

# Plant Disease Classification: Baseline vs Agent Evaluation Report

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## 1 Executive Summary

This report compares two approaches for plant disease image classification using Claude:

- **Baseline:** Direct API call to Claude Haiku with only the image and class list (single inference, no context).
- **Agent:** Claude Code headless mode (`claude -p`) where the agent reads a symptom knowledge base, views the test image, views reference images, reasons through candidates, and then predicts.

### 1.1 Overall Results

Dataset	Baseline	Agent	Improvement
Foliar_Disease_Stress	42.9%	64.3%	+21.4%

Table 1: Overall accuracy comparison across datasets.

### 1.2 Agent Cost and Latency

Dataset	Images	Avg Turns	Avg Duration (s)	Avg Cost (\$)	Total Cost (\$)
Foliar_Disease_Stress	14	7.6	12.4	0.0220	0.3077

Table 2: Agent execution statistics.

## 2 Foliar\_Disease\_Stress: Mango Leaf Diseases

### 2.1 Per-Class Accuracy

Class	Baseline	Agent	Diff
Anthracnose	2/2	2/2	0%
Bacterial_Canker	0/2	1/2	+50%
Cutting_Weevil	1/2	2/2	+50%
Die_Back	1/2	1/2	0%
Gall_Midge	0/2	1/2	+50%
Powdery_Mildew	0/2	0/2	0%
Sooty_Mould	2/2	2/2	0%

Table 3: Per-class accuracy for Foliar\_Disease\_Stress.

### 2.2 Image-by-Image Results

#	Image	Ground Truth	Baseline	Agent	Turns
1	test_001.jpg	Die_Back	Gall_Midge	✗	Die_Back ✓ 9
2	test_002.jpg	Cutting_Weevil	Die_Back	✗	Cutting_Weevil ✓ 6
3	test_003.jpg	Powdery_Mildew	Anthracnose	✗	Sooty_Mould ✗ 7
4	test_004.jpg	Bacterial_Canker	Anthracnose	✗	Bacterial_Canker ✓ 9
5	test_005.jpg	Cutting_Weevil	Cutting_Weevil	✓	Cutting_Weevil ✓ 8
6	test_006.jpg	Powdery_Mildew	Sooty_Mould	✗	Sooty_Mould ✗ 6
7	test_007.jpg	Anthracnose	Anthracnose	✓	Anthracnose ✓ 8
8	test_008.jpg	Die_Back	Die_Back	✓	Cutting_Weevil ✗ 6
9	test_009.jpg	Sooty_Mould	Sooty_Mould	✓	Sooty_Mould ✓ 8
10	test_010.jpg	Sooty_Mould	Sooty_Mould	✓	Sooty_Mould ✓ 9
11	test_011.jpg	Anthracnose	Anthracnose	✓	Anthracnose ✓ 8
12	test_012.jpg	Gall_Midge	Anthracnose	✗	Gall_Midge ✓ 7
13	test_013.jpg	Gall_Midge	Anthracnose	✗	Sooty_Mould ✗ 8
14	test_014.jpg	Bacterial_Canker	Anthracnose	✗	Sooty_Mould ✗ 8

### 2.3 Agent Reasoning Traces

#### 2.3.1 Correct Predictions

test\_001.jpg — **Correct** Ground Truth: Die\_Back → Prediction: Die\_Back  
 Turns: 9 Duration: 12.9s Cost: \$0.0298

**Think:** I'll help you classify the plant disease in the image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → disease\_symptoms.md

**Tool:** Read → test\_data/Foliar\_Disease\_Stress/images/test\_001.jpg

**Think:** Good! I can see the target image shows a mango leaf with dark discoloration. Now let me examine the reference images for the most likely candidates. Based on the visual features I see (dark brown/black appearance on the leaf), the top candidates appear to be:

1. \*\*Anthracnose\*\* - dark flat sunken lesions
2. \*\*Sooty Mould\*\* - dark coating appearance
3. \*\*Die Back\*\* - browning and wilting

Let me v...

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_001.jpg

**Think:** Let me view more reference images to better compare:

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_002.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_002.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_002.jpg

**Think:** Based on my analysis of the target image and comparison with the reference images:

\*\*Visual Analysis:\*\*

The target image (test\_001.jpg) shows a mango leaf that is predominantly dark brown/black in color. Comparing this to the reference images:

- \*\*Anthracnose references\*\* (Anthracnose\_001, \_002): Show leaves with scattered dark lesions and brown patches on a mostly tan/brown background, with so...

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**test\_002.jpg — Correct** Ground Truth: **Cutting\_Weevil** → Prediction: **Cutting\_Weevil**  
Turns: 6 Duration: 9.1s Cost: \$0.0183

**Think:** I'll help you classify the plant disease in the image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → disease\_symptoms.md

**Tool:** Read → test\_data/Foliar\_Disease\_Stress/images/test\_002.jpg

**Think:** Good! I can see the target image shows leaves that appear to be curled, twisted, and contorted with a distinctive mechanical damage pattern. The leaves look like they have been cut or scraped. This is characteristic of Cutting Weevil damage. However, let me examine the reference images for my top candidate classes to make a thorough comparison.

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Cutting\_Weevil/Cutting\_Weevil\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Cutting\_Weevil/Cutting\_Weevil\_002.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_001.jpg

**Think:** Perfect! Comparing the target image with the reference images:

\*\*Analysis:\*\*

1. \*\*Target Image (test\_002.jpg)\*\*: Shows leaves that are curled, twisted, contorted, and appear to have been cut or stripped. The leaves hang from the twigs in a characteristic manner.
2. \*\*Cutting Weevil Reference Images\*\*: - Cutting\_Weevil\_001.jpg shows brown, curled, and contorted leaves typical of weevil damage...

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**test\_004.jpg — Correct** Ground Truth: **Bacterial\_Canker** → Prediction: **Bacterial\_Canker**  
Turns: 9 Duration: 12.8s Cost: \$0.0220

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_004.jpg`

**Think:** Good! I can see the target image shows a green mango leaf with what appears to be dark spots or damage on the edges. The leaf has a relatively green background but with visible brown/dark damage along the margins.

Based on the initial visual inspection, my top candidates are: 1. \*\*Anthracnose\*\* - shows dark lesions with eaten-away margins 2. \*\*Bacterial Canker\*\* - angular lesions with yellow halo...

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Bacterial_Canker/Bacterial_Canker_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Bacterial_Canker/Bacterial_Canker_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_002.jpg`

**Think:** Now I can clearly compare the images. Let me analyze:

\*\*Target Image (test\_004.jpg):\*\* - Green leaf with dark brown/black damage along the edges  
- Appears to have eaten-away or irregular margins - The damage looks sunken and embedded in the tissue - Dark spots with relatively clean margins along the leaf edge

\*\*Comparison Analysis:\*\*

1. \*\*Anthracnose References:\*\* - Anthracnose\_001.jpg: Sho...

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**test\_005.jpg — Correct** Ground Truth: **Cutting\_Weevil** → Prediction: **Cutting\_Weevil**  
Turns: 8 Duration: 11.9s Cost: \$0.0229

**Think:** I'll help you classify the mango leaf disease. Let me start by reading the knowledge base and examining the images.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_005.jpg`

**Think:** Now let me view reference images for the diseases that could match this image. The image shows what appears to be leaves with cutting/mechanical damage. Let me check the Cutting Weevil reference images first, as well as a couple other candidates:

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Cutting_Weevil/Cutting_Weevil_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Cutting_Weevil/Cutting_Weevil_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Cutting_Weevil/Cutting_Weevil_003.jpg`

**Think:** Perfect! The test\_005.jpg image is nearly identical to Cutting\_Weevil\_003.jpg. Both show:  
- Young leaves that are green and intact  
- Leaves that appear partially severed or cut near the base  
- A contorted/crumpled appearance  
- Stripped, leafless shoot patterns  
- The characteristic cutting pattern from adult weevils

Let me also check Die\_Back to be thorough, as it can sometimes involve defoliation...

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_002.jpg

**Think:** ## Analysis

\*\*Test Image (test\_005.jpg):\*\* Shows young, green mango leaves that are partially severed or cut near the base, with contorted leaf shapes and a stripped, bare shoot pattern.

\*\*Key Observations:\*\* - The leaves are intact and green (not brown or diseased-looking) - Multiple leaves appear cut or partially detached near their base/petiole - The shoot shows a pattern of stripped, bare se...

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**test\_007.jpg — Correct** Ground Truth: **Anthracnose** → Prediction: **Anthracnose**  
Turns: 8 Duration: 14.0s Cost: \$0.0237

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and viewing the target image.

**Tool:** Read → disease\_symptoms.md

**Tool:** Read → test\_data/Foliar\_Disease\_Stress/images/test\_007.jpg

**Think:** Now let me view reference images for the most likely candidates. Based on the target image showing a leaf with scattered reddish-brown spots/patches on a tan-colored leaf, my top candidates are: 1. Anthracnose - for the sunken, embedded lesions with darker edges 2. Sooty Mould - for the dusty/speckled appearance 3. Gall Midge - for the raised bumps

Let me examine reference images:

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_002.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Gall\_Midge/Gall\_Midge\_001.jpg

**Think:** Let me also check Sooty Mould reference images:

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_002.jpg

**Think:** ## Analysis

Based on my examination of the target image (test\_007.jpg) and comparison with the reference images, here's my analysis:

\*\*Target Image Observations:\*\* - Tan/brown colored leaf (indicating stress or maturity) - Scattered reddish-brown spots/patches across the leaf surface - Spots appear to have darker edges with lighter centers - Multiple lesions distributed across the leaf - Green m...

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**test\_009.jpg — Correct** Ground Truth: **Sooty\_Mould** → Prediction: **Sooty\_Mould**  
Turns: 8 Duration: 12.6s Cost: \$0.0228

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_009.jpg`

**Think:** Now let me examine the reference images for the diseases that best match the features I see in test\_009.jpg. The image shows a mango leaf with dark spots/lesions scattered on a green background. This could be Anthracnose, Sooty Mould, or Bacterial Canker based on initial observation. Let me view the reference images for comparison.

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Bacterial_Canker/Bacterial_Canker_001.jpg`

**Think:** Let me also check additional reference images to ensure accurate classification:

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_002.jpg`

**Think:** Based on my analysis of the target image (test\_009.jpg) and comparison with the reference images, I can now provide my classification:

\*\*Analysis:\*\*

\*\*Test Image (test\_009.jpg):\*\* Shows a mango leaf with numerous small dark spots/speckles scattered across the surface on a predominantly green background. The spots appear as tiny dark specks distributed densely over the leaf.

\*\*Comparison with re...

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**test\_010.jpg — Correct** Ground Truth: **Sooty\_Mould** → Prediction: **Sooty\_Mould**  
Turns: 9 Duration: 18.4s Cost: \$0.0240

**Think:** I'll help you classify the disease in the image. Let me start by reading the knowledge base and then examining the target image and reference images.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_010.jpg`

**Think:** Now let me view reference images for the top candidate classes. Based on the target image showing a green leaf with numerous small dark speckles/spots scattered across the surface, this appears to be either Sooty Mould or Gall Midge. Let me examine reference images:

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_001.jpg`

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Gall\_Midge/Gall\_Midge\_002.jpg

**Think:** Let me also check Anthracnose reference images as a third candidate:

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_002.jpg

**Think:** ## Analysis

Based on my comparison of the target image with reference images and symptom descriptions:

\*\*Target Image Features:\*\* - Green leaf background with many small, scattered dark speckles  
- Speckles appear flat and superficial, sitting on the leaf surface - Dense distribution of tiny dark spots giving a "dirty" or "dusty" appearance - No raised bumps or 3D galls - No distinct lesions with...

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**test\_011.jpg — Correct** Ground Truth: **Anthracnose** → Prediction: **Anthracnose**

Turns: 8 Duration: 14.1s Cost: \$0.0238

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → disease\_symptoms.md

**Tool:** Read → test\_data/Foliar\_Disease\_Stress/images/test\_011.jpg

**Think:** Now let me examine the target image more closely. I can see a mango leaf that is primarily brown/tan colored with some areas showing red or darker coloration. The leaf appears to have discoloration affecting large portions of it. Let me view reference images for the top candidate diseases to compare.

Based on the visual features I'm seeing, the primary candidates are: 1. \*\*Die Back\*\* - the leaf s...

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Die\_Back/Die\_Back\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_002.jpg

**Think:** Good! Now let me look at one more anthracnose example and a powdery mildew reference to be thorough:

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Anthracnose/Anthracnose\_003.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Powdery\_Mildew/Powdery\_Mildew\_001.jpg

**Think:** ## Analysis of Test Image 011

After carefully examining the target image and comparing it with reference images for the Mango Leaf Diseases dataset, here's my analysis:

\*\*Target Image Characteristics:\*\* - Leaf is predominantly brown/tan colored - Shows significant discoloration covering most of the leaf surface - Green midrib still visible - The browning appears to be progressive across the leaf...

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**test\_012.jpg — Correct** Ground Truth: **Gall\_Midge** → Prediction: **Gall\_Midge**  
Turns: 7 Duration: 11.0s Cost: \$0.0196

**Think:** I'll help you classify the plant disease in the image. Let me start by reading the knowledge base and viewing the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_012.jpg`

**Think:** Now let me view reference images for the top candidate diseases. Based on the target image showing what appears to be small bumps/galls on a green leaf, I should compare with Gall Midge and also check Sooty Mould and Powdery Mildew as alternatives.

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Powdery_Mildew/Powdery_Mildew_001.jpg`

**Think:** Perfect! I can now analyze the test image by comparing it with the reference images.

## Analysis:

\*\*Target Image (test\_012.jpg):\*\* - Shows a green mango leaf - Has visible small dark spots/bumps scattered along the leaf - The leaf background remains predominantly green - The spots appear to have some raised/3D appearance

\*\*Comparison with Reference Images:\*\*

1. \*\*Gall Midge References:\*\* Shows...

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### 2.3.2 Incorrect Predictions — Error Analysis

**test\_003.jpg — Incorrect** Ground Truth: **Powdery\_Mildew** → Prediction: **Sooty\_Mould**  
Turns: 7 Duration: 11.4s Cost: \$0.0198

**Think:** I'll help you classify the mango leaf disease in the image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_003.jpg`

**Think:** Now let me examine the target image more carefully and view reference images for the top candidate diseases. Based on the image, I can see a mango leaf with numerous small dark speckles distributed across a greenish leaf surface. This pattern is most consistent with either Sooty Mould or Gall Midge. Let me view reference images for these candidates.

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_002.jpg`

**Think:** Perfect! Now I can clearly compare the images:

**\*\*Target Image (test\_003.jpg):\*\*** Shows a mango leaf with numerous small dark speckles densely scattered across the entire greenish-yellow surface, giving it a "dirty" or "dusty" appearance.

**\*\*Comparison with references:\*\***

1. **\*\*Sooty Mould references\*\*** (Sooty\_Mould\_001.jpg and 002.jpg): - Sooty\_Mould\_001: Shows dark patches/coating along the leaf...

### Final Reasoning:

*Perfect! Now I can clearly compare the images:*

**\*\*Target Image (test\_003.jpg):\*\*** Shows a mango leaf with numerous small dark speckles densely scattered across the entire greenish-yellow surface, giving it a "dirty" or "dusty" appearance.

**\*\*Comparison with references:\*\***

1. **\*\*Sooty Mould references\*\*** (Sooty\_Mould\_001.jpg and 002.jpg): - Sooty\_Mould\_001: Shows dark patches/coating along the leaf margin - Sooty\_Mould\_002: Shows dense, numerous small dark speckles distributed across a green leaf - **\*\*MATCHES the target image very closely\*\*** - The key feature is the superficial dark speckles that sit on top of the green leaf, giving a sooty/dusty appearance
2. **\*\*Gall Midge references\*\*** (Gall\_Midge\_001.jpg and 002.jpg): - Shows raised 3D bumps/galls (visible as protrusions with depth...)

**test\_006.jpg — Incorrect** Ground Truth: Powdery\_Mildew → Prediction: **Sooty\_Mould**  
Turns: 6 Duration: 8.8s Cost: \$0.0185

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → disease\_symptoms.md

**Tool:** Read → test\_data/Foliar\_Disease\_Stress/images/test\_006.jpg

**Think:** Now let me examine reference images for the top candidate classes. Based on the target image, I can see a leaf with dark speckles/coating on a greenish surface. This looks most consistent with Sooty Mould, but let me verify by viewing reference images for my top candidates.

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_001.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Sooty\_Mould/Sooty\_Mould\_002.jpg

**Tool:** Read → Plant\_Disease\_Dataset/Foliar\_Disease\_Stress/Gall\_Midge/Gall\_Midge\_001.jpg

**Think:** Perfect! I can now compare the visual features:

**\*\*Analysis of test\_006.jpg:\*\*** - The target image shows a leaf with dark speckles/dots densely scattered across the surface - The overall leaf remains greenish underneath the dark material - The dark marks appear superficial, sitting ON TOP of the leaf like a coating - This is NOT raised bumps (ruling out Gall Midge) - This is NOT angular lesions wit...

### Final Reasoning:

*Perfect! I can now compare the visual features:*

**\*\*Analysis of test\_006.jpg:\*\*** - The target image shows a leaf with dark speckles/dots densely scattered across the surface - The overall leaf remains greenish underneath the dark material - The dark marks appear superficial, sitting ON TOP of the leaf like a coating - This is NOT raised bumps (ruling out Gall Midge) - This is NOT angular lesions with halos (ruling out Bacterial Canker) - This is NOT sunken lesions (ruling out Anthracnose)

**\*\*Comparison with reference images:\*\*** - **\*\*Sooty\_Mould\_002.jpg\*\*:** Shows exactly this pattern - a yellowish-green leaf covered with numerous small dark dots/speckles that create a "dirty" or "dusty" appearance. This matches the target image perfectly. - **\*\*Sooty\_Mould\_001.jpg\*\*:** Shows darker areas but is more...

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**test\_008.jpg — Incorrect** Ground Truth: **Die\_Back** → Prediction: **Cutting\_Weevil**  
Turns: 6 Duration: 10.2s Cost: \$0.0184

**Think:** I'll help you classify the disease in the mango leaf image. Let me start by reading the knowledge base and then analyzing the image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_008.jpg`

**Think:** Now let me view the reference images for my top candidate diseases. Based on the image showing a severely wilted, curled, and darkened leaf, I should examine Cutting Weevil, Die Back, and Powdery Mildew as candidates.

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Cutting_Weevil/Cutting_Weevil_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Die_Back/Die_Back_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Powdery_Mildew/Powdery_Mildew_001.jpg`

**Think:** Excellent! The comparison is clear now. Let me analyze:

**\*\*Test Image (test\_008.jpg):\*\*** - Single darkened, severely curled and wilted leaf - Progressive browning and drying - Leaf is completely drooped/curled upward - No visible spots, lesions, or disease coating - Shows mechanical damage/stress rather than fungal disease

**\*\*Candidate Comparison:\*\***

1. **\*\*Cutting Weevil\*\* (Reference image):** Shows m...

### Final Reasoning:

*Excellent! The comparison is clear now. Let me analyze:*

**\*\*Test Image (test\_008.jpg):\*\*** - Single darkened, severely curled and wilted leaf - Progressive browning and drying - Leaf is completely drooped/curled upward - No visible spots, lesions, or disease coating - Shows mechanical damage/stress rather than fungal disease

**\*\*Candidate Comparison:\*\***

1. **\*\*Cutting Weevil\*\* (Reference image):** Shows multiple leaves with brown curling, twisted shapes, and mechanical damage patterns - MATCHES closely with test image's appearance
  2. **\*\*Die Back\*\* (Reference image):** Shows a single leaf with similar curling and browning, but typically presents with twig damage and defoliation patterns on branches
  3. **\*\*Powdery Mildew\*\* (Reference image):** Shows white/grayish powdery coating on a relatively healthy g...
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**test\_013.jpg — Incorrect** Ground Truth: **Gall\_Midge** → Prediction: **Sooty\_Mould**  
Turns: 8 Duration: 14.6s Cost: \$0.0211

**Think:** I'll help you classify the mango leaf disease. Let me start by examining the knowledge base and the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_013.jpg`

**Think:** Good! Now let me examine the target image more carefully. I can see a green mango leaf with several small dark brown spots scattered across it. The leaf background is predominantly green. Let me view the reference images for the most likely candidates based on the visual features I'm observing.

The target image shows:  
- Green leaf background  
- Small dark brown spots scattered across the leaf surf...

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_002.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_001.jpg`

**Think:** Perfect! Now I can make a detailed comparison:

**\*\*Target Image Analysis (test\_013.jpg):\*\*** - Green leaf background with vibrant color - Multiple small dark brown spots scattered across the leaf surface - Spots appear superficial and distributed as small specks - The spots look like they sit ON TOP of the leaf surface - Overall leaf structure is intact

**\*\*Reference Image Comparison:\*\***

1. **\*\*Gall\_Mid...**

### Final Reasoning:

*Perfect! Now I can make a detailed comparison:*

**\*\*Target Image Analysis (test\_013.jpg):\*\*** - Green leaf background with vibrant color - Multiple small dark brown spots scattered across the leaf surface - Spots appear superficial and distributed as small specks - The spots look like they sit ON TOP of the leaf surface - Overall leaf structure is intact

**\*\*Reference Image Comparison:\*\***

1. **\*\*Gall\_Midge\_001.jpg\*\*:** Shows raised, 3D dome-shaped galls that are clearly visible bumps/protrusions. Very distinct from target.
  2. **\*\*Gall\_Midge\_002.jpg\*\*:** Similar raised gall appearance with visible depth. Not matching target image.
  3. **\*\*Sooty\_Mould\_001.jpg\*\*:** Shows dark coating/patches on a green leaf with a dirty, sooty appearance - very similar to target.
  4. **\*\*Sooty\_Mould\_002.jpg\*\*:** Shows extensive ...
-

**test\_014.jpg — Incorrect** Ground Truth: **Bacterial\_Canker** → Prediction: **Sooty\_Mould**  
Turns: 8 Duration: 12.1s Cost: \$0.0232

**Think:** I'll help you classify the plant disease. Let me start by reading the knowledge base and examining the target image.

**Tool:** Read → `disease_symptoms.md`

**Tool:** Read → `test_data/Foliar_Disease_Stress/images/test_014.jpg`

**Think:** Good! I can see the target image (test\_014.jpg) shows a green mango leaf with some visible damage/spots. Now let me examine the reference images for the top candidate diseases to make an accurate classification. Based on the image, I can see some dark spots on the leaf. Let me check the reference images for the most likely candidates:

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Bacterial_Canker/Bacterial_Canker_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Sooty_Mould/Sooty_Mould_001.jpg`

**Think:** Now let me check a couple more reference images to confirm:

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Gall_Midge/Gall_Midge_001.jpg`

**Tool:** Read → `Plant_Disease_Dataset/Foliar_Disease_Stress/Anthracnose/Anthracnose_002.jpg`

**Think:** Based on my analysis of the target image (test\_014.jpg) and comparison with reference images:

\*\*Visual Analysis of test\_014.jpg:\*\* - Green leaf with visible brown/tan spots scattered on the surface - The spots appear to be small, dark lesions - The leaf background remains mostly green - The spots look like they have some texture/depth to them

\*\*Comparison with Reference Images:\*\*

1. \*\*Anthracnose...

### Final Reasoning:

*Based on my analysis of the target image (test\_014.jpg) and comparison with reference images:*

*\*\*Visual Analysis of test\_014.jpg:\*\* - Green leaf with visible brown/tan spots scattered on the surface - The spots appear to be small, dark lesions - The leaf background remains mostly green - The spots look like they have some texture/depth to them*

*\*\*Comparison with Reference Images:\*\**

1. **\*\*Anthracnose\*\*** (`Anthracnose_001`, `Anthracnose_002`): Shows dark, sunken lesions with irregular shapes and holes. The reference images show more severe browning and larger lesions than what I see in `test_014`.

2. **\*\*Bacterial\_Canker\*\*** (`Bacterial_Canker_001`): Shows dark spots with yellow halos and angular shapes. The `test_014` image does not show prominent yellow halos around the spots.

3. **\*\*Sooty\_Mould\*\*** (`Sooty_Mould_001`): Shows dark, fuzzy lesions with a white center. The reference image shows larger, more confluent lesions than what I see in `test_014`.