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Poaching techniques of Walter's Duiker (*Philantomba walteri*) in the forests of southern Benin

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Abstract

Walter's duiker (*Philantomba walteri*) is an antelope species endemic to the Dahomey gap region. To date, little knowledge exists on the hunting of the species. The objective of this study is to collect information on the hunting techniques of this new species of antelope described by science. The semi-structured individual survey method was conducted with 340 people across 34 villages from February 2019 to January 2022. Focus and direct observation sessions were also carried out. The results obtained show that Walter's duiker is a species that is hunted in the forests in southern Benin, mainly for food and the use of these organs in traditional African medicine. Beaten hunting and stalking are practiced. The hunting tools used to poach Walter's duikers are shotgun (94.70%), traps (83.32%), snares (3.23%), and sometimes nets (1.76 %). In addition, three (3) uses are made of Walter's duikers poached in the forests of southern Benin. These are consumption with a proportion of (79%), sale (20%), and detention in captivity (1%). Similarly, Sixty percent (60%) of the local population buy the duiker meat from Walter slaughtered. They are followed by (30%) of local meat sellers and 10% of foreign people who buy this meat. For sustainable management of this population, it will be necessary to set up effective conservation programs.

Keywords: Hunting technique, Poaching, *Philantomba walteri*, South Benin

Introduction

Some mammalian species are now rare or threatened; this is essentially due to various anthropogenic pressures such as hunting, the reduction of ecosystem surfaces, the use of pesticides (insecticides and herbicides), and the population growth for living space around large cities (Sinsin, 2010). These threats have reached such seriousness that some species are in danger of disappearing if nothing is done to protect them (Giotto, 2011). These species include: duikers (Sinsin, 2004). Duikers are small antelopes of the family Bovidae and the subfamily Cephalophinae endemic to Africa (Haltenorth and Diller; 1985, Houngbégnon, 2018). They are among the most hunted species (FAO, 2010) and as such constitute an important protein source and income through the sale of their meat (Fargeot, 2013). Hunting has a significant impact on many species (Laurance, 2006), including those once considered resilient to hunting pressure (Grande-Vega et al., 2016). The walter's duiker is a new (third) species recently discovered in the genus *Philantomba* (Colyn, 2010). This antelope is endemic to the region of Togo, Benin, and Nigeria (Colyn, 2010). According to, (Soké, 2015), Its range in Benin is limited to a few forests in southern Benin, (Sitatunga Reserve, and other shreds of forest). However, Walter's Duiker is not listed in the CITES Appendices internationally. It remains a Not Evaluated (NE) species on the IUCN Red List of Threatened Species (Colyn, 2010; Soniké, 2018). In Benin, Walter's duiker is a little-known species (Soké, 2015). Indeed, duikers occupy a very important place, both in food and in the pharmacopeia and traditional religious rites as a source of animal protein (FAO, 2010). In southern Benin, some antelope organs are used in the composition of several ingredients and mixtures with therapeutic or magical properties (Kidjo,2012). This situation creates serious threats to the species, which is today at an important vulnerability threshold. The objective of this study is to collect information on the hunting techniques of this new species of antelope discovered.

Materials and methods

Study environment

Starting from the coast of Benin (Atlantic Ocean) in Niger, Benin is subdivided into three phytogeographical zones (the Guinean Congolese zone, the Guinean-Sudanian transition zone, and the Sudanian zone). The South of Benin which is the subject of this research corresponds to the Guinean or Subequatorial region of Benin. It starts from the coast of Benin to the Zagnanado latitude. This area is subdivided into four phyto-districts. These are the coastal Phyto-district, the Phyto-district of Pobè, the Phyto-district of the plateau, and the Phyto-district of the Ouémé Valley (Fig.1).

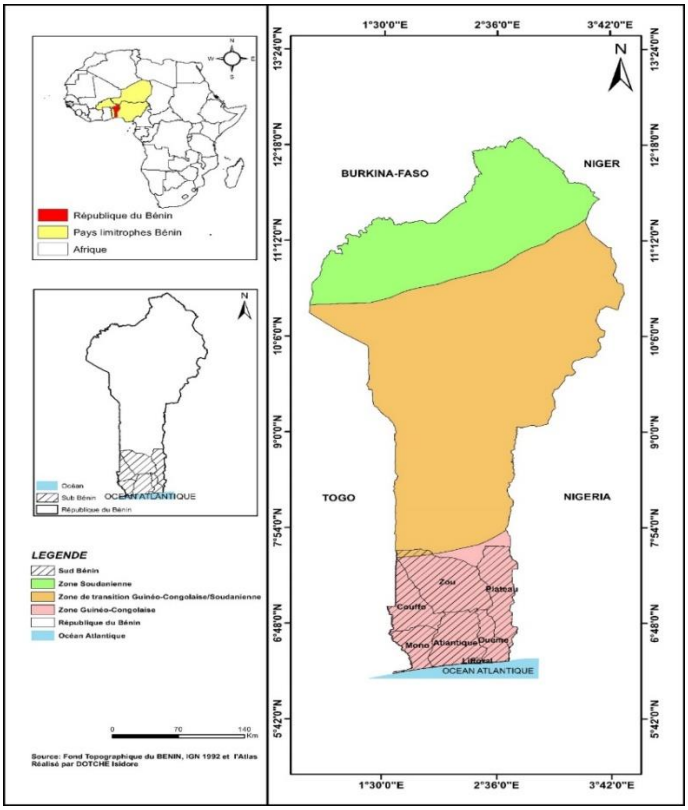

Figure 1. The geographical location of Benin and Southern Benin

Benin with the major phytogeographical subdivisions the Guinean-Congolese zone, the area at the bottom of the map, the Guinean-Sudanian transition zone, and the Sudanian zone that goes as far as Niger. The climatic shade of southern Benin is of the subequatorial or Beninian type (Adam & Boko, 1993). The average annual temperature is 27.5°C. Based on the distribution of precipitation, there are two rainy seasons and two intercalated dry seasons. The first rain season extends from March to June with a maximum in June and the second from September to November, with a maximum in October. The first dry season extends from July to August and the second from December to March (Figure, 1984). The forest cover of this zone consists of dense semi-deciduous forests corresponding to the dry evergreen forest (Guinea-Congolese/Sudanian zone transition forest) of White (1983). Figure 2 illustrates the habitats of Walter's duiker in southern Benin.

Figure 2. Habitats of Walter's duiker in southern Benin, Note the Bahazoun forest island in Lanzron in the Sitatunga Valley Natural Park with the density of vegetation and abundance of lianas. Pobè Igbo Itché Forest. Note here the Igbo-Itché forest of Pobè with tall trees and very dense undergrowth.

Data collection

To collect reliable information, an exploratory survey was carried out among hunters and other socio-professional categories of the populations bordering the forests of southern Benin, to apprehend the degree of knowledge of the populations on Walter's duiker. The choice of villages is based on proof of evidence (footprints, droppings, and feces) of the presence of Walter's duiker reported during the exploratory survey phase. So, thirty-four (34) villages located around the forests of southern Benin were investigated. Thus, 10 people were randomly selected around each site. The sample is determined by the formula of Dagnelie (2011):

$$N = \frac{U^2_{(\alpha-1/2)} \times P(1-P)}{d^2}$$

Where N is the total number of people surveyed.

$U_{(1-\alpha/2)}$ is the normal distribution value for a value of 1.96 at a significance level $\alpha = 0.05$;

P is the proportion of individuals with knowledge of Walter's duiker and holding information related to its various hunting techniques. For this study, the authorized margin of error d is retained at 8%. A total of 340 people from different ethnic groups, genders, and socio-professional categories were interviewed (Table 1). The questions asked during the interviews essentially concerned the presence of Walter's duiker, whether it is hunted and the means used to hunt it.

Table 1. Social data of interviewees

Categories of people surveyed	Gender	Age range

Farmers	Hunters	Business-minded	Animal remains sellers	Male	Female	20-40	40-60	>60
178	**97**	**51**	**14**	**243**	**97**	**192**	**133**	**15**

Focus group

This approach consists in bringing the inhabitants together around a personality who, at first on board, can be the village chief or their spokesperson in the village or the farm. The size of the group is 5 to 7 people. The group interviews are done to supplement the information gathered during the individual interviews. Figure 3 illustrates a focus group in Togbota Agué village in the municipality of Adjohoun.

Figure 3. Focus group interview with inhabitants of the village Togbota Ague village municipality of Adjohoun.

Direct observations of hunting tools used in the wild were made. These are cartridges, traps, snares, and nets. Table 1 presents the survey sites chosen and the villages surveyed.

Table 2. Selected prospecting sites and the Commune or village in which the various selected sites are located.

Chosen site	Villages / Town
Bahazoun island forest	Lanzron /Zinvié
Ninkouizoun island forest	Ninkouin / Zè
Monastère forest	Hèkanmè/ Zè
Houédota forest	Houédota / Zè
Ahounssè island forest	Ahounssè / Zè
Djigbéplantation forest	Djigbé / Zè
Gnanhouizoumè protected forest	Gnanhouizoumè / Bonou
Niaouli classified forest	Attogon/ Allada
Togbozoun sacred forest	Togbota
Vazoun sacred forest	Gla/ Adjohoun
Bamèzoun sacred forest	Bembè/ Aguégués
Igbo-itché protected forest	Pobè
Ahozon protected forest	Ouidah/ Pahou
Lama classified forest	Têgon

Observations were also made using the line transect method

From December 2019 to February 2020 and April to June 2020 and November to December 2021, the forests of southern Benin were surveyed in search of traces, clues of hunting techniques in the study sites. (These periods correspond to dry periods and the beginning of the rainy seasons when hunting is practiced the most according to the chief hunters. Walks (4 km) following a precise azimuth (North-South) of the chosen sites while noting the information relating to hunting techniques, and hunting tools used.

Data analysis

The data obtained were mainly used to calculate the citation frequencies of hunting or not knowing Walter's duiker in the study environment and the means used to hunt Walter's duiker in the study environment. To analyze the data, the citation frequencies of:

- Hunter or not Walter's duiker

FC=n/N x 100

n: number of respondents hunting Walter's duiker or not and N: total number of people surveyed.

- Hunting tools used

FC=n/N x 100

n: number of people who mentioned a given tool and N: total number of people questioned.

Results

Recognition of Walter's duiker species as a hunting object

Duiker species are widely used as a source of protein and in traditional African medicine across their ranges. In southern Benin, 98% of people surveyed answered that Walter's duiker is hunted in the forests. On the other hand, only 2% are skeptical (Fig. 4). This state of affairs shows that although Walter's duiker is rare, it continues to be hunted. Hunters and farmers are the main groups of people who hunt Walter's duiker in the study area. According to the people interviewed, the tool most used to hunt and kill Walter's duiker is the traditional shotgun (94.70%), followed by a trap (83.32%), snare (3.23%), and the nets (1.76%) (Fig. 5).

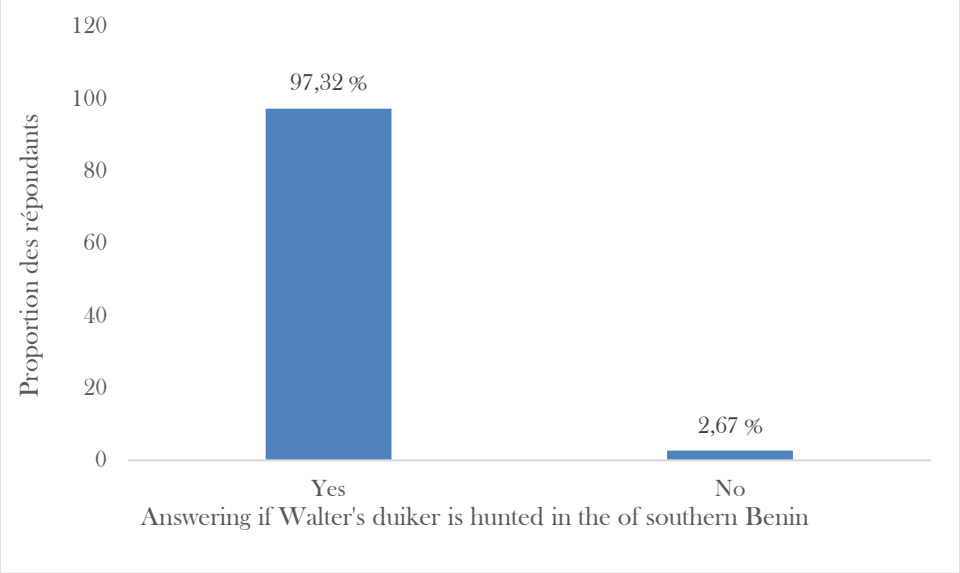

Figure 4. Respondents if Walter's duiker was hunted in the forests of southern Benin

Walter's duiker hunting tools in the forests of southern Benin

Several tools are used for poaching in the forests of southern Benin. Figure 5 illustrates the proportions of tools used for poaching Walter's duiker in the forests of southern Benin.

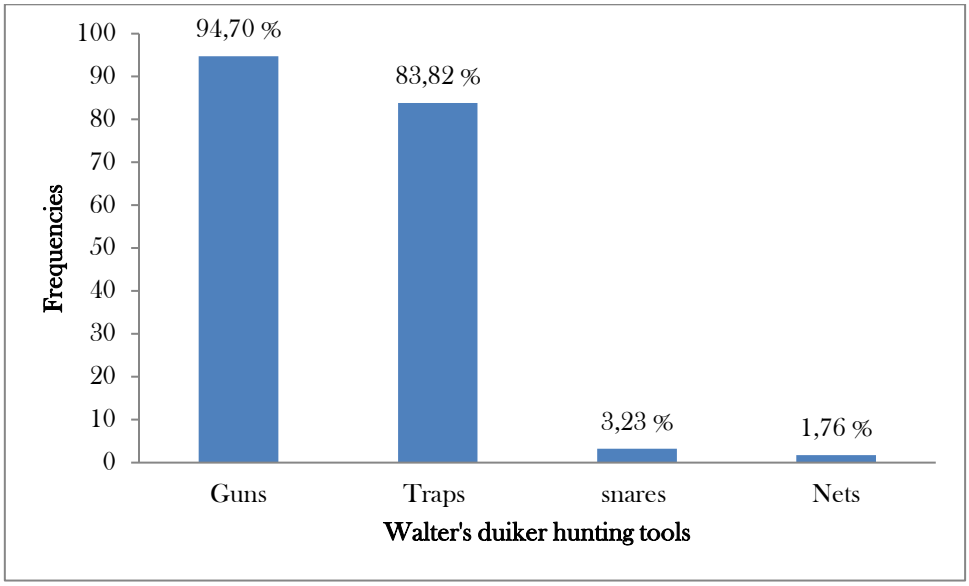

Figure 5. Walter's duiker hunting tools in the southern forests of Benin

Hunters in southern Benin, to stock up on these resources, adopt several tools and techniques to hunt. These techniques used are beat hunting, stalking, and setting traps.

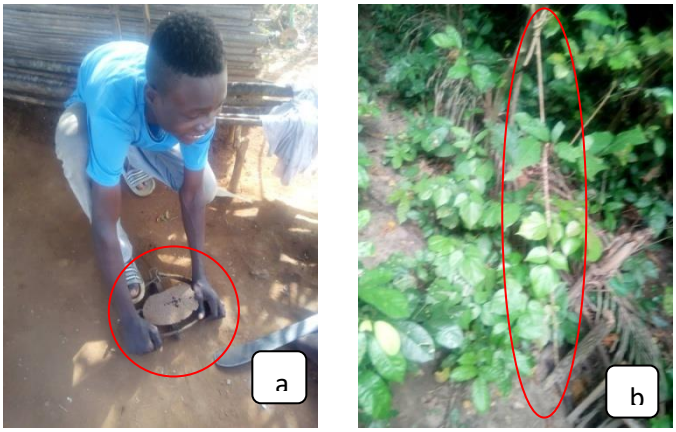

Figure 6. Some Walter's duiker hunting tools. Trap in the Ahozon protected forest (municipality of Ouidah) (a); collar in the forest island of Bahazoun in Lanzron (Natural Park of the Sitatunga Valley, Municipality of Abomey-Calavi) (b). (Dotche Isidore) Photo (a) shows a jaw trap that once attacks the animal's legs, but can't get rid of it. In addition, the collar generally attacks the neck of the animals and tightens their throat. Hunting practices are still numerous in the forests of southern Benin.

Poaching process

Hunting is a socio-traditional activity practiced in the study area. The study area has a wealth of wildlife which is an important source of food and income for the population. Thus, the hunters stock up on their resources and adopt several techniques to hunt. These techniques used are beat hunting, stalking, and setting traps. According to field surveys, the most dangerous for monitoring biodiversity is driven hunting. This technique is used in the study area periodically by hunters, which consists of

identifying the area authorized to collect the game. Once the hunting area has been identified, they make it to the track of the area. Thus, the armed hunters position themselves on one side to capture the game, and the others on the opposite side are responsible for setting fire allowing the animals to be hunted to be captured. This kind of hunting is collective and is practiced during the day. The fauna and flora of this area set on fire are destroyed and devastated. This situation is a factor in the regression of plant communities and the extinction of some animal species such as Bushpig*Potamochoerus larvatus* (75% of respondents), Porcupine *Hystrix cristata* (70%), Sitatunga *Tragelaphus scriptus* (43%) which are deprived of their habitats. elsewhere; stalking is an individual hunt that is practiced during the day and more often at night. This technique has less harmful effects on biodiversity but it is not regulated because the samples are non-selective.

Socio-economic importance

After a beaten duiker hunt, part of the game is taken and given to the person who killed the animal. The rest of the meat is divided into two parts. The first is shared between all the hunters who participated in the hunt. The second part is sold to different people (locals, meat sellers, and foreign people). It should be noted that some hunters sell the meat along the inter-State roads in southern Benin or the local markets and/or slaughterhouses of Abomey-Calavi, Cotonou Ouidah, Allada, Zogbodomè, Zè, Pobè, Adjohoun, Bonou. The animal can be sold whole, cut into small pieces, or in quarters (the thigh, block of shoulder, or other large pieces of meat). Figure 7 shows the proportion of buyers of Walter's duiker meat.

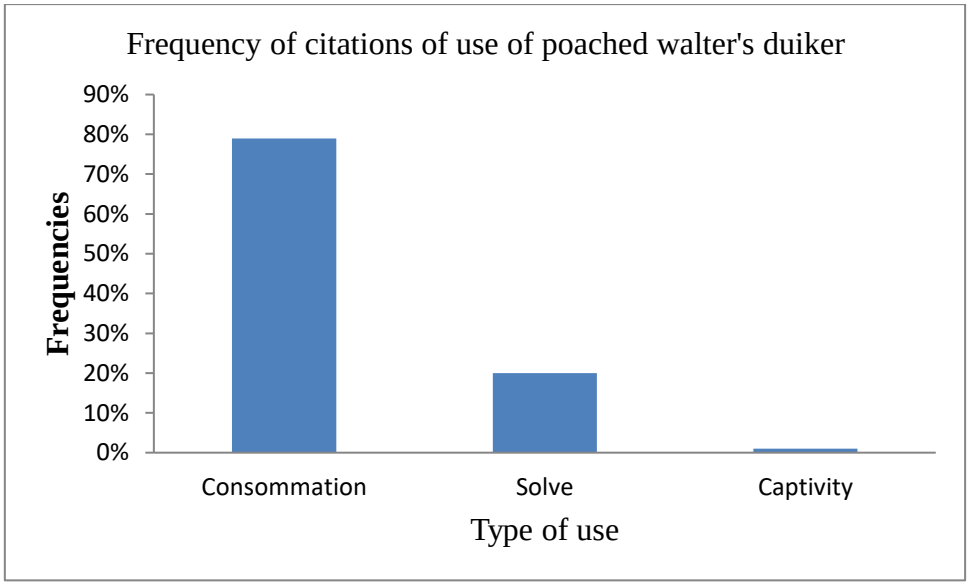

Figure 7. Proportions of uses made of poached Walter's duikers in the forests of southern Benin

From the exploitation of this figure, it emerges that three uses are made of Walter's duikers poached in the forests of southern Benin. These are consumption with a proportion of 79%, sale (20%), and

detention in captivity (1%). Consumption is the first thing done by the populations bordering the forests of the South –Benin of Walter's duiker burned. Figure 8 shows Walter's duiker beaten with rifles in the locality of Goulo near the classified forest of Djigbé (Zè)

Figure 8. Walter's duiker hunting. Rifles used to kill Anagbo in the Commune of Zè) (a); view of Walter's duiker killed in Goulo near the protected forest of Djigbé (Commune of Zè) (b). (Dotche Isidore)

Figure 9 made up of photos of horn, skin, and skull shows that hunting is a threat to Walter's duiker populations, thus causing its rarity. During our prospection observed Walter's duiker trophies from some respondents who say they obtained them after hunting the species.

Horn of Walter's duiker Skin of Walter's duiker Skull of Walter's duiker

Figure 9. Walter's duiker trophies are composed of horn, skin, and skull in southern Benin

These trophies according to their owner were obtained after the hunting of the species.

Types of buyers of slaughtered Walter's duikers

Walter's duiker after having slaughtered it is sold to several people. These are local people, local meat sellers, and foreign people. Figure 10 shows the proportions of types of buyers of killed Walter's duikers.

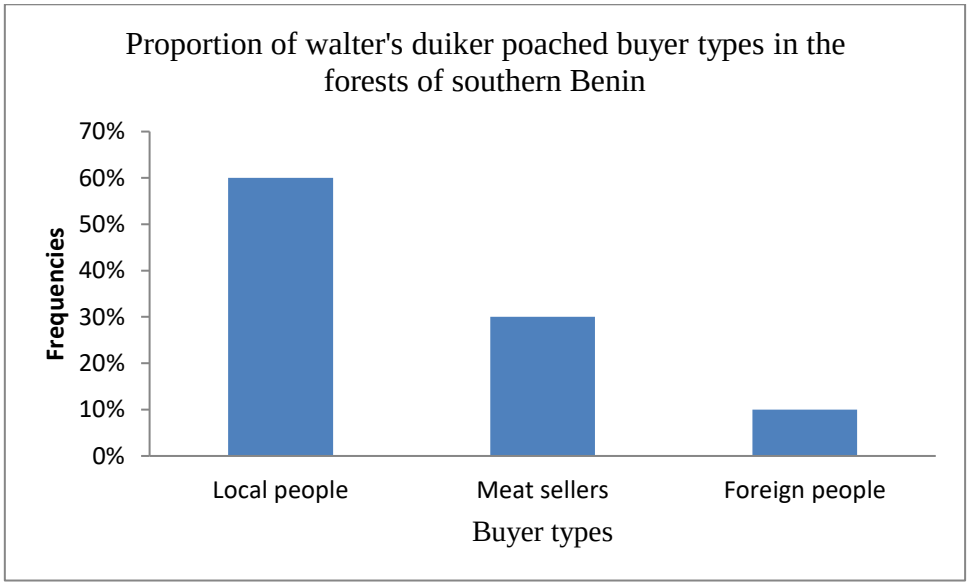

Figure 10. Proportions of types of buyers of Walter's duikers harvested in the forests of southern Benin

From this figure, it appears that 60% of the local population buys the meat of slaughtered duikers from Walter. They are followed by 30% of local meat sellers and 10% of foreign people who buy this meat (foreign people).

Economic values of Walter's duiker among the riparian populations of the forests of southern Benin

Among the populations bordering the forests of southern Benin, the walter's duiker has an economic value. Table III shows the possible price of some organs of Walter's duiker in the study area.

Table 3. Price of Walter's duiker organs

N°	Organs	price
1	The whole animal killed	11.000F (17 €)
2	Skin	4000F (6 €)
3	Legs (2 pairs)	4000F (6 €)
4	Horn	3000F (4,5 €)
5	Urine (1/8 l)	2500F (4 €)

The hunters surveyed revealed that they earn less money by selling the animal as a whole than by selling it in detail. This income is used for the basic needs of the family. As for the sellers of animal

organs, they say that they make a little profit compared to the purchase price, which allows them to survive and ensure their education. of their children.

Discussion

In localities bordering the forests of southern Benin, Walter's duiker is a species of antelope hunted for its meat, the trade, and the use of their organs in traditional African medicine. These results confirm those of (Soké) 2015, which shows that Walter's duiker is a rare species whose meat is highly prized in the markets. In southern Benin, several tools are used for Walter's duiker hunting. These are guns, traps, snares, and nets. This traditional hunting contributes to the reduction of the size of the duiker population. guns, neck or leg traps, and nets, although these are tending to disappear (Fargeot, 2013). Several hunting techniques are used, these are stalking and driven hunting. These latest results confirm those of Mallon et al., 2015, which show that the snaring and killing of duikers continues to increase due to the growing demand for bushmeat, and the decline and disappearance of several species of duikers have been reported from several sites in the region. These last results are similar to those of Tchankpan (2014) who, in describing the different types of wildlife hunting in the Sitatunga valley, listed stalking and driven hunting. In localities bordering the forests of southern Benin, three (3) uses are made of Walter's duikers poached in the forests of southern Benin. These are consumption, sale, and detention in captivity. Consumption is the first use made by the local populations of the forests of the South –Benin of Walter's duiker poached. These results are similar to those of Houngbégnon (2019), who, by reviewing the state of knowledge of duikers of the genus Philantomba in Central Africa, also showed that hunting, in particular, subsistence hunting, commercial hunting, and poaching are the types of duiker hunts. Moreover, these results corroborate those of (Brown, 2003) who estimated that the annual consumption of game meat in the Congo Basin can go up to five million tons, the results of (Vanthomme et al., 2010) who recognized duikers as the first products of hunting and as such represent a significant part of harvesting both in number and in biomass (Hart, 2000; Mockrin, 2009; Yasuoka et al., 2015). They can total up to 80% of hunting harvests, and the results (Poulsen et al., 2009; Fargeot, 2013) saw that duikers constitute an important source of protein and income through the sale of their meat.

Conclusion

Walter's duiker, is a species endemic to the Dahomey gap region and neighboring regions. It is hunted in the forests of southern Benin and the surrounding lands. Several hunting tools such as (guns, traps, snares, and nets) are used to poach it. In southern Benin, Walter's duiker is hunted in the forests. This state of affairs shows that although Walter's duiker is rare, it continues to be hunted. Agriculture is the primary cause of Walter's duiker scarcity, followed by hunting and the trade-in remains, and

deforestation. Other pressures such as the scarcity of food resources, wildfires, floods, and transhumance are poorly represented. The conservation of this still little-known mammal, as in the case of Walter's duiker, therefore requires the implementation of a conservation program for better protection of the species. For this, it is necessary: to deepen this study to better assess the conservation of Walter's duiker, through the axes of strategies based on regular monitoring of their habitat, awareness of the protection of the species, and a dashboard indicator such as population size, variation in threats, its distribution over the next ten years (2022/2032); Carry out the count at least once a year to monitor the dynamics of Walter's duiker in the forests of southern Benin. This will undoubtedly guide choices for the conservation and protection of the species; Create activities for hunters to reduce their reliance on hunting; Reinforce surveillance in areas favored by Walter's duiker (dense habitat) by creating surveillance teams within localities bordering forests. These teams will be trained by those responsible for monitoring biodiversity with whom it is necessary to define transition periods to verify the effectiveness and efficiency of the actions.

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