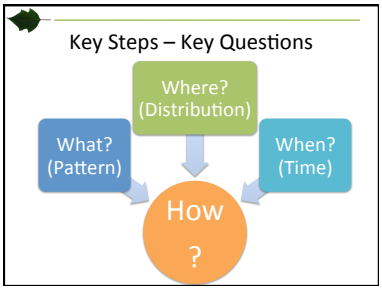
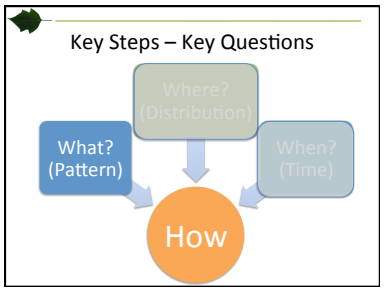
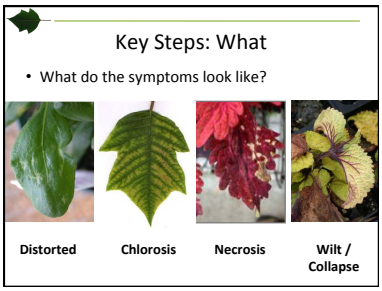
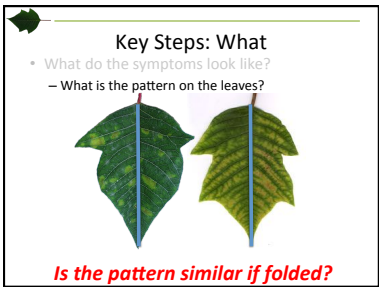
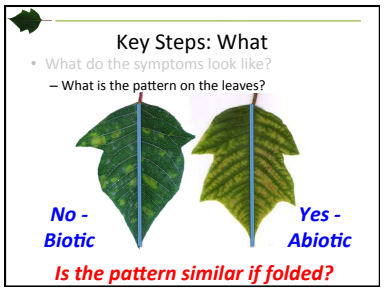
Plant Diagnostics – B Whipker NCSU

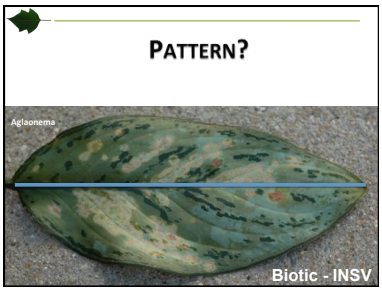






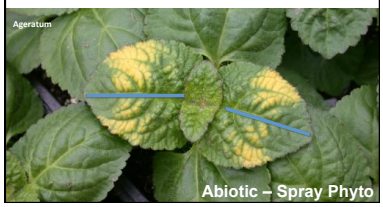




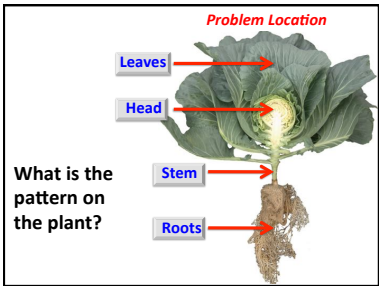


Plant Diagnostics – B Whipker NCSU

PATTERN?

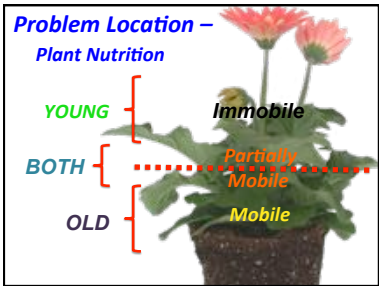


Problem Location

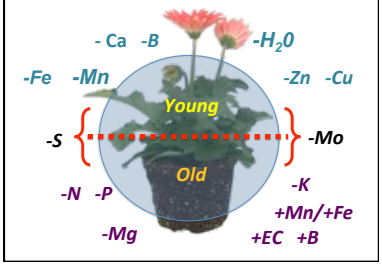


What is the pattern on the plant?

Problem Location – Plant Nutrition



Problem Location – Plant Nutrition



Key Steps: What

- What do the symptoms look like?
  - What is the pattern?
  - What problems occur with the plant?

What to look out for

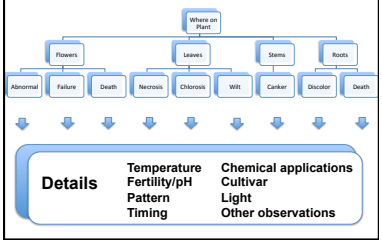
- Experience
- Technical guides
- Web searches
- Reference books

Lobularia Disorders

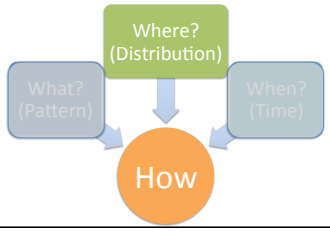
Disease	Insect	Nutritional	Physiological
Club root	Diamondback moth	Nitrogen	Water stress – lower leaf yellowing and necrosis
*Pythium**	Leafminers	Magnesium	Low temperature stress – lower leaf purpling
Rhizoctonia*	Leafhoppers	Phosphorus	Frost/Freeze damage
Botrytis*	Tarnish plant bug	Iron (high pH)	Insecticide phytotoxicity – flowering ceases, distorted growth
Downy mildew*	Slugs	Boron	PGR overdose - flowering ceases, distorted growth
	Cyclamen mite*	Sulfur	Leggy growth – low light
Fasciation*		Low EC	Stretched growth – no 2nd pinch
		High EC	Stretched growth – need PGRs

* Listed for seed sweet alyssum, not specifically 'Snow Princess'

Decision Tree



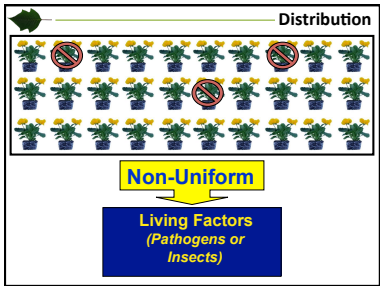
Key Steps – Key Questions

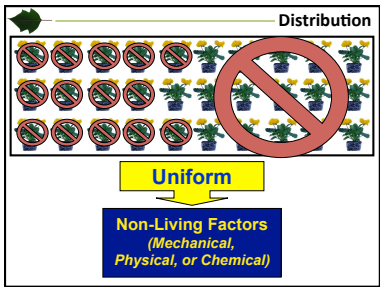


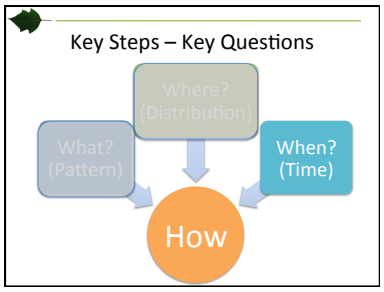
Key Steps: Where

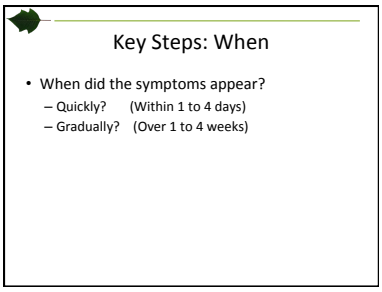
- Where are the symptoms?
  - Distribution within the greenhouse / bed?

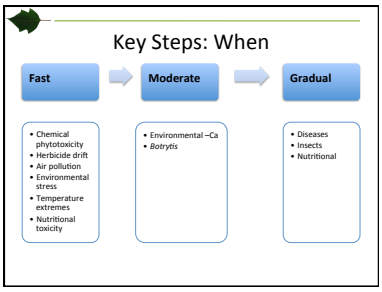
Plant Diagnostics – B Whipker NCSU











Plant Diagnostics – B Whipker NCSU

Key Steps: When

- When did the symptoms appear?
  - Quickly? (Within 1 to 4 days)
  - Gradually? (Over 1 to 4 weeks)

Key Steps: When

- When did the symptoms appear?
  - Quickly? (Within 1 to 4 days)
  - Gradually? (Over 1 to 4 weeks)

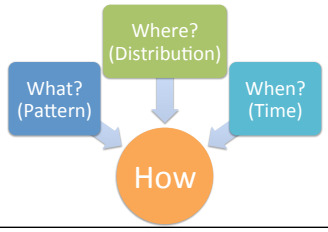
High pH (Iron Deficiency)

Initial: *Slight interveinal chlorosis of recently matured leaf*

Moderate: *Interveinal chlorosis more pronounced, spread to other leaves*

Advanced: *Bleached (white) interveinal chlorosis*

Key Steps – Key Questions



What Problems Commonly Occur?

- Determine what the common *(nutritional, physiological, disease, insect)* problems are for the plant.
  - Assign probabilities
  - Goal: being able to identify the most common ones.

Gerbera Disorders

Disease	Insect	Nutritional	Physiological
Alternaria leaf spot	Aphids	Nitrogen deficiency	Bent neck
Ascochyta leaf spot	Broad/Cyclamen mite	Phosphorus deficiency	Hastened senescence
Botrytis	Caterpillars	Iron deficiency (high pH)	Non-uniform flowering
Fusarium wilt	Fungus gnats	Magnesium deficiency	
INSV / TSWV virus	Leafminers	Iron/Manganese toxicity (low pH)	
Phyllosticta leaf spot	Slugs	Boron deficiency	
Phytophthora	Spider mites	High EC	
Powdery mildew	Thrips		
Pseudomonas leaf spot (bacterial)	Whitefly	Potassium deficiency	
Pythium		Sulfur deficiency	
Rhizoctonia solani		Calcium deficiency	
Rhizopus blight		Copper deficiency	
Sclerotinia		Manganese deficiency	
Thielaviopsis		Zinc deficiency	
Verticillium wilt		Iron toxicity	

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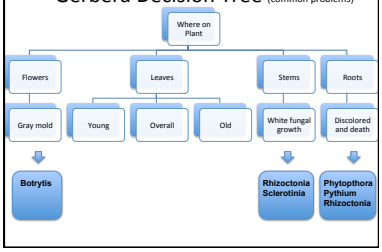
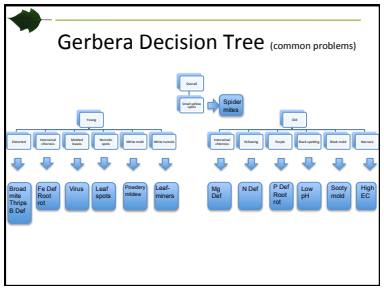
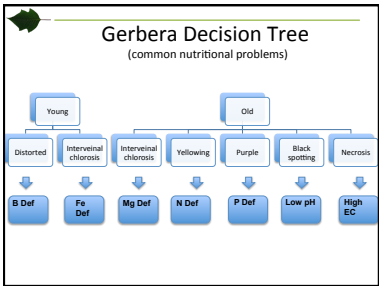
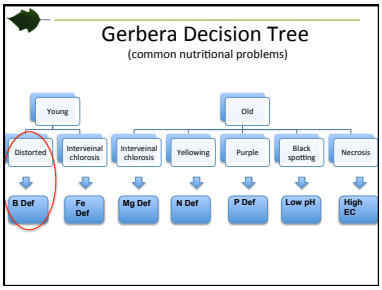
Gerbera Decision Tree (common problems)

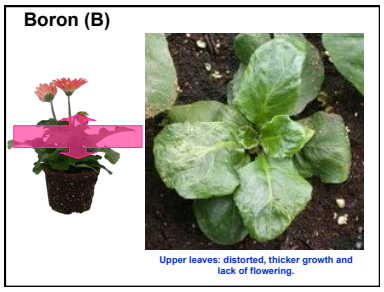


Plant Diagnostics – B Whipker NCSU

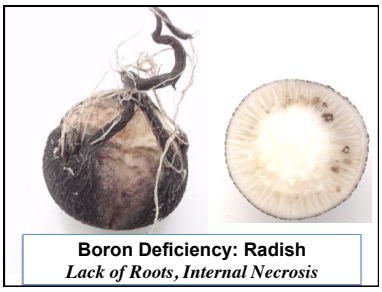









Boron Deficiency : Gerbera



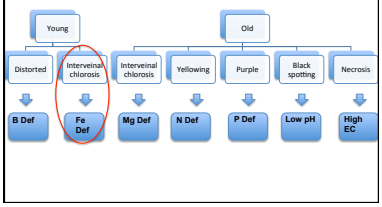
Plant Diagnostics – B Whipker NCSU

Boron Deficiency

- Deficiencies due to the lack of Boron in the fertilizer solution are rare.
- Most problems with gerbera are *ENVIRONMENTALLY INDUCED* and are associated with low transpiration rates during plug production or waterlogged growing conditions.

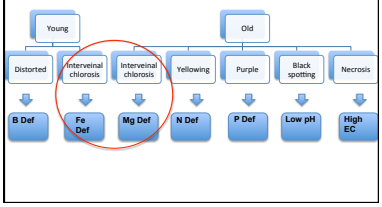
Gerbera Decision Tree

(common nutritional problems)

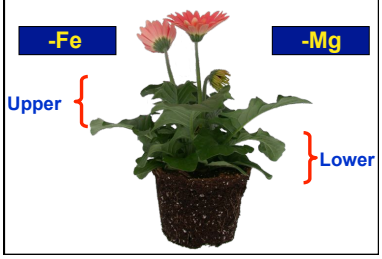


Gerbera Decision Tree

(common nutritional problems)



Location of Interveinal Chlorosis



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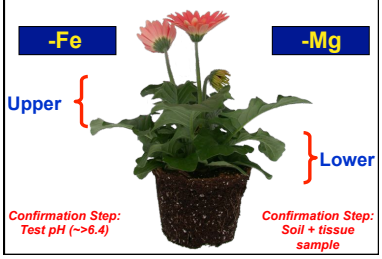


High pH (Iron Deficiency)

Upper leaves: with interveinal chlorosis

Magnesium (Mg)

Initially lower leaves with interveinal yellowing

Magnesium (Mg)

More pronounced interveinal yellowing

Magnesium (Mg)

Lower leaves: interveinal yellowing

Plant Diagnostics – B Whipker NCSU

Iron (Fe) or Magnesium (Mg) Deficiency?

Interveinal yellowing (chlorosis)

Iron (Fe) or Magnesium (Mg) Deficiency?

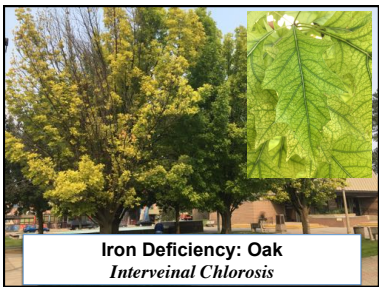
- Rosette leaf arrangement makes visual diagnosis difficult.
- Over time symptoms can cover entire plant.

Interveinal yellowing (chlorosis)

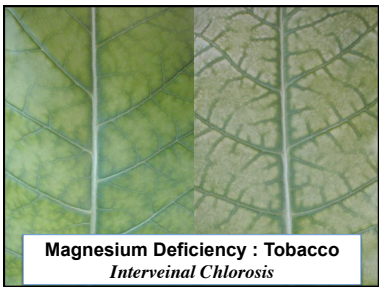
High pH or ???

- Root rot and overwatering can also induce iron problems.
  - Random pattern
  - Check the roots

Iron Deficiency : Basil



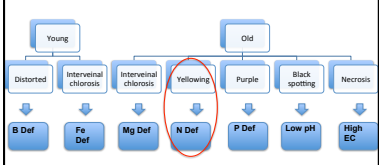
Iron Deficiency: Oak
Interveinal Chlorosis



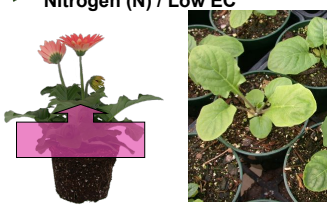
Magnesium Deficiency : Tobacco
Interveinal Chlorosis

Magnesium Deficiency : Tomato
Advanced Purpling

Gerbera Decision Tree
(common nutritional problems)



Nitrogen (N) / Low EC



Lower leaves: total leaf yellowing, which turns necrotic over time

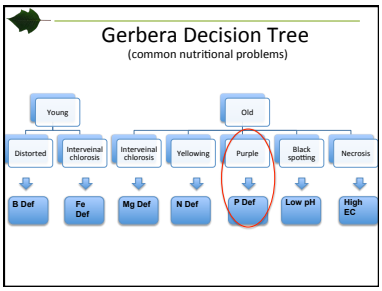
Plant Diagnostics – B Whipker NCSU

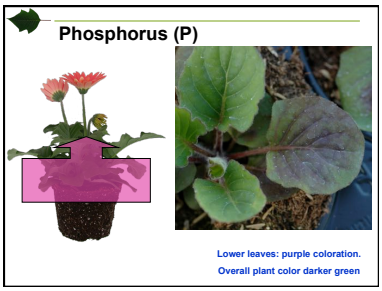
Lower Leaf Yellowing and Loss

Nitrogen Deficiency : Parsley
Lower Leaf Yellowing

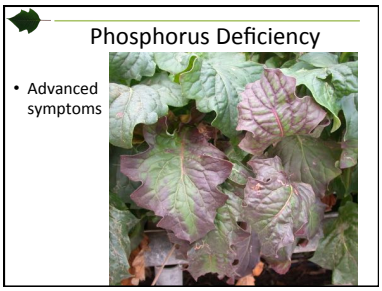
Nitrogen Deficiency : Dill
Orange instead of Yellow

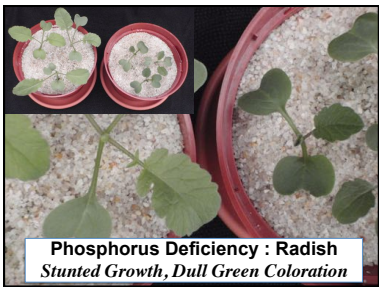
Nitrogen Deficiency : Tobacco
Lower Leaf Chlorosis





P Deficiency: Lower leaves with purple coloration

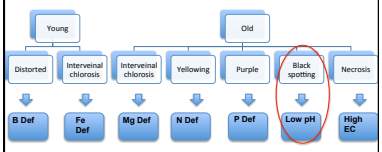




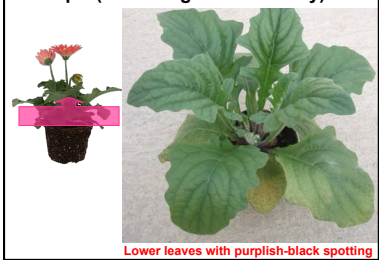
Phosphorus Deficiency : Radish
Stunted Growth, Dull Green Coloration

Plant Diagnostics – B Whipker NCSU

Gerbera Decision Tree
(common nutritional problems)



Low pH (Iron/Manganese Toxicity)



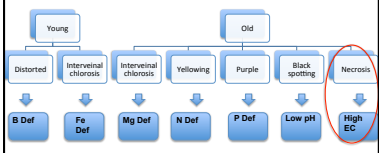
Lower leaves with purplish-black spotting

Low pH (Iron/Manganese Toxicity)

Low pH (Iron/Manganese Toxicity)

- Low pH (<5.5) problems occur as iron/ manganese toxicity.
  - Lower leaves develop black spotting.

Gerbera Decision Tree
(common nutritional problems)



Electrical Conductivity (EC) - High

Lower leaves: crinkled
Marginal leaf burn
Less growth likely

Sub-irrigated plants: Less upper root growth

High EC

- Marginal leaf burn from high EC and water stress.

High EC

- Advanced lower leaf burn due to high EC.

Be a Plant Detective – Key Questions