

## Troubleshooting Vegetable Crop Production Problems

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## Trouble Shooting Vegetable Production Problems

- Important factors for consideration
- Field patterns
- Symptom recognition

## Don't jump to conclusions!

- First make field observations and collect the information from those involved.
- Take everything into consideration.
- And make your conclusion after you have seen everything.

## Items Needed When Troubleshooting

- shovel
- knife
- hand lens
- camera
- a note pad
- plastic bags
- an open mind

## Important Information

- What is normal for this crop?
- What was planted last season?
- Is there one or more varieties or seed sources?
- When did symptoms appear?
- What was applied to the crop (how much, when, how)?
- What part of the field and plant are symptomatic?
- Are weeds showing symptoms too?
- What is bordering the affected field?

## Distribution of symptoms in the field

## In & Out Pattern

- Example-An edge of the field where there are often 4 bad rows followed by 4 normal rows, then 4 bad rows again.
- The good/bad row pattern may repeated with 4, 6, or 8 rows involved. It depends upon the tractor application pattern and the number of tractors used.

## In & Out Patterns

- Chemical application problems often due to misapplication of –
- Herbicides
- Fertilizers
- Insecticides

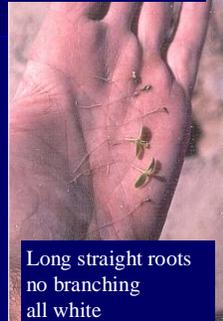
## In & Out Patterns

- Patterns may be due to cultivation.
- Planters not being adjusted properly.
- The equipment not being lifted too soon.
- Or set down too late.
- Valve not turned on at right time

## In-and-out pattern



Kerb herbicide injury



Long straight roots  
no branching  
all white

## Down the Row Patterns

- Chemical injury due to herbicides or fertilizer overdose, often found in repeating row patterns
- Cultivator damage
- Poor irrigation practices



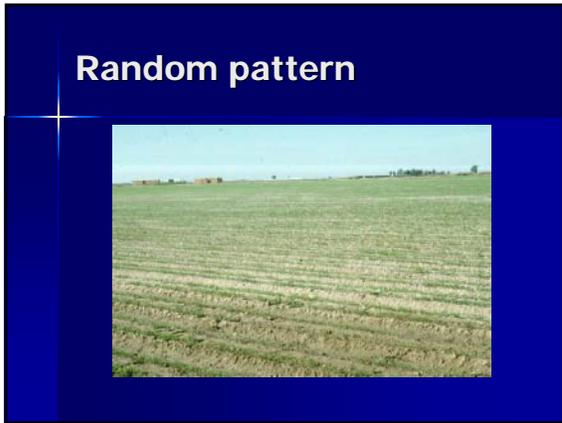
### Damage on edges of field

- Drift
- Double trim with aerial spray
- Excess fertilizer or other chemicals when slowing down
- Insects & other animals
- Head and tail ends of fields are not planted so there is no carryover of debris or chemicals in the next crop (may be better or worse)





- ### Random Patterns
- Insect damage
  - Environmental damage  
frost, wind whip, air pollution, sunburn, hail
  - Birds
  - Carry-over fertilizer injury
  - Crop residue injury
  - Nematodes



## Streaks that Occur at Angles

- Chemical drift
- Changes in soil physical properties
  - sand streaks, clay layer
- Salinity, usually poor drainage
- Crop residue causing injury
- Crop residue providing benefit.
- Nematodes
- Carry-over fertilizer



## Sudangrass crop residue discolored roots



## Plant Symptoms and Possible Causes

## Discoloration of Leaves

## Veinal chlorosis – virus, pigment inhibitor herbicide



**Interveinal chlorosis –  
nutrient deficiency, virus,  
photosynthesis inhibitor  
herbicides**



**Mosaic  
alternating light and dark  
Virus**



CuLCrV



CuLCrV + WMV

**Marginal Chlorosis – Cupric  
Hydroxide injury**



**Leaf Distortions**

**Growth Regulators**

|       |                             |
|-------|-----------------------------|
| 2,4-D | triclopyr (Garlon, Turflon) |
| MCPA  | dicamba (Banvel)            |
| MCPP  | clopyalid (Stinger)         |



**Virus**



CuLCrV



ZYMV



WMV

## Necrosis on Leaves



## Foliar lesions

variable size, variable color, concentric zones  
Possible causes – fungal, bacterial diseases



Early blight (*Alternaria solani*)

## Necrotic lesions with mosaic symptoms



Lettuce Dieback Disease  
Lettuce Necrotic Stunt Virus (LNSV)

## Angular Necrotic Lesions – limited by veins



Lettuce Downy Mildew - *Bremia lactucae*

## Marginal necrosis or spots



organosilicon  
surfactant



linuron  
drift

## Root symptoms

## Herbicide - Inhibitors of Cell Division



## Nematodes



▪ Needle Nematode  
(*Longidorus africanus*)



▪ Root Knot Nematode  
(*Meloidogyne* sp.)

▪ Especially bad on sandy soils

## Vascular discoloration – fungal disease or fertilizer toxicity



Fusarium Wilt  
*Fusarium oxysporum* f.  
sp. *lactucum*



Fertilizer burn

## Fusarium Wilt *Fusarium oxysporum* f. sp. *lactucum*



## Root lesions



Lesions/constrictions at or below soil line = fungi

## Limitations of Field Diagnosis

- Several conditions may cause similar symptoms
- More than one production problem may be involved
- Symptoms of the same cause can look different on different crops, varieties or under different environmental conditions
- Laboratory tests may be required to make a positive identification