

# Morphological Studies of the Life Stages of *Oryctesowariensis Beauvois* (Coleoptera: Dynastinae:Scarabaeidae)

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## ABSTRACT

All developmental stages of *Oryctesowariensisbeauvois* egg; 1<sup>st</sup> to 3<sup>rd</sup> larval instar stages; pupa and adult were illustrated and described. Eggs were white in colour, oval, small and laid singly. The larva of *O. Owariensis* is whitish in colour, robust with brownish bristles or hairs uniformly scattered over its body. It has cylindrical c-shaped characteristic of dynastid larvae. The black colouration of the caudal region indicated the presence of accumulated faecal material. The pre-pupa stage is mostly inactive, doesnot feed and white in colour. The pupa is orange-brown in colour, exarate with highly sclerotized head capsule. The adult is dark brown in colour with males showing protruding tubercles (horns) that are slightly longer than that of the females

**keywords:** *Oryctesowariensis*, Eggs, Larvae, Pupae, Adults

## I. INTRODUCTION

*Oryctesowariensis* is one of the edible species of *Oryctes*beetle and is most acceptable as food insect in Nigeria especially in the Niger Delta area. The larval stage is sold as a form of trade among the Izon tribe of Nigeria with particular emphasis to Bayelsa, Rivers and Delta States respectively where they are prepared and sold on sticks along market places, streets, parks and high ways and fondly called “BayelsaSuya” [3]. All larval stages are destructive to *Raphia* and Oil palms. Observations show that *O. owariensis* specie attack these palms entering through any cut at the frond during wine tapping, thereby destroying the inflorescence of the palms, eating deep into the pith of the palms, feeding on tissue juices degenerating them into dark brownish mass. The larvae bore into the crown of the palms forming V-cuts in the fronds. In India, there is the record of loss in yield of about 5.5 to 9.1% due to *Oryctes* infestation [4], while severe infestation of oil palm leaves led to leaf area reduction of 13% and decrease in nut yield by 25% [6]. Theattack on palms also provide entry points for lethal secondary infestation by *Rhynchophorusphoenicis* and

other pathogens [1]. There is no known information on the egg, larva or pupa stages, except identification and acknowledgement of the beetle by International Institute for Tropical Agriculture (IITA). Its importance as real protein supplement necessitates the reason for its precise description. The study therefore is aimed at enabling the insect collectors and the eaters in recognizing *O. owariensis* at all stages especially the larva thereby reducing and eradicating the chances of harvesting inedible but closely related larval types and species.

## II. MATERIAL AND METHODS

Eggs were collected from *Raphiahookeri* palm trees situated along the Yenagoa-Amassoma link road in Southern Ijaw Local Government Area of Bayelsa State. Eggs were placed in wooden chambers covered with net having vents in which were stored large amount of palm pith. Also from the field was felled and moved to the laboratory, a *Raphia* palm trunk measuring 6 feet containing some eggs. The palm trunk was wrapped with nets having vents so as to prevent the hatched larvae from falling out and to avoid drying out of the tee trunk. The palm pith was replaced weekly to enhance freshness until the eggs hatched into larvae. Upon emergence of first larval instar, the larvae were placed in transparent plastic jars with perforated vents covered with nets and fed with palm piths and other substrates such as fruits (banana, orange) which were renewed weekly. In the jars were added 100g of palm tissues to be used as pupation medium. The life stages were monitored for a period of thirty weeks with pictures taken showing body forms of various stages ranging from eggs, larvae (first, second and third instar), prepupa, pupa and adult.

## III. RESULT

### A. EGG

Round whitish eggs laid singly in small chambers at the bottom of the substrate. Eggs are sensitive to desiccation and shrank when exposed to heat and dryness. Eggs enlarged during the incubation period of 12-14 days and became more rounded and dense.



Plate 1: Eggs

### B. LARVA

C - Shaped cylindrical, scarabaeiform larvae with highly sclerotized head (plate 2). Larvae were white in colour, showing presence of three pairs of legs at the head region. *O. owariensis* had three larval instar stages with two moults.

a). **First instar:** Head and prothoracic shield black. Body 10 segmented, with presence of stigmata at both sides of larvae. True legs black. Bristle spines on body. Plate 2.



Plate 2: First instar larva

b). **Second instar:** Head and prothoracic shield black. Presence of paired spiracles on body. Well sclerotized head capsule. Feed continuously.

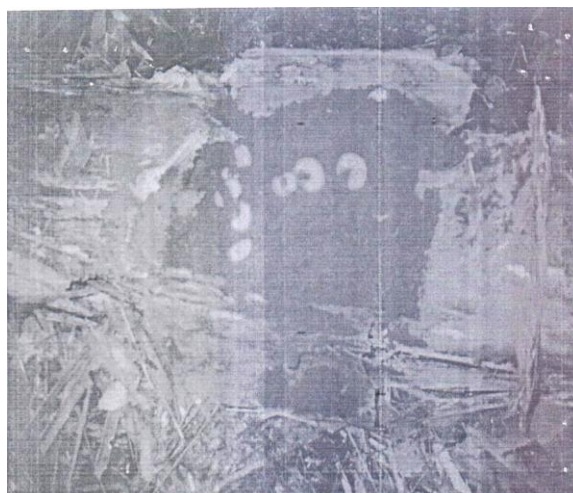


Plate 3: Second Instar larva

c). **Third instar:** This instar stage showed the same colour distributed as the second instar, through the head, prothoracic shield and Plates are darker. Mandibular sclerites are dark brown. True legs are dark brown. Mature larva is same as third instar larva but larger in size. (Plate 4) Abdomen is cylindrical composed of 10 segments ( $A_1-A_{10}$ ). Paired oval spiracles present laterally on the abdomen. Larva also showed presence of accumulated faeces at caudal region which appear as dark brown.



Plate 4: Third instar larva

### C. PREPUPA

The pre pupal stage is less active, body ruffled, dull white to creamy colour but tans to orange brown prior to moulting. Does not feed hence showed absence of faeces since it had emptied all its waste at this period and constricted in size. (Plate 5).





Plate 5: Prepupa



Plate 6b: Pupa in trunk of raphia palm

#### **D. PUPA**

Exarate, inactive, led solitary life. Do not feed. Are highly sclerotized showing presence of horn. Abdominal segments reduced to 7. Showed presence of lamellate antenna that is four segmented. Whitish upon emergence from prepupa, but later tanned into brownish orange from the head which is less prominent and flexed by the thorax to the abdomen. Colour deepened within days to dark brown. Plate 6 shows earlier and later stages of pupa at dorsal and ventral views and also the exuviae of the moulted skin of prepupa transcending into pupal stage.

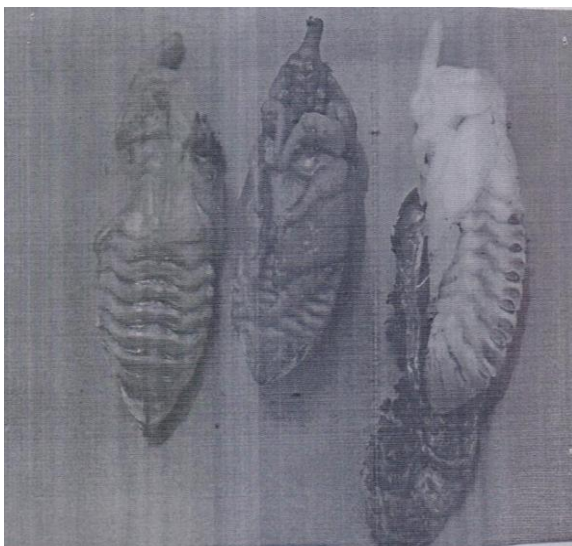


Plate 6a: Pupal stage

#### **E. ADULT**

Adults are monocoloured, varying from shiny brown to rusty blacks with heads that are small with protruding horns (that are slightly shorter in females) and but beneath a large thorax. There is the presence of spherical compound eyes. Antenna is lamellate and four segmented. Mouth part is the mandibulate (biting and chewing type) with mandibles that are four segmented showing presence of sharp pointed spines and hairs scattered all over. Pygidium of females covered with bristle hairs at ventral side. Males are slightly smaller than females but with longer horns used for feeding and defence. Adults also have hard bodies that are smooth and leathery with a set of paired leathery wings.



Plate 7: Adults

#### IV. DISCUSSION

This study has provided baseline information on the description of the egg, larvae and pupa of *O. owariensis* beetle which had no earlier information except information on its closely related species *O. rhinoceros* and *O. monoceros* worked upon by [1]-[2], [5].

#### V. CONCLUSION

The study showed that *O. owariensis* exhibited holometabolic metamorphosis transcending from egg, larva, pupa to adult stages. Results also proved that the life stages have features pertaining to members of other species of the genus *Oryctes* hence providing adequate information on this species rather than relying on information from related species such as *O. rhinoceros*, *O. boas* and *O. monoceros*.

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