

ROOT CAUSE CRIME SCENE INVESTIGATION

A practical worksheet for investigating struggling crops

THE GOLDEN RULE: Do not accuse a suspect until the evidence supports the charge.

Date				Investigator			
Crop				Location/Block			
pH		EC		EC method	☐ Pour-through ☐ SME ☐ 1:2 dilution ☐ Other: _____		
Date/time		Units		Compared with	☐ Healthy plant ☐ Target range ☐ Previous reading		

Record the extraction method and units with every EC value. Method changes can make results difficult to compare.

1. SECURE THE SCENE: RECORD FACTS BEFORE OPINIONS

- | | | |
|--------------------------------------|---|--|
| ☐ Stunting | ☐ Chlorosis | ☐ Necrosis |
| ☐ Wilting | ☐ Distortion | ☐ Root loss |
| ☐ Plant death | ☐ Poor flowering | ☐ Uneven growth |

Describe exactly what you see _____

INITIAL SUSPECTS • Before investigating, list the first explanations that come to mind.

1. _____	2. _____	3. _____
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2. READ THE PATTERN

- | | | |
|---|---------------------------------------|--|
| ☐ One plant | ☐ A few plants | ☐ Random/scattered |
| ☐ Entire tray or block | ☐ Entire bench | ☐ Entire greenhouse |
- Does the pattern follow a boundary?**
- | | | |
|--|---|--|
| ☐ Irrigation zone | ☐ Fertilizer injector/line | ☐ Cultivar or batch |
| ☐ Bench edge or aisle | ☐ Spray/application path | ☐ No obvious boundary |

PATTERN CLUE: A pattern narrows the suspect list, but it does not prove the cause. Record exceptions.

Where does the pattern begin, end, or change _____

3. IDENTIFY THE VICTIMS AND CONTROLS

- | | | |
|---|---|---|
| ☐ One species | ☐ Multiple species | ☐ One cultivar/batch |
| ☐ Multiple cultivars | ☐ Youngest plants | ☐ Oldest plants |

Which plants are affected _____

Which nearby plants are healthy, and what is different about them _____

4. CRIME SCENE ANALYSIS: GROWING ENVIRONMENT

- | | | |
|---|---|---|
| ☐ High/low temperature event | ☐ Rapid temperature swing | ☐ High humidity/condensation |
| ☐ Low humidity/high VPD | ☐ Excess or limited light | ☐ Draft, vent or heater exposure |
| ☐ Poor air movement | ☐ Standing water/poor drainage | ☐ Irrigation nonuniformity |

Record actual conditions or data: air/root-zone temperature, RH, light/DLI, moisture, airflow _____

How does the affected area differ from a healthy area _____

5. BUILD THE TIMELINE

- | | | |
|---------------------------------------|--|------------------------------------|
| ☐ Sudden onset | ☐ Gradual onset | ☐ Improving |
| ☐ Worsening | ☐ Stable | ☐ Recurring |

When were healthy plants last observed _____

What happened immediately before symptoms appeared _____

EVIDENCE COLLECTION & CASE RESOLUTION

6. CASE HISTORY: CROP INPUTS AND CHEMICAL EXPOSURE

- | | | |
|---|---|---|
| ☐ Fungicide/bactericide | ☐ Insecticide/miticide | ☐ Biological treatment |
| ☐ PGR | ☐ Herbicide nearby | ☐ Sanitizer/disinfectant |
| ☐ Fertilizer or supplement | ☐ Wetting agent/adjuvant | ☐ Water treatment |
| ☐ Tank contamination/residue | ☐ Application overlap or drift | ☐ Nothing known |

Product / active ingredient	Rate	Date/time	Method	Area / crop treated
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Other recent changes: supplier/batch, media, planting crew, irrigation, fertilizer, spacing or location _____

Was a jar test, compatibility check or small-area test performed? Note unusual weather during application _____

7. EXAMINE THE WHOLE PLANT

ABOVE-GROUND EVIDENCE

- ☐ Symptoms on new growth
☐ Symptoms on lower/older leaves
☐ Leaf spots or lesions
☐ Distortion or tip injury
☐ Insects, mites, frass or webbing

ROOT & MEDIA EVIDENCE

- ☐ Roots white/tan and firm
☐ Roots brown/black or soft
☐ Roots sparse or uneven
☐ Media unusually wet or dry
☐ Odor, algae, salts or poor fill

Measurements or tests: root-zone pH, EC, moisture, temperature, water quality, lab results _____

SIDE-BY-SIDE CONTROL CHECK

Compare the same measurement	Affected plant	Healthy plant
Root appearance / root mass	_____	_____
Root-zone pH and EC	_____	_____
Media moisture / weight	_____	_____

8. PREPARE EVIDENCE FOR THE CRIME LAB

- | | | |
|--|---|---|
| ☐ Whole affected plant with roots | ☐ Healthy comparison plant | ☐ Growing medium/root ball |
| ☐ Irrigation water | ☐ Fertilizer solution | ☐ Insect or mite specimen |

Sample ID	_____	Date/time	_____
Collected by	_____	Crop/location	_____
Lab/test	_____	Tracking no.	_____

CRIME LAB NOTES Photograph before sampling. Include healthy and affected material. Label every sample. Record handling, storage and shipment details. Contact the diagnostic lab for its current submission and packaging requirements.

Question the lab needs to answer / suspected agents or tests requested _____

9. TEST EACH SUSPECT AGAINST THE EVIDENCE

Does the proposed cause explain...	YES	NO	UNKNOWN
The symptom pattern and exceptions?	☐	☐	☐
The timing and crop history?	☐	☐	☐
Why affected and healthy plants differ?	☐	☐	☐

CASE RULE: If the theory cannot explain the key clues, downgrade that suspect and keep investigating.

10. NAME THE MOST LIKELY ROOT CAUSE

Prime suspect / most likely root cause _____

Three strongest pieces of evidence _____

What evidence would confirm or disprove this conclusion _____

11. CORRECT THE PROBLEM AND PREVENT A REPEAT

Immediate containment or corrective action _____

Long-term preventive action and person responsible _____

THE FIVE DETECTIVE QUESTIONS: 1) What is the pattern? 2) Who is affected? 3) Why are nearby plants healthy? 4) What changed? 5) Does the theory explain every key clue?