Prospect for resistance to cocoa pod borer

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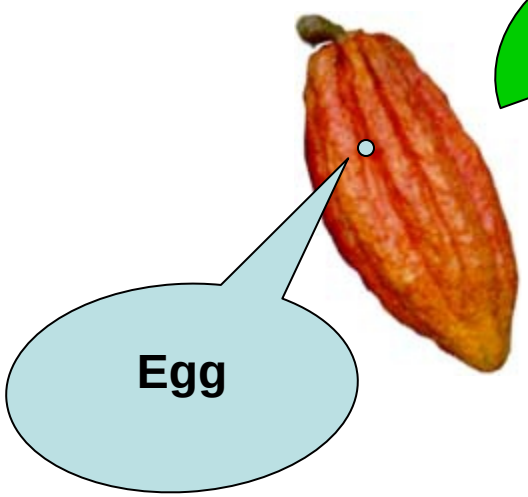
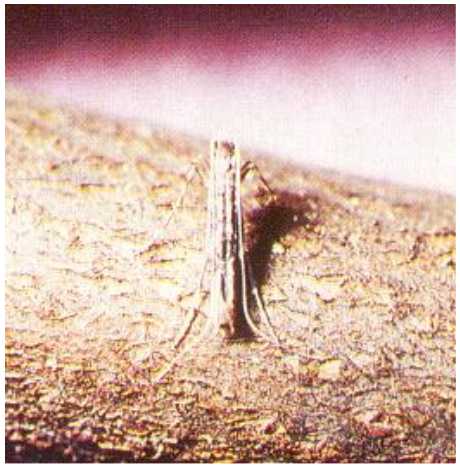
What we know about CPB?



Larvae

LIFE CYCLE

Pupae



Adult

Host plant resistance in cocoa

- **Reopke (1912) observed that smooth pod surfaces suffer less damage than rough pod surfaces.**
- **However, more recent work has failed to confirm this relationship (Azhar & Lim, 1987)**
- **Older pods are preferred for oviposition (Azhar & Long, 1996)**
- **No difference has been shown between genotypes in larval survival at the pre-sclerotic layer and inside the pods, but higher survival observed in genotype with soft pods (Day, 1985)**
- **Larval survival on entering the pods is correlated with pod age (Day, 1985)**

- **Larval survival at the sclerotic layer decreases with increasing pod age (Day, 1985)**

- **Thickness/hardness of sclerotic layer increases towards pod maturity (Day, 1985). However, pods may suffered heavy damage before the sclerotic layer has developed properly.**

- **Variation exist in thickness of sclerotic layer between genotypes (Adomako & Fordham, 1985).**

- **Antibiosis and hardness of sclerotic layer are the primary factors affecting larval mortality (Day, 1985; Azhar & Lim, 1987)**

- **Penetrometer measurement of pod hardness can be a reliable screening tool in a clone selection programme (Day, 1985; Azhar & Lim, 1987; Teh *et al*., 2005)**

There are still considerable gaps concerning knowledge on host plant resistance to CPB.

This includes understanding of:-

1. **Pod wall anatomy**
2. **Nutritional value of the pod**
3. **Interactions between development of pod wall anatomy at various pod ages, genotypes and nutritional values of the pods in relation to larval survival**

Prospect for resistance to CPB

- **Existing information indicates that clones with hard sclerotic layer are more tolerant to CPB.**
- **Future planting should consider clones with hard sclerotic layer.**
- **Planting system for resistant clones needs to be investigated (either new planting or existing area),**
- **This need to be parts of a strategy for integrated pest management of CPB (perhaps a key to successful in controlling CPB).**

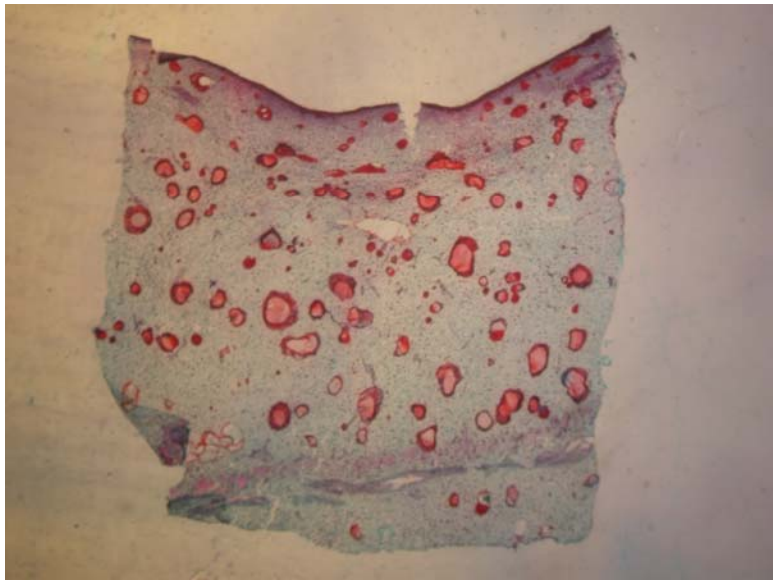
Proposed research area

- **To study the development of pod wall anatomy at various stages of pod development in contrasting genotypes,**

- **To investigate antibiotic effects mediated through the lack of nutritional value (by evaluating the reproductive performance of the moths on different age pods in contrasting clones),**

- **To establish the relationship between pod wall anatomy, nutritional value and larval survival,**

- **Finally, to screen for clones resistance to CPB.**



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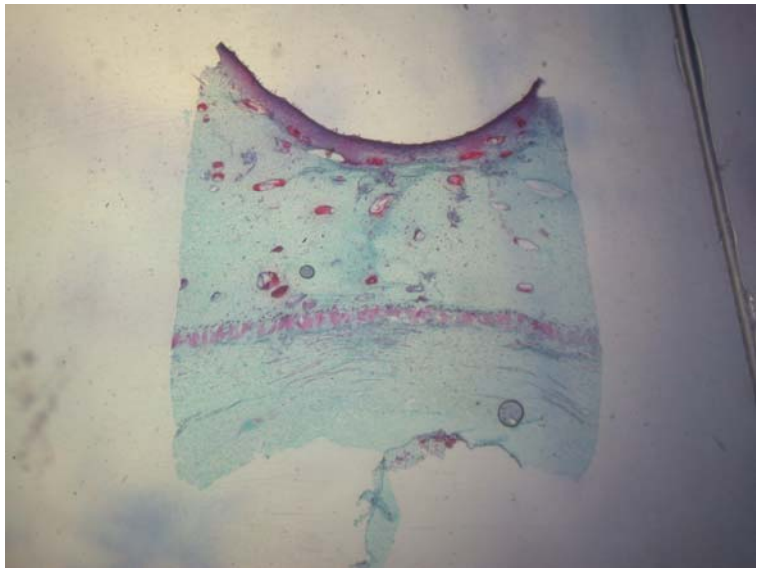

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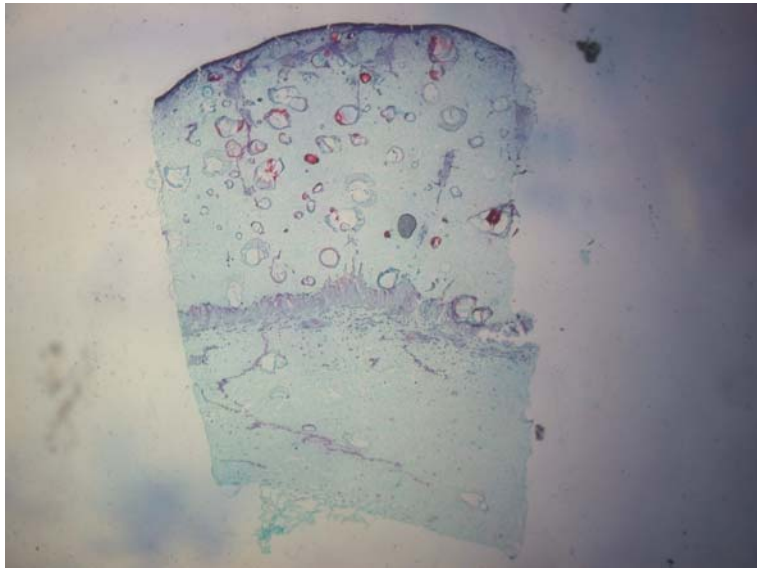

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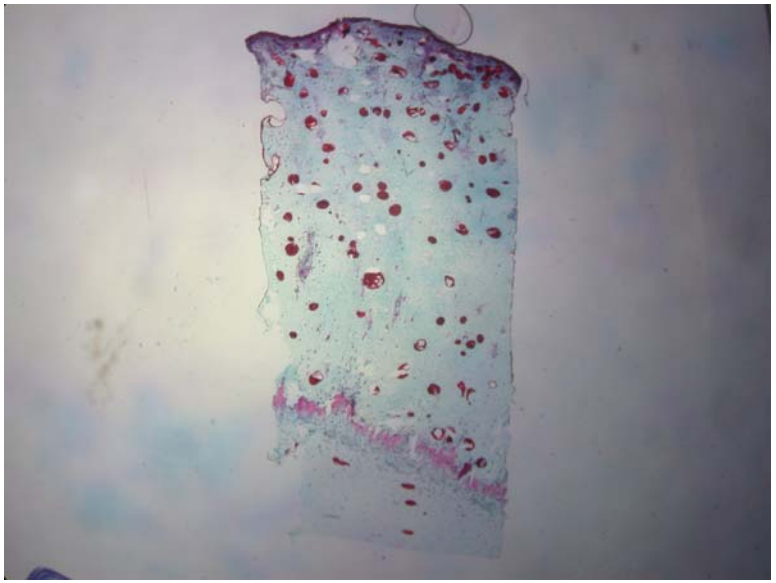

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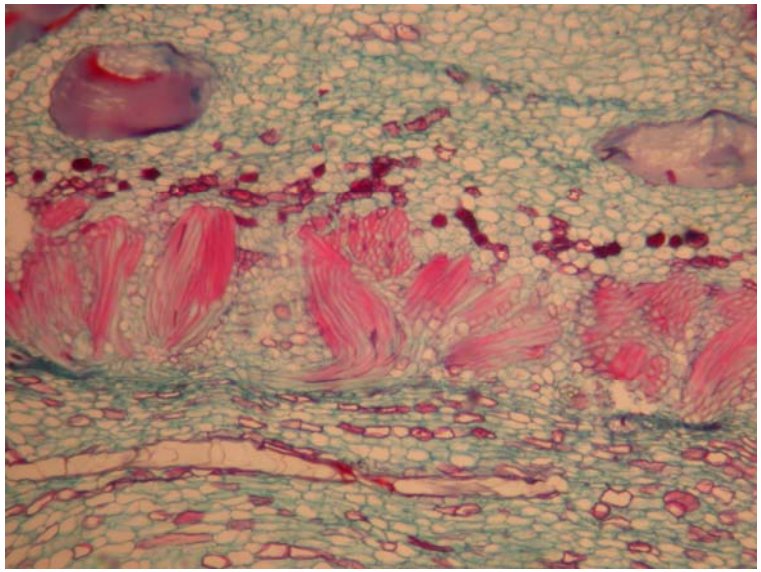

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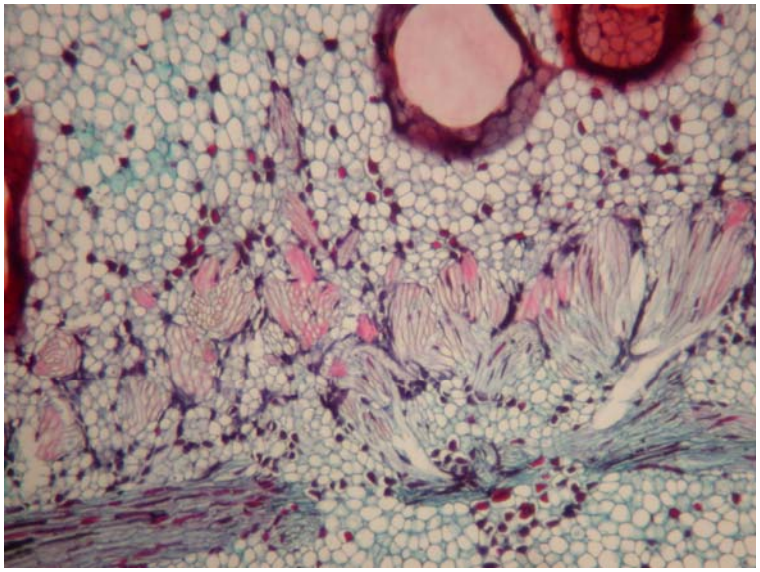

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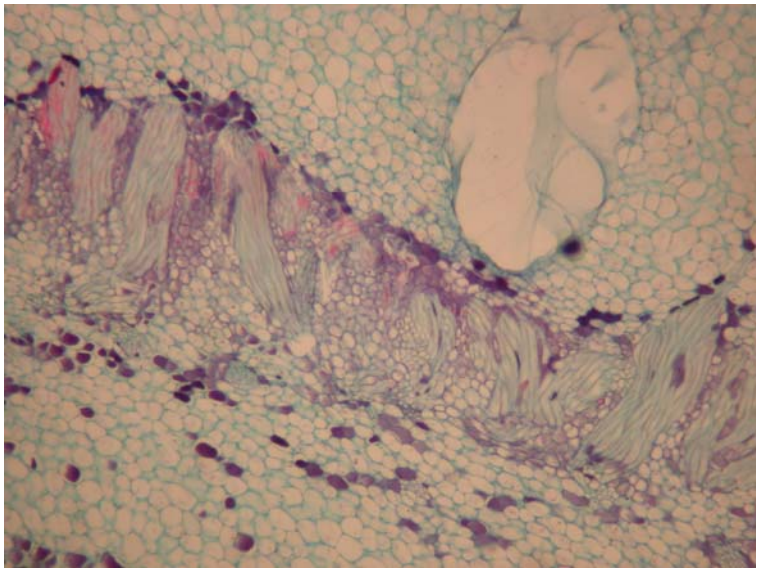

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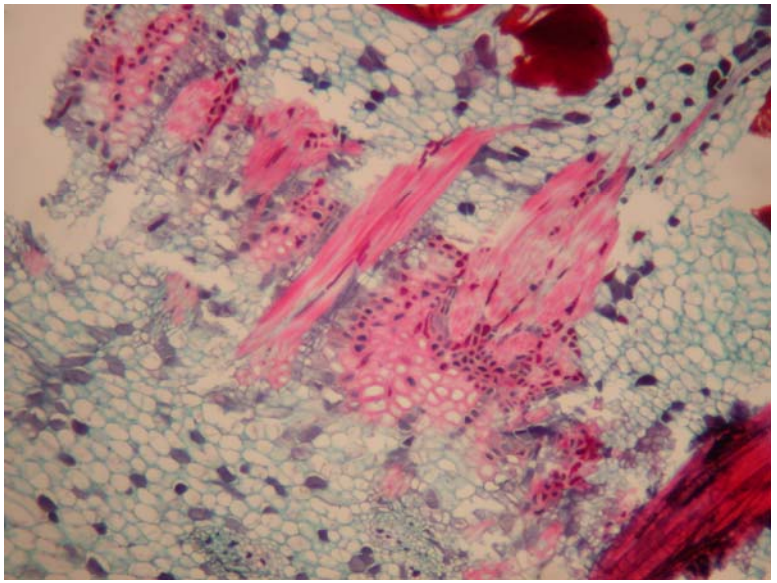

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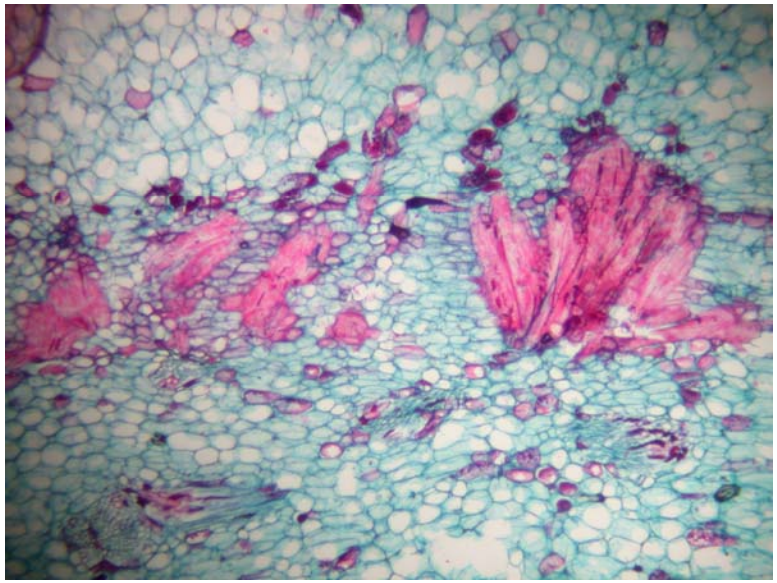

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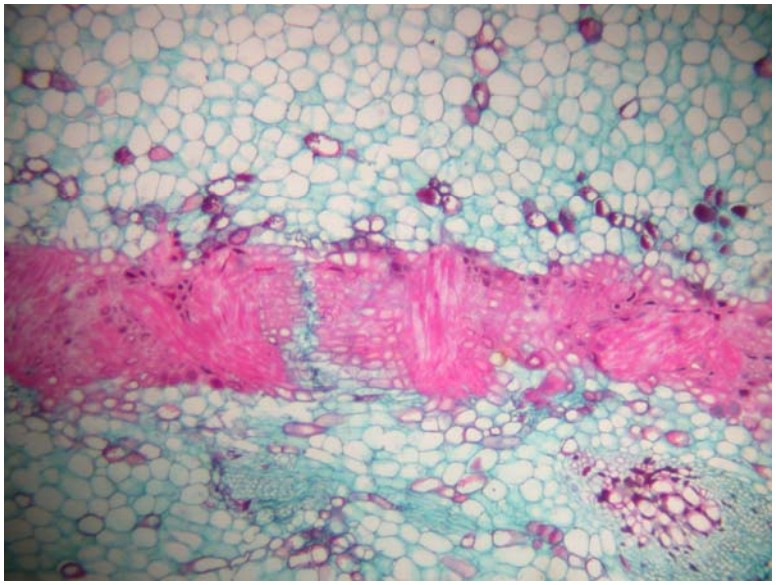

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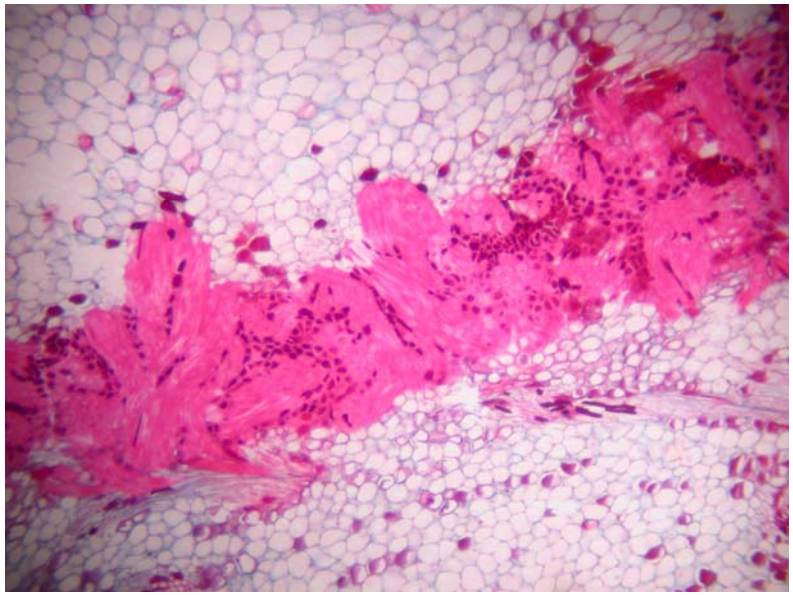

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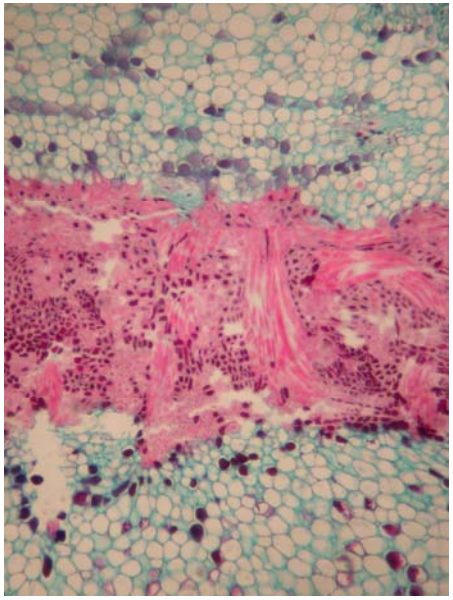

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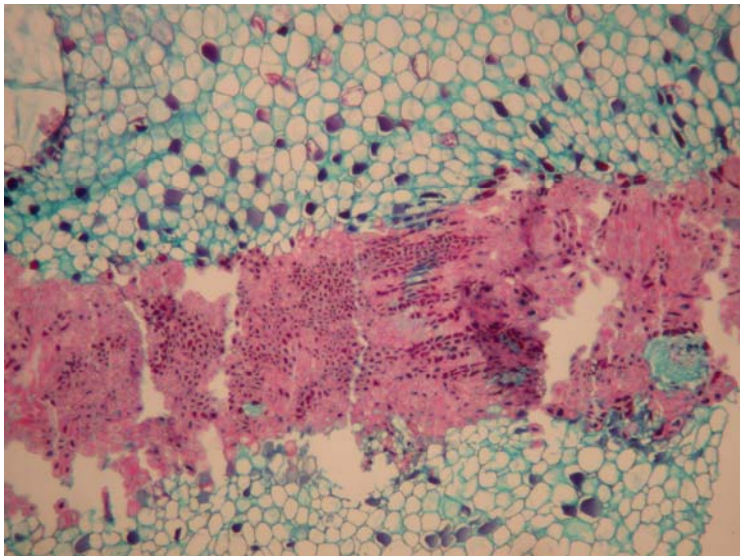

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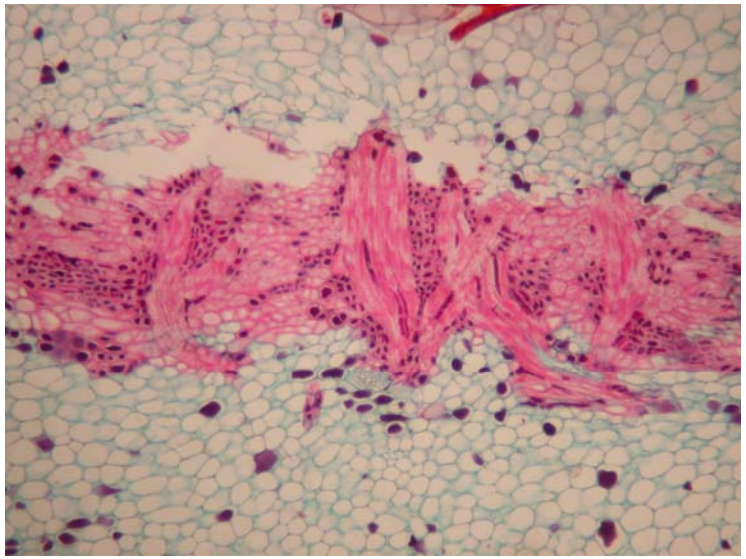

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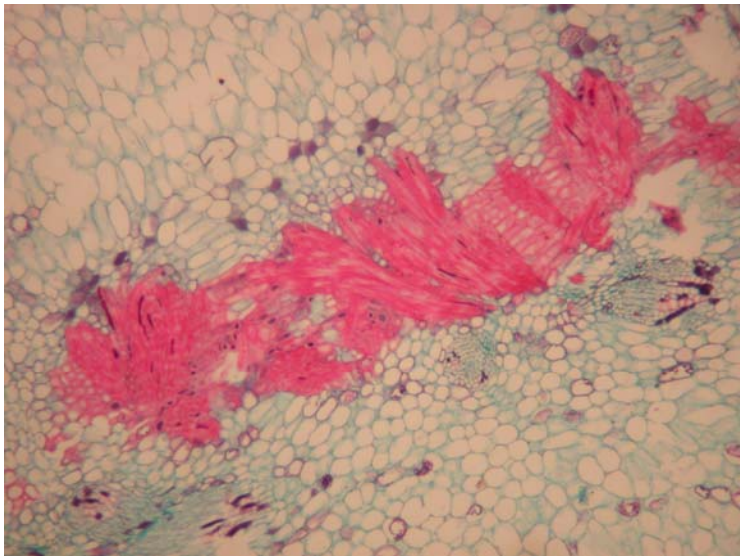

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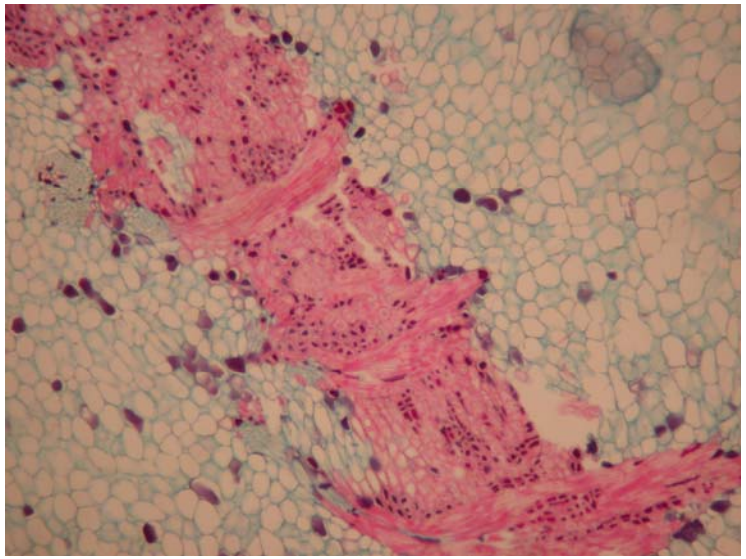

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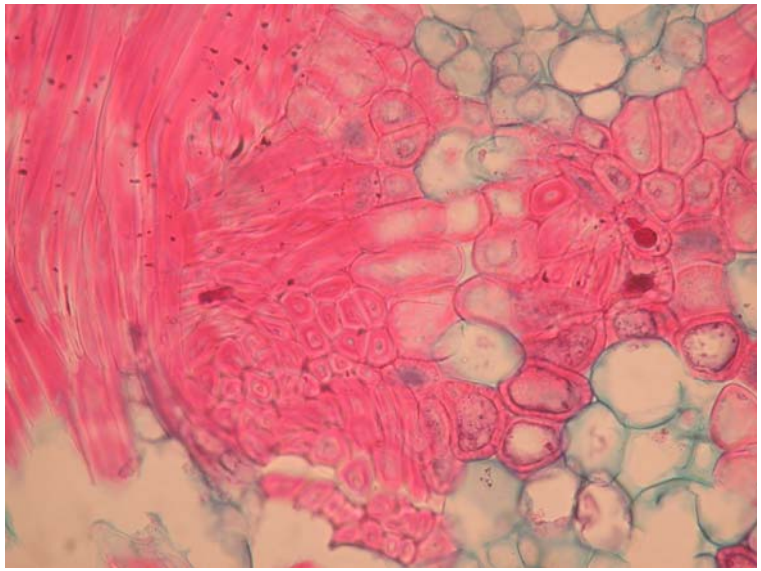

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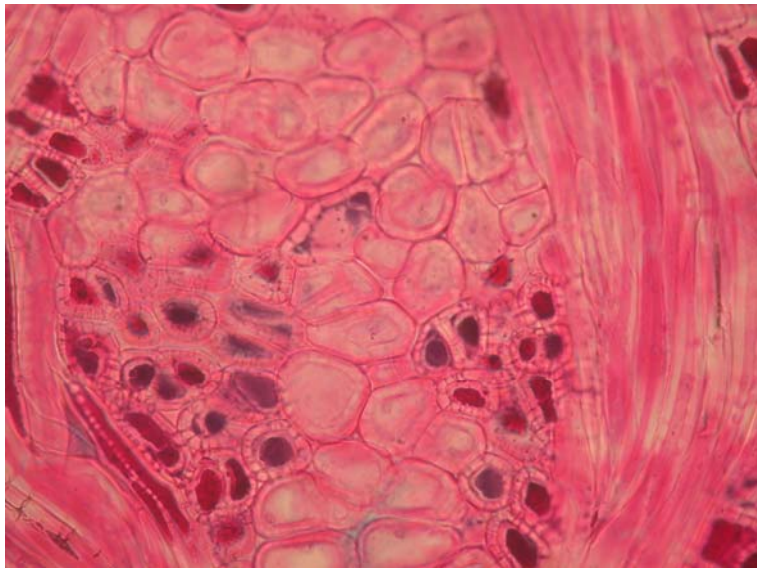

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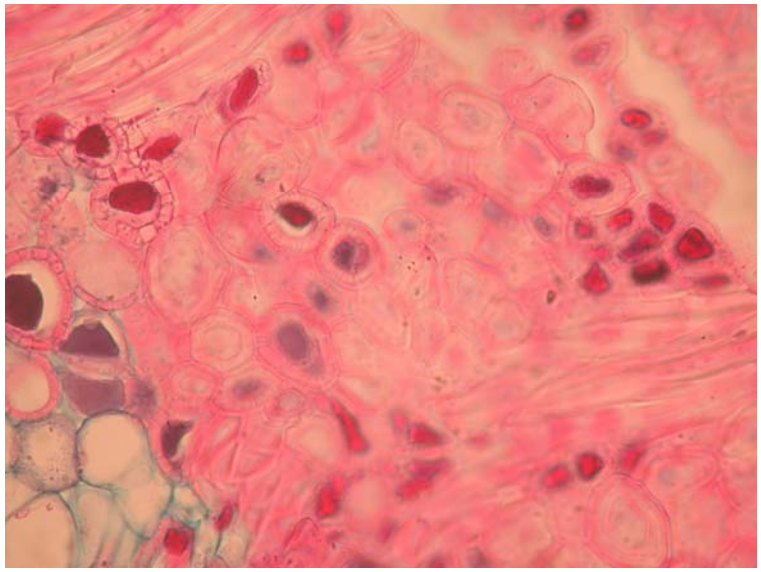

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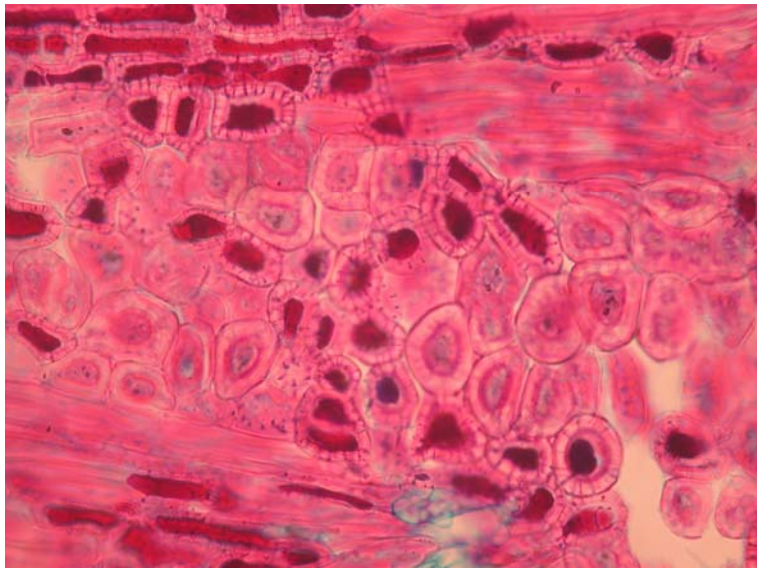

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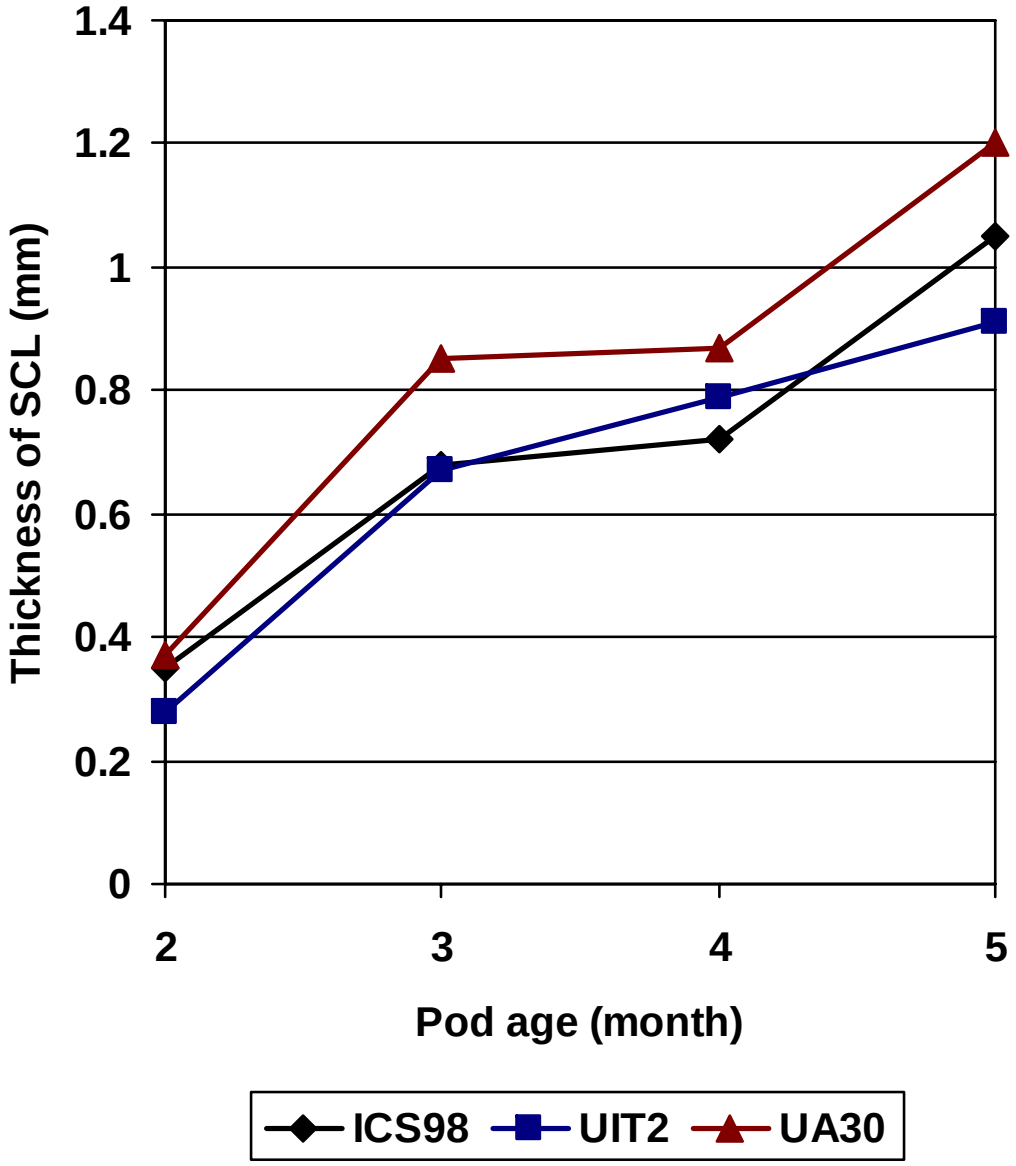
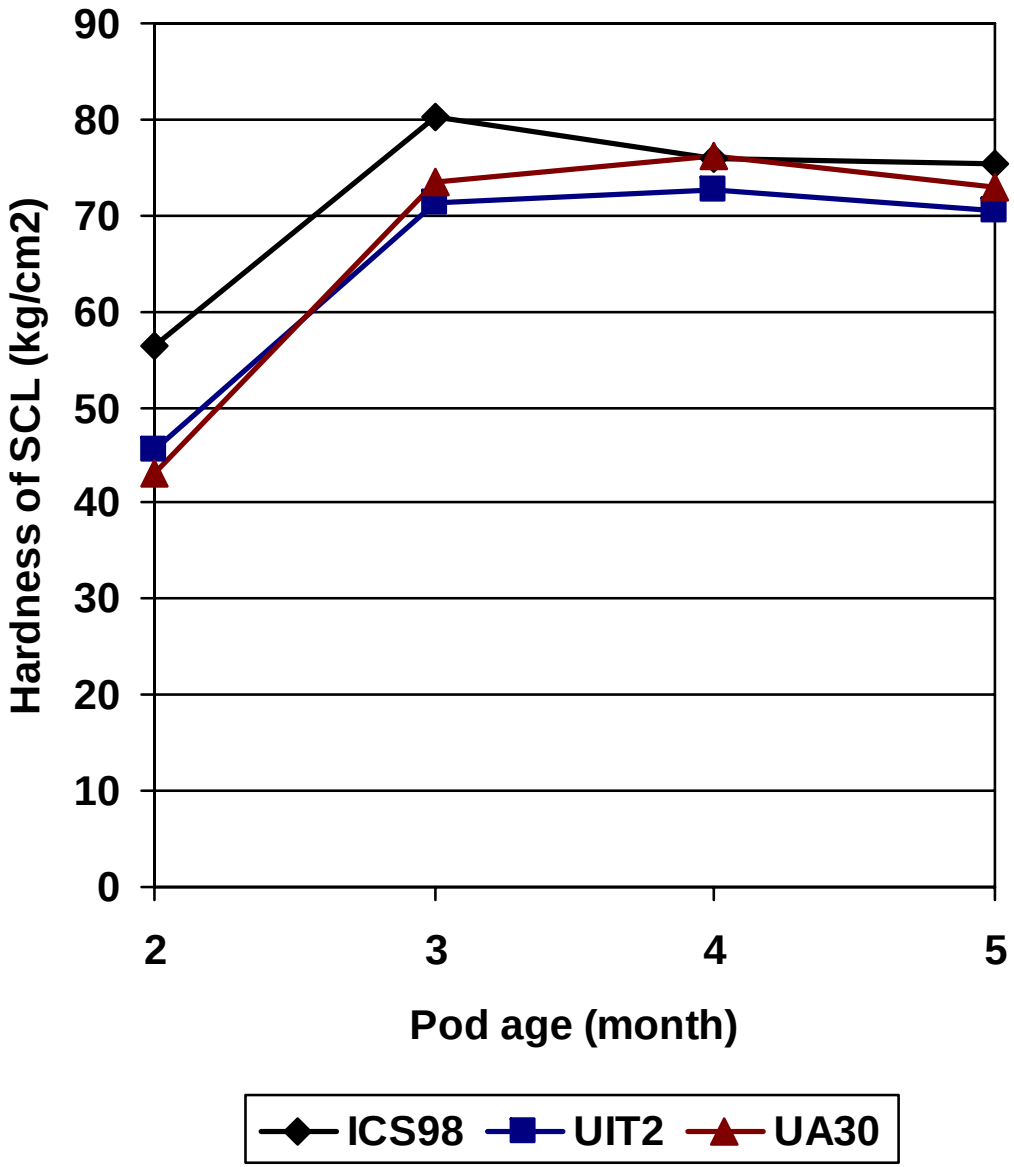
Thickness of sclerotic layer at various pod age and clones



Hardness of sclerotic layer at various pod age and clones



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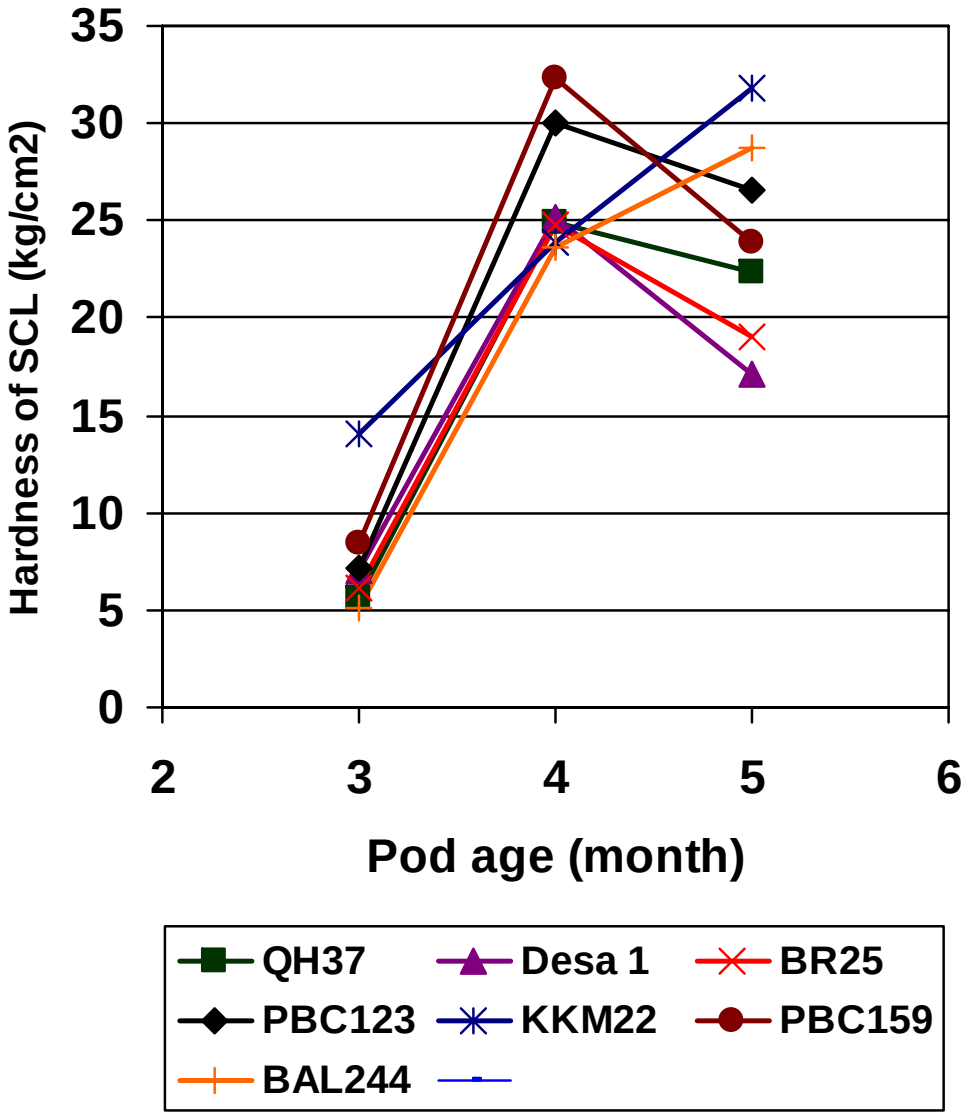

Summary

- **Pod wall anatomy**
  - **Epicarp, pre-sclerotic layer, sclerotic layer and endocarp**
  - **Interaction between pod wall anatomy, hardness and thickness of sclerotic layer, and larval survival**
- **Nutritional value of cocoa pod**
  - **Determine nutritional value of cocoa pod**
  - **Reproductive performance of CPB on various clones and pod age**
- **Screen for clones resistance to CPB**
  - **Morphological traits of the clones**
  - **Classification of primary clones**
  - **Larva survival and pod damage**