
UTILIZATION OF TORTOISE (*CHELONOIDES NIGRA*, QUOY AND GAIMARD, 1824) IN FIVE SELECTED COMMUNITIES IN UDU LOCAL GOVERNMENT AREA OF DELTA STATE, NIGERIA

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ABSTRACT

Chelonoidis nigra is threatened, but the utilization pattern and efforts to change the conservation status in its natural home range is yet to be recommended. Utilization of tortoise in selected communities in Udu Local Government Area was therefore carried out with the aim of investigating the various ways tortoise is being utilized, factors militating against the availability of tortoise, various methods of procuring tortoise, the perceived population dynamics, and to determine the association between age and occupation with utilization and procurement in the study area. Structured questionnaire, field observations and in-depth interview were used for the study in five randomly selected communities. A set of questionnaire was administered at random to 50% of household representatives of selected communities in the study area. A total of 124 respondents were sampled and the data collected were analysed using descriptive statistics and Chi square. The study revealed that *Chelonoidis nigra* is popular in the study area and it is mostly utilized as food and therefore hunted for sale as a source of income for families. Majority of the respondents (90.32%) hunt tortoise, few respondents (7.26%) buy without hunting and only 2.42% buy and hunt. Factors' militating against the availability of tortoise in the study area includes the seasonal nature of tortoise (35%) and weather (65%) including the high level of rainfall as a result of global warming which made the forests flooded thereby reducing the procurement of tortoise and extending the months of the species availability to October. Chi square tests revealed that age ($X^2 = 27.896$) and occupation ($X^2 = 101.75$) are associated ($p < 0.05$) with the utilization and procurement of tortoise respectively. Most respondents perceived that tortoise is not as many as it used to be in the study area. In view of the roles played by tortoise in the study area, there is therefore need for its conservation to ensure sustainability in the utilization.

Keywords: Tortoise, Biodiversity utilization, Delta State, Poverty alleviation

INTRODUCTION

Chelonoidis nigra is a reptile of the Order Testudines, Family of Testudinidae; which are terrestrial turtles with high domed carapace and elephantine feet (Galapagos Species Checklist: *Chelonoides nigra*, 2013)). The word tortoise is usually used for terrestrial turtles in the family of Testudinidae. Turtles are the closest relatives of birds and crocodiles (the archosaurs); and less related to snakes, lizards and the tuatara (Crawford *et al.*, 2012). Fossil record revealed that Testudinidae originated from Asia from where it spread to Europe, North America and Africa (Le *et al.* 2006). The close genetic relationship between

Chelonoides with the African hinged turtles (*Kinixys* sp) (Le *et al.*, 2006) shows that *Chelonoides* (and all Sought American tortoises) seems to have originated from Africa. According to San Diego Zoo Global (2010) western ocean currents such as Equatorial currents could have facilitated the dispersal of *Chelonoides* from Africa. The species can live up to hundred years. Its carapace resembles black horny shield. The males are typically larger than females (Fernando, 2000) In most rural areas of Sub Saharan Africa, hunting is a major occupation and a form of cultural recreational activities. In such areas where hunting is seen as an indigenous occupation, available

Data collection

Data for the study were collected through a set of structured questionnaire and complimented with personal interviews of indigenes of the community that has spent minimum of ten years in the community and are knowledgeable about procurement and utilization of tortoise in the study area. Data on procurement and utilization of the species were collected using structured questionnaires. Based on proportional allocation questionnaire were randomly administered to

male who are household representatives in selected communities as hunting in the study areas is normally carried out by men. In all, a total of 124 households were sampled.

Statistical design

With the assistance of indigenes from the study area who are conversant with the communities, households in the selected communities were listed as consistent with Ijeomah (2007) and 50% of household representatives were sampled in each selected community as shown in Table 1a.

Table 1a: Proportional allocation of questionnaire

Community	Number of households	50% of household	Retrieved questionnaire
Egiegi	70	35	35
Ekrota	55	30	27
Okolor Uburhie	48	24	24
Ukperheren	45	22	22
Obubu	60	30	16
Total	278	141	124

Source: Field Survey, 2011

In all, 141 households were sampled with only 124 Questionnaire retrieved.

Data analysis

Data obtained from the study were analyzed using descriptive statistics in the form of counts of frequency, bar charts and pie charts while Chi square was used to test for associations between age and utilization, age and procurement, occupation and procurement, and occupation and utilization.

RESULTS

Chelonoidis nigra, commonly called tortoise is traditionally called *Oriese* by 3 of the communities in the study area (Egiegi, Ekrota and Ukperierhen) and *Oriose* by 2 of the communities (Okolor and Obubu).

Utilization of tortoise

Results on utilization of tortoise are presented in Table 1b, Plate 1, Figure 1, Table 2 and Table 3. Tortoise is mostly utilized for food in the study area (Table 1b).

Table 1b: Respondents ways of utilization of tortoise in the study area

Variable	Frequency (F)	Percentage %
For food	98	79.03
For sale	21	16.94
For food / sale	5	4.03
Total	124	100

Kind of food prepared with tortoise meat		
Banga soup	95	92.23
Pepper soup	4	3.88
Any soup	4	3.88
Total	103	100

Source: Field Survey, 2011



Plate 1: Utilization of Tortoise as food

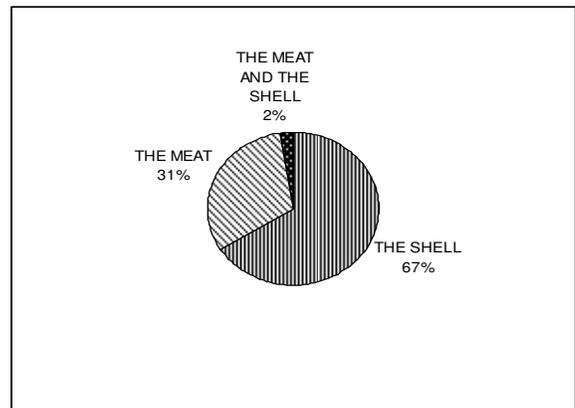


Figure 3: Parts of tortoise utilized by respondents in order of preference

Table 2 :Chi square test of association between age of respondents and ways of utilization of tortoise

		Age (Years)					Total
		Below 18	18-24	25-44	45-64	65+	
Ways of utilization	Both	0	1	2	0	0	3
	Cook	3	10	28	56	2	99
	Sell	2	2	17	1	0	22
Total		5	13	47	57	2	124

Source: Field Survey, 2011

There is a significant relationship ($p < 0.05$) between respondents age and ways of utilization ($X^2 = 27.896$)

Table 3: Chi square test of association between occupation of respondents and ways of utilization of tortoise

		Occupation							Total
		Civil servant	Driver	Others	Retired	Sales worker	Student	Unemployed	
Ways of utilization	Both	0	2	0	0	0	0	1	3
	Cook	62	2	7	19	0	2	6	98
	Sell	0	1	5	0	1	0	16	23
Total		62	5	12	19	1	2	23	124

Source: Field Survey, 2011

There is a significant association ($p < 0.05$) between occupation of respondents and ways of utilizing tortoise in the study area ($X^2 = 101.75$)

Procurement of tortoise

Results on procurement of tortoise are presented in Tables 4 – 9; Plates 2 and 3; Tables 10 and 11. Tortoise is mostly hunted in the study area by searching of the species by respondents.

Table 4: Ways of procuring tortoise in the study area

Variable	Frequency	Percentage (%)
Buy	9	7.26
Hunt	112	90.32
Buy and hunt	3	2.42
Total	124	100

Source: Field Survey, 2011

Table 5: Respondents awareness of locations to hunt tortoise

Variable	Frequency	Percentage (%)
In water and also on land	28	24.35
Riparian forests	18	15.65
Indigenous knowledge	9	7.82
By searching for them	57	49.57
No response	3	2.16
Total	115	100

Source: Field Survey, 2011

Table 6: Respondents rate of hunting tortoise in the study area

Variable	Frequency	Percentage (%)
4 times a week	6	5.22
2-3 times a week	26	22.61
Once a week	74	64.35
Occasionally	8	6.96
No response	1	0.87
Total	115	100

Source: Field Survey, 2011

Table 7: Number of tortoise caught by respondents in each hunting expedition

Rate of hunting	Frequency	Percentage (%)
1	1	0.87
1-2	52	45.22
2	43	37.39
2-3	18	15.65
No response	1	0.87
Total	115	100

Source: Field Survey, 2011

Table 8: Bait used in the study area for trapping tortoise in cages

Baits	Frequency	Percentage (%)
Frog	66	57.89
Palm fruit (banga)	44	41.74
No response	1	0.87
Total	115	100

Source: Field Survey, 2011

Table 9: Respondents criteria for selecting individuals of tortoise to hunt

Criteria of selection	Frequency	Percentage (%)
By size	22	19.13
By type	92	80.00
By looks	1	0.87
Total	115	100

Source: Field Survey, 2011



Plate 2: Physical appearance of the *Chelonoidis nigra*



Plate 3: Physical appearance of the *Chelonoidis denticulata*

Table 10: Chi square test of association between age and procurement

		Age					Total
		<18	18-24	25-44	45-64	65+	
Ways of procurement	Both	0	2	1	0	0	3
	Buy	0	4	5	0	0	9
	Hunt	5	7	41	57	2	112
Total		5	13	47	57	2	124

Source: Field Survey, 2011

There is a significant association ($p < 0.05$) between age of respondents and means of procuring tortoise in the study area ($X^2 = 28.511$)

Table 11: Chi square test of association between occupation and procurement

		Occupation						Total	
		Civil servant	Driver	Others	Retired	Sales worker	Student		Unemployed
Ways of procurement	Both	0	2	1	0	0	0	1	4
	Buy	1	2	2	0	1	0	3	9
	Hunt	61	2	8	19	0	2	19	111
Total		62	6	11	19	1	2	23	124

Source: Field Survey, 2011

There is a significant association ($p < 0.05$) between occupation of respondents and hunting of tortoise in the study area ($X^2 = 49.702$)

Availability of tortoise

Results on availability of tortoise in the study area are presented in Figures 2, 3 and 4. Availability of the species is seasonal as presented in Figure 2 while Figure 3 shows the factors that militate against the availability of tortoise in the study area. Due to reasons in Figure 4 respondents could not make tortoise more available.

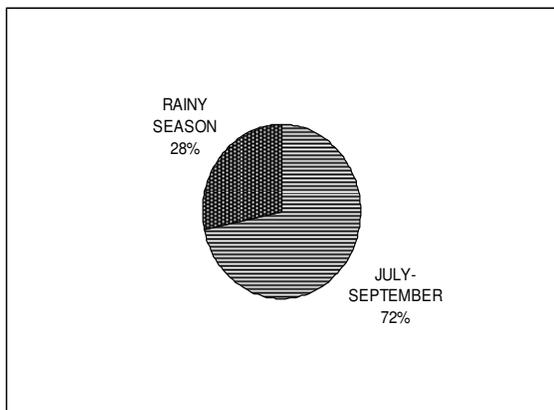


Figure 4: Seasonal availability of tortoise

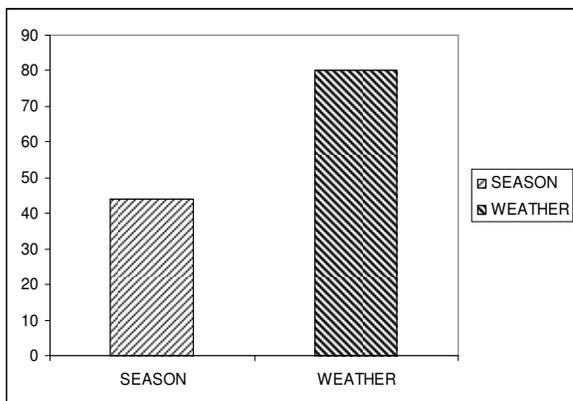


Figure 5: Factors militating against the availability of tortoise

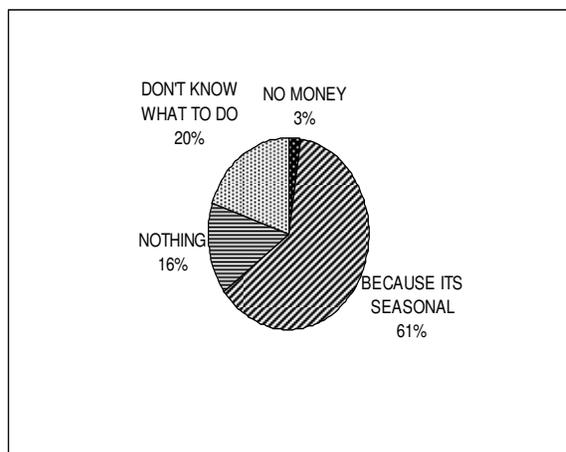


Figure 6: Reasons for respondents' inability to make tortoise available during off season

Perceived assessment of tortoise population

Figure 7 shows that the population of tortoise in the study area is decreasing.

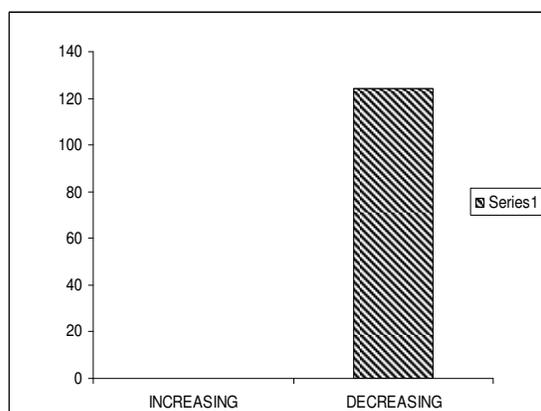


Figure 7: Dynamics of tortoise population in the study area

DISCUSSION

Utilization of Tortoise in the Study area

Tortoise is mostly used for food and sale (Table 1) in the study area. About 79% of respondents utilize it as food and about 17% sell it to generate money. A big tortoise costs between 1,500 and 2,000 naira. It is used to cook Banga soup (Table 1), a cherished native food in the locality. This shows the high value respondents place on tortoise meat. Similar high rate of consumptive

utilization of tortoise by catholic population in the region of Plovdiv has been reported. Study by Beshkov (1984), revealed that thousands of tortoises, were being collected from different Bulgarian regions, and distributed in the villages with catholic population in the region of Plovdiv. About 98% of the population of Rakovski town, in Bulgaria, has confirmed their regular consumption of tortoises (Beshkov, 1984), which are considered as appropriate source of protein (comparable to

fish) during the catholic feast. The demand for tortoises during the period before the Catholic Easter in Rakovski town of Bulgaria is extremely intense and therefore results to commensurate high rate of hunting and trading of tortoises similar to high demand for poultry in South eastern Nigeria during the Christmas period or the high demand for Ram by the Hausa Muslims in Northern Nigeria during the Muslim (*Ileya*) festival. Similar high utilization rate of carved daggers (*Jambiyas*) made from the Rhino horn as ceremonial daggers in the Middle East has been implicated as one of the causes of rhino over exploitation in East Africa (African Wildlife Foundation, 2012).

Tortoise is mostly utilized by respondents between the age range of 25 – 64 years in the study area. This could be attributed to the fact that the age range of 25 and 64 years is the working age class or the active age and since they are also those that mostly hunt they are therefore able to access and utilize it more than other age groups. Chi-square analyses showed significant association ($p < 0.05$) between respondents' occupation ($X^2 = 101.75$), age ($X^2 = 27.896$) and ways of utilization of the species in the study area. This implies that respondents' age and occupation affects utilization of the species (Tables 2 and 3). The shell of tortoise is more frequently utilized and valued than the meat that is the edible part (Figure 3). This cannot be unconnected with the fact that the edible part cannot be further utilized after consumption unlike the shell, which can be used for other purposes like kitchen bowls, sitting room decorations, and medicinal use or crafted into jewelries. Utilization of the shell for these purposes is because of its durability. The shell is found in most homes in the study area. Medicinally, the shell is still under utilized in the study area unlike in communities in China. Utilisation of *Chelonoidis nigra* for pet and export is not pronounced in the study area. Export of species of Monkey, Parrot, Tortoises and Turtles for pet trade is one of the major factors that have

endangered these species. Ijeomah *et al.* (2011) observed a student of the University of PortHarcourt, who uses tortoise for pet.

Procurement of tortoise in the study area

The major way of procuring tortoise in the study area is by hunting (Table 4) as the communities are located close to the wild, and therefore have access to the forests around them. Also, a Chi-square analysis reveals that age ($X^2 = 28.511$) and occupation ($X^2 = 49.702$) are significantly associated ($p < 0.005$) with procurement of the species in the study area. Many of the inhabitants of the study area are civil servants, and therefore work at specific hours of the week. This nature of job makes them to have more time to do other menial jobs. Tortoise is utilized in different forms but rarely used as a gift item in the study area. It is not valued as a gift item because of its easy accessibility in the study area - as many persons that need it can access it. Similarly the Asian brown tortoise (*Manouria emys*), which is a good source of meat in Malaysia was described by Smith (1933) as an easy prey as it was frequently found in streams and can easily be killed by natives for its flesh whenever found.

Hunting, in Udu Local Government Area, is an indigenous occupation. Tortoise is therefore procured by respondents using indigenous knowledge to know where to harness the species. Respondents are aware that it is usually found in riparian area of the forest. Frogs and palm fruits are mostly used as baits in the study area (Table 8) for catching tortoise because they are readily available and are collected at no financial cost. However, this situation where more than ninety percent of the respondents hunt mostly on weekly basis (Table 6), using frogs as bait throughout the season (of tortoise availability) could threaten the existence of the frog species especially as the population of the study area is increasing.

There are two common types of tortoise in the study area: *Chelonoidis nigra* (Plate 2) and *Chelonoidis denticulata* (Plate 3). During

procurement the respondents, however, have criteria for selecting individuals of tortoise to hunt. Selection is either done by size (big or small) or type (*Chelonoidis denticulata* or *Chelonoidis nigra*) depending on users' requirement or demand. Most users procure small tortoise for fetish purposes (sacrifice and rituals) and large or medium sized ones for either food or sale. Selection by type (Table 9) is the criterion mostly adopted by respondents. This can be ascribed to the fact that *Chelonoidis denticulata* is a sacred species in Egiegi community and should therefore neither be hunted nor killed. However, as a result of the influence of changes in religion (Christianity) few persons do hunt and kill *Chelonoidis denticulata* as a way to demonstrate their faith. This agrees with the findings of Ijeomah *et al.* (2007) on local conservation practices in Dikenafai. It is also similar with the report of Ijeomah *et al.* (2011) concerning conservation of the sacred species, *Cercopithecus sclateri* in Lagwa community of Imo State. Even among the other studied communities where *Chelonoidis denticulata* is not considered sacred, respondents still discriminate against *Chelonoidis denticulata*. They complain that the meat is hard and takes time and fuel to be cooked. The look (appearance) of *Chelonoidis denticulata* is not appealing to many respondents (Plate 3), which also makes respondents to select by looks. Similarly in Peninsular, Malaysia Asian giant soft turtle (*Pelochelys bibroni*) is disliked due to its tough meat (Pan, 1990) and frequently released especially in Terengganu whenever caught by fishermen (Sharmar, 1999). The meat of *Chelonoidis denticulata* is described as being tasteless and inferior by respondents. *Chelonoidis nigra* is usually procured in the study communities as it is the preferred choice of most respondents

Limitations to availability of tortoise

Between July and September has become part of respondents' cultural time table as period of the species availability in the study area (Figure 4).

Pan (1990) obtained similar result in Malaysia on seasonal availability of tortoise. However, as a result of the global warming there has been increased rate of rainfall in Udu Local Government Area leading to flooding of forests in the study area. This made *Chelonoidis nigra* became rare and *Chelonoides denticulata* unavailable as it is found only on land. This climate change now made the period of tortoise availability extended to October, a situation which experienced hunters described as an abnormal occurrence. More so, respondents complained that the number of catches per hunting has been reduced to a maximum of 2 or 3 per hunting (Table 7). This can also be attributed to the effects of Climate change. Availability of tortoise is seasonal. It is also affected by changes in weather conditions (Figure 5). Another limitation to the availability is the fact that attempts have not been made to either manage the species in semi intensive or intensive form. This could be attributed to the fact that the respondents do not know what to do to make it more available in the study area and also lack the finance to domesticate tortoise (Figure 6).

Perceived Population assessment of Tortoise

Respondents have perceived declines in the population of the species (Figure 7) but only complain without making any concerted effort to ensure that the population becomes stabilized. This agrees with studies by (Anonymous, Undated) that Tortoises *are* currently experiencing a very serious decline in much of its range, due mainly to habitat loss and over exploitation for subsistence and traditional medicinal utilization as well as for the international pet trade by local people in desperately poor economic condition. This is because respondents do not have financial resources to conserve tortoise and lack the knowledge of how to go about domesticating the species. Besides, respondents have poor attitude towards establishment of wildlife farms. This is attitude is common in most rural areas of Africa.

For instance, most *Python regius* exported to Europe from Togo; which were claimed to have been harvested from established farms were discovered by Harris (2001) to be actually newborns of wild-caught females (killed after oviposition). Similar studies by Lawson (2000) and the observations of hunted specimens from two protected areas in the Niger Delta of Nigeria by Luiselli (2003) confirm that hunting is still rampant in many protected areas. Ijeomah and Efenakpo (2011) noticed similar poor attitude of locals toward establishment of wildlife farms in other coastal areas of Niger Delta region where Crocodiles are under serious threat due to consumption and high demand of their skins by leather industries.

CONCLUSION AND RECOMMENDATIONS

Previously, tortoise was very abundant in the study area and the flesh is mostly consumed while the shell is used as utensils in the study area. The species is popular among respondents and freely and easily procured. Exporting the species for pet is not common among the respondents. The continuous utilization of tortoise for food and source of income irrespective of its endangered conservation status without provision to manage the species for sustainability could lead to local extinction of tortoise in the study area. With the prevailing pattern of the species' utilization respondents can hardly stop consumption of tortoise as it is their major source of cheap or free dietary protein. There is need for conservation and domestication of the species to guarantee its sustainability. Awareness should be created on the need for the conservation of the species in the study area. The rural people should be encouraged to participate in conservation of *Chelonoidis nigra* in the study area. The communities should be sensitized on the potential impacts of climate change and mitigating strategies including how to check coastal erosions.

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