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RE-INSTATEMENT OF THREE SPECIES OF THE DOG WHELK (*THAIS*: MURICIDAE, GASTROPODA) FROM THE MANGROVE SWAMPS OF EASTERN OBOLO, NIGERIA

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ABSTRACT

Udoidiong, O. 2006. Re-instatement of three species of the dog whelk (Thais: Muricidae, gastropoda) from the mangrove swamps of Eastern, Nigeria. ***Nigerian Journal of Agriculture, Food and Environment. 3(1&2): 103 – 107.***

The dog whelk (Thais) species of the mangrove ecosystem east of Imo River, Nigeria, were sampled for twenty four months. More than 3 species were found to occur here, contrary to literature impression that the genus was monospecific. Thais callifera, T. coronata, and T. haemastoma were identified, with the identities of about three other probable species yet to be confirmed. T-test analysis of mean composite spatial data showed no significant differences between station pairs. However, a contingency Chi-square analysis revealed a significant departure of the figures from random expectation (Chi-square = 20.738; $p < 0.001$). Examination of the sign and magnitude of the O-E terms indicated significant relationships between the three species and the three stations. The re-instatement of these species will resolve the nomenclatural discrepancies in the local scientific literature.

Key Words: *Thais species, mangrove swamps, taxonomy, relative abundance, Nigeria*

INTRODUCTION

The dog whelks or tingles are among the marine gastropods that have invaded the estuarine mangrove habitats, with the ability to withstand periodic exposure to air. In the Niger Delta mangal these muricid gastropods occur but there appears to be conflict in nomenclature of the single species of the genus *Thais*, implied in available literature in Nigeria. Along the larger West African coast, there also appears to be no unanimity in the number of species in the genus. For example, Schneider (1990) indicated the existence of three species namely, *Thais coronata, T. haemastoma* and *T. nodosa*. Edmunds (1978) and Yankson and Kendall (2001) described five species, namely *T. haemastoma, T. forbesi, T. nodosa, T. callifera,* and *T. callifera* var. *coronata*. Within Nigeria, available reports give conflicting nomenclature of the 'single' species believed to occur here. Thus Moses (1985) and MPN (1997) claim it is *Thais haemastoma;* Egborge (1993) calls it *Thais callifera* var. *coronata* whereas USIC (2000) refers to this same species as *Thais coronata*. From the Lagos lagoon, Oyenekan's report which unfortunately could not be dated, named it *Thais callifera* var. *coronata*. Previous literatures cited indicate these names belong to three different species. Presently, no report exists that has clarified the apparent confusion in names of the species in this genus that occur in the Niger Delta east of Imo River. The objectives of this study were to clarify the nomenclatural confusion in the genus and, if more than one species, assess their relative abundance.

Study area

The area covered in this study lies entirely in Eastern Obolo Local Government Area of Akwa Ibom State, Nigeria. It situates on the Nigerian map between latitudes 4° 28' and 4° 33' North; and longitudes 7° 30' and 7° 50' East (Fig. 1). The area shares the climatic conditions that prevail in the rain forest zone in southern Nigeria with an annual rainfall of up to 4000mm. The dominant factor influencing the climate in the area is the movement of the Inter-Tropical Front which gives rise to two seasons: The wet and the dry. The wet season is characterized by high rainfall, relative humidity and heavy cloud cover, and lasts from April to mid- November. The dry season, during which the harmattan (a cold, dry, dusty wind from the Sahara desert) occurs, lasts for only a short period, beginning in mid- November and ending in March. However, variations do occur.

The swamps are characterized by daily tidal flooding, and an organic substrate associated with acid conditions (Ukpong, 1997, 1998), characteristic of waterlogged saline soils (Boto, 1984). There are two distinct zones of soil, viz., clayey silt along the fringe of creeks, and peaty, fibrous mud (chikoko) at the back swamps (Wokoma, 1985). Tidal amplitude is about 1.07m at neap tides. The vegetation varies from one location to another, with some areas having predominantly native mangrove species such as *Rhizophora* spp., *Avicennia africana, Conocarpus erectus,* etc. Other areas are dominated by an Indo-

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Pacific mangrove palm, *Nypa fruticans* introduced about one hundred years ago, whilst other areas have a mixture of these and other mangrove macrophytes.

MATERIALS AND METHODS

Between December, 2000 and November, 2002, monthly samples of individuals of the genus *Thais* were obtained from the swamp vegetation in Eastern Obolo at three stations: 1) Kampa with predominantly *Rhizophora spp.*, 2) Emereoke with mixed native mangrove plant species and the alien *Nypa fruticans,* and 3) Obianga which is dominated by *Nypa fruticans.* Sampling was carried out monthly within three 5x5m^2 quadrats along transects established from channel margins across the mangrove swamps during ebb tide. Specimens were preserved in 10% formalin in clear estuarine water and taken to the laboratory for identification and other analyses. Materials for identification were obtained from Edmunds (1978), Schneider (1990), and Yankson and Kendall (2001).

RESULTS AND DISCUSSION

Contrary to reports in available literature, more than three species of the dog whelk, *Thais* were obtained in this study. However, three species are reported here. They are *Thais callifera, Thais coronata,* and *Thais haemastoma* (Fig. 2); key for identification in Table 2). The species not reported here had the attributes of either *Thais nodosa* but lacked the two purple spots on the columella callosity characteristic of this species or, *Thais forbesi* (Edmunds, 1978). Small-size specimens which did not fit into the descriptive framework of the above species were also collected. As at the time of this report the identities of these specimens were yet to be confirmed. Therefore, the disparate names given to what was generally believed to be a single species, belonged to three different species which occur in this part of the Niger Delta.

Table I. Summary of numerical data of the three species of *Thais* collected. Proportional contribution (%) in parentheses.

Species	1	2	3	Pooled
Thais callifera	409(49.42)	412(51.69)	334(42.28)	1155(46.80
Thais coronata	345(39.16)	279(35.01)	302(38.23)	926)37.52)
Thais haemastoma	127(14.42)	106(13.30)	154(19.49)	387(15.68)
Total	**881(35.70)**	**797(32.29)**	**790(32.01)**	**2468**

Table 1 is a summary of the numerical data of the species collected per station, and the pooled data, along with percentage composition (in parenthesis) per station and per species. A total of two thousand, four hundred and sixty eight specimens were collected during the twenty four months study.

Table 2. Key to common species of Muricidae

1	Oval aperture with canal.	2
	Oval aperture without canal	3
2	Aperture with short canal, teeth in outer lip	*Drupa nodulosa*
	Aperture with fairly long canal fused at the sides to form a tube	*Ocenebra inermicosta*
3	Body with large spire, short and blunt	*4*
	Aperture notched near suture as well as below	*5*
4	Broad, almost flat, white collumella callosity with two purple spots	*Thais nodosa*
	Aperture notched near suture as well as below	*T. callifera*
	Aperture not as above	*T. coronata*
5	Sculpture of rows of rounded tubercles; inside of aperture orange or pink	*T. haemastoma*
	Sculpture of rows of pointed tubercles with shoulder row best developed	*T. forbesi*

**From Yankson and Kendall (2001).*
My addition

The overall proportional representation showed that *Thais callifera* had 1155 individuals representing 46.8%; *T. coronata* 926 individual representing 37.52%, whilst *T. haemastoma* yielded 387 individuals with a 15.68% contribution to the *Thais* assemblage. Spatially, station 1 had most specimens of

the three species (881 or 35.70% contribution), followed by station 2 (797 representing 32.29%), and station 3 (790 or 32.01%). Spatial comparison of mean total collections among station pairs (1 and 2; 2 and 3; 1 and 3) showed no significant difference between them ($p > 0.05$, f 4 in each case).

However, a contingency Chi-square analysis of the data revealed a highly significant departure of the figures from random expectation (Chi-square = 20.738, $p < 0.001$, df 4). Since the value of chi-square does not indicate the nature of the association between the variables (Parker, 1979), examination of the sign and magnitude of differences for individual cells of the table (O-E terms) revealed the following interrelationships between the species and the stations:

(i) Thais coronata tended to occur most abundantly at station 1. (ii) Thais callifera occurred most abundantly at station 2 whilst, (iii) Thais haemastoma seemed to prefer station 3 most.

In a related study, Udoidiong (2005) reported a significant inverse association between *Rhizophora* spp. and *Thais haemastoma* in an all – *Rhizophora* vegetation (station 1), indicating that this species of the dog whelk might be sensitive to the plant, hence its preference for an area with nipa palm dominating the vegetation (station 3). A significant positive association was found between *Thais callifera* and dissolved oxygen at station 1,while *Thais coronata* associated significantly positively with potassium at station 2 characterized by mixed mangrove macrophytes species. It is however, not clear whether these findings could account for the observed spatial relative abundance of the three species.

Thais species are highly priced items of delicacy to members of the coastal community, and are exploited without regulation, leading to dwindling stocks in many areas. Since *T. haemastoma* had low densities, it is not clear whether it is a recent addition to the mangrove community and thus struggling to establish itself; or has been native to the area but in low densities. This doubt is informed by worrisome reports (Powell, 1987; Powell, *et al.*, 1990; Powell and Clark, 1990) of the occurrence of three Indo-Pacific species (*Macrobrachium equidens*: a prawn), (*Ulvaria oxysperma:* a seaweed) and *Temnopleurus toreumaticus:* a sea urchin) in the Bonny Estuary, and Powell's (1990) conclusion that it is now too late to ever determine with confidence the indigenous estuarine fauna of Nigeria. This claim may not be completely true since these species are not holistically distributed in the Niger Delta. However, the possibility of dilution exists due to increased international maritime trade and the interconnectedness of the creeks.

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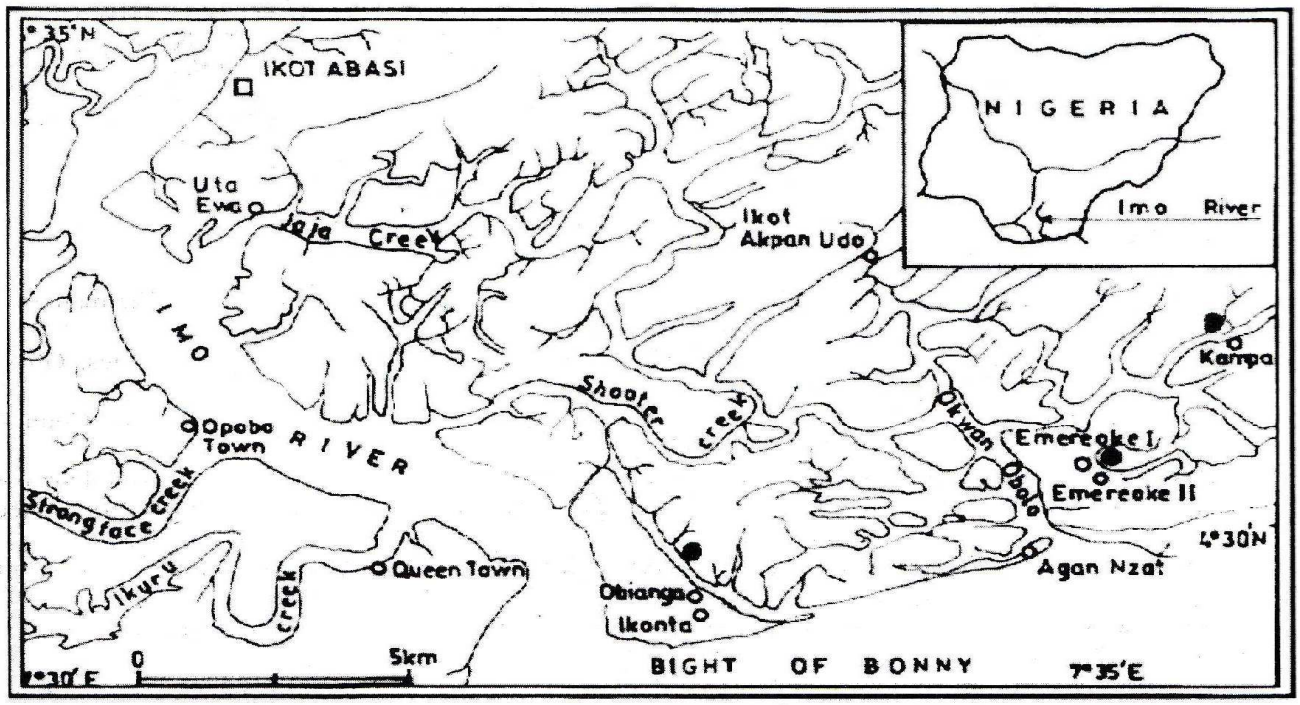

Fig. 1: Parts of the Coastal Basin of Imo River showing sampling sites, with closed circles.

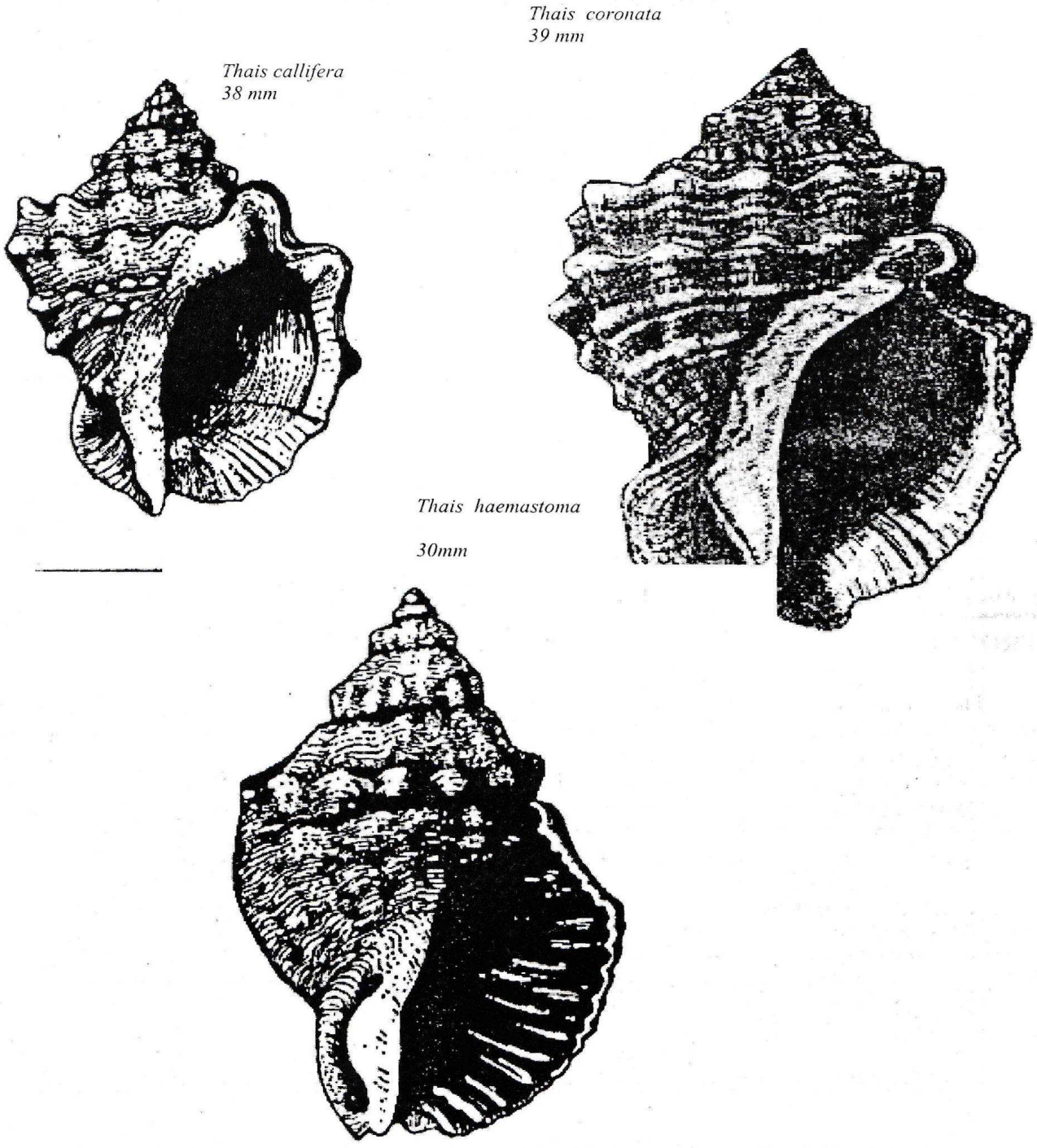

Fig. 2: The dog whelk *Thais* species. (a) *Thais callifera;* (b) *Thais coronata;* (c) *Thais haemastoma;* (a) and (b) from Edmunds (1978); (c) from Schneider (1990). Dimensions from this study