

Mango Leaf Disease Classification

This report consolidates the training, evaluation, and comparison of different models (AlexNet, ResNet, VGG-16, ViT, Swin Transformer) for Mango Leaf Disease Classification.

Dataset Information

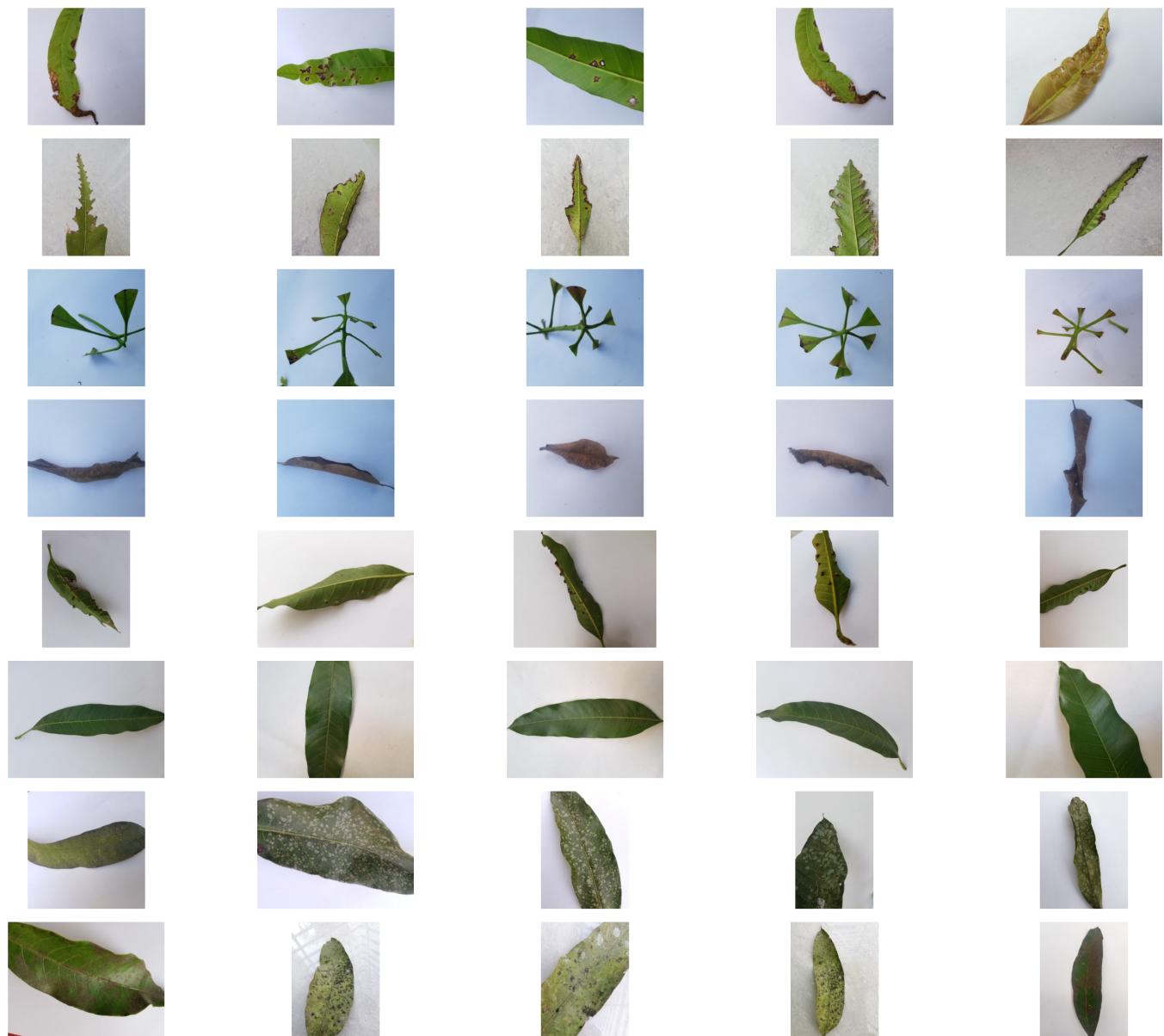
Total images: 4000

Training set: 3200

Validation set: 400

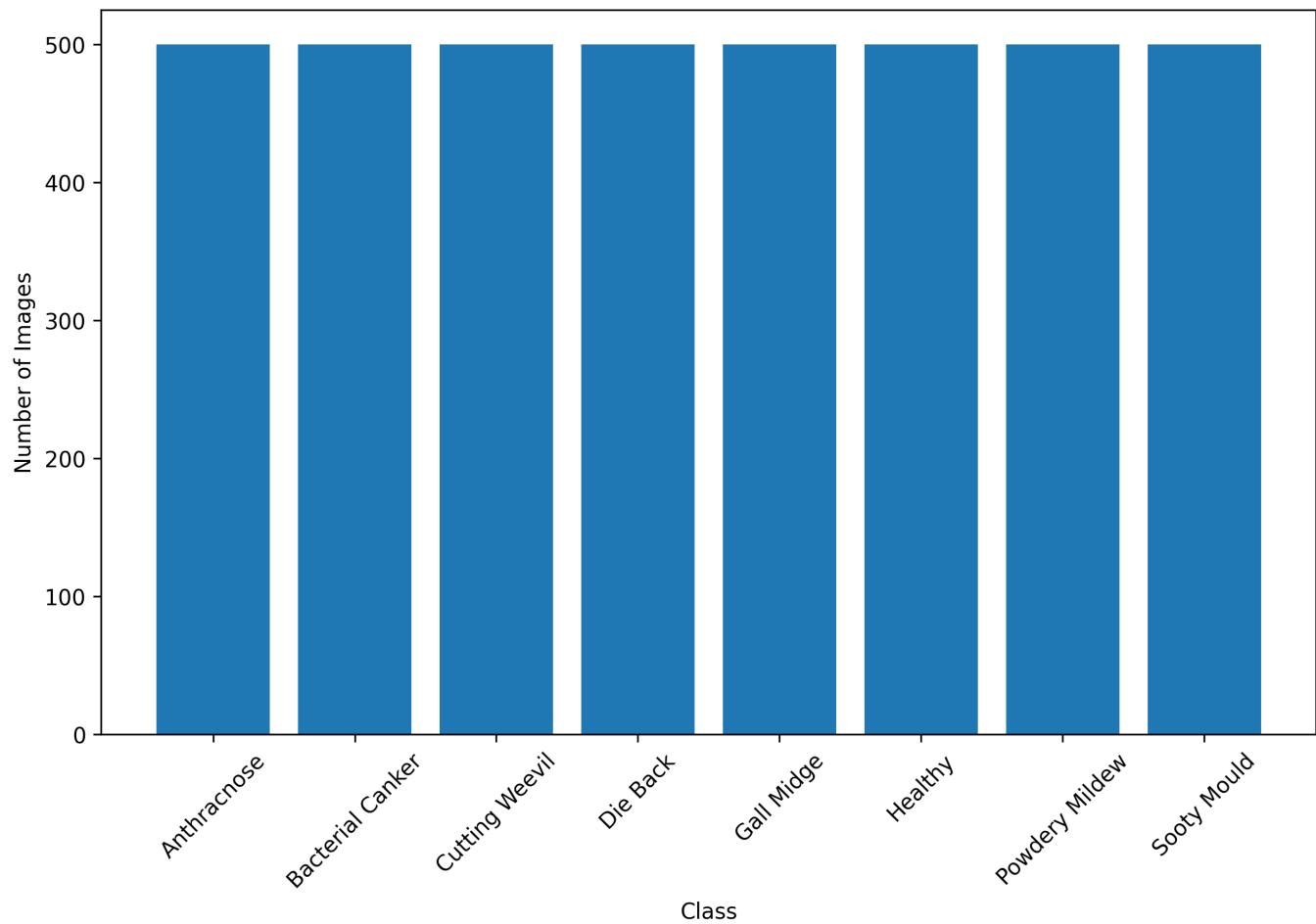
Test set: 400

Sample Images from Dataset



Class Distribution

Class Distribution in Dataset



Model Performance Comparison

Model	Our Accuracy (%)	Paper Accuracy (%)	Difference (%)
AlexNet	99.00	69.08	+29.92
ResNet	100.00	91.33	+8.67
VGG-16	91.00	84.92	+6.08
ViT	44.00	98.50	-54.50
Swin Transformer	24.00	96.55	-72.55
Fusion ResNet and VGG-16	100.00	97.17	+2.83
Fusion ResNet and AlexNet	99.75	97.65	+2.10
Fusion ResNet and AlexNet with DODCAM	100.00	99.97	+0.03

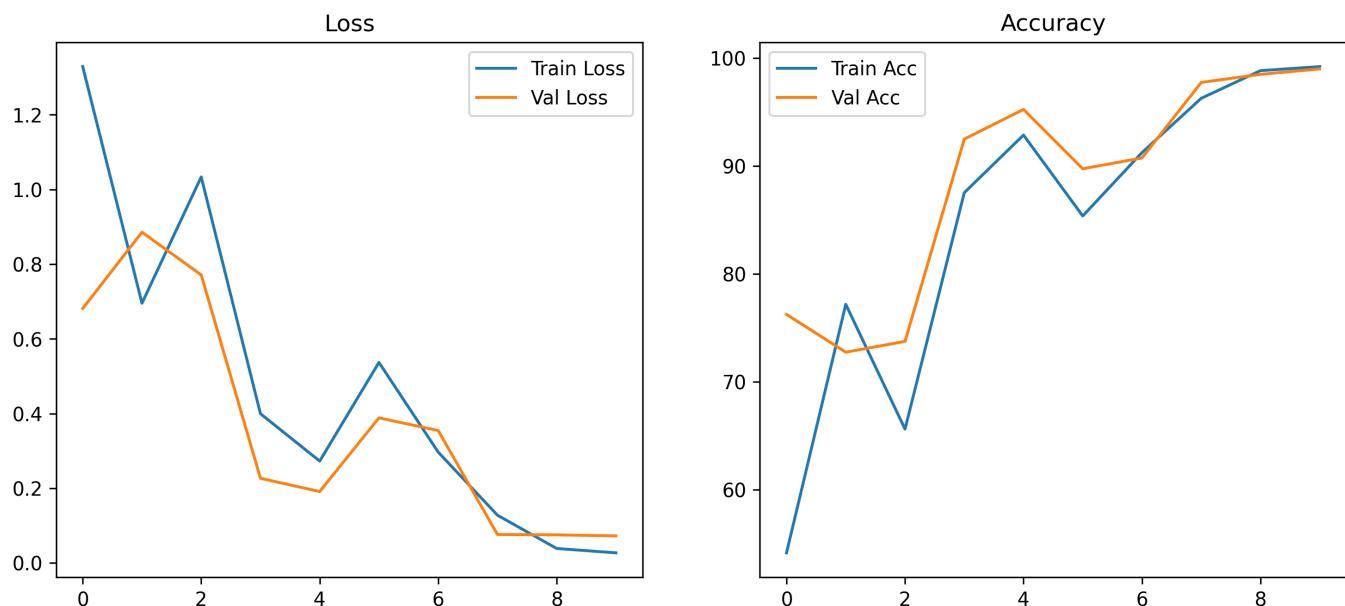
Detailed Model Comparison

Model	Accuracy	Precision	Recall	F1-Score	ROC AUC	Avg Precision
AlexNet	99.00	0.99	0.99	0.99	1.00	1.00
ResNet	100.00	1.00	1.00	1.00	1.00	1.00
VGG-16	91.00	0.91	0.91	0.91	1.00	0.97
ViT	44.00	0.43	0.44	0.41	0.84	0.47
Swin Transformer	24.00	0.12	0.24	0.14	0.72	0.33
Fusion ResNet and VGG	160.00	1.00	1.00	1.00	1.00	1.00
Fusion ResNet and AlexNet	75	1.00	1.00	1.00	1.00	1.00
Fusion ResNet and AlexNet Grad-CAM	100.00	1.00	1.00	1.00	1.00	1.00

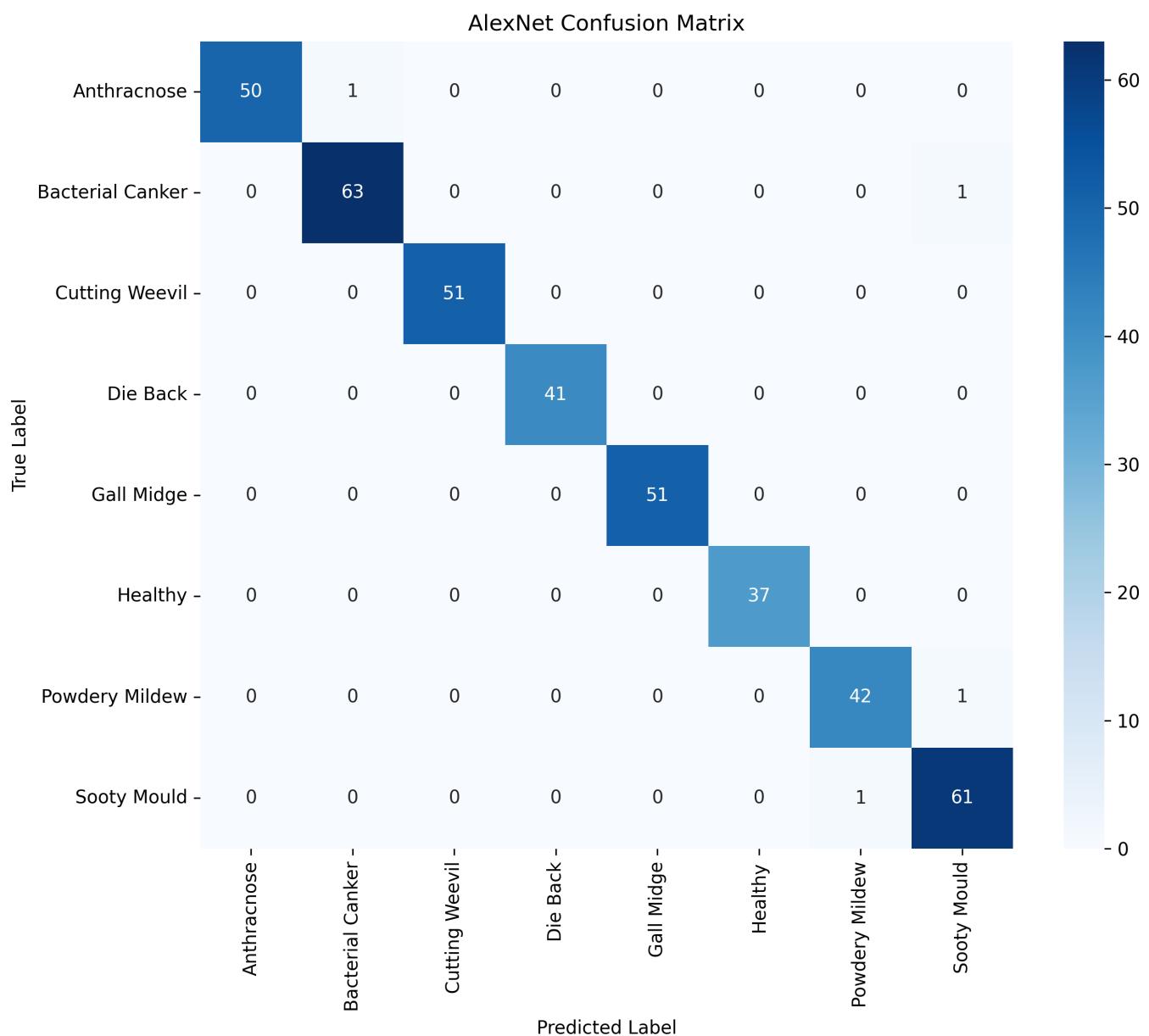
AlexNet - Results

Test Accuracy: 99.00%

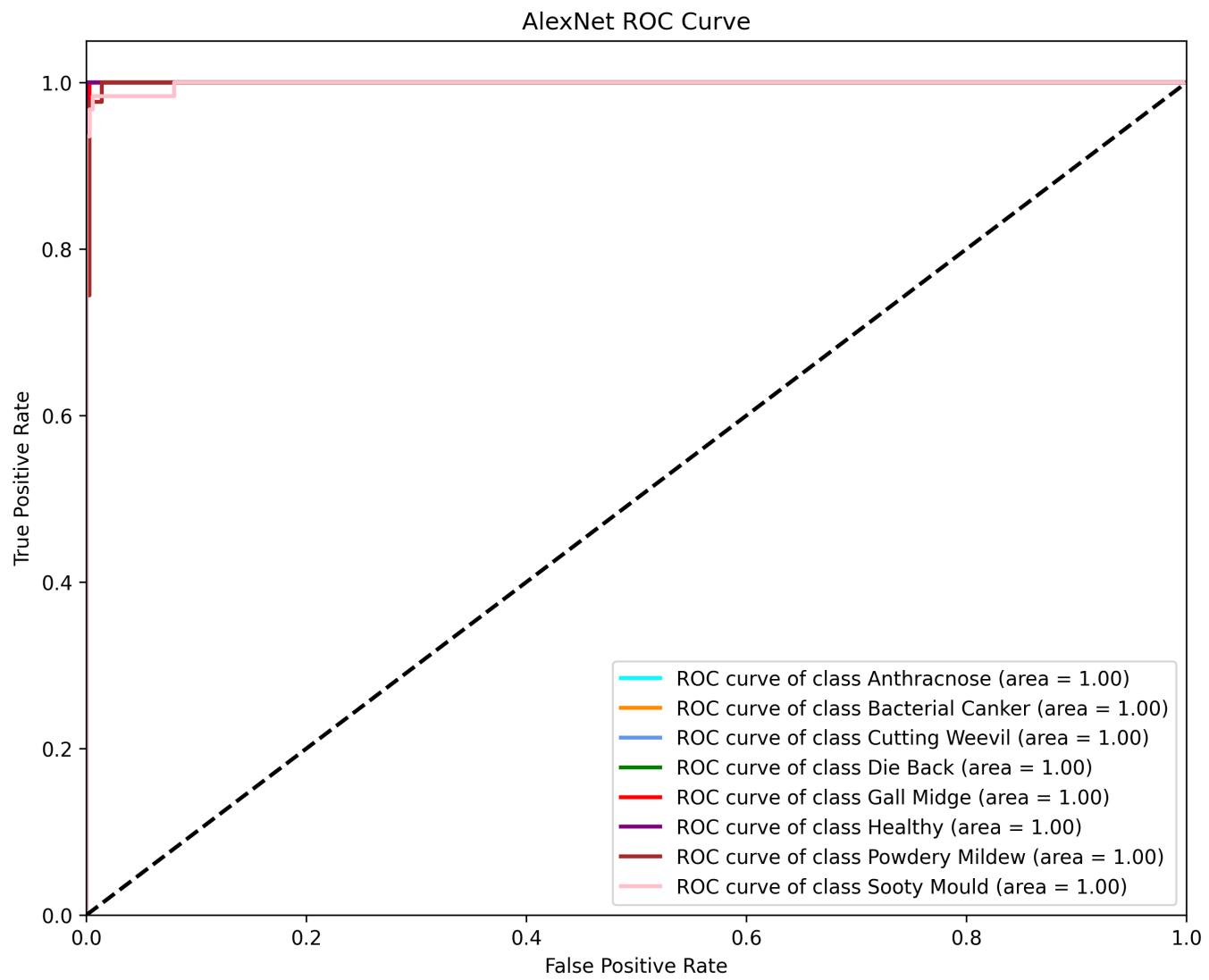
AlexNet Training History



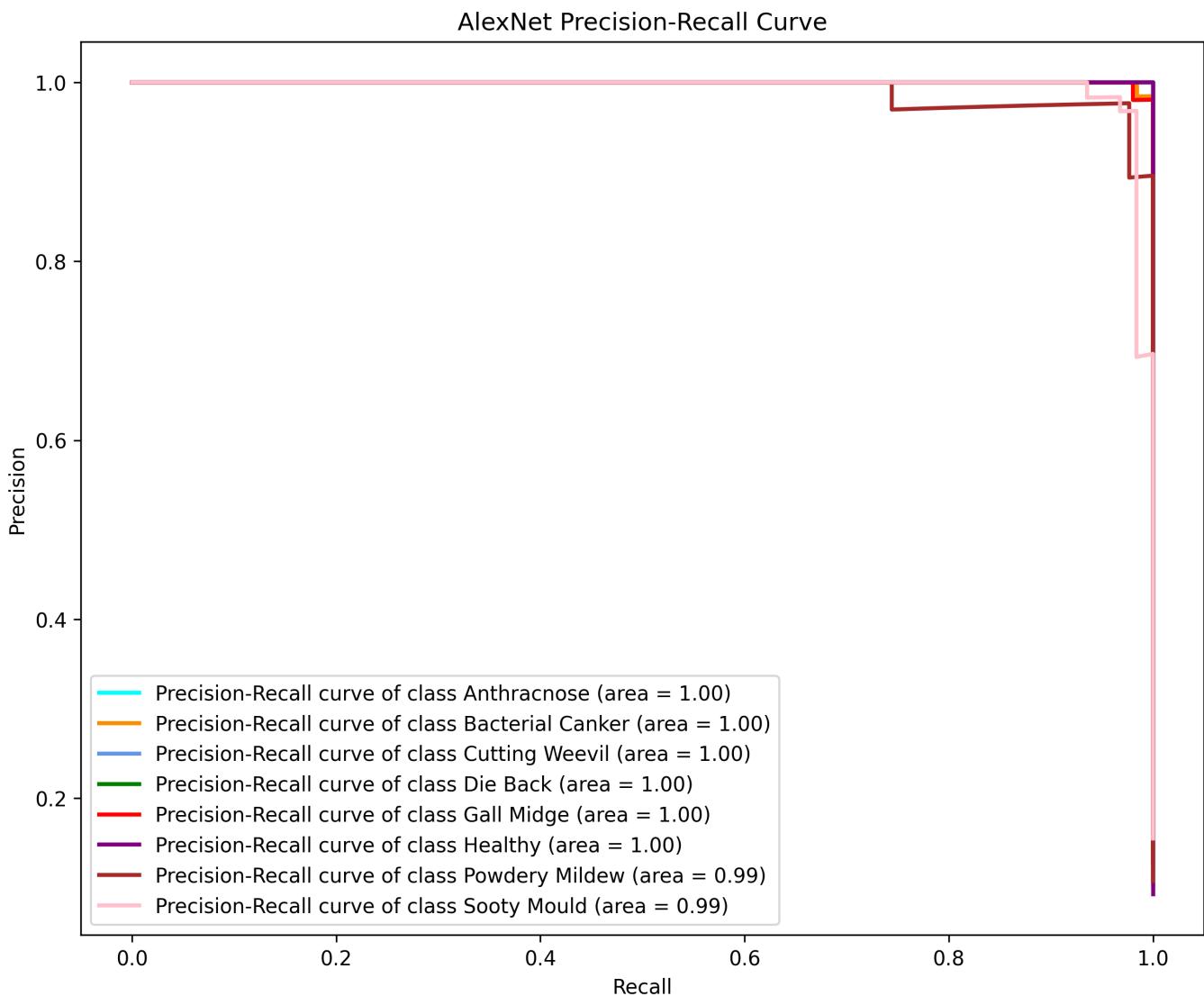
Confusion Matrix



ROC Curve



Precision-Recall Curve



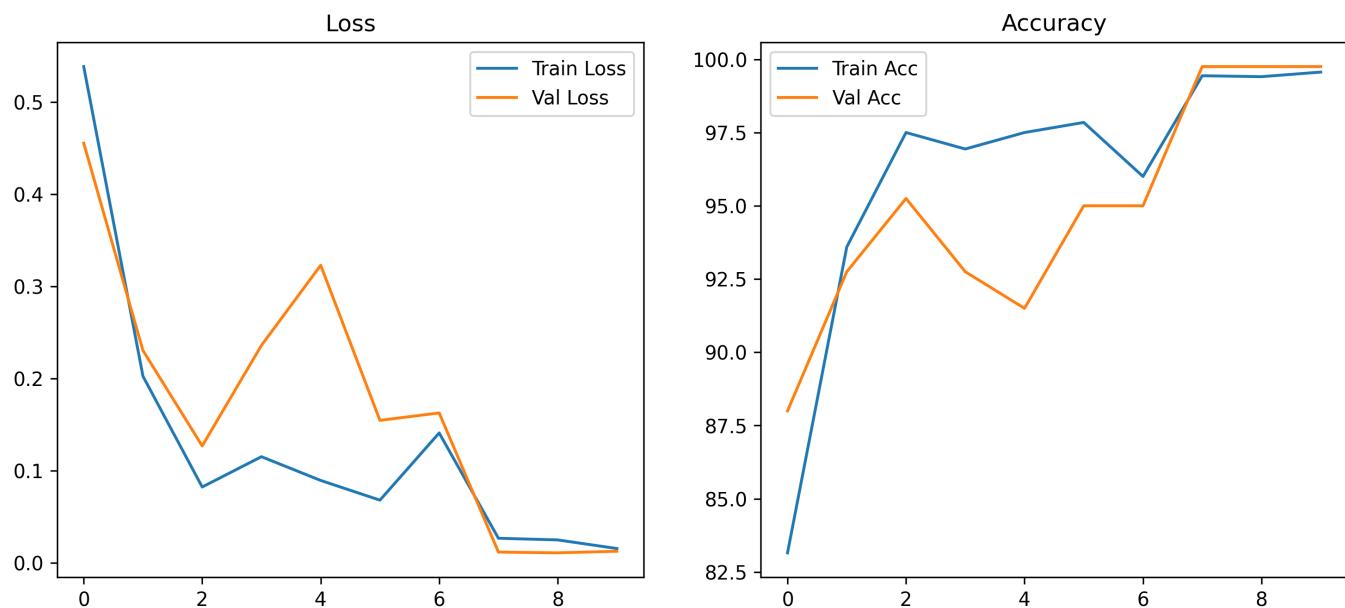
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	1.00	0.98	0.99	51.0
Bacterial Canker	0.98	0.98	0.98	64.0
Cutting Weevil	1.00	1.00	1.00	51.0
Die Back	1.00	1.00	1.00	41.0
Gall Midge	1.00	1.00	1.00	51.0
Healthy	1.00	1.00	1.00	37.0
Powdery Mildew	0.98	0.98	0.98	43.0
Sooty Mould	0.97	0.98	0.98	62.0
Macro Avg	0.99	0.99	0.99	400.0
Weighted Avg	0.99	0.99	0.99	400.0

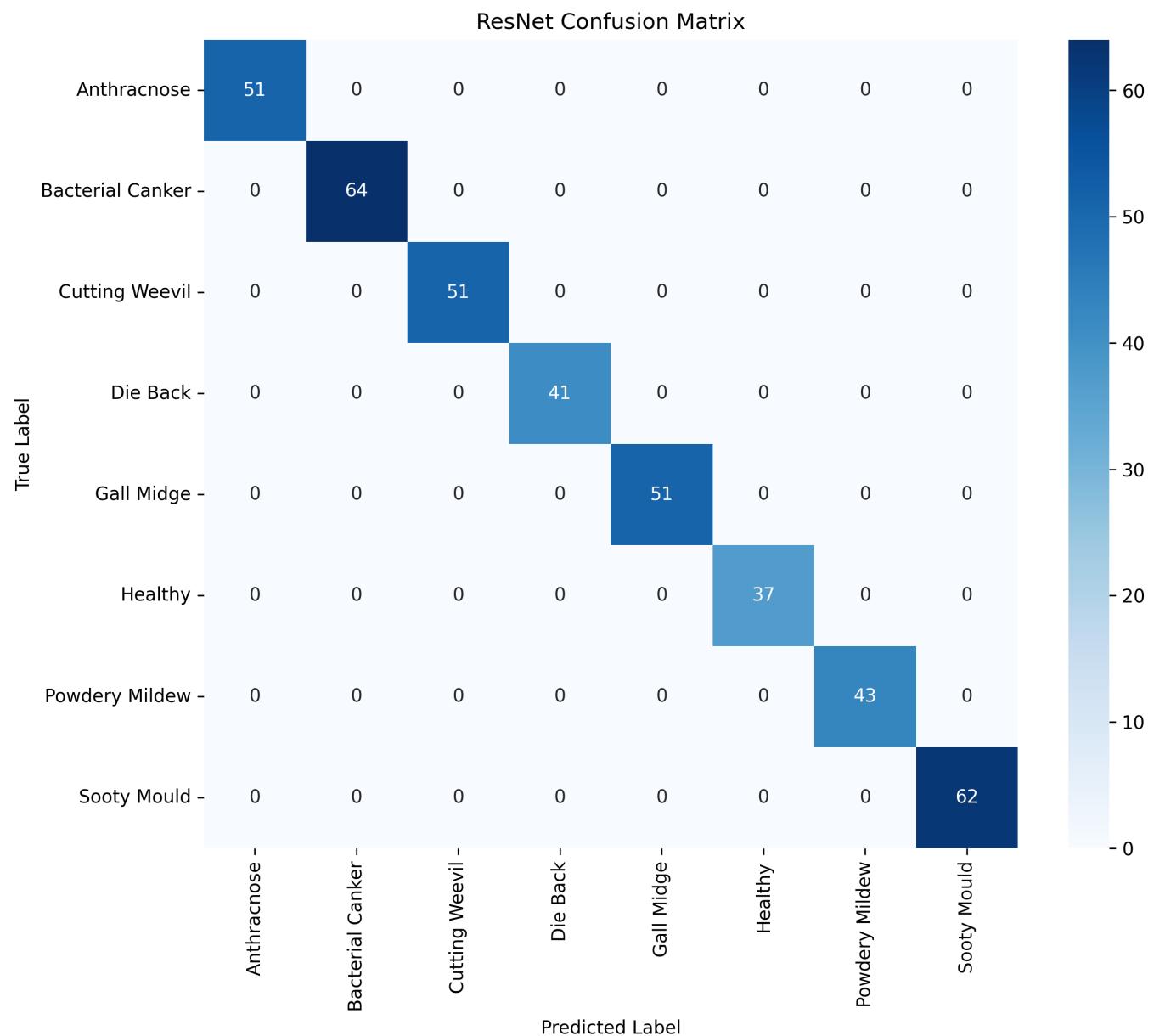
ResNet - Results

Test Accuracy: 100.00%

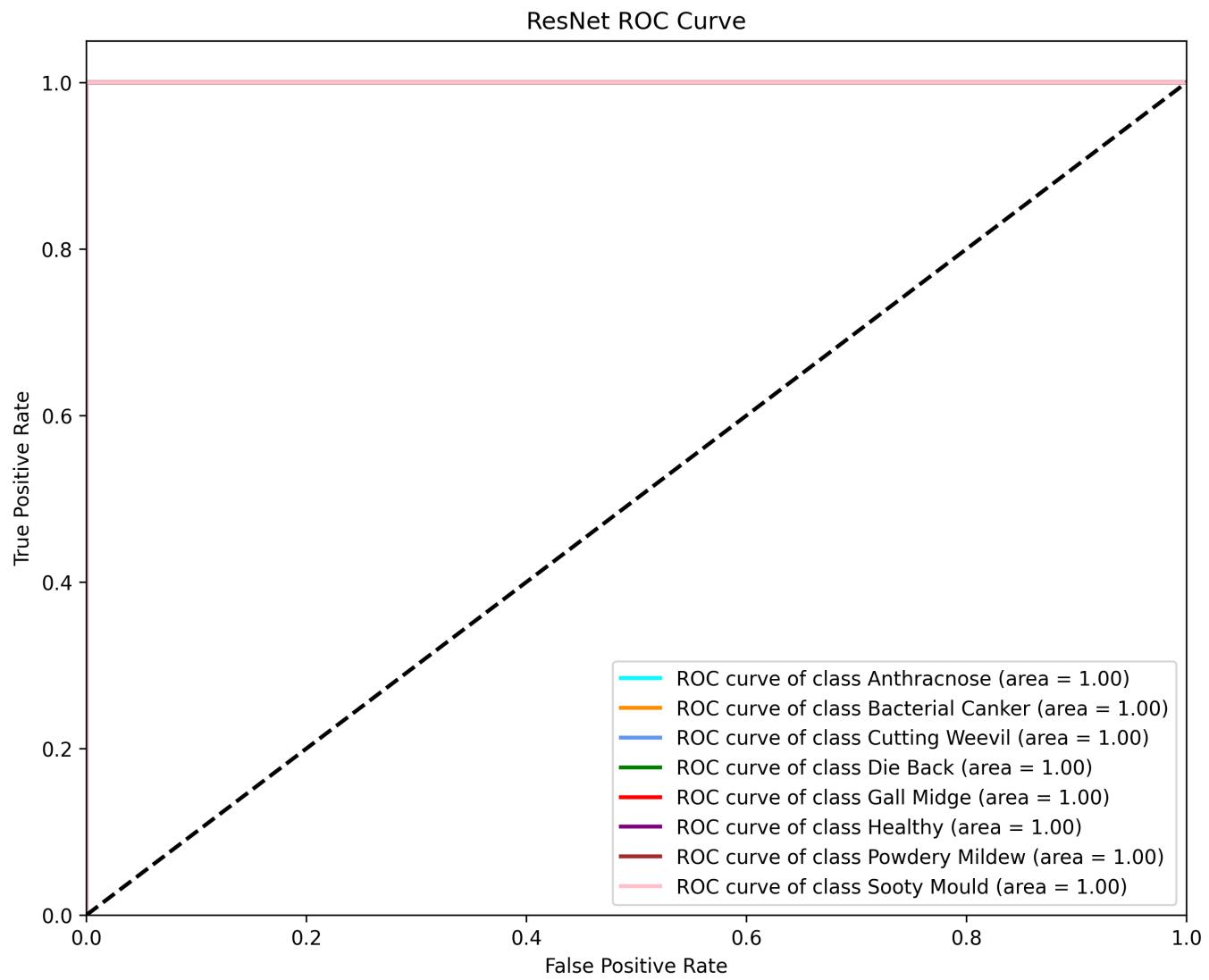
ResNet Training History



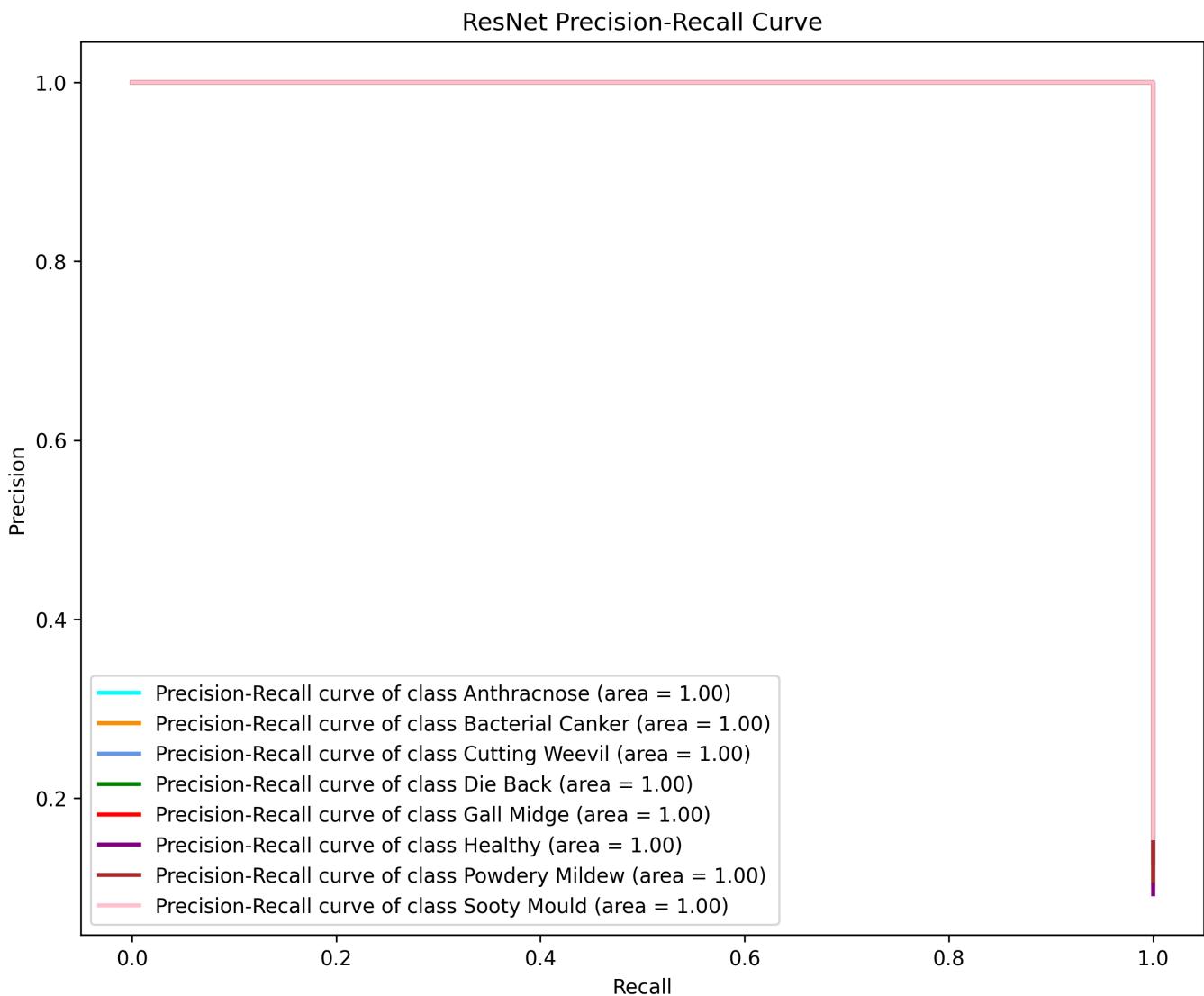
Confusion Matrix



ROC Curve



Precision-Recall Curve



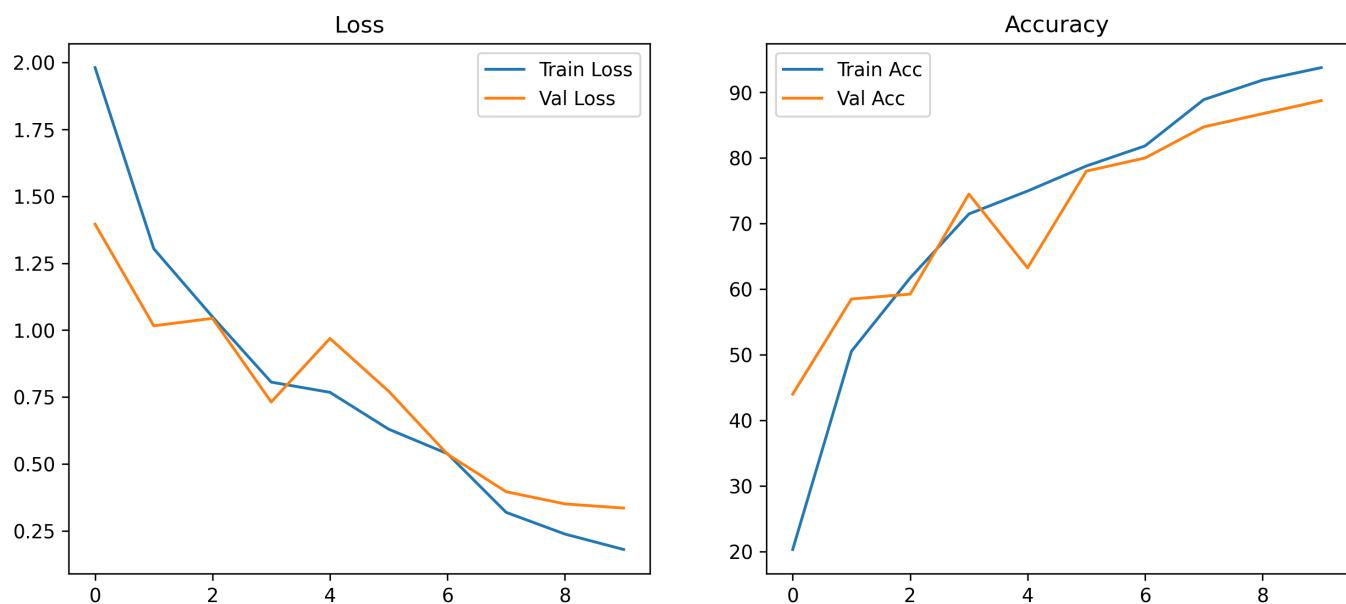
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	1.00	1.00	1.00	51.0
Bacterial Canker	1.00	1.00	1.00	64.0
Cutting Weevil	1.00	1.00	1.00	51.0
Die Back	1.00	1.00	1.00	41.0
Gall Midge	1.00	1.00	1.00	51.0
Healthy	1.00	1.00	1.00	37.0
Powdery Mildew	1.00	1.00	1.00	43.0
Sooty Mould	1.00	1.00	1.00	62.0
Macro Avg	1.00	1.00	1.00	400.0
Weighted Avg	1.00	1.00	1.00	400.0

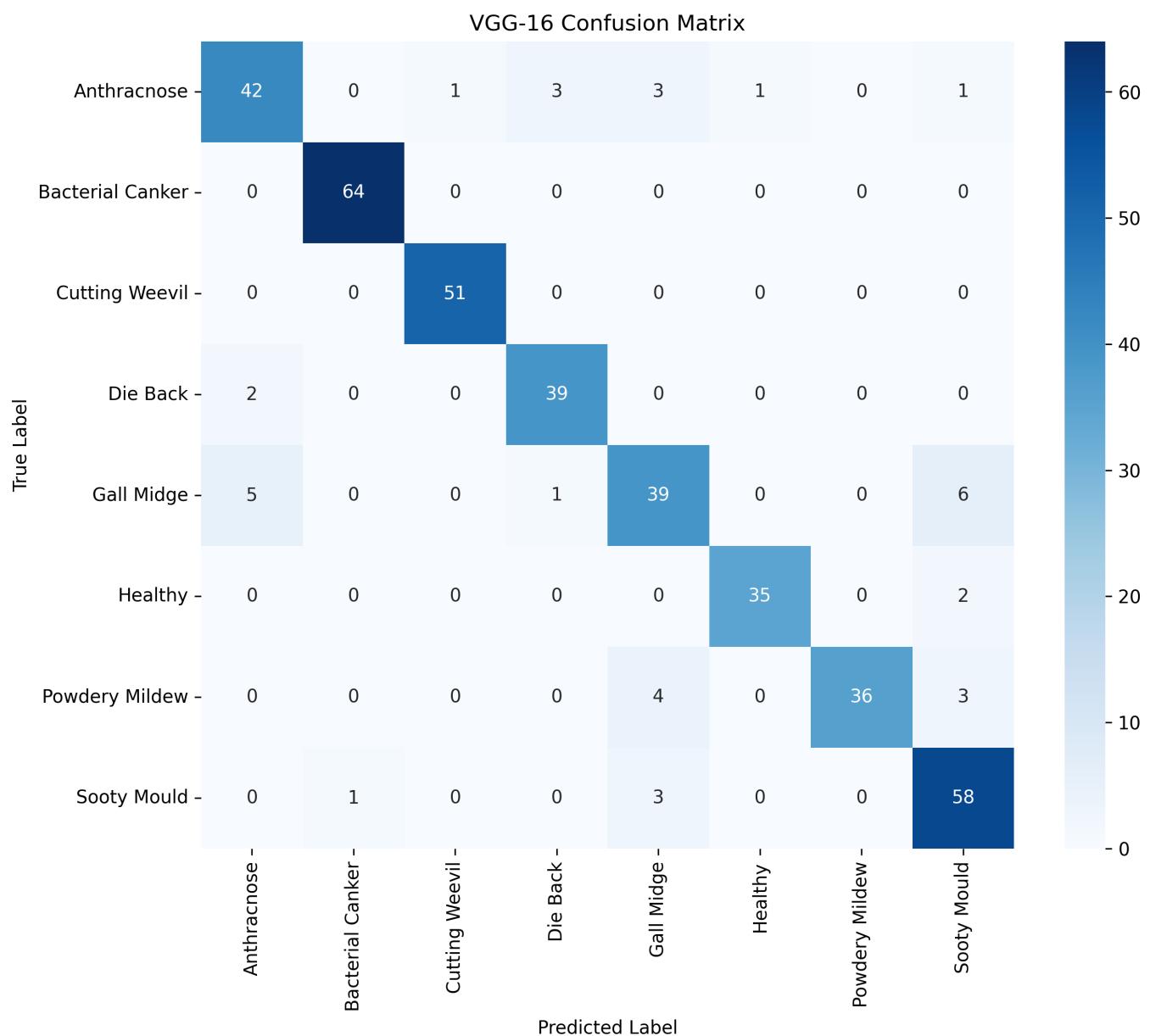
VGG-16 - Results

Test Accuracy: 91.00%

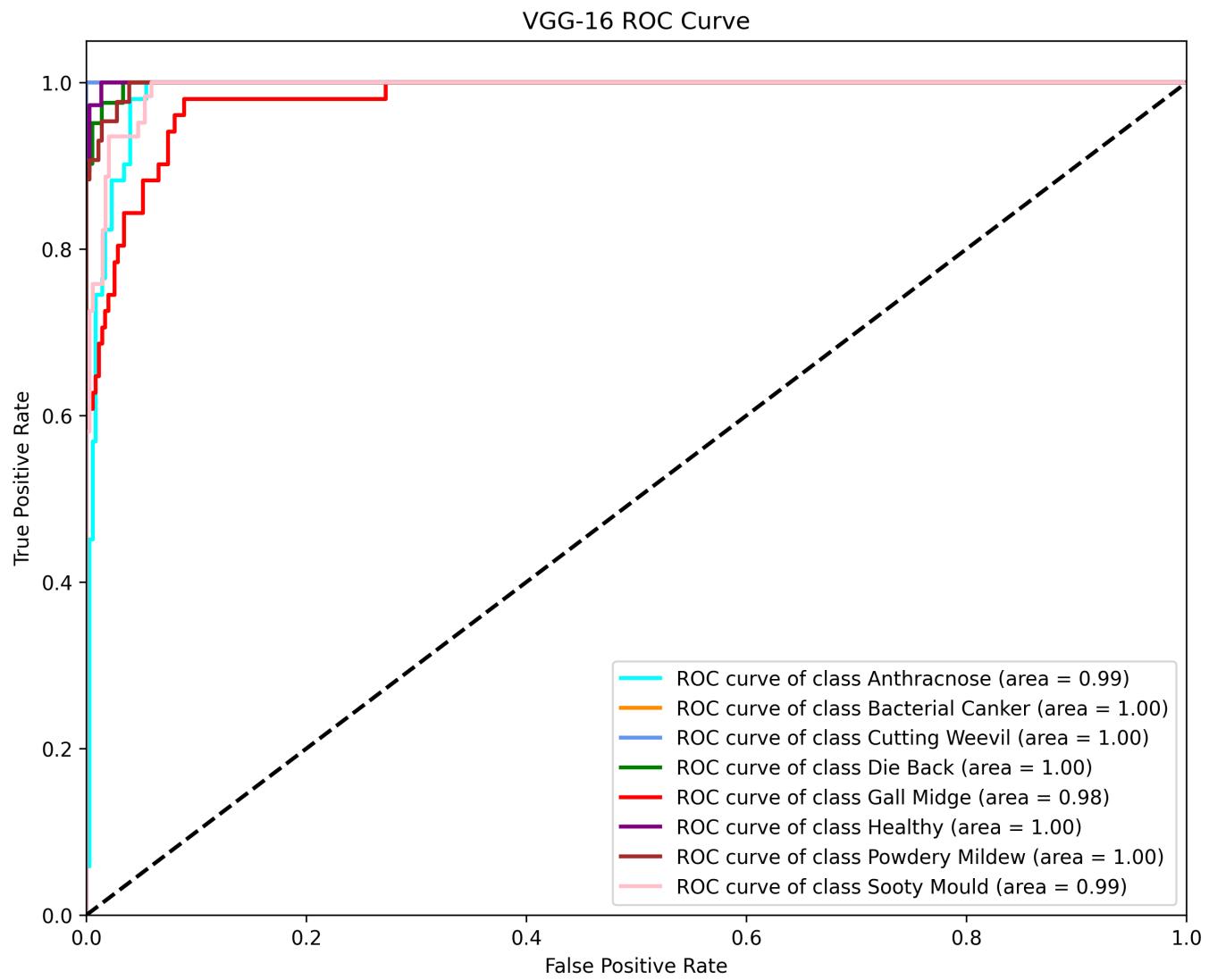
VGG-16 Training History



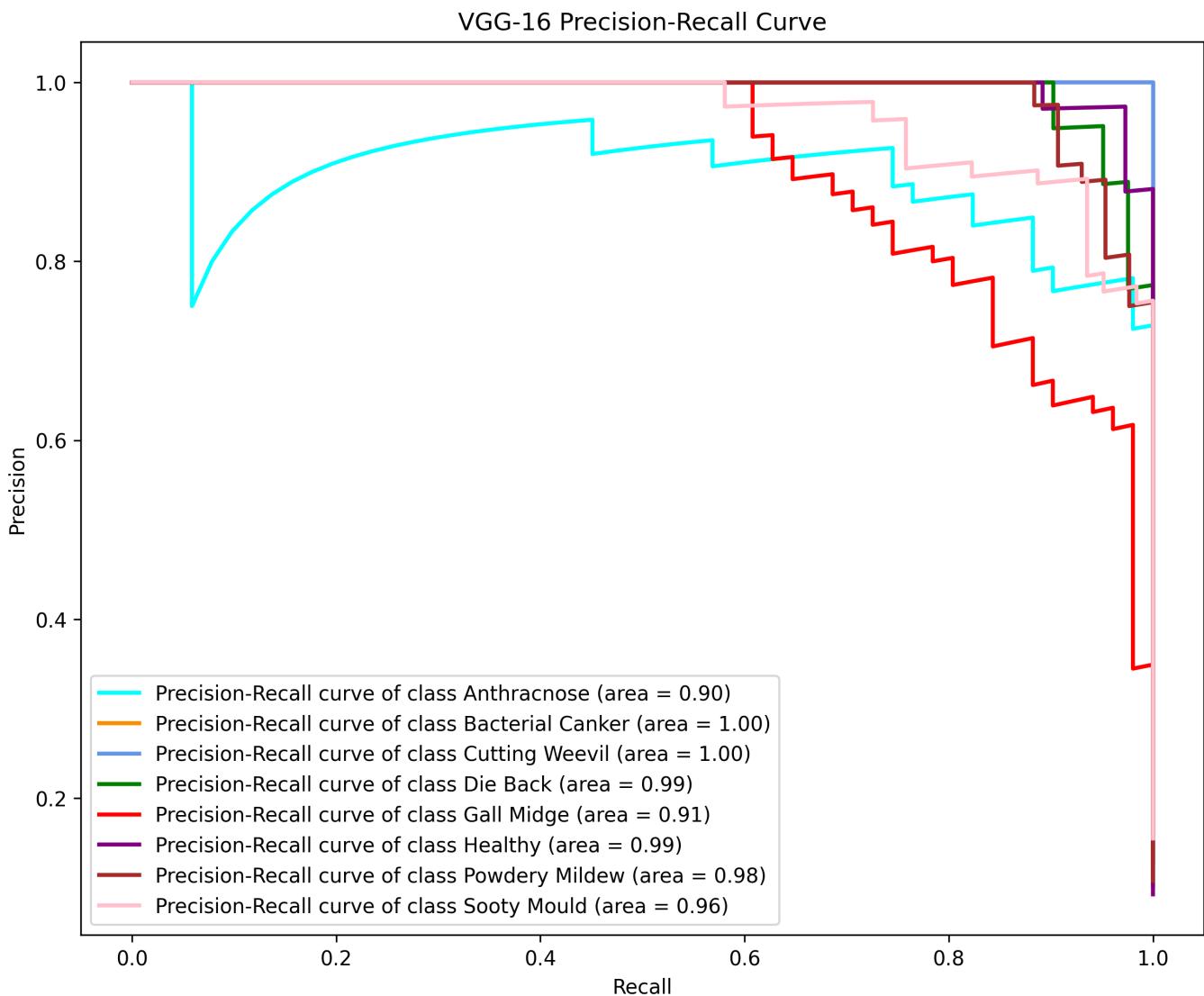
Confusion Matrix



ROC Curve



Precision-Recall Curve



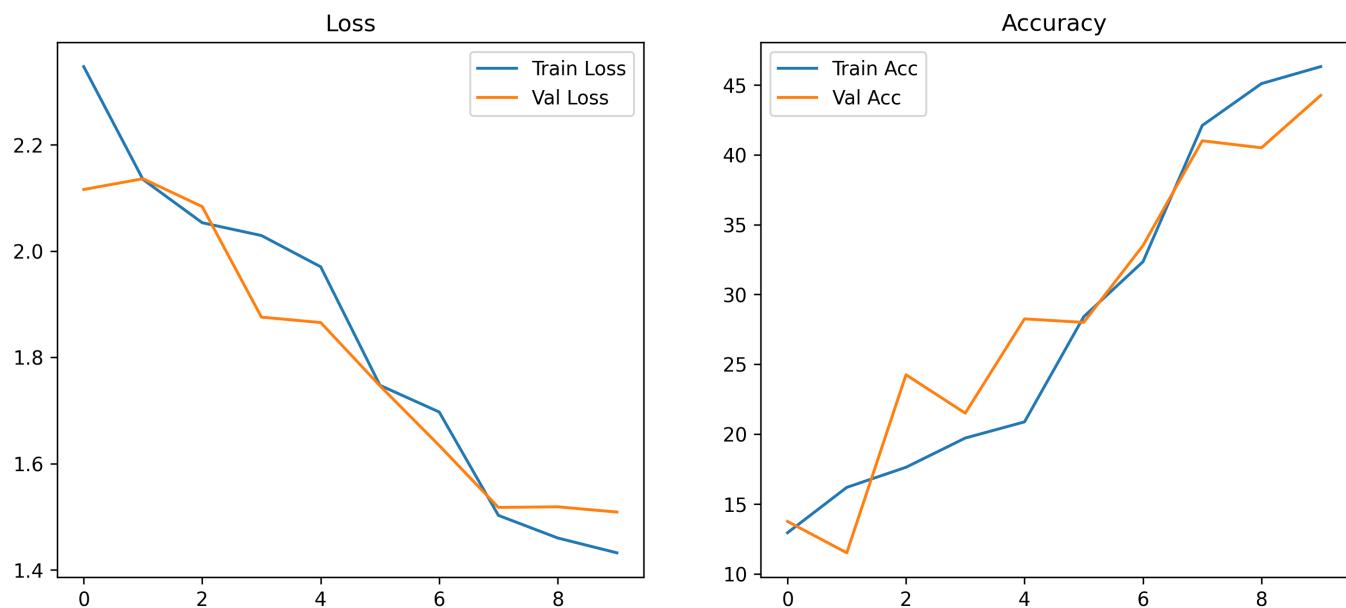
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	0.86	0.82	0.84	51.0
Bacterial Canker	0.98	1.00	0.99	64.0
Cutting Weevil	0.98	1.00	0.99	51.0
Die Back	0.91	0.95	0.93	41.0
Gall Midge	0.80	0.76	0.78	51.0
Healthy	0.97	0.95	0.96	37.0
Powdery Mildew	1.00	0.84	0.91	43.0
Sooty Mould	0.83	0.94	0.88	62.0
Macro Avg	0.92	0.91	0.91	400.0
Weighted Avg	0.91	0.91	0.91	400.0

ViT - Results

Test Accuracy: 44.00%

ViT Training History

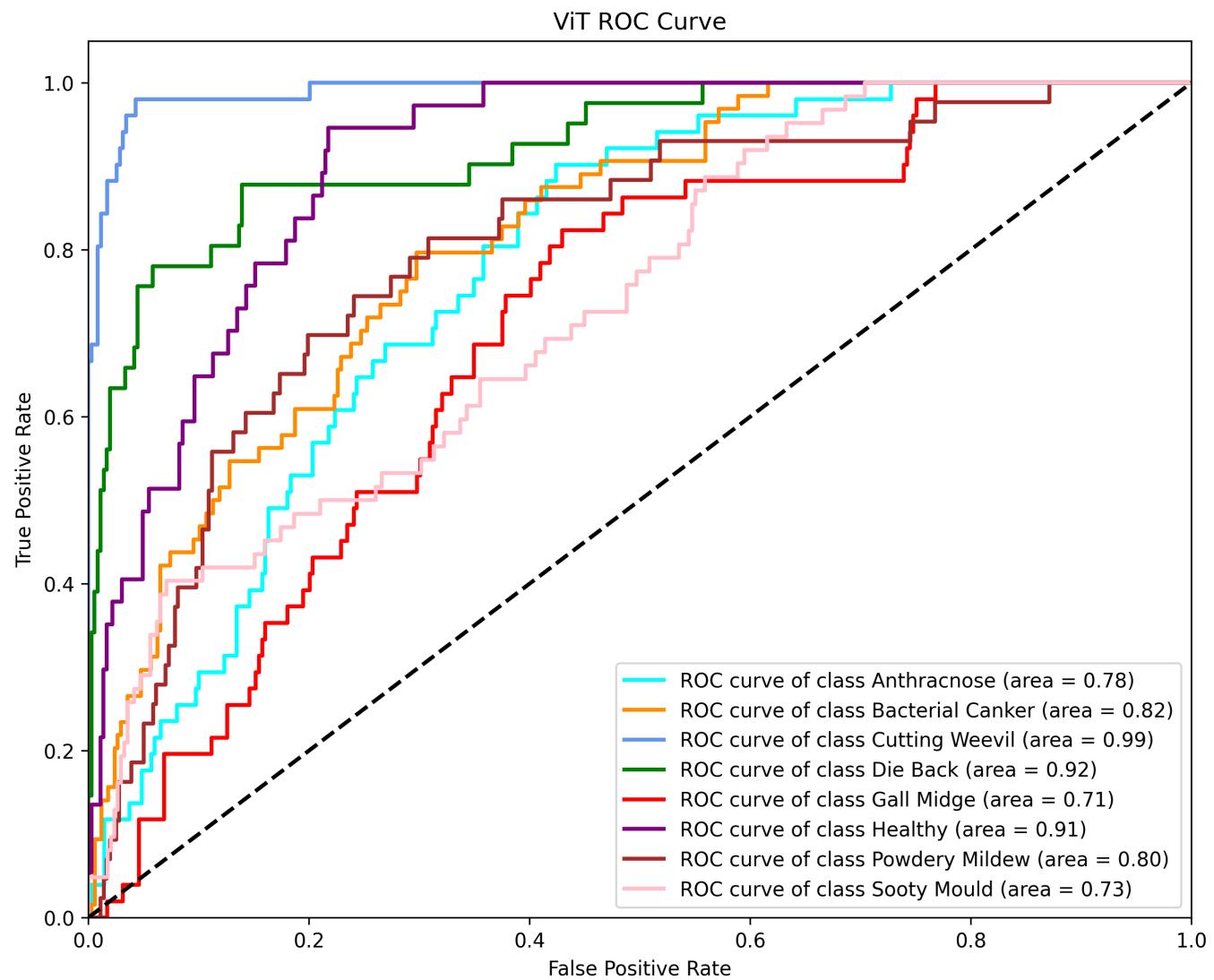


Confusion Matrix

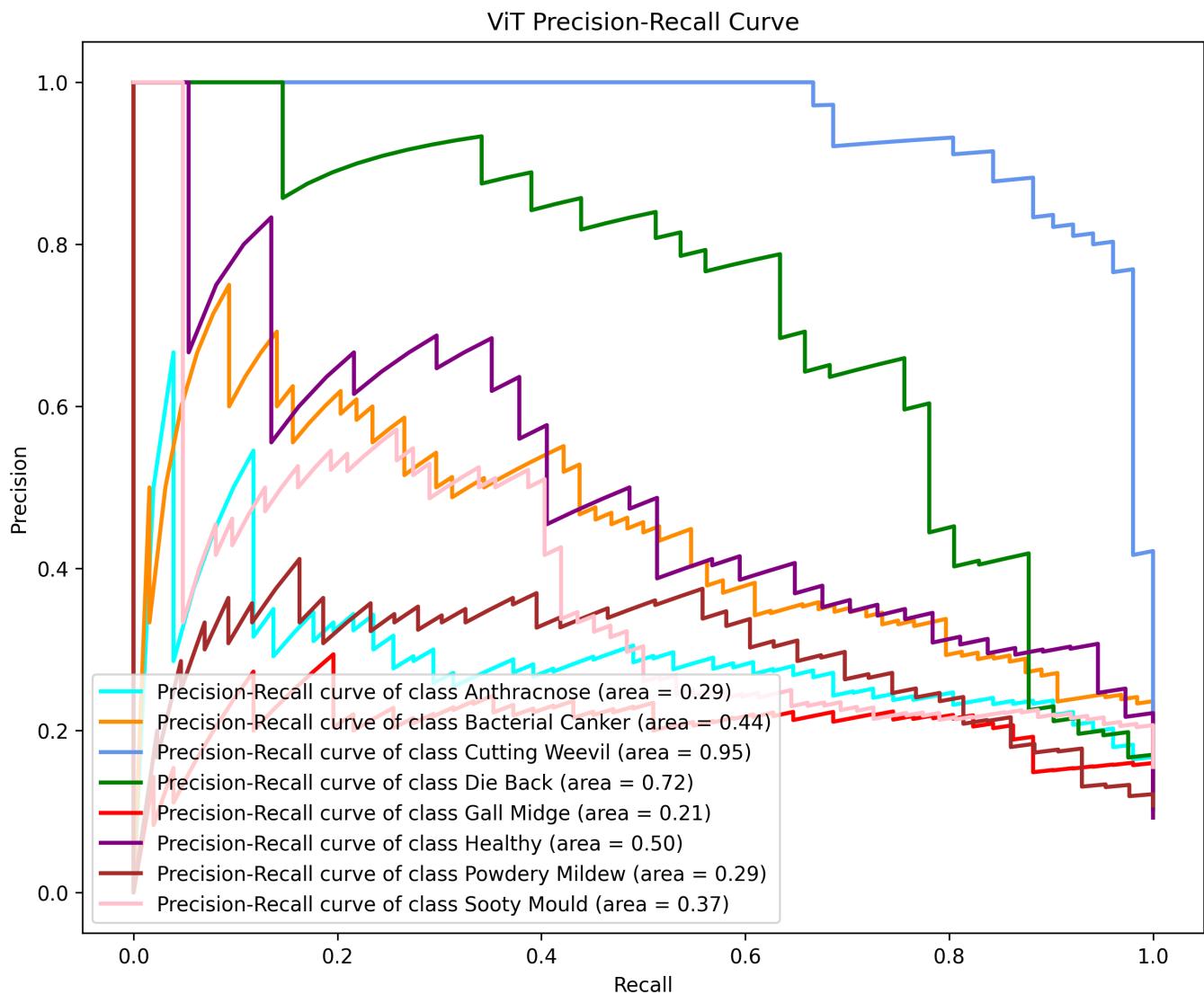
		ViT Confusion Matrix																
		Anthracnose -		Bacterial Canker -		Cutting Weevil -		Die Back -		Gall Midge -		Healthy -		Powdery Mildew -		Sooty Mould -		
True Label		15	8	2	1	3	4	9	9	8	3	1	0	1	6	0	3	- 40
	Anthracnose -																	- 30
	Bacterial Canker -	18	16	0	0	8	11	3	8	11	3	8	0	1	6	0	3	- 20
	Cutting Weevil -	0	0	49	1	0	0	1	0	0	1	0	1	0	1	6	0	- 10
	Die Back -	3	0	8	23	1	0	0	6	11	3	0	1	0	6	0	3	- 0
	Gall Midge -	6	7	2	0	1	21	11	11	3	21	11	3	1	6	24	1	- 10
	Healthy -	0	1	0	0	1	30	5	5	0	30	5	0	1	5	24	1	- 10
	Powdery Mildew -	5	0	1	5	1	6	24	24	1	6	24	1	1	6	24	1	- 10
	Sooty Mould -	10	6	0	0	0	17	11	11	18	17	11	18	0	11	18	1	- 0

Predicted Label

ROC Curve



Precision-Recall Curve



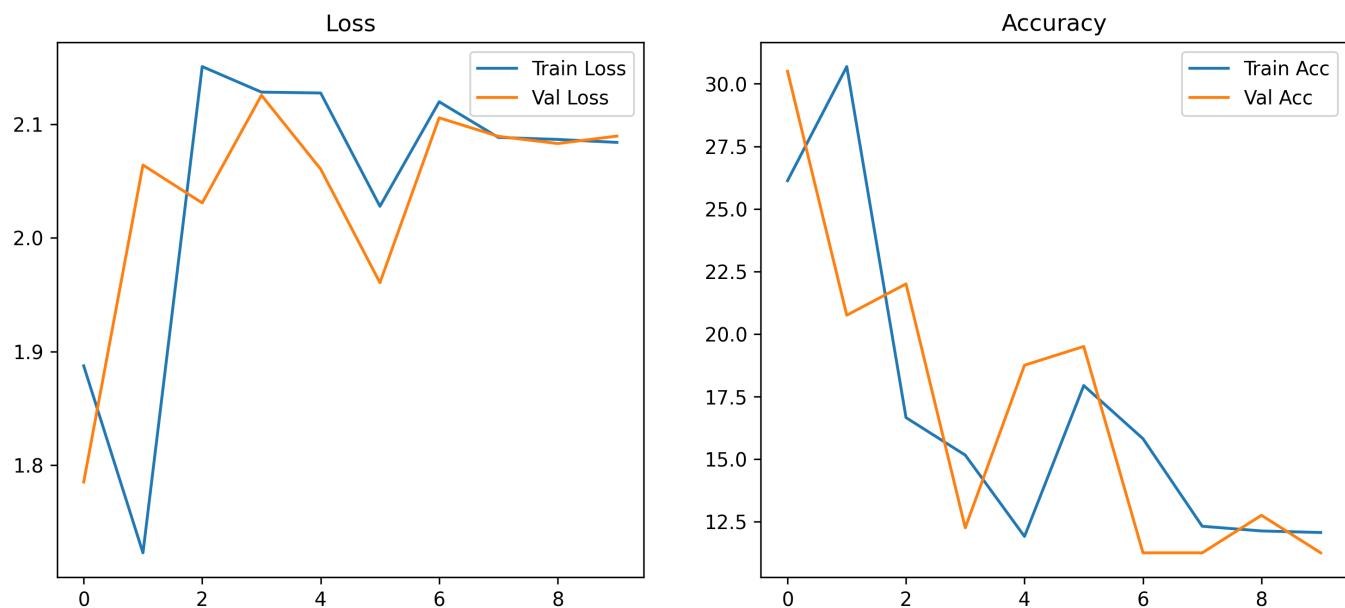
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	0.26	0.29	0.28	51.0
Bacterial Canker	0.42	0.25	0.31	64.0
Cutting Weevil	0.79	0.96	0.87	51.0
Die Back	0.77	0.56	0.65	41.0
Gall Midge	0.07	0.02	0.03	51.0
Healthy	0.34	0.81	0.48	37.0
Powdery Mildew	0.34	0.56	0.42	43.0
Sooty Mould	0.46	0.29	0.36	62.0
Macro Avg	0.43	0.47	0.42	400.0
Weighted Avg	0.43	0.44	0.41	400.0

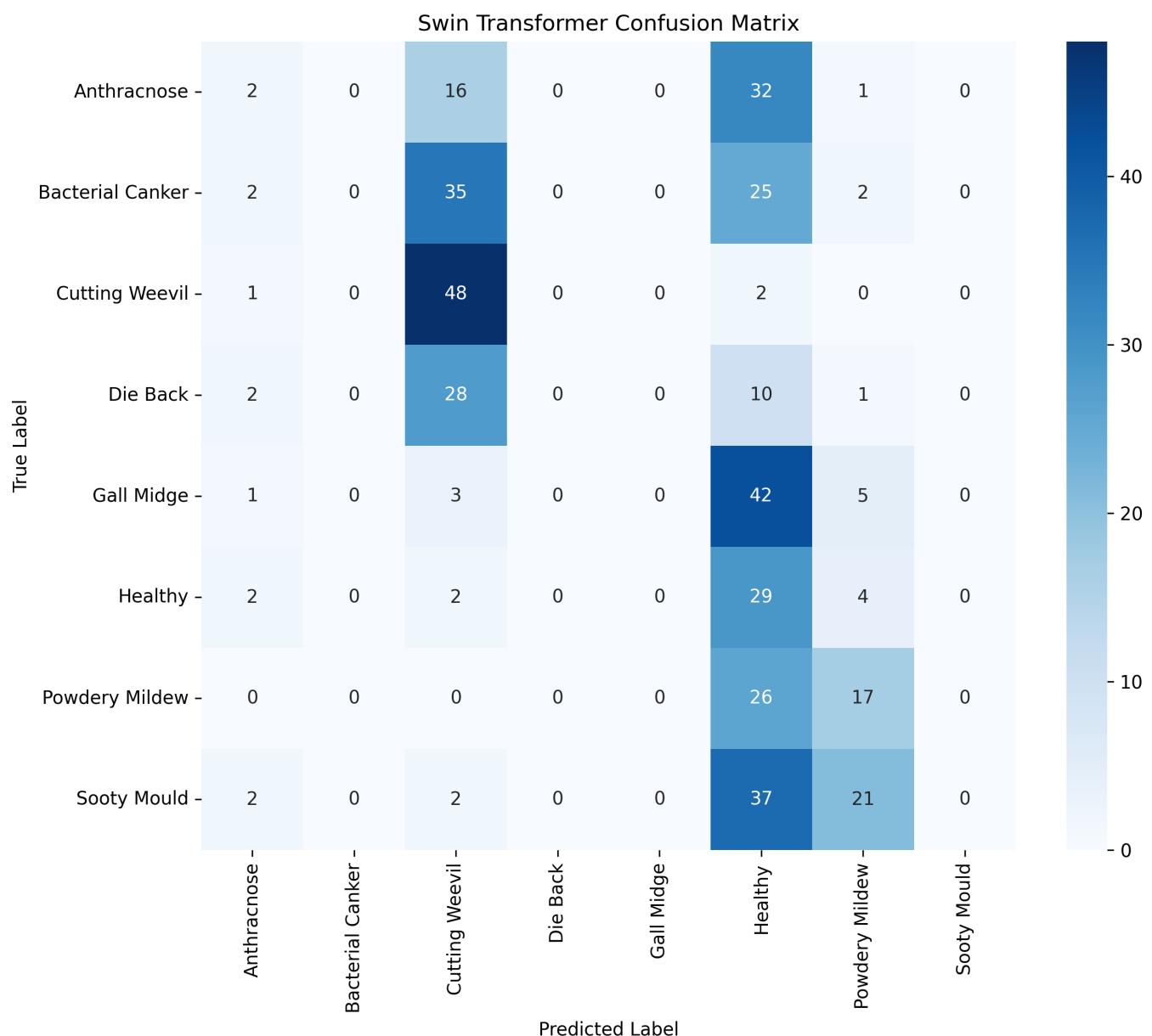
Swin Transformer - Results

Test Accuracy: 24.00%

Swin Transformer Training History

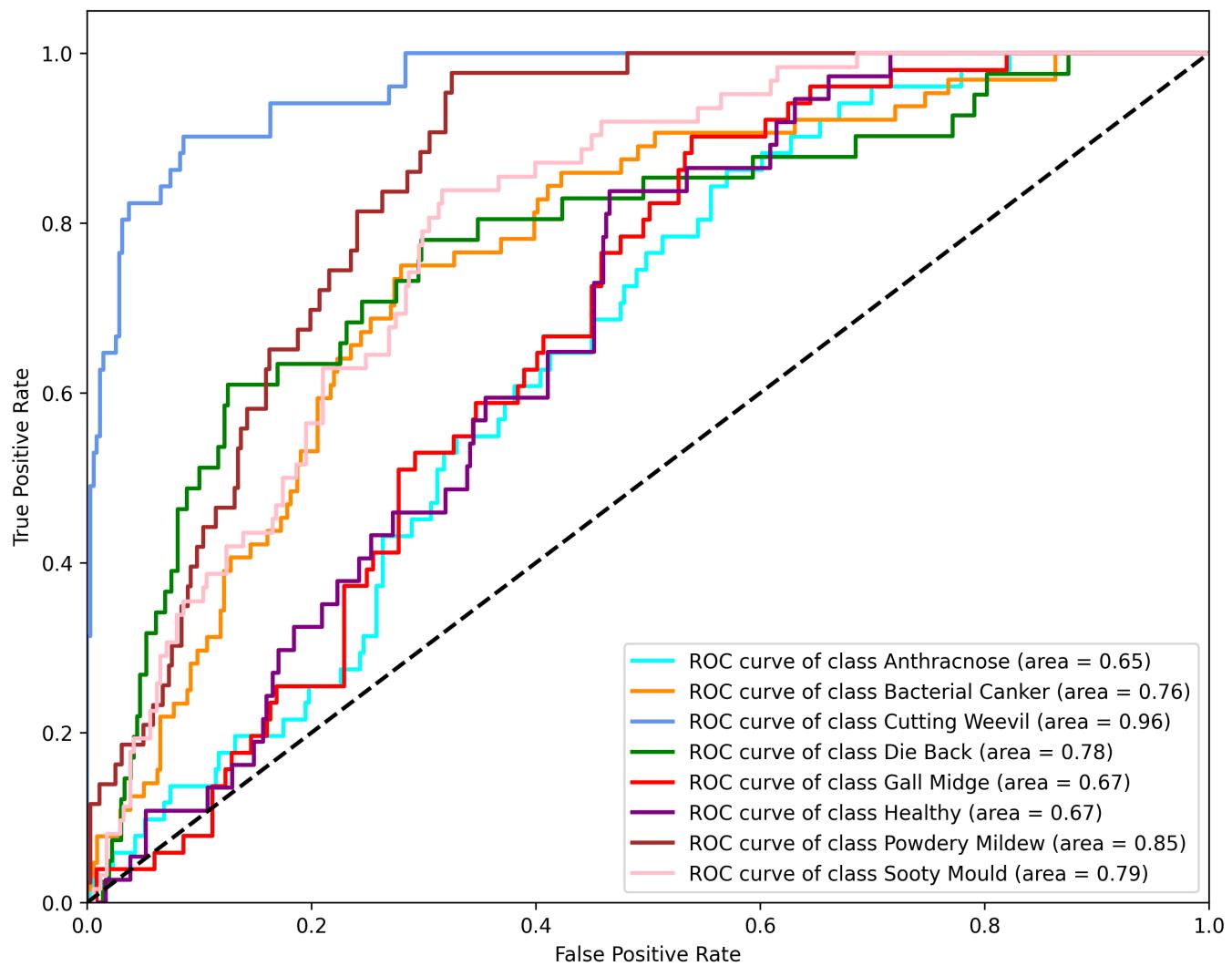


Confusion Matrix

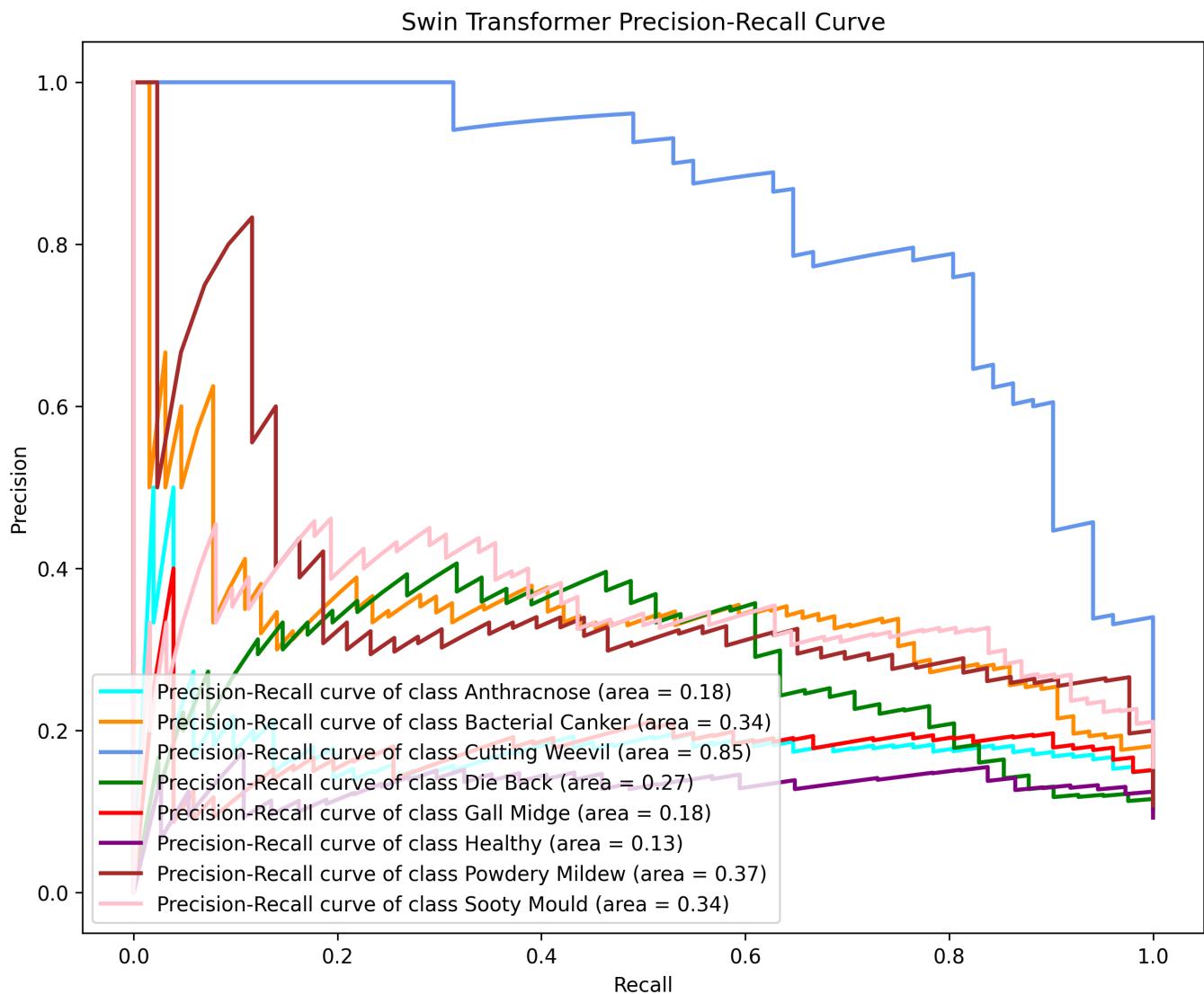


ROC Curve

Swin Transformer ROC Curve



Precision-Recall Curve



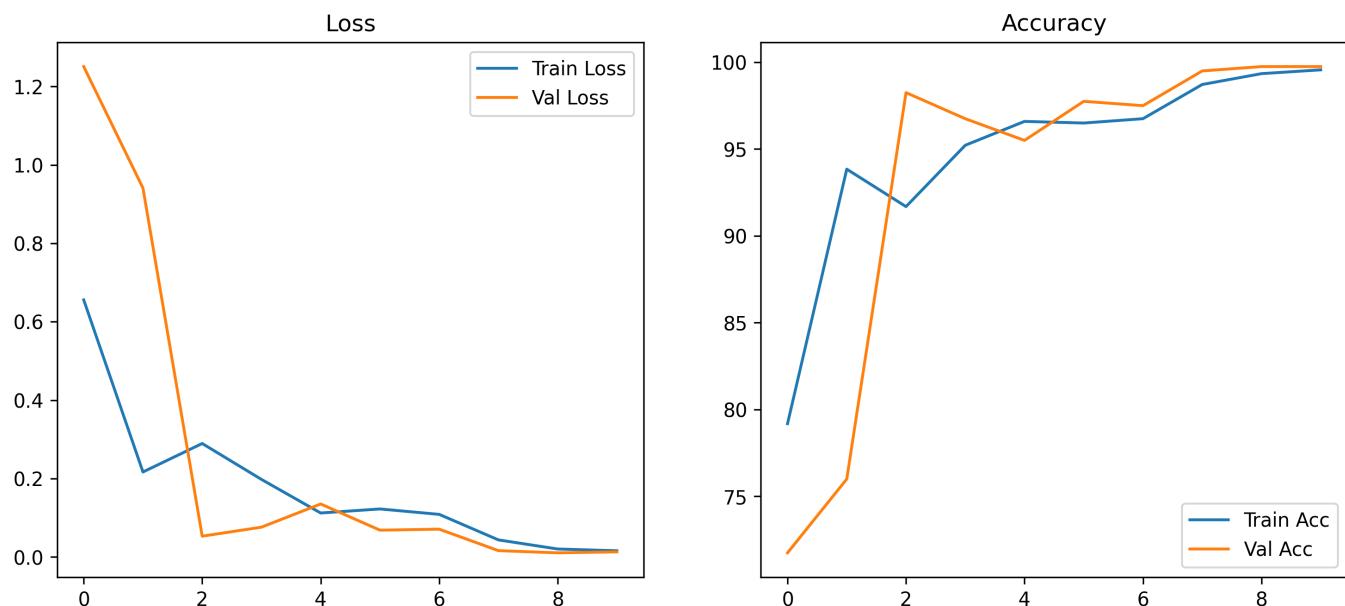
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	0.17	0.04	0.06	51.0
Bacterial Canker	0.00	0.00	0.00	64.0
Cutting Weevil	0.36	0.94	0.52	51.0
Die Back	0.00	0.00	0.00	41.0
Gall Midge	0.00	0.00	0.00	51.0
Healthy	0.14	0.78	0.24	37.0
Powdery Mildew	0.33	0.40	0.36	43.0
Sooty Mould	0.00	0.00	0.00	62.0
Macro Avg	0.13	0.27	0.15	400.0
Weighted Avg	0.12	0.24	0.14	400.0

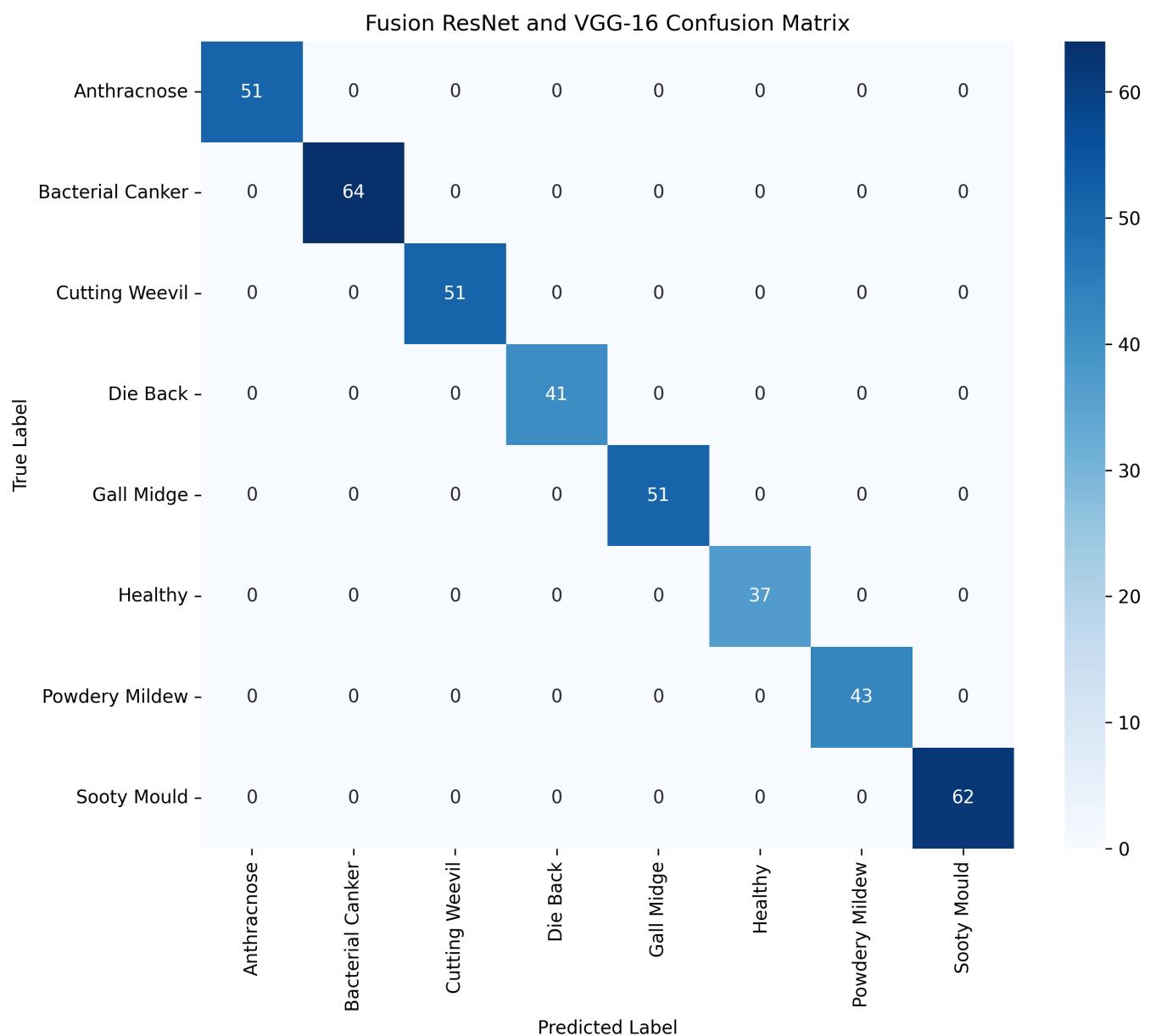
Fusion ResNet and VGG-16 - Results

Test Accuracy: 100.00%

Fusion ResNet and VGG-16 Training History

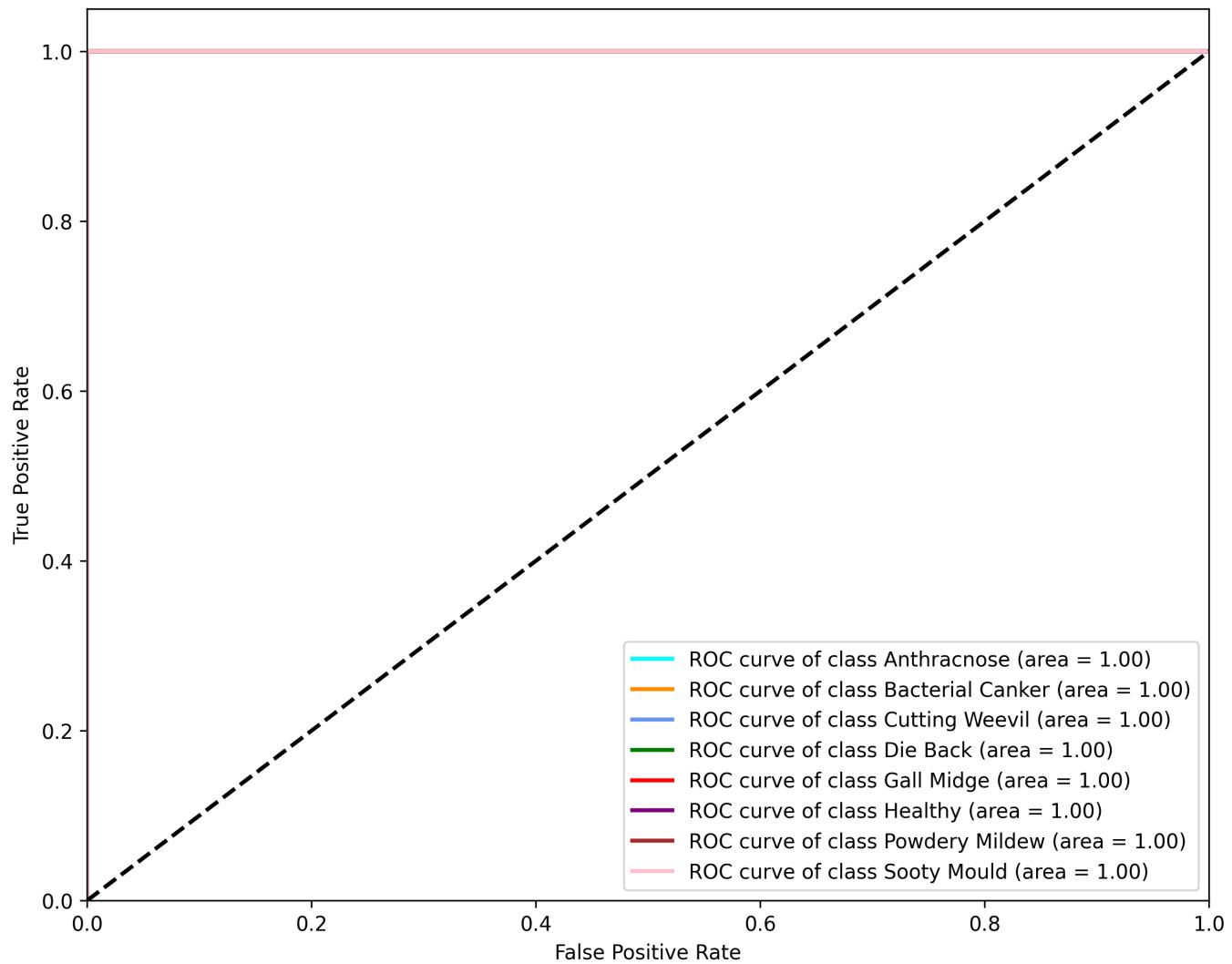


Confusion Matrix

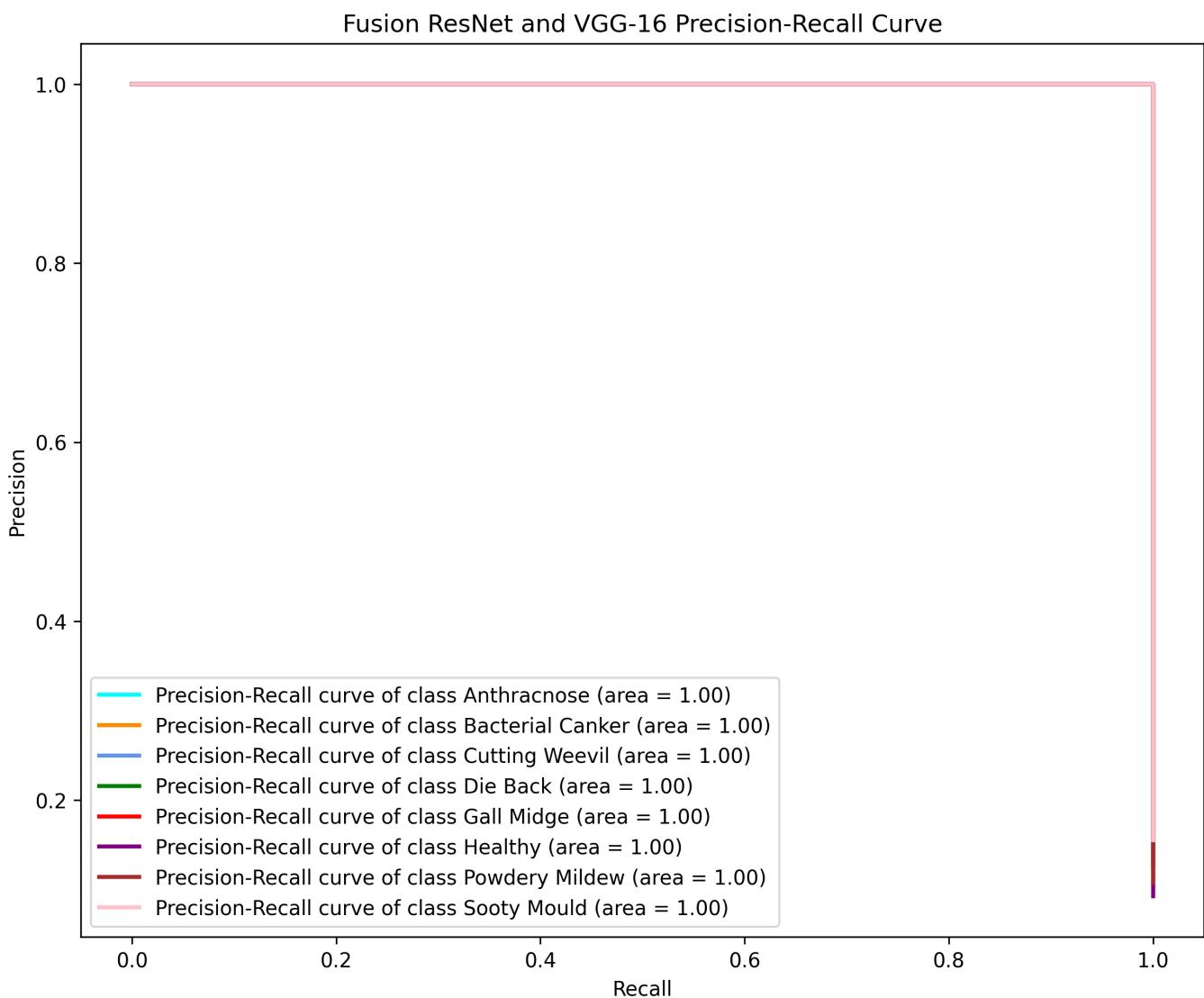


ROC Curve

Fusion ResNet and VGG-16 ROC Curve



Precision-Recall Curve



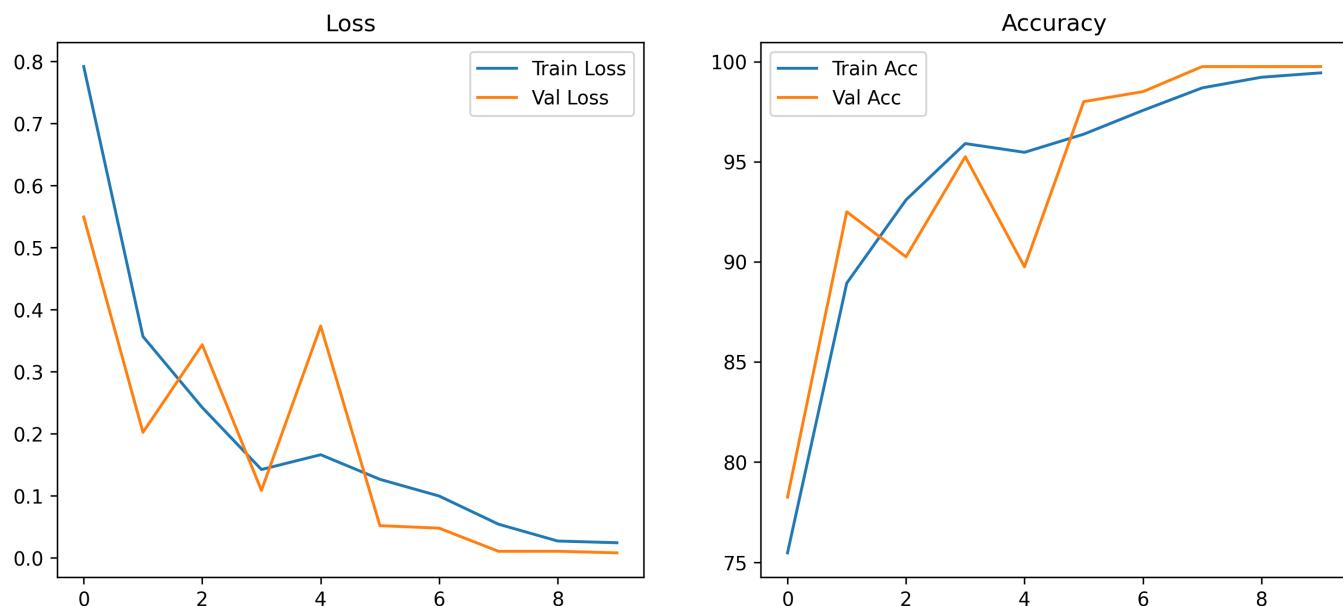
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	1.00	1.00	1.00	51.0
Bacterial Canker	1.00	1.00	1.00	64.0
Cutting Weevil	1.00	1.00	1.00	51.0
Die Back	1.00	1.00	1.00	41.0
Gall Midge	1.00	1.00	1.00	51.0
Healthy	1.00	1.00	1.00	37.0
Powdery Mildew	1.00	1.00	1.00	43.0
Sooty Mould	1.00	1.00	1.00	62.0
Macro Avg	1.00	1.00	1.00	400.0
Weighted Avg	1.00	1.00	1.00	400.0

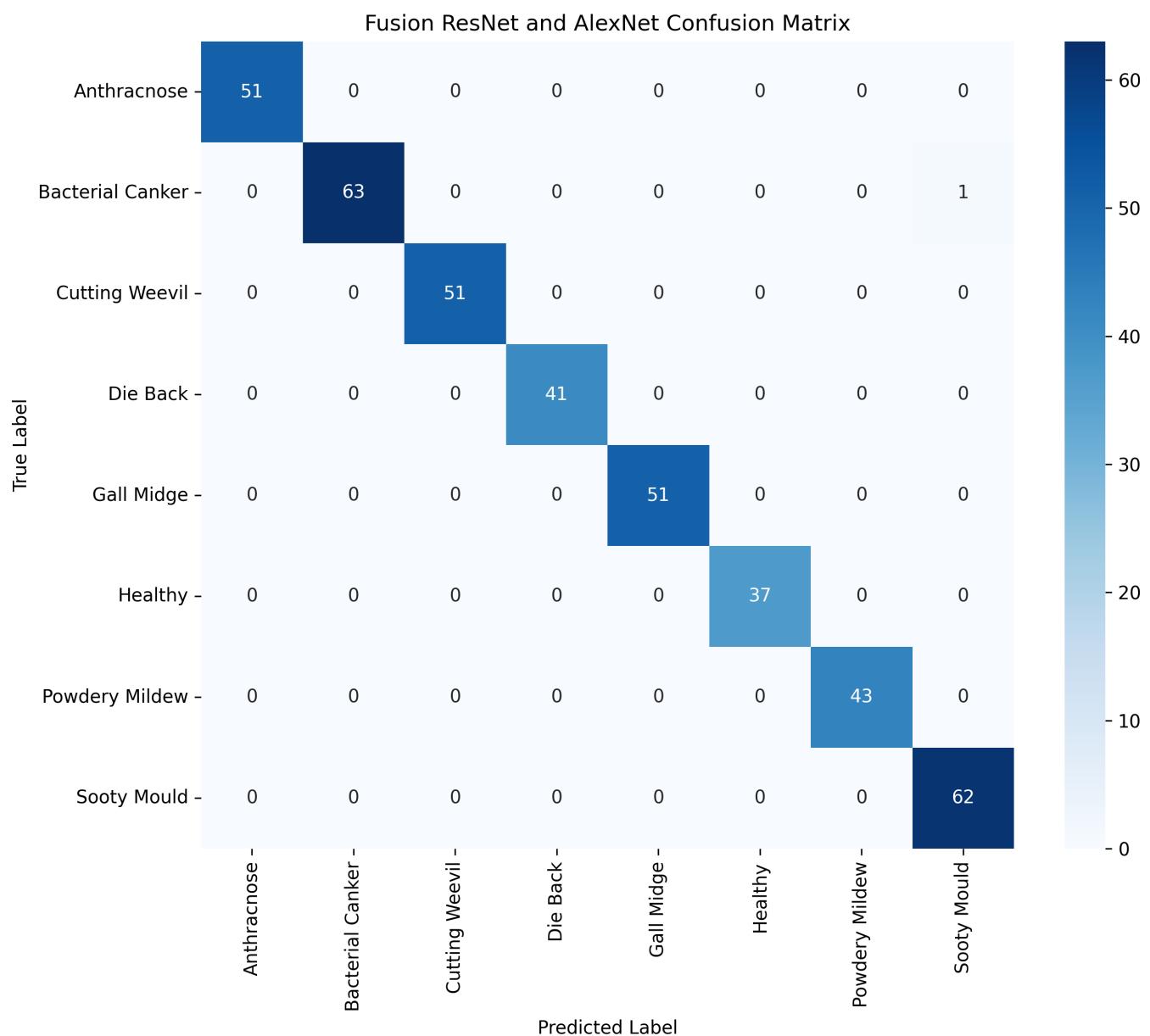
Fusion ResNet and AlexNet - Results

Test Accuracy: 99.75%

Fusion ResNet and AlexNet Training History

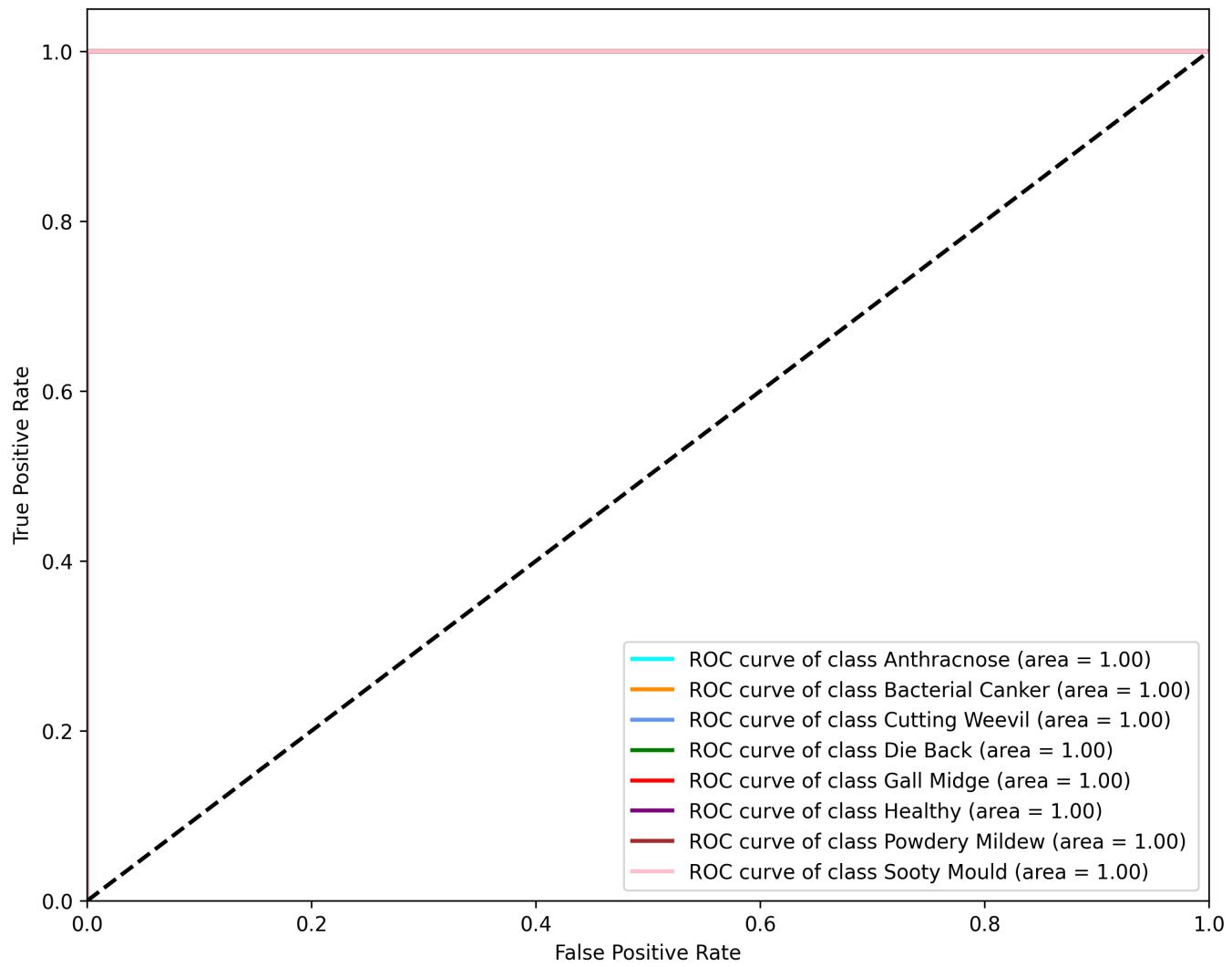


Confusion Matrix

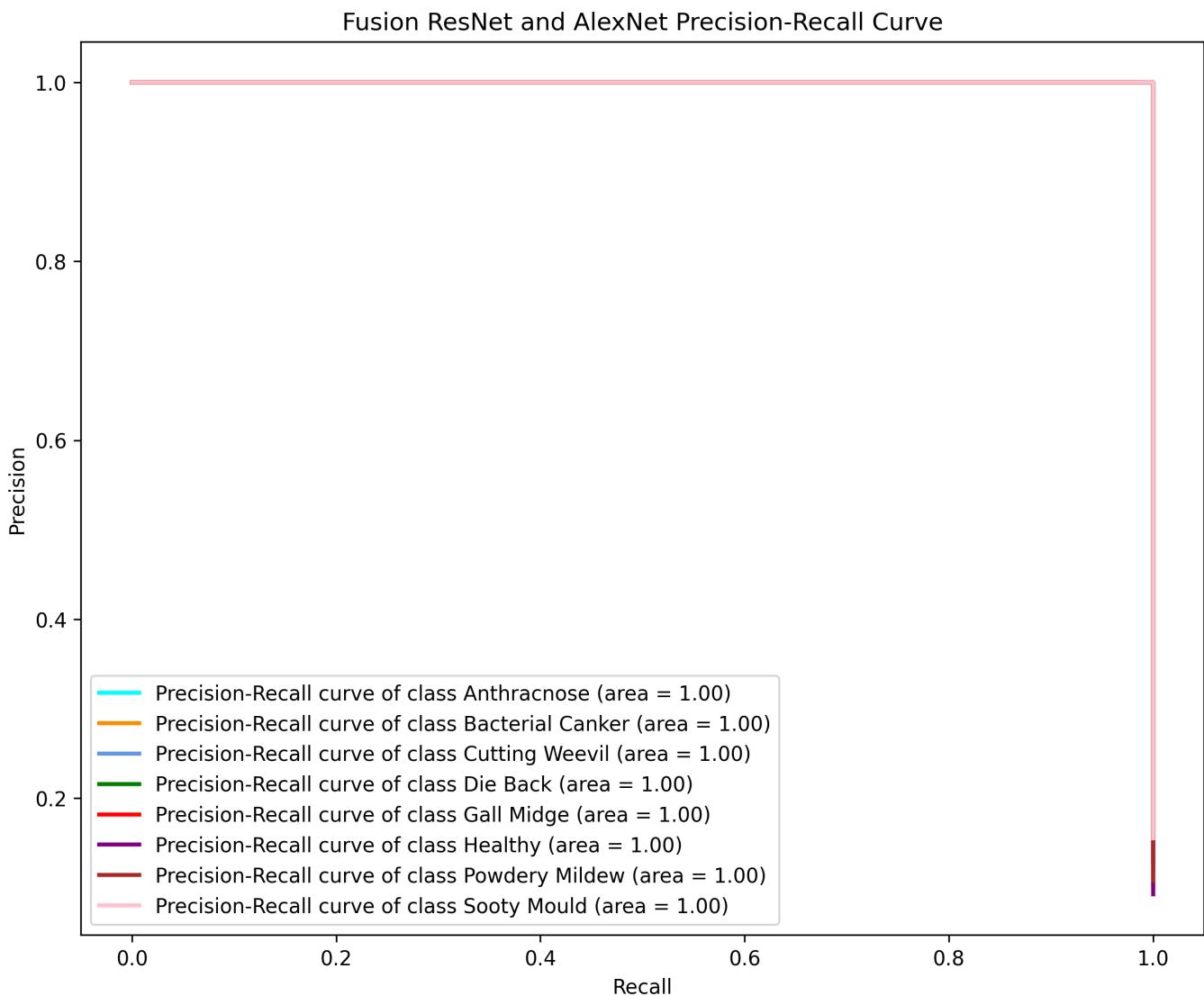


ROC Curve

Fusion ResNet and AlexNet ROC Curve



Precision-Recall Curve



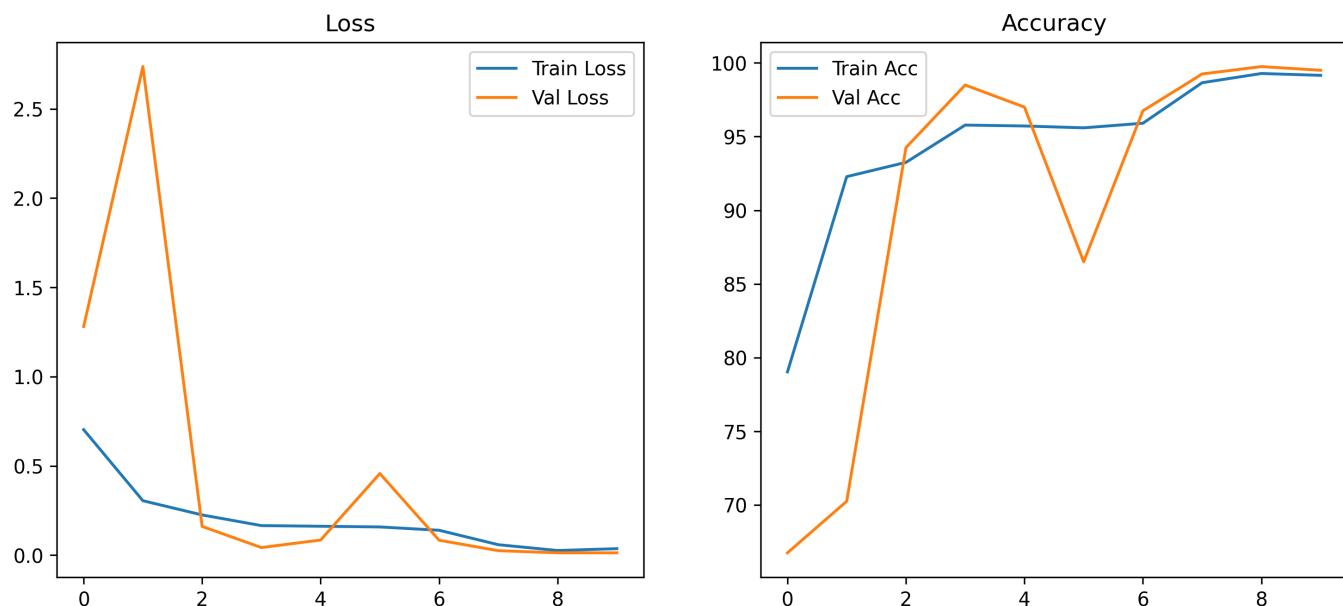
Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	1.00	1.00	1.00	51.0
Bacterial Canker	1.00	0.98	0.99	64.0
Cutting Weevil	1.00	1.00	1.00	51.0
Die Back	1.00	1.00	1.00	41.0
Gall Midge	1.00	1.00	1.00	51.0
Healthy	1.00	1.00	1.00	37.0
Powdery Mildew	1.00	1.00	1.00	43.0
Sooty Mould	0.98	1.00	0.99	62.0
Macro Avg	1.00	1.00	1.00	400.0
Weighted Avg	1.00	1.00	1.00	400.0

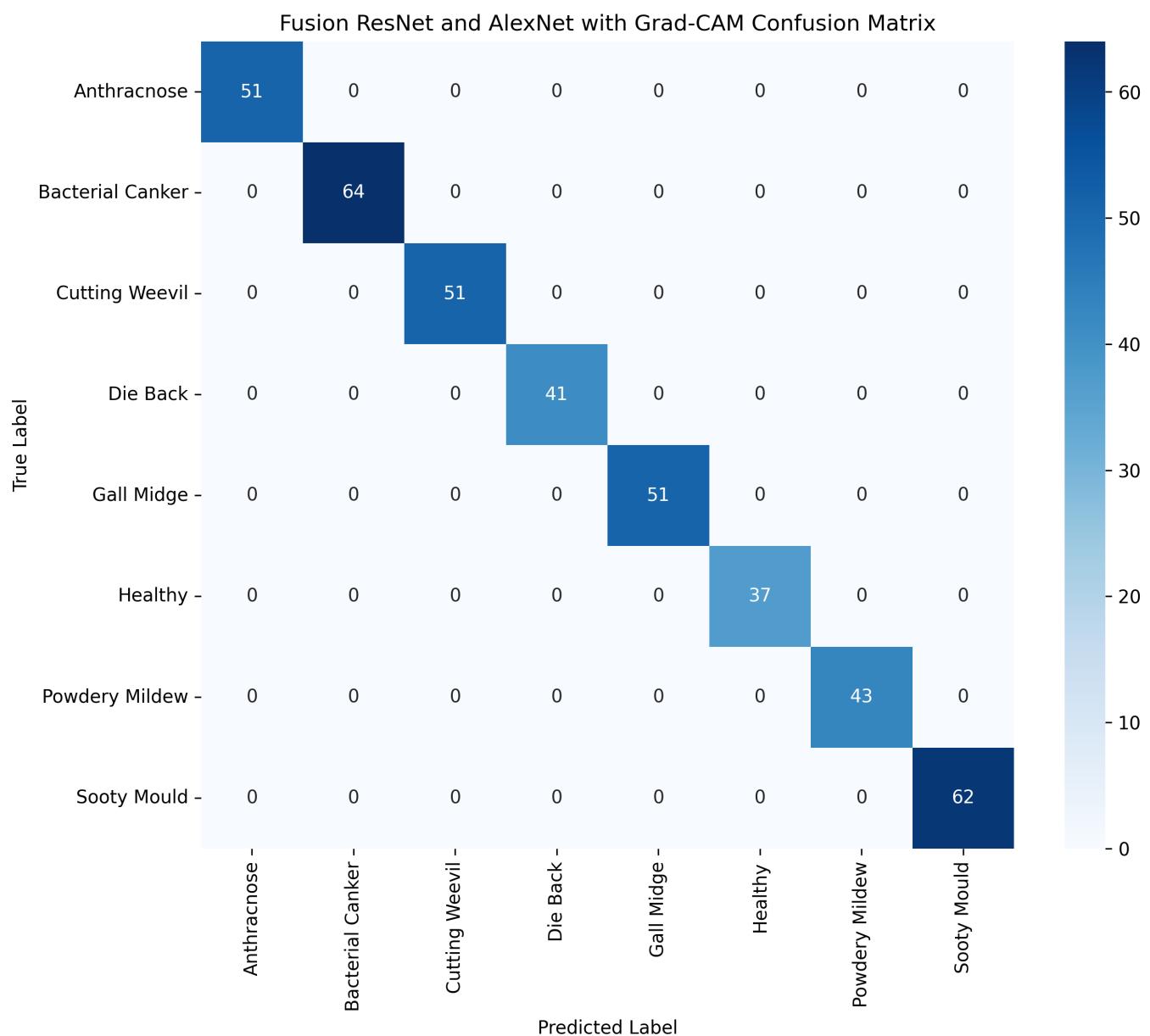
Fusion ResNet and AlexNet with Grad-CAM - Results

Test Accuracy: 100.00%

Fusion ResNet and AlexNet with Grad-CAM Training History

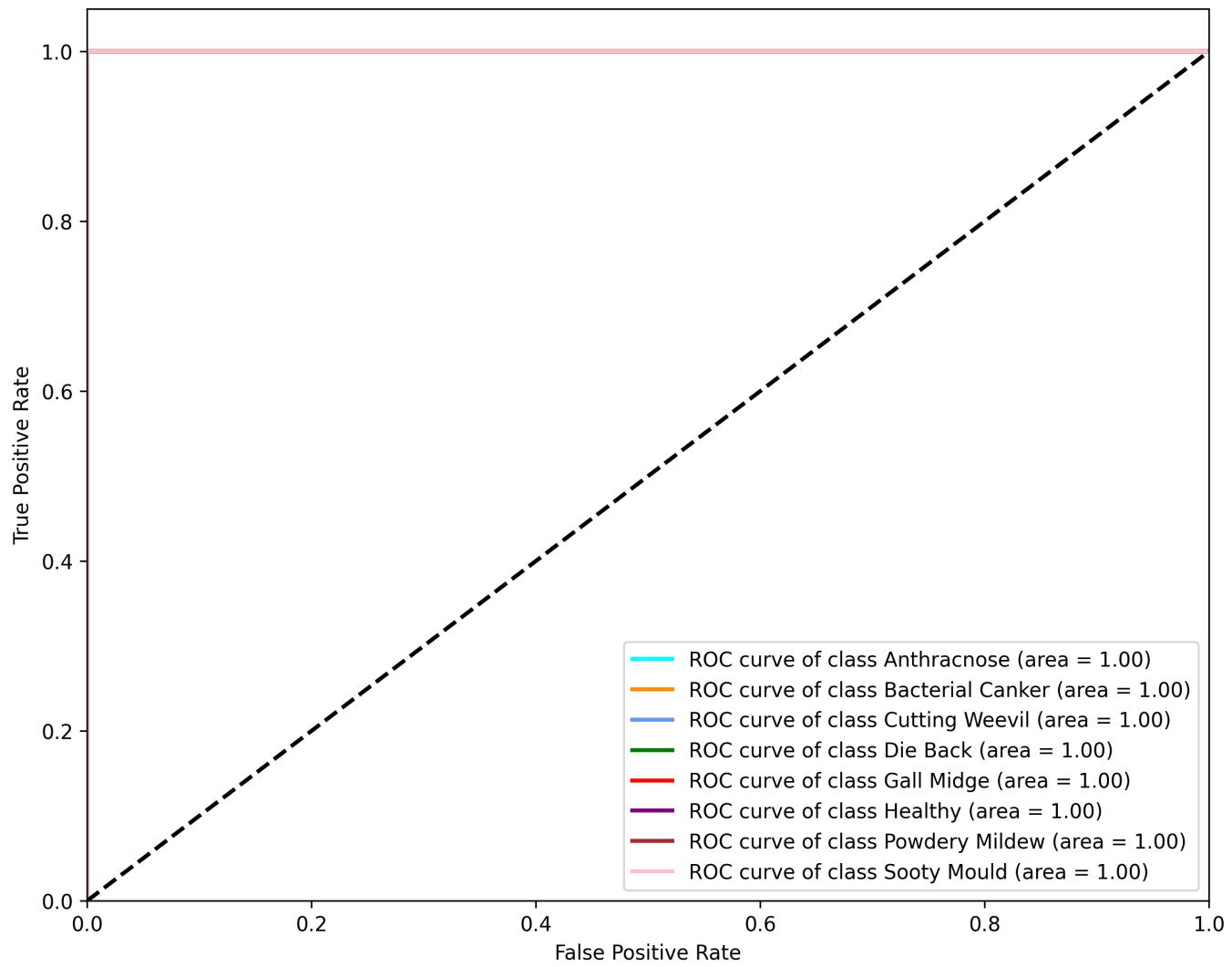


Confusion Matrix

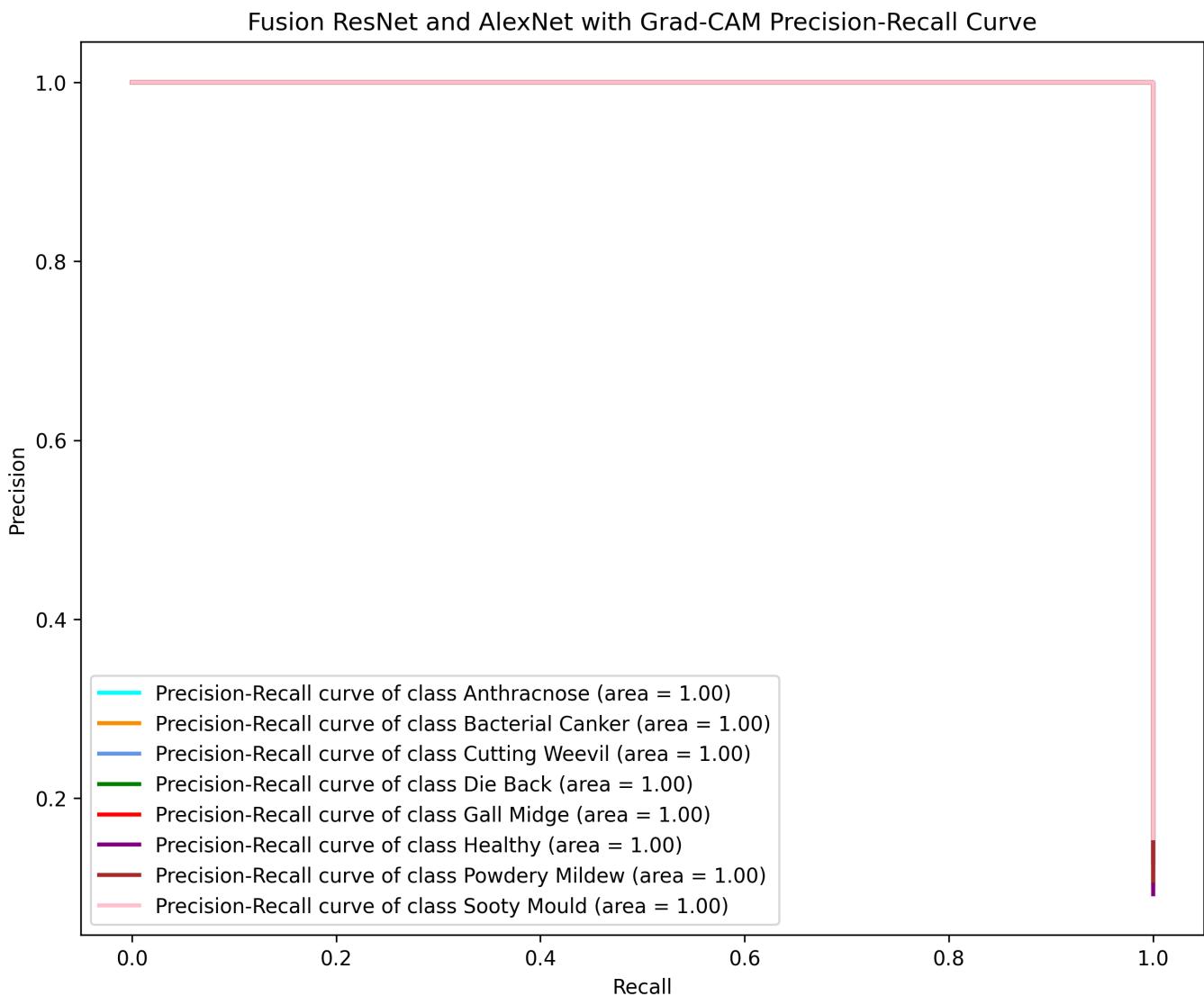


ROC Curve

Fusion ResNet and AlexNet with Grad-CAM ROC Curve



Precision-Recall Curve



Classification Report

Class	Precision	Recall	F1-Score	Support
Anthracnose	1.00	1.00	1.00	51.0
Bacterial Canker	1.00	1.00	1.00	64.0
Cutting Weevil	1.00	1.00	1.00	51.0
Die Back	1.00	1.00	1.00	41.0
Gall Midge	1.00	1.00	1.00	51.0
Healthy	1.00	1.00	1.00	37.0
Powdery Mildew	1.00	1.00	1.00	43.0
Sooty Mould	1.00	1.00	1.00	62.0
Macro Avg	1.00	1.00	1.00	400.0
Weighted Avg	1.00	1.00	1.00	400.0