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VIGOUR AND JUVENILITY IN COCOA

M.Phil Biological Sciences

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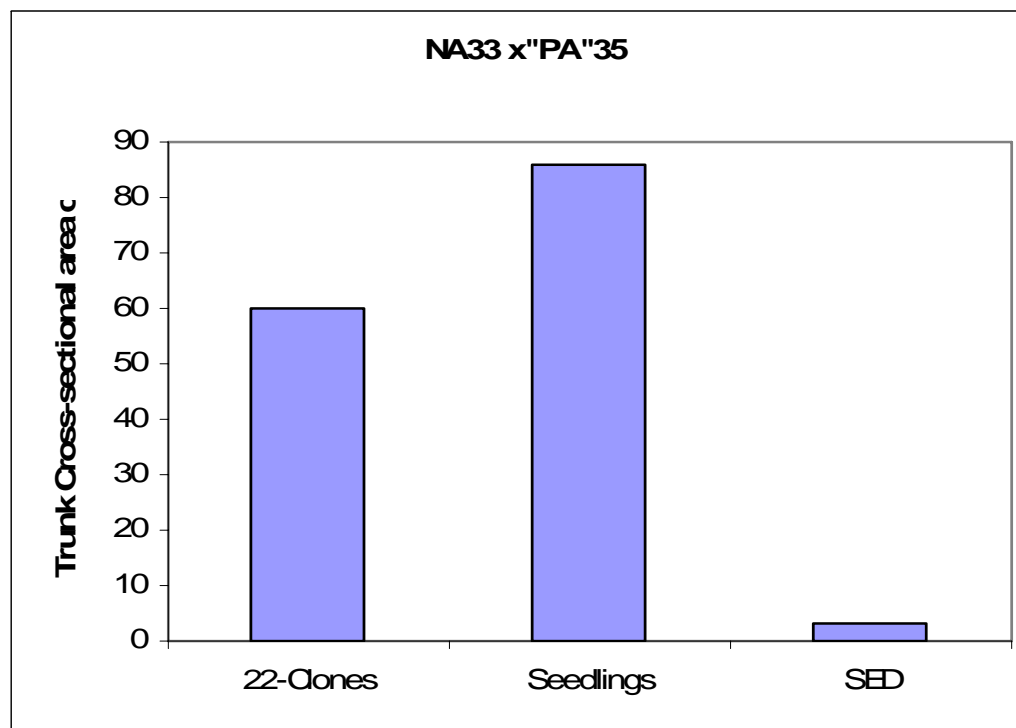
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Findings in Malaysia

Cocoa seedlings do not have the same vigor as genetically similar clones which have been propagated by budding.



Comparison between growth of seedlings derived from bi-parental crosses and clones derived from the same crosses.



How is differential growth possible

- Root stock effects
- Vascular discontinuities at the graft union
- Juvenility/maturity of the source buds



OBJECTIVE

To determine the possible contributions of lack of juvenility and vascular discontinuities to the reduced vigour.

Vigour is the rate at which a plant grows and accumulates dry matter.



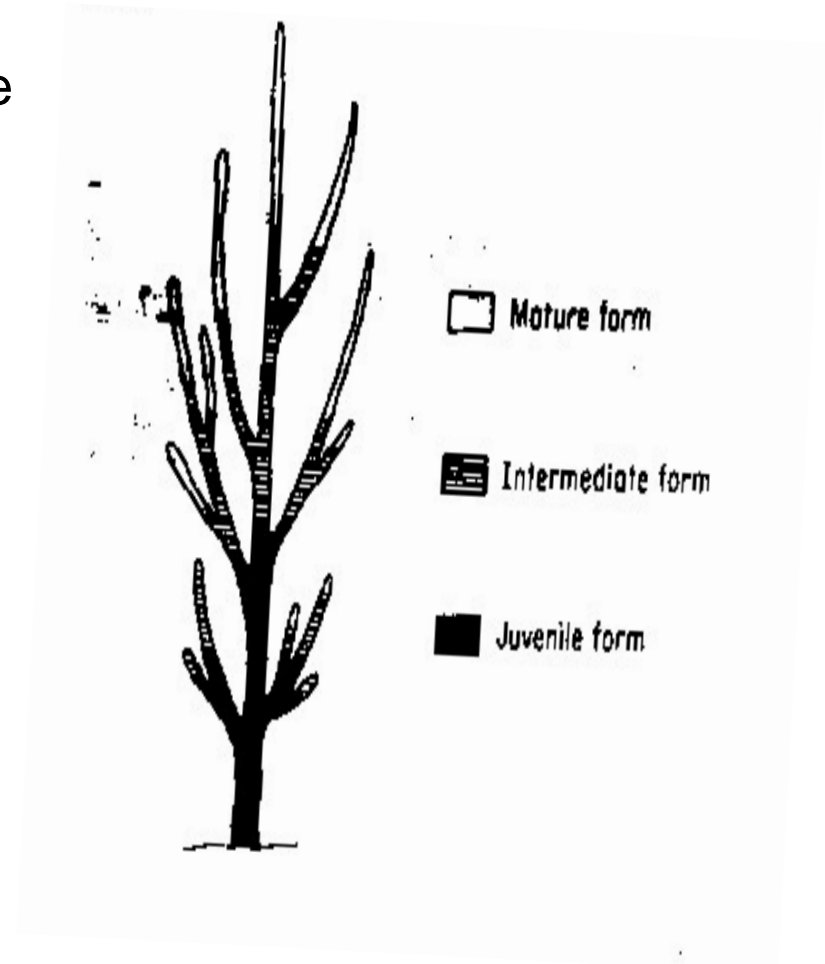
What is juvenility?





What is juvenility?

- Juvenility is defined as the phase in the cycle of a seedling or a plant during which it can not be induced to form flowers by any means (Stokes *et al* ,1951)





Progress so far

- Green budding in Ghana
- Somatic embryogenesis in Ghana

- **Clones used**
- IMC 23 -35 yr old tree
- IMC23 -3yr old tree (Tissue Culture derived)
- NA 33 -35 yr old tree
- NA 33 -3 yr old tree (Tissue Culture derived)
- P30 - 35 yr old tree



What is “Green budding”

Using green budwood onto two weeks old seedlings

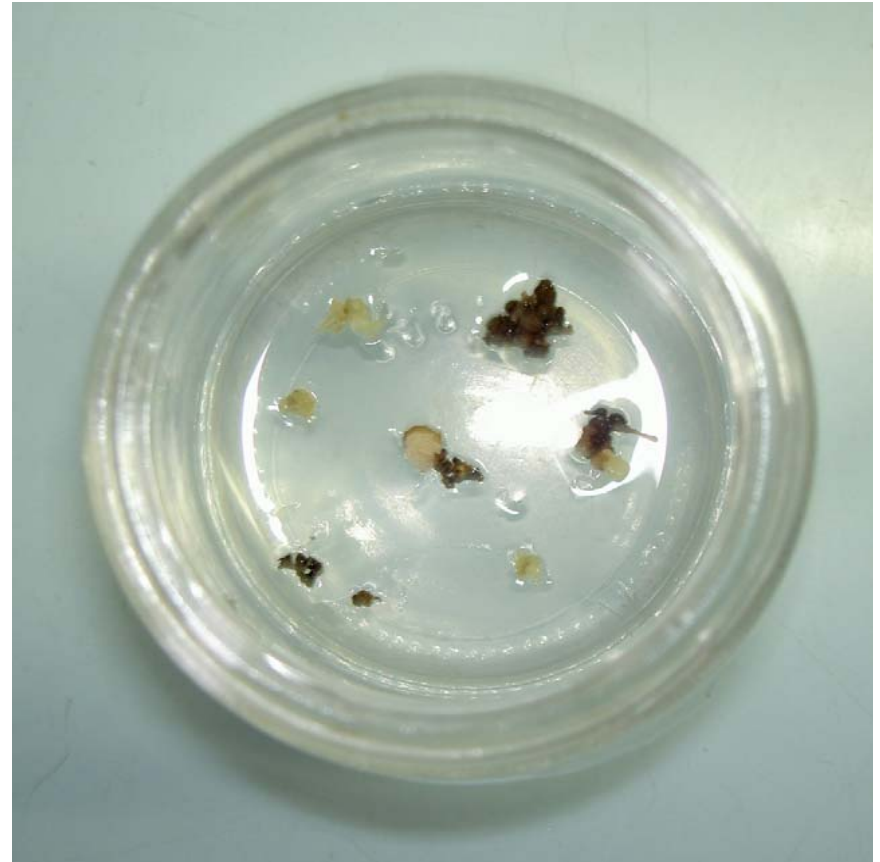
A two month old green budded plant





Somatic embryogenesis

- Cocoa plants raised from somatic embryoids grow about 40% faster than clones from the same genotype Masseret *et al's* (2005)
- Embryos produced 6 weeks after flower initiation



Progress at Reading



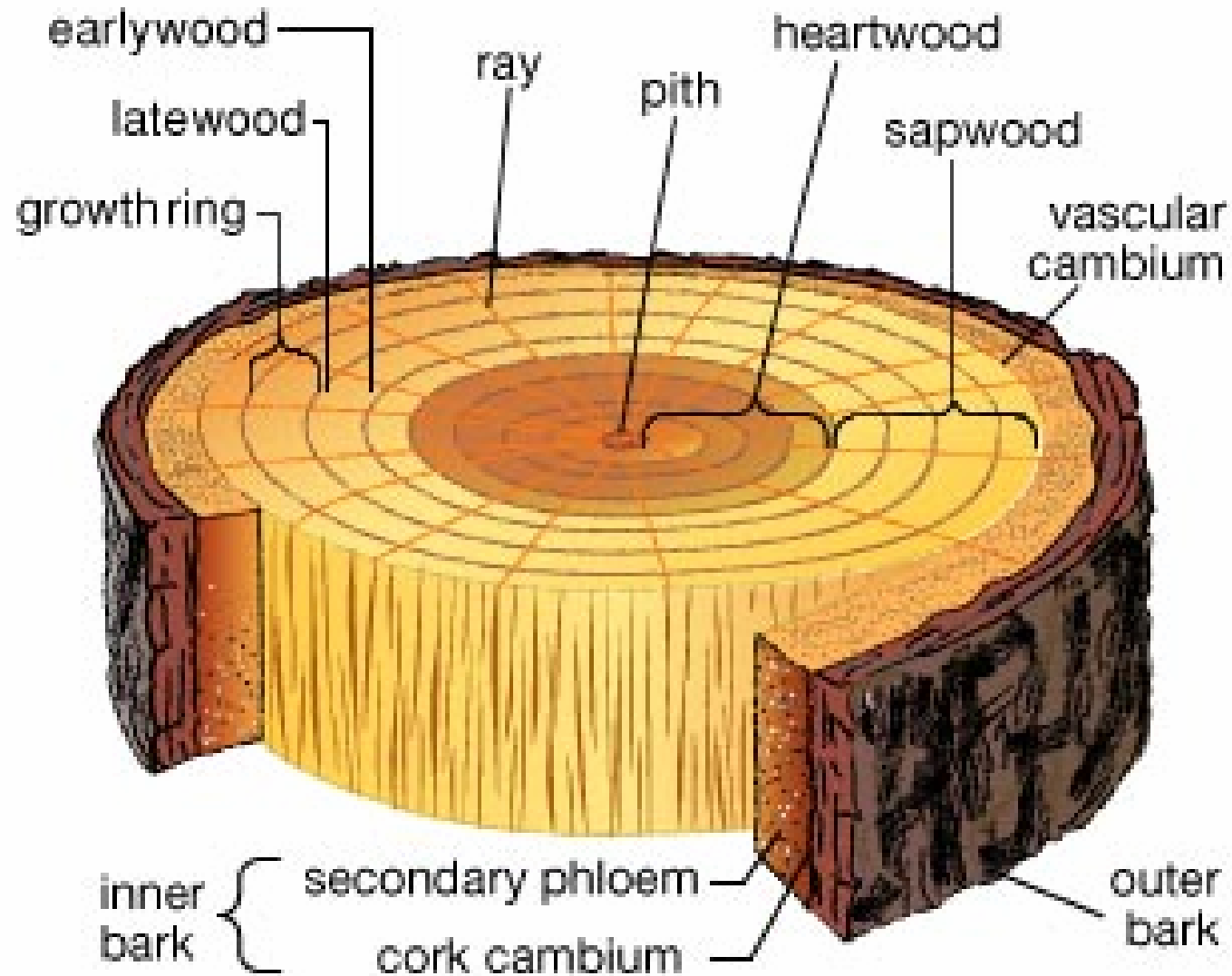
- Somatic embryogenesis using all homozygous clones
- Glass house experiment to test the hypothesis:

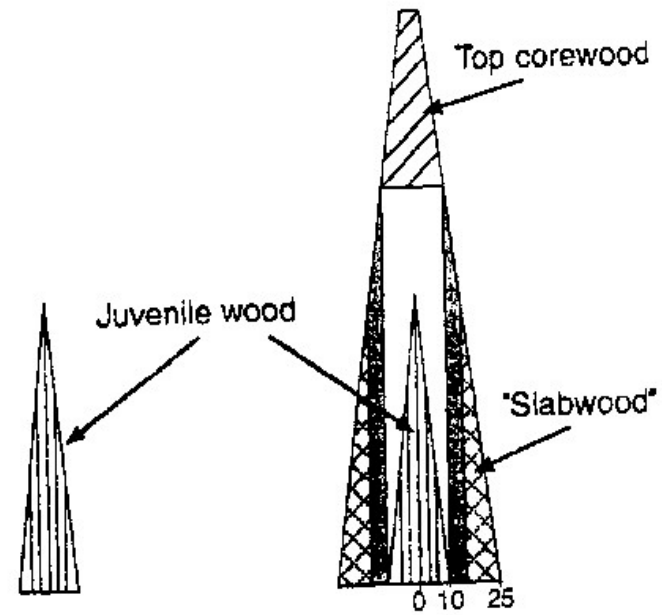
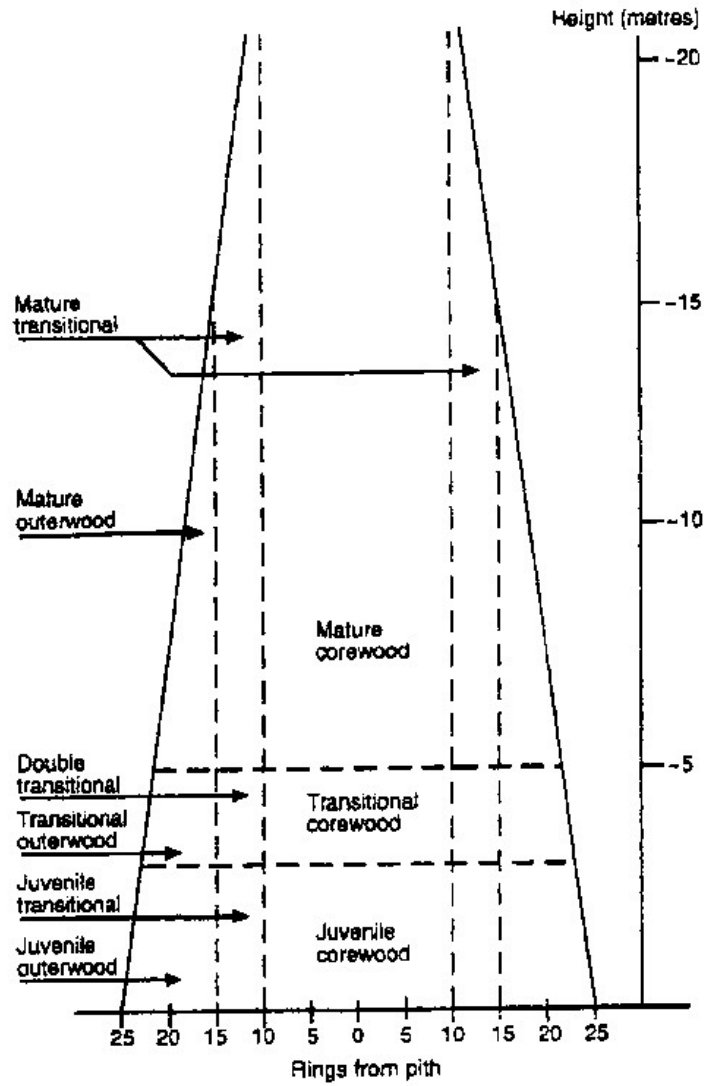
Is it true that seedlings perform better than clones?



Measurements to be taken

- **Physiological measurements** e.g height ,girth, etc
- **Microscopic measurements** e,g grafted union
- A vertical cross section of a cocoa stem
- The ratio between the back of a cocoa stem to the main wood
- Rate of embryo formation







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THANK YOU FOR YOUR ATTENTION

