# Title

"Development of a CNN-Based Model for Multi-Class Insect Classification”

# Research Question

How can a robust CNN-based insect classification model advance agricultural pest management and ecological research?

# Dataset Description

The dataset used for this study is titled Insect Classification, provided by module leader for academic use. This dataset is designed to train and evaluate image classification models aimed at recognizing insect species relevant to crop protection and pest control.

## General Overview:

* **Source:** Provided by the tutor as part of an AI/ML course assignment.
* **Purpose:** To train and evaluate an image classification model for identifying different insect species.
* **Format**: JPG images organized into class-specific folders.
* **Relevance:** Focuses on insects commonly found in farming areas, making it useful for real-world agricultural monitoring systems.

## Dataset Structure:

* **Total Classes:** 9 distinct insect species.
* **Total Images:** 2,616

1. Training Set: 2,232 images (~80%)
2. Test Set: 384 images (~20%)

* **Class Distribution:**

**Training Set:**

1. Aphids: 266
2. Mosquito: 295
3. Armyworm: 223
4. Mites: 254
5. Stem Borer: 181
6. Beetle: 291
7. Sawfly: 200
8. Grasshopper: 277
9. Bollworm: 245

**Test Set:**

1. Grasshopper: 46
2. Aphids: 44
3. Bollworm: 36
4. Stem Borer: 36
5. Beetle: 50
6. Mosquito: 50
7. Armyworm: 43
8. Sawfly: 37
9. Mites: 42

* **Data Characteristics:**

1. Each class contains multiple labeled images, ensuring that the dataset supports effective supervised learning.
2. Images will be resized to 224x224 pixels during preprocessing to meet deep learning input requirements.
3. All insect images are from real-world agricultural settings, adding practical value.
4. Variation in image background and lighting enhances model robustness.
5. The dataset is balanced across different classes, minimizing class imbalance issues during training.
6. Ideal for CNN-based architectures that require labeled data across distinct visual categories.