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Traditional use of wild edible food in rural territories within tropical forest zones: A case study from the northwestern Colombia

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Abstract

Traditionally, wild edible food has been important sources of nutrition to human populations in rural territories within tropical forest zones. This study provides new insights on ethnobiological knowledge about the traditional use of wild edible food in rural territories within tropical forest zones in northwestern Colombia. Moreover, this knowledge makes an important contribution to the process of planning accurate and sustainable actions to improve food security. **Methods:** This study was conducted with 12 rural communities living in places within tropical forest zones in northwestern Colombia (South America) and 153 key informants were interviewed. To estimate the importance of each food for the studied communities, a Smith's salience index was used. The results are presented in tables with absolute numbers and percentages. **Results:** Fifty-one food products provided by wild biodiversity were identified, the main ones being fruits, tubers, beef, eggs and fats. Fifty-three percent of them are food of plant origin and 47% of animal origin. These products are consumed either raw or boiled. However, they are also prepared using other cooking techniques. The most important edible foods of plant origin for the studied communities are the Borojo (*Alibertia patioi*), the Caimito (*Pouteria caimito*) and the Guayaba Agria (*Psidium guajava*), while those of animal origin are the Guagua (*Cuniculus paca*), the Guatin (*Dasyprocta punctata*) and the Venado (*Mazama Americana*). **Conclusion:** For these communities, the importance of wild edible food is not only related to a traditional consumption associated to flavour, hunting practices, cultivation nor their aphrodisiac properties but also relates to income-generating activities for subsistence. These findings suggest that once the food's nutritional value and sustainable

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management practices are determined through science, technology and innovation processes, they could also be used as a feasible alternative for planning actions to improve food security in these territories.

Keywords: Wild edible food, tropical forest, food security, Colombia.

1. Background

Tropical forests are known for their high biodiversity levels and endemism. Although they cover 10% of the earth's surface, tropical forests are important on a global scale as they not only capture and process large quantities of carbon (Wright, 2010) but also store between half and two-thirds of all species on the planet (Groombridge & Jenkins, 2002; Malhi & Grace, 2000). The highest percentage of tropical forest is found on the American continent (55%), making it a place of high interest for the study of biodiversity and its sustainable management and conservation (Cayuela & Granzow-de la Cerda, 2012). In South America, Colombia's tropical forest is located in the northwest of the country, containing around 253 species of mammals, 578 reptiles, 92 amphibians and 4,500 species of plants (Rangel-Ch, 2004). This biodiversity is highly valued in this territory for the environmental, social, cultural and economic services that it provides.

One of the main environmental services provided by the tropical forest is food, mainly because of the traditional customs associated with its community. For them, the forest's wild edible food is an important source for their diet providing food security to families, mostly to rural communities with limited access to the main urban or commercial areas where typical food is sold. Wild edible food is defined as all edible products from plant species, fungi or animals that has not passed through the domestication process and/or genetic enhancement. Cereals, tubers, vegetables, fruits, meats, eggs and others illustrate this point clearly (Erskine, Ximenes & Glazebrook, 2015; Fa et al., 2015; Misra, Sahoo, Pani & Bhandari, 2013; Schulp, Thuiller & Verburg, 2014; Termote, Raneri, Deptford & Cogill, 2014). However, breeding or cultivation does not necessarily prevent species from being wild; indeed, for a species to become domestic, it should be demonstrated that specimens in a natural state do not exist (Ojasti & Dalmeier, 2000; Schuerholz & Mann, 1979; Usher, 1986; Wing, 1951).

The ancestral and cultural importance of plants, fungi and animals from the forest in the diet of the inhabitants of tropical forest zones suggest the potential of this source in the development of policies, plans, programmes and projects to improve food security in these territories. However, knowledge about the most important species and their pattern of use is required to ensure success during the implementation of actions, with emphasis on the relationships between species/culture/territory, nutritional value and cultivation techniques and/or breeding programmes that reduce the risks associated with their conservation. For this reason, this study aims to identify the real potential of wild edible food in rural territories within tropical rainforest areas in South America in order to plan accurate and sustainable actions for food security.

2. Materials and methods

2.1. Study area

The study was conducted with rural communities that inhabit territories within tropical rainforest zones in northwestern Colombia. This region belongs to the department of Choco, which has 485,515 inhabitants with an area of 46,530 km^2 (Departamento Administrativo Nacional de Estadistica, 2005). The boundaries of the study area are defined between 4°00'50" and 8°41'32" of north latitude and 76°02'57" and 77°53'38" of west longitude. Relating to its environment, this zone is a place of megathermal weather (25.7°C–27.9°C), high rainfall (8.494–13.670 mm) and water balance from per humid to super humid (248.9–385.8) (Poveda, Rojas-P, Rudas-LL & Rangel-ch, 2004).

Overall, the zone has multi-stratified jungle vegetation with three distinguishable arboreal strata. The dominant species in the superior stratum are as follows: *Otoba lehmanni*, *Compsoneura trianae*, *Compsoneura atopa*, *Anacardium excelsum*, *Brossimum utile*, *Cespedesia macrophylla*, *Couma macrocarpa*, *Pentaclethra macroloba*, *Vochysia ferruginea*, *Phragmotheca siedrosa*, *Pterocarpus officinalis*, *Cecropia eximia*, *Cecropia virgusa*, *Chrysochlamys floribunda*, *Chrysochlamys dependens* and species of *Inga*, *Vismia*, *Pseudolmedia*, *Jacaranda* and *Cedrella*. The medium strata consists of *Perebea castilloides*, *Helicostylis paraensis*, *Mayna pacifica*, *Duroia hirsuta*, *Henrietella verrucosa*, *Miconia* sp., *Jessenia polycarpa*, *Welfia regia*, *Wettinia quinara*, *Iriartea corneto*, *Socratea elegans*, *Euterpe* sp., *Phytelephas* sp., *Astrocaryum standleyanum* y *Mauritiella pacifica*. The lower strata consists of *Begonia semiovata*, *Monolaena* sp., *Cyperus diffusus*, *Diolena pileoides*, *Trichomanes elengans* as well as various species from *Heliconia* and *Calathea* and the climbers *Schnella mutissi*, *Strychnos panurensis*, *Strychnos mitschertichii* as well as species of *Marcgravia*, *Machaerium*, *Cissus*, *Smilax*, *Serjania*, *Solanum*, *Mimosa*, *Piper*, *Bauhinia*, *Bignoniaceae*, *Malpighiaceae* and of *Menispermaceae*. The epiphytes are represented chiefly by *Guzmania subcorymbosa*, *Guzmania musaica*, *Guzmania calamifolia*, *Ronbergia columbiana*, *Aechmea germinyana*, *Epidendrum nocturnum*, *Epidendrum difforme*, *Psammisia occidentalis*, *Calopteryx insignis*, *Cavendishia compacta*, *Cavendishia praestans*, *Cavendishia palustris*, *Satyria bracteata*, *Satyra grandifolia*, *Sphyrospermum buxifolium* and *Macleania pentaptera* y *Thibaudia pachypoda* (Jimenez-Ortega, 2013; Rangel-Ch, Lowy-C & Aguilar-P, 1987).

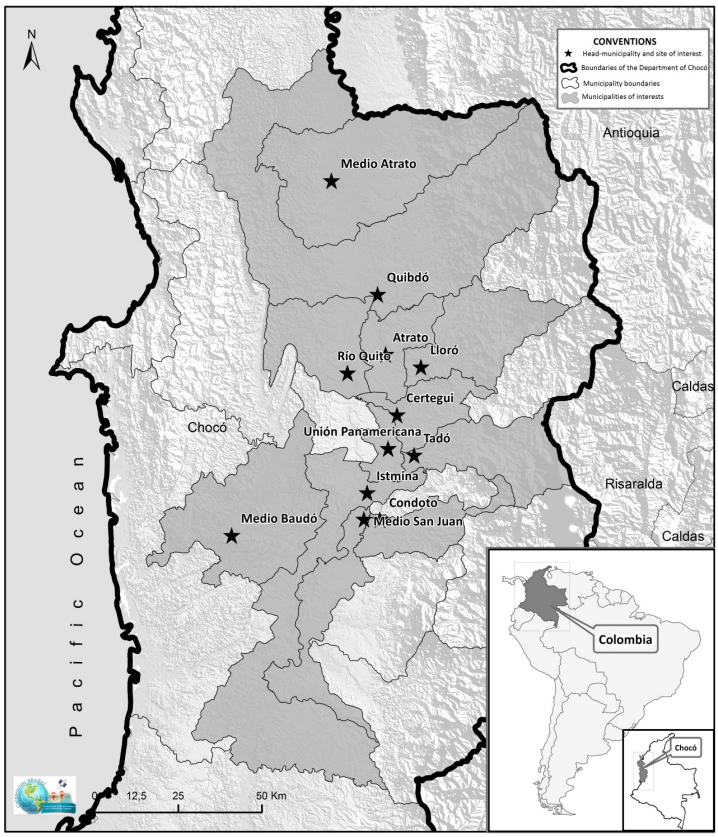

Figure 1. Geographic location of the study area

2.2. Studied communities

The fieldwork was undertaken in 12 rural territories (municipalities) within tropical rainforest zones in the northwestern Colombia in South America. The territories (municipalities) studied were as follows: Atrato, Certegui, Condoto, Istmina, Lloro, Medio Atrato, Medio Baudo, Medio San Juan, Quibdo, River Quito, Tado and Union Panamericana (Figure 1). The Table 1 illustrates general data from each of the target territories/municipalities.

Table 1. General data from the territories/municipalities where the research was undertaken

Territory/ Municipality	Geographical location	Average altitude (MASL)	Area (km²)	Population	Ethnic group	Types of territories	Number of interviewees
Atrato	5°31'56" N; 76°38'11" W	43	725	10.195	Black communities	Rural	13
Certegui	5°22'16" N; 76°36'22" W	43	342	10.068	Black communities	Rural	14
Condoto	5°05'30" N; 76°39'00" W	70	890	14.660	Black and indigenous communities	Rural	28
Istmina	5°09'48" N; 76°41'12" W	65	2,480	25.351	Black and indigenous communities	Urban Centre*	8
Lloro	5°29'54" N; 76°32'29" W	69	905	11.197	Black and indigenous communities	Rural	8
Medio Atrato	5°59'42" N; 76°46'57" W	50	562	29.487	Black communities	Rural	15
Medio Baudo	5°02'59" N; 77°03'08" W	37	4.840	13.560	Black and indigenous communities	Rural	5
Medio San Juan	5°05'34" N; 76°41'43" W	96	620	15.945	Black communities	Rural	13
Quibdo	5°41'32" N; 76°39'29" W	43	3.337	115.907	Black and indigenous communities	Urban Centre*	15
River Quito	5°28'58" N; 76°44'23" W	125	700	8.961	Black and indigenous communities	Rural	15
Tado	5°15'48" N; 76°33'36" W	75	1.013	18.906	Black communities	Rural	7
Union Panamericana	5°16'53" N; 76°37'48" W	119	1.600	9.592	Black communities	Rural	12

*Although these also include rural areas, these territories are the principal market and business towns of the area and are commonly identified as urban centres.

2.3. Data collection

The design of the questionnaire was based on direct questions in order to register the traditional knowledge related to the use of wild edible food in each territory. Participants were interviewed between the months of June 2015 and June 2016. Key interviewees were selected based on the indications of the community leaders and also, based on their knowledge about the zone. Criteria for selecting the subjects were as follows: a) people living in the zone for more than 30 years and b) being

recognised as a local connoisseur. Local connoisseurs are people appreciated for their knowledge and experience on sociocultural aspects related to black and indigenous communities in northwestern Colombia. For this study, the connoisseurs interviewed were housewives and farmers as well as hunters and traditional doctors. All key informants identified in each territory were interviewed. Meetings were focused on the knowledge related to flora, fungi and fauna species used traditionally as food, its production or processing (method of extraction or cultivation), consumption frequency and mode (soups, stew, fried, salads, dressings, beverages, ice creams, bakery etc.), parts or sub-products used and diseases associated with their intake. In the first part of the interview, each informant was asked to free list the wild animals used in the community. The list was the source to calculate the index that identifies the relevance of each food for different territories.

During the interviews the key respondents identified species using the local name. Additionally, some trips were made to the forest zones as well as visits to crops and local markets where wild edible food is sold. Botanic samples were taken to reaffirm the taxonomy of some species and were deposited at the Herbarium of the Universidad Tecnologica del Choco in Colombia. Regarding the wild fauna, its taxonomic determination was made as part of the fieldwork by assessing the exemplars hunted in the territories, also, through the visits to traditional breeding centres and local markets where exemplars and fauna sub-products are sold. Wild fauna samples were not included in the fauna collection of the Universidad Tecnologica del Choco since they were found as part of the hunting practices of our informants and other community members that supported this study. In the case of plants and animals, trips were undertaken with some of the key informants that supported other community members at the moment of assessing the species.

The food products identified by informants were categorised in the groups stated by the Colombian Family Welfare Institute (ICBF by its acronym in Spanish) and the Food and Agriculture Organisation (FAO) (2015). Food groups are as follows: a) Cereals, roots, tubers, plantains and derivate, b) Fruits and vegetables, c) Milk and dairy products, d) Meats, eggs, dried legumes, dried fruit and seeds, e) Fats and f) Sugars.

2.4. Data analysis

Data collected were normalised using a list of wild edible food identified in each territory. From those lists, some taxonomic aspects were completed and a classification was made between food of animal origin and those of vegetable origin. For each specific case, a table was created with all the characteristics of food including its taxonomic aspects (family, genus, species and local name), growth pattern (herb, bush, tree and palms), used parts or sub-products, food group according to ICBF and FAO, mode of consumption and use values (extractive use or cultivation). The results of these aspects are shown in absolute values and/or percentages.

The level of importance of each food for the communities studied was calculated using the Smith's salience index (*S*), which takes into account the degree of importance of each food, among all the wild edible food used in each territory. The index measures the frequency with which an item (food) is mentioned and the amount of times it was cited by the informants in a certain order (Thompson & Juan, 2006).

The Smith's index was calculated using the formula; $S = (n - n_i)/n$. where n: is the total number of wild edible food free listed by each informant and n_i: is a number that indicates the order in which items are registered in the free list. The average of the Smith's index for each territory (S) was calculated through the use of statistic calculation tools from Excel. In order to estimate the importance of each kind of food in the study area, the value of (S) in all territories was averaged and the standard deviation was calculated as a reference of the data variation. The (S) average for each food was used to create a table in descendent order. This table allows the identification of how salient each wild edible food is for the inhabitants of the territories included in this study.

3. Results

3.1. Wild biodiversity traditionally used as food

A total of 51 wild species were registered, those traditionally used as food by the rural communities in the territories within tropical forest zones in northwestern Colombia, South America. Fifty-three percent (*n* = 27) were vegetable origin food and 47% (*n* = 24) were of animal origin. Fungi species associated with human consumption were not identified.

3.2. Wild edible food of vegetable origin

Overall, wild edible food of vegetable origin identified in this study belongs to 16 botanical families, 25 genera and 27 species. Sixty-three percent of total registered (*n* = 17) are the most representative families regarding the number of species: *Arecaceae*, *Fabaceae*, *Malvaceae*, *Myrtaceae*, *Lecythidaceae* and *Passifloraceae*. Regarding the growth pattern, 53% (*n* = 14) of used species are trees, 22% (*n* = 6) herbs and 15% (*n* = 4) palm trees, while bushes were only 11% (*n* = 3).

3.3. Characterisation of traditional use

In relation to the parts used, communities take advantage of tubers and fruits, the latter being the most used. Eighty-nine percent (*n* = 24) of total identified species are consumed as fruits (Table 2). The study shows that only three species of tubers are used (*Colocasia esculenta*, *Xanthosoma sagittifolium* and *Dioscorea alata*) whereas the intake of flowers and leaves was not registered (Table 2).

The wild edible food of vegetable origin are recognised among three food groups defined for Colombia: a) Fruits and vegetables b) Cereals, roots, tubers, plantains and derivatives, b) Fruits and vegetables and c) Fats. The traditional use of 24 species was identified regarding fruits and vegetables. They are as follows: Anon (*Rollinia mucosa*), Chontaduro (*Bactris gasipaes*), Don pedrito (*Oenocarpus minor*), Taparo (*Attalea amigdalina*), Madrono (*Rheedia madruno*), Lechito (*Chamaesyce* sp.), Algarrobo (*Hymenaea oblongifolia*), Churima (*Inga* sp.), Guama (*Inga spectabilis*), Salero (*Lecythis minor*), Paco (*Gustavia superba*), Almirajo (*Patinoa almirajo*), Bacao (*Theobroma bicolor*), Chocolatillo (*Herrania pulcherrima*), Coronilla (*Bellucia grossularioides*), Castano (*Compsoneura atopa*), Guayaba de monte (*Eugenia* sp.), Guayaba agria (*Psidium guajava*), Maranon (*Syzygium malaccense*), Badea (*Passiflora quadrangularis*), Granadilla (*Passiflora* sp.), Borojo (*Alibertia patinoi*), Caimito (*Pouteria caimito*) and Milpeso (*Jessenia bataua*) (Table 2). Three species were found in relation to the food group of Cereals, roots, tubers, plantains and derivatives; Achin (*Colocasia esculenta*), Bore (*Xanthosoma sagittifolium*) and Name (*Dioscorea alata*) (Table 2). Milpeso (*Jessenia bataua*) is part of the consumed food group of fruits and vegetables, however, since a vegetable oil for cooking is extracted from it, Milpeso is also considered as part of the group of fats (Table 2).

These foods are consumed raw (mainly fruits), boiled (tubers and some fruits) or in other preparations such as salads, soups, sancocho (which is a typical latinoamerican soup containing vegetables, potatoes, mandioc, meats and/or chicken), conservas (a traditional marmalade), biscuits, juices and ice creams (Table 2). Regarding the use values, 41% (*n* = 11) is food obtained by gathering in the forest and/or cultivation practices, 33% (*n* = 9) is consumed through cultivation and the 26% left (*n* = 7) is gathered in the forest (Table 2).

Table 2. Taxonomical characterisation and traditional use of wild edible food of vegetable origin, identified in rural communities living in territories linked to tropical forest zones in the northwestern region of Colombia

Family	Genus	Species	Local name	Growth pattern	Edible plant parts	Food groups	Mode of consumption	Other uses
Araceae	*Colocasia*	*Colocasia esculenta* (L.) Schott	Achin	Herb	Tuber	Cereals, roots, tubers, plantains and derivatives.	Cooked in water	Farming
Annonaceae	*Roollinia*	*Rollinia mucosa* (Jacq.) Baill.	Anon	Bush	Fruit	Fruits and vegetables	Raw, juice	Farming, extractive
Araceae	*Xanthosoma*	*Xanthosoma sagittifolium* (L.) Schott	Bore	Herb	Tuber	Cereals, roots, tubers, plantains and derivatives	Cooked in water, soup or sancocho	Farming
Arecaceae	*Bactris*	*Bactris gasipaes* Kunth	Chontaduro	Palm	Fruit	Fruits and vegetables	Cooked in water, juice, biscuits	Farming
	Oenocarpus	*Oenocarpus minor* Mart.	Don pedrito	Palm	Fruit	Fruits and vegetables	Raw	Extractive
	Jessenia	*Jessenia bataua* (Mart.) Burret	Milpeso	Palm	Fruit	Fruits and vegetables/oil.	Juice, ice cream, oil.	Farming, extractive
	Attalea	*Attalea amygdalina* Kunth	Taparo	Palm	Fruit	Fruits and vegetables	Raw	Extractive
Clusiaceae	*Rheedia*	*Rheedia madruno* (Kunth) Planch. & Triana	Madrono	Tree	Fruit	Fruits and vegetables	Raw	Extractive
Dioscoreaceae	*Dioscorea*	*Dioscorea alata* L.	Name	Herb	Tuber	Cereals, roots, tubers, plantains and derivatives.	Cooked in water, soup or sancocho.	Farming
Euphorbiaceae	*Chamaesyce*	*Chamaesyce* sp	Lechito	Herb	Fruit	Fruits and vegetables	Raw	Extractive
Fabaceae	*Hymenaea*	*Hymenaea oblongifolia* Huber	Algarrobo	Tree	Fruit	Fruits and vegetables	Raw	Extractive
	Inga	*Inga* sp.	Churima	Tree	Fruit	Fruits and vegetables	Raw	Farming, extractive
		Inga spectabilis (Vahl) Willd.	Guama	Tree	Fruit	Fruits and vegetables	Raw	Farming

Lecythidaceae	*Gustavia*	*Gustavia superba* (Kunth) O. Berg	Paco	Tree	Fruit	Fruits and vegetables	Soup	Farming, extractive
	Lecythis	*Lecythis minor* Jacq.	Fruta del salero	Tree	Fruit	Fruits and vegetables	Raw	Extractive
Malvaceae	*Patinoa*	*Patinoa almirajo* Cuatrec.	Almirajo	Tree	Fruit	Fruits and vegetables	Raw	Farming
	Theobroma	*Theobroma bicolor* Bonpl.	Bacao	Tree	Fruit	Fruits and vegetables	Raw	Farming, extractive
	Herrania	*Herrania pulcherrima* Goudot	Chocolatillo	Bush	Fruit	Fruits and vegetables	Raw	Farming, extractive
Melastomataceae	*Bellucia*	*Bellucia grossularioides* (L.) Triana	Coronilla	Tree	Fruit	Fruits and vegetables	Raw, juice.	Farming, extractive
Myristicaceae	*Compsoneura*	Compsoneura atopa (A. C. Sm.) A. C. Sm.	Castano	Tree	Fruit	Fruits and vegetables	Raw, juice	Extractive
Myrtaceae	*Eugenia*	*Eugenia* sp.	Guayaba de monte	Tree	Fruit	Fruits and vegetables	Raw, juice	Farming, extractive
	Psidium	*Psidium guajava* L.	Guayaba agria	Tree	Fruit	Fruits and vegetables	Raw, juice, ice creams	Farming
	Syzygium	*Syzygium malaccense* (L.) Merr. & L. M. Perry	Maranon	Tree	Fruit	Fruits and vegetables	Raw, juice	Farming
Passifloraceae	*Passiflora*	*Passiflora quadrangularis* L.	Badea	Herb	Fruit	Fruits and vegetables	Raw, juice	Farming, extractive
		Passiflora sp.	Granadilla	Herb	Fruit	Fruits and vegetables	Raw, juice	Farming, extractive
Rubiaceae	*Alibertia*	*Alibertia patinoi* (Cuatrec.) Delprete & C. H. Perss.	Borojo	Bush	Fruit	Fruits and vegetables	Juice, marmalade, ice creams	Farming
Sapotaceae	*Pouteria*	*Pouteria caimito* (Ruiz & Pav.) Radlk.	Caimito	Tree	Fruit	Fruits and vegetables	Raw	Farming, extractive
16	25	27						

3.4. Food of vegetable origin with greater importance for the communities

The results of the Smith's index show that from 27 wild edible foods of vegetable origin registered in this study, the species with the greatest value of salience for locals are the Borojo (*S* = 0.54), the Caimito (*S* = 0.52) and the Guayaba Agria (*S* = 0.41) (Table 3). These fruits, altogether with the Madrono (*Rheedia madruno*), the Name (*Dioscorea alata*), the Guama (*Inga spectabilis*), the Achin (*Colocasia esculenta*), the Badea (*Passiflora quadrangularis*), the Milpeso (*Jessenia bataua*) and the Almirajo (*Patinoa almirajo*) are the 10 wild edible foods of vegetable origin with the highest salience.

The Borojo (*Alibertia patinoi*) is an arboreal species of the Rubiaceae family originally from tropical territories in America, and its geographic distribution is restricted to the centre of the Equatorial climatic zone. The Borojo is a fleshy fruit from 7 to 12 cm in diameter that in its first stage is light green, then, turns reddish brown when it is in its ripe stage. It has a fleshy mesocarp with an aromatic and fragrant flavour (Diaz-Ocampo, Garcia-Zapateiro, Franco-Gomez & Vallejo-Torres, 2012; Giraldo, Rengifo, Aguilar, Gaviria & Alegria, 2004), and its fruits average weight is 740 g consisting of a pulp, seed and shell. Frequently up to 10% of its weight is composed by seeds (Jaramillo, Arguello, Benitez & Borja, 2005).

The Caimito (*Pouteria caimito*) is a species of the Sapotacea family that grows under ideal conditions in tropical areas. The tree is up to 40 m high and its trunk is 50 cm thick. The fruit is round or oval, occasionally dotted and yellow when it is ripe. The Caimito has from one to two oval dark seeds, its pulp is white, translucent, mucilaginous, fragrant and caramelled, and its shell has a sticky latex (Baehni & Bernardi, 1970; Silva, Simeoni & Silveira, 2009).

The Guayaba Agria (*Psidium guajava*) is a small leafy tree of the Myrtacea family, 5 or 6 m high on average. It is a round or oval-shaped tropical edible fruit with sweet–sour taste, 3–10 cm in diameters and 4–12 cm long. It has a thin and delicate light green skin, which turns yellow when it has ripened. Its pulp is creamy white or orange with a lot of small hard seeds and has strong fragrance. Regarding the weight, the fruits of this species differ to the extent it is possible to find exemplars from 60 to 500 g (Castano & Montes, 2014).

Table 3. Smith's index for wild edible food of vegetable origin identified per territory in the studied field (Territories are; 1 = Atrato, 2 = Certegui, 3 = Condoto, 4 = Istmina, 5 = Lloro, 6 = Medio Atrato, 7 = Medio Baudo, 8 = Medio San Juan, 9 = Quibdo, 10 = Rio Quito, 11 = Tado y 12 = Union Panamericana)

	Smith's index (*S*)/Territories													
Local name	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Smith's (*S*) average**	**Standard deviation**
Borojo	0.62	0.51	0.56	0.20	0.65	0.50	0.73	0.68	0.59	0.51	0.44	0.45	0.54	0.14
Caimito	0.55	0.43	0.43	0.45	0.60	0.53	0.77	0.35	0.48	0.63	0.50	0.54	0.52	0.11
Guayaba agria	0.51	0.44	0.25	0.62	0.54	0.59	0.64	0.42	0.49	0.41	0.00	0.00	0.41	0.22
Madrono	0.52	0.28	0.47	0.00	0.17	0.61	0.62	0.42	0.39	0.46	0.00	0.47	0.37	0.21
Name	0.57	0.54	0.23	0.50	0.42	0.36	0.64	0.08	0.00	0.39	0.17	0.40	0.36	0.20
Guama	0.10	0.64	0.24	0.35	0.63	0.33	0.21	0.19	0.48	0.34	0.58	0.00	0.34	0.21
Achin	0.66	0.54	0.43	0.00	0.29	0.52	0.11	0.28	0.57	0.38	0.00	0.20	0.33	0.22
Badea	0.55	0.44	0.52	0.19	0.24	0.27	0.68	0.22	0.08	0.00	0.00	0.50	0.31	0.23
Milpeso	0.00	0.00	0.38	0.00	0.25	0.57	0.27	0.47	0.45	0.48	0.33	0.46	0.31	0.21
Almirajo	0.22	0.47	0.21	0.00	0.43	0.32	0.37	0.00	0.43	0.56	0.64	0.00	0.30	0.22
Bacao	0.09	0.29	0.42	0.31	0.21	0.23	0.00	0.30	0.39	0.58	0.38	0.23	0.28	0.15
Paco	0.34	0.34	0.27	0.00	0.68	0.25	0.00	0.17	0.60	0.30	0.00	0.26	0.27	0.22

Maranon	0.48	0.47	0.00	0.00	0.52	0.41	0.53	0.00	0.40	0.35	0.00	0.00	0.26	0.24
Taparo	0.00	0.00	0.38	0.00	0.15	0.50	0.00	0.33	0.43	0.47	0.00	0.52	0.23	0.23
Coronilla	0.31	0.31	0.48	0.47	0.00	0.12	0.45	0.00	0.22	0.41	0.00	0.00	0.23	0.20
Churima	0.00	0.00	0.29	0.00	0.53	0.11	0.00	0.33	0.31	0.38	0.33	0.00	0.19	0.19
Anon	0.34	0.29	0.45	0.00	0.31	0.10	0.04	0.00	0.55	0.00	0.00	0.00	0.17	0.20
Castano	0.00	0.00	0.36	0.00	0.20	0.57	0.00	0.00	0.46	0.41	0.00	0.00	0.17	0.22
Chontaduro	0.00	0.00	0.50	0.00	0.00	0.55	0.25	0.00	0.40	0.00	0.00	0.00	0.14	0.22
Granadilla	0.55	0.00	0.33	0.00	0.00	0.00	0.47	0.00	0.00	0.32	0.00	0.00	0.14	0.21
Chocolatillo	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.64	0.12	0.22
Bore	0.40	0.36	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.15
Guayaba de monte	0.00	0.24	0.00	0.00	0.00	0.00	0.48	0.00	0.00	0.00	0.00	0.00	0.06	0.15
Algarrobo	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.04	0.10
Fruta del salero	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.04	0.13
Don pedrito	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.03	0.09
Lechito	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.01	0.04

3.5. Wild edible food of animal origin

The food identified in this study comes from three different groups (reptiles, birds and mammals) which are represented in 19 families, 23 genders and 24 species (Table 4). Mammals are the most representative group at the family level (*n* = 12; 63%), genders (*n* = 15; 65%) and species (*n* = 15; 63%). Birds contribute to five species (21%) and reptiles to four species (17%) (Table 4). Food from amphibians was not identified.

3.6. Characterisation of traditional use

The food use of all the fauna species is carried out through the consumption of its meat; however, eggs are sometimes used as part of the diet of the communities. Birds' eggs and those from wild reptiles such as *Crax Alberti* (Pavon), *Penelope perspicax* (Pava), *Iguana iguana* (Iguana) and *Chelydra serpentina* (Tortuga bache) are frequently consumed across these territories (Table 4). All food of animal origin identified in this study belongs to the group of meat, eggs, dried legumes, nuts and seeds, as established by ICBF and FAO.

Wild edible meats are consumed through different preparations that include; stew, soup or sancocho (a common dish that includes meats, plantains, yucca, cilantro, corn and potatoes), roasting, frying and chopped meat (a preparation in which the meat is chopped and then, cooked with some vegetables and condiments) (Table 4).

In many cases, the meats are previously smoked or salted to improve their flavour and/or increase their shelf life for consumption. According to the inhabitants, the term *chamuscar* refers to the practice of superficially burning the skin of some birds and mammals, which allows for an easier removal of the feathers or hairs and also, produces a special flavour in the meat. In reference to the eggs, their consumption is similar to that of hen's eggs, that is, they are consumed fried or scrambled.

In specific cases such as the consumption of the meat of *Didelphis marsupialis* (Chucha), *Tayassu pecari* (Tatabro), *Pecari tajacu* (Saino) and *Hydrochoerus isthmius* (Chiguiro), the inhabitants of these territories state that it is necessary to prepare the meat using herbs prior to eating to remove its 'almizcle' and give the food a better flavour. 'Almizcle' is a strong odour produced by glands found in the skin of certain animals (Asprilla-Perea, Mosquera & Moreno, 2012; CODECHOCO, CORPOURABA & FCA, 2006).

In general, all food of animal origin identified in this study is obtained through the traditional practices of hunting, or to be more precise, realised by means of the extractive exploitation of the rainforest. Hunting plays a crucial role in the socio-economic activities of these territories, for some communities the rainforest serves as the main pantry of meat products as an energy source of protein in their diets.

Table 4. Taxonomic characterisation and traditional uses of wild edible food of animal origin identified in rural populations inhabiting territories linked to tropical forest areas in northwestern Colombia

Fauna group	Family	Genus	Species	Local name	Edible animal parts	Food types	Mode of consumption	Other uses
Birds	Craidae	*Crax*	*Crax rubra*	Pajuil	Meat	Meat, eggs, dried leguminous plants, nuts and seeds	Stew, soup or sancocho	Extractive
			Crax Alberti	Pavon	Meat/eggs		Stew, soup/fried, scrambled.	Extractive
		Penelope	*Penelope perspicax*	Pava	Meat/eggs		Stew, soup/fried, scrambled.	Extractive
	Ramphastidae	*Ramphastos*	*Ramphastos tucanus*	Paleton	Meat		Stew, soup or sancocho	Extractive
	Thraupidae	*Thraupis*	*Thraupis episcopus*	Azulejo	Meat		Stew, soup or sancocho	Extractive
Amiferos Mammals	Callitrichidae	*Saguinus*	*Saguinus geoffroyi*	Michichi	Meat		Stew, soup or sancocho	Extractive
	Caviidae	*Hidrochoerus*	*Hydrochoerus isthmius*	Chiguiro	Meat		Stew, soup, roasted, fried	Extractive, breeding*
	Cervidae	*Mazama*	*Mazama americana*	Venado	Meat		Stew, soup, roasted, fried	Extractive
	Cuniculidae	*Cuniculus*	*Cuniculus paca*	Guagua	Meat		Stew, soup, roasted, fried	Extractive, breeding*
	Dasypodidae	*Dasypus*	*Dasypus novemcinctus*	Armadillo	Meat		Stew, soup or sancocho	Extractive

	Dasyproctidae	*Dasyprocta*	*Dasyprocta punctata*	Guatin	Meat	Stew, soup or sancocho	Extractive, breeding*
	Didelphidae	*Didelphis*	*Didelphis marsupialis*	Chucha	Meat	Stew, soup or sancocho.	Extractive
		Hoplomys	*Hoplomys gymnurus*	Raton de espinas	Meat	Stew, soup or sancocho	Extractive, breeding*
	Echimyidae	*Proechimys*	*Proechimys semispinosus*	Raton de espinas	Meat	Stew, soup or sancocho	Extractive, breeding*
	Felidae	*Leopardus*	*Leopardus pardalis*	Tigrillo	Meat	Stew, soup or sancocho	Extractive
	Megalonychidae	*Choloepus*	*Choloepus hoffmanni*	Perezoso dos unas	Meat	Stew, soup or sancocho	Extractive
	Procyonidae	*Potos*	*Potos flavus*	Cuzumbi	Meat	Stew, soup or sancocho	Extractive
		Nasua	*Nasua narica*	Cusumbo Solo	Meat	Stew, soup or sancocho	Extractive
	Tayassuidae	*Tayassu*	*Tayassu pecari*	Tatabro	Meat	Stew, soup or sancocho	Extractive, breeding*
		Pecari	*Pecari tajacu*	Saino	Meat	Stew, soup or sancocho	Extractive, breeding*
Reptiles	Alligatoridae	*Caiman*	*Caiman crocodilus*	Babilla	Meat	Stew, chopped, fried	Extractive
	Chelydrinae	*Chelydra*	*Chelydra serpentina*	Tortuga bache	Meat/eggs	Stew/fried, scrambled	Extractive
	Iguanidae	*Iguana*	*Iguana iguana*	Iguana	Meat/eggs	Stew/fried, scrambled	Extractive
	Kinosternidae	*Kinosternon*	*Kinosternon scorpioides*	Tortuga tapaculo	Meat	Stew/fried, scrambled	Extractive
3	19	23	24				

*Breeding generally occurs in traditional subsistence breeding farms.

We could not identify planned strategies for breeding of an important number of wild fauna species used in these territories' traditional food that allow the sustainable production of individuals with the aim of exploitation. However, there is a very strong ancestral link that rules the man/fauna relationship in these localities and therefore, traditional practices of breeding are frequently employed, this is especially the case where hunters have the opportunity to catch newborn animals or juveniles, whose biomass is not appealing for immediate consumption. In these cases, individuals are taken to subsistence wildlife breeding centres (usually sheltered at hunters' homes) where they are kept until they are considered fit for consumption. The main species kept in subsistence breeding centres are *Cuniculus paca*, *Hydrochoerus isthmius*, *Dasyprocta punctata*, *Proechimys semispinosus*, *Hoplomys gymnurus*, *Tayassu pecari* and *Pecari tajacu*.

3.7. Food of animal origin with greater importance for the communities

The results of Smith's salience index indicate that of the 24 species recorded in the study, Guagua (S = 0.73), Guatin (S = 0.60) and Venado (S = 0.48) are wild edible fauna of the greatest importance for the communities that live there (Table 5).

The Guagua (*Cuniculus paca*) is the third largest rodent in the world, it is robust in appearance and can reach up to 10 kg. The body of the species is covered by thick short hairs that are sometimes dark or light brown, it has stripes or white dotted lines on the sides and the belly is white. *Cuniculus paca* is an inhabitant of the tropical forest, is frequently in proximity to bodies of water and is a species that feeds on fruits according to the availability of these in the territory (Asprilla-Perea, Lopez-Perea, Viveros-Riveros & Jimenez-Ortega, 2011). The female has a gestation period of approximately 118 days and the birth of individuals occurs in any month of the year. In general, the female has a calf per labour, but twins can occur occasionally (CODECHOCO et al., 2006).

Individuals of this species are mainly hunted through the use of *trampa de lazo*, which is a type of trap that is armed at a previously selected hunting site based on the presence of traces of the species. For the construction of the trap, a hole is dug in the ground. Subsequently, the surface of this hole is covered with branches and fallen leaves that bear little weight but simulate normal soil conditions. Then, on the false ground surface, a rope is installed with a mooring system that activates with the footfall and fall of the animal. At the other end, a special wood branch attached to that is flexible but very resistant, which supports the weight of the animal which is lifted after the trap is activated.

Table 5. Smith's salience index for wild edible food of animal origin identified by territories in the study area (the territories are: 1 = Atrato, 2 = Certegui, 3 = Condoto, 4 = Istmina, 5 = Lloro, 6 = Medio Atrato, 7 = Medio Baudo, 8 = Medio San Juan, 9 = Quibdo, 10 = River Quito, 11 = Tado and 12 = Union Panamericana)

	Smith's salience index (*S*)/Territory													
Local name	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Smith's (*S*) average**	**Standard deviation**
Guagua	0.67	0.79	0.66	0.70	0.72	0.73	0.83	0.85	0.73	0.54	0.77	0.78	0.73	0.09
Guatin	0.71	0.66	0.60	0.34	0.54	0.56	0.67	0.63	0.50	0.58	0.63	0.76	0.60	0.11
Venado	0.60	0.00	0.49	0.62	0.48	0.62	0.35	0.59	0.54	0.42	0.52	0.56	0.48	0.17
Raton de espinas	0.39	0.27	0.44	0.48	0.41	0.34	0.77	0.36	0.33	0.50	0.48	0.39	0.43	0.13
Tatabro	0.14	0.36	0.45	0.56	0.50	0.58	0.00	0.39	0.63	0.57	0.46	0.41	0.42	0.19
Perezoso dos unas	0.53	0.40	0.44	0.28	0.42	0.66	0.17	0.28	0.48	0.33	0.39	0.59	0.41	0.14
Armadillo	0.53	0.50	0.36	0.35	0.46	0.26	0.30	0.39	0.41	0.38	0.34	0.46	0.39	0.08
Chucha	0.30	0.22	0.41	0.25	0.33	0.37	0.63	0.40	0.32	0.38	0.49	0.49	0.38	0.11
Pava	0.56	0.50	0.19	0.00	0.37	0.35	0.33	0.00	0.33	0.53	0.31	0.15	0.30	0.19
Saino	0.00	0.00	0.18	0.44	0.60	0.49	0.44	0.30	0.00	0.54	0.00	0.34	0.28	0.23
Cuzumbi	0.64	0.33	0.42	0.33	0.00	0.00	0.07	0.33	0.00	0.39	0.26	0.36	0.26	0.20
Pavon	0.53	0.22	0.00	0.00	0.40	0.24	0.31	0.00	0.33	0.42	0.00	0.00	0.20	0.20
Paleton	0.20	0.19	0.28	0.00	0.35	0.26	0.00	0.13	0.35	0.34	0.00	0.33	0.20	0.14
Iguana	0.10	0.00	0.40	0.00	0.00	0.30	0.16	0.18	0.00	0.42	0.10	0.19	0.15	0.15
Babilla	0.00	0.00	0.32	0.35	0.00	0.50	0.20	0.36	0.00	0.00	0.00	0.09	0.15	0.19
Tortuga tapaculo	0.00	0.00	0.41	0.28	0.00	0.00	0.47	0.13	0.00	0.00	0.18	0.08	0.13	0.17
Tortuga bache	0.00	0.47	0.00	0.39	0.00	0.00	0.42	0.04	0.00	0.00	0.08	0.03	0.12	0.19
Raton de espinas	0.00	0.00	0.00	0.00	0.00	0.00	0.67	0.60	0.00	0.00	0.00	0.00	0.11	0.25
Pajuil	0.00	0.00	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.18	0.07	0.13
Chiguiro	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.04	0.14
Cusumbo Solo	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12
Tigrillo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.03	0.11
Azulejo	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.03	0.10
Michichi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01	0.05

The Guatin (*Dasyprocta punctata*) is a rodent with an approximate weight of between 2 and 4 kg. It is a very variable species in its colouration pattern, the back may be reddish brown, yellow or greyish yellow. The anterior parts of the back may be brown or black with certain brown spots. On its back are long black hairs with yellow tips. The underside varies from brown to black (Morales-Jimenez, Sanchez, Poveda & Cadena, 2004). It usually inhabits tropical forests that can be mature, intervened and/or cultivated. This species feeds mainly on seeds and fruits and occasionally consumes mushrooms, flowers, leaves and insects to supplement its diet (Morales-Jimenez et al., 2004). The Guatin females can have between two and three births a year, and they can give birth between one and three breeds each birth, so their gestation period lasts between 93 and 104 days (CODECHOCO et al., 2006).

The Venado (*Mazama americana*) is a species of medium mammal that reaches an adult weight of between 20 and 30 kg. It is a reddish-brown animal with a lighter colouration on the chest and underside. The males of the species develop a pair of straight and short horns. *Mazama americana* is geographically distributed through tropical South America and feeds on young branches of shrubs and trees, fruits, flowers and some fungi (Emmons & Feer, 1999; Medellin, Gardner & Aranda, 1988; Wilson & Reeder, 2005). At the reproductive level, this species breeds once or twice per year after a gestation period of approximately 222 days and can reproduce at any time of the year (Branan & Marchinton, 1987; Hurtado-Gonzales & Bodmer, 2006).

4. Discussion

The wild edible foods of vegetable origin of greatest relevance for the inhabitants of the territories studied are; The Borojo (*Alibertia patinoi*), the Caimito (*Pouteria caimito*) and the Guayaba Agria (*Psidium guajava*). In general, the importance of this food is related to the strong cultural link between wild biodiversity and human food in territories associated with tropical forest areas, as well as the economic incomes (generally subsistence) generated by their informal commercialisation in the local market.

In the specific case of Borojo, its importance is probably due to the fact that its fruit is easily obtained in these territories (family farming or purchase at a low price), the juice made with its pulp is very refreshing and sought after in Afro-descendant and indigenous communities. Fruit and vegetables are also prepared and marketed as fruit jams and artisanal ice creams, and aphrodisiac properties are attributed to their intake (Arango & Quijano, 1986; Asprilla-Perea et al., 2011; Baehni & Bernardi, 1970; Branan & Marchinton, 1987; Castano & Montes, 2014; CODECHOCO et al., 2006; Diaz-Ocampo et al., 2012; Emmons & Feer, 1999; Hurtado-Gonzales & Bodmer, 2006; Jaramillo et al., 2005; Medellin et al., 1988; Morales-Jimenez et al., 2004; Mosquera, Moraga & Martinez-Navarrete, 2010; Mosquera, Rios & Zapata, 2006; Silva et al., 2009; Wilson & Reeder, 2005).

The importance of Caimito can be related to the fact that it is a fruit that is marketed in market places and in informal stalls located in the farmers' houses, it is in demand for its sweet and refreshing taste, in addition, its colour and the shape are very attractive to locals and it often amuses children with the sticky effect on the lips subsequent to its consumption that is produced by the latex in its skin (Baehni & Bernardi, 1970; Silva et al., 2009). These elements added to the limited supply of non-wild fruits that allow *Pouteria caimito* to be one of the favourite food for the inhabitants of these territories.

The Guayaba Agria is a fruit of great importance in the consumption of these territories because it is not only used in the preparation of juices for family consumption but also it is the raw material for the preparation of '*Bolis*' or traditional ice creams that are very often consumed by black and indigenous communities in these territories (CODECHOCO et al., 2006). '*Bolis*' are a type of sorbet made from natural fruit juices or soda with artificial colours and flavourings, wrapped in a plastic bag and frozen. The regular sale of Guayaba Agria flavoured '*Bolis*' is a source of subsistence economic

income for many homes, and this is perhaps one of the main reasons that this fruit is one of the most important wild edible foods of vegetable origin in these territories.

In the case of wild animal food, the meats of Guagua (*Cuniculus paca*), Guatin (*Dasyprocta punctata*) and Venado (*Mazama americana*) were identified as the most important products for the communities. The importance of the Guagua is due to the taste of its meat, which makes it very desired by the locals, being consumed in different culinary preparations such as stews, soups or roasted and fried (Asprilla-Perea & Hinestroza, 2011; Cordoba-Mosquera & Mosquera-Hinestroza, 2006; Cuesta-Rios, Valencia-Mazo & Jimenez-Ortega, 2007; Obregon & Hurtado, 2006; Palacios-Mosquera, Rodriguez-Bolanos & Jimenez-Ortega, 2008). The importance of this food is due to the fact that the meat has always been culturally important in the diet of these communities. Two types of use can be identified: firstly as a subsistence product and secondly, as a 'luxury product in the family basket'. At the subsistence level, the main food marketing centres are identified in the most remote areas where wild meat is the main source of protein in the families' food. In these localities, meat is obtained through the hunting or the purchase from hunters at a cost of approximately $7,000 Colombian pesos per kilogram (approximately US $2.5). On the other hand, it is considered as a luxury food product in the main urban centres such as Quibdo and Istmina where this meat acquires a high cost and people pay up to $26,000 Colombian pesos per kilogram (approximately US $9), this cost is very high, being more than what is paid for a kilogram of beef ($16,000; 5.5), pork ($14,000, $4.8) or chicken ($8,000, $2.7).

The identification of the meat of *Dasyprocta punctata* as one of the most important wild animal foods for the territories studied is probably due to the fact that the meat of this rodent has a good flavour according to the interviewees, additionally, it is an abundant species in zones of tropical humid forest [51] and easy to capture through traditional hunting practices in which a trap is used. The trap is a portable hunting method (it can be transported from place to place as needed) and it is made of wood and metal meshes or old pieces of iron sheets. Its operation consists of attracting the rodent through scent by using fruits from the forest. Fruits attract the individual to the interior of the box and this closes when the animal, feeding on the fruit, activates a system of handmade mechanisms with small pieces of wood and some strings or vines, leaving the animal trapped inside the box. This type of trap is widely used for the hunting of small live rodents including the Guatin which is the most highly prized (Morales-Jimenez et al., 2004). *Dasyprocta punctata*'s meat is often obtained through hunting practiced by children and young people who are trained through the use of the trap (Asprilla-Perea & Hinestroza, 2011). The meat of this animal is consumed as stewed or by means of soup or sancocho. The sale of Guatin meat was not identified, which may be related to its low biomass.

The importance of the Venado to rural territories in the north-west Colombia is related to the attractive taste of its meat to local people, as well as its biomass (up to 30 kg) (CODECHOCO et al., 2006), the *Mazama americana* hunt not only makes it possible to obtain meat for consumption at home but also allows local people to sell it (Asprilla-Perea & Hinestroza, 2011; Asprilla-Perea et al., 2011). The money obtained from these sales is used to supplement the family's food through the purchase of other food products such as rice, bananas and some vegetables. The *Mazama americana* is usually consumed stewed or in soup, roasted or fried. According to local residents, the Venado meat costs approximately $6,000 Colombian pesos per kilogram (2 US dollars) in the most remote territories and up to $8,000 Colombian pesos (2.7 dollars) in the main urban centres.

5. Conclusions

Wild biodiversity is essential in feeding rural communities of territories within tropical forest areas in South America. The inhabitants use 51 food products from edible species of the forest, with 53% corresponding to plants and 47% to animals, with species like fungi or amphibians not identified as part of people's diet. When looking at the plants, the families Arecaceae, Fabaceae, Malvaceae,

Myrtaceae, Lecythidaceae and Passifloraceae are the most representative, while with fauna, mammals are the most favoured group.

Food products provided by wild flora are consumed raw (especially fruits), cooked in water (tubers and some fruits) or through different forms of culinary preparation including salads, soups, sancocho (typical Colombian soup containing vegetables, potato, yucca, meats and/or chicken), marmalades, cookies, juices and ice cream. Meat and eggs derived from fauna are consumed in stews or soups, roasts, fried and as chopped meat. In this way, wild edible food provides a great variety of dishes or supplements to the diet for these communities.

At the level of exploitation, 74% of the wild edible food of plant origin is obtained from species that have been subjected to cultivation practices, while the remaining 26% is made only from jungle collection. In the case of fauna, all species identified are exploited under hunting schemes (extractive use) and only in some cases, hunters keep animals in subsistence farms as a mechanism to increase their biomass and to obtain better yield from their use. Thus, we were not able to identify planned strategies of breeding centres.

As for the food, it was identified that Borojo (*Alibertia patinoi*), Caimito (*Pouteria caimito*) and Guayava Agria (*Psidium guajava*) are the taxa of vegetable origin whose food products are the most relevant for these communities. At the fauna level, the Guagua (*Cuniculus paca*), Guatin (*Dasyprocta punctata*) and Venado (*Mazama americana*) are the most relevant wild edible animals. In general, the significance of these foods is due to the fact that they are not only attractive for consumption as part of the ancestral diet, but also these are also linked to income-generating activities for these communities, *Dasyprocta punctata* being the exception since its meat is not marketed.

The wild edible food identified in this study can be recognised within four of the six food groups defined for Colombia by the Colombian Family Welfare Institute (ICBF by its acronym in Spanish) and FAO (2015). These food groups are; a) Cereals, roots, tubers, bananas and derivatives; b) Fruits and vegetables; c) meat, eggs, dried legumes, nuts and seeds d) Fats. The linking of wild edible food to these categories constitutes a basis for their exploration using mechanisms of science, technology and innovation to identify their potential as an alternative to conventional food in the planning of interventions in favour of food security for these territories.

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Not applicable.

Availability of data and material

Not applicable.

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Author's contributions

The research was designed by Jeferson Asprilla-Perea, who also undertook the fieldwork in the communities, wrote the initial draft, proofread and edited a final version suggested by the co-author.

Jose Maria Diaz-Puente contributed to the design of the research, especially writing the first draft, proofreading and making suggestions to it. All the authors read and agreed with the final draft.

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