Starting training...

Epoch 1, Batch 0/164, Loss: 2.2853

Epoch 1, Batch 10/164, Loss: 2.0600

Epoch 1, Batch 20/164, Loss: 2.2587

Epoch 1, Batch 30/164, Loss: 1.7921

Epoch 1, Batch 40/164, Loss: 1.3993

Epoch 1, Batch 50/164, Loss: 0.8533

Epoch 1, Batch 60/164, Loss: 1.5440

Epoch 1, Batch 70/164, Loss: 0.5472

Epoch 1, Batch 80/164, Loss: 0.4496

Epoch 1, Batch 90/164, Loss: 0.6474

Epoch 1, Batch 100/164, Loss: 1.1466

Epoch 1, Batch 110/164, Loss: 0.8154

Epoch 1, Batch 120/164, Loss: 0.9395

Epoch 1, Batch 130/164, Loss: 1.3714

Epoch 1, Batch 140/164, Loss: 1.2116

Epoch 1, Batch 150/164, Loss: 0.7138

Epoch 1, Batch 160/164, Loss: 1.1572

Epoch 1/10 | Train Loss: 1.2128 Acc: 0.6188 | Val Loss: 0.7357 Acc: 0.7669 | LR: 0.000100 | Time: 59.6s

Epoch 2, Batch 0/164, Loss: 0.6783

Epoch 2, Batch 10/164, Loss: 1.0181

Epoch 2, Batch 20/164, Loss: 1.0107

Epoch 2, Batch 30/164, Loss: 1.0114

Epoch 2, Batch 40/164, Loss: 0.5069

Epoch 2, Batch 50/164, Loss: 0.8221

Epoch 2, Batch 60/164, Loss: 1.1358

Epoch 2, Batch 70/164, Loss: 0.3334

Epoch 2, Batch 80/164, Loss: 0.3410

Epoch 2, Batch 90/164, Loss: 0.5623

Epoch 2, Batch 100/164, Loss: 0.2061

Epoch 2, Batch 110/164, Loss: 0.2933

Epoch 2, Batch 120/164, Loss: 0.5902

Epoch 2, Batch 130/164, Loss: 0.4762

Epoch 2, Batch 140/164, Loss: 1.0519

Epoch 2, Batch 150/164, Loss: 0.3530

Epoch 2, Batch 160/164, Loss: 0.6196

Epoch 2/10 | Train Loss: 0.6601 Acc: 0.7879 | Val Loss: 0.5319 Acc: 0.8310 | LR: 0.000100 | Time: 63.7s

Epoch 3, Batch 0/164, Loss: 0.6998

Epoch 3, Batch 10/164, Loss: 0.3323

Epoch 3, Batch 20/164, Loss: 0.7930

Epoch 3, Batch 30/164, Loss: 0.6643

Epoch 3, Batch 40/164, Loss: 0.4548

Epoch 3, Batch 50/164, Loss: 0.7903

Epoch 3, Batch 60/164, Loss: 0.3686

Epoch 3, Batch 70/164, Loss: 0.5351

Epoch 3, Batch 80/164, Loss: 0.4581

Epoch 3, Batch 90/164, Loss: 0.3739

Epoch 3, Batch 100/164, Loss: 0.2851

Epoch 3, Batch 110/164, Loss: 0.3956

Epoch 3, Batch 120/164, Loss: 0.1902

Epoch 3, Batch 130/164, Loss: 0.3314

Epoch 3, Batch 140/164, Loss: 0.1910

Epoch 3, Batch 150/164, Loss: 0.3952

Epoch 3, Batch 160/164, Loss: 0.2961

Epoch 3/10 | Train Loss: 0.5099 Acc: 0.8352 | Val Loss: 0.4102 Acc: 0.8737 | LR: 0.000100 | Time: 62.4s

Epoch 4, Batch 0/164, Loss: 0.2644

Epoch 4, Batch 10/164, Loss: 0.4585

Epoch 4, Batch 20/164, Loss: 0.5683

Epoch 4, Batch 30/164, Loss: 0.4545

Epoch 4, Batch 40/164, Loss: 0.2599

Epoch 4, Batch 50/164, Loss: 0.8457

Epoch 4, Batch 60/164, Loss: 0.4944

Epoch 4, Batch 70/164, Loss: 0.5112

Epoch 4, Batch 80/164, Loss: 0.3678

Epoch 4, Batch 90/164, Loss: 0.5445

Epoch 4, Batch 100/164, Loss: 0.4334

Epoch 4, Batch 110/164, Loss: 0.4078

Epoch 4, Batch 120/164, Loss: 0.1758

Epoch 4, Batch 130/164, Loss: 0.2612

Epoch 4, Batch 140/164, Loss: 0.3439

Epoch 4, Batch 150/164, Loss: 0.3313

Epoch 4, Batch 160/164, Loss: 0.4809

Epoch 4/10 | Train Loss: 0.4375 Acc: 0.8623 | Val Loss: 0.4347 Acc: 0.8381 | LR: 0.000100 | Time: 61.3s

Epoch 5, Batch 0/164, Loss: 0.3285

Epoch 5, Batch 10/164, Loss: 0.1258

Epoch 5, Batch 20/164, Loss: 0.4119

Epoch 5, Batch 30/164, Loss: 0.7568

Epoch 5, Batch 40/164, Loss: 0.6682

Epoch 5, Batch 50/164, Loss: 0.6844

Epoch 5, Batch 60/164, Loss: 0.4758

Epoch 5, Batch 70/164, Loss: 0.6387

Epoch 5, Batch 80/164, Loss: 0.1367

Epoch 5, Batch 90/164, Loss: 0.4644

Epoch 5, Batch 100/164, Loss: 0.3959

Epoch 5, Batch 110/164, Loss: 0.1697

Epoch 5, Batch 120/164, Loss: 0.1249

Epoch 5, Batch 130/164, Loss: 0.1492

Epoch 5, Batch 140/164, Loss: 0.2771

Epoch 5, Batch 150/164, Loss: 0.4605

Epoch 5, Batch 160/164, Loss: 0.3227

Epoch 5/10 | Train Loss: 0.4411 Acc: 0.8577 | Val Loss: 0.4086 Acc: 0.8665 | LR: 0.000100 | Time: 64.8s

Epoch 6, Batch 0/164, Loss: 0.5256

Epoch 6, Batch 10/164, Loss: 0.1450

Epoch 6, Batch 20/164, Loss: 0.3792

Epoch 6, Batch 30/164, Loss: 0.5693

Epoch 6, Batch 40/164, Loss: 0.1092

Epoch 6, Batch 50/164, Loss: 0.3037

Epoch 6, Batch 60/164, Loss: 0.6526

Epoch 6, Batch 70/164, Loss: 0.6808

Epoch 6, Batch 80/164, Loss: 0.3464

Epoch 6, Batch 90/164, Loss: 0.4344

Epoch 6, Batch 100/164, Loss: 0.2253

Epoch 6, Batch 110/164, Loss: 0.1809

Epoch 6, Batch 120/164, Loss: 0.1470

Epoch 6, Batch 130/164, Loss: 0.1560

Epoch 6, Batch 140/164, Loss: 0.2750

Epoch 6, Batch 150/164, Loss: 0.7434

Epoch 6, Batch 160/164, Loss: 0.1356

Epoch 6/10 | Train Loss: 0.3513 Acc: 0.8882 | Val Loss: 0.3467 Acc: 0.8683 | LR: 0.000100 | Time: 60.5s

Epoch 7, Batch 0/164, Loss: 0.3300

Epoch 7, Batch 10/164, Loss: 0.2395

Epoch 7, Batch 20/164, Loss: 0.3401

Epoch 7, Batch 30/164, Loss: 0.2094

Epoch 7, Batch 40/164, Loss: 0.3753

Epoch 7, Batch 50/164, Loss: 0.3767

Epoch 7, Batch 60/164, Loss: 0.2604

Epoch 7, Batch 70/164, Loss: 0.1242

Epoch 7, Batch 80/164, Loss: 0.1859

Epoch 7, Batch 90/164, Loss: 0.5352

Epoch 7, Batch 100/164, Loss: 0.2200

Epoch 7, Batch 110/164, Loss: 0.9342

Epoch 7, Batch 120/164, Loss: 0.1318

Epoch 7, Batch 130/164, Loss: 0.2423

Epoch 7, Batch 140/164, Loss: 0.2375

Epoch 7, Batch 150/164, Loss: 0.4717

Epoch 7, Batch 160/164, Loss: 0.3802

Epoch 7/10 | Train Loss: 0.3605 Acc: 0.8863 | Val Loss: 0.3884 Acc: 0.8843 | LR: 0.000100 | Time: 61.4s

Epoch 8, Batch 0/164, Loss: 0.7763

Epoch 8, Batch 10/164, Loss: 0.6939

Epoch 8, Batch 20/164, Loss: 0.1551

Epoch 8, Batch 30/164, Loss: 0.2561

Epoch 8, Batch 40/164, Loss: 0.4394

Epoch 8, Batch 50/164, Loss: 0.3658

Epoch 8, Batch 60/164, Loss: 0.3158

Epoch 8, Batch 70/164, Loss: 0.1517

Epoch 8, Batch 80/164, Loss: 0.1585

Epoch 8, Batch 90/164, Loss: 0.2105

Epoch 8, Batch 100/164, Loss: 0.1165

Epoch 8, Batch 110/164, Loss: 0.0520

Epoch 8, Batch 120/164, Loss: 0.3132

Epoch 8, Batch 130/164, Loss: 0.4196

Epoch 8, Batch 140/164, Loss: 0.3773

Epoch 8, Batch 150/164, Loss: 0.3071

Epoch 8, Batch 160/164, Loss: 0.4423

Epoch 8/10 | Train Loss: 0.2943 Acc: 0.9012 | Val Loss: 0.3421 Acc: 0.8790 | LR: 0.000100 | Time: 63.7s

Epoch 9, Batch 0/164, Loss: 0.1327

Epoch 9, Batch 10/164, Loss: 0.2170

Epoch 9, Batch 20/164, Loss: 0.1662

Epoch 9, Batch 30/164, Loss: 0.4434

Epoch 9, Batch 40/164, Loss: 0.5057

Epoch 9, Batch 50/164, Loss: 0.0701

Epoch 9, Batch 60/164, Loss: 0.8234

Epoch 9, Batch 70/164, Loss: 0.0997

Epoch 9, Batch 80/164, Loss: 0.0952

Epoch 9, Batch 90/164, Loss: 0.1090

Epoch 9, Batch 100/164, Loss: 0.1465

Epoch 9, Batch 110/164, Loss: 0.0860

Epoch 9, Batch 120/164, Loss: 0.3959

Epoch 9, Batch 130/164, Loss: 0.4699

Epoch 9, Batch 140/164, Loss: 0.4703

Epoch 9, Batch 150/164, Loss: 0.0928

Epoch 9, Batch 160/164, Loss: 0.0583

Epoch 9/10 | Train Loss: 0.2775 Acc: 0.9081 | Val Loss: 0.3012 Acc: 0.9075 | LR: 0.000100 | Time: 62.2s

Epoch 10, Batch 0/164, Loss: 0.4089

Epoch 10, Batch 10/164, Loss: 0.1775

Epoch 10, Batch 20/164, Loss: 0.0256

Epoch 10, Batch 30/164, Loss: 0.3001

Epoch 10, Batch 40/164, Loss: 0.2423

Epoch 10, Batch 50/164, Loss: 0.1484

Epoch 10, Batch 60/164, Loss: 0.0875

Epoch 10, Batch 70/164, Loss: 0.0855

Epoch 10, Batch 80/164, Loss: 0.1857

Epoch 10, Batch 90/164, Loss: 0.3175

Epoch 10, Batch 100/164, Loss: 0.3489

Epoch 10, Batch 110/164, Loss: 0.0907

Epoch 10, Batch 120/164, Loss: 0.3411

Epoch 10, Batch 130/164, Loss: 0.2124

Epoch 10, Batch 140/164, Loss: 0.1466

Epoch 10, Batch 150/164, Loss: 0.1930

Epoch 10, Batch 160/164, Loss: 0.6784

Epoch 10/10 | Train Loss: 0.2369 Acc: 0.9237 | Val Loss: 0.3167 Acc: 0.9004 | LR: 0.000100 | Time: 65.6s

Training completed.

Training complete. Evaluating on test set...

Test set predictions complete. Generating confusion matrix...

A screenshot of a computer

AI-generated content may be incorrect.

Classification Report:

precision recall f1-score support

aphid 0.9750 0.8864 0.9286 44

army\_worm 1.0000 0.9767 0.9882 43

black\_rust 0.7347 0.7826 0.7579 46

brown\_rust 0.9318 0.9318 0.9318 44

common\_rust 0.9412 0.9057 0.9231 53

fusarium\_head\_blight 0.9459 1.0000 0.9722 35

healthy 0.8861 0.9722 0.9272 72

leaf\_blight 0.7500 0.5745 0.6506 47

powdery\_mildew\_leaf 0.8864 0.7222 0.7959 54

spetoria 0.9091 0.9756 0.9412 41

tan\_spot 0.5400 0.7297 0.6207 37

yellow\_rust 1.0000 1.0000 1.0000 47

accuracy 0.8721 563

macro avg 0.8750 0.8715 0.8698 563

weighted avg 0.8790 0.8721 0.8722 563

Model saved to ../saved\_models\_and\_data/wheat\_disease\_hybrid\_model.pth