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

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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.

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.

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 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

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.

RESULTS
A) CWSB life cycle in the laboratory

<table>
<thead>
<tr>
<th>Stage</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg</td>
<td>26 days</td>
</tr>
<tr>
<td>Larva</td>
<td>35 days</td>
</tr>
<tr>
<td>Adult</td>
<td>23 days</td>
</tr>
<tr>
<td>Pupa</td>
<td>209 days</td>
</tr>
</tbody>
</table>

B) CWSB life table parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross reproductive rate (GRR)</td>
<td>35.38</td>
</tr>
<tr>
<td>The net reproductive rate (R0)</td>
<td>2.60</td>
</tr>
<tr>
<td>Mean generation time (T1)</td>
<td>304.66</td>
</tr>
<tr>
<td>Doubling time (T0)</td>
<td>220.05</td>
</tr>
<tr>
<td>Intrinsic rate of increase (r)</td>
<td>0.00315</td>
</tr>
<tr>
<td>Finite rate of increase (λ)</td>
<td>1.00099</td>
</tr>
</tbody>
</table>

REFERENCES


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