and K Needs; Medium P

Potato – Soil Management Considerations

- Soil Types – Must be well drained

  Sandy – Warm up faster, Better Drained
  Require more frequent irrigation

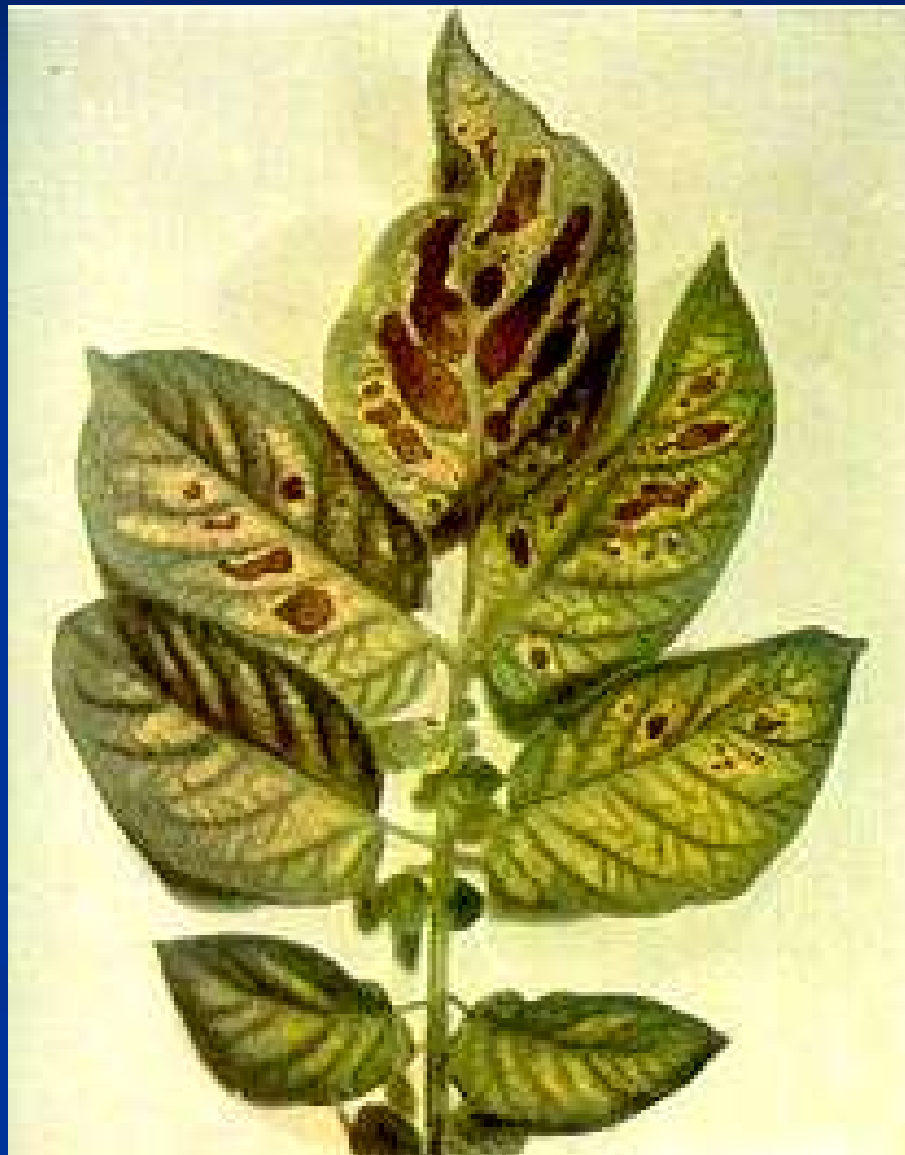
  Silt/Clay Loam –Higher Water Holding Capacity
  - More Susceptible to Excess soil water problems

Potato – N Deficiency

Potato – P Deficiency

Potato – K Deficiency

Potato – Mg Deficiency



Potato – Fe Deficiency

Potato – Water Management Considerations

- Shallow Rooted → Frequent Irrigations at low rates

- Frequency Factors:
  - Soil Type
  - Crop Growth Stage
  - Variety
  - Irrigation Method
    - Furrow/Sprinkler – 3 to 7 days
    - Drip – 1 to 3 days

Potato – Sprinkler Irrigation

Potato – Water Management Considerations

- Soil Salinity and Irrigation Water Salinity

- Lower Salinity → Less Frequent Irrigation, More Quantity each Irrigation
- Higher Salinity → More Frequent Irrigation, Less Quantity each Irrigation
- Potato Moderate Sensitivity to Salt
  - EC < 1.5-2.0 mmhos/cm (Soil)
  - TDS < 1,000 ppm (Water)

Potato – Water Management Considerations

- Very High Relationship Between Soil/Water Status and Disease Susceptibility

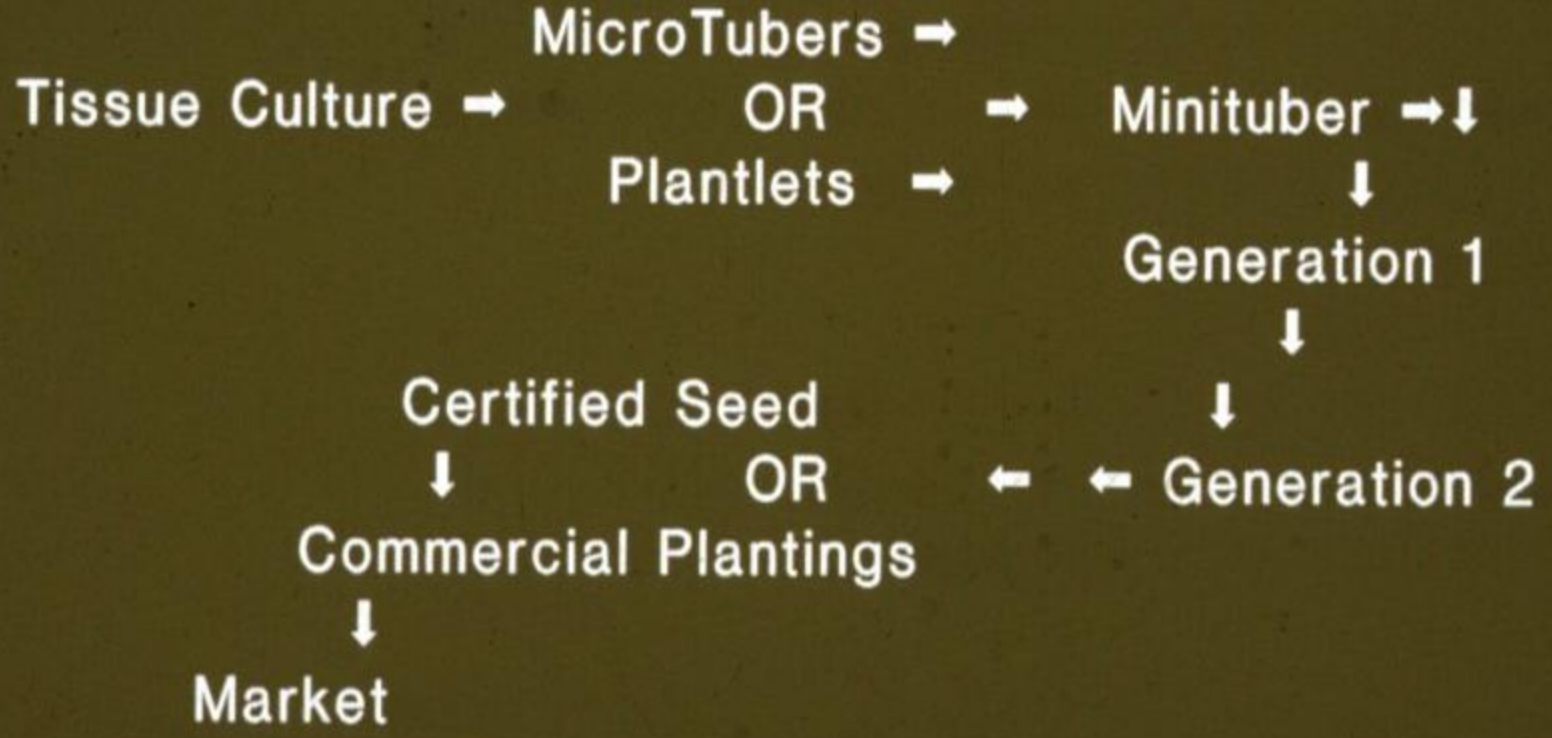
  - Stem and Vascular Diseases – Verticillium, Rhizoctonia
  - Foliage (stem, leave) Diseases – Viruses, Late Blight, Early Blight
  - Tuber Diseases – Scab, Pythium, Phytophthora,

Potato – Disease Management Strategies

- Avoidance and Prevention
  - Disease Free Seed
  - Sanitation
  - Crop Rotation
  - Proper Soil Tilth
  - Precise Water Management
  - Correct Nutrient Management

Potato Seed Piece Decay

SEED POTATO PROGRAM WITH TISSUE CULTURE ORIGIN



Potato – Disease Management Strategies

- Management and Control
  - Monitor for Diseases Frequently
  - Adjust Environment as Possible
  - Control / Manage Insects
  - Use Pesticides

Verticillium Wilt

Verticillium Wilt

Sclerotinia White Mold

Bacterial Soft Rot and Blackleg

Early Blight

Late Blight

Fusarium Dry Rot

Rhizoctonia Black Scurf

Pink Rot

Common Scab

Physiological / Non-pathogenic Diseases

- Examples – Growth Cracks, Second Growth, Hollow Heart

- Major causes – Water management, soil compaction, temperature fluctuations

Potato Pests - Nematode

- Microscopic roundworms - feed on plants by puncturing cells and sucking their contents.
  - Root knot : *Meloidogyne incognita*
  - Lesion : *Pratylenchus* spp.
  - Stubby root : *Trichodorus* sp. and *Paratrichodorus* sp.
  - Cyst – Globora spp

Root Knot Nematode

Nematode Management

- **Cultural Practices**
  - Crop rotation with non-susceptible crops
  - Deep plowing
  - Fallow
  - Flooding
  - Proper irrigation and crop nutrition

Nematode Management

- Resistant cultivars
- Disease Free Seed
- Monitoring
- Solarization?
- Treatment with Pesticide

Weed Management Components

- Monitoring - Knowledge of what weeds are present
- Weed Management Before Planting
- Weed Management At Planting
- Weed Management After Planting

Weed Management - Monitoring

- Monitoring - Knowledge of what weeds are present
- Conduct weed surveys on each field at least twice a year
- Note the location of weeds producing seed
- Examine field edges and ditch banks

Weed Management – Pre-Plant

- Crop Rotation
- Field preparation
- Soil solarization
- Herbicides

Weed Management – At Planting

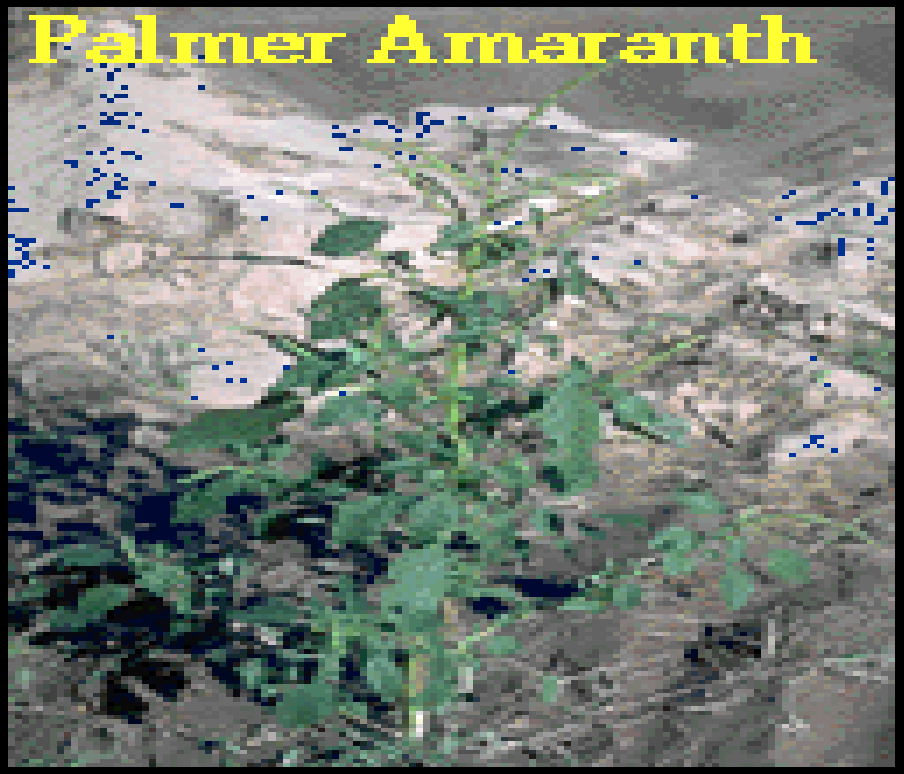
- Planting dates
- Cultivation
- Herbicides

Weed Management – Post-Plant

- Cultural practices
  - keep canal banks free of weeds
  - subsurface drip irrigation
  - maintain deep furrows
- Cultivation and hand-weeding
  - cultivate when weeds are small
  - risk of damage to roots, stolons and tubers
- Flaming
- Herbicides

Black Nightshade

Pigweed (Amaranthus)



London Rocket

Purple Nutsedge

THE UNIVERSITY OF CALIFORNIA

LET THERE BE LIGHT

1868