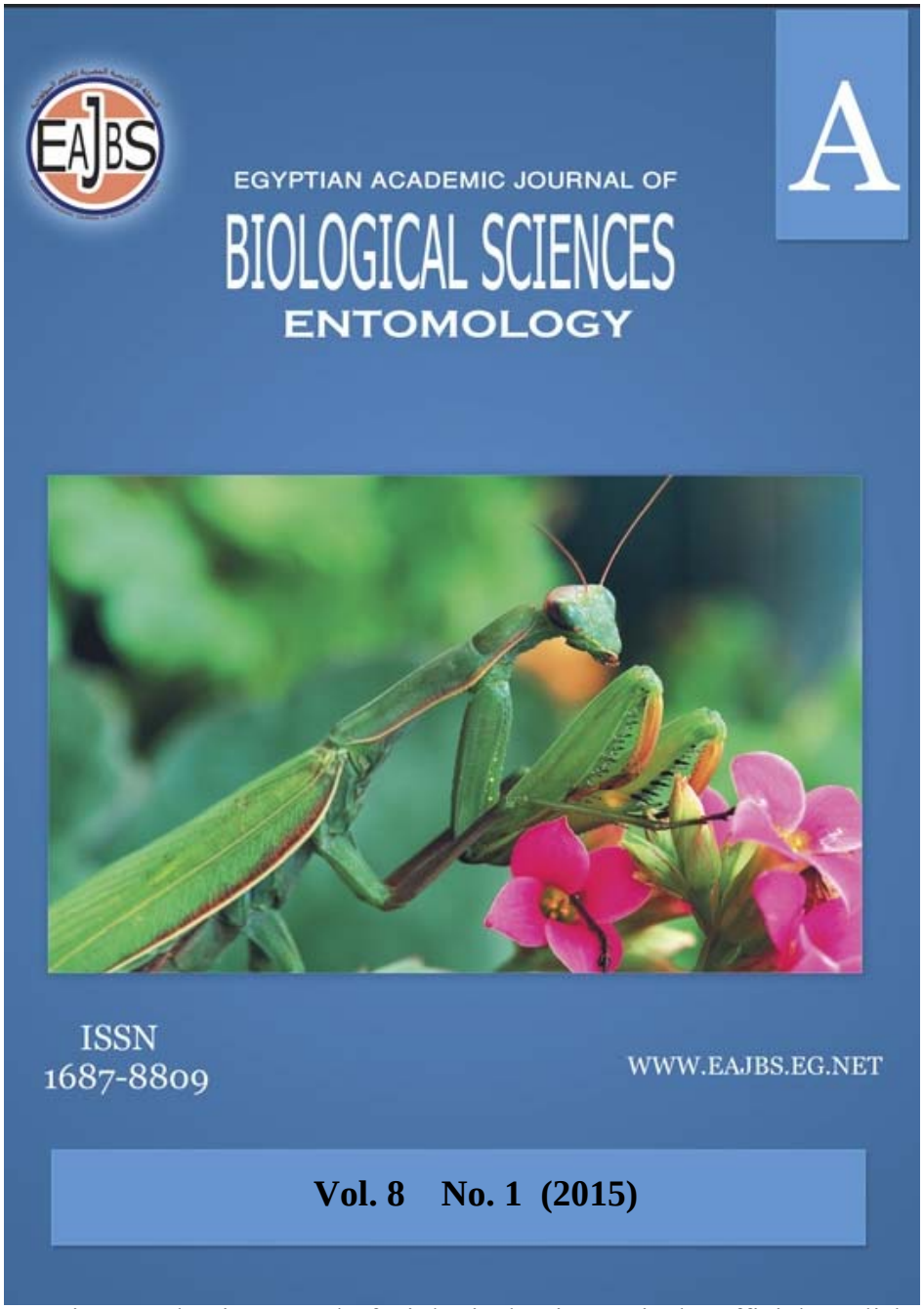
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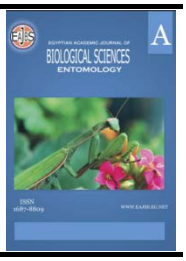
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Citation :*Egypt.Acad.J.Biolog.Sci. (A.Entomology) Vol.8(1)pp41-52 (2015)*

Egypt. Acad. J. Biolog. Sci., 8(1): 41 –52 (2015)

Egyptian Academic Journal of Biological Sciences
A. Entomology

ISSN 1687-8809
www.eajbs.eg.net



Structure, production and constraints of honey hunting and traditional beekeeping activities in patigi, Kwara state, Nigeria

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ARTICLE INFO

Article History
Received:28/1/2015
Accepted:30/3/2015

Keywords:
Constraints,
honey, structures,
Nigeria

ABSTRACT

Honey has continued to play an important role in nutrition and medicine; it is an ingredient in many herbal remedies and a crucial component of the bride price for many tribes in Nigeria. Several methods and structures including traditional, modern beekeeping, and age long honey hunting are employed to obtain honey for its several uses. This study aims to study honey bee farming structure; production capacity and constraints faced by both honey hunters and traditional beekeepers. A proportional random sample size of 190 bee honey farmers comprising of 110 bee honey hunters and 80 traditional beekeepers were used for the study. Data were collected through structured questionnaire and direct participation. The results of the study indicated that about 53% and 70% of the honey hunters and traditional beekeepers were within 20-30 years and 31-40 years of age respectively. The result also revealed that 86.3% of honey hunters and 87.5% of beekeepers employed smoking as mean of honey harvest. Further, 4.7litres, 4.8litres, 5.8lites and 6.2litres of honey were harvested from tree cavities, colonies on tree branches, woven grasses and calabashes respectively. Provision of necessary modern beekeeping tools, training, and credit facilities could minimize constraints faced by bee farmers and improve their welfare.

INTRODUCTION

Bee farming is one of the important means of reducing poverty and it is common among the people of West African countries. Honey fetching or hunting and traditional bee keeping constitute age old tradition of people and means of sustenance of many poverty stricken rural dwellers in Nigeria. People result to gathering of fruits

and hunting for animals and their products during dry season when there is less farm work to supplement their incomes (Crane, 2002).

Honey hunting, plundering wild nests of honey bees to obtain honey, beeswax and other hive products is widely practiced where subsistence living level is poor and wild honeybee colonies are abundant. It is an age long tradition of people of Africa and seen as part of the lives of the world's remaining hunter and fruit gatherers. The colonies of wild honeybees nesting in tree cavities, rocks holes, and termite mounds are plundered. For hunter hunters, honey hunting is a way of quickly obtaining honey, pollen and bee larvae as foods at no financial cost (Ntenga, 2000; Mutsaers, 1991a and Taylor, 1978).

Local customs and traditions have become associated with honey hunting and cultural associations. Among the cultural believes within hunter-folk is the apparent role of the African honey guide woodland birds *Indicator indicator* which are remarkable for its behaviour of leading honey hunters towards bee nests. The birds chatter, flutter and lead the honey hunters towards the vicinity of a bees' nest. When the honey hunters plunder the nest, the birds are busy feeding on bees' brood, pollen and honey (Dutton *et al.*, 1981and Mutsaers, 1991b).

Honey hunting by smoking and setting hives on fire kills and destroys large number of bees and often results to bushfire that clear vegetation cover including bee colonies and bee structures (Gurung, 2005 and Ikediobi, Obi and Achoba, 1985). Traditional beekeeping is one of the oldest practices of bee-keep carried out by many tribes in Nigeria. It is widely believed that knowledge of keeping the bees is been passed on from generation to generation, with some family lineages named after their beekeeping practices. Among the indigenous beekeeping tribes, beekeeping was strictly a man's business and only boys received training through apprenticeships (Lawal and Banjo, 2010 and Crane, 1999).

In many parts of Nigeria, traditionally forest nesting *Apis mellifera adansonii* is kept in traditional structures such as clay hives protected by pointed grass roofing, straw hives made from grass stems can be cylindrical or woven type which tapers at one end. Pots placed on or a little above the ground are used by keepers in Southern, Northern and North-Central zones. A traditional bee keeper could put about 100 hives in trees in one bee season (Lamb, 1978; Taylor,1978). According to Igboanugo, (1996) and Mutsaers, (1991a), beekeepers in Kaduna State use unbaked or mud hives, gourds and calabashes with a capacity of 5-15litres placed on trees, 3 meters high from the ground. In most cases traditional beekeeping in trees is practiced by men while bee nests in pots and other structures on ground are owned and harvested by women.

Traditional beekeeping hives are made from local materials such as hollowed-out logs; bark formed into a cylinder, clay pots, woven grass or cane and whatever is available locally and suitable. The sole purpose of the hive is to encourage bees to nest in a place easily accessible to the beekeeper. The bees build their nest inside the hive in whatever hive type is provided, just as they would build it in a natural cavity. The beekeeper plunders the nest to obtain crops of honey and beeswax. Depending on the expertise of the beekeeper bees may or may not be killed during harvesting process. Bee colonies and structures destroyed during harvesting may remain empty for a while but later attracts swarm which may eventually settle in the empty hive and start building a new nest (Ajao, 2012). Traditional beekeepers often own many hives but expect only a portion of it to be occupied by bees at any point in time. All the materials required are locally available, but traditional beekeepers could be assisted with protective clothing, smokers and containers for the honey, and help in locating markets for their products (Kolmes and Sam, 1990).

A lot of studies has been carried out and reported in literature on productivity of various bee nesting structures for honey hunting, traditional and modern beekeeping methods. Ajao and Oladimeji, 2013; Shawer, 1987 and Duff and Furgala, (1986) observed positive correlation between stored pollen, brood production and honey yield. According to Mladenovic *et al.,* (1999), strong colonies produced more honey, 10.50 kg/colony than weak ones, 7.17 k/colony. Further, significant positive correlations were found between honey yield and each of stored pollen area, worker sealed brood area and colony population (r = 0.72, 0.73 and 0.71 kg^{-1}). In addition, Graham, (1993) and Jevic *et al.,* (2009) found strong relationships between the colony size and the honey production of various sizes of bee colonies.

The loss of large trees makes it more difficult for bees to find secure nesting places as nesting in smaller trees makes wild bee colony easier to locate and to plunder by predators including man. Finding conducive structures to nest in decimate bee colonies and lead to decline in number of bee colonies with possible bad effect upon pollination and biodiversity maintenance. Also, because honey hunting usually takes place under crude circumstances the product from honey hunting is usually a mixture of ripe and unripe honey, beeswax, dead bees and other debris, leading to product of low value which often ferment quickly (Crane, 1999 and Dutton *et al.,* 1981).

Therefore, there is paucity of dependable statistics on nature of various indigenous bee farming structures, the volumes of honey harvested and constraints faced by hunters and traditional beekeepers in most rural settings of Nigeria, particularly in many villages in Kwara state. This research aimed at providing relevant data to document the structure, production, constraints and activities of traditional bee farmers and honey hunters in Patigi Local Government Area (LGA) of Kwara State, Nigeria.

MATERIALS AND METHODS

Study Area

The research was conducted in Patigi Local Government Area (LGA) of Kwara State, Nigeria. The State lies on Latitude $8^0 5^1$ and $10^0 4^1$ N and Longitude $4^0 55^1$ and $6^0 5^1$E in North Central Nigeria, and shares boundary with Niger, Osun, Oyo, Kogi and the Republic of Benin. It has an estimated land area of 32,500 km^2. The State lies within two geo-ecological zones; the derived savanna which is characterized by woodland and the Guinea savanna which is characterized by tall grasses growing intermixed with deciduous trees.



Fig. 1: The map of Kwara State showing the sixteen LGAs including Patigi LGA

Kwara State comprises of 16 Administrative LGAs, divided into four agricultural zones by the Kwara State Agricultural Development Project (KWADP) in consonance with ecological characteristics, cultural practices and project administrative (Fig. 1). Important economic bee trees for nests and forage in the study area include: *Vittellaria paradoxa, Parkia biglobosa, Acacia sp, Mangifera indica, Citrus sinensi,, Butyrospermum parkii, Azadiracta indica, Delonix regia, Anacardium occidentale* and *Khaya senegalensis.* These species of trees provide nests and forage for the bees.

Data Collection and Sampling Technique

Ten villages were randomly selected from the list of traditional bee farming and honey hunting settlements in Patigi LGA. The sampled villages consisted of Ekati, Gbodongi, Jida, Kokodo, Kpada, Lade, Lanta Nna, Patigi, Ragada, and Sunkuso for honey hunting and traditional beekeeping activities. In all, a proportional random sample size of 190 bee honey farmers comprising of 110 bee honey hunters and 80 traditional bee keepers were selected. The structured questionnaire sought demographic information, nature of honey bee farming activities, method of honey harvest, quantity harvested and constraints faced by bee farmers.

Also, survey of honey hunters' wild bee and traditional bee farming structures was carried out between July 2012 and June 2013 in the selected settlements, with assistance of the local honey hunters who are conversant with the locations. The occurrence of nesting structures, size, and quantity of honey harvested from each type and town were recorded. The size of the structure of the wild bees was measured during the survey. This was achieved by temporarily driving away bees with smoke and taking measurements of the cavities using flexible copper wire and meter rule. For the traditional beekeeping, materials used, its construction and placement were all noted. During honey flow usually October-December and February-May, five wild and traditional bee colonies/structures each, were randomly selected from each settlement, to examine the quantity of honey produced, harvested and processed. Descriptive analysis was employed for the collected data.

RESULTS

The analysis of data from the respondents on the socio-economic status presented in Table 1 indicated that the bulk (58.2%) of the people engaging in bee honey hunting were within the age range of 41- 60 years and only about 14% of respondents were above 60 years. However, more than half (53.8%) of traditional beekeepers fall within 20 – 40 years of age range and less than 8% of them has attained the age of above 60 years. Experience in bee farming also measured in years showed that two-fifth, 45(about 41%) of bee honey hunter have at most 10 years' experience in bee honey hunting expedition. Conversely, more than half, 42(52.5%) of traditional beekeepers also have at most 10 years' experience in bee farming while only 14% attained at least 20 years. Results also revealed that both bee honey hunters and traditional beekeepers in the study area are males dominated (100%); but the adjusted household size varied significantly between the two groups. For example, about 49% and 36.2% respectively of honey hunters and traditional beekeepers had 6-10 household size.

Table 1: Socio-economic status of the honey hunters and traditional beekeepers

Parameters	Honey hunters		Traditional beekeepers	
	F	%	F	%
Age of the respondents (years)				
20-40	31	28.2	43	53.8
41-60	64	58.2	31	38.7
>60	15	13.6	6	7.5
Experience in bee farming (years)				
1-10	45	40.9	42	52.5
11-20	49	44.6	27	33.8
>20	16	14.5	11	13.7
Adjusted household size (number)				
1-5	27	24.5	35	43.8
6-10	54	49.1	29	36.2
>10	29	26.4	16	20.0
Total	110	100	80	100

Source: Data Analysis 2013

The result of the analysis of responses on the location of wild bee colonies in Table 2 revealed that the bulk of honey hunters (51.8%) discovered the bee nests during game hunting but the majority of traditional beekeepers (62.5%) got the clue of bee nests through information from other hunters and farmers. However, honey guide birds Indicator were employed by both honey hunter (22.7%) and traditional beekeepers (15%).

Table 2: Respondents' assessment of source of information on location of wild bee colony

Parameters	Honey hunters		Traditional beekeepers	
Source of information on location of wild bee colony	F	%	F	%
During game hunting	57	51.8	08	10.0
Informed by other hunters and farmers	23	20.9	50	62.5
honey guide bird(*Indicator indicator*)	25	22.7	12	15.0
Other sources	05	4.6	10	12.5
Total	110	100	80	100

Source: Data Analysis 2013

Table 3 showed the result of the analysis of respondents' responses on honey harvesting techniques for both the honey hunters and traditional beekeepers. The results revealed that smoking of the colony to drive away the bees as the most common method of harvest for honey hunters (86.3) as well as traditional beekeepers (87.5%). In addition, honey hunters also employed detaching of combs (15%) while traditional beekeepers employed both detaching (2.5%) and covering with protective clothing (10%).

Table 3: Distribution of the assessment of honey harvest procedure by bee hunting and traditional beekeeping activities

Parameters	**Honey hunters**		**Traditional beekeepers**	
Honey harvest procedure	**F**	**%**	**F**	**%**
Smoking to drive the bees away	95	86.3	70	87.5
Detaching the hanging combs	15	13.7	02	2.5
Covering with protective clothing	-	-	08	10.0
Total	**110**	**100**	**80**	**100**

Source: Data Analysis 2013

The distribution of occurrence of wild honey bee hunting structure is depicted in Table 4 and a typical example of nesting structures found in the study area are shown

in Figs. 2 and 3. The result showed wild bee honey hunting structures in the study area to consist of tree cavities, voids of ceilings, termite mounds, rocks/cave holes and colonies on tree branches. Of 1986 wild nesting structures, nearly half (about 46%) consist of tree cavities and more than 37% on tree branches. Others include 11.4% on termite mounds; 3.2% on voids ceilings and only 2.5% on crevices of rocks and caves. However, Gbodongi settlements has the highest nesting structure (about 17%) while Sunkuso had the least (4.9%). Further, five villages viz. Gbodongi (16.9%); Lade (12.7%); Kpada (12.6%); Patigi (11.4%) and Ekate (10.6%) with two digit percentages, captured more than two-third (64.2%) of total nesting structures found in the study area.

Table 4: Distribution of occurrence of types of wild honey bee nesting structure

Parameters	Wild honey bee nesting structures					
Villages	Tree cavities	Voids of ceilings	Termite mounds	Rocks/caves	On Tree branches	Total
Ekate	80 (8.8)	05 (7.9)	56 (20.2)	02 (4.1)	67 (9.1)	210(10.6)
Gbodongi	195 (21.4)	09 (14.2)	05 (1.8)	05 (1.8)	122 (16.4)	336 (16.9)
Jida	87 (9.5)	07 (11.1)	24 (10.5)	0 (0)	50 (6.7)	168 (8.5)
Kokodo	84 (9.26)	06 (9.5)	04 (1.7)	0 (0)	48 (6.4)	142(7.2)
Kpada	35 (3.8)	19 (30.1)	12 (5.2)	13 (26.5)	176 (23.7)	255(12.6)
Lade	130 (14.3)	08 (12.6)	35 (15.4)	02 (4.1)	77 (10.4)	252(12.7)
Lanta Nna	57 (6.8)	0 (0)	38(13.7)	12 (24.4)	38 (5.1)	145 (7.3)
Patigi	138 (15.2)	05 (7.9)	23 (10.1)	10 (20.4)	51 (6.8)	227(11.4)
Ragada	50 (5.5)	02 (3.1)	30 (13.2)	0 (0)	77 (10.4)	159 (8.0)
Sunkuso	51 (5.6	02 (3.1)	0 (0)	10 (20.4)	34 (4.5)	97 (4.9)
Total	907 (45.7)	63(3.2)	227(11.4)	49 (2.5)	740 (37.3)	1986 (100)

Source: Data Analysis 2013; Note: ***figure in parenthesis are %***



Fig. 2: Wild bee structure for honey hunting



Fig. 3: Wild bees inhabiting a cave
Source: adapted from Ajao, 2012

Similarly, traditional bee hives such as Figs. 4 and 5 consists of 30.3% woven grasses, 26.1% mud pots; 10.8% gourds and calabashes; 17.5% tree bark/logs and other containers, 15.3%. Lanta Nna had highest traditional bee structures (19.8%) follow by Kpada settlements (17.8%) and Patigi (15.1%) as shown in Table 5. It suffice to note that the trio settlements aforementioned accounted for more than half (52.7%) of pooled structure in the study area. Results also revealed that woven grass and mud pots captured about 56% of sampled structures understudied.

Table 5: Distribution of occurrence of types of traditional beekeeping structure

Parameters	Traditional bee keeping structures					
Villages	Wooven grass	Mud pots	Gourds & Calabashes	Tree bark/log	Other containers	Total
Ekate	50 (9.9)	56 (12.9)	10 (3.4)	18 (7.1)	03 (1.6	137(8.2)
Gbodongi	15 (2.9)	29 (6.6)	09 (5.0)	09 (5.0)	08 (2.7)	73(4.4)
Jida	87 (17.2)	87 (17.2)	07 (2.4)	02 (7.8)	07 (3.9)	138(8.3)
Kokodo	84 (16.6)	12 (2.7)	06 (2.1)	15 (5.8)	06 (3.3)	123(7.4)
Kpada	52 (10.2)	15 (3.4)	96 (32.9)	55 (21.5)	79 (44.1)	297(17.8)
Lade	20 (3.9)	50 (11.5)	08 (2.7)	20 (7.8)	08 (4.4)	106(6.4)
Lanta Nna	120 (23.7)	87 (20.0)	02 (6.8)	120 (47.1)	0 (0)	329(19.8)
Patigi	38 (7.3)	48 (11.0)	87 (29.8)	13 (5.1)	65 (36.3)	251(15.1)
Ragada	18 (3.5)	89 (20.5)	45 (15.4)	0 (0)	0 (0)	152(9.1)
Sunkuso	21 (4.1)	13 (2.1)	22 (7.5)	0 (0)	02 (1.1)	58 (3.5)
Total	505(30.3)	434(26.1)	179(10.8)	291(17.5)	255 (15.3)	1664

Source: Data Analysis 2013; Note: *figure in parenthesis are %*



Fig. 4: Cane woven traditional structure



Fig, 5: Grass woven oval shaped bee hive

Source: adapted from Ajao, 2012

The types of bee farming structure, their size, honey production level and expected income generated for the bee hunter structures were recorded in Table 6. The result of the study revealed that of 1246 honey hunting structures, 28.2% were found to be (0-15cm^3), 54.3% (15-30cn^3) and 17.5% (30-45cm^3) by volume. An average of 4.53kg honey was harvested per each of the tree cavities. Also 4108.7kg of honey harvested by the honey hunters from tree cavities and at ₦1300/1.6kg, the sum of ₦3,338,326.87 was obtained as expected revenue generated.

Table 6: Distribution of nature of bee nesting structures and honey production

Parameters	Volume of structure (occurrence)				Quantity of honey harvested		Total
	0-15 cm^3	15.1-30cm^3	30.1-40cm^3	Total	Kg/str-ucture	Total harvested (kg)	*EGR(₦)*
			Honey hunter structure				
Tree cavities	256	534	117	907	4.53	4 108.71	3 338 326.9
Voids of ceiling of buildings	0	02	61	63	5.33	335.79	272 829.4
Termite mounds	87	108	32	227	5.22	1 184.94	962 763.8
Rocks & caves	09	32	8	49	4.43	217.07	176 369.4
Exposed tree branches	-	-	-	740	5.13	3 796.20	3 084 412.5
Total	352	676	218	1986	X = 4.92	X = 1 928.54	1 566 940.4
			Traditional beekeeping structure				
Grass woven hives	0	56	449	505	5.40	2727.00	2 21 5687.5
Mud pots	06	132	296	434	6.35	2755.90	2 239 168.8
Plastic containers	0	127	52	179	5.86	1048.94	852 263.8
Gourds & Calabashes	12	122	157	291	5.89	1713.99	1 392 616.9
Reeds hive	0	208	47	255	5.12	1305.60	1 060 800.0
Total	18	645	1001	1664	X = 5.70	X=1 910.30	1 552 107.4

Source: Data Analysis 2013; *Note: EGR denote expected generated revenue @1.6kg/ ₦1300*

Similarly, of the 1664 traditional beekeeping structures encountered at the study area, a total of 2727kg (5.40kg/colony) of honey was harvested from 505 woven grass structure; with expected generated revenue of ₦2215687.50 at ₦1300/1.6kg. The highest amount of honey harvested from traditional beekeeping structures was obtained from mud pots (6.35kg/colony) and a total of 2755.90kg amounted to ₦2239168.75 expected generated revenue at ₦1300/1.6kg for the 435 colonies visited (Table 6).

In the Table 7 the result of the analysis of the responses of the respondents on constraints faced by bee farmers at the study area showed that of the three categories of constraints, biological constraint was dominant for the duo practices: honey hunters (66.4%) and traditional beekeepers (42.5%). This was followed by finance and products constraint for both honey hunters (31.8%) and traditional beekeepers (34%). For the biological constraints, bush burning was most rated by both bee farmers. However, bee products theft by man came next in order of ranking (13.75%) of traditional beekeepers. Only lack of training and workshops (1.8%) was responded to by honey hunters on technical constraints while lack of knowledge of bee management (8.75%); lack of training and workshops (8.75) and lack of bee research information (5%) are recorded from traditional beekeepers. For constraints on trade both bee farmers identified poor market system as a major problem, 13.6% for honey hunter and 12.5% traditional beekeeper).

Table 7: Respondents' identified constraints of honey hunting and traditional beekeeping

Constraints	**Honey hunters**			**Traditional beekeepers**		
Biological and man-made	**F**	**%**	**Rank**	**F**	**%**	**Rank**
Inadequate bee nests	13	11.8	4th	5	6.25	8th
Bee aggressiveness	18	16.4	2nd	3	3.75	11th
Bee products theft by man	08	7.3	6th	11	13.75	2nd
Bush burning	25	22.7	1st	13	16.25	1st
Swarming and absconding	06	5.5	8th	2	2.5	12th
Predators, pests and diseases	03	2.7	10th	-	-	-
Sub Total	**73**	**66.4 (1st)**	**-**	**34**	**42.50(1st)**	
Technical constraints						
Lack of knowledge of bee mangt	0	0.0	12th	07	8.75	4th
Lack of training and workshops	2	1.8	11th	07	8.75	4th
Lack of bee research information	-	-	-	04	5.0	10th
Sub Total	**2**	**1.8 (3rd)**	**-**	**18**	**22.5 (3rd)**	
Finance & product constraints						
Small volume of bee products	04	**3.6**	9th	06	7.5	7th
Products meeting standard	09	**8.2**	5th	05	6.25	8th
Lack of credit facility	07	**6.4**	7th	07	8.75	4th
Poor market system	15	**13.6**	3rd	10	12.50	3rd
Sub Total	**35**	**31.8 (2nd)**	**-**	**28**	**34.00(2nd)**	
Total	110	**100**		80	**100**	

Source: Data Analysis 2013; *Note: mangt denote management*

DISCUSSION

The result of this study on both the age and years of experience for honey hunters and some traditional beekeepers (Table 1) showed them to be at their youthful and training receptive stage which will be an added advantage in acquisition of training and skill development a prerequisite for productive modern beekeeping. The bee farmers still have more expected years to live and they can be trained in modern bee farming. The mean adjusted household size was 7. The implication of this is that the households with more members per household would probably have ample labour

available for honey bee activities. Similar observation was made by Lawal and Banjo, (2010) and Inah *et al*. (2006).

Many of the honey hunters of the zones (about 52%) discover wild bee's nesting habitats during hunting for animals and fruit gathering (Table 2). Others had contact with the bees in their surroundings (21%); while some, through experiences identify certain animals that regularly visit honey hives and thereby follow them as guides to bee colonies. Such guides are rooted in cultural and traditional believes of the people at rural settings on the association between groups of animals within the ecosystem which shows their dependency by feeding.

The knowledge on the bees' nesting structure is important as modern beekeeping utilize such knowledge and mimics it in artificial hives. The nature of such structures determines bee farming activity and by extension the production capacity and profitability of the bee farming. For harvesting of bee combs hung on tree branches, a long sickle bearing dry pole is used to cut combs which then fall to the ground, At times a sheet of cloth is spread to take the falling combs. This method of honey hunting does not give room for proper inspection of the state of honey leading to harvesting of uncapped immature honey admixture with ripped honey. This method also is liable to low quality honey with consequent adulteration and shortened shelve life.

Because of the nature and materials used to harvest honey at the study area (Table 3), a lot of impurities are introduced which lowers the quality of honey harvested from the structures. Dusts, dirt, soot from burning grass and some metals may be accidentally introduced which may lead to adulteration and bioaccumulation of products of predators, microbes and others, living in the structures before honey hunting and traditional honey harvest. Employing the right tools and equipment like hive knife and protective clothing will ease the process and refine the products of the various bee structures. This finding is in line with those of (Inah, *et al.,* (2006); Crane, 1999 and Dutton *et al.,* (1981).

The wild bee structure commonly encountered were tree cavities, on exposed tree branches, voids of ceilings, termite mounds and, rock and cave holes (Table 4). Types, nature and distibution of wild bee colonies in the study area were quite intresting. The tree cavities encountered were diverse in nature, some were found on living and dead trees, cavities ranges from small (0-15litres), medium (15-30 litres) to large (30-45litres).They are probably created by either effect of weather and microbial action on parts constantly facing sunshine or burrowed in by other animals that might have used the cavities for abode before being occupied by bees. The height also differs from tree to tree, some were found near the ground and some around 3 meters off ground. Those wild bee structures found attached to tree branches were found entangled in living tree branches and all consisting of between 6 to 8 combs arranged in parralel and leaving a bee space between each for easy manouvering of bees. They are however, exposed to the extremes of weather in all cases. The findings of this study is corroborated by those of Ajao and Oladimeji, 2013; Duff and Shawer, 1987 and Furgala, 1986).

Woven grasses, mud pots, gourds and calashes, tree bark and logs and other containers were encountered as the traditional bee farming structures at the study area (Table 5). The types, nature of materials, their construction and placement are as varied as the number and nature of the bee farming villages. The woven grass types are mostly cylindrical, constructed with locally available materials like the stem of thick grasses or canes. Some with one end tapering and the other provided with a lid of flat woven reed material with small holes for bee entrance (Figures 4 and 5).

Special pots mainly designed for bee keeping of two pieces placed on top of each other were encountered in some of the understudied bee villages. In most cases the bee structures are placed on tree branches some height above the ground. The findings of this study is comparable with those of Igboanugo, (1996) and Mutsaers, (1991a).

From the result of this study it could be concluded that the type of bee nesting structure available, the tradition, cultural and occupational orientation of people of a particular area could determine the type of bee farming activity in such area. Suffice to note that abundant wild bee structures in form of natural tree cavities, termite mounds and rock holes may influence honey hunting activity of people during off farming periods. Likewise peoples' agricultural, traditional and cultural callings, such as the use of bee product in trado-medical treatment of ailments, local production of items such as pot, gourds and calabash cultivation may influence people's thoughts towards traditional bee farming. Since hive materials are available locally and wild bee colonies are abundant (Ajao and Oladimeji, 2013 and Duff and Furgala, 1986).

Also the nature of bee nesting structure determine bee keeping activity and production performance and profit making of the bee farming business (Table 6). As an illustration, the findings from this research showed that the maximum quantity of honey produced from 30-40 litres of voids of ceiling for honey hunting was 5.33kg/structure at rate of ₦1,300/kg. While similar sized structure from traditional beekeeping such as mud pot, 30-40 litres produced 6.35 kg of honey and at rate of ₦1300/ kg. This left a difference of ₦1,329 as profit for the traditional beekeeper. Giving conscientious analyses of the efficiency of both honey hunting and traditional bee keeping, it was evidenced from the study that both bee keeping practices are profitable. Since materials of traditional beekeeper are sourced locally, it implies that with adequate training, credit facility, fair market opportunity, the duo local beekeepers could be encouraged to practice modern beekeeping method for improved and quality yield of bee products.

The findings of this study also observed that bush burning, honey and other products theft are major biological or man-made constraints facing beekeeping in the study area (Table 7). Also of significance are technical and trade related problems such as lack of knowledge, skills and necessary research information. Others include credit facilities, inadequate tools and equipments for honey bee and beekeeping, increased hive production, standard and quality products and adequate provision of market channels for bee products.

Conclusion and Recommendations

Few studies have mentioned the existence of honey hunters although the bulk of honey in Nigerian local market may be obtained from honey hunting and traditional beekeepers. The study identified that both practices are profitable but bedeviled with a number of constraints. However, if these constraints are critically examined and their bee farming cooperatives are revived, it may boost the honey yield from these sectors. This will also be an impetus to the transformation of the bee sector from subsistence to modern sector (commercial production) and transpose the status of honey farming to primary occupation among the rural populace.

Providing support to honey hunters in the form of formal training and credit through extension services may assist to harvest quality honey devoid of contamination during and after harvest. It will also enable the beekeepers to convert beeswax and propolis to better use.

Acknowledgement

The authors appreciate the grant provided by Beekeeping Training and Research Centre (BTRC), situated at Amberi, Offa road, Ajasse-Ipo, and Buari, Igbaja Road, Buari, Kwara State, Nigeria, (www.ajaocbtr.com), with which this research was conducted.

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