



New rearing method and biology of the African coffee white stemborer, *Monochamus leuconotus* (Pascoe) (Coleoptera: Cerambycidae)

James Maina Gichuhi^{1,2}, Ephantus Kimani Guandaru¹, Régis Babin^{1,3}

¹International Centre of Insect Physiology and Ecology (*icipe*), Kenya; ²University of Nairobi, Kenya; ³Agricultural Research Centre for International Development (CIRAD), France
gichuhimn@yahoo.com

INTRODUCTION

The African coffee white stemborer (CWSB), *Monochamus leuconotus* Pascoe (Coleoptera: Cerambycidae), is one of the most important insect pests of arabica coffee in Africa. Its life cycle in the field takes one and a half to two years. Early larval instars are the most destructive due to ring barking which destroys phloem interrupting translocation of metabolites. Along with galleries in wood of stems, this damage induces wilting, stunted growth, dieback, and reduced yields. The economic damage caused by CWSB is great (>25%) as infestation eventually leads to total loss of the crop. Lack of knowledge on the biology of the pest impedes the development of management strategies against CWSB. Moreover, the main challenge in bioassays studies with CWSB is getting enough beetles due to lack of rearing method.

METHODS

A) Development of an artificial diet for larvae

Main ingredients of the diet are: coffee bark and leaves, sucrose, brewer's yeast, ascorbic acid, sorbic acid, methyl-paraben, vitamin E acetate, and distilled water.



Larvae feeding on artificial diet

B) Reproduction phase on coffee sticks in cages

Adult pairs were introduced into Plexiglas cages with 60-cm-long freshly cut arabica coffee sticks as food and oviposition substrate. Neonate larvae extracted from the sticks and introduced into artificial diet.



Reproduction cages

C) Life cycle and life table parameters

Larval development and oviposition were monitored on a daily basis.

CONCLUSION

- This rearing method will help to gather comprehensive information on all stages in addition to reducing the travelling costs and time spent on research.
- The biology of laboratory bred colony was similar to that of wild CWSB meaning that the findings can be applied in the field. This study showed that eggs are laid in the later stages of adulthood. This can form a basis of formulating control strategies aimed at preventing oviposition.

IMPACT

New rearing method for researchers

The rearing method developed raised 78% of the colony from egg to adult stage. The duration of the life cycle was 11 months compared to duration in the field (18-24 months). Studies on this pest will take a shorter period. It will be easy to carry out more studies on larval and pupal stages, as they will be accessible.

Better knowledge of the pest biology for improving management



Monitoring CSB field infestation

OBJECTIVES

- To develop a rearing method for CWSB.
- To elucidate the life cycle of CWSB under laboratory conditions.
- To determine life table parameters of CWSB under laboratory conditions.



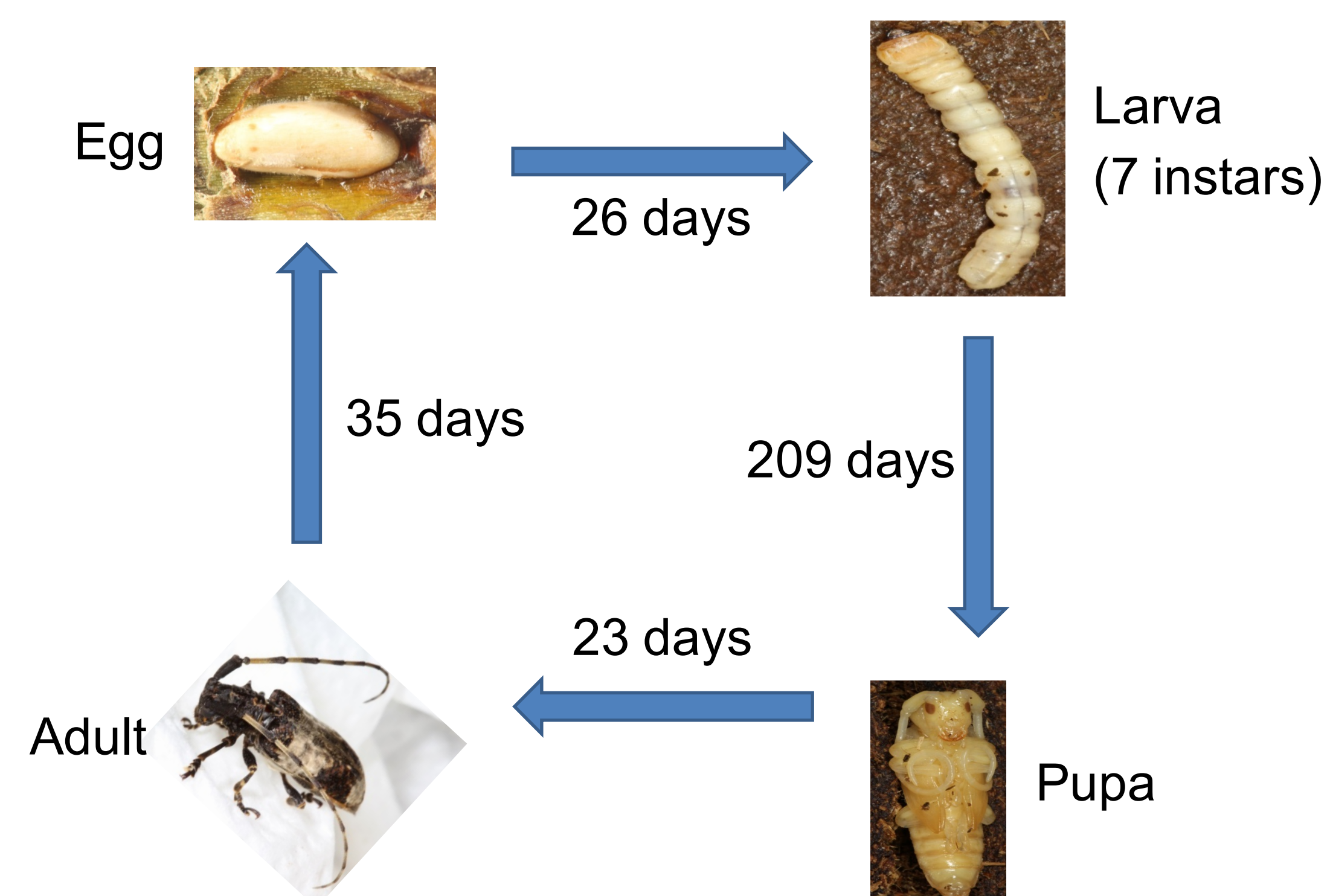
Adult CSB



Ring barking of coffee stem by CSB

RESULTS

A) CWSB life cycle in the laboratory



B) CWSB life table parameters

Parameter	Value
Gross reproductive rate (GRR)	35.36
The net reproductive rate (R_0)	2.60
Mean generation time (T_c)	304.66
Doubling time (T_d)	220.05
Intrinsic rate of increase (r)	0.00315
Finite rate of increase (λ)	1.00099

REFERENCES

Schoeman P.S., Hamburg H. and Pasques B.P. (1998) The morphology and phenology of the coffee white stem borer, *Monochamus leuconotus* (Pascoe) (Coleoptera: Cerambycidae), a pest of arabica coffee. *African Entomology* [online]. 6 (1), 83–89.

Tapley R.G. (1960) The white coffee borer, *Anthores leuconotus* Pasc. and its control. *Bulletin of Entomological Research*, [online]. 51 (2), 279–301.