

Advanced Horticulture – Pest Management, Soil and Water Management

Tomato



Tomato – Plant Considerations

- Warm Season Vegetable
- Deep Rooted (Pepper and Eggplant – Medium Deep)
- Moderate Water Needs
- Low Tolerance to Excess Soil Moisture
- Medium to Good Tolerance to Drought
- Medium Tolerance to Humidity
- Low to Medium N, P, K Needs

Tomato – Soil Management Considerations

- Soil Types – Adaptable to Many
 - Sandy – Warm up faster, Better Drained
Best for early field planting
 - Clay Loam – Higher Yields, Higher Water Holding Capacity
 - More Susceptible to Root Diseases

Whole leaf and petiole nutrient sufficiency guidelines

Sufficiency range by growth stage

<u>Plant Part Nutrient</u>	<u>First Flower</u>	<u>Full Bloom</u>
Whole leaf	%N 4.6 – 5.2	3.5 – 4.5
	%P .32 - .49	.25 - .41
	%K 2.2 – 3.5	1.6 – 3.1
Petiole dry	ppm NO ₃ 8 – 12,000	4 – 8,000
	ppm PO ₄ 2,500-3,500	2 – 3,000
	%K 5 – 8	3 - 5

Whole leaf and petiole nutrient sufficiency guidelines

Sufficiency range by growth stage

<u>Plant Part</u>	<u>Nutrient</u>	<u>First Flower</u>	<u>Full Bloom</u>
Petiole Sap	ppm NO ₃	600 – 900	300 – 600
	%K	3 – 4,000	2,500-3,500

Potassium Deficiency



Tomato – Water Management Considerations

- Deep Rooted → Deep, Infrequent Irrigations
- Frequency Factors:
 - Soil Type
 - Crop Growth Stage
 - Variety
 - Irrigation Method
 - Furrow/Flood – 7 to 14 days
 - Drip – 1 to 3 days

Tomato – 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
- Tomato Moderate Tolerance to Salt
 - EC < 2.5 mmhos/cm (Soil)
 - TDS < 2,000 ppm (Water)

Tomato Furrow Irrigation



Tomato – Water Management Considerations

- Very High Relationship Between Soil/Water Status and Disease Susceptibility
 - Root Diseases – Phytophthora Root Rot
 - Foliage (stem, leave) Diseases – Late Blight, Early Blight
 - Fruit Diseases – Bacterial Speck,

Drip irrigation requirement between irrigations without inducing crop water stress

<u>Soil texture</u>	<u>Irrigation requirement (mm)</u>
sand	5.0 – 7.5
sandy loam	7.5 – 12.5
silt loam	12.5 – 18.0
clay loam	12.5 – 18.0
clay	10.0 – 15.0

Tomato – Disease Management Strategies

□ Avoidance and Prevention

- Resistant Varieties, including Root Stock**
- Cover Crops, Green Manure, Compost**
- Sanitation**
- Crop Rotation**

Tomato – Disease Management Strategies

□ Avoidance and Prevention

- Proper Soil Tilth**
- Precise Water Management**
- Correct Nutrient Management**

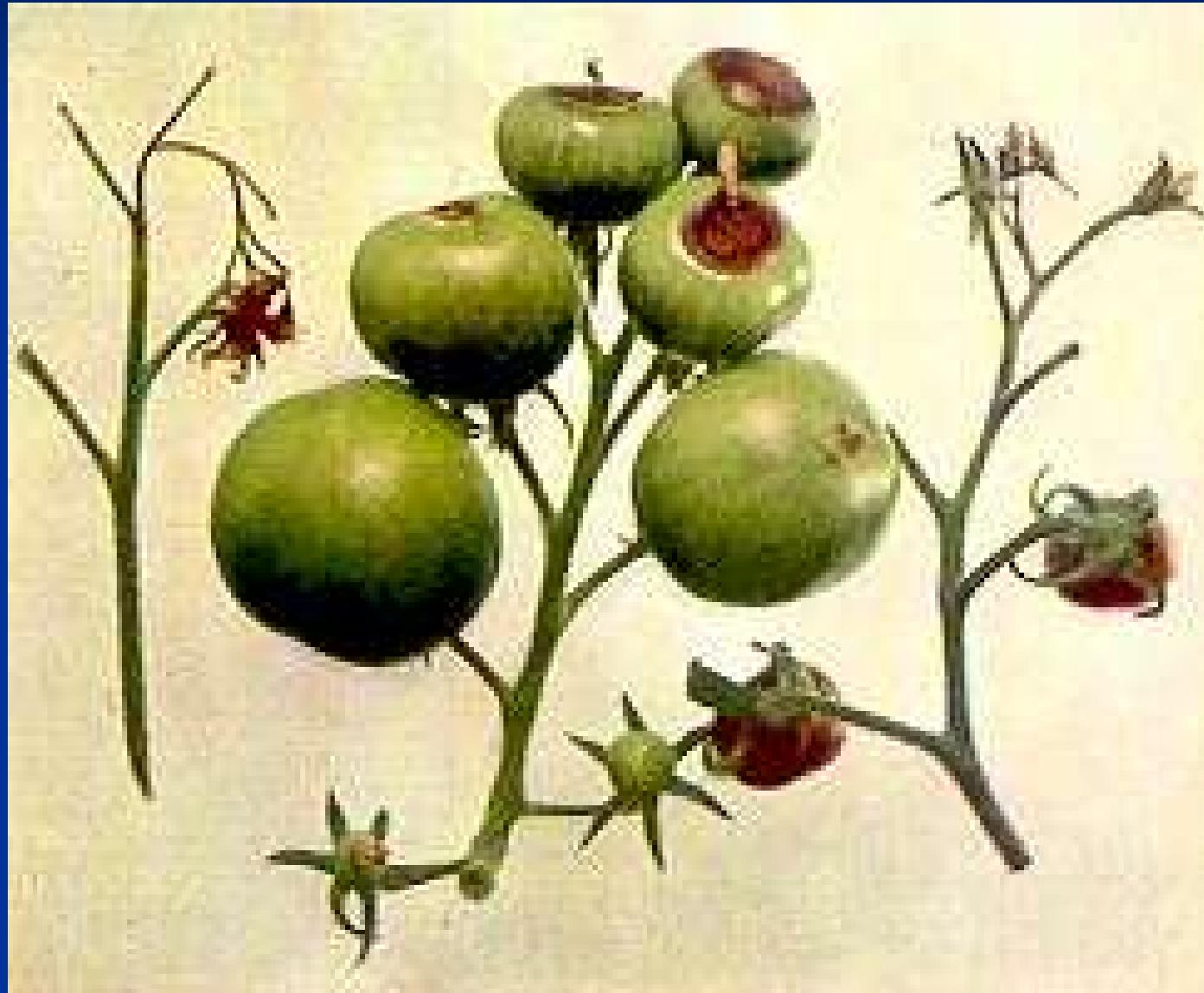
Tomato – Disease Management Strategies

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

Physiological / Non-pathogenic Diseases

- Examples – Blossom end rot, Catface / Cracking
- Major causes – Water management, soil compaction, temperature fluctuations

Blossom End Rot – Calcium Deficiency



Phytophthora Root Rot - Tomato





Phytophthora Root Rot

Phytophthora Root Rot



Tomato – Fusarium Wilt



Tomato – Fusarium Wilt



Tomato – Fusarium Wilt



Late Blight - Tomato



4.

Tomato Late Blight



Alternaria Rot



Tomato – Bacterial speck



Rhizopus Fruit Rot



Anthracnose Rot



Fusarium Rot





Late Blight - Tomato

Tomato Pests - Nematode

- Microscopic roundworms - feed on plants by puncturing cells and sucking their contents.
 - Root knot : *Meloidogyne incognita* and *M. javanica*
 - Lesion : *Pratylenchus* spp.
 - Stubby root : *Trichodorus* sp. and *Paratrichodorus* sp.
 - Needle : *Longidorus africanus*

Lesion Nematode



Nematode Management

□ Cultural Practices

- Crop rotation with non-susceptible crops
- Deep plowing,
- Fallow, and
- Destroy susceptible weed hosts
- Proper irrigation and crop nutrition

Nematode Management

- Resistant cultivars
- 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
- Transplanting

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
 - Eliminate plants that have dodder attached
- Flaming
- Herbicides

Dodder on Tomato



Flowers



Mature dodder

Black Nightshade



Black nightshade berries



Mature plant



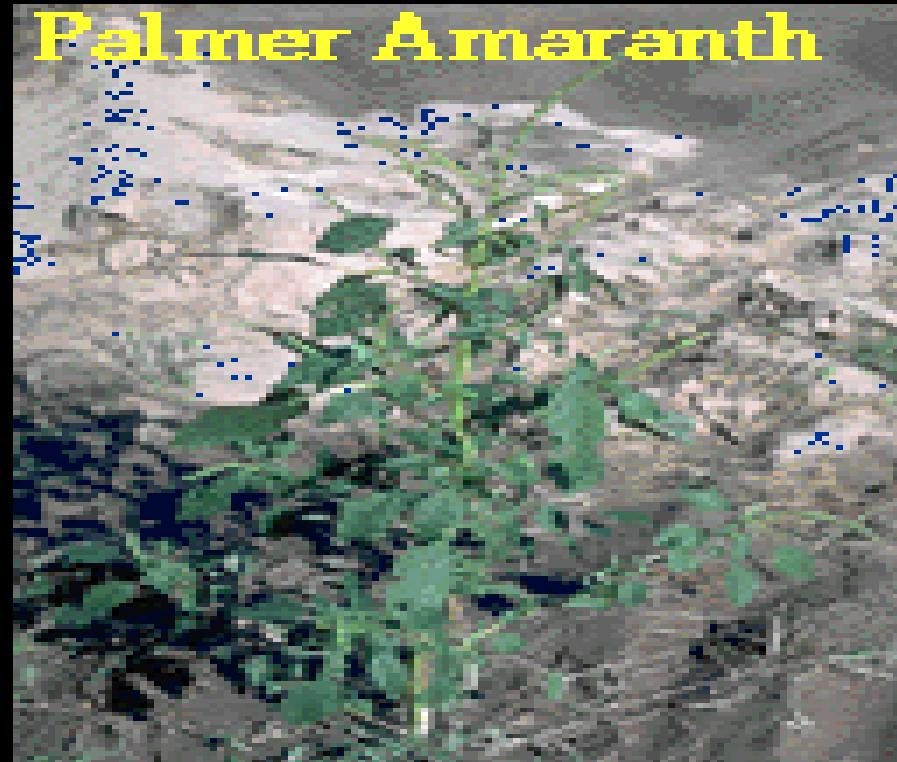
Seedling

Pigweed (*Amaranthus*)

Tumble pigweed



Palmer Amaranth



Redroot pigweed



Prostrate pigweed



London Rocket



Seedling



Flowers



Mature plant

Purple Nutsedge

Yellow nutsedge tubers

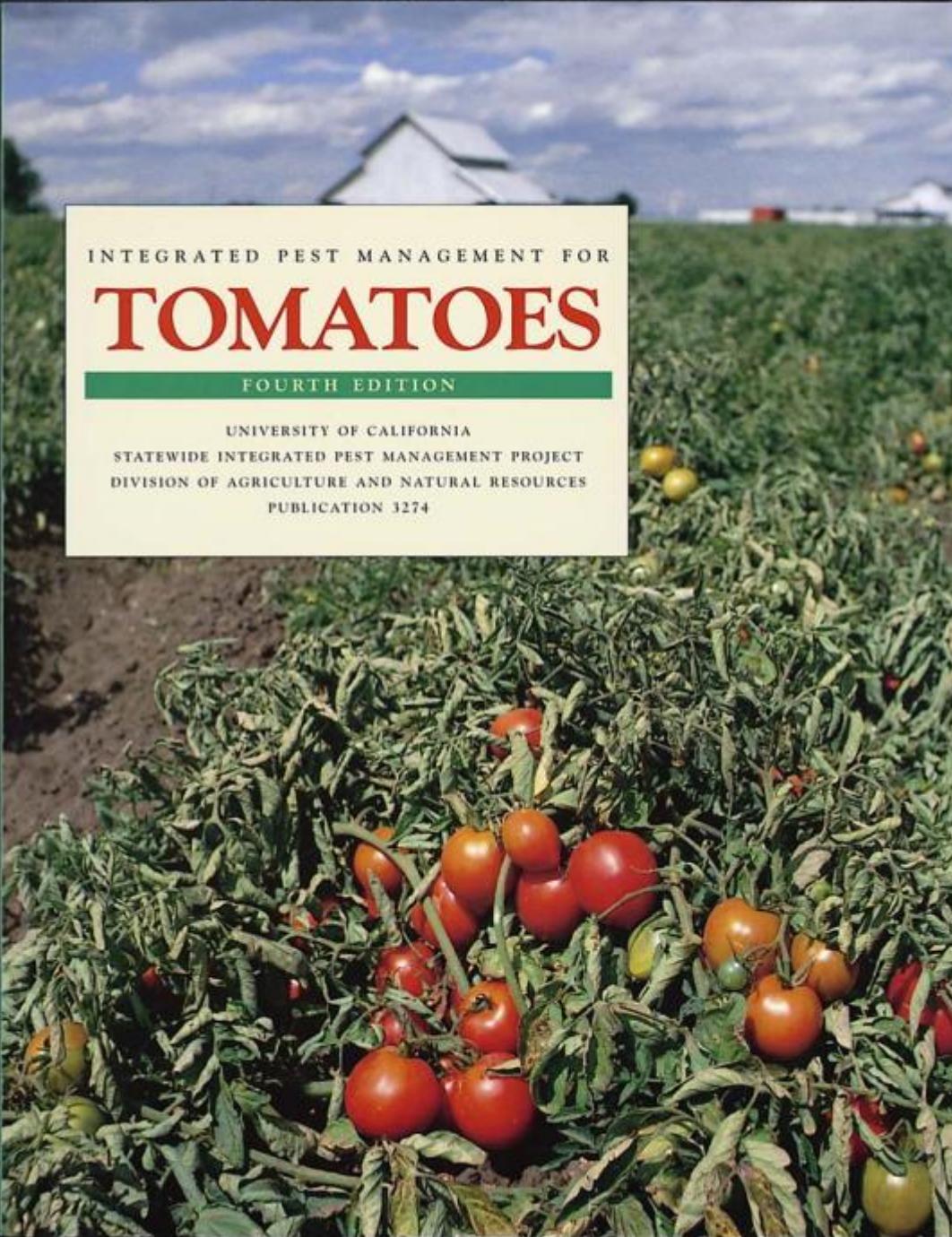


Nutsedge flower



Young plant





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